DryMax Shaft Seal

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Simplicity of DryMax® design.

Leonardo da Vinci is credited with saying, "simplicity is the ultimate sophistication". This statement summarizes the uniqueness of DryMax® Seal System. Some competitive sealing systems can be overcomplicated and difficult to service. The design of the DryMax® has only 2 primary sealing parts; the seal ring and our DuraChrome® Mating Ring which never require adjustment.

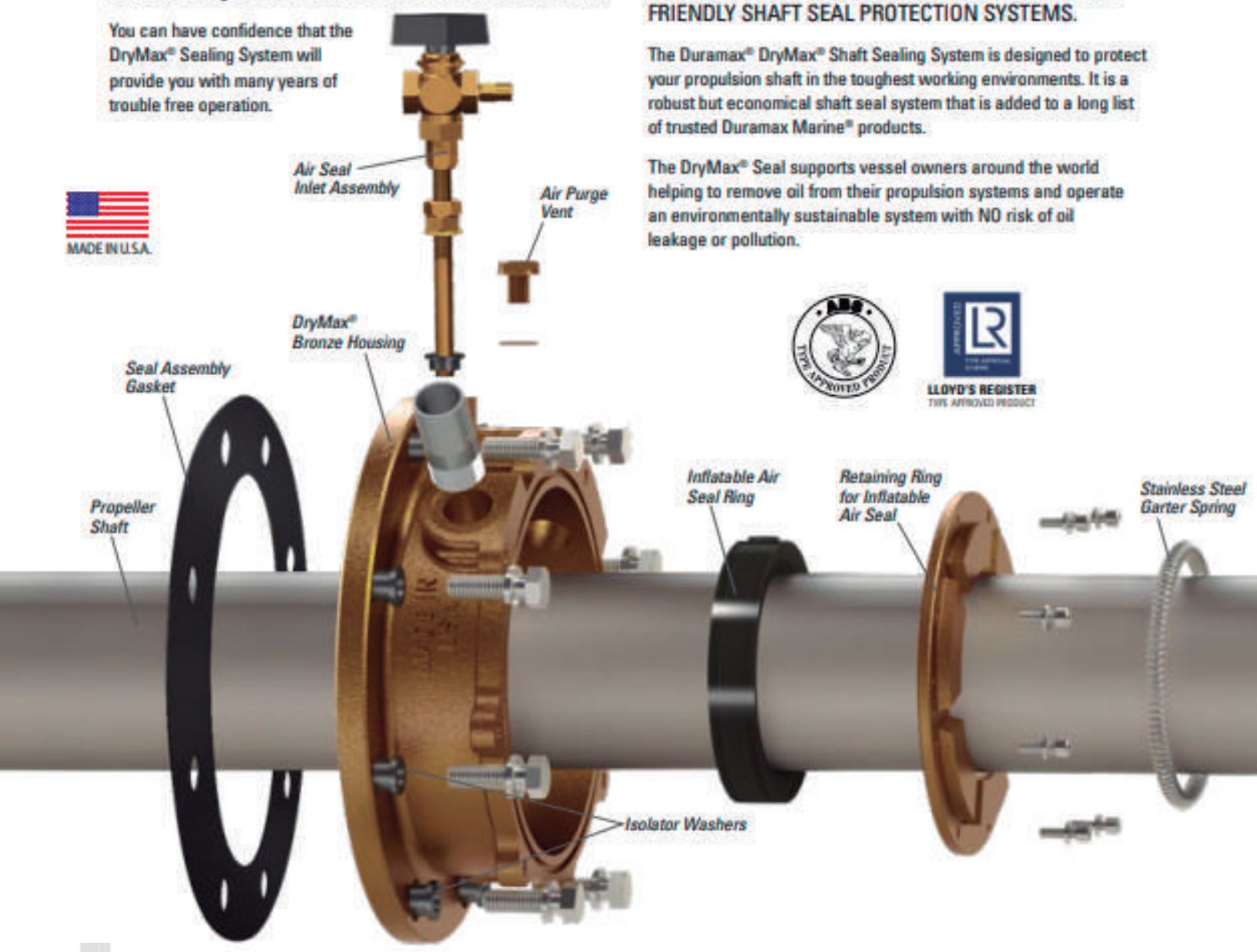
The superior design of the DryMax® Shaft Seal System makes it the best choice for your shaft seal requirements. It eliminates the inefficiencies of many existing designs. The DryMax® Sealing System is easy to install and requires zero maintenance. Something ship owners around the world appreciate.

Designed for heavy duty service in clean and dirty water.

The DryMax® Seal has been engineered and tested for service in both Blue (clean) and Brown (gritted) water operating conditions. Our research and development team conducted experiments on our full scale test rig built to simulate the most difficult service conditions.

You can have confidence that the DryMax® Sealing System will provide you with many years of trouble free operation.

MADE IN U.S.A.



Proprietary rubber Sealing Ring.

The DryMax® Rubber Sealing Ring is very durable and is easily replaced if necessary. The ring is constructed of proprietary nitrile rubber that rotates with the propeller shaft and creates a hydrodynamic sealing interface with the highly polished DuraChrome® Mating Ring. Every seal assembly includes an active rubber seal and a spare seal ready on the shaft for change out when needed. The DryMax® Seal Ring is engineered to deliver a long operating life.

Maximum seal life with DuraChrome® Mating Ring.

The DuraChrome® Mating Ring can be reversed and reused with the spare rubber ring that is stored forward of the seal assembly on the shaft. Once both sides of the DuraChrome® Mating Ring have been worn it can be restored by machining in a lathe. The Alloy used in the DuraChrome® Mating Ring was engineered to optimize operation with our rubber seal ring.

DURAMAX MARINE® ADDS TO ENVIRONMENTALLY-FRIENDLY SHAFT SEAL PROTECTION SYSTEMS.

The Duramax® DryMax® Shaft Sealing System is designed to protect your propulsion shaft in the toughest working environments. It is a robust but economical shaft seal system that is added to a long list of trusted Duramax Marine® products.

The DryMax® Seal supports vessel owners around the world helping to remove oil from their propulsion systems and operate an environmentally sustainable system with NO risk of oil leakage or pollution.

ABS TYPE APPROVED PRODUCT

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The Duramax® DryMax® Shaft Sealing System can be installed in new construction or replace an existing shaft seal. In retrofit applications Duramax engineers can design an adapter plate that mates with the vessels existing stern tube flange to simplify installation.

Heavy duty cast bronze housing and components.

The housing and internal components of the DryMax® Seal are made from a high grade cast bronze. The material was selected to resist corrosion and in many cases will last the lifetime of the vessel.

Sealing performance with shaft movement.

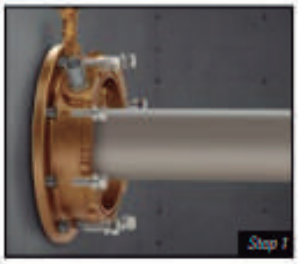
The Duramax® DryMax® Shaft Seal System allows unlimited axial movement and very large radial motion of the propeller shaft. The seal ring will still maintain a waterproof seal even with large running clearances in the stern tube bearings.

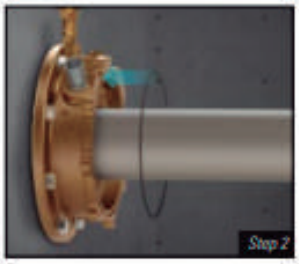
DryMax® Seal requires no adjustments.

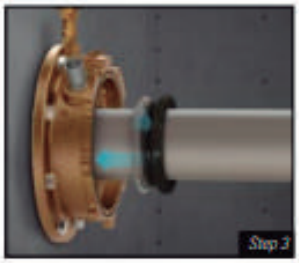
The DryMax® has no springs, bellows or clamp rings required to engage the seal. The DryMax® Seal uses the seawater draft pressure as the primary spring force engaging the sealing ring so there is no concern that the DryMax® Seal will ever disengage or change position. Also, there is no sliding contact of the seal with the shaft, eliminating the possibility of wear and grooving of the propeller shaft or liner.

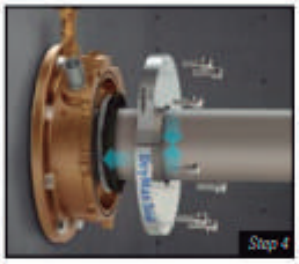
DryMax® extends dry dock intervals.

The DryMax® Sealing System is designed to give unmatched reliability and longevity in the harshest conditions. The superior design of the DryMax® Seal will keep you and your vessel running full speed ahead.



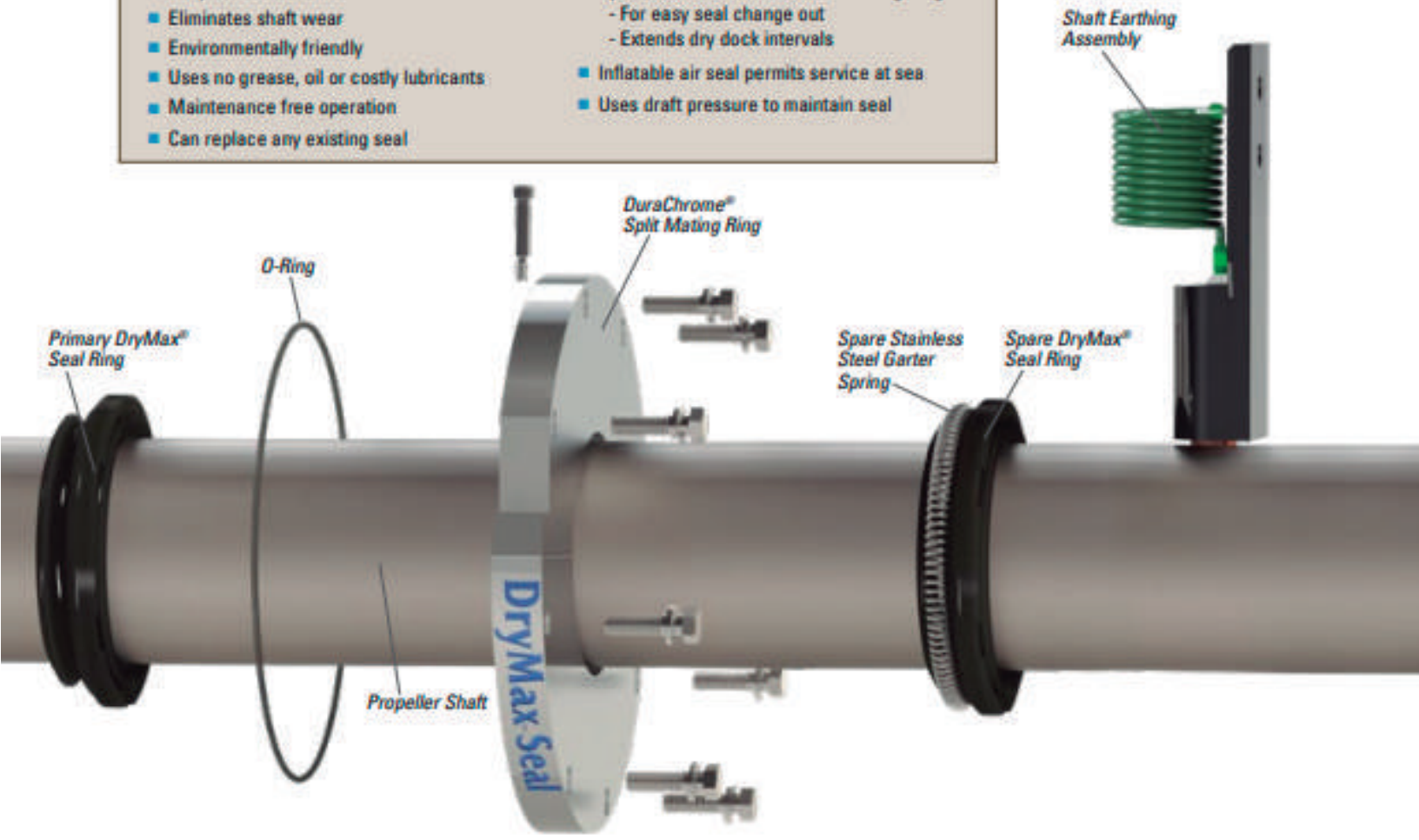






DRYMAX® SEALING SYSTEM

- Easy to use and install
- Eliminates shaft wear
- Environmentally friendly
- Uses no grease, oil or costly lubricants
- Maintenance free operation
- Can replace any existing seal
- Split, reversible DuraChrome® Mating Ring
  - For easy seal change out
  - Extends dry dock intervals
- Inflatable air seal permits service at sea
- Uses draft pressure to maintain seal

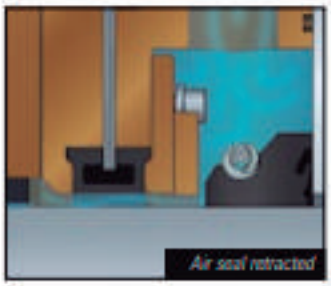


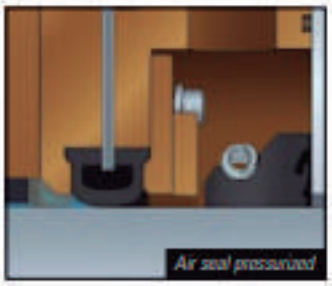
Easy maintenance of DryMax® Seal System.

Self retracting inflatable air seal ring.

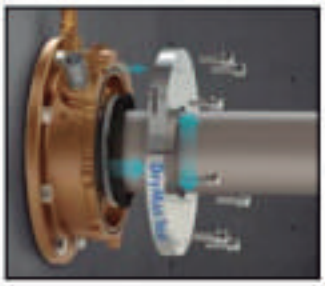
Duramax Marine® was the first to introduce a patented air seal in the Johnson® Heavy-Duty Stuffing Box. Our engineered Inflatable air seal is used as a safety feature on the DryMax® Shaft Seal System.

The air seal is held by a bronze retaining ring in the housing. It can be pressurized to make contact with the shaft, preventing any seawater from entering the vessel. It's a safety measure if leakage exceeds allowable levels. It can be pressurized to replace the rubber seal ring at sea without dry docking.





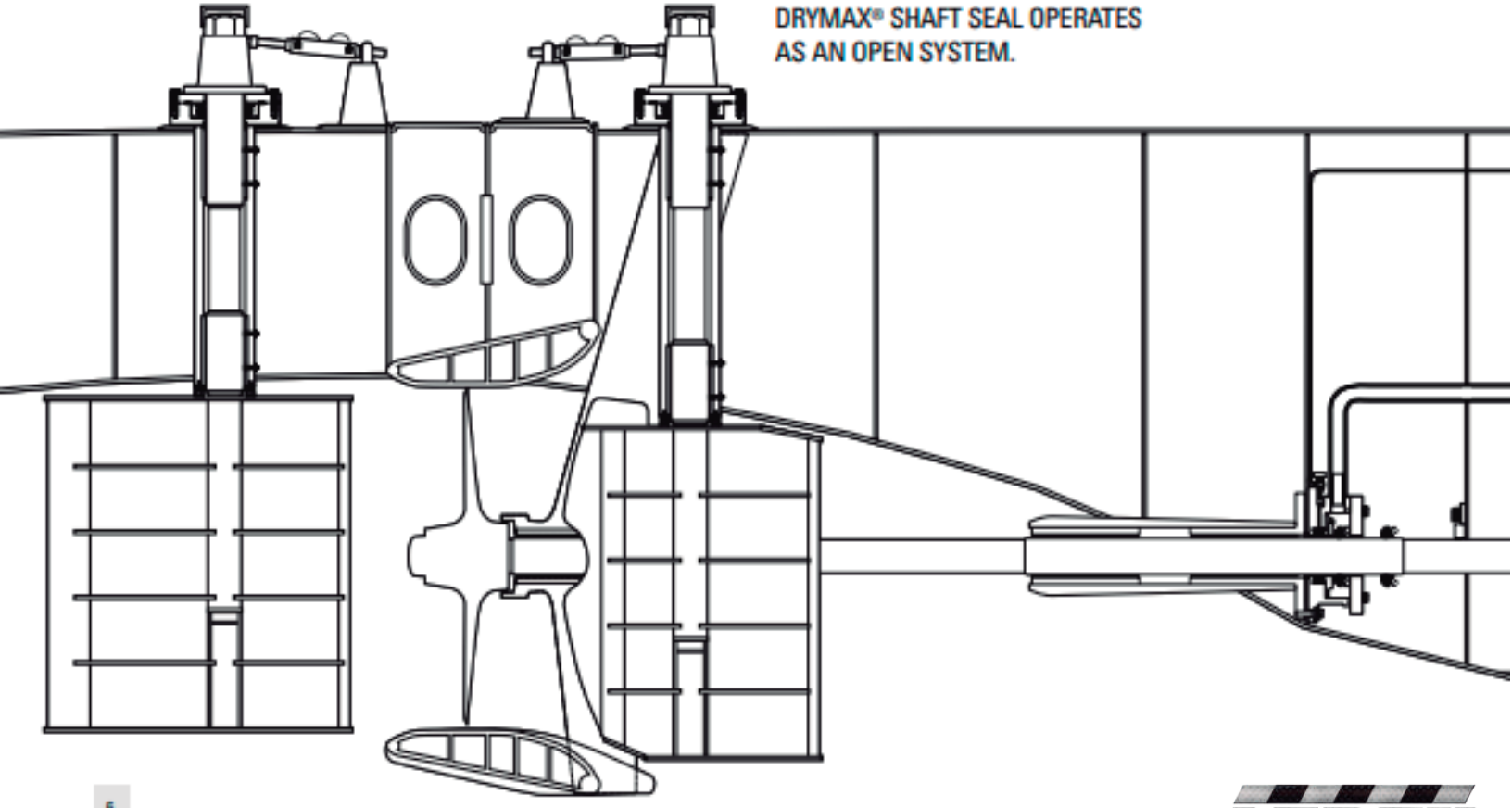
Engineered for easy seal ring change out.



The DryMax® primary sealing components can be renewed easily with the vessel at sea. With seawater restricted by the inflatable seal the split DuraChrome® Mating Ring can be removed and the old seal ring replaced with the spare seal. The split DuraChrome® Mating Ring is reversible and switching to the unused side extends service intervals.

Shaft Earthing Device for corrosion control.

The Duramax® DryMax® Shaft Seal System includes an earthing assembly to help prevent shaft corrosion. The assembly contains a replaceable carbon brush that is spring loaded and grounded to the ship's hull.



DRYMAX® SHAFT SEAL OPERATES AS AN OPEN SYSTEM.

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Global service and support network.

Unmatched technical support.

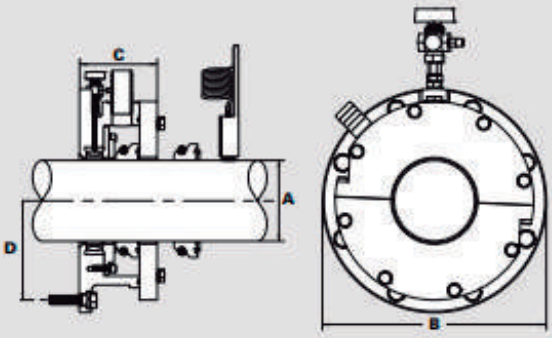
Duramax Marine® products are backed by a team of marine industry professionals that supply technical support before, during and after installation of your Duramax® DryMax® Seal System.

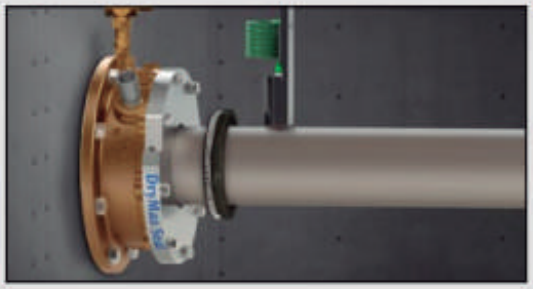
Our experts can assist you in converting your existing seal or stuffing box to fit our seal flange. **Once installed, if at any time you need technical help to solve a problem just contact our technical support group at +1 440-834-5400.**

Our worldwide distribution network puts our complete line of high quality marine products and spare parts within your reach to keep your vessel operating at peak performance.

Factory authorized installation and service.

Duramax Marine® has a global service network available for new installations and service on existing systems. Our service professionals can vulcanize new seal rings on the shaft while your vessel is at sea and can help you get the most from your DryMax® Sealing System. Contact Duramax Marine® for more information.





SEAL SPACE REQUIREMENTS

Model	A Shaft Size (in)	A Shaft Size (mm)	B Flange OD (in)	B Flange OD (mm)	C Length (in)	C Length (mm)	D BCD (in)	D BCD (mm)	Mounting Bolt (in)
400	3.5 - 4.49	89 - 114	11 1/8	283	4 1/2	115	9 7/8	250.8	1/2
500	4.5 - 5.49	115 - 139	12 1/8	308	4 1/2	115	10 7/8	276.2	1/2
600	5.5 - 6.49	140 - 165	13 1/8	334	4 1/2	115	11 7/8	301.6	1/2
700	6.5 - 7.49	166 - 190	14 1/8	359	4 1/2	115	12 7/8	327.0	1/2
800	7.5 - 8.49	191 - 215	15 1/8	385	4 1/2	115	13 7/8	352.4	1/2
900	8.5 - 9.49	216 - 241	16 3/8	416	5	127	15	381.0	5/8
1000	9.5 - 10.49	242 - 266	17 3/8	442	5	127	16	406.4	5/8
1100	10.5 - 11.49	267 - 292	18 3/8	467	5	127	17	431.8	5/8
1200	11.5 - 12.49	293 - 317	19 3/8	493	5	127	18	457.2	5/8
1300	12.5 - 13.49	318 - 342	20 3/8	518	5	127	19	482.6	5/8
1400	13.5 - 14.49	343 - 368	21 3/8	543	5	127	20	508.0	5/8
1500	14.5 - 15.49	369 - 393	22 5/8	575	5 1/8	131	21 1/8	536.6	3/4
1600	15.5 - 16.49	394 - 419	23 5/8	601	5 1/8	131	22 1/8	562.0	3/4
1700	16.5 - 17.49	420 - 444	24 5/8	626	5 1/8	131	23 1/8	587.4	3/4
1800	17.5 - 18.49	445 - 469	25 5/8	651	5 1/8	131	24 1/8	612.8	3/4
1900	18.5 - 19.49	470 - 495	26 5/8	677	5 1/8	131	25 1/8	638.2	3/4
2000	19.5 - 20.49	496 - 520	27 5/8	702	5 1/8	131	26 1/8	663.6	3/4
2100	20.5 - 21.49	521 - 546	28 7/8	734	5 1/8	131	27 1/4	692.2	7/8
2200	21.5 - 22.49	547 - 571	29 7/8	759	5 1/8	131	28 1/4	717.6	7/8
2300	22.5 - 23.49	572 - 596	30 7/8	785	5 1/8	131	29 1/4	743.0	7/8
2400	23.5 - 24.49	597 - 622	31 7/8	810	5 1/8	131	30 1/4	768.4	7/8
2500	24.5 - 25.49	623 - 647	32 7/8	836	5 1/8	131	31 1/4	793.8	7/8
2600	25.5 - 26.49	648 - 673	33 7/8	861	5 1/8	131	32 1/4	819.2	7/8
2700	26.5 - 27.49	674 - 698	35 1/8	893	5 1/8	131	33 3/8	847.7	1
2800	27.5 - 28.49	699 - 723	36 1/8	918	5 1/8	131	34 3/8	873.1	1
2900	28.5 - 29.49	724 - 749	37 1/8	943	5 1/8	131	35 3/8	898.5	1
3000	29.5 - 30.49	750 - 774	38 1/8	969	5 1/8	131	36 3/8	923.9	1
3100	30.5 - 31.49	775 - 800	39 1/8	994	5 1/8	131	37 3/8	949.3	1
3200	31.5 - 32.49	801 - 825	40 1/8	1020	5 1/8	131	38 3/8	974.7	1
3300	32.5 - 33.49	826 - 850	41 5/8	1058	5 1/8	131	39 5/8	1006.5	1 1/4
3400	33.5 - 34.49	851 - 876	42 5/8	1083	5 1/8	131	40 5/8	1031.9	1 1/4
3500	34.5 - 35.49	877 - 901	43 5/8	1109	5 1/8	131	41 5/8	1057.3	1 1/4
3600	35.5 - 36.49	902 - 927	44 5/8	1134	5 1/8	131	42 5/8	1082.7	1 1/4

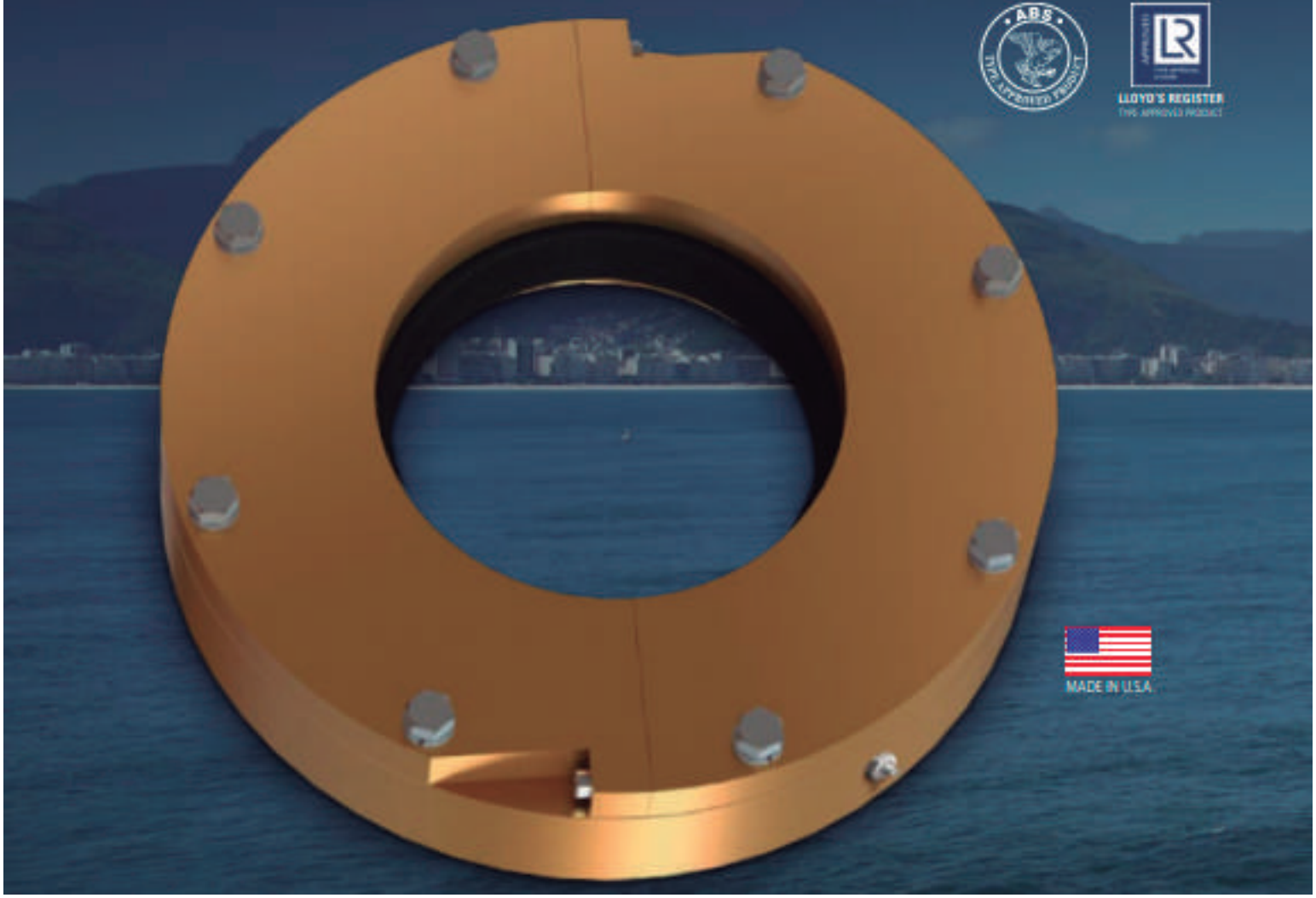
DryMax® Rudder Sealing System

- Environmentally Friendly
- Eliminates Rudder Stock Wear
- Robust Design

For rudder stocks from:
3.5" - 36" diameter (89-900mm)

DryMax® is a robust and reliable hydrodynamic rudder seal system constructed of the highest quality materials designed to deliver long service life. DryMax® Sealing System was engineered, tested and built by Duramax Marine in the USA.

This axial system provides excellent sealing and can accommodate large increases in radial clearances due to wearing down of rudder stock bushings. DryMax® Rudder Sealing System is installed above the DuraBlue® Rudder Bushing and controls seawater from entering the hull.



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Duramax Marine® technology is the difference.

Simple design with maintenance free operation.

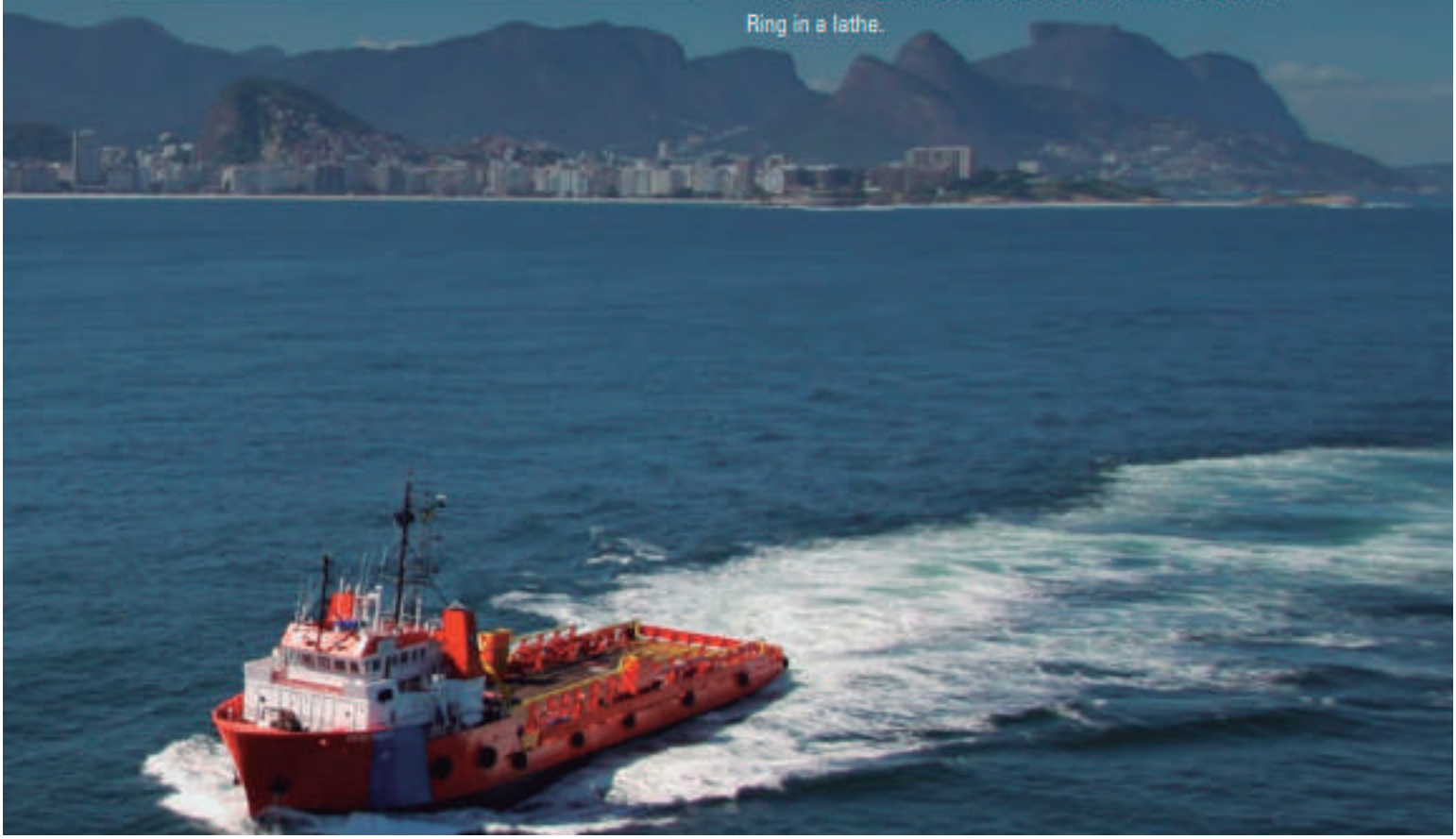
The DryMax® Sealing System has only 2 primary sealing parts; the proprietary nitrile rubber seal ring and our Bronze Mating Ring that never need adjustment. DryMax® has been engineered and tested for service in blue (clean) and brown (gritted) water. Our research and development team conducted experiments on our full scale test rig built to simulate the most difficult service conditions.

DRYMAX® RUDDER SEALING SYSTEM

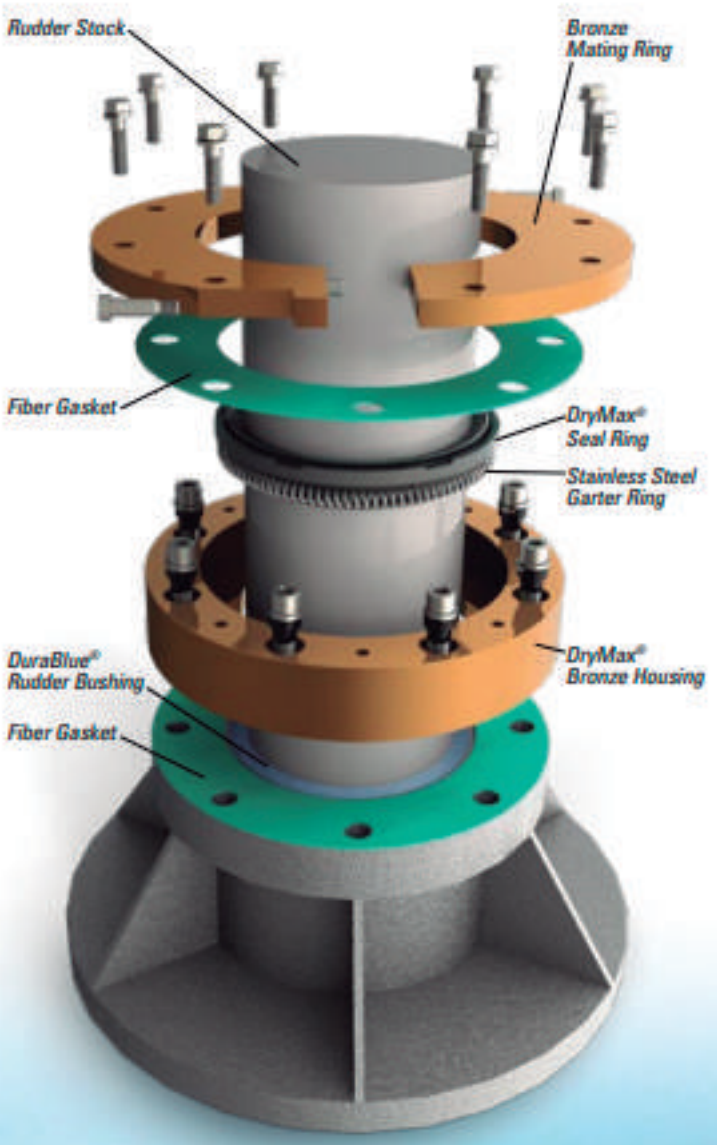
- Easy to use and install
- Eliminates rudder stock wear
- Environmentally friendly
- Maintenance free operation
- Can replace any existing seal
- Split, reversible Bronze Mating Ring
  - For easy seal change out
  - Extends dry dock intervals

DryMax® was designed for heavy duty service, low maintenance and long life.

The DryMax® housing is made of heavy duty, high grade cast bronze to resist corrosion and in many cases last the life of the vessel. The DryMax® Rubber Seal Ring is very durable and is easily replaced if necessary. The ring rotates with the rudder stock and creates a hydrodynamic sealing interface with the highly polished Bronze Mating Ring. The alloy used in the Bronze Mating Ring was designed to operate with our rubber seal ring in rudder stock sealing applications. The Bronze Mating Ring can be reversed and reused. When both sides of the Mating Ring are used, it can be restored by machining the Mating Ring in a lathe.



Simple design with maintenance free operation.

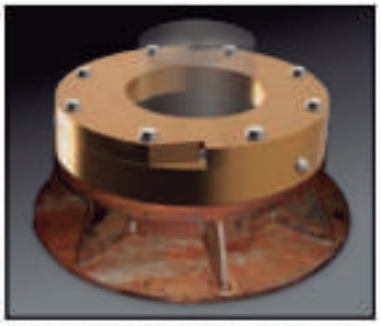


DryMax® Rudder Seal comes with Split Bronze Mating Ring as standard.

The Duramax® DryMax® Rudder Seal System comes standard with a reversible high grade cast Bronze Mating Ring. When the Mating Ring is worn, it can be reversed and reused.

After a period of time, once both sides of the Mating Ring is worn its face can be restored on a lathe, then reused with a new DryMax® Rubber Sealing Ring.

DryMax® Rudder Seal requires no adjustments.



There are no springs, bellows or clamp rings to engage the seal. Seawater draft pressure is used to keep the seal in place. Unlike traditional lip seal systems, there is no sliding contact with the rudder stock. Possibility of wear and grooving of rudder stock is eliminated.

DryMax® Rubber Sealing Ring is easy to replace.

The split design of the Mating Ring allows quick, easy change out of the nitrile rubber seal when it is required. Switching to the unused side of the Bronze Mating Ring extends service intervals.

Duramax Marine® expertise in the science of tribology makes the difference.

Duramax Marine® understands rubber technology and its hydrodynamic interaction with water-lubricated surfaces. This is the same proven technology used in our water-lubricated bearing technology used on almost every US Navy surface vessel and submarine today.

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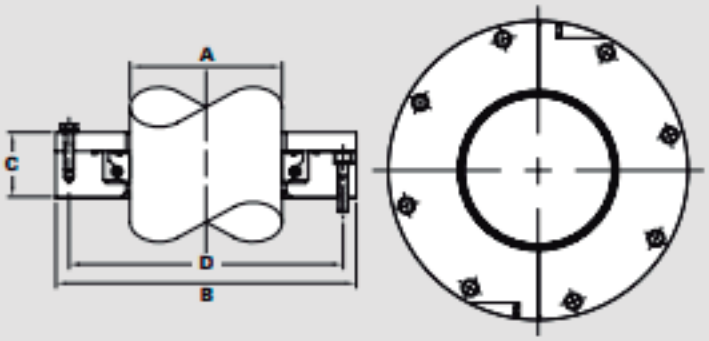
Global service and support network.

Unmatched technical support.

DryMax® Sealing Systems are backed by a team of marine industry professionals that supply technical support before, during and after installation. For technical help to solve a problem contact our technical support group at: **+1-440-834-5400.**

DryMax® is available for rudder stock diameters from 3.5" (89mm) to 36" (900mm). See chart below for additional measurments.



RUDDER SEAL SPACE REQUIREMENTS

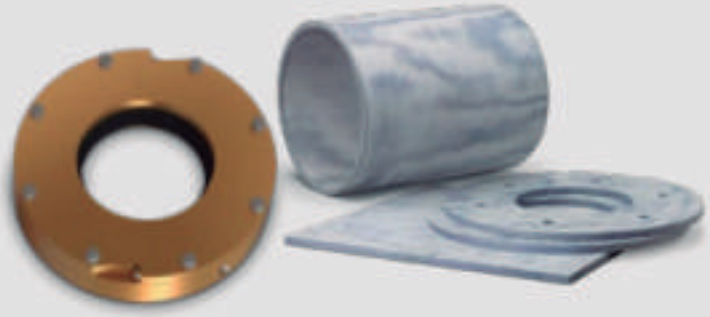
Model	A Rudder Stock Dia. (in)	A Rudder Stock Dia. (mm)	B DryMax® OD (in)	B DryMax® OD (mm)	C Length (in)	C Length (mm)	D BCD (in)	D BCD (mm)	Mounting Bolt (in)
400-R	3.5 - 4.49	89 - 114	9 1/4	235	2 3/4	70	7 7/8	200.0	1/2
500-R	4.5 - 5.49	115 - 139	10 1/4	260	2 3/4	70	8 7/8	225.4	1/2
600-R	5.5 - 6.49	140 - 165	11 1/4	286	2 3/4	70	9 7/8	250.8	1/2
700-R	6.5 - 7.49	166 - 190	12 1/4	311	2 3/4	70	10 7/8	276.2	1/2
800-R	7.5 - 8.49	191 - 215	13 1/4	337	2 3/4	70	11 7/8	301.6	1/2
900-R	8.5 - 9.49	216 - 241	14 1/2	368	3	75	13	330.2	5/8
1000-R	9.5 - 10.49	242 - 266	15 1/2	394	3	75	14	355.6	5/8
1100-R	10.5 - 11.49	267 - 292	16 1/2	419	3	75	15	381.0	5/8
1200-R	11.5 - 12.49	293 - 317	17 1/2	445	3	75	16	406.4	5/8
1300-R	12.5 - 13.49	318 - 342	18 1/2	470	3	75	17	431.8	5/8
1400-R	13.5 - 14.49	343 - 368	19 1/2	495	3	75	18	457.2	5/8
1500-R	14.5 - 15.49	369 - 393	20 3/4	527	3	75	19 1/8	485.8	3/4
1600-R	15.5 - 16.49	394 - 419	21 3/4	552	3	75	20 1/8	511.2	3/4
1700-R	16.5 - 17.49	420 - 444	22 3/4	578	3	75	21 1/8	536.6	3/4
1800-R	17.5 - 18.49	445 - 469	23 3/4	603	3	75	22 1/8	562.0	3/4
1900-R	18.5 - 19.49	470 - 495	24 3/4	629	3	75	23 1/8	587.4	3/4
2000-R	19.5 - 20.49	496 - 520	25 3/4	654	3	75	24 1/8	612.8	3/4
2100-R	20.5 - 21.49	521 - 546	27	686	3	75	25 1/4	641.4	7/8
2200-R	21.5 - 22.49	547 - 571	28	711	3	75	26 1/4	666.8	7/8
2300-R	22.5 - 23.49	572 - 596	29	737	3	75	27 1/4	692.2	7/8
2400-R	23.5 - 24.49	597 - 622	30	762	3	75	28 1/4	717.6	7/8
2500-R	24.5 - 25.49	623 - 647	31	787	3	75	29 1/4	743.0	7/8
2600-R	25.5 - 26.49	648 - 673	32	813	3	75	30 1/4	768.4	7/8
2700-R	26.5 - 27.49	674 - 698	33 1/4	845	3	75	31 3/8	796.9	1
2800-R	27.5 - 28.49	699 - 723	34 1/4	870	3	75	32 3/8	822.3	1
2900-R	28.5 - 29.49	724 - 749	35 1/4	895	3	75	33 3/8	847.7	1
3000-R	29.5 - 30.49	750 - 774	36 1/4	921	3	75	34 3/8	873.1	1
3100-R	30.5 - 31.49	775 - 800	37 1/4	946	3	75	35 3/8	898.5	1
3200-R	31.5 - 32.49	801 - 825	38 1/4	972	3	75	36 3/8	923.9	1
3300-R	32.5 - 33.49	826 - 850	39 3/4	1010	3	75	37 5/8	955.7	1 1/4
3400-R	33.5 - 34.49	851 - 876	40 3/4	1035	3	75	38 5/8	981.1	1 1/4
3500-R	34.5 - 35.49	877 - 901	41 3/4	1060	3	75	39 5/8	1006.5	1 1/4
3600-R	35.5 - 36.49	902 - 927	42 3/4	1086	3	75	40 5/8	1031.9	1 1/4

Complete your rudder system with Durablue® Composite Rudder Bushings, Thrust Washers, and Wear Pads.

DuraBlue® needs no lubrication.

Duramax Marine® is the leader in water-lubricated bearing technology that offers dimensionally stable rudder bushings and thrust washers. DuraBlue® Bushings are designed to be used with the DryMax® Rudder Sealing System.

DuraBlue® is dimensionally stable, extremely wear resistant and delivers extremely long wear life. DuraBlue® composite material has a low coefficient of friction value of 0.09 to 0.11 and a low thermal expansion rate in high & low temperature environments.



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