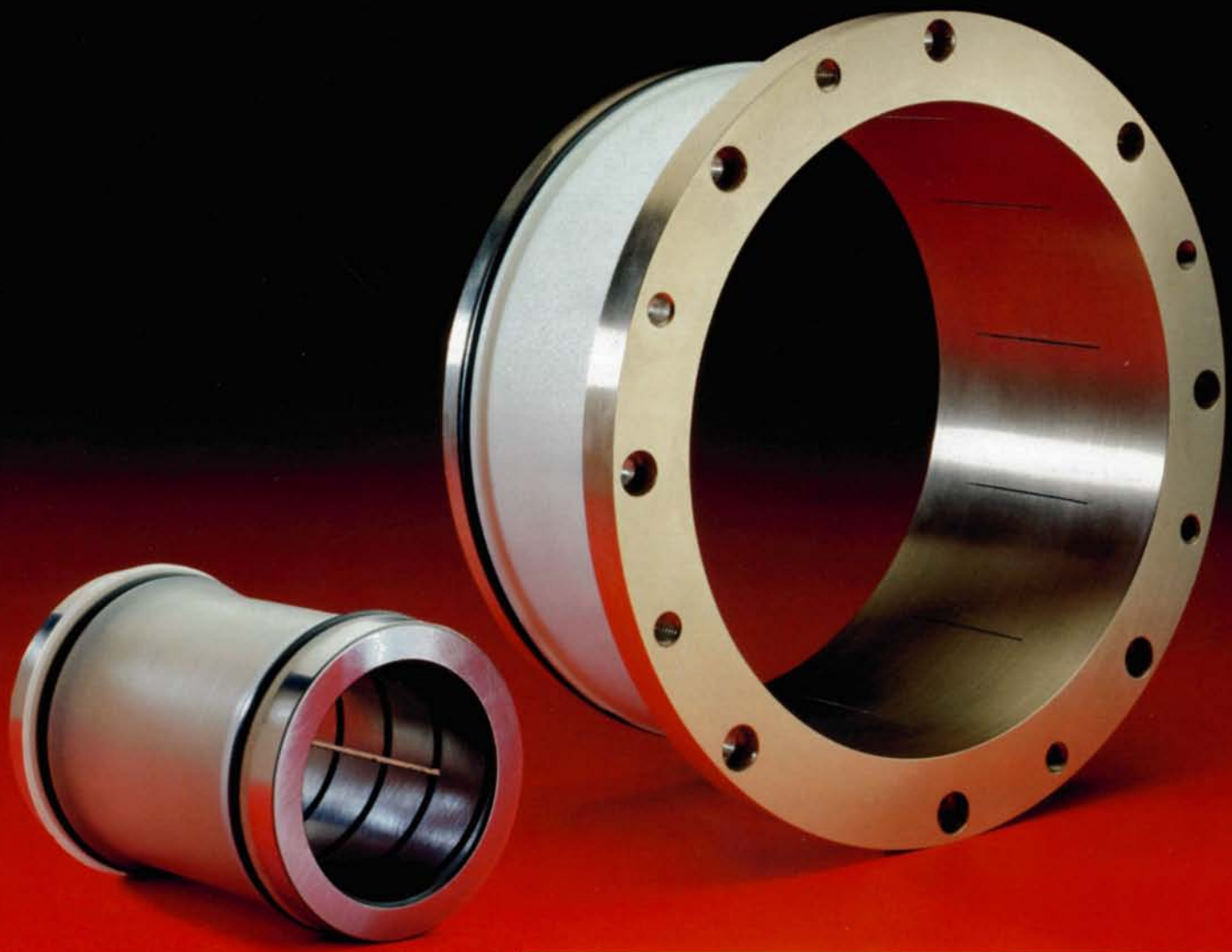
AMBUSH®

# HYDRAULIC SQUEEZE BUSHINGS



## General:

AMBUSH® Hydraulic Squeeze Bushings are used to clamp moving shafts to fixed housings in a wide range of applications.

Type ASA Squeeze Bushings are designed to resist axial forces only. They are commonly used in fixturing and reciprocating shaft applications.

Type AST Squeeze Bushings are designed to resist torque as well as axial forces. One or two holes (for dowel or roll pins) have been provided in the mounting cap to resist the torque and to insure that the Squeeze Bushing does not move.

**NOTE:** The Squeeze Bushing clamps only to the shaft, not the outer diameter. The axial load is transmitted only through the bushing ends and the torque load is resisted by the bushing flange. Provisions to resist axial force and/or torque must be provided.

---

## Description:

Each AMBUSH® is made of high quality alloy bronze or spring steel with a special plastic molded over the slotted squeeze surface. Seals are provided at each end to resist hydraulic pressure up to 5,000 psi (340 bar) depending on diameter. For higher pressure (up to 10,000 psi) contact our engineering department.

The ASB Bearing is made of 660 bronze.

The ASC cap is made of steel with black oxide finish.

Hydraulic pressure acts upon the molded sleeve (between the seals). The hydraulic pressure compresses the bushing radially over the entire length between the seals. This squeeze action locks the shaft to the bushing with high efficiency without introducing any movement to the shaft. Very accurate clamping can be accomplished in many fixture, machine tool and general applications.

---

## Tolerances and Material of Mating Parts:

Housing bore diameter ISO H7 with surface finish in seal area 32 micro inches. Ferrous or non-ferrous materials can be used, but must have sufficient strength to resist the hydraulic pressure.

Shaft diameters of ISO f6 require surface finish of 63 micro inches or better. Shaft materials can be ferrous or non-ferrous, soft or hard.

**NOTE:** Some surface treatments of the shaft may reduce the coefficient of friction and thu the holding force.

---

## Design Hints:

Provide polished chamfer on bore to permit assembly without pinching the "O" rings (See assembly instuctions).

The housing wall should be thick enough to resist the same pressure that is used to clamp the sqeeze bushing.

Provide for air bleeding at the highest point of the bushing's O.D. relief pocket and also the hydraulic lines.

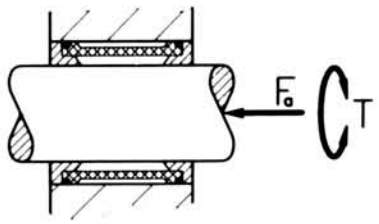
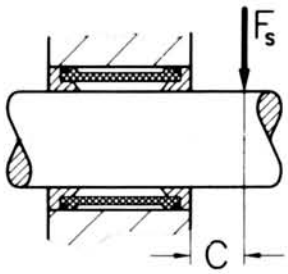
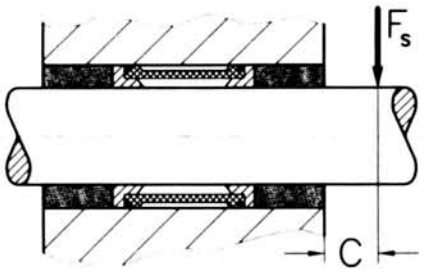
To prevent axial movement under load, bushings must be preloaded. Preload must be 0.0002 to 0.0003 x length (inches). If reload is too high, bushing will not function properly!

Tapped holes are provided in the flanges for easy removal of the type AST Squeeze Bushing.

**Be sure that lubrication oil is not trapped on the I.D. of the Squeeze Bushing which reduces clamping forces.**

Locate oil inlet or bleed holes not closer than s+12 mm (s+.50 in.) from each end. Oil inlet hole size about 4mm (.157 in.) diameter.

Provide shoulders on each end of the bushings to help support hydraulic and thrust forces. Maximum clearance is 0.25mm (.010 in) for diameters and 0.1mm (.004 in) for axi location (See Figures 1 & 2 on back cover).

| Application | Inch | Metric |
|---|---|---|
| **Axial Holding Force and Holding Torque Calculation** | | |
| Holding Force |  | $F_a = d \bullet ( l - 2 \bullet s ) \bullet \pi \bullet P_{hyd} \bullet \mu$ |
| Torque | | $T = F_a \bullet \frac{d}{2}$ |
| **Sideload Calculations** | | |
| without bearing |  | $F_s = \frac{P_{surf}}{S} \bullet \frac{f \bullet l \bullet d}{( l + C )}$ <br> f = 0.12 inch \| f = 3.0 mm <br> $n < \frac{10000}{S}$ <br> $v < B \bullet \frac{d}{S}$ |
| with one or two bearings |  | $F_s = \frac{P_{surf}}{S} \bullet \frac{0.75 \bullet l^2 \bullet d}{( 1.75 \bullet l + C )}$ |

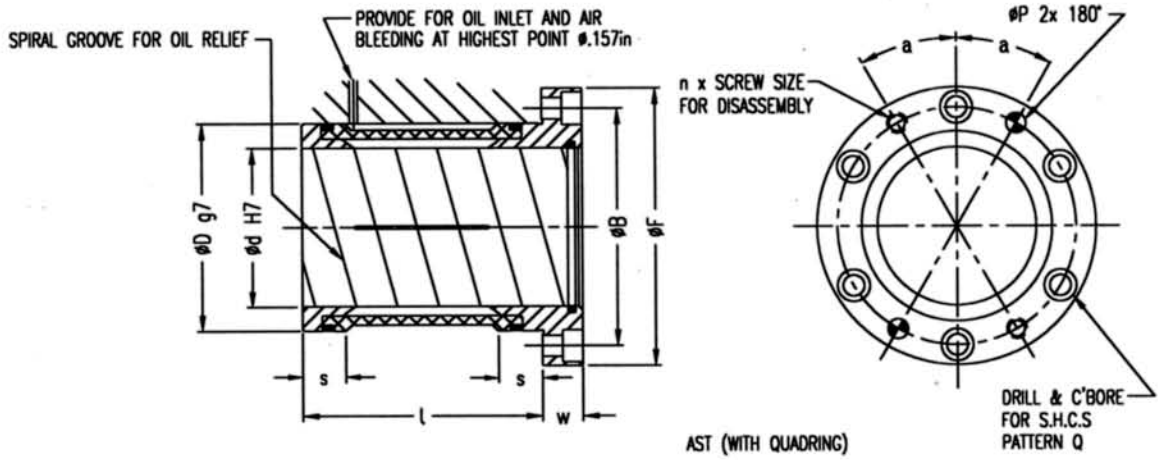
Squeeze Bushings are not designed to take heavy sideloads. For this reason, auxiliary bearings are offered for each size of Squeeze Bushing. The performance of a bearing is influenced by the conditions of speed, mating materials, clearance, temperature, lubrication, type of loading etc. Of primary importance is the maintenance of an oil film between the bearing surface to reduce friction, dissipate heat and retard wear by minimizing metal to metal contact. The most critical periods of operation are during starting and stopping. Recommended oil for moderate speeds is SAE20.

| | | Inch | | Metric | |
|---|---|---|---|---|---|
| symbol | description | value | unit | value | unit |
| $F_a$ | axial holding force | | lb | | N |
| d | I.D. of squeeze bushing | see table | inch | see table | mm |
| l | length of squeeze bushing | see table | inch | see table | mm |
| s | shoulder width of squeeze bushing | see table | inch | see table | mm |
| $p_{hyd}$ | available hydraulic pressure | | psi | | N/mm² |
| μ | coefficient of friction; well lubricated | .1 | — | .1 | — |
| | normal | .12 | — | .12 | — |
| | dry | .15 | — | .15 | — |
| T | holding torque | | in-lbs. | | Nm |
| $F_S$ | (maximum) sideload | | lb | | N |
| $p_{surf}$ | (maximum) surface pressure | 3000 | psi | 20 | N/mm² |
| S | safety factor | ( 3 ) * | — | ( 3 )* | — |
| n | revolutions of the rod | | RPM | | 1/min |
| v | linear velocity of the rod (axial) | | ft/s | | m/s |
| B | bearing factor | 0.53 | 1/s | 43.50 | 1/s |

*recommendation

Conversion factors: 1 N = 0.225 lbs; 1 Nm = 8.8583 in-lbs; 1 bar = 0.1 N/mm² = 14.5 psi; 25.4 mm= 1 in

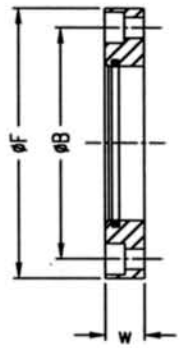
# INCH



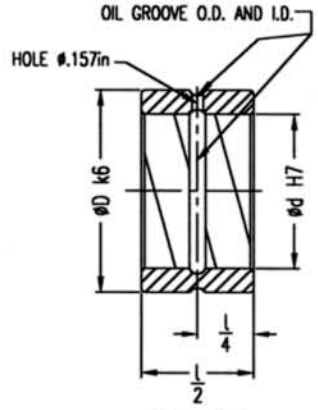

| ASA / AST size d x l | AMBUSH® | | LENGTH l | MATING PARTS | |
|---|---|---|---|---|---|
| | Inside $\phi d\ ^{H}_{7}$ | Outside $\phi D_{g7}$ | .000 / -.003 | Shaft $\phi d_{f6}$ | Housing $\phi D\ ^{H}_{7}$ |
| .250 x 1.250 | .250 | .625 | 1.250 | -.0005 / -.0009 | .0000 / +.0007 |
| .375 x 1.250 | .375 | .750 | 1.250 | -.0005 / -.0009 | .0000 / +.0008 |
| .500 x 2.000 | .500 | .875 | 2.000 | -.0006 / -.0011 | .0000 / +.0008 |
| .625 x 2.000 | .625 | 1.000 | 2.000 | -.0006 / -.0011 | .0000 / +.0008 |
| .750 x 2.000 | .750 | 1.125 | 2.000 | -.0008 / -.0013 | .0000 / +.0008 |
| .875 x 2.500 | .875 | 1.250 | 2.500 | -.0008 / -.0013 | .0000 / +.0010 |
| 1.000 x 2.500 | 1.000 | 1.375 | 2.500 | -.0008 / -.0013 | .0000 / +.0010 |
| 1.125 x 2.500 | 1.125 | 1.563 | 2.500 | -.0008 / -.0013 | .0000 / +.0010 |
| 1.250 x 3.000 | 1.250 | 1.688 | 3.000 | -.0010 / -.0016 | .0000 / +.0010 |
| 1.375 x 3.000 | 1.375 | 1.813 | 3.000 | -.0010 / -.0016 | .0000 / +.0010 |
| 1.500 x 3.000 | 1.500 | 1.938 | 3.000 | -.0010 / -.0016 | .0000 / +.0010 |
| 1.750 x 3.500 | 1.750 | 2.188 | 3.500 | -.0010 / -.0016 | .0000 / +.0012 |
| 2.000 x 3.500 | 2.000 | 2.625 | 3.500 | -.0012 / -.0019 | .0000 / +.0012 |
| 2.250 x 3.500 | 2.250 | 2.875 | 3.500 | -.0012 / -.0019 | .0000 / +.0012 |
| 2.500 x 4.000 | 2.500 | 3.125 | 4.000 | -.0012 / -.0019 | .0000 / +.0012 |
| 2.750 x 4.000 | 2.750 | 3.375 | 4.000 | -.0012 / -.0019 | .0000 / +.0014 |
| 3.000 x 4.000 | 3.000 | 3.750 | 4.000 | -.0012 / -.0019 | .0000 / +.0014 |
| 3.500 x 4.500 | 3.500 | 4.250 | 4.500 | -.0014 / -.0023 | .0000 / +.0014 |
| 4.000 x 4.500 | 4.000 | 4.750 | 4.500 | -.0014 / -.0023 | .0000 / +.0016 |
| 4.500 x 4.500 | 4.500 | 5.250 | 4.500 | -.0014 / -.0023 | .0000 / +.0016 |
| 5.000 x 5.000 | 5.000 | 5.875 | 5.000 | -.0017 / -.0027 | .0000 / +.0016 |
| 5.500 x 5.000 | 5.500 | 6.375 | 5.000 | -.0017 / -.0027 | .0000 / +.0016 |
| 6.000 x 5.000 | 6.000 | 6.875 | 5.000 | -.0017 / -.0027 | .0000 / +.0016 |
| 6.500 x 5.000 | 6.500 | 7.375 | 5.000 | -.0017 / -.0027 | .0000 / +.0018 |
| 7.000 x 5.000 | 7.000 | 7.875 | 5.000 | -.0017 / -.0027 | .0000 / +.0018 |
| 7.500 x 6.000 | 7.500 | 8.375 | 6.000 | -.0020 / -.0031 | .0000 / +.0018 |
| 8.000 x 6.000 | 8.000 | 8.875 | 6.000 | -.0020 / -.0031 | .0000 / +.0018 |
| 8.500 x 6.000 | 8.500 | 9.375 | 6.000 | -.0020 / -.0031 | .0000 / +.0018 |
| 9.000 x 6.000 | 9.000 | 10.000 | 6.000 | -.0020 / -.0031 | .0000 / +.0020 |
| 9.500 x 6.000 | 9.500 | 10.500 | 6.000 | -.0020 / -.0031 | .0000 / +.0020 |
| 10.000 x 7.000 | 10.000 | 11.000 | 7.000 | -.0022 / -.0035 | .0000 / +.0020 |
| 10.500 x 7.000 | 10.500 | 11.500 | 7.000 | -.0022 / -.0035 | .0000 / +.0020 |
| 11.000 x 7.000 | 11.000 | 12.000 | 7.000 | -.0022 / -.0035 | .0000 / +.0020 |
| 11.500 x 7.000 | 11.500 | 12.500 | 7.000 | -.0022 / -.0035 | .0000 / +.0022 |
| 12.000 x 7.000 | 12.000 | 13.000 | 7.000 | -.0022 / -.0035 | .0000 / +.0022 |

Notes: 1. Ream at assembly or drill for standard roll pins
2. Axial force based on 1,000 psi and coefficent of friction of .12
3. Side load at 1 inch axial distance to squeeze bushing, based on safety factor 3 and $p_{surf}$ = 3000 lbs/in²

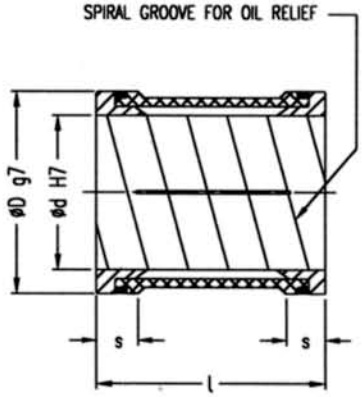
# SIZES




ASC CAP (WITH QUADRING)




ASB BEARING

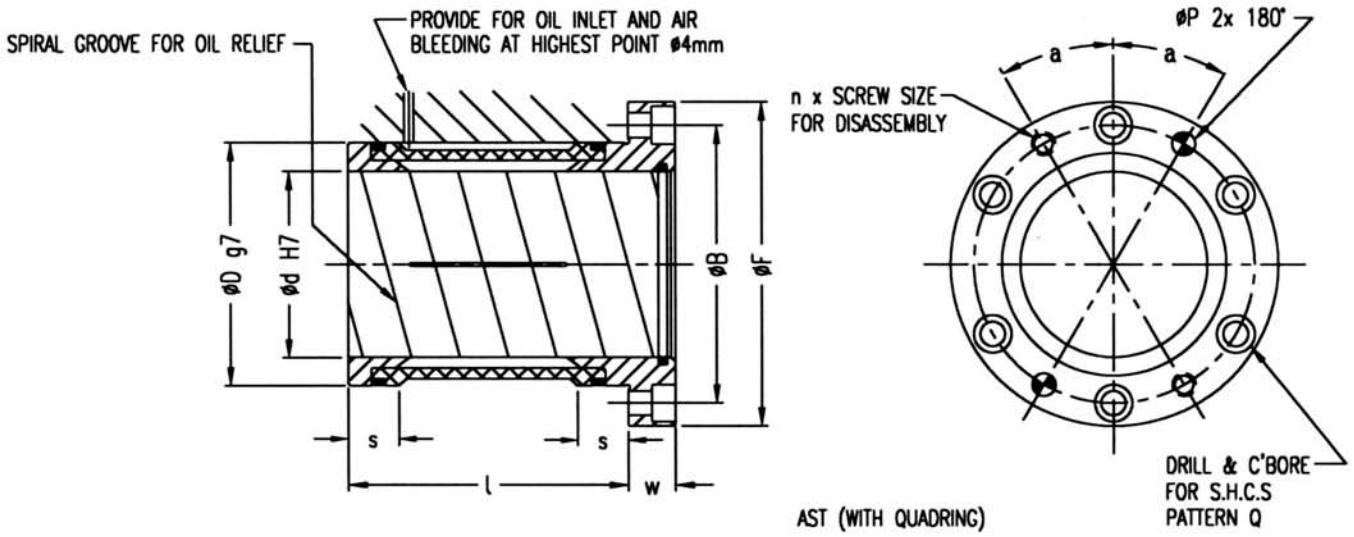



ASA

| S | W | ØF | ØB | SCREWS | | | ØP 1) | a | Axial Holding Force (lb) 2) | Max. Side Load (lb) 3) | ASA / AST SIZE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ±.015 | ±.008 | Pattern Q | Screw Size | Qty. n | | | | | d x l |
| .342 | .236 | 1.380 | .936 | 4 x 90° | 8-32 | 2 | .113 | 45° | 18 | 15 | .250 x 1.250 |
| .342 | .236 | 1.500 | 1.061 | 4 x 90° | 8-32 | 2 | .113 | 45° | 60 | 20 | .375 x 1.250 |
| .342 | .236 | 1.630 | 1.193 | 4 x 90° | 8-32 | 2 | .113 | 45° | 220 | 40 | .500 x 2.000 |
| .342 | .236 | 1.750 | 1.318 | 4 x 90° | 8-32 | 2 | .113 | 45° | 280 | 50 | .625 x 2.000 |
| .342 | .236 | 1.880 | 1.443 | 4 x 90° | 8-32 | 2 | .113 | 45° | 330 | 60 | .750 x 2.000 |
| .342 | .236 | 2.000 | 1.574 | 4 x 90° | 8-32 | 2 | .113 | 45° | 550 | 80 | .875 x 2.500 |
| .342 | .236 | 2.130 | 1.699 | 4 x 90° | 8-32 | 2 | .113 | 45° | 630 | 90 | 1.000 x 2.500 |
| .372 | .315 | 2.380 | 1.886 | 6 x 60° | 10-24 | 2 | .177 | 30° | 710 | 100 | 1.125 x 2.500 |
| .372 | .315 | 2.500 | 2.011 | 6 x 60° | 10-24 | 2 | .177 | 30° | 1030 | 110 | 1.250 x 3.000 |
| .372 | .315 | 2.750 | 2.214 | 6 x 60° | 10-24 | 2 | .177 | 30° | 1130 | 120 | 1.375 x 3.000 |
| .372 | .315 | 2.880 | 2.339 | 6 x 60° | 10-24 | 2 | .177 | 30° | 1240 | 140 | 1.500 x 3.000 |
| .372 | .315 | 3.130 | 2.589 | 6 x 60° | 10-24 | 2 | .177 | 30° | 1770 | 160 | 1.750 x 3.500 |
| .526 | .394 | 3.625 | 3.062 | 6 x 60° | 1/4-20 | 2 | .177 | 30° | 1710 | 190 | 2.000 x 3.500 |
| .526 | .394 | 3.875 | 3.312 | 6 x 60° | 1/4-20 | 2 | .177 | 30° | 1920 | 210 | 2.250 x 3.500 |
| .526 | .394 | 4.125 | 3.562 | 6 x 60° | 1/4-20 | 2 | .177 | 30° | 2610 | 240 | 2.500 x 4.000 |
| .556 | .394 | 4.380 | 3.815 | 6 x 60° | 1/4-20 | 2 | .177 | 30° | 2870 | 260 | 2.750 x 4.000 |
| .660 | .394 | 4.750 | 4.188 | 6 x 60° | 1/4-20 | 2 | .177 | 30° | 2700 | 290 | 3.000 x 4.000 |
| .660 | .394 | 5.250 | 4.687 | 6 x 60° | 1/4-20 | 2 | .117 | 30° | 3810 | 350 | 3.500 x 4.500 |
| .818 | .512 | 6.000 | 5.251 | 8 x 45° | 5/16-18 | 4 | .238 | 22.5° | 3880 | 400 | 4.000 x 4.500 |
| .878 | .512 | 6.500 | 5.813 | 8 x 45° | 5/16-18 | 4 | .238 | 22.5° | 4370 | 450 | 4.500 x 4.500 |
| .878 | .512 | 7.000 | 6.375 | 8 x 45° | 5/16-18 | 4 | .238 | 22.5° | 5800 | 500 | 5.000 x 5.000 |
| .878 | .512 | 7.625 | 6.938 | 8 x 45° | 5/16-18 | 4 | .238 | 22.5° | 6380 | 550 | 5.500 x 5.000 |
| .878 | .512 | 8.188 | 7.500 | 8 x 45° | 5/16-18 | 4 | .238 | 22.5° | 6960 | 600 | 6.000 x 5.000 |
| .878 | .512 | 8.630 | 7.938 | 8 x 45° | 5/16-18 | 4 | .238 | 22.5° | 7540 | 650 | 6.500 x 5.000 |
| .878 | .512 | 9.065 | 8.438 | 8 x 45° | 5/16-18 | 4 | .238 | 22.5° | 8120 | 690 | 7.000 x 5.000 |
| .878 | .512 | 9.625 | 8.938 | 8 x 45° | 5/16-18 | 4 | .238 | 22.5° | 11530 | 780 | 7.500 x 6.000 |
| .878 | .512 | 10.125 | 9.438 | 8 x 45° | 5/16-18 | 4 | .238 | 22.5° | 12290 | 830 | 8.000 x 6.000 |
| .878 | .512 | 10.625 | 9.938 | 8 x 45° | 5/16-18 | 4 | .238 | 22.5° | 13060 | 840 | 8.500 x 6.000 |
| .977 | .630 | 11.375 | 10.625 | 8 x 45° | 3/8-16 | 4 | .302 | 22.5° | 12560 | 930 | 9.000 x 6.000 |
| .977 | .630 | 11.875 | 11.125 | 8 x 45° | 3/8-16 | 4 | .302 | 22.5° | 13250 | 970 | 9.500 x 6.000 |
| .977 | .630 | 12.375 | 11.625 | 8 x 45° | 3/8-16 | 4 | .302 | 22.5° | 17720 | 1050 | 10.000 x 7.000 |
| .977 | .630 | 12.875 | 12.125 | 8 x 45° | 3/8-16 | 4 | .302 | 22.5° | 18610 | 1100 | 10.500 x 7.000 |
| .977 | .630 | 13.375 | 12.625 | 8 x 45° | 3/8-16 | 4 | .302 | 22.5° | 19490 | 1160 | 11.000 x 7.000 |
| .977 | .630 | 13.875 | 13.125 | 8 x 45° | 3/8-16 | 4 | .302 | 22.5° | 20380 | 1200 | 11.500 x 7.000 |
| .977 | .630 | 14.375 | 13.625 | 8 x 45° | 3/8-16 | 4 | .302 | 22.5° | 21270 | 1260 | 12.000 x 7.000 |

Table values in inch

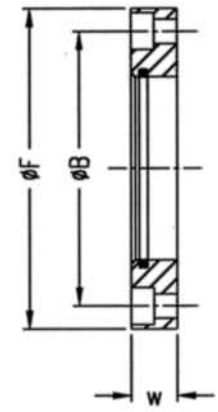
***Specifications and dimensions are subject to change without notification. Other sizes or special shapes can be funished upon request.***



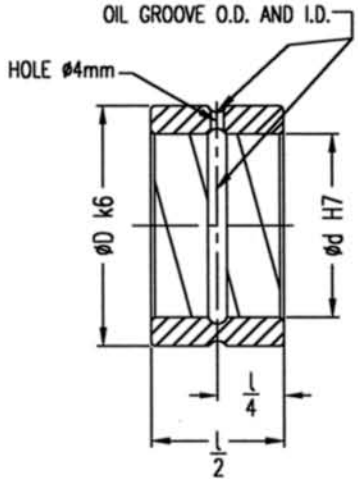

| ASA / AST size d x l | AMBUSH® | | LENGTH l | MATING PARTS | |
|---|---|---|---|---|---|
| | Inside $\phi$ d | Outside $\phi$ D | 0.00 / -0.08 | Shaft $\phi$ $d_{f6}$ | Housing $\phi$ $H_7$ |
| 10 x 40 | 10 | 20 | 40 | -0.013 / -0.022 | 0.000 / +0.021 |
| 15 x 50 | 15 | 25 | 50 | -0.016 / -0.027 | 0.000 / +0.021 |
| 20 x 65 | 20 | 30 | 65 | -0.020 / -0.033 | 0.000 / +0.021 |
| 25 x 80 | 25 | 35 | 80 | -0.020 / -0.033 | 0.000 / +0.025 |
| 30 x 80 | 30 | 40 | 80 | -0.020 / -0.033 | 0.000 / +0.025 |
| 35 x 80 | 35 | 45 | 80 | -0.025 / -0.041 | 0.000 / +0.025 |
| 40 x 100 | 40 | 50 | 100 | -0.025 / -0.041 | 0.000 / +0.025 |
| 45 x 100 | 45 | 55 | 100 | -0.025 / -0.041 | 0.000 / +0.030 |
| 50 x 100 | 50 | 65 | 100 | -0.025 / -0.041 | 0.000 / +0.030 |
| 60 x 100 | 60 | 75 | 100 | -0.030 / -0.049 | 0.000 / +0.030 |
| 70 x 120 | 70 | 85 | 120 | -0.030 / -0.049 | 0.000 / +0.035 |
| 80 x 120 | 80 | 100 | 120 | -0.030 / -0.049 | 0.000 / +0.035 |
| 100 x 140 | 100 | 125 | 140 | -0.036 / -0.058 | 0.000 / +0.040 |
| 120 x 140 | 120 | 140 | 140 | -0.036 / -0.058 | 0.000 / +0.040 |
| 150 x 140 | 150 | 175 | 140 | -0.043 / -0.068 | 0.000 / +0.040 |
| 180 x 140 | 180 | 205 | 140 | -0.043 / -0.068 | 0.000 / +0.046 |
| 200 x 140 | 200 | 225 | 140 | -0.050 / -0.079 | 0.000 / +0.046 |
| 220 x 140 | 220 | 245 | 140 | -0.050 / -0.079 | 0.000 / +0.046 |
| 250 x 160 | 250 | 280 | 160 | -0.050 / -0.079 | 0.000 / +0.057 |
| 300 x 160 | 300 | 330 | 160 | -0.056 / -0.088 | 0.000 / +0.057 |

***Specifcations and dimensions are subject to change without notification. Other sizes or special shapes can be furnished upon request.***

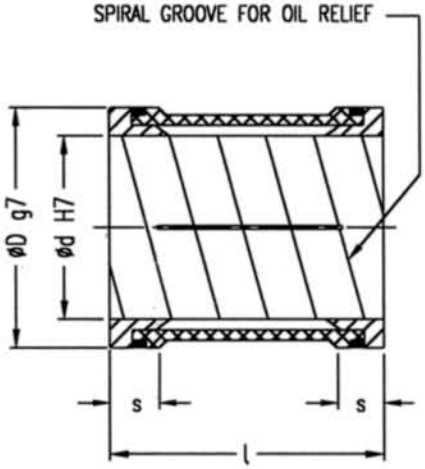
# SIZES




ASC CAP (WITH QUADRING)




ASB BEARING




ASA

| S | W | ∅F ±0.4 | ∅B ±0.2 | SCREWS Pattern Q | SCREWS Screw Size | SCREWS Qty. n | ∅P 2) | a | Axial Holding Force (N) 3) | Max. Side Load (N) 4) | ASA / AST SIZE d x 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 8.7 | 6 | 39 | 28 | 4 x 90° | M4 x 0.70 | 2 | 3.7 | 45° | 510 | 130 | 10 x10 |
| 8.7 | 6 | 44 | 33 | 4 x 90° | M4 x 0.70 | 2 | 3.7 | 45° | 1170 | 200 | 15 x 50 |
| 8.7 | 6 | 49 | 38 | 4 x 90° | M4 x 0.70 | 2 | 3.7 | 45° | 2350 | 280 | 20 x 65 |
| 8.7 | 6 | 54 | 43 | 4 x 90° | M4 x 0.70 | 2 | 3.7 | 45° | 3930 | 380 | 25 x 80 |
| 9.4 | 8 | 62 | 49 | 6 x 60° | M5 x 0.80 | 2 | 4.7 | 30° | 4710 | 450 | 30 x 80 |
| 9.4 | 8 | 67 | 54 | 6 x 60° | M5 x 0.80 | 2 | 4.7 | 30° | 5550 | 540 | 35 x 80 |
| 9.4 | 8 | 72 | 59 | 6 x 60° | M5 x 0.80 | 2 | 4.7 | 30° | 8400 | 640 | 40 x 100 |
| 9.4 | 8 | 77 | 64 | 6 x 60° | M5 x 0.80 | 2 | 4.7 | 30° | 9450 | 720 | 45 x 100 |
| 13.4 | 10 | 89 | 75 | 6 x 60° | M6 x 1.00 | 2 | 5.7 | 30° | 9070 | 800 | 50 x 100 |
| 13.4 | 10 | 99 | 85 | 6 x 60° | M6 x 1.00 | 2 | 5.7 | 30° | 10890 | 960 | 60 x 100 |
| 14.1 | 10 | 109 | 95 | 6 x 60° | M6 x 1.00 | 2 | 5.7 | 30° | 16400 | 1160 | 70 x 120 |
| 16.7 | 10 | 124 | 110 | 6 x 60° | M6 x 1.00 | 2 | 5.7 | 30° | 16720 | 1320 | 80 x 120 |
| 20.8 | 13 | 155 | 137 | 8 x 45° | M8 x 1.25 | 4 | 7.7 | 22.5° | 24060 | 1690 | 100 x 140 |
| 22.3 | 13 | 172 | 154 | 8 x 45° | M8 x 1.25 | 4 | 7.7 | 22.5° | 28880 | 2030 | 120 x 140 |
| 22.3 | 13 | 207 | 189 | 8 x 45° | M8 x 1.25 | 4 | 7.7 | 22.5° | 36100 | 2540 | 150 x 140 |
| 22.3 | 13 | 237 | 219 | 8 x 45° | M8 x 1.25 | 4 | 7.7 | 22.5° | 43320 | 3070 | 180 x 140 |
| 22.3 | 13 | 257 | 239 | 8 x 45° | M8 x 1.25 | 4 | 7.7 | 22.5° | 48130 | 3390 | 200 x 140 |
| 22.3 | 13 | 277 | 259 | 8 x 45° | M8 x 1.25 | 4 | 7.7 | 22.5° | 52940 | 3770 | 220 x 140 |
| 24.8 | 16 | 317 | 296 | 8 x 45° | M10 x 1.50 | 4 | 9.7 | 22.5° | 67020 | 4320 | 250 x 160 |
| 24.8 | 16 | 367 | 346 | 8 x 45° | M10 x 1.50 | 4 | 9.7 | 22.5° | 80430 | 5180 | 300 x 160 |

Table values in mm

Notes: 1. Ream at assembly, or drill for standard roll pins.
2. Axial force based on 70 bar and coefficient of fiction of .12.
3. Side load at 25 mm axial distance to squeeze bushing, based on safety of 3 and $p_{surf}$ = 20 N/mm$^2$

## TYPICAL APPLICATIONS:

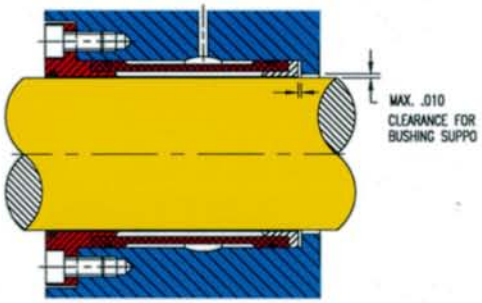
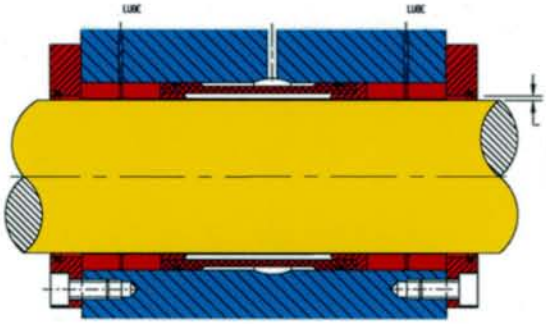



**Figure 1**
Type AST Squeeze Bushing (with quadring), pinned and bolted to housing to resist torque loads.

**Figure 2**
Type ASA Squeeze Bushing with (2) additional Type ASB bearings preloaded by (2) Type ASC caps with quadrings. Assembly will resist higher side loads of shaft.



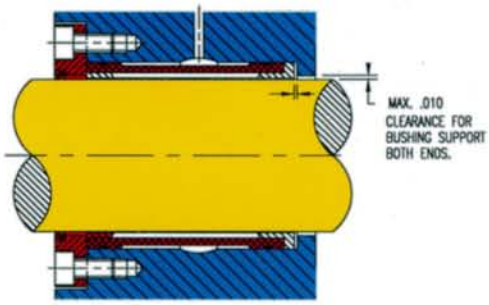




**Figure 3**
Type ASA Squeeze Bushing assembled and preloaded by an ASC cap with quadring.

## ASSEMBLY INSTRUCTIONS:

1. Provide chamfer (Figure 4), clean, deburr, and polish I.D. of housing to avoid damage of O-rings. When O-ring must be pushed over a cross-drilled port, the hole should be deburred or undercut and polished (see Figures 5 & 6).
2. Oil and grease O-rings and housing before assembly.
3. For AST bushings, use longer mounting screws to push bushing evenly into bore.
4. For ASA bushings, we suggest using our assembly tool (available upon request). This is a special plastic sleeve with sharp edges on one side and a chamfer on the other side. Put the ASA bushing into the housing and make sure that the O-ring is still covered by the assembly tool. Tap bushing carefully through polished chamfer into housing to avoid shearing of O-rings. (See Figures 5 & 6).
5. Provide slight axial preload on type ASA Squeeze Bushing (preload =.0002 to .0003 x length / inches).
6. Do not allow more than .02" clearance on diameter and .004" on end of bush ings to guarantee solid backup, especially at higher hydraulic pressure.
7. For accurate, concentric locating of shafts, apply hydraulic pressure on type AST bushings before reaming pin holes through cap.
8. Bleed air at highest point of pressure line.


Chamfer Hole and Polish Bore
**Figure 4**

Chamfer Hole and Polish
**Figure 5**
or

Undercut Bore and Polish
**Figure 6**

**NOTES:**

- **Never apply hydraulic pressure if shaft is not inserted in bore to prevent damage to bushing.**
- **The Squeeze Bushings are manufactured to high tolerances, but may deform sightly during final testing. However, roundness and concentricity will be reestablished after assembly in housing.**
- **Handle these precision bushings with care, as the bronze may become distorted if bumped or dropped.**
- **The O.D. tolerance of the plastic sleeve may deviate slightly from the bronze diameter's tolerance, due to temperature and moisture.**

## DISASSEMBLY INSTRUCTIONS:

1. To disassemble type ASA bushings, we recommend using an expanding removal tool, to avoid damage to the bushing.
2. Type AST Bushings can be removed by using screw holes provided on cap.

**ADVANCED MACHINE & ENGINEERING CO.**
*2500 Latham Street Rockford, Il 61103-3963 815/962-6076 Fax 815/962-6483*
**Visit us on the World Wide Web at: www.ame.com**

**Your Local Advanced Representative is:**