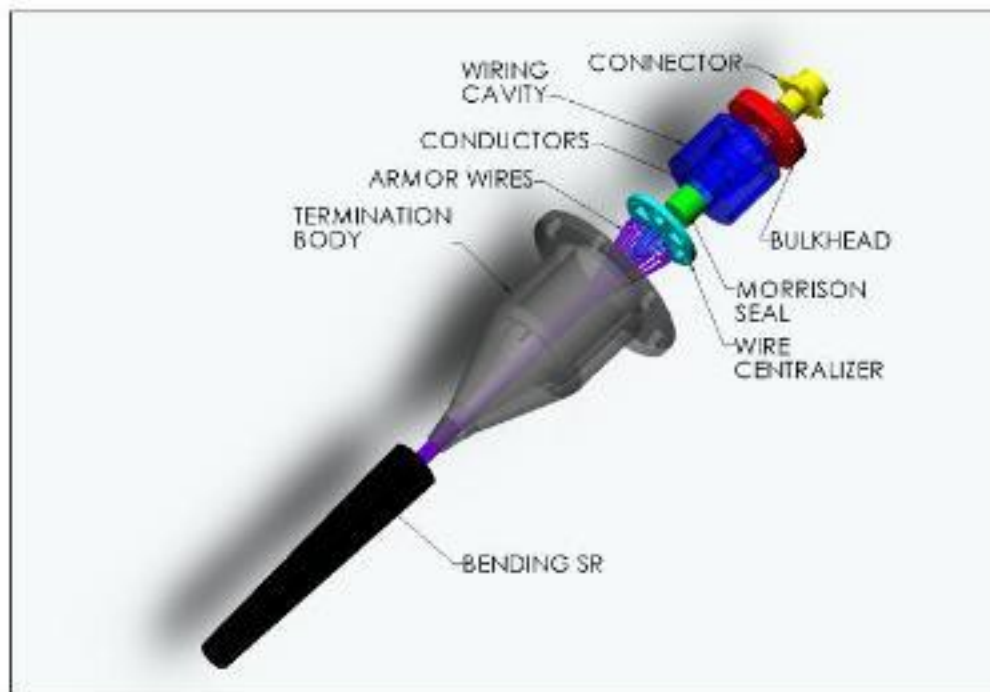


[\\Tornado\projectlibrary\ESP\Profiler\Drifter2011\Mechanical](#)

This shallow water, 0.478" dia. Version, started with a supplied cable cut to 23 meters, finished length flange to flange to be 22.0 meters +/- 0.5m. 7/10/12 -10 & 30 m

DRAWINGS AND PARTS: Connector Plate-100894, Wire Centralizer-100895, Connector Spacer-100896, EM Cable Termination housing- (8/07 100897 Rev. B DWG), Molded Silicon Wire Morrison Seal (molded here), PMI EVERFLEX #1 Bending Strain relief (smallest)(Note required modification)

## E/M CABLE TERMINATION



### MATERIALS AND TOOLS

ESCO SocketFast Resin for wire rope socketing, 300gms BC Wire, ( Alt.-CROSBY W416-7, 250 cc) Smooth-Sil 950 from Smooth-On for Morrison seal molding, Silastic J from Dow Corning no longer avail in small quantities.

Seizing Wire, .025-0.035 dia., Galvanized and Annealed

0.625 " Diameter Heat shrink

Bead Blaster that has good control of stream

DMM to check for electrical isolation between housing and cable

Lineman's, Round Nose and Needle nose pliers, also long handled cutters (better leverage )

Electrical Tape

6-32 socket head screws, 6 x 3/8" and 6 x 3/4", shorten to 2.9" and bevel threaded end

2-131 O'ring

Food grade Silicon spray Lube

EverFlex PMI strain relief needs to be bored out to 0.50 thru, .54 for an inch below the conical thread for clearance of heat shrink isolation. Used 1.125" collet, .53 drill thru(.505), .55" (.54) dry, 3 x each



**PRELIMINARIES:**

Bore out Housings to 0.531" Diameter to clear cable ,0.478" plus 1<sup>st</sup> layer of heat shrink insulation

Confirm or Fabricate locking grooves in cone area. 1/4" x 0.1" ~0.5" below lip, see photo

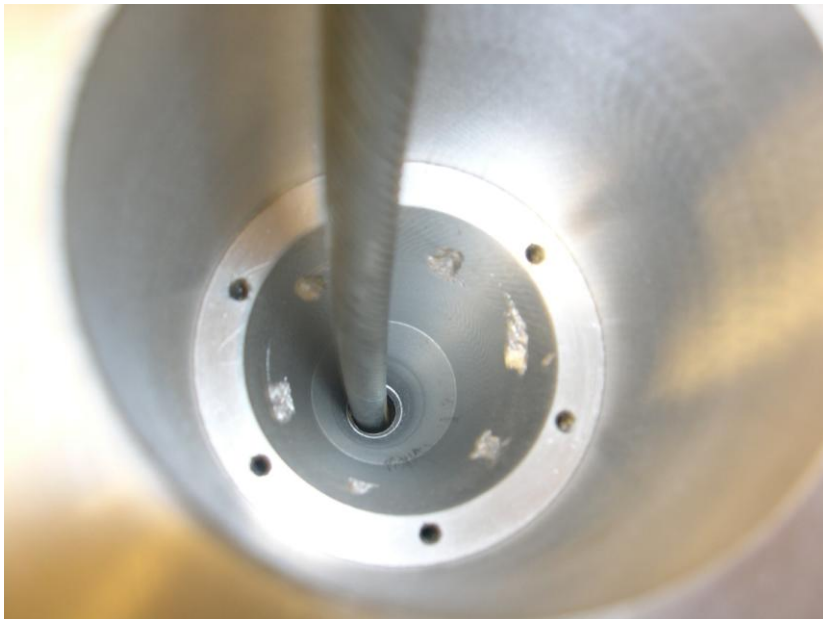
Clean grease etc. off inside of Housing

Slide Strain Relief and Housing down cable

Morrison Seal cut to 0.70" length, See end of document for details.

Chamfer lead-in edge of Morrison Seal Cavity in Connector Block, if nec.

MinK10FCR from Sea-Con, sometimes long lead time.



#### INITIAL PROCEDURE:

Check 6-32 thrds at bottom of Termination Body to confirm 0.6 depth, run 3" screw, chase if nec.

Apply 6- 10 wraps seizing wire about 20" down cable, make sure locking twist will be in coned section of Housing and not jammed in entrance area.

Slip a 3" piece of heat shrink down the cable, shrink into place with upper end just covering the seizing.

Slip a ½" section down and shrink into position just covering the bump made by the seizing. This becomes the seating point and extra electrical isolation (corrosion) for the Housing. See p.4 picture.

Wrap the heat shrink with a few turns of electrical tape then gently tighten a small worm clamp around the heat shrink at the seize wire location to temporarily protect it from damage while we are "brooming" the cable's strength wires.

#### BROOMING PROCEDURE:

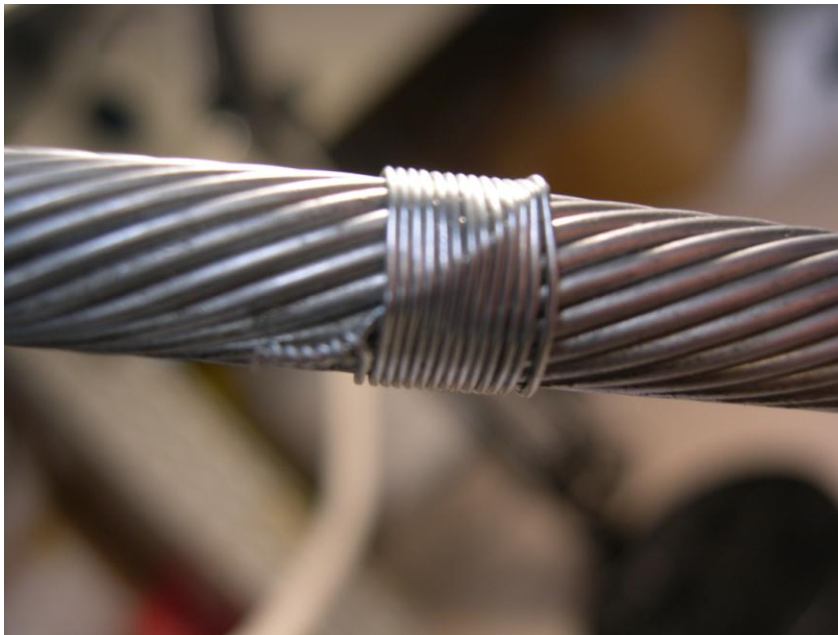
The max width of the spread out wires must be less than 1 ½" at the top.

Work methodically and carefully, this larger wire has stiffer strands, more difficult

Start with the outer layer, unraveling the strands, do not bend outward too much, hard to bend back to 1 ½"

Cut these off at about 4" to make it easier to handle and do the straightening process.

Reasonably straighten the outer larger wires avoiding kinks and nicks, round nose pliers help





Mark at 3" length from the bottom of the seizing (seating point in the cone)

Cut off at 3", looping the top later will bring finished length to ~2.7" so clears centralizing ring

Leave the black covering on the Copper wires as protection for now

Continue the Brooming with the thinner inner layer, stiffer wires require extra care to avoid any possible damage to wires

Use the same procedure, access to base is more difficult for straightening, OK if not perfect

Cut off at 3" and spread all wires somewhat evenly noting 1 1/2" dia. Max.

Slide a 3" piece of 3/8" spiral wrap down wire bundle to add more protection, this can be removed after wire looping and sandblasting is completed.

Carefully put a small loop (round nose) bringing tip back under slightly on all cable wires

Sand blast carefully, avoiding damage to Copper wires and Heat Shrink, this will clean and abraid the cable wires for better resin adhesion. (Alt. procedure is to solvent clean and sand each one)

Remove the spiral wrap and black outer covering from the Cu wires down to ~ 1/2 " below the level of the loops.

Similarly remove the outer insulating layer carefully. Do not damage the smoother inner layer.

Separate and solvent clean the Copper wires,. NOTE twist direction.

This cleaned section and the loops will lock into the socketing resin

Now fit check the broomed ass'y , remove temp. clamp, check for about 1/4" clearance beneath centralizer mounting lip and **no** electrical contact of the cable to the alum housing, use a DVM

Adjust cable wires as req'd. When potted, loops must be covered and resin still be below centralizer

Solvent clean all parts again, fingerprints, etc. If sandblasted, run 6-32 tap down holes to clear grit.



Carefully slide the centralizer part way down the wire loom maintaining the sequence as they exit the covered portion. This will make final connector wiring easier. Use a DVM, clocking from colored wire, one end will be clockwise, the other CCW to follow the twist direction.

Slide loom into the housing, recheck clearances and isolation, fix cable below the housing so is stabile.

Seal exit so resin will not leak out or foul threads of strain relief, electrical tape work well

#### THE OTHER END

Repeat all the above making sure to slide strain relief and housing onto cable before starting brooming

#### POURING RESIN

Get 6 x 6-32 x 3/8 screws, allen drive, gloves, ventilation on, and potting resin on hand

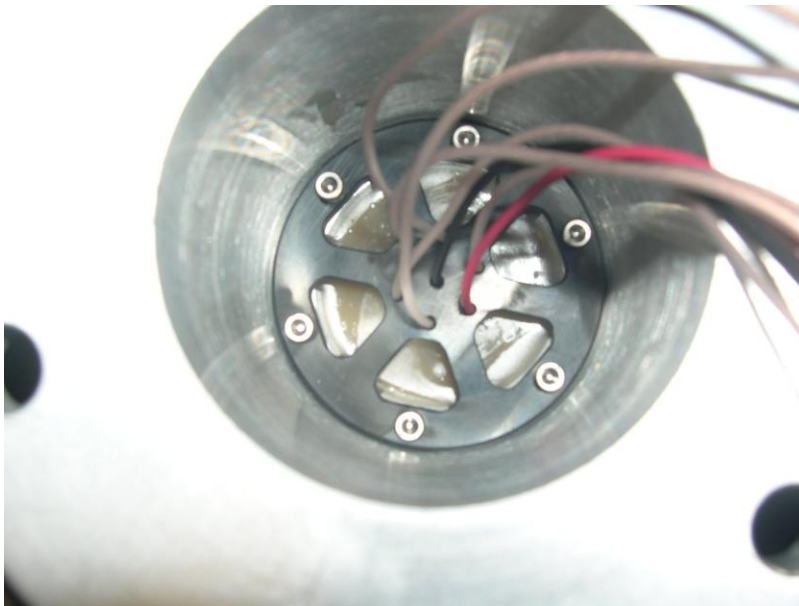
We won't use much of the 250/300 grms, need to use whole thing since catalyst volume is pre-measured for the can-full. Mix very thoroughly, scaping edges and bottom. Total of ~130 CC for both ends.



Thoroughly mix resin, scraping settled contents off bottom of can

Open catalyst and mix all of it into the can, mix well, you have about 15 minutes working time.  
Degas if sufficient working time available.

**Avoiding** the Copper wires, pour mixed resin slowly so air bubbles leave and wires are fully covered.  
Stop when about 1/8" below the level of the screw holes (bottom of centralizer)



Slide centralizer into position, temporarily hold down with 6-32's

Quickly check for resin on wire insulation, clean off, this is the watertight seal area and must be smooth

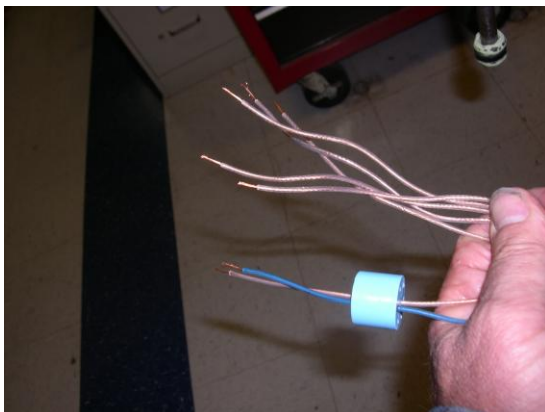
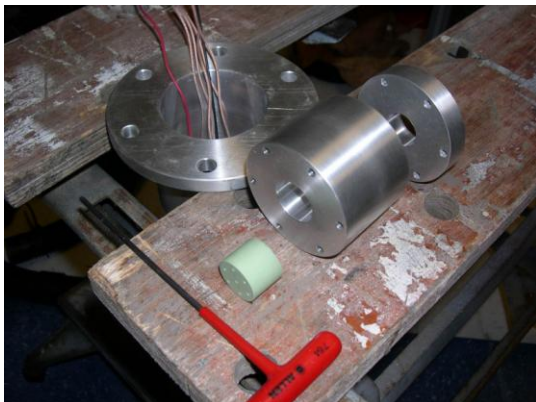
Resin will set up in about an hour at RT, let sit several hours before moving however.

#### FINISHING THE WATERTIGHT SEALS

Check all remaining parts for cleanliness and burrs

Check Cu wires for rough spots and resin drops, clean as necessary

Spray with Silicon Lube all sides of wires



Slide Morrison seal onto wires noting sequence, note photos

Coat Seal and Recess with Silicon Lube, slide part way down wires

Slide Wiring Cavity onto wires noting sequence

Respray with silicon lube, slide Wiring Cavity down wires carefully, mindful of damaging wire seal surfaces.

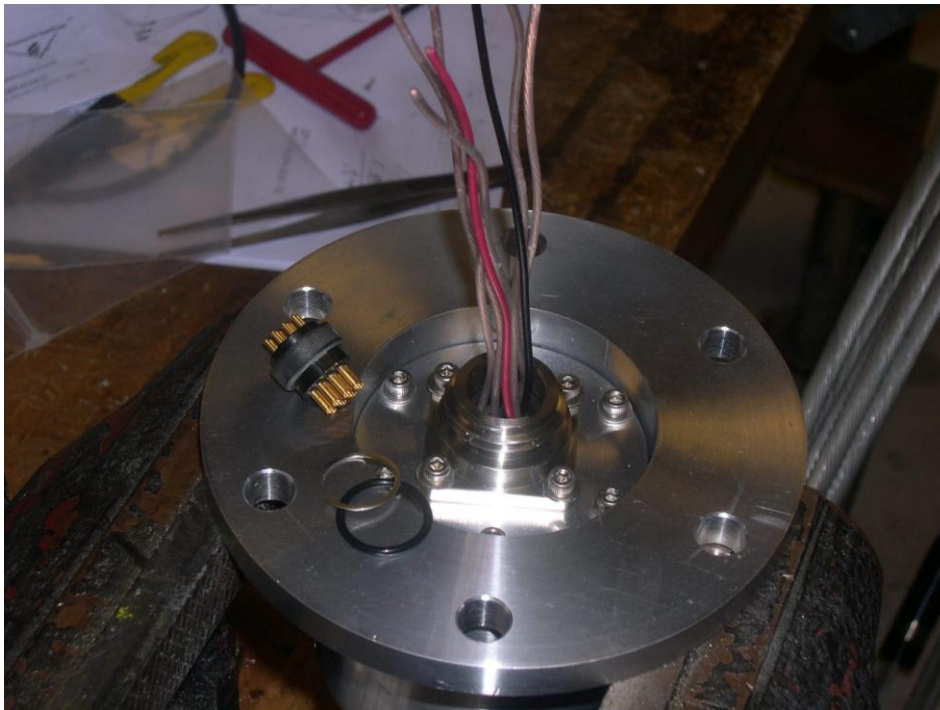
Lead-in chamfer will guide cavity over Morrison Seal, Noting wire to cavity hole alignment

Guide seal partway into cavity, then slide fully down to centralizer. Pulling wires taut in turn will eliminate possibility of kinks as slide assembly down, check alignment again to avoid damage to insulation as seal fully enters the cavity,

2-131 oring will seal connector area, be careful with seal area of Connector Plate

6-6-32 x 3" screws will do final seating and alignment of the Morrison seal, be careful screws do not bottom out or jam before drawing assembly tight.

Ready for MinK connector wiring.



Soldering to pins is in a very tight space. Let Electronics techs do it.



## MORRISON SEAL FABRICATION

Clean all parts of mold and pins, Check for proper diameter .062 (inner insul layer) , 1<sup>st</sup> version were .082,

Assemble mold, insert pins holding <.070 in position with pink molding compatible clay.

Coat mold surfaces with suitable release agent, silicon spray or Ease Release 200 from Smooth-On

Check mat'l for shelf life. Use either Silastic J from Dow Corning (preferred due to Shore 56A) or Smooth-Sil 950, (Shore 50A) from Smooth-On. (SmoothSil shone.)



Follow mixing instructions after carefully cleaning mix cups and stirrers. 40 grams total is plenty.

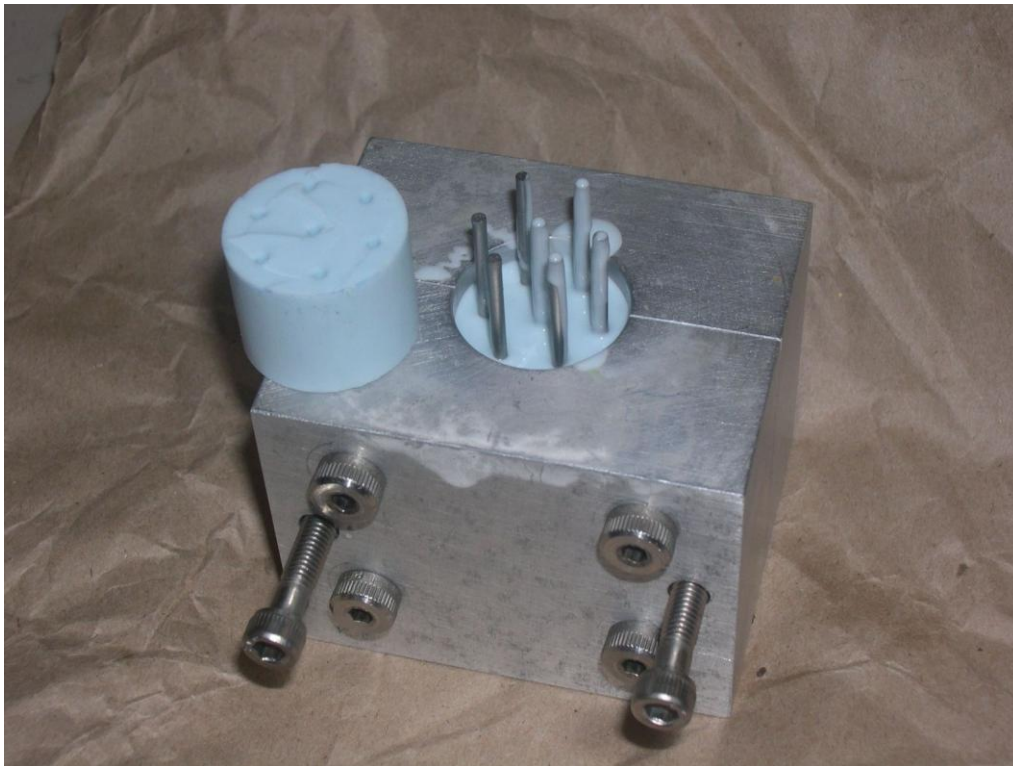
Mix thoroughly, degas 29"Hg for at least a minute, pour smoothly into mold avoiding bubbles.

You have about an hour of working time. Let cure overnight .

Smooth-Sil 950 requires a post-cure of 80 deg. C for 2 hrs. to guarantee a full cure.

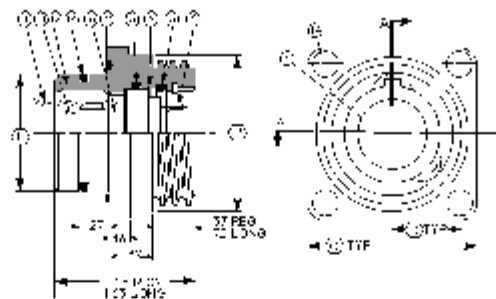
Demold. Pull pins first.

Cut off square ended cylinder 0.70 " long.



### FLANGED CONNECTOR RECEPTACLE (FCR)

FCR (MATES TO CCP)



**NOTE:**  
Reference pages 30-26 – 30-29  
for pattern availability.

|           | (B)    | (C)    | (D)    | (E)    |                         | (F)    | (G)     | (H)    | (I)                 | (J)    |
|-----------|--------|--------|--------|--------|-------------------------|--------|---------|--------|---------------------|--------|
| PART NAME | INCHES | INCHES | INCHES | INCHES | MOUNTING HOLE DIAMETER* | O-RING | SPROLOX | O-RING | SKID RING CAPSCREEN | O-RING |
| HWMS-PCR  | 1.00   | 1.12   | 0.433  | 0.685  | 0.649/0.687             | 2.015  | UB50    | 2.418  | 4.40 UNC-2A         | 2.414  |
| HWML-PCR  | 1.12   | 1.25   | 0.510  | 0.748  | 0.752/0.758             | 2.016  | UB62    | 2.419  | 6.32 UNC-2A         | 2.416  |
| HWML-PCR  | 1.25   | 1.37   | 0.542  | 0.873  | 0.877/0.875             | 2.018  | UB75    | 2.421  | 6.32 UNC-2A         | 2.418  |
| HWML-PCR  | 1.37   | 1.58   | 0.593  | 0.998  | 1.002/1.000             | 2.020  | UB81    | 2.423  | 8.32 UNC-2A         | 2.419  |
| HWML-PCR  | 1.62   | 1.75   | 0.723  | 1.123  | 1.127/1.125             | 2.022  | UB106   | 2.426  | 8.32 UNC-2A         | 2.423  |
| HWML-PCR  | 1.75   | 1.87   | 0.777  | 1.248  | 1.252/1.258             | 2.024  | UB118   | 2.428  | 8.32 UNC-2A         | 2.425  |
| HWML-PCR  | 1.87   | 2.00   | 0.831  | 1.373  | 1.377/1.375             | 2.026  | UB127   | 2.429  | 10.24 UNC-2A        | 2.428  |
| HWML-PCR  | 2.00   | 2.12   | 0.884  | 1.498  | 1.502/1.500             | 2.028  | UB158   | 2.429  | 10.24 UNC-2A        | 2.428  |
| HWML-PCR  | 2.50   | 2.62   | 1.043  | 1.998  | 2.002/2.000             | 2.032  | UB175   | 2.434  | 1/4-20 UNC-2A       | 2.431  |
| HWML-PCR  | 2.75   | 2.87   | 1.130  | 2.248  | 2.252/2.250             | 2.034  | UB200   | 2.436  | 1/4-20 UNC-2A       | 2.433  |
| HWML-PCR  | 3.50   | 3.62   | 1.470  | 2.748  | 2.752/2.750             | 2.038  | UB250   | 2.441  | 3/8-16 UNC-2A       | 2.437  |

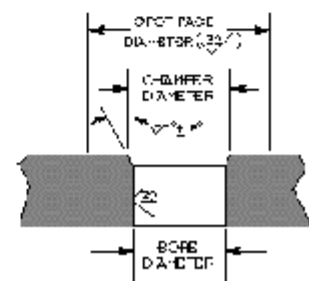
## FCR MOUNTING REQUIREMENTS

| SIZE | BORE Ø $+0.002"$<br>$-0.000"$ | CHAMFER Ø<br>( $\pm .010"$ ) | *SPOTFACE Ø<br>( $\pm 0.015"$ ) | **SPOTFACE Ø<br>( $\pm 0.015"$ ) |
|------|-------------------------------|------------------------------|---------------------------------|----------------------------------|
| G    | 0.687"                        | 0.727"                       | 1.00"                           | 1.56"                            |
| K    | 0.750"                        | 0.800"                       | 1.12"                           | 1.75"                            |
| L    | 0.875"                        | 0.915"                       | 1.25"                           | 1.87"                            |
| M    | 1.000"                        | 1.040"                       | 1.31"                           | 2.12"                            |
| O    | 1.125"                        | 1.175"                       | 1.50"                           | 2.44"                            |
| P    | 1.250"                        | 1.290"                       | 1.62"                           | 2.62"                            |
| Q    | 1.375"                        | 1.425"                       | 1.81"                           | 2.81"                            |
| R    | 1.500"                        | 1.540"                       | 1.87"                           | 3.00"                            |
| T    | 2.000"                        | 2.050"                       | 2.50"                           | 3.75"                            |
| U    | 2.250"                        | 2.290"                       | 2.75"                           | 4.00"                            |
| X    | 2.750"                        | 2.800"                       | 3.31"                           | 5.06"                            |

NOTE: CHAMFER IS TO BE  $20^{\circ} \pm 5^{\circ}$

\* This dimension is to be used if spotface is less than or equal to 0.001 inches deep.

\*\*This dimension is to be used if spotface is greater than 0.001 inches deep.



30-5 (REV 0304)

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