

## **SHAFT ALIGNMENT**

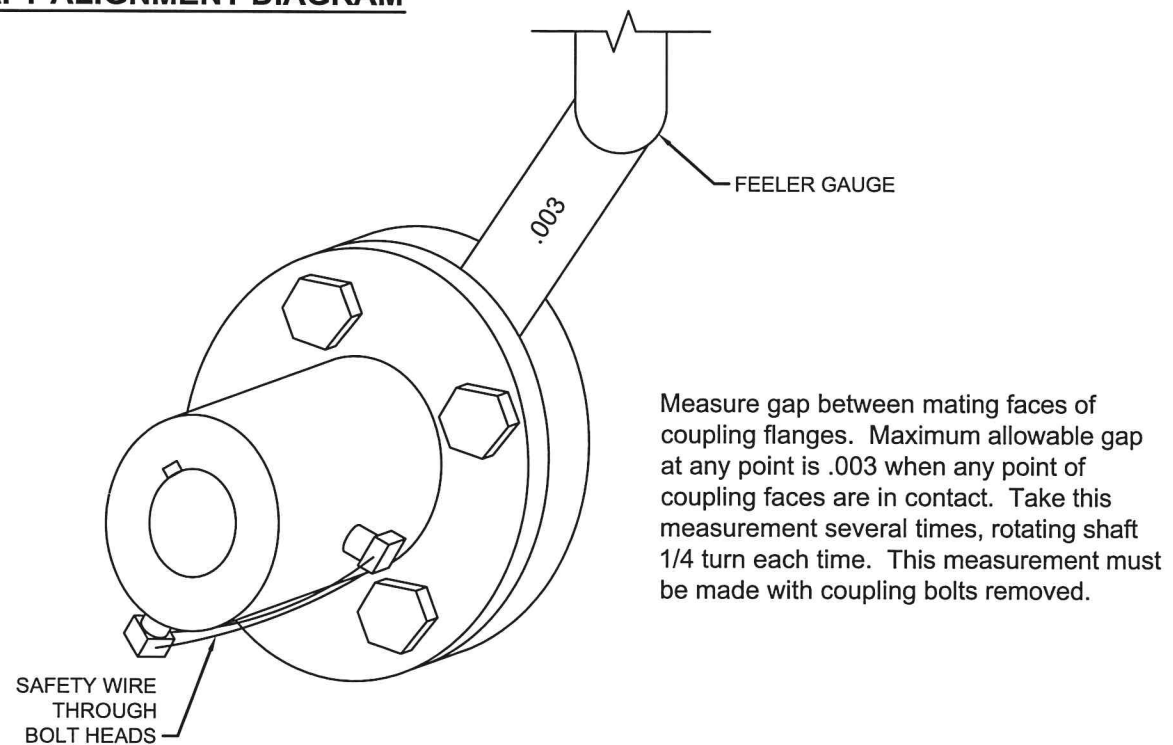
For proper operation of the engine, the propeller shaft and engine must be aligned.

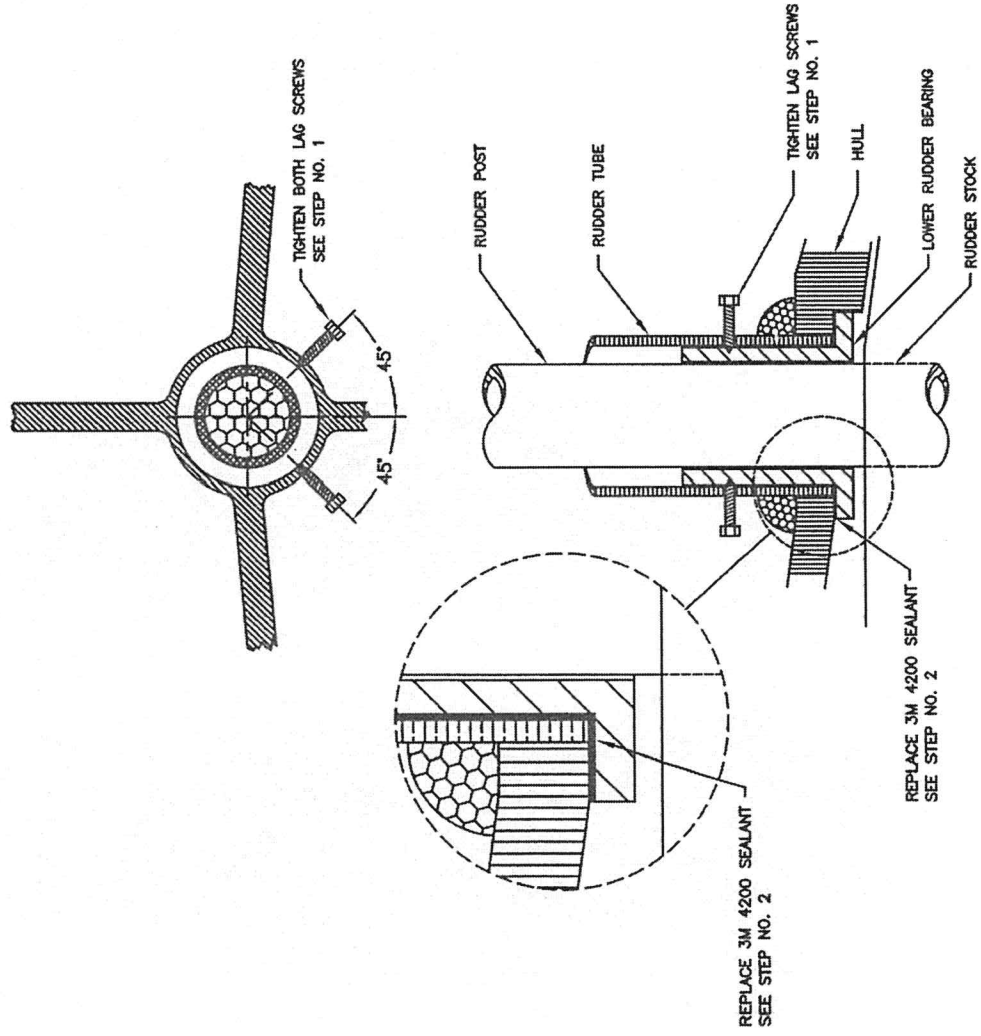
Alignment is gauged at the engine and shaft coupling. Alignment procedures must be done with the boat in the water after the mast is stepped, and the rigging is tuned.

1. Check key in keyway, as it must be in place between shaft and coupling.
2. Remove coupling flange bolts and check propeller shaft for clearance.
3. Slide shaft away from engine and check coupling mating surfaces. These must be clean.
4. Slide shaft forward to connect coupling surfaces. Pilot on transmission flange must align with recess in shaft coupling flange. This is an indication of correct axial alignment.
5. With coupling flanges in contact, measure gap around edge of coupling with .003 feeler gauge. Maximum allowable gap at any point is three thousandths of an inch. Take this measurement several times, rotating shaft 1/4 turn each time. Any gap in excess of .003 must be corrected by changing engine position, especially fore/aft tilt. For example, excessive gap at the bottom of the coupling (see drawing) indicates engine is tilted too far aft (front too high). Using a 15/16-end wrench, loosen lock nuts on forward motor mounts. Lower front of engine by clockwise rotation of motor mount nuts. Remeasure gap at coupling. A gap at the top of the coupling would require the exact reverse procedure.
6. Pull shaft backwards as in step 3.
7. Repeat steps 5 and 6 until alignment within tolerance is achieved.
8. Tighten motor mount lock nuts and install coupling bolts.

Note: Alignment should be checked yearly, or whenever any excess vibration is noticed. The alignment can also be affected by changes in rigging tension.

## **SHAFT ALIGNMENT DIAGRAM**





SECTION AT RUDDER POST

INSTRUCTIONS FOR TIGHTENING THE LOWER RUDDER BEARING:

THE LOWER BEARING IS SECURED IN PLACE BY 3M 4200 ADHESIVE APPLIED TO THE OUTSIDE OF THE BEARING AND THE INSIDE OF THE FIBERGLASS RUDDER TUBE AND PREVENTED FROM ROTATING BY (2) S.S. LAG SCREWS THROUGH THE FIBERGLASS RUDDER TUBE AND ENGAGING INTO THE BEARING WALL.

1.) IF THE BEARING IS LOOSE BUT NOT SEPERATED FROM THE INSIDE OF THE FIBERGLASS TUBE. THE BEARING CAN BE SECURED TO PREVENT MOVEMENT BY TIGHTING THE LAG SCREWS INSIDE THE BOAT AT THE BOTTOM OF THE TUBE. WHEN TIGHTENING THE LAG SCREWS THEY SHOULD BE REMOVED AND NEW 3M 4200 SEALANT APPLIED TO THE THREADS.

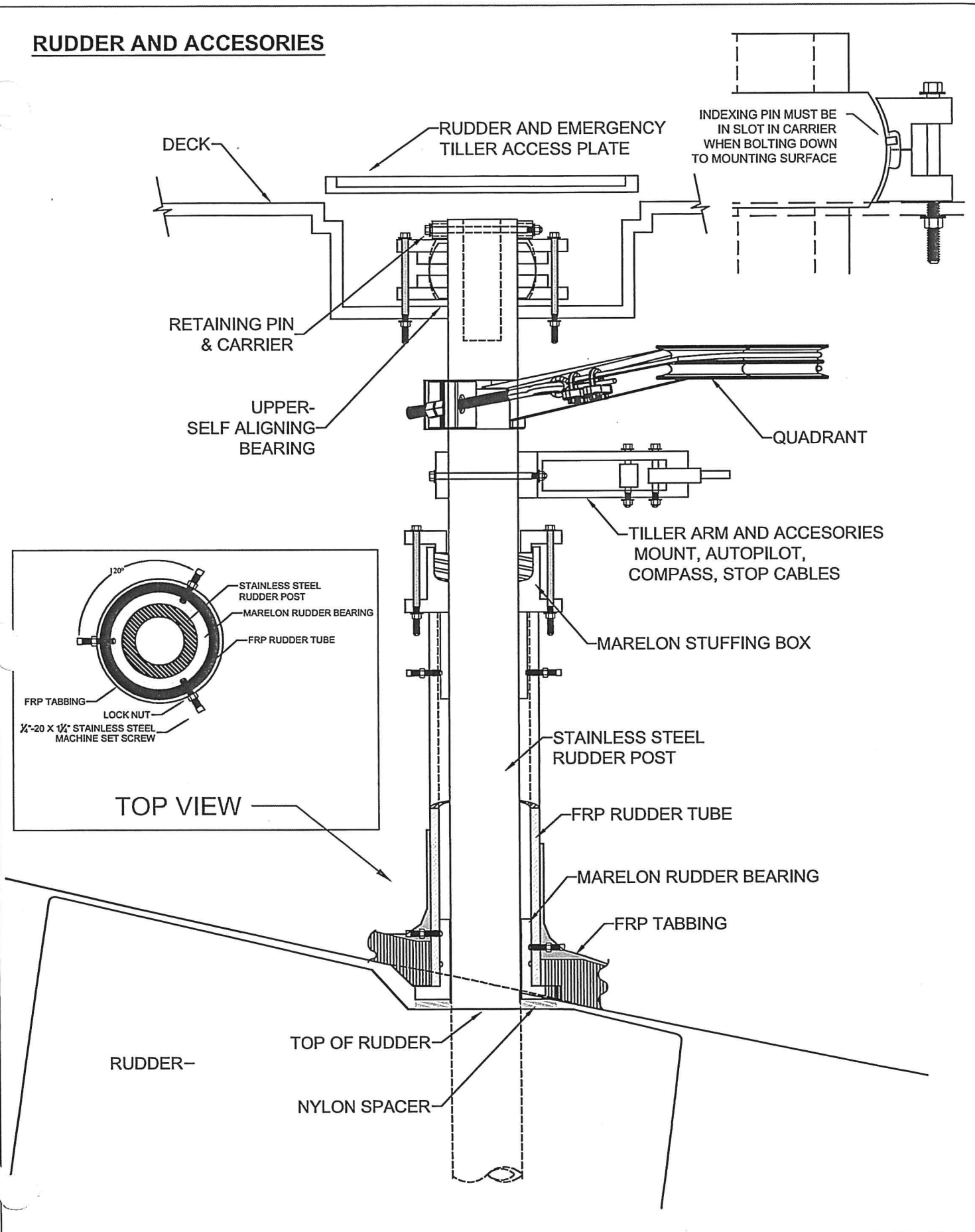
2.) IF THE BEARING IS LOOSE AND CAN ROTATE INSIDE THE TUBE IT WILL NECESSARY TO APPLY A NEW COAT OF 3M 4200 TO THE OUTSIDE OF THE BEARING. THIS WILL REQUIRE LOWERING THE RUDDER ENOUGH TO SLIDE THE BEARING DOWN THE RUDDER POST 3"-4" AND APPLYING FRESH 3M 4200 AND INSERTING THE LOWER BEARING INTO THE POST.

*Catalina* Yachts

7200 BRYAN DAWY RD.  
LARGO, FL 33777  
(727)844-6881

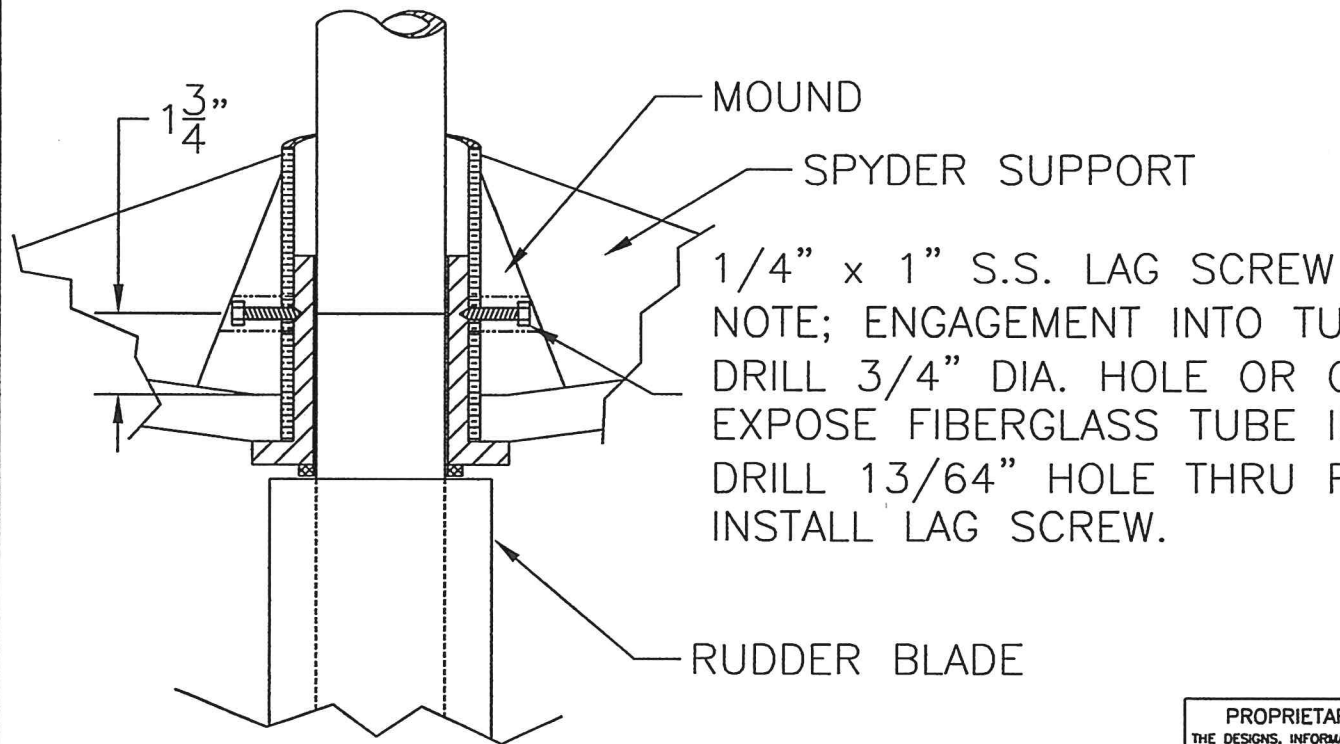
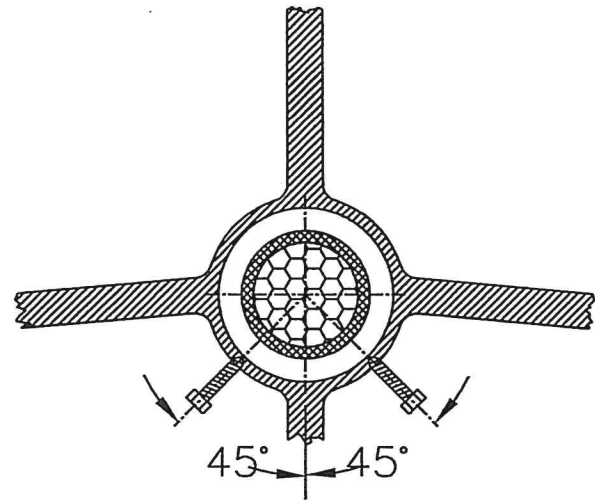
APPROVED BY	J.S.M.	
DATE	2/24/10	FILE RB-1
TITLE	LOWER RUDDER BEARING REFASTENING	
REV	1	1/1
CATALINA 309 - 470		

**RUDDER AND ACCESORIES**



RUDDER BEARING LOCK SCREW INSTALLATION.

- 1) LOOSEN STEERING CABLES, LOWER RUDDER APPROXIMATELY THREE INCHES TO EXPOSE LOWER BEARING.  
SUPPORT RUDDER BLADE WITH BLOCKING FROM THE BOTTOM.  
CAUTION- DO NOT FULLY REMOVE.
- 2) REMOVE OLD SEALANT AND SAND SURFACE TO A ROUGH TEXTURE.
- 3) APPLY 3M 5200 TO RUDDER BEARING AND INSERT INTO FIBERGLASS TUBE.
- 4) ADD TWO LAG BOLTS AS SHOWN. NOTE- DRILL 13/64" DIAMETER HOLE THROUGH FIBERGLASS TUBE AND TO BEARING A TOTAL OF ONE HALF INCH.
- 5) INSTALL LAG SCREW WITH 3M 5200 SEALANT.
- 6) LAG SCREW SHOULD ENGAGE APPROXIMATELY 1/8" INTO THE BEARING, NOTE RUDDER TUBE IS 3/8" WALL THICKNESS.



1 3/4"

MOUND

SPYDER SUPPORT

1/4" x 1" S.S. LAG SCREW

NOTE; ENGAGEMENT INTO TUBE SHOULD BE 3/8" TO 7/16" NO MORE.  
DRILL 3/4" DIA. HOLE OR GRIND AWAY BONDING FILLER TO EXPOSE FIBERGLASS TUBE IF NECESSARY.  
DRILL 13/64" HOLE THRU FIBERGLASS TUBE 1/2" DEEP.  
INSTALL LAG SCREW.

RUDDER BLADE

*Catalina Yachts*

21200 VICTORY BLVD.  
WOODLANDHILLS, CA. 91367  
(818) 884-7700

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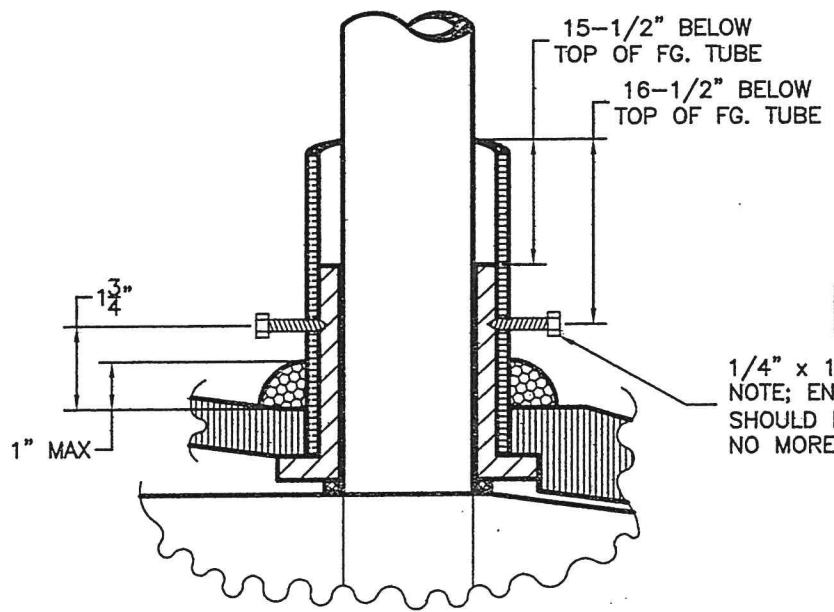
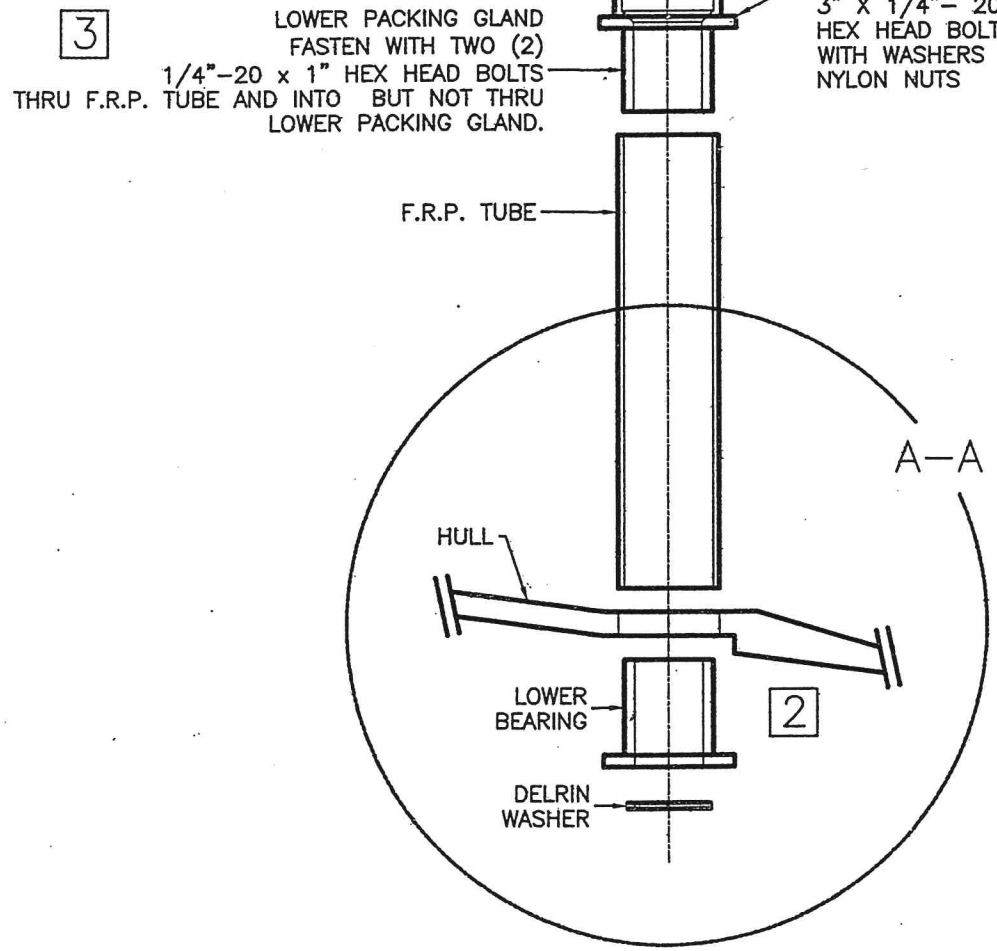
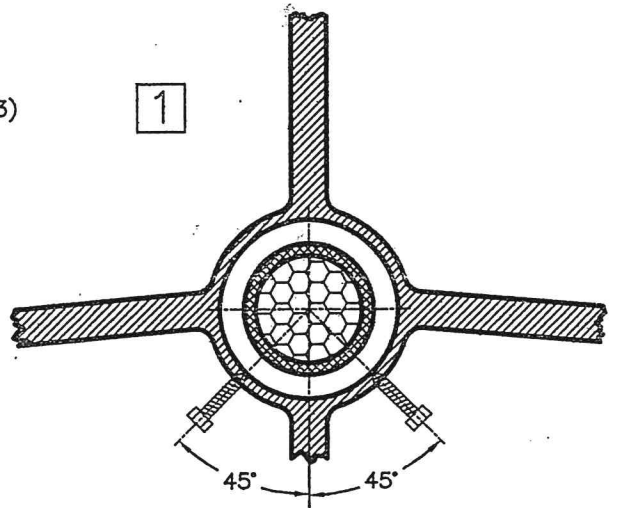
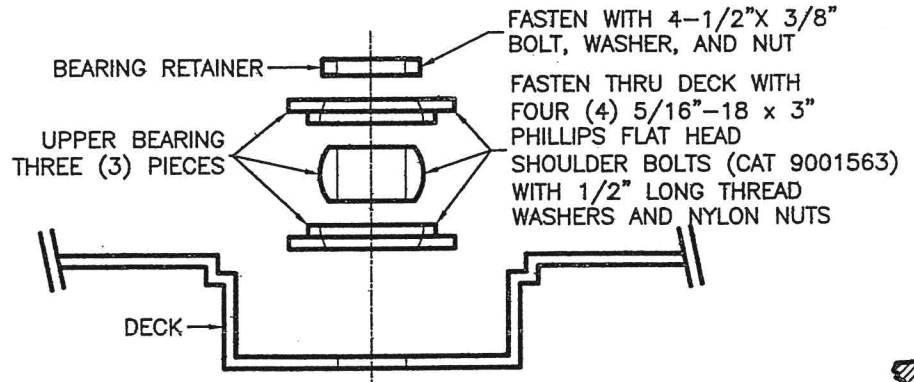
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

GENERAL TOLERANCES  
ANGLES : ±0.5°  
X.X : ±0.1  
X.XX : ±0.01  
X.XXX : ±0.005  
SURFACE FINISH: 63/

DO NOT SCALE DRAWING

TITLE: RUDDER BEARING ASSEMBLY- MARELON REPAIR PROCEDURE			
BOAT: ALL BOATS	DRAWING NO: 400-28056-0		
DESIGNED BY:	CHECKED BY:	SCALE: NONE	SIZE SHEET B 1/1
DRAWN BY: C.D.	APPROVED BY:	DATE: 5/4/99	

NO	REVISION	DATE
1	REVISED BOLTS	3/3/01
2	DELETED FLAT HEAD SCREWS IN LOWER BEARING. ADDED LAG SCREWS IN LOWER BEARING.	3/16/01
3	CORRECTED NONCLAMATURE FOR FASTENERS FOR LOWER PACKING GLAND.	10/31/01



2  
1/4" x 1" S.S. LAG SCREW  
NOTE; ENGAGEMENT INTO TUBE  
SHOULD BE 3/8" TO 7/16"  
NO MORE.

**Catalina Yachts**  
7200 BRYAN DIARY RD.  
LARGO, FL. 33777  
(727) 544-6681

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES  
**GENERAL TOLERANCES**  
ANGLES : ±0.5°  
X.X : ±0.1  
X.XX : ±0.01  
X.XXX : ±0.005  
SURFACE FINISH: 63/  
DO NOT SCALE DRAWING

TITLE: C310, C380, C400 RUDDER BEARING ASSEMBLY			
BOAT: C310- C380- C400	DRAWING NO: 400-28051-3	SCALE: NONE	SIZE: B
DESIGNED BY:	CHECKED BY:	DATE: 5/4/99	SHEET: 1/1
DRAWN BY: C.D.	APPROVED BY:		