

Lip Seals

Installation & Replacement

For:

SureSeal™
Shaft Seal System



See Page 3

STRONG™ Seal™
Shaft Seal System (Sold Prior to 2000)



See Page 9

**Spare Seal
Carrier Kits**



See Page 15

**Rudder
Port/Bearings**



See Page 17

User Manual

*For additional information
Or assistance contact:*

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Before You Begin

If there is a Spare Seal Carrier clamped to the propeller shaft directly in front of the shaft seal (see photos below) and it contains a replacement lip seal inside, it may be possible to replace the lip seal while the vessel is in the water.

In-water replacement is possible only if there is unobstructed access to the front of the seal housing.

During in-water replacement, some water will enter the bilge. Be sure bilge pumps are working.

Read instructions that follow before beginning work.

IF THERE IS NO SPARE SEAL CARRIER, (OR THERE IS LIMITED ROOM TO WORK), THE VESSEL WILL HAVE TO BE HAULED.

When hauled, the shaft seal may be removed from the vessel. Lip seal replacement can then be done at a workbench.

Note*

Rudder lip seal replacement is best performed when the vessel is out of the water.

This work is simplified when the rudder stock is lowered completely before beginning work.



*Spare Seal Carrier installed in front of a **Strong Seal***



***SureSeal** unit with a Spare Seal Carrier which has been opened to show replacement seal.*



*Spare Seal Carrier installed above a **Type C Rudder Port/Bearing** with Seal.*

SureSeal™ Shaft Seal System

SureSeal™ Components

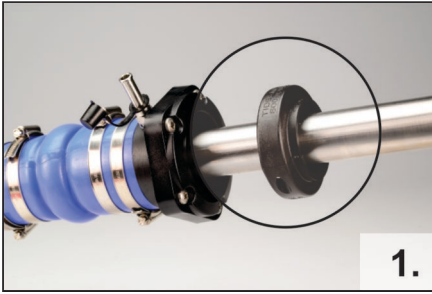
Before beginning the installation or replacement of a lip seal for a SureSeal unit, familiarize yourself with the various components of the system.



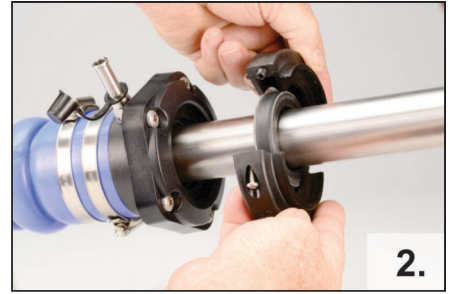
Note*

There are two styles of SureSeals which are sold. Units are either molded with a pentagonal face cap or machined with a circular one. The process for installation or replacement of the lip seal is the same for both styles.

In-Water Lip Seal Replacement for SureSeal™ Using Spare Seal Carrier



Inspect the surface both behind and in front of the Spare Seal Carrier. If there are any nicks or burrs which might damage the seal during replacement, polish this area with 280-320 grit wet/dry sandpaper or emery cloth, working around the shaft - NOT fore and aft.



Remove any sanding dust/debris with a clean cloth. Remove the 2 screws which secure the Spare Seal Carrier to the shaft using a Phillips-head screwdriver or Allen Wrench. Separate the two housing halves and remove from the shaft.



Remove the screws from the face cap of the SureSeal housing and set aside nearby. They may be either Philips-head or Allen-head screws.



Separate the front cap from the housing body.



If the plastic split washer is retained in the cap, push it back towards the housing until it snaps out and is free of the cap.



Pass the face cap over the new lip seal.



7.

Separate the ends of the split washer and remove from the shaft.



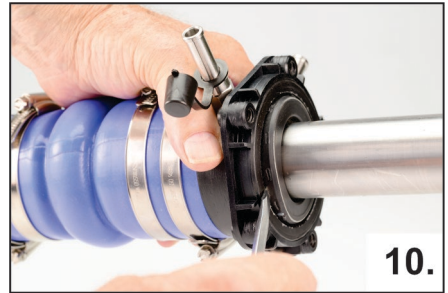
8.

Reinstall the split washer onto the shaft on the other side of the spare lip seal.



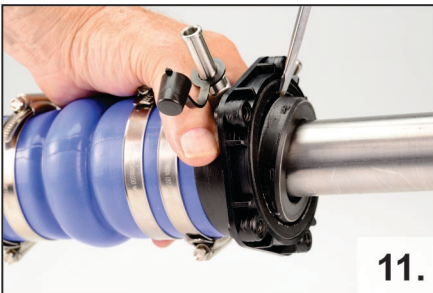
9.

Reinstall the split washer into its recess in the cap where it was before. Press the washer firmly all around the perimeter to be sure it is fully seated. It should be flush with the circular rib.



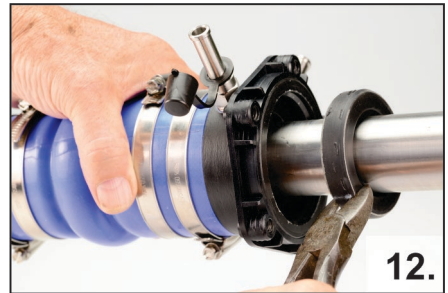
10.

Using a flat-bladed screwdriver, gently pry out the old lip seal from the SureSeal housing. For more working room, slide the replacement seal and face cap away from the SureSeal a few inches.



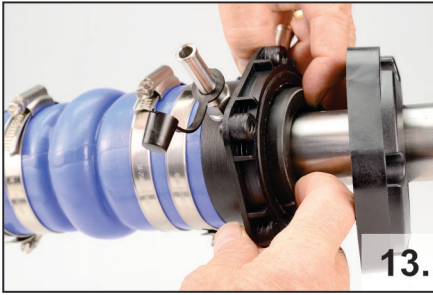
11.

Work around the seal in several places moving it a little bit in each spot. **BE PREPARED TO WORK QUICKLY.** As the lip seal is removed from the housing, water will begin to flow into the bilge.

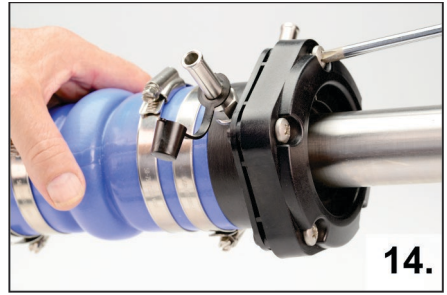


12.

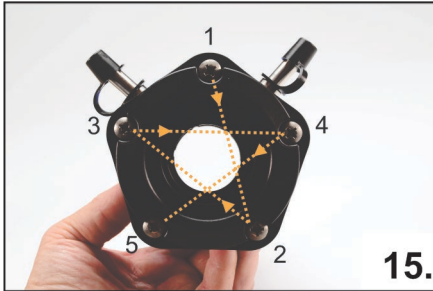
When the lip seal is completely out of the housing, use diagonal cutters to cut it off the shaft.



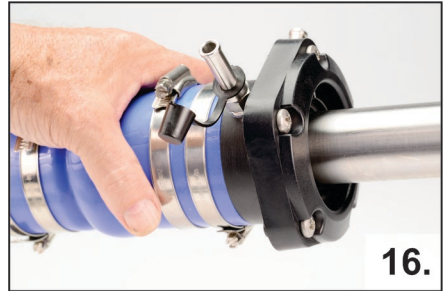
Slide the replacement lip seal into the opening as far as it will go. Most of the seal should still be exposed. This will slow the water entering the bilge.



Slide the front cap and split washer assembly down the shaft and align the holes in the cap with those in the housing collar. Quickly start the screws in each hole.



Begin hand tightening each screw 2 to 3 turns in an alternating pattern as shown. This will begin to drive the lip seal into the housing stopping the flow of water.



Continue tightening the screws to finish driving the seal into the housing. The seal is properly seated when the cap and housing are touching.



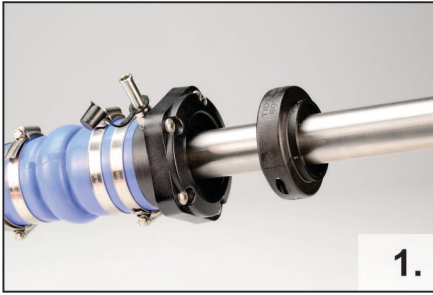
Reinstall the spare seal carrier housing in front of the SureSeal unit maintaining a minimum of 1" clearance between the two.

THE LONG SHOULDER ON THE CARRIER SHOULD BE FACING AWAY FROM THE SURESEAL UNIT.

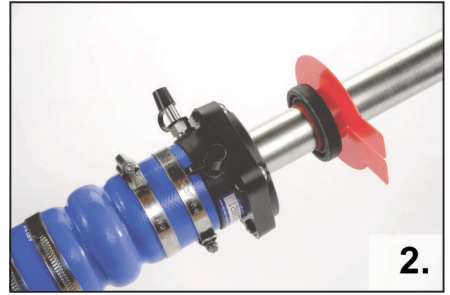
When the vessel is once again out of the water, install a new replacement lip seal inside the Spare Seal Carrier housing.

18.

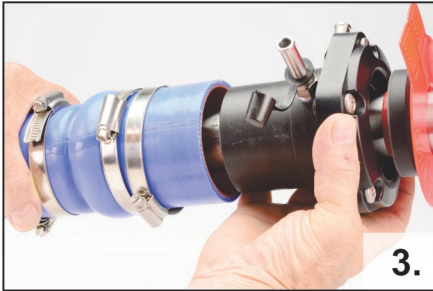
Out-Of-Water Lip Seal Replacement For SureSeal™ Shaft Seal



Disconnect the propeller shaft from the coupling. Slide the shaft away from the coupling so there is space to remove the SureSeal housing and any Spare Seal Carriers.



If the lip seal inside the Spare Seal Carrier will be used as the replacement lip seal, slide a Red Installation Hat down the shaft and in between the lip seal and shaft to prevent damage to it when removing it from the shaft.



Loosen the two hose clamps which fasten the SureSeal housing to the articulating blue hose. Remove the spare lip seal and SureSeal unit from the shaft. Leave the clamps and articulating blue hose on the stern tube.



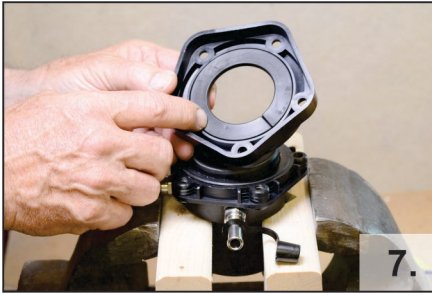
Position the SureSeal unit in a vise and clamp securely. (A set of simple wooden V-blocks will help hold the unit). Remove the five cap screws and the face cap from the housing, set aside.



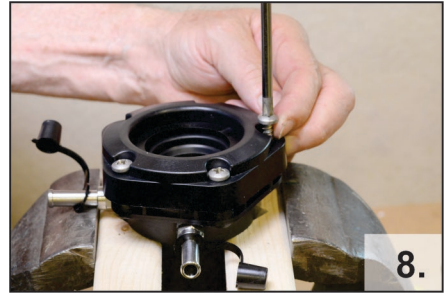
Using a flat-bladed screwdriver, gently pry out the old lip seal from the SureSeal housing. Work around the seal in several places, moving it a little bit in each spot. Once the seal is removed, wipe the seal cavity with a clean cloth.



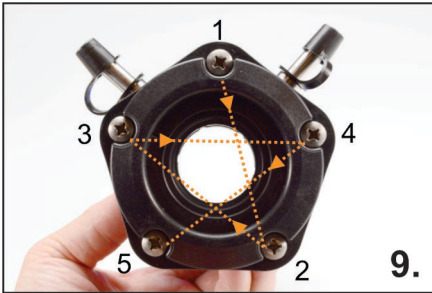
Make sure the walls of the seal cavity have not been scratched or gouged. Place the new lip seal into the seal cavity with the smooth side of the lip seal facing upwards. The molded part number should be visible.



Confirm that the plastic split washer is retained in the face cap as shown. Press the washer firmly all around the perimeter to be sure it is fully seated. It should be flush with the circular rib.



Position the face cap on top of the lip seal and align the screw holes. Insert the cap screws.



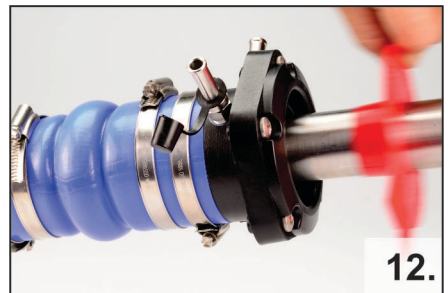
Begin hand tightening each screw 2 to 3 turns in an alternating pattern as shown. Continue tightening the screws to drive the seal evenly into its cavity. The seal is properly seated when the cap and housing are touching.



Insert the Red Installation Hat into the lip seal and press in evenly all around as far as it will go. Slide the SureSeal unit back onto the propeller shaft carefully so that the shaft passes through the Red Installation Hat.



Position the unit in its previous location inside the blue articulating hose. Space the hose clamps evenly over the housing end and tighten equally.



REMOVE THE RED INSTALLATION HAT. If reinstalling the spare seal carrier, follow instructions beginning on page 13. Reconnect the propeller shaft to the coupling. Reconnect the water supply lines.

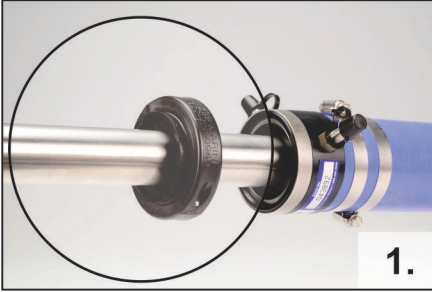
STRONG™ Seal Shaft Seal System

STRONG™ Seal Components

Before beginning the replacement of a lip seal for a STRONG™ Seal unit, familiarize yourself with the various components of the system.



In-Water Lip Seal Replacement for STRONG™ Seal Using Spare Seal Carrier



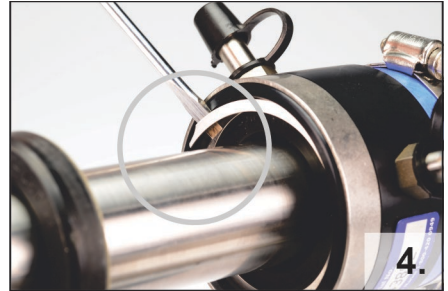
Inspect the shaft surface on both sides of the Spare Seal Carrier for nicks or burrs which might damage the seal during replacement. Polish this area with 280-320 grit sandpaper or emery cloth working around the shaft not fore and aft.



Remove any sanding dust/debris with a clean cloth. Remove the two screws which secure the Spare Seal Carrier to the shaft using a Phillips-head screwdriver. Separate the two halves and flip over.



Reassemble the Spare Seal Carrier on the shaft in front of the new lip seal with the long shoulder facing the lip seal. Insert and snug the two carrier screws. Slide both the lip seal and carrier away from the Strong Seal housing for more working room.



Locate the end of the spiral retaining ring in the front of the Strong Seal housing. With a small flat-bladed screwdriver, pry the end out of its groove.



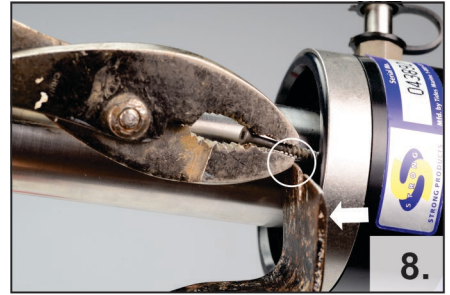
Spiral the ring around the shaft until it is free from the housing.



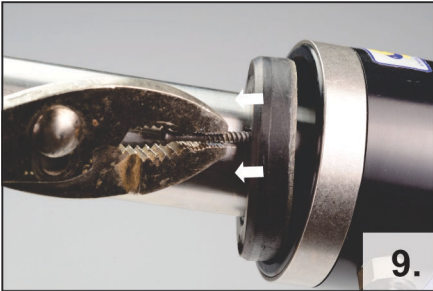
Remove the retaining ring from the shaft. **DO NOT DISCARD.**



Position and then screw 2 or 3 (evenly spaced) self-tapping or small trim-head screws into the face of the lip seal - close to the outer edge as there is a solid fibre ring there which will hold the screw thread. Screw to a depth of 1/2 inch.



Alternating between screws, grasp each protruding screw with a diagonal or regular pliers and then, using a small prybar, begin to lever against the jaws of the pliers to move the lip seal out of the housing.



Continue working on each screw until the seal is free of the housing. As the lip seal is removed from the housing, water will begin to flow into the bilge.

BE PREPARED TO WORK QUICKLY.



Cut the worn seal off the shaft with diagonal cutters.



Slide the replacement seal down the shaft towards the STRONG Seal housing.

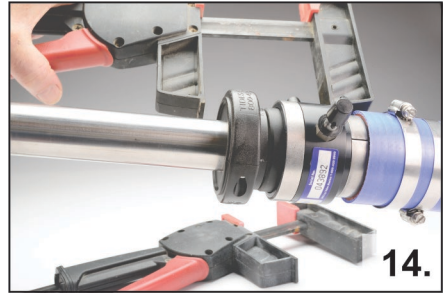


Align the seal evenly with the chamfered edge of the cavity opening on the face of the housing.



13.

Slide the Spare Seal Carrier toward the STRONG Seal housing until the shoulder is in contact with the face of the lip seal.



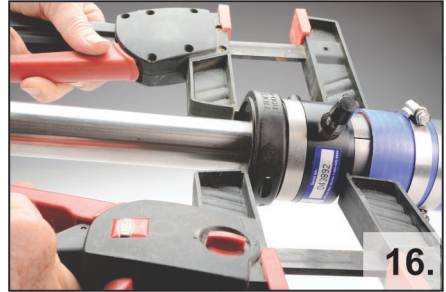
14.

Using a sliding bar clamp, position one jaw on the housing shoulder and the other on the Spare Seal Carrier as shown. Add a second clamp opposite the first.



15.

Alternately squeeze each clamp to pull the lip seal into its cavity. Work so that the lip seal moves evenly and stays generally perpendicular to the shaft.



16.

Continue moving the lip seal into the housing until the Spare Seal Carrier contacts the STRONG Seal housing. The groove for the spiral retaining ring should be fully visible when the lip seal is seated fully.



17.

Reinstall the spiral retaining ring into its groove. Push the STRONG Seal back into the blue hose as far as it will go. Evenly space the hose clamps over the housing and tighten fully.

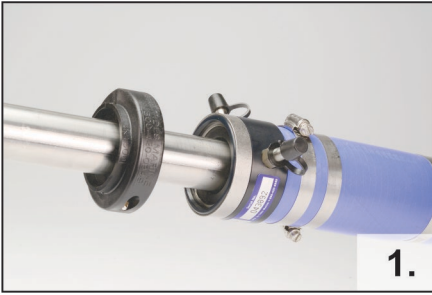


18.

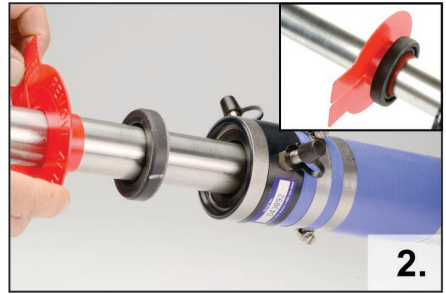
Re-install the Spare Seal Carrier in front of the STRONG Seal. Maintain at least 1" of clearance between it and the STRONG Seal. When the vessel is next hauled for repairs, install a new lip seal inside the Spare Seal Carrier housing.

Out-Of-Water Lip Seal Replacement

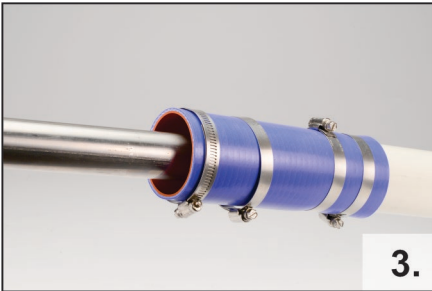
For STRONG™ Seal with Spare Seal Carrier



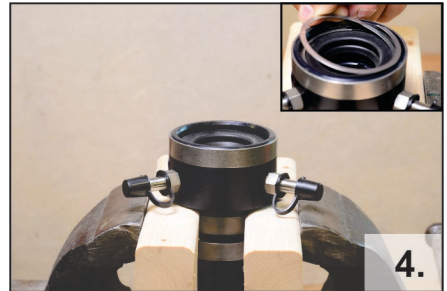
Disconnect the propeller shaft from the coupling. Slide the shaft away from the coupling so there will be space to remove the STRONG Seal housing and any spare lip seals. Open the Spare Seal Carrier by removing the two housing screws.



If the lip seal inside the Spare Seal Carrier will be used as the replacement, slide a Red Installation Hat between the lip seal and the shaft (inset) to prevent damage to it when removing it from the shaft.



Loosen the two hose clamps which fasten the STRONG Seal housing to the blue hose. Remove the spare lip seal and STRONG Seal unit from the shaft. Leave the clamps and blue hose on the stern tube.



Position the STRONG Seal unit in a vise and clamp securely. (A simple set of V-blocks will help hold the unit). **DO NOT OVER TIGHTEN THE VISE.** Remove the lip seal retaining ring from the housing (inset), set aside.



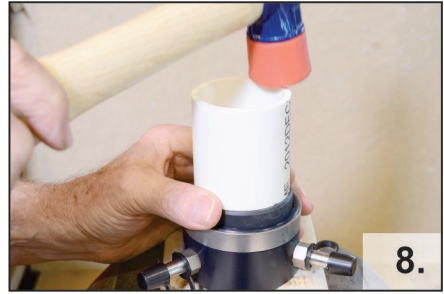
Using a flat-bladed screwdriver, pry the lip seal from the STRONG Seal housing. Work around the seal in several places—moving it a little bit in each spot. Once the lip seal is out, wipe the seal cavity with a clean cloth.



Place the replacement lip seal on the chamfered edge of the lip seal cavity. The smooth side of the lip seal which has the part number molded on it must be visible.



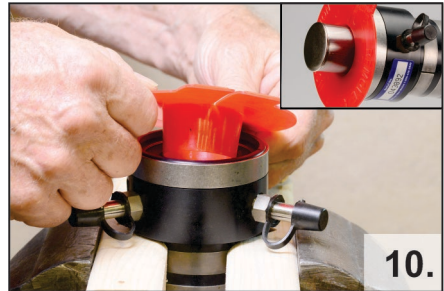
7. There are several methods in which to install the replacement lip seal. A short length of PVC pipe or the long shoulder on a Spare Seal Carrier can be used to drive the lip seal into the housing.



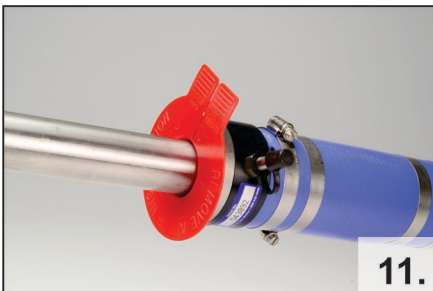
8. Alternately, an arbor press or bar clamps (see *in-water replacement instructions*) will work equally well. Finish driving the lip seal evenly into the housing. When the retaining ring groove is visible, the seal is properly seated.



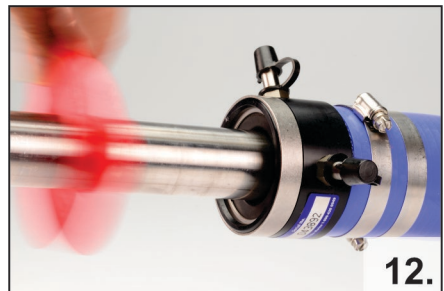
9. Reinstall the retaining ring into it's groove.



10. Insert a Red Installation Hat into the lip seal and press in evenly as far as it will go. Carefully slide the STRONG Seal back onto the propeller shaft with the shaft passing through the Red Installation Hat (*inset*).



11. Slide the STRONG Seal to it's previous location inside the blue hose. Space the hose clamps evenly over the housing end and tighten equally.



REMOVE THE RED INSTALLATION HAT. If reinstalling the Spare Seal Carrier, follow the instructions beginning on page 15. Reconnect the propeller shaft to the coupling. Reconnect the water supply lines.

Spare Seal Carrier Kit

Spare Seal Carriers protect and store spare lip seal(s) and may allow lip seal replacement to be performed while the vessel is in the water. The propeller shaft may not have to be removed from the coupling.

The unit is a lightweight two-piece composite housing which is clamped to the shaft between the shaft seal transmission coupling. One or two lip seals are contained depending on size (*see below*)



Long Shoulder Side



For shaft sizes up to 1-3/4" or 45mm, single Spare Seal Carriers are used which hold one lip seal.

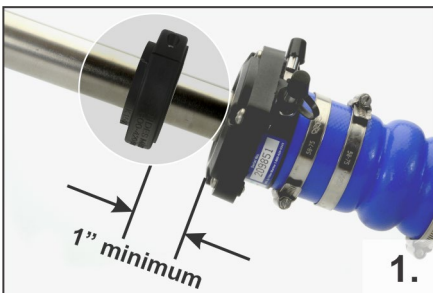


For shaft sizes up to 2" to 3", two single Spare Seal Carriers are used with one lip seal in each.



For shaft sizes greater than 3-1/4" or 50mm one double Spare Seal Carrier is used which holds two lip seals.

Instructions for installing a Spare Seal Carrier Kit



Determine where the Spare Seal Carrier will be located on the shaft (*minimally 1" from the front of the shaft seal housing.*) Be certain there are no keyways, nicks or corrosion in this area which could damage the lip seal.



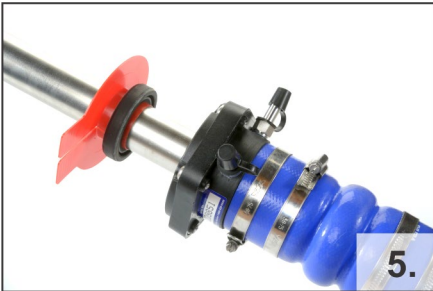
Remove the screws from the carrier and separate the two halves exposing the lip seal(s).



Insert the Red Installation Hat into the lip seal from the side which has the part number molded on it. **PUSH IT THROUGH THE SEAL AS FAR AS IT WILL GO.** This allows the Hat and lip seal to be moved freely onto the shaft without resistance.



Slide the Red Installation Hat and seal onto the shaft as shown.



Slide the new lip seal down the shaft until it is in the desired location (*no closer than 1" from the front of the shaft seal housing*).



REMOVE THE RED INSTALLATION HAT.
NOTE* If the Spare Seal Carrier holds two lip seals, both may be positioned on the Red Installation Hat at the same time, or just repeat steps 3 to 6, leaving the second seal just in front of the first.



Reassemble the Spare Seal Carrier housing over the lip seal(s) and around the shaft with the long shoulder side of the carrier facing away from the shaft seal.



Confirm that there is at least 1" of clear space between the Spare Seal Carrier and the face of the shaft seal. Tighten the two screws fully to lock the carrier onto the shaft.

Rudder Port/Bearings



Type C



Type D



Type E



Type F



Type I



Type J



Type K

While there are several configuration of Tides Marine Rudder Port/Bearings, the removal and replacement of the lip seal component is similar for all types.

The installation process which follows uses a Type C unit which is typically mounted in a tube with an upper flange to bolt to.

NOTES*

1. In addition to storing and protecting replacement lip seals, Spare Seal Carrier housings are also used when installing new lip seals into Rudder Port/Bearing housings. The long shoulder is dimensioned so that it will properly seat the replacement lip seal so that the retaining ring groove is fully accessible.
2. If no Spare Seal Carrier is available, a short length of PVC pipe works equally well to drive the seal into position. 1-1/2 inch pipe works with seals for up to 1-3/8" shafts, 2 inch pipe works with seals for shafts 1-1/2" thru 2" and 2-1/2 inch pipe works with seals for 2 1/4, 2 1/2 and so on.



Long Shoulder



Lip Seal Replacement For Rudder Port/Bearings



Disconnect the steering gear and lower the rudder stock allowing access to the lip seal. Locate the spiral retaining ring located on top of the lip seal. Find the end which is partially cut away.



Using a small flat-bladed screwdriver, work the end of the retaining ring out of the groove. Gently pull upwards and spiral the ring free from the housing. **DO NOT DISCARD.**



Using a larger flat-bladed screwdriver or other flat lever, begin to pry the lip seal upwards. Be careful not to scratch or gouge the sides of the lip seal cavity. Work in several locations around the seal until it is free from the housing.



Inspect and clean the lip seal cavity in the rudder bearing housing with a clean cloth.



Place the replacement lip seal on the chamfered edge of the lip seal cavity. The smooth side of the lip seal which has the part number molded on it must be visible.



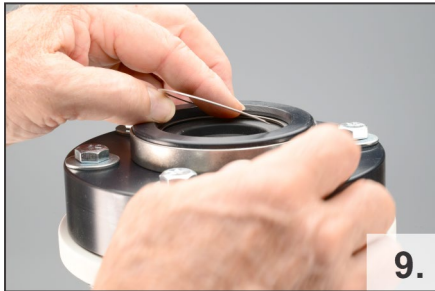
Place either a Spare Seal Carrier (*long shoulder-side down*) or a short length of PVC pipe centered on the face of the replacement lip seal.



With a rubber or plastic faced mallet, hit the Spare Seal Carrier housing or PVC pipe around the top surface to begin to drive the replacement lip seal into the cavity.



Working around the perimeter, continue driving the replacement lip seal into position.



The lip seal is fully seated when the retaining ring groove is fully visible. Reinstall the retaining ring in its groove.



Press the Red Installation Hat fully into the lip seal opening. Reinstall / raise the rudder stock into place.



As the rudder stock is raised back into position, it will pass through the Red Installation Hat. Before reconnecting the steering gear, remove and invert the Red Installation Hat and place on top of the lip seal.



If using a Spare Seal Carrier, reinstall and clamp it above the Red Installation Hat. There should be a minimum of 1/2 inch between the Spare Seal Carrier and Red Installation Hat. Reconnect the steering gear.

NOTE* THIS PART IS USED IN THE FOLLOWING PRODUCTS:

STRONG Seal Shaft Seals

IF THIS PART WAS ORDERED FOR USE WITH A PRODUCT NOT LISTED ABOVE, CONTACT YOUR DISTRIBUTOR FOR ASSISTANCE OR EXCHANGE.

Tides Part Number	LIP SEAL 2000
Manuf. Part Number	11551
Fits Shaft / Stock Diameter	2"

Measurements

I.D.	2.000"
O.D.	2.750"
THK.	0.500"

Contents

1 - LIP SEAL 2000
1 - HAT-2000-02



LIP SEAL 2000

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INNOVATIVE PRODUCTS FOR THE MARINE INDUSTRY

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