Johnson®

CUTLESS® BEARINGS

WATER LUBRICATED DEMOUNTABLE RUBBER STAVE BEARINGS

Johnson®

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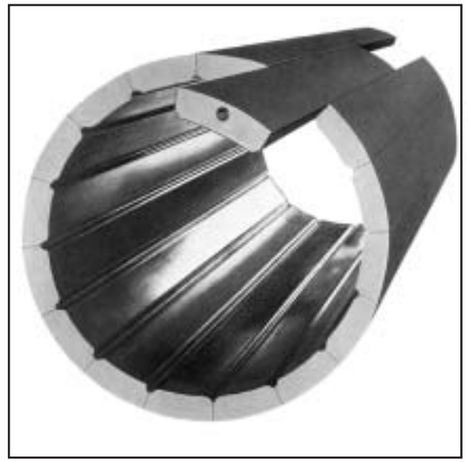
For Sterntubes, Struts, Cutterheads & Pumps

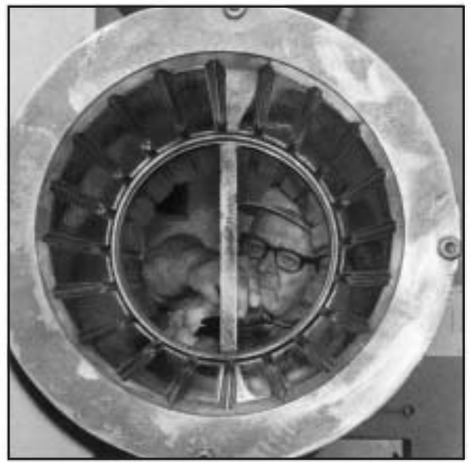
DESCRIPTION

Johnson Cutless® demountable bearings are made up of keystone-sided staves of molded rubber that, when fitted together in a housing, form a cylindrical bearing. The staves slide individually into place and can be removed without removing the shaft. When fully inserted, the stave ends protrude a specified length from the housing.

Once the staves are inserted, a compression head (split in two 180° segments) is bolted to the bearing housing. This compresses the staves, which thereby lock together to produce a tight frictional bond with the housing and a full-length bearing ID with the prescribed clearance for hydrodynamic lubrication.

Water grooves molded into the rubber provide an ample supply of water.





EVERY BEARING IS PRE-FITTED

Quality control procedures at Duramax® Marine include a complete fitting of all bearings and measurement of proper clearance before the system is packed and shipped. The complete bearing is assembled in a tube of identical dimensions to those shown on your engineering drawings, the ID is machined to the proper dimension and the compression head is applied to verify an accurate fit. Finally, the bearing ID is checked for proper size.

Clearances around the shaft are measured and recorded. A copy of the pertinent data accompanies the bearing, together with installation instructions keyed to the specific installation.

FEATURES & BENEFITS

- Durable product
- Reliable performance
- Decreased time in dry dock for bearing replacement
- Comprehensive stock for prompt shipment worldwide

REVISIONS				
LTR.	DESCRIPTION	DATE	BY	APPD.

GENERAL NOTES

1 All MM Dimensions Are Exact Conversions of Inch Dimensions. All Parts Furnished in Inch Dimension.

2 All Surfaces Indicated ($\mathcal{x}$) are 125 R.M.S.

3 C1 Bearing Length Over 60 Inches (1524.00MM) Consists of Two 1/2-Length Staves.
C1 Bearing Length Over 125 Inches (3175.00MM) Consists of Three 1/3-Length Staves.
Bearing Stave Length Code: C1 = Full Length • C2 = 2/3-Length • C3 = 1/2-Length
C4 = Custom Length. See Page 1:1:11

4 Bearing Staves Are Secured in Position by Longitudinal Compressive Force Applied Against the end of the Staves.
Secured Bearing Stave Length + Amount of Compression = Unsecured Bearing Stave Length.
NOTE: *Duramax® Marine LLC determines the correct amount of compression to secure stave into the housing.*

5 Determine Thickness of Retainer Ring from the Following Table:

O.D. SHAFT OR SLEEVE JOURNAL		THICKNESS OF RETAINER RING	
Inches	MM	Inches	MM
Up to 7¼	Up to 184.15	¾	19.05
7½-15	190.5 -381.0	1	25.40
15¼-24	387.35-609.60	1¼	31.75
24¼-36	615.95-914.40	1½	38.1

NOTE: I.D. of Compression Head and Retaining Ring must be concentric with housing bore within 1/32 of an inch (.794 mm) for journals up through 12½ inches (317.500 mm). For larger journals, concentricity must be within 1/16 inch (1.588 mm).

6 Normal Lubricating Water Flow Through Bearing is 2 GPM Per Inch of Shaft Diameter at 5-7 PSI Greater Than Static Head Pressure At the Bearing.

7 Compression Head and/or Stuffing Box Is Recommended to be Used as Drill Jig for Stud Location on Bearing Housing. Maintain .050/.060 Inches (1.27/1.52MM) Clearance Between Compression Head Halves.

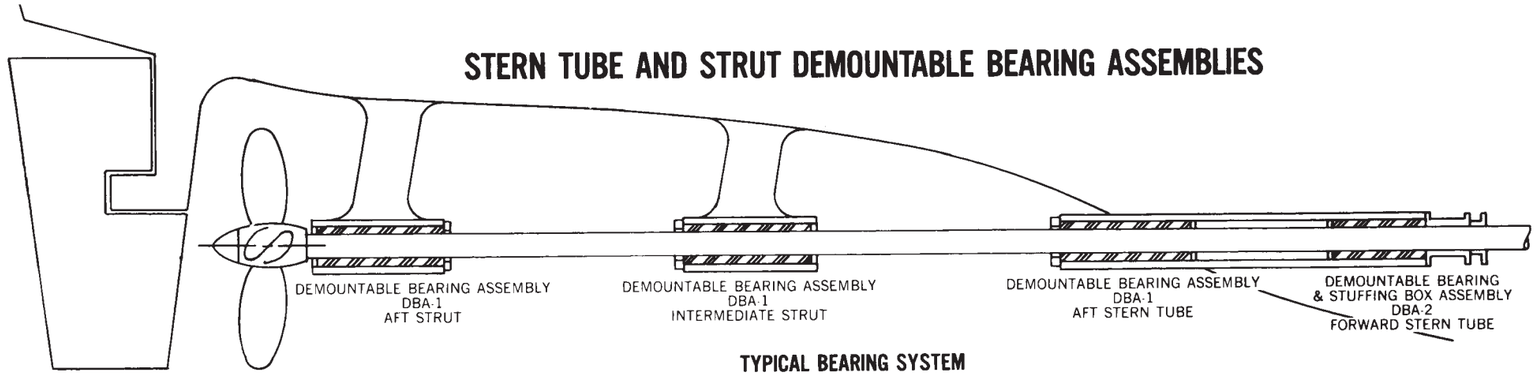
8 Self Tapping Eye Bolt Is Recommended to be Used for Withdrawal of Staves. Staves Are Drilled on One End Only. Drilled End Must Face the Installer.

O.D. SHAFT OR SLEEVE JOURNAL		DRILLED HOLE DIMENSIONS			
		Diameter		Depth	
Inches	MM	Inches	MM	Inches	MM
Up to 4½	Up to 114.300	¼	6.350	1	25.400
4¾- 7¼	120.650-184.150	⅜	9.525	1¼	31.750
7½- 9½	190.500-241.300	½	12.700	1½	38.100
9¾-14	247.650-355.601	⅝	15.875	2¼	57.150
14¼ & Over	361.951 & Over	¾	19.050	2¼	57.150

9 Determine Tolerance of Housing Bore (Bearing O.D.) from the Following Table:

O.D. SHAFT OR SLEEVE JOURNAL		HOUSING BORE (BEARING O.D.) TOLERANCE	
Inches	MM	Inches	MM
Up to 4¾	Up to 120.650	+.003 −.000	+.076 −.000
5 -7¼	127.000-184.150	+.005 −.000	+.127 −.000
7½-9½	190.500-241.300	+.008 −.000	+.203 −.000
9¾ & Over	247.650 & Over	+.010 −.000	+.254 −.000

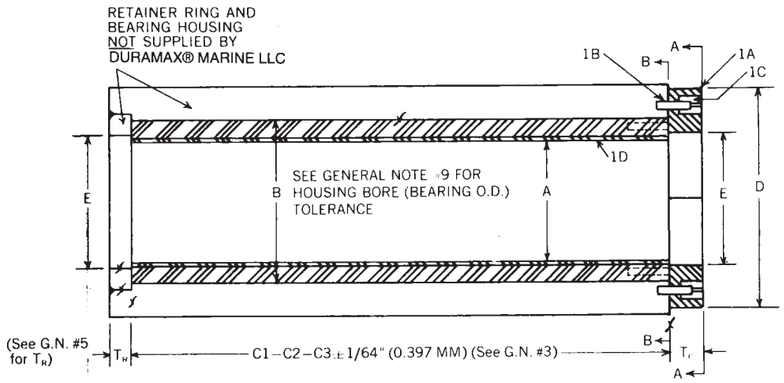
STERN TUBE AND STRUT DEMOUNTABLE BEARING ASSEMBLIES



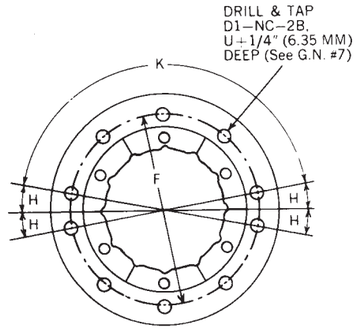
TYPICAL BEARING SYSTEM

PARTS LIST

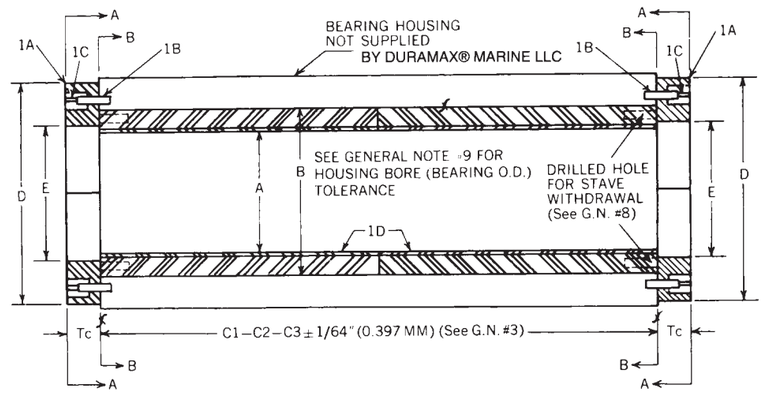
ASSY. NO.	ITEM NO.	QTY.	NAME	MATERIALS	REMARKS	SEE PAGE
DBA-1	1A	As Required	COMPRESSION HEAD	ASTM-A36	2-180° Halves	12 13 14
	1B		STUD	PARTS HAVE BEEN CHANGED SEE INSIDE BACK COVER		
	1C		PLUG LOCK NUT			
	1D		STAVE BEARING SET	NITRILE RUBBER	Code Size As Specified	9 10 11
DBA-2	2A	As Required	STUFFING BOX ASSY.	BRONZE SAE 40	Model and Code Size As Specified	Sec. 2
	2B		STUD	BRASS		Sec. 2
	2C		NUT-HEX	BRASS		Sec. 2
	2D		NUT-JAM	BRASS		Sec. 2
	2E		STAVE BEARING SET	NITRILE RUBBER	Code Size As Specified	9 10 11



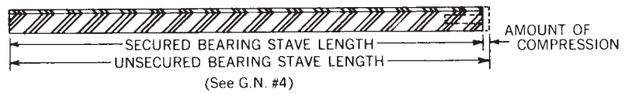
Demountable Bearing Assembly: DBA-1
OPTIONAL DESIGN TYPE I (SINGLE COMPRESSION HEAD)



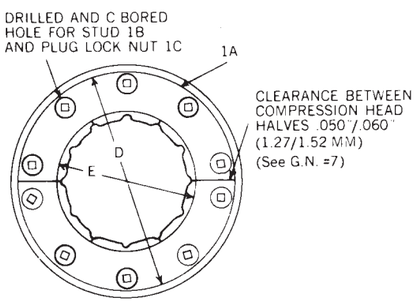
View B-B
TYPICAL VIEW WITH
COMPRESSION HEADS REMOVED



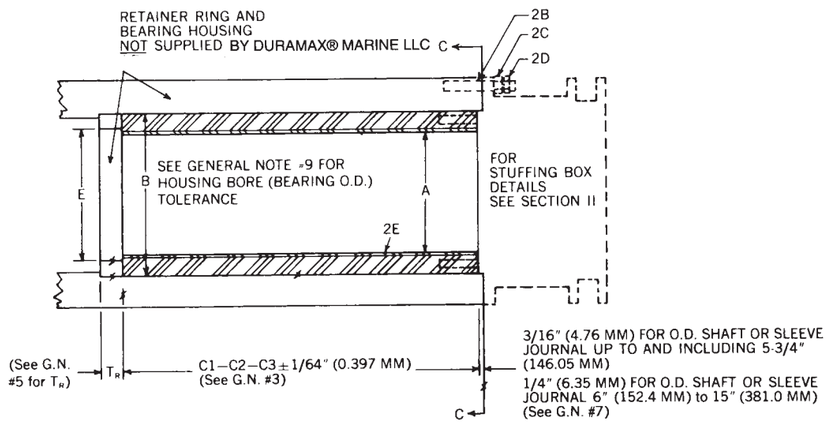
Demountable Bearing Assembly: DBA-1
OPTIONAL DESIGN TYPE II (DOUBLE COMPRESSION HEADS)



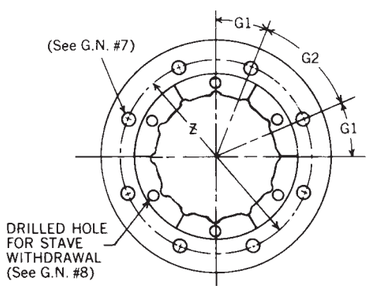
Typical Rubber Bearing Stave



View A-A
TYPICAL VIEW WITH
COMPRESSION HEADS IN PLACE



Demountable Bearing And Stuffing Box Assembly: DBA-2



View C-C
TYPICAL DRILLING DIAGRAM
FORWARD STERN TUBE/STUFFING
BOX MATING FLANGE

alphaver
IMPORTATEUR & DISTRIBUTEUR
Marine Industrie Equipements Depuis 1977

PATENTED UNDER ONE OR MORE OF THE FOLLOWING PATENTS:

UNITED STATES

3,225,731	3,487,805
3,236,570	3,561,524
3,317,254	3,578,342
3,407,779	3,606,505
3,447,794	3,610,713
3,470,843	

Other United States Patents pending.

CANADA
Patented in Canada 1969, 1970, and 1971.

GREAT BRITAIN

1,050,330	1,197,850
1,175,763	1,214,274
1,193,145	1,257,456

Other British Patents pending.

JAPAN
618,022

Additional Patents and Applications for Patents in Other Countries.

Johnson
CUTLESS® BEARINGS

Installation Procedure

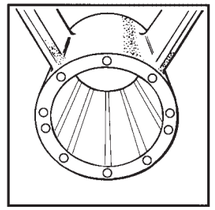
NEW INSTALLATION

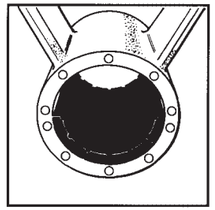
1. Check if housing ID, housing length and shaft OD are identical to the Dimensional Data or to the specific drawing.
2. Check if housing is clean.
3. Insert rubber staves in the lower half of the bearing housing (you will notice that the staves are longer than the housing. This is correct. Do not cut the staves). Lubricate the running surface of the staves; see "note and warning".
4. Install the lower compression head half and tighten bolts lightly.
5. Carefully install and position the shaft (upper half of bearing is not yet in place, providing ample clearance for moving and positioning the shaft).
6. Insert upper half staves. Lubricate stave surfaces and the sides of the last stave with liquid dish soap to obtain an easier fit of the last stave. DO NOT LUBRICATE THE BACKS OF THE STAVES. The last stave may need to be fitted with the help of a wooden mallet.
7. Install the upper compression head half and tighten the bolts lightly.
8. Jack up the shaft to press against the upper half staves so the positive setting is obtained.
9. Tighten all bolts using a torque pattern.
10. Lower shaft.
11. Measure clearances between the shaft and the bearing by means of long feeler gauges and record the data.

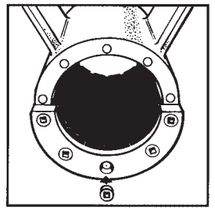
NOTE: Lubricate the running surface of the staves only and also the sides of the last stave. NEVER lubricate the back of the staves or the inside of the housing.

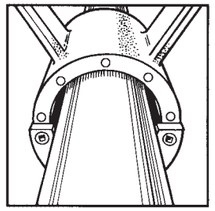
WARNING: Although the rubber is oil resistant, NEVER use oil or grease as a lubricant. It will contaminate the system and the environment. Keep each set of bearings strictly as a set; do not mix!

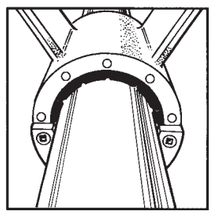
Each set is individually matched. Install each set in number sequence as indicated on one end of the bearing staves.

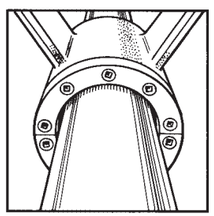












REPLACEMENT PROCEDURE

1. Remove bolts and compression heads.
2. Insert an eyebolt with coarse thread or a self-expanding bolt in the hole of one of the upper staves. The first stave can be withdrawn with the help of a pulley and the remaining staves can easily be withdrawn by hand.
3. Jack up the shaft in order to withdraw the lower staves.
4. Clean the shaft and housing properly. REMOVE ALL DIRT, RUST AND SCALE.
5. Insert rubber staves in the lower half of the bearing housing. You will notice that the staves are longer than the housing. This is correct. DO NOT CUT THE STAVES. Lubricate the running surface of the staves. (see note/warning)
6. Install the lower compression head half and tighten the bolts lightly.
7. Lower the shaft and insert new staves in the upper half of the bearing. Lubricate the stave surfaces and the sides of the last stave.
8. Install the upper compression head half and tighten bolts lightly.
9. Jack up the shaft to press against the upper half staves so that the positive setting is obtained.
10. Tighten all bolts using a torque pattern.
11. Lower the shaft.
12. Measure clearances between the shaft and the bearing by means of long feeler gauges and record data.

Water Lubrication

APPLICATIONS

Design Rules:
Stern tube, struts, rudders, cutterheads and continuously immersed pump bearings are adequately lubricated when the following 4 rules are adhered to:

1. Nominal loading should not exceed 0.26 N/mm² (40 psi). If nominal loading is in excess of 0.26 N/mm² (40 psi), please consult Duramax® Marine for recommendations.
2. Shaft or sleeve surface speed should be in excess of 1m/sec (3.25 ft/sec) to create a hydrodymnamic water wedge, thus minimizing frictional heat generation.
3. Proper clearances should be applied to accommodate potential shaft misalignment and moderate environmental temperature increases. This is to support waterwedge formation. If poor bearing installation should occur, shaft clearances can serve as a warning signal.
4. A minimum constant waterflow and pressure, as specified in the graph below, should be maintained, not only to develop the waterwedge but also to dissipate frictional heat.

Important notes:

a. If design circumstances require violation of any one of the first three rules, the bearing design criteria will change. We then strongly recommend forced water lubrication to prevent bearing destruction due to increased friction heat generation. The minimum required water flow should then be 4 times the rate derived from the graph. We also recommend forced water lubrication when the out board water conditions are very dirty and the flow of water has to prevent abrasives and contaminants from entering the bearing. The minimum required water should then be 2 times the rate derived from the graph.

b. If design circumstances require violation of two or more of the first three rules, in addition to forced water lubrication, keeper bars are recommended.

c. Rule 4 must not be violated at any time. Water lubrication interruption to any rubber-lined bearing will generate rapid frictional heat and failure.

d. None of the four rules can be ignored or abused without consequences. In case any of the 4 rules are violated, Duramax® Marine should be contacted to verify the proper modifications of the design criteria. If care is taken, water lubricated rubber bearings will offer years of dependability and economic savings.

EFFICIENT LUBRICATION

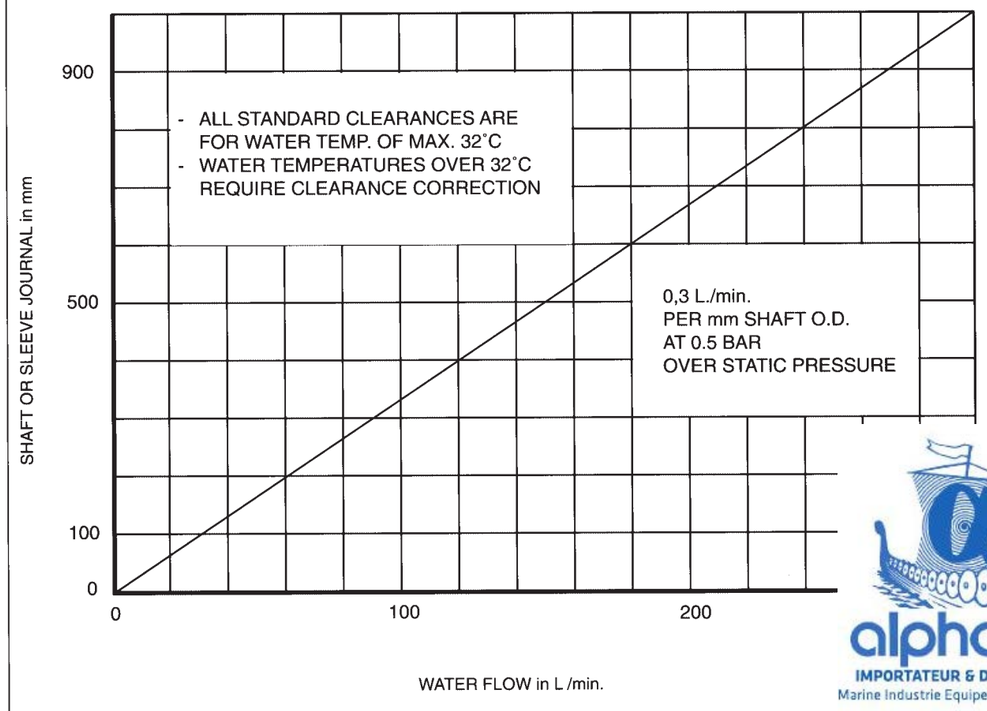
Water is an ideal lubricant because it is non-polluting and does not require expensive seals. Water has a tendency to adhere to metal but not to rubber.

Water entering the bearing grooves is immediately diverted to the revolving shaft and driven concentrically to form a continuous lubricating film.

This film separates the bearing from the shaft and the result is a reduction of friction and heat. The radially spaced grooves at calculated intervals assure full and complete lubrication and cooling of the entire bearing, even at slow shaft speeds. A continuous water supply flushes away abrasives and contaminants.

FILTRATION

Heavily contaminated water may cause shaft and bearing wear. Service life can be improved by reducing the abrasives in the water by filtration.



PHYSICAL PROPERTIES

Material	: Rubber Nitrile no. 3825
Durometer	: 70 ±5 Shore C scale
Density	: 1.16 gr/cm³
Tensile strength	: 13,8 N/mm²
Temperature Range	: -29°C to +93°C
Thermal expansion	: 170 x 10-⁶/°C
Absorption	: Negligible
Compression set	: at 22°C

aging	residual stress
72 hrs	70%
1 year	60%
over 1 year	50%

DEFLECTION

Due to the contour design and the quality of the rubber, Johnson Cutless® demountable rubber stave bearings will support very heavy loads.

The contour design allows the shaft to see more surface area, decreasing the load calculated per unit of projected area (nominal – or specific load).

The loading force will deflect a rubber bearing. The deflection is shown as a function of the specific load.

STIFFNESS and DAMPING

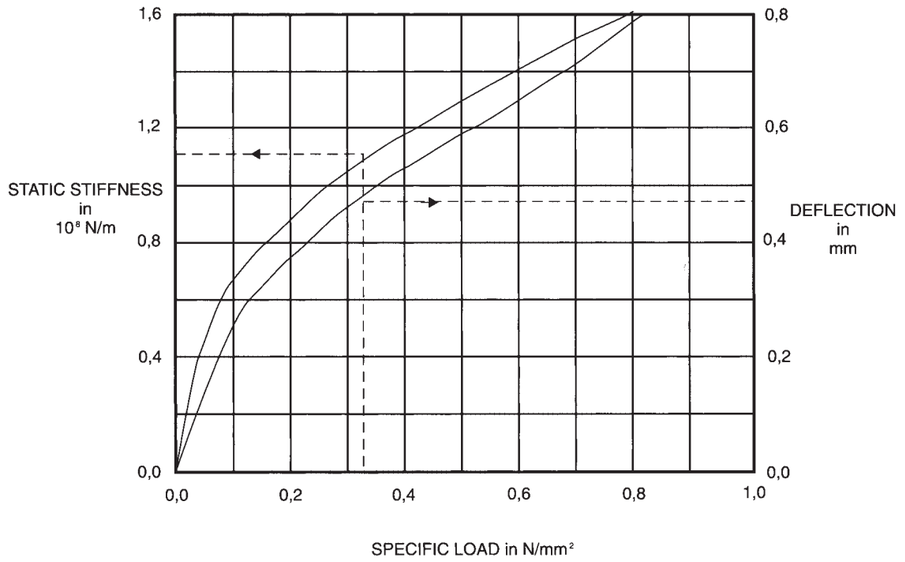
An extended testing program produced the stiffness and damping coefficients for Johnson Cutless® demountable rubber stave bearings. The influence of the running speed was found to be negligible.

Static stiffness is a function of load and deflection and not depending on shaft speed or any frequency.

In line-shaft vibration analysis the primary variable of interest is the frequency. Therefore the dynamic stiffness and damping coefficients are a function of the forcing frequency, with the specific load as a parameter.

NOTE

All coefficients shown are for the tested bearing code L-1012-1334 x 10 C3. For all other bearings multiply the coefficients by the new bearing diameter times length in mm, divided by 149 x 10³



LUBRICANT

(at installation/replacement only)

Use a detergent, soft or liquid soap, or a solution with water. It should be an unadulterated product, not containing acids, ammonia, chlorine or any other harmful additive. Also glycerin can be used as a lubricant.

NOTE: Lubricate the running surface of the staves only and also the sides of the last stave. NEVER lubricate the back of the staves or the inside of the housing.

WARNING: Although the rubber is oil resistant NEVER use oil or grease as a lubricant. It will contaminate the system and the environment.

MAXIMUM WEAR

The maximum running clearance we advise for water lubricated rubber bearings in marine application is:

O.D. Shaft or sleeve journal in	mm	Maximum clearance in	mm
1- 2	25- 50	.04	1,0 + 1% of O.D.
2- 4	50- 100	.06	1,5 + 1% of O.D.
4- 8	100- 200	.08	2,0 + 1% of O.D.
8-20	200- 500	.10	2,5 + 1% of O.D.
20-40	500-1000	.12	3,0 + 1% of O.D.

This is the clearance, measured with feeler gauges, between shaft or sleeve journal and bearing.

It includes both bearing and journal wear.

Although the inside diameter of the compression head and the depth of the water grooves in the bearing will allow more wear, we advise that the advised maximum wear not be exceeded.

Excessive wear can cause too much shaft deflection, and as a consequence, damage of seals and shaftline bearings.

The advised maximum wear values relate to the water lubricated rubber bearings only. They do not take into account any requirements of the seal manufacturer.

TOOLING

a. For mounting and dismantling of the compression head, use a (extended) hex-key. For dimensions see inside back cover.

b. For driving in the last stave, use a wooden mallet or a sledge hammer and a piece of wood.

c. For withdrawing staves, use a coarse-threaded eyebolt or rawlplug. The aid of the 'come-along' or pulley may be required for withdrawing the first stave. For hole dimensions in the front end of the staves see pages 15 and 16.

STORAGE

To assure extended shelf life, the rubber staves should be protected from compression set, age hardening and extensive heat or cold during storage.

Compression set occurs when rubber must sustain a prolonged concentrated load.

Age hardening results from degradation of the rubber by environmental forces and pollutants.

Johnson Cutless® demountable rubber stave bearings can be stored for an unlimited period as long as the following precautions are taken:

a. The bearing should be stored in its original box.

b. At moderate temperature between 0° and 50°C (32° to 122°F).

c. Away from high voltage electrical equipment.

d. Away from ozone producing sources. Protect from exposure to ultra-violet light (including sunlight and fluorescent lights).

e. WARNING: If the vessel is laid up for a longer period, the shaft should be rotated regularly to avoid seagrowth on the liner. We recommend one complete rotation of the shaft per week.

FRICTION

Friction as the result of contact between the bearing and shaft journal and/or viscous resistance of the lubricant depends on the quality of the lubrication.

For boundary and mixed lubrication the viscous friction will be negligible compared to the contact friction. For hydrodynamic lubrication, only viscous friction is present.

It is obvious that hydrodynamic lubrication will provide the maximum bearing life.

The coefficient of friction is a function of load, journal speed and viscosity of the lubricant.

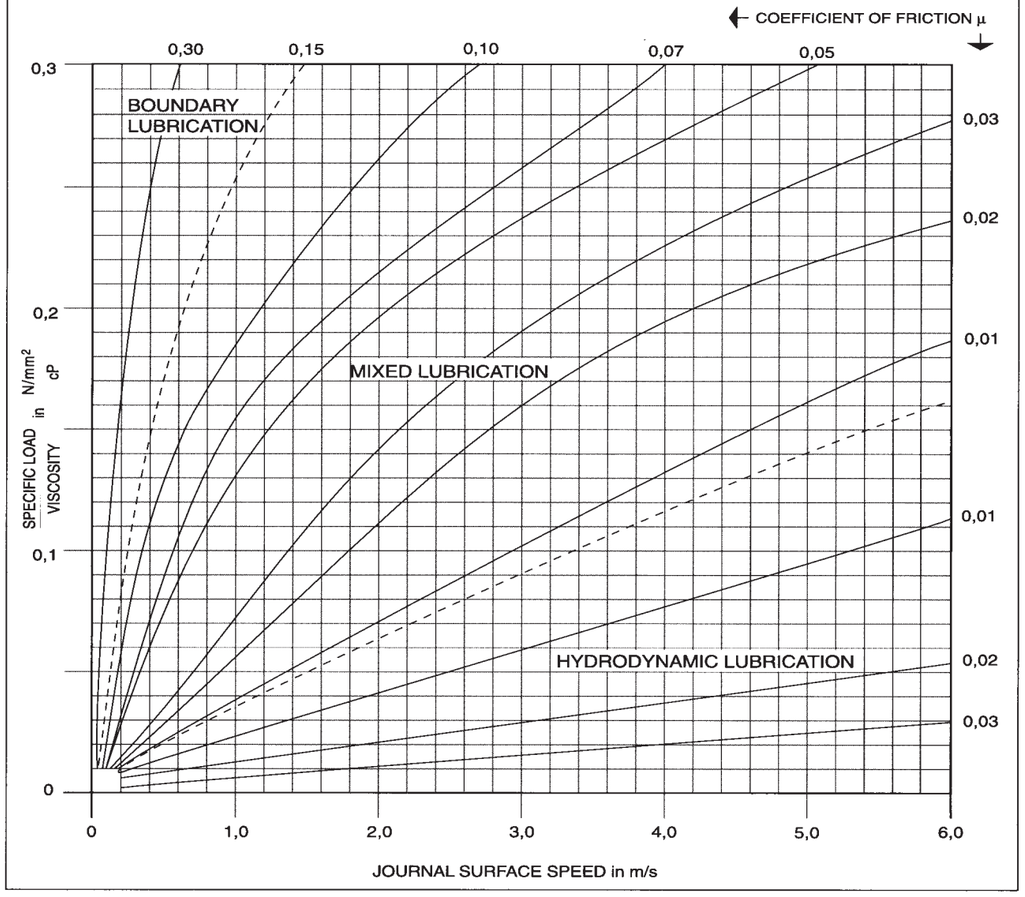
The bearing dimensions required for hydrodynamic lubrication can be determined with the aid of the graph and formula on this page.

Bearings operating near or in boundary lubrication need special measures to overcome increased heat generation. Please consult Duramax® Marine LLC for recommendations.

$$Pv = \frac{F}{D \times L \times cP} \qquad V = \frac{\pi \times D \times N}{1000 \times 60}$$

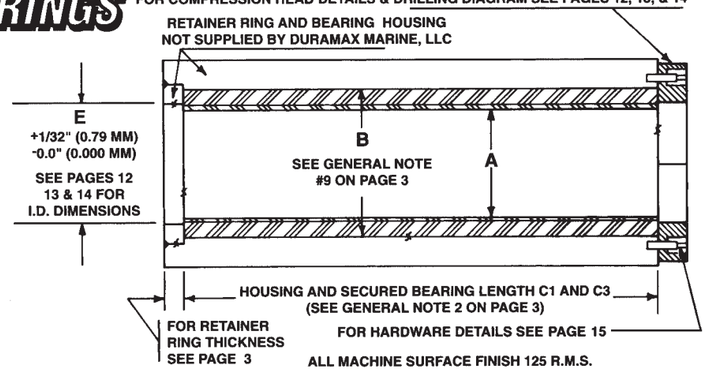
F	=	Bearing load	= N
P	=	Specific load	= N/mm²
D	=	Journal diameter	= mm.
L	=	Bearing length	= mm.
V	=	Surface speed	= m/s
N	=	Rotational speed	= rev./min.
cP	=	Water viscosity	= see table

TEMPERATURE °C	VISCOSITY cP
0	1,80
5	1,50
10	1,30
15	1,15
20	1,00
25	0,90
30	0,80



Demountable Rubber Stave Bearing Dimensions

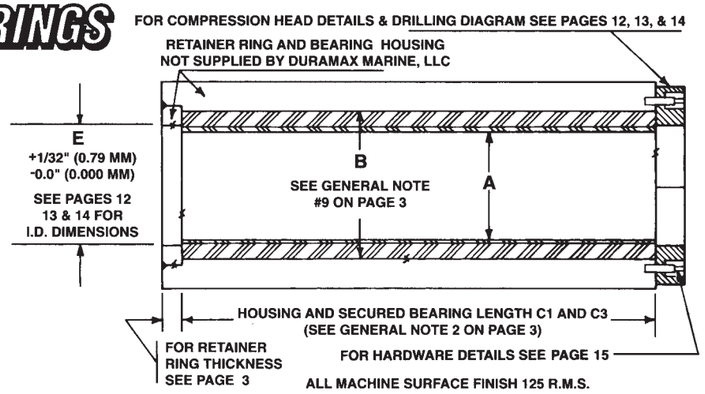
FOR COMPRESSION HEAD DETAILS & DRILLING DIAGRAM SEE PAGES 12, 13, & 14



O.D. SHAFT OR SLEEVE JOURNAL A		BEARING CODE SIZE	REFERENCE PART NUMBER	HOUSING BORE (BEARING O.D.) (SEE GENERAL NOTE 1 ON PAGE 3) B		HOUSING AND SECURED BEARING LENGTH (SEE ORIGINAL NOTE 2 ON PAGE 3) C1 (FULL LENGTH)		C3 (HALF LENGTH)		NORMAL SHAFT CLEARANCE (SECURED BEARING)	
INCHES	MM			INCHES	MM	INCHES	MM	INCHES	MM	INCHES	MM
2½	63.500	L-0212-0312 x 4	2600	3.500	88.900	10	254.001	5	127.000	.012-.023	.305- .584
3	76.200	L-0300-0412 x 4	2600-032	4.500	114.300	14	355.601	7	177.800	.012-.023	.305- .584
3½	88.900	L-0312-0412 x 4	2601								
4	101.600	L-0400-0512 x 4	2602	5.500	139.700	17	431.801	8½	215.900	.015-.024	.381- .610
4¼	107.950	L-0414-0512 x 4	2603								
4½	114.300	L-0412-0618 x 4	2604	6.125	155.575	19	482.601	9½	241.300	.015-.024	.381- .610
4¾	120.650	L-0434-0618 x 4	2605								
5	127.000	L-0500-0612 x 4	2606	6.500	165.100	21	533.401	10½	266.701	.018-.030	.457- .762
5¼	133.350	L-0514-0612 x 4	2607								
5½	139.700	L-0512-0712 x 4	2608	7.500	190.500	23	584.201	11½	292.101	.018-.030	.457- .762
5¾	146.050	L-0534-0712 x 4	2609								
6	152.400	L-0600-0800 x 6	2610	8.000	203.200	25	635.001	12½	317.501	.018-.030	.457- .762
6¼	158.750	L-0614-0800 x 6	2611								
6½	165.100	L-0612-0812 x 6	2612	8.500	215.900	27	685.801	13½	342.901	.018-.030	.457- .762
6¾	171.450	L-0634-0812 x 6	2613								
7	177.800	L-0700-0914 x 6	2614	9.250	234.950	29	736.601	14½	368.301	.020-.032	.508- .813
7¼	184.150	L-0714-0914 x 6	2615								
7½	190.500	L-0712-1014 x 6	2616	10.250	260.351	32	812.802	16	406.401	.020-.034	.508- .864
7¾	196.850	L-0734-1014 x 6	2617								
8	203.200	L-0800-1014 x 6	2618								
8¼	209.550	L-0814-1100 x 8	2619	11.000	279.901	35	889.002	17½	444.501	.020-.034	.508- .864
8½	215.900	L-0812-1100 x 8	2620								
8¾	222.250	L-0834-1100 x 8	2621								
9	228.600	L-0900-1134 x 8	2622	11.750	298.451	38	965.202	19	482.601	.022-.038	.559- .965
9¼	234.950	L-0914-1134 x 8	2623								
9½	241.300	L-0912-1134 x 8	2624								
9¾	247.650	L-0934-1234 x 8	2625	12.750	323.851	41	1041.40	20½	520.701	.024-.040	609-1.016
10	254.001	L-1000-1234 x 8	2626								
10¼	260.351	L-1014-1234 x 8	2627								
10½	266.701	L-1012-1334 x 10	2628	13.750	349.250	44	1117.60	22	558.801	.026-.042	.660-1.067
10¾	273.051	L-1034-1334 x 10	2629								
11	279.401	L-1100-1334 x 10	2630								
11¼	285.751	L-1114-1412 x 10	2631	14.500	368.301	47	1193.80	23½	596.901	.026-.042	.660-1.067
11½	292.101	L-1112-1412 x 10	2632								
11¾	298.451	L-1134-1412 x 10	2633								
12	304.801	L-1200-1512 x 10	2634	15.500	393.700	50	1270.00	25	635.001	.027-.043	.686-1.092
12¼	311.150	L-1214-1512 x 10	2635								
12½	317.500	L-1212-1512 x 10	2636								
12¾	323.850	L-1234-1614 x 10	2637	16.250	412.750	53	1346.20	26½	673.101	.028-.044	.711-1.178
13	330.201	L-1300-1614 x 10	2638								
13¼	336.550	L-1314-1614 x 10	2639								
13½	342.900	L-1312-1714 x 12	2640	17.250	438.150	56	1422.40	28	711.201	.029-.045	.737-1.143
13¾	349.250	L-1334-1714 x 12	2641								
14	355.601	L-1400-1714 x 12	2642								
14¼	361.951	L-1414-1814 x 12	2643	18.250	463.551	59	1498.60	29½	749.301	.029-.045	.737-1.143
14½	368.301	L-1412-1814 x 12	2644								
14¾	374.651	L-1434-1814 x 12	2645								

CUTLESS BEARINGS

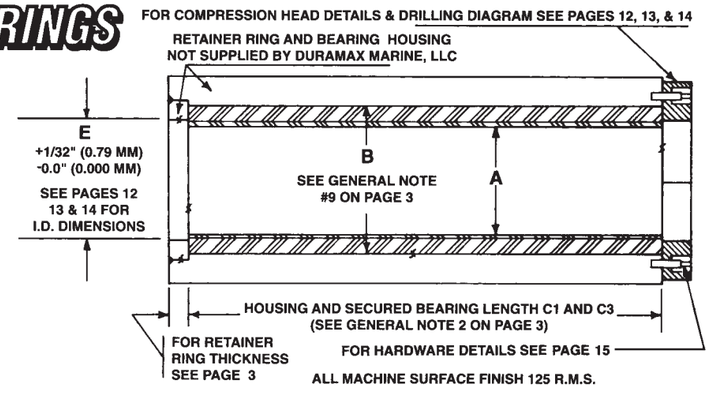
Demountable Rubber Stave Bearing Dimensions



O.D. SHAFT OR SLEEVE JOURNAL A		BEARING CODE SIZE	REFERENCE PART NUMBER	HOUSING BORE (BEARING O.D.) (SEE GENERAL NOTE 1 ON PAGE 3) B		HOUSING AND SECURED BEARING LENGTH (SEE ORIGINAL NOTE 2 ON PAGE 3) C1 (FULL LENGTH)		C3 (HALF LENGTH)		NORMAL SHAFT CLEARANCE (SECURED BEARING)	
INCHES	MM			INCHES	MM	INCHES	MM	INCHES	MM	INCHES	MM
15	381.000	L-1500-1900 x 12	2646	19.000	482.601	62	1574.80	31	787.400	.030-.046	.762-1.168
15¼	387.350	L-1514-1900 x 12	2647								
15½	393.700	L-1512-1900 x 12	2648								
15¾	400.050	L-1534-2000 x 12	2649	20.000	508.000	65	1651.00	32½	825.502	.032-.048	.813-1.219
16	406.401	L-1600-2000 x 12	2650								
16¼	412.750	L-1614-2000 x 12	2651								
16½	419.100	L-1612-2012 x 12	2652	20.500	520.700	68	1727.20	34	863.602	.035-.050	.838-1.270
16¾	425.450	L-1634-2012 x 12	2653								
17	431.801	L-1700-2012 x 12	2654								
17¼	438.150	L-1714-2114 x 14	2655	21.250	539.751	71	1803.40	35½	901.702	.035-.050	.838-1.270
17½	444.500	L-1712-2114 x 14	2656								
17¾	450.850	L-1734-2114 x 14	2657								
18	457.201	L-1800-2200 x 14	2658	22.000	558.801	74	1879.60	37	939.802	.036-.052	.914-1.321
18¼	463.550	L-1814-2200 x 14	2659								
18½	469.900	L-1812-2200 x 14	2660								
18¾	476.250	L-1834-2234 x 14	2661	22.750	577.850	77	1955.80	38½	977.902	.038-.054	.965-1.372
19	482.601	L-1900-2234 x 14	2662								
19¼	488.950	L-1914-2234 x 14	2663								
19½	495.300	L-1912-2312 x 14	2664	23.500	596.900	80	2032.00	40	1016.00	.040-.056	1.016-1.422
19¾	501.650	L-1934-2312 x 14	2665								
20	508.000	L-2000-2312 x 14	2666								
20¼	514.350	L-2014-2414 x 14	2667	24.250	615.950	83	2108.20	41½	1054.10	.040-.056	1.016-1.422
20½	520.700	L-2012-2414 x 14	2668								
20¾	527.050	L-2034-2414 x 14	2669								
21	533.401	L-2100-2500 x 16	2670	25.000	635.001	86	2184.40	43	1092.20	.043-.060	1.092-1.524
21¼	539.750	L-2114-2500 x 16	2671								
21½	546.100	L-2112-2500 x 16	2672								
21¾	552.450	L-2134-2534 x 16	2673	25.750	654.051	89	2260.60	44½	1130.30	.044-.062	1.118-1.575
22	558.801	L-2200-2534 x 16	2674								
22¼	565.150	L-2214-2534 x 16	2675								
22½	571.500	L-2212-2612 x 16	2676	26.500	673.100	92	2336.80	46	1168.40	.047-.065	1.194-1.651
22¾	577.850	L-2234-2612 x 16	2677								
23	584.201	L-2300-2612 x 16	2678								
23¼	590.550	L-2314-2714 x 16	2679	27.250	692.150	95	2413.00	47½	1206.50	.047-.065	1.194-1.651
23½	596.900	L-2312-2714 x 16	2680								
23¾	603.250	L-2334-2714 x 16	2681								
24	609.601	L-2400-2800 x 18	2682	28.000	711.201	98	2489.20	49	1244.60	.048-.066	1.219-1.676
24¼	615.950	L-2414-2800 x 18	2683								
24½	622.300	L-2412-2800 x 18	2684								
24¾	628.650	L-2434-2834 x 18	2685	28.750	730.250	101	2565.41	50½	1282.70	.051-.069	1.295-1.753
25	635.001	L-2500-2834 x 18	2686								
25¼	641.350	L-2514-2834 x 18	2687								
25½	647.700	L-2512-2912 x 20	2688	29.500	749.300	104	2641.61	52	1320.80	.052-.070	1.321-1.778
25¾	654.050	L-2534-2912 x 20	2689								
26	660.401	L-2600-2912 x 20	2690								

CUTLESS BEARINGS

Demountable Rubber Stave Bearing Dimensions



O.D. SHAFT OR SLEEVE JOURNAL A		BEARING CODE SIZE	REFERENCE PART NUMBER	HOUSING BORE (BEARING O.D.) (SEE GENERAL NOTE 1 ON PAGE 3) B		HOUSING AND SECURED BEARING LENGTH (SEE ORIGINAL NOTE 2 ON PAGE 3) C1 (FULL LENGTH)		C3 (HALF LENGTH)		NORMAL SHAFT CLEARANCE (SECURED BEARING)	
INCHES	MM			INCHES	MM	INCHES	MM	INCHES	MM	INCHES	MM
26¼	666.750	L-2614-3014 x 20	2691	30.250	768.353	107	2717.81	53½	1358.90	.052-.070	1.321-1.778
26½	673.100	L-2612-3014 x 20	2692								
26¾	679.450	L-2634-3014 x 20	2693								
27	685.801	L-2700-3100 x 20	2694	31.000	787.403	110	2743.21	55	1397.00	.055-.073	1.397-1.854
27¼	692.150	L-2714-3100 x 20	2695								
27½	698.500	L-2712-3100 x 20	2696								
27¾	704.850	L-2734-3134 x 20	2697	31.750	806.453	113	2870.21	56½	1435.10	.056-.074	1.422-1.880
28	711.201	L-2800-3134 x 20	2698								
28¼	717.550	L-2814-3134 x 20	2699								
28½	723.900	L-2812-3212 x 20	2600-001	32.500	825.503	116	2946.41	58	1473.20	.059-.077	1.499-1.956
28¾	730.250	L-2834-3212 x 20	2600-002								
29	736.601	L-2900-3212 x 20	2600-003								
29¼	742.950	L-2914-3314 x 22	2600-004	33.250	844.553	119	3022.61	59½	1511.30	.059-.077	1.499-1.956
29½	749.300	L-2912-3314 x 22	2600-005								
29¾	755.650	L-2934-3314 x 22	2600-006								
30	762.003	L-3000-3400 x 22	2600-007	34.000	863.602	122	3098.81	61	1549.40	.060-.080	1.524-2.032
30¼	768.353	L-3014-3400 x 22	2600-008								
30½	774.703	L-3012-3400 x 22	2600-009								
30¾	781.053	L-3034-3434 x 22	2600-010	34.750	882.653	125	3175.01	62½	1587.50	.063-.083	1.600-2.108
31	787.403	L-3100-3434 x 22	2600-011								
31¼	793.753	L-3114-3434 x 22	2600-012								
31½	800.103	L-3112-3512 x 24	2600-013	35.500	901.703	128	3251.21	64	1625.60	.064-.084	1.626-2.134
31¾	806.453	L-3134-3512 x 24	2600-014								
32	812.803	L-3200-3512 x 24	2600-015								
32¼	819.153	L-3214-3614 x 24	2600-016	36.250	920.752	131	3327.41	65½	1663.70	.064-.084	1.626-2.134
32½	825.503	L-3212-3614 x 24	2600-017								
32¾	831.853	L-3234-3614 x 24	2600-018								
33	838.203	L-3300-3700 x 24	2600-019	37.000	939.802	134	3403.61	67	1701.80	.067-.087	1.702-2.210
33¼	844.553	L-3314-3700 x 24	2600-020								
33½	850.903	L-3312-3700 x 24	2600-021								
33¾	857.253	L-3334-3734 x 24	2600-022	37.750	958.852	137	3479.81	68½	1739.90	.068-.088	1.727-2.235
34	863.603	L-3400-3734 x 24	2600-023								
34¼	869.953	L-3414-3734 x 24	2600-024								
34½	876.303	L-3412-3812 x 26	2600-025	38.500	977.902	140	3556.01	70	1778.00	.071-.091	1.803-2.311
34¾	882.653	L-3434-3812 x 26	2600-026								
35	889.004	L-3500-3812 x 26	2600-027								
35¼	895.354	L-3514-3914 x 26	2600-028	39.250	996.952	143	3632.21	71½	1816.10	.071-.091	1.803-2.311
35½	901.703	L-3512-3914 x 26	2600-029								
35¾	908.054	L-3534-3914 x 26	2600-030								

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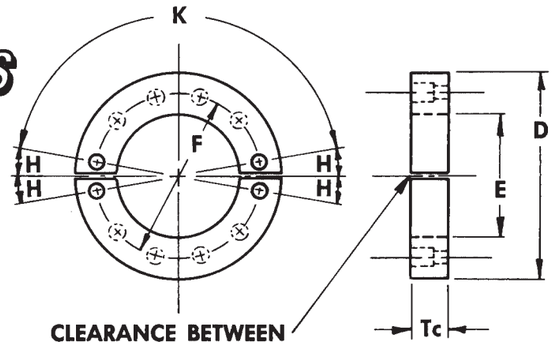
CUTLESS® BEARINGS

Compression Head Dimensions



CLEARANCE BETWEEN COMPRESSION HEAD HALVES

.050/ .060 Inches —1.270/1.524 MM

NOTE: I.D of Compression Head and Retaining Ring must be concentric with housing bore within 1/32 of an inch (.794 mm) for journals up through 12½ inches (317.500 mm). For larger journals, concentricity must be within 1/16 inch (1.588 mm).

O.D. SHAFT OR SLEEVE JOURNAL A		REFERENCE PART NUMBER	OUTSIDE DIAMETER D		INSIDE DIAMETER E		BOLT CIRCLE DIAMETER F		THICKNESS Tc		BOLT HOLE LOCATION PER COMPRESSION HEAD HALF	
											DEG. SYM. ABOUT CENTER LINE	NUMBER OF HOLES EQUALLY SPACED
INCHES	MM		INCHES	MM	INCHES	MM	INCHES	MM	INCHES	MM	H	K
2½	63.500	260001-125	6.000	152.400	2.813	71.446	4.438	112.723	1.000	25.400	—	4
3 3½	76.200 88.900	260001-126	7.000	177.800	4.000	101.600	5.438	138.113	1.000	25.400	15	3
4 4¼	101.600 107.950	260001-127	8.000	203.200	4.875	123.825	6.438	163.513	1.000	25.400	15	3
4½ 4¾	114.300 120.650	260001-128	8.625	219.075	5.375	136.525	7.063	179.388	1.000	25.400	15	3
5 5¼	127.000 133.350	260001-129	9.000	228.600	5.875	149.225	7.438	188.913	1.500	38.100	10	3
5½ 5¾	139.700 146.050	260001-130	10.000	254.001	6.375	161.925	8.438	214.313	1.500	38.100	10	3
6 6¼	152.400 158.750	260001-131	10.500	266.701	6.875	174.625	8.938	227.013	1.500	38.100	15	4
6½ 6¾	165.100 171.450	260001-132	11.000	279.401	7.375	187.325	9.438	239.713	1.500	38.100	10	5
7 7¼	177.800 184.150	260001-133	12.250	311.151	7.875	200.025	10.375	263.526	2.125	53.975	10	5
7½ 7¾ 8	190.500 196.850 203.200	260001-134	13.250	336.551	8.625	219.075	11.375	288.926	2.125	53.975	10	5
8¼ 8½ 8¾	209.550 215.900 222.250	260001-135	14.000	355.601	9.375	238.125	12.125	307.976	2.125	53.975	10	5
9 9¼ 9½	228.600 234.950 241.300	260001-136	15.750	400.051	10.125	257.176	13.250	336.551	2.750	69.850	10	5
9¾ 10 10¼	247.650 254.001 260.351	260001-137	16.750	425.451	10.875	276.224	14.250	361.951	2.750	69.850	10	5
10½ 10¾ 11	266.701 273.051 279.401	260001-138	17.750	450.852	11.875	301.624	15.250	387.351	2.750	69.850	10	5
11¼ 11½ 11¾	285.751 292.101 298.451	260001-139	18.500	469.902	12.375	314.326	16.000	406.401	2.750	69.850	10	5
12 12¼ 12½	304.801 311.150 317.500	260001-140	19.500	495.301	13.375	339.726	17.000	431.801	2.750	69.850	10	5
12¾ 13 13¼	323.850 330.201 336.550	260001-141	20.250	514.352	14.000	355.601	17.750	450.852	2.750	69.850	10	5
13½ 13¾ 14	342.900 349.250 355.601	260001-142	21.250	539.752	14.875	377.820	18.750	476.252	2.750	69.850	10	5
14¼ 14½ 14¾	361.951 368.301 374.651	260001-143	22.250	565.152	15.500	393.702	19.750	501.652	2.750	69.850	10	5

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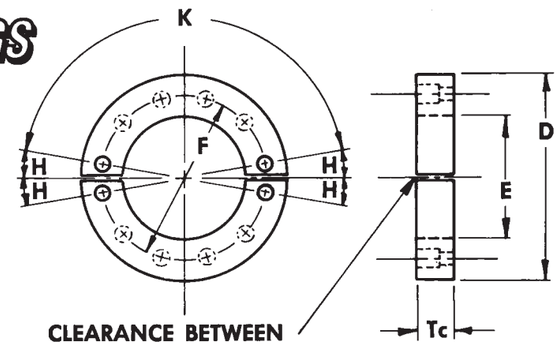
CUTLESS® BEARINGS

Compression Head Dimensions



CLEARANCE BETWEEN COMPRESSION HEAD HALVES

.050/ .060 Inches —1.270/1.524 MM

NOTE: I.D of Compression Head and Retaining Ring must be concentric with housing bore within 1/32 of an inch (.794 mm) for journals up through 12½ inches (317.500 mm). For larger journals, concentricity must be within 1/16 inch (1.588 mm).

O.D. SHAFT OR SLEEVE JOURNAL A		REFERENCE PART NUMBER	OUTSIDE DIAMETER D		INSIDE DIAMETER E		BOLT CIRCLE DIAMETER F		THICKNESS Tc		BOLT HOLE LOCATION PER COMPRESSION HEAD HALF	
											DEG. SYM. ABOUT CENTER LINE	NUMBER OF HOLES EQUALLY SPACED
INCHES	MM		INCHES	MM	INCHES	MM	INCHES	MM	INCHES	MM	H	K
15 15¼ 15½	381.000 387.350 393.700	260001-144	23.000	584.201	16.375	415.927	20.500	520.702	2.750	69.850	10	6
15¾ 16 16¼	400.050 406.401 412.750	260001-145	24.000	609.601	17.125	434.977	21.500	546.101	2.750	69.850	10	6
16½ 16¾ 17	419.100 425.450 431.801	260001-146	24.500	622.302	17.875	454.027	22.000	558.801	2.750	69.850	10	6
17¼ 17½ 17¾	438.150 444.500 450.850	260001-147	25.250	641.353	18.625	473.077	22.750	577.852	2.750	69.850	10	6
18 18¼ 18½	457.201 463.550 469.900	260001-148	26.000	660.401	19.375	492.127	23.500	596.902	2.750	69.850	10	6
18¾ 19 19¼	476.250 482.601 488.950	260001-149	26.750	679.453	20.125	511.177	24.250	615.952	2.750	69.850	10	6
19½ 19¾ 20	495.300 501.650 508.000	260001-150	27.500	698.501	20.875	530.226	25.000	635.001	2.750	69.850	10	6
20¼ 20½ 20¾	514.350 520.700 527.050	260001-151	28.250	717.552	21.625	549.277	25.750	654.053	2.750	69.850	10	6
21 21¼ 21½	533.401 539.750 546.100	260001-152	29.000	736.601	22.375	568.326	26.500	673.101	2.750	69.850	11.25	8
21¾ 22 22¼	552.450 558.801 565.150	260001-153	29.750	755.653	23.125	587.377	27.250	692.153	2.750	69.850	11.25	8
22½ 22¾ 23	571.500 577.850 584.201	260001-154	30.50	774.703	23.875	606.427	28.000	711.203	2.750	69.850	11.25	8
23¼ 23½ 23¾	590.550 596.900 603.250	260001-155	31.250	793.753	24.625	625.477	28.750	730.253	2.750	69.850	11.25	8
24 24¼ 24½	609.601 615.950 622.300	260001-156	33.000	838.202	25.375	644.528	29.875	758.828	3.500	88.900	11.25	8
24¾ 25 25¼	628.650 635.001 641.350	260001-157	33.750	857.253	26.125	663.578	30.625	777.877	3.500	88.900	11.25	8
25½ 25¾ 26	647.700 654.050 660.401	260001-158	34.500	876.303	26.875	682.628	31.375	796.928	3.500	88.900	11.25	8

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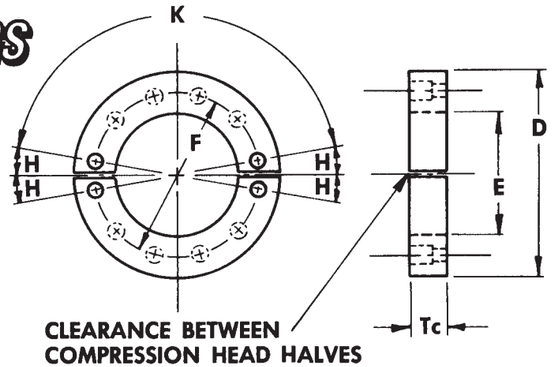
CUTLESS® BEARINGS

Compression Head Dimensions



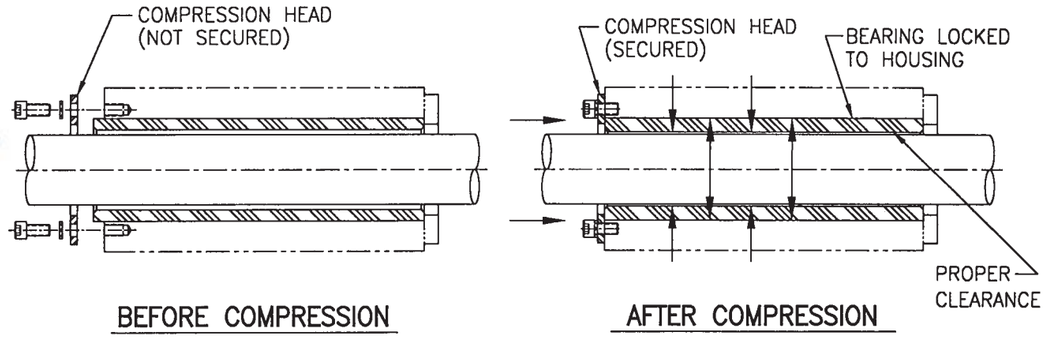
.050/ .060 Inches —1.270/1.524 MM

NOTE: I.D of Compression Head and Retaining Ring must be concentric with housing bore within 1/32 of an inch (.794 mm) for journals up through 12½ inches (317.500 mm). For larger journals, concentricity must be within 1/16 inch (1.588 mm).

O.D. SHAFT OR SLEEVE JOURNAL A		REFERENCE PART NUMBER	OUTSIDE DIAMETER D		INSIDE DIAMETER E		BOLT CIRCLE DIAMETER F		THICKNESS Tc		BOLT HOLE LOCATION PER COMPRESSION HEAD HALF	
											DEG. SYM. ABOUT CENTER LINE	NUMBER OF HOLES EQUALLY SPACED
INCHES	MM		INCHES	MM	INCHES	MM	INCHES	MM	INCHES	MM	H	K
26¼ 26½ 26¾	666.750 673.100 679.450	260001-159	35.250	895.354	27.625	701.678	32.125	815.978	3.500	88.900	11.25	8
27 27¼ 27½	685.801 692.150 698.500	260001-160	36.000	914.402	28.375	720.728	32.875	835.028	3.500	88.900	11.25	8
27¾ 28 28¼	704.850 711.201 717.550	260001-161	36.750	933.454	29.125	739.778	33.625	854.078	3.500	88.900	11.25	8
28½ 28¾ 29	723.900 730.250 736.601	260001-162	37.500	952.504	29.875	758.828	34.375	873.128	3.500	88.900	10	9
29¼ 29½ 29¾	742.950 749.300 755.650	260001-163	38.250	971.554	30.625	777.878	35.125	892.179	3.500	88.900	10	9
30 30¼ 30½	762.003 768.353 774.703	260001-164	39.000	990.602	31.375	796.928	35.875	911.229	3.500	88.900	10	9
30¾ 31 31¼	781.053 787.403 793.753	260001-165	39.750	1009.654	32.125	815.978	36.625	930.279	3.500	88.900	9	10
31½ 31¾ 32	800.103 806.453 812.803	260001-166	40.500	1028.704	32.875	835.028	37.375	949.329	3.500	88.900	9	10
32¼ 32½ 32¾	819.153 825.503 831.853	260001-167	41.250	1047.754	33.625	854.078	38.125	968.379	3.500	88.900	9	10
33 33¼ 33½	838.203 844.553 850.903	260001-168	42.000	1066.804	34.375	873.128	38.875	987.429	3.500	88.900	9	10
33¾ 34 34¼	857.253 863.603 869.953	260001-169	42.750	1085.854	35.125	892.178	39.625	1006.479	3.500	88.900	9	10
34½ 34¾ 35	876.303 882.653 889.004	260001-170	43.500	1104.904	35.875	911.229	40.375	1025.529	3.500	88.900	9	10
35¼ 35½ 35¾	895.354 901.703 908.054	260001-171	44.250	1123.954	36.625	930.279	41.125	1044.579	3.500	88.900	9	10

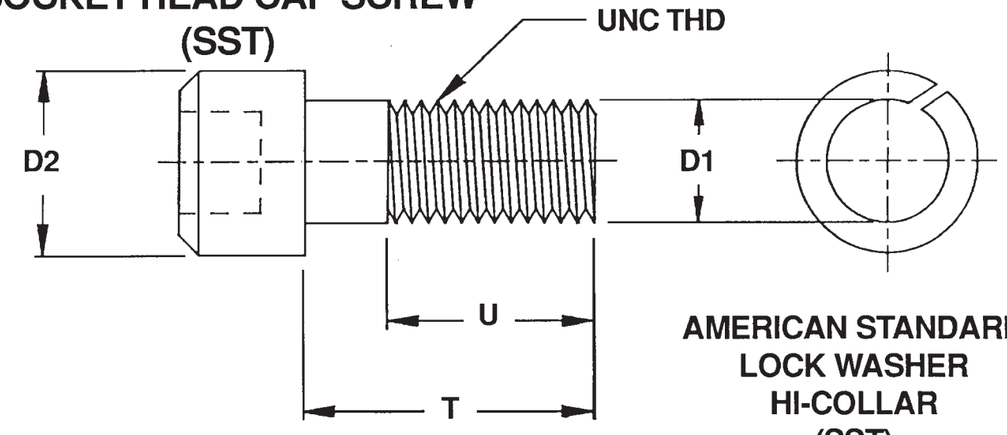
Johnson®
CUTLESS® BEARINGS

Demountable Bearing Concept



STANDARD DBA-1 HARDWARE

SOCKET HEAD CAP SCREW (SST)



AMERICAN STANDARD LOCK WASHER HI-COLLAR (SST)

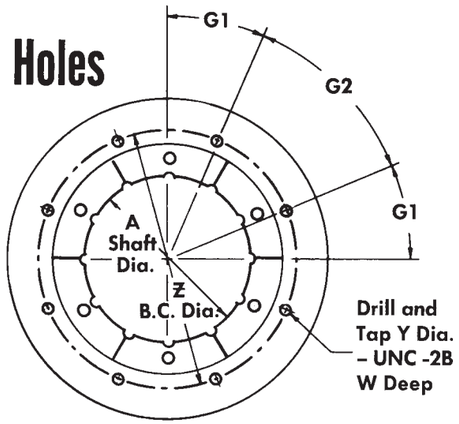
SHAFT SIZE	SOCKET HEAD CAP SCREW PART NO.	UNC THD	D1	D2	T	U	LOCK WASHER PART NO.
2 1/2 - 6 3/4	893161600	5/8 - 11	.625	.938	1.250	.875	891371601
7 - 8 3/4	893161901	3/4 - 10	.750	1.125	1.750	1.250	891371901
9 - 23 3/4	893162500	1 - 8	1.000	1.500	2.000	1.625	891372501
24 - 35 3/4	893163200	1 1/4 - 7	1.250	1.875	2.500	1.750	891373201

Johnson

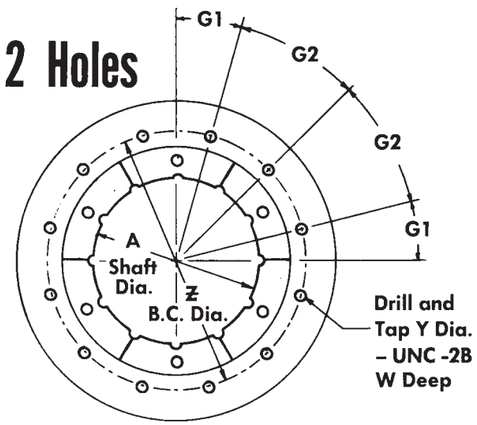
CUTLESS BEARINGS

Drilling Diagram – Forward Stern Tube/Stuffing Box Mating Flange

8 Holes



12 Holes



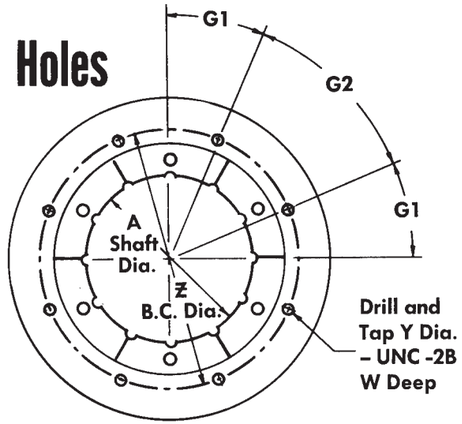
O.D. SHAFT OR SLEEVE JOURNAL		BOLT CIRCLE DIAMETER		NUMBER OF HOLES	THREAD DIAMETER		THREAD DEPTH		STUD SPACING	
A		Ƶ			Y		W		G-1	G-2
INCHES	MM	INCHES	MM		INCHES	MM	INCHES	MM	DEGREES	
3 3¼	76.2002 82.5502	6.25	158.750	8	⅝	15.875	1 1/16	26.9876	30	30
3½ 3¾	88.9002 95.2502	6.75	171.450	8	⅝	15.875	1 1/16	26.9876	30	30
4 4¼	101.600 107.950	7.250	184.150	8	⅝	15.875	1 1/16	26.9876	30	30
4½ 4¾	114.300 120.650	8.000	203.200	8	⅝	15.875	1 1/16	26.9876	30	30
5 5¼	127.000 133.350	8.750	222.250	8	⅝	15.875	1 1/16	26.9876	30	30
5½ 5¾	139.700 146.050	9.250	234.950	8	⅝	15.875	1 1/16	26.9876	30	30
6 6¼	152.400 158.750	10.125	257.176	8	⅝	15.875	1 1/16	26.9876	30	30
6½ 6⅝	165.100 168.275	11.375	288.926	8	¾	19.050	1¼	31.7501	22°30′	45
6¾ 6⅞ 7	171.450 174.625 177.800	12.000	304.801	8	¾	19.050	1¼	31.7501	22°30′	45
7⅛ 7¼ 7⅜	180.975 184.150 187.325	12.375	314.326	8	¾	19.050	1¼	31.7501	22°30′	45
7½ 7⅝ 7¾	190.500 193.675 196.850	12.750	323.850	8	¾	19.050	1¼	31.7501	22°30′	45
7⅞ 8 8⅛	200.025 203.200 206.375	13.125	333.376	8	¾	19.050	1¼	31.7501	22°30′	45
8¼ 8⅜ 8½	209.550 212.725 215.900	13.500	342.900	8	¾	19.050	1¼	31.7501	22°30′	45
8⅝ 8¾ 8⅞	219.075 222.250 225.425	13.875	352.426	8	¾	19.050	1¼	31.7501	22°30′	45
9 9⅛ 9¼	228.600 231.775 234.950	14.250	361.951	8	¾	19.050	1¼	31.7501	22°30′	45
9⅜ 9½ 9⅝	238.125 241.300 244.475	14.625	371.476	8	¾	19.050	1¼	31.7501	22°30′	45

Johnson

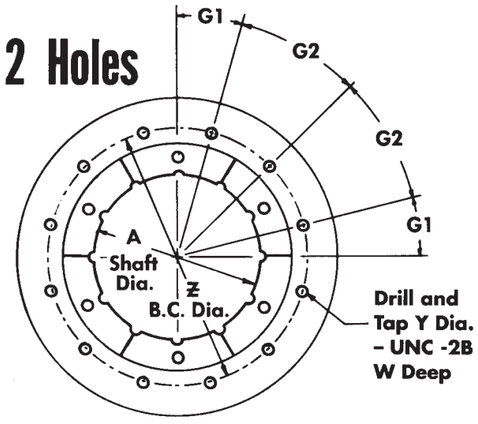
CUTLESS BEARINGS

Drilling Diagram – Forward Stern Tube/Stuffing Box Mating Flange

8 Holes



12 Holes



O.D. SHAFT OR SLEEVE JOURNAL		BOLT CIRCLE DIAMETER		NUMBER OF HOLES	THREAD DIAMETER		THREAD DEPTH		STUD SPACING	
A		Ƶ			Y		W		G-1	G-2
INCHES	MM	INCHES	MM		INCHES	MM	INCHES	MM	DEGREES	
9¾ 9⅞ 10	247.650 250.825 254.001	15.000	381.001	8	¾	19.050	1¼	31.7501	22°30′	45
10⅛ 10¼ 10⅜	257.176 260.351 263.526	15.750	400.050	8	⅞	22.225	1 9/16	39.6876	22°30′	45
10½ 10⅝ 10¾	266.701 269.876 273.051	16.125	409.576	8	⅞	22.225	1 9/16	39.6876	22°30′	45
10⅞ 11 11⅛	276.226 279.401 282.576	16.500	419.100	8	⅞	22.225	1 9/16	39.6876	22°30′	45
11¼ 11⅜ 11½	285.751 288.926 292.101	16.875	428.626	8	⅞	22.225	1 9/16	39.6876	22°30′	45
11⅝ 11¾ 11⅞	295.276 298.451 301.626	17.250	438.150	12	⅞	22.225	1 9/16	39.6876	15	30
12 12⅛ 12¼	304.801 307.976 311.150	17.625	447.676	12	⅞	22.225	1 9/16	39.6876	15	30
12⅜ 12½ 12⅝	314.326 317.500 320.676	18.000	457.201	12	⅞	22.225	1 9/16	39.6876	15	30
12¾ 12⅞ 13	323.850 327.026 330.201	18.375	466.726	12	⅞	22.225	1 9/16	39.6876	15	30
13⅛ 13¼ 13⅜	333.376 336.550 339.726	18.875	479.425	12	⅞	22.225	1 9/16	39.6876	15	30
13½ 13⅝ 13¾	342.900 346.076 349.250	19.250	488.950	12	⅞	22.225	1 9/16	39.6876	15	30
13⅞ 14 14⅛	352.426 355.601 358.776	19.625	498.476	12	⅞	22.225	1 9/16	39.6876	15	30
14¼ 14⅜ 14½	361.951 365.126 368.301	20.000	508.001	12	⅞	22.225	1 9/16	39.6876	15	30
14⅝ 14¾	371.476 374.651	20.375	517.526	12	⅞	22.225	1 9/16	39.6876	15	30
14⅞ 15	377.826 381.001	20.625	523.876	12	⅞	22.225	1 9/16	39.6876	15	30

General Notes

DIMENSIONS

All dimensions of demountable stave bearings and shaft or sleeve journals are conversions of inch into metric.

TOLERANCE AND MACHINE FINISH

Name	Tolerance ISO no	Machine ISO no	Finish Ra µm	µin
Shaft/sleeve journal O.D.	h8	N5	0.4	16
Housing bore I.D.	H8	N7	1.6	63
Housing length	±0.25	N7	1.6	63
Bearing I.D.	see page 2-3			

MATERIALS

Name	Material	Page
Stave bearing set	Nitrile rubber	2-3
Compression head	Fe 360 A	6-7
Socket head cap screw	SST 304	5
Spring washer	SST 304	5

These are standard materials.
Compression head and mounting hardware can also be supplied in other materials on request.

HOLE DIMENSIONS IN FRONT END OF STAVES

O.D. Shaft or sleeve journal in	mm	Diameter mm	Depth mm
$2^1/_2$- $4^1/_2$	63,50-114,30	6,5	25
$4^3/_4$- $7^1/_4$	120,65-184,15	9,5	32
$7^1/_2$- $9^1/_2$	190,50-241,30	12,7	38
$9^3/_4$-14	247,65-355,60	15,9	57
$14^1/_4$-$35^3/_4$	361,95-908,05	19,0	57

BEARING LENGTH

JOHNSON demountable rubber stave bearings are available in three standard length C1, C2 and C3.
Non standard bearing length can be supplied on customers request.
C1 = full length of 4 x journal OD
C2 = two-third length - 2,67 x OD
C3 = half length of 2 x journal OD
C4 = any other specified length.

STAVE LENGTH

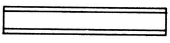
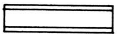
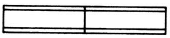
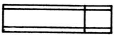
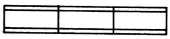
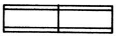
The staves have an overlength for compression, which is approximately 1,5% of the stave length.
The overlength can vary for each bearingset and depends on the stave dimensions when leaving the mold.
Stave length, thickness and width can change during storage, but the volume will remain the same.
Once installed and compressed, it will reproduce the same accurate inside diameter as during the pre-fit at JOHNSON.

NO. OF STAVES PER BEARING LENGTH

Bearings for journal sizes up to 14 3/4' (374,65 mm) have 1 stave set per bearing length.
Bearings for journal sizes of 15' (381,00 mm) and over have 2 or 3 stave sets per bearing length.

KEEPER BARS

As an anti-twist device the application of a keeper bar is recommended for 8" (203.20 mm) bearings and larger.
For installations consisting of more than one stave per bearing length, a keeper bar is required to ensure alignment of the water grooves.
Also when design circumstances so require (see APPLICATIONS), keeper bars are recommended.
Keeper bar to be located preferably at the 6 o'clock position.

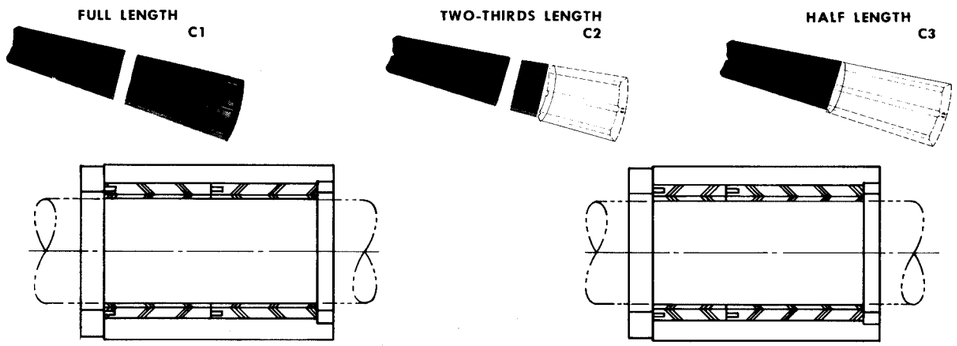
O.D. Shaft or sleeve jounal in	mm	full length C1	Two third length C2	Half length C3
$2^1/_2$-$14^3/_4$	63,50-374,65			
15-$30^1/_2$	381,00-774,70			
$30^3/_4$-$35^3/_4$	781,05-908,05			

Alphaver Marine-Industrie-Equipements
Immeuble Le Colbert • 2 rue Le Corbusier • 95190 Goussainville
Tél. : +33 (0)1 43 83 05 59 • Port. : +33 (0)6 67 65 10 43 • Fax : +33 (0)1 43 83 96 76 • E-mail : info@alphaver.com

Johnson®
DURAMAX PRODUCTS

Demountable Rubber Stave Bearing Dimensions

Number Of Stave Lengths Per Secured Bearing Length



C 1 Secured bearing length in inches. Two C3 or half length bearing sets make one C1 or full length bearing for journal diameters 15" through 30½". For journal diameters 30¾" through 35¾" three bearing lengths are required to make one C1 or full length bearing.

C 2 Secured bearing length in inches. One C3 or half length bearing set and one 1/6 length bearing set makes one C2 or 2/3 length bearing for journal diameters 15" through 30½". For journal diameters:30¾" through 35¾" two bearing sets (C4 length) of equal length will be used to make one C2 length bearing.

A Number of stave lengths per secured bearing length.

SHAFT JOURNAL DIAMETER	BEARING CODE SIZE	J.R. Co. PART NUMBER	C 1 FULL LENGTH	A NO. OF PCS.	C 2 2/3 LENGTH	A NO. OF PCS.	C 3 1/2 LENGTH	A NO. OF PCS.
15	L-1500-1900 x 12	2646	62	2	41	2	31	1
15¼	L-1514-1900 x 12	2647						
15½	L-1512-1900 x 12	2648						
15¾	L-1534-2000 x 12	2649	65	2	43	2	32½	1
16	L-1600-2000 x 12	2650						
16¼	L-1614-2000 x 12	2651						
16½	L-1612-2012 x 12	2652	68	2	45	2	34	1
16¾	L-1634-2012 x 12	2653						
17	L-1700-2012 x 12	2654						
17¼	L-1714-2114 x 14	2655	71	2	47	2	35½	1
17½	L-1712-2114 x 14	2656						
17¾	L-1734-2114 x 14	2657						
18	L-1800-2200 x 14	2658	74	2	49	2	37	1
18¼	L-1814-2200 x 14	2659						
18½	L-1812-2200 x 14	2660						
18¾	L-1834-2234 x 14	2661	77	2	51	2	38½	1
19	L-1900-2234 x 14	2662						
19¼	L-1914-2234 x 14	2663						
19½	L-1912-2312 x 14	2664	80	2	53	2	40	1
19¾	L-1934-2312 x 14	2665						
20	L-2000-2312 x 14	2666						

ALL DEMOUNTABLE RUBBER STAVE SETS ARE PRETESTED AT THE FACTORY TO DETERMINE THE CORRECT AMOUNT OF COMPRESSION FOR SECURELY LOCKING THE STAVES IN THE HOUSING AND TO ESTABLISH THE CORRECT BEARING CLEARANCE OVER THE SHAFT.

JOURNAL SIZES SMALLER THAN 15" DIAMETER (C1 LENGTH AND SMALLER) HAVE ONE STAVE LENGTH PER SECURED BEARING LENGTH.