PSS Type “A” Shaft Seal Features & Components

1) Two nitrile O-rings seal the stainless steel rotor to the shaft and do not experience any wear.
2) A primary set screw and a backup set screw (2 sets) are used to secure the stainless steel rotor to the shaft.
3) A seal is created between the two flat surfaces of the carbon stator and the stainless steel rotor.
4) Water is fed into the PSS Shaft Seal for cooling/lubricating the seal faces on high speed vessels.
5) The stationary carbon stator is attached to the nitrile bellow, which is attached to the stern tube (shaft log).

Shaft Seal Components

Rotor

The rotor is manufactured out of 316L stainless steel and machined to a 9Ra finish on precision CNC lathes. It is secured on the shaft using 2 pairs of set screws positioned at 90 degrees angle for

maximum holding power. The carbon stator further polishes the rotor during the initial hours of operation. This rotor will not need replacement or maintenance under normal operating conditions.

Carbon Stator

The high density, resin-impregnated carbon stator is manufactured from a space age composite which is first mixed and molded, then formed under pressure. The stator is then baked, machined, and lapped to a measured flatness of 4 helium light bands (measured at 0.000044" of variation over its entire lapped surface).
The grade of carbon composite used in the PSS Shaft Seal has a maximum operating temperature of 500°F (+260°C) and cannot melt if the seal runs dry for a short period of time – unlike a lip seal or a 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 4-1/2 years of continuous operation) engine hours on the same, original components. The carbon should not need to be replaced under normal operating conditions.

Bellow

The bellow on the Type A seal is molded out of a nitrile compound. Nitrile is known for its good resistance to petroleum products. It provides the best combination of durability, strength and elasticity necessary in this application.

Hose Barb

For high speed vessels (12+ knots), a positive water supply is required to be plumbed to the PSS Shaft Seal for the purpose of lubricating and cooling the seal faces. Please review the PSS Shaft Seal Installation Instructions for more information on pickup points for water supply. In most cases, a slow speed boat (less than 12 knots) that does not have a bearing in the shaft log does not require positive water feed and can simply be vented overboard. Ideally, the vent line will be run at least 2-3 feet above the water line and will be as close to the center line as possible. This will ensure the vent hose is never below the water line, even with significant heeling. The PSS Shaft Seal Installation Instructions have more details on venting the seal.

Additional Important Information

PSS Type A Maintenance Kit

To ensure longevity and proper function of the PSS Type A Shaft Seal, PYI provides a PSS Maintenance Kit to follow the PYI's recommended maintenance schedule. As with any rubber hose below waterline, the PSS bellow must be inspected on a regular basis for any sign of wear, aging or chemical deterioration. PYI recommends that the bellow be replaced once every 6 years. During the bellow replacement it is also recommended that the o-rings & set screws in the stainless steel rotor are replaced, as well as the hose clamps. PYI includes all of the necessary replacement parts in the PSS Maintenance Kit.

Set Screws

You should never use the same set screw on the shaft twice. There are two set screws in each of the two holes in the stainless steel rotor. One is tightened onto the shaft and the other is tightened onto the first to lock it in place against the shaft. The set screws are made **with a cup at the tip that deforms** onto the shaft to ensure a secure grip. When re-installing the rotor you should use new set screws.

In the unfortunate case that you do not have spare set screws, the stacked set screws in the rotor should be reversed so there is an unused cup being compressed onto the shaft.

If you need new set screws, you can purchase a PSS O-Ring Kit. This comes with 2 new O-rings, 5 set screws, an Allen wrench, Clamp Jackets, and Thread Locker.