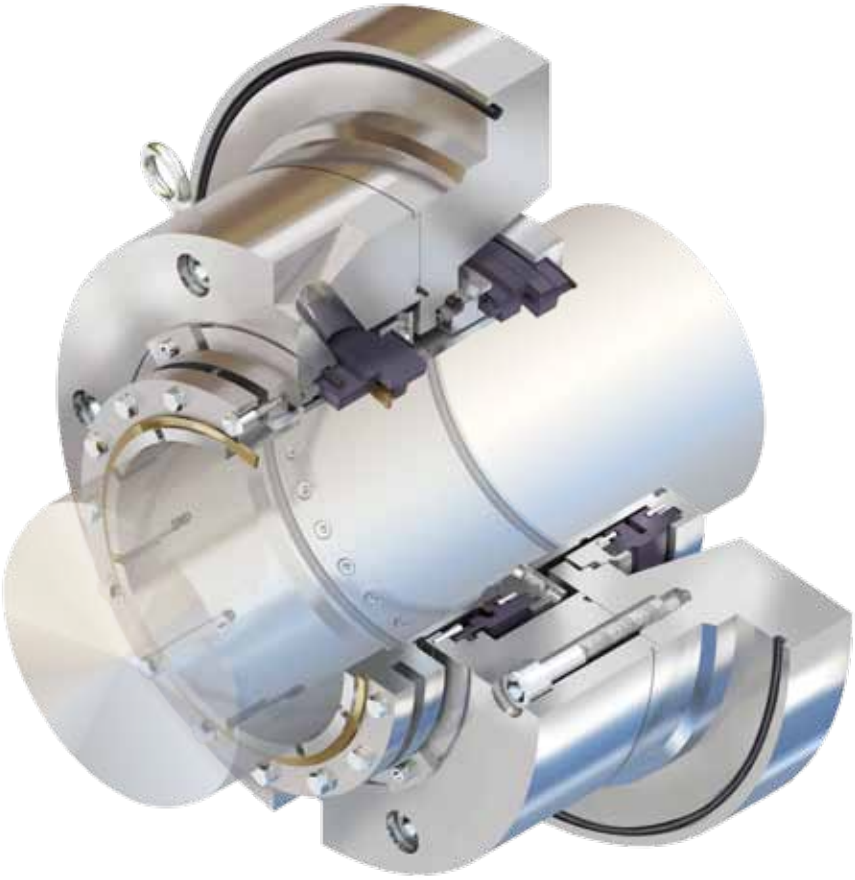
FLOWSERVE

Installation Instructions

SLM-6200

Self contained cartridge
medium duty slurry seal



Experience In Motion

1 Cartridge Installation Instructions

The following instruction manual is designed to simplify the installation of the SLM-6200 slurry seal. The SLM-6200 is a dual (pressurized double) seal with a circulating device and 2 “barrier” fluid connections.

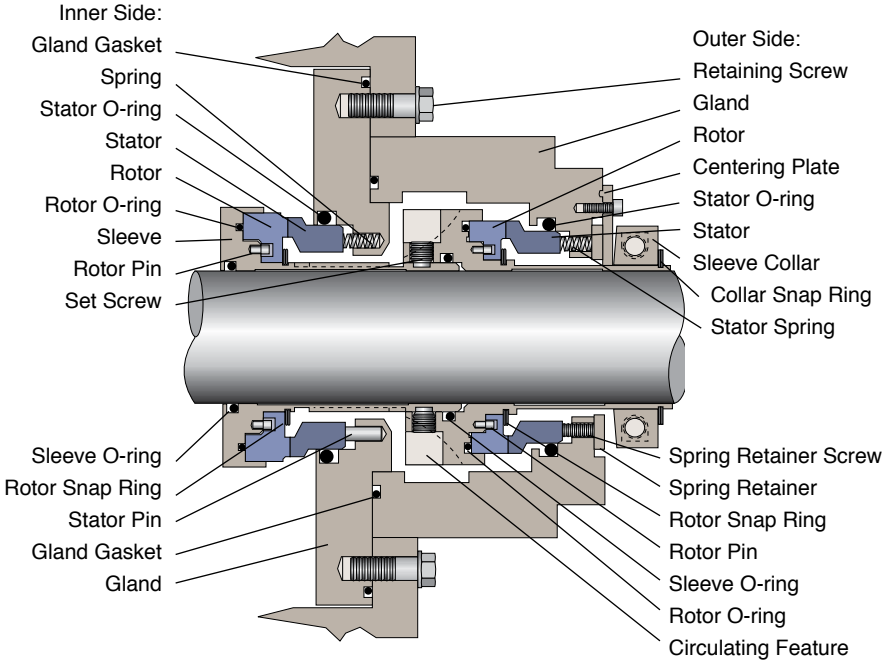
By reading this manual and following its guidelines, seal performance can be improved by eliminating the chances of premature failure due to improper installation. In addition to these instructions, consult the seal assembly drawing included for your specific seal design, materials of construction, critical dimensions, and any auxiliary piping connections.

As you go through this manual you will find some of the instructions referenced with figure numbers. These illustrations are provided to help you visualize what the instruction is trying to explain. If these instructions are followed faithfully, the seal installation will be successful, and maintenance personnel will understand the proper procedures to follow when pump adjustment is necessary.

For special problems encountered during installation, contact your nearest Flowserve Sales and Service Representative or Authorized Distributor.

Note: The SLM-6200 has been designed to leak water barrier fluid into the process at 4 liters (1 gallon) per day. Barrier fluid must be compatable and able to be refilled while pressurized. If another barrier fluid is used leakage will increase.

Typical Dual SLM-6200 Cartridge Seal Figure 1



The images of parts shown in these instructions may differ visually from the actual parts due to manufacturing processes that do not affect the part function or quality.

2 Recommendations

To ensure that your SLM-6200 Mechanical Seal will provide you with the longest possible life, we recommend the following:

2.1 New radial and thrust bearings be installed in the pump.

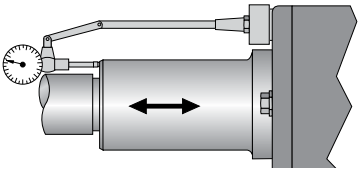
2.2 The saddle fits of the bearing assembly should not be worn.

2.3 The axial end float of the pump shaft must not exceed 0.25 mm (0.010 inch). See Figure 2.

Check Axial Shaft Travel

Figure 2

0.25 mm (0.010 inch) Maximum Acceptable Axial Movement

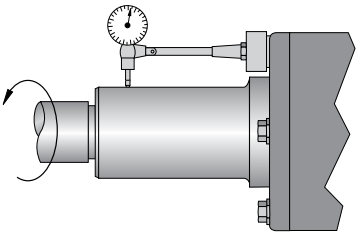


2.4 Shaft radial runout should be less than 0.0005 mm per mm (0.0005 inch per inch) of shaft/sleeve diameter. See Figure 3. Turn the shaft through 360° and observe the range of indicator movement.

Check Radial Shaft Runout

Figure 3

Maximum Acceptable Radial Runout 0.0005 mm per mm (0.0005 inch per inch) of shaft diameter

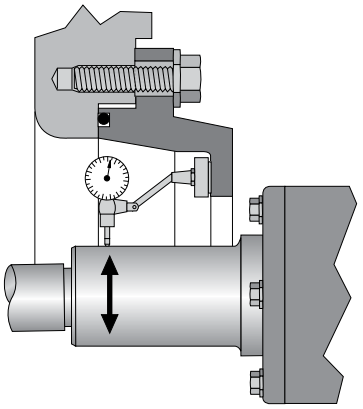


2.5 The shaft should deflect no more than 0.30 mm (0.012 inch) at the seal chamber face. See Figure 4.

Check Radial Shaft Deflection

Figure 4

Shaft should Deflect no more than 0.30 mm (0.012 inch)



2.6 Ensure that the shaft or shaft sleeve has a 1.6 mm (0.06 inch) x 30° chamfer on the leading edge to prevent O-ring damage at seal installation.

2.7 Hardened shaft sleeves must not be used when cartridge sleeve locking is accomplished by set screws bearing directly into the shaft sleeve. Any of the sleeve collars that clamp the cartridge sleeve to the shaft sleeve may be used on hardened shaft sleeves.

3 General Instructions

3.1 Ensure that the bearing assembly is mounted correctly (central and square) to the pump pedestal and securely fastened.

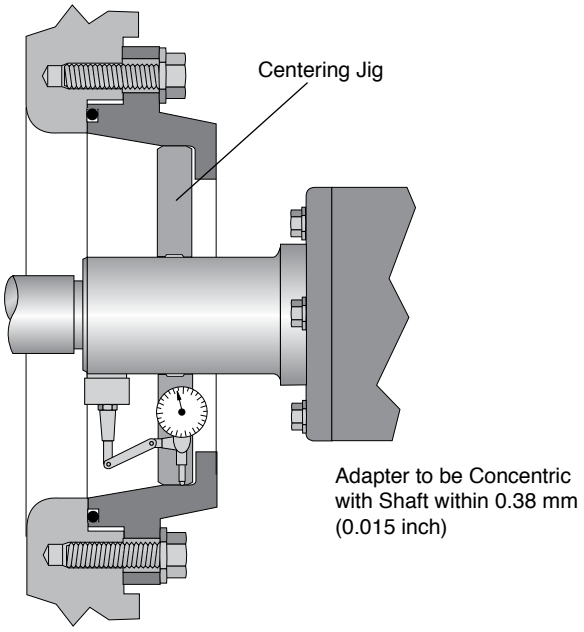
3.2 Ensure that all fit locations on the pedestal are clean and free of burrs.

3.3 Clean the pump shaft/sleeve surface, making sure it is clean of product and rust and has no burrs.

3.4 If the pump design requires it, bolt seal adapter plate to equipment case/pedestal (hand tighten only).

3.5 Locate the seal fit of the adapter to the shaft by use of a dial indicator or centering jig. The equipment shaft must be concentric to the seal adapter bore to within 0.38 mm (0.015 inch). See Figure 5.

Center Adapter Plate to Shaft Figure 5



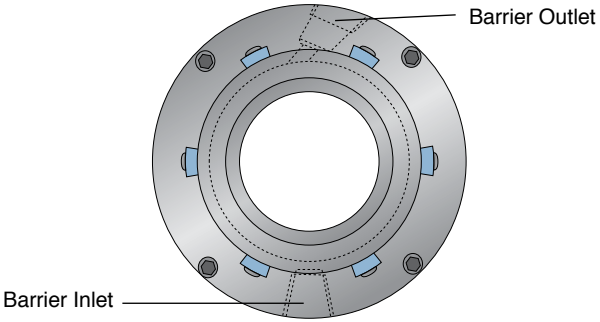
3.6 For adapters provided with a centering jig, simply insert the centering jig into the adapter and tighten adapter bolts, alternately adjusting the cover location until the centering jig can be removed by hand.

3.7 Apply a light coat of O-ring lubricant to the seal sleeve O-ring. (Silicone grease must be used with EPDM gaskets.)

Warning: Do not apply anti-seize or other lubrication to the pump shaft/sleeve. Keep the shaft/sleeve clean and dry. The use of lubricants will cause improper clamping pressure by the clamp collar.

3.8 Orient the barrier inlet and outlet ports as illustrated. See Figure 6. If the ports are not located 180° apart, position the outlet port at top dead center or as near to that as possible.

Barrier Port Orientation Figure 6



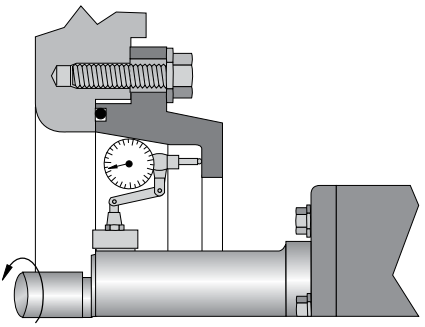
4 Wet-Side (Impeller-Side) Installation

The following steps describe installation of the seal cartridge mounted on the wet, or impeller, side of the equipment case. If your cartridge is designed to mount on the dry, or bearing, side of the equipment case, skip to section 5.

4.1 Seal chamber face runout (perpendicularity) should be less than 0.001 mm per mm (0.001 inch per inch) of indicated diameter. See Figure 7.

Check Seal Chamber Face Runout Figure 7

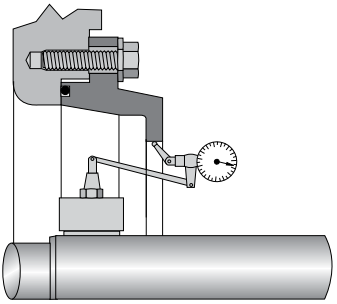
Maximum Acceptable
Runout 0.001 mm per mm
(0.001inch per inch)
of indicated diameter



4.2 Seal chamber concentricity should be less than 0.38 mm (0.015 inch). See Figure 8. Seal life varies with alignment. Poor shaft alignment will reduce seal life.

Check Seal Chamber Concentricity

Figure 8



0.38 mm (0.015 inch) Maximum Seal Chamber Concentricity Runout

4.3 It is advisable to hold the inner gland gasket in place in the gland groove with contact adhesive or vacuum grease (in spots only).

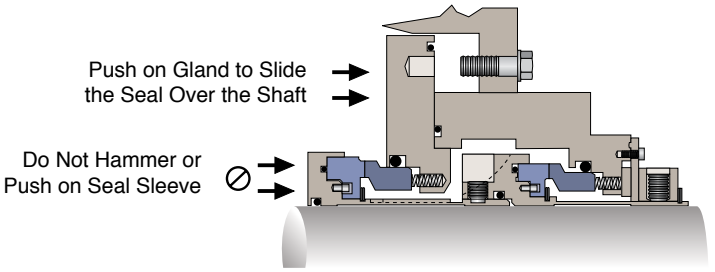
With the seal clamp collar facing toward the bearing assembly, slide the complete cartridge over the pump shaft/sleeve and push the assembly back into the pump case. See Figure 9.

Warning: Do not hammer on or push against the cartridge sleeve.

Do not secure the gland retaining screws to the equipment casing at this time.

Inserting Cartridge

Figure 9



4.4 If the seal is mounted directly on the shaft, rather than on the equipment sleeve, install the impeller spacer sleeve (possibly modified).

4.5 Install the impeller and suction cover.

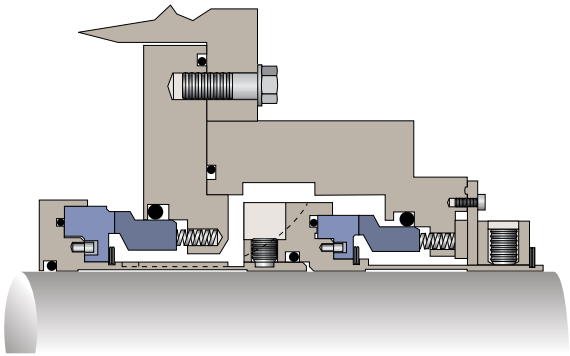
4.6 Make any necessary impeller adjustments.

Warning: Loosen the bearing assembly and drive belts only enough to make the adjustments. Fully retighten the bearing assembly and belts after adjustment.

4.7 Check the orientation of the gland ports and reposition as necessary. See Figure 6.

4.8 Insert the retaining screws through the rear face of the pump case and screw into the seal gland. Tighten the retaining screws evenly to pull the seal into the pump case. See Figure 10.

Cartridge in Place (Wet Side) Figure 10

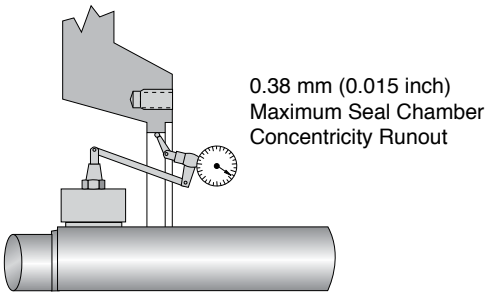


5 Dry-Side (Bearing-Side) Installation

The following steps describe installation of the seal cartridge mounted on the dry, or bearing side of the equipment case. If your cartridge is designed to mount on the wet, or impeller side of the equipment case, refer to section 4. If you have completed section 4, skip to section 6.

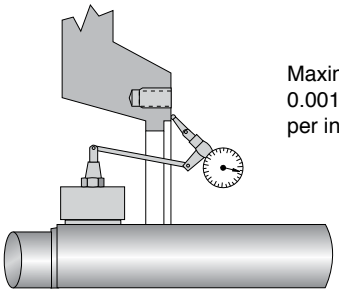
5.1 Seal chamber concentricity should be less than 0.38 mm (0.015 inch). Poor shaft alignment can reduce seal life. See Figure 11.

Check Seal Chamber Concentricity Figure 11



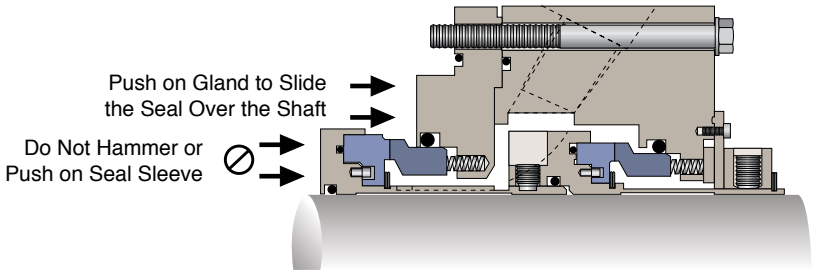
5.2 Seal mounting runout (perpendicularity) should be less than 0.001 mm per mm (0.001 inch per inch) of indicated diameter. See Figure 12. When the equipment case and shaft are properly aligned, secure the case in place.

Check Seal Chamber Face Runout Figure 12



5.3 With the seal clamp collar facing toward the bearing assembly, slide the complete cartridge over the pump shaft/sleeve and push back toward the bearing housing. See Figure 13. If the gland screws are too long to insert with the cartridge in place, insert them through the gland before sliding the cartridge fully onto the shaft.

Inserting Cartridge Figure 13



5.4 If the seal is mounted directly on the shaft, rather than on the equipment sleeve, install the impeller spacer sleeve (possibly modified).

5.5 Position and lightly secure the equipment casing in place. **Do not** secure the gland retaining screws to the equipment casing at this time.

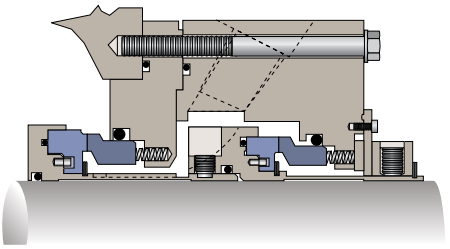
5.6 Check the orientation of the gland ports and reposition as necessary. See Figure 6.

5.7 Install the impeller and suction cover.

5.8 Make any necessary impeller adjustments.

5.9 Slide the seal cartridge up to the equipment case. Insert the gland retaining bolts through the gland holes and screw into the threaded holes on the face of the equipment case. Tighten the retaining bolts evenly in opposing pairs. See Figure 14.

Cartridge in Place (Dry Side) Figure 14



6 Completing Installation

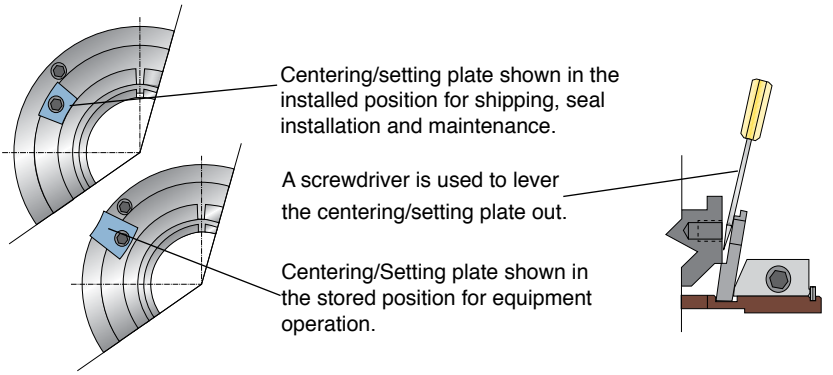
6.1 Evenly tighten the Socket Head Cap Screws of the 2-piece split clamp collar, the Hex Head Cap Screws of the 3-piece shrink disk collar, or the Set Screws of the 1-piece sleeve collar to the proper torque values listed below.

TORQUE VALUES
N-m
(ft-lbs)

	Split Clamp	Shrink Disk Clamp	Set Screw Clamping (Dog Point)	Set Screw Penetrating (Cup Point)	
Fastener Size	**Alloy Steel**	**Alloy Steel**	**Alloy Steel**	**Stainless Steel**	**Alloy Steel**
1/4”	_____	14-16 (10-12)	_____	5-8 (4-6)	9-11 (7-8)
5/16”	33-35 (24-26)	27-30 (20-22)	_____	14-16 (10-12)	18-20 (13-15)
3/8”	54-61 (40-45)	33-37 (24-27)	_____	24-27 (18-20)	30-34 (22-25)
1/2”	122-136 (90-100)	_____	68-75 (50-55)	54-57 (40-42)	81-84 (60-62)

6.2 Remove the setting plate screws. With a screwdriver, pry the setting plates clear of the gland and remove them. Keep the setting plates and screws with the seal at all times. See Figure 15.

Setting Plate Removal Figure 15



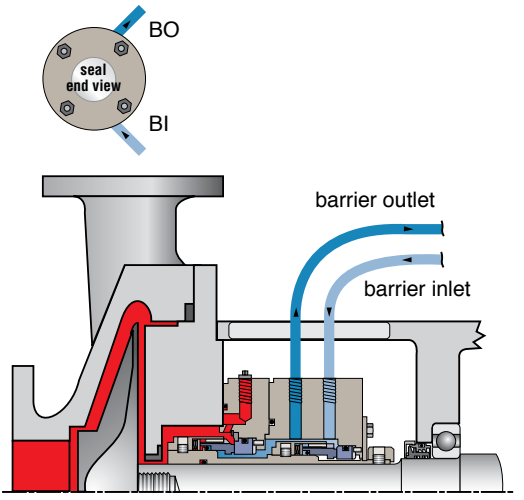
7 Barrier Fluid Piping Plans

7.1 Typical installation for a Plan 54 support system, pressurized water barrier fluid circulation by external system. See Figure 16.

See Flowserve Piping Plan Guide FTA160 or your local Flowserve representative for best practice guidelines for installation of Plans 53A, 53B or 53C.

Note: The SLM-6200 has been designed to leak water barrier fluid into the process at 4 liters (1 gallon) per day. Barrier fluid must be compatable and able to be refilled while pressurized. If another barrier fluid is used leakage will increase.

Plan 54 Figure 16



7.2 Connect the seal gland barrier outlet (BO) port to the return side of the external system. 3/4" tubing is recommended for the seal circulation piping on both outlet and inlet runs. Piping runs should be smooth, with a minimum number of turns. Turns should be accomplished by large radius bends rather than elbow fittings.

7.3 Connect the seal gland barrier inlet (BI) port to the supply side external system.

7.4 Connect a regulated pressure source and and pressure gages to monitor the barrier pressure. Barrier fluid temperature must be kept below 79°C (175°F).

7.5 Your SLM-6200 Mechanical Seal is now ready for operation.

Warning: To ensure that the mechanical seal does not run dry, leave motor v-belts or drive coupling off the pump until the motor has been tested for rotation.

Note: For any subsequent impeller or bearing adjustment, reverse steps 6.1, and 6.2. If any problems arise during installation, **Do not** try to force anything, contact your nearest Flowserve Sales and Service Representative or Authorized Distributor.

8 Start Up and Shut Down Procedures for the SLM-6200 Slurry Seal

The SLM-6200 seal incorporates its own operating environment. To insure the proper conditions in this environment, observe the following procedures for pump operation:

8.1 Pump Start-Up

8.1.1 Pressurize the water barrier fluid system to 2 bar (30 psi) above the maximum expected seal chamber pressure and be sure it is flowing.

8.1.2 Open the valve on the suction line to ensure that the pump is fully flooded with product.

8.1.3 A pump flooded with liquid must be ensured, before starting. If possible, open washout/bleed venting valve to release any air that may be trapped in the piping. Close the valve after a steady stream of liquid flows from it. If little or no liquid appears, do not start the pump. This means that part of the piping system is blocked with product.

8.1.4 Partially open the discharge valve to ensure that water hammer or cavitation does not occur at start-up.

8.1.5 After start up, slowly open the discharge valve. This will keep a false/artificial head/back-pressure on the pump until the line fills.

8.2 Pump Shut-Down

8.2.1 Stop the pump.

8.2.2 Close the discharge valve.

8.2.3 Close the suction valve.

8.2.4 Before depressurizing the water barrier system, drain all product from the pump seal chamber or flush with clean water or process fluid to prevent solids in the slurry (either free solids or dissolved solids that will precipitate out when temperature is reduced during standby) from settling in the seal chamber or volute. This also prevents product from contaminating the barrier system when barrier pressure is released.

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9 General Operation

Pressure must be maintained on the barrier fluid above product-side pressure at all times whenever product will be present in the seal chamber. If the barrier fluid ever becomes contaminated with product, the barrier system must be flushed and cleaned.

10 Repair

This product is a precision sealing device. The design and dimension tolerances are critical to seal performance. Only parts supplied by Flowserve should be used to repair a seal. To order replacement parts, refer to the part code and B/M number. A spare backup seal should be stocked to reduce repair time.

When seals are returned to Flowserve for repair, **decontaminate the seal assembly** and include an order marked **"Repair or Replace." A signed certificate of decontamination** must be attached. **A Material Safety Data Sheet (MSDS) must be enclosed** for any product that came in contact with the seal. The seal assembly will be inspected and, if repairable, it will be rebuilt, tested, and returned.

For technical assistance or additional seal sizes and conditions not listed, contact your local Flowserve Sales and Service Representative or Authorized Distributor.

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