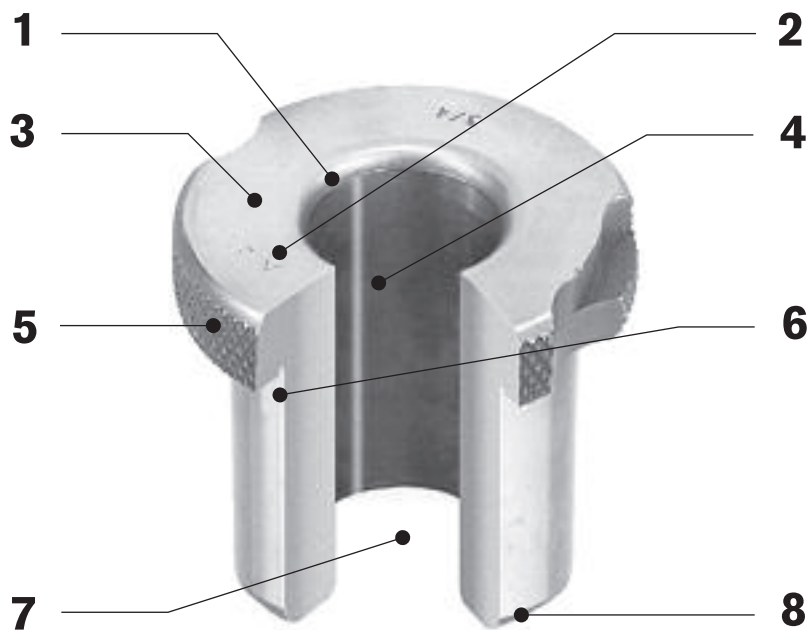


BUSHINGS

TYPE P	2.6
TYPE H	2.10
TYPE SFX	2.14
TYPE FM	2.18
TYPE L	2.21
TYPE HL	2.25
LOCKING ACCESSORIES	2.28
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SERATA PRESS	2.34
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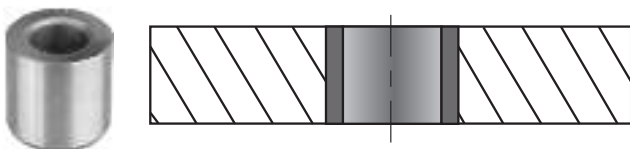
OUR DRILL BUSHINGS OFFER YOU GOOD REASONS TO CHOOSE THE ALL AMERICAN SOLUTION



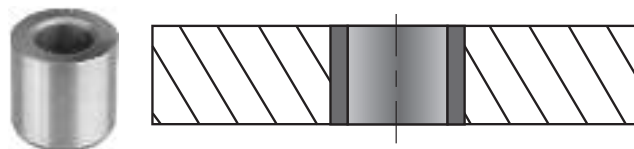
1. Blended radius at drill entrance improves proper drill entry and alignment which prevents tool wear and breakage.

Hardness: bushings are heat treated to Rockwell C62 - 64.
2. For quick and proper identification, all bushings are clearly stamped with SIZE and the All American "AA" TRADEMARK for your assurance that you are getting a superior products.
3. Steel: All American bushings are manufactured from either C1144 Stressproof steel or other high carbon steels known for thier long wear and stability. Special materials such as tungsten carbide, 52100 steel, 300 & 400 series stainless steel, plus A2, D2, D3, M2 and M4 tool steels and bronze are also available.
4. All American anti-galling process creates a super finish which increases the life of both the drill and the bushing
5. Slip fixed renewable (SF and SFX) bushing heads are knurled which improves operator handling when installing and removeable bushings from jigs or fixtures.
6. All American bushings feature a two dimensional undercut and are ground square to allow the bushing to fit flush on top of the jig.
7. All American bushings feature an inside chamfer which improves chip control and reduces tool wear.
8. Chamfer on the O.D. exit end of All American bushings eliminate peening which permits easy entry and removal.

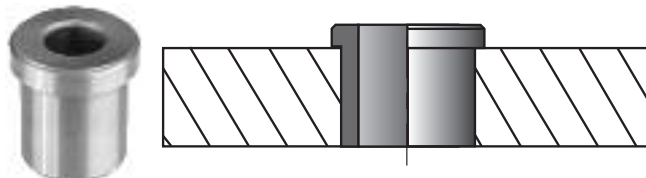
DRILL BUSHING TYPE DEFINITIONS



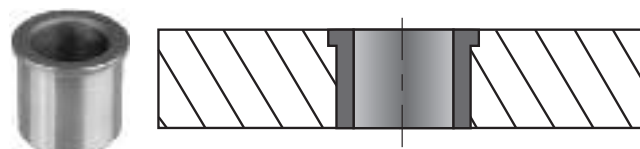
PRESS FIT BUSHINGS: Designated as Type P, these bushings are the least expensive and most popular bushings. Generally used in single step drilling. Pressed flush in the fixture plate, they can be spaced closer together than other types of bushings. Available as unground with additional outside diameter stock.



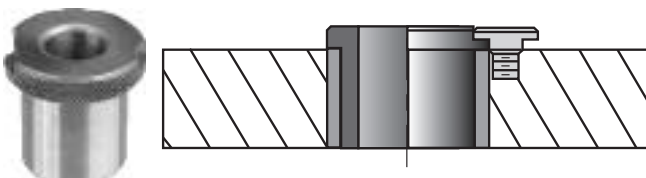
LINER BUSHINGS: Designated as Type L, these bushings are similar to press fit type bushings but are pressed in the fixture to maintain precise location for the slip fixed type bushings. Their hardened condition protects the fixture from wear of repeated bushing replacement. These parts may be ordered as unground when extra outside diameter stock is used.



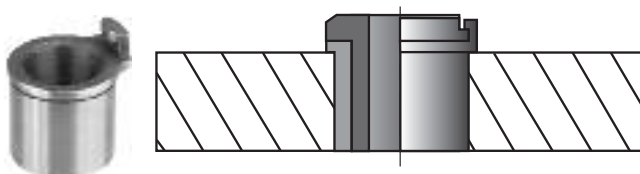
HEAD PRESS FIT BUSHINGS: Designated as Type H, these bushings can accept heavier axial loads than type P bushings whether mounted with the head above the fixture or recessed into the fixture. Also available as unground with additional outside diameter stock.



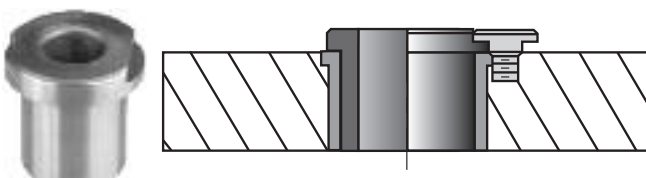
HEAD LINER BUSHINGS: Designated as Type HL, these bushings are used when excess axial loads or pounding would dislodge the headless liner. Type HL bushing may be used with the head projected above the fixture or countersunk flush with the top surface of the fixture. Type HL bushings are available with extra stock on the outside diameter when necessary, and ordered as unground. **The length is measured overall including the head.**



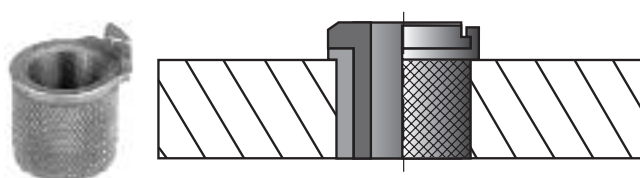
SLIP/FIXED RENEWABLE BUSHINGS: Designated as Type SF or SFX, these bushings are mostly used when the number of holes drilled will be greater than expected life of the bushing. Type SF and SFX bushings are also used when a hole is drilled, than a reaming or tapping operation is required. By slipping the bushing out of the liner another size may be installed for the next operation to be performed. Clamps or lock screws are used to secure them in the fixture.



UNILOCK BUSHINGS: Designated as Type UL, these are similar to the head liner with the additional feature of a locking lip projecting up to replace the necessity of drilling, tapping and use of a lock screw when using slip/fixed bushings.

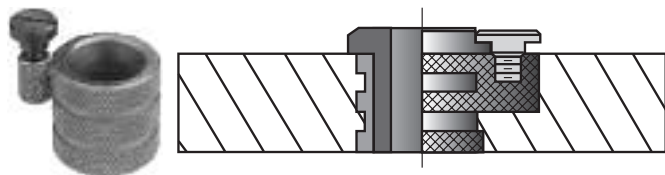


FIXED RENEWABLE BUSHINGS: Designated as Type FM, these bushings are mostly used when the number of holes drilled will be greater than the expected life of the bushing. By slipping the bushing out of the liner another size may be installed for the next operation to be performed. Clamps or lock screws are used to secure them in the fixture.

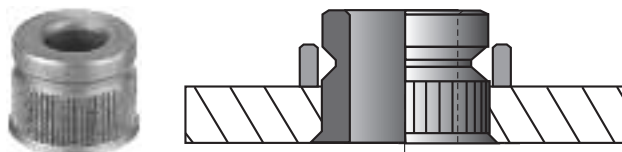


UNILOCK LINER BUSHINGS DIAMOND KNURLED O.D.: Designated as Type ULD, these liners are similar to type UL liners but are knurled on the outer dimension, O.D., for use in cast in place or potted installations.

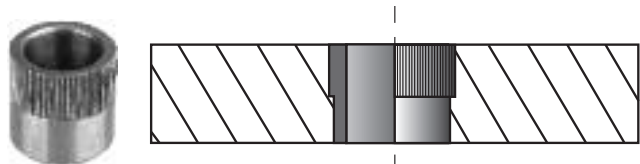
DRILL BUSHING TYPE DEFINITIONS



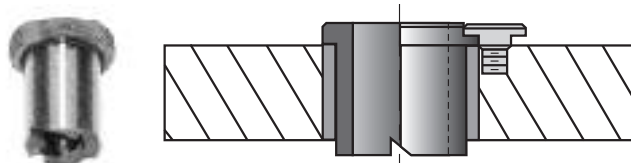
EZ CAST LINER BUSHINGS: Designated as Type EZ-L, these liners are for use in cast in place or potted installations. They have a lock screw positioned for use with type SF, SFX and FM bushings.



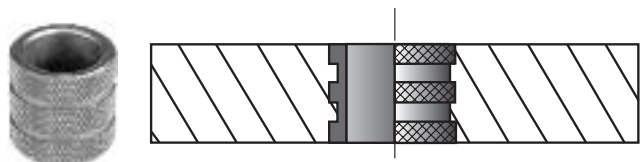
TEMPLATE BUSHINGS: Designated as Type TB, these bushings are for light weight fixturing whose thicknesses range from 1/16 to 3/8 inch thick. They have serrations to add resistance to rotational forces and an aluminum ring to clamp it firmly to the template.



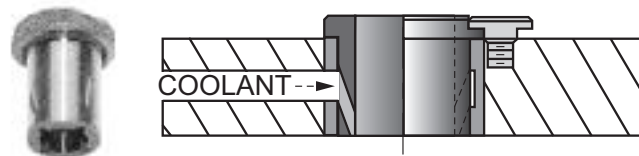
SERATTA PRESS FIT BUSHINGS: Designated as Type SP, these bushings are similar to type P bushings except for the half length, oversized serrations to prevent rotation in soft materials such as Aluminum, masonite or wood fixtures.



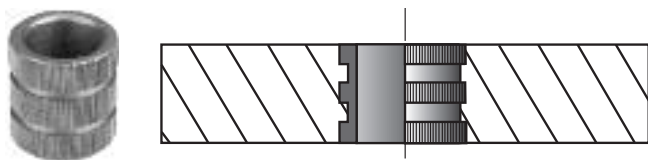
CHIP BREAKER BUSHINGS: Designated as Type CH, when drilling material producing long stringy chips, the chip breaker feature is added to the exit end of the bushing to assist in the breaking up these chips. The bushing projects beyond the feature to allow the chips to be broken and not have to travel up the drill flutes. Add CH after the ANSI code. Example: SFX-88-22-CH



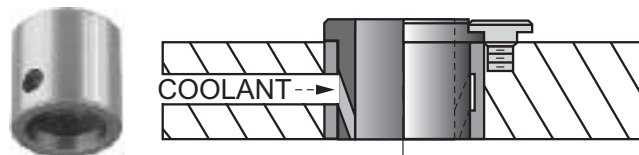
DIAMOND GROOVE BUSHINGS: Designated as Type DG, these bushings are for use in cast in place or potted installations. The diamond knurled outer dimension, O.D. holds better when axial and rotational forces exist.



DIRECT COOLANT BUSHINGS: Designated as Type DC, these bushings are specially designed for heavy drilling needing coolant to flush the chips away from the drill and work piece. These slip/fixed type bushings with coolant hole liners ensure coolant flow directly on the drill without the inconvenience of flex lines. Add DC after the ANSI code. Example: SFX-48-16-DC

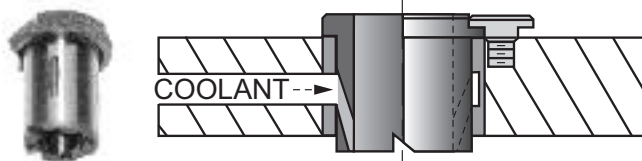


SERATTA GROOVE BUSHINGS: Designated as Type SG, these bushings are similar to the type DG bushing but can also be pressed into soft materials such as laminates or acrylics.

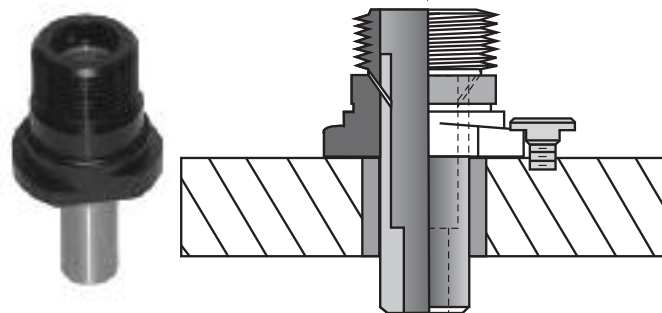


DIRECT COOLANT LINERS: Designated as Type DC, these liners are for use with directed coolant and combination bushings. They are available as headless or with heads, and should be ordered the same length as the bushing to work properly. Keep in mind though, that combination bushings have the chip breaker feature and will sit below the work surface. Example: L-64-16-DC

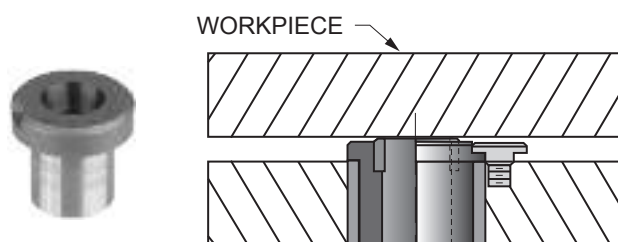
DRILL BUSHING TYPE DEFINITIONS



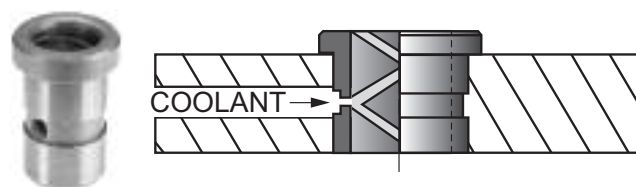
COMBINATION CHIP BREAKER DIRECTED COOLANT BUSHINGS AND LINERS: These specialty type bushings offer the best assistance in drilling difficult material. The chip breaker extends beyond the liners to help break up the chips. The positive coolant flow washes away the chips and provides lubricity to the drill making a very good combination drill guide.



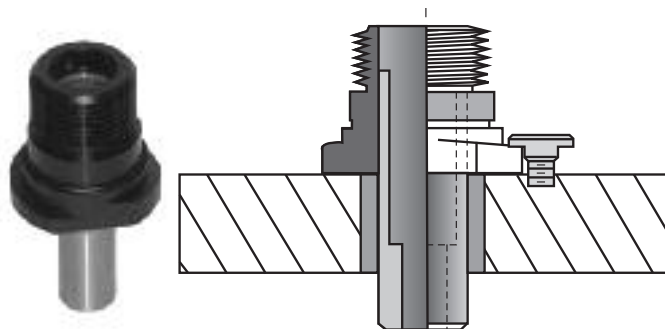
COOLANT FED AIR FEED DRILL BUSHINGS: These bushings are available for such tools as Buckeye, Aro, Gardner-denver, Quackenbush, DeSoutter and Ingersoll-Rand. They also have all the benefits of the positive coolant flow that washes away the chips and provides lubricity to the drill making a very good combination drill guide. Threaded collars, shanks or tips and locking devices for their use are available.



GUN DRILL BUSHINGS: These bushings are used in gun drilling machines such as the El Dorado, Dehoff and Drillmaster. Some machines use a SF type with an insert. Designated GDI for the inserts and GDL for the liner holding the insert. Other types of one piece construction are GDB liners and insert as one piece. DGDB deep hole drill bushings have a long guide projecting beyond the chip box. The type GDH bushing is for the Dehoff machine with the insert at the end opposite the head.



OIL GROOVE BUSHINGS: Oils groove bushings are available in any ANSI style. They offer complete positive lubrication and they are available in 25 oil groove configurations and come with wipers at the ends if needed.



AIR FEED DRILL BUSHINGS: These bushings are available for such tools as Buckeye, Aro, Gardner-denver, Quackenbush, DeSoutter and Ingersoll-Rand. Threaded collars, shanks or tips and locking devices for their use are available.

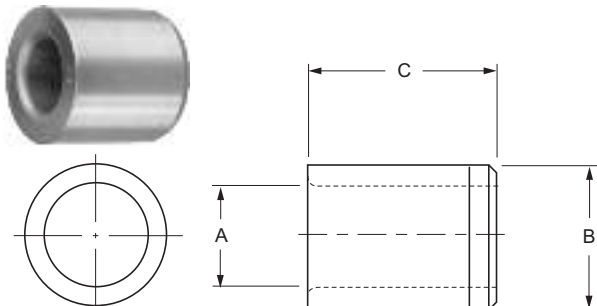
PRESS FIT - TYPE P

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	P	5/16	5/8	3/4

Or: 6 P-40-12-5/16



NOTE: For drill sizes, see the chart on page 1.6 in the information section.

A I.D. RANGE Drill Size Decimal Range	B O.D. TOLERANCE Nominal		C	ANSI SYMBOL ‡	PRICE CODE
	GROUND	UNGROUND DIGITAL RANGE			
#80 - #70 (.0135 - .0280) .35 - .70mm	5/32	.171 .169	1/4	P-10-4	203
			5/16	P-10-5	209
			3/8	P-10-6	211
			*1/2	P-10-8	214
#69 - 3/64 (.0292 - .0469) .75 - 1.25mm	5/32	.171 .169	1/4	P-10-4	190
			5/16	P-10-5	193
			3/8	P-10-6	195
			*1/2	P-10-8	199
#55 - 1/16 (.0520 - .0625) 1.30 - 1.60mm	5/32	.171 .169	1/4	P-10-4	166
			5/16	P-10-5	170
			3/8	P-10-6	173
			1/2	P-10-8	174
#55 - 1/16 (.0520 - .0625) 1.30 - 1.60mm	3/16	.203 .198	*3/4	P-10-12	182
			1/4	P-12-4	166
			5/16	P-12-5	170
			3/8	P-12-6	173
#52 - #39 (.0635 - .0995) 1.65 - 2.50mm	3/16	.203 .198	1/2	P-12-8	174
			*5/8	P-12-10	179
			*3/4	P-12-12	182
			1/4	P-12-4	119
#80 - #70 (.0135 - .0280) .35 - .70mm	13/64	.219 .216	5/16	P-12-5	125
			3/8	P-12-6	127
			1/2	P-12-8	130
			5/8	P-12-10	132
#69 - 3/64 (.0292 - .0469) .75 - 1.25mm	13/64	.219 .216	*3/4	P-12-12	135
			1/4	P-13-4	203
			5/16	P-13-5	209
			3/8	P-13-6	211
#55 - 1/16 (.0520 - .0625) 1.30 - 1.60mm	13/64	.219 .216	*1/2	P-13-8	214
			1/4	P-13-4	190
			5/16	P-13-5	193
			3/8	P-13-6	195
#52 - #39 (.0635 - .0995) 1.65 - 2.50mm	13/64	.219 .198	*1/2	P-13-8	199
			*3/4	P-13-12	209
			1/4	P-13-4	115
			5/16	P-13-5	118

* Counterbored leaving correct drill bearing length and chip clearance.

‡ All bushings are finish ground unless the letter "U" appears with the bushing type or the ANSI symbol.

A I.D. RANGE Drill Size Decimal Range	B O.D. TOLERANCE Nominal		C	ANSI SYMBOL ‡	PRICE CODE
	GROUND	UNGROUND DIGITAL RANGE			
#55 - 1/16 (.0520 - .0625) 1.30 - 1.60mm	13/64 .2046 .2043	.219 .198	1/4	P-13-4	166
			5/16	P-13-5	170
			3/8	P-13-6	173
			1/2	P-13-8	174
			*3/4	P-13-12	182
			*1	P-13-16	195
#52 - #39 (.0635 - .0995) 1.65 - 2.50mm	13/64 .2046 .2043	.219 .198	1/4	P-13-4	119
			5/16	P-13-5	125
			3/8	P-13-6	128
			1/2	P-13-8	130
			*3/4	P-13-12	135
			*1	P-13-16	140
#40 - 9/64 (.0980 - .1406) 2.50 - 3.50mm	1/4 .2516 .2513	.265 .260	*1-3/8	P-13-22	171
			1/4	P-16-4	115
			5/16	P-16-5	118
			3/8	P-16-6	122
			1/2	P-16-8	125
			5/8	P-16-10	128
1/8 - #10 (.1250 - .1935) 3.20 - 4.90mm	5/16 .3141 .3138	.327 .322	*3/4	P-16-12	131
			*1	P-16-16	136
			*1-3/8	P-16-22	169
			*1-1/2	P-16-24	174
			*1-3/4	P-16-28	179
			1/4	P-20-4	110
#10 - #1 (.1935 - .2280) includes 1/4 4.90 - 5.80mm	3/8 .3766 .3763	.390 .385	5/16	P-20-5	112
			3/8	P-20-6	113
			1/2	P-20-8	114
			5/8	P-20-10	115
			3/4	P-20-12	117
			*1	P-20-16	119
3/16 - F (.1875 - .2570) includes .2510 4.75-6.50mm	13/32 .4078 .4075	.421 .416	*1-3/8	P-20-22	140
			*1-1/2	P-20-24	150
			*1-3/4	P-20-28	159
			1/4	P-24-4	105
			5/16	P-24-5	106
			3/8	P-24-6	109
A - L (.2340 - .2900) includes .2510 5.90 - 7.40mm	7/16 .4392 .4389	.453 .448	1/2	P-24-8	110
			5/8	P-24-10	112
			3/4	P-24-12	113
			*1	P-24-16	118
			1/4	P-26-4	105
			5/16	P-26-5	106
3/16 - F (.1875 - .2570) includes .2510 4.75-6.50mm	13/32 .4078 .4075	.421 .416	3/8	P-26-6	109
			1/2	P-26-8	110
			3/4	P-26-12	113
			*1	P-26-16	118
			*1-3/8	P-26-22	125
			*1-1/2	P-26-24	131
A - L (.2340 - .2900) includes .2510 5.90 - 7.40mm	7/16 .4392 .4389	.453 .448	*1-3/4	P-26-28	136
			1/4	P-28-4	105
			5/16	P-28-5	106
			3/8	P-28-6	109
			1/2	P-28-8	110
			5/8	P-28-10	112
3/16 - F (.1875 - .2570) includes .2510 4.75-6.50mm	13/32 .4078 .4075	.421 .416	3/4	P-28-12	113
			*1	P-28-16	118

PRESS FIT - TYPE P

A I.D. RANGE Drill Size Decimal Range	B O.D. TOLERANCE Nominal GROUND UNGROUND DIGITAL RANGE	C	ANSI SYMBOL ‡	PRICE CODE
3/16 - 0 (.1875 - .3160) includes .2510 3/8 4.75 - 8.00mm	1/2 .5017 .515 .5014 .511	1/4	P-32-4	105
		5/16	P-32-5	106
		3/8	P-32-6	109
		1/2	P-32-8	110
		3/4	P-32-12	113
		*1	P-32-16	118
		*1-3/8	P-32-22	125
		*1-1/2	P-32-24	131
		*1-3/4	P-32-28	136
		*2-1/8	P-32-34	193
M - 11/32 (.2950 - .3437) 7.50 - 8.75mm	9/16 .5642 .578 .5639 .574	1/4	P-36-4	110
		5/16	P-36-5	105
		3/8	P-36-6	107
		1/2	P-36-8	107
		5/8	P-36-10	109
		3/4	P-36-12	110
		1	P-36-16	112
5/16 - 7/16 (.3125 - .4375) includes 1/2 7.90 - 11.00mm	5/8 .6267 .640 .6264 .637	1/4	P-40-4	110
		5/16	P-40-5	105
		3/8	P-40-6	107
		1/2	P-40-8	107
		5/8	P-40-10	109
		3/4	P-40-12	110
		1	P-40-16	112
		1-1/4	P-40-20	124
		1-3/8	P-40-22	124
		1-1/2	P-40-24	126
		1-3/4	P-40-28	131
		2-1/8	P-40-34	141
5/16 - 17/32 (.3125 - .5312) includes 5/8 7.90 - 13.50mm	3/4 .7518 .765 .7515 .761	1/4	P-48-4	112
		5/16	P-48-5	106
		3/8	P-48-6	110
		1/2	P-48-8	110
		5/8	P-48-10	112
		3/4	P-48-12	112
		1	P-48-16	114
		1-1/4	P-48-20	125
		1-3/8	P-48-22	125
		1-1/2	P-48-24	128
		1-3/4	P-48-28	132
		2-1/8	P-48-34	142
		*2-1/2	P-48-40	193
		5/16	P-56-5	119
1/2 - 21/32 (.5000 - .6562) includes 3/4 12.50-16.50mm	7/8 .8768 .890 .8765 .886	3/8	P-56-6	121
		1/2	P-56-8	115
		5/8	P-56-10	117
		3/4	P-56-12	117
		1	P-56-16	119
		1-1/4	P-56-20	124
		1-3/8	P-56-22	124
		1-1/2	P-56-24	128
		1-3/4	P-56-28	133
		2-1/8	P-56-34	141
		2-1/2	P-56-40	151

A I.D. RANGE Drill Size Decimal Range	B O.D. TOLERANCE Nominal GROUND UNGROUND DIGITAL RANGE	C	ANSI SYMBOL ‡	PRICE CODE
1/2 - 49/64 (.5000 - .7656) 12.50 - 19.50mm	1 1.0018 1.015 1.0015 1.011	1/2	P-64-8	117
		5/8	P-64-10	117
		3/4	P-64-12	117
		1	P-64-16	120
		1-1/4	P-64-20	124
		1-3/8	P-64-22	124
		1-1/2	P-64-24	130
		1-3/4	P-64-28	135
		2-1/8	P-64-34	141
		2-1/2	P-64-40	151
		3	P-64-48	199
		1/2	P-72-8	140
		5/8	P-72-10	136
49/64 - 27/32 (.7656 - .8437) 19.50 - 21.50mm	1-1/8 1.1270 1.140 1.1267 1.137	3/4	P-72-12	131
		1	P-72-16	140
		1-1/4	P-72-20	148
		1-1/2	P-72-24	152
		1-3/4	P-72-28	159
		5/8	P-80-10	136
		3/4	P-80-12	131
55/64 - 15/16 (.8595 - .9375) 22.00 - 24.00mm	1-1/4 1.2520 1.270 1.2517 1.265	1	P-80-16	140
		1-1/4	P-80-20	148
		1-1/2	P-80-24	152
		1-3/4	P-80-28	159
		2	P-80-32	171
		1/2	P-88-8	141
		5/8	P-88-10	138
5/8 - 1-1/32 (.6250 - 1.0312) 16.00 - 26.00mm	1-3/8 1.3772 1.395 1.3768 1.390	3/4	P-88-12	131
		1	P-88-16	141
		1-1/4	P-88-20	149
		1-3/8	P-88-22	149
		1-1/2	P-88-24	153
		1-3/4	P-88-28	161
		2	P-88-32	173
		2-1/8	P-88-34	174
		2-1/2	P-88-40	185
		3	P-88-48	222
		3/4	P-96-12	156
1-1/64 - 1-1/8 (1.0156 - 1.1250) 26.00 - 29.00mm	1-1/2 1.5022 1.524 1.5018 1.519	1	P-96-16	149
		1-1/4	P-96-20	156
		1-1/2	P-96-24	163
		1-3/4	P-96-28	166
		2	P-96-32	182
		2-1/4	P-96-36	188
1 - 1-25/64 (1.0000 - 1.3906) 25.00 - 35.00mm	1-3/4 1.7523 1.770 1.7519 1.765	3/4	P-112-12	156
		1	P-112-16	149
		1-1/4	P-112-20	156
		1-1/2	P-112-24	163
		1-3/4	P-112-28	166
		2	P-112-32	182
		2-1/4	P-112-36	193
1-3/8 - 1-49/64 (1.3750 - 1.7656) 35.00 - 45.00mm	2-1/4 2.2525 2.270 2.2521 2.265	3	P-112-24	240
		1	P-144-16	167
		1-1/4	P-144-20	178
		1-1/2	P-144-24	183
		1-3/4	P-144-28	187
		2	P-144-32	204
		2-1/4	P-144-36	216
		3	P-144-24	253

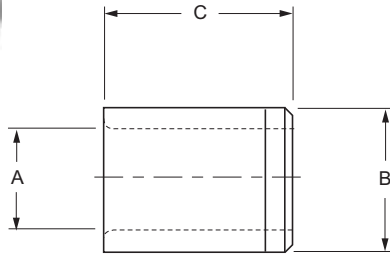
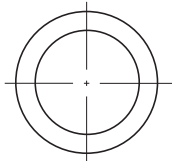
EXTENDED RANGE PRESS FIT - TYPE P

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	P	1-15/16	2-3/8	1- 3/4

Or: 6 P-152-28-1-15/16



TYPE PU (UNGROUND OD)

BODY O.D.	ACTUAL DIMENSION				
	FROM	TO	BODY O.D.	FROM	TO
2-3/8	2.395	2.390	3-3/4	3.770	3.765
2-1/2	2.520	2.515	4	4.020	4.015
2-3/4	2.770	2.765	4-1/4	4.270	4.265
3	3.020	3.015	4-3/8	4.395	4.390
3-1/4	3.270	3.265	4-1/2	4.520	4.515
3-3/8	3.395	3.390	4-3/4	4.770	4.765
3-1/2	3.520	3.515	5	5.020	5.015

NOTE: All bushings are finish ground unless the letter "U" appears with the bushing type or ANSI symbol.

All extended range bushings are considered special orders and are non-returnable.

I.D. RANGE	.0003 to .0007	1.5000 to 2.0000	1.5000 to 2.1250	1.5000 to 2.3750	1.7500 to 2.5000	2.2500 to 2.7500	2.2500 to 2.8750	2.5000 to 3.0000	2.5000 to 3.1250	2.7500 to 3.3750	3.0000 to 3.6250	3.0000 to 3.7500	3.3750 to 3.8750	3.3750 to 4.1250	3.6250 to 4.2500
O.D. RANGE (B)	NOM.	2-3/8	2-1/2	2-3/4	3	3-1/4	3-3/8	3-1/2	3-3/4	4	4-1/4	4-3/8	4-1/2	4-3/4	5
	DEC. RANGE	2.3775 2.3771	2.5025 2.5021	2.7525 2.7521	3.0028 3.0023	3.2528 3.2523	3.3778 3.3773	3.5028 3.5023	3.7528 3.7523	4.0028 4.0023	4.2530 4.2525	4.3780 4.3775	4.5030 4.5025	4.7530 4.7525	5.0030 5.0025
LENGTH (C)	ANSI CODE	152	160	176	192	208	216	224	240	256	272	280	288	304	320
3/4	12	306	307	322	339	360	362	366	368	372	374	*	*	*	*
1	16	309	312	325	341	363	366	367	371	375	378	*	*	*	*
1-1/4	20	313	313	328	343	365	367	370	373	379	381	*	*	*	*
1-1/2	24	317	319	333	345	367	369	373	380	384	386	*	*	*	*
1-3/4	28	320	322	335	348	370	372	375	384	387	391	*	*	*	*
2	32	324	325	338	351	372	375	382	390	391	397	*	*	*	*
2-1/8	34	326	327	340	-	-	-	-	-	-	-	-	-	-	-
2-1/4	36	329	331	341	356	380	381	389	395	397	402	*	*	*	*
2-1/2	40	333	340	348	360	382	385	395	398	402	407	*	*	*	*
2-3/4	44	341	343	358	374	386	389	400	406	407	413	*	*	*	*
3	48	355	356	367	379	390	393	407	411	414	419	*	*	*	*
3-1/4	52	358	360	376	381	395	397	415	419	420	424	*	*	*	*
3-1/2	56	361	363	378	386	398	401	421	423	426	431	*	*	*	*
3-3/4	60	364	367	381	388	402	405	428	431	432	438	*	*	*	*
4	64	366	368	382	390	406	409	435	439	440	447	*	*	*	*
4-1/4	68	370	372	387	397	410	413	440	447	449	456	*	*	*	*
4-1/2	72	374	376	390	402	414	417	448	456	458	463	*	*	*	*
4-3/4	76	378	380	395	406	418	424	454	461	466	472	*	*	*	*
5	80	380	384	399	413	424	427	461	469	475	481	*	*	*	*
5-1/2	88	-	-	-	-	-	435	470	484	492	497	*	*	*	*
6	96	-	-	-	-	-	-	-	497	506	513	*	*	*	*
6-1/2	104	-	-	-	-	-	-	-	-	523	530	*	*	*	*
7	112	-	-	-	-	-	-	-	-	-	-	*	*	*	*

*- Priced upon request

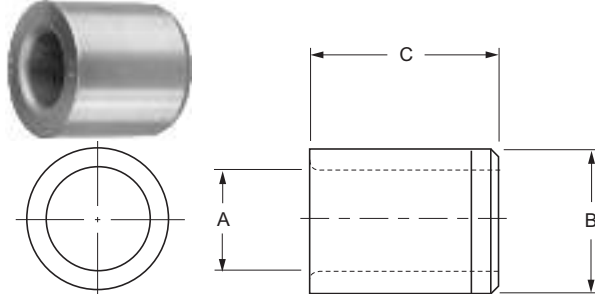
METRIC PRESS FIT - TYPE PM

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	PM	6M	10M	16M

Or: 6 PM-10-16-6



NOTE: For drill sizes, see the chart on page 1.6 in the information section.
NOTE: All bushings over 25mm are not returnable.

A I.D. RANGE	B O.D. TOLERANCE	C	ANSI SYMBOL	PRICE CODE
.035	4	6	PM-4-6	221
1.00	4.027-4.019	9	PM-4-9	230
1.05	4	6	PM-4-6	208
1.80	4.027-4.019	9	PM-4-6	212
1.85	5	6	PM-5-6	126
2.60	5.027-5.019	9	PM-5-9	136
2.65	6	8	PM-6-8	126
3.30	6.027-6.019	12	PM-6-12	132
		16	PM-6-16	139
3.31	7	8	PM-7-8	116
4.00	7.032-7.023	12	PM-7-12	121
		16	PM-7-16	126
4.01	8	8	PM-8-8	116
5.00	8.032-8.023	12	PM-8-12	121
		16	PM-8-16	126
5.01	10	10	PM-10-10	113
6.00	10.032-10.023	16	PM-10-16	114
		20	PM-10-20	118
6.01	12	10	PM-12-10	113
8.00	12.039-12.028	16	PM-12-16	114
		20	PM-12-20	118
8.01	15	12	PM-15-12	112
10.00	15.039-15.028	20	PM-15-20	114
		25	PM-15-25	116
10.01	18	12	PM-18-12	114
12.00	18.039-18.028	20	PM-18-20	116
		25	PM-18-25	121
12.01	22	16	PM-22-16	125
15.00	22.048-22.035	28	PM-22-28	127
		36	PM-22-36	136
15.01	26	16	PM-26-16	125
18.00	26.048-26.035	28	PM-26-28	128
		36	PM-26-36	139
18.01	30	20	PM-30-20	125
22.00	30.048-30.035	36	PM-30-36	139
		45	PM-30-45	145
22.01	35	20	PM-35-20	140
26.00	35.059-35.043	36	PM-35-36	166
		45	PM-35-45	174

A I.D. RANGE	B O.D. TOLERANCE	C	ANSI SYMBOL	PRICE CODE
26.01	42	25	PM-42-25	159
30.00	42.059-42.043	45	PM-42-45	182
		56	PM-42-56	207
30.01	48	25	PM-48-25	159
35.00	42.059-42.043	45	PM-48-45	182
		56	PM-48-56	207
35.01	55	30	PM-55-30	192
42.00	55.072-55.053	56	PM-55-56	234
		67	PM-55-67	263
42.01	62	30	PM-62-30	244
48.00	62.072-62.053	56	PM-62-56	266
		67	PM-62-67	271
48.01	70	30	PM-70-30	263
55.00	70.078-70.059	56	PM-70-56	271
		67	PM-70-67	374
55.01	78	35	PM-78-35	357
63.00	78.078-78.059	67	PM-78-67	390
		78	PM-78-78	399
63.01	85	35	PM-85-35	385
70.00	85.093-85.071	67	PM-85-67	409
		78	PM-85-78	413
70.01	95	40	PM-95-40	398
78.00	95.093-95.071	78	PM-95-78	433
		105	PM-95-105	474
78.01	105	40	PM-105-40	405
85.00	105.101-105.079	78	PM-105-78	442
		105	PM-105-105	484
85.01	115	45	PM-115-45	421
95.00	115.101-115.079	89	PM-115-89	471
		112	PM-115-112	507
96.01	125	45	PM-125-45	443
105.00	125.117-125.092	89	PM-125-89	445
		112	PM-125-112	535

All the above standard sizes are no counterbore. See back cover for standard metric drill chart.



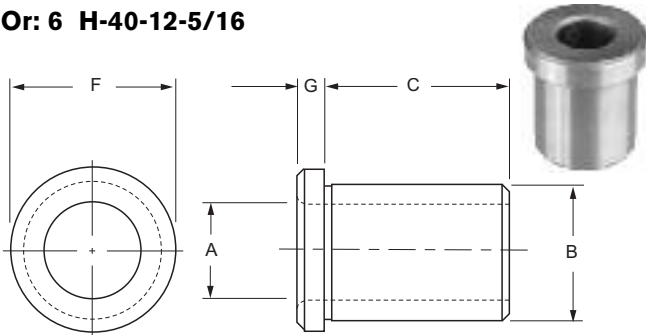
HEAD PRESS FIT - TYPE H

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	H	5/16	5/8	3/4

Or: 6 H-40-12-5/16



NOTE: For drill sizes, see the chart on page 1.6 in the information section.

A I.D. RANGE Drill Size Decimal Range	B O.D. TOLERANCE Nominal GROUND UNGROUND DIGITAL RANGE		C	ANSI SYMBOL ‡	PRICE CODE
	GROUND	UNGROUND			
#80 - #70 (.0135 - .0280) .35 - .70mm	5/32 .1578 .171 .1575 .169		1/4	H-10-4	209
			5/16	H-10-5	211
			*3/8	H-10-6	215
			*1/2	H-10-8	217
#69 - 3/64 (.0292 - .0469) .75 - 1.25mm	5/32 .1578 .171 .1575 .169		1/4	H-10-4	193
			5/16	H-10-5	195
			*3/8	H-10-6	199
			*1/2	H-10-8	202
#55 - 1/16 (.0520 - .0625) 1.30 - 1.60mm	5/32 .1578 .171 .1575 .169		1/4	H-10-4	171
			5/16	H-10-5	173
			3/8	H-10-6	174
			*1/2	H-10-8	175
#80 - #70 (.0135 - .0280) .35 - .70mm	13/64 .2046 .219 .2043 .216		1/4	H-13-4	209
			5/16	H-13-5	211
			*3/8	H-13-6	215
			*1/2	H-13-8	217
#69 - 3/64 (.0292 - .0469) .75 - 1.25mm	13/64 .2046 .219 .2043 .216		1/4	H-13-4	193
			5/16	H-13-5	195
			*3/8	H-13-6	199
			*1/2	H-13-8	202
#55 - 1/16 (.0520 - .0625) 1.30 - 1.60mm	13/64 .2046 .219 .2043 .198		1/4	H-13-4	171
			5/16	H-13-5	173
			3/8	H-13-6	174
			*1/2	H-13-8	175
#52 - #39 (.0635 - .0995) 1.65 - 2.50mm	13/64 .2046 .219 .2043 .198		1/4	H-13-4	132
			5/16	H-13-5	133
			3/8	H-13-6	136
			*1/2	H-13-8	138
			*3/4	H-13-12	147
			*1	H-13-16	165

* Counterbored leaving correct drill bearing length and chip clearance.

‡ All bushings are finish ground unless the letter "U" appears with the bushing type or the ANSI symbol.

ANSI HEAD PRESS FIT HEAD DIMENSIONS

BODY O.D. B	HEAD DIMENSION				
	F	G	BODY O.D. B	F	G
5/32	1/4	3/32	5/8	51/64	7/32
13/64	19/64	3/32	3/4	59/64	7/32
1/4	23/64	3/32	7/8	1-7/64	1/4
5/16	27/64	1/8	1	1-15/64	5/16
3/8	1/2	3/32	1-1/4	1-1/2	1/4
13/32	1/2	5/32	1-3/8	1-39/64	3/8
7/16	9/16	3/32	1-3/4	1-63/64	3/8
1/2	39/64	7/32	2-1/4	2-31/64	3/8
9/16	11/16	3/32			

A I.D. RANGE Drill Size Decimal Range	B O.D. TOLERANCE Nominal GROUND UNGROUND DIGITAL RANGE		C	ANSI SYMBOL ‡	PRICE CODE
	GROUND	UNGROUND			
#40 - 9/64 (.0980 - .1406) 2.50 - 3.50mm	1/4 .2516 .265 .2513 .260		1/4	H-16-4	125
			5/16	H-16-5	128
			3/8	H-16-6	131
			*1/2	H-16-8	132
			*5/8	H-16-10	138
			*3/4	H-16-12	145
			*1	H-16-16	163
			*1-3/8	H-16-22	199
			*1-1/2	H-16-24	208
			1/4	H-20-4	115
	5/16 .3141 .327 .3138 .322		5/16	H-20-5	118
			3/8	H-20-6	121
			1/2	H-20-8	122
			5/8	H-20-10	123
			3/4	H-20-12	124
			*1	H-20-16	133
			*1-3/8	H-20-22	170
			*1-1/2	H-20-24	183
#10 - #1 (.1935 - .2280) 4.90 - 5.80mm	3/8 .3766 .390 .3763 .385		1/4	H-24-4	113
			5/16	H-24-5	115
			3/8	H-24-6	117
			1/2	H-24-8	118
			5/8	H-24-10	120
			3/4	H-24-12	121
			*1	H-24-16	130
			1/4	H-26-4	113
	13/32 .4078 .421 .4075 .416		5/16	H-26-5	114
			3/8	H-26-6	117
			1/2	H-26-8	118
			3/4	H-26-12	121
			*1	H-26-16	130
			*1-3/8	H-26-22	136
			*1-1/2	H-26-24	143
			*1-3/4	H-26-28	150

HEAD PRESS FIT - TYPE H

A I.D. RANGE Drill Size Decimal Range	B O.D. TOLERANCE Nominal GROUND UNGROUND DIGITAL RANGE	C	ANSI SYMBOL ‡	PRICE CODE
A - L (.2340 - .2900) 5.90 - 7.40mm	7/16 .4392 .453 .4389 .448	1/4	H-28-4	113
		5/16	H-28-5	115
		3/8	H-28-6	117
		1/2	H-28-8	118
		5/8	H-28-10	120
		3/4	H-28-12	121
		*1	H-28-16	130
3/16 - 0 (.1875 - .3160) 4.75 - 8.00mm	1/2 .5017 .518 .5014 .511	1/4	H-32-4	113
		5/16	H-32-5	114
		3/8	H-32-6	117
		1/2	H-32-8	118
		3/4	H-32-12	121
		*1	H-32-16	130
		*1-3/8	H-32-22	136
M - 11/32 (.2950 - .3437) 7.50 - 8.75mm	9/16 .5642 .580 .5639 .575	*1-1/2	H-32-24	143
		*1-3/4	H-32-28	150
		1/4	H-36-4	117
		5/16	H-36-5	113
		3/8	H-36-6	115
		1/2	H-36-8	115
		5/8	H-36-10	117
5/16 - 7/16 (.3125 - .4375) 7.90 - 13.50mm	5/8 .6267 .640 .6264 .637	3/4	H-36-12	117
		1	H-36-16	121
		1/4	H-40-4	117
		5/16	H-40-5	113
		3/8	H-40-6	114
		1/2	H-40-8	114
		5/8	H-40-10	117
5/16 - 17/32 (.3125 - .5312) 7.90 - 13.50mm	3/4 .7518 .768 .7515 .763	3/4	H-40-12	117
		1	H-40-16	121
		1-3/8	H-40-22	136
		1-1/2	H-40-24	140
		1-3/4	H-40-28	145
		2-1/8	H-40-34	154
		1/4	H-48-4	121
		5/16	H-48-5	115
		3/8	H-48-6	117
		1/2	H-48-8	117
		5/8	H-48-10	119
		3/4	H-48-12	121
		1	H-48-16	125
		1-1/4	H-48-20	138
		1-3/8	H-48-22	138
		1-1/2	H-48-24	141
		1-3/4	H-48-28	146
		2-1/8	H-48-34	156

A I.D. RANGE Drill Size Decimal Range	B O.D. TOLERANCE Nominal GROUND UNGROUND DIGITAL RANGE	C	ANSI SYMBOL ‡	PRICE CODE
1/2 - 21/32 (.5000 - .6562) 12.50 - 16.50mm	7/8 .8768 .890 .8765 .888	1/2	H-56-8	126
		5/8	H-56-10	126
		3/4	H-56-12	127
		1	H-56-16	130
		1-1/4	H-56-20	135
		1-3/8	H-56-22	135
		1-1/2	H-56-24	141
		1-3/4	H-56-28	149
		2-1/8	H-56-34	156
		2-1/2	H-56-40	172
1/2 - 49/64 (.5000 - .7656) 12.50 - 19.50mm	1 1.0018 1.018 1.0015 1.013	1/2	H-64-8	128
		3/4	H-64-12	128
		1	H-64-16	132
		1-3/8	H-64-22	136
		1-1/2	H-64-24	147
		1-3/4	H-64-28	153
		2-1/8	H-64-34	166
55/64 - 15/16 (.8595 - .9375) 22.00 - 24.00mm	1-1/4 1.2520 1.270 1.2517 1.265	2-1/2	H-64-40	181
		3	H-64-48	230
		5/8	H-80-10	153
		3/4	H-80-12	151
		1	H-80-16	158
		1-1/4	H-80-20	166
		1-1/2	H-80-24	174
		1-3/4	H-80-28	181
		2	H-80-32	192
5/8-1-1/32 (.6250 - 1.0312) 16.00 - 26.00mm	1-3/8 1.3772 1.395 1.3768 1.390	1/2	H-88-8	159
		3/4	H-88-12	152
		1	H-88-16	160
		1-3/8	H-88-22	168
		1-1/2	H-88-24	175
		1-3/4	H-88-28	182
		2-1/8	H-88-34	195
		2-1/2	H-88-40	210
		3	H-88-48	246
1-1-25/64 (1.0000 - 1.3906) 26.00 - 35.00mm	1-3/4 1.7523 1.770 1.7519 1.765	3/4	H-112-12	187
		1	H-112-16	177
		1-3/8	H-112-22	187
		1-1/2	H-112-24	191
		1-3/4	H-112-28	196
		2-3/8	H-112-34	212
		2-1/8	H-112-40	224
1-3/8-1-49/64 (1.3750 - 1.7656) 35.00 - 45.00mm	2-1/4 2.2525 2.270 2.2521 2.265	3	H-112-48	258
		1	H-144-16	205
		1-3/8	H-144-22	219
		1-1/2	H-144-24	223
		1-3/4	H-144-28	233
		2	H-144-32	243
		2-1/4	H-144-36	250
		3	H-144-48	268

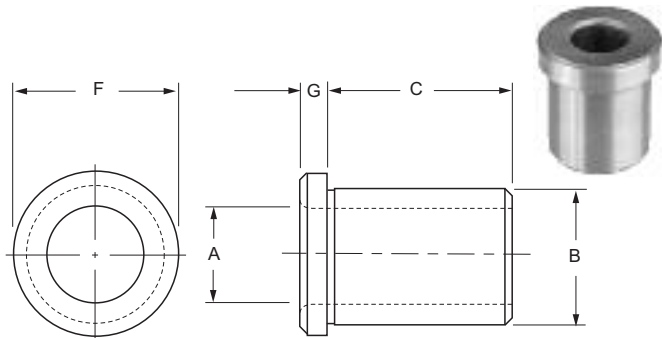
EXTENDED RANGE HEAD PRESS FIT - TYPE H

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	H	1-5/16	2-5/8	1-3/4

Or: 6 H-152-28-1-15/16



TYPE H (UNGROUND OD)

BODY O.D.	ACTUAL DIMENSION				
	FROM	TO	BODY O.D.	FROM	TO
2-3/8	2.395	2.390	3-3/4	3.770	3.765
2-1/2	2.520	2.515	4	4.020	4.015
2-3/4	2.770	2.765	4-1/4	4.270	4.265
3	3.020	3.015	4-3/8	4.395	4.390
3-1/4	3.270	3.265	4-1/2	4.520	4.515
3-3/8	3.395	3.390	4-3/4	4.770	4.765
3-1/2	3.520	3.515	5	5.020	5.015

NOTE: All bushings are finish ground unless the letter "U" appears with the bushing type or ANSI symbol.

All extended range bushings are considered special orders and are non-returnable.

I.D. RANGE	.0003 to .0007	1.5000 to 2.0000	1.5000 to 2.1250	1.5000 to 2.3750	1.7500 to 2.5000	2.2500 to 2.7500	2.2500 to 2.8750	2.5000 to 3.0000	2.5000 to 3.1250	2.7500 to 3.3750	3.0000 to 3.6250	3.0000 to 3.7500	3.3750 to 3.8750	3.3750 to 4.1250	3.6250 to 4.2500
O.D. RANGE (B)	NOM.	2-3/8	2-1/2	2-3/4	3	3-1/4	3-3/8	3-1/2	3-3/4	4	4-1/4	4-3/8	4-1/2	4-3/4	5
DEC. RANGE	2.3775 2.3771	2.5025 2.5021	2.7525 2.7521	3.0028 3.0023	3.2528 3.2523	3.3778 3.3773	3.5028 3.5023	3.7528 3.7523	4.0028 4.0023	4.2530 4.2525	4.3780 4.3775	4.5030 4.5025	4.7530 4.7525	5.0030 5.0025	
LENGTH (C)	ANSI CODE	152	160	176	192	208	216	224	240	256	272	280	288	304	320
3/4	12	308	309	336	341	368	369	372	376	*	*	*	*	*	*
1	16	311	313	339	344	370	371	373	380	*	*	*	*	*	*
1-1/4	20	314	316	341	348	371	373	379	386	*	*	*	*	*	*
1-1/2	24	320	321	343	351	373	375	384	393	*	*	*	*	*	*
1-3/4	28	323	324	345	354	376	378	390	401	*	*	*	*	*	*
2	32	326	328	350	359	379	380	397	408	*	*	*	*	*	*
2-1/8	34	328	330	352	-	-	-	-	-	-	-	-	-	-	-
2-1/4	36	333	335	354	363	384	386	404	415	*	*	*	*	*	*
2-1/2	40	336	337	359	368	388	390	411	421	*	*	*	*	*	*
2-3/4	44	344	346	362	378	393	395	420	427	*	*	*	*	*	*
3	48	358	360	366	380	398	399	427	435	*	*	*	*	*	*
3-1/4	52	361	363	370	386	402	403	435	443	*	*	*	*	*	*
3-1/2	56	365	367	374	389	405	407	447	452	*	*	*	*	*	*
3-3/4	60	367	369	377	391	410	411	456	460	*	*	*	*	*	*
4	64	370	372	380	396	414	415	464	469	*	*	*	*	*	*
4-1/4	68	374	376	384	403	418	420	471	477	*	*	*	*	*	*
4-1/2	72	378	380	388	418	421	422	479	486	*	*	*	*	*	*
4-3/4	76	380	383	393	422	426	428	482	494	*	*	*	*	*	*
5	80	385	388	419	429	432	434	493	502	*	*	*	*	*	*
5-1/2	88	-	-	-	-	-	442	500	517	*	*	*	*	*	*
6	96	-	-	-	-	-	-	-	532	*	*	*	*	*	*
6-1/2	104	-	-	-	-	-	-	-	-	*	*	*	*	*	*
7	112	-	-	-	-	-	-	-	-	-	-	*	*	*	*
HEAD F		2-3/4	2-3/4	3	3-1/4	3-1/2	3-5/8	3-7/8	4-1/8	4-3/8	4-5/8	4-3/4	4-7/8	5-1/8	5-3/8
HEAD G		3/8	3/8	3/8	3/8	3/8	3/8	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2

*- Priced upon request

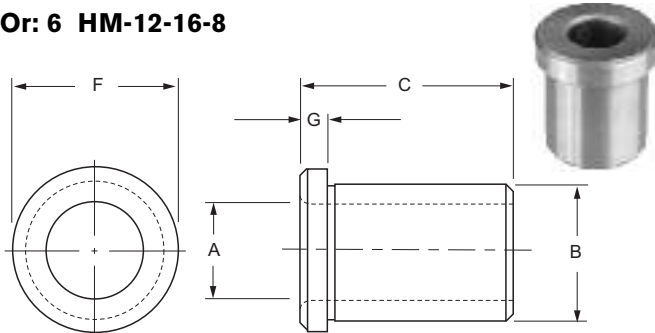
METRIC HEAD PRESS FIT - TYPE HM

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	HM	8	12	16

Or: 6 HM-12-16-8



- NOTE:**
- For drill sizes, see the chart on page 1.6 in the information section.
 - The length is measured overall.
 - All bushings over 25mm are not returnable

A I.D. RANGE	B O.D. TOLERANCE	C	F	G	ANSI SYMBOL	PRICE CODE
.035	4	6	7	2	HM-4-6	228
1.00	4.027-4.019	9	7	2	HM-4-9	233
1.01----	4	6	7	2	HM-4-6	213
1.80	4.027-4.019	9	7	2	HM-4-6	220
1.81	5	6	8	2	HM-5-6	141
2.60	5.027-5.019	9	8	2	HM-5-9	147
2.61	6	8	9	2.5	HM-6-8	136
3.30	6.027-6.019	12	9	2.5	HM-6-12	141
		16	9	2.5	HM-6-16	154
3.31	7	8	10	2.5	HM-7-8	125
4.00	7.032-7.023	12	10	2.5	HM-7-12	130
		16	10	2.5	HM-7-16	132
4.01	8	8	11	2.5	HM-8-8	125
5.00	8.032-8.023	12	11	2.5	HM-8-12	130
		16	11	2.5	HM-8-16	132
5.01	10	10	13	3	HM-10-10	125
6.00	10.032-10.023	16	13	3	HM-10-16	129
		20	13	3	HM-10-20	152
6.01	12	10	15	3	HM-12-10	125
8.00	12.039-12.028	16	15	3	HM-12-16	129
		20	15	3	HM-12-20	139
8.01	15	12	18	3	HM-15-12	121
10.00	15.039-15.028	20	18	3	HM-15-20	129
		25	18	3	HM-15-25	130
10.01	18	12	22	4	HM-18-12	125
12.00	18.039-18.028	20	22	4	HM-18-20	129
		25	22	4	HM-18-25	133
12.01	22	16	26	4	HM-22-16	136
15.00	22.048-22.035	28	26	4	HM-22-28	145
		36	26	4	HM-22-36	151
15.01	26	16	30	4	HM-26-16	136
18.00	26.048-26.035	28	30	4	HM-26-28	141
		36	30	4	HM-26-36	150
18.01	30	20	34	5	HM-30-20	163
22.00	30.048-30.035	36	34	5	HM-30-36	189
		45	34	5	HM-30-45	196
22.01	35	20	39	5	HM-35-20	164
26.00	35.059-35.043	36	39	5	HM-35-36	190
		45	39	5	HM-35-45	198

A I.D. RANGE	B O.D. TOLERANCE	C	F	G	ANSI SYMBOL	PRICE CODE
26.01	42	25	46	5	HM-42-25	191
30.00	42.059-42.043	45	46	5	HM-42-45	198
		56	46	5	HM-42-56	243
30.01	48	25	52	5	HM-48-25	197
35.00	42.059-42.043	45	52	5	HM-48-45	216
		56	52	5	HM-48-56	242
35.01	55	30	59	5	HM-55-30	236
42.00	55.072-55.053	56	59	5	HM-55-56	262
		67	59	5	HM-55-67	359
42.01	62	30	66	6	HM-62-30	249
48.00	62.072-62.053	56	66	6	HM-62-56	267
		67	66	6	HM-62-67	358
48.01	70	30	74	6	HM-70-30	353
55.00	70.078-70.059	56	74	6	HM-70-56	369
		67	74	6	HM-70-67	373
55.01	78	35	82	6	HM-78-35	365
63.00	78.078-78.059	67	82	6	HM-78-67	386
		78	82	6	HM-78-78	392
63.01	85	35	90	6	HM-85-35	403
70.00	85.093-85.071	67	90	6	HM-85-67	443
		78	90	6	HM-85-78	453
70.01	95	40	100	6	HM-95-40	415
78.00	95.093-95.071	78	100	6	HM-95-78	461
		105	100	6	HM-95-105	507
78.01	105	40	110	6	HM-105-40	429
85.00	105.101-105.079	78	110	6	HM-105-78	473
		105	110	6	HM-105-105	517
85.01	115	45	120	6	HM-115-45	449
95.00	115.101-115.079	89	120	6	HM-115-89	503
		112	120	6	HM-115-112	543
95.01	125	45	130	6	HM-125-45	473
105.00	125.117-125.092	89	130	6	HM-125-89	530
		112	130	6	HM-125-112	566

All the above standard sizes are no counterbore. See back cover for standard metric drill chart.

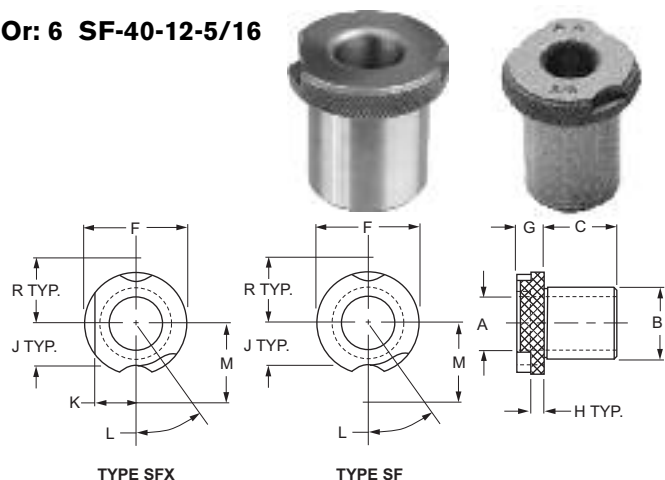
SLIP FIXED RENEWABLES - TYPE SF & SFX

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	SF	5/16	5/8	3/4

Or: 6 SF-40-12-5/16



SLIP/FIXED RENEWABLE HEAD DIMENSIONS								
BODY O.D. B	F	G	H	J	K*	L	M	R
3/16	5/16	3/16	3/32	3/32	-	55°	-	17/64
1/4	27/64	1/4	1/8	9/64	-	30°	-	23/64
5/16	35/64	1/4	1/8	11/64	11/64	65°	5/8	1/2
3/8	5/8	1/4	1/8	15/64	-	30°	-	29/64
7/16	5/8	1/4	1/8	15/64	-	30°	-	29/64
1/2	25/32	1/4	1/8	19/64	17/64	65°	3/4	5/8
9/16	7/8	1/4	1/8	23/64	-	30°	-	37/64
5/8	7/8	1/4	1/8	23/64	-	30°	-	37/64
3/4	1-3/64	1/4	1/8	27/64	25/64	50°	7/8	3/4
7/8	1-1/4	3/8	3/16	33/64	-	30°	-	53/64
1	1-25/64	3/8	3/16	19/32	1/2	35°	1-7/64	59/64
1-3/8	1-49/64	3/8	3/16	25/32	11/16	30°	1-19/64	1-7/64
1-3/4	2-5/16	3/8	3/16	1	7/8	30°	1-41/64	1-25/64
2-1/4	2-49/64	3/8	3/16	1-1/4	1-1/8	25°	1-57/64	1-41/64

NOTE: For drill sizes, see the chart on page 1.6 in the information section.

A - I.D. RANGE Drill Size Decimal Range	B - O.D. TOLERANCE Nominal DIGITAL RANGE	C	ANSI SYMBOL	PRICE CODE	LOCK SCREW CLAMPS
#80 - #70 (.0135 - .0280) .35 - .70mm	3/16 .1875 .1873	*1/4	SF-12-4	233	LS-0
		*5/16	SF-12-5	235	
		*3/8	SF-12-6	237	
		*1/2	SF-12-8	238	
		*5/8	SF-12-10	248	
		*3/4	SF12-12	260	
#69 - 3/64 (.0292 - .0469) .75 - 1.25mm	3/16 .1875 .1873	1/4	SF-12-4	214	LS-0
		*5/16	SF-12-5	216	
		*3/8	SF-12-6	219	
		*1/2	SF-12-8	221	
		*5/8	SF-12-10	225	
		*3/4	SF12-12	230	
#55 - 1/16 (.0520 - .0625) 1.30 - 1.60mm	3/16 .1875 .1873	1/4	SF-12-4	182	LS-0
		*5/16	SF-12-5	184	
		*3/8	SF-12-6	186	
		*1/2	SF-12-8	187	
		*5/8	SF-12-10	191	
		*3/4	SF12-12	197	
#52-#40 (.0635 - .0980) 1.65 - 2.50mm	3/16 .1875 .1873	1/4	SF-12-4	141	LS-0
		*5/16	SF-12-5	143	
		*3/8	SF-12-6	144	
		*1/2	SF-12-8	147	
		*5/8	SF-12-10	151	
		*3/4	SF12-12	154	
#39-9/64 (.0995 - .1406) 2.55 - 3.50mm	1/4 .2500 .2498	1/4	SF-16-4	136	TW-2
		5/16	SF-16-5	136	
		*3/8	SF-16-6	138	
		*1/2	SF-16-8	141	
		*5/8	SF-16-10	146	
		*3/4	SF16-12	150	
#80-#70 (.0135 - .0280) .35 - .70mm	5/16 .3125 .3123	*1/4	SF-20-4	233	LS-1 RC-01 RK-01 RK-11
		*5/16	SF-20-5	235	
		*3/8	SF-20-6	237	
		*1/2	SF-20-8	238	
		*3/4	SF-20-12	260	

A - I.D. RANGE Drill Size Decimal Range	B - O.D. TOLERANCE Nominal DIGITAL RANGE	C	ANSI SYMBOL	PRICE CODE	LOCK SCREW CLAMPS
#69 - 3/64 (.0292 - .0469) .75 - 1.25mm	5/16 .3125 .3123	*5/16	SF-20-5	216	LS-1
		*3/8	SF-20-6	219	RC-01
		*1/2	SF-20-8	221	RK-01
		*3/4	SF-20-12	230	RK-11
#55 - 1/16 (.0520 - .0625) 1.30 - 1.60mm	5/16 .3125 .3123	*5/16	SF-20-5	184	LS-1
		*3/8	SF-20-6	186	RC-01
		*1/2	SF-20-8	187	RK-01
		*3/4	SF-20-12	197	RK-11
#52 - #43 (.0635 - .0890) 1.65 - 2.35mm	5/16 .3125 .3123	5/16	SF-20-5	142	LS-1 RC-01 RK-01 RK-11
		*3/8	SF-20-6	144	
		*1/2	SF-20-8	147	
		*3/4	SF-20-12	154	
		*1	SF-20-16	172	
#42 - #31 (.0935 - .1200) 2.40 - 3.15mm	5/16 .3125 .3123	5/16	SF-20-5	136	LS-1 RC-01 RK-01 RK-11
		3/8	SF-20-6	138	
		*1/2	SF-20-8	141	
		*3/4	SF-20-12	150	
		*1	SF-20-16	163	
		*1-3/8	SF-20-22	185	
1/8-#10 (.1250 - .1935) 3.20 - 4.90mm	5/16 .3125 .3123	5/16	SF-20-5	135	LS-1 RC-01 RK-01 RK-11
		3/8	SF-20-6	136	
		1/2	SF-20-8	139	
		5/8	SF-20-10	143	
		*3/4	SF-20-12	148	
		*1	SF-20-16	161	
#10-#1 (.1935 - .2280) 4.90 - 5.80mm	3/8 .3750 .3748	*1-3/8	SF-20-22	184	TW-2
		1/4	SF-20-4	117	
		5/16	SF-20-5	120	
		3/8	SF-20-6	122	
		1/2	SF-20-8	125	
		5/8	SF-20-10	126	
		3/4	SF-20-12	128	
		*1	SF-20-16	135	

* Counterbored leaving correct drill bearing length and chip clearance.

SLIP FIXED RENEWABLES - TYPE SF & SFX

A - I.D. RANGE Drill Size Decimal Range	B - O.D. TOLERANCE Nominal DIGITAL RANGE	C	ANSI SYMBOL	PRICE CODE	LOCK SCREW CLAMPS
A - L (.2340 - .2900) 5.90 - 7.40mm	7/16 .4375 .4373	1/4	SF-28-4	117	TW-2
		5/16	SF-28-5	120	
		3/8	SF-28-6	122	
		1/2	SF-28-8	125	
		5/8	SF-28-10	126	
		3/4	SF-28-12	128	
		*1	SF-28-16	135	
#28 - 3/16 (.1405 - .1875) 3.60 - 4.75mm	1/2 .5000 .4998	5/16	SFX-32-5	126	LS-1 RC-01 RK-01 RK-11
		3/8	SFX-32-6	128	
		1/2	SFX-32-8	130	
		*3/4	SFX-32-12	135	
		*1	SFX-32-16	143	
		*1-3/8	SFX-32-22	152	
		*1-1/2	SFX-32-24	157	
#12 - 11/32 (.1890 - .3437) 4.80 - 8.70mm	1/2 .5000 .4998	*1-3/4	SFX-32-28	164	
		5/16	† SFX-32-5	120	LS-1 RC-01 RK-01 RK-11
		3/8	† SFX-32-6	122	
		1/2	† SFX-32-8	124	
		3/4	† SFX-32-12	128	
		*1	† SFX-32-16	135	
		*1-3/8	† SFX-32-22	147	
M-11/32 (.2950 - .3437) 7.50 - 14.00mm	9/16 .5625 .5623	*1-1/2	† SFX-32-24	150	
		*1-3/4	† SFX-32-28	155	
		*2-1/8	† SFX-32-34	221	
		1/4	SF-36-4	117	TW-2
		5/16	SF-36-5	120	
		3/8	SF-36-6	122	
		1/2	SF-36-8	125	
S - 7/16 (.3480 - .4375) 8.90 - 11.00mm	5/8 .6250 .6248	5/8	SF-36-10	126	
		3/4	SF-36-12	128	
		1	SF-36-16	135	
		3/8	SF-40-6	123	TW-2
		1/2	SF-40-8	123	
		5/8	SF-40-10	125	
		3/4	SF-40-12	126	
9/32 - 9/16 (.2812 - .5625) 7.20 - 14.00mm	3/4 .7500 .7498	1	SF-40-16	129	
		1-1/4	SF-40-20	147	
		3/8	† SFX-48-6	122	LS-1 RC-01 RK-01 RK-11
		1/2	† SFX-48-8	123	
		3/4	† SFX-48-12	126	
		1	† SFX-48-16	130	
		1-3/8	† SFX-48-22	147	
35/64-21/32 (.5469 - .6562) 13.50 - 16.50mm	7/8 .8750 .8748	1-1/2	† SFX-48-24	151	
		1-3/4	† SFX-48-28	156	
		2-1/8	† SFX-48-34	166	
		*2-1/2	† SFX-48-40	226	
		*3	† SFX-48-48	257	
		1/2	SF-56-8	135	TW-7
		5/8	SF-56-10	136	
		3/4	SF-56-12	137	
		1	SF-56-16	141	
		1-1/4	SF-56-20	148	
		1-1/2	SF-56-24	153	

A - I.D. RANGE Drill Size Decimal Range	B - O.D. TOLERANCE Nominal DIGITAL RANGE	C	ANSI SYMBOL	PRICE CODE	LOCK SCREW CLAMPS
15/32 - 25-32 (.4687 - .7812) 12.00 - 19.50mm	1 1.0000 .9998	1/2	† SFX-64-8	135	LS-2 RC-02 RK-02 RK-12
		3/4	† SFX-64-12	136	
		1	† SFX-64-16	141	
		1-3/8	† SFX-64-22	148	
		1-1/2	† SFX-64-24	152	
		1-3/4	† SFX-64-28	161	
		2-1/8	† SFX-64-34	177	
		2-1/2	† SFX-64-40	234	
		3	† SFX-64-48	259	
		3/4	† SFX-88-12	164	
23/32 - 1-1/16 (.7187 - 1.0625) 18.50 - 27.00mm	1-3/8 1.3750 1.3747	1	† SFX-88-16	175	LS-2 RC-02 RK-02 RK-12
		1-3/8	† SFX-88-22	184	
		1-1/2	† SFX-88-24	190	
		1-3/4	† SFX-88-28	198	
		2-1/8	† SFX-88-34	212	
		2-1/2	† SFX-88-40	244	
		3	† SFX-88-48	266	
		3/4	† SFX-112-12	202	
		1	† SFX-112-16	191	
		1-3/8	† SFX-112-22	202	
31/32 - 1-13/32 (.9687 - 1.4062) 25.00 - 35.00mm	1-3/4 1.7500 1.7497	1-1/2	† SFX-112-24	210	LS-3 RC-03 RK-03 RK-13
		1-3/4	† SFX-112-28	220	
		2-1/8	† SFX-112-34	233	
		2-1/2	† SFX-112-40	252	
		3	† SFX-112-48	267	
		3/4	† SFX-144-12	239	
		1	† SFX-144-16	228	
		1-3/8	† SFX-144-22	239	
		1-1/2	† SFX-144-24	243	
		1-3/4	† SFX-144-28	245	
1-11/32 - 1-7/8 (1.3438 - 1.8750) 35.00 - 47.00mm	2-1/4 2.2500 2.2496	2-1/8	† SFX-144-34	256	LS-3 RC-03 RK-03 RK-13
		2-1/2	† SFX-144-40	263	
		3	† SFX-144-48	271	

* Counterbored leaving correct drill bearing length and chip clearance.
† Type SF are also available.

EXTENDED RANGE SLIP FIXED RENEWABLE - TYPE SFX

When ordering specify:

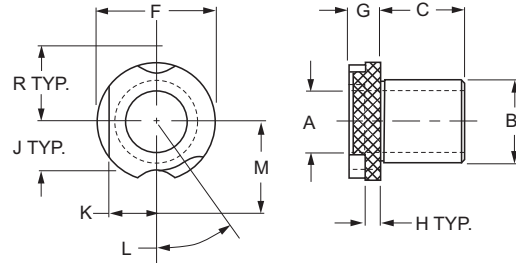
Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	† SFX	2-1/4	2-3/4	3

Or: 6 SFX-176-48-2-1/4

All extended range bushings are considered special orders and are non-returnable.

† Type SF are also available.



I.D. RANGE	.0003 to .0007	1.0937 to 1.5312	1.5000 to 2.0312	1.5000 to 2.2812	1.7500 to 2.5312	2.2500 to 2.6250	2.2500 to 2.8750	2.6250 to 2.8750	2.5000 to 3.1250	2.7500 to 3.2500	3.0000 to 3.5000	3.0000 to 3.6250	3.3750 to 3.7500	3.3750 to 4.0000	3.6250 to 4.2500
O.D. RANGE (B)	NOM.	2"	2-1/2	2-3/4	3	3-1/4	3-3/8	3-1/2	3-3/4	4	4-1/4	4-3/8	4-1/2	4-3/4	5
	DEC. RANGE	2.0000 1.9996	2.5000 2.4996	2.7500 2.7496	3.0000 2.9996	3.2500 3.2496	3.3750 3.3746	3.5000 3.4996	3.7500 3.7496	4.0000 3.9996	4.2500 4.2496	4.3750 4.3746	4.5000 4.4996	4.7500 4.7496	5.0000 4.9996
LENGTH (C)	ANSI CODE	128	160	176	192	208	216	224	240	256	272	280	288	304	320
3/4	12	312	349	371	384	386	391	394	*	*	*	*	*	*	*
1	16	313	352	377	388	393	396	398	*	*	*	*	*	*	*
1-1/4	20	317	356	382	393	398	403	406	*	*	*	*	*	*	*
1-1/2	24	321	360	384	397	404	409	413	*	*	*	*	*	*	*
1-3/4	28	324	365	386	403	410	416	420	*	*	*	*	*	*	*
2	32	332	372	391	407	416	422	426	*	*	*	*	*	*	*
2-1/8	34	335	376	395	-	-	-	-	-	-	-	-	-	-	-
2-1/4	36	337	380	399	413	422	430	434	*	*	*	*	*	*	*
2-1/2	40	342	384	404	419	427	437	441	*	*	*	*	*	*	*
2-3/4	44	347	389	409	425	435	445	451	*	*	*	*	*	*	*
3	48	358	393	413	431	442	455	459	*	*	*	*	*	*	*
3-1/4	52	367	397	418	438	452	463	468	*	*	*	*	*	*	*
3-1/2	56	368	402	422	445	459	473	477	*	*	*	*	*	*	*
3-3/4	60	372	405	426	454	468	483	487	*	*	*	*	*	*	*
4	64	380	410	431	461	476	490	495	*	*	*	*	*	*	*
4-1/4	68	382	415	435	470	484	496	502	*	*	*	*	*	*	*
4-1/2	72	383	420	440	479	492	502	508	*	*	*	*	*	*	*
4-3/4	76	387	425	446	488	498	507	517	*	*	*	*	*	*	*
5	80	391	432	458	496	505	513	526	*	*	*	*	*	*	*
5-1/2	88	-	-	-	-	-	527	543	*	*	*	*	*	*	*
6	96	-	-	-	-	-	-	-	*	*	*	*	*	*	*
6-1/2	104	-	-	-	-	-	-	-	-	*	*	*	*	*	*
7	112	-	-	-	-	-	-	-	-	-	-	*	*	*	*
HEAD F		2-9/16	3-1/16	3-7/16	3-11/16	3-15/16	4-1/16	4-3/16	4-9/16	4-13/16	5-1/16	5-3/16	5-5/16	5-9/16	5-13/16
HEAD G		3/8	3/8	7/16	7/16	7/16	7/16	7/16	7/16	1/2	1/2	1/2	1/2	1/2	1/2
H		3/16	3/16	7/32	7/32	7/32	7/32	7/32	7/32	1/4	1/4	1/4	1/4	1/4	1/4
J		1-1/8	1-3/8	1-35/64	1-43/64	1-51/64	1-55/64	1-59/64	2-7/64	2-15/64	2-23/64	2-27/64	2-31/64	2-39/64	2-47/64
K		1	1-1/4	1-3/8	1-1/2	1-5/8	1-11/16	1-3/4	1-7/8	2	2-1/8	2-3/16	2-1/4	2-3/8	2-1/2
L		30°	25°	25°	25°	25°	25°	25°	25°	25°	20°	20°	20°	20°	20°
R		1-33/64	1-49/64	1-15/16	2-1/16	2-3/16	2-1/4	2-5/16	2-1/2	2-5/8	2-3/4	2-13/16	2-7/8	3	3-1/8
LOCK SCREW	#3	#3	#4	#4	#4	#4	#4	#4	#4	#5	#5	#5	#5	#5	#5

*- Priced upon request



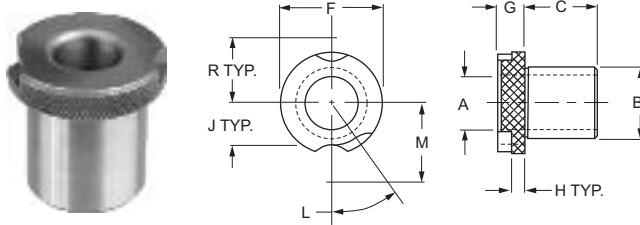
METRIC SLIP FIXED RENEWABLE - TYPE SFM

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	SFM	12M	20M	8M

Or: 6 SFM-12-20-8



METRIC SLIP/FIXED HEAD DIMENSIONS						
BODY O.D. B	F	G	H	J	L	R
8mm	15mm	6	3	4.5mm	65°	11.5mm
10	18			6	65°	13
12	22			7.5	60°	16
15	26			9.5	50°	18
18	30	8	4	11.5	50°	20
22	34			13	35°	23.5
26	39			15.5	35°	26
30	46			19	30°	29.5
35	52	10	5.5	22	30°	32.5
42	59			25.5	30°	36
48	66			28.5	30°	41
55	74			32.5	25°	45
62	82	12	7	36.5	25°	49
70	90			40.5	25°	53
78	100			45.5	25°	58
85	110			50.5	20°	63
95	120			55.5	20°	68
105	130			60.5	20°	73

A I.D. RANGE	B OUTSIDE DIMENSION	C	ANSI SYMBOL	PRICE CODE	LOCK SCREW	ROUND CLAMP
.035 1.00	8 8.000-7.994	10 16	SFM-8-10 SFM-8-16	251 268	LSM-1	RCM-1
1.01 1.80	8 8.000-7.994	10 16	SFM-8-10 SFM-8-16	242 262	LSM-1	RCM-1
1.81 4.00	8 8.000-7.994	10 16	SFM-8-10 SFM-8-16	143 169	LSM-1	RCM-1
4.01 6.00	10 10.000-9.994	12 20 25	SFM-10-12 SFM-10-20 SFM-10-25	133 136 144	LSM-2	RCM-2
6.01 8.00	12 12.00-11.992	12 20 25	SFM-12-12 SFM-12-20 SFM-12-25	131 136 144	LSM-3 LSM-4	RCM-3 RCM-4
8.01 10.00	15 15.000-14.992	16 28 36	SFM-15-16 SFM-15-28 SFM-15-36	136 144 161	LSM-3 LSM-4	RCM-3 RCM-4
10.01 12.00	18 18.000-17.992	16 28 36	SFM-18-16 SFM-18-28 SFM-18-36	135 139 163	LSM-3 LSM-4	RCM-3 RCM-4
12.01 15.00	22 22.000-21.991	20 36 45	SFM-22-20 SFM-22-36 SFM-22-45	151 166 176	LSM-5 LSM-6	RCM-5 RCM-6
15.01 18.00	26 26.000-25.991	20 36 45	SFM-26-20 SFM-26-36 SFM-26-45	151 165 176	LSM-5 LSM-6	RCM-5 RCM-6
18.01 22.00	30 30.000-29.991	25 45 56	SFM-30-25 SFM-30-45 SFM-30-56	190 219 259	LSM-5 LSM-6	RCM-5 RCM-6
22.01 26.00	35 35.000-24.989	25 45 56	SFM-35-25 SFM-35-45 SFM-35-56	190 219 259	LSM-5 LSM-6	RCM-5 RCM-6
26.01 30.00	42 42.000-41.989	30 56 67	SFM-42-30 SFM-42-56 SFM-42-67	221 263 356	LSM-5 LSM-6	RCM-5 RCM-6
30.01 35.00	48 48.000-47.989	30 56 67	SFM-48-30 SFM-48-56 SFM-48-67	261 360 370	LSM-7 LSM-8	RCM-7 RCM-8

A I.D. RANGE	B OUTSIDE DIMENSION	C	ANSI SYMBOL	PRICE CODE	LOCK SCREW	ROUND CLAMP
35.01 42.00	55 55.000-54.987	30 56 67	SFM-55-30 SFM-55-56 SFM-55-67	254 270 372	LSM-7 LSM-8	RCM-7 RCM-8
42.01 48.00	62 62.000-61.987	35 67 78	SFM-62-35 SFM-62-67 SFM-62-78	383 417 421	LSM-7 LSM-8	RCM-7 RCM-8
48.01 55.00	70 70.000-69.987	35 67 78	SFM-70-35 SFM-70-67 SFM-70-78	411 439 444	LSM-7 LSM-8	RCM-7 RCM-8
55.01 62.00	78 78.000-77.987	40 78 105	SFM-78-40 SFM-78-78 SFM-78-105	426 466 508	LSM-7 LSM-8	RCM-7 RCM-8
62.01 70.00	85 85.000-84.985	40 78 105	SFM-85-40 SFM-85-78 SFM-85-105	441 492 535	LSM-7 LSM-8	RCM-7 RCM-8
70.01 78.00	95 95.000-94.985	45 89 112	SFM-95-45 SFM-95-89 SFM-95-112	458 521 557	LSM-7 LSM-8	RCM-7 RCM-8
78.01 85.00	105 105.000-104.985	45 89 112	SFM-105-45 SFM-105-89 SFM-105-112	479 533 566	LSM-7 LSM-8	RCM-7 RCM-8

All the above standard sizes are no counterbore.

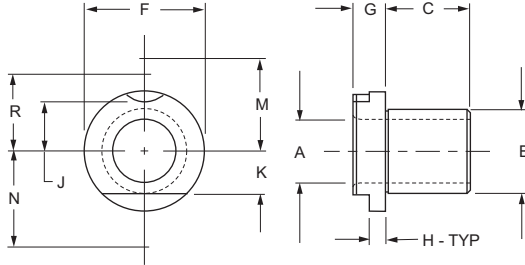
FIXED RENEWABLE - TYPE FM

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	FM	5/16	3/4	3/4

Or: 6 FM-48-12-5/16



NOTE: For drill sizes, see the chart on page 1.6 in the information section.

A - I.D. RANGE Drill Size Decimal Range	B - O.D. TOLERANCE Nominal DIGITAL RANGE	C	ANSI SYMBOL	PRICE CODE	LOCK SCREW CLAMPS
#80 - #70 (.0135 - .0280) .35 - .70mm	3/16 .1875 .1873	*1/4	FM-12-4	233	LS-0
		*5/16	FM-12-5	235	
		*3/8	FM-12-6	237	
		*1/2	FM-12-8	238	
#69 - 3/64 (.0292 - .0469) .75 - 1.30mm	3/16 .1875 .1873	1/4	FM-12-4	214	LS-0
		*5/16	FM-12-5	216	
		*3/8	FM-12-6	219	
		*1/2	FM-12-8	221	
#55 - 1/16 (.0520 - .0625) 1.35 - 1.60mm	3/16 .1875 .1873	1/4	FM-12-4	182	LS-0
		*5/16	FM-12-5	184	
		*3/8	FM-12-6	186	
		*1/2	FM-12-8	187	
		*5/8	FM-12-10	191	
		*3/4	FM-12-12	197	
#52 - #40 (.0635 - .0980) 1.65 - 2.35mm	3/16 .1875 .1873	1/4	FM-12-4	141	LS-0
		*5/16	FM-12-5	143	
		*3/8	FM-12-6	144	
		*1/2	FM-12-8	147	
		*5/8	FM-12-10	151	
		*3/4	FM-12-12	154	
#39 - 9/64 (.0995 - .1406) 2.55 - 3.50mm	1/4 .2500 .2498	1/4	FM-16-4	136	TW-2
		5/16	FM-16-5	136	
		*3/8	FM-16-6	138	
		*1/2	FM-16-8	141	
		*5/8	FM-16-10	146	
		*3/4	FM-16-12	150	
#80 - #70 (.0135 - .0280) .35 - .70mm	5/16 .3125 .3123	*1/4	FM-20-4	233	FC-01 FC-11 RC-01
		*5/16	FM-20-5	235	
		*3/8	FM-20-6	237	
		*1/2	FM-20-8	238	
		*3/4	FM-20-12	260	

FIXED RENEWABLE HEAD DIMENSIONS

BODY O.D. B	F	G	H	J	K	M	N	R
3/16	5/16	3/16	3/32	3/32	-	-	-	17/64
1/4	27/64	1/4	1/8	9/64	-	-	-	23/64
5/16	35/64	1/4	1/8	11/64	11/64	5/8	11/16	1/2
3/8	5/8	1/4	1/8	15/64	-	-	-	29/64
7/16	5/8	1/4	1/8	15/64	-	-	-	29/64
1/2	25/32	1/4	1/8	19/64	17/64	3/4	25/32	5/8
9/16	7/8	1/4	1/8	23/64	-	-	-	37/64
5/8	7/8	1/4	1/8	231/64	-	-	-	37/64
3/4	1-1/32	1/4	1/8	27/64	25/64	7/8	57/64	3/4
7/8	1-1/4	3/8	3/16	31/64	-	-	-	53/64
1	1-25/64	3/8	3/16	19/32	1/2	1-7/64	1-9/16	59/64
1-3/8	1-49/64	3/8	3/16	25/32	11/16	1-19/64	1-21/61	1-7/64
1-3/4	2-5/16	3/8	3/16	1	7/8	1-41/64	1-33/64	1-25/64
2-1/4	2-49/64	3/8	3/16	1-1/4	1-1/8	1-57/64	1-49/64	1-41/64

A - I.D. RANGE Drill Size Decimal Range	B - O.D. TOLERANCE Nominal DIGITAL RANGE	C	ANSI SYMBOL	PRICE CODE	LOCK SCREW CLAMPS
#69 - 3/64 (.0292 - .0469) .75 - 1.30mm	5/16 .3125 .3123	*5/16	FM-20-5	216	LS-1 FC-01 FC-11 RC-01
		*3/8	FM-20-6	219	
		*1/2	FM-20-8	221	
		*3/4	FM-20-12	230	
#55 - 1/16 (.0520 - .0625) 1.35 - 1.60mm	5/16 .3125 .3123	*5/16	FM-20-5	184	LS-1 FC-01 FC-11 RC-01
		*3/8	FM-20-6	186	
		*1/2	FM-20-8	187	
		*3/4	FM-20-12	197	
#52 - #43 (.0635 - .0890) 1.65 - 2.35mm	5/16 .3125 .3123	5/16	FM-20-5	142	LS-1 FC-01 FC-11 RC-01
		*3/8	FM-20-6	144	
		*1/2	FM-20-8	147	
		*3/4	FM-20-12	154	
		*1	FM-20-16	172	
#42 - #31 (.0935 - .1200) 2.40 - 3.15mm	5/16 .3125 .3123	5/16	FM-20-5	136	LS-1 FC-01 FC-11 RC-01
		3/8	FM-20-6	138	
		*1/2	FM-20-8	141	
		*3/4	FM-20-12	150	
		*1	FM-20-16	163	
		*1-3/8	FM-20-22	185	
1/8-#10 (.1250 - .1935) 3.20 - 4.90mm	5/16 .3125 .3123	5/16	FM-20-5	135	LS-1 FC-01 FC-01 RC-01
		3/8	FM-20-6	136	
		1/2	FM-20-8	139	
		5/8	FM-20-10	143	
		*3/4	FM-20-12	148	
		*1	FM-20-16	161	
#10 - #1 (.1935 - .2280) 4.90 - 5.80mm	3/8 .3750 .3748	*1-3/8	FM-20-22	184	TW-2
		1/4	FM-24-4	117	
		5/16	FM-24-5	120	
		3/8	FM-24-6	122	
		1/2	FM-24-8	125	
		5/8	FM-24-10	126	
		3/4	FM-24-12	128	
		*1	FM-24-16	135	

* Counterbored leaving correct drill bearing length and chip clearance.

FIXED RENEWABLE - TYPE FM

A - I.D. RANGE Drill Size Decimal Range	B - O.D. TOLERANCE Nominal DIGITAL RANGE	C	ANSI SYMBOL	PRICE CODE	LOCK SCREW CLAMPS
A - L (.2340 - .2900) 5.90 - 7.40mm	7/16 .4375 .4373	1/4	FM-28-4	117	TW-2
		5/16	FM-28-5	120	
		3/8	FM-28-6	122	
		1/2	FM-28-8	125	
		5/8	FM-28-10	126	
		3/4	FM-28-12	128	
		*1	FM-28-16	135	
#28 - 3/16 (.1405 - .1875) 3.60 - 4.75mm	1/2 .5000 .4998	5/16	FM-32-5	126	LS-1 FC-01 RC-01
		3/8	FM-32-6	128	
		1/2	FM-32-8	130	
		*3/4	FM-32-12	135	
		*1	FM-32-16	142	
		*1-3/8	FM-32-22	152	
		*1-1/2	FM-32-24	157	
#12-11/32 (.1890 - .3437) 4.80 - 8.70mm	1/2 .5000 .4998	*1-3/4	FM-32-28	164	
		5/16	FM-32-5	120	LS-1 FC-01 RC-01
		3/8	FM-32-6	122	
		1/2	FM-32-8	124	
		3/4	FM-32-12	128	
		*1	FM-32-16	135	
		*1-3/8	FM-32-22	147	
M - 11/32 (.2950 - .3437) 7.50 - 8.80mm	9/16 .5625 .5623	*1-1/2	FM-32-24	150	
		*1-3/4	FM-32-28	155	
		*2-1/8	FM-32-34	221	
		1/4	FM-36-4	117	TW-2
		5/16	FM-36-5	120	
		3/8	FM-36-6	122	
		1/2	FM-36-8	125	
S - 7/16 (.3480 - .4375) 8.90 - 11.00mm	5/8 .6250 .6248	5/8	FM-36-10	126	
		3/4	FM-36-12	128	
		1	FM-36-16	135	
		3/8	FM-40-6	123	TW-2
		1/2	FM-40-8	123	
		5/8	FM-40-10	125	
		3/4	FM-40-12	126	
9/32 - 9/16 (.2815 - .5625) 7.20 - 14.00mm	3/4 .7500 .7498	1	FM-40-16	130	
		1-1/4	FM-40-20	147	
		3/8	FM-48-6	122	LS-1 FC-01 RC-01
		1/2	FM-48-8	123	
		3/4	FM-48-12	126	
		1	FM-48-16	130	
		1-3/8	FM-48-22	147	
35/64 - 21/32 (.5469 - .6562) 13.50 - 16.50mm	7/8 .8750 .8748	1-1/2	FM-48-24	151	
		1-3/4	FM-48-28	156	
		2-1/8	FM-48-34	166	
		*2-1/2	FM-48-40	226	
		*3	FM-48-48	257	
		1/2	FM-56-8	135	TW-7
		5/8	FM-56-10	136	
		3/4	FM-56-12	136	
		1	FM-56-16	141	
		1-1/4	FM-56-20	148	
		1-1/2	FM-56-24	152	

A - I.D. RANGE Drill Size Decimal Range	B - O.D. TOLERANCE Nominal DIGITAL RANGE	C	ANSI SYMBOL	PRICE CODE	LOCK SCREW CLAMPS
15/32 - 25-32 (.4687 - .7812) 12.00 - 19.50mm	1 1.0000 .9998	1/2	FM-64-8	135	LS-2 FC-02 RC-02
		3/4	FM-64-12	136	
		1	FM-64-16	141	
		1-3/8	FM-64-22	148	
		1-1/2	FM-64-24	153	
		1-3/4	FM-64-28	161	
		2-1/8	FM-64-34	177	
		2-1/2	FM-64-40	234	
		3	FM-64-48	259	
		3/4	FM-88-12	164	LS-2 RC-02
23/32 - 1-1/16 (.7187 - 1.0625) 18.50 - 27.00mm	1-3/8 1.3750 1.3747	1	FM-88-16	175	
		1-3/8	FM-88-22	184	
		1-1/2	FM-88-24	190	
		1-3/4	FM-88-28	198	
		2-1/8	FM-88-34	212	
		2-1/2	FM-88-40	244	
		3	FM-88-48	266	
31/32 - 1-13/32 (.9687 - 1.4062) 25.00 - 35.00mm	1-3/4 1.7500 1.7497	3/4	FM-112-12	202	LS-3 FC-03 RC-03
		1	FM-112-16	191	
		1-3/8	FM-112-22	202	
		1-1/2	FM-112-24	210	
		1-3/4	FM-112-28	220	
		2-1/8	FM-112-34	233	
		2-1/2	FM-112-40	252	
1-11/32 - 1-7/8 (1.3437 - 1.8750) 35.00 - 47.00mm	2-1/4 2.2500 2.2496	3	FM-112-48	266	LS-3 FC-03 RC-03
		3/4	FM-144-12	239	
		1	FM-144-16	228	
		1-3/8	FM-144-22	239	
		1-1/2	FM-144-24	243	
		1-3/4	FM-144-28	245	
		2-1/8	FM-144-34	256	
		2-1/2	FM-144-40	263	
		3	FM-144-48	271	

* Counterbored leaving correct drill bearing length and chip clearance.

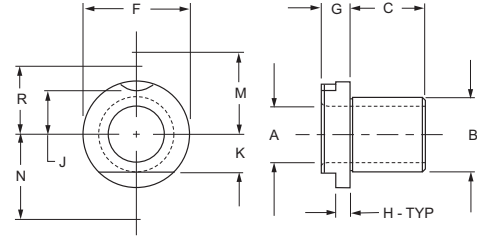
When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	FM	2-5/16	3-3/8	1-3/4

Or: 6 FM-216-28-2-5/16

All extended range bushings are considered special orders and are non-returnable.



I.D. RANGE	.0003 to .0007	1.0937 to 1.5312	1.5000 to 2.0312	1.5000 to 2.2812	1.7500 to 2.5312	2.2500 to 2.6250	2.2500 to 2.8750	2.6250 to 2.8750	2.5000 to 3.1250	2.7500 to 3.2500	3.0000 to 3.5000	3.0000 to 3.6250	3.3750 to 3.7500	3.3750 to 4.0000	3.6250 to 4.2500
O.D. RANGE (B)	NOM.	2"	2-1/2	2-3/4	3	3-1/4	3-3/8	3-1/2	3-3/4	4	4-1/4	4-3/8	4-1/2	4-3/4	5
	DEC. RANGE	2.0000 to 1.9996	2.5000 to 2.4996	2.7500 to 2.7496	3.0000 to 2.9996	3.2500 to 3.2496	3.3750 to 3.7496	3.5000 to 3.4996	3.7500 to 3.7496	4.0000 to 3.9996	4.2500 to 4.2496	4.3750 to 3.7495	4.5000 to 4.4996	4.7500 to 4.7496	5.0000 to 4.9996
LENGTH (C)	ANSI CODE	128	160	176	192	208	216	224	240	256	272	280	288	304	320
3/4	12	312	349	371	384	386	391	394	*	*	*	*	*	*	*
1	16	313	352	377	388	393	396	398	*	*	*	*	*	*	*
1-1/4	20	317	356	382	393	398	403	406	*	*	*	*	*	*	*
1-1/2	24	321	360	384	397	404	409	413	*	*	*	*	*	*	*
1-3/4	28	324	365	386	403	410	416	420	*	*	*	*	*	*	*
2	32	332	372	391	407	416	422	426	*	*	*	*	*	*	*
2-1/8	34	335	376	395	-	-	-	-	-	-	-	-	-	-	-
2-1/4	36	337	380	399	413	422	430	434	*	*	*	*	*	*	*
2-1/2	40	342	384	404	419	427	437	441	*	*	*	*	*	*	*
2-3/4	44	347	389	409	425	435	445	451	*	*	*	*	*	*	*
3	48	358	393	413	431	442	455	459	*	*	*	*	*	*	*
3-1/4	52	367	397	418	438	452	463	468	*	*	*	*	*	*	*
3-1/2	56	368	402	422	445	459	473	477	*	*	*	*	*	*	*
3-3/4	60	372	405	426	454	468	483	487	*	*	*	*	*	*	*
4	64	380	410	431	461	476	490	495	*	*	*	*	*	*	*
4-1/4	68	382	415	435	470	484	496	502	*	*	*	*	*	*	*
4-1/2	72	383	420	440	479	492	502	508	*	*	*	*	*	*	*
4-3/4	76	387	425	446	488	498	507	517	*	*	*	*	*	*	*
5	80	391	432	458	496	505	513	526	*	*	*	*	*	*	*
5-1/2	88	-	-	-	-	-	527	543	*	*	*	*	*	*	*
6	96	-	-	-	-	-	-	-	*	*	*	*	*	*	*
6-1/2	104	-	-	-	-	-	-	-	-	*	*	*	*	*	*
7	112	-	-	-	-	-	-	-	-	-	-	*	*	*	*
HEAD F		2-9/16	3-1/16	3-7/16	3-11/16	3-15/16	4-1/16	4-3/16	4-9/16	4-13/16	5-1/16	5-3/16	5-5/16	5-9/16	5-13/16
HEAD G		3/8	3/8	7/16	7/16	7/16	7/16	7/16	7/16	1/2	1/2	1/2	1/2	1/2	1/2
H		3/16	3/16	7/32	7/32	7/32	7/32	7/32	7/32	1/4	1/4	1/4	1/4	1/4	1/4
J		1-1/8	1-3/8	1-35/64	1-43/64	1-51/64	1-55/64	1-59/64	2-7/64	2-15/64	2-23/64	2-27/64	2-31/64	2-39/64	2-74/64
K		1	1-1/4	1-3/8	1-1/2	1-5/8	1-11/16	1-3/4	1-7/8	2	2-1/8	2-3/16	2-1/4	2-3/8	2-1/2
R		1-33/64	1-49/64	1-15/16	2-1/16	2-3/16	2-1/4	2-5/16	2-1/2	2-5/8	2-3/4	2-13/16	2-7/8	3	3-1/8
LOCK SCREW		#3	#3	#4	#4	#4	#4	#4	#4	#5	#5	#5	#5	#5	#5
FLAT CLAMPS		FC-3 FC-14 FC-15	FC-3 FC-14 FC-15	FC-4 FC-5 FC-16 FC-17	FC-4 FC-5 FC-16 FC-17	FC-4 FC-5 FC-16 FC-17	FC-4 FC-5 FC-16 FC-17	FC-4 FC-5 FC-16 FC-17	FC-4 FC-5 FC-16 FC-17	FC-6 FC-7 FC-20 FC-21	FC-6 FC-7 FC-20 FC-21	FC-6 FC-7 FC-20 FC-21	FC-6 FC-7 FC-20 FC-21	FC-6 FC-7 FC-20 FC-21	FC-6 FC-7 FC-20 FC-21

*- Priced upon request



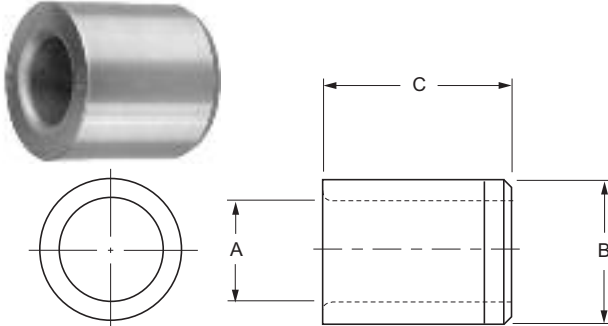
LINER - TYPE L

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	L	5/16	1/2	3/4

Or: 6 L-32-12*



NOTE: For drill sizes, see the chart on page 1.6 in the information section.

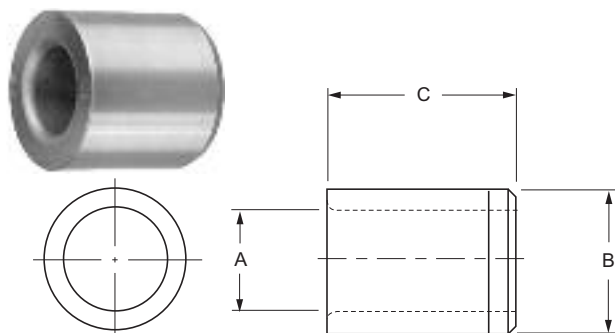
A I.D. RANGE Drill Size Decimal Range	B O.D. TOLERANCE Nominal GROUND UNGROUND DIGITAL RANGE		C	ANSI SYMBOL ‡	PRICE CODE
	GROUND	UNGROUND			
3/16 (.1876 - .1879)	5/16 .3141 .3138	5/16 .327 .322	1/4	L-20-4	110
			5/16	L-20-5	112
			3/8	L-20-6	113
			1/2	L-20-8	114
			5/8	L-20-10	115
			3/4	L-20-12	117
1/4 (.2501 - .2504)	7/16 .4392 .4389	7/16 .453 .448	1/4	L-28-4	105
			5/16	L-28-5	106
			3/8	L-28-6	109
			1/2	L-28-8	110
			5/8	L-28-10	112
			3/4	L-28-12	113
5/16 (.3126 - .3129)	1/2 .5017 .5014	1/2 .518 .513	1/4	L-32-4	105
			5/16	L-32-5	106
			3/8	L-32-6	109
			1/2	L-32-8	110
			5/8	L-32-10	112
			3/4	L-32-12	113
			1	L-32-16	118
			1-3/8	L-32-22	125
5/16 (.3126 - .3129)	9/16 .5642 .5639	9/16 .580 .575	1/4	L-36-4	110
			5/16	L-36-5	105
			3/8	L-36-6	107
			1/2	L-36-8	107
			5/8	L-36-10	109
			3/4	L-36-12	110
3/8 (.3751 - .3754)	5/8 .6267 .6264	5/8 .643 .638	1	L-36-16	112
			1/4	L-40-4	110
			5/16	L-40-5	105
			3/8	L-40-6	107
			1/2	L-40-8	107
			5/8	L-40-10	109
3/8 (.3751 - .3754)	5/8 .6267 .6264	5/8 .643 .638	3/4	L-40-12	110
			1	L-40-16	112

* On 5/8 O.D. specify the I.D. size

‡ All bushings are finish ground unless the letter "U" appears with the bushing type or the ANSI symbol.

A I.D. RANGE Drill Size Decimal Range	B O.D. TOLERANCE Nominal GROUND UNGROUND DIGITAL RANGE		C	ANSI SYMBOL ‡	PRICE CODE
	GROUND	UNGROUND			
7/16 (.4377 - .4380)	5/8 .6267 .6264	5/8 .643 .638	1/4	L-40-4	110
			5/16	L-40-5	105
			3/8	L-40-6	107
			1/2	L-40-8	107
			5/8	L-40-10	109
			3/4	L-40-12	110
			1	L-40-16	112
1/2 (.5002 - .5005)	3/4 .7518 .7515	3/4 .768 .763	5/16	L-48-5	106
			3/8	L-48-6	110
			1/2	L-48-8	110
			3/4	L-48-12	112
			1	L-48-16	114
			1-3/8	L-48-22	125
			1-1/2	L-48-24	128
			1-3/4	L-48-28	132
			2-1/8	L-48-34	142
			5/16	L-56-5	119
9/16 (.5627 - .5630)	7/8 .8768 .8765	7/8 .893 .888	3/8	L-56-6	121
			1/2	L-56-8	115
			5/8	L-56-10	117
			3/4	L-56-12	117
			1	L-56-16	119
			1-1/4	L-56-20	124
			5/16	L-56-5	119
5/8 (.6252 - .6255)	7/8 .8768 .8765	7/8 .893 .888	3/8	L-56-6	121
			1/2	L-56-8	115
			5/8	L-56-10	117
			3/4	L-56-12	117
			1	L-56-16	119
			1-1/4	L-56-20	124
			5/16	L-56-5	119
3/4 (.7503 - .7506)	1 1.0018 1.0015	1 1.018 1.013	3/8	L-56-6	121
			1/2	L-56-8	115
			5/8	L-56-10	117
			3/4	L-56-12	117
			1	L-56-16	119
			1-1/4	L-56-20	124
			1/2	L-64-8	117
			3/4	L-64-12	117
			1	L-64-16	120
			1-3/8	L-64-22	124
			1-1/2	L-64-24	130
7/8 (.8754 - .8757)	1-1/4 1.2520 1.2517	1-1/4 1.268 1.263	1-3/4	L-64-28	135
			2-1/8	L-64-34	141
			2-1/2	L-64-40	151
			3	L-64-48	199
			1/2	L-80-8	140
			5/8	L-80-10	136
			3/4	L-80-12	131
			1	L-80-16	140
			1-1/4	L-80-20	148
			1-1/2	L-80-24	152
			1/2	L-88-8	141
1 (1.0004 - 1.0007)	1-3/8 1.3772 1.3768	1-3/8 1.395 1.388	3/4	L-88-12	131
			1	L-88-16	141
			1-3/8	L-88-22	149
			1-1/2	L-88-24	153
			1-3/4	L-88-28	161
			2-1/8	L-88-34	174
			2-1/2	L-88-40	185
			3	L-88-48	222

LINER - TYPE L



NOTE: For drill sizes, see the chart on page 1.6 in the information section.

‡ All bushings are finish ground unless the letter "U" appears with the bushing type or the ANSI symbol.

A I.D. RANGE Drill Size Decimal Range	B O.D. TOLERANCE Nominal		C	ANSI SYMBOL ‡	PRICE CODE
	GROUND	UNGROUND DIGITAL RANGE			
1-3/8 (1.3756 - 1.3760)	1-3/4 1.7523 1.7519	1.770 1.765	3/4	L-112-12	156
			1	L-112-16	149
			1-3/8	L-112-22	156
			1-1/2	L-112-24	163
			1-3/4	L-112-28	166
			2-1/8	L-112-34	182
			2-1/2	L-112-40	193
			3	L-112-48	240
1-3/4 (1.7508 - 1.7512)	2-1/4 2.2525 2.2521	2.270 2.265	3/4	L-144-12	178
			1	L-144-16	167
			1-3/8	L-144-22	178
			1-1/2	L-144-24	183
			1-3/4	L-144-28	187
			2-1/8	L-144-34	204
			2-1/2	L-144-40	216
			3	L-144-48	253
2-1/4 (2.2510 - 2.2515)	2-3/4 2.7526 2.7522	2.770 2.765	3/4	L-176-12	188
			1	L-176-16	178
			1-3/8	L-176-22	189
			1-1/2	L-176-24	194
			1-3/4	L-176-28	201
			2-1/8	L-176-34	212
			2-1/2	L-176-40	225
			3	L-176-48	255



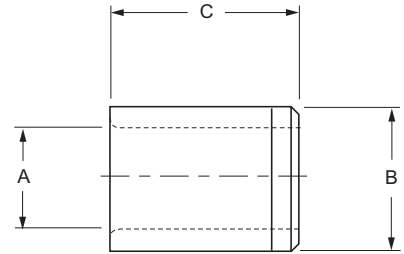
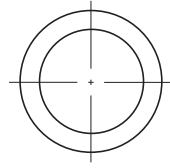
EXTENDED RANGE LINER - TYPE L

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	L	2-3/4	3-3/8	3-3/4

Or: 6 L-216-60



I.D. RANGE (A)	NOM.	2"	2-1/2	2-3/4	3"	3-1/4	3-3/8	3-1/2	3-3/4	4"	4-1/4	4-3/8	4-1/2	4-3/4	5"
	DEC. RANGE	2.0010 2.0015	2.5010 2.5015	2.7510 2.7515	3.0010 3.0015	3.2510 3.2515	3.3760 3.3765	3.5010 3.5015	3.7510 3.7515	4.0010 4.0015	4.2510 4.2515	4.3760 4.3765	4.5010 4.5015	4.7510 4.7515	5.0010 5.0015
O.D. RANGE (B)†	NOM.	2-1/2	3"	3-3/8	3-5/8	3-7/8	4"	4-1/8	4-1/2	4-3/4	5"	5-1/8	5-1/4	5-1/2	5-3/4
	DEC. RANGE	2.5025 2.5021	3.0028 3.0023	3.3778 3.3773	3.6278 3.6273	3.8778 3.8773	4.0028 4.0023	4.1280 4.1275	4.5030 4.5025	4.7530 4.7525	5.0030 5.0025	5.1280 5.1275	5.2530 5.2525	5.5030 5.5025	5.7530 5.7525
LENGTH (C)	ANSI CODE	160	192	216	232	248	256	264	288	304	320	328	336	352	368
3/4	12	301	339	356	364	366	369	373	*	*	*	*	*	*	*
1	16	301	340	359	367	371	373	377	*	*	*	*	*	*	*
1-1/4	20	302	343	360	371	376	378	382	*	*	*	*	*	*	*
1-1/2	24	304	345	363	374	378	383	387	*	*	*	*	*	*	*
1-3/4	28	305	348	367	379	381	389	393	*	*	*	*	*	*	*
2	32	307	351	370	382	388	395	396	*	*	*	*	*	*	*
2-1/8	34	309	353	372	-	-	-	-	-	-	-	-	-	-	-
2-1/4	36	312	356	376	383	395	402	405	*	*	*	*	*	*	*
2-1/2	40	315	360	380	391	399	407	411	*	*	*	*	*	*	*
2-3/4	44	329	365	383	397	406	414	419	*	*	*	*	*	*	*
3	48	337	370	387	403	412	421	425	*	*	*	*	*	*	*
3-1/4	52	345	373	390	408	420	428	433	*	*	*	*	*	*	*
3-1/2	56	347	378	395	414	425	437	441	*	*	*	*	*	*	*
3-3/4	60	350	380	398	421	432	445	450	*	*	*	*	*	*	*
4	64	353	384	404	427	439	452	457	*	*	*	*	*	*	*
4-1/4	68	356	388	406	435	447	458	463	*	*	*	*	*	*	*
4-1/2	72	360	393	410	442	453	462	471	*	*	*	*	*	*	*
4-3/4	76	364	398	416	450	459	468	478	*	*	*	*	*	*	*
5	80	366	404	421	458	466	474	486	*	*	*	*	*	*	*
5-1/2	88	-	-	-	-	-	497	505	*	*	*	*	*	*	*
6	96	-	-	-	-	-	-	-	*	*	*	*	*	*	*
6-1/2	104	-	-	-	-	-	-	-	-	*	*	*	*	*	*
7	112	-	-	-	-	-	-	-	-	-	-	*	*	*	*

Unground O.D.'s are .015 / .020 oversized

NOTE: All bushings are finish ground unless the letter "U" appears with the bushing type or ANSI symbol.

All extended range bushings are considered special orders and are non-returnable.

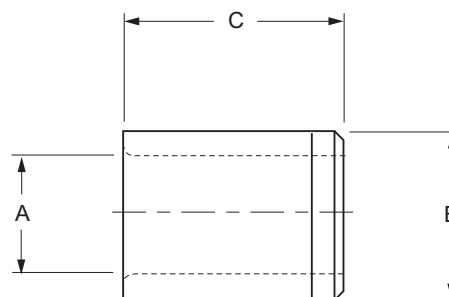
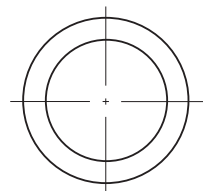
*- Priced upon request

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	LM	15	22	16

Or: 6 L-22-16-15



NOTE: For drill sizes, see the chart on page 1.6 in the information section.

A I.D. RANGE	B OUTSIDE DIMENSION	C	ANSI SYMBOL	PRICE CODE
8 8.005-8.014	12 12.039-12.028	10	LM-12-10-8	113
		16	LM-12-16-8	114
10 10.005-10.014	15 15.039-15.028	12	LM-15-12-10	112
		20	LM-15-20-10	114
		25	LM-15-25-10	116
12 12.006-12.017	18 18.039-18.028	12	LM-18-12-12	114
		20	LM-18-20-12	116
		25	LM-18-25-12	121
15 15.006-15.017	22 22.048-22.035	16	LM-22-16-15	125
		28	LM-22-28-15	127
		36	LM-22-36-15	136
18 18.006-18.017	26 26.048-26.035	16	LM-26-16-18	125
		28	LM-26-28-18	128
		36	LM-26-36-18	139
22 22.007-22.020	30 30.048-30.035	20	LM-30-20-22	125
		36	LM-30-36-22	139
		45	LM-30-45-22	145
26 26.007-26.020	35 35.059-35.043	20	LM-35-20-26	140
		36	LM-35-36-26	166
		45	LM-35-45-26	174
30 30.007-30.020	42 42.059-42.043	25	LM-42-25-30	159
		45	LM-42-45-30	182
		56	LM-42-56-30	207
35 35.009-35.025	48 42.059-42.043	25	LM-48-25-35	159
		45	LM-48-45-35	182
		56	LM-48-56-35	207
42 42.009-42.025	55 55.072-55.053	30	LM-55-30-42	192
		56	LM-55-56-42	234
		67	LM-55-67-42	264
48 48.009-48.025	62 62.072-62.053	30	LM-62-30-48	244
		56	LM-62-56-48	266
		67	LM-62-67-48	271
55 55.010-55.029	70 70.078-70.059	30	LM-70-30-55	263
		56	LM-70-56-55	271
		67	LM-70-67-55	273
62 62.010-62.029	78 78.078-78.059	35	LM-78-35-62	357
		67	LM-78-67-62	390
		78	LM-78-78-62	399
70 70.010-70.029	85 85.093-85.071	35	LM-85-35-70	385
		67	LM-85-67-70	409
		78	LM-85-78-70	413

A I.D. RANGE	B OUTSIDE DIMENSION	C	ANSI SYMBOL	PRICE CODE
78 78.010-78.029	95 95.093-95.071	40	LM-95-40-78	398
		78	LM-95-78-78	433
		105	LM-95-105-78	474
85 85.010-85.029	105 105.101-105.079	40	LM-105-40-85	405
		78	LM-105-78-85	442
		105	LM-105-105-85	484
95 95.010-95.029	115 115.101-115.079	45	LM-115-45-95	421
		89	LM-115-89-95	471
		112	LM-115-112-95	507
105 105.010-105.029	125 125.117-125.092	45	LM-125-45-112	443
		89	LM-125-89-112	445
		112	LM-125-112-112	535

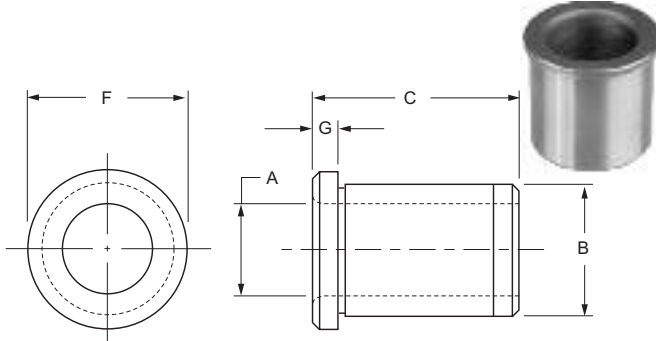
HEAD LINER - TYPE HL

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	HL	5/16	1/2	3/4

Or: 6 HL-32-12



ANSI HEAD LINER HEAD DIMENSIONS

BODY O.D. B	HEAD DIMENSION	
	F	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

NOTE: For drill sizes, see the chart on page 1.6 in the information section.

A I.D. RANGE Drill Size Decimal Range	B O.D. TOLERANCE Nominal GROUND UNGROUND DIGITAL RANGE		C	ANSI SYMBOL ‡	PRICE CODE
	GROUND	UNGROUND			
5/16 (.3126 - .3129)	1/2 .5017 .5014	.518 .513	5/16	HL-32-5	114
			3/8	HL-32-6	117
			1/2	HL-32-8	117
			3/4	HL-32-12	121
			1	HL-32-16	135
			1-3/8	HL-32-22	149
1/2 (.5002 - .5005)	3/4 .7518 .7515	.768 .763	5/16	HL-48-5	115
			3/8	HL-48-6	117
			1/2	HL-48-8	117
			3/4	HL-48-12	121
			1	HL-48-16	128
			1-3/8	HL-48-22	136
			1-1/2	HL-48-24	141
			1-3/4	HL-48-28	147
3/4 (.7503 - .7506)	1 1.0018 1.0015	1.018 1.013	2-1/8	HL-48-34	156
			1/2	HL-64-8	126
			3/4	HL-64-12	130
			1	HL-64-16	133
			1-3/8	HL-64-22	136
			1-1/2	HL-64-24	143
			1-3/4	HL-64-28	151
			2-1/8	HL-64-34	161
1 (1.0004 - 1.0007)	1-3/8 1.3772 1.3768	1.395 1.390	2-1/2	HL-64-40	177
			3	HL-64-48	228
			1/2	HL-88-8	144
			3/4	HL-88-12	136
			1	HL-88-16	144
			1-3/8	HL-88-22	150
			1-1/2	HL-88-24	153
			1-3/4	HL-88-28	161
			2-1/8	HL-88-34	171
			2-1/2	HL-88-40	185
2-3/4 (2.2510 - 2.2515)	2-3/4 2.7526 2.7522	2.770 2.765	3	HL-88-48	246
			3/4	HL-112-12	158
			1	HL-112-16	163
			1-3/8	HL-112-22	170
			1-1/2	HL-112-24	176
			1-3/4	HL-112-28	182
			2-1/8	HL-112-34	195
			2-1/2	HL-112-40	210
			3	HL-112-48	261
			3/4	HL-144-12	191
1-3/8 (1.3756 - 1.3760)	1-3/4 1.7523 1.7519	1.770 1.765	1	HL-144-16	184
			1-3/8	HL-144-22	192
			1-1/2	HL-144-24	198
			1-3/4	HL-144-28	205
			2-1/8	HL-144-34	218
			2-1/2	HL-144-40	231
			3	HL-144-48	264
			3/4	HL-176-12	216
			1	HL-176-16	203
			1-3/8	HL-176-22	218
1-3/4 (1.7508 - 1.7512)	2-1/4 2.2525 2.2521	2.270 2.265	1-1/2	HL-176-24	222
			1-3/4	HL-176-28	229
			2-1/8	HL-176-34	241
			2-1/2	HL-176-40	249
			3	HL-176-48	270
			3/4	HL-176-12	216
			1	HL-176-16	203
			1-3/8	HL-176-22	218
			1-1/2	HL-176-24	222
			1-3/4	HL-176-28	229
2-1/4 (2.2510 - 2.2515)	2-3/4 2.7526 2.7522	2.770 2.765	2-1/8	HL-176-34	241
			2-1/2	HL-176-40	249
			3	HL-176-48	270
			3/4	HL-176-12	216
			1	HL-176-16	203
			1-3/8	HL-176-22	218
			1-1/2	HL-176-24	222
			1-3/4	HL-176-28	229
			2-1/8	HL-176-34	241
			2-1/2	HL-176-40	249

NOTE: Length is measured overall.

‡ All bushings are finish ground unless the letter "U" appears with the bushing type or the ANSI symbol.

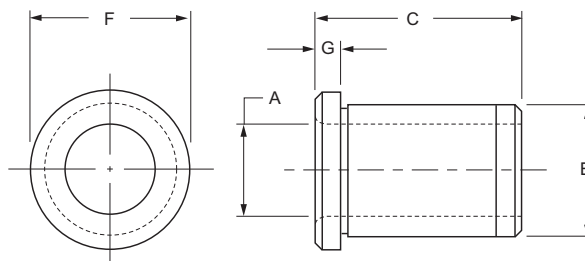
EXTENDED RANGE HEAD LINER - TYPE HL

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	HL	2-3/4	3-3/8	2-3/4

Or: 6 HL-216-44



I.D. RANGE (A)	NOM.	2"	2-1/2	2-3/4	3"	3-1/4	3-3/8	3-1/2	3-3/4	4"	4-1/4	4-3/8	4-1/2	4-3/4	5"
	DEC. RANGE	2.0010 2.0015	2.5010 2.5015	2.7510 2.7515	3.0010 3.0015	3.2510 3.2515	3.3760 3.3765	3.5010 3.5015	3.7510 3.7515	4.0010 4.0015	4.2510 4.2515	4.3760 4.3765	4.5010 4.5015	4.7510 4.7515	5.0010 5.0015
O.D. RANGE (B)†	NOM.	2-1/2	3"	3-3/8	3-5/8	3-7/8	4"	4-1/8	4-1/2	4-3/4	5"	5-1/8	5-1/4	5-1/2	5-3/4
	DEC. RANGE	2.5025 2.5021	3.0028 3.0023	3.3778 3.3773	3.6278 3.6273	3.8778 3.8773	4.0028 4.0023	4.1280 4.1275	4.5030 4.5025	4.7530 4.7525	5.0030 5.0025	5.1280 5.1275	5.2530 5.2525	5.5030 5.5025	5.7530 5.7525
LENGTH (C)	ANSI CODE	160	192	216	232	248	256	264	288	304	320	328	336	352	368
3/4	12	303	343	360	366	370	372	*	*	*	*	*	*	*	*
1	16	304	344	363	370	374	376	*	*	*	*	*	*	*	*
1-1/4	20	306	348	365	373	378	381	*	*	*	*	*	*	*	*
1-1/2	24	310	350	367	378	382	387	*	*	*	*	*	*	*	*
1-3/4	28	313	352	370	381	387	392	*	*	*	*	*	*	*	*
2	32	316	357	373	386	392	399	*	*	*	*	*	*	*	*
2-1/8	34	318	359	376	-	-	-	-	-	-	-	-	-	-	-
2-1/4	36	323	362	380	390	398	405	*	*	*	*	*	*	*	*
2-1/2	40	326	366	382	396	404	412	*	*	*	*	*	*	*	*
2-3/4	44	334	370	387	400	410	419	*	*	*	*	*	*	*	*
3	48	338	374	390	406	416	425	*	*	*	*	*	*	*	*
3-1/4	52	360	378	395	412	422	433	*	*	*	*	*	*	*	*
3-1/2	56	363	380	398	418	430	442	*	*	*	*	*	*	*	*
3-3/4	60	366	384	402	424	438	451	*	*	*	*	*	*	*	*
4	64	370	387	406	431	444	457	*	*	*	*	*	*	*	*
4-1/4	68	373	391	410	439	451	462	*	*	*	*	*	*	*	*
4-1/2	72	377	396	414	448	458	468	*	*	*	*	*	*	*	*
4-3/4	76	380	400	419	456	465	474	*	*	*	*	*	*	*	*
5	80	382	407	424	462	472	480	*	*	*	*	*	*	*	*
5-1/2	88	-	-	-	-	-	492	*	*	*	*	*	*	*	*
6	96	-	-	-	-	-	-	*	*	*	*	*	*	*	*
6-1/2	104	-	-	-	-	-	-	-	*	*	*	*	*	*	*
7	112	-	-	-	-	-	-	-	-	-	*	*	*	*	*
HEAD F		2-5/8	3-1/8	3-1/2	3-7/8	4-1/8	4-1/4	4-3/8	4-3/4	5	5-1/4	5-3/8	5-1/2	5-3/4	6
HEAD G		3/16	3/16	3/16	3/16	3/16	3/16	3/16	7/32	7/32	7/32	7/32	7/32	7/32	7/32

Unground O.D.'s are .015 / .020 oversized

NOTE: All bushings are finish ground unless the letter "U" appears with the bushing type or ANSI symbol.

*- Priced upon request

All extended range bushings are considered special orders and are non-returnable.

NOTE: Length is measured overall.

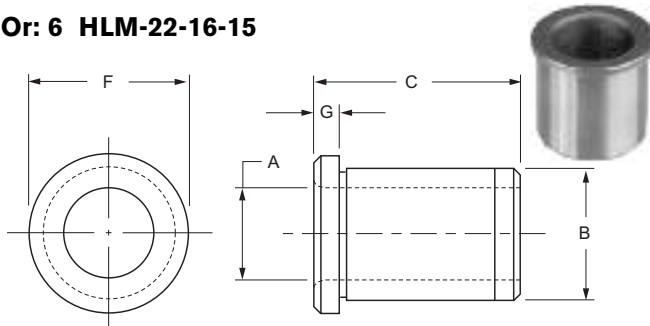
METRIC HEAD LINER - TYPE HLM

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	HLM	15	22	16

Or: 6 HLM-22-16-15



NOTE: For drill sizes, see the chart on page 1.6 in the information section.

A I.D. RANGE	B OUTSIDE DIMENSION	C	ANSI SYMBOL	PRICE CODE
8 8.005-8.014	12 12.039 -12.028	10	HLM-12-10-8	125
		16	HLM-12-16-8	129
		12	HLM-15-12-10	121
10 10.005-10.014	15 15.039 -15.028	20	HLM-15-20-10	129
		25	HLM-15-25-10	130
		12	HLM-18-12-12	125
12 12.006-12.017	18 18.039 -18.028	20	HLM-18-20-12	129
		25	HLM-18-25-12	133
		16	HLM-22-16-15	136
15 15.006-15.017	22 22.048 -22.035	28	HLM-22-28-15	145
		36	HLM-22-36-15	151
		16	HLM-26-16-18	136
18 18.006-18.017	26 26.048 -26.035	28	HLM-26-28-18	141
		36	HLM-26-36-18	156
		20	HLM-30-20-22	163
22 22.007-22.020	30 30.048 -30.035	36	HLM-30-36-22	189
		45	HLM-30-45-22	196
		20	HLM-35-20-26	164
26 26.007-26.020	35 35.059 -35.043	36	HLM-35-36-26	190
		45	HLM-35-45-26	198
		25	HLM-42-25-30	191
30 30.007-30.020	42 42.059 -42.043	45	HLM-42-45-30	198
		56	HLM-42-56-30	243
		25	HLM-48-25-35	191
35 35.009-35.025	48 42.059 -42.043	45	HLM-48-45-35	216
		56	HLM-48-56-35	242
		30	HLM-55-30-42	236
42 42.009-42.025	55 55.072 -55.053	56	HLM-55-56-42	262
		67	HLM-55-67-42	350
		30	HLM-62-30-48	249
48 48.009-48.025	62 62.072 -62.053	56	HLM-62-56-48	267
		67	HLM-62-67-48	358
		30	HLM-70-30-55	353
55 55.010-55.029	70 70.078 -70.059	56	HLM-70-56-55	369
		67	HLM-70-67-55	377
		35	HLM-78-35-62	365
62 62.010-62.029	78 78.078 -78.059	67	HLM-78-67-62	386
		78	HLM-78-78-62	392
		35	HLM-85-35-70	403
70 70.010-70.029	85 85.093 -85.071	67	HLM-85-67-70	443
		78	HLM-85-78-70	453

ANSI METRIC HEAD LINERS HEAD DIMENSIONS

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

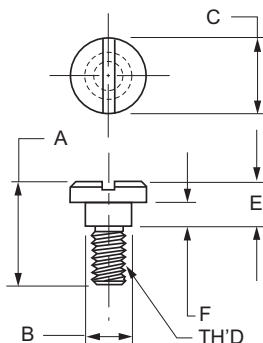
A I.D. RANGE	B OUTSIDE DIMENSION	C	ANSI SYMBOL	PRICE CODE
78 78.010-78.029	95 95.093 -95.071	40	HLM-95-40-78	415
		78	HLM-95-78-78	461
		105	HLM-95-105-78	507
85 85.010-85.029	105 105.101 -105.079	40	HLM-105-40-85	429
		78	HLM-105-78-85	473
		105	HLM-105-105-85	517
95 95.010-95.029	115 115.101 -115.079	45	HLM-115-45-95	449
		89	HLM-115-89-95	503
		112	HLM-115-112-95	543
105 105.010-105.029	125 125.117 -125.092	45	HLM-125-45-112	473
		89	HLM-125-89-112	530
		112	HLM-125-112-112	566

LENGTH FOR METRIC HEAD LINERS IS OVERALL LENGTH.

LOCKING ACCESSORIES FOR RENEWABLE BUSHINGS

These are for all A.N.S.I., Carbide and Extended Range renewable bushings.

Lock screws are the most popular locking device for renewable drill bushings. They are used on either the "Slip" or "fixed" side of all available renewable bushings. They are simple, strong, compact and economical.



LOCK SCREWS - TYPE LS

Slotted - Black Oxide

P/N	DIMENSIONS					
	A	B	C	E	F	THREAD
LS-0	7/16	3/16	5/16	3/16	.100-.094	8-32
LS-1	5/8	3/8	5/8	1/4	.138-.132	5/16-18
LS-2	7/8	3/8	5/8	3/8	.200-.194	5/16-18
LS-3	1	7/16	3/4	3/8	.200-.194	3/8-16
LS-4	1-1/16	7/16	3/4	7/16	.231-.225	3/8-16
LS-5	1-1/8	7/16	3/4	1/2	.263-.257	3/8-16

METRIC LOCK SCREWS - TYPE LSM

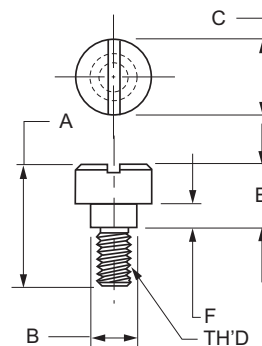
Slotted - Standard - Black Oxide

P/N	DIMENSIONS					
	A	B	C	E	F	THREAD
LSM-1	15	7.5	13	6	3	M5 x .80
LSM-3	18	9.5	16	8	4	M6 x 1.00
LSM-5	22	12	20	10	5.5	M8 x 1.25
LSM-7	32	15	24	12	7	M10 x 1.50

METRIC LOCK SCREWS - TYPE LSM

Slotted - Protected - Black Oxide

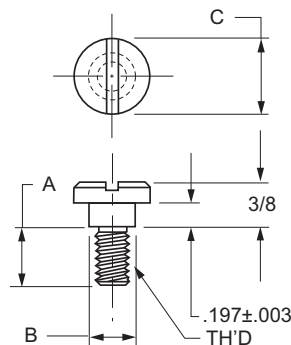
P/N	DIMENSIONS					
	A	B	C	E	F	THREAD
LSM-2	18	7.5	13	9	6	M5 x .80
LSM-4	22	9.5	16	12	8	M6 x 1.00
LSM-6	27	12	20	15	10.5	M8 x 1.25
LSM-8	38	15	24	18	13	M10 x 1.50



LOCK SCREWS - TYPE TW

Slotted - Black Oxide

P/N	DIMENSIONS					
	A	B	C	E	F	THREAD
TW-1	7/16	3/16	5/16	3/16	3/32	8-32
TW-2	1/2	1/4	3/8	1/4	1/8	10-32
TW-3	11/16	1/4	7/16	3/8	3/16	10-32
TW-4	7/8	3/8	9/16	1/2	1/4	5/16-18
TW-5	1	3/8	5/8	5/8	5/16	5/16-18
TW-7	3/4	3/8	5/8	3/8	3/16	5/16-18

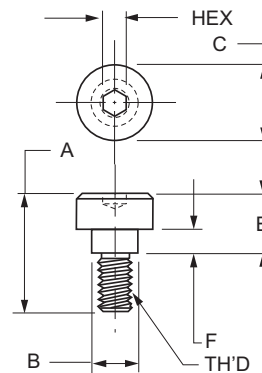
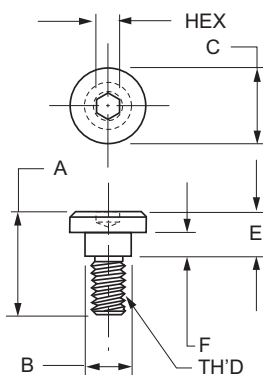


LOCK SCREWS - AIRFEED SERIES

Slotted - Black Oxide

P/N	DIMENSIONS			
	A	B	C	THREAD
16530	5/8	7/16	3/4	3/8-16
16531	5/16	3/8	5/8	5/16-18
16532	7/16	3/8	5/8	5/16-18

LOCKING ACCESSORIES FOR RENEWALE BUSHINGS



LOCK SCREWS - TYPE HLS

Hex - Black Oxide

P/N	DIMENSIONS						
	A	B	C	E	F	THREAD	HEX
HLS-0	7/16	3/16	5/16	3/16	.100-.094	8-32	3/32
HLS-1	5/8	3/8	5/8	1/4	.138-.132	5/16-18	3/16
HLS-2	7/8	3/8	5/8	3/8	.200-.194	5/16-18	3/16
HLS-3	1	7/16	3/4	3/8	.200-.194	3/8-16	7/32
HLS-4	1-1/16	7/16	3/4	7/16	.231-.225	3/8-16	7/32
HLS-5	1-1/8	7/16	3/4	1/2	.263-.257	3/8-16	7/32

LOCK SCREWS - TYPE HTW

Hex - Black Oxide

P/N	DIMENSIONS						
	A	B	C	E	F	THREAD	HEX
HTW-1	7/16	3/16	5/16	3/16	3/32	8-32	3/32
HTW-2	1/2	1/4	3/8	1/4	1/8	10-32	1/8
HTW-3	11/16	1/4	7/16	3/8	3/16	10-32	1/8
HTW-4	7/8	3/8	9/16	1/2	1/4	5/16-18	3/16
HTW-5	1	3/8	5/8	5/8	5/16	5/16-18	3/16
HTW-7	3/4	3/8	5/8	3/8	3/16	5/16-18	3/16

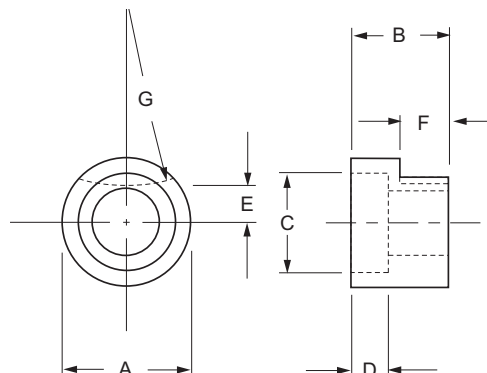
BUSHINGS



LOCKING ACCESSORIES FOR RENEWABLE BUSHINGS

These are for all A.N.S.I., Carbide and Extended Range renewable bushings.

Round clamps are the alternative to lockscrews when using the "Fixed" side of renewable drill bushings.



ROUND CLAMP - TYPE RC

Black Oxide

P/N	DIMENSIONS							REPLACES LOCKSCREW
	A	B	C	D	E	F	G	
RC-01	5/8	5/16	5/16 SHS	5/32	.109	.1250	17/32	LS-1
RC-02	5/8	7/16	5/16 SHS	7/32	.125	.1875	29/32	LS-2
RC-03	3/4	1/2	3/8 SHS	9/32	.156	.1875	1-13/32	LS-3
RC-04*	3/4	17/32	3/8 SHS	1/4	.156	.2187	2-1/2	LS-4
RC-05*	3/4	9/16	3/8 SHS	1/4	.156	.2500	2-1/2	LS-5

METRIC ROUND CLAMP - TYPE RCM

Standard Mounting - Black Oxide

P/N	DIMENSIONS							USE WITH SOCKET HEAD CAP SCREW
	A	B	C	D	E	F	G	
RCM-1	13	8	10	4	2.8	3	9.5	M5 x .80
RCM-3	16	10	12	5	3.3	4	15	M6 x 1.00
RCM-5	20	12	15	5	3.8	5.5	30	M8 x 1.25
RCM-7	24	16	18	7	4.5	7	80	M10 x 1.50

METRIC ROUND CLAMP - TYPE RCM

Protected Mounting - Black Oxide

P/N	DIMENSIONS							USE WITH SOCKET HEAD CAP SCREW
	A	B	C	D	E	F	G	
RCM-2	13	11	10	4	2.8	6	9.5	M5 x .80
RCM-4	16	14	12	5	3.3	8	15	M6 x 1.00
RCM-6	20	17	15	5	3.8	10.5	30	M8 x 1.25
RCM-8	24	22	18	7	4.5	13	80	M10 x 1.50

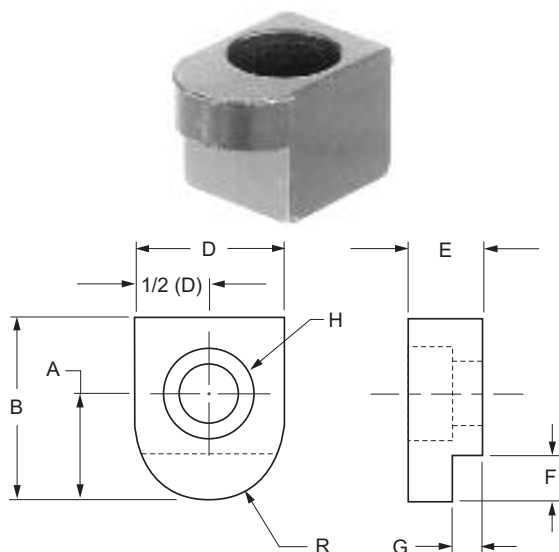
* For use with extended range renewable bushings only.

LOCKING ACCESSORIES FOR RENEWABLE BUSHINGS

These are for all A.N.S.I., Carbide and Extended Range renewable bushings.

These are for all A.N.S.I., Carbide and Extended Range renewable bushings.

Round end clamps are an alternative to lockscrews when using the "Fixed" side of renewable drill bushings.



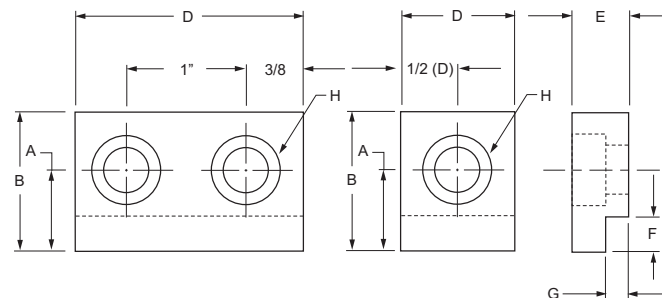
ROUND END CLAMP - TYPE RK
For Flush Mounting of Liner - Black Oxide

P/N	DIMENSIONS							R
	A	B	D	E	F	G	(H) MOUNTING SCREW SIZE	
RK-01	7/16	3/4	5/8	5/16	3/16	1/8	1/4 SHS	5/16
RK-02	1/2	3/4	5/8	3/8	1/4	3/16	1/4 SHS	5/16
RK-03	5/8	1	3/4	3/8	5/16	3/16	5/16 SHS	3/8
RK-04	11/16	1-1/8	3/4	7/16	5/16	7/32	3/8 SHS	3/8
RK-05	11/16	1-1/8	3/4	1/2	5/16	1/4	3/8 SHS	3/8

ROUND END CLAMP - TYPE RK
For Protected Mounting of Shoulder Liner - Black Oxide

P/N	DIMENSIONS							R
	A	B	D	E	F	G	(H) MOUNTING SCREW SIZE	
RK-10	7/16	3/4	5/8	3/8	3/16	7/32	1/4 SHS	5/16
RK-11	7/16	3/4	5/8	3/8	3/16	1/4	1/4 SHS	5/16
RK-12	1/2	3/4	5/8	1/2	1/4	5/16	1/4 SHS	5/16
RK-13	1/2	3/4	5/8	1/2	1/4	3/8	1/4 SHS	5/16
RK-14	5/8	1	3/4	1/2	5/16	3/8	3/8 SHS	3/8
RK-15*	11/16	1-1/8	3/4	5/8	5/16	13/32	3/8 SHS	3/8
RK-16*	11/16	1-1/8	3/4	5/8	5/16	7/16	3/8 SHS	3/8
RK-17*	11/16	1-1/8	3/4	3/4	5/16	15/32	3/8 SHS	3/8

* Only for use with all extended range renewable bushings.



FLAT CLAMP - TYPE FC
For Flush Mounting of Liner - Black Oxide

P/N	HOLES	DIMENSIONS						(H) MOUNTING SCREW SIZE
		A	B	D	E	F	G	
FC-01	1	1/2	7/8	5/8	5/16	3/16	1/8	1/4 SHS
FC-02	1	5/8	1	1	3/8	1/4	3/16	5/16 SHS
FC-03	1	5/8	1-1/8	1	3/8	5/16	3/16	5/16 SHS
FC-04*	1	51/64	1-11/16	1-1/4	3/8	27/64	7/32	3/8 SHS
FC-05*	2	51/64	1-11/16	1-3/4	3/8	27/64	7/32	3/8 SHS
FC-06*	1	51/64	1-11/16	1-1/4	1/2	27/64	1/4	3/8 SHS
FC-07*	2	51/64	1-11/16	1-3/4	1/2	27/64	1/4	3/8 SHS

FLAT CLAMP - TYPE FC
For Protected Mounting of Shoulder Liner - Black Oxide

P/N	HOLES	DIMENSIONS						(H) MOUNTING SCREW SIZE
		A	B	D	E	F	G	
FC-10	1	1/2	7/8	5/8	3/8	3/16	7/32	1/4 SHS
FC-11	1	1/2	7/8	5/8	3/8	3/16	1/4	1/4 SHS
FC-12	1	5/8	1	1	1/2	1/4	5/16	5/16 SHS
FC-13	1	5/8	1	1	1/2	1/4	3/8	5/16 SHS
FC-14	1	5/8	1-1/8	1-1/4	1/2	5/16	3/8	3/8 SHS
FC-15	2	5/8	1-1/8	1-3/4	1/2	5/16	3/8	3/8 SHS
FC-16*	1	51/64	1-11/16	1-1/4	5/8	27/64	13/32	3/8 SHS
FC-17*	2	51/64	1-11/16	1-3/4	5/8	27/64	13/32	3/8 SHS
FC-18*	1	51/64	1-11/16	1-1/4	5/8	27/64	7/16	3/8 SHS
FC-19*	2	51/64	1-11/16	1-3/4	5/8	27/64	7/16	3/8 SHS
FC-20*	1	51/64	1-11/16	1-1/4	3/4	27/64	15/32	3/8 SHS
FC-21*	2	51/64	1-11/16	1-3/4	3/4	27/64	15/32	3/8 SHS

UNILOCK LINERS - TYPE UL & ULD

UNILOCK LINERS FOR METALLIC TOOLING

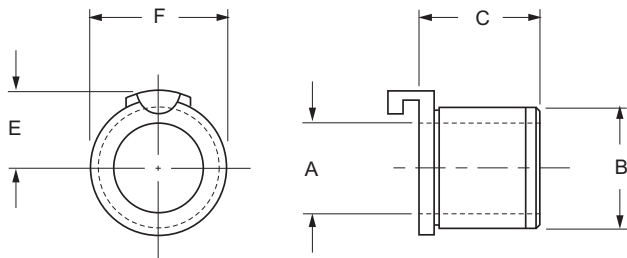
The type UL liner is similar to the head liner with the additional feature of a locking lip projecting up. This replaces the necessity of drilling, tapping and use of a locking screw when using slip/fixed bushings.

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	UL	5/16	1/2	3/4

Or: 6 UL-32-12



UNILOCK LINERS DIAMOND KNURLED O.D. FOR PLASTIC TOOLING

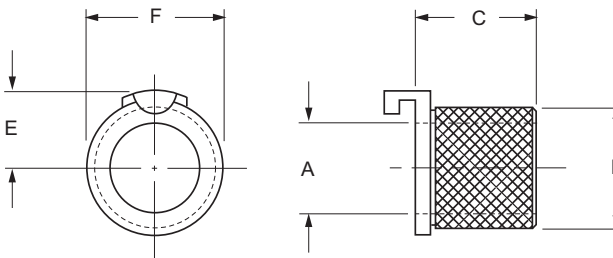
The type ULD liner is similar to the UL liner but has a knurled outside diameter for use in imbedment fixturing.

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	ULD	5/16	1/2	3/4

Or: 6 ULD-32-12



NOTE: For drill sizes, see the chart on page 1.6 in the information section.

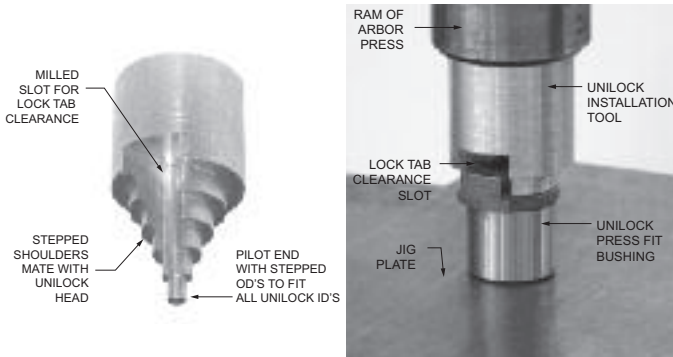
A I.D. RANGE Drill Size Decimal Range	B O.D. TOLERANCE Nominal Decimal Range	C	E	F	ANSI SYMBOL	PRICE CODE
3/16 (.1876 - .1879)	5/16 .3141 .3138	5/16	1/4	3/8	UL-20-5	168
		3/8			UL-20-6	172
		1/2			UL-20-8	174
		3/4			UL-20-12	178
5/16 (.3126 - .3129)	1/2 .5017 .5014	3/8	3/8	9/16	UL-32-6	145
		1/2			UL-32-8	148
		3/4			UL-32-12	154
1/2 (.5002 - .5005)	3/4 .7518 .7515	1/2	1/2	13/16	UL-48-8	151
		3/4			UL-48-12	162
		1			UL-48-16	168
3/4 (.7503 - .7506)	1 1.0018 1.0015	1/2	21/32	1-1/16	UL-64-8	192
		3/4			UL-64-12	201
		1			UL-64-16	231
1 (1.0004 - 1.0007)	1-3/8 1.3772 1.3768	1/2	7/8	1-7/16	UL-88-8	219
		3/4			UL-88-12	235
		1			UL-88-16	252
		1-3/8			UL-88-22	260

A I.D. RANGE Drill Size Decimal Range	B O.D. TOLERANCE Nominal Decimal Range	C	E	F	ANSI SYMBOL	PRICE CODE
3/16 (.1876 - .1879)	5/16 .342 .332	5/16	1/4	3/8	ULD-20-5	140
		3/8			ULD-20-6	149
		1/2			ULD-20-8	151
		3/4			ULD-20-12	156
5/16 (.3126 - .3129)	1/2 .533 .523	3/8	3/8	9/16	ULD-32-6	136
		1/2			ULD-32-8	137
		3/4			ULD-32-12	141
1/2 (.5002 - .5005)	3/4 .785 .775	1/2	1/2	13/16	ULD-48-8	159
		3/4			ULD-48-12	170
		1			ULD-48-16	183
3/4 (.7503 - .7506)	1 1.035 1.025	1/2	21/32	1-1/16	ULD-64-8	162
		3/4			ULD-64-12	173
		1			ULD-64-16	185
1 (1.0004 - 1.0007)	1-3/8 1.415 1.405	1/2	7/8	1-7/16	ULD-88-8	175
		3/4			ULD-88-12	190
		1			ULD-88-16	204
		1-3/8			ULD-88-22	209

UNILOCK - TYPE ULT / EZ CAST - TYPE EZ-L

UNILOCK INSTALATION TOOL - TYPE ULT

Type ULT installation tools are intended for type UL Unilock bushings. They are milled with a slot for lock tab clearance. The pilot end features stepped shoulders that help the tool mate to all unilock IDs. The Type ULT installation tool is made out of Alluminum.

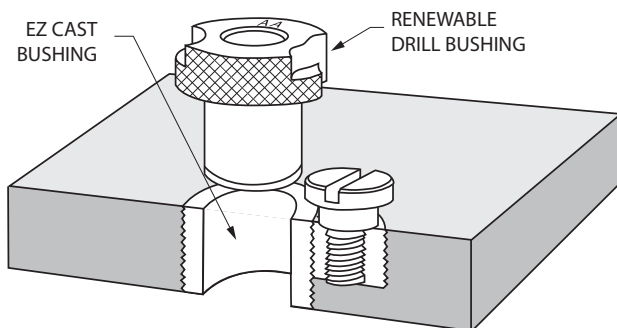


APPLICATION

The type EZ-L liner is made for use with potted, cast in place or imbedment in jigs made of laminated, glass fibers, potting compound or castable and soft materials. Unlike the type ULD liner, they can be used with all All American or ANSI renewable drill bushings in either the "slip" or "fixed" side.

EZ CAST liners, through welded construction, provides a precise and stable location for renewable drill bushings. In addition, it protects the hole in the jig plate from wear and spin-out. They provide an excellent solution in reducing time consuming repairs in the tool room. The inside diameter is ground for correct slip fit with renewable drill bushings which offers greater versatility, convenience an economy.

Due to their unique design, the EZ CAST liner assembly allows for rapid installation and removable of renewable drill biushings. A quick turn locks it securely in place or easily removes it.

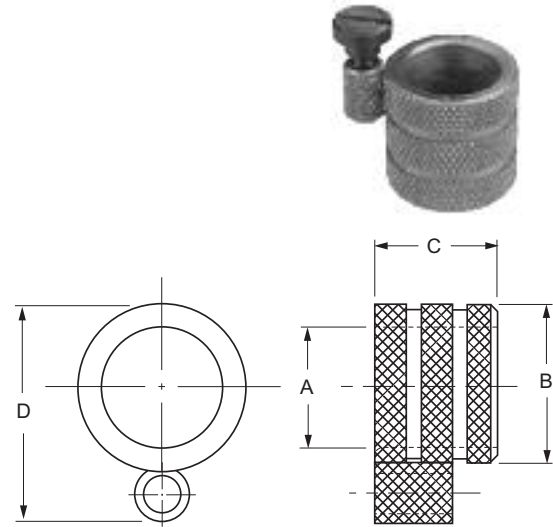


When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	EZ-L	5/16	1/2	3/4

Or: 6 EZ-L-32-12



NOTE: For drill sizes, see the chart on page 1.6 in the information section.

A I.D. RANGE Drill Size Decimal Range	B O.D. TOLERANCE Nominal Decimal Range	C	D	ANSI SYMBOL	PRICE CODE	LOCK SCREW PROVIDED
5/16 (.3126 - .3129)	1/2 .525 .510	1/2	1-1/32	EZ-L-32-8	127	LS-1
		3/4		EZ-L-32-12	131	
		1		EZ-L-32-16	136	
1/2 (.5002 - .5005)	3/4 .775 .760	1/2	1-9/32	EZ-L-48-8	124	LS-1
		3/4		EZ-L-48-12	128	
		1		EZ-L-48-16	131	
		1-3/8		EZ-L-48-22	148	
3/4 (.7503 - .7506)	1 1.035 1.010	1/2	1-17/32	EZ-L-64-8	136	LS-1
		3/4		EZ-L-64-12	137	
		1		EZ-L-64-16	140	
		1-3/8		EZ-L-64-22	146	
1 (1.0004 - 1.0007)	1-3/8 1.410 1.385	3/4	1-27/32	EZ-L-88-12	154	LS-2
		1		EZ-L-88-16	161	
		1-3/8		EZ-L-88-22	171	

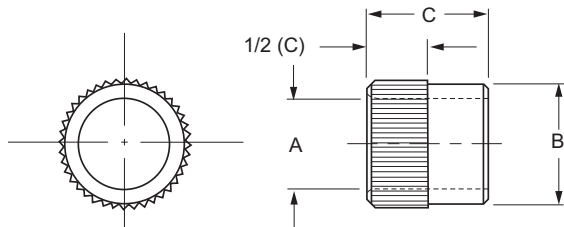
SERRATA PRESS - TYPE SP & SPM

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	SP	5/16	5/8	3/4

Or: 6 SP-40-12-5/16



NOTE: For drill sizes, see the chart on page 1.6 in the information section.

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	SPM	6	10	16

Or: 6 SPM-10-16-6



SERRATA PRESS - TYPE SP

Standard - Finish ground O.D.

A I.D. RANGE DRILL SIZE DIGITAL RANGE	B O.D. TOLERANCE NOMINAL ACTUAL	C	ANSI SYMBOL	PRICE CODE
#55-#39 (.0520 - .0995) 1.35 - 2.50mm	13/64 .2031 .2029	1/4	SP-13-4	127
		5/16	SP-13-5	134
		3/8	SP-13-6	136
		1/2	SP-13-8	139
#40 - 9/64 (.0980 - .1406) 2.50 - 3.50mm	1/4 .2500 .2498	1/4	SP-16-4	115
		5/16	SP-16-5	118
		3/8	SP-16-6	122
		1/2	SP-16-8	125
1/8 - #10 (.1250 - .1935) 3.20 - 4.90mm	5/16 .3125 .3123	5/16	SP-20-5	112
		3/8	SP-20-6	113
		1/2	SP-20-8	114
		3/4	SP-20-12	117
5/32 - F (.1562 - .2570) 4.00 - 6.50mm	13/32 .4062 .4060	1/4	SP-26-4	105
		5/16	SP-26-5	106
		3/8	SP-26-6	109
		1/2	SP-26-8	110
		3/4	SP-26-12	113
5/32 - 0 (.1562 - .3160) 4.00 - 8.00mm	1/2 .5000 .4998	*1	SP-26-16	118
		5/16	SP-32-5	106
		3/8	SP-32-6	109
		1/2	SP-32-8	110
		3/4	SP-32-12	113
5/16 - 7/16 (.3125 - .4375) 7.90 - 11.00mm	5/8 .6250 .6248	*1	SP-32-16	118
		3/8	SP-40-6	107
		1/2	SP-40-8	107
		3/4	SP-10-12	110
		1	SP-40-16	112
5/16 - 17/32 (.3125 - .5312) 8.00 - 13.00mm	3/4 .7500 .7498	3/8	SP-48-6	110
		1/2	SP-48-8	110
		3/4	SP-48-12	112
		1	SP-48-16	114
		3/8	SP-56-6	121
1/2 - 21/32 (.5000 - .6562) 13.00 - 16.50mm	7/8 .8750 .8748	1/2	SP-56-8	115
		3/4	SP-56-12	117
		1	SP-56-16	119
		1/2	SP-64-8	117
1/2-49/64 (.5000 - .7656) 13.00 - 19.00mm	1 1.0000 .9998	3/4	SP-64-12	117
		1	SP-64-12	120
		1-3/8	SP-64-22	123

METRIC SERRATA PRESS - TYPE SPM

Finish ground O.D.

A I.D. RANGE NOMINAL	B O.D. TOLERANCE NOMINAL ACTUAL	C	ANSI SYMBOL	PRICE CODE
1.00 1.80	5 5.000 - 4.995	6	SPM - 5-6	210
		9	SPM - 5-9	230
1.81 2.60	5 5.000 - 4.995	6	SPM - 5-6	134
		9	SPM - 5-9	144
2.61 3.30	6 6.000 5.995	8	SPM - 6-8	124
		12	SPM - 6-12	134
		16	SPM - 6-16	137
3.31 4.00	7 7.000 6.995	8	SPM - 7-8	114
		12	SPM - 7-12	118
		16	SPM - 7-16	123
4.01 5.00	8 8.000 7.994	8	SPM - 8-8	114
		12	SPM - 8-12	118
		16	SPM - 8-16	123
5.01 6.00	10 10.000 9.994	10	SPM - 10-10	113
		16	SPM - 10-16	116
		22	SPM - 10-22	123
6.01 8.00	12 12.000 11.992	10	SPM - 12-10	113
		16	SPM - 12-12	116
		22	SPM - 12-22	123
8.01 10.00	15 15.000 14.992	12	SPM - 15-12	111
		20	SPM - 15-20	114
		25	SPM - 15-25	116
10.01 12.00	18 18.000 17.992	12	SPM - 18-12	113
		20	SPM - 18-20	118
		25	SPM - 18-25	124
12.01 15.00	22 22.000 21.991	16	SPM - 22-16	123
		28	SPM - 22-28	124
		36	SPM - 22-36	130
15.01 18.00	26 26.000 25.991	16	SPM - 26-16	123
		28	SPM - 26-28	124
		36	SPM - 26-36	130

* Counterbored leaving correct drill bearing length and chip clearance.

DIAMOND GROOVE - TYPE DG & DGM

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	DG	5/16	5/8	3/4

Or: 6 DG-40-12

NOTE: For drill sizes, see the chart on page 1.6 in the information section.

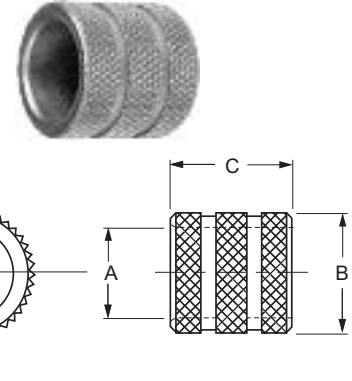
DIAMOND GROOVE - TYPE DG Standard - All grooves are 1/8th inch wide.				
A I.D. RANGE DRILL SIZE DIGITAL RANGE	B O.D. TOLERANCE NOMINAL ACTUAL	C	ANSI SYMBOL	PRICE CODE
#55-#39 (.0520 - .0995) 1.35 - 2.50mm	13/64 .223 .213	1/4	DG-13-4	118
		5/16	DG-13-5	121
		3/8	DG-13-6	124
		1/2	DG-13-8	125
#40 9/64 (.0980 - .1406) 2.50 - 3.50mm	1/4 .275 .260	1/4	DG-16-4	107
		5/16	DG-16-5	108
		3/8	DG-16-6	110
		1/2	DG-16-8	112
1/8 - #10 (.1250 - .1935) 3.20 - 4.90mm	5/16 .337 .322	*3/4	DG-16-12	119
		1/4	DG-20-4	101
		5/16	DG-20-5	103
		3/8	DG-20-6	104
5/32 - F (.1562 - .2570) 4.00 - 6.50mm	13/32 .431 .416	1/2	DG-20-8	105
		3/4	DG-20-12	110
		*1	DG-20-16	115
		1/4	DG-26-4	101
5/32 - 0 (.1562 - .3160) 4.00 - 8.00mm	1/2 .525 .510	5/16	DG-26-5	101
		3/8	DG-26-6	102
		1/2	DG-26-8	103
		3/4	DG-26-12	105
5/16 - 7/16 (.3125 - .4375) 7.90 - 11.00mm	5/8 .650 .630	*1	DG-26-16	110
		3/8	DG-32-5	101
		1/2	DG-32-6	102
		1/2	DG-32-8	103
5/16 - 17/32 (.3125 - .5312) 8.00 - 13.00mm	3/4 .775 .760	3/4	DG-32-12	105
		*1	DG-32-16	110
		3/8	DG-40-6	101
		1/2	DG-40-8	101
1/2 - 21/32 (.5000 - .6562) 13.00 - 16.50mm	7/8 .900 .885	3/4	DG-40-12	103
		1	DG-40-16	104
		1-3/8	DG-40-22	110
		3/8	DG-48-6	101
1/2-49/64 (.5000 - .7656) 13.00 - 19.00mm	1 1.035 1.010	1/2	DG-48-8	101
		3/4	DG-48-12	103
		1	DG-48-16	104
		1-3/8	DG-48-16	114
		3/8	DG-56-6	113
		1/2	DG-56-8	109
		3/4	DG-56-12	110
		1	DG-56-16	112
		1-3/8	DG-56-22	114
		1/2	DG-64-8	110
		3/4	DG-64-12	110
		1	DG-64-12	113
		1-3/8	DG-64-22	115
		1-1/2	DG-64-26	119

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	DGM	6	10	16

Or: 6 DGM-10-16



METRIC DIAMOND GROOVE - TYPE DGM Lengths below 10mm will be full Knurl.				
A I.D. RANGE NOMINAL	B O.D. TOLERANCE NOMINAL ACTUAL	C	ANSI SYMBOL	PRICE CODE
1.00 1.80	5 5.50 - 5.25	6	DGM - 5-6	192
		9	DGM - 5-9	207
1.81 2.60	5 5.50 - 5.25	6	DGM - 5-6	126
		9	DGM - 5-9	131
2.61 3.30	6 6.65 6.25	8	DGM - 6-8	114
		12	DGM - 6-12	115
		16	DGM - 6-16	127
3.31 4.00	7 7.65 7.25	8	DGM - 7-8	110
		12	DGM - 7-12	111
		16	DGM - 7-16	114
4.01 5.00	8 8.65 8.25	8	DGM - 8-8	105
		12	DGM - 8-12	107
		16	DGM - 8-16	111
5.01 6.00	10 10.65 10.25	10	DGM - 10-10	107
		16	DGM - 10-16	111
		20	DGM - 10-20	114
6.01 8.00	12 12.65 12.25	10	DGM - 12-10	107
		16	DGM - 12-12	111
		20	DGM - 12-20	114
8.01 10.00	15 15.65 15.25	12	DGM - 15-12	102
		20	DGM - 15-20	107
		25	DGM - 15-25	110
10.01 12.00	18 18.65 18.25	12	DGM - 18-12	104
		20	DGM - 18-20	107
		25	DGM - 18-25	111
12.01 15.00	22 22.65 22.25	16	DGM - 22-16	114
		28	DGM - 22-28	115
		36	DGM - 22-36	120
15.01 18.00	26 26.90 26.25	16	DGM - 26-16	114
		28	DGM - 26-28	122
		36	DGM - 26-36	127

* Counterbored leaving correct drill bearing length and chip clearance.

SERRATA GROOVE - TYPE SG

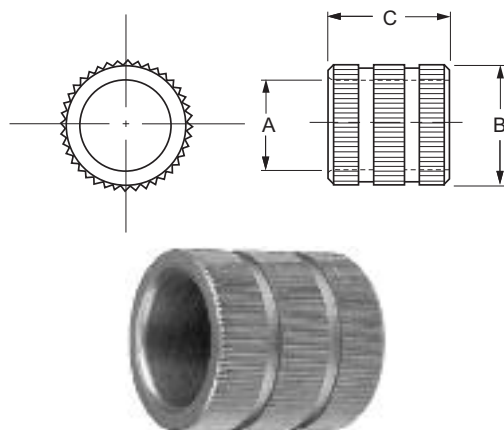
The type SG bushing, Serrata Groove, features a special serration which allows the bushing to be easily pressed into a jig made of plastic or other soft material. It offers excellent holding strength.

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)
6	SG	5/16	5/8	3/4

Or: 6 SG-40-12



A I.D. RANGE DRILL SIZE DIGITAL RANGE	B O.D. TOLERANCE NOMINAL ACTUAL	C	ANSI SYMBOL	PRICE CODE
5/16 - 7/16 (.3125 - .4375) 7.90 - 11.00mm	5/8 .650 .635	3/8	SG-40-6	101
		1/2	SG-40-8	101
		3/4	SG-40-12	103
		1	SG-40-16	104
		1-3/8	SG-40-22	110
5/16 - 17/32 (.3125 - .5312) 8.00 - 13.00mm	3/4 .775 .760	3/8	SG-48-6	101
		1/2	SG-48-8	101
		3/4	SG-48-12	103
		1	SG-48-16	104
		1-3/8	SG-48-22	114
1/2 - 21/32 (.5000 - .6562) 13.00 - 16.50mm	7/8 .900 .885	3/8	SG-56-6	113
		1/2	SG-56-8	109
		3/4	SG-56-12	110
		1	SG-56-16	112
		1-3/8	SG-56-22	114
1/2 - 49/64 (.5000 - .7656) 13.00 - 19.00mm	1 1.035 1.010	1/2	SG-64-8	110
		3/4	SG-64-12	110
		1	SG-64-16	113
		1-3/8	SG-64-22	115
		1-1/2	SG-64-24	119

* Counterbored leaving correct drill bearing length and chip clearance.

NOTE: For drill sizes, see the chart on page 1.6 in the information section.

SERRATA GROOVE - TYPE SG				
All Grooves are 1.8" Wide.				
A I.D. RANGE DRILL SIZE DIGITAL RANGE	B O.D. TOLERANCE NOMINAL ACTUAL	C	ANSI SYMBOL	PRICE CODE
#55-#39 (.0520 - .0995) 1.35 - 2.50mm	13/64 .223 .213	1/4	SG-13-4	118
		5/16	SG-13-5	121
		3/8	SG-13-6	124
		1/2	SG-13-8	125
		1/4	SG-16-4	107
#40 9/64 (.0980 - .1406) 2.50 - 3.50mm	1/4 .275 .260	5/16	SG-16-5	108
		3/8	SG-16-6	110
		1/2	SG-16-8	112
		*3/4	SG-16-12	119
		1/4	SG-20-4	101
1/8 - #10 (.1250 - .1935) 3.20 - 4.90mm	5/16 .337 .322	5/16	SG-20-5	103
		3/8	SG-20-6	104
		1/2	SG-20-8	105
		3/4	SG-20-12	110
		*1	SG-20-16	115
5/32 - F (.1562 - .2570) 4.00 - 6.50mm	13/32 .431 .416	1/4	SG-26-4	101
		5/16	SG-26-5	101
		3/8	SG-26-6	102
		1/2	SG-26-8	103
		3/4	SG-26-12	105
5/32 - 0 (.1562 - .3160) 4.00 - 8.00mm	1/2 .525 .510	*1	SG-26-16	110
		5/16	SG-32-5	101
		3/8	SG-32-6	102
		1/2	SG-32-8	103
		3/4	SG-32-12	105
		1	SG-32-16	110

CIRCUIT BOARD BUSHINGS - TYPE CB

All American® circuit board bushings are designed to fit a variety of circuit board drilling machines.

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)
4	CB-2	#55

When ordering carbide bushings, add the letter "C" after the bushing type.

Quantity	Bushing Type	I.D.(A)
4	CB-2C	#55

Note: All carbide bushings are furnished with steel heads.

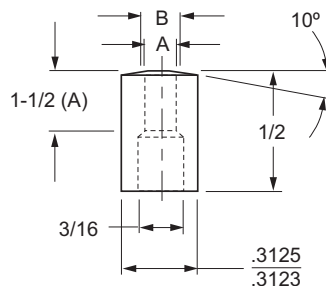
TECHNICAL DATA

Standard Sizes: Standard sizes in a given I.D. range are sizes listed in the decimal equivalent chart as a fraction, number or letter size. Any other decimal or millimeter size within a given range is considered special and will be priced accordingly.

Drill Bearing Length: 1-1/2 times the I.D. (A) diameter.

Hardness: RC 62-64

Note: Considered as special and not returnable.



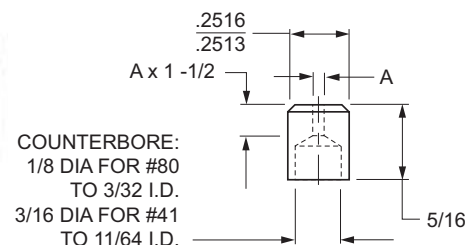
B = 5/32 (#80 THRU #41 I.D.)
B = 3/16 (#40 THRU 11/64 I.D.)

NOTE: For drill sizes, see the chart on page 1.6 in the information section.

CIRCUIT BOARD BUSHINGS - TYPE CB-1

for Electro-Mechano

A DRILL SIZE NOMINAL	A DRILL SIZE DECIMAL	PRICE CODE
#80 to #78	.0135 - .0160	181
#77 to #70	.0180 - .0280	164
#69 to 3/64	.0292 - .0469	151
#55 to 1/16	.0520 - .0625	134
#52 to 3/32	.0635 - .0937	130
#41 to 9/64	.0960 - .1406	117

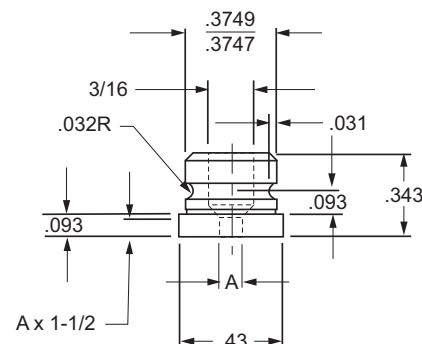


NOTE: For drill sizes, see the chart on page 1.6 in the information section.

CIRCUIT BOARD BUSHINGS - TYPE CB-2

for Excellon and Waco

A DRILL SIZE NOMINAL	A DRILL SIZE DECIMAL	PRICE CODE
#80 to #79	.0135 - .0145	151
1/64 to #75	.0156 - .0210	141
#74 to 1/32	.0225 - .0312	130
#67 to 3/64	.0320 - .0469	118
#55 to #41	.0520 - .0960	115
#40 to 9/64	.0990 - .1406	109



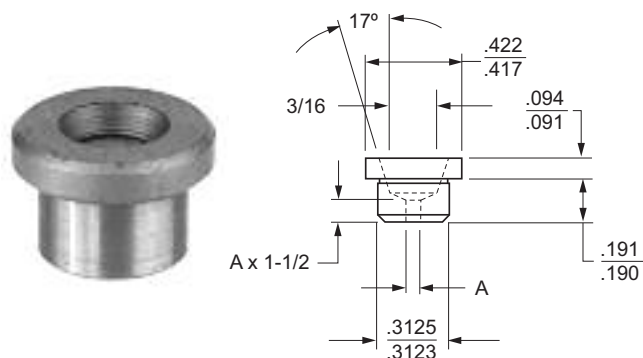
NOTE: For drill sizes, see the chart on page 1.6 in the information section.

CIRCUIT BOARD BUSHINGS - TYPE CB-3

for Digital

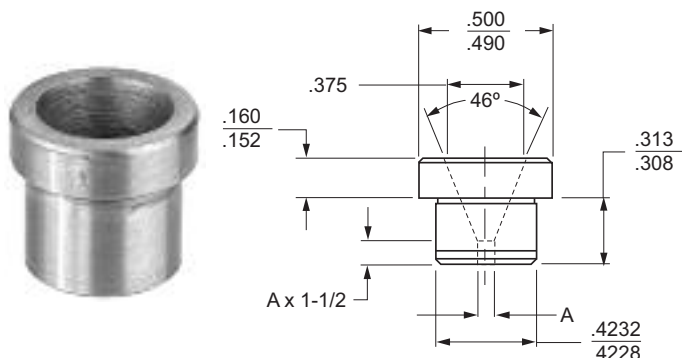
A DRILL SIZE NOMINAL	A DRILL SIZE DECIMAL	PRICE CODE
#80 to #78	.0135 - .0160	178
#77 to #70	.0180 - .0280	162
#69 to 3/64	.0292 - .0469	148
#55 to 1/16	.0520 - .0625	135
#52 to 3/32	.0635 - .0937	129
#41 to 9/64	.0960 - .1406	122

CIRCUIT BOARD BUSHINGS - TYPE CB



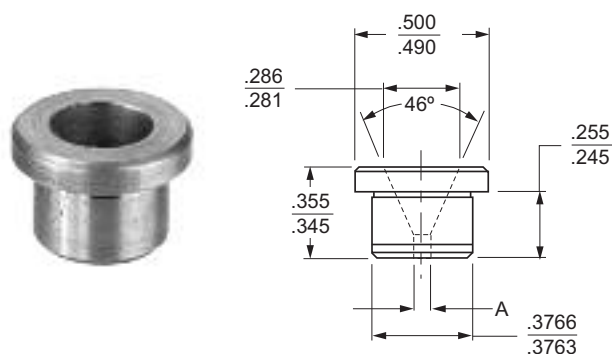
NOTE: For drill sizes, see the chart on page 1.6 in the information section.

CIRCUIT BOARD BUSHINGS - TYPE CB-4 for Nawide		
A DRILL SIZE NOMINAL	A DRILL SIZE DECIMAL	PRICE CODE
#80 to #78	.0135 - .0160	174
#77 to #70	.0180 - .0280	162
#69 to 3/64	.0292 - .0469	150
#55 to 1/16	.0520 - .0625	137
#52 to 3/32	.0635 - .0937	133
#41 to 9/64	.0960 - .1406	121



NOTE: For drill sizes, see the chart on page 1.6 in the information section.

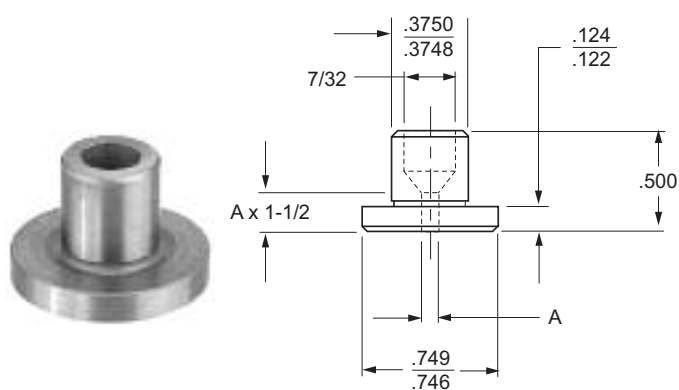
CIRCUIT BOARD BUSHINGS - TYPE CB-6 for Leland - Gifford		
A DRILL SIZE NOMINAL	A DRILL SIZE DECIMAL	PRICE CODE
#80 to #78	.0135 - .0160	236
#77 to #70	.0180 - .0280	216
#69 to 3/64	.0292 - .0469	190
#55 to 1/16	.0520 - .0625	167
#52 to 3/32	.0635 - .0937	160
#41 to 9/64	.0960 - .1406	151



NOTE: For drill sizes, see the chart on page 1.6 in the information section.

CIRCUIT BOARD BUSHINGS - TYPE CB-5 for Edlund and Tektronix		
A DRILL SIZE NOMINAL	A DRILL SIZE DECIMAL	PRICE CODE
#80 to #78	.0135 - .0160	178
#77 to #70	.0180 - .0280	162
#69 to 3/64	.0292 - .0469	148
#55 to 1/16	.0520 - .0625	132
#52 to 3/32	.0635 - .0937	127
#41 to 9/64	.0960 - .1406	122

Note: Considered as special and not returnable.



NOTE: For drill sizes, see the chart on page 1.6 in the information section.

CIRCUIT BOARD BUSHINGS - TYPE CB-7 for Palomar		
A DRILL SIZE NOMINAL	A DRILL SIZE DECIMAL	PRICE CODE
#80 to #78	.0135 - .0160	245
#77 to #70	.0180 - .0280	233
#69 to 3/64	.0292 - .0469	215
#55 to 1/16	.0520 - .0625	194
#52 to 3/32	.0635 - .0937	187
#41 to 9/64	.0960 - .1406	174

TEMPLATE BUSHINGS - TYPE TB

Template bushings are designed for economy and are primarily intended for thin template material varying from 1/16 to 3/8 inch thick. This provides low cost drill tooling. Template bushings are held in place by a retainer ring. The serration on the template bushing allows positive locking, which prevents bushing spin in the template.

A feature of the template bushing is that you can reuse it by simply breaking the aluminum retaining ring and removing it from the template.

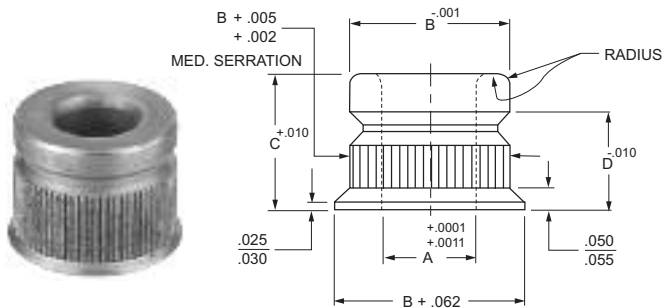
When ordering specify:

Example: Example of Retainer Ring for 1/8 inch Template.

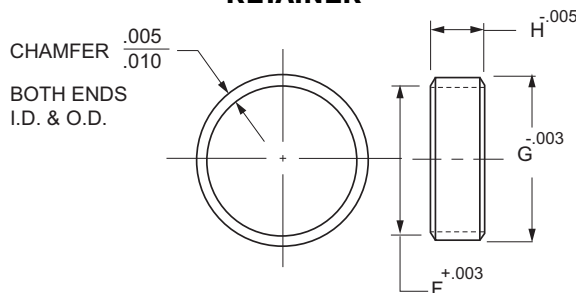
Quantity	Bushing Part No.	I.D.(A)	Part No
6	TB-24-6-4	5/32	TR-30

Note: Retainer rings are included with all template bushing orders.

TEMPLATE BUSHING



RETAINER



TECHNICAL DATA

Standard Sizes: All American has a complete range of sizes from 1/16 to 3/8 thick, drill sizes from #55 to 1/2 inch.

I.D. Tolerances - All American®:

Standard Drill Sizes	I.D.	Tolerances
#55-1/2	Nom	+ .0001 / + .0011

Concentricity: ID. to O.D. within .002 T.I.R..

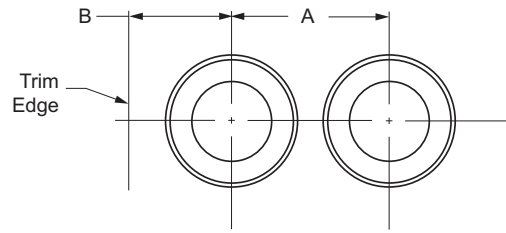
Radius: All American Bushings feature a blended radius at the drill entrance

Steel: C-1144

Hardness: Case hardened RC 61-65

Retainer Ring Material: Aluminum

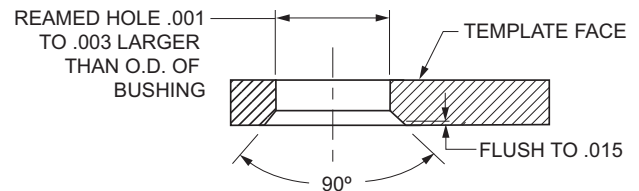
A - Layout: Edge distance and hole spacing limitations.



HOLE SPACING LIMITATIONS	
MINIMUM A DIMENSIONS	HOLE SPACING BUSHING O.D.
1.24	.999
.98	.749
.86	.624
.73	.499
.60	.374

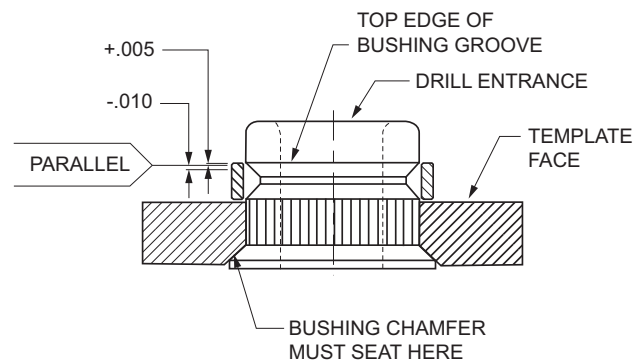
EDGE DISTANCE LIMITATIONS	
MINIMUM B DIMENSIONS	EDGE DISTANCE BUSHING O.D.
.563	.999
.438	.749
.375	.624
.312	.499
.250	.374

B - Countersink and Position: The reamed hole must be countersunk to permit the bushing to seat flush to .015 inside the surface of the template hole.



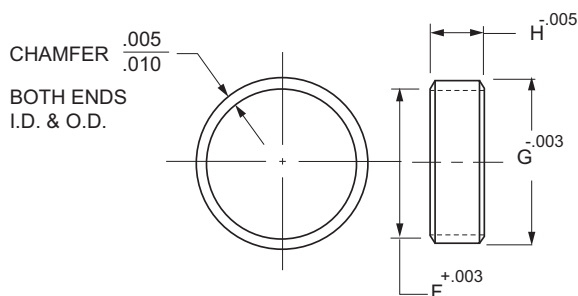
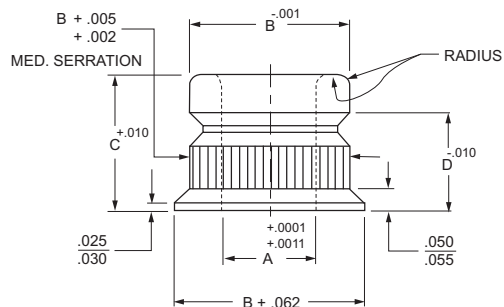
C - Installation: The Template bushing is ideally designed for installation by Arbor Press, Rivet Gun or other impact tools. The serrated body compensates for the varying impact pressure while locking positively and preventing bushing spin in the template or plastic tooling lay-out.

Please check the relative height of the aluminum ring with the bushing groove before securing.



Note: Considered as special and not returnable.

TEMPLATE BUSHINGS - TYPE TB

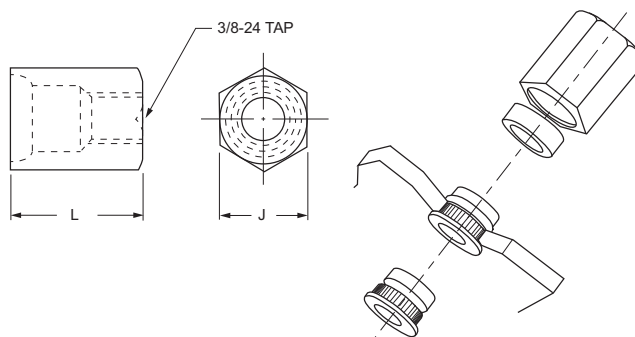


TEMPLATE BUSHINGS

A I.D. RANGE	B O.D. TOLERANCES	C	D	ANSI SYMBOL	RETAINER RINGS	
					P/N	TEMPLATE THICKNESS
#55 - #9 (.0520 - .1960) 1.30 - 5.00mm	.374	3/8	1/4	TB-24-6-4	TB-10	1/16
					TB-20	3/32
					TB-30	1/8
			5/16	TB-24-6-5	TB-10	1/8
					TB-30	3/16
					TB-10	1/8
		1/2	5/16	TB-24-8-5	TB-30	3/16
					TB-10	3/16
					TB-30	1/4
			3/8	TB-24-8-6	TB-10	1/4
					TB-30	5/16
					TB-40	1/16
#9 - 0 (.1960 - .3160) 5.00 - 8.00mm	.499	3/8	1/4	TB-32-6-4	TB-50	3/32
					TB-60	1/8
					TB-40	1/8
			5/16	TB-32-6-5	TB-60	3/16
					TB-40	1/8
					TB-60	3/16
		1/2	5/16	TB-32-8-5	TB-40	3/16
					TB-60	1/4
					TB-40	1/4
			3/8	TB-32-8-6	TB-60	5/16
					TB-40	5/16
					TB-60	3/8
		5/8	1/2	TB-32-10-8	TB-70	1/16
					TB-80	3/32
					TB-90	1/8
5/16 - 1/2 (.3125 - .5000) 8.00 - 12.00mm	.749	3/8	1/4	TB-48-6-4	TB-70	1/8
					TB-90	3/16
					TB-90	1/8
			5/16	TB-48-6-5	TB-70	1/8
					TB-90	3/16
					TB-90	1/4
		1/2	5/16	TB-48-8-5	TB-70	1/4
					TB-90	5/16
					TB-90	5/16
			3/8	TB-48-8-6	TB-70	1/4
					TB-90	5/16
					TB-90	3/8
		5/8	1/2	TB-48-10-8	TB-70	5/16
					TB-90	3/8
					TB-90	3/8

RETAINER RINGS

P/N	F	G	H
TR-10	.375	.468	.205
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

P/N	BUSHING SERIES	RETAINER RINGS	J	L	COMPLETE SET PART NUMBER
TBT-100	TB-24	TR-10	5/8	1	TBT-400
		TR-20			
		TR-30			
TBT-200	TB-32	TR-40	3/4	1	TBT-400
		TR-50			
		TR-60			
TBT-300	TB-48	TR-70	1	1	TBT-400
		TR-80			
		TR-90			

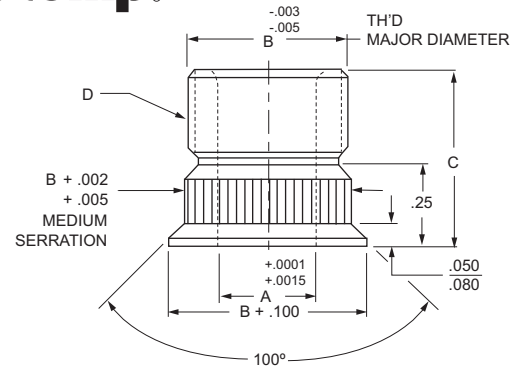
Note: Considered as special and not returnable.

FASTEMP THREADED TEMPLATE BUSHINGS

Fastemp Threaded Template bushings are designed for economy and are primarily intended for thin template material varying from 1/16 to 3/8 inch thick. This provides low cost drill tooling. Fastemp bushings are held in place by a retainer ring. The serrations on the bushing allow for positive locking. This prevents the bushing from spinning in the template.

A feature of the Threaded Template bushing is that you can reuse it by simply unscrewing the retaining ring and removing it from the template.

fastemp



When ordering specify:

Example: Example of Retainer Ring for 1/8 inch Template.

Quantity Bushing Part No. I.D.(A) Part No

6 THTB-24 5/32 THTR24-5

Note: Retainer rings are included with all template bushing orders.

THTB

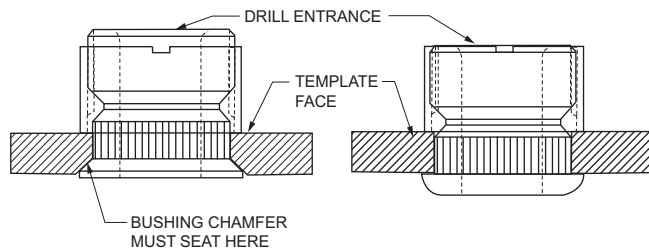


THTBF



**THREADED TEMPLATE
BUSHING**

**THREADED TEMPLATE
BUSHING WITH
FLANGED BOTTOM**



TECHNICAL DATA

Standard Sizes: All American has a complete range of sizes from 1/16 to 3/8 thick, drill sizes from #55 to 49/64 inch.

I.D. Tolerances:

Standard Drill Sizes	I.D.	Tolerances
#55-1/2	Nom	+0.001/+0.011

Concentricity: ID. to O.D. within .002 T.I.R..

Radius: All American Bushings feature a blended radius at the drill entrance

Steel: C-1144

Hardness: Case hardened RC 62-64

Retainer Ring Material: Aluminum

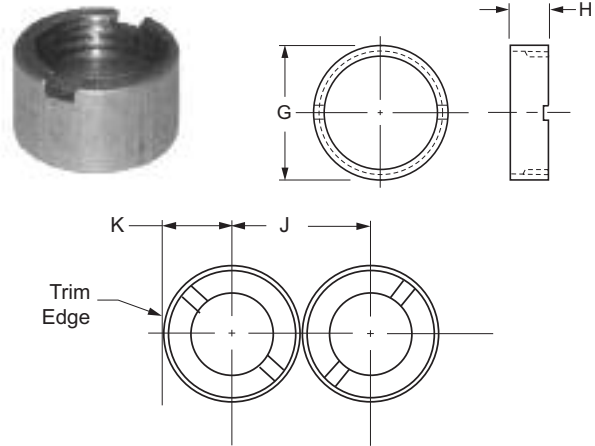
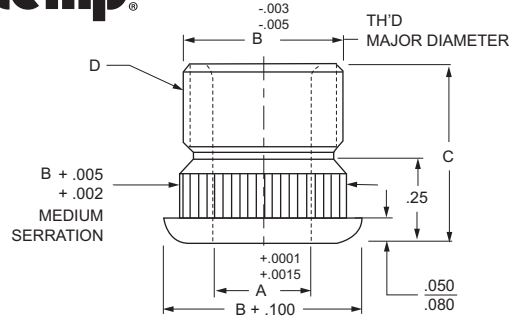
THREADED TEMPLATE BUSHINGS

A I.D. RANGE	B O.D. TOLERANCES	C	D	ANSI SYMBOL	RETAINER RINGS	
					P/N	TEMPLATE THICKNESS
#55 - #9 (.0520 - .1960) 1.30 - 5.00mm	.375	1/2	3/8-24 LH	THTB-24	THTR-24-6	3/64-1/8
					THTR-24-5	9/64-3/16
					THTR-24-3	13/64-3/8
#9 - 0 (.1960 - .3160) 5.00 - 8.00mm	.500	1/2	1/2-20 LH	THTB-32	THTR-32-6	3/64-1/8
					THTR-32-5	9/64-3/16
					THTR-32-3	13/64-3/8
5/16 - 7/16 (.3125 - .4375) 8.00 - 11.00mm	.625	1/2	5/8-18 LH	THTB-40	THTR-40-6	3/64-1/8
					THTR-40-5	9/64-3/16
					THTR-40-3	13/64-3/8
5/16-17/32 (.3125 - .5312) 8.00 - 11.00mm	.750	1/2	3/4-16 LH	THTB-48	THTR-48-6	3/64-1/8
					THTR-48-5	9/64-3/16
					THTR-48-3	13/64-3/8
1/2-49/64 (.5000 - .756) 13.00 - 19.00mm	1.000	5/8	1-1/4 LH	THTB-64	THTR-64-6	3/64-1/8
					THTR-64-5	9/64-3/16
					THTR-64-3	13/64-3/8

Note: Considered as special and not returnable.

FASTEMP THREADED TEMPLATE BUSHINGS

fastemp[®]



FLANGED THREADED TEMPLATE BUSHINGS

A I.D. RANGE	B O.D. TOLERANCES	C	D	ANSI SYMBOL	RETAINER RINGS	
					P/N	TEMPLATE THICKNESS
#55 - #9 (.0520 - .1960) 1.30 - 5.00mm	.375	1/2	3/8-24 LH	THTBF-24	THTR-24-6	3/64-1/8
					THTR-24-5	9/64-3/16
					THTR-24-3	13/64-3/8
#9 - 0 (.1960 - .3160) 5.00 - 8.00mm	.500	1/2	1/2-20 LH	THTBF-32	THTR-32-6	3/64-1/8
					THTR-32-5	9/64-3/16
					THTR-32-3	13/64-3/8
5/16 - 7/16 (.3125 - .4375) 8.00 - 11.00mm	.625	1/2	5/8-18 LH	THTBF-40	THTR-40-6	3/64-1/8
					THTR-40-5	9/64-3/16
					THTR-40-3	13/64-3/8
5/16-17/32 (.3125 - .5312) 8.00 - 11.00mm	.750	1/2	3/4-16 LH	THTBF-48	THTR-48-6	3/64-1/8
					THTR-48-5	9/64-3/16
					THTR-48-3	13/64-3/8
1/2-49/64 (.5000 - .756) 13.00 - 19.00mm	1.000	5/8	1-1/4 LH	THTBF-64	THTR-64-6	3/64-1/8
					THTR-64-5	9/64-3/16
					THTR-64-3	13/64-3/8

STANDARD WALL RETAINER RINGS

P/N	G	H	J - MIN HOLE SPACING	K - MIN EDGE SPACING
THTR-24-6	.500	3/8	.516	.250
THTR-24-5		5/16		
THTR-24-3		3/16		
THTR-32-6	.625	3/8	.641	.312
THTR-32-5		5/16		
THTR-32-3		3/16		
THTR-40-6	.750	3/8	.766	.375
THTR-40-5		5/16		
THTR-40-3		3/16		
THTR-48-6	1.000	3/8	1.016	.500
THTR-48-5		5/16		
THTR-48-3		3/16		
THTR-64-6	1.250	3/8	1.266	.625
THTR-64-5		5/16		
THTR-64-3		3/16		

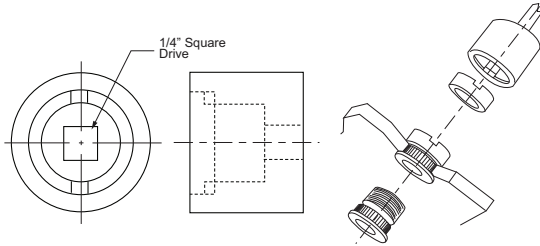
THIN WALL RETAINER RINGS

P/N	G	H	J - MIN HOLE SPACING	K - MIN EDGE SPACING
THTR-24-6-TW	.437	3/8	.453	.218
THTR-24-5-TW		5/16		
THTR-24-3-TW		3/16		
THTR-32-6-TW	.562	3/8	.578	.281
THTR-32-5-TW		5/16		
THTR-32-3-TW		3/16		
THTR-40-6-TW	.687	3/8	.703	.343
THTR-40-5-TW		5/16		
THTR-40-3-TW		3/16		
THTR-48-6-TW	.875	3/8	.890	.437
THTR-48-5-TW		5/16		
THTR-48-3-TW		3/16		
THTR-64-6-TW	1.125	3/8	1.140	.562
THTR-64-5-TW		5/16		
THTR-64-3-TW		3/16		

Note: Considered as special and not returnable.

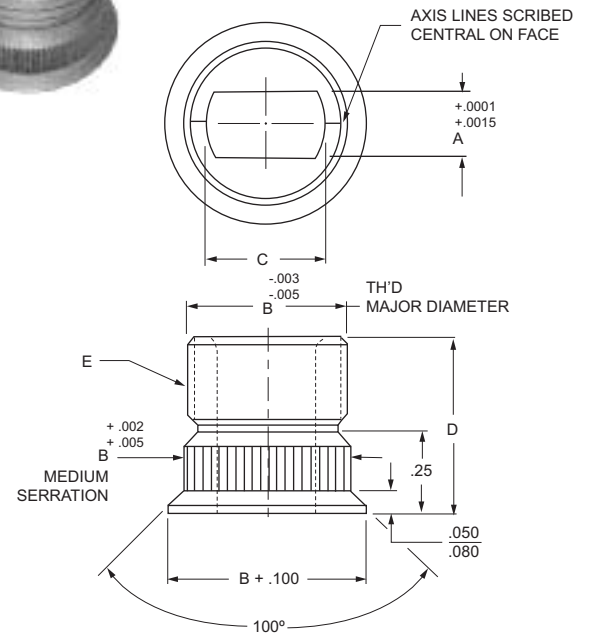


FASTEMP THREADED TEMPLATE BUSHINGS



INSTALLATION TOOLS

P/N	FOR INSTALLATION OF RETAINER RINGS		
THTBT-24	THTR-24-5	THTR-24-6	THTR-24-7
THTBT-32	THTR-32-5	THTR-32-6	THTR-32-7
THTBT-40	THTR-40-5	THTR-40-6	THTR-40-7
THTBT-48	THTR-48-5	THTR-48-6	THTR-48-7
THTBT-64	THTR-64-5	THTR-64-6	THTR-64-7



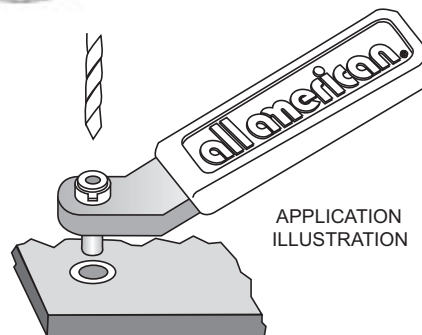
THREADED TEMPLATE LOCATOR BUSHINGS

P/N	A	B O.D.	C	D	E	RETAINER RINGS			
						P/N	TEMPLATE THICKNESS		
THTL-40-1/8	1/8 .1251	.625	1/4	1/2	5/8-18 LH	THTR-40-6	1/64-1/8		
						THTR-40-5	9/64-3/16		
						THTR-40-3	13/64-3/8		
THTR-40-6	1/64-1/8								
THTR-40-5	9/64-3/16								
THTR-40-3	13/64-3/8								
THTL-40-#30	#30 .1286		3/8	1/2	5/8-18 LH	THTR-40-6	1/64-1/8		
						THTR-40-5	9/64-3/16		
						THTR-40-3	13/64-3/8		
THTR-40-6	1/64-1/8								
THTR-40-5	9/64-3/16								
THTR-40-3	13/64-3/8								
THTL-40-#20	#20 .1611		3/8	1/2	5/8-18 LH	THTR-40-6	1/64-1/8		
						THTR-40-5	9/64-3/16		
						THTR-40-3	13/64-3/8		
THTR-40-6	1/64-1/8								
THTR-40-5	9/64-3/16								
THTR-40-3	13/64-3/8								
THTL-40-3/16	3/16 .1876	3/8	1/2	5/8-18 LH	THTR-40-6	1/64-1/8			
					THTR-40-5	9/64-3/16			
					THTR-40-3	13/64-3/8			
THTR-40-6	1/64-1/8								
THTR-40-5	9/64-3/16								
THTR-40-3	13/64-3/8								
THTL-40-#10	#10 .1936	3/8	1/2	5/8-18 LH	THTR-40-6	1/64-1/8			
					THTR-40-5	9/64-3/16			
					THTR-40-3	13/64-3/8			
THTR-40-6	1/64-1/8								
THTR-40-5	9/64-3/16								
THTR-40-3	13/64-3/8								
THTL-40-1/4	1/4 .2501	3/8	1/2	5/8-18 LH	THTR-40-6	1/64-1/8			
					THTR-40-5	9/64-3/16			
					THTR-40-3	13/64-3/8			
THTR-48-6	1/64-1/8								
THTL-48-5/16	5/16 .3126				.750	1/2	3/4-16 LH	THTR-48-5	9/64-3/16
								THTR-48-3	13/64-3/8
		THTR-48-6	1/64-1/8						
THTR-48-5	9/64-3/16								
THTR-48-3	13/64-3/8								
THTR-48-6	1/64-1/8								
THTL-48-3/8	3/8 .3751	5/8	1/2	3/4-16 LH	THTR-48-5	9/64-3/16			
					THTR-48-3	13/64-3/8			
					THTR-48-6	1/64-1/8			
THTR-48-5	9/64-3/16								
THTR-48-3	13/64-3/8								
THTR-48-6	1/64-1/8								
THTL-48-1/2	1/2 .5001	1.000	3/4	5/8	1"-14 LH	THTR-64-6	1/64-1/8		
						THTR-64-5	9/64-3/16		
						THTR-64-3	13/64-3/8		
THTR-64-6	1/64-1/8								
THTR-64-5	9/64-3/16								
THTR-64-3	13/64-3/8								
THTL-64-5/8	5/8 .6251	13/16	3/4	5/8	1"-14 LH	THTR-64-6	1/64-1/8		
						THTR-64-5	9/64-3/16		
						THTR-64-3	13/64-3/8		
THTR-64-6	1/64-1/8								
THTR-64-5	9/64-3/16								
THTR-64-3	13/64-3/8								
THTL-64-3/4	3/4 .7501	13/16	3/4	5/8	1"-14 LH	THTR-64-6	1/64-1/8		
						THTR-64-5	9/64-3/16		
						THTR-64-3	13/64-3/8		
THTR-64-6	1/64-1/8								
THTR-64-5	9/64-3/16								
THTR-64-3	13/64-3/8								

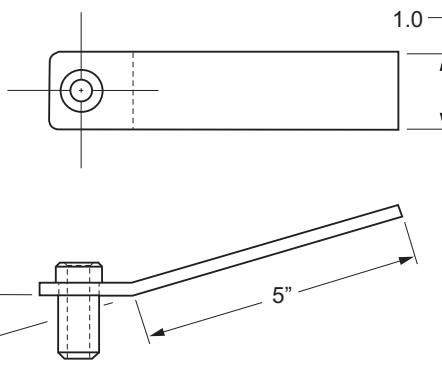
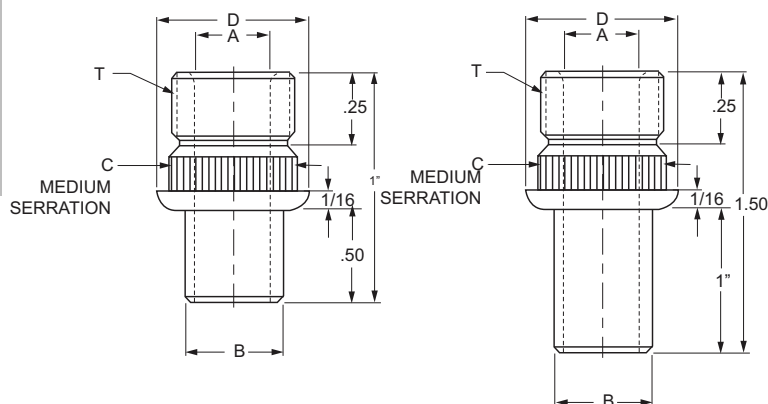
fastemp

The All American handle bushing, with the replaceable Fastemp bushing, is a portable bushing holder which is excellent for drilling holes that are hard to reach with stationary tooling. Unlike the type HB handle bushing, the Fastemp bushing is readily replaceable. A wide range of I.D. sizes and lengths are available.

WHEN ORDERING: please specify the part Number, the I.D. and length. Add a "L" to the end of the part number for the 1" bushing length. Handle bushings will be priced upon request by All American.



APPLICATION
ILLUSTRATION



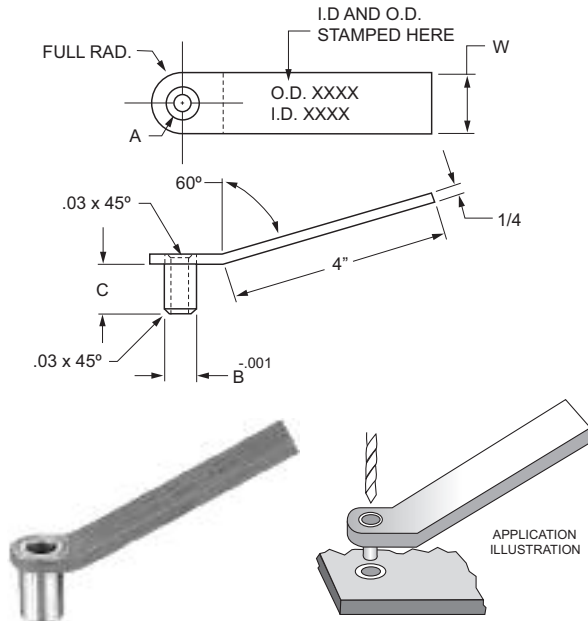
THREADED TEMPLATE HANDLE BUSHINGS

A NOMINAL	A ACTUAL	B NOMINAL	B ACTUAL	C	D	T	ANSI SYMBOL	RETAINER RING P/N
#55 - 1/16	.0520 - .0625	5/32	.1552 - .1542	3/8	15/32	3/8-24	HBTH-2410	THTR-24-6
#55 - #39	.0520 - .0995	3/16	.1865 - .1855	3/8	15/32	3/8-24	HBTH-2412	THTR-24-6
#55 - #39	.0520 - .0995	13/64	.2021 - .2011	3/8	15/32	3/8-24	HBTH-2413	THTR-24-6
#40 - #28	.0980 - .1405	1/4	.2490 - .2480	3/8	15/32	3/8-24	HBTH-2416	THTR-24-6
1/8 - #10	.1250 - .1935	5/16	.3115 - .3105	3/8	15/32	3/8-24	HBTH-2420	THTR-24-6
1/8 - #10	.1250 - .1935	3/8	.3740 - .3730	3/8	15/32	3/8-24	HBTH-2424	THTR-24-6
#10 - 1	.1935 - .2280	5/16	.3115 - .3105	1/2	19/32	1/2-20	HBTH-3220	THTR-32-6
#10 - 1	.1935 - .2280	3/8	.3740 - .3730	1/2	19/32	1/2-20	HBTH-3224	THTR-32-6
3/16 - F	.1875 - .2570	13/32	.4052 - .4042	1/2	19/32	1/2-20	HBTH-3226	THTR-32-6
A - L	.2340 - .2900	7/16	.4365 - .4355	1/2	19/32	1/2-20	HBTH-3228	THTR-32-6
3/16 - O	.1875 - .3160	1/2	.4990 - .4980	1/2	19/32	1/2-20	HBTH-3232	THTR-32-6
M - 11/32	.2950 - .3437	9/16	.5615 - .5605	5/8	23/32	5/8-18	HBTH-4036	THTR-40-6
5/16 - 7/16	.3125 - .4375	5/8	.6240 - .6230	5/8	23/32	5/8-18	HBTH-4040	THTR-40-6
5/16 - 17/32	.3125 - .5312	3/4	.7490 - .7480	3/4	27/32	3/4-16	HBTH-4848	THTR-48-6
1/2 - 49/64	.5000 - .7656	1	.9990 - .9980	1	1-3/32	1"-14	HBTH-6464	THTR-64-6

HANDLE BUSHINGS - TUNGSTEN CARBIDE

The All American handle bushing is a portable bushing holder which is excellent for drilling holes that are hard to reach with stationary tooling. A wide range of I.D. sizes and lengths are available.

WHEN ORDERING: please specify the I.D., O.D. and length. Handle bushings will be priced upon request by All American.



HANDLE BUSHINGS								
A - I.D. RANGE Drill Size Decimal Range	B - O.D. TOLERANCE Nominal DIGITAL EQUIVALENT	C - LENGTH						W
		5/16	3/8	1/2	5/8	3/4	1	
#55 - 1/16 (.0520 - .0625)	5/32 .1552	•	•					3/4
#55 - #39 (.625 - .0995)	3/16 .1865	•	•	•				3/4
#40 - 9/64 (.0980 - .1406)	1/4 .2490	•	•	•	•	•	•	3/4
1/8 - #10 (.1250 - .1935)	5/16 .3115		•	•	•	•	•	3/4
#10 - #1 (.1935 - .2280)	3/8 .3740		•	•	•	•	•	3/4
3/16 - F (.1875 - .2570)	13/32 .4052		•	•	•	•	•	3/4
A - L (.2340 - .2900)	7/16 .4365		•	•	•	•	•	3/4
3/16 - O (.1875 - .3160)	1/2 .4990		•	•	•	•	•	1
M - 11/32 (.2950 - .3437)	9/16 .5615			•	•	•	•	1
5/16 - 7/16 (.3125 - .4375)	5/8 .6240			•	•	•	•	1
5/16 - 17/32 (.3125 - .5312)	3/4 .7490			•	•	•	•	1

TUNGSTEN CARBIDE HEADLESS PRESS FIT - TYPE PC For Photographs and Drawings see page 2.6			
A - I.D. RANGE Drill Size Decimal Range	B - O.D. TOLERANCE Nominal DIGITAL RANGE	C	ANSI SYMBOL
#70 - #56 (.0280 - .0465) .75 - 1.15mm	5/32 .1578 .1575	5/16	PC-10-5
		1/2	PC-10-8
3/64 - 1/16 (.0469 - .0425) 1.20 - 1.55mm	5/32 .1578 .1575	5/16	PC-10-5
		1/2	PC-10-8
#54 - #39 (.0550 - .0995) 1.40 - 2.50mm	13/64 .2046 .2043	5/16	PC-13-5
		1/2	PC-13-8
#39 - #29 (.0995 - .1360) 2.55 - 3.40mm	1/4 .2516 .2513	5/16	PC-16-5
		1/2	PC-16-8
#30 - 3/16 (.1285 - .1875) 3.30 - 4.75mm	5/16 .3141 .3138	5/16	PC-20-5
		1/2	PC-20-8
		3/4	PC-20-12
		1	PC-20-16

TUNGSTEN CARBIDE HEADLESS PRESS FIT - TYPE PC For Photographs and Drawings see page 2.6			
A - I.D. RANGE Drill Size Decimal Range	B - O.D. TOLERANCE Nominal DIGITAL RANGE	C	ANSI SYMBOL
3/16 - 1/4 (.1875 - .2500) 4.80 - 6.30mm	13/32 .4078 .4075	5/16	PC-26-5
		1/2	PC-26-8
		3/4	PC-26-12
		1	PC-26-16
7/32 - 5/16 (.2187 - .3125) 5.60 - 7.90mm	1/2 .5017 .5014	5/16	PC-32-5
		1/2	PC-32-8
		3/4	PC-32-12
		1	PC-32-16
5/16 - 27/64 (.3125 - .4219) 8.00 - 10.50mm	5/8 .6267 .6264	1-3/8	PC-32-22
		1/2	PC-40-8
		3/4	PC-40-12
		1	PC-40-16
3/8 - 1/2 (.3750 - .5000) 9.60 - 12.50mm	3/4 .7518 .7515	1-3/8	PC-40-22
		1/2	PC-48-8
		3/4	PC-48-12
		1	PC-48-16
		1-3/8	PC-48-22

All Carbide Bushings are specials and not returnable.
All Carbide Bushings have no counterbore.

Note: Type H, SF and F have carbide bodies and steel heads.

Prices available upon request.

TUNGSTEN CARBIDE - TYPE PC & HC

TUNGSTEN CARBIDE HEADLESS PRESS FIT - TYPE PC

For Photographs and Drawings see page 2.6

A - I.D. RANGE Drill Size Decimal Range	B - O.D. TOLERANCE Nominal DIGITAL RANGE	C	ANSI SYMBOL
1/2 - 5/8 (.50000 - .6250) 13.00 - 15.50mm	7/8 .8768 .8765	1/2	PC56-8
		3/4	PC56-12
		1	PC56-16
		1-3/8	PC56-22
		1-3/4	PC56-28
1/2 - 3/4 (.50000 - .7500) 13.00 - 19.00mm	1 1.0018 1.0015	1/2	PC64-8
		3/4	PC64-12
		1	PC64-16
		1-3/8	PC64-22
		1-3/4	PC64-28
3/4 - 1 (.7500 - 1.0000) 19.50 - 25.00mm	1-3/8 1.3772 1.3768	3/4	PC88-12
		1	PC88-16
		1-3/8	PC88-22
		1-3/4	PC88-28
		2-1/8	PC88-34
1 - 1-3/8 (1.0000 - 1.3750) 26.00 - 34.00mm	1-3/4 1.7523 1.7519	2-1/2	PC88-40
		1	PC-112-16
		1-3/8	PC-112-22
		1-3/4	PC-112-28
		2-1/8	PC-112-34
1-3/8 - 1-3/4 (1.3750 - 1.7500) 35.00 - 44.00mm	2-1/4 2.2525 2.2521	2-1/2	PC-112-40
		3	PC-112-48
		1	PC-144-16
		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

TUNGSTEN CARBIDE HEAD PRESS FIT - TYPE HC

For Photographs and Drawings see page 2.10

A - I.D. RANGE Drill Size Decimal Range	B - O.D. TOLERANCE Nominal DIGITAL RANGE	C	ANSI SYMBOL
#70 - #56 (.0280 - .0465) .75 - 1.15mm	5/32 .1578 .1575	5/16	HC-10-5
		1/2	HC-10-8
3/64 - 1/16 (.0469 - .0425) 1.20 - 1.55mm	5/32 .1578 .1575	5/16	HC-10-5
		1/2	HC-10-8
#54 - #39 (.0550 - .0995) 1.40 - 2.50mm	13/64 .2046 .2043	5/16	HC-13-5
		1/2	HC-13-8
#39 - #29 (.0995 - .1360) 2.55 - 3.40mm	1/4 .2516 .2513	5/16	HC-16-5
		1/2	HC-16-8

TUNGSTEN CARBIDE HEAD PRESS FIT - TYPE HC

For Photographs and Drawings see page 2.10

A - I.D. RANGE Drill Size Decimal Range	B - O.D. TOLERANCE Nominal DIGITAL RANGE	C	ANSI SYMBOL
#30 - 3/16 (.1285 - .1875) 3.30 - 4.75mm	5/16 .3141 .3138	5/16	HC-20-5
		1/2	HC-20-8
		3/4	HC-20-12
		1	HC-20-16
3/16 - 1/4 (.1875 - .2500) 4.80 - 6.30mm	13/32 .4078 .4075	5/16	HC-26-5
		1/2	HC-26-8
		3/4	HC-26-12
		1	HC-26-16
7/32 - 5/16 (.2187 - .3125) 5.60 - 7.90mm	1/2 .5017 .5014	5/16	HC-32-5
		1/2	HC-32-8
		3/4	HC-32-12
		1	HC-32-16
5/16 - 27/64 (.3125 - .4219) 8.00 - 10.50mm	5/8 .6267 .6264	1-3/8	HC-32-22
		1/2	HC-40-8
		3/4	HC-40-12
		1	HC-40-16
3/8 - 1/2 (.3750 - .5000) 9.60 - 12.50mm	3/4 .7518 .7515	1-3/8	HC-40-22
		1/2	HC-48-8
		3/4	HC-48-12
		1	HC-48-16
1/2 - 5/8 (.5000 - .6250) 13.00mm - 15.50mm	7/8 .8768 .8765	1-3/8	HC-48-22
		1/2	HC-56-8
		3/4	HC-56-12
		1	HC-56-16
1/2 - 3/4 (.5000 - .7500) 13.00 - 19.00mm	1 1.0018 1.0015	1-3/8	HC-56-22
		1-3/4	HC-56-28
		1/2	HC-64-8
		3/4	HC-64-12
3/4 - 1 (.7500 - 1.0000) 19.50 - 25.00mm	1-3/8 1.3772 1.3768	1	HC-64-16
		1-3/8	HC-64-22
		1-3/4	HC-64-28
		3/4	HC-88-12
1 - 1-3/8 (1.0000 - 1.3750) 26.00 - 34.00mm	1-3/4 1.7523 1.7519	1	HC-88-16
		1-3/8	HC-88-22
		1-3/4	HC-88-28
		2-1/8	HC-88-34
1-3/8 - 1-3/4 (1.3750 - 1.7500) 35.00 - 44.00mm	2-1/4 1.7523 1.7519	2-1/2	HC-88-40
		1	HC-112-12
		1-3/8	HC-112-16
		1-3/4	HC-112-22
		2-1/8	HC-112-28
		2-1/2	HC-112-34
		3	HC-112-40
		1	HC-144-16
		1-3/8	HC-144-22
		1-3/4	HC-144-28
		2-1/8	HC-144-34
		2-1/2	HC-144-40
		3	HC-144-48

All Carbide Bushings are specials and not returnable.
All Carbide Bushings have no counterbore.

Note: Type H, SF and F have carbide bodies and steel heads.

Prices available upon request.

TUNGSTEN CARBIDE - TYPE SFC & FC

TUNGSTEN CARBIDE SLIP FIXED RENEWABLE - TYPE SFC			
For Photographs and Drawings see page 2.14			
A - I.D. RANGE Drill Size Decimal Range	B - O.D. TOLERANCE Nominal DIGITAL RANGE	C	ANSI SYMBOL
#55 - #43 (.0520 - .0890) 1.35 2.35mm	5/16 .3125 .3123	5/16	SFC - 20-5
		1/2	SFC - 20-8
		3/4	SFC - 20-12
		1	SFC - 20-16
#42 - 5/32 (.0935 - .1562) 2.40 - 3.90mm	5/16 .3125 .3123	5/16	SFC - 20-5
		1/2	SFC - 20-8
		3/4	SFC - 20-12
		1	SFC - 20-16
9/64 - 3/16 (.1406 - .1875) 3.60 - 4.75mm	1/2 .5000 .4998	5/16	SFC - 32-5
		1/2	SFC - 32-8
		3/4	SFC - 32-12
		1	SFC - 32-16
		1-3/8	SFC - 32-22
#12 - 11/32 (.1890 - .3437) 4.80 - 8.70mm	1/2 .5000 .4998	5/16	SFC - 32-5
		1/2	SFC - 32-8
		3/4	SFC - 32-12
		1	SFC - 32-16
		1-3/8	SFC - 32-22
9/32 - 17/32 (.2812 - .5312) 7.20 - 13.00mm	3/4 .7500 .7498	1/2	SFC - 48-8
		3/4	SFC - 48-12
		1	SFC - 48-16
		1-3/8	SFC - 48-22
15/32 - 25/32 (.4687 - .7812) 12.00 - 19.50mm	1 1.0000 .9998	1/2	SFC - 64-8
		3/4	SFC - 64-12
		1	SFC - 64-16
		1-3/8	SFC - 64-22
		1-3/4	SFC - 64-28
23/32 - 1-1/32 (.7187 - 1.0312) 18.50 - 27.00mm	1-3/8 1.3750 1.3747	3/4	SFC - 88-12
		1	SFC - 88-16
		1-3/8	SFC - 88-22
		1-3/4	SFC - 88-28
		2-1/8	SFC - 88-34
31/23 - 1-13/32 (.9687 - 1.4062) 25.00 - 35.00mm	1-3/4 1.7500 1.7498	2-1/2	SFC - 88-40
		1	SFC - 112-16
		1-3/8	SFC - 112-22
		1-3/4	SFC - 112-28
		2-1/8	SFC - 112-34
		2-1/2	SFC - 112-40
1-11/32 - 1-25/32 (1.3437 - 1.7812) 35.00 - 45.00mm	2-1/4 2.2500 2.2496	3	SFC - 112-48
		1	SFC - 144-16
		1-3/8	SFC - 114-22
		1-3/4	SFC - 114-28
		2-1/8	SFC - 114-34
		2-1/2	SFC - 144-40
		3	SFC - 114-48

TUNGSTEN CARBIDE FIXED RENEWABLE - TYPE FC			
For Photographs and Drawings see page 2.18			
A - I.D. RANGE Drill Size Decimal Range	B - O.D. TOLERANCE Nominal DIGITAL RANGE	C	ANSI SYMBOL
#55 - #43 (.0520 - .0890) 1.35 - 2.35mm	5/16 .3125 .3123	5/16	FC - 20-5
		1/2	FC - 20-8
		3/4	FC - 20-12
		1	FC - 20-16
#42 - 5/32 (.0935 - .1562) 2.40 - 3.90mm	5/16 .3125 .3123	5/16	FC - 20-5
		1/2	FC - 20-8
		3/4	FC - 20-12
		1	FC - 20-16
9/64 - 3/16 (.1406 - .1875) 3.60 - 4.75mm	1/2 .5000 .4998	5/16	FC - 32-5
		1/2	FC - 32-8
		3/4	FC - 32-12
		1	FC - 32-16
		1-3/8	FC - 32-22
#12 - 11/32 (.1890 - .3437) 4.80 - 8.70mm	1/2 .5000 .4998	5/16	FC - 32-5
		1/2	FC - 32-8
		3/4	FC - 32-12
		1	FC - 32-16
		1-3/8	FC - 32-22
9/32 - 17/32 (.2812 - .5312) 7.20 - 13.00mm	3/4 .7500 .7498	1/2	FC - 48-8
		3/4	FC - 48-12
		1	FC - 48-16
		1-3/8	FC - 48-22
15/32 - 25/32 (.4687 - .7812) 12.00 - 19.50mm	1 1.0000 .9998	1/2	FC - 64-8
		3/4	FC - 64-12
		1	FC - 64-16
		1-3/8	FC - 64-22
		1-3/4	FC - 64-28
23/32 - 1-1/32 (.7187 - 1.0312) 18.50 - 27.00mm	1-3/8 1.3750 1.3747	3/4	FC - 88-12
		1	FC - 88-16
		1-3/8	FC - 88-22
		1-3/4	FC - 88-28
		2-1/8	FC - 88-34
31/23 - 1-13/32 (.9687 - 1.4062) 25.00 - 35.00mm	1-3/4 1.7500 1.7498	2-1/2	FC - 88-40
		1	FC - 112-16
		1-3/8	FC - 112-22
		1-3/4	FC - 112-28
		2-1/8	FC - 112-34
		2-1/2	FC - 112-40
1-11/32 - 1-25/32 (1.3437 - 1.7812) 35.00 - 45.00mm	2-1/2 2.2500 2.2496	3	FC - 112-48
		1	FC - 144-16
		1-3/8	FC - 114-22
		1-3/4	FC - 114-28
		2-1/8	FC - 114-34
		2-1/2	FC - 144-40
		3	FC - 114-48

All Carbide Bushings are specials and not returnable.
All Carbide Bushings have no counterbore.

Note: Type H, SF and F have carbide bodies and steel heads.

Prices available upon request.

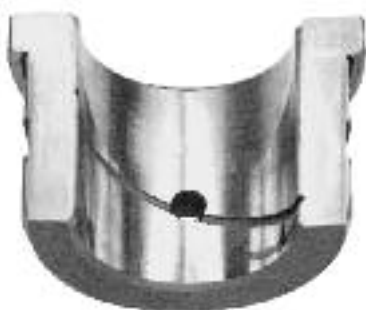
OIL GROOVE BUSHINGS - TYPE OG

Oil Groove Bushings are used when bushing applications require lubrication. They may be considered in any A.N.S.I. or All American standard drill bushing. **Oil Impregnated bushings are available on request.**

When ordering specify:

Example:

Quantity	Bushing Type	I.D.(A)	O.D.(B)	Length(C)	Oil Groove Type	Wiper Style
6	P	3/4"	1"	1"	AJ	AAA



TECHNICAL DATA

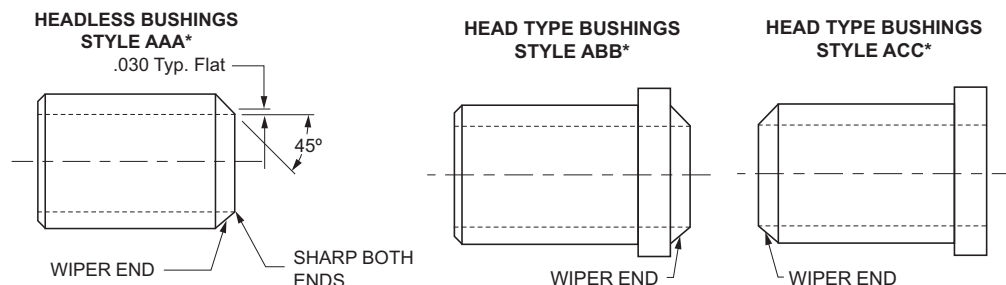
Select from 25 different types of oil grooves as shown in this section. Internal dimensions range from 1/2" minimum. to 6" maximum. The length ranges from 1/2" minimum. to 6" maximum. Oil grooves are 3/64" wide by 3/64" deep. Oil holes are 1/4" in diameter. Outer diameter grooves are 5/16" wide. Bushings with any of the following three conditions will have 3/16" wide by 1/32" deep O.D. grooves and oil holes of 1/8":

1. I.D. is 1" or less.
2. O.D. is 1" or less.
3. Length is 1" or less

WIPER DESIGNS

To guard against dirt and/or chips, merely add the appropriate wiper style with your order.

WIPER STYLES AVAILABLE

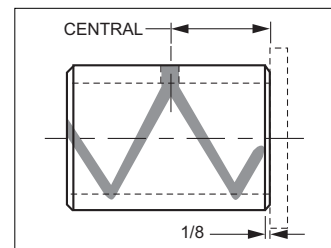


* The wiper for all styles will be furnished when the wall thickness exceeds 1/4"

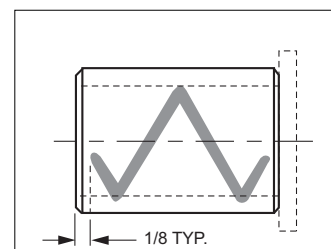
Note: The oil groove should never break out at the wiper end of the bushing

Note: We reserve the right to make changes and improvements that may be desirable.

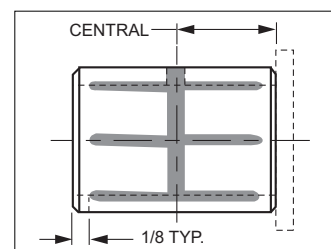
Note: Oil Impregnated bushings are available on request.



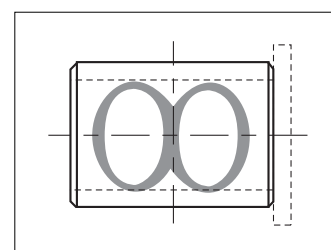
STYLE AA: With oil hole. Breaks out on bottom end only.



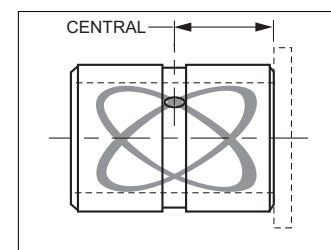
STYLE AF: Does not break out on either end.



STYLE AL: With oil hole. Does not break out.



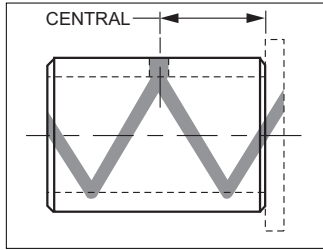
STYLE AQ: Figure eight.



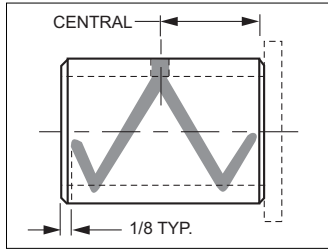
STYLE AV: With oil groove and hole. Double loop.

OIL GROOVE BUSHINGS - TYPE OG

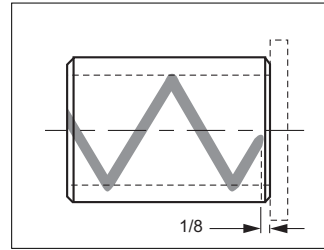
OIL GROOVE STYLES AVAILABLE



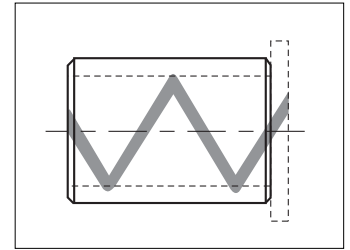
STYLE AB: With oil hole. Breaks out on both ends.



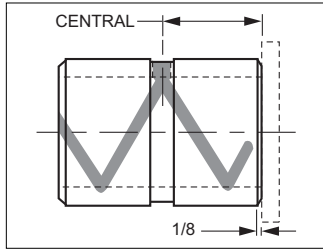
STYLE AC: With oil hole. Does not break out on either end.



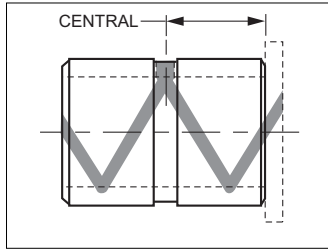
STYLE AD: Breaks out bottom end only.



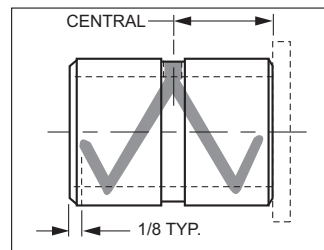
STYLE AE: Breaks out on both ends.



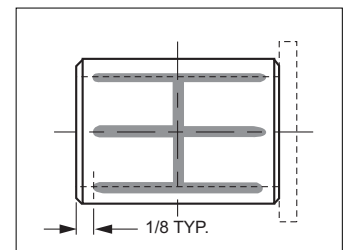
STYLE AG: With oil groove and hole. Breaks out on the bottom end.



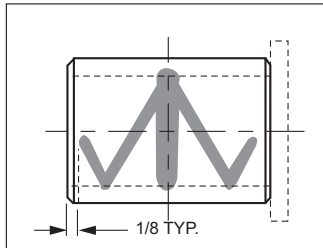
STYLE AH: With oil groove and hole. Breaks out on both ends.



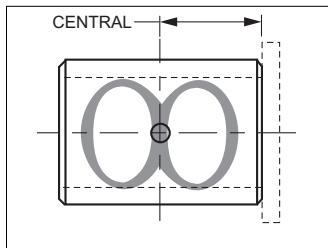
STYLE AJ: With oil groove and hole. Does not break out.



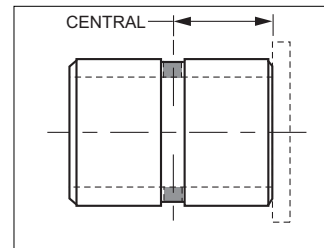
STYLE AK: Does not break out



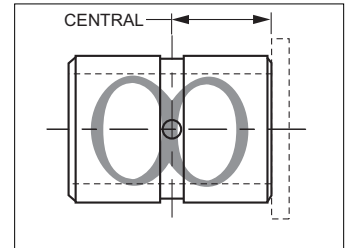
STYLE AM: Does not break out. With I.D. groove.



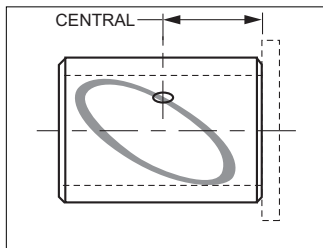
STYLE AN: With oil hole. Figure eight.



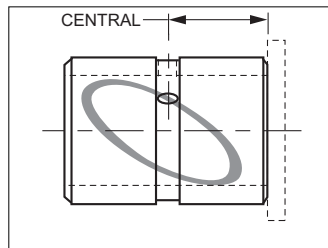
STYLE AO: With oil groove and two holes.



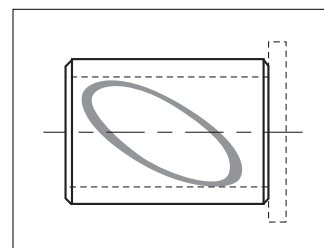
STYLE AP: With oil groove and hole. Figure eight.



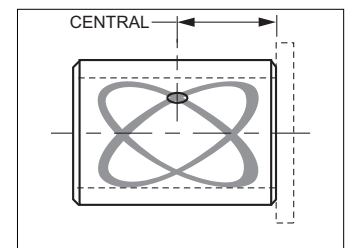
STYLE AR: With oil hole. Single loop



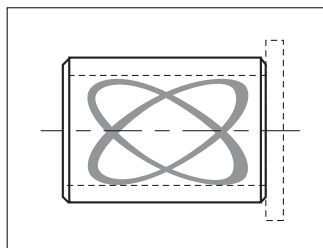
STYLE AS: With oil groove and hole. Single Loop.



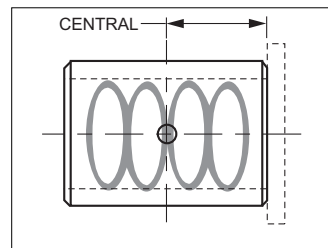
STYLE AT: Single loop.



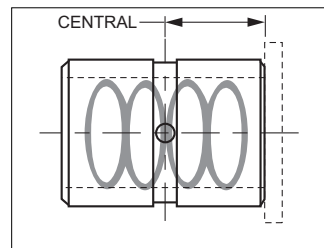
STYLE AU: With oil hole. Double loop.



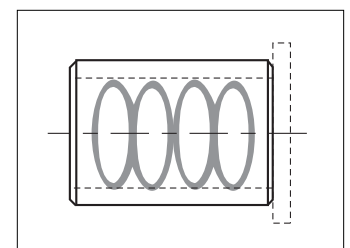
STYLE AW: Double loop.



STYLE AX: With oil hole. Double figure eight.



STYLE AY: With oil groove and hole. Double figure eight.



STYLE AZ: Double figure eight.

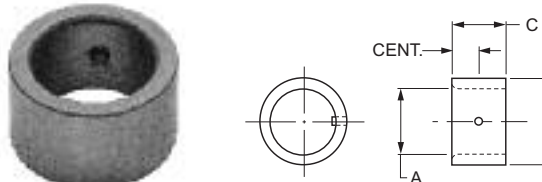
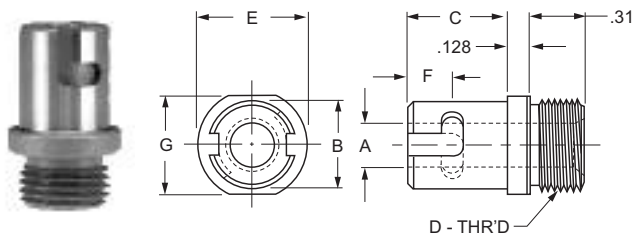
ANDREWS TOOL COMPANY.

ATC-PFO SERIES MOTOR SET UP SHEET.

Pin locking bushings designed for use in drill motor
ATC-PFO-P344.

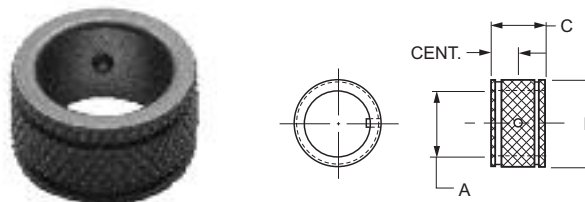
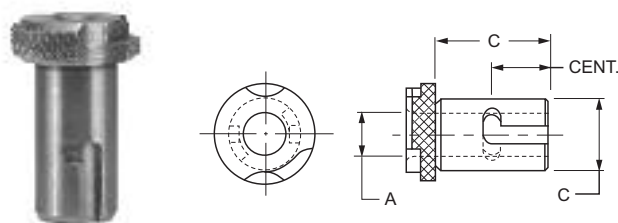
Matching liner bushing may be either diamond groove for
embedment in epoxy or press fit type for permanent fixturing
PLLB-DGL-48-8 with pin
PLLB L48-8 with pin

PATENT PENDING



BUSHING								
A I.D. RANGE	B O.D. RANGE	C	D	E	F	G	P/N	PRICE CODE
.0937 .1250	3/8 .3748 - .3745	.562	1/2-20 LH	5/8	.251	9/16	PLB-01	164
		.812			.376		PLB-05	164
		1.062			.501		PLB-09	164
.0937 .2505	1/2 .4998 - .4995	.562	1/2-20 LH	5/8	.251	9/16	PLB-02	164
		.812			.376		PLB-06	164
		1.0612			.501		PLB-10	164
.0937 .3750	5/8 .6248 - .6245	.562	3/4-16 LH	7/8	.251	13/16	PLB-03	175
		.812			.376		PLB-07	175
		1.062			.501		PLB-11	175
.1875 .5000	3/4 .7498 - .7495	.562	3/4-16 LH	7/8	.251	13/16	PLB-04	175
		.812			.376		PLB-08	175
		1.062			.501		PLB-12	175

PRESS FIT LINER				
A I.D. RANGE	B O.D. RANGE	C	P/N	PRICE CODE
3/8	5/8	1/2	PLLB-L-40-8	138
		3/4	PLLB-L-40-12	141
		1	PLLB-L-40-16	142
1/2	3/4	1/2	PLLB-L-48-8	141
		3/4	PLLB-L-48-12	142
		1	PLLB-L-48-16	147
5/8	7/8	1/2	PLLB-L-56-8	149
		3/4	PLLB-L-56-12	150
		1	PLLB-L-56-16	151
3/4	1	1/2	PLLB-L-64-8	150
		3/4	PLLB-L-64-12	150
		1	PLLB-L-64-16	152



SLIP FIXED RENEWABLE				
A I.D. RANGE	B O.D. RANGE	C	P/N	PRICE CODE
.1405 - .2505	1/2	1/2	PLSF-32-8	142
		3/4	PLSF-32-12	147
		1	PLSF-32-16	152
.3480 - .3750	5/8	1/2	PLSF-40-8	141
		3/4	PLSF-40-12	145
		1	PLSF-40-16	149
.2812 - .5000	3/4	1/2	PLSF-48-8	141
		3/4	PLSF-48-12	145
		1	PLSF-48-16	150

POTTED LINER				
A I.D. RANGE	B O.D. RANGE	C	P/N	PRICE CODE
3/8	5/8	1/2	PLLB-DGL-40-8	130
		3/4	PLLB-DGL-40-12	134
		1	PLLB-DGL-40-16	136
1/2	3/4	1/2	PLLB-DGL-48-8	130
		3/4	PLLB-DGL-48-12	134
		1	PLLB-DGL-48-16	136
5/8	7/8	1/2	PLLB-DGL-56-8	140
		3/4	PLLB-DGL-56-12	141
		1	PLLB-DGL-56-16	142
3/4	1	1/2	PLLB-DGL-64-8	141
		3/4	PLLB-DGL-64-12	141
		1	PLLB-DGL-64-16	145

CHIP BREAKER - TYPE CH

APPLICATION

The standard configuration for the chip breaker bushings, type CH, are similar to the Slip/Fixed renewable bushing but with specially designed chip-breaking notches on the drill exit end. They are used to break up chips from tough stringy materials. They reduce friction and reduce heat build-up. This will reduce bushing wear at the drill exit end and reduce the chances of tool or workplace damage.

OPTIONAL TYPES:

The other types are available with chip breakers such as type P and type H.

When ordering specify:

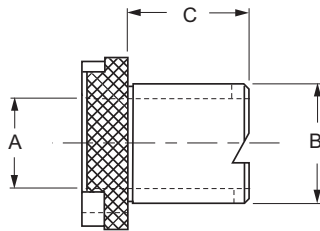
Example:

6 SF-20-16-CH 1250

6 P-20-16-CH 1250

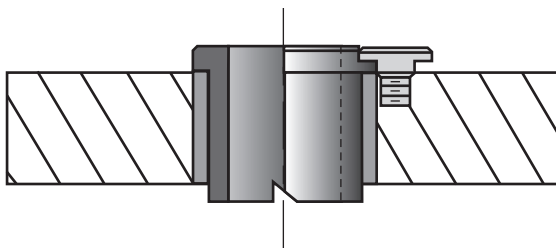
6 H-20-16-CH 1250

Standard Slip/Fixed
bushing with chip breaker
Type P bushing with
chip breaker
Type H bushing with
chip breaker



NOTE:

Chip breaker bushings should extend beyond the liner used so that chips can escape. See example below.



Prices available upon request..

NOTE:

These bushings are considered special and not returnable.

A - I.D. RANGE Drill Size Decimal Range	B - O.D. TOLERANCE Nominal DIGITAL RANGE	C	ANSI SYMBOL
#42 - #10 (.0935 - .1935) 2.40 - 4.90mm	5/16 .3125 .3123	3/4	SFX-20-12-CH
		1	SFX-20-16-CH
		1-3/8	SFX-20-22-CH
#28 - 11/32 (.1405 - .3438) 3.60 - 8.70mm	1/2 .5000 .4998	3/4	SFX-32-12-CH
		1	SFX-32-16-CH
		1-3/8	SFX-32-22-CH
		1-3/4	SFX-32-28-CH
		2-1/8	SFX-32-34-CH
9/32 - 9/16 (.2812 - .5625) 7.20 - 14.00mm	3/4 .7500 .7498	1	SFX-48-16-CH
		1-3/8	SFX-48-22-CH
		1-3/4	SFX-48-28-CH
		2-1/8	SFX-48-34-CH
		2-1/2	SFX-48-40-CH
15/32 - 25/32 (.4687 - .7812) 11.50 - 19.50mm	1 1.0000 .9998	1	SFX-64-16-CH
		1-3/8	SFX-64-22-CH
		1-3/4	SFX-64-28-CH
		2-1/8	SFX-64-34-CH
		2-1/2	SFX-64-40-CH
		3	SFX-64-48-CH
23/32 - 1-1/16 (.7187 - 1.0625) 18.50 - 27.00mm	1-3/8 1.3750 1.3747	1	SFX-88-16-CH
		1-3/8	SFX-88-22-CH
		1-3/4	SFX-88-28-CH
		2-1/8	SFX-88-34-CH
		2-1/2	SFX-88-40-CH
		3	SFX-88-48-CH
31/32 - 1-13/32 (.9687 - 1.4062) 25.00 - 35.00mm	1-3/4 1.7500 1.7497	1-3/8	SFX-112-22-CH
		1-3/4	SFX-112-28-CH
		2-1/8	SFX-112-34-CH
		2-1/2	SFX-112-40-CH
		3	SFX-112-48-CH
1-11/32 - 1-7/8 (1.3438 - 1.8750) 35.00 - 47.00mm	2-1/4 2.2500 2.2496	1-3/8	SFX-144-22-CH
		1-3/4	SFX-144-28-CH
		2-1/8	SFX-144-34-CH
		2-1/2	SFX-144-40-CH
		3	SFX-144-48-CH

DIRECTED COOLANT BUSHINGS - TYPE DC

The Directed Coolant bushing is similar to the slip/fixed renewable bushing, but with passages to direct coolant to the cutting areas. This improved design of this bushing eliminates expensive external pipes and tubing. No more accidental movement of coolant pipes. The Directed Coolant bushing puts the coolant where you need it and assures a constant flow. Please note that these bushings must be used with the correct Directed Coolant liner or head liner.

COUNTERBORE:

Direct Coolant bushings are not counterbored thereby providing a full bearing surface for the drill reamer. However, any standard bushing will be counterbored upon request at no additional charges.

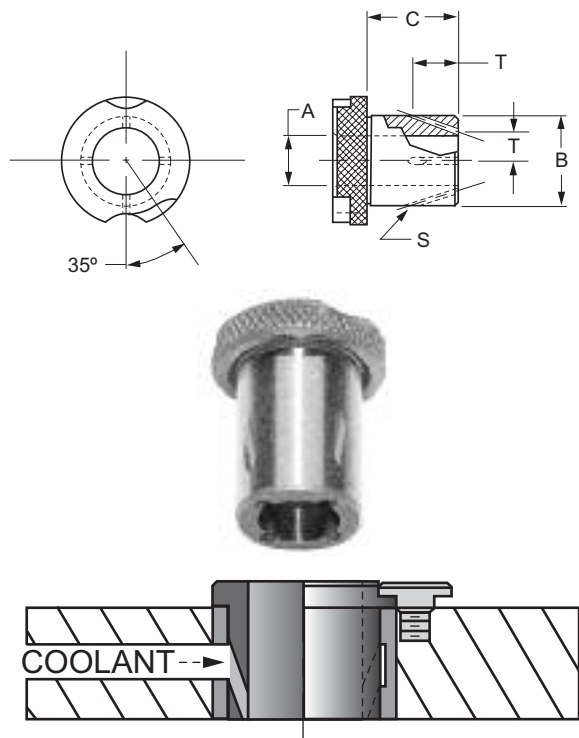
ADVANTAGES:

- Reduced heat and friction.
- Improved bushing and drill life.
- Reduced incidence of tool breakage.
- Improved chip washing action.
- Eliminates expensive floor time required for external pipe and tubing installation.

When ordering specify:

Example:

6 SFX-48-12-DC



Note: Directed Coolant bushings must be used with a Directed Cooler Liner or Head liner.

Note: These bushings are considered as special and are not returnable.

Prices available upon request.

DIRECT COOLANT BUSHING PIPE DIMENSIONS

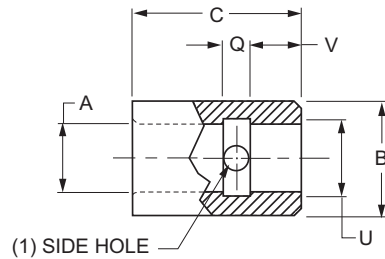
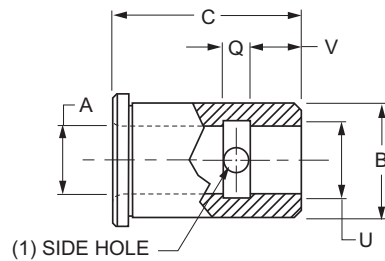
BODY O.D. B	C*	J	S	T	BODY O.D. B	C*	J	S	T
5/16		5/64	#51	1/4	1		23/64	1/8	3/8
1/2	1/2*	9/64	3/32	1/4	1-3/8		17/32	#26	1/2
1/2		9/64	3/32	3/8	1-3/4		11/16	#17	1/2
3/4		17/64	#37	3/8	2-1/4		7/8	#17	1/2

* Only the 1/2 inch length of the 1/2 OD size is different and listed separately

DIRECTED COOLANT BUSHINGS - TYPE DC

A - I.D. RANGE Drill Size Decimal Range	B - O.D. TOLERANCE Nominal DIGITAL RANGE	C	ANSI SYMBOL	USE WITH LINER
#42 - #10 (.0935 - .1935) 2.40 - 4.90mm	5/16 .3125 .3123	1/2	SFX-20-8-DC	L/HL-32-8-DC
		3/4	SFX-20-12-DC	L/HL-32-12-DC
		1	SFX-20-16-DC	L/HL-32-16-DC
		1-3/8	SFX-20-22-DC	L/HL-32-22-DC
#28 - 11/32 (.1405 - .3437) 3.60 - 8.70mm	1/2 .5000 .4998	1/2	SFX-32-8-DC	L/HL-48-8-DC
		3/4	SFX-32-12-DC	L/HL-48-12-DC
		1	SFX-32-16-DC	L/HL-48-16-DC
		1-3/8	SFX-32-22-DC	L/HL-48-22-DC
9/32 - 9/16 (.2812 - .5625) 7.20 - 14.00mm	3/4 .7500 .7498	1-3/4	SFX-32-28-DC	L/HL-48-28-DC
		1/2	SFX-48-8-DC	L/HL-64-8-DC
		3/4	SFX-48-12-DC	L/HL-64-12-DC
		1	SFX-48-16-DC	L/HL-64-16-DC
		1-3/8	SFX-48-22-DC	L/HL-64-22-DC
		1-3/4	SFX-48-28-DC	L/HL-64-28-DC
		2-1/8	SFX-48-34-DC	L/HL-64-34-DC
15/32 - 25/32 (.4687 - .7812) 11.50 - 19.50mm	1 1.0000 .9998	2-1/2	SFX-48-40-DC	L/HL-64-40-DC
		3	SFX-48-48-DC	L/HL-64-48-DC
		3/4	SFX-64-12-DC	L/HL-88-12-DC
		1	SFX-64-16-DC	L/HL-88-16-DC
		1-3/8	SFX-64-22-DC	L/HL-88-22-DC
		1-3/4	SFX-64-28-DC	L/HL-88-28-DC
		2-1/8	SFX-64-34-DC	L/HL-88-34-DC
23/32 - 1-1/16 (.7187 - 1.0625) 18.50 - 27.00mm	1-3/8 1.3750 1.3747	2-1/2	SFX-64-40-DC	L/HL-88-40-DC
		3	SFX-64-48-DC	L/HL-88-48-DC
		3/4	SFX-88-12-DC	L/HL-112-12-DC
		1	SFX-88-16-DC	L/HL-112-16-DC
		1-3/8	SFX-88-22-DC	L/HL-112-22-DC
		1-3/4	SFX-88-28-DC	L/HL-112-28-DC
31/32 - 1-13/32 (.9687 - 1.4062) 25.00 - 35.00mm	1-3/4 1.7500 1.7497	2-1/8	SFX-88-34-DC	L/HL-112-34-DC
		2-1/2	SFX-88-40-DC	L/HL-112-40-DC
		3	SFX-88-48-DC	L/HL-112-48-DC
		1	SFX-112-16-DC	L/HL-144-16-DC
		1-3/8	SFX-112-22-DC	L/HL-144-22-DC
		1-3/4	SFX-112-28-DC	L/HL-144-28-DC
1-11/32 - 1-7/8 (1.3438 - 1.8750) 35.00 - 47.00mm	2-1/4 2.2500 2.2496	2-1/8	SFX-112-34-DC	L/HL-144-34-DC
		2-1/2	SFX-112-40-DC	L/HL-144-40-DC
		3	SFX-112-48-DC	L/HL-144-48-DC
		1	SFX-144-16-DC	L/HL-176-16-DC
		1-3/8	SFX-144-22-DC	L/HL-176-22-DC
		1-3/4	SFX-114-28-DC	L/HL-176-28-DC
		2-1/8	SFX-114-34-DC	L/HL-176-34-DC
		2-1/2	SFX-114-40-DC	L/HL-176-40-DC
		3	SFX-114-48-DC	L/HL-176-48-DC

DIRECTED COOLANT LINERS - TYPE DC



Note: Directed Coolant bushings must be used with a Directed Cooler Liner or Head liner.

Note: These bushings are considered as special and are not returnable.

Prices available upon request.

DIRECT COOLANT LINERS PIPE DIMENSIONS									
BODY O.D. B	C*	V	Q	U	BODY O.D. B	C*	V	Q	U
1/2		5/32	3/16	25/64	1-3/8		7/32	5/16	1-5/32
3/4	1/2*	5/32	3/16	19/64	1-3/4		9/32	7/16	1-17/32
3/4		7/32	5/16	19/32	2-1/4		9/32	7/16	1-31/32
1	1/2*	5/32	3/16	55/64	2-3/4		9/32	7/16	2-15/32
1		7/32	5/16	55/64					

* Only the 1/2 inch length of the 3/4" and 1" OD size is different and added separately

DIRECTED COOLANT LINERS - TYPE DC			
A - I.D. RANGE Drill Size Decimal Range	B - O.D. TOLERANCE Nominal DIGITAL RANGE	C	ANSI SYMBOL
5/16 .3129 .3126	1/2 .5017 .5014	1/2	L/HL-32-8-DC
		3/4	L/HL-32-12-DC
		1	L/HL-32-16-DC
		1-3/8	L/HL-32-22-DC
1/2 .5005 .5002	3/4 .7518 .7515	1/2	L/HL-48-8-DC
		3/4	L/HL-48-12-DC
		1	L/HL-48-16-DC
		1-3/8	L/HL-48-22-DC
		1-3/4	L/HL-48-28-DC
		2-1/2	L/HL-48-34-DC
3/4 .7506 .7503	1 1.0018 1.0015	1/2	L/HL-64-8-DC
		3/4	L/HL-64-12-DC
		1	L/HL-64-16-DC
		1-3/8	L/HL-64-22-DC
		1-3/4	L/HL-64-28-DC
		2-1/8	L/HL-64-34-DC
		2-1/2	L/HL-64-40-DC
		3	L/HL-64-48-DC
1 1.0007 1.0004	1-3/8 1.3772 1.3768	3/4	L/HL-88-12-DC
		1	L/HL-88-16-DC
		1-3/8	L/HL-88-22-DC
		1-3/4	L/HL-88-28-DC
		2-1/8	L/HL-88-34-DC
		2-1/2	L/HL-88-40-DC
1-3/8 1.3760 1.3756	1-3/4 1.7523 1.7519	3	L/HL-88-48-DC
		3/4	L/HL-112-12-DC
		1	L/HL-112-16-DC
		1-3/8	L/HL-112-22-DC
		1-3/4	L/HL-112-28-DC
		2-1/8	L/HL-112-34-DC
1-3/4 1.7512 1.7508	2-1/4 2.2525 2.2521	2-1/2	L/HL-112-40-DC
		3	L/HL-112-48-DC
		1	L/HL-144-16-DC
		1-3/8	L/HL-144-22-DC
		1-3/4	L/HL-144-28-DC
		2-1/8	L/HL-144-34-DC
2-1/4 2.2515 2.2510	2-3/4 2.7526 2.7522	2-1/2	L/LH-144-40-DC
		3	L/LH-144-48-DC
		1	L/LH-176-16-DC
		1-3/8	L/LH-176-22-DC
		1-3/4	L/LH-176-28-DC
		2-1/8	L/LH-176-34-DC
		2-1/2	L/LH-176-40-DC
		3	L/HL-176-48-DC

CHIP BREAKER / DIRECT COOLANT COMBINATION - TYPE COMBO

The Combination Bushing is similar to the slip/fixed renewable bushing, but with all of the advantages of the Chip Breaker Bushing and the Direct Coolant bushing all in one. Combination style bushings are designed to operate at maximum efficiency when used with the Directed Coolant liner. They will not function with ordinary bushing liners. The bushings are longer than the liners when the Chip Breaker and the Direct Coolant feature are combined. See below.

COUNTERBORE:

Combination bushings are not counterbored thereby providing a full bearing surface for the drill reamer. However, any standard bushing will be counterbored upon request at no additional charges.

ADVANTAGES:

- Reduced heat and friction.
- Improved bushing and drill life.
- Reduced incidence of tool breakage.
- Improved chip washing action.
- Improved chip clearance.
- Eliminates expensive floor time required for external pipe and tubing installation.

CONCENTRICITY:

0 to .0005 T.I.R. on standard finished ground parts.

When ordering specify:

Example:

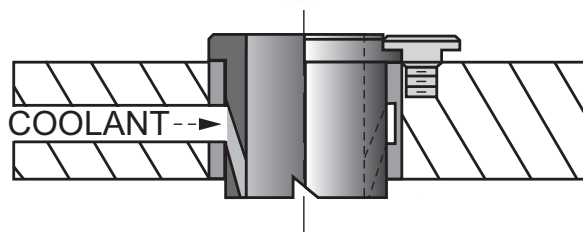
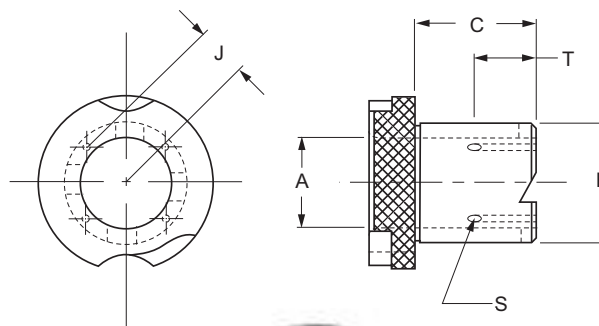
6 SFX-48-12-COMBO

Note: Combination bushings must be used with a directed coolant liner or head liner.

Note: These bushings are considered as special and are not returnable.

Note: The Word Combination refers to the combination of a Chip Breaker and a Direct Coolant Bushing. It does not refer to the combination of a bushing and a liner together. Liners must be ordered separately.

Prices available upon request.

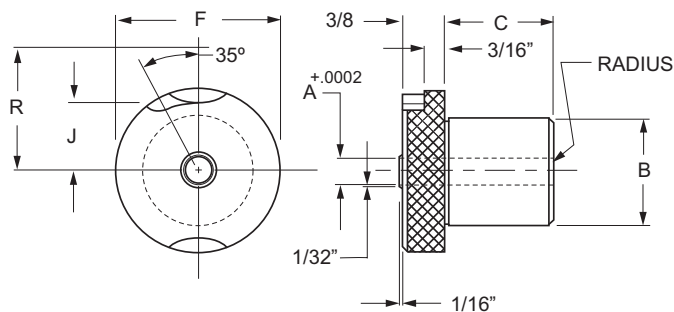


CHIP BREAKER / DIRECT COOLANT COMBINATION - TYPE COMBO

COMBINATION BUSHING - TYPE COMBO							
A - I.D. RANGE Drill Size Decimal Range	B - O.D. TOLERANCE Nominal DIGITAL RANGE	C	ANSI SYMBOL	USE WITH LINER	J	S	T
#42 - #10 (.0935 - .1935) 2.40 - 4.90mm	5/16 .3125 .3123	3/4	SFX-20-12-COMBO	L/HL-32-12-DC	5/64	#51	1/2
		1	SFX-20-16-COMBO	L/HL-32-16-DC	5/64	#51	1/2
		1-3/8	SFX-20-22-COMBO	L/HL-32-22-DC	5/64	#51	5/8
#28 - 11/32 (.1405 - .3437) 3.60 - 8.70mm	1/2 .5000 .4998	3/4	SFX-32-12-COMBO	L/HL-48-8-DC	9/64	3/32	1/2
		1	SFX-32-16-COMBO	L/HL-48-12-DC	9/64	3/32	5/8
		1-3/8	SFX-32-22-COMBO	L/HL-48-16-DC	9/64	3/32	3/4
		1-3/4	SFX-32-28-COMBO	L/HL-48-22-DC	9/64	3/32	3/4
		2-1/8	SFX-32-34-COMBO	L/HL-48-28-DC	9/64	3/32	3/4
9/32 - 9/16 (.2812 - .5625) 7.20 - 14.00mm	3/4 .7500 .7498	1	SFX-48-16-COMBO	L/HL-64-16-DC	17/64	#37	5/8
		1-3/8	SFX-48-22-COMBO	L/HL-64-22-DC	17/64	#37	3/4
		1-3/4	SFX-48-28-COMBO	L/HL-64-28-DC	17/64	#37	3/4
		2-1/8	SFX-48-34-COMBO	L/HL-64-34-DC	17/64	#37	3/4
		2-1/2	SFX-48-40-COMBO	L/HL-64-40-DC	17/64	#37	3/4
15/32 - 25/32 (.4687 - .7812) 11.50 - 19.50mm	1 1.0000 .9998	1	SFX-64-16-COMBO	L/HL-88-16-DC	23/64	1/8	5/8
		1-3/8	SFX-64-22-COMBO	L/HL-88-22-DC	23/64	1/8	3/4
		1-3/4	SFX-64-28-COMBO	L/HL-88-28-DC	23/64	1/8	3/4
		2-1/8	SFX-64-34-COMBO	L/HL-88-34-DC	23/64	1/8	3/4
		2-1/2	SFX-64-40-COMBO	L/HL-88-40-DC	23/64	1/8	3/4
		3	SFX-64-48-COMBO	L/HL-88-48-DC	23/64	1/8	7/8
23/32 - 1-1/16 (.7187 - 1.0625) 18.50 - 27.00mm	1-3/8 1.3750 1.3747	1	SFX-88-16-COMBO	L/HL-112-12-DC	17/32	#26	3/4
		1-3/8	SFX-88-22-COMBO	L/HL-112-16-DC	17/32	#26	3/4
		1-3/4	SFX-88-28-COMBO	L/HL-112-22-DC	17/32	#26	3/4
		2-1/8	SFX-88-34-COMBO	L/HL-112-28-DC	17/32	#26	3/4
		2-1/2	SFX-88-40-COMBO	L/HL-112-34-DC	17/32	#26	3/4
		3	SFX-88-48-COMBO	L/HL-112-40-DC	17/32	#26	3/4
31/32 - 1-13/32 (.9687 - 1.4062) 25.00 - 35.00mm	1-3/4 1.7500 1.7498	1-3/8	SFX-112-22-COMBO	L/HL-144-16-DC	11/16	#17	7/8
		1-3/4	SFX-112-28-COMBO	L/HL-144-22-DC	11/16	#17	7/8
		2-1/8	SFX-112-34-COMBO	L/HL-144-28-DC	11/16	#17	7/8
		2-1/2	SFX-112-40-COMBO	L/HL-144-34-DC	11/16	#17	7/8
		3	SFX-112-48-COMBO	L/HL-144-40-DC	11/16	#17	1"
1-11/32 - 1-7/8 (1.3438 - 1.8750) 35.00 - 47.00mm	2-1/4 2.2500 2.2496	1-3/8	SFX-144-22-COMBO	L/HL-176-16-DC	7/8	#17	7/8
		1-3/4	SFX-114-28-COMBO	L/HL-176-22-DC	7/8	#17	7/8
		2-1/8	SFX-114-34-COMBO	L/HL-176-28-DC	7/8	#17	7/8
		2-1/2	SFX-114-40-COMBO	L/HL-176-34-DC	7/8	#17	7/8
		3	SFX-114-48-COMBO	L/HL-176-40-DC	7/8	#17	1"

GUN DRILL BUSHINGS - TYPE GDB & DGDB

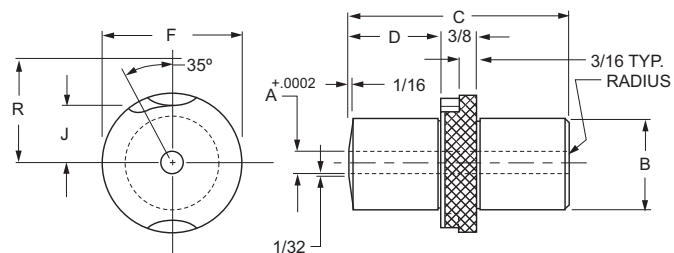
These bushings are intended to be used with gun-drilling machines. They are similar to Slip/Fixed renewable bushings, but with the drill bearing at the bushings head end. All American type GDB bushings are heat treated to RC 62-64 and ground concentric with .0002 T.I.R. The head is undercut and ground square to the O.D. within .0002 T.I.R. These bushings are considered as special and not returnable. Prices available upon request.



GUN DRILL BUSHINGS - TYPE GDB

P/N	A I.D. RANGE Drill Size Decimal Range	B O.D. TOLERANCE Nominal DIGITAL RANGE	C	F	J	R	LOCK SCREW
GDB-64-16	1/8 - 25/32 (.1250 - .7813)	1" 1.0000 .9998	1"	1-27/64	19/32	59/64	LS-2
GDB-64-22	1/4 - 25/32 (.2500 - .7813)		1-3/8	1-27/64	19/32	59/64	LS-2
GDB-88-16	3/16 - 1-1/16 (.1875 - 1.0625)	1-3/8 1.3750 1.3748	1"	1-51/64	25/32	1-7/64	LS-2
GDB-88-22	1/4 - 1-1/16 (.2500 - 1.0625)		1-3/8	1-51/64	25/32	1-7/64	LS-2

All American type DGDB bushings are made of Alloy Steel hardened to RC 62-64. The I.D. ground concentric to the O.D. within .0002 T.I.R. and the face is also square to the I.D. within .0002 T.I.R. The head is undercut and ground square to the O.D. Special Sizes and materials are available on request. These bushings are considered as special and not returnable. Prices available upon request.



DEEP HOLE GUN DRILL BUSHINGS - TYPE DGDB

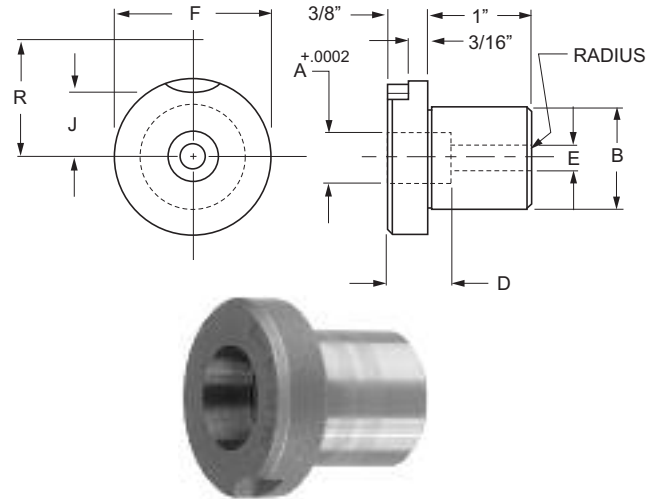
P/N	A I.D. RANGE Drill Size Decimal Range	B O.D. TOLERANCE Nominal DIGITAL RANGE	C	D	F	J	R	LOCK SCREW
DGDB-88-30	3/16 - 1-1/16 (.1875 - 1.0625)	1-3/8 1.3750 1.3748	1-7/8	1-51/64	1/2	25/32	1-7/64	LS-2
DGDB-88-38	1/4 - 1-1/16 (.2500 - 1.0625)		2-3/8	1-51/64	1	25/32	1-7/64	LS-2
DGDB-88-46	9/32 - 1-1/16 (.2813 - 1.0625)	1-3/8 1.3750 1.3748	2-7/8	1-51/64	1-1/2	25/32	1-7/64	LS-2
DGDB-88-54	5/16 - 1-1/16 (.3125 - 1.0625)		3-3/8	1-51/64	2	25/32	1-7/64	LS-2

GUN DRILL BUSHINGS TYPE GDL & GDI

Gun Drill Liners and Inserts are in large demand for precise drilling and are made to the same high standards of excellence which characterize All American bushings. They are heat treated to RC 62-64 and have a concentricity of .0002 T.I.R. Standards are available from stock in numbers, letters and fractional drill sizes. Specials can be made upon request.

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

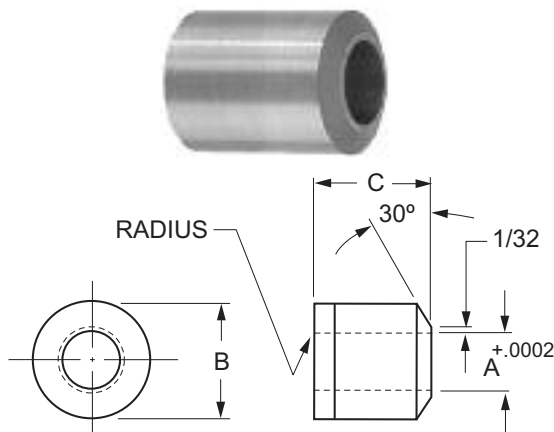
NOTE: These parts are considered as specials and are not returnable.



GUN DRILL LINERS - TYPE GDL									
P/N	A - I.D.	B O.D. TOLERANCE Nominal DIGITAL RANGE	D	E	F	J	R	LOCK ASCREW	INSERT USED
GDL-64-16	.2045	1" 1.0000 .9998	7/16	1/8	1-27/64	19/32	59/64	LS-2	GDI-13-8
	.2515			5/32					GDI-16-8
	.3140			7/32					GDI-20-8
	.5016			11/32					GDI-32-8
	.7517			9/16					GDI-48-8
GDL-88-16	.2045	1-3/8 1.3750 1.3748	7/16	1/8	1-51/64	25/32	1-7/64	LS-2	GDI-13-8
	.2515		7/16	5/32					GDI-16-8
	.3140		7/16	7/32					GDI-20-8
	.5016		7/16	11/32					GDI-32-8
	.7515		7/16	9/16					GDI-48-8
	1.0017		11/16	51/64					GDI-64/12

Gun Drill Inserts are stocked in standard drill sizes only. Special I.D. sizes and special materials are available to meet your requirements. The I.D., O.D. and face of the GDI bushing are ground concentric and square within .0002 T.I.R..

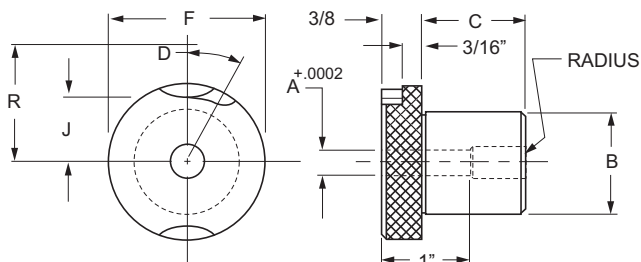
NOTE: These parts are considered as specials and are not returnable.



GUN DRILL INSERTS - TYPE GDI			
P/N	A I.D. RANGE Drill Size Decimal Range	B O.D. TOLERANCE Nominal DIGITAL RANGE	C
GDI-13-8	5/64 - #39 (.0781 - .0995)	13/64 .2047 - .2044	1/2
GDI-16-8	#38 - 9/64 (.1015 - .1406)	1/4 .2517 - .2514	1/2
GDI-20-8	#27 - #10 (.1440 - .1935)	5/16 .3142 - .3139	1/2
GDI-32-8	13/64 - O (.2031 - .3160)	1/2 .5018 - .5015	1/2
GDI-48-8	P - 17/32 (.3230 - .5313)	3/4 .7519 - .7516	1/2
GDI-64-12	9/16 - 3/4 (.5625 - .7500)	1 1.0019 - 1.0016	3/4

GUN DRILL BUSHINGS TYPE GDH & GHS

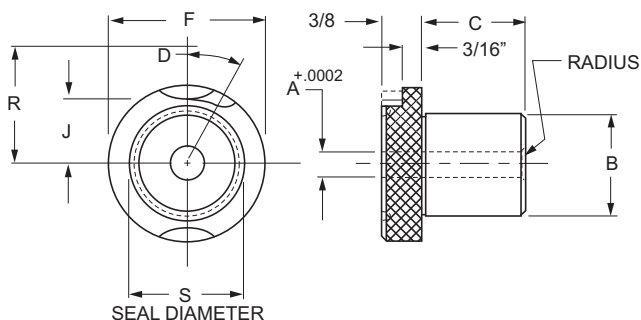
These bushings are intended to be used with De Hoff gun-drilling machines. They are similar to Slip/Fixed renewable bushings, but with the drill bearing at the bushings head end. All American type GDH bushings are heat treated to RC 62-64 and ground concentric with .0002 T.I.R. The head is undercut and ground square to the O.D. within .0002 T.I.R. These bushings are considered as special and not returnable. Prices available upon request.



GUN DRILL BUSHINGS FOR DE HOFF GUN DRILLING MACHINE - TYPE GDH

P/N	A I.D. RANGE Drill Size DECIMAL RANGE	B O.D. TOLERANCE Nominal DIGITAL RANGE	C	D	F	J	R	LOCK SCREW
GDH-64-12	1/8 - 25/32 (.1250 - .7813) 3.20-19.50mm	1" 1.0000 .9998	3/4"	35°	1-27/64	19/32	59/64	LS-2
GDH-64-16			1	35°	1-27/64	19/32	59/64	LS-2
GDH-64-22			1-3/8	35°	1-27/64	19/32	59/64	LS-2
GDH-88-16	1/8 - 1-1/16 (.1250 - 1.0625) 3.20-27.00mm	1-3/8 1.3750 1.3748	1"	30°	1-51/64	25/32	1-7/64	LS-2
GDH-88-22			1-3/8	30°	1-51/64	25/32	1-7/64	LS-2

Oil Seal Gun Drill bushings are intended to be used with gun-drilling machines. Using the positive sealing of the O-ring against the workpiece, your gun drilling machine will maintain the oil pressure required to continue optimum operating conditions. They are similar to Slip/Fixed renewable bushings, but with the drill bearing at the bushings head end. All American type GDS bushings are heat treated to RC 62-64 and ground concentric with .0002 T.I.R. These bushings are considered as special and not returnable. Prices available upon request.

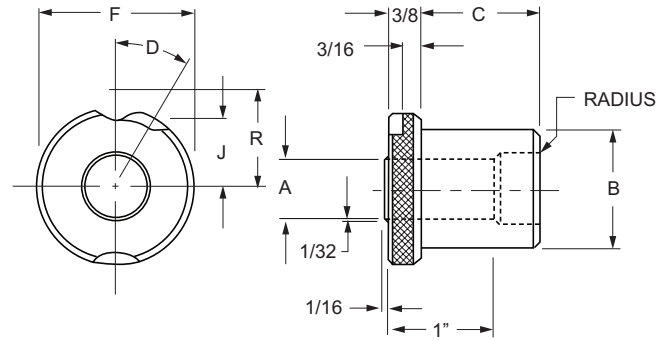


OIL SEAL GUN DRILL BUSHINGS - TYPE GDS

P/N	A I.D. RANGE Drill Size DECIMAL RANGE	B O.D. TOLERANCE Nominal DIGITAL RANGE	C	D	F	J	R	O-RING P/N	S	LOCK SCREW
GDS-64-12	1/8 - 25/32 (.1250 - .7813) 3.20-19.50mm	1" 1.0000 .9998	3/4"	35°	1-27/64	19/32	59/64	GDSR-64	15/16	LS-2
GDS-64-16			1	35°	1-27/64	19/32	59/64	GDSR-64	15/16	LS-2
GDS-64-22			1-3/8	35°	1-27/64	19/32	59/64	GDSR-64	15/16	LS-2
GDS-88-16	1/8 - 1-1/16 (.1250 - 1.0625) 3.20-27.00mm	1-3/8 1.3750 1.3748	1"	30°	1-51/64	25/32	1-7/64	GDSR-88	1-1/4	LS-2
GDS-88-22			1-3/8	30°	1-51/64	25/32	1-7/64	GDSR-88	1-1/4	LS-2

GUN DRILL BUSHINGS TYPE GDE

These bushings are intended to be used with Eldorado gun-drilling machines. They are similar to Slip/Fixed renewable bushings, but with the drill bearing at the bushings head end. All American type GDE bushings are heat treated to RC 62-64 and ground concentric with .0002 T.I.R. The head is undercut and ground square to the O.D. within .0002 T.I.R. These bushings are considered as special and not returnable. Prices available upon request.



GUN DRILL BUSHINGS FOR ELDORADO GUN DRILLING MACHINE - TYPE GDE

P/N	A I.D. RANGE Drill Size DECIMAL RANGE	B O.D. TOLERANCE Nominal DIGITAL RANGE	C	D	F	J	R	LOCK SCREW
GDE-64-12	1/8 - 25/32 (.1250 - .7812) 3.20-19.50mm	1" 1.0000 .9998	3/4"	35°	1-27/64	19/32	59/64	LS-2
GDE-64-16			1	35°	1-27/64	19/32	59/64	LS-2
GDE-64-22			1-3/8	35°	1-27/64	19/32	59/64	LS-2
GDE-88-16	1/8 - 1-1/16 (.1250 - 1.0625) 3.20-27.00mm	1-3/8 1.3750 1.3748	1"	30°	1-51/64	25/32	1-7/64	LS-2
GDE-88-22			1-3/8	30°	1-51/64	25/32	1-7/64	LS-2

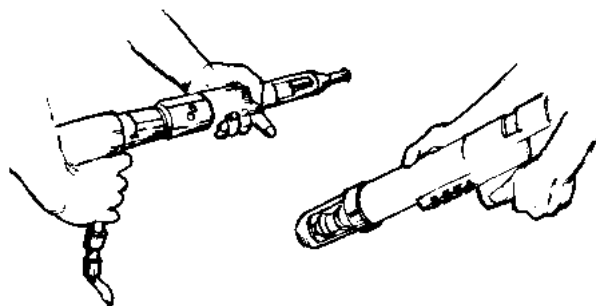


APPLICATION

All American Drill Bushing Tips provide a fast, accurate method for portable/stationary mounting of drilling, tapping and other self-contained machining units on a jig/fixture. The threaded end of the drill bushing tip screws into the nose end of the drill unit. The helical flanges on the tip fit under the shoulders on the lock/screw strips on the jig, effectively holding the drilling unit in alignment position and absorbing drilling thrust and torque.

All tips conform to the drill size specified by the user. They are available for applications from 3/32" drill up through 1-15/32" diameter.

All American Drill Bushing Tips and accessories fit all standard automatic feed drill motors including Gardner-Denver, Keller, Aro, Buckeye, Quackenbush, Ingersoll-Rand, Etc.

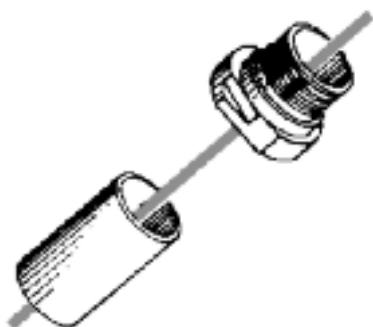


WITHOUT COLLAR

WITH COLLAR A21311

CONSTRUCTION:

All drill bushing tips are constructed by a two-piece method consisting of a collar and a pressed-in shank. The collar contains the screw threads, alignment diameter and the lock flange. The shank contains the A, B and C dimensions listed in the chart on page 2.56 through 2.61. Maximum and minimum drill sizes (A) for drill bushing tips are shown in the column headings of the chart. Collars/shanks only of Two-piece drill bushing tips may be ordered separately for replacement purposes, see ordering information.



ORDERING INFORMATION

DRILL BUSHING TIP:

Specify the part number, add the drill sizes as a parenthetical suffix to the part number. Drill size should be specified as a decimal size to four places.

EXAMPLE: A-22110 (1/4)

NOTE:

There is an extra charge for all drill bushing tips specified to have smaller than the minimum drill size. Standard drill bushing tips are those with standard drill sizes, see page 1.6, and with sizes falling between the maximum and minimum sizes in (A.) An extra charge will be added for each special dimension (such as shank O.D./length) which may be specified.

SHANK ONLY:

To order bushings without the threaded collars, the letter "A" is omitted **EXAMPLE: 21310 (1/8)**

COLLAR ONLY:

Specify the Collar part number shown below collar drawing **EXAMPLE: 21000**

DRILL BUSHING TIP/SHANK ONLY WITH SPECIAL DRILL GUIDE HOLE CLEARANCE:

Specify the part number and add minimum and maximum drill guide hole size to four places as a parenthetical suffix to the part number **EXAMPLE: Shank 21104(.1260-1264) / Shank only 23522 (.6201-.6207)** Special sizes are supplied only at extra cost. Drill Guide Hole tolerances closer than standard are supplied on special quotations only.

ALL OTHER ITEMS:

Specify part number.

ACCESSORIES:

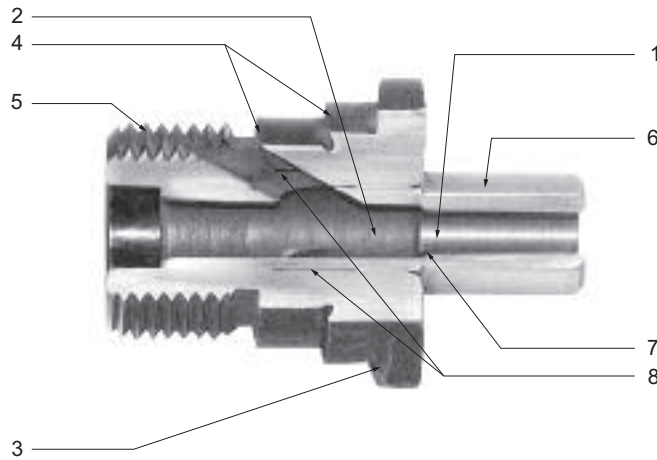
The accessories listed are designed to work with tips appearing in the same vertical column in which the accessory part numbers are shown.

SELECTION FOR JIG DESIGN REQUIREMENTS:

There are five drill bushing tip thread sizes listed which match those of the standard nose pieces. In each of the five drill bushing tip dimensional drawings, dimension "B" is the shank outside diameter. This shank slips into the lock liner bushing. Dimension "A" is the drill bit guide hole. This dimension is finished to A.N.S.I. drill specifications. Dimension "C" is the length of the shank extending from the collar to the end of the shank.

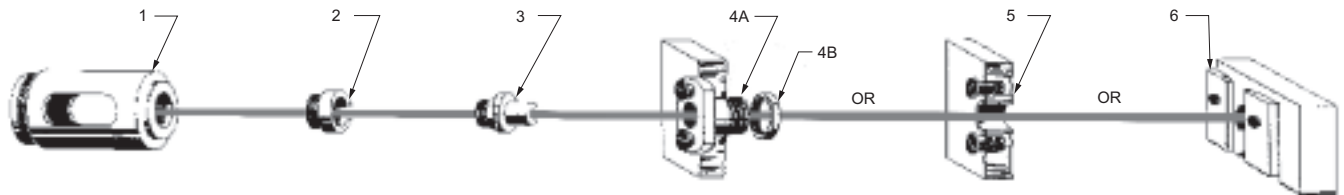
NOTE: These parts are considered as specials and are not returnable.

OUTSIDE FEATURES:



1. Drill guide hole is finished to A.N.S.I. specifications and to customers exact dimensional requirements.
2. Counterboring for chip clearance hole prevents jam-up of chips, working their way back into the nose piece and out of the nose piece slots.
3. Helical milling gives quick, positive lock of the drill bushing tip under the heads of the lock screws. A 30° turn locks or unlocks the drill bushing tip.
4. Square shoulder and concentric alignment diameter accurately line up the drill bushing tip with the axis of the tool.
5. Collar and threads are heat treated and hardened to produce strength and provide wear resistance. The shank is hardened for maximum wear resistance.
6. Marked with the part number and drill size for easy identification and simplicity in reordering.
7. Precision ground shank with entering bevel for easy insertion in lock liner bushing.
8. Coolant holes provide positive flow for chip removal and cooler drilled parts. NOTE: Coolant holes are available on 11000, 12000, 13000, 14000, 15000 series bushings.

MOUNTING DATA:



1. NOSE PIECE: Automatic mechanical/air-feed drills, tappers and back spotfacers are equipped with either a short or a long nose piece depending upon the length of the cutting tool holding device - i.e. drill chuuk, tap chuck, morse taper adapter, etc.

2. REDUCER BUSHING: Reducer bushings are occasionally used to reduce the thread size in a specific nose piece to adapt it to accommodate smaller thread drill bushing tips.

3. DRILL BUSHING TIPS: Close fit between mating the shank of tip and the hole in the lock liner bushing holds tool alignment to produce straight close-tolerance holes.

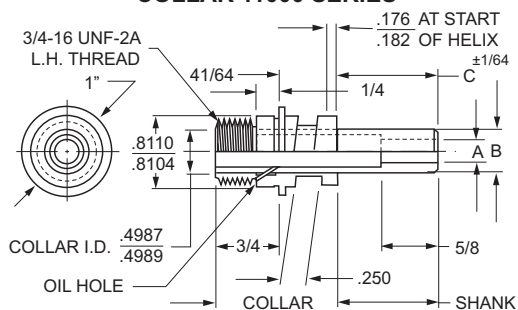
4. LOCK LINER AND LOCK NUT: This is a conventional method for automatic, mechanical/air feed drills, tappers and back spotfacers to a jig face or fixture. A hole is bored in the jig to accommodate the lock liner bushing (4A). The lock nuts (4B) hold the lock liner in position in the jig.

5. DIRECT JIG MOUNTING: An Alternate mounting method for holes so closely spaced that a lock liner bushings cannot be used has lock screws mounted directly in the jig. The shank of the drill bushing tip fits directly into the bored hole in the jig. Hardened headless liner bushings are available to press into the bored hole to provide a wearing surface and prolong the useful life on the jig.

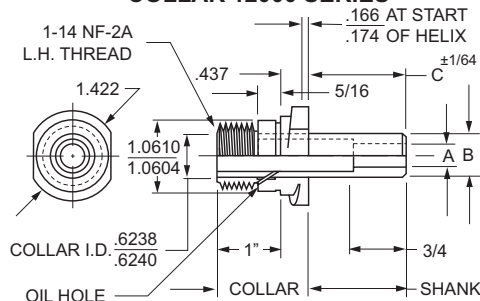
6. LOCKING STRIP MOUNTING: A second mounting option for closely spaced holes employs a lock strip along each side of the row of holes in the jig. The flanges on the drill bushing tip lock under the extended edges of the lock strips when the tip is turned 30° to the left. Headless liner bushings pressed into the bored holes in the jig are recommended to forestall wear in the bored holes.

COOLANT FED AIR FEED BUSHINGS

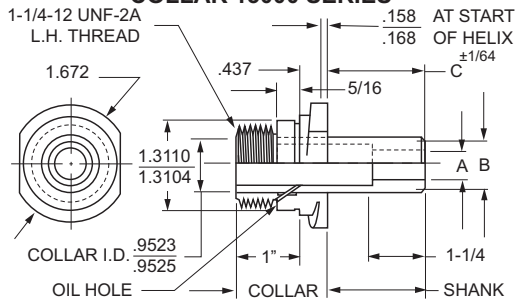
COLLAR 11000 SERIES



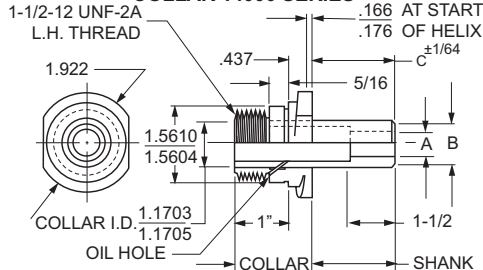
COLLAR 12000 SERIES



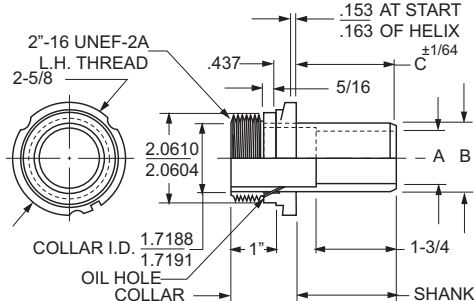
COLLAR 13000 SERIES



COLLAR 14000 SERIES



COLLAR 15000 SERIES



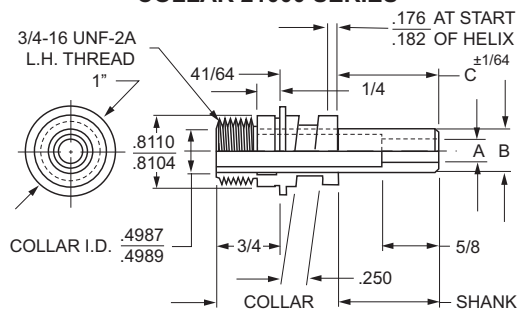
		COLLAR-11000 SERIES			COLLAR-12000 SERIES				
I.D. RANGE A	MAX. MIN.	.2500 1/4 3/32 .0938	.3125 5/16 3/32 .0938	.3750 3/8 3/32 .0938	.2812 9/32 3/16 .1875	.3437 11/32 3/16 .1875	.4062 13/32 3/16 .1875	.4688 15/32 3/16 .1875	.4688 15/32 3/16 .1875
		3/8 .3748 .3745	7/16 .4373 .4370	1/2 .4998 .4995	7/16 .4373 .4370	1/2 .4998 .4995	9/16 .5623 .5620	5/8 .6248 .6245	3/4 .7498 .7495
O.D. RANGE B	NOM. DEC. RANGE	3/8 .3748 .3745	7/16 .4373 .4370	1/2 .4998 .4995	7/16 .4373 .4370	1/2 .4998 .4995	9/16 .5623 .5620	5/8 .6248 .6245	3/4 .7498 .7495
LENGTH C - SHANK EXTENDS FROM COLLAR - INCHES		3/8	A-11101		A-11301	A-12101		A-12401	
		1/2	A-11102	A-11202	A-11302	A-12102	A-12202	A-12402	
		5/8	A-11103	A-11203	A-11303	A-12103	A-12203	A-12303	A-12403
		3/4	A-11104	A-11204	A-11304	A-12104	A-12204	A-12304	A-12404
		7/8	A-11105	A-11205	A-11305	A-12105	A-12205	A-12305	A-12405
		1	A-11106	A-11206	A-11306	A-12106	A-12206	A-12306	A-12406
		1-1/16	A-11107		A-11307				
		1-1/8	A-11108	A-11208	A-11308	A-12108	A-12208	A-12308	A-12408
		1-3/16						A-12409	
		1-1/4	A-11110	A-11210	A-11310	A-12110	A-12210	A-12310	A-12410
		1-3/8	A-11111	A-11211	A-11311	A-12111	A-12211	A-12311	A-12411
		1-7/16							
		1-1/2	A-11113	A-11213	A-11313	A-12113	A-12213	A-12313	A-12413
		1-5/8	A-11114	A-11214	A-11314	A-12114	A-12214	A-12314	A-12414
		1-3/4	A-11115	A-11215	A-11315	A-12115	A-12215	A-12315	A-12415
		1-7/8	A-11116	A-11216	A-11316	A-12116	A-12216	A-12316	A-12416
		1-15/16							
		2	A-11118	A-11218	A-11318	A-12118	A-12218	A-12318	A-12418
		2-1/8	A-11119	A-11219	A-11319	A-12119	A-12219	A-12319	A-12419
		2-1/4	A-11120	A-11220	A-11320	A-12120	A-12200	A-12320	A-12420
		2-3/8	A-11121	A-11221	A-11321	A-12121	A-12221	A-12321	A-12421
		2-1/2	A-11122	A-11222	A-11322	A-12122	A-12222	A-12322	A-12422
		2-5/8							
		2-3/4	A-11124	A-11224	A-11324	A-12124	A-12224	A-12324	A-12424
		3	A-11125	A-11225	A-11325	A-12125	A-12225	A-12325	A-12425
		3-1/4	A-11126	A-11226	A-11326	A-12126	A-12226	A-12326	A-12426
		3-1/2				A-12127	A-12227	A-12327	A-12427
		3-3/4				A-12128	A-12228	A-12328	A-12428
		4				A-12129	A-12229	A-12329	A-12429
		5			A-11330	A-12130	A-12230	A-12330	A-12430
		6	A-11131			A-12131	A-12231	A-12331	A-12431
LOCK LINER BUSHINGS		LL-21100 (Matches A-11107 tip)		LL-21300 (Matches A-11307 tip)				LL-22400 (Matches A-12409 tip)	
LOCK NUTS		14441		14442				14443	
HELICAL LINER BUSHINGS - METALS		HAL-13212	HAL-14808	HAL-14808	HAL-24808	HAL-24808	HAL-25210	HAL-25610	HAL-25410
HELICAL LINER BUSHINGS - PLASTICS		HALD-13212	HALD-14808	HALD-14808	HALD-24808	HALD-24808	HALD-25210	HALD-25610	HALD-25410
LOCK RINGS		LR-52101	LR-52103	LR-52103	LR-52105	LR-52105	LR-52104	LR-52105	LR-52107
LOCK LINERS		LL-21100	LL-21200	LL-21300	LL-22100	LL-22200	LL-22300	LL-22400	
LOCK SCREWS		16531	16531	16531	16532	16532	16532	16532	16532
HEADLESS BUSHINGS		19936	19937	19938	19937	19938	19939	19940	19941

COOLANT FED AIR FEED BUSHINGS

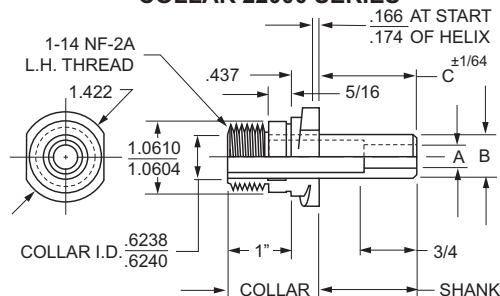
COLLAR-13000 SERIES						COLLAR-14000 SERIES										COLLAR-15000 SERIES						
.4688 15/32 1/4 .2500	.5312 17/32 1/4 .2500	.5937 19/32 1/4 .2500	.6562 21/32 1/4 .2500	.7187 23/32 1/4 .2500	.7187 23/32 1/4 .2500	.4062 13/32 5/16 .3125	.5312 17/32 5/16 .3125	.5937 19/32 5/16 .3125	.6562 21/32 5/16 .3125	.7812 25/32 5/16 .3125	.9062 29/32 5/16 .3125	.9375 15/16 5/16 .3125	1.0000 1 5/16 .3125	1.0625 1-1/16 5/16 .3125	1.0313 1-1/32 3/8 .3750	1.1562 1-5/32 3/8 .3750	1.2812 1-9/32 3/8 .3750	1.4688 1-15/32 3/8 .3750	1.4688 1-15/32 3/8 .3750			
5/8 6248 .6245	3/4 .7498 .7495	13/16 .8123 .8120	7/8 .8748 .8745	1 .9998 .9995	1-1/8 1.1248 1.1245	5/8 .6248 .6245	3/4 .7498 .7495	13/16 .8123 .8120	7/8 .8748 .8745	1 .9998 .9995	1-1/8 1.1248 1.1245	1-1/4 1.2498 1.2495	1-3/8 1.2498 1.2495	1-1/2 1.4998 1.4995	1-1/4 1.2498 1.2495	1-3/8 1.3748 1.3745	1-1/2 1.4998 1.4995	1-3/4 1.7498 1.7495	2 1.9998 1.9995			
																						3/8
																						1/2
						A-14103																5/8
A-13004	A-13104	A-13204	A-13304			A-14104	A-14304	A-14204														3/4
A-13005	A-13105	A-13205	A-13305			A-14105	A-14305	A-14205	A-14405													7/8
A-13006	A-13106	A-13206	A-13306	A-13406	A-13506	A-14106	A-14306	A-14206	A-14406	A-14506	A-14606			A-14806								1
																						1-1/16
A-13008	A-13108	A-13208	A-13308	A-13408	A-13508	A-14108	A-14308	A-14208	A-14408	A-14508	A-14608		A-14908									1-1/8
																						1-3/16
A-13010	A-13110	A-13210	A-13310	A-13410	A-13510	A-14110	A-14310	A-14210	A-14410	A-14510	A-14610	A-14710	A-14910		A-15110							1-1/4
A-13011	A-13111	A-13211	A-13311	A-13411	A-13511	A-14111	A-14311	A-14211	A-14411	A-13511	A-13611	A-14711	A-13911	A-14811	A-15111	A-15211						1-3/8
			A-13312																			1-7/16
A-13013	A-13113	A-13213	A-13313	A-13413	A-13513	A-14113	A-14313	A-14213	A-14413	A-14513	A-14613	A-14713	A-14913	A-14813	A-15113	A-15213	A-15313					1-1/2
A-13014	A-13114	A-13214	A-13314	A-13414	A-13514	A-14114	A-14314	A-14214	A-14414	A-14514	A-14614	A-14714	A-14914	A-14814	A-15114	A-15214	A-15314					1-5/8
A-13015	A-13115	A-13215	A-13315	A-13415	A-13515	A-14115	A-14315	A-14215	A-14415	A-14515	A-14615	A-14715	A-14915	A-14815	A-15115	A-15215	A-15315	A-15415				1-3/4
A-13016	A-13116	A-13216	A-13316	A-13416	A-13516	A-14116	A-14316	A-14216	A-14416	A-14516	A-14616	A-14716	A-14916	A-14816	A-15116	A-15216	A-15316	A-15416				1-7/8
					A-13517						A-14617			A-14817								1-15/16
A-13018	A-13118	A-13218	A-13318	A-23418	A-13518	A-14118	A-14318	A-14218	A-14418	A-14518	A-14618	A-14718	A-14918	A-14818	A-15118	A-15218	A-15318	A-15418	A-15518			2
A-13019	A-13119	A-13219	A-13319	A-13419	A-13519	A-14119	A-14319	A-14219	A-14419	A-14519	A-14619	A-14719	A-14919	A-14819	A-15119	A-15219	A-15319	A15419	A-15519			2-1/8
A-13020	A-13120	A-13220	A-13320	A-13420	A-13520	A-14120	A-14320	A-14220	A-14420	A-14520	A-14620	A-14720	A-14920	A-14820	A-15120	A-15220	A-15320	A-15420	A-15520			2-1/4
A-13021	A-13121	A-13221	A-13321	A-13421	A-13521	A-14121	A-14321	A-14221	A-14421	A-14521	A-14621	A-14721	A-14921	A-14821	A-15121	A-15221	A-15321	A-15421	A-15521			2-3/8
A-13022	A-13122	A-13222	A-13322	A-13422	A-13522	A-14122	A-14322	A-14222	A-14422	A-14522	A-14622	A-14722	A-14922	A-14822	A-15122	A-15222	A-15322	A-15422	A-15522			2-1/2
																				A-15523		2-5/8
A-13024	A-13124	A-13224	A-13324	A-13424	A-13524	A-14124	A-14324	A-14224	A-14424	A-14524	A-14624	A-14724	A-14924	A-14824	A-15124	A-15224	A-15324	A-15424	A-15524			2-3/4
A-13025	A-13125	A-13225	A-13325	A-13425	A-13525	A-14125	A-14325	A-14225	A-14425	A-14525	A-14625	A-14725	A-14925	A-14825	A-15125	A-15225	A-15325	A-15425	A-15525			3
A-13026	A-13126	A-13226	A-13326	A-13426	A-13526	A-14126	A-14326	A-14226	A-14426	A-14526	A-14626	A-14726	A-14926	A-14826	A-15126	A-15226	A-15326	A-15426	A-15526			3-1/4
A-13027	A-13127	A-13227	A-13327	A-13427	A-13527	A-14127	A-14327	A-14227	A-14427	A-14527	A-14627	A-14727	A-14927	A-14827	A-15127	A-15227	A-15327	A-15427	A-15527			3-1/2
A-13028	A-13128	A-13228	A-13328	A-13428	A-13528	A-14128	A-14328	A-14228	A-14428	A-14528	A-14628	A-14728	A-14928	A-14828	A-15128	A-15228	A-15328	A-15428	A-15528			3-3/4
A-13029	A-13129	A-13229	A-13329	A-13429	A-13529	A-14129	A-14329	A-14229	A-14429	A-14529	A-14629	A-14729	A-14929	A-14829	A-15129	A-15229	A-15329	A-15429	A-15529			4
A-13030	A-13130	A-13230	A-13330	A-13430	A-13530	A-14130	A-14330	A-14230	A-14430	A-14530	A-14630	A-14730	A-14930	A-14830	A-15130	A-15230	A-15330	A-15430	A-15530			5
A-13031	A-13131	A-13231	A-13331	A-13431	A-13531	A-14131	A-14331	A-14231	A-14431	A-14531	A-13631	A-14731	A-14931	A-14831	A-15131	A-15231	A-15331	A-15431	A-15531			6
			LL-23300 (Matches A-13312 tip)		LL-23500 (Matches A-13517 tip)						LL-24600 (Matches A-14617 tip)			LL-24800 (Matches A-14817 tip)						LL-25500 (Matches A-15523 tip)		
			14445		14446						14446			14447						14448		
HAL-35610	HAL-36410	HAL-36410	HAL-38016	HAL-39616	HAL-39624	HAL-45616	HAL-46416	HAL-48016	HAL-48016	HAL-48016	HAL-48816	HAL-49616	HAL-411216	HAL-412816	HAL-25100	HAL-25200	HAL-25300	HAL-25400	HAL-25500			
HALD-35610	HALD-36410	HALD-36410	HALD-38016	HALD-39616	HALD-39624	HALD-45616	HALD-46416	HALD-48016	HALD-48016	HALD-48016	HALD-48816	HALD-49616	HALD-411216	HALD-412816	HALD-25100	HALD-25200	HALD-25300	HALD-25400	HALD-25500			
LR-52108	LR-52107	LR-52107	LR-52109	LR-52112	LR-52110	LR-52105	LR-52107	LR-52107	LR-52109	LR-52109	LR-52110	LR-52112	LR-52116	LR-52118	LR-52121	LR-52121	LR-52121	LR-52121	LR-52121	LR-52121		
	LL-23100	LL-23200	LL-23300	LL-23400	LL-23500	LL-24100	LL-24300	LL-24300	LL-24400	LL-24500	LL-24600	LL-24700		LL-24800	LL-25100	LL-25200	LL-25300	LL-25400	LL-25500			
16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16532			
19940	19942	19943	19944	19945	19946	19947	19949	19950	19950	19951	19946	19952	19954	19955	19953	19954	19955	19956				

AIR FEED BUSHINGS

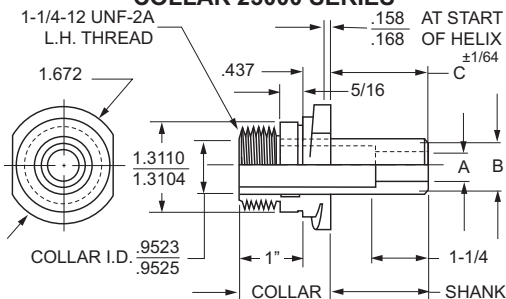
COLLAR 21000 SERIES



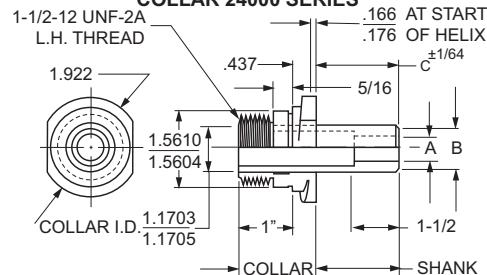
COLLAR 22000 SERIES



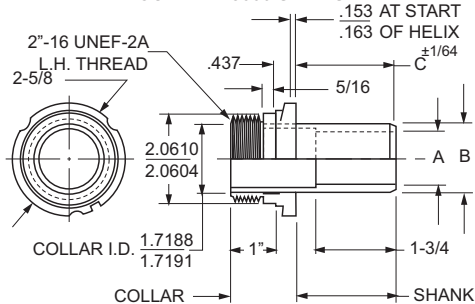
COLLAR 23000 SERIES



COLLAR 24000 SERIES



COLLAR 25000 SERIES



NOTE: These parts are considered as specials and are not returnable.

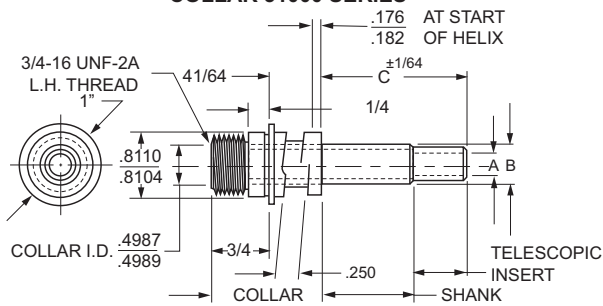
		COLLAR-21000 SERIES			COLLAR-22000 SERIES				
I.D. RANGE A	MAX. MIN.	.2500 1/4 3/32 .0938	.3125 5/16 3/32 .0938	.3750 3/8 3/32 .0938	.2812 9/32 3/16 .1875	.3437 11/32 3/16 .1875	.4062 13/32 3/16 .1875	.4688 15/32 3/16 .1875	.4688 15/32 3/16 .1875
		3/8 .3748 .3745	7/16 .4373 .4370	1/2 .4998 .4995	7/16 .4373 .4370	1/2 .4998 .4995	9/16 .5623 .5620	5/8 .6248 .6245	3/4 .7498 .7495
O.D. RANGE B	NOM. DEC. RANGE	3/8 .3748 .3745	7/16 .4373 .4370	1/2 .4998 .4995	7/16 .4373 .4370	1/2 .4998 .4995	9/16 .5623 .5620	5/8 .6248 .6245	3/4 .7498 .7495
LENGTH C - SHANK EXTENDS FROM COLLAR - INCHES		3/8	A-21101		A-21301	A-22101			A-22401
		1/2	A-21102	A-21202	A-21302	A-22102	A-22202		A-22402
		5/8	A-21103	A-21203	A-21303	A-22103	A-22203	A-22303	A-22403
		3/4	A-21104	A-21204	A-21304	A-22104	A-22204	A-22304	A-22404
		7/8	A-21105	A-21205	A-21305	A-22105	A-22205	A-22305	A-22405
		1	A-21106	A-21206	A-21306	A-22106	A-22206	A-22306	A-22406
		1-1/16	A-21107		A-21307				
		1-1/8	A-21108	A-21208	A-21308	A-22108	A-22208	A-22308	A-22408
		1-3/16							A-22409
		1-1/4	A-21110	A-21210	A-21310	A-22110	A-22210	A-22310	A-22410
		1-3/8	A-21111	A-21211	A-21311	A-22111	A-22211	A-22311	A-22411
		1-7/16							
		1-1/2	A-21113	A-21213	A-21313	A-22113	A-22213	A-22313	A-22413
		1-5/8	A-21114	A-21214	A-21314	A-22114	A-22214	A-22314	A-22414
		1-3/4	A-21115	A-21215	A-21315	A-22115	A-22215	A-22315	A-22415
		1-7/8	A-21116	A-21216	A-21316	A-22116	A-22216	A-22316	A-22416
		1-15/16							
		2	A-21118	A-21218	A-21318	A-22118	A-22218	A-22318	A-22418
		2-1/8	A-21119	A-21219	A-21319	A-22119	A-22219	A-22319	A-22419
		2-1/4	A-21120	A-21220	A-21320	A-22120	A-22200	A-22320	A-22420
		2-3/8	A-21121	A-21221	A-21321	A-22121	A-22221	A-22321	A-22421
		2-1/2	A-21122	A-21222	A-21322	A-22122	A-22222	A-22322	A-22422
		2-5/8							
		2-3/4	A-21124	A-21224	A-21324	A-22124	A-22224	A-22324	A-22424
		3	A-21125	A-21225	A-21325	A-22125	A-22225	A-22325	A-22425
		3-1/4	A-21126	A-21226	A-21326	A-22126	A-22226	A-22326	A-22426
		3-1/2				A-22127	A-22227	A-22327	A-22427
		3-3/4				A-22128	A-22228	A-22328	A-22428
		4				A-22129	A-22229	A-22329	A-22429
		5			A-21330	A-22130	A-22230	A-22330	A-22430
		6	A-21131			A-22131	A-22231	A-22331	A-22431
STANDARD LINER BUSHINGS		LL-21100 (Matches A-21107 tip)		LL-21300 (Matches A-21307 tip)				LL-22400 (Matches A-22409 tip)	
LOCK LINERS		14441		14442				14443	
HELICAL LINER BUSHINGS - METALS		HAL-13212	HAL-14808	HAL-14808	HAL-24808	HAL-24808	HAL-25210	HAL-25610	HAL-26410
HELICAL LINER BUSHINGS - PLASTICS		HALD-13212	HALD-14808	HALD-14808	HALD-24808	HALD-24808	HALD-25210	HALD-25610	HALD-26410
LOCK RINGS		LR-52101	LR-52103	LR-52103	LR-52105	LR-52105	LR-52104	LR-52105	LR-52107
LOCK LINERS		LL-21100	LL-21200	LL-21300	LL-22100	LL-22200	LL-22300	LL-22400	
LOCK SCREWS		16531	16531	16531	16532	16532	16532	16532	16532
HEADLESS BUSHINGS		19936	19937	19938	19937	19938	19939	19940	19941

AIR FEED BUSHINGS

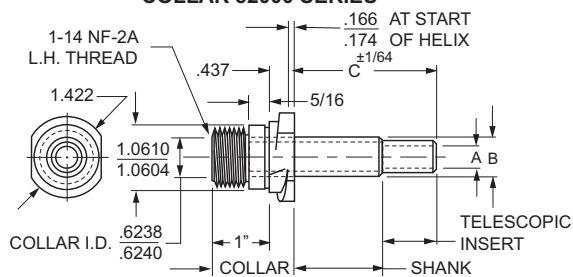
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.4688 15/32 1/4 .2500	.5312 17/32 1/4 .2500	.5937 19/32 1/4 .2500	.6562 21/32 1/4 .2500	.7187 23/32 1/4 .2500	.7187 23/32 1/4 .2500	.4062 13/32 5/16 .3125	.5312 17/32 5/16 .3125	.5937 19/32 5/16 .3125	.6562 21/32 5/16 .3125	.7812 25/32 5/16 .3125	.9062 5/16 29/32 .3125	.9375 15/16 5/16 .3125	1.0000 1 5/16 .3125	.9375 15/16 5/16 .3125	1.0313 1-1/32 3/8 .3750	1.1562 1-5/32 3/8 .3750	1.2812 1-9/32 3/8 .3750	1.4688 1-15/32 3/8 .3750	1.4688 1-15/32 3/8 .3750			
5/8 .6248 .6245	3/4 .7498 .7495	13/16 .8123 .8120	7/8 .8748 .8745	1 .9998 .9995	1-1/8 1.1248 1.1245	5/8 .6248 .6245	3/4 .7498 .7495	13/16 .8123 .8120	7/8 .8748 .8745	1 .9998 .9995	1-1/8 1.1248 1.1245	1-1/4 1.2498 1.2495	1-3/8 1.3748 1.3745	1-1/2 1.4998 1.4995	1-1/4 1.2498 1.2495	1-3/8 1.3748 1.3745	1-1/2 1.4998 1.4995	1-3/4 1.7498 1.7495	2 1.9998 1.9995			
																						3/8
																						1/2
						A-24103																5/8
A-23004	A-23104	A-23204	A-23304			A-24104	A-24304	A-24204														3/4
A-23005	A-23105	A-23205	A-23305			A-24105	A-24305	A-24205	A-24405													7/8
A-23006	A-23106	A-23206	A-23306	A-23406	A-23506	A-24106	A-24306	A-24206	A-24406	A-24506	A-24606		A-24906	A-24806								1
																						1-1/16
A-23008	A-23108	A-23208	A-23308	A-23408	A-23508	A-24108	A-24308	A-24208	A-24408	A-24508	A-24608		A-24908									1-1/8
																						1-3/16
A-23010	A-23110	A-23210	A-23310	A-23410	A-23510	A-24110	A-24310	A-24210	A-24410	A-24510	A-24610	A-24710			A-25110							1-1/4
A-23011	A-23111	A-23211	A-23311	A-23411	A-23511	A-24111	A-24311	A-24211	A-24411	A-23511	A-23611	A-24711	A-24911	A-24811	A-25111	A-25211						1-3/8
			A-23312																			1-7/16
A-23013	A-23113	A-23213	A-23313	A-23413	A-23513	A-24113	A-24313	A-24213	A-24413	A-24513	A-24613	A-24713	A-24913	A-24813	A-25113	A-25213	A-25313					1-1/2
A-23014	A-23114	A-23214	A-23314	A-23414	A-23514	A-24114	A-24314	A-24214	A-24414	A-24514	A-24614	A-24714	A-24914	A-24814	A-25114	A-25214	A-25314					1-5/8
A-23015	A-23115	A-23215	A-23315	A-23415	A23515	A-24115	A-24315	A-24215	A-24415	A24515	A24615	A24715	A24915	A24815	A-25115	A-25215	A-25315	A-25415				1-3/4
A-23016	A-23116	A-23216	A-23316	A-23416	A-23516	A-24116	A-24316	A-24216	A-24416	A-24516	A-24616	A-24716	A-24916	A-24816	A-25116	A-25216	A-25316	A-25416				1-7/8
					A-23517						A-24617			A-24817								1-15/16
A-23018	A-23118	A-23218	A-23318	A-23418	A-23518	A-24118	A-24318	A-24218	A-24418	A-24518	A-24618	A-24718	A-24918	A-24818	A-25118	A-25218	A-25318	A-25418	A-25518			2
A-23019	A-23119	A-23219	A-23319	A23419	A-23519	A-24119	A-24319	A-24219	A24419	A-24519	A-24619	A-24719	A-24919	A-24819	A-25119	A-25219	A-25319	A25419	A-25519			2-1/8
A-23020	A-23120	A-23220	A-23320	A-23420	A-23520	A-24120	A-24320	A-24220	A-24420	A-24520	A-24620	A-24720	A-24920	A-24820	A-25120	A-25220	A-25320	A-25420	A-25520			2-1/4
A-23021	A-23121	A-23221	A-23321	A-23421	A-23521	A-24121	A-24321	A-24221	A-24421	A-24521	A-24621	A-24721	A-24921	A-24821	A-25121	A-25221	A-25321	A-25421	A-25521			2-3/8
A-23022	A-23122	A-23222	A-23322	A-23422	A-23522	A-24122	A-24322	A-24222	A-24422	A-24522	A-24622	A-24722	A-24922	A-24822	A-25122	A-25222	A-25322	A-25422	A-25522			2-1/2
																				A-25523		2-5/8
A-23024	A-23124	A-23224	A-23324	A-23424	A-23524	A-24124	A-24324	A-24224	A-24424	A-24524	A-24624	A-24724	A-24924	A-24824	A-25124	A-25224	A-25324	A-25424	A-25524			2-3/4
A-23025	A-23125	A-23225	A-23325	A-23425	A-23525	A-24125	A-24325	A-24225	A-24425	A-24525	A-24625	A-24725	A-24925	A-24825	A-25125	A-25225	A-25325	A-25425	A-25525			3
A-23026	A-23126	A-23226	A-23326	A-23426	A-23526	A-24126	A-24326	A-24226	A-24426	A-24526	A-24626	A-24726	A-24926	A-24826	A-25126	A-25226	A-25326	A-25426	A-25526			3-1/4
A-23027	A-23127	A-23227	A-23327	A-23427	A-23527	A-24127	A-24327	A-24227	A-24427	A-24527	A-24627	A-24727	A-24927	A-24827	A-25127	A-25227	A-25327	A-25427	A-25527			3-1/2
A-23028	A-23128	A-23228	A-23328	A-23428	A-23528	A-24128	A-24328	A-24228	A-24428	A-24528	A-24628	A-24728	A-24928	A-24828	A-25128	A-25228	A-25328	A-25428	A-25528			3-3/4
A-23029	A-23129	A-23229	A-23329	A-23429	A-23529	A-24129	A-24329	A-24229	A-24429	A-24529	A-24629	A-24729	A-24929	A-24829	A-25129	A-25229	A-25329	A-25429	A-25529			4
A-23030	A-23130	A-23230	A-23330	A-23430	A-23530	A-24130	A-24330	A-24230	A-24430	A-24530	A-24630	A-24730	A-24930	A-24830	A-25130	A-25230	A-25330	A-25430	A-25530			5
A-23031	A-23131	A-23231	A-23331	A-23431	A-23531	A-24131	A-24331	A-24231	A-24431	A-24531	A-24631	A-24731	A-24931	A-24831	A-25131	A-25231	A-25331	A-25431	A-25531			6
			LL-23300 (Matches A-23312 tip)		LL-23500 (Matches A-23517 tip)						LL-24600 (Matches A-24617 tip)			LL-24800 (Matches A-24817 tip)						LL-25500 (Matches A-25523 tip)		
			14445		14446						14446			14447						14448		
HAL-35610	HAL-36410	HAL-36410	HAL-38016	HAL-39616	HAL-39624	HAL-45616	HAL-46416	HAL-48016	HAL-48016	HAL-48016	HAL-48816	HAL-49616	HAL-411216	HAL-412816	HAL-25100	HAL-25200	HAL-25300	HAL-25400	HAL-25500			
HALD-35610	HALD-36410	HALD-36410	HALD-38016	HALD-39616	HALD-39624	HALD-45616	HALD-46416	HALD-48016	HALD-48016	HALD-48816	HALD-49616	HALD-411216	HALD-412816	HALD-25100	HALD-25200	HALD-25300	HALD-25400	HALD-25500				
LR-52108	LR-52107	LR-52107	LR-52109	LR-52112	LR-52110	LR-52105	LR-52107	LR-52107	LR-52109	LR-52109	LR-52110	LR-52112	LR-52116	LR-52118	LR-52121	LR-52121	LR-52121	LR-52121	LR-52121			
	LL-23100	LL-23200	LL-23300	LL-23400	LL-23500	LL-24100	LL-24300	LL-24300	LL-24400	LL-24500	LL-24600	LL-24700		LL-24800	LL-25100	LL-25200	LL-25300	LL-25400	LL-25500			
16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16530	16530	16530	16530	16530			
19940	19942	19943	19944	19945	19946	19947	19949	19943	19950	19951	19946	19952	19954	19955	19953	19954	19955	19956				

TELESCOPING AIR FEED BUSHINGS

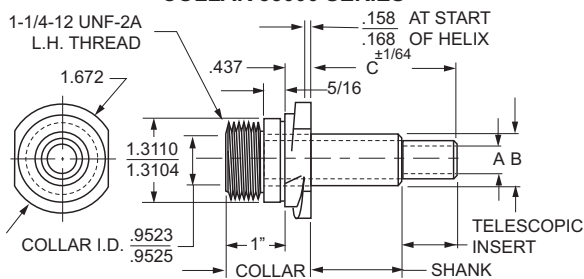
COLLAR 51000 SERIES



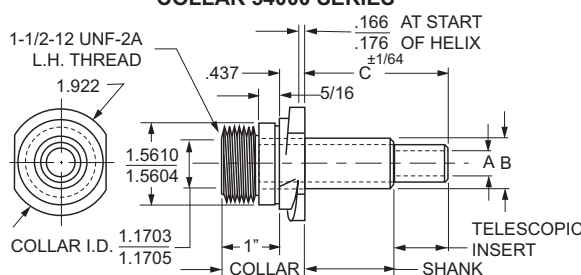
COLLAR 52000 SERIES



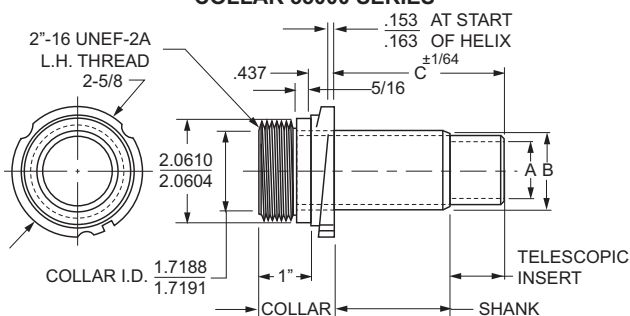
COLLAR 53000 SERIES



COLLAR 54000 SERIES



COLLAR 55000 SERIES



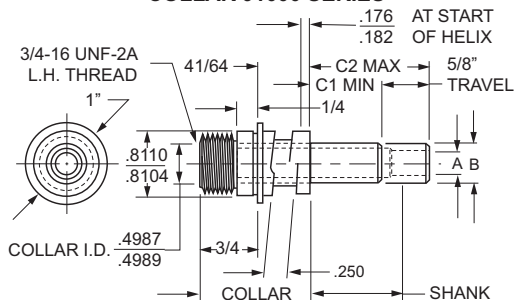
		COLLAR-51000 SERIES			COLLAR-52000 SERIES		
I.D. RANGE A	MAX. MIN.	.1360 29 3/32 .0938	.1875 3/16 3/32 .0938	.2344 15/64 3/32 .0938	.3160 0 3/16 .1875	.3750 3/8 3/16 .1875	.4219 27/64 3/16 .1875
O.D. RANGE B	NOM. DEC. RANGE	3/8 .3748 .3745	7/16 .4373 .4370	1/2 .4998 .4995	5/8 .6248 .6245	3/4 .7498 .7495	13/16 .8123 .8120
LENGTH C - SHANK EXTENDS FROM COLLAR - INCHES		5/8 1	A-51106	A-51206	A-51306	A-52406	A-52506
		7/8 1-1/2	A-51113	A-51213	A-51313	A-52413	A-52513
		1-3/8 2	A-51118	A-51218	A-51318	A-52418	A-52518
		1-7/8 2-1/2	A-51122	A-51222	A-51322	A-52422	A-52522
		2-1/4 3	A-51125	A-51225	A-51325	A-52425	A-52525
		2-3/4 3-1/2	A-51127	A-51227	A-51327	A-52427	A-52527
		3-1/4 4	A-51129	A-51229	A-51329	A-52429	A-52529
		3-3/4 4-1/2	A-51129B	A-51229B	A-51329B	A-52429B	A-52529B
		4-1/4 5	A-51130	A-51230	A-51330	A-52430	A-52530
		4-3/4 5-1/2	A-51130B	A-51230B	A-51330B	A-52430B	A-52530B
		5-1/4 6	A-51131	A-51231	A-51331	A-52431	A-52531
			HAL-13212	HAL-14808	HAL-14808	HAL-25610	HAL-26410
			HALD-13212	HALD-14808	HALD-14808	HALD-25610	HALD-26410
			LR-52101	LR-52103	LR-52103	LR-52105	LR-52107
			LL-21100	LL-21200	LL-21300	LL-21400	
			16531	16531	16531	16532	16532
			19936	19937	19938	19940	19941

TELESCOPING AIR FEED BUSHINGS

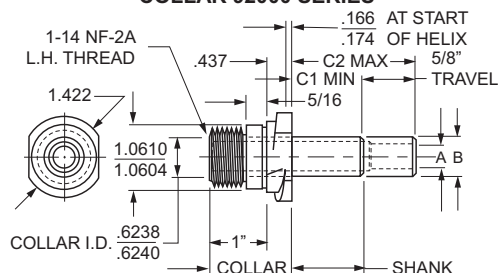
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.4219 27/64 3/16 .1875	.4375 7/16 3/16 .1875	.4688 15/32 3/16 .1875	.5000 1/2 3/16 .1875	.5937 19/32 3/16 .1875	.5937 23/32 3/16 .1875	.8125 13/16 3/16 .1875	.4375 7/16 5/16 .3125	.5937 19/32 5/16 .3125	.7187 23/32 5/16 .3125	.8125 13/16 5/16 .3125	.9062 29/32 5/16 .3125	1.0625 1-1/16 5/16 .3125	.8125 13/16 3/8 .3750	.9062 29/32 3/8 .3750	1.0625 1-1/16 3/8 .3750	1.2500 1-1/4 3/8 .3750	1.4062 1-13/32 3/8 .3750						
5/8 .6248 .6245	3/4 .7498 .7495	13/16 .8123 .8120	7/8 .8748 .8745	1 .9998 .9995	1-1/8 1.1248 1.1245	1-1/4 1.2498 1.2495	13/16 .8123 .8120	1 .9998 .9995	1-1/8 1.1248 1.1245	1-1/4 1.2498 1.2495	1-3/8 1.3748 1.3745	1-1/2 1.4998 1.4995	1-1/4 1.2498 1.2495	1-3/8 1.3748 1.3745	1-1/2 1.4998 1.4995	1-3/4 1.7498 1.7495	2 1.9998 1.9995						
A-53006	A-53106	A-53206	A-53306	A-53406	A-53506	A-53606	A-54206	A-54506	A-54606	A-54706	A-54906	A-54806	A-55106	A-55206	A-55306	A-55406	A-55506						5/8 1
A-53013	A-53113	A-53213	A-53313	A-53413	A-53513	A-53613	A-54213	A-54513	A-54613	A-54713	A-54913	A-54813	A-55113	A-55213	A-55313	A-55413	A-55513						7/8 1-1/2
A-53018	A-53118	A-53218	A-53318	A-53418	A-53518	A-53618	A-54218	A-54518	A-54618	A-54718	A-54918	A-54818	A-55118	A-55218	A-55318	A-55418	A-55518						1-3/8 2
A-53022	A-53122	A-53222	A-53322	A-53422	A-53522	A-53622	A-54222	A-543522	A-54622	A-54722	A-54922	A-54822	A-55122	A-55222	A-55322	A-55422	A-55522						1-7/8 2-1/2
A-53025	A-53125	A-53225	A-53325	A-53425	A-53525	A-53625	A-54225	A-54525	A-54625	A-54725	A-54925	A-54825	A-55125	A-55225	A-55325	A-55425	A-55525						2-1/4 3
A-53027	A-53127	A-53227	A-53327	A-53427	A-53527	A-53627	A-54227	A-54527	A-54627	A-54727	A-54927	A-54827	A-55127	A-55227	A-55327	A-55427	A-55527						2-3/4 3-1/2
A-53029	A-53129	A-53229	A-53329	A-53429	A-53529	A-53629	A-54229	A-54529	A-54629	A-54729	A-54929	A-54829	A-55129	A-55229	A-55329	A-55429	A-55529						3-1/4 4
A-53029B	A-53129B	A-53229B	A-53329B	A-53429B	A-53529B	A-53629B	A-54229B	A-54529B	A-54629B	A-54729B	A-54929B	A-54829B	A-55129B	A-55229B	A-55329B	A-55429B	A-55529B						3-3/4 4-1/2
A-53030	A-53130	A-53230	A-53330	A-53430	A-53530	A-53630	A-54230	A-54530	A-54630	A-54730	A-54930	A-54830	A-55130	A-55230	A-55330	A-55430	A-55530						4-1/4 5
A-53030B	A-53130B	A-53230B	A-53330B	A-53430B	A-53530B	A-53630B	A-54230B	A-54530B	A-54630B	A-54730B	A-54930B	A-54830B	A-55130B	A-55230B	A-55330B	A-55430B	A-55530B						4-3/4 5-1/2
A-53031	A-53131	A-53231	A-53331	A-53431	A-53531	A-53631	A-54231	A-54531	A-54631	A-54731	A-54931	A-54831	A-55131	A-55231	A-55331	A-55431	A-55531						5-1/4 6
HAL-35610	HAL-36410	HAL-36410	HAL-38016	HAL-39616	HAL-38816	HAL-39616	HAL-48016	HAL-48016	HAL-48816	HAL-49616	HAL-411216	HAL-412816	HAL-25100	HAL-25200	HAL-25300	HAL-25400	HAL-25500						
HALD-35610	HALD-36410	HALD-36410	HALD-38016	HALD-39616	HALD-38816	HALD-39616	HALD-48016	HALD-48116	HALD-48016	HALD-48816	HALD-411216	HALD-412816	HALD-25100	HALD-25200	HALD-25300	HALD-25400	HALD-25500						
LR-52108	LR-52107	LR-52107	LR-52112	LR-52112	LR-52110	LR-52111	LR-52109	LR-52109	LR-52110	LR-52112	LR-52116	LR-52118	LR-52120	LR-52120	LR-52120	LR-52120	LR-52121						
	LL-23100	LL-23200	LL-23300	LL-23400	LL-23500		LL-24500	LL-24500	LL-24600	LL-24700		LL-24800	LL-25100	LL-25200	LL-25300	LL-25400	LL-25500						
16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16530	16530	16530	16530	16530	16530						
19940	19942	19943	19944	19945	19946	19952	19945	19945	19946	19954	19955	19952	19954	19955	19956	19957							

TELESCOPING AIR FEED BUSHINGS

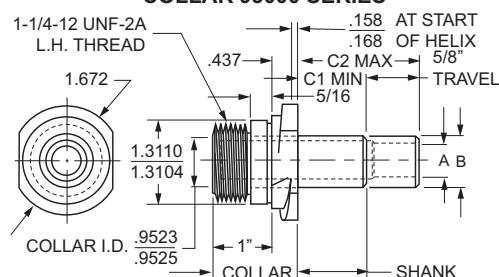
COLLAR 91000 SERIES



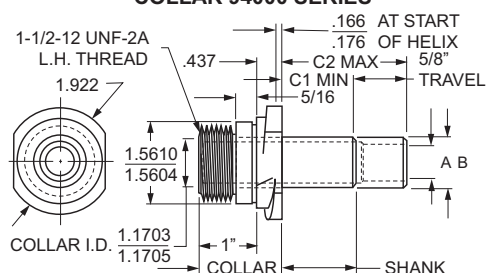
COLLAR 92000 SERIES



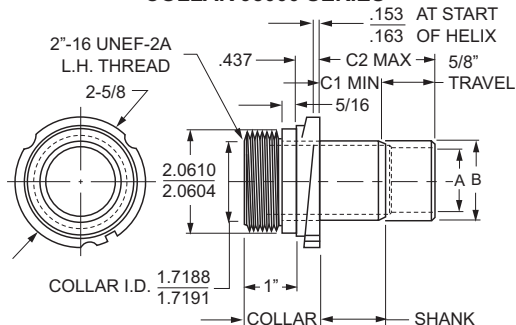
COLLAR 93000 SERIES



COLLAR 94000 SERIES



COLLAR 95000 SERIES



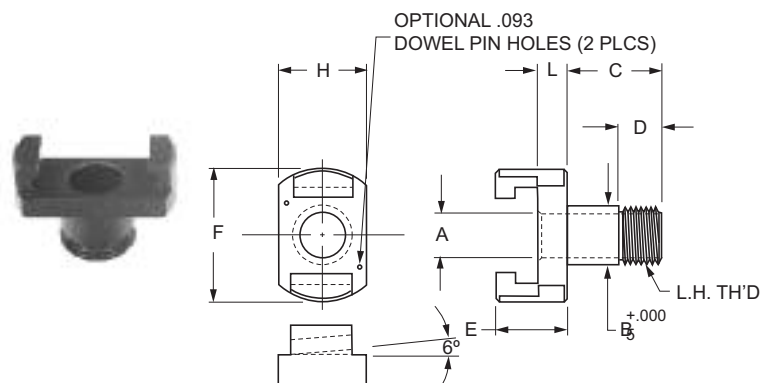
NOTE: These parts are considered as specials and are not returnable.

		COLLAR-91000 SERIES			COLLAR-92000 SERIES				
I.D. RANGE A	MAX. MIN.	.2500 1/4 3/32 .0938	.3125 5/16 3/32 .0938	.3750 3/8 3/32 .0938	.2812 9/32 3/16 .1875	.3437 11/32 3/16 .1875	.4062 13/32 3/16 .1875	.4688 15/32 3/16 .1875	.5000 1/2 3/16 .1875
		.3748 .3745	.4373 .4370	.4998 .4995	.4373 .4370	.4998 .4995	.5623 .5620	.6248 .6245	.7498 .7495
O.D. RANGE B	NOM. DEC. RANGE								
0	1/2	A-91102	A-91202	A-91302	A-92102	A-92202	A-92302	A-92402	A-92502
0	5/8	A-91103	A-91203	A-91303	A-92103	A-92203	A-92303	A-92403	A-92503
1/8	3/4	A-91104	A-91204	A-91304	A-92104	A-92204	A-92304	A-92404	A-92504
1/4	7/8	A-91105	A-91205	A-91305	A-92105	A-92205	A-92305	A-92405	A-92505
3/4	1	A-91106	A-91206	A-91306	A-92106	A-92206	A-92306	A-92406	A-92506
7/16	1-1/16	A-91107	A-91207	A-91307	A-92107	A-92207	A-92307	A-92407	A-92507
1/2	1-1/8	A-91108	A-91208	A-91308	A-92108	A-92208	A-92308	A-92408	A-92508
9/16	1-3/16	A-91109	A-91209	A-91309	A-92109	A-92209	A-92309	A-92409	A-92509
5/8	1-1/4	A-91110	A-91210	A-91310	A-92110	A-92210	A-92310	A-92410	A-92510
3/4	1-3/8	A-91111	A-91211	A-91311	A-92111	A-92211	A-92311	A-92411	A-92511
13/16	1-7/16	A-91112	A-91212	A-91312	A-92112	A-92212	A-92312	A-92412	A-92512
7/8	1-1/2	A-91113	A-91213	A-91313	A-92113	A-92213	A-92313	A-92413	A-92513
1	1-5/8	A-91114	A-91214	A-91314	A-92114	A-92214	A-92314	A-92414	A-92514
1-1/8	1-3/4	A-91115	A-91215	A-91315	A-92115	A-92215	A-92315	A-92415	A-92515
1-1/4	1-7/8	A-91116	A-91216	A-91316	A-92116	A-92216	A-92316	A-92416	A-92516
1-5/16	1-15/16	A-91117	A-91217	A-91317	A-92117	A-92217	A-92317	A-92417	A-92517
1-3/8	2	A-91118	A-91218	A-91318	A-92118	A-92218	A-92318	A-92418	A-92518
1-1/2	2-1/8	A-91119	A-91219	A-91319	A-92119	A-92219	A-92319	A-92419	A-92519
1-5/8	2-1/4	A-91120	A-91220	A-91320	A-92120	A-92220	A-92320	A-92420	A-92520
1-3/4	2-3/8	A-91121	A-91221	A-91321	A-92121	A-92221	A-92321	A-92421	A-92521
1-7/8	2-1/2	A-91122	A-91222	A-91322	A-92122	A-92222	A-92322	A-92422	A-92522
2	2-5/8	A-91123	A-91223	A-91323	A-92123	A-92223	A-92323	A-92423	A-92523
2-1/8	2-3/4	A-91124	A-91224	A-91324	A-92124	A-92224	A-92324	A-92424	A-92524
2-3/8	3	A-91125	A-91225	A-91325	A-92125	A-92225	A-92325	A-92425	A-92525
5-5/8	3-1/4	A-91126	A-91226	A-91326	A-92126	A-92226	A-92326	A-92426	A-92526
2-7/8	3-1/2	A-91127	A-91227	A-91327	A-92127	A-92227	A-92327	A-92427	A-92527
3-1/8	3-3/4	A-91128	A-91228	A-91328	A-92128	A-92228	A-92328	A-92428	A-92528
3-3/8	4	A-91129	A-91229	A-91329	A-92129	A-92229	A-92329	A-92429	A-92529
3-5/8	4-1/4	A-91129A	A-91229A	A-91329A	A-92129A	A-92229A	A-92329A	A-92429A	A-92529A
3-7/8	4-1/2	A-91129B	A-91229B	A-91329B	A-92129B	A-92229B	A-92329B	A-92429B	A-92529B
4-1/8	4-3/4	A-91129C	A-91229C	A-91329C	A-92129C	A-92229C	A-92329C	A-92429C	A-92529C
4-3/8	5	A-91130	A-91230	A-91330	A-92130	A-92230	A-92330	A-92430	A-92530
4-5/8	5-1/4	A-91130A	A-91230A	A-91330A	A-92130A	A-92230A	A-92330A	A-92430A	A-92530A
4-7/5	5-1/2	A-91130B	A-91230B	A-91330B	A-92130B	A-92230B	A-92330B	A-92430B	A-92530B
5-1/8	5-3/4	A-91130C	A-91230C	A-91330C	A-92130C	A-92230C	A-92330C	A-92430C	A-92530C
5-3/8	6	A-91131	A-91231	A-91331	A-92131	A-92231	A-92331	A-92431	A-92531
HELICAL LINER BUSHINGS - METALS		HAL-13212	HAL-14808	HAL-14808	HAL-24808	HAL-24808	HAL-25210	HAL-25610	HAL-26410
HELICAL LINER BUSHINGS - PLASTICS		HALD-13212	HALD-14808	HALD-14808	HALD-24808	HALD-24808	HALD-25210	HALD-25610	HALD-26410
LOCK RINGS		LR-52101	LR-52103	LR-52103	LR-52105	LR-52105	LR-52104	LR-52105	LR-52107
LOCK LINERS		LL-21100	LL-21200	LL-21300	LL-22100	LL-22200	LL-22300	LL-22400	
LOCK SCREWS		16531	16531	16531	16532	16532	16532	16532	16532
HEADLESS BUSHINGS		19936	19937	19938	19937	19938	19939	19940	19941

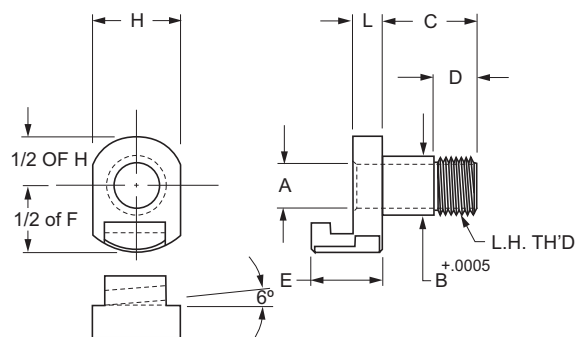
TELESCOPING AIR FEED BUSHINGS

COLLAR-93000 SERIES						COLLAR-94000 SERIES							COLLAR-95000 SERIES					
.4688 15/32 1/4 .2500	.5312 17/32 1/4 .2500	.5937 19/32 1/4 .2500	.6562 21/32 1/4 .2500	.7187 23/32 1/4 .2500	.7187 23/32 1/4 .2500	.8125 13/32 5/16 .3125	.5312 17/32 5/16 .3125	.5937 19/16 5/16 .3125	.6562 21/32 5/16 .3125	.7812 25/32 5/16 .3125	.9062 5/16 29/32 .3125	.9375 15/16 5/16 .3125	1.0313 1-1/32 3/8 .3750	1.1562 1-5/32 3/8 .3750	1.2812 1-9/32 3/8 .3750	1.4688 1-15/32 3/8 .3750		
5/8 .6248 .6245	3/4 .7498 .7495	13/16 .8123 .8120	7/8 .8748 .8745	1 .9998 .9995	1-1/8 1.1248 1.1245	5/8 .6248 .6245	3/4 .7498 .7495	13/16 .8123 .8120	7/8 .8748 .8745	1 .9998 .9995	1-1/8 1.1248 1.1245	1-1/4 1.2498 1.2495	1-1/4 1.2498 1.2495	1-3/8 1.3748 1.3745	1-1/2 1.4998 1.4995	1-3/4 1.7498 1.7495		
A-93002	A-93102	A-93202	A-92302	A-93402	A-93502	A-94102	A-94302	A-94202	A-94402	A-94502	A-94602	A-94702	A-95102	A-95202	A-95302	A-95402	0	1/2
A-93003	A-93103	A-93203	A-93303	A-93403	A-93503	A-94103	A-94303	A-94203	A-94403	A-94503	A-94603	A-94703	A-95103	A-95203	A-95303	A-95403	0	5/8
A-93004	A-93104	A-93204	A-93304	A-93404	A-93504	A-94104	A-94304	A-94204	A-94404	A-94504	A-94604	A-94704	A-95104	A-95204	A-95304	A-95404	1/8	3/4
A-93005	A-93105	A-93205	A-93305	A-93405	A-93505	A-94105	A-94305	A-94205	A-94405	A-94505	A-94605	A-94705	A-95105	A-95205	A-95305	A-95405	1/4	7/8
A-93006	A-93106	A-93206	A-93306	A-93406	A-93506	A-94106	A-94306	A-94206	A-94406	A-94506	A-94606	A-94706	A-95106	A-95206	A-95306	A-95406	3/4	1
A-93007	A-93107	A-93207	A-93307	A-93407	A-93507	A-94107	A-94307	A-94207	A-94407	A-94507	A-94607	A-94707	A-95107	A-95207	A-95307	A-95407	7/16	1-1/16
A-93008	A-93108	A-93208	A-93308	A-93408	A-93508	A-94108	A-94308	A-94208	A-94408	A-94508	A-94608	A-94708	A-95108	A-95208	A-95308	A-95408	1/2	1-1/8
A-93009	A-93109	A-93209	A-93309	A-93409	A-93509	A-94109	A-94309	A-94209	A-94409	A-94509	A-94609	A-94709	A-95109	A-95209	A-95309	A-95409	9/16	1-3/16
A-93010	A-93110	A-93210	A-93310	A-93410	A-93510	A-94110	A-94310	A-94210	A-94410	A-94510	A-94610	A-94710	A-95110	A-95210	A-95310	A-95410	5/8	1-1/4
A-93011	A-93111	A-93211	A-93311	A-93411	A-93511	A-94111	A-94311	A-94211	A-94411	A-94511	A-94611	A-94711	A-95111	A-95211	A-95311	A-95411	3/4	1-3/8
A-93012	A-93112	A-93212	A-93312	A-93412	A-93512	A-94112	A-94312	A-94212	A-94412	A-94512	A-94612	A-94712	A-95112	A-95212	A-95312	A-95412	13/16	1-7/16
A-93013	A-93113	A-93213	A-93313	A-93413	A-93513	A-94113	A-94313	A-94213	A-94413	A-94513	A-94613	A-94713	A-95113	A-95213	A-95313	A-95413	7/8	1-1/2
A-93014	A-93114	A-93114	A-93314	A-93414	A-93514	A-94114	A-94314	A-94214	A-94414	A-94514	A-94614	A-94714	A-95114	A-95214	A-95314	A-95414	1	1-5/8
A-93015	A-93115	A-93215	A-93315	A-93415	A-93515	A-94115	A-94315	A-94215	A-94415	A-94515	A-94615	A-94715	A-95115	A-95215	A-95315	A-95415	1-1/8	1-3/4
A-93016	A-93116	A-93216	A-93316	A-93416	A-93516	A-94116	A-94316	A-94216	A-94416	A-94516	A-94616	A-94716	A-95116	A-95216	A-95316	A-95416	1-1/4	1-7/8
A-93017	A-93117	A-93217	A-93317	A-93417	A-93517	A-94117	A-94317	A-94217	A-94417	A-94517	A-94617	A-94717	A-95117	A-95217	A-95317	A-95417	1-5/16	1-15/16
A-93018	A-93118	A-93218	A-93318	A-93418	A-93518	A-94118	A-94318	A-94218	A-94418	A-94518	A-94618	A-94718	A-95118	A-95218	A-95318	A-95418	1-3/8	2
A-93019	A-93119	A-93219	A-93319	A-93419	A-93519	A-94119	A-94319	A-94219	A-94419	A-94519	A-94619	A-94719	A-95119	A-95219	A-95319	A-95419	1-1/2	2-1/8
A-93020	A-93120	A-93220	A-93320	A-93420	A-93520	A-94120	A-94320	A-94220	A-94420	A-94520	A-94620	A-94720	A-95120	A-95220	A-95320	A-95420	1-5/8	2-1/4
A-93021	A-93121	A-93221	A-93321	A-93421	A-93521	A-94121	A-94321	A-94221	A-94421	A-94521	A-94621	A-94721	A-95121	A-95221	A-95321	A-95421	1-3/4	2-3/8
A-93022	A-93122	A-93222	A-93322	A-93422	A-93522	A-94122	A-94322	A-94222	A-94422	A-94522	A-94622	A-94722	A-95122	A-95222	A-95322	A-95422	1-7/8	2-1/2
A-93023	A-93123	A-93223	A-93323	A-93423	A-93523	A-94123	A-94323	A-94223	A-94423	A-94523	A-94623	A-94723	A-95123	A-95223	A-95323	A-95423	2	2-5/8
A-93024	A-93124	A-93224	A-93324	A-93424	A-93524	A-94124	A-94324	A-94224	A-94424	A-94524	A-94624	A-94724	A-95124	A-95224	A-95324	A-95424	2-1/8	2-3/4
A-93025	A-93125	A-93225	A-93325	A-93425	A-93525	A-94125	A-94325	A-94225	A-94425	A-94525	A-94625	A-94725	A-95125	A-95225	A-95325	A-95425	2-3/8	3
A-93026	A-93126	A-93226	A-93326	A-93426	A-93526	A-94126	A-94326	A-94226	A-94426	A-94526	A-94626	A-94726	A-95126	A-95226	A-95326	A-95426	5-5/8	3-1/4
A-93027	A-93127	A-93227	A-93327	A-93427	A-93527	A-94127	A-94327	A-94227	A-94427	A-94527	A-94627	A-94727	A-95127	A-95227	A-95327	A-95427	2-7/8	3-1/2
A-93028	A-93128	A-93228	A-93328	A-93428	A-93528	A-94128	A-94328	A-94228	A-94428	A-94528	A-94628	A-94728	A-95128	A-95228	A-95328	A-95428	3-1/8	3-3/4
A-93029	A-93129	A-93229	A-93329	A-93429	A-93529	A-94129	A-94329	A-94229	A-94429	A-94529	A-94629	A-94729	A-95129	A-95229	A-95329	A-95429	3-3/8	4
A-93029A	A-93129A	A-93229A	A-93329A	A-93429A	A-93529A	A-94129A	A-94329A	A-94229A	A-94429A	A-94529A	A-94629A	A-94729A	A-95129A	A-95229A	A-95329A	A-95429A	3-5/8	4-1/4
A-93029B	A-93129B	A-93229B	A-93329B	A-93429B	A-93529B	A-94129B	A-94329B	A-94229B	A-94429B	A-94529B	A-94629B	A-94729B	A-95129B	A-95229B	A-95329B	A-95429B	3-7/8	4-1/2
A-93029C	A-93129C	A-93229C	A-93329C	A-93429C	A-93529C	A-94129C	A-94329C	A-94229C	A-94429C	A-94529C	A-94629C	A-94729C	A-95129C	A-95229C	A-95329C	A-95429C	4-1/8	4-3/4
A-93030	A-93130	A-93230	A-93330	A-93430	A-93530	A-94130	A-94330	A-94230	A-94430	A-94530	A-94630	A-94730	A-95130	A-95230	A-95330	A-95430	4-3/8	5
A-93030A	A-93130A	A-93230A	A-93330A	A-93430A	A-93530A	A-94130A	A-94330A	A-94230A	A-94430A	A-94530A	A-94630A	A-94730A	A-95130A	A-95230A	A-95330A	A-95430A	4-5/8	5-1/4
A-93030B	A-93130B	A-93230B	A-93330B	A-93430B	A-93530B	A-94130B	A-94330B	A-94230B	A-94430B	A-94530B	A-94630B	A-94730B	A-95130B	A-95230B	A-95330B	A-95430B	4-7/5	5-1/2
A-93030C	A-93130C	A-93230C	A-93330C	A-93430C	A-93530C	A-94130C	A-94330C	A-94230C	A-94430C	A-94530C	A-94630C	A-94730C	A-95130C	A-95230C	A-95330C	A-95430C	5-1/8	5-3/4
A-93031	A-93131	A-93231	A-93331	A-93431	A-93531	A-94131	A-94331	A-94231	A-94431	A-94531	A-94631	A-94731	A-95131	A-95231	A-95331	A-95431	5-3/8	6
HAL-35610	HAL-36410	HAL-36410	HAL-38016	HAL-39616	HAL-39624	HAL-45616	HAL-46416	HAL-48016	HAL-48016	HAL-48016	HAL-48816	HAL-49616	HAL-25100	HAL-25200	HAL-25300	HAL-25400		
HALD-35610	HALD-36410	HALD-36410	HALD-38016	HALD-39616	HALD-39624	HALD-45616	HALD-46416	HALD-48016	HALD-48016	HALD-48016	HALD-48816	HALD-49616	HALD-25100	HALD-25200	HALD-25300	HALD-25400		
LR-52108	LR-52107	LR-52107	LR-52109	LR-52112	LR-52112	LR-52105	LR-52107	LR-52109	LR-52109	LR-52109	LR-52110	LR-52112	LR-52121	LR-52121	LR-52121	LR-52121		
	LL-23100	LL-23200	LL-23300	LL-23400	LL-23500	LL-24100	LL-24300	LL-24400	LL-24400	LL-24500	LL-24600	LL-24700	LL-25100	LL-25200	LL-25300	LL-25400		
16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16532	16530	16530	16530	16530		
19940	19942	19943	19944	19945	19946	19940	19942	19943	19944	19945	19946	19952	19952	19954	19955	19956		

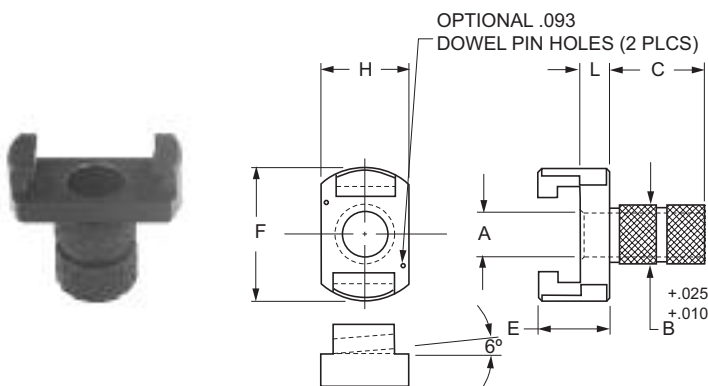
ONE PIECE AIR FEED LOCK LINER: The one piece lock liner construction is more rigid than the lock screw type. Closer hole proximity is possible with the style. This locknut or imbedment type holds the drill units thrust and torque better than lock screws alone.



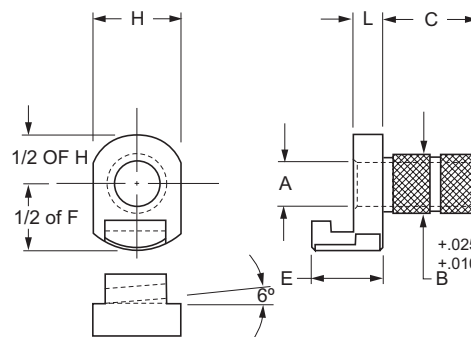
TYPE - HAL



TYPE - HAL1



TYPE - HALD



TYPE - HALD1

Use HAL for the version for use with Metals and HALD for use with Plastic.

NOTE: Add DP for the optional dowel pin holes. Use HALDP or HALDDP respectively.

HELICAL AIR FEED LOCK LINERS

P/N	A	B	C	*D	E	F	H	L	*LH THREAD	*LOCK NUT NO.**	MATCHING TIP	DRILL SIZE MIN	DRILL SIZE MAX
HAL-13208-3/8	.3752 / .3756	.4990	1/2	1/4	39/64	1-1/8	.505	.250	1/2-20	LR-52101	21000	3/32	1/4
HAL-13212-3/8	.3752 / .3756	.4990	3/4	5/16	39/64	1-1/8	.505	.250	1/2-20	LR-52101	21000	3/32	1/4
HAL-14808-7/16	.4377 / .4380	.7490	1/2	1/4	39/64	1-1/8	.755	.250	3/4-16	LR-52103	21000	3/32	5/16
HAL-14812-7/16	.4377 / .4380	.7490	3/4	5/16	39/64	1-1/8	.755	.250	3/4-16	LR-52103	21000	3/32	5/16
HAL-14808-1/2	.5002 / .5006	.7490	1/2	1/4	39/64	1-1/8	.755	.250	3/4-16	LR-52103	21000	3/32	3/8
HAL-14812-1/2	.5002 / .5006	.7490	3/4	5/16	39/64	1-1/8	.755	.250	3/4-16	LR-52103	21000	3/32	3/8
HAL-14816-1/2	.5000 / .5006	.7490	1	5/16	39/64	1-1/8	.755	.250	3/4-16	LR-52103	21000	3/32	3/8
HAL-24808-7/16	.4377 / .4381	.7490	1/2	1/4	39/64	1-13/16	.755	.250	3/4-16	LR-52103	22000	3/16	9/32
HAL-24812-7/16	.4377 / .4381	.7490	3/4	5/16	39/64	1-13/16	.755	.250	3/4-16	LR-52103	22000	3/16	9/32
HAL-24808-1/2	.5002 / .5006	.7490	1/2	1/4	39/64	1-13/16	.755	.250	3/4-16	LR-52103	22000	3/16	11/32
HAL-24812-1/2	.5002 / .5006	.7490	3/4	5/16	39/64	1-13/16	.755	.250	3/4-16	LR-52103	22000	3/16	11/32
HAL-25210-9/16	.5627 / .5631	.8117	5/8	5/16	39/64	1-13/16	.816	.250	13/16-16	LR-52104	22000	3/16	13/32
HAL-25612-1/2	.5002 / .5006	.8740	3/4	5/16	39/64	1-13/16	.880	.250	7/8-14	LR-52105	22000	3/16	11/32

* For use with HAL and HAL-1

** Order the Lock Ring separately.

NOTE: These parts are considered as specials and are not returnable.

AIR FEED ACCESSORIES

HELICAL AIR FEED LOCK LINERS - CONTINUED

P/N	A	B	C	*D	E	F	H	L	*LH THREAD	*LOCK NUT NO.**	MATCHING TIP	DRILL SIZE MIN	DRILL SIZE MAX
HAL-25610-5/8	.6252 .6256	.8740	5/8	5/16	39/64	1-13/16	.880	.250	7/8-14	LR-52105	22000	3/16	15/32
HAL-25612-5/8	.6252 .6256	.8740	3/4	5/16	39/64	1-13/16	.880	.250	7/8-14	LR-52105	22000	3/16	15/32
HAL-26410-3/4	.7503 .7507	.9990	5/8	5/16	39/64	1-13/16	1.005	.250	1-14	LR-52107	22000	3/16	15/32
HAL-26412-3/4	.7503 .7507	.9990	3/4	5/16	39/64	1-13/16	1.005	.250	1-14	LR-52107	22000	3/16	15/32
HAL-26416-3/4	.7503 .7507	.9990	1	5/16	39/64	1-13/16	1.005	.250	1-14	LR-52107	22000	3/16	15/32
HAL-26416-13/16	.8127 .8131	.9990	1	5/16	39/64	1-13/16	1.005	.250	1-14	LR-52107	22000	3/16	15/32
HAL-27216-7/8	.8753 .8757	1.1240	1	5/16	39/64	1-13/16	1.130	.250	1-1/8-16	LR-52108	22000	3/16	15/32
HAL-35610-5/8	.6252 .6256	.8740	5/8	1	5/8	2-1/8	1.005	.250	7/8-14	LR-52105	23000	1/4	17/32
HAL-35616-5/8	.6252 .6256	.8740	1	5/16	5/8	2-1/8	1.005	.250	7/8-14	LR-52105	23000	1/4	17/32
HAL-36410-3/4	.7503 .7507	.9990	5/8	5/16	5/8	2-1/8	1.005	.250	1-14	LR-52107	23000	1/4	17/32
HAL-36416-3/4	.7503 .7507	.9990	1	5/16	5/8	2-1/8	1.005	.250	1-14	LR-52107	23000	1/4	17/32
HAL-36410-13/16	.8125 .8132	.9990	5/8	5/16	5/8	2-1/8	1.005	.250	1-14	LR-52107	23000	1/4	19/32
HAL-36416-13/16	.8125 .8132	.9990	1	5/16	5/8	2-1/8	1.005	.250	1-14	LR-52107	23000	1/4	19/32
HAL-38016-7/8	.8753 .8757	1.2490	1	5/16	5/8	2-1/8	1.255	.250	1-1/4-12	LR-52109	23000	1/4	21/32
HAL-38816-1-1/8	1.1254 1.1257	1.3740	1	5/16	5/8	2-1/8	1.380	.250	1-3/8-16	LR-52110	23000	1/4	23/32
HAL-38820-1-1/8	1.1254 1.1257	1.3740	1-1/4	5/16	5/8	2-1/8	1.380	.250	1-3/8-16	LR-52110	23000	1/4	23/32
HAL-39616-1	1.0004 1.0007	1.4990	1	5/16	5/8	2-1/8	1.505	.250	1-1/2-16	LR-52112	23000	1/4	23/32
HAL-39616-1-1/4	1.2505 1.2509	1.4990	1	5/16	5/8	2-1/8	1.505	.250	1-1/2-16	LR-52112	23000	1/4	23/32
HAL-39620-1-1/4	1.2505 1.2509	1.4990	1-1/4	5/16	5/8	2-1/8	1.505	.250	1-1/2-16	LR-52112	23000	1/4	23/32
HAL-39624-1	1.0004 1.0007	1.4990	1-1/2	5/16	5/8	2-1/8	1.505	.250	1-1/2-16	LR-52112	23000	1/4	23/32
HAL-39624-1-1/8	1.1254 1.1257	1.4990	1-1/2	5/16	5/8	2-1/8	1.505	.250	1-1/2-16	LR-52112	23000	1/4	23/32
HAL-39628-1-1/4	1.2505 1.2507	1.4990	1-3/4	5/16	5/8	2-1/8	1.505	.250	1-1/2-16	LR-52112	23000	1/4	23/32
HAL-45616-5/8	.6252 .6256	.8740	1	5/16	5/8	2-7/16	.880	.250	7/8-14	LR-52105	24000	5/16	13/32
HAL-45624-5/8	.6252 .6256	.8740	1-1/2	5/16	5/8	2-7/16	.880	.250	7/8-14	LR-52105	24000	5/16	13/32
HAL-45616-3/4	.7503 .7507	.9990	1	5/16	5/8	2-7/16	1.005	.250	1-14	LR-52107	24000	5/16	17/32
HAL-45624-3/4	.7503 .7507	.9990	1-1/2	5/16	5/8	2-7/16	1.005	.250	1-14	LR-52107	24000	5/16	17/32
HAL-48016-13/16	.8128 .8132	1.2490	1	5/16	5/8	2-7/16	1.255	.250	1-1/4-12	LR-52109	24000	5/16	19/32
HAL-48024-13/16	.8128 .8132	1.2490	1-1/2	5/16	5/8	2-7/16	1.255	.250	1-1/4-12	LR-52109	24000	5/16	19/32
HAL-48016-7/8	.8753 .8757	1.2490	1	5/16	5/8	2-7/16	1.255	.250	1-1/4-12	LR-52109	24000	5/16	21/32
HAL-48024-7/8	.8753 .8757	1.2490	1-1/2	5/16	5/8	2-7/16	1.255	.250	1-1/4-12	LR-52109	24000	5/16	21/32
HAL-48016-1	1.0004 1.0007	1.2490	1	5/16	5/8	2-7/16	1.255	.250	1-1/4-12	LR-52109	24000	5/16	25/32
HAL-48024-1	1.0004 1.0007	1.2490	1-1/2	5/16	5/8	2-7/16	1.255	.250	1-3/8-16	LR-52119	24000	5/16	25/32

* For use with HAL and HAL-1
Next Page

** Order the Lock Ring separately.

Continued

AIR FEED ACCESSORIES - TYPE AF

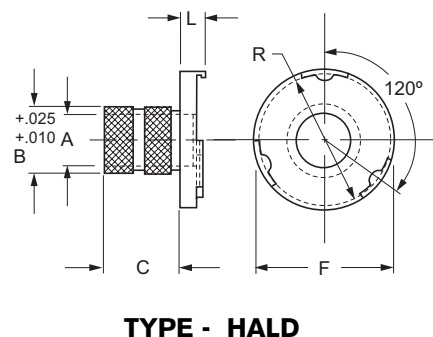
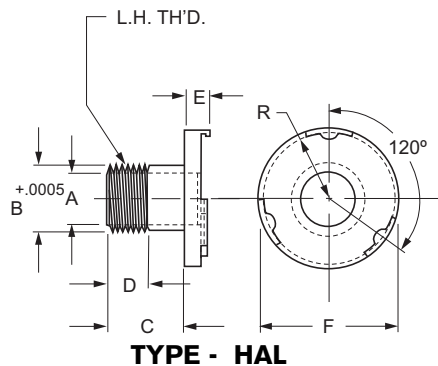
HELICAL AIR FEED LOCK LINERS - CONTINUED

P/N	A	B	C	*D	E	F	H	L	*LH THREAD	*LOCK NUT NO.**	MATCHING TIP	DRILL SIZE MIN	DRILL SIZE MAX
HAL-48816-1-1/8	1.1254 1.1257	1.3750	1	5/16	5/8	2-7/16	1.380	.250	1-3/8-16	LR-52110	24000	5/16	29/32
HAL-48824-1-1/8	1.1254 1.1257	1.3750	1-1/2	5/16	5/8	2-7/16	1.380	.250	1-1/2-16	LR-52110	24000	1/4	29/32
HAL-49616-1-1/4	1.2505 1.2509	1.4990	1	5/16	5/8	2-7/16	1.505	.250	1-1/2-16	LR-52112	24000	1/4	23/32
HAL-49620-1-1/4	1.2505 1.2509	1.4990	1-1/4	5/16	5/8	2-7/16	1.505	.250	1-1/2-16	LR-52112	24000	5/16	23/32
HAL-49624-1-1/4	1.2505 1.2509	1.4990	1-1/2	5/16	5/8	2-7/16	1.505	.250	1-1/2-16	LR-42112	24000	5/16	15/16
HAL-411216-1-3/8	1.3756 1.3760	1.7490	1	5/16	5/8	2-7/16	1.755	.250	1-3/4-16	LR-42116	24000	5/16	15/16
HAL-411224-1-3/8	1.3756 1.3760	1.7490	1-1/2	5/16	5/8	2-7/16	1.755	.250	1-3/4-16	LR-52116	24000	5/16	15/16
HAL-412816-1-1/2	1.5006 1.5010	1.9990	1	5/16	5/8	2-7/16	2.005	.250	2-16	LR-52118	24000	5/16	15/16
HAL-412824-1-1/2	1.5006 1.5010	1.9990	1-1/2	5/16	5/8	2-7/16	2.005	.250	2-16	LR-52118	24000	5/16	15/16

* For use with HAL and HAL-1

** Order the Lock Ring separately.

This series of Lock Liners is for use with A-15000, A-25000 and A-55000. Use HAL for the version for use with Metals and HALD for use with Plastic.

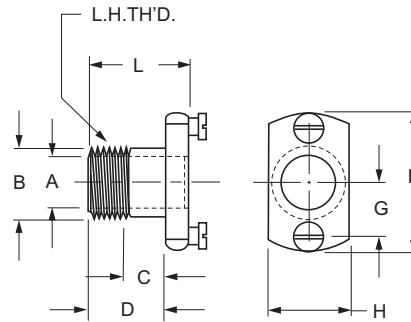


- HELICAL AIR FEED LOCK LINERS

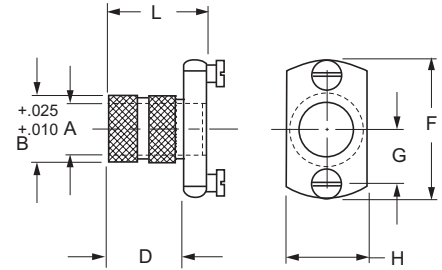
P/N	A	B	C	*D	E	F	R	*LH THREAD	*LOCK NUT NO.**	MATCHING TIP	DRILL SIZE MIN	DRILL SIZE MAX
HAL-25100	1.2505 1.2509	2.4990	2.00	5/8	5/8	3-1/8	3.375	2-1/2-16	LR-52121	25100	3/8	1-1/32
HAL-25200	1.3756 1.3760	2.4990	2.00	5/8	5/8	3-1/8	3.375	2-1/2-16	LR-52121	25200	3/8	1-5/32
HAL-25300	1.5006 1.5010	2.4990	2.00	5/8	5/8	3-1/8	3.375	2-1/2-16	LR-52121	25300	3/8	1-9/32
HAL-25400	1.7508 1.7512	2.4990	2.00	5/8	5/8	3-1/8	3.375	2-1/2-16	LR-52121	25400	3/8	1-15/32
HAL-25500	2.0010 2.0015	2.4990	2.00	5/8	5/8	3-1/8	3.375	2-1/2-16	LR-52121	25500	3/8	1-15/32

** Order the lock ring separately. **NOTE:** These parts are considered as specials and are not returnable.

AIR FEED ACCESSORIES - TYPE AF



TYPE - LL



TYPE - LLD

Use LL for the version for use with Metals and LLD for use with Plastic.

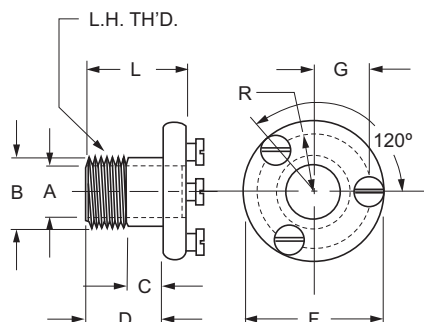
AIR FEED LOCK LINERS

NEW P/N	OLD P/N	A NOMINAL	A ACTUAL	B NOMINAL	B ACTUAL	C	D	F	G	H	L	LH THREAD	LOCK RING NO.**	MATCHING TIP
LL-21100	A-16520	3/8	.3750 .3756	1/2	.4995 .4989	7/16	3/4	1-3/4	5/8	3/4	1-1/16	1/2-20	LR-52101	A-16500, A-11100 A-11107, A-21100 A-51100, A-91100
LL-21200	-	7/16	.4375 .4381	3/4	.7495 .7489	7/16	3/4	1-3/4	5/8	1	1-1/16	3/4-16	LR-52103	A-11200, A-21200 A-51200, A-91200
LL-21300	A-16521	1/2	.5000 .5006	3/4	.7495 .7489	7/16	3/4	1-3/4	5/8	1	1-1/16	3/4-16	LR-52103	A-16501, A-13100 A-11307, A-21100 A-51300, A-91300
LL-22100	-	7/16	.4375 .4381	7/8	.8745 .8739	7/16	3/4	2-7/16	59/64	1-1/8	1-3/16	7/8-14	LR-52105	A-12100, A-22100 A-92100
LL-22200	-	1/2	.5000 .5006	7/8	.8745 .8739	7/16	3/4	2-7/16	59/64	1-1/8	1-3/16	7/8-14	LR-52105	A-12200, A-22200 A-92200
LL-22300	-	9/16	.5625 .5631	7/8	.8745 .8739	7/16	3/4	2-7/16	59/64	1-1/8	1-3/16	7/8-14	LR-52105	A-12300, A-22300 A-92300
LL-22400	A-16522	5/8	.6250 .6256	7/8	.8745 .8739	7/16	3/4	2-7/16	59/64	1-1/8	1-3/16	7/8-14	LR-52105	A-16502, A-12400 A-12409, A-22400 A-52400, A-92400
LL-23100	-	3/4	.7500 .7506	1-1/4	1.2495 1.2485	9/16	1	2-11/16	1-3/64	1-1/2	1-7/16	1-1/4-12	LR-52109	A-13100, A-23100 A-53100, A-93100
LL-23200	-	13/16	.8125 .8131	1-1/4	1.2495 1.2485	9/16	1	2-11/16	1-3/64	1-1/2	1-7/16	1-1/4-12	LR-52109	A-13200, A-23200 A-53200, A-93200
LL-23300	A-16523	7/8	.8750 .8756	1-1/4	1.2495 1.2485	9/16	1	2-11/16	1-3/64	1-1/2	1-7/16	1-1/4-12	LR-52109	A-16503, A-13300 A-13312, A-23300 A-53300, A-93300
LL-23400	-	1	1.0000 1.0010	1-1/2	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	LR-52111	A-13400, A-23400 A-53400, A-93400
LL-23500	A-16524	1-1/8	1.1250 1.1260	1-1/2	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	LR-52111	A-16504, A-13500 A-13517, A-23500 A-53500, A-93500
LL-24100	-	5/8	.6250 .6256	1-1/2	1.4990 1.4980	27/32	1-1/2	3	1-11/64	1-3/4	1-15/16	1-1/2-12	LR-52111	A-14100, A-24100 A-54100, A-94100
LL-24300	-	3/4	.7500 .7506	1-1/2	1.4990 1.4980	27/32	1-1/2	3	1-11/64	1-3/4	1-15/16	1-1/2-12	LR-52111	A-14300, A-24300 A-54300, A-94300
LL-24400	-	7/8	.8750 .8756	1-1/2	1.4990 1.4980	27/32	1-1/2	3	1-11/64	1-3/4	1-15/16	1-1/2-12	LR-52111	A-14400, A-24400 A-54400, A-94400
LL-24500	-	1	1.0000 1.0010	1-1/2	1.4990 1.4980	27/32	1-1/2	3	1-11/64	1-3/4	1-15/16	1-1/2-12	LR-52111	A-14500, A-24500 A-54500, A-94500
LL-24600	A-16525	1-1/8	1.1250 1.1260	1-1/2	1.4990 1.4980	27/32	1-1/2	3	1-11/64	1-3/4	1-15/16	1-1/2-12	LR-52111	A-16505, A-14600 A-14617, A-24600 A-54600, A-94600
LL-24700	-	1-1/4	1.2500 1.2510	2	1.9990 1.9980	27/32	1-1/2	3	1-11/64	2-1/2	1-15/16	2"-16	LR-52118	A-14700, A-24700 A-54700, A-94700
LL-24800	A-16526	1-1/2	1.5000 1.5010	2	1.9990 1.9980	27/32	1-1/2	3	1-11/64	2-1/2	1-15/16	2"-16	LR-52118	A-16506, A-14800 A-14817, A-24800 A-54800, A-94800

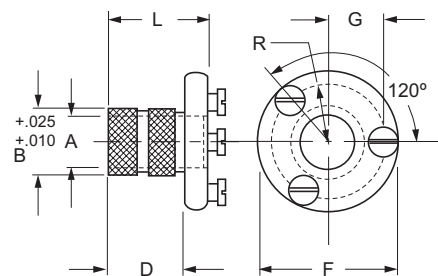
** Order the lock ring separately. **NOTE:** These parts are considered as specials and are not returnable.

AIR FEED ACCESSORIES

This series of Lock Liners is for use with A-15000, A-25000, A-55000 and A-95000. Use LL for the version for use with Metals and LLD for use with Plastic.



TYPE - LL



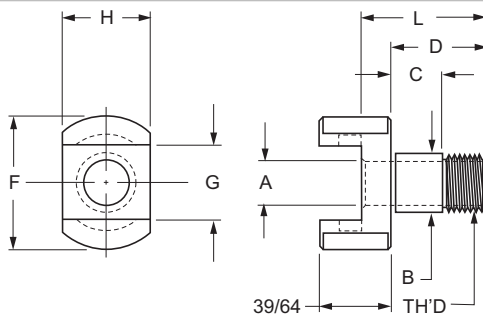
TYPE - LLD

AIR FEED LOCK LINERS

NEW P/N	OLD P/N	A NOMINAL	A ACTUAL	B NOMINAL	B ACTUAL	C	D	F	G	L	LH THREAD	LOCK RING NO.**	MATCHING TIP
LL-25100	-	1-1/4	1.2500 1.2510	2-1/2	2.4990 2.4980	1-3/8	2	3-3/4	1-9/16	2-5/8	2-1/2-16	LR-52121	A-15100, A-25100 A-55100, A-95100
LL-25200	-	1-3/8	1.3750 1.3760	2-1/2	2.4990 2.4980	1-3/8	2	3-3/4	1-9/16	2-5/8	2-1/2-16	LR-52121	A-15200, A-25200 A-55200, A-95200
LL-25300	-	1-1/2	1.5000 1.5010	2-1/2	2.4990 2.4980	1-3/8	2	3-3/4	1-9/16	2-5/8	2-1/2-16	LR-52121	A-15300, A-25300 A-55300, A-95300
LL-25400	-	1-3/4	1.7500 1.7510	2-1/2	2.4990 2.4980	1-3/8	2	3-3/4	1-9/16	2-5/8	2-1/2-16	LR-52121	A-15400, A-25400 A-55400, A-95400
LL-25500	A-16533	2	2.0000 2.0015	2-1/2	2.4990 2.4980	1-3/8	2	3-3/4	1-9/16	2-5/8	2-1/2-16	LR-52121	A-16513, A-15500 A-15523, A-25500 A-55500

** Order the lock ring separately.

NOTE: These parts are considered as specials and are not returnable.



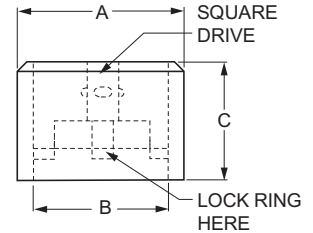
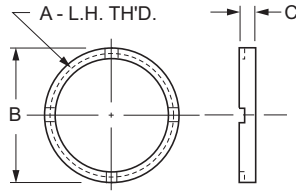
AIR FEED LOCK LINERS

P/N	A	B	C	D	F	G	H	L	LH THREAD	LOCK NUT NO.**	MATCHING TIP
AFL-16520	.3750 .3755	.4995 .4990	7/16	3/4	1-1/8	.625	3/4	1	1/2-20	14441	A-21106
AFL-16521	.5000 .5005	.7495 .7490	7/16	3/4	1-3/16	.625	7/8	1	3/4-16	14442	A-21306
AFL-16522	.6250 .6255	.8740 .8740	7/16	3/4	1-13/16	1.218	1-1/8	1	7/8-14	14443	A-22406
AFL-16523	.8750 .8755	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
AFL-16524	1.1252 1.1258	1.4990 1.4985	27/32	1-1/2	2-1/8	1.468	1-5/8	1-3/4	1-1/2-12	14446	A-23515
AFL-16525	1.1252 1.1258	1.4990 1.4985	27/32	1-1/2	2-7/16	1.718	1-5/8	1-3/4	1-1/2-12	14446	A-24615
AFL-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

** Order the lock nut separately.

NOTE: These parts are considered as specials and are not returnable.

AIR FEED ACCESSORIES



AIR FEED LOCK RINGS

P/N	DIMENSIONS		
	A	B	C
LR-52101	1/2-20	3/4	1/4
LR-52103	3/4-16	1	1/4
LR-52104	13/16-16	1-3/16	1/4
LR-52105	7/8-14	1-1/4	1/4
LR-52107	1-14	1-3/8	1/4
LR-52108	1-1/8-16	1-1/2	1/4
LR-52109	1-1/4-12	1-3/4	3/8
LR-52110	1-3/8-16	1-3/4	5/16
LR-52111	1-1/2-12	1-3/4	5/16
LR-52112	1-1/2-16	1-3/4	1/4
LR-52116	1-3/4-16	2-3/8	1/4
LR-52117	1-7/8-16	2-3/8	1/4
LR-52118	2-16	2-1/2	1/4
LR-52121	2-1/2-16	3	5/16

NOTE: Other sizes are available upon request.

AIR FEED LOCK RING SOCKETS

P/N	DIMENSIONS			
	A	B	C	SOCKET HANDLE
LRS-52101	1	3/4	3/4	LRSH-5
LRS-52103	1-1/4	1	3/4	LRSH-5
LRS-52104	1-7/16	1-3/16	3/4	LRSH-5
LRS-52105	1-1/2	1-1/4	3/4	LRSH-5
LRS-52107	1-5/8	1-3/8	3/4	LRSH-5
LRS-52108	1-3/4	1-1/2	3/4	LRSH-5
LRS-52109	2	1-3/4	3/4	LRSH-5
LRS-52110	2	1-3/4	1	LRSH-6
LRS-52111	2	1-3/4	1	LRSH-6
LRS-52112	2	1-3/4	1	LRSH-6
LRS-52116	2-5/8	2-3/8	1	LRSH-6
LRS-52117	2-5/8	2-3/8	1	LRSH-6
LRS-52118	2-3/4	2-1/2	1	LRSH-6
LRS-52121	3-1/4	3	1	LRSH-6

NOTE: Other sizes are available upon request.

LRSH - 5 LOCK RING HANDLES

This handle is for use with the 1/4" socket size. For use with LR-52101 through LR-52109

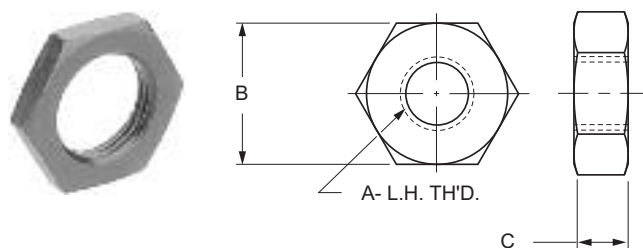


LRSH - 6 LOCK RING HANDLES

This handle is for use with the 1/2" socket size. For use with LR-52110 through LR-52127.

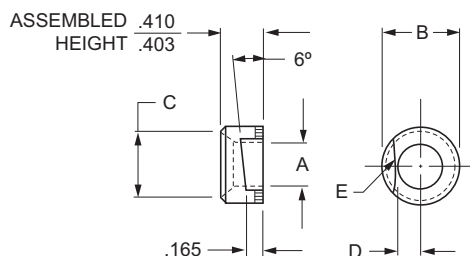


AIR FEED ACCESSORIES



AIR FEED LOCK NUTS

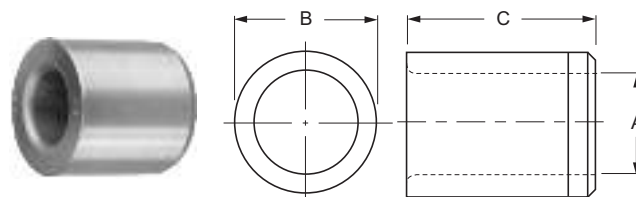
P/N	A	B	C
14441	1/2-20	3/4	1/4
14442	3/4-16	1	1/4
14443	7/8-14	1-1/4	1/4
14445	1-1/4-12	1-3/4	3/8
14446	1-1/2-12	2	1/2
14447	2"-16	2-1/2	1/2
14448	2-1/2-16	3	1/2



AIR FEED CLAMPS - FLAT HEAD

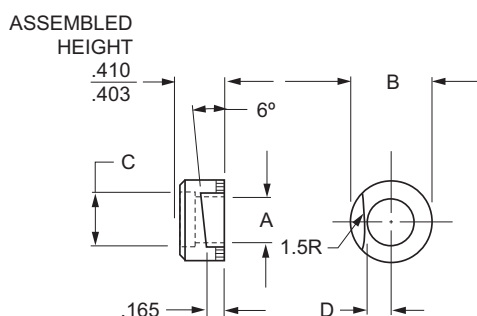
P/N	A	B	C	D	E	FLAT HEAD SOCKET SCREW (FURNISHED)
AFF-2	21/64	5/8	19/32	.188	1.5	5/16-18 x 1
AFF-3	25/64	3/4	23/32	.219	1.5	3/8-16 x 1
AFF-4	21/64	5/8	19/32	.188	1.5	5/16-18 x 1-1/2
AFF-5	21/64	5/8	19/32	.188	1.5	5/16-18 x 2
AFF-6	25/64	3/4	23/32	.219	2.0	3/8-16 x 2
AFF-7	25/64	3/4	23/32	.219	2.5	3/8-16 x 2

- Directly interchangeable with standard lock screws.
- Greater strength eliminates costly replacement of bent and/or broken lock screws.
- Angular clamping surface is normal to locking flange of Air Feed Tip - provides a mating surface in proper alignment with locking flange.
- Clamping base serrations bite into the jig plate which prevents rotation of clamp under heavy torque loads.
- Mounting screws furnished with clamps are of heat treated alloy steel.



AIR FEED LINERS

P/N	ANSI SYMBOL	DIMENSIONS		
		A	B	C
19936	P40-16	3/8	5/8	1
19937	P40-16	7/16	3/4	1
19938	P40-16	1/2	3/4	1
19939	P56-16	9/16	7/8	1
19940	P56-16	5/8	7/8	1
19941	P64-16	3/4	1	1
19942	P64-22	3/4	1	1-3/8
19943	P88-22	13/16	1-3/8	1-3/8
19944	P88-22	7/8	1-3/8	1-3/8
19945	P88-22	1	1-3/8	1-3/8
19946	P122-28	1-1/8	1-3/4	1-3/4
19947	P56-28	5/8	7/8	1-3/4
19949	P64-28	3/4	1	1-3/4
19950	P88-28	7/8	1-3/8	1-3/4
19951	P88-28	1	1-3/8	1-3/4
19952	P112-28	1-1/4	1-3/4	1-3/4
19953	P112-40	1-1/4	1-3/4	2-1/2
19954	P112-40	1-3/8	1-3/4	2-1/2
19955	P144-40	1-1/2	2-1/4	2-1/2
19956	P144-40	1-3/4	2-1/4	2-1/2

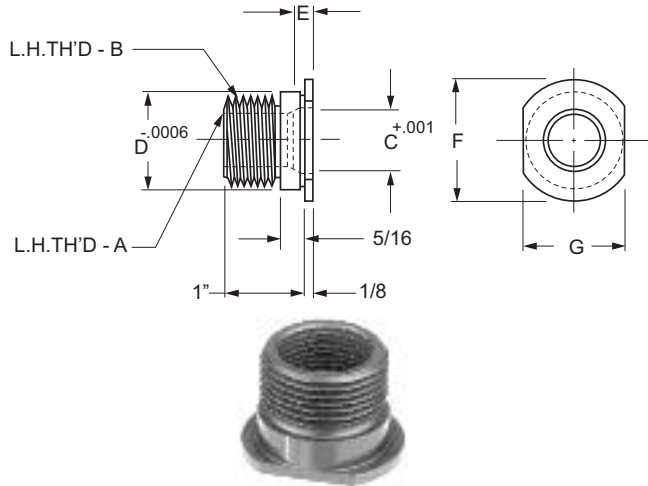


-AIR FEED CLAMPS - SOCKET HEAD

P/N	A	B	C	D	BUTTON HEAD SOCKET SCREW (FURNISHED)
AFC-2	21/64	5/8	29/64	.188	5/16-18 x 5/8
AFC-3	25/64	3/4	33/64	.219	3/8-16 x 3/4

NOTE: Tolerances on the inside and outside diameters are the same as the ANSI Press Fit bushings. See catalog or web site.

AIR FEED ACCESSORIES



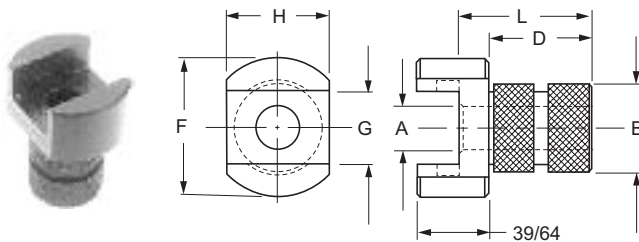
AIR FEED REDUCER BUSHINGS

P/N	A	B	C	D	E	F	G
17952	3/4-16	1"-14	.8125	1.0610	9/32	1-3/8	1-1/16
25018	3/4-16	1-1/4-12	.8125	1.3110	9/32	1-5/8	1-5/16
25583	1"-14	1-1/4-12	1.0625	1.3110	11/32	1-5/8	1-5/16
25582	3/4-16	1-1/2-12	.8125	1.5610	9/32	1-15/16	1-9/16
20032	1"-14	1-1/2-12	1.0625	1.5610	11/32	1-15/16	1-9/16
20017	1-1/4-12	1-1/2-12	1.3125	1.5610	11/32	1-15/16	1-9/16
27910	1-1/2-12	2"-16	1.5625	2.0610	11/32	2-1/2	2-1/16

NOTE: C and D diameters concentric within .001 T.I.R.

NOTE: These parts are considered as specials and are not returnable.

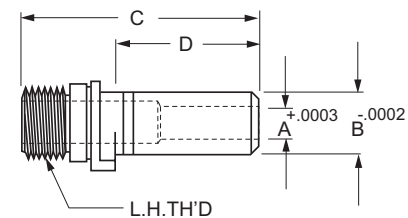
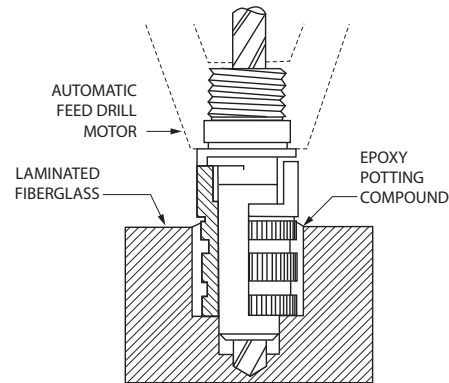
ONE PIECE AIR FEED LOCK LINER: The one piece lock liner construction is more rigid than the lock screw type. Closer hole proximity is possible with the style. Both locknut and imbedment type hold the drill units thrust and torque better than lock screws alone.



AIR FEED LOCK LINERS FOR PLASTIC TOOLING

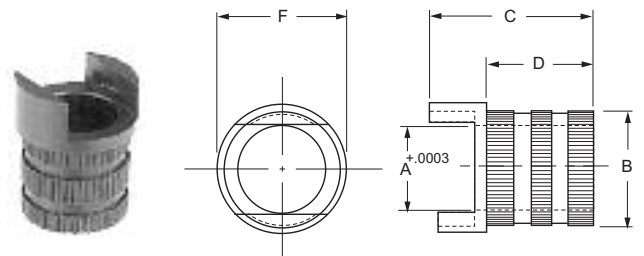
P/N	A	B	D	F	G	H	L	MATCHING TIP
AFD-375	.3750 .3755	3/4	7/8	1-3/16	.625	7/8	1-1/8	A-21108
AFD-500	.5000 .5005	3/4	7/8	1-3/16	.625	7/8	1-1/8	A-21308
AFD-750	.7500 .7505	1-1/8	7/8	1-13/16	1.218	1-1/8	1-1/8	A-22508

All American Precision Adapter Tips and Lock Liner bushings are designed for fiberglass and plastic tooling requiring the use of automatic feed drill motors. The Adapter tip fits all standard automatic feed drill motors such as Keller, Aro, Buckeye and Quackenbush. A close tolerance is maintained when drilling rivet holes in Stainless Steel, Titanium, Nickel and other hard materials.



AIR FEED ADAPTER TIPS

P/N	A	B	C	D	LH THREAD
AT-1	.191 .205	.3437	2-7/16	1-9/16	3/4-16
AT-2	.191 .285	.4375	2-7/16	1-9/16	3/4-16
AT-3	.281 .431	.5625	2-7/16	1-9/16	3/4-16
AT-4	.281 .625	.7500	2-7/16	1-9/16	1"-14



AIR FEED TIP LOCK LINERS

P/N	A	B	C	D	E
LL-1	.3440	9/16	1-3/8	7/8	11/16
LL-2	.4377	11/16	1-3/8	7/8	13/16
LL-3	.5627	13/16	1-3/8	7/8	15/16
LL-4	.7502	1	1-3/8	7/8	1-1/8

