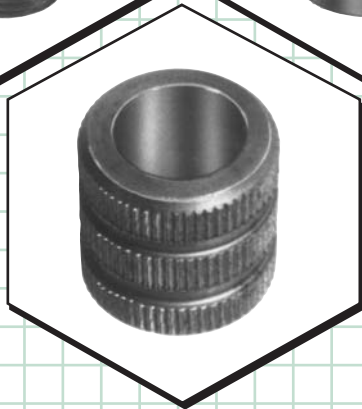
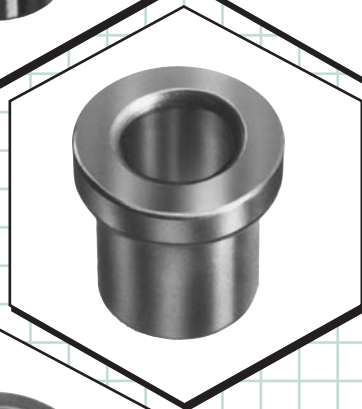
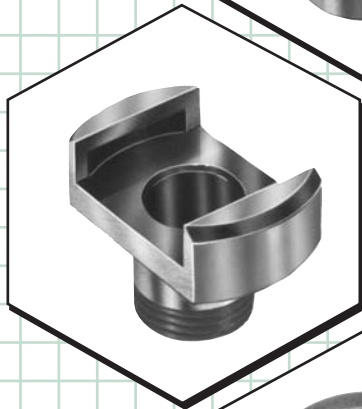
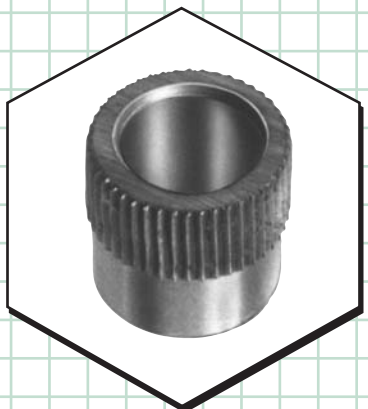
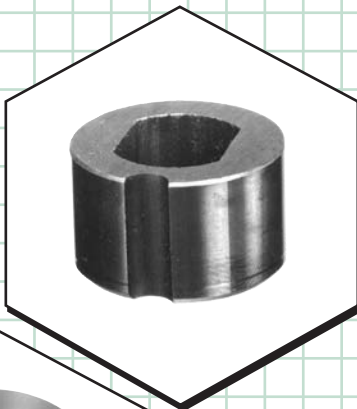
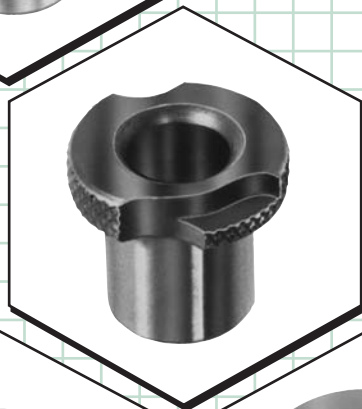




# PRECISION DRILL JIG BUSHINGS



**MANUFACTURING CO.**  
4200 Carr Lane Ct., P.O. Box 191970  
St. Louis, Missouri 63119-7970 USA  
Phone: 314-647-6200, FAX: 314-647-5736  
Web Site: [www.carrlane.com](http://www.carrlane.com)

Authorized Distributor:

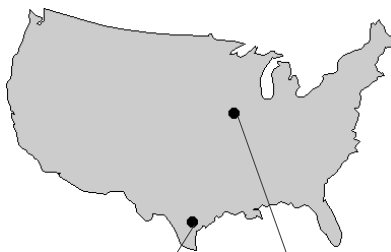
# WHAT MAKES A CARR LANE DRILL BUSHING BETTER?

**1  
TOP  
QUALITY**



Carr Lane drill bushings are all precision honed and ground, the finest quality available. They exceed all ANSI drill-bushing standards. Unlike some of our competitors, we manufacture only first-quality drill bushings, never "economy grade."

**2  
FAST  
DELIVERY**



**Drill Bushing Factory**  
Austin, Texas

**Main Factory  
and Warehouse**  
St. Louis, Missouri

Our nationwide network of stocking distributors, plus huge inventories at two warehouse locations, guarantees same-day shipment for standard bushings. In addition, our quick-response manufacturing capabilities allow us to ship almost all special and modified bushings in less than 10 days.

**3  
ECONOMICAL  
PRICES**
























As you expect with all Carr Lane products, our drill-bushing prices are the most competitive around. Our production volumes and advanced manufacturing techniques mean excellent value for you.



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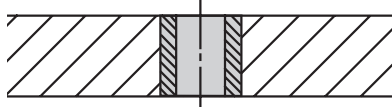
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# BUSHING SELECTION

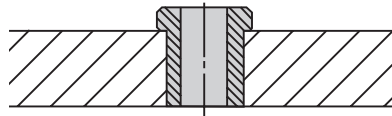
USA				METRIC			
<b>P</b>	<b>- 20</b>	<b>- 8</b>	<b>- .1250</b>	<b>PM</b>	<b>- 8</b>	<b>- 12</b>	<b>- 4.50</b>
Type	OD in 64ths of an inch	Length in 16ths of an inch	ID as 4-place decimal inch	Type	OD in mm	Length in mm	ID as 2-place decimal mm

## PRESS FIT:



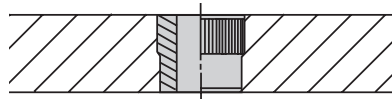
Types **P**, **PC** (carbide), and **PM** (metric). This is the most-popular and least-expensive drill bushing. P bushings are permanently pressed into the jig plate, usually flush with the top surface. They are generally used for single-step drilling or reaming operations when you do not expect to replace bushings during the tooling's lifetime. P bushings can be mounted closer together than headed bushings, but offer less resistance to heavy axial loads.

## HEAD PRESS FIT:



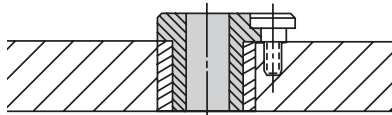
Types **H**, **HC** (carbide), and **HM** (metric). Similar to a P bushing, but with a head to resist heavy axial loads. H bushings are permanently pressed into the jig plate. They are generally used for single-step drilling or reaming operations when you do not expect to replace bushings during the tooling's lifetime. The head can be left exposed, or recessed by counterboring the installation hole. Note: The "length" listed for a USA head-press-fit bushing refers to its length under the head, while the metric version's "length" is its overall length.

## SERRATED PRESS FIT:



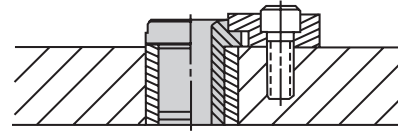
Types **SP** and **SPM** (metric). Similar to a P bushing, but with top serrations to prevent rotation in soft materials. Recommended in high-torque situations for materials such as magnesium, aluminum, masonite, or wood. Finish-ground OD ensures accurate ID location. Serrations also resist axial force to prevent pushing the bushing through the jig plate.

## SLIP/FIXED RENEWABLE:



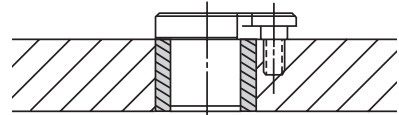
Types **SF**, **SFC/SC/FC** (carbide), and **SFM** (metric). Replaceable bushing generally used with a liner bushing and lockscrew. Use when you expect to replace bushings during the tooling's lifetime, or when you want to switch bushings to perform multi-step operations with the same tooling. SF bushings combine the benefits of older S-type slip-renewable and F-type fixed-renewable bushings: One side has a small recess for fixed mounting; the other has a locking recess that allows the bushing to slip down, then lock in place by rotating it. S and F types are now obsolete (except in carbide) and combination SF bushings will be furnished at no extra charge.

## FLAT MILLED RENEWABLE:



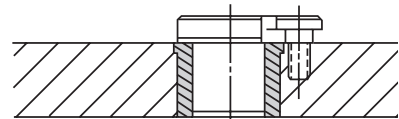
Types **FM** and **FMC** (carbide). Replaceable bushing used for extra resistance to rotational forces under harsh conditions. This bushing, generally used with a liner, has a milled locking flat to allow fastening securely with a flat clamp. FM bushings also have a standard recess on the other side to allow using a lockscrew instead.

## LINER:



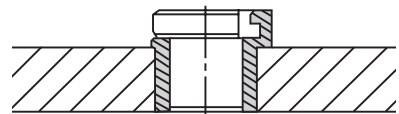
Types **L** and **PM** (metric). Liners are permanent bushings used to hold renewable drill bushings. The liner's ID has a precise sliding fit with the renewable bushing's OD. The hardened liner accurately locates the renewable bushing and protects the jig plate from wear caused by frequent bushing replacement. Note: Metric liner bushings are the same as metric press-fit bushings.

## HEAD LINER:



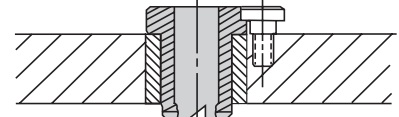
Types **HL** and **HM** (metric). Similar to an L bushing, but with a head to resist heavy axial loads. Head liners are permanent bushings used to hold renewable drill bushings. The head liner's ID has a precise sliding fit with the renewable bushing's OD. The hardened head liner accurately locates the renewable bushing and protects the jig plate from wear caused by frequent bushing replacement. Note: The "length" listed for a head liner refers to its overall length, not its length under the head. Metric head-liner bushings are the same as metric head-press-fit bushings.

## UN-A-LOK® LINER:



Types **UL** and **ULM** (metric). Similar to an HL head liner, but incorporating a special locking tab that eliminates the need for a lockscrew. Un-A-Lok® liners are permanent bushings used to hold SF renewable drill bushings (on the "slip" side only, not the "fixed" side). Although slightly more expensive than a head liner plus a lock screw, installation time is dramatically reduced.

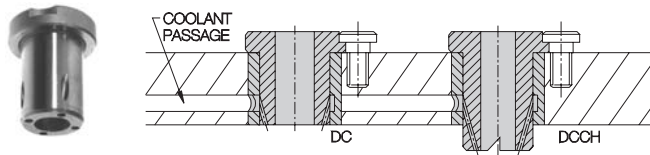
## CHIP BREAKER:



Types **CH** and **CHM** (metric). Similar to an SF renewable bushing, but with specially designed chip-breaking notches on the drill-exit end. Use to break up chips from tough, stringy materials, to reduce friction and heat buildup. Reduces bushing wear at the drill-exit end and reduces the chance of tool or workpiece damage. A chip-breaker bushing should extend beyond its liner to allow chips to escape. Chip breakers are also available on other bushing types such as P, H, and DC.

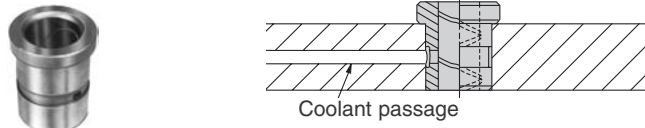
# BUSHING SELECTION

## DIRECTED COOLANT:



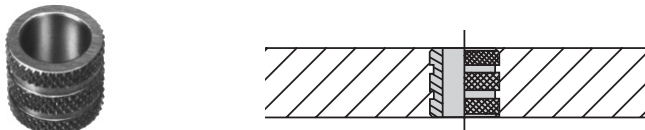
Types **DC**, **DCCH** (chip breaker), **DCL** (liner), and **DCHL** (head liner). Similar to an SF renewable bushing, but with passages to direct coolant to the cutting area. This design is particularly good for washing away chips, especially when ordered as the combination Directed Coolant Chip Breaker (DCCH). DC bushings require special liners, DCL or DCHL, to direct coolant from a drilled manifold passage to the holes in the bushing's OD wall.

## OIL GROOVE:



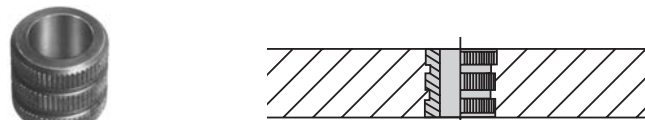
Oil grooves are available on most drill-bushing types, including P, H, and SF. Use when you need complete drill lubrication and cooling, such as when drilling hardened steel. Oil grooves are specially designed coolant passageways in the bushing's ID wall. Choose from 25 different groove styles. End wipers are also available, to keep out dirt and chips.

## DIAMOND GROOVE:



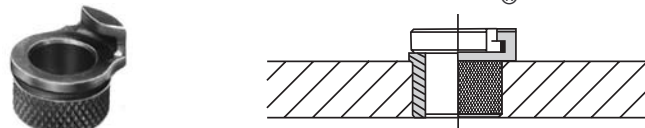
Types **DG** and **DGM** (metric). A bushing for cast-in-place or potted installation. Diamond-knurled OD provides superior holding strength against both rotational and axial forces. Since the bushing's OD is not ground, keep the ID accurately located during casting or potting to ensure accuracy in the finished tool.

## SERRATA GROOVE:



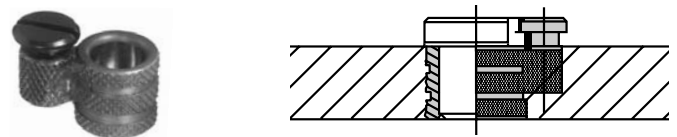
Type **SG**. Can be cast in place or potted, just as a diamond-groove bushing, or can also be pressed into an installation hole. Straight knurl provides less resistance to axial loads than the diamond knurl on a DG bushing. Since the bushing's OD is not ground, keep the ID accurately located during casting or potting to ensure accuracy in the finished tool.

## DIAMOND-KNURL UN-A-LOK® LINER:



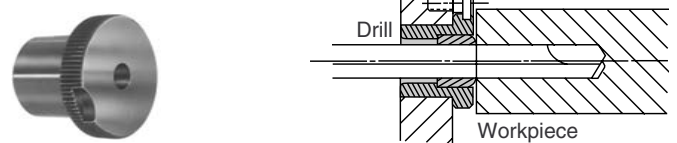
Types **ULD** and **ULDM** (metric). A liner for cast-in-place or potted installation, used to hold SF renewable drill bushings. Un-A-Lok® liners incorporate a special locking tab that eliminates the need for a lock screw. Holds only the "slip" side of an SF bushing, not the "fixed" side. Diamond-knurled OD provides superior holding strength against both rotational and axial forces. Since the bushing's OD is not ground, keep the ID accurately located during casting or potting to ensure accuracy in the finished tool.

## EZ CAST LINER:



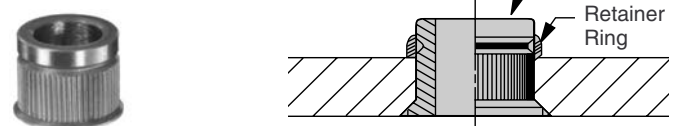
Type **EZ**. Another liner for cast-in-place or potted installation, used to hold SF renewable drill bushings. Unlike diamond-knurled unlock liners, EZ-cast liners hold either the "slip" or "fixed" side of an SF bushing, since they include an integral lock screw holder. Diamond-knurled OD provides superior holding strength against both rotational and axial forces. Since the bushing's OD is not ground, keep the ID accurately located during casting or potting to ensure accuracy in the finished tool.

## GUN DRILL:



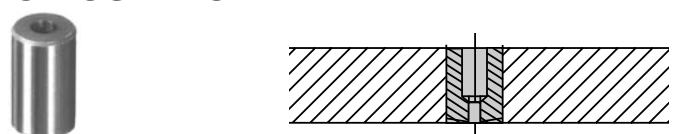
Types **GD**, **GDL** (liner), and **GDI** (insert). Drill bushings for gun-drilling machines, such as Eldorado, Drillmation, DeHoff, and Lahr. Gun drill bushings are similar to SF renewable bushings, but with the drill bearing at the bushing's head end. Depending on the gun-drilling machine, bushings are either one-piece or two-piece (a liner and an insert).

## TEMPLATE:



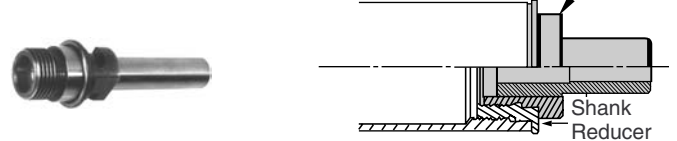
Type **TB**. An economical bushing designed for thin template jig plates from 1/16- to 3/8-inch thick. Bushings are held in place by a retainer ring. The OD serrations prevent the bushing from spinning. Bushings can be removed and reused by breaking the aluminum retainer ring (extra retainer rings available).

## CIRCUIT BOARD:



Types **CB** and **CBC** (carbide). Headless and head-type bushings made especially for circuit-board drilling machines. Available for Electro-Mechano, Excellon, Waco, Digital, Nationwide, Edlund, Tektronix, Leland-Gifford, Palomar, Hughes, Rapidrill, and Reliable drilling machines.

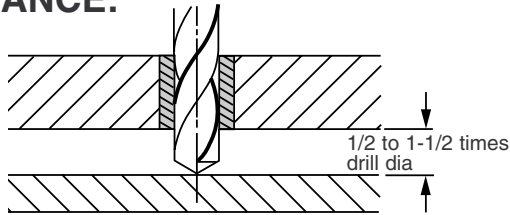
## AIR-FEED DRILL:



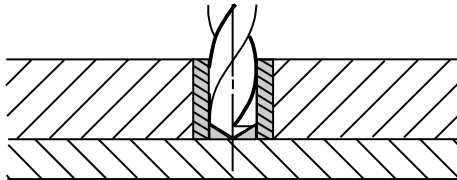
Type **A**. Drill-bushing shanks, collars, adaptors, and locking accessories for air-feed drills, tappers, and back-spotfacers. Available for all standard drill motors, including Gardner-Denver, Keller, Aro, Buckeye, Quackenbush, Desoutter, and Ingersoll-Rand.

# INSTALLATION AND TECHNICAL DATA

## RECOMMENDED CHIP CLEARANCE:

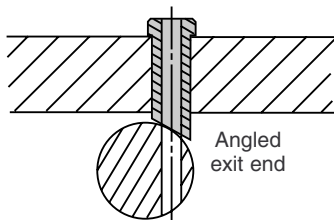


To minimize drill bending and maximize hole accuracy, mount drill bushings as close to the workpiece as possible while still allowing adequate chip clearance. The necessary clearance depends on workpiece material and chip stringiness. For example, cast iron, with fine chips requires about 1/2 times drill diameter for chip clearance. Materials that produce long, stringy chips, such as cold-rolled steel and aluminum, require at least one-drill-diameter clearance. To reduce clearance even with long, stringy chips, exit-end chip breakers are available...see pages 42-43.



Direct workpiece contact is usually not recommended. Chips can escape only up through the drill's flutes, drill-bearing length is shortened by the drill point's length, and drill-withdrawal burrs can raise the jig plate. Direct contact may be necessary, though, for maximum bearing length when drilling sloped surfaces (see below). Also, reamer bushings can be mounted much closer than drill bushings, due to much finer chips, for more-accurate hole finishing.

## SLOPED WORKPIECE SURFACES:



Whenever the drilling axis is not perpendicular to the workpiece surface, locate the exit end as close to the part as possible. Otherwise the drill will tend to wander. For maximum drill guiding, we recommend specifying bushings with an angle milled on the exit end, tangent to the workpiece surface at point of entry.

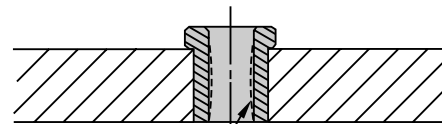
## SPECIAL BUSHINGS FOR CLOSE HOLE SPACING:

When holes are located close together, special bushings are sometimes required. Thinwall bushings, where the bushing ID is larger than the normal ID range for a given OD, are often a good solution. Holes for thinwall bushings must be very

accurate and round, because these bushings are more-easily distorted. For very-close hole spacing, especially with headed bushings, specify bushings with ground flats.



## INSTALLATION-HOLE PREPARATION:



Excessive interference causes bellmouthing

To avoid jig-plate or bushing distortion, do not use excessive interference fits on press-fit bushings. See table below for recommended hole sizes in unhardened steel or cast iron jig plates. Always prepare installation holes using a jig borer or reamer. Standard chucking reamers (with a plus tolerance) usually produce installation holes to the tolerances shown in the table. Other factors to consider are: (1) headed bushings require less interference to resist drilling thrust; (2) longer bushings in thick plates require less interference; (3) bushings with thinner walls are more prone to distortion; (4) less-ductile jig-plate materials require less interference.

### METRIC

PRESS-FIT BUSHING OD		RECOMMENDED HOLE SIZE (H7)
NOM.	ACTUAL (s6)	
3mm	3.020-3.014mm	3.000-3.010mm
4mm	4.027-4.019mm	4.000-4.012mm
5mm	5.027-5.019mm	5.000-5.012mm
6mm	6.027-6.019mm	6.000-6.012mm
7mm	7.032-7.023mm	7.000-7.015mm
8mm	8.032-8.023mm	8.000-8.015mm
10mm	10.032-10.023mm	10.000-10.015mm
12mm	12.039-12.028mm	12.000-12.018mm
15mm	15.039-15.028mm	15.000-15.018mm
18mm	18.039-18.028mm	18.000-18.018mm
22mm	22.048-22.035mm	22.000-22.021mm
26mm	26.048-26.035mm	26.000-26.021mm
30mm	30.048-30.035mm	30.000-30.021mm
35mm	35.059-35.043mm	35.000-35.025mm
42mm	42.059-42.043mm	42.000-42.025mm
48mm	48.059-48.043mm	48.000-48.025mm
55mm	55.072-55.053mm	55.000-55.030mm
62mm	62.072-62.053mm	62.000-62.030mm
70mm	70.078-70.059mm	70.000-70.030mm
78mm	78.078-78.059mm	78.000-78.030mm
85mm	85.093-85.071mm	85.000-85.035mm
95mm	95.093-95.071mm	95.000-95.035mm
105mm	105.101-105.079mm	105.000-105.035mm
115mm	115.101-115.079mm	115.000-115.035mm
125mm	125.117-125.092mm	125.000-125.040mm

### USA

PRESS-FIT BUSHING OD		RECOMMENDED HOLE SIZE
NOM.	ACTUAL	
5/32	.1578-.1575	.1565-.1570
3/16	.1891-.1888	.1880-.1883
13/64	.2046-.2043	.2037-.2040
1/4	.2516-.2513	.2507-.2510
5/16	.3141-.3138	.3132-.3135
3/8	.3766-.3763	.3757-.3760
13/32	.4078-.4075	.4069-.4072
7/16	.4392-.4389	.4382-.4385
1/2	.5017-.5014	.5007-.5010
9/16	.5642-.5639	.5632-.5635
5/8	.6267-.6264	.6257-.6260
3/4	.7518-.7515	.7507-.7510
7/8	.8768-.8765	.8757-.8760
1	1.0018-1.0015	1.0007-1.0010
1-1/8	1.1270-1.1267	1.1257-1.1260
1-1/4	1.2520-1.2517	1.2507-1.2510
1-3/8	1.3772-1.3768	1.3757-1.3760
1-1/2	1.5021-1.5018	1.5007-1.5010
1-3/4	1.7523-1.7519	1.7507-1.7510
2-1/4	2.2525-2.2521	2.2507-2.2510
2-3/4	2.7526-2.7522	2.7507-2.7510

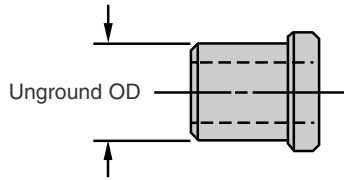


## MANUFACTURING CO.

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 Phone: 314-647-6200, FAX: 314-647-5736  
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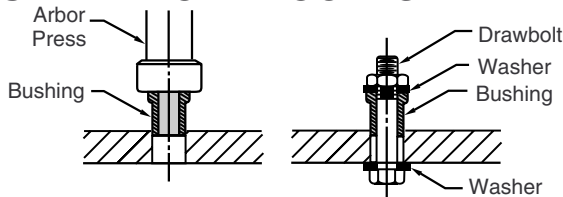
# INSTALLATION AND TECHNICAL DATA

## UNGROUND BUSHINGS AVAILABLE FOR OVERSIZE HOLES:



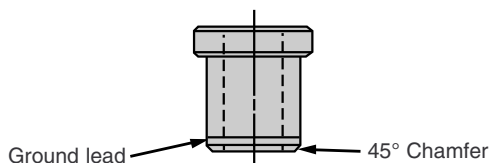
We offer bushings with unfinished ODs for custom-fitting to oversize holes. They are slightly larger than nominal diameter to provide grinding stock, .005-.020 extra, depending on the OD size (see charts under each specific bushing type). We recommend grinding on a mandrel to hold ID/OD concentricity.

## INSTALLATION PROCEDURE:



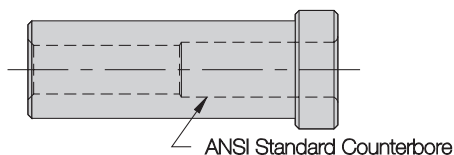
We recommend installing bushings with an arbor press whenever possible. If the bushing's OD is large enough, you can also use a drawbolt with two washers as shown above. If a hammer is the only tool available, do not strike the bushing directly or it could fracture. Use a soft-metal punch to cushion the blows. Before installing a press-fit bushing, lubricate the inside of the mounting hole and outside of the bushing with a lubricant such as lithium grease. Otherwise the bushing may score the mounting hole, and may be difficult to replace later.

## GROUND LEAD FOR EASY INSTALLATION:



All bushings feature a concentric ground lead and a 45° chamfer on the exit end to ensure perfect alignment during installation.

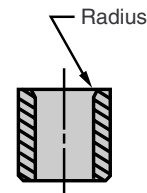
## COUNTERBORES ON LONG BUSHINGS:



Long bushings with small IDs are slightly counterbored for proper drill-bearing length and chip clearance, as specified by

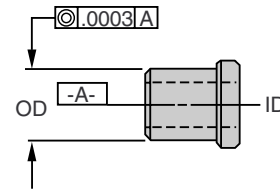
ANSI standards. Counterbores prevent binding and heat buildup due to excessive bearing length. See chart on page 6 for ANSI counterbore depths. Counterbore diameters are generally 1/32 inch larger than the inside diameter, and are angled at the bottom for smooth entrance. No-counterbore bushings are available on request as specials.

## DRILL ENTRANCE RADIUS:



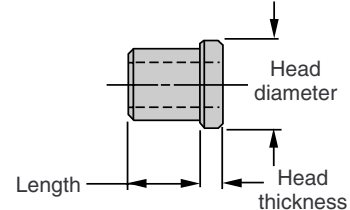
Bushings feature a blended and polished radius at the drill-entrance end for smooth drill entry and proper alignment, preventing drill wear and breakage. Radius size varies in proportion to drill size.

## CONCENTRICITY:



Bushing OD is ground concentric to the ID to within .0003 TIR for ID sizes from 1/8 inch to 1/2 inch (3mm to 12mm), unless otherwise indicated. For larger or smaller sizes, concentricity is within .0005 TIR. Unground bushings are concentric to within .006 TIR. On counterbored bushings, concentricity applies only over the drill-bearing length.

## OTHER TOLERANCES:



Any dimensions where tolerances are not specifically listed are held to +/- .010 inches on standard ANSI sizes, and +/- .015 inches on larger sizes (extended range). Special tolerances for any dimension are available on request as specials.

## MATERIAL:

Standard drill-bushing material is durable 1144 Stressproof steel, heat treated to achieve RC 62-64 ID hardness, and other high-carbon steels. Optional materials such as tungsten carbide (Grade C2 carbide with steel head), 52100 steel, A2 tool steel, D2 tool steel, M2 tool steel, 416 stainless, 440C stainless, 17-4PH stainless, 303 stainless, 660 bronze, Ampco 18 bronze, Ampco 21 bronze, Oilite, and brass are available as specials. See pages 13, 19, and 27 for carbide bushings.



# COUNTERBORE DATA



## TYPE P — DRILL BEARING LENGTH

DRILL SIZE (ID)	OD	BUSHING LENGTH											
		1/4	5/16	3/8	1/2	3/4	1	1-3/8	1-1/2	1-3/4	2-1/8	2-1/2	3
.0135 - .0291	5/32	FULL	FULL	FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0292 - .0519		FULL	FULL	FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0520 - .0625		FULL	FULL	FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0135 - .0291	3/16	FULL	FULL	FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0292 - .0519		FULL	FULL	FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0520 - .0634		FULL	FULL	FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0635 - .0995	13/64	FULL	FULL	FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0135 - .0291		FULL	FULL	FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0292 - .0519		FULL	FULL	FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0520 - .0634	1/4	FULL	FULL	FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0635 - .0995		FULL	FULL	FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0980 - .1406		FULL	FULL	FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.1250 - .1935	5/16	FULL	FULL	FULL	FULL	FULL	5/8	5/8	5/8	5/8	5/8	5/8	5/8
.1935 - .2880	3/8	FULL	FULL	FULL	FULL	FULL	5/8	5/8	5/8	5/8	5/8	5/8	5/8
.1875 - .2570	13/32	FULL	FULL	FULL	FULL	FULL	5/8	5/8	5/8	5/8	5/8	5/8	5/8
.2340 - .2900	7/16	FULL	FULL	FULL	FULL	FULL	5/8	5/8	5/8	5/8	5/8	5/8	5/8
.1875 - .3160	1/2	FULL	FULL	FULL	FULL	FULL	5/8	3/4	3/4	3/4	3/4	3/4	3/4
.3125 - .4375	5/8	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	1-1/2
.3125 - .5313	3/4	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	1-1/2



## TYPE H — DRILL BEARING LENGTH

RANGE (ID)	OD	BUSHING LENGTH (UNDER HEAD)											
		1/4	5/16	3/8	1/2	3/4	1	1-3/8	1-1/2	1-3/4	2-1/8	2-1/2	3
.0135 - .0291	5/32	FULL	FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0292 - .0519		FULL	FULL	FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0520 - .0625		FULL	FULL	FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0135 - .0291	13/64	FULL	FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0292 - .0519		FULL	FULL	FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0520 - .0634		FULL	FULL	FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0635 - .0995	1/4	FULL	FULL	FULL	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16
.0980 - .1406		FULL	FULL	FULL	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16
.1250 - .1935		FULL	FULL	FULL	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16
.1935 - .2280	3/8	FULL	FULL	FULL	FULL	FULL	5/8	5/8	5/8	5/8	5/8	5/8	5/8
.1875 - .2570	13/32	FULL	FULL	FULL	FULL	FULL	5/8	5/8	5/8	5/8	5/8	5/8	5/8
.2340 - .2900	7/16	FULL	FULL	FULL	FULL	FULL	5/8	5/8	5/8	5/8	5/8	5/8	5/8
.1875 - .3160	1/2	FULL	FULL	FULL	FULL	FULL	3/4	3/4	3/4	3/4	3/4	3/4	3/4
.3125 - .4375	5/8	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	1-1/2
.3125 - .5313	3/4	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	1-1/2



## TYPES SF & FM — DRILL BEARING LENGTH

DRILL SIZE (ID)	OD	BUSHING LENGTH (UNDER HEAD)											
		1/4	5/16	3/8	1/2	5/8	3/4	1	1-3/8	1-1/2	1-3/4	2-1/8	2-1/2
.0135 - .0291	3/16	1/4	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0292 - .0519		FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0520 - .0634		FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0635 - .0980	1/4	FULL	FULL	3/8	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16
.0995 - .1405		FULL	FULL	3/8	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16
.0135 - .0291		FULL	FULL	3/8	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16
.0292 - .0519	5/16	FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0520 - .0634		FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0635 - .0934		FULL	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
.0935 - .1249	3/8	FULL	FULL	3/8	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16
.1250 - .1935		FULL	FULL	3/8	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16
.1935 - .2280		FULL	FULL	3/8	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16
.2340 - .2900	7/16	FULL	FULL	FULL	FULL	FULL	5/8	5/8	5/8	5/8	5/8	5/8	5/8
.1405 - .1889	1/2	FULL	FULL	FULL	FULL	FULL	5/8	5/8	5/8	5/8	5/8	5/8	5/8
.1890 - .3438		FULL	FULL	FULL	FULL	FULL	5/8	5/8	5/8	5/8	5/8	5/8	5/8
.2950 - .5625		FULL	FULL	FULL	FULL	FULL	5/8	5/8	5/8	5/8	5/8	5/8	5/8
	3/4	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	FULL	1-1/2



**MANUFACTURING CO.**

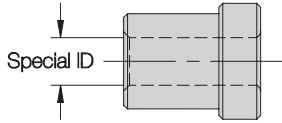
4200 Carr Lane Ct., P.O. Box 191970  
 St. Louis, Missouri 63119-7970 USA  
 Phone: 314-647-6200, FAX: 314-647-5736  
 Web Site: www.carrlane.com



# SPECIALS

## 1. SPECIAL ID SIZE (WITHIN LISTED ID RANGE):

With standard OD, standard length, and standard tolerances.



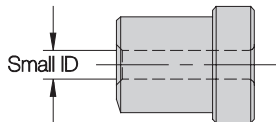
Special ID sizes include any ID size that is not a standard fractional, number, letter, or metric drill size as listed on the back cover of our catalog (reamer and tap-guide ID sizes are specials). To price, add a prorated \$55.00 setup charge to the quantity price for the standard OD and length.

Example: (6) H-10-8-.0365

List price for H-10-8	\$27.83
Quantity price for H-10-8 (\$27.83 less 18%)	\$22.82
\$55.00 setup divided by 6	+ 9.17
	\$31.99

## 2. ID SIZE SMALLER THAN LISTED RANGE:

With standard or special ID, standard OD, standard length, and standard tolerances.



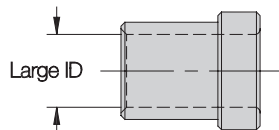
To price, compare price for the standard OD and length with the price for the largest bushing of the same length with the ID within range. Add a prorated \$55.00 setup charge to the higher of the two.

Example: (6) H-16-8-.0820

List price for H-16-8 (low)	\$12.05
List price for H-13-8 (high)	\$13.27
Quantity price for H-13-8 (\$13.27 less 18%)	\$10.88
\$55.00 setup divided by 6	+ 9.17
	\$20.05

## 3. ID SIZE LARGER THAN LISTED RANGE (THIN-WALL BUSHINGS):

With standard or special ID, standard OD, standard length, and standard tolerances.



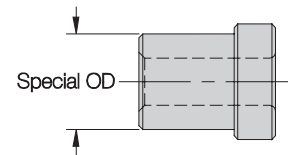
Check for adequate wall thickness by calculating the ratio of ID divided by OD:

Up to 1/4" OD	ID/OD must be $\leq$ .70
Over 1/4" to 1/2" OD	ID/OD must be $\leq$ .75
Over 1/2" OD	ID/OD must be $\leq$ .80

Please contact factory for pricing.

## 4. SPECIAL OD SIZE:

With standard ID and length for the next-larger OD, and standard tolerances.



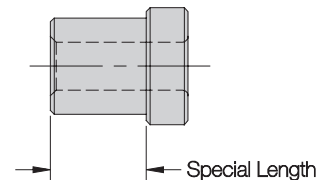
To price, add a prorated \$55.00 setup charge to the quantity price for the same-length bushing with the next-larger standard OD. Head dimensions for the next-larger size will be used unless otherwise requested.

Example: (6) H-18-8-.1250

List price for H-20-8	\$ 9.85
Quantity price for H-20-8 (\$9.85 less 18%)	\$ 8.08
\$55.00 setup divided by 6	+ 9.17
	\$17.25

## 5. SPECIAL LENGTH

With standard ID, standard OD, standard tolerances, and length shorter than maximum listed length.



To price, add a prorated \$55.00 setup charge to the quantity price for the next-longer standard length.

Example: (6) H-16-14-.1250

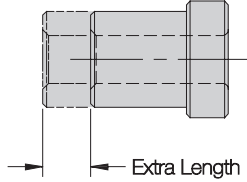
List price for H-16-16	\$ 20.03
Quantity price for H-16-16 (\$20.03 less 18%)	\$ 16.42
\$55.00 setup divided by 6	+ 9.17
	\$ 25.59



# SPECIALS

## 6. EXTRA LENGTH:

With standard ID, standard OD, and standard tolerances.



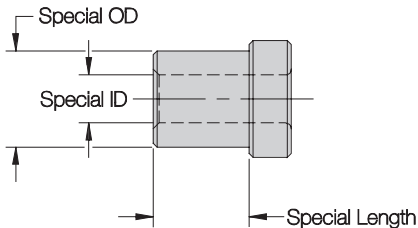
To price, add 15% for up to 1/4" extra length, to the quantity price for the longest length listed in the catalog, plus a prorated \$55.00 setup charge.

Example: (6) H-16-26-.1250

List price for H-16-24	\$28.92
Quantity price for H-16-24 (\$28.92 less 18%)	\$23.71
Quantity price for H-16-24 plus 15%	\$27.27
\$55.00 setup divided by 6	+ 9.17
	\$36.44

## 7. COMBINATION SPECIAL ID, OD, AND/OR LENGTH:

With standard tolerances.



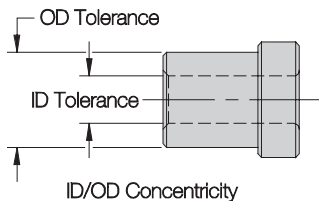
To price, compare price for the ID range, special OD, and/or special length. Add a prorated \$55.00 setup charge to the highest of all the prices.

Example: (6) H-22-14-.1260

List price for H-24-16, ID range (low)	\$11.48
List price for H-20-16, ID range (high)	\$12.17
List price for H-24-16, OD range (low)	\$11.48
List price for H-24-16, Length (low)	\$11.48
Quantity price for H-20-16 (\$12.17 less 18%)	\$ 9.98
\$55.00 setup divided by 6	+ 9.17
	\$19.15

## 8. SPECIAL TOLERANCES:

With standard ID, standard OD, and standard length.



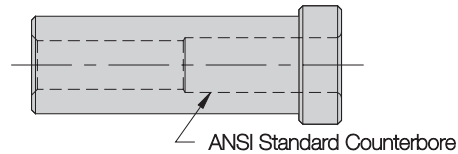
To price, add the following percentages to the standard bushing's price (add a separate percentage charge for each special tolerance). Also add a prorated \$55.00 setup charge.

.0002 ID tolerance range (up to 1" ID)	+25%
.0001 ID tolerance range (up to 1" ID)	+75%
.0001 OD tolerance range (up to 1" OD)	+25%
.0002 TIR concentricity (over 1/8" to 1" ID)	+25%

Example: (6) H-16-10-.1250 ID+0/+.0001 CONC .0002

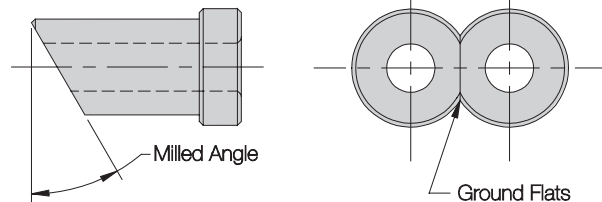
List price for H-16-10	\$13.27
Quantity price for H-16-10 (\$13.27 less 18%)	\$10.88
Add-on for .0001 ID tolerance (+ 75%)	+ 8.16
Add-on for .0002 concentricity (+ 25%)	+ 2.72
\$55.00 setup divided by 6	+ 9.17
	\$30.93

## 9. NO COUNTERBORE ON LONG BUSHINGS:



Contact factory for special pricing on "No Counterbore" bushings, long bushings that would normally be counter-bored, according to ANSI standards.

## 10. OTHER ALTERATIONS:



For milled angles, ground flats, cross holes, chip breakers, oil grooves, or special finishing, please contact factory.

## 11. SPECIAL MATERIAL:

Bushings made of the following heat-treated materials are readily available as specials:

52100 Steel	416 Stainless Steel
A2 Tool Steel	440C Stainless Steel
D2 Tool Steel	17-4PH Stainless Steel
M2 Tool Steel	

Bushings made of the following non-heat-treated materials are also readily available as specials:

303 Stainless Steel	Ampco 21 Bronze
660 Bronze	Oilite
Ampco 18 Bronze	Brass

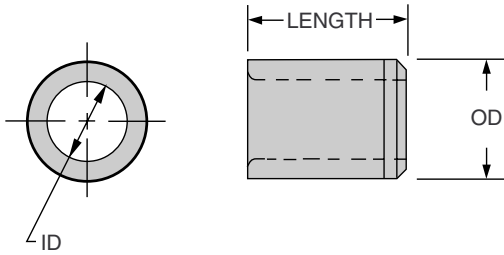
Please contact factory for pricing.





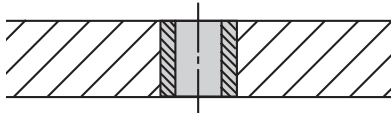
# PRESS FIT

# P



### APPLICATIONS:

This is the most-popular and least-expensive drill bushing. P bushings are permanently pressed into the jig plate, usually flush with the top surface. They are generally used for single-step drilling or reaming operations when you do not expect to replace bushings during the tooling's lifetime. P bushings can be mounted closer together than headed bushings, but offer less resistance to heavy axial loads.



### ORDERING EXAMPLES:

- P-20-16-.1250 Standard USA bushing, inch ID
- P-20-16-.1772 Standard USA bushing, mm ID (.1772 = 4.50mm)
- P-20-16U-.1250 Unground OD
- P-20-16-.1250 REAMER Reamer tolerance on ID
- P-20-16-.1250 NCB No counterbore on long bushings marked with \* (no counterbore is standard on all other bushings)
- PC-20-16-.1250 Carbide bushing
- PM-8-12-4.50 Standard metric bushing

Prices shown here apply to standard bushings only, either ground or unground OD, for a standard drill size within the stated ID range. See back cover for decimal equivalents. To price non-standard sizes, including all reamer and tap-guide bushings, see page 7.

### STANDARD ID TOLERANCES:

From #80 to 1/4"	+ .0001/+ .0004	From .35 to 3mm	+ .002/+ .008mm
Over 1/4 to 3/4"	+ .0001/+ .0005	Over 3 to 6mm	+ .004/+ .012mm
Over 3/4 to 1-1/2"	+ .0002/+ .0006	Over 6 to 10mm	+ .005/+ .014mm
Over 1-1/2 to 2-3/4"	+ .0003/+ .0007	Over 10 to 18mm	+ .006/+ .017mm
		Over 18 to 30mm	+ .007/+ .020mm
		Over 30 to 50mm	+ .009/+ .025mm
		Over 50 to 80mm	+ .010/+ .029mm
		Over 80 to 120mm	+ .012/+ .034mm
			(G6 tolerance)

### REAMER ID TOLERANCES:

From #60 to 1/4"	+ .0005/+ .0008	From 1 to 3mm	+ .006/+ .012mm
Over 1/4 to 1"	+ .0006/+ .0010	Over 3 to 6mm	+ .010/+ .018mm
Over 1" to 1-1/2"	+ .0008/+ .0012	Over 6 to 10mm	+ .013/+ .022mm
		Over 10 to 18mm	+ .016/+ .027mm
		Over 18 to 30mm	+ .020/+ .033mm
			(F6 tolerance)

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5
.0135-.0291 #80-#70 .35-.70mm	5/32 .1578-.1575 (.166-.161 UNG)	1/4	P-10-4	
		5/16	P-10-5	
		3/8	P-10-6	
		*1/2	P-10-8	
.0292-.0519 #69-3/64 .75-1.25mm		1/4	P-10-4	
		5/16	P-10-5	
		3/8	P-10-6	
		*1/2	P-10-8	
.0520-.0625 #55-1/16 1.30-1.60mm		*3/4	P-10-12	
		1/4	P-10-4	
		5/16	P-10-5	
		3/8	P-10-6	
.0520-.0634 #55-1/16 1.30-1.60mm	*1/2	P-10-8		
	*3/4	P-10-12		
	1/4	P-12-4		
	5/16	P-12-5		
.0520-.0634 #55-1/16 1.30-1.60mm	3/8	P-12-6		
	*1/2	P-12-8		
	*5/8	P-12-10		
	*3/4	P-12-12		
.0635-.0995 #52-#39 1.65-2.50mm	1/4	P-12-4		
	5/16	P-12-5		
	3/8	P-12-6		
	1/2	P-12-8		
.0635-.0995 #52-#39 1.65-2.50mm	5/8	P-12-10		
	*3/4	P-12-12		
	1/4	P-13-4		
	5/16	P-13-5		
.0135-.0291 #80-#70 .35-.70mm	3/8	P-13-6		
	*1/2	P-13-8		
	1/4	P-13-4		
	5/16	P-13-5		
.0292-.0519 #69-3/64 .75-1.30mm	3/8	P-13-6		
	*1/2	P-13-8		
	*3/4	P-13-12		
	1/4	P-13-4		
.0520-.0634 #55-1/16 1.35mm-1.60mm	5/16	P-13-5		
	3/8	P-13-6		
	*1/2	P-13-8		
	*3/4	P-13-12		
.0520-.0634 #55-1/16 1.35mm-1.60mm	*1	P-13-16		
	1/4	P-13-4		
	5/16	P-13-5		
	3/8	P-13-6		
.0635-.0995 #52-#39 1.65-2.50mm	1/2	P-13-8		
	*3/4	P-13-12		
	*1	P-13-16		
	*1-3/8	P-13-22		

Please see our web catalog for pricing.

\* Counterbored, leaving correct drill-bearing length and clearance (see page 6 for bearing length).

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48



## MANUFACTURING CO.

4200 Carr Lane Ct., P.O. Box 191970  
 St. Louis, Missouri 63119-7970 USA  
 Phone: 314-647-6200, FAX: 314-647-5736  
 Web Site: www.carrlane.com

# P

# PRESS FIT



ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5
<b>.0980-.1406</b> #40-9/64 2.50-3.50mm	<b>1/4</b> .2516-.2513 (.265-.260 UNG)	1/4	P-16-4	
		5/16	P-16-5	
		3/8	P-16-6	
		1/2	P-16-8	
		5/8	P-16-10	
		*3/4	P-16-12	
		*1	P-16-16	
		*1-3/8	P-16-22	
		*1-1/2	P-16-24	
		*1-3/4	P-16-28	
<b>.1250-.1935</b> 1/8-#10 3.20-4.90mm	<b>5/16</b> .3141-.3138 (.327-.322 UNG)	1/4	P-20-4	
		5/16	P-20-5	
		3/8	P-20-6	
		1/2	P-20-8	
		5/8	P-20-10	
		3/4	P-20-12	
		*1	P-20-16	
		*1-3/8	P-20-22	
		*1-1/2	P-20-24	
		*1-3/4	P-20-28	
<b>.1935-.2280</b> #10-#1 4.90-5.80mm	<b>3/8</b> .3766-.3763 (.390-.385 UNG)	1/4	P-24-4	
		5/16	P-24-5	
		3/8	P-24-6	
		1/2	P-24-8	
		5/8	P-24-10	
		3/4	P-24-12	
		*1	P-24-16	
<b>.1875-.2570</b> 3/16-F 4.75-6.50mm	<b>13/32</b> .4078-.4075 (.421-.416 UNG)	1/4	P-26-4	
		5/16	P-26-5	
		3/8	P-26-6	
		1/2	P-26-8	
		3/4	P-26-12	
		*1	P-26-16	
		*1-3/8	P-26-22	
		*1-1/2	P-26-24	
		*1-3/4	P-26-28	
		<b>.2340-.2900</b> A-L 5.90-7.40mm	<b>7/16</b> .4392-.4389 (.453-.448 UNG)	
5/16	P-28-5			
3/8	P-28-6			
1/2	P-28-8			
5/8	P-28-10			
3/4	P-28-12			
*1	P-28-16			
<b>.1875-.3160</b> 3/16-O 4.75-8.00mm	<b>1/2</b> .5017-.5014 (.520-.515 UNG)	1/4	P-32-4	
		5/16	P-32-5	
		3/8	P-32-6	
		1/2	P-32-8	
		3/4	P-32-12	
		*1	P-32-16	
		*1-3/8	P-32-22	
		*1-1/2	P-32-24	
		*1-3/4	P-32-28	
		*2-1/8	P-32-34	

Please see our web catalog for pricing.

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5
<b>.2950-.3438</b> M-11/32 7.50-8.75mm	<b>9/16</b> .5642-.5639 (.582-.577 UNG)	1/4	P-36-4	
		5/16	P-36-5	
		3/8	P-36-6	
		1/2	P-36-8	
		5/8	P-36-10	
		3/4	P-36-12	
		1	P-36-16	
		<b>.3125-.4375</b> 5/16-7/16 7.90-11.00mm	<b>5/8</b> .6267-.6264 (.645-.640 UNG)	
5/16	P-40-5			
3/8	P-40-6			
1/2	P-40-8			
5/8	P-40-10			
3/4	P-40-12			
1	P-40-16			
1-1/4	P-40-20			
1-3/8	P-40-22			
1-1/2	P-40-24			
<b>.3125-.5312</b> 5/16-17/32 7.90-13.50mm	<b>3/4</b> .7518-.7515 (.770-.765 UNG)	1/4	P-48-4	
		5/16	P-48-5	
		3/8	P-48-6	
		1/2	P-48-8	
		5/8	P-48-10	
		3/4	P-48-12	
		1	P-48-16	
		1-1/4	P-48-20	
		1-3/8	P-48-22	
		1-1/2	P-48-24	
<b>.5000-.6562</b> 1/2-21/32 12.50-16.50mm	<b>7/8</b> .8768-.8765 (.895-.890 UNG)	1/4	P-56-4	
		5/16	P-56-5	
		3/8	P-56-6	
		1/2	P-56-8	
		5/8	P-56-10	
		3/4	P-56-12	
		1	P-56-16	
		1-1/4	P-56-20	
		1-3/8	P-56-22	
		1-1/2	P-56-24	
<b>.1875-.2570</b> 3/16-F 4.75-6.50mm	<b>13/32</b> .4078-.4075 (.421-.416 UNG)	1-3/4	P-48-28	
		2-1/8	P-48-34	
		*2-1/2	P-48-40	
		2-1/2	P-56-34	
<b>.1875-.2570</b> 3/16-F 4.75-6.50mm	<b>13/32</b> .4078-.4075 (.421-.416 UNG)	2-1/2	P-56-40	
		2-1/2	P-56-40	
		2-1/2	P-56-40	
		2-1/2	P-56-40	

Please see our web catalog for pricing.

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
<b>Discount %</b>	Net	18%	29%	34%	42%	48%	50%	52%
<b>Multiplier</b>	1.00	.82	.71	.66	.58	.52	.50	.48

\* Counterbored, leaving correct drill-bearing length and clearance (see page 6 for bearing length).



### MANUFACTURING CO.

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# PRESS FIT

# P

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5
<b>.5000-.7656</b> 1/2-49/64 12.50-19.50mm	<b>1</b> 1.0018-1.0015 (1.020-1.015 UNG)	1/2	P-64-8	
		5/8	P-64-10	
		3/4	P-64-12	
		1	P-64-16	
		1-1/4	P-64-20	
		1-3/8	P-64-22	
		1-1/2	P-64-24	
		1-3/4	P-64-28	
		2-1/8	P-64-34	
		2-1/2	P-64-40	
<b>.7656-.8438</b> 49/64-27/32 19.50-21.50mm	<b>1-1/8</b> 1.1270-1.1267 (1.145-1.140 UNG)	1/2	P-72-8	
		5/8	P-72-10	
		3/4	P-72-12	
		1	P-72-16	
		1-1/4	P-72-20	
		1-1/2	P-72-24	
		1-3/4	P-72-28	
<b>.8594-.9375</b> 55/64-15/16 22.00-24.00mm	<b>1-1/4</b> 1.2520-1.2517 (1.270-1.265 UNG)	5/8	P-80-10	
		3/4	P-80-12	
		1	P-80-16	
		1-1/4	P-80-20	
		1-1/2	P-80-24	
		1-3/4	P-80-28	
		2	P-80-32	
<b>.6250-1.0312</b> 5/8-1-1/32 16.00-26.00mm	<b>1-3/8</b> 1.3772-1.3768 (1.395-1.390 UNG)	1/2	P-88-8	
		5/8	P-88-10	
		3/4	P-88-12	
		1	P-88-16	
		1-1/4	P-88-20	
		1-3/8	P-88-22	
		1-1/2	P-88-24	
		1-3/4	P-88-28	
		2	P-88-32	
		2-1/8	P-88-34	
2-1/2	P-88-40			
<b>1.0156-1.1250</b> 1-1/64-1-1/8 26.00-29.00mm	<b>1-1/2</b> 1.5021-1.5018 (1.520-1.515 UNG)	3/4	P-96-12	
		1	P-96-16	
		1-1/4	P-96-20	
		1-1/2	P-96-24	
		1-3/4	P-96-28	
		2	P-96-32	
		2-1/4	P-96-36	

Please see our web catalog for pricing.

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5
<b>1.0000-1.3906</b> 1-1-25/64 25.00-35.00mm	<b>1-3/4</b> 1.7523-1.7519 (1.770-1.765 UNG)	3/4	P-112-12	Please see our web catalog for pricing.
		1	P-112-16	
		1-3/8	P-112-22	
		1-1/2	P-112-24	
		1-3/4	P-112-28	
		2-1/8	P-112-34	
		2-1/2	P-112-40	
<b>1.3750-1.7656</b> 1-3/8-1-49/64 35.00-45.00mm	<b>2-1/4</b> 2.2525-2.2521 (2.270-2.265 UNG)	3	P-112-48	
		1	P-144-16	
		1-3/8	P-144-22	
		1-1/2	P-144-24	
		1-3/4	P-144-28	
		2-1/8	P-144-34	
2-1/2	P-144-40			
		3	P-144-48	

For extended-range bushings (larger sizes) please see our web catalog.

## Have a problem?

Carr Lane can help you pin it down,

with

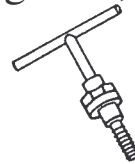
L Pins,



T Pins,



Locking Pins,



Clamping Pins,



Ball-Lock Pins,



Lifting Pins,

and More.

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48





# PRESS FIT CARBIDE

# PC

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5
<b>.0280-.0468</b> #70-#56 .75-1.15mm	<b>5/32</b>	5/16	PC-10-5	Contact Factory
		1/2	PC-10-8	
<b>.0469-.0625</b> 3/64-1/16 1.20-1.55mm	.1578-.1575	5/16	PC-10-5	Contact Factory
		1/2	PC-10-8	
<b>.0550-.0995</b> #54-#39 1.40-2.50mm	<b>13/64</b> .2046-.2043	5/16	PC-13-5	Contact Factory
		1/2	PC-13-8	
<b>.0995-.1360</b> #39-#29 2.55-3.40mm	<b>1/4</b> .2516-.2513	5/16	PC-16-5	Contact Factory
		1/2	PC-16-8	
<b>.1285-.1875</b> #30-3/16 3.30-4.75mm	<b>5/16</b> .3141-.3138	5/16	PC-20-5	Contact Factory
		1/2	PC-20-8	
		3/4	PC-20-12	
		1	PC-20-16	
<b>.1875-.2500</b> 3/16-1/4 4.80-6.30mm	<b>13/32</b> .4078-.4075	5/16	PC-26-5	Contact Factory
		1/2	PC-26-8	
		3/4	PC-26-12	
		1	PC-26-16	
<b>.2188-.3125</b> 7/32-5/16 5.60-7.90mm	<b>1/2</b> .5017-.5014	5/16	PC-32-5	Contact Factory
		1/2	PC-32-8	
		3/4	PC-32-12	
		1	PC-32-16	
<b>.3125-.4219</b> 5/16-27/64 8.00-10.50mm	<b>5/8</b> .6267-.6264	1-3/8	PC-32-22	Contact Factory
		1/2	PC-40-8	
		3/4	PC-40-12	
		1	PC-40-16	
<b>.3750-.5000</b> 3/8-1/2 9.60-12.50mm	<b>3/4</b> .7518-.7515	1-3/8	PC-40-22	Contact Factory
		1/2	PC-48-8	
		3/4	PC-48-12	
		1	PC-48-16	
<b>.5000-.6250</b> 1/2-5/8 13.00-15.50mm	<b>7/8</b> .8768-.8765	1-3/8	PC-48-22	Contact Factory
		1/2	PC-56-8	
		3/4	PC-56-12	
		1	PC-56-16	
		1-3/8	PC-56-22	Contact Factory
		1-3/4	PC-56-28	

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5
<b>.5000-.7500</b> 1/2-3/4 13.00-19.00mm	<b>1</b> 1.0018-1.0015	1/2	PC-64-8	Contact Factory
		3/4	PC-64-12	
		1	PC-64-16	
		1-3/8	PC-64-22	
		1-3/4	PC-64-28	Contact Factory
		3/4	PC-88-12	
		1	PC-88-16	
		1-3/8	PC-88-22	
<b>.7500-1.0000</b> 3/4-1 19.50-25.00mm	<b>1-3/8</b> 1.3772-1.3768	1-3/4	PC-88-28	Contact Factory
		2-1/8	PC-88-34	
		2-1/2	PC-88-40	
		1	PC-112-16	
<b>1.0000-1.3750</b> 1-1-3/8 26.00-34.00mm	<b>1-3/4</b> 1.7523-1.7519	1-3/8	PC-112-22	Contact Factory
		1-3/4	PC-112-28	
		2-1/8	PC-112-34	
		2-1/2	PC-112-40	
		3	PC-112-48	
<b>1.3750-1.7500</b> 1-3/8-1-3/4 35.00-44.00mm	<b>2-1/4</b> 2.2525-2.2521	1	PC-144-16	Contact Factory
		1-3/8	PC-144-22	
		1-3/4	PC-144-28	
		2-1/8	PC-144-34	
		2-1/2	PC-144-40	
		3	PC-144-48	

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# PM

# PRESS FIT METRIC



ID RANGE (G6)	OD (s6)	LENGTH	ANSI PART NO.	PRICE 1-5
.35-1.00mm	4mm 4.027-4.019mm	*6mm	PM-4-6	Please see our web catalog for pricing.
		*9mm	PM-4-9	
1.01-1.80mm	4mm 4.027-4.019mm	6mm	PM-4-6	
		9mm	PM-4-9	
1.81-2.60mm	5mm 5.027-5.019mm	6mm	PM-5-6	
		9mm	PM-5-9	
2.61-3.30mm	6mm 6.027-6.019mm	8mm	PM-6-8	
		12mm	PM-6-12	
		16mm	PM-6-16	
3.31-4.00mm	7mm 7.032-7.023mm	8mm	PM-7-8	
		12mm	PM-7-12	
		16mm	PM-7-16	
4.01-5.00mm	8mm 8.032-8.023mm	8mm	PM-8-8	
		12mm	PM-8-12	
		16mm	PM-8-16	
5.01-6.00mm	10mm 10.032-10.023mm	10mm	PM-10-10	
		16mm	PM-10-16	
		20mm	PM-10-20	
6.01-8.00mm	12mm 12.039-12.028mm	10mm	PM-12-10	
		16mm	PM-12-16	
		20mm	PM-12-20	
8.01-10.00mm	15mm 15.039-15.028mm	12mm	PM-15-12	
		20mm	PM-15-20	
		25mm	PM-15-25	
10.01-12.00mm	18mm 18.039-18.028mm	12mm	PM-18-12	
		20mm	PM-18-20	
		25mm	PM-18-25	
12.01-15.00mm	22mm 22.048-22.035mm	16mm	PM-22-16	
		28mm	PM-22-28	
		36mm	PM-22-36	
15.01-18.00mm	26mm 26.048-26.035mm	16mm	PM-26-16	
		28mm	PM-26-28	
		36mm	PM-26-36	
18.01-22.00mm	30mm 30.048-30.035mm	20mm	PM-30-20	
		36mm	PM-30-36	
		45mm	PM-30-45	
22.01-26.00mm	35mm 35.059-35.043mm	20mm	PM-35-20	
		36mm	PM-35-36	
		45mm	PM-35-45	
26.01-30.00mm	42mm 42.059-42.043mm	25mm	PM-42-25	
		45mm	PM-42-45	
		56mm	PM-42-56	
30.01-35.00mm	48mm 48.059-48.043mm	25mm	PM-48-25	
		45mm	PM-48-45	
		56mm	PM-48-56	
35.01-42.00mm	55mm 55.072-55.053mm	30mm	PM-55-30	
		56mm	PM-55-56	
		67mm	PM-55-67	
42.01-48.00mm	62mm 62.072-62.053mm	30mm	PM-62-30	
		56mm	PM-62-56	
		67mm	PM-62-67	

ID RANGE (G6)	OD (s6)	LENGTH	ANSI PART NO.	PRICE 1-5
48.01-55.00mm	70mm 70.078-70.059mm	30mm	PM-70-30	Please see our web catalog for pricing.
		56mm	PM-70-56	
		67mm	PM-70-67	
55.01-63.00mm	78mm 78.078-78.059mm	35mm	PM-78-35	
		67mm	PM-78-67	
		78mm	PM-78-78	
63.01-70.00mm	85mm 85.093-85.071mm	35mm	PM-85-35	
		67mm	PM-85-67	
		78mm	PM-85-78	
70.01-78.00mm	95mm 95.093-95.071mm	40mm	PM-95-40	
		78mm	PM-95-78	
		105mm	PM-95-105	
78.01-85.00mm	105mm 105.101-105.079mm	40mm	PM-105-40	
		78mm	PM-105-78	
		105mm	PM-105-105	
85.01-95.00mm	115mm 115.101-115.079mm	45mm	PM-115-45	
		89mm	PM-115-89	
		112mm	PM-115-112	
95.01-105.00mm	125mm 125.117-125.092mm	45mm	PM-125-45	
		89mm	PM-125-89	
		112mm	PM-125-112	

\* Small metric drill sizes through .80mm are counterbored 1.00mm diameter, with 3mm drill-bearing length.

A man's real limitations are not the things he wants to do and cannot; they are the things he ought to do but does not.

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48

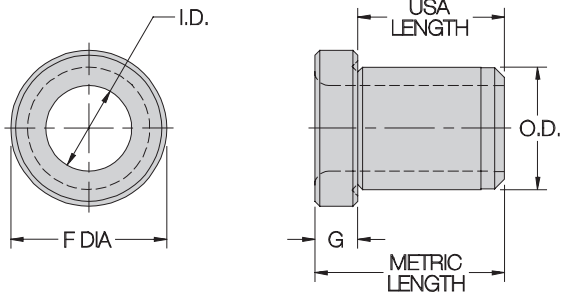


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# H

# HEAD PRESS FIT



- H-20-16U-.1250 Unground OD
- H-20-16-.1250 REAMER Reamer tolerance on ID
- H-20-16-.1250 NCB No counterbore on long bushings marked with \* (no counterbore is standard on all other bushings)
- HC-20-16-.1250 Carbide bushing
- HM-8-12-4.50 Standard metric bushing

Prices shown here apply to standard bushings only, either ground or unground OD, for a standard drill size within the stated ID range. See back cover for decimal equivalents. To price non-standard sizes, including all reamer and tap-guide bushings, see page 7.

## USA

## METRIC

BODY OD	F DIA	G
5/32	1/4	3/32
13/64	19/64	3/32
1/4	23/64	3/32
5/16	27/64	1/8
3/8	1/2	3/32
13/32	1/2	5/32
7/16	9/16	3/32
1/2	39/64	7/32
9/16	11/16	3/32
5/8	51/64	7/32
3/4	59/64	7/32
7/8	1-7/64	1/4
1	1-15/64	5/16
1-1/4	1-1/2	1/4
1-3/8	1-39/64	3/8
1-3/4	1-63/64	3/8
2-1/4	2-31/6	3/8

BODY OD	F DIA	G
4mm	7mm	2mm
5mm	8mm	2mm
6mm	9mm	2.5mm
7mm	10mm	2.5mm
8mm	11mm	2.5mm
10mm	13mm	3mm
12mm	15mm	3mm
15mm	18mm	3mm
18mm	22mm	4mm
22mm	26mm	4mm
26mm	30mm	4mm
30mm	34mm	5mm
35mm	39mm	5mm
42mm	46mm	5mm
48mm	52mm	5mm
55mm	59mm	5mm
62mm	66mm	6mm
70mm	74mm	6mm
78mm	82mm	6mm
85mm	90mm	6mm
95mm	100mm	6mm
105mm	110mm	6mm
115mm	120mm	6mm
125mm	130mm	6mm

## STANDARD ID TOLERANCES:

From #80 to 1/4"	+0.001/+0.004	From .35 to 3mm	+0.02/+0.08mm
Over 1/4 to 3/4"	+0.001/+0.005	Over 3 to 6mm	+0.04/+0.12mm
Over 3/4 to 1-1/2"	+0.002/+0.006	Over 6 to 10mm	+0.05/+0.14mm
Over 1-1/2 to 2-3/4"	+0.003/+0.007	Over 10 to 18mm	+0.06/+0.17mm
		Over 18 to 30mm	+0.07/+0.20mm
		Over 30 to 50mm	+0.09/+0.25mm
		Over 50 to 80mm	+0.10/+0.29mm
		Over 80 to 120mm	+0.12/+0.34mm
			(G6 tolerance)

## REAMER ID TOLERANCES:

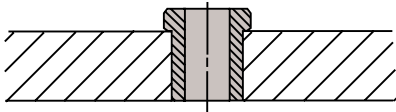
From #60 a 1/4"	+0.005/+0.008	From 1 to 3mm	+0.06/+0.12mm
Over 1/4 to 1"	+0.006/+0.010	Over 3 to 6mm	+0.10/+0.18mm
Over 1 to 1-1/2"	+0.008/+0.012	Over 6 to 10mm	+0.13/+0.22mm
		Over 10 to 18mm	+0.16/+0.27mm
		Over 18 to 30mm	+0.20/+0.33mm
			(F6 tolerance)

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5
.0135-.0291 #80-#70 .35-.70mm	5/32 .1578-.1575 (.166-.161 UNG)	1/4	H-10-4	Please see our web catalog for pricing.
		5/16	H-10-5	
		*3/8	H-10-6	
		*1/2	H-10-8	
.0292-.0519 #69-3/64 .75-1.25mm		1/4	H-10-4	
		5/16	H-10-5	
		*3/8	H-10-6	
		*1/2	H-10-8	
.0520-.0625 #55-1/16 1.30-1.60mm		*3/4	H-10-12	
		1/4	H-10-4	
		5/16	H-10-5	
		3/8	H-10-6	
	*1/2	H-10-8		
		*3/4	H-10-12	

\* Counterbored, leaving correct drill-bearing length and chip clearance (see page 6 for bearing length).

## APPLICATIONS:

Similar to a P bushing, but with a head to resist heavy axial loads. H bushings are permanently pressed into the jig plate. They are generally used for single-step drilling or reaming operations when you do not expect to replace bushings during the tooling's lifetime. The head can be left exposed, or recessed by counterboring the installation hole. **Note: The "length" listed for a USA head-press-fit bushing refers to its length under the head, while the metric version's "length" is its overall length.**



## ORDERING EXAMPLES:

- H-20-16-.1250 Standard USA bushing, inch ID
- H-20-16-.1772 Standard USA bushing, mm ID (.1772 = 4.50mm)

## QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48



## MANUFACTURING CO.

4200 Carr Lane Ct., P.O. Box 191970  
St. Louis, Missouri 63119-7970 USA  
Phone: 314-647-6200, FAX: 314-647-5736  
Web Site: www.carrlane.com





# HEAD PRESS FIT

# H

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5
<b>.0135-.0291</b> #80-#70 .35-.70mm	<b>13/64</b> .2046-.2043 (.213-.208 UNG)	1/4	H-13-4	Please see our web catalog for pricing.
		5/16	H-13-5	
		*3/8	H-13-6	
		*1/2	H-13-8	
<b>.0292-.0519</b> #69-3/64 .75-1.30mm		1/4	H-13-4	
		5/16	H-13-5	
		*3/8	H-13-6	
		*1/2	H-13-8	
<b>.0520-.0634</b> #55-1/16 1.35-1.60mm		*3/4	H-13-12	
		1/4	H-13-4	
		5/16	H-13-5	
		3/8	H-13-6	
<b>.0635-.0995</b> #52-#39 1.65-2.50mm	*1/2	H-13-8		
	*3/4	H-13-12		
	*1	H-13-16		
	1/4	H-13-4		
<b>.0980-.1406</b> #40-9/64 2.50-3.50mm	5/16	H-13-5		
	3/8	H-13-6		
	*1/2	H-13-8		
	*3/4	H-13-12		
	*1	H-13-16		
	1/4	H-16-4		
	5/16	H-16-5		
	3/8	H-16-6		
<b>.1250-.1935</b> 1/8-#10 3.20-4.90mm	*1/2	H-16-8		
	*5/8	H-16-10		
	*3/4	H-16-12		
	*1	H-16-16		
	*1-3/8	H-16-22		
	*1-1/2	H-16-24		
	1/4	H-20-4		
	5/16	H-20-5		
<b>.1935-.2280</b> #10-#1 4.90-5.80mm	3/8	H-20-6		
	1/2	H-20-8		
	5/8	H-20-10		
	3/4	H-20-12		
	*1	H-20-16		
	*1-3/8	H-20-22		
	*1-1/2	H-20-24		
	1/4	H-24-4		
<b>.1875-.2570</b> 3/16-F 4.75-6.50mm	5/16	H-24-5		
	3/8	H-24-6		
	1/2	H-24-8		
	5/8	H-24-10		
	3/4	H-24-12		
	*1	H-24-16		
	1/4	H-26-4		
	5/16	H-26-5		

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5
<b>.2340-.2900</b> A-L 5.90-7.40mm	<b>7/16</b> .4392-.4389 (.453-.448 UNG)	1/4	H-28-4	Please see our web catalog for pricing.
		5/16	H-28-5	
		3/8	H-28-6	
		1/2	H-28-8	
		5/8	H-28-10	
		*1	H-28-12	
<b>.1875-.3160</b> 3/16-O 4.75-8.00mm	<b>1/2</b> .5017-.5014 (.520-.515 UNG)	*1	H-28-16	
		1/4	H-32-4	
		5/16	H-32-5	
		3/8	H-32-6	
		1/2	H-32-8	
		3/4	H-32-12	
		*1	H-32-16	
		*1-3/8	H-32-22	
<b>.2950-.3438</b> M-11/32 7.50-8.75mm	<b>9/16</b> .5642-.5639 (.582-.577 UNG)	*1-1/2	H-32-24	
		*1-3/4	H-32-28	
		1/4	H-36-4	
		5/16	H-36-5	
		3/8	H-36-6	
		1/2	H-36-8	
<b>.3125-.4375</b> 5/16-7/16 7.90-11.00mm	<b>5/8</b> .6267-.6264 (.645-.640 UNG)	5/8	H-36-10	
		3/4	H-36-12	
		1	H-36-16	
		1/4	H-40-4	
		5/16	H-40-5	
		3/8	H-40-6	
		1/2	H-40-8	
		5/8	H-40-10	
<b>.3125-.5312</b> 5/16-17/32 7.90-13.50mm	<b>3/4</b> .7518-.7515 (.770-.765 UNG)	3/4	H-40-12	
		1	H-40-16	
		1-3/8	H-40-22	
		1-1/2	H-40-24	
		1-3/4	H-40-28	
		2-1/8	H-40-34	
		1/4	H-48-4	
		5/16	H-48-5	
<b>.1935-.2280</b> #10-#1 4.90-5.80mm	<b>3/8</b> .3766-.3763 (.390-.385 UNG)	3/8	H-48-6	
		1/2	H-48-8	
		5/8	H-48-10	
		3/4	H-48-12	
		1	H-48-16	
		1-1/4	H-48-20	
		1-3/8	H-48-22	
		1-1/2	H-48-24	
<b>.1875-.2570</b> 3/16-F 4.75-6.50mm	<b>13/32</b> .4078-.4075 (.421-.416 UNG)	1-3/4	H-48-28	
		2-1/8	H-48-34	
		1/4	H-26-4	
		5/16	H-26-5	
		3/8	H-26-6	
		1/2	H-26-8	
		3/4	H-26-12	
		*1	H-26-16	

## QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48

\* Counterbored, leaving correct drill-bushing length and clearance (see page 6 for bearing length).



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# HEAD PRESS FIT

# H

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5
<b>.5000-.6562</b> 1/2-21/32 12.50-16.50mm	<b>7/8</b> .8768-.8765 (.895-.890 UNG)	1/2	H-56-8	
		5/8	H-56-10	
		3/4	H-56-12	
		1	H-56-16	
		1-1/4	H-56-20	
		1-3/8	H-56-22	
		1-1/2	H-56-24	
		1-3/4	H-56-28	
		2-1/8	H-56-34	
		2-1/2	H-56-40	
<b>.5000-.7656</b> 1/2-49/64 12.50-19.50mm	<b>1</b> 1.0018-1.0015 (1.020-1.015 UNG)	1/2	H-64-8	
		3/4	H-64-12	
		1	H-64-16	
		1-3/8	H-64-22	
		1-1/2	H-64-24	
		1-3/4	H-64-28	
		2-1/8	H-64-34	
		2-1/2	H-64-40	
		3	H-64-48	
		5/8	H-80-10	
<b>.8594-.9375</b> 55/64-15/16 22.00-24.00mm	<b>1-1/4</b> 1.2520-1.2517 (1.270-1.265 UNG)	3/4	H-80-12	
		1	H-80-16	
		1-1/4	H-80-20	
		1-1/2	H-80-24	
		1-3/4	H-80-28	
		2	H-80-32	
		1/2	H-88-8	
<b>.6250-1.0312</b> 5/8-1-1/32 16.00-26.00mm	<b>1-3/8</b> 1.3772-1.3768 (1.395-1.390 UNG)	3/4	H-88-12	
		1	H-88-16	
		1-3/8	H-88-22	
		1-1/2	H-88-24	
		1-3/4	H-88-28	
		2-1/8	H-88-34	
		2-1/2	H-88-40	
		3	H-88-48	
<b>1.0000-1.3906</b> 1-1-25/64 26.00-35.00mm	<b>1-3/4</b> 1.7523-1.7519 (1.770-1.765 UNG)	3/4	H-112-12	
		1	H-112-16	
		1-3/8	H-112-22	
		1-1/2	H-112-24	
		1-3/4	H-112-28	
		2-1/8	H-112-34	
		2-1/2	H-112-40	
		3	H-112-48	
<b>1.3750-1.7656</b> 1-3/8-1-49/64 35.00-45.00mm	<b>2-1/4</b> 2.2525-2.2521 (2.270-2.265 UNG)	1	H-144-16	
		1-3/8	H-144-22	
		1-1/2	H-144-24	
		1-3/4	H-144-28	
		2-1/8	H-144-34	
		2-1/2	H-144-40	
		3	H-144-48	

Please see our web catalog for pricing.

A great speaker  
is one  
whose spirit  
enters the souls  
of his listeners.

If you have  
no goals  
you have  
nothing  
to reach for.

For extended-range bushings (larger sizes) please see our web catalog.

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48



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# HEAD PRESS FIT CARBIDE

# HC

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5
.0280-.0468 #70-#56 .75-1.15mm	5/32 .1578-.1575	5/16	HC-10-5	Contact Factory
		1/2	HC-10-8	
.0469-.0625 3/64-1/16 1.20-1.55mm	5/32 .1578-.1575	5/16	HC-10-5	Contact Factory
		1/2	HC-10-8	
.0550-.0995 #54-#39 1.40-2.50mm	13/64 .2046-.2043	5/16	HC-13-5	Contact Factory
		1/2	HC-13-8	
.0995-.1360 #39-#29 2.55-3.40mm	1/4 .2516-.2513	5/16	HC-16-5	Contact Factory
		1/2	HC-16-8	
.1285-.1875 #30-3/16 3.30-4.75mm	5/16 .3141-.3138	5/16	HC-20-5	Contact Factory
		1/2	HC-20-8	
		3/4	HC-20-12	
		1	HC-20-16	
.1875-.2500 3/16-1/4 4.80-6.30mm	13/32 .4078-.4075	5/16	HC-26-5	Contact Factory
		1/2	HC-26-8	
		3/4	HC-26-12	
		1	HC-26-16	
.2188-.3125 7/32-5/16 5.60-7.90mm	1/2 .5017-.5014	5/16	HC-32-5	Contact Factory
		1/2	HC-32-8	
		3/4	HC-32-12	
		1	HC-32-16	
.3125-.4219 5/16-27/64 8.00-10.50mm	5/8 .6267-.6264	1/2	HC-40-8	Contact Factory
		3/4	HC-40-12	
		1	HC-40-16	
		1-3/8	HC-40-22	
.3750-.5000 3/8-1/2 9.60-12.50mm	3/4 .7518-.7515	1/2	HC-48-8	Contact Factory
		3/4	HC-48-12	
		1	HC-48-16	
		1-3/8	HC-48-22	
.5000-.6250 1/2-5/8 13.00-15.50mm	7/8 .8768-.8765	1/2	HC-56-8	Contact Factory
		3/4	HC-56-12	
		1	HC-56-16	
		1-3/8	HC-56-22	
		1-3/4	HC-56-28	

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5
.5000-.7500 1/2-3/4 13.00-19.00mm	1 1.0018-1.0015	1/2	HC-64-8	Contact Factory
		3/4	HC-64-12	
		1	HC-64-16	
		1-3/8	HC-64-22	
.7500-1.0000 3/4-1 19.50-25.00mm	1-3/8 1.3772-1.3768	1-3/4	HC-64-28	Contact Factory
		3/4	HC-88-12	
		1	HC-88-16	
		1-3/8	HC-88-22	
.7500-1.0000 3/4-1 19.50-25.00mm	1-3/8 1.3772-1.3768	1-3/4	HC-88-28	Contact Factory
		2-1/8	HC-88-34	
		2-1/2	HC-88-40	
		3	HC-112-16	
1.0000-1.3750 1--1-3/8 26.00-34.00mm	1-3/4 1.7523-1.7519	1-3/8	HC-112-22	Contact Factory
		1-3/4	HC-112-28	
		2	HC-112-32	
		2-1/8	HC-112-34	
		2-1/2	HC-112-40	
		3	HC-112-48	
1.3750-1.7500 1-3/8-1-3/4 35.00-44.00mm	2-1/4 2.2525-2.2521	1	HC-144-16	Contact Factory
		1-3/8	HC-144-22	
		1-3/4	HC-144-28	
		2-1/8	HC-144-34	
		2-1/2	HC-144-40	
1.3750-1.7500 1-3/8-1-3/4 35.00-44.00mm	2-1/4 2.2525-2.2521	3	HC-144-48	Contact Factory

Note: Due to manufacturing requirements, head dimensions of some carbide bushings may differ slightly from ANSI standards. Most carbide bushings have steel heads.

180° Pivot

360° Rotation

What pivots 180°  
and takes more tugging  
than an eye bolt?

**Swivel Hoist Rings —**  
from Carr Lane, of course.



# HM

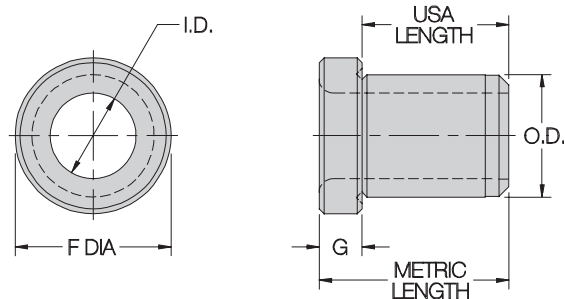
## HEAD PRESS FIT METRIC



ID RANGE (G6)	OD (s6)	LENGTH	ANSI PART NO.	PRICE 1-5
.35-1.00mm	4mm 4.027-4.019mm	*6mm	HM-4-6	Please see our web catalog for pricing.
		*9mm	HM-4-9	
1.01-1.80mm	4.027-4.019mm	6mm	HM-4-6	
		9mm	HM-4-9	
1.81-2.60mm	5.027-5.019mm	6mm	HM-5-6	
		9mm	HM-5-9	
2.61-3.30mm	6.027-6.019mm	8mm	HM-6-8	
		12mm	HM-6-12	
3.31-4.00mm	7.032-7.023mm	16mm	HM-6-16	
		8mm	HM-7-8	
4.01-5.00mm	8.032-8.023mm	12mm	HM-7-12	
		16mm	HM-7-16	
5.01-6.00mm	10.032-10.023mm	8mm	HM-8-8	
		12mm	HM-8-12	
6.01-8.00mm	12.039-12.028mm	16mm	HM-8-16	
		10mm	HM-10-10	
8.01-10.00mm	15.039-15.028mm	16mm	HM-10-16	
		20mm	HM-10-20	
10.01-12.00mm	18.039-18.028mm	10mm	HM-12-10	
		16mm	HM-12-16	
12.01-15.00mm	22.048-22.035mm	20mm	HM-12-20	
		12mm	HM-15-12	
15.01-18.00mm	26.048-26.035mm	20mm	HM-15-20	
		25mm	HM-15-25	
18.01-22.00mm	30.048-30.035mm	12mm	HM-18-12	
		20mm	HM-18-20	
22.01-26.00mm	35.059-35.043mm	25mm	HM-18-25	
		16mm	HM-22-16	
26.01-30.00mm	42.059-42.043mm	28mm	HM-22-28	
		36mm	HM-22-36	
30.01-35.00mm	48.059-48.043mm	16mm	HM-26-16	
		28mm	HM-26-28	
35.01-42.00mm	55.072-55.053mm	36mm	HM-26-36	
		20mm	HM-30-20	
42.01-48.00mm	62.072-62.053mm	36mm	HM-30-36	
		45mm	HM-30-45	
		20mm	HM-35-20	
		36mm	HM-35-36	
		45mm	HM-35-45	
		25mm	HM-42-25	
		45mm	HM-42-45	
		56mm	HM-42-56	
		25mm	HM-48-25	
		45mm	HM-48-45	
		56mm	HM-48-56	
		30mm	HM-55-30	
		56mm	HM-55-56	
		67mm	HM-55-67	
		30mm	HM-62-30	
		56mm	HM-62-56	
		67mm	HM-62-67	

ID RANGE (G6)	OD (s6)	LENGTH	ANSI PART NO.	PRICE 1-5
48.01-55.00mm	70mm 70.078-70.059mm	30mm	HM-70-30	Please see our web catalog for pricing.
		56mm	HM-70-56	
		67mm	HM-70-67	
55.01-63.00mm	78mm 78.078-78.059mm	35mm	HM-78-35	
		67mm	HM-78-67	
		78mm	HM-78-78	
63.01-70.00mm	85mm 85.093-85.071mm	35mm	HM-85-35	
		67mm	HM-85-67	
		78mm	HM-85-78	
70.01-78.00mm	95mm 95.093-95.071mm	40mm	HM-95-40	
		78mm	HM-95-78	
		105mm	HM-95-105	
78.01-85.00mm	105mm 105.101-105.079mm	40mm	HM-105-40	
		78mm	HM-105-78	
		105mm	HM-105-105	
85.01-95.00mm	115mm 115.101-115.079mm	45mm	HM-115-45	
		89mm	HM-115-89	
		112mm	HM-115-112	
95.01-105.00mm	125mm 125.117-125.092mm	45mm	HM-125-45	
		89mm	HM-125-89	
		112mm	HM-125-112	

\* Small metric drill sizes through .80mm are counterbored 1.00mm diameter, with 3mm drill-bearing length.



Note: The "length" listed on this page for a metric head-press-fit bushing refers to its overall length, while the USA version's "length" is its length under the head.

## CARR LANE:

We're often  
imitated . . .  
but never  
duplicated!

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
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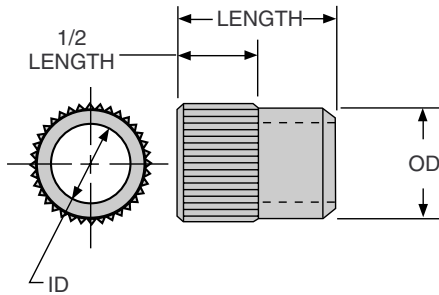
**MANUFACTURING CO.**

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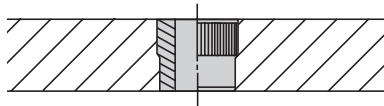
# SERRATED PRESS FIT

# SP



### APPLICATIONS:

Similar to a P bushing, but with top serrations to prevent rotation in soft materials. Recommended in high-torque situations for materials such as magnesium, aluminum, masonite, or wood. Finish-ground OD ensures accurate ID location. Serrations also resist axial force to prevent pushing the bushing through the jig plate.



### ORDERING EXAMPLES:

- SP-26-16-.1875 Standard USA bushing, inch ID
- SP-26-16-.1772 Standard USA bushing, mm ID (.1772 - 4.50mm)
- SP-26-16-.1875 REAMER Reamer tolerance on ID
- SP-26-16-.1875 NCB No counterbore on long bushings marked with \* (no counterbore is standard on all other bushings)
- SPM-8-12-4.50 Standard metric bushing

Prices shown here apply to standard bushings only, for a standard drill size within the stated ID range. See back cover for decimal equivalents. To price non-standard sizes, including all reamer and tap-guide bushings, see page 7.

### STANDARD ID TOLERANCES:

From #55 to 1/4"	+ .0001/+ .0004	From 1 to 3mm	+ .002/+ .008mm
		Over 3 to 6mm	+ .004/+ .012mm
Over 1/4 to 3/4"	+ .0001/+ .0005	Over 6 to 10mm	+ .005/+ .014mm
		Over 10 to 18mm	+ .006/+ .017mm
Over 3/4 to 1-1/2"	+ .0002/+ .0006	Over 18 to 19mm	+ .007/+ .020mm (G6 tolerance)

### REAMER ID TOLERANCES:

From #60 to 1/4"	+ .0005/+ .0008	From 1 to 3mm	+ .006/+ .012mm
		Over 3 to 6mm	+ .010/+ .018mm
Over 1/4 to 1"	+ .0006/+ .0010	Over 6 to 10mm	+ .013/+ .022mm
		Over 10 to 18mm	+ .016/+ .027mm
		Over 18 to 19mm	+ .020/+ .033mm (F6 tolerance)

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5
.0520-.0995 #55-#39 1.35-2.50mm	13/64 .2031-.2029	1/4	SP-13-4	Please see our web catalog for pricing.
		5/16	SP-13-5	
		3/8	SP-13-6	
		1/2	SP-13-8	
.0980-.1406 #40-9/64 2.50-3.50mm	1/4 .2500-.2498	1/4	SP-16-4	
		5/16	SP-16-5	
		3/8	SP-16-6	
		1/2	SP-16-8	
		1/4	SP-20-4	
		5/16	SP-20-5	
.1250-.1935 1/8-#10 3.20-4.90mm	5/16 .3125-.3123	3/8	SP-20-6	
		1/2	SP-20-8	
		3/4	SP-20-12	
.1562-.2570 5/32-F 4.00-6.50mm	13/32 .4062-.4060	5/16	SP-26-5	
		3/8	SP-26-6	
		1/2	SP-26-8	
		3/4	SP-26-12	
		*1	SP-26-16	
		5/16	SP-32-5	
		3/8	SP-32-6	
		1/2	SP-32-8	
.1562-.3160 5/32-O 4.00-8.00mm	1/2 .5000-.4998	3/4	SP-32-12	
		*1	SP-32-16	
		3/8	SP-40-6	
		1/2	SP-40-8	
.3125-.4375 5/16-7/16 7.90-11.00mm	5/8 .6250-.6248	3/4	SP-40-12	
		1	SP-40-16	
		3/8	SP-48-6	
.3125-.5312 5/16-17/32 8.00-13.00mm	3/4 .7500-.7498	1/2	SP-48-8	
		3/4	SP-48-12	
		1	SP-48-16	
.5000-.6562 1/2-21/32 13.00-16.50mm	7/8 .8750-.8748	3/8	SP-56-6	
		1/2	SP-56-8	
		3/4	SP-56-12	
		1	SP-56-16	
		1/2	SP-64-8	
		3/4	SP-64-12	
.5000-.7656 1/2-49/64 13.00-19.00mm	1 1.0000-.9998	1	SP-64-16	
		1-3/8	SP-64-22	

\* Counterbored, leaving correct drill-bushing length and clearance (see page 6 for bearing length).

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48



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Web Site: www.carrlane.com

# SPM SERRATED PRESS FIT METRIC



ID RANGE (G6)	OD (h5)	LENGTH	ANSI PART NO.	PRICE 1-5
1.00-1.80mm	5mm 5.000-4.995mm	6mm	SPM-5-6	
		9mm	SPM-5-9	
1.81-2.60mm		6mm	SPM-5-6	
		9mm	SPM-5-9	
2.61-3.30mm	6mm 6.000-5.995mm	8mm	SPM-6-8	
		12mm	SPM-6-12	
		16mm	SPM-6-16	
3.31-4.00mm	7mm 7.000-6.994mm	8mm	SPM-7-8	
		12mm	SPM-7-12	
		16mm	SPM-7-16	
4.01-5.00mm	8mm 8.000-7.994mm	8mm	SPM-8-8	
		12mm	SPM-8-12	
		16mm	SPM-8-16	
5.01-6.00mm	10mm 10.000-9.994mm	10mm	SPM-10-10	
		16mm	SPM-10-16	
		20mm	SPM-10-20	
6.01-8.00mm	12mm 12.000-11.992mm	10mm	SPM-12-10	
		16mm	SPM-12-16	
		20mm	SPM-12-20	
8.01-10.00mm	15mm 15.000-14.992mm	12mm	SPM-15-12	
		20mm	SPM-15-20	
		25mm	SPM-15-25	
10.01-12.00mm	18mm 18.000-17.992mm	12mm	SPM-18-12	
		20mm	SPM-18-20	
		25mm	SPM-18-25	
12.01-15.00mm	22mm 22.000-21.991mm	16mm	SPM-22-16	
		28mm	SPM-22-28	
		36mm	SPM-22-36	
15.01-18.00mm	26mm 26.000-25.991mm	16mm	SPM-26-16	
		28mm	SPM-26-28	
		36mm	SPM-26-36	

Please see our web catalog for pricing.

## We Make Tooling Simple

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- Plug Gages
- Supports, Rests and Feet
- Threaded Inserts
- CAD/CAM Tooling Library



Handles & Knobs



Alignment Pins



Toggle Clamps



Drill Bushings



Chuck Jaws



Modular Fixturing



Hoist Rings

### QUANTITY DISCOUNTS

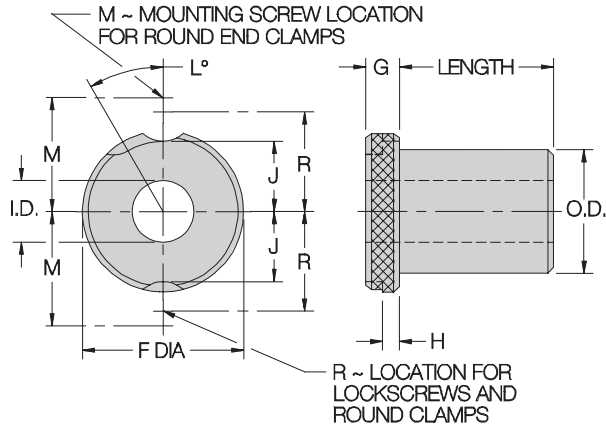
Quantity	1	6	12	24	50	100	200	500
	-5	-11	-25	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	54%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48





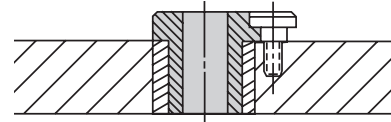
# SLIP/FIXED RENEWABLE

# SF



### APPLICATIONS:

Replaceable bushing generally used with a liner bushing and lock screw. Use when you expect to replace bushings during the tooling's lifetime, or when you want to switch bushings to perform multi-step operations with the same tooling. SF bushings combine the benefits of older S-type slip-renewable and F-type fixed-renewable bushings: One side has a small recess for fixed mounting; the other has a locking recess that allows the bushing to slip down, then lock in place by rotating it. S and F types are now obsolete (except in carbide) and combination SF bushings will be furnished at no extra charge.



### USA

BODY OD	F DIA	G	H	J	L	M	R	LOCK SCREW
3/16	5/16	3/16	3/32	3/32	55°		17/64	LS-0
1/4	7/16	1/4	1/8	9/64	30°		23/64	TW-2
5/16	35/64			11/64	65°	5/8	1/2	LS-1
3/8	5/8			15/64	30°		29/64	TW-2
7/16	5/8			15/64	30°		29/64	TW-2
1/2	51/64			19/64	65°	3/4	5/8	LS-1
9/16	7/8			23/64	65°		37/64	TW-2
5/8	7/8			23/64	30°		37/64	TW-2
3/4	1-3/64			27/64	50°	7/8	3/4	LS-1
7/8	1-1/4			31/64	30°		53/64	TW-7
1	1-27/64			19/32	35°	1-7/64	59/64	LS-2
1-1/4	1-5/8	43/64	30°		1-1/64			
1-3/8	1-51/64	25/32	30°	1-19/64	1-7/64			
1-1/2	1-7/8	51/64	30°		1-9/64			
1-3/4	2-19/64	3/8	3/16	1	30°	1-41/64	1-25/64	LS-3
2-1/4	2-51/64			1-1/4	25°	1-57/64	1-41/64	

### ORDERING EXAMPLES:

- SF-20-16-.1250 Standard USA bushing, inch ID
- SF-20-16-.1772 Standard USA bushing, mm ID (.1772 = 4.50mm)
- SF-20-16-.1250 REAMER Reamer tolerance on ID
- SF-20-16-.1250 NCB No counterbore on long bushings marked with \* (no counterbore is standard on all other bushings)
- SFC-20-16-.1250 Carbide bushing
- SFM-8-16-4.50 Standard metric bushing

Prices shown here apply to standard bushings only, for a standard drill size within the stated ID range. See back cover for decimal equivalents. To price non-standard sizes, including all reamer and tap-guide bushings, see page 7.

### METRIC

BODY OD	F DIA	G	H	J	L	M	R	LOCK SCREW
8mm	15mm	6mm	3mm	4.5mm	65°		11.5mm	LSM-1
10mm	18mm			6mm	65°		13mm	LSM-2
12mm	22mm	8mm	4mm	7.5mm	60°		16mm	LSM-3 LSM-4
15mm	26mm			9.5mm	50°		18mm	
18mm	30mm			11.5mm	50°		20mm	
22mm	34mm			13mm	35°		23.5mm	
26mm	39mm	10mm	5.5mm	15.5mm	35°		26mm	LSM-5 LSM-6
30mm	46mm			19mm	30°		29.5mm	
35mm	52mm			22mm	30°		32.5mm	
42mm	59mm			25.5mm	30°		36mm	
48mm	66mm			28.5mm	30°		41mm	
55mm	74mm			32.5mm	25°		45mm	
62mm	82mm	12mm	7mm	36.5mm	25°		49mm	LSM-7 LSM-8
70mm	90mm			40.5mm	25°		53mm	
78mm	100mm			45.5mm	25°		58mm	
85mm	110mm			50.5mm	20°		63mm	
95mm	120mm			55.5mm	20°		68mm	
105mm	130mm			60.5mm	20°		73mm	

### STANDARD ID TOLERANCES:

From #80 to 1/4"	+0.001/+0.004	From .35 to 3mm	+0.02/+0.08mm
		Over 3 to 6mm	+0.04/+0.12mm
Over 1/4 to 3/4"	+0.001/+0.005	Over 6 to 10mm	+0.05/+0.14mm
		Over 10 to 18mm	+0.06/+0.17mm
Over 3/4 to 1-1/2"	+0.002/+0.006	Over 18 to 30mm	+0.07/+0.20mm
		Over 30 to 50mm	+0.09/+0.25mm
Over 1-1/2 to 2-3/4"	+0.003/+0.007	Over 50 to 80mm	+0.10/+0.29mm
		Over 80 to 120mm	+0.12/+0.34mm
			(G6 tolerance)

### REAMER ID TOLERANCES:

From #60 to 1/4"	+0.005/+0.008	From 1 to 3mm	+0.06/+0.12mm
		Over 3 to 6mm	+0.10/+0.18mm
Over 1/4 to 1"	+0.006/+0.010	Over 6 to 10mm	+0.13/+0.22mm
		Over 10 to 18mm	+0.16/+0.27mm
Over 1 to 1-1/2"	+0.008/+0.012	Over 18 to 30mm	+0.20/+0.33mm
			(F6 tolerance)



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# SF

# SLIP/FIXED RENEWABLE



ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5	LOCK SCREW
.0135-.0291 #80-#70 .35-.70mm	3/16 .1875-.1873	*1/4	SF-12-4	Please see our web catalog for pricing.	LS-0
		*5/16	SF-12-5		
		*3/8	SF-12-6		
		*1/2	SF-12-8		
		*5/8	SF-12-10		
		*3/4	SF-12-12		
.0292-.0519 #69-3/64 .75-1.25mm		1/4	SF-12-4		
		*5/16	SF-12-5		
		*3/8	SF-12-6		
		*1/2	SF-12-8		
		*5/8	SF-12-10		
		*3/4	SF-12-12		
.0520-.0634 #55-1/16 1.30-1.60mm	1/4	SF-12-4			
	*5/16	SF-12-5			
	*3/8	SF-12-6			
	*1/2	SF-12-8			
	*5/8	SF-12-10			
	*3/4	SF-12-12			
.0635-.0980 #52-#40 1.65-2.50mm	1/4	SF-12-4			
	*5/16	SF-12-5			
	*3/8	SF-12-6			
	*1/2	SF-12-8			
	*5/8	SF-12-10			
	*3/4	SF-12-12			
.0995-.1405 #39-#28 2.55-3.50mm	1/4 .2500-.2498	1/4	SF-16-4	TW-2	
		5/16	SF-16-5		
		*3/8	SF-16-6		
		*1/2	SF-16-8		
		*5/8	SF-16-10		

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5	LOCK SCREW
.0135-.0291 #80-#70 .35-.70mm	5/16 .3125-.3123	*1/4	SF-20-4	Please see our web catalog for pricing.	LS-1 RC-01 RK-01 RK-10
		*5/16	SF-20-5		
		*3/8	SF-20-6		
		*1/2	SF-20-8		
		*3/4	SF-20-12		
		*5/16	SF-20-5		
.0292-.0519 #69-3/64 .75-1.30mm		*3/8	SF-20-6		
		*1/2	SF-20-8		
		*3/4	SF-20-12		
		*5/16	SF-20-5		
		*3/8	SF-20-6		
		*1/2	SF-20-8		
.0520-.0634 #55-1/16 1.35-1.60mm	*3/4	SF-20-12			
	5/16	SF-20-5			
	*3/8	SF-20-6			
	*1/2	SF-20-8			
	*3/4	SF-20-12			
	*1	SF-20-16			
.0635-.0934 #52-#43 1.65-2.35mm	5/16	SF-20-5			
	3/8	SF-20-6			
	*1/2	SF-20-8			
	*3/4	SF-20-12			
	*1	SF-20-16			
	*1-3/8	SF-20-22			
.0935-.1249 #42-#31 2.40-3.15mm	5/16	SF-20-5			
	3/8	SF-20-6			
	1/2	SF-20-8			
	5/8	SF-20-10			
	*3/4	SF-20-12			
	*1	SF-20-16			
.1250-.1935 1/8-#10 3.20-4.90mm	*1-3/8	SF-20-22			
	1/4	SF-24-4			
	5/16	SF-24-5			
	3/8	SF-24-6			
	1/2	SF-24-8			
	5/8	SF-24-10			
.1935-.2280 #10-#1 4.90-5.80mm	3/4	SF-24-12			
	*1	SF-24-16			
	1/4	SF-28-4			
	5/16	SF-28-5			
	3/8	SF-28-6			
	1/2	SF-28-8			
.2340-.2900 A-L 5.90-7.40mm	5/8	SF-28-10			
	3/4	SF-28-12			
	*1	SF-28-16			

Why settle  
for the rest  
when  
you can  
have the best?

\* Counterbored, leaving correct drill-bearing length and clearance (see page 6 for bearing length).

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48



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# SLIP/FIXED RENEWABLE

# SF

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5	LOCK SCREW
.1405-.1889 #28-3/16 3.60-4.75mm	1/2 .5000-.4998	5/16	SF-32-5	Please see our web catalog for pricing.	LS-1 RC-01 RK-01 RK-10
		3/8	SF-32-6		
		1/2	SF-32-8		
		*3/4	SF-32-12		
		*1	SF-32-16		
		*1-3/8	SF-32-22		
		*1-1/2	SF-32-24		
*1-3/4		SF-32-28			
.1890-.3438 #12-11/32 4.80-8.70mm		5/16	SF-32-5		
		3/8	SF-32-6		
		1/2	SF-32-8		
		3/4	SF-32-12		
		*1	SF-32-16		
		*1-3/8	SF-32-22		
	*1-1/2	SF-32-24			
.2950-.3438 M-11/32 7.50-8.80mm	*1-3/4	SF-32-28			
	*2-1/8	SF-32-34			
	1/4	SF-36-4			
	5/16	SF-36-5			
	3/8	SF-36-6			
	1/2	SF-36-8			
	5/8	SF-36-10			
.3480-.4375 S-7/16 8.90-11.00mm	3/4	SF-36-12			
	1	SF-36-16			
	3/8	SF-40-6			
	1/2	SF-40-8			
	5/8	SF-40-10			
.2812-.5625 9/32-9/16 7.20-14.00mm	3/4	SF-40-12			
	1	SF-40-16			
	1-1/4	SF-40-20			
	3/8	SF-48-6			
	1/2	SF-48-8			
	3/4	SF-48-12			
	1	SF-48-16			
.5469-.6562 35/64-21/32 13.50-16.50mm	1-3/8	SF-48-22			
	1-1/2	SF-48-24			
	1-3/4	SF-48-28			
	2-1/8	SF-48-34			
	*2-1/2	SF-48-40			
	*3	SF-48-48			
	1/2	SF-56-8			
.4688-.7812 15/32-25/32 12.00-19.50mm	5/8	SF-56-10			
	3/4	SF-56-12			
	1	SF-56-16			
	1-1/4	SF-56-20			
	1-1/2	SF-56-24			
1 1.0000-.9998	1/2	SF-64-8			
	3/4	SF-64-12			
	1	SF-64-16			
	1-3/8	SF-64-22			
	1-1/2	SF-64-24			
	1-3/4	SF-64-28			
	2-1/8	SF-64-34			
2-1/2	SF-64-40				
3	SF-64-48				

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5	LOCK SCREW
.7188-1.0625 23/32-1-1/16 18.50-27.00mm	1-3/8 1.3750-1.3747	3/4	SF-88-12	Please see our web catalog for pricing.	LS-2 RC-02 RK-02 RK-12
		1	SF-88-16		
		1-3/8	SF-88-22		
		1-1/2	SF-88-24		
		1-3/4	SF-88-28		
		2-1/8	SF-88-34		
		2-1/2	SF-88-40		
.9688-1.4062 31/32-1-13/32 25.00-35.00mm	1-3/4 1.7500-1.7497	3	SF-88-48		
		3/4	SF-112-12		
		1	SF-112-16		
		1-3/8	SF-112-22		
		1-1/2	SF-112-24		
		1-3/4	SF-112-28		
		2-1/8	SF-112-34		
1.3438-1.8750 1-11/32-1-7/8 35.00-47.00mm	2-1/4 2.2500-2.2496	2-1/2	SF-112-40		
		3	SF-112-48		
		3/4	SF-144-12		
		1	SF-144-16		
		1-3/8	SF-144-22		
		1-1/2	SF-144-24		
		1-3/4	SF-144-28		
LS-3 RC-03 RK-03 RK-14	2-1/8	SF-144-34			
	2-1/2	SF-144-40			
	3	SF-144-48			
	LS-3 RC-03 RK-03 RK-14	1-3/8	SF-144-22		
	1-1/2	SF-144-24			
1-3/4	SF-144-28				
2-1/8	SF-144-34				
2-1/2	SF-144-40				
3	SF-144-48				

For extended-range bushings (larger sizes) please see our web catalog.

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48

The biggest disappointments come to those who get what's coming to them.

\* Counterbored, leaving correct drill-bearing length and clearance (see page 6 for bearing length).



# SFC

# SLIP/FIXED RENEWABLE CARBIDE



## SFC

### SLIP/FIXED RENEWABLE

## SC

### SLIP RENEWABLE

## FC

### FIXED RENEWABLE

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5	LOCK SCREW	
<b>.0520-.0934</b> #55-#43 1.35-2.35mm	<b>5/16</b> .3125-.3123	5/16	SFC-20-5	Contact Factory	LS-1 RC-01 RK-01 RK-10	
		1/2	SFC-20-8			
		3/4	SFC-20-12			
		1	SFC-20-16			
<b>.0935-.1562</b> #42-5/32 2.40-3.90mm		5/16	SFC-20-5	Contact Factory		
		1/2	SFC-20-8			
		3/4	SFC-20-12			
		1	SFC-20-16			
<b>.1406-.1889</b> 9/64-3/16 3.60-4.75mm	<b>1/2</b> .5000-.4998	5/16	SFC-32-5	Contact Factory	LS-1 RC-01 RK-01 RK-10	
		1/2	SFC-32-8			
		3/4	SFC-32-12			
		1	SFC-32-16			
<b>.1890-.3438</b> #12-11/32 4.80-8.70mm		1-3/8	SFC-32-22	Contact Factory		
		5/16	SFC-32-5			
		1/2	SFC-32-8			
		3/4	SFC-32-12			
<b>.2812-.5312</b> 9/32-17/32 7.20-13.00mm	1	SFC-32-16	Contact Factory			
	1-3/8	SFC-32-22				
	1/2	SFC-48-8		Contact Factory	LS-1 RC-01 RK-01 RK-10	
	3/4	SFC-48-12				
1	SFC-48-16					
1-3/8	SFC-48-22					
<b>.4688-.7812</b> 15/32-25/32 12.00-19.50mm	<b>1</b> 1.0000-.9998	1/2	SFC-64-8	Contact Factory		LS-2 RC-02 RK-02 RK-12
		3/4	SFC-64-12			
		1	SFC-64-16			
		1-3/8	SFC-64-22			
		1-3/4	SFC-64-28			
<b>.7188-1.0312</b> 23/32 - 1-1/32 18.50-27.00mm	<b>1-3/8</b> 1.3750-1.3747	3/4	SFC-88-12	Contact Factory	LS-2 RC-02 RK-02 RK-12	
		1	SFC-88-16			
		1-3/8	SFC-88-22			
		1-3/4	SFC-88-28			
		2-1/8	SFC-88-34			
		2-1/2	SFC-88-40			
<b>.9688-1.4062</b> 31/32 - 1-13/32 25.00-35.00mm	<b>1-3/4</b> 1.7500-1.7497	1	SFC-112-16	Contact Factory	LS-3 RC-03 RK-03 RK-14	
		1-3/8	SFC-112-22			
		1-3/4	SFC-112-28			
		2-1/8	SFC-112-34			
		2-1/2	SFC-112-40			
		3	SFC-112-48			
<b>1.3438-1.7812</b> 1-11/32 - 1-25/32 35.00-45.00mm	<b>2-1/4</b> 2.2500-2.2496	1	SFC-144-16	Contact Factory	LS-3 RC-03 RK-03 RK-14	
		1-3/8	SFC-144-22			
		1-3/4	SFC-144-28			
		2-1/8	SFC-144-34			
		2-1/2	SFC-144-40			
		3	SFC-144-48			

ANSI PART NO.	PRICE 1-5
SC-20-5	Contact Factory
SC-20-8	
SC-20-12	
SC-20-16	
SC-20-5	Contact Factory
SC-20-8	
SC-20-12	
SC-20-16	
SC-32-5	Contact Factory
SC-32-8	
SC-32-12	
SC-32-16	
SC-32-22	
SC-32-5	Contact Factory
SC-32-8	
SC-32-12	
SC-32-16	
SC-32-22	
SC-48-8	Contact Factory
SC-48-12	
SC-48-16	
SC-48-22	
SC-64-8	Contact Factory
SC-64-12	
SC-64-16	
SC-64-22	
SC-64-28	
SC-88-12	Contact Factory
SC-88-16	
SC-88-22	
SC-88-28	
SC-88-34	
SC-88-40	Contact Factory
SC-112-16	
SC-112-22	
SC-112-28	
SC-112-34	
SC-112-40	
SC-112-48	Contact Factory
SC-144-16	
SC-144-22	
SC-144-28	
SC-144-34	
SC-144-40	
SC-144-48	

ANSI PART NO.	PRICE 1-5
FC-20-5	Contact Factory
FC-20-8	
FC-20-12	
FC-20-16	
FC-20-5	Contact Factory
FC-20-8	
FC-20-12	
FC-20-16	
FC-32-5	Contact Factory
FC-32-8	
FC-32-12	
FC-32-16	
FC-32-22	
FC-32-5	Contact Factory
FC-32-8	
FC-32-12	
FC-32-16	
FC-32-22	
FC-48-8	Contact Factory
FC-48-12	
FC-48-16	
FC-48-22	
FC-64-8	Contact Factory
FC-64-12	
FC-64-16	
FC-64-22	
FC-64-28	
FC-88-12	Contact Factory
FC-88-16	
FC-88-22	
FC-88-28	
FC-88-34	
FC-88-40	Contact Factory
FC-112-16	
FC-112-22	
FC-112-28	
FC-112-34	
FC-112-40	
FC-112-48	Contact Factory
FC-144-16	
FC-144-22	
FC-144-28	
FC-144-34	
FC-144-40	
FC-144-48	

Note: Due to manufacturing requirements, head dimensions of some carbide bushings may differ slightly from ANSI standards. Most carbide bushings have steel heads.



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# SLIP/FIXED RENEWABLE METRIC

# SFM

ID RANGE (G6)	OD (h5)	LENGTH	ANSI PART NO.	PRICE 1-5	LOCK SCREW	
.35-1.00mm	8mm 8.000-7.994mm	*10mm	SFM-8-10	Please see our web catalog for pricing.	LSM-1 LSM-2 RCM-1 RCM-2	
		*16mm	SFM-8-16			
1.01-1.80mm		10mm	SFM-8-10			
		16mm	SFM-8-16			
1.81-4.00mm		10mm	SFM-8-10			
		16mm	SFM-8-16			
4.01-6.00mm	10mm 10.000-9.994mm	12mm	SFM-10-12		LSM-3 LSM-4 RCM-3 RCM-4	
		20mm	SFM-10-20			
		25mm	SFM-10-25			
6.01-8.00mm	12mm 12.000-11.992mm	12mm	SFM-12-12			LSM-5 LSM-6 RCM-5 RCM-6
		20mm	SFM-12-20			
		25mm	SFM-12-25			
8.01-10.00mm	15mm 15.000-14.992mm	16mm	SFM-15-16	LSM-7 LSM-8 RCM-7 RCM-8		
		28mm	SFM-15-28			
		36mm	SFM-15-36			
10.01-12.00mm	18mm 18.000-17.992mm	16mm	SFM-18-16			
		28mm	SFM-18-28			
		36mm	SFM-18-36			
12.01-15.00mm	22mm 22.000-21.991mm	20mm	SFM-22-20			
		36mm	SFM-22-36			
		45mm	SFM-22-45			
15.01-18.00mm	26mm 26.000-25.991mm	20mm	SFM-26-20			
		36mm	SFM-26-36			
		45mm	SFM-26-45			
18.01-22.00mm	30mm 30.000-29.991mm	25mm	SFM-30-25			
		45mm	SFM-30-45			
		56mm	SFM-30-56			
22.01-26.00mm	35mm 35.000-34.989mm	25mm	SFM-35-25			
		45mm	SFM-35-45			
		56mm	SFM-35-56			
26.01-30.00mm	42mm 42.000-41.989mm	30mm	SFM-42-30			
		56mm	SFM-42-56			
		67mm	SFM-42-67			
30.01-35.00mm	48mm 48.000-47.989mm	30mm	SFM-48-30			
		56mm	SFM-48-56			
		67mm	SFM-48-67			
35.01-42.00mm	55mm 55.000-54.987mm	30mm	SFM-55-30			
		56mm	SFM-55-56			
		67mm	SFM-55-67			
42.01-48.00mm	62mm 62.000-61.987mm	35mm	SFM-62-35			
		67mm	SFM-62-67			
		78mm	SFM-62-78			

ID RANGE (G6)	OD (h5)	LENGTH	ANSI PART NO.	PRICE 1-5	LOCK SCREW
48.01-55.00mm	70mm 70.000-69.987mm	35mm	SFM-70-35	Please see our web catalog for pricing.	LSM-7 LSM-8 RCM-7 RCM-8
		67mm	SFM-70-67		
		78mm	SFM-70-78		
55.01-62.00mm	78mm 78.000-77.987mm	40mm	SFM-78-40		
		78mm	SFM-78-78		
		105mm	SFM-78-105		
62.01-70.00mm	85mm 85.000-84.985mm	40mm	SFM-85-40		
		78mm	SFM-85-78		
		105mm	SFM-85-105		
70.01-78.00mm	95mm 95.000-94.985mm	45mm	SFM-95-45		
		89mm	SFM-95-89		
		112mm	SFM-95-112		
78.01-85.00mm	105mm 105.000-104.985mm	45mm	SFM-105-45		
		89mm	SFM-105-89		
		112mm	SFM-105-112		

\* Small metric drill sizes through .80mm are counterbored 1.00mm diameter, with 3mm drill-bearing length.

He that won't  
be counselled  
can't be helped.

-Ben Franklin

### QUANTITY DISCOUNTS

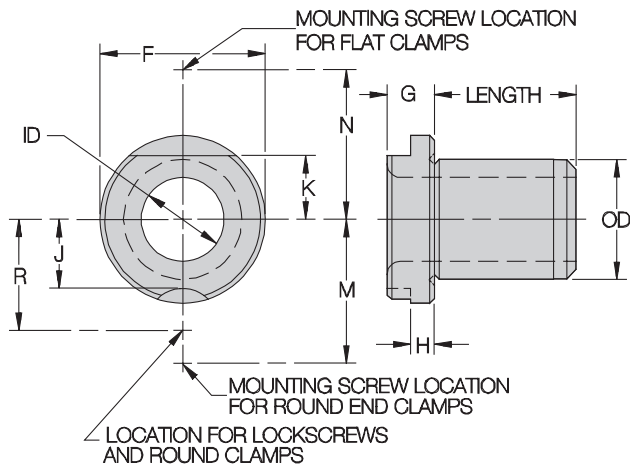
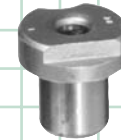
Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48



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# FM FLAT MILLED RENEWABLE



## STANDARD ID TOLERANCES:

From #80 to 1/4"	+0.001/+0.004	From .35 to 3mm	+0.002/+0.008mm
Over 1/4 to 3/4"	+0.001/+0.005	Over 3 to 6mm	+0.004/+0.012mm
Over 3/4 to 1-1/2"	+0.002/+0.006	Over 6 to 10mm	+0.005/+0.014mm
Over 1-1/2 to 2-3/4"	+0.003/+0.007	Over 10 to 18mm	+0.006/+0.017mm
		Over 18 to 30mm	+0.007/+0.020mm
		Over 30 to 50mm	+0.009/+0.025mm
			(G6 tolerance)

## REAMER ID TOLERANCES:

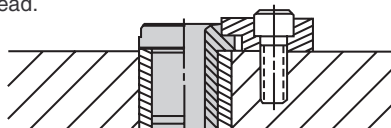
From #60 to 1/4"	+0.0005/+0.0008	From 1 to 3mm	+0.006/+0.012mm
Over 1/4 to 1"	+0.0006/+0.0010	Over 3 to 6mm	+0.010/+0.018mm
Over 1" to 1-1/2"	+0.0008/+0.0012	Over 6 to 10mm	+0.013/+0.022mm
		Over 10 to 18mm	+0.016/+0.027mm
		Over 18 to 30mm	+0.020/+0.033mm
			(F6 tolerance)

BODY OD	F	G	H	J	K	M	N	R	FLAT CLAMP	LOCK SCREW
5/16	35/64			11/64	11/64	5/8	11/16	1/2	FC-01 FC-10	LS-1
1/2	51/64	1/4	1/8	19/64	17/64	3/4	25/32	5/8		
3/4	1-3/64			27/64	25/64	7/8	57/64	3/4		
1	1-27/64			19/32	1/2	1-7/64	1-9/64	59/64	FC-02 FC-12	LS-2
1-3/8	1-51/64	3/8	3/16	25/32	11/16	1-19/64	1-21/64	1-7/64		
1-3/4	2-19/64			1	7/8	1-41/64	1-33/64	1-25/64	FC-03 FC-14 FC-15	LS-3
2-1/4	2-51/64	3/8	3/16	1-1/4	1-1/8	1-57/64	1-49/64	1-41/64		

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5	CLAMP
.0135-.0291 #80-#70 .35-.70mm	5/16 .3125-.3123	*1/4	FM-20-4	Please see our web catalog for pricing.	FC-01 FC-10 LS-1 RC-01 RK-01 RK-10
		*5/16	FM-20-5		
		*3/8	FM-20-6		
		*1/2	FM-20-8		
		*3/4	FM-20-12		
.0292-.0519 #69-3/64 .75-1.30mm		*5/16	FM-20-5		
		*3/8	FM-20-6		
		*1/2	FM-20-8		
		*3/4	FM-20-12		
		.0520-.0634 #55-1/16 1.35-1.60mm	*5/16		
*3/8			FM-20-6		
*1/2			FM-20-8		
*3/4			FM-20-12		
.0635-.0934 #52-#43 1.65-2.35mm			5/16		
		*3/8	FM-20-6		
	*1/2	FM-20-8			
	*3/4	FM-20-12			
	*1	FM-20-16			
.0935-.1249 #42-#31 2.40-3.15mm	5/16	FM-20-5			
	3/8	FM-20-6			
	*1/2	FM-20-8			
	*3/4	FM-20-12			
	*1	FM-20-16			
.1250-.1935 1/8-#10 3.20-4.90mm	*1-3/8	FM-20-22			
	5/16	FM-20-5			
	3/8	FM-20-6			
	1/2	FM-20-8			
	5/8	FM-20-10			
	*3/4	FM-20-12			
	*1	FM-20-16			
	*1-3/8	FM-20-22			

## APPLICATIONS:

Replaceable bushing used for extra resistance to rotational forces under harsh conditions. This bushing, generally used with a liner, has a milled locking flat to allow fastening securely with a flat clamp. FM bushings also have a standard recess on the other side to allow using a lock screw instead.



## ORDERING EXAMPLES:

FM-20-16-.1250	Standard USA Bushing, inch ID
FM-20-16-.1772	Standard USA Bushing, mm ID (.1772 = 4.50mm)
FM-20-16-.1250 REAMER	Reamer Tolerance on ID
FM-20-16-.1250 NCB	No counterbore on long bushings marked with * (no counterbore is standard on all other bushings)
FMC-20-16-.1250	Carbide Bushing

Prices shown here apply to standard bushings only, for a standard drill size within the stated ID range. See back cover for decimal equivalents. To price non-standard sizes, including all reamer and tap-guide bushings, see page 7.

\* Counterbored, leaving correct drill-bearing length and clearance (see page 6 for bearing length).

## QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48



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# FLAT MILLED RENEWABLE **FM**

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5	CLAMP
<b>.1405-.1889</b> #28-3/16 3.60-4.75mm	<b>1/2</b> .5000-.4998	5/16	FM-32-5	Please see our web catalog for pricing.	FC-01 FC-10 LS-1 RC-01 RK-01 RK-10
		3/8	FM-32-6		
		1/2	FM-32-8		
		*3/4	FM-32-12		
		*1	FM-32-16		
		*1-3/8	FM-32-22		
		*1-1/2	FM-32-24		
		*1-3/4	FM-32-28		
		5/16	FM-32-5		
		3/8	FM-32-6		
<b>.1890-.3438</b> #12-11/32 4.80-8.70mm	<b>3/4</b> .7500-.7498	1/2	FM-32-8		
		3/4	FM-32-12		
		*1	FM-32-16		
		*1-3/8	FM-32-22		
		*1-1/2	FM-32-24		
		*1-3/4	FM-32-28		
		*2-1/8	FM-32-34		
		3/8	FM-48-6		
		1/2	FM-48-8		
		<b>.2812-.5625</b> 9/32-9/16 7.20-14.00mm	<b>1</b> 1.0000-.9998	3/4	FM-48-12
1	FM-48-16				
1-3/8	FM-48-22				
1-1/2	FM-48-24				
1-3/4	FM-48-28				
2-1/8	FM-48-34				
*2-1/2	FM-48-40				
*3	FM-48-48				
1/2	FM-64-8				
<b>.4688-.7812</b> 15/32-25/32 12.00-19.50mm	<b>1-3/8</b> 1.3750-1.3747			3/4	FM-64-12
		1	FM-64-16		
		1-3/8	FM-64-22		
		1-1/2	FM-64-24		
		1-3/4	FM-64-28		
		2-1/8	FM-64-34		
		2-1/2	FM-64-40		
		3	FM-64-48		
		3/4	FM-88-12		
		<b>.7188-1.0625</b> 23/32 - 1-1/16 18.50-27.00mm	<b>1</b> 1.0000-.9998	1	FM-88-16
1-3/8	FM-88-22				
1-1/2	FM-88-24				
1-3/4	FM-88-28				
2-1/8	FM-88-34				
2-1/2	FM-88-40				
3	FM-88-48				

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5	CLAMP
<b>.9688-1.4062</b> 31/32 - 1-13/32 25.00-35.00mm	<b>1-3/4</b> 1.7500-1.7497	3/4	FM-112-12	Please see our web catalog for pricing.	FC-03 FC-14 FC-15 LS-3 RC-03 RK-03 RK-14
		1	FM-112-16		
		1-3/8	FM-112-22		
		1-1/2	FM-112-24		
		1-3/4	FM-112-28		
		2-1/8	FM-112-34		
		2-1/2	FM-112-40		
		3	FM-112-48		
<b>1.3438-1.8750</b> 1-11/32 - 1-7/8 35.00-47.00mm	<b>2-1/4</b> 2.2500-2.2496	3/4	FM-144-12	FC-03 FC-14 FC-15 LS-3 RC-03 RK-03 RK-14	
		1	FM-144-16		
		1-3/8	FM-144-22		
		1-1/2	FM-144-24		
		1-3/4	FM-144-28		
		2-1/8	FM-144-34		
		2-1/2	FM-144-40		
		3	FM-144-48		

For extended-range bushings (larger sizes) please see our web catalog.

**Cooperation  
is doing  
with a smile  
what you  
have to do  
anyway.**

\* Counter-bored, leaving correct drill-bearing length and clearance (see page 6 for bearing length).

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48

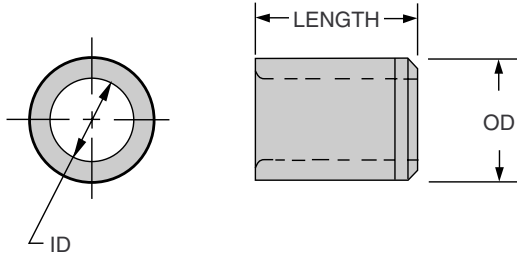


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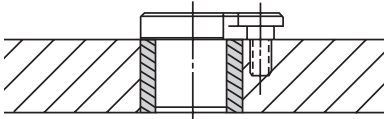
# L

# LINER



### APPLICATIONS:

Liners are permanent bushings used to hold renewable drill bushings. The liner's ID has a precise sliding fit with the renewable bushing's OD. The hardened liner accurately locates the renewable bushing and protects the jig plate from wear caused by frequent bushing replacement. Note: Metric liner bushings are the same as metric press-fit bushings.



### ORDERING EXAMPLES:

- L-32-16 Standard USA liner bushing
- L-32-16U Unground OD
- L-40-16-24 Standard USA liner bushing with a choice of ID in that OD size
- PM-18-25-12.00 Standard metric liner bushing (same as metric press-fit type)

Prices shown here apply to standard bushings only, either ground or unground OD, for a standard ID size.

### STANDARD LINER ID TOLERANCES:

3/16 to 3/8"	+ .0001/+ .0004	8 to 10mm	+ .005/+ .014mm
7/16 to 5/8"	+ .0002/+ .0005	12 to 18mm	+ .006/+ .017mm
3/4"	+ .0003/+ .0006	22 to 30mm	+ .007/+ .020mm
7/8 to 1"	+ .0004/+ .0007	35 to 48mm	+ .009/+ .025mm
1-3/8"	+ .0006/+ .0010	55 to 78mm	+ .010/+ .029mm
1-3/4"	+ .0008/+ .0012	85 to 105mm	+ .012/+ .034mm
2-1/4"	+ .0010/+ .0015	(G6 tolerance)	

ID	OD	LENGTH	ANSI PART NO.	PRICE 1-5
3/16	5/16 .3141-.3138 (.327-.322 UNG)	1/4	L-20-4	Please see our web catalog for pricing.
		5/16	L-20-5	
		3/8	L-20-6	
		1/2	L-20-8	
		5/8	L-20-10	
		3/4	L-20-12	
1/4	7/16 .4392-.4389 (.453-.448 UNG)	1/4	L-28-4	
		5/16	L-28-5	
		3/8	L-28-6	
		1/2	L-28-8	
		5/8	L-28-10	
		3/4	L-28-12	

ID	OD	LENGTH	ANSI PART NO.	PRICE 1-5	
5/16	1/2 .5017-.5014 (.520-.515 UNG)	1/4	L-32-4	Please see our web catalog for pricing.	
		5/16	L-32-5		
		3/8	L-32-6		
		1/2	L-32-8		
		5/8	L-32-10		
		3/4	L-32-12		
		1	L-32-16		
	9/16 .5642-.5639 (.582-.577 UNG)	1-3/8	L-32-22		
		1/4	L-36-4		
		5/16	L-36-5		
		3/8	L-36-6		
		1/2	L-36-8		
		5/8	L-36-10		
		3/4	L-36-12		
3/8	5/8 .6267-.6264 (.645-.640 UNG)	1	L-36-16		
		1/4	L-40-4-24		
		5/16	L-40-5-24		
		3/8	L-40-6-24		
		1/2	L-40-8-24		
		5/8	L-40-10-24		
		3/4	L-40-12-24		
		1	L-40-16-24		
		7/16		1/4	L-40-4-28
				5/16	L-40-5-28
3/8	L-40-6-28				
1/2	L-40-8-28				
5/8	L-40-10-28				
3/4	L-40-12-28				
1	L-40-16-28				
1/2	3/4 .7518-.7515 (.770-.765 UNG)			5/16	L-48-5
		3/8	L-48-6		
		1/2	L-48-8		
		3/4	L-48-12		
		1	L-48-16		
		1-3/8	L-48-22		
		1-1/2	L-48-24		
		1-3/4	L-48-28		
		2-1/8	L-48-34		
		9/16	7/8 .8768-.8765 (.895-.890 UNG)	5/16	L-56-5-36
3/8	L-56-6-36				
1/2	L-56-8-36				
5/8	L-56-10-36				
3/4	L-56-12-36				
1	L-56-16-36				
1-1/4	L-56-20-36				
5/8				5/16	L-56-5-40
				3/8	L-56-6-40
				1/2	L-56-8-40
		5/8	L-56-10-40		
		3/4	L-56-12-40		
		1	L-56-16-40		
		1-1/4	L-56-20-40		

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48





# LINER



ID	OD	LENGTH	ANSI PART NO.	PRICE 1-5
3/4	1 1.0018-1.0015 (1.020-1.015 UNG)	1/2	L-64-8	
		3/4	L-64-12	
		1	L-64-16	
		1-3/8	L-64-22	
		1-1/2	L-64-24	
		1-3/4	L-64-28	
		2-1/8	L-64-34	
		2-1/2	L-64-40	
7/8	1-1/4 1.2520-1.2517 (1.270-1.265 UNG)	3	L-64-48	
		1/2	L-80-8	
		5/8	L-80-10	
		3/4	L-80-12	
		1	L-80-16	
		1-1/4	L-80-20	
1	1-3/8 1.3772-1.3768 (1.395-1.390 UNG)	1-1/2	L-80-24	
		1/2	L-88-8	
		3/4	L-88-12	
		1	L-88-16	
		1-3/8	L-88-22	
		1-1/2	L-88-24	
		1-3/4	L-88-28	
		2-1/8	L-88-34	
1-3/8	1-3/4 1.7523-1.7519 (1.770-1.765 UNG)	2-1/2	L-88-40	
		3	L-88-48	
		3/4	L-112-12	
		1	L-112-16	
		1-3/8	L-112-22	
		1-1/2	L-112-24	
		1-3/4	L-112-28	
		2-1/8	L-112-34	
1-3/4	2-1/4 2.2525-2.2521 (2.270-2.265 UNG)	2-1/2	L-112-40	
		3	L-112-48	
		3/4	L-144-12	
		1	L-144-16	
		1-3/8	L-144-22	
		1-1/2	L-144-24	
		1-3/4	L-144-28	
		2-1/8	L-144-34	
2-1/4	2-3/4 2.7526-2.7522 (2.770-2.765 UNG)	2-1/2	L-144-40	
		3	L-144-48	
		3/4	L-176-12	
		1	L-176-16	
		1-3/8	L-176-22	
		1-1/2	L-176-24	
		1-3/4	L-176-28	
		2-1/8	L-176-34	
2-1/2	L-176-40			
3	L-176-48			

Please see our web catalog for pricing.

For extended-range bushings (larger sizes) please see our web catalog.

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48

## Alignment Pins

### Offer Strength and Precision

Our wide variety of precision alignment pins includes ball-lock pins, detent pins, expanding pins and lifting pins. Choose just the right pin for every job. Send for a free catalog, or view our web site, [www.carlane.com](http://www.carlane.com). We also have a wide assortment of tooling components, clamps, modular fixturing and much more.



L Pin



Shoulder Pin



T Pin



Clamping Pin



Jig Pin



Ball Lock Pin



Marine Pin



Lifting Pin



Locating Pin



Detent Pin



Locking Pin



Expanding Pin



# PM

# LINER METRIC



ID (G6)	OD (s6)	LENGTH	ANSI PART NO.	PRICE 1-5
8mm	12mm 12.039-12.028mm	10mm	PM-12-10-8.00	Please see our web catalog for pricing.
		16mm	PM-12-16-8.00	
10mm	15mm 15.039-15.028mm	12mm	PM-15-12-10.00	
		20mm	PM-15-20-10.00	
		25mm	PM-15-25-10.00	
12mm	18mm 18.039-18.028mm	12mm	PM-18-12-12.00	
		20mm	PM-18-20-12.00	
		25mm	PM-18-25-12.00	
15mm	22mm 22.048-22.035mm	16mm	PM-22-16-15.00	
		28mm	PM-22-28-15.00	
		36mm	PM-22-36-15.00	
18mm	26mm 26.048-26.035mm	16mm	PM-26-16-18.00	
		28mm	PM-26-28-18.00	
		36mm	PM-26-36-18.00	
22mm	30mm 30.048-30.035mm	20mm	PM-30-20-22.00	
		36mm	PM-30-36-22.00	
		45mm	PM-30-45-22.00	
26mm	35mm 35.059-35.043mm	20mm	PM-35-20-26.00	
		36mm	PM-35-36-26.00	
		45mm	PM-35-45-26.00	
30mm	42mm 42.059-42.043mm	25mm	PM-42-25-30.00	
		45mm	PM-42-45-30.00	
		56mm	PM-42-56-30.00	
35mm	48mm 48.059-48.043mm	25mm	PM-48-25-35.00	
		45mm	PM-48-45-35.00	
		56mm	PM-48-56-35.00	
42mm	55mm 55.072-55.053mm	30mm	PM-55-30-42.00	
		56mm	PM-55-56-42.00	
		67mm	PM-55-67-42.00	
48mm	62mm 62.072-62.053mm	30mm	PM-62-30-48.00	
		56mm	PM-62-56-48.00	
		67mm	PM-62-67-48.00	
55mm	70mm 70.078-70.059mm	30mm	PM-70-30-55.00	
		56mm	PM-70-56-55.00	
		67mm	PM-70-67-55.00	
62mm	78mm 78.078-78.059mm	35mm	PM-78-35-62.00	
		67mm	PM-78-67-62.00	
		78mm	PM-78-78-62.00	

ID (G6)	OD (s6)	LENGTH	ANSI PART NO.	PRICE 1-5
70mm	85mm 85.093-85.071mm	35mm	PM-85-35-70.00	Please see our web catalog for pricing.
		67mm	PM-85-67-70.00	
		78mm	PM-85-78-70.00	
78mm	95mm 95.093-95.071mm	40mm	PM-95-40-78.00	
		78mm	PM-95-78-78.00	
		105mm	PM-95-105-78.00	
85mm	105mm 105.101-105.079mm	40mm	PM-105-40-85.00	
		78mm	PM-105-78-85.00	
		105mm	PM-105-105-85.00	
95mm	115mm 115.101-115.079mm	45mm	PM-115-45-95.00	
		89mm	PM-115-89-95.00	
		112mm	PM-115-112-95.00	
105mm	125mm 125.117-125.092mm	45mm	PM-125-45-105.00	
		89mm	PM-125-89-105.00	
		112mm	PM-125-112-105.00	

Note: Metric liner bushings are the same as metric press-fit bushings.

Please see our web catalog for pricing.

Be the job  
Great or small  
Do it right  
Or not at all.

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48



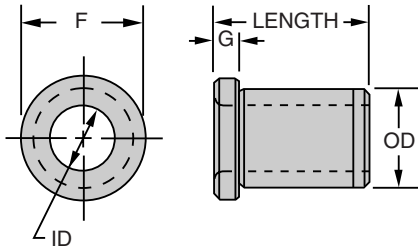
**MANUFACTURING CO.**  
4200 Carr Lane Ct., P.O. Box 191970  
St. Louis, Missouri 63119-7970 USA  
Phone: 314-647-6200, FAX: 314-647-5736  
Web Site: www.carrlane.com





# HEAD LINER

# HL



**USA**

BODY OD	F DIA	G
1/2	5/8	3/32
3/4	7/8	3/32
1	1-1/8	1/8
1-3/8	1-1/2	1/8
1-3/4	1-7/8	3/16
2-1/4	2-3/8	3/16
2-3/4	2-7/8	3/16

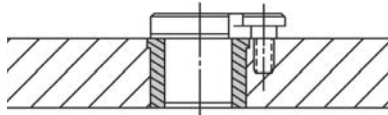
**METRIC**

BODY OD	F DIA	G
12mm	15mm	3mm
15mm	18mm	3mm
18mm	22mm	4mm
22mm	26mm	4mm
26mm	30mm	4mm
30mm	34mm	5mm
35mm	39mm	5mm
42mm	46mm	5mm
48mm	52mm	5mm
55mm	59mm	5mm
62mm	66mm	6mm
70mm	74mm	6mm
78mm	82mm	6mm
85mm	90mm	6mm
95mm	100mm	6mm
105mm	110mm	6mm
115mm	120mm	6mm
125mm	130mm	6mm

For dimensions of larger USA sizes, see page 37 (Extended Range).

### APPLICATIONS:

Similar to an L bushing, but with a head to resist heavy axial loads. Head liners are permanent bushings used to hold renewable drill bushings. The head liner's ID has a precise sliding fit with the renewable bushing's OD. The hardened head liner accurately locates the renewable bushing and protects the jig plate from wear caused by frequent bushing replacement. Note: The "length" listed for a head liner refers to its overall length, not its length under the head. Metric head-liner bushings are the same as metric head-press-fit bushings.



### ORDERING EXAMPLES:

HL-32-16 Standard USA liner bushing  
 HL-32-16U Unground OD  
 HM-18-25-12.00 Standard metric liner bushing (same as metric press-fit type)

Prices shown here apply to standard bushings only, either ground or unground OD, for a standard ID size.

### STANDARD LINER ID TOLERANCES:

5/16"	+0.001/+0.004	8 to 10mm	+0.05/+0.014mm
1/2"	+0.002/+0.005	12 to 18mm	+0.06/+0.017mm
3/4"	+0.003/+0.006	22 to 30mm	+0.07/+0.020mm
1"	+0.004/+0.007	35 to 48mm	+0.09/+0.025mm
1-3/8"	+0.006/+0.010	55 to 78mm	+0.10/+0.029mm
1-3/4"	+0.008/+0.012	85 to 105mm	+0.12/+0.034mm
2-1/4"	+0.010/+0.015		(G6 tolerance)

ID	OD	LENGTH	ANSI PART NO.	PRICE 1-5
5/16	1/2 .5017-.5014 (.520-.515 UNG)	5/16	HL-32-5	
		3/8	HL-32-6	
		1/2	HL-32-8	
		3/4	HL-32-12	
		1	HL-32-16	
1/2	3/4 .7518-.7515 (.770-.765 UNG)	1-3/8	HL-32-22	
		5/16	HL-48-5	
		3/8	HL-48-6	
		1/2	HL-48-8	
		3/4	HL-48-12	
		1	HL-48-16	
		1-3/8	HL-48-22	
3/4	1 1.0018-1.0015 (1.020-1.015 UNG)	1-1/2	HL-48-24	
		1-3/4	HL-48-28	
		2-1/8	HL-48-34	
		1/2	HL-64-8	
		3/4	HL-64-12	
		1	HL-64-16	
		1-3/8	HL-64-22	
		1-1/2	HL-64-24	
		1-3/4	HL-64-28	
		2-1/8	HL-64-34	
1	1-3/8 1.3772-1.3768 (1.395-1.390 UNG)	2-1/2	HL-64-40	
		3	HL-64-48	
		1/2	HL-88-8	
		3/4	HL-88-12	
		1	HL-88-16	
		1-3/8	HL-88-22	
		1-1/2	HL-88-24	
		1-3/4	HL-88-28	
1-3/8	1-3/4 1.7523-1.7519 (1.770-1.765 UNG)	2-1/8	HL-88-34	
		2-1/2	HL-88-40	
		3	HL-88-48	
		3/4	HL-112-12	
		1	HL-112-16	
		1-3/8	HL-112-22	
1-3/4	2-1/4 2.2525-2.2521 (2.270-2.265 UNG)	1-1/2	HL-112-24	
		1-3/4	HL-112-28	
		2-1/8	HL-112-34	
		2-1/2	HL-112-40	
		3	HL-112-48	
		3/4	HL-144-12	
		1	HL-144-16	
2-1/4	2-3/4 2.7526-2.7522 (2.770-2.765 UNG)	1-3/8	HL-144-22	
		1-1/2	HL-144-24	
		1-3/4	HL-144-28	
		2-1/8	HL-144-34	
		2-1/2	HL-144-40	
		3	HL-144-48	
2-3/4	3 3.2528-3.2524 (3.270-3.265 UNG)	3/4	HL-176-12	
		1	HL-176-16	
		1-3/8	HL-176-22	
		1-1/2	HL-176-24	
		1-3/4	HL-176-28	
		2-1/8	HL-176-34	
		2-1/2	HL-176-40	
		3	HL-176-48	

Please see our web catalog for pricing.

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48

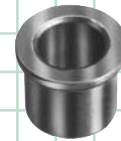


### MANUFACTURING CO.

4200 Carr Lane Ct., P.O. Box 191970  
 St. Louis, Missouri 63119-7970 USA  
 Phone: 314-647-6200, FAX: 314-647-5736  
 Web Site: www.carrlane.com

# HM

# HEAD LINER METRIC



ID (G6)	OD (s6)	LENGTH	ANSI PART NO.	PRICE 1-5
8mm	12mm 12.039-12.028mm	10mm	HM-12-10-8.00	Please see our web catalog for pricing.
		16mm	HM-12-16-8.00	
10mm	15mm 15.039-15.028mm	12mm	HM-15-12-10.00	
		20mm	HM-15-20-10.00	
12mm	18mm 18.039-18.028mm	12mm	HM-18-12-12.00	
		20mm	HM-18-20-12.00	
15mm	22mm 22.048-22.035mm	25mm	HM-18-25-12.00	
		16mm	HM-22-16-15.00	
		28mm	HM-22-28-15.00	
18mm	26mm 26.048-26.035mm	36mm	HM-22-36-15.00	
		16mm	HM-26-16-18.00	
22mm	30mm 30.048-30.035mm	28mm	HM-26-28-18.00	
		36mm	HM-26-36-18.00	
		45mm	HM-26-45-26.00	
26mm	35mm 35.059-35.043mm	20mm	HM-30-20-22.00	
		36mm	HM-30-36-22.00	
		45mm	HM-30-45-22.00	
30mm	42mm 42.059-42.043mm	20mm	HM-35-20-26.00	
		36mm	HM-35-36-26.00	
		45mm	HM-35-45-26.00	
35mm	48mm 48.059-48.043mm	25mm	HM-42-25-30.00	
		45mm	HM-42-45-30.00	
		56mm	HM-42-56-30.00	
42mm	55mm 55.072-55.053mm	25mm	HM-48-25-35.00	
		45mm	HM-48-45-35.00	
		56mm	HM-48-56-35.00	
48mm	62mm 62.072-62.053mm	30mm	HM-55-30-42.00	
		56mm	HM-55-56-42.00	
		67mm	HM-55-67-42.00	
55mm	70mm 70.078-70.059mm	30mm	HM-62-30-48.00	
		56mm	HM-62-56-48.00	
		67mm	HM-62-67-48.00	
62mm	78mm 78.078-78.059mm	30mm	HM-70-30-55.00	
		56mm	HM-70-56-55.00	
		67mm	HM-70-67-55.00	
78mm	85mm 85.093-85.071mm	35mm	HM-78-35-62.00	
		67mm	HM-78-67-62.00	
		78mm	HM-78-78-62.00	

ID (G6)	OD (s6)	LENGTH	ANSI PART NO.	PRICE 1-5
70mm	85mm 85.093-85.071mm	35mm	HM-85-35-70.00	Please see our web catalog for pricing.
		67mm	HM-85-67-70.00	
		78mm	HM-85-78-70.00	
78mm	95mm 95.093-95.071mm	40mm	HM-95-40-78.00	
		78mm	HM-95-78-78.00	
		105mm	HM-95-105-78.00	
85mm	105mm 105.101-105.079mm	40mm	HM-105-40-85.00	
		78mm	HM-105-78-85.00	
		105mm	HM-105-105-85.00	
95mm	115mm 115.101-115.079mm	45mm	HM-115-45-95.00	
		89mm	HM-115-89-95.00	
		112mm	HM-115-112-95.00	
105mm	125mm 125.117-125.092mm	45mm	HM-125-45-105.00	
		89mm	HM-125-89-105.00	
		112mm	HM-125-112-105.00	

Note: Metric head-liner bushings are the same as metric head-press-fit bushings.

It is not  
a tragedy to have  
only one talent;  
the tragedy  
is in  
not using it.

### QUANTITY DISCOUNTS

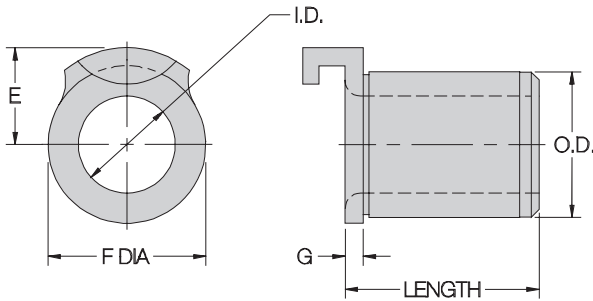
Quantity	1	6	12	24	50	100	200	500
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48





# UN-A-LOK® LINER

# UL



### USA

BODY OD	E	F DIA	G
5/16	1/4	.365	3/32
1/2	3/8	9/16	3/32
3/4	1/2	13/16	3/32
1	21/32	1-1/16	1/8
1-3/8	7/8	1-7/16	1/8

### METRIC

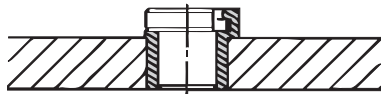
BODY OD	E	F DIA	G
12mm	9.5mm	15mm	3mm
15mm	11mm	18mm	3mm
18mm	13mm	22mm	4mm
22mm	15.5mm	26mm	4mm
26mm	17.5mm	30mm	4mm

### USA

ID	OD	LENGTH	PART NO.	PRICE 1-5
3/16	5/16 .3141-.3138 (.327-.322 UNG)	5/16	UL-20-5	Please see our web catalog for pricing.
		3/8	UL-20-6	
		1/2	UL-20-8	
		3/4	UL-20-12	
5/16	1/2 .5017-.5014 (.520-.515 UNG)	3/8	UL-32-6	
		1/2	UL-32-8	
		3/4	UL-32-12	
1/2	3/4 .7518-.7515 (.770-.765 UNG)	1/2	UL-48-8	
		3/4	UL-48-12	
		1	UL-48-16	
3/4	1 1.0018-1.0015 (1.020-1.015 UNG)	1/2	UL-64-8	
		3/4	UL-64-12	
		1	UL-64-16	
1	1-3/8 1.3772-1.3768 (1.395-1.390 UNG)	1/2	UL-88-8	
		3/4	UL-88-12	
		1	UL-88-16	
		1-3/8	UL-88-22	

### APPLICATIONS:

Similar to an HL head liner, but incorporating a special locking tab that eliminates the need for a lock screw. Un-A-Lok® liners are permanent bushings used to hold SF renewable drill bushings (on the "slip" side only, not the "fixed" side). Although slightly more expensive than a head liner plus a lock screw, installation time is dramatically reduced. Patent no. 3,015,242 and 3,099,079.



### ORDERING EXAMPLES:

UL-20-5 Standard USA liner bushing  
 UL-20-5U Unground OD  
 ULM-12-10 Standard metric liner bushing

### STANDARD LINER ID TOLERANCES:

3/16 to 5/16"	+0.0001/+0.0004	8 to 10mm	+0.005/+0.014mm
1/2"	+0.0002/+0.0005	12 to 18mm	+0.006/+0.017mm
3/4"	+0.0003/+0.0006		(G6 tolerance)
1"	+0.0004/+0.0007		

### METRIC

ID (G6)	OD (s6)	LENGTH	PART NO.	PRICE 1-5
8mm	12mm 12.039-12.028mm	10mm	ULM-12-10-8.00	Contact Factory
		16mm	ULM-12-16-8.00	Contact Factory
10mm	15mm 15.039-15.028mm	12mm	ULM-15-12-10.00	Contact Factory
		20mm	ULM-15-20-10.00	Contact Factory
		25mm	ULM-15-25-10.00	Contact Factory
12mm	18mm 18.039-18.028mm	12mm	ULM-18-12-12.00	Contact Factory
		20mm	ULM-18-20-12.00	Contact Factory
		25mm	ULM-18-25-12.00	Contact Factory
15mm	22mm 22.048-22.035mm	16mm	ULM-22-16-15.00	Contact Factory
		28mm	ULM-22-28-15.00	Contact Factory
		36mm	ULM-22-36-15.00	Contact Factory
18mm	26mm 26.048-26.035mm	16mm	ULM-26-16-18.00	Contact Factory
		28mm	ULM-26-28-18.00	Contact Factory
		36mm	ULM-26-36-18.00	Contact Factory

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48

### UN-A-LOK® INSTALLATION TOOL

MILLED SLOT FOR LOCK TAB CLEARANCE

STEPPED SHOULDERS MATE WITH UN-A-LOK HEAD



PILOT END WITH STEPPED OD'S TO FIT ALL UN-A-LOK ID'S

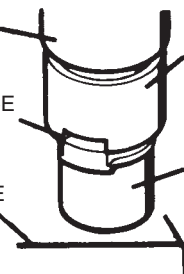
**NEW!**

CL-1-ULT

RAM OF ARBOR PRESS

LOCK TAB CLEARANCE SLOT

JIG PLATE



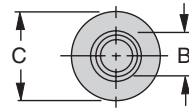
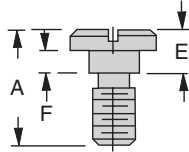
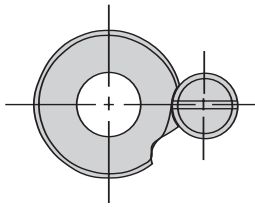
UN-A-LOK INSERTING TOOL

UN-A-LOK PRESS FIT LINER



# LOCKSCREWS AND CLAMPS

## LOCKSCREWS



\* For extended-range bushings.

The most popular locking device for renewable drill bushings. Use on either the "slip" or "fixed" side of a slip-fixed bushing. Simple, strong, compact, and economical.

### STANDARD MOUNTING (USA)

PART NO.	A	B DIA	C DIA	E	F	THREAD	PRICE (NET)
LS-0	7/16	3/16	5/16	3/16	.105/.100	#8-32	Please see web catalog for pricing
LS-1	5/8	3/8	5/8	1/4	.138/.132	5/16-18	
LS-2	7/8			3/8	.200/.194		
LS-3	1	7/16	3/4	3/8	.200/.194	3/8-16	
LS-4*	1-1/16			7/16	.231/.225		
LS-5*	1-1/8			1/2	.263/.257		

### STANDARD MOUNTING — THINWALL (USA)

PART NO.	A	B DIA	C DIA	E	F	THREAD	PRICE (NET)	
TW-1	7/16	3/16	5/16	3/16	.105/.100	#8-32	Please see web catalog for pricing	
TW-2	1/2	1/4	7/16	3/8	1/4	.138/.132		#10-32
TW-3	11/16			3/8	.200/.194			
TW-4	7/8	3/8	9/16	1/2	.263/.257	5/16-18		
TW-5	1	3/8	5/8	5/8	.325/.319			
TW-7	3/4			3/8	.200/.194			

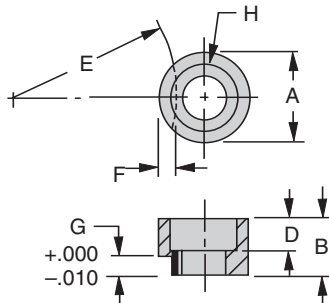
### STANDARD MOUNTING (METRIC)

PART NO.	A	B DIA	C DIA	E	F	THREAD	PRICE (NET)
LSM-1	15mm	7.5mm	13mm	6mm	3.3mm	M5	Please see web catalog
LSM-3	18mm	9.5mm	16mm	8mm	4.3mm	M6	
LSM-5	22mm	12mm	20mm	10mm	5.8mm	M8	
LSM-7	32mm	15mm	24mm	12mm	7.3mm	M10	

### PROJECTED MOUNTING (METRIC)

PART NO.	A	B DIA	C DIA	E	F	THREAD	PRICE (NET)
LSM-2	18mm	7.5mm	13mm	9mm	6.3mm	M5	Please see web catalog
LSM-4	22mm	9.5mm	16mm	12mm	8.3mm	M6	
LSM-6	27mm	12mm	20mm	15mm	10.8mm	M8	
LSM-8	38mm	15mm	24mm	18mm	13.3mm	M10	

## ROUND CLAMPS



Alternative to lock screws when using the "fixed" side of a slip-fixed SF bushing. Round clamps have less clearance under their heads, to clamp bushings tighter (which is why you cannot use them on the bushing's "slip" side). Use them with a socket-head cap screw.

\* For extended-range bushings.

### STANDARD MOUNTING (USA)

PART NO.	A DIA	B	D	E	F	G	H SOCKET-HEAD CAP SCREW	REPLACES LOCK SCREW	PRICE (NET)
RC-01	5/8	5/16	5/32	17/32	.109	.125	5/16-18	LS-1	Please see web catalog for pricing
RC-02		7/16	7/32	29/32	.125	.188		LS-2	
RC-03		1/2	9/32	1-13/32	.188	.219	3/8-16	LS-3	
RC-04*	3/4	17/32	1/4	2-1/2	.156	.250		LS-4	
RC-05*		9/16						LS-5	

### STANDARD MOUNTING (METRIC)

PART NO.	A DIA	B	D	E	F	G	H SOCKET-HEAD CAP SCREW	REPLACES LOCK SCREW	PRICE (NET)
RCM-1	13mm	8mm	4mm	9.5mm	2.8mm	3mm	M5	LSM-1	Please see web catalog
RCM-3	16mm	10mm	5mm	15mm	3.3mm	4mm	M6	LSM-3	
RCM-5	20mm	12mm	5mm	30mm	3.8mm	5.5mm	M8	LSM-5	
RCM-7	24mm	16mm	7mm	80mm	4.5mm	7mm	M10	LSM-7	

### PROJECTED MOUNTING (METRIC)

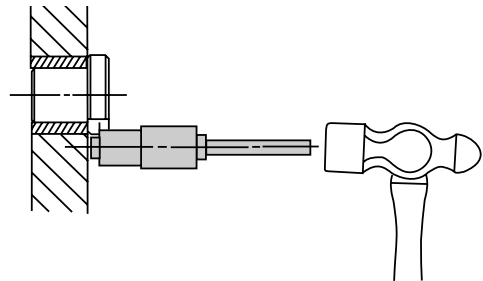
PART NO.	A DIA	B	D	E	F	G	H SOCKET-HEAD CAP SCREW	REPLACES LOCK SCREW	PRICE (NET)
RCM-2	13mm	11mm	4mm	9.5mm	2.8mm	6mm	M5	LSM-2	Please see web catalog
RCM-4	16mm	14mm	5mm	15mm	3.3mm	8mm	M6	LSM-4	
RCM-6	20mm	17mm	5mm	30mm	3.8mm	10.5mm	M8	LSM-6	
RCM-8	24mm	22mm	7mm	80mm	4.5mm	13mm	M10	LSM-8	

## LOCKSCREW LOCATING JIG



CL-1-LSLJ

A precision tool for centerpunching lock screw holes. The jig is made in two parts: a reversible centerpunch and an outer body for locating. To use, just insert the bushing and place the locating jig against the lock screw recess. Turn bushing to desired orientation, then tap centerpunch lightly. For installing lock screws LS-1, LS-2, LS-3, LS-4, LS-5, TW-5, and TW-7. Also for installing round clamps RC-01, RC-02, RC-03, RC-04, and RC-05.

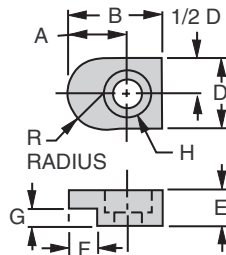


**MANUFACTURING CO.**

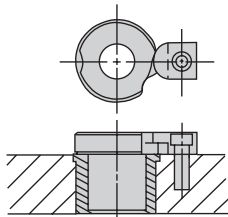
4200 Carr Lane Ct., P.O. Box 191970  
St. Louis, Missouri 63119-7970 USA  
Phone: 314-647-6200, FAX: 314-647-5736  
Web Site: www.carrlane.com

# LOCKSCREWS AND CLAMPS

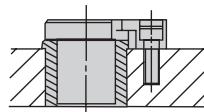
## ROUND END CLAMPS



A heavy-duty alternative to lockscrews. Allows locating tapped hole farther away from bushing to avoid interference with a larger liner. Use on either the "slip" or "fixed" side of a slip-fixed renewable bushing. Available in two heights: standard for recessed liner mounting; tall for projected head-liner mounting. Use with a socket-head cap screw.



Standard Mounting



Projected Mounting

### STANDARD MOUNTING (USA)

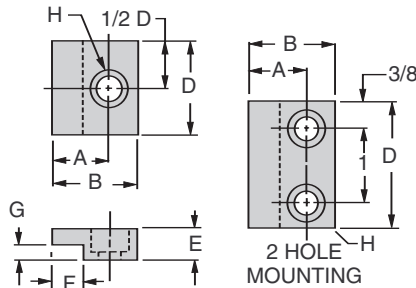
PART NO.	A	B	D	E	F	G	H SOCKET-HEAD CAP SCREW	R	PRICE (NET)
RK-01	7/16			5/16	3/16	1/8	1/4-20	5/16	See our website for pricing.
RK-02	1/2	3/4	5/8	3/8	1/4	3/16			
RK-03	5/8	1	3/4	3/8	5/16	3/16	5/16-18	3/8	
RK-04*	11/16	1-1/8	3/4	7/16	5/16	7/32	3/8-16	3/8	
RK-05*				1/2		1/4			

### PROJECTED MOUNTING (USA)

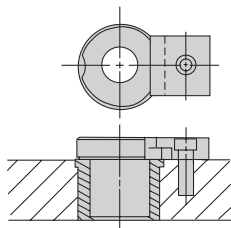
PART NO.	A	B	D	E	F	G	H SOCKET-HEAD CAP SCREW	R	PRICE (NET)
RK-10	7/16	3/4	5/8	3/8	3/16	7/32	1/4-20	5/16	See our web catalog for pricing.
RK-11						1/4			
RK-12	1/2			1/2	1/4	5/16	3/8-16	3/8	
RK-13						3/8			
RK-14	5/8	1		1/2		3/8	3/8-16	3/8	
RK-15*	11/16	1-1/8	3/4	5/8	5/16	13/32			
RK-16*						7/16			
RK-17*				3/4		15/32			

\* For extended-range bushings.

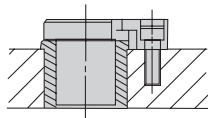
## FLAT CLAMPS



Use to lock FM-type fixed-renewable bushings which have a milled locking flat. Available in two heights: standard for recessed liner mounting; tall for projected head-liner mounting. Use with one or two socket-head cap screws.



Standard Mounting



Projected Mounting

### STANDARD MOUNTING (USA)

PART NO.	NO. OF HOLES	A	B	D	E	F	G	H SOCKET-HEAD CAP SCREW	PRICE (NET)
FC-01	1	1/2	7/8	5/8	5/16	3/16	1/8	1/4-20	See our web catalog for pricing.
FC-02		5/8	1	1	3/8	1/4	3/16	5/16-18	
FC-03		1-1/8				5/16			
FC-04*	1			1-1/4	3/8	27/64	7/32	3/8-16	
FC-05*	2	51/64	1-11/64	1-3/4					
FC-06*	1			1-1/4	1/2		1/4		
FC-07*	2			1-3/4					

### PROJECTED MOUNTING (USA)

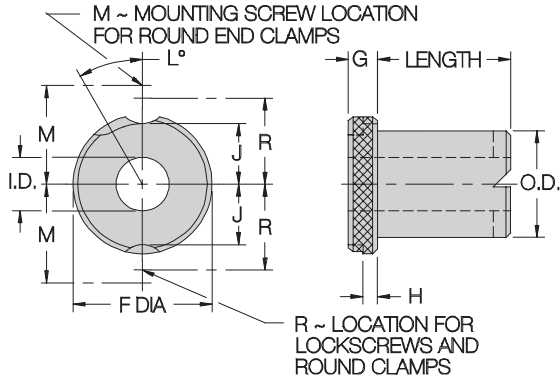
PART NO.	NO. OF HOLES	A	B	D	E	F	G	H SOCKET-HEAD CAP SCREW	PRICE (NET)
FC-10	1	1/2	7/8	5/8	3/8	3/16	7/32	1/4-20	See our web catalog for pricing.
FC-11							1/4		
FC-12	1	5/8	1	1	1/2	1/4	5/16	5/16-18	
FC-13							3/8		
FC-14	1	5/8	1-1/8	1-1/4	1/2	5/16	3/8	3/8-16	
FC-15	2			1-3/4					
FC-16*	1			1-1/4	5/8	27/64	7/16		
FC-17*	2			1-3/4					
FC-18*	1	51/64	1-11/64	1-1/4	3/4		15/32		
FC-19*	2			1-3/4					
FC-20*	1			1-1/4					
FC-21*	2			1-3/4					

\* For extended-range bushings.



# CH

# CHIP BREAKER



## USA

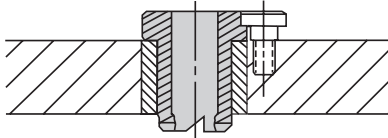
BODY OD	F	G	H	J	L	M	R	LOCK SCREW
5/16	35/64			11/64	65°	5/8	1/2	LS-1
1/2	51/64	1/4	1/8	19/64	65°	3/4	5/8	
3/4	1-3/64			27/64	50°	7/8	3/4	
1	1-27/64			19/32	35°	1-7/64	59/64	LS-2
1-3/8	1-51/64	3/8	3/16	25/32	30°	1-19/64	1-7/64	
1-3/4	2-19/64			1	30°	1-41/64	1-25/64	
2-1/4	2-51/64	3/8	3/16	1-1/4	25°	1-57/64	1-41/64	LS-3

## METRIC

BODY OD	F	G	H	J	L	M	R	LOCK SCREW
8mm	15mm			4.5mm	65°		11.5mm	LSM-1
10mm	18mm	6mm	3mm	6mm	65°		13mm	LSM-2
12mm	22mm			7.5mm	60°		16mm	LSM-3 LSM-4
15mm	26mm	8mm	4mm	9.5mm	50°		18mm	
18mm	30mm			11.5mm	50°		20mm	
22mm	34mm			13mm	35°		23.5mm	LSM-5 LSM-6
26mm	39mm	10mm	5.5mm	15.5mm	35°		26mm	
30mm	46mm			19mm	30°		29.5mm	
35mm	52mm			22mm	30°		32.5mm	LSM-7 LSM-8
42mm	59mm	12mm	7mm	25.5mm	30°		36mm	
48mm	66mm			28.5mm	30°		41mm	
55mm	74mm			32.5mm	25°		45mm	
62mm	82mm			36.5mm	25°		49mm	

## APPLICATIONS:

Similar to an SF renewable bushing, but with specially designed chip-breaking notches on the drill-exit end. Use to break up chips from tough stringy materials, to reduce friction and heat buildup. Reduces bushing wear at the drill-exit end and reduces the chance of tool or workpiece damage. A chip-breaker bushing should extend beyond its liner to allow chips to escape. Chip breakers are also available on other bushing types such as P, H, and DC (directed coolant).



## ORDERING EXAMPLES:

CH-20-16-.1250 Standard USA SF-type bushing with chip breaker, inch ID  
 CH-20-16-.1772 Standard USA SF-type bushing with chip breaker, mm ID (.1772 = 4.50mm)

CH-20-16-.1250 NCB No counterbore on long bushings marked with \* (no counterbore is standard on all other bushings)  
 CHM-10-20-4.50 Standard metric SF-type bushing with chip breaker  
 PCH-20-16-.1250 P bushing with chip breaker  
 HCH-20-16-.1250 H bushing with chip breaker  
 DCCH-20-16-.1250 Directed coolant bushing with chip breaker

## STANDARD ID TOLERANCES:

From #80 to 1/4"	+ .0001/+ .0004	From .35 to 3mm	+ .002/+ .008mm
Over 1/4 to 3/4"	+ .0001/+ .0005	Over 3 to 6mm	+ .004/+ .012mm
Over 3/4 to 1-1/2"	+ .0002/+ .0006	Over 6 to 10mm	+ .005/+ .014mm
Over 1-1/2 to 2-3/4"	+ .0003/+ .0007	Over 10 to 18mm	+ .006/+ .017mm
		Over 18 to 30mm	+ .007/+ .020mm
		Over 30 to 50mm	+ .009/+ .025mm

(G6 tolerance)

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5	LOCK SCREW
.0625-.0934 1/16-#43 1.60-2.35mm	5/16	*3/4	CH-20-12	Contact Factory	LS-1 RC-01 RK-01 RK-10
		*1	CH-20-16		
		*1-3/8	CH-20-22		
.0935-.1935 #42-#10 2.40-4.90mm	.3125-.3123	*3/4	CH-20-12	Contact Factory	LS-1 RC-01 RK-01 RK-10
		*1	CH-20-16		
		*1-3/8	CH-20-22		
.1405-.3438 #28-11/32 3.60-8.70mm	1/2	*3/4	CH-32-12	Contact Factory	LS-1 RC-01 RK-01 RK-10
		*1	CH-32-16		
		*1-3/8	CH-32-22		
		*1-3/4	CH-32-28		
.2812-.5625 9/32-9/16 7.20-14.00mm	3/4	*2-1/8	CH-32-34	Contact Factory	LS-1 RC-01 RK-01 RK-11
		1	CH-48-16		
		1-3/8	CH-48-22		
		1-3/4	CH-48-28		
.4688-.7812 15/32-25/32 11.50-19.50mm	1	2-1/8	CH-48-34	Contact Factory	LS-2 RC-02 RK-02 RK-12
		*2-1/2	CH-48-40		
		1	CH-64-16		
		1-3/8	CH-64-22		
.7188-1.0625 23/32-1-1/16 18.50-27.00mm	1-3/8	1-3/4	CH-64-28	Contact Factory	LS-2 RC-02 RK-02 RK-12
		2-1/8	CH-64-34		
		2-1/2	CH-64-40		
		3	CH-64-48		
.9688-1.4062 31/32-1-13/32 25.00-35.00mm	1-3/4	1-3/8	CH-88-16	Contact Factory	LS-3 RC-03 RK-03 RK-13
		1-3/4	CH-88-22		
		2-1/8	CH-88-28		
		2-1/2	CH-88-34		
1.3438-1.8750 1-11/32-1-7/8 35.00-47.00mm	2-1/4	2-1/2	CH-88-40	Contact Factory	LS-3 RC-03 RK-03 RK-13
		3	CH-88-48		
		1-3/8	CH-112-22		
		1-3/4	CH-112-28		
		2-1/8	CH-112-34	Contact Factory	LS-3 RC-03 RK-03 RK-13
		2-1/2	CH-112-40		
		3	CH-112-48		
		1-3/8	CH-144-22		
		1-3/4	CH-144-28	Contact Factory	LS-3 RC-03 RK-03 RK-13
		2-1/8	CH-144-34		
		2-1/2	CH-144-40		
		3	CH-144-48		

\* Counterbored, leaving correct drill-bearing length and chip clearance (see page 6 for bearing length).



## MANUFACTURING CO.

4200 Carr Lane Ct., P.O. Box 191970  
 St. Louis, Missouri 63119-7970 USA  
 Phone: 314-647-6200, FAX: 314-647-5736  
 Web Site: www.carrlane.com



# CHIP BREAKER METRIC

# CHM

ID RANGE (G6)	OD (h5)	LENGTH	ANSI PART NO.	PRICE	LOCK SCREW
1.00-4.00mm	8mm 8.000-7.994mm	*10mm	CHM-8-10	Contact Factory	LSM-1 LSM-2 RCM-1 RCM-2
		*16mm	CHM-8-16	Contact Factory	
4.01-6.00mm	10mm 10.000-9.994mm	12mm	CHM-10-12	Contact Factory	LSM-3 LSM-4 RCM-3 RCM-4
		20mm	CHM-10-20		
		25mm	CHM-10-25		
6.01-8.00mm	12mm 12.000-11.992mm	12mm	CHM-12-12	Contact Factory	LSM-5 LSM-6 RCM-5 RCM-6
		20mm	CHM-12-20		
		25mm	CHM-12-25		
8.01-10.00mm	15mm 15.000-14.992mm	16mm	CHM-15-16	Contact Factory	LSM-7 LSM-8 RCM-7 RCM-8
		28mm	CHM-15-28		
		36mm	CHM-15-36		
10.01-12.00mm	18mm 18.000-17.992mm	16mm	CHM-18-16	Contact Factory	
		28mm	CHM-18-28		
		36mm	CHM-18-36		
12.01-15.00mm	22mm 22.000-21.991mm	20mm	CHM-22-20	Contact Factory	
		36mm	CHM-22-36		
		45mm	CHM-22-45		
15.01-18.00mm	26mm 26.000-25.991mm	20mm	CHM-26-20	Contact Factory	
		36mm	CHM-26-36		
		45mm	CHM-26-45		
18.01-22.00mm	30mm 30.000-29.991mm	25mm	CHM-30-25	Contact Factory	
		45mm	CHM-30-45		
		56mm	CHM-30-56		
22.01-26.00mm	35mm 35.000-34.989mm	25mm	CHM-35-25	Contact Factory	
		45mm	CHM-35-45		
		56mm	CHM-35-56		
26.01-30.00mm	42mm 42.000-41.989mm	30mm	CHM-42-30	Contact Factory	
		56mm	CHM-42-56		
		67mm	CHM-42-67		
30.01-35.00mm	48mm 48.000-47.989mm	30mm	CHM-48-30	Contact Factory	
		56mm	CHM-48-56		
		67mm	CHM-48-67		
35.01-42.00mm	55mm 55.000-54.987mm	30mm	CHM-55-30	Contact Factory	
		56mm	CHM-55-56		
		67mm	CHM-55-67		
42.01-48.00mm	62mm 62.000-61.987mm	35mm	CHM-62-35	Contact Factory	
		67mm	CHM-62-67		
		78mm	CHM-62-78		

Why settle  
for  
the rest  
when  
you can have  
the best?

We've done  
well,  
now  
let's excel.

\* Small metric drill sizes through .80mm are counterbored 1.00mm diameter, with 3mm drill-bearing length.

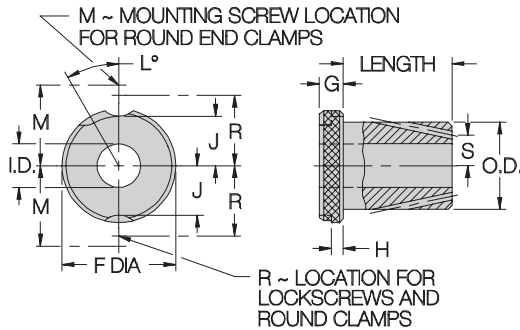


**MANUFACTURING CO.**

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# DC

# DIRECTED COOLANT



### STANDARD ID TOLERANCES:

From #80 to 1/4"	+ .0001/+ .0004	From .35 to 3mm	+ .002/+ .008mm
Over 1/4 to 3/4"	+ .0001/+ .0005	Over 3 to 6mm	+ .004/+ .012mm
Over 3/4 to 1-1/2"	+ .0002/+ .0006	Over 6 to 10mm	+ .005/+ .014mm
Over 1-1/2 to 2-3/4"	+ .0003/+ .0007	Over 10 to 18mm	+ .006/+ .017mm
		Over 18 to 30mm	+ .007/+ .020mm
		Over 30 to 50mm	+ .009/+ .025mm

### REAMER ID TOLERANCES:

From #60 to 1/4"	+ .0005/+ .0008	From 1 to 3mm	+ .006/+ .012mm
Over 1/4 to 1"	+ .0006/+ .0010	Over 3 to 6mm	+ .010/+ .018mm
Over 1 to 1-1/2"	+ .0008/+ .0012	Over 6 to 10mm	+ .013/+ .022mm
		Over 10 to 18mm	+ .016/+ .027mm
		Over 18 to 30mm	+ .020/+ .033mm

### STANDARD LINER ID TOLERANCES:

5/16"	+ .0001/+ .0004	1-3/8"	+ .0006/+ .0010
1/2"	+ .0002/+ .0005	1-3/4"	+ .0008/+ .0012
3/4"	+ .0003/+ .0006	2-1/4"	+ .0010/+ .0015
1"	+ .0004/+ .0007		

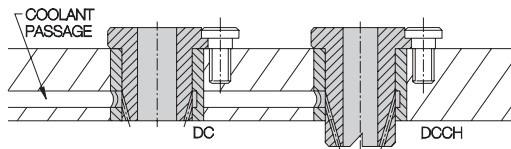
BODY OD	F DIA	G	H	J	L	M	N DIA
5/16	35/64	1/4	1/8	11/64	65°	5/8	5/8
1/2	51/64			19/64	65°	3/4	7/8
3/4	1-3/64			27/64	50°	7/8	1-1/8
1	1-27/64	3/8	3/16	19/32	35°	1-7/64	1-1/2
1-3/8	1-51/64			25/32	30°	1-19/64	1-7/8
1-3/4	2-19/64			1	30°	1-41/64	2-3/8
2-1/4	2-51/64			1-1/4	25°	1-57/64	2-7/8

BODY OD	P	Q	R	S	T DIA	U DIA	V
5/16	3/32	3/16	1/2	5/64	.067	25/64	5/32
1/2	3/32	5/16**	5/8	9/64	.093	19/32**	7/32**
3/4	1/8	5/16	3/4	17/64	.104	55/64	7/32
1	1/8	5/16	59/64	23/64	.125	1-5/32	7/32
1-3/8	3/16	7/16	1-7/64	17/32	.147	1-17/32	9/32
1-3/4	3/16		1-25/64	11/16	.173	1-31/32	
2-1/4	3/16		1-41/64	7/8	.173	2-15/32	

\*\* Q = 3/16, U = 39/64, V = 5/32 on 1/2" long liner bushings.

### APPLICATIONS:

Similar to an SF renewable bushing, but with passages to direct coolant to the cutting area. This design is particularly good for washing away chips, especially when ordered as the combination Directed Coolant Chip Breaker (DCCH). DC bushings require special liners, DCL or DCHL, to direct coolant from a drilled manifold passage to the holes in the bushing's OD wall. Important note: Always order matching liner length (see page 39.)



### ORDERING EXAMPLES:

DC-20-12-.1250	Standard USA directed-coolant bushing, inch ID
DCCH-20-16-.1250	Same as above, except with chip breakers (go to next length so that chip breakers extend beyond the liner)
DC-20-12-.1772	Standard USA directed-coolant bushing, mm ID (.1772 = 4.50 mm)
DC-20-12-.1250 REAMER	Reamer tolerance on ID
DC-20-12-.1250 NCB	No counterbore on long bushings marked with * (no counterbore is standard on all other bushings)
DCL-32-12	Liner for renewable bushings above
DCHL-32-12	Head liner for renewable bushings above

ID RANGE	OD	LENGTH	PART NO.	PRICE 1-5	LOCK SCREW
.0625-.0934 1/16-#43 1.60-2.35mm	5/16	*3/4	DC-20-12	Contact Factory	LS-1 RC-01 RK-01 RK-11
		*1	DC-20-16		
		*1-3/8	DC-20-22		
.0935-.1935 #42-#10 2.40-4.90mm	.3125-.3123	*3/4	DC-20-12	Contact Factory	LS-1 RC-01 RK-01 RK-11
		*1	DC-20-16		
		*1-3/8	DC-20-22		
.1405-.3438 #28-11/32 3.60-8.70mm	1/2	*3/4	DC-32-12	Contact Factory	LS-1 RC-01 RK-01 RK-11
		*1	DC-32-16		
		*1-3/8	DC-32-22		
		*1-3/4	DC-32-28		
		*2-1/8	DC-32-34		
.2812-.5625 9/32-9/16 7.20-14.00mm	3/4	1	DC-48-16	Contact Factory	LS-1 RC-01 RK-01 RK-11
		1-3/8	DC-48-22		
		1-3/4	DC-48-28		
		2-1/8	DC-48-34		
		*2-1/2	DC-48-40		
.4688-.7812 15/32-25/32 11.50-19.50mm	1	1	DC-64-16	Contact Factory	LS-2 RC-02 RK-02 RK-12
		1-3/8	DC-64-22		
		1-3/4	DC-64-28		
		2-1/8	DC-64-34		
		2-1/2	DC-64-40		
.7188-1.0625 23/32-1-1/16 18.50-27.00mm	1-3/8	3	DC-64-48	Contact Factory	LS-2 RC-02 RK-02 RK-12
		1	DC-88-16		
		1-3/8	DC-88-22		
		1-3/4	DC-88-28		
		2-1/8	DC-88-34		
.9688-1.4062 31/32-1-13/32 25.00-35.00mm	1-3/4	2-1/2	DC-88-40	Contact Factory	LS-3 RC-03 RK-03 RK-13
		3	DC-88-48		
		1-3/8	DC-112-22		
		1-3/4	DC-112-28		
		2-1/8	DC-112-34		
1.3438-1.8750 1-11/32-1-7/8 35.00-47.00mm	2-1/4	2-1/2	DC-112-40	Contact Factory	LS-3 RC-03 RK-03 RK-13
		3	DC-112-48		
		1-3/8	DC-144-22		
		1-3/4	DC-144-28		
		2-1/8	DC-144-34		
		2-1/2	DC-144-40		
		3	DC-144-48		

\* Counterbored, leaving correct drill-bearing length and chip clearance (see page 6 for depth).

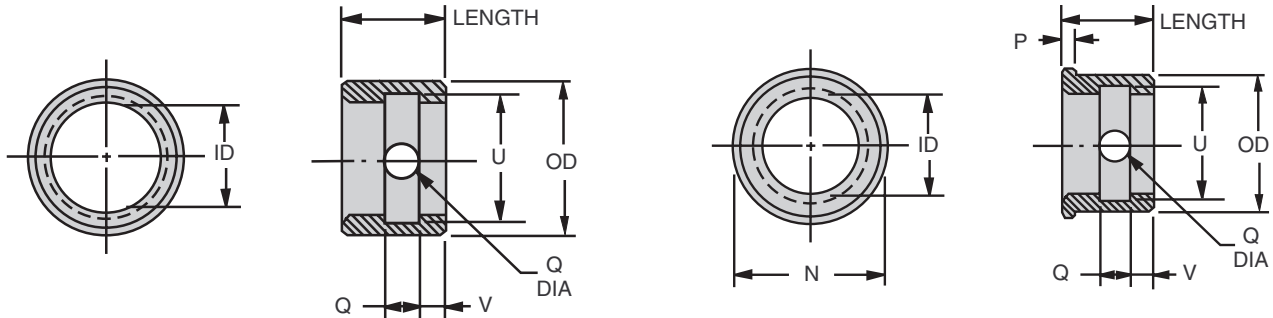






# DIRECTED COOLANT

# DC



SEE BELOW AND PAGE 38 FOR DIMENSIONS

## LINERS

ID	OD	LENGTH	LINER PART NO.	PRICE	MATCHING RENEWABLE BUSHING	
					STANDARD	CHIP BREAKER
5/16	1/2 .5017-.5014 (.520-.515 UNG)	1/2	DCL-32-8	Please see our web catalog for pricing.	—	DCCH-20-12
		3/4	DCL-32-12		DC-20-12	DCCH-20-16
		1	DCL-32-16		DC-20-16	DCCH-20-22
		1-3/8	DCL-32-22		DC-20-22	—
1/2	3/4 .7518-.7515 (.770-.765 UNG)	1/2	DCL-48-8		—	DCCH-32-12
		3/4	DCL-48-12		DC-32-12	DCCH-32-16
		1	DCL-48-16		DC-32-16	DCCH-32-22
		1-3/8	DCL-48-22		DC-32-22	DCCH-32-28
		1-3/4	DCL-48-28		DC-32-28	DCCH-32-34
		2-1/8	DCL-48-34		DC-32-34	—
3/4	1 1.0018-1.0015 (1.020-1.015 UNG)	3/4	DCL-64-12		—	DCCH-48-16
		1	DCL-64-16		DC-48-16	DCCH-48-22
		1-3/8	DCL-64-22		DC-48-22	DCCH-48-28
		1-3/4	DCL-64-28		DC-48-28	DCCH-48-34
		2-1/8	DCL-64-34		DC-48-34	DCCH-48-40
1	1-3/8 1.3772-1.3768 (1.395-1.390 UNG)	2-1/2	DCL-64-40		DC-48-40	—
		3/4	DCL-88-12	—	DCCH-64-16	
		1	DCL-88-16	DC-64-16	DCCH-64-22	
		1-3/8	DCL-88-22	DC-64-22	DCCH-64-28	
		1-3/4	DCL-88-28	DC-64-28	DCCH-64-34	
		2-1/8	DCL-88-34	DC-64-34	DCCH-64-40	
		2-1/2	DCL-88-40	DC-64-40	DCCH-64-48	
1-3/8	1-3/4 1.7523-1.7519 (1.770-1.765 UNG)	3	DCL-88-48	DC-64-48	—	
		3/4	DCL-112-12	—	DCCH-88-16	
		1	DCL-112-16	DC-88-16	DCCH-88-22	
		1-3/8	DCL-112-22	DC-88-22	DCCH-88-28	
		1-3/4	DCL-112-28	DC-88-28	DCCH-88-34	
		2-1/8	DCL-112-34	DC-88-34	DCCH-88-40	
		2-1/2	DCL-112-40	DC-88-40	DCCH-88-48	
1-3/4	2-1/4 2.2525-2.2521 (2.270-2.265 UNG)	3	DCL-112-48	DC-88-48	—	
		1	DCL-144-16	—	DCCH-112-22	
		1-3/8	DCL-144-22	DC-112-22	DCCH-112-28	
		1-3/4	DCL-144-28	DC-112-28	DCCH-112-34	
		2-1/8	DCL-144-34	DC-112-34	DCCH-112-40	
2-1/4	2-3/4 2.7526-2.7522 (2.770-2.765 UNG)	2-1/2	DCL-144-40	DC-112-40	DCCH-112-48	
		3	DCL-144-48	DC-112-48	—	
		1	DCL-176-16	—	DCCH-144-22	
		1-3/8	DCL-176-22	DC-144-22	DCCH-144-28	
		1-3/4	DCL-176-28	DC-144-28	DCCH-144-34	
		2-1/8	DCL-176-34	DC-144-34	DCCH-144-40	
		2-1/2	DCL-176-40	DC-144-40	DCCH-144-48	
		3	DCL-176-48	DC-144-48	—	

## HEAD LINERS

HEAD LINER PART NO.	PRICE	MATCHING RENEWABLE BUSHING	
		STANDARD	CHIP BREAKER
DCHL-32-8	Please see our web catalog for pricing.	—	DCCH-20-12
DCHL-32-12		DC-20-12	DCCH-20-16
DCHL-32-16		DC-20-16	DCCH-20-22
DCHL-32-22		DC-20-22	—
DCHL-48-8		—	DCCH-32-12
DCHL-48-12		DC-32-12	DCCH-32-16
DCHL-48-16		DC-32-16	DCCH-32-22
DCHL-48-22		DC-32-22	DCCH-32-28
DCHL-48-28		DC-32-28	DCCH-32-34
DCHL-48-34		DC-32-34	—
DCHL-64-12		—	DCCH-48-16
DCHL-64-16		DC-48-16	DCCH-48-22
DCHL-64-22		DC-48-22	DCCH-48-28
DCHL-64-28		DC-48-28	DCCH-48-34
DCHL-64-34		DC-48-34	DCCH-48-40
DCHL-64-40		DC-48-40	—
DCHL-88-12	—	DCCH-64-16	
DCHL-88-16	DC-64-16	DCCH-64-22	
DCHL-88-22	DC-64-22	DCCH-64-28	
DCHL-88-28	DC-64-28	DCCH-64-34	
DCHL-88-34	DC-64-34	DCCH-64-40	
DCHL-88-40	DC-64-40	DCCH-64-48	
DCHL-88-48	DC-64-48	—	
DCHL-112-12	—	DCCH-88-16	
DCHL-112-16	DC-88-16	DCCH-88-22	
DCHL-112-22	DC-88-22	DCCH-88-28	
DCHL-112-28	DC-88-28	DCCH-88-34	
DCHL-112-34	DC-88-34	DCCH-88-40	
DCHL-112-40	DC-88-40	DCCH-88-48	
DCHL-112-48	DC-88-48	—	
DCHL-144-16	—	DCCH-112-22	
DCHL-144-22	DC-112-22	DCCH-112-28	
DCHL-144-28	DC-112-28	DCCH-112-34	
DCHL-144-34	DC-112-34	DCCH-112-40	
DCHL-144-40	DC-112-40	DCCH-112-48	
DCHL-144-48	DC-112-48	—	
DCHL-176-16	—	DCCH-144-22	
DCHL-176-22	DC-144-22	DCCH-144-28	
DCHL-176-28	DC-144-28	DCCH-144-34	
DCHL-176-34	DC-144-34	DCCH-144-40	
DCHL-176-40	DC-144-40	DCCH-144-48	
DCHL-176-48	DC-144-48	—	



## MANUFACTURING CO.

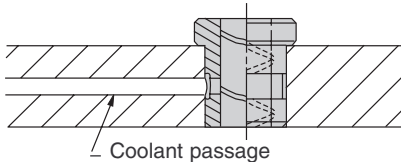
4200 Carr Lane Ct., P.O. Box 191970  
 St. Louis, Missouri 63119-7970 USA  
 Phone: 314-647-6200, FAX: 314-647-5736  
 Web Site: www.carrlane.com

# OIL GROOVE



## APPLICATIONS:

Oil grooves are available on most drill-bushing types, including P, H, and SF. Use when you need complete drill lubrication and cooling, such as when drilling hardened steel. Oil grooves are specially designed coolant passageways in the bushing's ID wall. Choose from 25 different groove styles. End wipers are also available, to keep out dirt and chips.



## ORDERING EXAMPLES:

P-48-16-.5000-AJ P bushing with AJ oil groove, inch ID  
 P-48-16-.4724-AJ P bushing with AJ oil groove, mm ID  
 (.4724 = 12.00mm)  
 P-48-16-.5000-AJ-AAA P bushing with AJ oil groove and AAA  
 wiper  
 SF-48-16-.5000-AJ SF bushing with AJ oil groove

## THREE GENERAL TYPES:

1. With oil hole. A single radial hole in the bushing wall allows coolant to flow from a manifold passage to the internal oil grooves. Bushing must be installed to line up the radial hole with the manifold passage.

2. With oil hole and external groove. OD groove allows coolant to flow around the bushing, then through the radial hole in the bushing's wall to the internal oil grooves. Allows installing the bushing at any orientation, and mounting bushings in series using a single manifold passage. This type is our most popular.

3. Without oil feed. No external coolant feed through a manifold passage, so all coolant enters through the top. This type is also commonly used as a bearing bushing, packed with oil or grease.

## OIL-GROOVE STYLES:

We offer a wide selection of oil-groove styles in each general type. This allows choosing a style to suit various operating conditions, lubrication requirements, and individual preferences.

## OPTIONAL WIPERS:

To guard against dirt and chips entering the bushing ID, order oil-groove bushings with a wiper end. Note: do not order an oil-groove style that breaks out at the wiper end (AA, AB, AG, AH, AD, or AE). Order style AAA for headless bushings (install wiper in either direction). Order style ABB or ACC for head-type bushings.

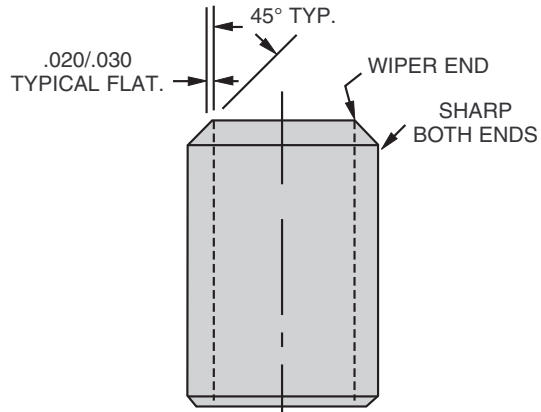
## TECHNICAL DATA:

Oil-groove dimensions - 1/16" wide x 1/32" deep  
 Oil-hole dimensions - 1/4" diameter  
 External-groove dimensions - 5/16" wide x 3/64" deep  
 Allowable ID range - 1/2" to 8"  
 Allowable length range - 1/2" to 8"  
 Oil grooves stop 1/8" short of bushing end

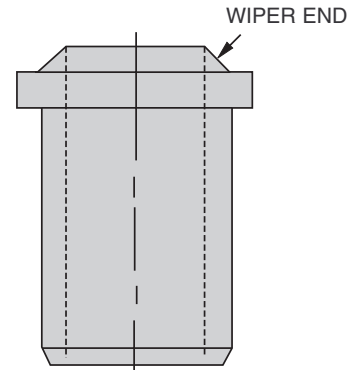
## PRICING:

Please contact factory for pricing on oil-groove bushings.

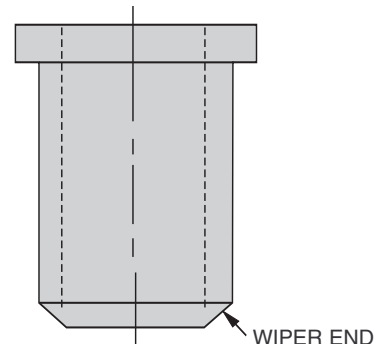
## OPTIONAL WIPERS



**STYLE AAA**  
HEADLESS BUSHINGS



**STYLE ABB**  
HEAD-TYPE BUSHINGS



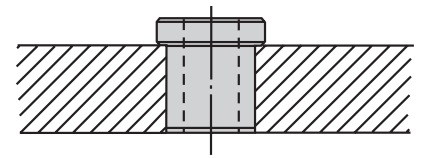
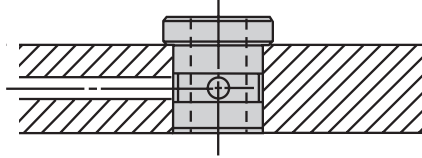
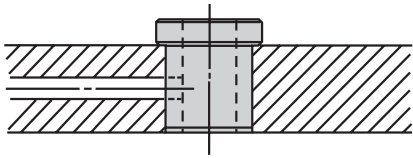
**STYLE ACC**  
HEAD-TYPE BUSHINGS



**MANUFACTURING CO.**  
 4200 Carr Lane Ct., P.O. Box 191970  
 St. Louis, Missouri 63119-7970 USA  
 Phone: 314-647-6200, FAX: 314-647-5736  
 Web Site: www.carrlane.com



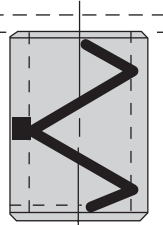
# OIL GROOVE



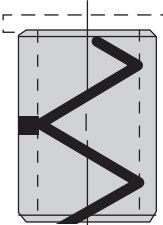
**WITH  
OIL HOLE**

**WITH OIL HOLE &  
EXTERNAL GROOVE**

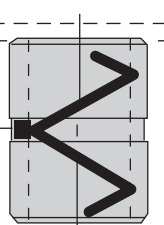
**WITHOUT  
OIL FEED**



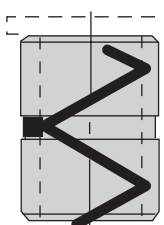
**AC**  
Helix



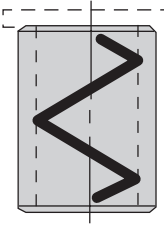
**AA**  
Helix  
Open Bottom



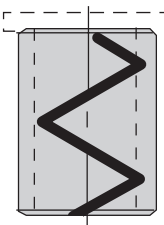
**AJ**  
Helix



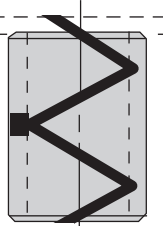
**AG**  
Helix  
Open Bottom



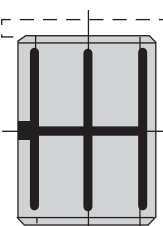
**AF**  
Helix



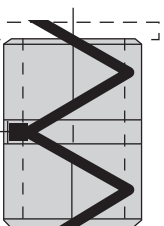
**AD**  
Helix  
Open Bottom



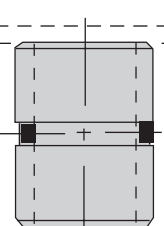
**AB**  
Helix  
Open both ends



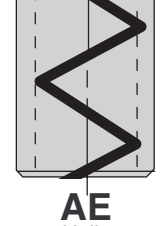
**AL**  
Straight



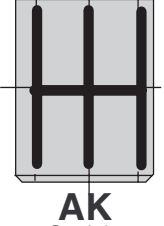
**AH**  
Helix  
Open both ends



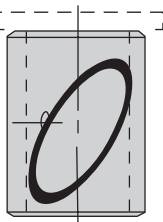
**AO**  
Two Holes



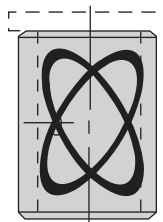
**AE**  
Helix  
Open both ends



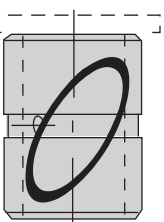
**AK**  
Straight



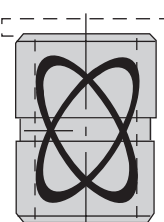
**AR**  
Loop



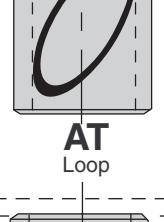
**AU**  
Double Loop



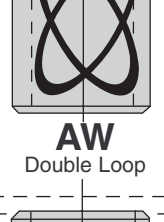
**AS**  
Loop



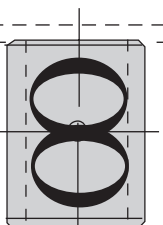
**AV**  
Double Loop



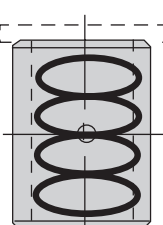
**AT**  
Loop



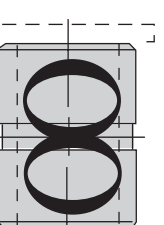
**AW**  
Double Loop



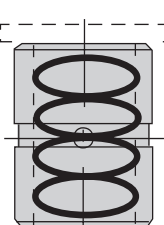
**AN**  
Figure 8



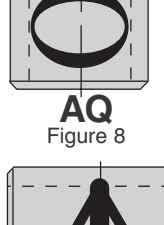
**AX**  
Double Figure 8



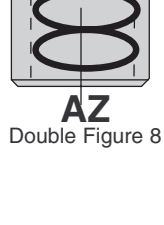
**AP**  
Figure 8



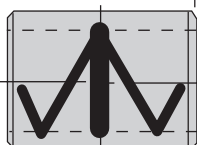
**AY**  
Double Figure 8



**AQ**  
Figure 8



**AZ**  
Double Figure 8



**AM**  
Helix  
with ID groove



# OIL GROOVE



## OIL-GROOVE CONVERSION CHART

Carr Lane	Ace	Acme	American	Briney	Economy	United	Universal	Welch
Style AA	Type 1	Style 5	Style 1	Style A	Style A	Style 1A	Style A	Style A
Style AB	Type 2	Style 8	Style 2	Style B	Style B	Style 2A	Style B	Style B
Style AC	Type 3	Style 2	Style 3	Style C	Style C	Style 3A	Style C	Style C
Style AD	Type 4	Style 4	Style 4	Style D	Style D	Style 1	Style D	Style D
Style AE	Type 6	Style 7	Style 5	Style E	Style E	Style 2	Style E	Style E
Style AF	Type 5	Style 1	Style 6	Style F	Style F	Style 3	Style F	Style F
Style AG	Type 7	Style 6	Style 7	Style G	Style G	Style 1B	Style G	Style G
Style AH	Type 8	Style 9	Style 8	Style H	Style H	Style 2B	Style H	Style H
Style AJ	Type 9	Style 3	Style 9	Style J	Style J	Style 3B	Style J	Style J
Style AK	Type 10	Style 10	Style 10	Style K	Style K	Style 4	Style K	Style K
Style AL	Type 11	Style 11	Style 11	Style L	Style L	Style 4A	Style L	Style L
Style AM	Type 12	—	Style 12	Style M	Style M	Style 6	Style M	Style M
Style AN	Type 14	Style 20	Style 13	Style N	Style N	Style 7A	Style N	Style N
Style AO	Type 13	Style 12	Style 14	Style O	Style O	Style 12C	Style O	Style O
Style AP	Type 15	Style 21	Style 15	Style P	Style P	Style 7B	Style P	Style P
Style AQ	Type 16	Style 19	Style 16	Style Q	Style Q	Style 7	Style Q	Style Q
Style AR	Type 17	Style 14	Style 17	Style R	Style R	Style 9A	Style R	Style R
Style AS	Type 18	Style 15	Style 18	Style S	Style S	Style 9B	Style S	Style S
Style AJ	Type 19	Style 13	Style 19	Style T	Style T	Style 9	Style T	Style T
Style AU	Type 20	Style 17	Style 20	Style U	Style U	Style 10A	Style U	Style U
Style AV	Type 21	Style 18	Style 21	Style V	Style V	Style 10B	Style V	Style V
Style AW	Type 22	Style 16	Style 22	Style W	Style W	Style 10	Style W	Style W
Style AX	Type 23	Style 23	Style 23	Style X	Style X	Style 8A	Style X	Style X
Style AY	Type 24	Style 24	Style 24	Style Y	Style Y	Style 8B	Style Y	Style Y
Style AZ	Type 25	Style 22	Style 25	Style Z	Style Z	Style 8	Style Z	Style Z

## WIPER CONVERSION CHART

Carr Lane	Ace	Acme	American	Briney	Economy	United	Universal	Welch
Style AAA	Type WEA	Style WA	Style A	Style AA	Style AA	Style PE	Style AA	Style AA
Style ABB	Type WEB	Style WC	Style B	Style BB	Style BB	Style HW	Style BB	Style BB
Style ACC	Type WEC	Style WB	Style C	Style CC	Style CC	Style HE	Style CC	Style CC



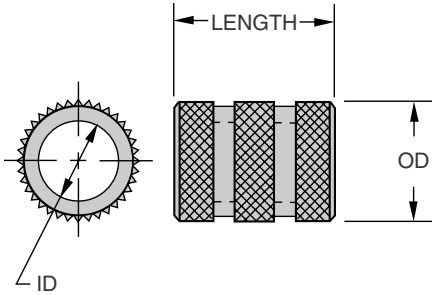
**MANUFACTURING CO.**

4200 Carr Lane Ct., P.O. Box 191970  
 St. Louis, Missouri 63119-7970 USA  
 Phone: 314-647-6200, FAX: 314-647-5736  
 Web Site: [www.carrlane.com](http://www.carrlane.com)



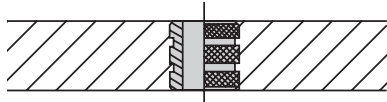
# DIAMOND GROOVE

# DG



### APPLICATIONS:

A bushing for cast-in-place or potted installation. Diamond-knurled OD provides superior holding strength against both rotational and axial forces. Since the bushing's OD is not ground, keep the ID accurately located during casting or potting to ensure accuracy in the finished tool.



### ORDERING EXAMPLES:

DG-26-16-.1875 Standard USA bushing, inch ID  
 DG-26-16-.1772 Standard USA bushing, mm ID (.1772 = 4.50mm)  
 DG-26-16-.1875 REAMER Reamer tolerance on ID  
 DG-26-16-.1875 NCB No counterbore on long bushings marked with \* (no counterbore is standard on all other bushings)  
 DGM-8-12-4.50 Standard metric bushing

Prices shown here apply to standard bushings only, for a standard drill size within the stated ID range. See back cover for decimal equivalents. To price non-standard sizes, including all reamer and tap-guide bushings, see page 7.

### STANDARD ID TOLERANCES:

From #55 to 1/4"	+0.001/+0.004	From 1 to 3mm	+0.02/+0.08mm
		Over 3 to 6mm	+0.04/+0.12mm
Over 1/4 to 3/4"	+0.001/+0.005	Over 6 to 10mm	+0.05/+0.14mm
		Over 10 to 18mm	+0.06/+0.17mm
Over 3/4 to 1-1/2"	+0.002/+0.006	Over 18 to 19mm	+0.07/+0.20mm (G6 tolerance)

### REAMER ID TOLERANCES:

From #60 to 1/4"	+0.005/+0.008	From 1 to 3mm	+0.06/+0.12mm
		Over 3 to 6mm	+0.10/+0.18mm
Over 1/4 to 1"	+0.006/+0.010	Over 6 to 10mm	+0.13/+0.22mm
		Over 10 to 18mm	+0.16/+0.27mm
		Over 18 to 19mm	+0.20/+0.33mm (F6 tolerance)

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5
.0520-.0995 #55-#39 1.35-2.50mm	13/64 .223-.213	1/4	DG-13-4	
		5/16	DG-13-5	
		3/8	DG-13-6	
		1/2	DG-13-8	
.0980-.1406 #40-9/64 2.50-3.50mm	1/4 .275-.260	1/4	DG-16-4	
		5/16	DG-16-5	
		3/8	DG-16-6	
		1/2	DG-16-8	
		*3/4	DG-16-12	
.1250-.1935 1/8-#10 3.20-4.90mm	5/16 .337-.322	1/4	DG-20-4	
		5/16	DG-20-5	
		3/8	DG-20-6	
		1/2	DG-20-8	
		3/4	DG-20-12	
.1562-.2570 5/32-F 4.00-6.50mm	13/32 .431-.416	*1	DG-20-16	
		1/4	DG-26-4	
		5/16	DG-26-5	
		3/8	DG-26-6	
		1/2	DG-26-8	
.1562-.3160 5/32-O 4.00-8.00mm	1/2 .525-.510	3/4	DG-26-12	
		*1	DG-26-16	
		5/16	DG-32-5	
		3/8	DG-32-6	
		1/2	DG-32-8	
.3125-.4375 5/16-7/16 7.90-11.00mm	5/8 .650-.635	3/4	DG-32-12	
		1	DG-32-16	
		3/8	DG-40-6	
		1/2	DG-40-8	
		3/4	DG-40-12	
.3125-.5312 5/16-17/32 8.00-13.00mm	3/4 .775-.760	1	DG-40-16	
		1-3/8	DG-40-22	
		3/8	DG-48-6	
		1/2	DG-48-8	
		3/4	DG-48-12	
.5000-.6562 1/2-21/32 13.00-16.50mm	7/8 .900-.885	1	DG-48-16	
		1-3/8	DG-48-22	
		3/8	DG-56-6	
		1/2	DG-56-8	
		3/4	DG-56-12	
.5000-.7656 1/2-49/64 13.00-19.00mm	1 1.035-1.010	1	DG-56-16	
		1-3/8	DG-56-22	
		1/2	DG-64-8	
		3/4	DG-64-12	
		1	DG-64-16	
		1-3/8	DG-64-22	
		1-1/2	DG-64-24	

Please see our web catalog for pricing.

\* Counterbored, leaving correct drill-bearing length and clearance (see page 6 for bearing length).

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48



### MANUFACTURING CO.

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 Web Site: www.carrlane.com

# DGM

## DIAMOND GROOVE METRIC



ID RANGE (G6)	OD	LENGTH	ANSI PART NO.	PRICE 1-5
1.00-1.80mm	5mm 5.50-5.25mm	6mm	DGM-5-6	
		9mm	DGM-5-9	
1.81-2.60mm		6mm	DGM-5-6	
		9mm	DGM-5-9	
2.61-3.30mm	6mm 6.65-6.25mm	8mm	DGM-6-8	
		12mm	DGM-6-12	
		16mm	DGM-6-16	
3.31-4.00mm	7mm 7.65-7.25mm	8mm	DGM-7-8	
		12mm	DGM-7-12	
		16mm	DGM-7-16	
4.01-5.00mm	8mm 8.65-8.25mm	8mm	DGM-8-8	
		12mm	DGM-8-12	
		16mm	DGM-8-16	
5.01-6.00mm	10mm 10.65-10.25mm	10mm	DGM-10-10	
		16mm	DGM-10-16	
		20mm	DGM-10-20	
6.01-8.00mm	12mm 12.65-12.25mm	10mm	DGM-12-10	
		16mm	DGM-12-16	
		20mm	DGM-12-20	
8.01-10.00mm	15mm 15.65-15.25mm	12mm	DGM-15-12	
		20mm	DGM-15-20	
		25mm	DGM-15-25	
10.01-12.00mm	18mm 18.65-18.25mm	12mm	DGM-18-12	
		20mm	DGM-18-20	
		25mm	DGM-18-25	
12.01-15.00mm	22mm 22.65-22.25mm	16mm	DGM-22-16	
		28mm	DGM-22-28	
		36mm	DGM-22-36	
15.01-18.00mm	26mm 26.90-26.25mm	16mm	DGM-26-16	
		28mm	DGM-26-28	
		36mm	DGM-26-36	

Please see our web catalog for pricing.

Something  
you get  
for nothing  
is usually  
worth it.

Temper is  
what gets  
most of us  
into trouble.  
Pride is  
what keeps  
us there.

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48



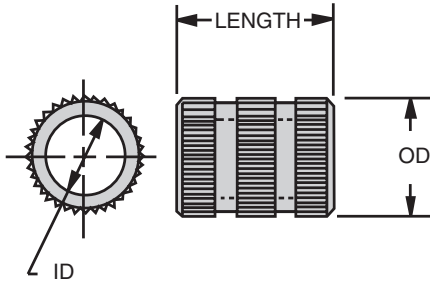
**MANUFACTURING CO.**

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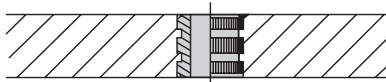
# SERRATA GROOVE

# SG



### APPLICATIONS:

Can be cast in place or potted, just as a diamond-groove bushing, or can also be pressed into an installation hole. Straight knurl provides less resistance to axial loads than the diamond knurl on a DG bushing. Since the bushing's OD is not ground, keep the ID accurately located during casting or potting to ensure accuracy in the finished tool.



### ORDERING EXAMPLES:

SG-26-16-.1875 Standard USA bushing, inch ID  
 SG-26-16-.1772 Standard USA bushing, mm ID (.1772 = 4.50mm)  
 SG-26-16-.1875 REAMER Reamer tolerance on ID  
 SG-26-16-.1875 NCB No counterbore on long bushings marked with \* (no counterbore is standard on all other bushings)

Prices shown here apply to standard bushings only, for a standard drill size within the stated ID range. See back cover for decimal equivalents. To price non-standard sizes, including all reamer and tap-guide bushings, see page 7.

### STANDARD ID TOLERANCES:

From #55 to 1/4"	+ .0001/+ .0004	From 1 to 3mm	+ .002/+ .008mm
Over 1/4 to 3/4"	+ .0001/+ .0005	Over 3 to 6mm	+ .004/+ .012mm
Over 3/4 to 1-1/2"	+ .0002/+ .0006	Over 6 to 10mm	+ .005/+ .014mm
		Over 10 to 18mm	+ .006/+ .017mm
		Over 18 to 19mm	+ .007/+ .020mm
			(G6 tolerance)

### REAMER ID TOLERANCES:

From #60 to 1/4"	+ .0005/+ .0008	From 1 to 3mm	+ .006/+ .012mm
		Over 3 to 6mm	+ .010/+ .018mm
Over 1/4 to 1"	+ .0006/+ .0010	Over 6 to 10mm	+ .013/+ .022mm
		Over 10 to 18mm	+ .016/+ .027mm
		Over 18 to 19mm	+ .020/+ .033mm
			(F6 tolerance)

ID RANGE	OD	LENGTH	ANSI PART NO.	PRICE 1-5
.0520-.0995 #55-#39 1.35-2.50mm	13/64 .223-.213	1/4	SG-13-4	
		5/16	SG-13-5	
		3/8	SG-13-6	
		1/2	SG-13-8	
.0980-.1406 #40-9/64 2.50-3.50mm	1/4 .275-.260	1/4	SG-16-4	
		5/16	SG-16-5	
		3/8	SG-16-6	
		1/2	SG-16-8	
.1250-.1935 1/8-#10 3.20-4.90mm	5/16 .337-.322	*3/4	SG-16-12	
		1/4	SG-20-4	
		5/16	SG-20-5	
		3/8	SG-20-6	
		1/2	SG-20-8	
.1562-.2570 5/32-F 4.00-6.50mm	13/32 .431-.416	3/4	SG-20-12	
		*1	SG-20-16	
		1/4	SG-26-4	
		5/16	SG-26-5	
		3/8	SG-26-6	
.1562-.3160 5/32-O 4.00-8.00mm	1/2 .525-.510	1/2	SG-26-8	
		3/4	SG-26-12	
		*1	SG-26-16	
		5/16	SG-32-5	
		3/8	SG-32-6	
.3125-.4375 5/16-7/16 7.90-11.00mm	5/8 .650-.635	1/2	SG-32-8	
		3/4	SG-32-12	
		*1	SG-32-16	
		3/8	SG-40-6	
.3125-.5312 5/16-17/32 8.00-13.00mm	3/4 .775-.760	1/2	SG-40-8	
		3/4	SG-40-12	
		1	SG-40-16	
		1-3/8	SG-40-22	
		3/8	SG-48-6	
.5000-.6562 1/2-21/32 13.00-16.50mm	7/8 .900-.885	1/2	SG-48-8	
		3/4	SG-48-12	
		1	SG-48-16	
		1-3/8	SG-48-22	
		3/8	SG-56-6	
.5000-.7656 1/2-49/64 13.00-19.00mm	1 1.035-1.010	1/2	SG-56-8	
		3/4	SG-56-12	
		1	SG-56-16	
		1-3/8	SG-56-22	
		1/2	SG-64-8	
		3/4	SG-64-12	
		1	SG-64-16	
		1-3/8	SG-64-22	
		1-1/2	SG-64-24	

Please see our web catalog for pricing.

\* Counterbored, leaving correct drill-bearing length and clearance (see page 6 for bearing length).

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48



### MANUFACTURING CO.

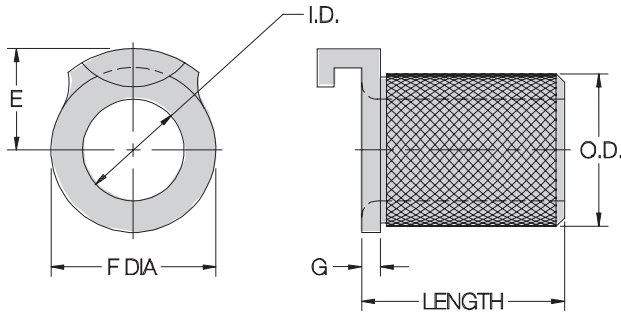
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 Web Site: www.carrlane.com

# ULD

# DIAMOND-KNURL UN-A-LOK<sup>®</sup> LINER



### USA



### USA

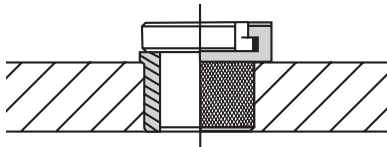
BODY OD	E	F DIA	G
5/16	1/4	.365	3/32
1/2	3/8	9/16	3/32
3/4	1/2	13/16	3/32
1	21/32	1-1/16	1/8
1-3/8	7/8	1-7/16	1/8

### METRIC

BODY OD	E	F DIA	G
12mm	9.5mm	15mm	3mm
15mm	11mm	18mm	3mm
18mm	13mm	22mm	4mm
22mm	15.5mm	26mm	4mm
26mm	17.5mm	30mm	4mm

### APPLICATIONS:

A liner for cast-in-place or potted installation, used to hold SF renewable drill bushings. Un-A-Lok<sup>®</sup> liners incorporate a special locking tab that eliminates the need for a lockscrew. Holds only the "slip" side of an SF bushing, not the "fixed" side. Diamond-knurl OD provides superior holding strength against both rotational and axial forces. Since the bushing's OD is not ground, keep the ID accurately located during casting or potting to ensure accuracy in the finished tool.



### ORDERING EXAMPLES:

ULD-20-5                      Standard USA liner bushing  
 ULDM-12-10                Standard metric liner bushing

### STANDARD LINER ID TOLERANCES:

3/16 to 5/16"	+0.001/+0.004	8 to 10mm	+0.05/+0.014mm
1/2"	+0.002/+0.005	12 to 18mm	+0.06/+0.017mm
3/4"	+0.003/+0.006		(G6 tolerance)
1"	+0.004/+0.007		

ID	OD	LENGTH	PART NO.	PRICE 1-5
3/16	5/16 .342-.332	5/16	ULD-20-5	Please see our web catalog for pricing.
		3/8	ULD-20-6	
		1/2	ULD-20-8	
5/16	1/2 .533-.523	3/4	ULD-20-12	
		3/8	ULD-32-6	
		1/2	ULD-32-8	
1/2	3/4 .785-.775	3/4	ULD-32-12	
		1	ULD-48-8	
		3/4	ULD-48-12	
3/4	1 1.035-1.025	1	ULD-48-16	
		1/2	ULD-64-8	
		3/4	ULD-64-12	
1	1-3/8 1.415-1.405	1	ULD-64-16	
		1/2	ULD-88-8	
		3/4	ULD-88-12	
1	1-3/8 1.415-1.405	1	ULD-88-16	
		3/4	ULD-88-12	
		1-3/8	ULD-88-22	

### METRIC

ID (G6)	OD	LENGTH	PART NO.	PRICE 1-5
8mm	12mm 12.65-12.25mm	10mm	ULDM-12-10	Contact Factory
		16mm	ULDM-12-16	
10mm	15mm 15.65-15.25mm	12mm	ULDM-15-12	Contact Factory
		20mm	ULDM-15-20	
		25mm	ULDM-15-25	
12mm	18mm 18.65-18.25mm	12mm	ULDM-18-12	Contact Factory
		20mm	ULDM-18-20	
		25mm	ULDM-18-25	
15mm	22mm 22.65-22.25mm	16mm	ULDM-22-16	Contact Factory
		28mm	ULDM-22-28	
		36mm	ULDM-22-36	
18mm	26mm 26.90-26.25mm	16mm	ULDM-26-16	Contact Factory
		28mm	ULDM-26-28	
		36mm	ULDM-26-36	

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48



**MANUFACTURING CO.**

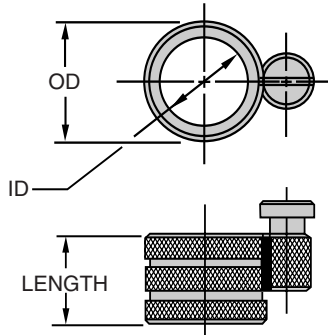
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 Web Site: www.carrlane.com





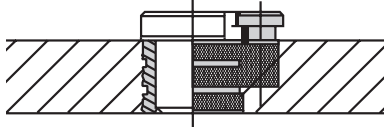
# EZ-CAST LINER

# EZ



### APPLICATIONS:

Another liner for cast-in-place or potted installation, used to hold SF renewable drill bushings. Unlike diamond-knurl unlock liners, EZ-cast liners hold either the "slip" or "fixed" side of an SF bushing, since they include an integral lock screw holder. Diamond-knurled OD provides superior holding strength against both rotational and axial forces. Since the bushing's OD is not ground, keep the ID accurately located during casting or potting to ensure accuracy in the finished tool.



ID	OD	LENGTH	PART NO.	PRICE 1-5
5/16 .3126-.3129	1/2 .525-.510	1/2	EZ-32-8	Please see our web catalog for pricing.
		3/4	EZ-32-12	
		1	EZ-32-16	
1/2 .5002-.5005	3/4 .775-.760	1/2	EZ-48-8	
		3/4	EZ-48-12	
		1	EZ-48-16	
3/4 .7503-.7506	1 1.035-1.010	1-3/8	EZ-48-22	
		1/2	EZ-64-8	
		3/4	EZ-64-12	
1 1.0004-1.0007	1-3/8 1.410-1.385	1	EZ-64-16	
		1-3/8	EZ-64-22	
		3/4	EZ-88-12	
1 1.0004-1.0007	1-3/8 1.410-1.385	1	EZ-88-16	
		1-3/8	EZ-88-22	

### ORDERING EXAMPLE:

EZ-32-8 Standard USA liner bushing

### STANDARD LINER ID TOLERANCES:

5/16"	+ .0001/+ .0004
1/2"	+ .0002/+ .0005
3/4"	+ .0003/+ .0006
1"	+ .0004/+ .0007

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48

## Handy Reference Books

### Jig & Fixture Handbook

- 430 pages
- Completely illustrated
- Hardbound manual
- Step-by-step instructions
- Handy reference charts
  - Decimals and fractions
  - Units of measure
  - Trigonometry calculations
  - Much more!



### Modular Fixturing Handbook

- 216 pages
- Step-by-step building
- Includes chart of break-even calculations
- Checklist helps you avoid problems caused by missing important steps in building
- Illustrated examples



Jig & Fixture Handbook: **\$19.95** — Modular Fixturing Handbook: **\$12.00** — Order online at [www.carrlane.com/books](http://www.carrlane.com/books)

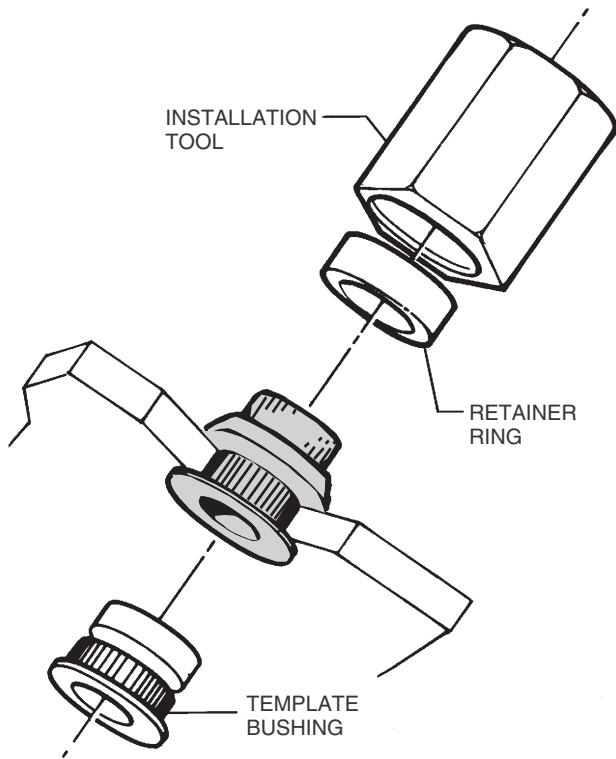


## MANUFACTURING CO.

4200 Carr Lane Ct., P.O. Box 191970  
 St. Louis, Missouri 63119-7970 USA  
 Phone: 314-647-6200, FAX: 314-647-5736  
 Web Site: [www.carrlane.com](http://www.carrlane.com)

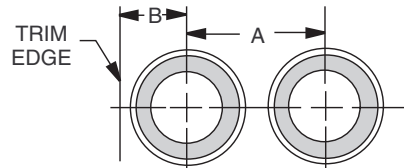
# TB

# TEMPLATE



## INSTALLATION STEPS

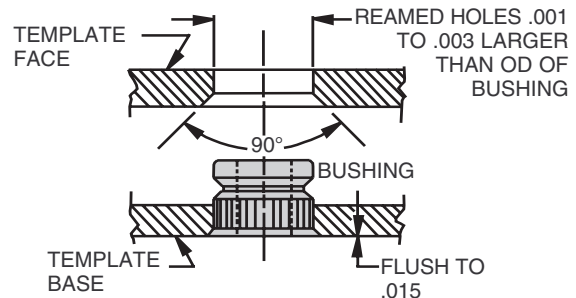
### 1. LAY OUT HOLES



When laying out holes, observe the minimum hole spacing and edge distance listed below:

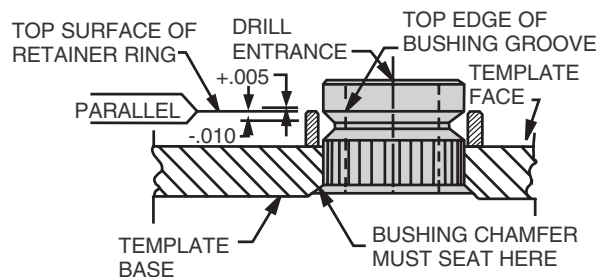
BUSHING OD	A MINIMUM	B MINIMUM
3/8	.60	.250
1/2	.73	.312
3/4	.98	.438

### 2. REAM AND COUNTERSINK



Ream hole .001 to .003 larger than bushing OD. Countersink reamed hole to allow the bushing to seat .015 below flush with surface. For best results, use a piloted countersink tool so that the countersink is concentric and free of chatter marks.

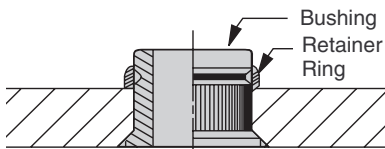
### 3. INSTALL



Install Retainer Ring with an arbor press whenever possible. The Installation Tool is also tapped for mounting on a rivet gun or other impact tool. Check that Retainer Ring top surface is within +.005 / -.010 of the bushing groove's top edge before installing.

### APPLICATIONS:

An economical bushing designed for thin template jig plates from 1/16- to 3/8-inch thick. Bushings are held in place by a retainer ring. The OD serrations prevent the bushing from spinning. Bushings can be removed and reused by breaking the aluminum retainer ring (extra retainer rings available).



### ORDERING EXAMPLES:

- TB-24-6-4-.1250-TR-10 Bushing for 1/8" drill and 1/16"-thick template
- TB-24-6-4-.1250-TR-30 Bushing for 1/8" drill and 1/8"-thick template
- TB-24-6-4-.1250 Bushing only for 1/8" drill (if rings are ordered separately)

Prices shown here apply to standard bushings only, for a standard drill size within the stated ID range. See back cover for decimal equivalents. To price non-standard sizes, including all reamer and tap-guide bushings, see page 7.

### STANDARD ID TOLERANCES:

#55 to 1/2" +.0001/+.0011 | 1.30 to 12mm +.002/+.030mm

### CONCENTRICITY:

ID concentric with OD to within .002 TIR



## MANUFACTURING CO.

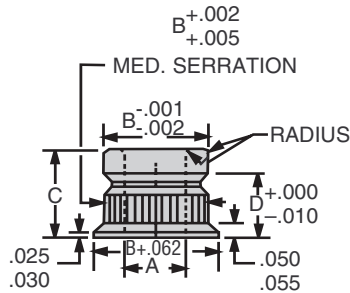
4200 Carr Lane Ct., P.O. Box 191970  
St. Louis, Missouri 63119-7970 USA  
Phone: 314-647-6200, FAX: 314-647-5736  
Web Site: www.carrlane.com



# TEMPLATE

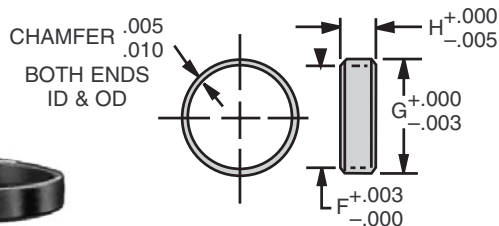
# TB

## TEMPLATE BUSHINGS WITH RETAINER RINGS



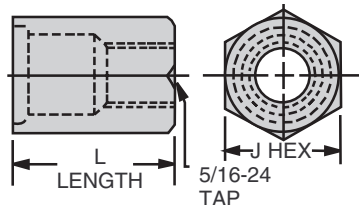
ID RANGE A	OD B	LGTH. C	GRIP D	BUSHING PART NO.	RETAINER RING PART NO.	TEMPLATE THICKNESS	PRICE	
.0520-.1960 #55-#9 1.30-5.00mm	3/8	3/8	1/4	TB-24-6-4	TR-10	1/16	Please see our web catalog for pricing.	
					TR-20	3/32		
			TR-30	1/8				
			TR-40	1/8				
		1/2	5/16	TB-24-6-5	TR-10	1/8		
					TR-30	3/16		
			5/16	TB-24-8-5	TR-10	1/8		
					TR-30	3/16		
				3/8	TB-24-8-6	TR-10		3/16
						TR-30		1/4
7/16	TB-24-8-7	TR-10	1/4					
		TR-30	5/16					
.1960-.3160 #9-O 5.00-8.00mm	1/2	3/8	1/4	TB-32-6-4	TR-40	1/16	Please see our web catalog for pricing.	
					TR-50	3/32		
			TR-60	1/8				
			5/16	TB-32-6-5	TR-40	1/8		
		TR-60			3/16			
		1/2	5/16	TB-32-8-5	TR-40	1/8		
					TR-60	3/16		
			3/8	TB-32-8-6	TR-40	3/16		
					TR-60	1/4		
		7/16	TB-32-8-7	TR-40	1/4			
				TR-60	5/16			
		5/8	1/2	TB-32-10-8	TR-40	5/16		
TR-60	3/8							
3/4	3/8		1/4	TB-48-6-4	TR-70	1/16	Please see our web catalog for pricing.	
					TR-80	3/32		
	5/16	TB-48-6-5	TR-90	1/8				
			TR-70	1/8				
1/2	5/16	TB-48-8-5	TR-90	3/16				
			TR-70	3/16				
	3/8	TB-48-8-6	TR-90	1/4				
			TR-70	1/4				
7/16	TB-48-8-7	TR-90	5/16					
		TR-70	5/16					
5/8	1/2	TB-48-10-8	TR-90	3/8				
			TR-70	3/8				

## EXTRA RETAINER RINGS



PART NO.	F ID	G OD	H	PRICE
TR-10	.375	.468	.205	Please see our web catalog for pricing.
TR-20			.173	
TR-30			.142	
TR-40	.500	.593	.205	
TR-50			.173	
TR-60			.142	
TR-70	.750	.843	.205	
TR-80			.173	
TR-90			.142	

## INSTALLATION TOOLS



PART NO.	FOR BUSHING SERIES	FOR RING SERIES	J	L	NET PRICE	COMPLETE SET PART NO.	NET PRICE
TBT-100	TB-24	TR-10,TR-20,TR-30	5/8	1	See our web catalog	TBT-400	See our web catalog
TBT-200	TB-32	TR-40,TR-50,TR-60	3/4	1			
TBT-300	TB-48	TR-70,TR-80,TR-90	1	1			



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# TTB THREADED TEMPLATE



**Retainer Ring**



**Threaded Template Bushing**

**STANDARD ID TOLERANCE:**

From #55 to 1/2" +.0001/+.0015  
(ID concentric with OD to within .002" TIR)

**INSTALLATION:**

Drill hole in jig plate to nominal bushing OD (B diameter). Countersink 90° to allow bushing to seat flush to .015" below surface of plate (standard version only, not flanged version). Install and tighten Retainer Ring to secure. To make Retainer Ring installation easier, we offer a handy Socket-Type Installation Tool that fits 1/4" square drives.

**NEW!**

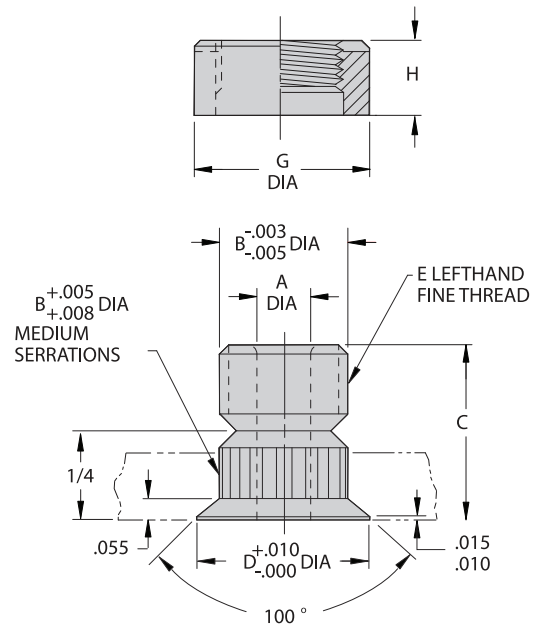
**APPLICATIONS:**

This economical bushing is designed for thin template jig plates from 3/64 to 3/8" thick. Bushings are held in place by a threaded Retainer Ring (order separately). Left-hand thread is self tightening during drilling to prevent the Retainer Ring from loosening. Flush contact of the Retainer Ring against the jig plate ensures perpendicular drill alignment. OD serrations prevent the bushing from rotating during drilling. Choose standard countersunk type for flush mounting, or flanged type for installation without countersinking the jig plate. Threaded Template Bushings can be easily removed to replace or reuse.

**ORDERING EXAMPLES:**

Available in 3/8", 1/2", 5/8", 3/4", and 1" OD sizes. The prices shown apply to standard bushings only, with any standard USA or metric ID size within the stated range.

- TTB-24-.1250 Bushing with 1/8" ID
- TTR-24-3 Matching Retainer Ring for 1/4" thick template



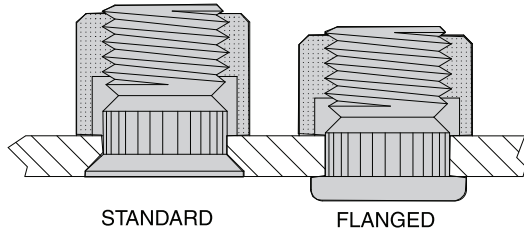
**THREADED TEMPLATE BUSHINGS — STANDARD  
(ORDER BUSHING AND RETAINER RING SEPARATELY)**

A ID RANGE	B OD	C LENGTH	D DIA	E	G DIA	H	BUSHING PART NO.	RETAINER RING PART NO.	TEMPLATE THICKNESS	PRICE
.0520-.1960 #55-#9 1.30-5.00mm	3/8	1/2	.475	3/8-24 LH	1/2	3/8	TTB-24	TTR-24-6	3/64-1/8	Please see our web catalog for pricing
						5/16		TTR-24-5	9/64-3/16	
						3/16		TTR-24-3	13/64-3/8	
.1960-.3160 #9-0 5.00-8.00mm	1/2	1/2	.600	1/2-20 LH	5/8	3/8	TTB-32	TTR-32-6	3/64-1/8	
						5/16		TTR-32-5	9/64-3/16	
						3/16		TTR-32-3	13/64-3/8	
.3125-.4375 5/16-7/16 7.90-11.00mm	5/8	1/2	.725	5/8-18 LH	3/4	3/8	TTB-40	TTR-40-6	3/64-1/8	
						5/16		TTR-40-5	9/64-3/16	
						3/16		TTR-40-3	13/64-3/8	
.3125-.5312 5/16-17/32 8.00-13.00mm	3/4	1/2	.850	3/4-16 LH	1	3/8	TTB-48	TTR-48-6	3/64-1/8	
						5/16		TTR-48-5	9/64-3/16	
						3/16		TTR-48-3	13/64-3/8	
.5000-.7656 1/2-49/64 13.00-19.00mm	1	1/2	1.100	1"-14 LH	1-1/4	3/8	TTB-64	TTR-64-6	3/64-1/8	
						5/16		TTR-64-5	9/64-3/16	
						3/16		TTR-64-3	13/64-3/8	

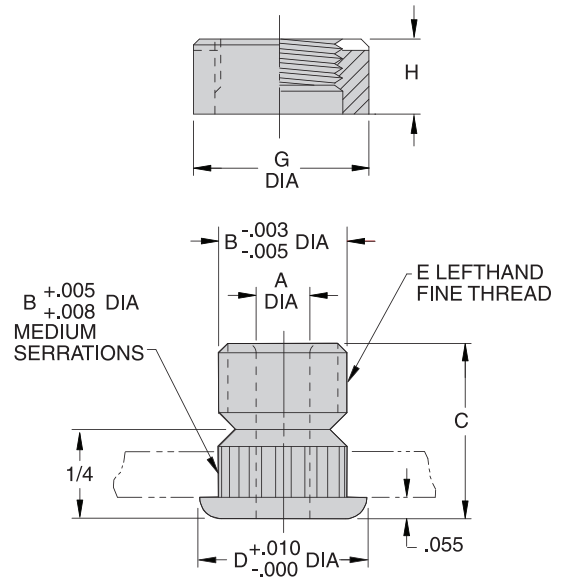




# THREADED TEMPLATE **TTB**

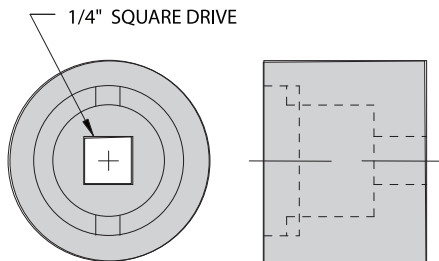


Choose standard countersunk type for flush mounting, or flanged type for installation without countersinking the jig plate.



## THREADED TEMPLATE BUSHES — FLANGED (ORDER BUSH AND RETAINER RING SEPERATELY)

A ID RANGE	B OD	C LENGTH	D DIA	E	G DIA	H	BUSH PART NO.	RETAINER RING PART NO.	TEMPLATE THICKNESS	PRICE
.0520-.1960 #55-#9 1.30-5.00mm	3/8	1/2	.475	3/8-24 LH	1/2	3/8	TTBF-24	TTR-24-6	3/64-1/8	Please see our web catalog for pricing
						5/16		TTR-24-5	9/64-3/16	
						3/16		TTR-24-3	13/64-3/8	
.1960-.3160 #9-0 5.00-8.00mm	1/2	1/2	.600	1/2-20 LH	5/8	3/8	TTBF-32	TTR-32-6	3/64-1/8	
						5/16		TTR-32-5	9/64-3/16	
						3/16		TTR-32-3	13/64-3/8	
.3125-.4375 5/16-7/16 7.90-11.00mm	5/8	1/2	.725	5/8-18 LH	3/4	3/8	TTBF-40	TTR-40-6	3/64-1/8	
						5/16		TTR-40-5	9/64-3/16	
						3/16		TTR-40-3	13/64-3/8	
.3125-.5312 5/16-17/32 8.00-13.00mm	3/4	1/2	.850	3/4-16 LH	1	3/8	TTBF-48	TTR-48-6	3/64-1/8	
						5/16		TTR-48-5	9/64-3/16	
						3/16		TTR-48-3	13/64-3/8	
.5000-.7656 1/2-49/64 13.00-19.00mm	1	5/8	1.100	1"-14 LH	1-1/4	3/8	TTBF-64	TTR-64-6	3/64-1/8	
						5/16		TTR-64-5	9/64-3/16	
						3/16		TTR-64-3	13/64-3/8	



## SOCKET-TYPE INSTALLATION TOOLS

PART NO.	FOR INSTALLING RETAINER RINGS		
TTBT-24	TTR-24-3	TTR-24-5	TTR-24-6
TTBT-32	TTR-32-3	TTR-32-5	TTR-32-6
TTBT-40	TTR-40-3	TTR-40-5	TTR-40-6
TTBT-48	TTR-48-3	TTR-48-5	TTR-48-6
TTBT-64	TTR-64-3	TTR-64-5	TTR-64-6



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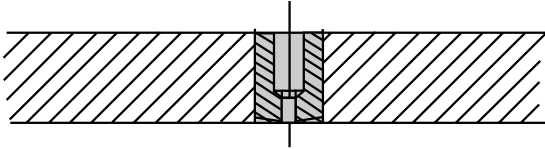
# CB

# CIRCUIT BOARD



### APPLICATIONS:

Headless and head-type bushings made especially for circuit-board drilling machines. Available for Electro-Mechano, Excellon, Waco, Digital, Nationwide, Edlund, Tektronix, Leland-Gifford, Palomar, Hughes, Rapidrill, and Reliable drilling machines.



### ORDERING EXAMPLES:

CB-1-.1250 Bushing for 1/8" drill

Prices shown here apply to standard bushings only, for a standard drill size within the stated ID range. See back cover.

### SPECIALS:

Bushings for other types of circuit-board drilling machines, including Hughes, Rapidrill, and Reliable, are available on request. Please contact factory.

### STANDARD ID TOLERANCE:

#80 to 1/4 Nominal +.0001/+ .0004

### CONCENTRICITY:

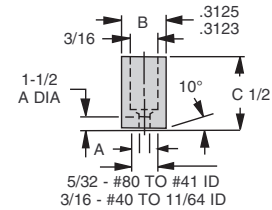
ID concentric with OD to within .0005 TIR maximum at drill exit end.

### DRILL BEARING LENGTH:

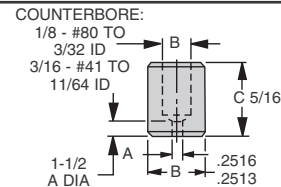
Standard drill bearing length is 1-1/2 times drill size on all types and sizes.

Great works are performed not by strength but by perseverance.

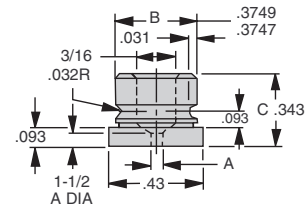
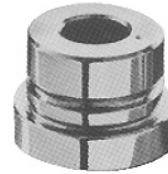
### CB-1 FOR ELECTRO-MECHANO



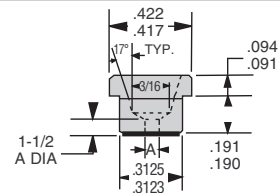
### CB-2 FOR EXCELLON AND WACO



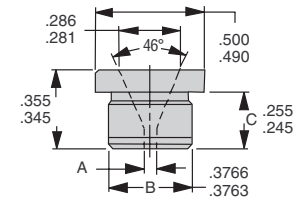
### CB-3 FOR DIGITAL



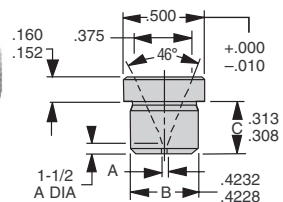
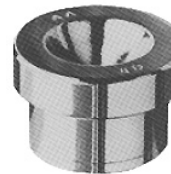
### CB-4 FOR NATION-WIDE



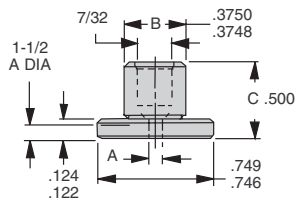
### CB-5 FOR EDLUND AND TEKTRONIX



### CB-6 FOR LELAND-GIFFORD



### CB-7 FOR PALOMAR



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Web Site: www.carlane.com



# CIRCUIT BOARD

# CB

TYPE	ID RANGE DRILL SIZE "A"		PRICE
CB-1	#80-#78	.0135-.0179	Contact Factory
	#77-#70	.0180-.0291	
	#69-3/64	.0292-.0519	
	#55-1/16	.0520-.0634	
	#52-3/32	.0635-.0959	
	#41-9/64	.0960-.1406	

TYPE	ID RANGE DRILL SIZE "A"		PRICE
CB-2	#80-#79	.0135-.0155	Contact Factory
	1/64-#75	.0156-.0224	
	#74-1/32	.0225-.0319	
	#67-3/64	.0320-.0519	
	#55-#41	.0520-.0979	
	#40-9/64	.0980-.1406	

TYPE	ID RANGE DRILL SIZE "A"		PRICE
CB-3	#80-#78	.0135-.0179	Contact Factory
	#77-#70	.0180-.0291	
	#69-3/64	.0292-.0519	
	#55-1/16	.0520-.0634	
	#52-3/32	.0635-.0959	
	#41-9/64	.0960-.1406	

TYPE	ID RANGE DRILL SIZE "A"		PRICE
CB-4	#80-#78	.0135-.0179	Contact Factory
	#77-#70	.0180-.0291	
	#69-3/64	.0292-.0519	
	#55-1/16	.0520-.0634	
	#52-3/32	.0635-.0959	
	#41-9/64	.0960-.1406	

TYPE	ID RANGE DRILL SIZE "A"		PRICE
CB-5	#80-#78	.0135-.0179	Contact Factory
	#77-#70	.0180-.0291	
	#69-3/64	.0292-.0519	
	#55-1/16	.0520-.0634	
	#52-3/32	.0635-.0959	
	#41-9/64	.0960-.1406	

TYPE	ID RANGE DRILL SIZE "A"		PRICE
CB-6	#80-#78	.0135-.0179	Contact Factory
	#77-#70	.0180-.0291	
	#69-3/64	.0292-.0519	
	#55-1/16	.0520-.0634	
	#52-3/32	.0635-.0959	
	#41-9/64	.0960-.1406	

TYPE	ID RANGE DRILL SIZE "A"		PRICE
CB-7	#80-#78	.0135-.0179	Contact Factory
	#77-#70	.0180-.0291	
	#69-3/64	.0292-.0519	
	#55-1/16	.0520-.0634	
	#52-3/32	.0635-.0959	
	#41-9/64	.0960-.1406	



**MANUFACTURING CO.**

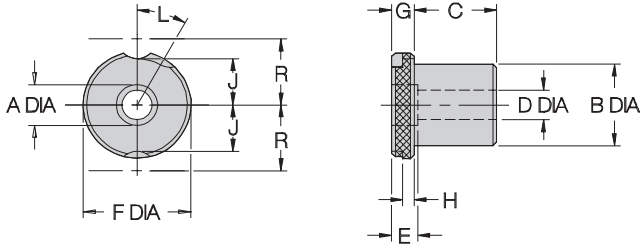
4200 Carr Lane Ct., P.O. Box 191970  
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# GD

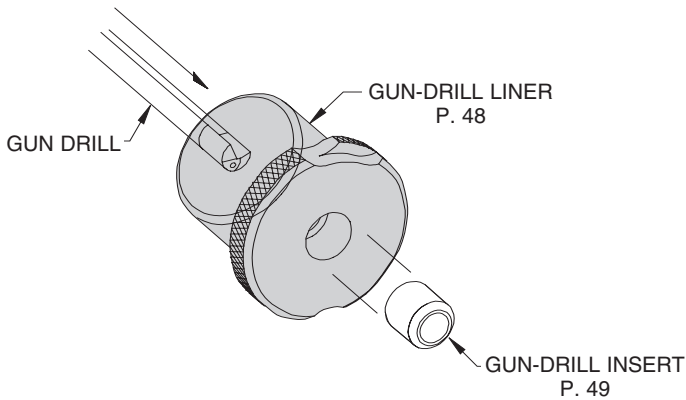
# GUN DRILL



## TYPE GD L GUN-DRILL LINER

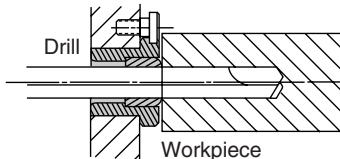


BODY OD	E	F DIA	G	H	J	L	R	LOCK SCREW
1	7/16	1-27/64	3/8	3/16	19/32	35°	59/64	LS-2
1-3/8	7/16	1-51/64	3/8	3/16	25/32	30°	1-7/64	LS-2
1-3/4	3/4	2-19/64	3/8	3/16	1	30°	1-25/64	LS-2



### APPLICATIONS:

These bushings are for gun-drilling machines, such as Eldorado, Drillmation, deHoff, and Lahr. Gun-drill bushings are similar to SF renewable bushings, but with the drill bearing at the bushing's head end. Depending on the gun-drilling machine, bushings are either one-piece or two-piece (a liner and an insert).



### ORDERING EXAMPLE:

GDL-112-28-20 Liner for any insert with a 5/16 OD

Prices shown here apply to standard bushings only, for a standard drill size within the stated ID range. See back cover for decimal equivalents. To price non-standard sizes, see page 7.

### STANDARD LINER ID TOLERANCES:

13/64"	+0.014/+0.016
1/4 to 5/16"	+0.015/+0.017
1/2"	+0.016/+0.018
3/4 to 1"	+0.017/+0.019
1-3/8"	+0.021/+0.023

A ID	B OD	C LGTH	D	PART NO.	PRICE	LOCK SCREW
13/64	1	1	1/8	GDL-64-16-13	Please see our web catalog for pricing.	LS-2
1/4			5/32	GDL-64-16-16		
5/16			7/32	GDL-64-16-20		
1/2			11/32	GDL-64-16-32		
3/4			9/16	GDL-64-16-48		
13/64	1-3/8	1-3/8	1/8	GDL-88-22-13		LS-2
1/4			5/32	GDL-88-22-16		
5/16			7/32	GDL-88-22-20		
1/2			11/32	GDL-88-22-32		
3/4			9/16	GDL-88-22-48		
1			51/64	GDL-88-22-64		
13/64	1-3/4	1-3/4	1/8	GDL-112-28-13		LS-2
1/4			5/32	GDL-112-28-16		
5/16			7/32	GDL-112-28-20		
1/2			11/32	GDL-112-28-32		
3/4			9/16	GDL-112-28-48		
1			51/64	GDL-112-28-64		
1-3/8			1-3/64	GDL-112-28-88		

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48

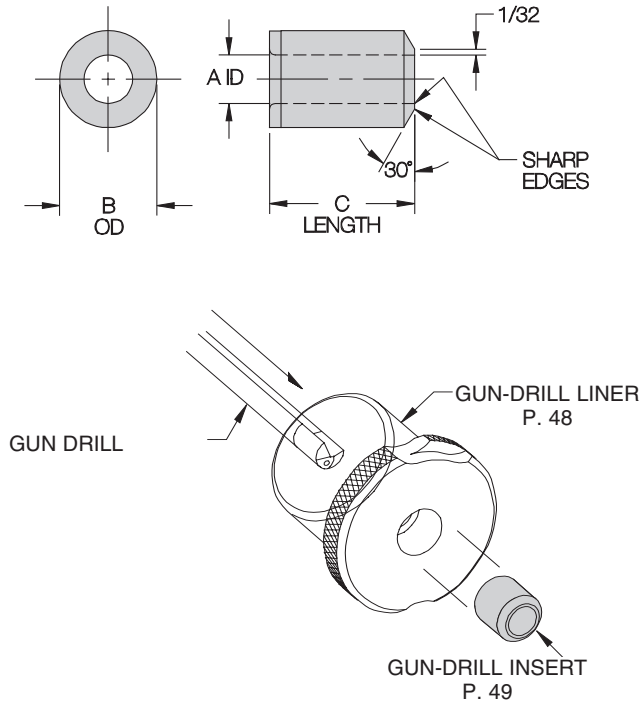






# GUN DRILL

# GD



### TYPE GDI GUN-DRILL INSERTS

A ID	B OD	C LGTH	PART NO.	PRICE	MATCHING LINER
.0635-.0995 #52-#39 1.65-2.50mm	13/64 .2046-.2043	1/2	GDI-13-8	Please see our web catalog for pricing.	GDL-64-16-13
		3/4	GDI-13-12		GDL-88-22-13
		1	GDI-13-16		GDL-112-28-13
.0980-.1406 #40-9/64 2.50-3.50mm	1/4 .2516-.2513	1/2	GDI-16-8		GDL-64-16-16
		3/4	GDI-16-12		GDL-88-22-16
		1	GDI-16-16		GDL-112-28-16
.1250-.1935 1/8-#10 3.20-4.90mm	5/16 .3141-.3138	1/2	GDI-20-8		GDL-64-16-20
		3/4	GDI-20-12		GDL-88-22-20
		1	GDI-20-16		GDL-112-28-20
.1875-.3160 3/16-O 4.80-8.00mm	1/2 .5017-.5014	1/2	GDI-32-8		GDL-64-16-32
		3/4	GDI-32-12	GDL-88-22-32	
		1	GDI-32-16	GDL-112-28-32	
.3125-.5312 5/16-17/32 8.00-13.50mm	3/4 .7518-.7515	1/2	GDI-48-8	GDL-64-16-48	
		3/4	GDI-48-12	GDL-88-22-48	
		1	GDI-48-16	GDL-112-28-48	
.5000-.7656 1/2-49/64 13.00-19.00mm	1 1.0018-1.0015	3/4	GDI-64-12	GDL-88-22-64	
		1	GDI-64-16	GDL-112-28-64	
.6250-1.0312 5/8-1-1/32 16.00-26.00mm	1-3/8 1.3772-1.3768	1	GDI-88-16		GDL-112-28-88

#### ORDERING EXAMPLES:

- GDI-20-16-.1250      Gun-drill insert for 1-3/4" OD liner
- GDL-112-28-20, inch ID
- GDI-20-16-.1772      Gun-drill insert for 1-3/4" OD liner
- GDL-112-28-20, mm ID
- (.1772 = 4.50mm)

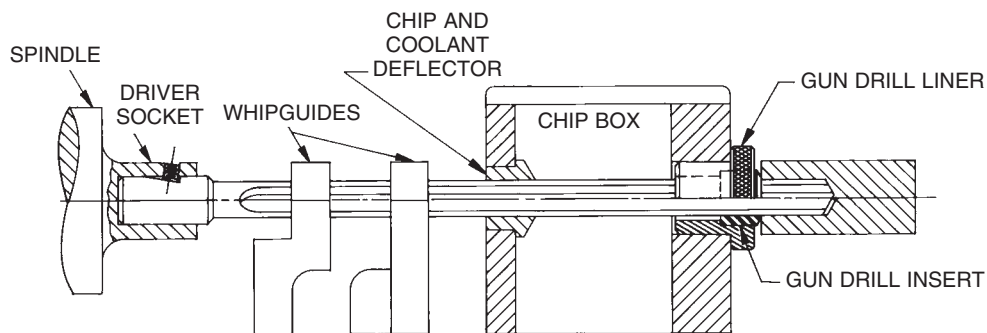
Prices shown here apply to standard bushings only, for a standard drill size within a stated ID range. See back cover for decimal equivalents. To price non-standard sizes, see page 7.

#### STANDARD ID TOLERANCES:

#52 to 1-1/32"      -.0000/+0.0002 | 1.65 to 26mm      -.000/+0.005mm

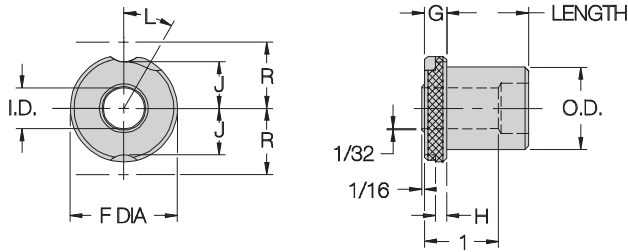
#### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48



# GD

## GUN DRILL



### TYPE GDE ONE-PIECE ELDORADO TYPE

BODY OD	F DIA	G	H	J	L	R
1	1-27/64	3/8	3/16	19/32	35°	59/64
1-3/8	1-51/64	3/8	3/16	25/32	30°	1-7/64

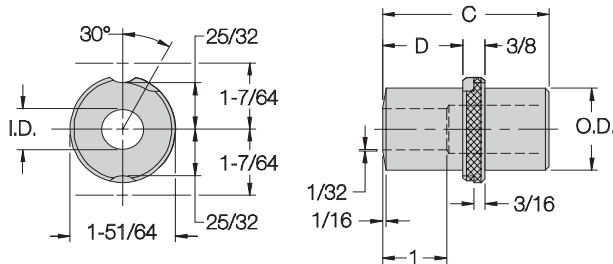
#### ORDERING EXAMPLES:

GDE-64-12-.1250 Standard gun-drill bushing, inch ID  
 GDE-64-12-.1772 Standard gun-drill bushing, mm ID (.1772 = 4.50mm)

#### STANDARD ID TOLERANCES:

1/8 to 1-1/16" -.0000/+0.0002 | 3 to 27mm -.000/+0.005mm

ID RANGE	OD	LENGTH	PART NO.	PRICE 1-5	LOCK SCREW
.1250-.7812 1/8-25/32 3.20-19.50mm	1 1.0000-.9998	3/4	GDE-64-12	Please see our web catalog for pricing.	LS-2
		1	GDE-64-16		
		1-3/8	GDE-64-22		
.1250-1.0625 1/8-1-1/16 3.20-27.00mm	1-3/8 1.3750-1.3747	1	GDE-88-16	Please see our web catalog for pricing.	LS-2
		1-3/8	GDE-88-22		



### TYPE GDD ONE-PIECE ELDORADO DEEP TYPE

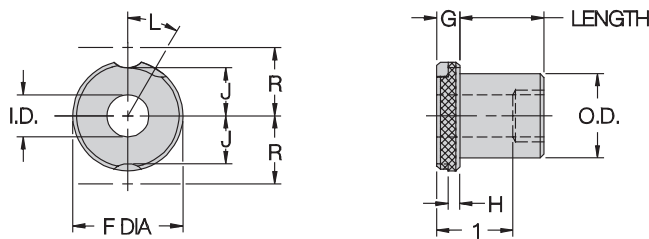
#### ORDERING EXAMPLES:

GDD-88-30-.1250 Standard gun-drill bushing, inch ID  
 GDD-88-30-.1772 Standard gun-drill bushing, mm ID (.1772 = 4.50mm)

#### STANDARD ID TOLERANCES:

1/8 to 1-1/16" -.0000/+0.0002 | 3 to 27mm -.000/+0.005mm

ID RANGE	OD	C LGTH.	D EXT.	PART NO.	PRICE 1-5	LOCK SCREW
.1250-1.0625 1/8-1-1/16 3.20-27.00mm	1-3/8 1.3750-1.3747	1-7/8	1/2	GDD-88-30	Please see our web catalog for pricing.	LS-2
		2-3/8	1	GDD-88-38		
		2-7/8	1-1/2	GDD-88-46		
		3-3/8	2	GDD-88-54		



### TYPE GDH ONE-PIECE DEHOFF TYPE

BODY OD	F DIA	G	H	J	L	R
1	1-27/64	3/8	3/16	19/32	35°	59/64
1-3/8	1-51/64	3/8	3/16	25/32	30°	1-7/64

#### ORDERING EXAMPLES:

GDH-64-12-.1250 Standard gun-drill bushing, inch ID  
 GDH-64-12-.1772 Standard gun-drill bushing, mm ID (.1772 = 4.50mm)

#### STANDARD ID TOLERANCES:

1/8 to 1-1/16" -.0000/+0.0002 | 3 to 27mm -.000/+0.005mm

ID RANGE	OD	LENGTH	PART NO.	PRICE 1-5	LOCK SCREW
.1250-.7812 1/8-25/32 3.20-19.50mm	1 1.0000-.9998	3/4	GDH-64-12	Please see our web catalog for pricing.	LS-2
		1	GDH-64-16		
		1-3/8	GDH-64-22		
.1250-1.0625 1/8-1-1/16 3.20-27.00mm	1-3/8 1.3750-1.3747	1	GDH-88-16	Please see our web catalog for pricing.	LS-2
		1-3/8	GDH-88-22		

### QUANTITY DISCOUNTS FOR ABOVE TYPES

Prices shown here apply to standard bushings only, for a standard drill size within the stated ID range. See back cover for decimal equivalents. To price non-standard sizes, see page 7.

### QUANTITY DISCOUNTS

Quantity	1	6	12	24	50	100	200	500
	-5	-11	-23	-49	-99	-199	-499	Up
Discount %	Net	18%	29%	34%	42%	48%	50%	52%
Multiplier	1.00	.82	.71	.66	.58	.52	.50	.48

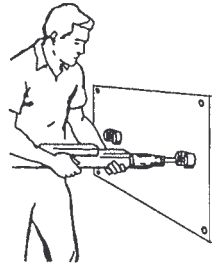
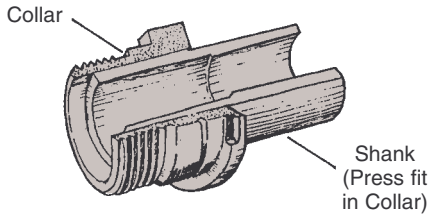


# A

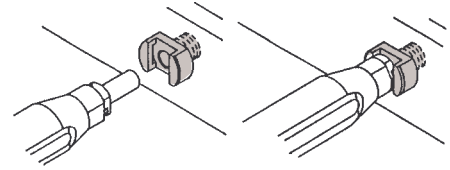
# AIR FEED



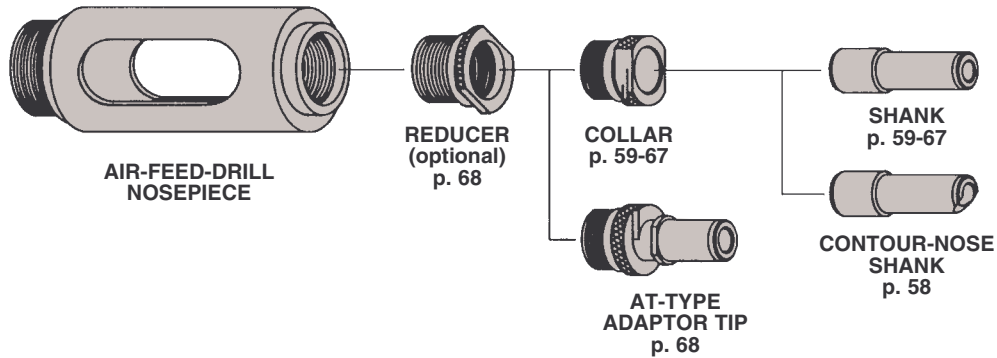
## ADAPTOR TIP ASSEMBLY



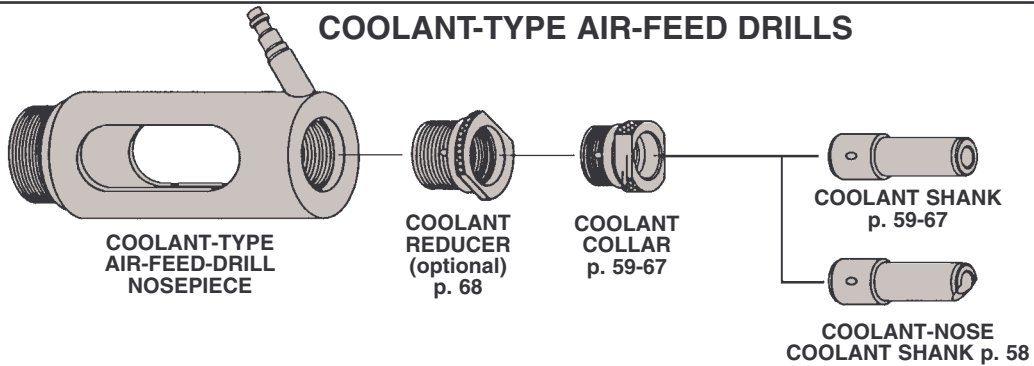
To mount air-feed drill, insert in liner and turn 30° counterclockwise to lock.



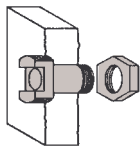
## STANDARD AIR-FEED DRILLS



## COOLANT-TYPE AIR-FEED DRILLS

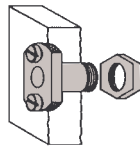


## MOUNTING OPTIONS



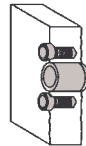
**TAPER-LOK® LINERS p. 69**

New-design one-piece lock liner has angular locking surfaces for superior strength. Allows very close hole spacing. Hold in place with a lock nut. Also available knurled for installing in plastic tooling.



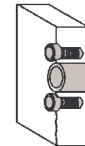
**LOCK LINERS p. 69**

Conventional lock liner incorporating two lock screws. Hold in place with a lock nut.



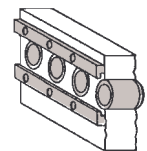
**TAPER-LOK® AIR-FEED LOCKSCREWS p. 71**

New-design lock screw especially for air-feed drills. Angular locking surface for superior strength. Install two lock screws and a liner directly in jig plate.



**LOCKSCREWS p. 71**

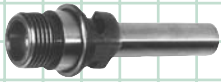
Conventional-style lock screws. Install two lock screws and a liner bushing directly in jig plate.



**LOCK STRIPS p. 71**

Allows the closest possible hole spacing. Use together with liner bushings.



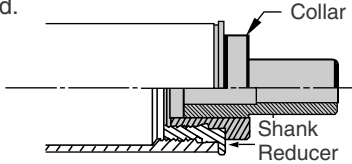


# AIR FEED

# A

## APPLICATIONS:

Drill-bushing shanks, collars, adaptors, and locking accessories for air-feed drills, tappers, and back-spotfacers. Available for all standard drill motors, including Gardner-Denver, Keller, Aro, Buckeye, Quackenbush, Desoutter, and Ingersoll-Rand.



## CONSTRUCTION:

Adaptor-tip assemblies consist of two pieces: a locking collar and a pressed-in shank. The collar screws into the air-feed-drill nosepiece, precisely aligns the shank, and locks the drill in place by rotating 30° counterclockwise after mounting. Shanks and collars can be ordered separately for replacement purposes.

## ORDERING EXAMPLES:

- A-21101-.1250 Complete adaptor-tip assembly
- 21101-.1250 Shank only
- 21000 Collar only
- A-21101-.1250-C Complete assembly with contour nose
- 21101-.1250-C Shank only, with contour nose
- A-11101-.1250 Coolant-type assembly
- A-11101-.1250-C Coolant-type assembly with contour nose

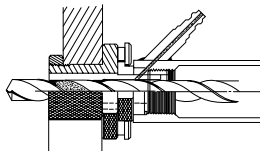
Prices shown here apply to standard bushings only, for a standard drill size within the stated ID range. See back cover for decimal equivalents. To price non-standard sizes, see page 7. All prices are net — no quantity discount.

## STANDARD ID TOLERANCES:

From #70 to 1/4"	+0.001/+0.0004	From 1 to 3mm	+0.02/+0.008mm
Over 1/4 to 3/4"	+0.001/+0.0005	Over 3 to 6mm	+0.04/+0.012mm
Over 3/4 to 1-1/2"	+0.002/+0.0006	Over 6 to 10mm	+0.05/+0.014mm
		Over 10 to 18mm	+0.06/+0.017mm
AT-Type	+0.000/+0.0003	Over 18 to 30mm	+0.07/+0.020mm

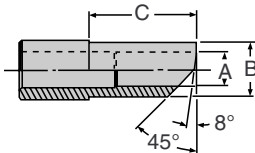
(See page 9 for reamer ID tolerances.)

## OPTIONAL COOLANT TYPE:



For coolant-inducing air-feed drills. Special shanks, collars, and reducers with internal coolant passages. Contact factory for pricing.

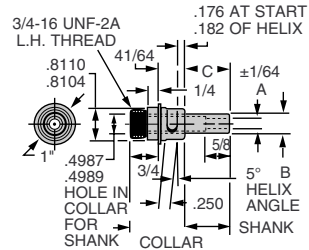
## OPTIONAL CONTOUR NOSE:



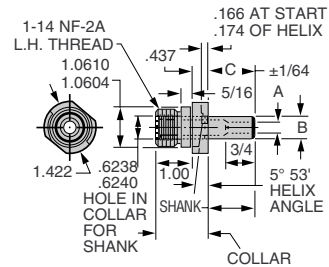
Angular-nose shank recommended for close drilling along sloped or curved surfaces. Available on standard and coolant-type shanks. To order, add "-C" suffix to part number. Contact factory for pricing.

## ADAPTOR TIP ASSEMBLIES

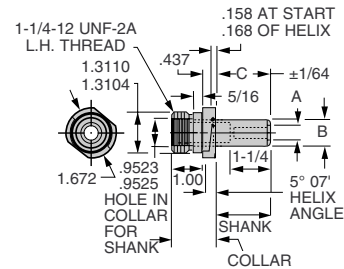
### 21000 SERIES



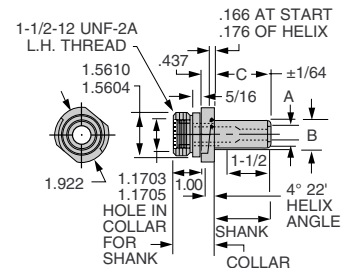
### 22000 SERIES



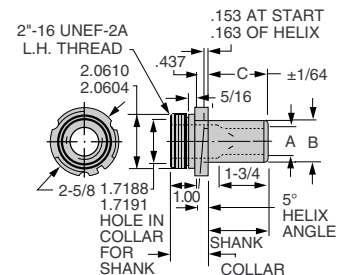
### 23000 SERIES



### 24000 SERIES



### 25000 SERIES



# A

# AIR FEED



## 21000 SERIES

A ID RANGE	B OD	C LENGTH	TIP ASSEMBLY			SHANK ONLY			COLLAR ONLY			TAPER-LOK® LINER PART NO. p. 69	LOCK LINER PART NO. p. 69	LOCK NUT PART NO. p. 69	TAPER-LOK® LOCKSCREW PART NO. p. 71	LOCK SCREW PART NO. p. 71	LINER PART NO. p. 71
			STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*	STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*	STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*						
			Please see our web catalog for pricing.														
.0938-.2500 3/32-1/4 2.40-6.35mm	3/8 .3748-.3745	3/8	A-21101	A-11101		21101	11101					TLL-16520 (Matches A-21106 tip)	A-16520 (Matches A-16500 tip)	14441			19936
		1/2	A-21102	A-11102		21102	11102										
		5/8	A-21103	A-11103		21103	11103										
		3/4	A-21104	A-11104		21104	11104										
		7/8	A-21105	A-11105		21105	11105										
		1	A-21106	A-11106		21106	11106										
		1-1/16	A-16500	A-11107		16500	11107										
		1-1/8	A-21108	A-11108		21108	11108										
		1-1/4	A-21110	A-11110		21110	11110										
		1-3/8	A-21111	A-11111		21111	11111										
		1-1/2	A-21113	A-11113		21113	11113										
		1-5/8	A-21114	A-11114		21114	11114										
		1-3/4	A-21115	A-11115		21115	11115										
		1-7/8	A-21116	A-11116		21116	11116										
		2	A-21118	A-11118		21118	11118										
		2-1/8	A-21119	A-11119		21119	11119										
		2-1/4	A-21120	A-11120		21120	11120										
		2-3/8	A-21121	A-11121		21121	11121										
		2-1/2	A-21122	A-11122		21122	11122										
		2-3/4	A-21124	A-11124		21124	11124										
		3	A-21125	A-11125		21125	11125										
3-1/4	A-21126	A-11126		21126	11126												
.0938-.3125 3/32-5/16 2.40-7.90mm	7/16 .4373-.4370	1/2	A-21202	A-11202		21202	11202				21000	11000					CL-11-AFL or CL-13-AFL or CL-14-AFL
		5/8	A-21203	A-11203		21203	11203										
		3/4	A-21204	A-11204		21204	11204										
		7/8	A-21205	A-11205		21205	11205										
		1	A-21206	A-11206		21206	11206										
		1-1/8	A-21208	A-11208		21208	11208										
		1-1/4	A-21210	A-11210		21210	11210										
		1-3/8	A-21211	A-11211		21211	11211										
		1-1/2	A-21213	A-11213		21213	11213										
		1-5/8	A-21214	A-11214		21214	11214										
		1-3/4	A-21215	A-11215		21215	11215										
		1-7/8	A-21216	A-11216		21216	11216										
		2	A-21218	A-11218		21218	11218										
		2-1/8	A-21219	A-11219		21219	11219										
		2-1/4	A-21220	A-11220		21220	11220										
		2-3/8	A-21221	A-11221		21221	11221										
		2-1/2	A-21222	A-11222		21222	11222										
		2-3/4	A-21224	A-11224		21224	11224										
		3	A-21225	A-11225		21225	11225										
		3-1/4	A-21226	A-11226		21226	11226										
		.0938-.3750 3/32-3/8 2.40-9.50mm	1/2 .4998-.4995	3/8	A-21301	A-11301		21301	11301								
1/2	A-21302			A-11302		21302	11302										
5/8	A-21303			A-11303		21303	11303										
3/4	A-21304			A-11304		21304	11304										
7/8	A-21305			A-11305		21305	11305										
1	A-21306			A-11306		21306	11306										
1-1/16	A-16501			A-11307		16501	11307										
1-1/8	A-21308			A-11308		21308	11308										
1-1/4	A-21310			A-11310		21310	11310										
1-3/8	A-21311			A-11311		21311	11311										
1-1/2	A-21313			A-11313		21313	11313										
1-5/8	A-21314			A-11314		21314	11314										
1-3/4	A-21315			A-11315		21315	11315										
1-7/8	A-21316			A-11316		21316	11316										
2	A-21318			A-11318		21318	11318										
2-1/8	A-21319			A-11319		21319	11319										
2-1/4	A-21320			A-11320		21320	11320										
2-3/8	A-21321			A-11321		21321	11321										
2-1/2	A-21322			A-11322		21322	11322										
2-3/4	A-21324			A-11324		21324	11324										
3	A-21325			A-11325		21325	11325										
3-1/4	A-21326	A-11326		21326	11326												
5	A-21330	A-11330		21330	11330												

\* Contact factory for pricing on coolant type.



**MANUFACTURING CO.**

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Phone: 314-647-6200, FAX: 314-647-5736  
Web Site: www.carlane.com



# AIR FEED

# A

## 22000 SERIES

A ID RANGE	B OD	C LENGTH	TIP ASSEMBLY			SHANK ONLY		COLLAR ONLY			TAPER-LOK® LINER PART NO. p. 69	LOCK LINER PART NO. p. 69	LOCK NUT PART NO. p. 69	TAPER-LOK® LOCKScrew PART NO. p. 71	LOCK SCREW PART NO. p. 71	LINER PART NO. p. 71		
			STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*	STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*	STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*							
			Please see our web catalog for pricing.			Please see our web catalog for pricing.		Please see our web catalog for pricing.										
.1875-.2812 3/16-9/32 4.80-7.10mm	7/16 .4373-.4370	3/8	A-22101	A-12101		22101	12101									19937		
		1/2	A-22102	A-12102		22102	12102											
		5/8	A-22103	A-12103		22103	12103											
		3/4	A-22104	A-12104		22104	12104											
		7/8	A-22105	A-12105		22105	12105											
		1	A-22106	A-12106		22106	12106											
		1-1/8	A-22108	A-12108		22108	12108											
		1-1/4	A-22110	A-12110		22110	12110											
		1-3/8	A-22111	A-12111		22111	12111											
		1-1/2	A-22113	A-12113		22113	12113											
		1-5/8	A-22114	A-12114		22114	12114											
		1-3/4	A-22115	A-12115		22115	12115											
		1-7/8	A-22116	A-12116		22116	12116											
		2	A-22118	A-12118		22118	12118											
		2-1/8	A-22119	A-12119		22119	12119											
		2-1/4	A-22120	A-12120		22120	12120											
		2-3/8	A-22121	A-12121		22121	12121											
		2-1/2	A-22122	A-12122		22122	12122											
		2-3/4	A-22124	A-12124		22124	12124											
		3	A-22125	A-12125		22125	12125											
		3-1/4	A-22126	A-12126		22126	12126											
		3-1/2	A-22127	A-12127		22127	12127											
		3-3/4	A-22128	A-12128		22128	12128											
		4	A-22129	A-12129		22129	12129											
		5	A-22130	A-12130		22130	12130											
		6	A-22131	A-12131		22131	12131											
		.1875-.3438 3/16-11/32 4.80-8.70mm	1/2 .4998-.4995	1/2	A-22202	A-12202		22202	12202									19938
				5/8	A-22203	A-12203		22203	12203									
3/4	A-22204			A-12204		22204	12204											
7/8	A-22205			A-12205		22205	12205											
1	A-22206			A-12206		22206	12206											
1-1/8	A-22208			A-12208		22208	12208											
1-1/4	A-22210			A-12210		22210	12210											
1-3/8	A-22211			A-12211		22211	12211											
1-1/2	A-22213			A-12213		22213	12213											
1-5/8	A-22214			A-12214		22214	12214											
1-3/4	A-22215			A-12215		22215	12215											
1-7/8	A-22216			A-12216		22216	12216											
2	A-22218			A-12218		22218	12218											
2-1/8	A-22219			A-12219		22219	12219											
2-1/4	A-22220			A-12220		22220	12220											
2-3/8	A-22221			A-12221		22221	12221											
2-1/2	A-22222			A-12222		22222	12222											
2-3/4	A-22224			A-12224		22224	12224											
3	A-22225			A-12225		22225	12225											
3-1/4	A-22226			A-12226		22226	12226											
3-1/2	A-22227			A-12227		22227	12227											
3-3/4	A-22228			A-12228		22228	12228											
4	A-22229			A-12229		22229	12229											
5	A-22230			A-12230		22230	12230											
6	A-22231			A-12231		22231	12231											
.1875-.4062 3/16-13/32 4.80-10.20mm	9/16 .5623-.5620			5/8	A-22303	A-12303		22303	12303								19939	
				3/4	A-22304	A-12304		22304	12304									
				7/8	A-22305	A-12305		22305	12305									
		1	A-22306	A-12306		22306	12306											
		1-1/8	A-22308	A-12308		22308	12308											
		1-1/4	A-22310	A-12310		22310	12310											
		1-3/8	A-22311	A-12311		22311	12311											
		1-1/2	A-22313	A-12313		22313	12313											
		1-5/8	A-22314	A-12314		22314	12314											
		1-3/4	A-22315	A-12315		22315	12315											
1-7/8	A-22316	A-12316		22316	12316													

CONTINUED ON NEXT PAGE.

\* Contact factory for pricing on coolant type.



**MANUFACTURING CO.**  
 4200 Carr Lane Ct., P.O. Box 191970  
 St. Louis, Missouri 63119-7970 USA  
 Phone: 314-647-6200, FAX: 314-647-5736  
 Web Site: www.carrlane.com

# A

# AIR FEED



## 2200 SERIES (CONT.)

A ID RANGE	B OD	C LENGTH	TIP ASSEMBLY		SHANK ONLY		COLLAR ONLY		TAPER-LOK® LINER PART NO. p. 69	LOCK LINER PART NO. p. 69	LOCK NUT PART NO. p. 69	TAPER-LOK® LOCKSCREW PART NO. p. 71	LOCK SCREW PART NO. p. 71	LINER PART NO. p. 71
			STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*	STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*	STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*			
<b>.1875-.4062</b> 3/16-13/32 4.80-10.20mm	<b>9/16</b> .5623-.5620	2	A-22318	A-12318		22318	12318							
		2-1/8	A-22319	A-12319		22319	12319							
		2-1/4	A-22320	A-12320		22320	12320							
		2-3/8	A-22321	A-12321		22321	12321							
		2-1/2	A-22322	A-12322		22322	12322							
		2-3/4	A-22324	A-12324		22324	12324							
		3	A-22325	A-12325		22325	12325							
		3-1/4	A-22326	A-12326		22326	12326							
		3-1/2	A-22327	A-12327		22327	12327							
		3-3/4	A-22328	A-12328		22328	12328							
		4	A-22329	A-12329		22329	12329							
		5	A-22330	A-12330		22330	12330							
		6	A-22331	A-12331		22331	12331							
		3/8	A-22401	A-12401		22401	12401							
		1/2	A-22402	A-12402		22402	12402							
		5/8	A-22403	A-12403		22403	12403							
		3/4	A-22404	A-12404		22404	12404							
		7/8	A-22405	A-12405		22405	12405							
1	A-22406	A-12406		22406	12406									
1-1/8	A-22408	A-12408		22408	12408									
1-3/16	A-16502	A-12409		16502	12409									
1-1/4	A-22410	A-12410		22410	12410									
1-3/8	A-22411	A-12411		22411	12411									
1-1/2	A-22413	A-12413		22413	12413									
1-5/8	A-22414	A-12414		22414	12414									
1-3/4	A-22415	A-12415		22415	12415									
1-7/8	A-22416	A-12416		22416	12416									
2	A-22418	A-12418		22418	12418									
2-1/8	A-22419	A-12419		22419	12419									
2-1/4	A-22420	A-12420		22420	12420									
2-3/8	A-22421	A-12421		22421	12421									
2-1/2	A-22422	A-12422		22422	12422									
2-3/4	A-22424	A-12424		22424	12424									
3	A-22425	A-12425		22425	12425									
3-1/4	A-22426	A-12426		22426	12426									
3-1/2	A-22427	A-12427		22427	12427									
3-3/4	A-22428	A-12428		22428	12428									
4	A-22429	A-12429		22429	12429									
5	A-22430	A-12430		22430	12430									
6	A-22431	A-12431		22431	12431									
3/4	A-22504	A-12504		22504	12504									
7/8	A-22505	A-12505		22505	12505									
1	A-22506	A-12506		22506	12506									
1-1/8	A-22508	A-12508		22508	12508									
1-1/4	A-22510	A-12510		22510	12510									
1-3/8	A-22511	A-12511		22511	12511									
1-1/2	A-22513	A-12513		22513	12513									
1-5/8	A-22514	A-12514		22514	12514									
1-3/4	A-22515	A-12515		22515	12515									
1-7/8	A-22516	A-12516		22516	12516									
2	A-22518	A-12518		22518	12518									
2-1/8	A-22519	A-12519		22519	12519									
2-1/4	A-22520	A-12520		22520	12520									
2-3/8	A-22521	A-12521		22521	12521									
2-1/2	A-22522	A-12522		22522	12522									
2-3/4	A-22524	A-12524		22524	12524									
3	A-22525	A-12525		22525	12525									
3-1/4	A-22526	A-12526		22526	12526									
3-1/2	A-22527	A-12527		22527	12527									
3-3/4	A-22528	A-12528		22528	12528									
4	A-22529	A-12529		22529	12529									
5	A-22530	A-12530		22530	12530									
6	A-22531	A-12531		22531	12531									

16.98

\* Contact factory for pricing on coolant type.



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# AIR FEED

# A

The best thing about the future is that it comes only one day at a time.

Abraham Lincoln

## 23000 SERIES

A ID RANGE	B OD	C LENGTH	TIP ASSEMBLY		SHANK ONLY		COLLAR ONLY			TAPER-LOK® LINER PART NO. p. 69	LOCK LINER PART NO. p. 69	LOCK NUT PART NO. p. 69	TAPER-LOK® LOCKSCREW PART NO. p. 71	LOCK SCREW PART NO. p. 71	LINER PART NO. p. 71	
			STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*	STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*	STANDARD TYPE PART NO.							COOLANT TYPE PART NO.
.2500-.5312 1/4-17/32 6.30-13.50mm	3/4 .7498-.7495	3/4	A-23104	A-13104		23104	13104									
		7/8	A-23105	A-13105		23105	13105									
		1	A-23106	A-13106		23106	13106									
		1-1/8	A-23108	A-13108		23108	13108									
		1-1/4	A-23110	A-13110		23110	13110									
		1-3/8	A-23111	A-13111		23111	13111									
		1-1/2	A-23113	A-13113		23113	13113									
		1-5/8	A-23114	A-13114		23114	13114									
		1-3/4	A-23115	A-13115		23115	13115									
		1-7/8	A-23116	A-13116		23116	13116									
		2	A-23118	A-13118		23118	13118									
		2-1/8	A-23119	A-13119		23119	13119									
		2-1/4	A-23120	A-13120		23120	13120									19942
		2-3/8	A-23121	A-13121		23121	13121									
		2-1/2	A-23122	A-13122		23122	13122									
		2-3/4	A-23124	A-13124		23124	13124									
		3	A-23125	A-13125		23125	13125									
		3-1/4	A-23126	A-13126		23126	13126									
		3-1/2	A-23127	A-13127		23127	13127									
		3-3/4	A-23128	A-13128		23128	13128									
4	A-23129	A-13129		23129	13129											
5	A-23130	A-13130		23130	13130											
6	A-23131	A-13131		23131	13131											
.2500-.5938 1/4-19/32 6.30-15.00mm	13/16 .8123-.8120	3/4	A-23204	A-13204		23204	13204		23000	13000						
		7/8	A-23205	A-13205		23205	13205									
		1	A-23206	A-13206		23206	13206									
		1-1/8	A-23208	A-13208		23208	13208									
		1-1/4	A-23210	A-13210		23210	13210									
		1-3/8	A-23211	A-13211		23211	13211									
		1-1/2	A-23213	A-13213		23213	13213									
		1-5/8	A-23214	A-13214		23214	13214									
		1-3/4	A-23215	A-13215		23215	13215									
		1-7/8	A-23216	A-13216		23216	13216									
		2	A-23218	A-13218		23218	13218									
		2-1/8	A-23219	A-13219		23219	13219									
		2-1/4	A-23220	A-13220		23220	13220									
		2-3/8	A-23221	A-13221		23221	13221									
		2-1/2	A-23222	A-13222		23222	13222									
		2-3/4	A-23224	A-13224		23224	13224									
		3	A-23225	A-13225		23225	13225									
		3-1/4	A-23226	A-13226		23226	13226									
		3-1/2	A-23227	A-13227		23227	13227									
		3-3/4	A-23228	A-13228		23228	13228									
4	A-23229	A-13229		23229	13229											
5	A-23230	A-13230		23230	13230											
6	A-23231	A-13231		23231	13231											

\* Contact factory for pricing on coolant type.



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# A

# AIR FEED



## 23000 SERIES (CONT.)

A ID RANGE	B OD	C LENGTH	TIP ASSEMBLY			SHANK ONLY			COLLAR ONLY			TAPER-LOK® LINER PART NO. p. 69	LOCK LINER PART NO. p. 69	LOCK NUT PART NO. p. 69	TAPER-LOK® LOCKSCREW PART NO. p. 71	LOCK SCREW PART NO. p. 71	LINER PART NO. p. 71												
			STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*	STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*	STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*																		
			Please see our web catalog for pricing.																										
.2500-.6562 1/4-21/32 6.30-16.50mm	7/8 .8748-.8745	3/4	A-23304	A-13304		23304	13304					TLL-16523 (Matches A-23310 Tip)	A-16523 (Matches A-16504 Tip)	14445				19944											
		7/8	A-23305	A-13305		23305	13305																						
		1	A-23306	A-13306		23306	13306																						
		1-1/8	A-23308	A-13308		23308	13308																						
		1-1/4	A-23310	A-13310		23310	13310																						
		1-3/8	A-23311	A-13311		23311	13311																						
		1-7/16	A-16503	A-13312		16503	13312																						
		1-1/2	A-23313	A-13313		23313	13313																						
		1-5/8	A-23314	A-13314		23314	13314																						
		1-3/4	A-23315	A-13315		23315	13315																						
		1-7/8	A-23316	A-13316		23316	13316																						
		2	A-23318	A-13318		23318	13318																						
		2-1/8	A-23319	A-13319		23319	13319																						
		2-1/4	A-23320	A-13320		23320	13320																						
		2-3/8	A-23321	A-13321		23321	13321																						
		2-1/2	A-23322	A-13322		23322	13322																						
		2-3/4	A-23324	A-13324		23324	13324																						
		3	A-23325	A-13325		23325	13325																						
		3-1/4	A-23326	A-13326		23326	13326																						
		3-1/2	A-23327	A-13327		23327	13327																						
		3-3/4	A-23328	A-13328		23328	13328																						
		4	A-23329	A-13329		23329	13329																						
		5	A-23330	A-13330		23330	13330																						
		6	A-23331	A-13331		23331	13331																						
		.2500-.7188 1/4-23/32 6.30-18.00mm	1 .9998-.9995	1	A-23406	A-13406		23406	13406																				
				1-1/8	A-23408	A-13408		23408	13408																				
				1-1/4	A-23410	A-13410		23410	13410																				
				1-3/8	A-23411	A-13411		23411	13411																				
1-1/2	A-23413			A-13413		23413	13413																						
1-5/8	A-23414			A-13414		23414	13414																						
1-3/4	A-23415			A-13415		23415	13415																						
1-7/8	A-23416			A-13416		23416	13416																						
2	A-23418			A-13418		23418	13418																						
2-1/8	A-23419			A-13419		23419	13419																						
2-1/4	A-23420			A-13420		23420	13420																						
2-3/8	A-23421			A-13421		23421	13421																						
2-1/2	A-23422			A-13422		23422	13422																						
2-3/4	A-23424			A-13424		23424	13424																						
3	A-23425			A-13425		23425	13425																						
3-1/4	A-23426			A-13426		23426	13426																						
3-1/2	A-23427			A-13427		23427	13427																						
3-3/4	A-23428			A-13428		23428	13428																						
4	A-23429			A-13429		23429	13429																						
5	A-23430			A-13430		23430	13430																						
6	A-23431			A-13431		23431	13431																						
.2500-.7188 5/16-23/32 6.30-18.00mm	1-1/8 1.1248-1.1245			1	A-23506	A-13506		23506	13506																				
				1-1/8	A-23508	A-13508		23508	13508																				
				1-1/4	A-23510	A-13510		23510	13510																				
				1-3/8	A-23511	A-13511		23511	13511																				
				1-1/2	A-23513	A-13513		23513	13513																				
				1-5/8	A-23514	A-13514		23514	13514																				
				1-3/4	A-23515	A-13515		23515	13515																				
		1-7/8	A-23516	A-13516		23516	13516																						
		1-15/16	A-16504	A-13517		16504	13517																						
		2	A-23518	A-13518		23518	13518																						
		2-1/8	A-23519	A-13519		23519	13519																						
		2-1/4	A-23520	A-13520		23520	13520																						
		2-3/8	A-23521	A-13521		23521	13521																						
		2-1/2	A-23522	A-13522		23522	13522																						
		2-3/4	A-23524	A-13524		23524	13524																						
		3	A-23525	A-13525		23525	13525																						
		3-1/4	A-23526	A-13526		23526	13526																						
		3-1/2	A-23527	A-13527		23527	13527																						
		3-3/4	A-23528	A-13528		23528	13528																						
		4	A-23529	A-13529		23529	13529																						
		5	A-23530	A-13530		23530	13530																						
		6	A-23531	A-13531		23531	13531																						

\* Contact factory for pricing on coolant type.



### MANUFACTURING CO.

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# AIR FEED

# A

**Sports do not build character.  
They reveal it.**

John Wooden

## 24000 SERIES

A ID RANGE	B OD	C LENGTH	TIP ASSEMBLY		SHANK ONLY		COLLAR ONLY			TAPER-LOK® LINER PART NO. p. 69	LOCK LINER PART NO. p. 69	LOCK NUT PART NO. p. 69	TAPER-LOK® LOCKSREW PART NO. p. 71	LOCK SCREW PART NO. p. 71	LINER PART NO.
			STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*	STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*	STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*				
.3125-.4062 5/16-13/32 8.00-10.20mm	5/8 .6248-.6245	5/8	A-24103	A-14103	Please see our web catalog for pricing.	24103	14103	24000	14000	Please see our web catalog for pricing.					
		3/4	A-24104	A-14104		24104	14104								
		7/8	A-24105	A-14105		24105	14105								
		1	A-24106	A-14106		24106	14106								
		1-1/8	A-24108	A-14108		24108	14108								
		1-1/4	A-24110	A-14110		24110	14110								
		1-3/8	A-24111	A-14111		24111	14111								
		1-1/2	A-24113	A-14113		24113	14113								
		1-5/8	A-24114	A-14114		24114	14114								
		1-3/4	A-24115	A-14115		24115	14115								
		1-7/8	A-24116	A-14116		24116	14116								
		2	A-24118	A-14118		24118	14118								
		2-1/8	A-24119	A-14119		24119	14119								
		2-1/4	A-24120	A-14120		24120	14120								
		2-3/8	A-24121	A-14121		24121	14121								
		2-1/2	A-24122	A-14122		24122	14122								
		2-3/4	A-24124	A-14124		24124	14124								
		3	A-24125	A-14125		24125	14125								
		3-1/4	A-24126	A-14126		24126	14126								
		3-1/2	A-24127	A-14127		24127	14127								
		3-3/4	A-24128	A-14128		24128	14128								
		4	A-24129	A-14129		24129	14129								
		5	A-24130	A-14130		24130	14130								
		6	A-24131	A-14131		24131	14131								
.3125-.5312 5/16-17/32 8.00-13.50mm	3/4 .7498-.7495	3/4	A-24304	A-14304	Please see our web catalog for pricing.	24304	14304	24000	14000	Please see our web catalog for pricing.			CL-11-AFL or CL-13-AFL or CL-14-AFL	16532	19949
		7/8	A-24305	A-14305		24305	14305								
		1	A-24306	A-14306		24306	14306								
		1-1/8	A-24308	A-14308		24308	14308								
		1-1/4	A-24310	A-14310		24310	14310								
		1-3/8	A-24311	A-14311		24311	14311								
		1-1/2	A-24313	A-14313		24313	14313								
		1-5/8	A-24314	A-14314		24314	14314								
		1-3/4	A-24315	A-14315		24315	14315								
		1-7/8	A-24316	A-14316		24316	14316								
		2	A-24318	A-14318		24318	14318								
		2-1/8	A-24319	A-14319		24319	14319								
		2-1/4	A-24320	A-14320		24320	14320								
		2-3/8	A-24321	A-14321		24321	14321								
		2-1/2	A-24322	A-14322		24322	14322								
		2-3/4	A-24324	A-14324		24324	14324								
		3	A-24325	A-14325		24325	14325								
		3-1/4	A-24326	A-14326		24326	14326								
		3-1/2	A-24327	A-14327		24327	14327								
		3-3/4	A-24328	A-14328		24328	14328								
		4	A-24329	A-14329		24329	14329								
		5	A-24330	A-14330		24330	14330								
		6	A-24331	A-14331		24331	14331								

\* Contact factory for pricing on coolant type.



**MANUFACTURING CO.**

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# A

## AIR FEED



### 24000 SERIES (CONT.)

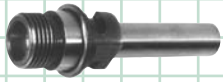
A ID RANGE	B OD	C LENGTH	TIP ASSEMBLY		SHANK ONLY		COLLAR ONLY			TAPER-LOK® LINER PART NO. p. 69	LOCK LINER PART NO. p. 69	LOCK NUT PART NO. p. 69	TAPER-LOK® LOCKSCREW PART NO. p. 71	LOCK SCREW PART NO. p. 71	LINER PART NO. p. 71		
			STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PART NO.	STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PART NO.	STANDARD TYPE PART NO.						
				PRICE*		PRICE*											
.3125-.6562 5/16-21/32 8.00-16.50mm	7/8 .8745-.8748	7/8	A-24405	A-14405	24405	14405											
		1	A-24406	A-14406	24406	14406											
		1-1/8	A-24408	A-14408	24408	14408											
		1-1/4	A-24410	A-14410	24410	14410											
		1-3/8	A-24411	A-14411	24411	14411											
		1-1/2	A-24413	A-14413	24413	14413											
		1-5/8	A-24414	A-14414	24414	14414											
		1-3/4	A-24415	A-14415	24415	14415											
		1-7/8	A-24416	A-14416	24416	14416											
		2	A-24418	A-14418	24418	14418											
		2-1/8	A-24419	A-14419	24419	14419											
		2-1/4	A-24420	A-14420	24420	14420										19950	
		2-3/8	A-24421	A-14421	24421	14421											
		2-1/2	A-24422	A-14422	24422	14422											
		2-3/4	A-24424	A-14424	24424	14424											
		3	A-24425	A-14425	24425	14425											
		3-1/4	A-24426	A-14426	24426	14426											
		3-1/2	A-24427	A-14427	24427	14427											
		3-3/4	A-24428	A-14428	24428	14428											
		4	A-24429	A-14429	24429	14429											
		5	A-24430	A-14430	24430	14430											
		6	A-24431	A-14431	24431	14431											
		.3125-.7812 5/16-25/32 8.00-19.50mm	1 .9998-.9995	1	A-24506	A-14506	24506	14506									
				1-1/8	A-24508	A-14508	24508	14508									
1-1/4	A-24510			A-14510	24510	14510											
1-3/8	A-24511			A-14511	24511	14511											
1-1/2	A-24513			A-14513	24513	14513											
1-5/8	A-24514			A-14514	24514	14514											
1-3/4	A-24515			A-14515	24515	14515											
1-7/8	A-24516			A-14516	24516	14516											
2	A-24518			A-14518	24518	14518											
2-1/8	A-24519			A-14519	24519	14519											
2-1/4	A-24520			A-14520	24520	14520											
2-3/8	A-24521			A-14521	24521	14521											
2-1/2	A-24522			A-14522	24522	14522											
2-3/4	A-24524			A-14524	24524	14524											
3	A-24525			A-14525	24525	14525											
3-1/4	A-24526			A-14526	24526	14526											
3-1/2	A-24527	A-14527	24527	14527													
3-3/4	A-24528	A-14528	24528	14528													
4	A-24529	A-14529	24529	14529													
5	A-24530	A-14530	24530	14530													
6	A-24531	A-14531	24531	14531													
.3125-.9062 5/16-29/32 8.00-23.00mm	1-1/8 1.1248-1.1245	1	A-24606	A-14606	24606	14606											
		1-1/8	A-24608	A-14608	24608	14608											
		1-1/4	A-24610	A-14610	24610	14610											
		1-3/8	A-24611	A-14611	24611	14611											
		1-1/2	A-24613	A-14613	24613	14613											
		1-5/8	A-24614	A-14614	24614	14614											
		1-3/4	A-24615	A-14615	24615	14615											
		1-7/8	A-24616	A-14616	24616	14616											
		1-15/16	A-16505	A-14617	16505	14617											
		2	A-24618	A-14618	24618	14618											
		2-1/8	A-24619	A-14619	24619	14619											
		2-1/4	A-24620	A-14620	24620	14620											
		2-3/8	A-24621	A-14621	24621	14621											
		2-1/2	A-24622	A-14622	24622	14622											
		2-3/4	A-24624	A-14624	24624	14624											
		3	A-24625	A-14625	24625	14625											
		3-1/4	A-24626	A-14626	24626	14626											
		3-1/2	A-24627	A-14627	24627	14627											
		3-3/4	A-24628	A-14628	24628	14628											
		4	A-24629	A-14629	24629	14629											
5	A-24630	A-14630	24630	14630													
6	A-24631	A-14631	24631	14631													

\* Contact factory for pricing on coolant type.



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# AIR FEED

# A

## 24000 SERIES (CONT.)

A ID RANGE	B OD	C LENGTH	TIP ASSEMBLY			SHANK ONLY			COLLAR ONLY			TAPER-LOK® LINER PART NO. p. 69	LOCK LINER PART NO. p. 69	LOCK NUT PART NO. p. 69	TAPER-LOK® LOCKSCREW PART NO. p. 71	LOCK SCREW PART NO. p. 71	LINER PART NO. p. 71	
			STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*	STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*	STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*							
<b>.3125-.9375</b> 5/16-15/16 8.00-23.50mm	<b>1-1/4</b> 1.2498-1.2495	1-1/4	A-24710	A-14710		24710	14710											
		1-3/8	A-24711	A-14711		24711	14711											
		1-1/2	A-24713	A-14713		24713	14713											
		1-5/8	A-24714	A-14714		24714	14714											
		1-3/4	A-24715	A-14715		24715	14715											
		1-7/8	A-24716	A-14716		24716	14716											
		2	A-24718	A-14718		24718	14718											
		2-1/8	A-24719	A-14719		24719	14719											
		2-1/4	A-24720	A-14720		24720	14720											
		2-3/8	A-24721	A-14721		24721	14721											
		2-1/2	A-24722	A-14722		24722	14722											
		2-3/4	A-24724	A-14724		24724	14724											
		3	A-24725	A-14725		24725	14725											
		3-1/4	A-24726	A-14726		24726	14726											
		3-1/2	A-24727	A-14727		24727	14727											
		3-3/4	A-24728	A-14728		24728	14728											
		4	A-24729	A-14729		24729	14729											
		5	A-24730	A-14730		24730	14730											
6	A-24731	A-14731		24731	14731													
<b>.3125-.9375</b> 5/16-15/16 8.00-23.50mm	<b>1-1/2</b> 1.4998-1.4995	1	A-24806	A-14806		24806	14806											
		1-3/8	A-24811	A-14811		24811	14811											
		1-1/2	A-24813	A-14813		24813	14813											
		1-5/8	A-24814	A-14814		24814	14814											
		1-3/4	A-24815	A-14815		24815	14815											
		1-7/8	A-24816	A-14816		24816	14816											
		1-15/16	A-16506	A-14817		16506	14817											
		2	A-24818	A-14818		24818	14818											
		2-1/8	A-24819	A-14819		24819	14819											
		2-1/4	A-24820	A-14820		24820	14820											
		2-3/8	A-24821	A-14821		24821	14821											
		2-1/2	A-24822	A-14822		24822	14822											
		2-3/4	A-24824	A-14824		24824	14824											
		3	A-24825	A-14825		24825	14825											
		3-1/4	A-24826	A-14826		24826	14826											
		3-1/2	A-24827	A-14827		24827	14827											
		3-3/4	A-24828	A-14828		24828	14828											
		4	A-24829	A-14829		24829	14829											
5	A-24830	A-14830		24830	14830													
6	A-24831	A-14831		24831	14831													

## 25000 SERIES

<b>.3750-1.0312</b> 3/8-1-1/32 9.50-26.00mm	<b>1-1/4</b> 1.2498-1.2495	1-1/4	A-25110	A-15110		25110	15110										
		1-3/8	A-25111	A-15111		25111	15111										
		1-1/2	A-25113	A-15113		25113	15113										
		1-5/8	A-25114	A-15114		25114	15114										
		1-3/4	A-25115	A-15115		25115	15115										
		1-7/8	A-25116	A-15116		25116	15116										
		2	A-25118	A-15118		25118	15118										
		2-1/8	A-25119	A-15119		25119	15119										
		2-1/4	A-25120	A-15120		25120	15120										
		2-3/8	A-25121	A-15121		25121	15121										
		2-1/2	A-25122	A-15122		25122	15122										
		2-3/4	A-25124	A-15124		25124	15124										
		3	A-25125	A-15125		25125	15125										
		3-1/4	A-25126	A-15126		25126	15126										
		3-1/2	A-25127	A-15127		25127	15127										
		3-3/4	A-25128	A-15128		25128	15128										
		4	A-25129	A-15129		25129	15129										
		5	A-25130	A-15130		25130	15130										
6	A-25131	A-15131		25211	15131												

\* Contact factory for pricing on coolant type.



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# A

# AIR FEED



## 25000 SERIES (CONT.)

A ID RANGE	B OD	C LENGTH	TIP ASSEMBLY		SHANK ONLY		COLLAR ONLY			TAPER-LOK® LINER PART NO. p. 69	LOCK LINER PART NO. p. 69	LOCK NUT PART NO. p. 69	TAPER-LOK® LOCKSREW PART NO. p. 71	LOCK SCREW PART NO. p. 71	LINER PART NO. p. 71
			STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*	STANDARD TYPE PART NO.	COOLANT TYPE PART NO.	STANDARD TYPE PRICE*	STANDARD TYPE PART NO.						
<b>.3750-1.1562</b> 3/8-1-5/32 9.50-29.00mm	<b>1-3/8</b> 1.3748-1.3745	1-3/8	A-25211	A-15211		25213	15211								
		1-1/2	A-25213	A-15213		25214	15213								
		1-5/8	A-25214	A-15214		25215	15214								
		1-3/4	A-25215	A-15215		25216	15215								
		1-7/8	A-25216	A-15216		25218	15216								
		2	A-25218	A-15218		25219	15218								
		2-1/8	A-25219	A-15219		25220	15219								
		2-1/4	A-25220	A-15220		25221	15220								
		2-3/8	A-25221	A-15221		25222	15221								
		2-1/2	A-25222	A-15222		25224	15222								
		2-3/4	A-25224	A-15224		25225	15224								
		3	A-25225	A-15225		25226	15225								
		3-1/4	A-25226	A-15226		25227	15226								
		3-1/2	A-25227	A-15227		25228	15227								
		3-3/4	A-25228	A-15228		25229	15228								
		4	A-25229	A-15229		25230	15229								
		5	A-25230	A-15230		25231	15230								
		6	A-25231	A-15231		25313	15231								
<b>.3750-1.2812</b> 3/8-1-9/32 9.50-32.00mm	<b>1-1/2</b> 1.4998-1.4995	1-1/2	A-25313	A-15313		25314	15313								
		1-5/8	A-25314	A-15314		25315	15314								
		1-3/4	A-25315	A-15315		25316	15315								
		1-7/8	A-25316	A-15316		25318	15316								
		2	A-25318	A-15318		25319	15318								
		2-1/8	A-25319	A-15319		25320	15319								
		2-1/4	A-25320	A-15320		25321	15320								
		2-3/8	A-25321	A-15321		25322	15321								
		2-1/2	A-25322	A-15322		25324	15322								
		2-3/4	A-25324	A-15324		25325	15324								
		3	A-25325	A-15325		25326	15325								
		3-1/4	A-25326	A-15326		25327	15326								
		3-1/2	A-25327	A-15327		25328	15327								
		3-3/4	A-25328	A-15328		25329	15328								
		4	A-25329	A-15329		25330	15329								
		5	A-25330	A-15330		25331	15330								
		6	A-25331	A-15331		25415	15331								
		<b>.3750-1.4688</b> 3/8-1-15/32 9.50-37.00mm	<b>1-3/4</b> 1.7498-1.7495	1-3/4	A-25415	A-15415		25416	15415						
1-7/8	A-25416			A-15416		25418	15416								
2	A-25418			A-15418		25419	15418								
2-1/8	A-25419			A-15419		25420	15419								
2-1/4	A-25420			A-15420		25421	15420								
2-3/8	A-25421			A-15421		25422	15421								
2-1/2	A-25422			A-15422		25424	15422								
2-3/4	A-25424			A-15424		25425	15424								
3	A-25425			A-15425		25426	15425								
3-1/4	A-25426			A-15426		25427	15426								
3-1/2	A-25427			A-15427		25428	15427								
3-3/4	A-25428			A-15428		25429	15428								
4	A-25429			A-15429		25430	15429								
5	A-25430			A-15430		25431	15430								
6	A-25431			A-15431		25518	15431								
2	A-25518			A-15518		16513	15518								
<b>.3750-1.4688</b> 3/8-1-15/32 9.50-37.00mm	<b>2</b> 1.9998-1.9995			2-5/8	A-16513	A-15523		25524	15523						
				2-3/4	A-25524	A-15524		25525	15524						
		3	A-25525	A-15525		25526	15525								
		3-1/4	A-25526	A-15526		25527	15526								
		3-1/2	A-25527	A-15527		25528	15527								
		3-3/4	A-25528	A-15528		25529	15528								
		4	A-25529	A-15529		25530	15529								
		5	A-25530	A-15530		25531	15530								
		6	A-25531	A-15531			15531								

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# A

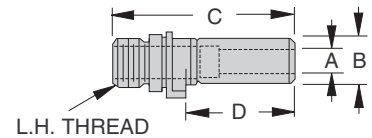
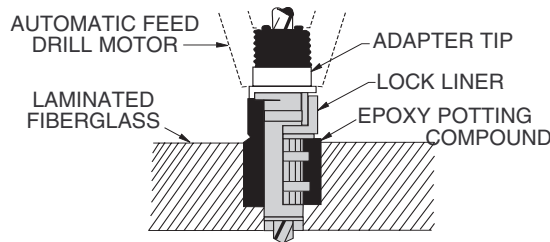
# AIR FEED



## AT-TYPE ONE-PIECE ADAPTER TIPS



**ADAPTER TIP**



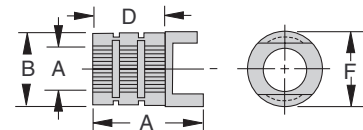
AT-series adapter tips are one-piece adapters primarily for fiberglass and plastic tooling. They are used with AT-series knurled liners, and are not compatible with any other liners or air-feed accessories. AT-series bushings are available in 3/4-16 and 1"-14 mounting-thread sizes, in a total of four OD sizes, to fit drill diameters from .1910" to .6250".

## AT-TYPE ADAPTER TIPS

PART NO.	A ID RANGE	B OD	C	D	L.H. THREAD	LIST & QUANTITY PRICES				
						1-3	4-6	7-12	13-24	25-49
AT-1	.1910-.2055 #11-#5	11/32 .3437-.3435	2-7/16	1-9/16	3/4-16	Please see our web catalog for pricing.				
AT-2	.1910-.2850 #11-9/32	7/16 .4375-.4373								
AT-3	.2810-.4130 K-Z	9/16 .5625-.5623								
AT-4	.2810-.6250 K-5/8	3/4 .7500-.7498			1-14					



**LOCK LINER**



Precision knurled liner bushing for mounting air-feed drills in fiberglass or plastic tooling. AT-series knurled lock liners are designed especially for AT-series one-piece adapter tips, and are not compatible with any other liners or air-feed accessories. Press-fit AT-series liners are available as specials. Available in four sizes.

## AT-TYPE LOCK LINERS

PART NO.	A ID	B OD	C	D	F DIA	LIST & QUANTITY PRICES							
						1-6	7-12	13-24	25-49	50-99	100-199	200-499	500-999
LL-1	11/32 .3440-.3443	9/16	1-3/8	7/8	11/16	Please see our web catalog for pricing.							
LL-2	7/16 .4377-.4380	11/16			13/16								
LL-3	9/16 .5627-.5630	13/16			15/16								
LL-4	3/4 .7503-.7506	1			1-1/8								



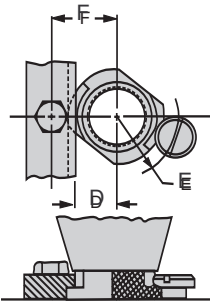
## MANUFACTURING CO.

4200 Carr Lane Ct., P.O. Box 191970  
St. Louis, Missouri 63119-7970 USA  
Phone: 314-647-6200, FAX: 314-647-5736  
Web Site: www.carrlane.com



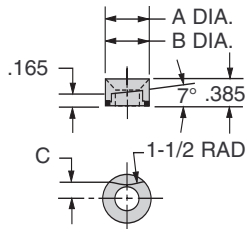
# AIR FEED

# A

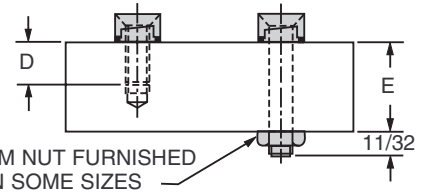


## MOUNTING DIMENSIONS FOR LOCKSCREWS AND LOCK STRIPS

DIMENSION	21000 SERIES	22000 SERIES	23000 SERIES	24000 SERIES	25000 SERIES
D	.312	.609	.734	.859	—
E	.625	.922	1.047	1.172	1.562
F	.687	.984	1.109	1.234	—



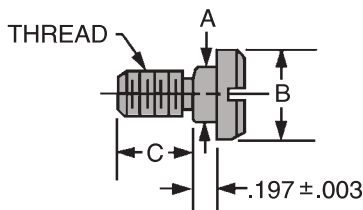
## TAPER-LOK® AIR-FEED LOCKSCREWS



Angular locking surface mates perfectly with air-feed collars. Use instead of standard lock screws for greater strength . . . eliminates worn, bent, or broken lock screws caused by point contact. Serrations at bottom bite into the fixture plate to positively prevent rotation under heavy torque loads. Alloy steel mounting screws furnished. Patent No. 3,336,822.

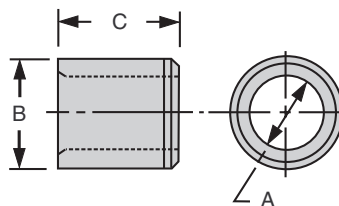
PART NO.	MOUNTING SCREW DIA	MOUNTING SCREW	A DIA	B DIA	C	D	E	REPLACES STANDARD LOCKSCREW	PRICE EACH
CL-9-AFL	5/16	Not Furnished	5/8	19/32	3/16	—	—	—	Please See our web catalog for pricing.
CL-11-AFL		5/16-18x1.00				19/32	—	16531 & 16532	
CL-13-AFL		5/16-18x1.50 w/Jam Nut				1-3/32	3/4	—	
CL-14-AFL		5/16-18x2.00 w/Jam Nut				1-19/32	1-1/4	—	
CL-10-AFL	3/8	Not Furnished	3/4	23/32	7/32	—	—	—	Please See our web catalog for pricing.
CL-12-AFL		3/8-16x1.00				19/32	—	16530	

## LOCKSCREWS



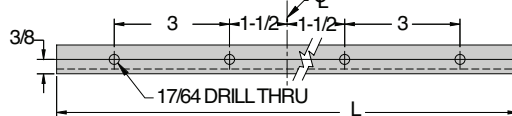
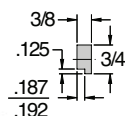
PART NO.	A DIA	B DIA	C	B THREAD	PRICE EACH
16531	3/8	5/8	5/16	5/16-18	See our website for pricing.
16532			7/16		
16530	7/16	3/4	5/8	3/8-16	

## LINERS



PART NO.	A ID	B OD	C LENGTH	PRICE EACH
19936	3/8	5/8	1	Please See our web catalog for pricing.
19937	7/16	3/4	1	
19938	1/2			
19939	9/16	7/8	1	
19940	5/8		1-3/4	
19947		1		
19941	3/4	1	1	
19942			1-3/8	
19949			1-3/4	
19943	13/16	1-3/8	1-3/8	
19944	7/8		1-3/4	
19950	7/8	1-3/8	1-3/4	
19945	1		1-3/8	
19951	1	1-3/4	1-3/4	
19946	1-1/8		1-3/4	
19952	1-1/4	1-3/4	2-1/2	
19953	1-3/8		2-1/2	
19954	1-3/8	2-1/4	2-1/2	
19955	1-1/2		2-1/2	
19956	1-3/4	2-1/4	2-1/2	

## LOCK STRIPS



PART NO.	L OVERALL LENGTH	NO. OF HOLES	PRICE EACH
LSM-12	12	4	See our website for pricing.
LSM-24	24	8	
LSM-36	36	12	



# A

# AIR FEED

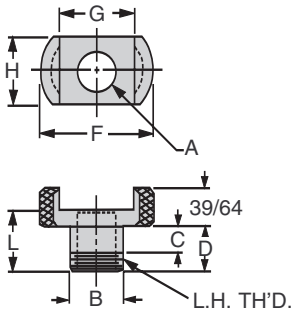


## TAPER-LOK® LINERS

Precision liner bushing for mounting air-feed drills through a jig plate. One-piece design has two angled locking surfaces to lock the drill motor in place, for superior strength. Milled flats allow close hole spacing. Press fit into jig plate, then fasten from behind with a Lock Nut (order separately). Optional heavy-duty type has precisely machined helical locking surfaces that mate exactly with the air-feed collar for added impact resistance. Patent no. 3,015,242. Available for 21000 through 24000 series air-feed drills (not 25000 series).



PRESS FIT



**NEW  
HEAVY-DUTY  
VERSION!**

### PRESS FIT – STANDARD

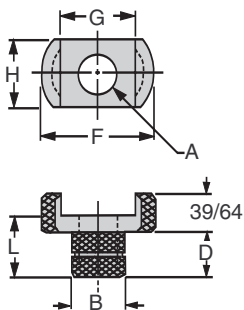
PART NO.	A DIA	B DIA	C	D	F DIA	G	H	L	L.H. THREAD	MATCHING LOCK NUT	MATCHING ADAPTOR TIP	PRICE EACH
TLL-16520	.3750 .3755	.4995 .4990	7/16	3/4	1-1/8	.625	3/4	1	1/2-20	14441	A-21106	Please see our web catalog for pricing.
TLL-16521	.5000 .5005	.7495 .7490	7/16	3/4	1-3/16	.625	7/8	1	3/4-16	14442	A-21306	
TLL-16522	.6250 .6255	.8745 .8740	7/16	3/4	1-13/16	1.218	1-1/8	1	7/8-14	14443	A-22406	
TLL-16523	.8750 .8756	1.2495 1.2490	9/16	1	2-1/8	1.468	1-3/8	1-1/4	1-1/4-12	14445	A-23310	
TLL-16524	1.1252	1.4990	27/32	1-1/2	2-1/8	1.468	1-5/8	1-3/4	1-1/2-12	14446	A-23515	
TLL-16525	1.1258	1.4985			2-7/16	1.718					A-24615	
TLL-16526	1.5002 1.5008	1.9990 1.9985	27/32	1-1/2	2-7/16	1.718	2-1/8	1-3/4	2-16	14447	A-24815	

### PRESS FIT – HEAVY DUTY

PART NO.	A DIA	B DIA	C	D	F DIA	G	H	L	L.H. THREAD	MATCHING LOCK NUT	MATCHING ADAPTOR TIP	PRICE EACH
HLL-16520	.3750 .3755	.4995 .4990	7/16	3/4	1-1/8	.625	3/4	1	1/2-20	14441	A-21106	Please see our web catalog for pricing.
HLL-16521	.5000 .5005	.7495 .7490	7/16	3/4	1-3/16	.625	7/8	1	3/4-16	14442	A-21306	
HLL-16522	.6250 .6255	.8745 .8740	7/16	3/4	1-13/16	1.218	1-1/8	1	7/8-14	14443	A-22406	
HLL-16523	.8750 .8756	1.2495 1.2490	9/16	1	2-1/8	1.468	1-3/8	1-1/4	1-1/4-12	14445	A-23310	
HLL-16524	1.1252	1.4990	27/32	1-1/2	2-1/8	1.468	1-5/8	1-3/4	1-1/2-12	14446	A-23515	
HLL-16525	1.1258	1.4985			2-7/16	1.718					A-24615	
HLL-16526	1.5002 1.5008	1.9990 1.9985	27/32	1-1/2	2-7/16	1.718	2-1/8	1-3/4	2-16	14447	A-24815	



KNURLED



**NEW  
HEAVY-DUTY  
VERSION!**

Precision knurled liner bushing for mounting air-feed drills in fiberglass or plastic tooling. One-piece design has two angled locking surfaces to lock the drill motor in place, for superior strength. Optional heavy-duty type has precisely machined helical locking surfaces that mate exactly with the air-feed collar for added impact resistance. Milled flats allow close hole spacing. Available for 21000 and 22000 series air-feed drills. Patent no. 3,015,242.

### KNURLED – STANDARD

PART NO.	A DIA	B DIA	D	F DIA	G	H	L	MATCHING ADAPTOR TIP	PRICE EACH
TLD-375	.3750 .3755	3/4	7/8	1-3/16	.625	7/8	1-1/8	A-21108	Please see our web catalog for pricing.
TLD-500	.5000 .5005	3/4	7/8	1-3/16	.625	7/8	1-1/8	A-21308	
TLD-750	.7500 .7505	1-1/8	7/8	1-13/16	1.218	1-1/8	1-1/8	A-22508	

### KNURLED – HEAVY DUTY

PART NO.	A DIA	B DIA	D	F DIA	G	H	L	MATCHING ADAPTOR TIP	PRICE EACH
HLD-375	.3750 .3755	3/4	7/8	1-3/16	.625	7/8	1-1/8	A-21108	Please see our web catalog for pricing.
HLD-500	.5000 .5005	3/4	7/8	1-3/16	.625	7/8	1-1/8	A-21308	
HLD-750	.7500 .7505	1-1/8	7/8	1-13/16	1.218	1-1/8	1-1/8	A-22508	

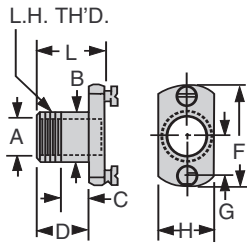




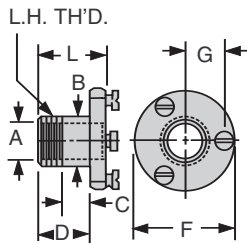


# AIR FEED

# A



STANDARD



A-16533 ONLY

## LOCK LINERS

Precision liner bushing for mounting air-feed drills through a jig plate. The large head holds two standard Lockscrews, to lock the drill motor in place. Milled flats allow close hole spacing. Press fit into jig plate, then fasten from behind with a Lock Nut (order separately). Available for 21000 through 25000 series air-feed drills.

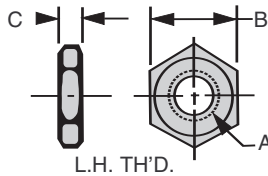


PART NO.	A DIA	B DIA	C	D	F DIA	G	H	L	L.H. THREAD	MATCHING LOCK NUT	MATCHING ADAPTOR TIP	PRICE EACH
A-16520	.3750 .3756	.4995 .4989	7/16	3/4	1-3/4	5/8	3/4	1-1/16	1/2-20	14441	A-16500	Please see our web catalog for pricing.
A-16521	.5000 .5006	.7495 .7489	7/16	3/4	1-3/4	5/8	1	1-1/16	3/4-16	14442	A-16501	
A-16522	.6250 .6256	.8745 .8739	7/16	3/4	2-7/16	59/64	1-1/8	1-3/16	7/8-14	14443	A-16502	
A-16523	.8750 .8756	1.2495 1.2485	9/16	1	2-11/16	1-3/64	1-1/2	1-7/16	1-1/4-12	14445	A-16503	
A-16524	1.1250 1.1260	1.4990 1.4980	27/32	1-1/2	2-11/16	1-3/64	1-3/4	1-15/16	1-1/2-12	14446	A-16504	
A-16525	1.1250 1.1260	1.4990 1.4980	27/32	1-1/2	3	1-11/64	1-3/4	1-15/16	1-1/2-12	14446	A-16505	
A-16526	1.5000 1.5010	1.9990 1.9980	27/32	1-1/2	3	1-11/64	2-1/2	1-15/16	2"-16	14447	A-16506	
A-16533	2.0000 2.0015	2.4990 2.4980	1-3/8	2	3-3/4	1-9/16	—	2-5/8	2-1/2-16	14448	A-16513	

## LOCK NUTS



These fine-thread Lock Nuts fit the entire range of standard lock liners. Lock liners press fit into the jig plate, then fasten from behind with a Lock Nut.



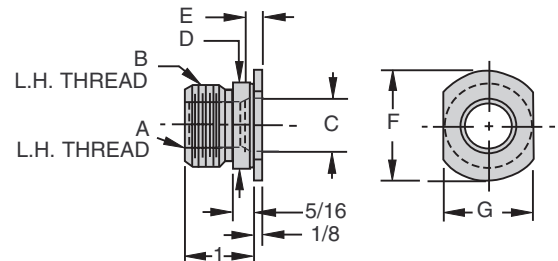
L.H. TH'D.

LOCK NUT PART NO.	A (THREAD SIZE)	B	C	PRICE EACH
14441	1/2-20	3/4	1/4	Please see our web catalog for pricing.
14442	3/4-16	1	1/4	
14443	7/8-14	1-1/4	1/4	
14445	1-1/4-12	1-3/4	3/8	
14446	1-1/2-12	2	1/2	
14447	2-16	2-1/2	1/2	
14448	2-1/2-16	3	1/2	

## REDUCERS



These Reducers allow mounting a smaller-series air-feed adaptor tip on a larger-series drill motor. Available for either standard or coolant-type air-feed drills. Available for 22000 through 25000 series air-feed drill motors. Two Reducers can be used together to step down several sizes.



PART NO. STANDARD TYPE	PART NO. COOLANT TYPE	A INSIDE THREAD	B OUTSIDE THREAD	C DIA	D DIA	E	F DIA	G*	STANDARD TYPE PRICE	COOLANT TYPE PRICE
17952	A-17952		1-14		1.0610-1.0604		1-3/8	1-1/16	Please see our web catalog for pricing.	
25018	A-25018	3/4-16	1-1/4-12	.8125	1.3110-1.3104	9/32	1-5/8	1-5/16		
25582	A-25582		1-1/2-12		1.5610-1.5604		1-15/16	1-9/16		
25583	A-25583	1-14	1-1/4-12	1.0625	1.3110-1.3104	11/32	1-5/8	1-5/16		
20132	A-20132		1-1/2-12		1.5610-1.5604		1-15/16	1-9/16		
20017	A-20017	1-1/4-12	1-1/2-12	1.3125	1.5610-1.5604	11/32	1-15/16	1-9/16		
27910	A-27910	1-1/2-12	2-16	1.5625	2.0610-2.0604	11/32	2-1/2	2-1/16		

\* Coolant type does not have wrench flats.



**MANUFACTURING CO.**

4200 Carr Lane Ct., P.O. Box 191970  
St. Louis, Missouri 63119-7970 USA  
Phone: 314-647-6200, FAX: 314-647-5736  
Web Site: www.carllane.com

## USA DRILL SIZES

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

## METRIC DRILL SIZES

Drill/Decimal	Drill/Decimal	Drill/Decimal
.35mm .0138	3.60mm .1417	8.70mm .3425
.38mm .0150	3.70mm .1457	8.75mm .3445
.40mm .0157	3.75mm .1476	8.80mm .3465
.42mm .0165	3.80mm .1496	8.90mm .3504
.45mm .0177	3.90mm .1535	<b>9.00mm .3543</b>
.48mm .0189	<b>4.00mm .1575</b>	9.10mm .3583
.50mm .0197	4.10mm .1614	9.20mm .3622
.55mm .0217	4.20mm .1654	9.25mm .3642
.60mm .0236	4.25mm .1673	9.30mm .3661
.65mm .0256	4.30mm .1693	9.40mm .3701
.70mm .0276	4.40mm .1732	9.50mm .3740
.75mm .0295	4.50mm .1772	9.60mm .3780
.80mm .0315	4.60mm .1811	9.70mm .3819
.85mm .0335	4.70mm .1850	9.75mm .3839
.90mm .0354	4.75mm .1870	9.80mm .3858
.95mm .0374	4.80mm .1890	9.90mm .3898
<b>1.00mm .0394</b>	4.90mm .1929	<b>10.00mm .3937</b>
1.05mm .0413	<b>5.00mm .1969</b>	10.20mm .4016
1.10mm .0433	5.10mm .2008	10.50mm .4134
1.15mm .0453	5.20mm .2047	10.80mm .4252
1.20mm .0472	5.25mm .2067	<b>11.00mm .4331</b>
1.25mm .0492	5.30mm .2087	11.20mm .4409
1.30mm .0512	5.40mm .2126	11.50mm .4528
1.35mm .0531	5.50mm .2165	11.80mm .4646
1.40mm .0551	5.60mm .2205	<b>12.00mm .4724</b>
1.45mm .0571	5.70mm .2244	12.20mm .4803
1.50mm .0591	5.75mm .2264	12.50mm .4921
1.55mm .0610	5.80mm .2283	<b>13.00mm .5118</b>
1.60mm .0630	5.90mm .2323	13.50mm .5315
1.65mm .0650	<b>6.00mm .2362</b>	<b>14.00mm .5512</b>
1.70mm .0669	6.10mm .2402	14.50mm .5709
1.75mm .0689	6.20mm .2441	<b>15.00mm .5906</b>
1.80mm .0709	6.25mm .2461	15.50mm .6102
1.85mm .0728	6.30mm .2480	<b>16.00mm .6299</b>
1.90mm .0748	6.40mm .2520	16.50mm .6496
1.95mm .0768	6.50mm .2559	<b>17.00mm .6693</b>
<b>2.00mm .0787</b>	6.60mm .2598	17.50mm .6890
2.05mm .0807	6.70mm .2638	<b>18.00mm .7087</b>
2.10mm .0827	6.75mm .2657	18.50mm .7283
2.15mm .0846	6.80mm .2677	<b>19.00mm .7480</b>
2.20mm .0866	6.90mm .2717	19.50mm .7677
2.25mm .0886	<b>7.00mm .2756</b>	<b>20.00mm .7874</b>
2.30mm .0906	7.10mm .2795	20.50mm .8071
2.35mm .0925	7.20mm .2835	<b>21.00mm .8268</b>
2.40mm .0945	7.25mm .2854	21.50mm .8465
2.45mm .0965	7.30mm .2874	<b>22.00mm .8661</b>
2.50mm .0984	7.40mm .2913	22.50mm .8858
2.55mm .1004	7.50mm .2953	<b>23.00mm .9055</b>
2.60mm .1024	7.60mm .2992	23.50mm .9252
2.65mm .1043	7.70mm .3031	<b>24.00mm .9449</b>
2.70mm .1063	7.75mm .3051	24.50mm .9646
2.75mm .1083	7.80mm .3071	<b>25.00mm .9843</b>
2.80mm .1102	7.90mm .3110	
2.90mm .1142	<b>8.00mm .3150</b>	+1.00mm increments up to 48mm
<b>3.00mm .1181</b>	8.10mm .3189	
3.10mm .1220	8.20mm .3228	
3.20mm .1260	8.25mm .3248	
3.25mm .1280	8.30mm .3268	+5.00mm increments from 50mm up to 105mm
3.30mm .1299	8.40mm .3307	
3.40mm .1339	8.50mm .3346	
3.50mm .1378	8.60mm .3386	

## TAP GUIDE SIZES

(Priced as specials)

Tap Size*	Tap Guide Nominal ID Size	Tap Drill Size**
#0-80	.0616	3/64
<b>#2-56</b>	.0883	#50
#2-64	.0880	#50
<b>#4-40</b>	.1152	#43
#4-48	.1147	#42
<b>#5-40</b>	.1282	#38
#5-44	.1280 (3.25mm)	#37
<b>#6-32</b>	.1421	#36
#6-40	.1412	#33
<b>#8-32</b>	.1681	#29
#8-36	.1676	#29
<b>#10-24</b>	.1954	#25
#10-32	.1941	#21
<b>1/4-20</b>	.2565	#7
1/4-28	.2546	#3
<b>5/16-18</b>	.3197	F
5/16-24	.3179	I
<b>3/8-16</b>	.3831	5/16
3/8-24	.3804	Q
<b>7/16-14</b>	.4468	U
7/16-20	.4440	25/64
<b>1/2-13</b>	.5100	27/64
1/2-20	.5065	29/64
<b>9/16-12</b>	.5733	31/64
9/16-18	.5697	33/64
<b>5/8-11</b>	.6368	17/32
5/8-18	.6322	37/64
<b>3/4-10</b>	.7630	21/32
3/4-16	.7581	11/16
<b>7/8-9</b>	.8894	49/64
7/8-14	.8843	13/16
<b>1-8</b>	1.0162	7/8
1-14	1.0093	15/16

METRIC		
<b>M1.6x0.35</b>	.0651	1.25mm or #55
<b>M2x0.4</b>	.0810 (#46)	1.60mm or #52
<b>M2.5x0.45</b>	.1008	2.05mm or #46
<b>M3x0.5</b>	.1207	2.50mm or #39
<b>M3.5x0.6</b>	.1407	2.90mm or #32
<b>M4x0.7</b>	.1613	3.30mm or #30
<b>M5x0.8</b>	.2010 (#7)	4.20mm or #19
<b>M6x1</b>	.2410	5.00mm or #8
<b>M8x1.25</b>	.3214	6.80mm or H
M8x1	.3197	7.00mm or J
<b>M10x1.5</b>	.4009	8.50mm or R
M10x1.25	.4002	8.80mm or 11/32
<b>M12x1.75</b>	.4805	10.20mm or 13/32
M12x1.25	.4789	10.80mm or 27/64
<b>M14x2</b>	.5600	12.00mm or 15/32
M14x1.5	.5584	12.50mm or 1/2
<b>M16x2</b>	.6387	14.00mm or 35/64
M16x1.5	.6372	14.50mm or 37/64
<b>M18x2.5</b>	.7191	15.50mm or 39/64
M18x1.5	.7159	16.50mm or 21/32
<b>M20x2.5</b>	.7978	17.50mm or 11/16
M20x1.5	.7946	18.50mm or 47/64
<b>M22x2.5</b>	.8765	19.50mm or 49/64
M22x1.5	.8734	20.50mm or 13/16
<b>M24x3</b>	.9583	21.00mm or 53/64
M24x2	.9537	22.00mm or 7/8

\* Coarse series shown in bold. Pitch callout not required on metric coarse series.  
\*\* Closest size for 75% theoretical thread.



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