

ROMOR® I

Class III Dove-Tailed, Plastic-backed Stave Bearings



Installation & Care Instructions

REPLACEMENT CRITERIA

Stern tube and strut bearings should be replaced at routine dockings whenever the rate of wear indicates that the allowable clearances (see “Stave Bearing Clearance” table) will be exceeded before the next scheduled docking. When wear on a bearing has progressed to the point requiring renewal, consider renewing other bearings on the same shaft to prevent misalignment and unequal loading. At interim dockings the main shaft seal need not be removed to measure the clearance of the inboard stern tube bearing unless the history of the bearing, excessive wear of the other bearings on the same shaft, or abnormal operating conditions since the clearances were last measured make the condition of these bearings doubtful.

WEAR RATE. Ships with controllable-pitch propellers tend to experience higher wear rates than fixed pitch propellers because they sometimes operate with the propeller turning at 0 pitch (idling). In this condition, no water is flowing through the naturally lubricated stave bearings, and they consequently experience increased wear. If the ROMOR1 bearing is forced lubricated, it should be lubricated with a minimum of 2 gallons per minute per foot of bearing length. For example, a 3 foot long bearing should receive 6 gallons of water per minute minimum. Generally speaking, more water is better and you cannot pump too much water to a bearing.

BEARING RENEWAL

GENERAL It is easier to remove the bearings with the shaft already removed. When removing the shaft, be sure to lift it off the rubber bearing surface before sliding it out. Sliding the shaft across the bearing will damage the bearing surface and adversely affect bearing performance. If the bearing must be removed with the shaft in place, first remove the upper half of the bearing shell or bushing by sliding it out along the shaft. The shaft may now be lifted to remove the pressure on the bottom bearing shell. Remove the lower half of the bearing.

STAVE REMOVAL. With the bushings removed from the ship, disassemble the retaining rings and push the staves out of the dovetailed slots. They can be driven out with a hand-held, air-driven impact hammer. Because the coefficient of thermal expansion of ROMOR®1 staves is greater than that of the brass housing, cooling the staves with ice will aid in stave removal.

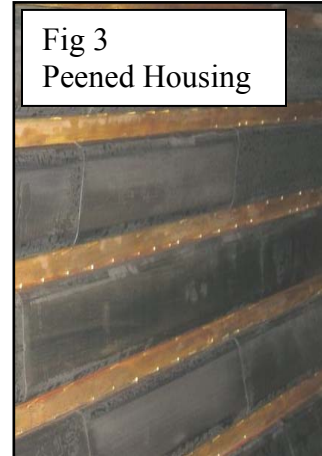
As a last resort, the staves may have to be cut lengthwise (fig 1) and removed in sections. Take care to avoid damaging the dovetailed slots.



INSTALLING STAVES

GENERAL. Pass a GO gage through each dovetailed slot to be sure that it is the proper dimension. If the GO gage does not pass, some filing of the inside of the dovetailed slot may be required. Slots shall accept the GO gage with no more than 0.004 inch of side clearance. If ROMOR®1 staves will not fit into the slot, immerse them in ice water for at least 2 hours. This will permit the staves to be installed by hand. Do not cool ROMOR®1 staves to below 0°F. Do not use dry ice to cool staves.

Once the staves are installed and the assembly is temperature stabilized, the installer can tap lightly on the stave face with a rubber mallet (fig 2) to determine from the sound if the stave is tight in the slot. When tapping indicates loose spots in the slot, lightly peen (fig 3) the housing land area between the staves at that location. This will tighten the staves in the slot. Keep peening to a minimum.



PRECAUTIONS.

Fitting Staves. When installing staves in the dovetailed slots, if the side clearance is greater than 0.011 inch (when the staves are flush with the bottom of the groove and hard against one side), no method of securing the bearing strips is acceptable. Install a new bearing shell.

Stave Surface Finish. The surface finish of the rubber staves is very important for proper operation of the bearing. Do not sand or grind the rubber stave bearing surface to obtain proper clearance. Use oversized staves, re-sleeve the shaft, or turn down the shaft sleeve to obtain proper clearance.

Installation. When installing the shaft, be sure to lift it off the rubber bearing surface before sliding it in. Sliding the shaft across the bearing will damage the bearing surface and adversely affect bearing performance. Reinstall the retaining rings, and secure the bolts with lockwire. Remove the remains of the sacrificial zinc anodes, and install new anodes. Secure these bolts with lockwire.

PRESERVATION COMPOUND. Voids between the bearing shells and the stern tubes and shaft struts should be given a heavy coating of corrosion-preventive compound per MIL- C-161-73, grade 1, Corrosion Preventive Compound, Solvent Cutback, Cold Application. Then, fill these spaces with a mixture of tallow and paraffin (180°F melting point) to reduce corrosion and the possibility of rupture due to freezing. The consistency shall be such that the mixture can be applied with a trowel before assembly and will remain a firm plastic mass until all parts of the bearing shell have been assembled.

DRAIN AND FILL HOLES. Many stern tubes and shaft struts have drain-and-fill holes with threaded bronze plugs in the voids. These plugs permit draining trapped water and filling and draining preservative compounds when the ship is in dry-dock.

STORAGE. To ensure long service life, protect the rubber surfaces of the bearings from compression set, age hardening, and excessive heat or cold during storage. Compression set occurs when rubber sustains a prolonged, concentrated load. Properly supporting equipment during storage so that the shaft does not rest on the rubber bearing faces prevents this type of distortion.

If the ship will lay idle for long periods of time, the propeller shaft should be rotated a minimum of 450 degrees of rotation at least once per week. This will prevent sea growth from becoming permanently attached to the propeller shaft. Permanently attached sea growth on the propeller shaft will damage to the ROMOR®1 staves if the shaft is rotated.

For extended lay-up in the water the bearings can be sealed to prevent ALL sea growth. Contact Duramax Marine LLC for more information.

FORMULA TO DETERMINE REPLACEMENT STAVE THICKNESS:

Use the following formula to determine the thickness of the replacement staves:

(Internal diameter across the flats of bearing housing – cleaned journal diameter – minimum overshaft clearance) / 2 = thickness of replacement staves

ROMOR®1 stave bearing concept:

Standard ROMOR®1stave sizes:

There are 10 “standard width” staves shown below.

STAVE SIZE NO.	STAVE WIDTH W	N = STAVE THICKNESS			
		STD.	1/16 OVER SIZE	1/8 OVER SIZE	3/16 OVER SIZE
1	1.680	.670	.733	.795	.857
2	1.805	.670	.733	.795	.857
3	1.930	.733	.796	.858	.920
4	2.055	.733	.796	.858	.920
5	2.180	.733	.796	.858	.920
6	2.305	.733	.796	.858	.920
7	2.743	.857	.920	.980	1.044
8	2.930	.857	.920	.980	1.044
9	3.055	.981	1.044	1.106	1.169
10	3.180	.981	1.044	1.106	1.169

NOTES:
 1. RUBBER THICKNESS SHALL BE NO LESS THAN .250 AT ANY LOCATION
 2. REF NAVSHIPS DWG. 1385664 REV H

If there is wear on the shaft liner – it can be machined to remove wear marks and replacement staves are then provided with an over-thickness. The “standard” over-thickness dimensions are stated in the above table (1/16, 1/8 and 3/16 inches).

Please note that replacement ROMOR®1 are custom manufactured for each application and can be supplied to special thickness not shown in above table.

To prolong bearing life, shaft liners should be machined to a final surface finish of 16 to 32 RMS



INFORMATION COMMANDES



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TABLE 244-4-1. STAVE BEARING CLEARANCES

Outside Diameter Shaft Sleeve (inches)	Min. Operating Diametral Clearance of Renewed Bearings (inch)	Max. Operating Diametral Clearance of Renewed Bearings (inch)	Total Operating Diametral Clearance at Which to Renew Bearings (inch)
6-3/4 to 6-7/8	0.027	0.142	0.142
7 to 7-7/8	0.030	0.154	0.154
8 to 8-7/8	0.032	0.157	0.165
9 to 9-7/8	0.035	0.160	0.177
10 to 10-7/8	0.037	0.162	0.187
11 to 11-7/8	0.040	0.165	0.197
12 to 12-7/8	0.042	0.167	0.207
13 to 13-7/8	0.045	0.170	0.217
14 to 14-7/8	0.047	0.172	0.226
15 to 15-7/8	0.050	0.175	0.235
16 to 16-7/8	0.052	0.177	0.243
17 to 17-7/8	0.055	0.180	0.252
18 to 18-7/8	0.057	0.182	0.259
19 to 19-7/8	0.060	0.185	0.267
20 to 20-7/8	0.062	0.187	0.274
21 to 21-7/8	0.065	0.190	0.281
22 to 22-7/8	0.067	0.192	0.286
23 to 23-7/8	0.070	0.195	0.292
24 to 24-7/8	0.072	0.197	0.295
25 to 25-7/8	0.075	0.200	0.299
26 to 26-7/8	0.077	0.202	0.301
27 to 27-7/8	0.080	0.205	0.304
28 to 28-7/8	0.082	0.207	0.307
29 to 29-7/8	0.085	0.210	0.310
30 to 30-7/8	0.088	0.213	0.313
31 to 31-7/8	0.090	0.215	0.315
32 to 32-7/8	0.092	0.217	0.317
33 to 33-7/8	0.095	0.220	0.320
34 to 34-7/8	0.098	0.223	0.323
35 to 36	0.098	0.223	0.327