PYI INC.

QUALITY MARINE
EQUIPMENT SINCE 1981

PACKLESS SEALING SYSTEM
SHAFT SEAL

www.shaftseal.com

APPLICATIONS

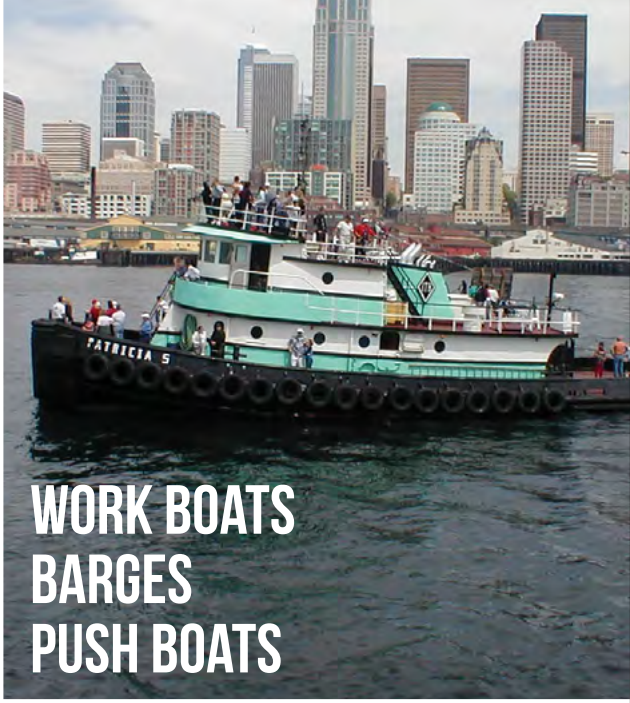


TABLE OF CONTENTS

OVERVIEW

Never repack a stuffing box or replace a lip seal again with the **PSS Shaft Seal**

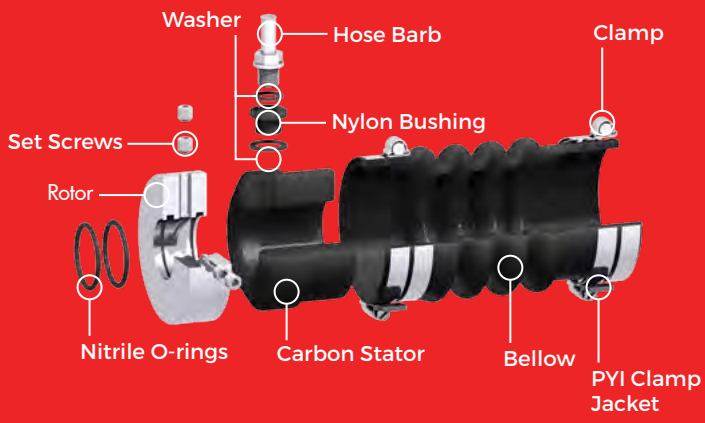
CERTIFICATIONS

The PSS Shaft Seal is Bureau Veritas, ABS & RINA certified.

The Packless Sealing System (PSS) Shaft Seal is a mechanical face seal that is created between a rotating stainless steel rotor and a stationary carbon stator. The carbon stator is attached to a convoluted rubber bellow and the back of the bellow is attached to the shaft log (stern-tube) of the boat with hose clamps. During installation, the stainless steel rotor is used to compress the convoluted bellow. The rotor is then secured to the shaft. The compression of the bellow allows the seal faces to remain in constant contact and compensate for the fore-and-aft movement of the shaft caused by the propellers thrust pushing on the engine mounts. The carbon stator is bored larger than the shaft diameter, allowing it to "float" around the shaft and compensate for most misalignment and vibration problems. The stainless steel rotor is sealed to the shaft with o-rings. These o-rings rotate with the shaft and rotor and do not experience any wear during operation. This static o-ring seal enables the PSS Shaft Seal to be fit on shafts that have some wear or pitting, unlike lip seal designs which require a clean area for the lip seal to ride on. This type of carbon face seal is not as sensitive to interruption of water flow or operation in silty water, when compared to other sealing options.

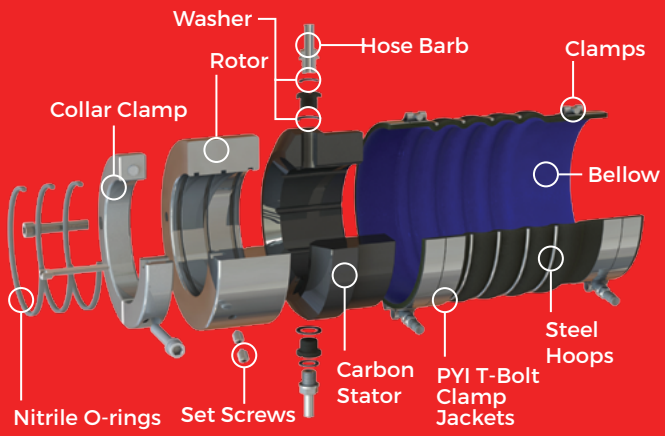
TYPE A

For shafts ¾" - 3¾"



TYPE B

For shafts 4" - 6"

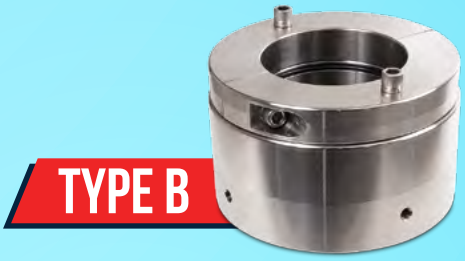


COMPONENTS | Main components of a PSS Shaft Seal

CARBON / GRAPHITE STATOR

The high density, resin impregnated carbon/graphite stator is a space age composite that is first mixed, molded and then formed under pressure. The blanks are then baked, machined and lapped. The face of our carbon is finished to a flatness of 4 helium light bands (measured .000044" of variation over entire lapped surface). The grade of carbon used in the PSS has an operating temperature over 500 degrees Fahrenheit (+260 Celsius), and cannot melt if the seal runs dry, unlike a rubber lip seal or plastic face seal. The high density of the carbon greatly increases the longevity and wear resistance. Several commercial vessels have recorded over 40,000 (over 4 ½ years of continuous operation) engine hours on the same, original components. The carbon should not need to be replaced under normal operating conditions.

STAINLESS STEEL ROTOR



The Type A stainless steel rotor (316L) is slid down the shaft and is secured to the shaft with set screws at 90 degrees for maximum holding power. The Type B rotor is made from Nitronic 50, and has a clamp assembly in front of it. Precision tolerances are maintained by computer controlled lathes. The faces have a number 9 micro finish and are perpendicular to the bore to prevent run-out as the collar rotates. The carbon will polish the face of the rotor during the first few minutes of operation. The rotor should not need to be replaced under normal operating conditions.

BELLOW

There are two different bellows, one for the Type A Seal and one for the Type B Seal. The Type A Seal is made from rubber (Nitrile), and has a temperature rating of -25 degrees to +225 degrees Fahrenheit (-31 to +107 Celsius). Nitrile is known for its good resistance to weathering. The Type B Seal bellow is constructed of five ply aramid/silicone with a flurosilicone outer. Both ends of the bellow are sealed. The five ply cloth inlay provides excellent strength and resistance to abrasion. The strength of the bellow is greatly increased by fitting stainless steel hoops in the convolutions of the bellow. This bellow has a continuous operating temperature range of -90 to +425 degrees Fahrenheit (-70 to +220 Celsius). These bellows provide the best combination of durability, strength and elasticity.

TYPE A SEAL

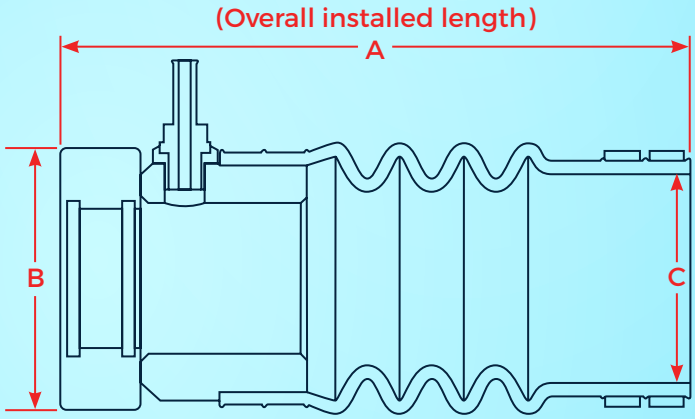
For shafts
¾" to 3¾" (20mm - 95mm) diameters

BEFORE ORDERING

1. Measure your shaft diameter.
2. Measure your stern tube diameter.
3. Check fore and aft measurements.

TIP

In difficult access areas, wrap a string around the stern tube, measure the circumference and divide by Pi (3.1416).



IMPERIAL SIZES

SHAFT DIAMETER	STERN TUBE DIAMETER (C)	APPROX. COMPRESSED LENGTH (A)	B
¾", ⅞", 1", 1⅛"	1¼", 1½", 1¾", 2", 2¼"	6.00" - 6.125"	2.375"
	2½"	6.625"	2.375"
1¼", 1⅜"	1¾", 2", 2¼", 2½"	6.625" - 6.75"	2.875"
	2¾", 3", 3¼", 3½"	8.125" - 8.313"	2.875"
1½", 9⁄16", 1¾", 2"	2", 2¼", 2½", 2¾", 3", 3¼", 3½"	8.00" - 8.218"	3.75"
	3¾", 4"	8.405"	3.75"
2¼", 2½"	3¼", 3½", 3¾", 4"	8.625"	4.20"
	4¼", 4½", 4¾", 5"	9.25"	4.20"
2¾", 3"	4", 4¼", 4½", 4¾", 5"	9.125" - 9.313"	5.00"
	5¼", 5½", 5¾", 6"	9.25" - 9.438"	5.00"
3¼", 3½", 3⅜", 3¾"	4½", 4¾", 5", 5¼", 5½", 5¾", 6"	9.675" - 9.863	6.00"

METRIC SIZES (MM)

SHAFT DIAMETER	C (STERN TUBE DIAMETER)	APPROX. COMPRESSED LENGTH (A)	B
20, 22, 25, 28, 30	30, 40, 45, 50, 60	152mm - 156mm	61
	65	168mm	61
32, 35	45, 50, 60, 65	168mm - 172mm	73
	70, 80, 85, 90	206mm - 211mm	73
38, 40, 45, 50, 55	50, 60, 65, 70, 75, 80, 85, 90	203mm - 209mm	96
	95, 100	213mm	96
60, 65	85, 90, 95, 100	219mm - 224mm	107
	110, 115, 120, 125	235mm	107
70, 75, 80	100, 110, 115, 120, 125	231mm - 237mm	127
	135, 140, 145, 150	235mm - 240mm	127
85, 90, 95	115, 120, 125, 130, 135, 140, 145, 150	245mm - 250mm	153

TYPE B SEAL

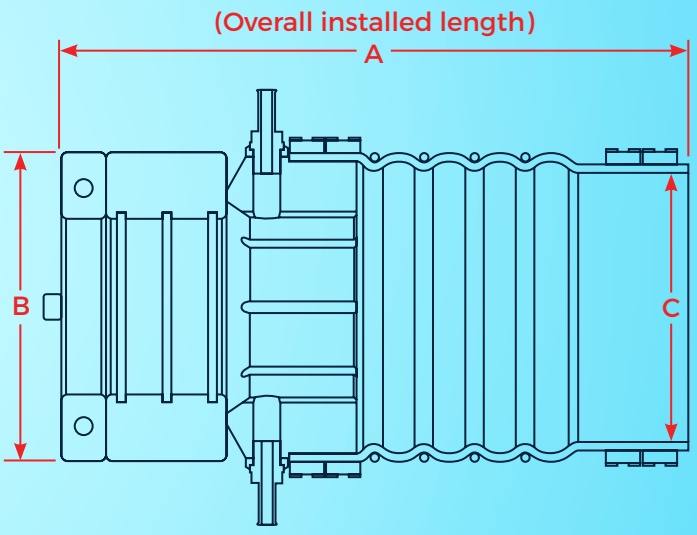
For shafts
4" to 6" (100mm - 150mm) diameters

BEFORE ORDERING

1. Measure your shaft diameter.
2. Measure your stern tube diameter.
3. Check fore and aft measurements.

TIP

In difficult access areas, wrap a string around the stern tube, measure the circumference and divide by Pi (3.1416).



IMPERIAL SIZES

SHAFT DIAMETER	STERN TUBE DIAMETER (C)	APPROX. COMPRESSED LENGTH (A)	B
4", 4¼"	5½", 5¾", 6", 6¼", 6½", 6¾", 7"	12.189"	7.00"
4½"	5½", 5¾", 6", 6¼", 6½", 6¾", 7"	12.189"	7.875"
4¾", 5", 5½"	6½", 6¾", 7", 7¼", 7½", 7¾", 8", 8⅝"	12.420" - 12.742"	7.875"
6"	6½", 6¾", 7", 7¼", 7½", 7¾", 8", 8⅝"	12.920" - 13.250"	8.875"

METRIC SIZES (MM)

SHAFT DIAMETER	STERN TUBE DIAMETER (C)	APPROX. COMPRESSED LENGTH (A)	B
100, 105, 110	140, 145, 150, 160, 165, 170, 180	310mm	178
115	140, 145, 150, 160, 165, 170, 180	310mm	201
120, 130, 140	165, 170, 180, 185, 190, 195, 205, 220	315mm - 324mm	201
150	165, 170, 180, 185, 190, 195, 205, 220	328mm - 337mm	226

DETERMINE YOUR PSS SHAFT SEAL PART

Imperial Sizes

Shaft diameter: ¾"
Stern Tube diameter: 1½"
02-____-____

02-034-112
Shaft diameter
Stern Tube diameter

Metric Sizes

Shaft diameter: 115mm
Stern Tube diameter: 140mm
02-____M-____

Divide by 25.4 to convert to inches.
(Round up or down to the closest ¼")

example: 140 ÷ 25.4 = 5.511 = 5½

02-115M-512
Shaft diameter
Stern Tube diameter

ACCESSORIES

For All
PSS Shaft Seal Kits

MAINTENANCE KIT

Prolong the life of your PSS Shaft Seal with a maintenance kit.

As with any rubber hose below waterline, the PSS bellows must be inspected on a regular basis for any sign of wear, aging or chemical deterioration. PYI recommends that the bellows be replaced every 6 years. Bellows may need to be more frequently inspected in an environment where non-sealed batteries emit sulfuric acid. Sulfuric acid vapor will accelerate rubber deterioration, as will an ozonator. This is a cost effective way to expand the life of your PSS Shaft Seal.

INCLUDES

- Bellow
- Set screws
- O-rings
- Stainless steel hose clamps
- Clamp Jackets
  (Hose clamp tail covers)
- Medium strength thread lock
- Wrench
- Instructions

SHAFT RETENTION COLLAR

The Shaft Retention Collar (SRC) is designed to protect propeller and rudder shafts. Assists in keeping the shaft and rudder in the boat in the event of a coupling failure. Due to its simple design the SRC is very easy to install with the shaft or rudder in place. Available in sizes to fit shafts from 1" to 3" or 25 to 80mm.

T-KIT

PYI offers T-Kits to help facilitate the installation of the PSS Shaft Seal. These T-Kits enable the installer to tee into the raw water discharge hose and plumb water to the hose barb fitting of the PSS Shaft Seal. Some examples of water pick-up points are: between the heat exchanger and riser, between oil cooler and heat exchanger and between the water pump and oil cooler.

INCLUDES:

- T-fitting
- 6" of ⅜" hose
- Hose clamps

BEFORE ORDERING

Measure the inside diameter of the cooling hose which you intend to tee off from before ordering.

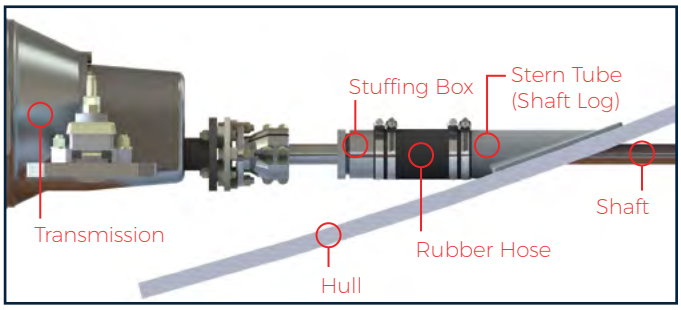
INSIDE HOSE ∅	T-KIT PART #
½"	07-KIT-012
¾"	07-KIT-034
1"	07-KIT-100
1¼"	07-KIT-114
1½"	07-KIT-112

Correct T-Kit installation

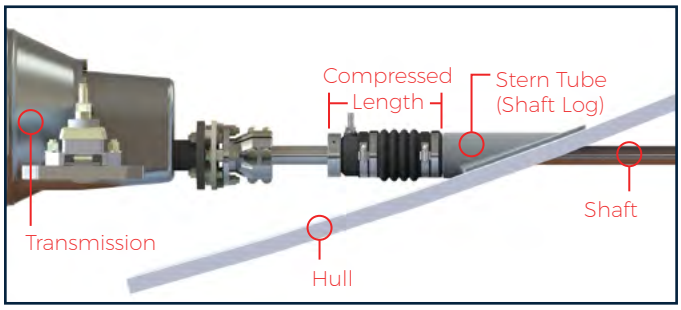
INSTALLATION EXAMPLES

REPLACEMENT OF CLASSIC STUFFING BOX

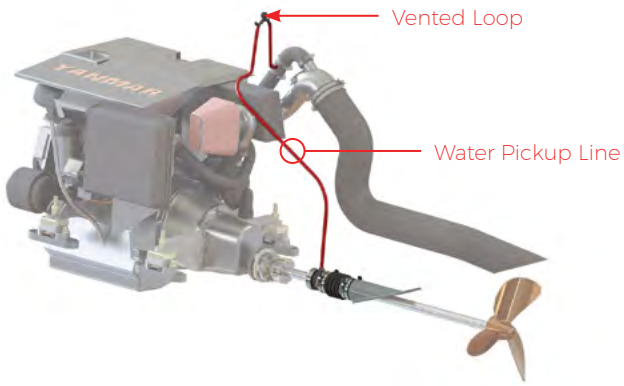
CLASSIC STUFFING BOX... BEFORE

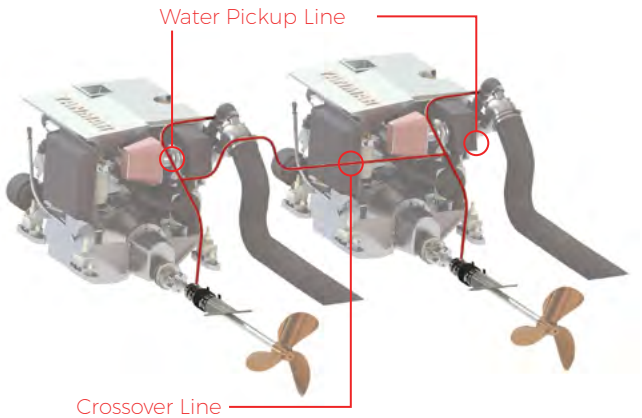


PSS SHAFT SEAL... AFTER



EXAMPLE OF POWERBOAT INSTALLATION

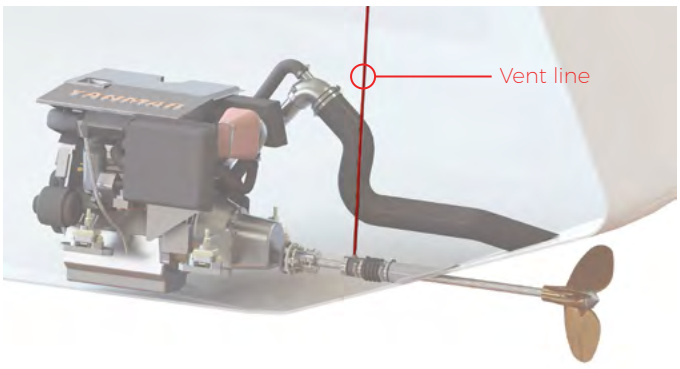




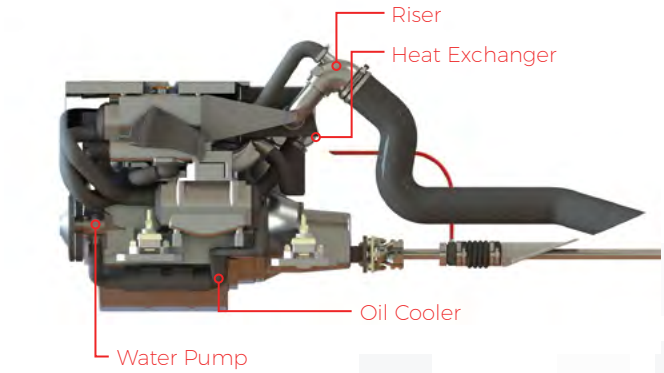
CAUTION!

When the pick up point is located below the waterline an anti-siphon might be required to prevent back-flooding of water through the exhaust system and into the engine. Standard boat plumbing practices should be followed.

SAILBOAT INSTALLATION



POWERBOAT INSTALLATION



1. Tee into line after heat exchanges.
2. Tee into line after oil cooler.
3. Tee into line after water pump.
4. Hose barb into heat exchanger or oil cooler.

OTHER APPLICATIONS

Other Applications For The PSS Shaft Seal

MIXING TANKS

The PSS Shaft Seal has made its way in the multitude of specialty mixing tanks. All mixing tanks equipped with a horizontal mixer require a seal, and the PSS Shaft Seal has proven itself as an ideal solution for this industry. Some examples of the types of mixing tanks you will find the PSS Shaft Seal in are mixing tanks for glue, pharmaceutical, food industry, paper pulp mill, etc. Another application is the wash down tanks for fruits and vegetables.

CURRENT POOLS

In the last few years this new industry has been using the PSS Shaft Seal in order to seal the propeller shaft of their current pools. The PSS Shaft Seal can be found in training rowing tanks, swimming current pools and hydrotherapy tubs. These sports training pools (rowing for example) are eliminating their leakage problem by using the PSS Shaft Seal.

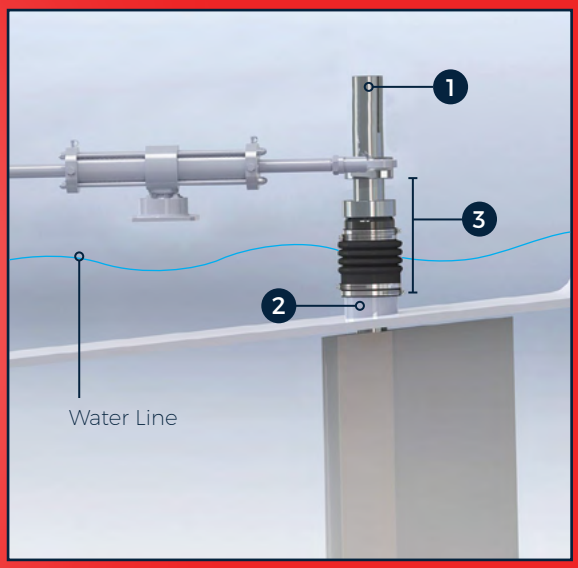
INDUSTRIAL PUMPS

The ability of the PSS Shaft Seal to function in a dirty/silty environment, as well as its big tolerance for radial movement, makes it an ideal solution for the irrigation and mining industry.

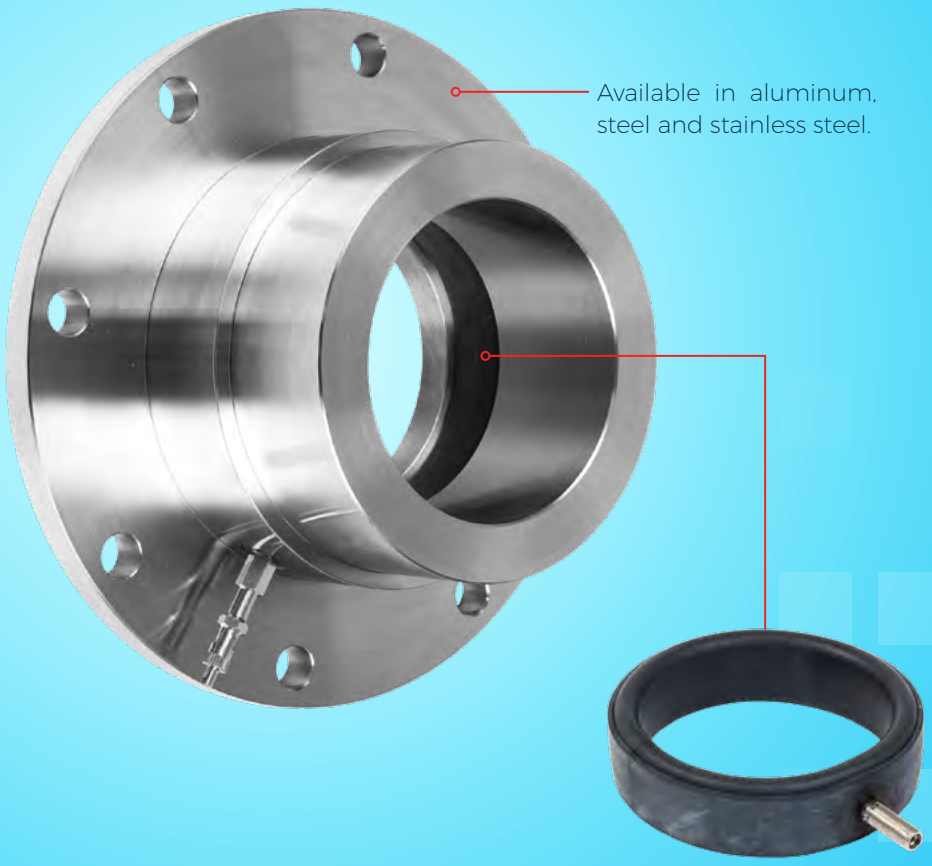
RUDDER SEALS

WHY PSS FOR RUDDER SEALS?

- Ultimate reliability for rudder seals
- Available from ¾" - 6" (20mm - 150mm)
- Service parts available from stock

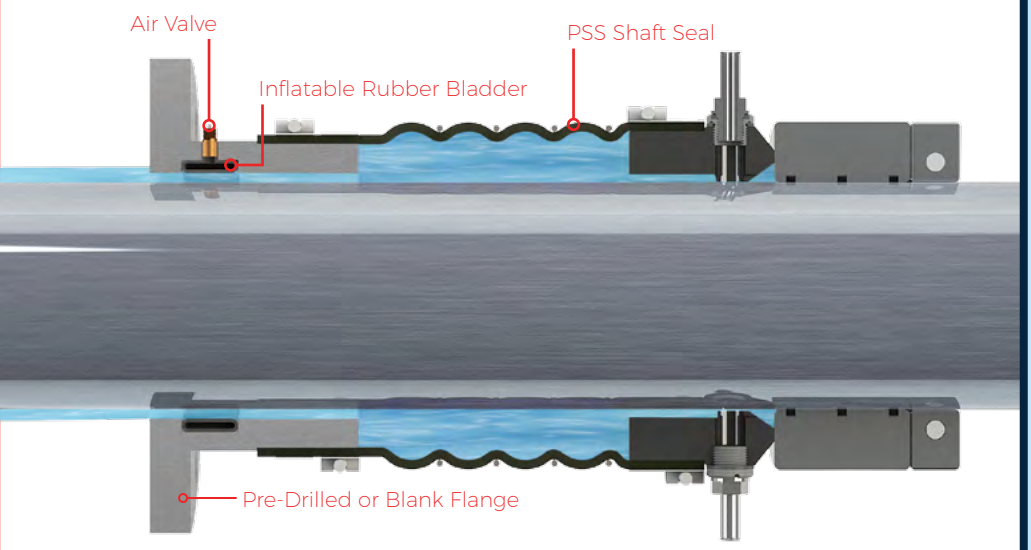


FLANGE & BLADDER SYSTEM

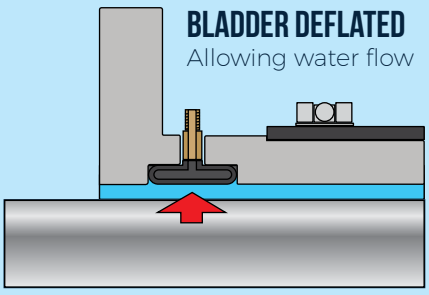


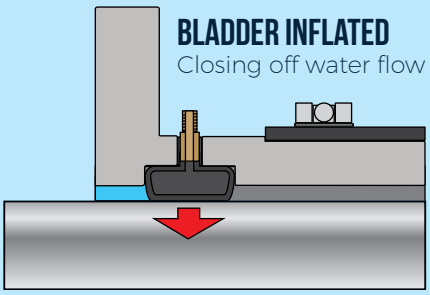
PYI Inc., manufacturer of the PSS Shaft Seal, is expanding the PSS product line with the recent development of a 'Flange & Bladder System'. This system allows you to seal the stern tube while the shaft is not rotating, in order to inspect, clean or replace components of the shaft seal. Another advantage is that if decoupling of the shaft is needed, this operation can be done in the water as the shaft can be moved aft, while the bladder is inflated, with no water intrusion. Of course, the inflatable bladder system can also be used in case of an emergency.

CROSS SECTION OF FLANGE & BLADDER SYSTEM



HOW IT WORKS!





071816

DISTRIBUTORS

WWW.SHAFTSEAL.COM

HEADQUARTERS
12532 Beverly Park Road
Lynnwood, WA 98087
(425) 355-3669
info@pyiinc.com
www.pyiinc.com

EUROPEAN OFFICE
ZI du Capitou, 85 rue Louis Lepine
83600 Frejus - France
+33 4 94 5327 70
info@seaviewprogress.com
www.seaviewprogress.com

Get social with us!