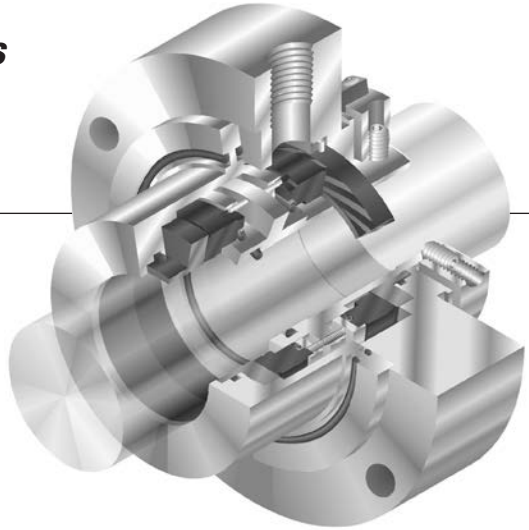


Dual Gas Barrier Seals

GB-200, GF-200, GX-200,
and BufferPac



1 Equipment Check

- 1.1 Follow plant safety regulations prior to equipment disassembly:
 - 1.1.1 Wear designated personal safety equipment
 - 1.1.2 Isolate equipment and relieve any pressure in the system
 - 1.1.3 Lock out equipment driver and valves
 - 1.1.4 Consult plant Safety Data Sheet (SDS) files for hazardous material regulations
- 1.2 Disassemble equipment in accordance with the equipment manufacturer's instructions to allow access to seal installation area.
- 1.3 Remove existing sealing arrangement (mechanical seal or otherwise).
Clean seal chamber and shaft thoroughly.
- 1.4 Inspect surfaces under gaskets to ensure they are free from pits or scratches. Break all sharp corners on shaft steps, threads, reliefs, shoulders, key ways, etc. over which gasket(s) must pass and/or seal against.
- 1.5 Check shaft or sleeve OD, seal chamber bore, seal chamber depth, gland pilot, stud diameter, stud bolt pattern and distance to first obstruction to ensure they are dimensionally the same as shown in the seal assembly drawing.
- 1.6 Check seal assembly drawings for any modifications (reworks) to be made to the equipment for mechanical seal installation and act accordingly.
- 1.7 The equipment must be earthed to prevent sparks due to static electricity discharge.

Shaft runout should be checked against the equipment manufacturer's specifications. Generally, should not exceed 0.05 mm (0.002 inch) TIR (Total Indicator Reading) at any point along the shaft for ball or roller type bearings. For sleeve type bearings, refer to manufacturer instructions. If the equipment is not completely dismantled, verify runout near seal location.

The above values apply to shaft speeds in the range from 1000 to 3600 RPM. For values above and below, consult your Flowserve representative. See Figure 1.

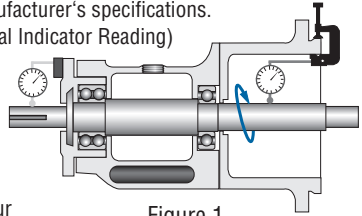


Figure 1

Shaft endplay should not exceed 0.25 mm (0.010 inch) TIR, regardless of thrust bearing type. See Figure 2.

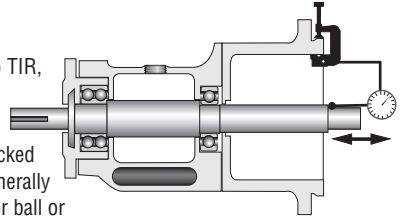


Figure 2

Radial bearing play at seal chamber face should be checked against the equipment manufacturer's specifications. Generally 0.05 - 0.10 mm (0.002 - 0.004 inch) will be applicable for ball or roller type bearings. For sleeve or journal type bearings, values will generally be in the order of 0.10 - 0.15 mm (0.004 - 0.006 inch). If equipment is found outside the general range, contact the equipment manufacturer and your Flowserve representative to verify the equipment's suitability for the seal.

Seal chamber squareness to the shaft centerline should be within 0.0005 mm/mm (0.0005 inch/inch) of seal chamber bore TIR.

Note: make sure that shaft endplay does not affect the reading. Verify the smoothness of the seal chamber face for a good gasket joint. See Figure 3.

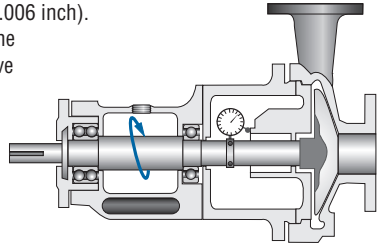


Figure 3

Concentricity of the shaft to the seal chamber bore or gland pilot register should be within 0.025 mm per 25 mm shaft diameter (0.001 inch per 1 inch shaft diameter) to a maximum of 0.125 mm (0.005 inch) TIR. See Figure 4.

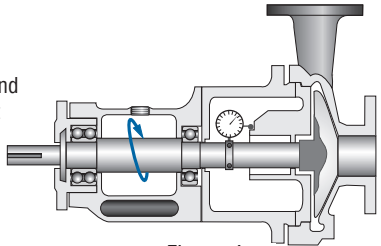
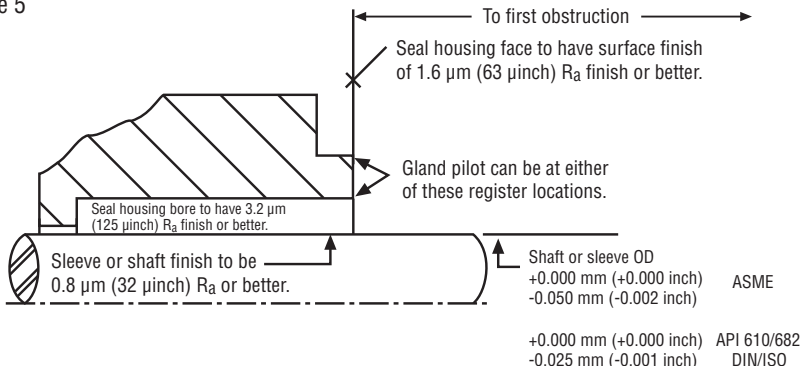


Figure 4

Surface finish requirements

Figure 5



Check gland bolting to ensure that bolt diameter and bolt circle conform to the dimensions shown in the assembly drawing.

Check seal chamber stud length to ensure that they conform to the dimensions shown in the assembly drawing. Assembly may require longer studs or use of bolts or cap screws if existing studs are not long enough.

Check rotation direction of the equipment. Uni-directional seal designs must be operated only in the direction shown on the seal gland.

Handle the **seal with care**, it is manufactured to precise tolerances. The sealing faces of the rotors and stators are specially finished. **Keep the seal faces perfectly clean at all times.** Oil, silicone lubrication, or type of grease should **not** be applied to these seal faces.

2 Dual Gas Barrier Seal Installation

Tools needed:

Provided: • **Lubricant** for sleeve O-rings

Not provided: • **Open end wrench** for gland nuts

- **Allen wrenches** for setting devices and set screws

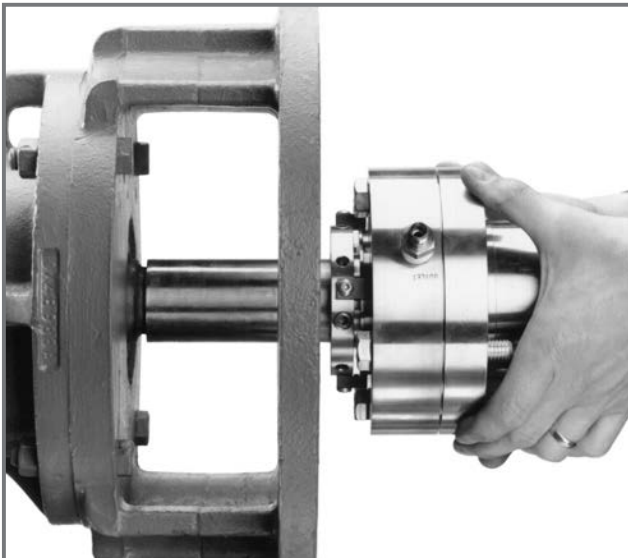
- **Allen wrenches** for gland cap screws if they are required in place of gland nuts or bolts

2.1 **Lubricate the shaft or sleeve OD** lightly with the lubricant provided. If bolts or cap screws are required in place of the seal chamber studs, insert them through the gland bolt holes before sliding the assembly onto the shaft. **Slide the complete seal cartridge onto the shaft**, Figure 6, with the end with the setting devices toward the bearing housing.

Note: Check for rotation direction requirements on the seal gland or assembly drawing before continuing.

Install Seal Cartridge

Figure 6



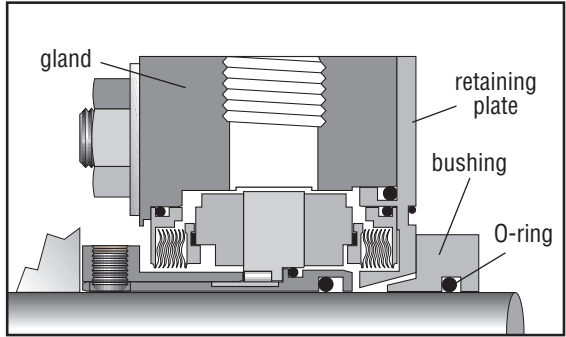
The images of parts shown in these instructions may differ visually from the actual parts due to manufacturing processes that do not affect the part function or quality.

2.1.1 **Optional: TARSEx Bushing Installation**

- Slide seal assembly against the bearing frame.
- Clean lubrication off pump shaft.
- Install the friction drive TARSEx bushing with O-ring, positioning them against the retaining plate with the bushing grooves oriented toward the seal. See Figure 7.

Install TARSEx Bushing (optional)

Figure 7

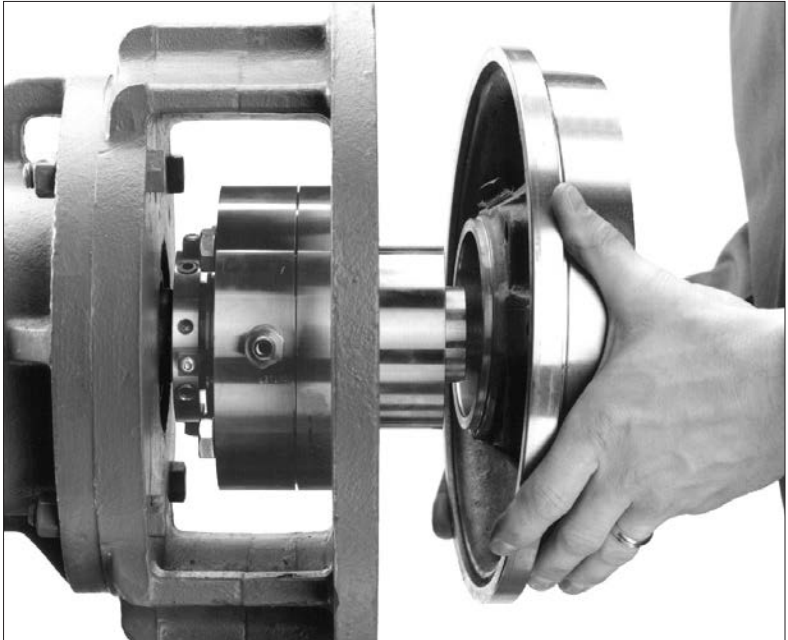


- 2.2 **Install the pump seal chamber, Figure 8. Position the seal gland gas barrier inlet, port **A**** shown in Figure 9, in the 9:00 o'clock position and the plugged gas barrier outlet, port **B** in the 6:00 o'clock position for normal installations. Alternate positioning of the gland may be necessary with some pumps, where the bearing housing interferes with piping. **Bolt the seal chamber in place** on the bearing housing.

Note: Either port can be used for gas barrier inlet or outlet.

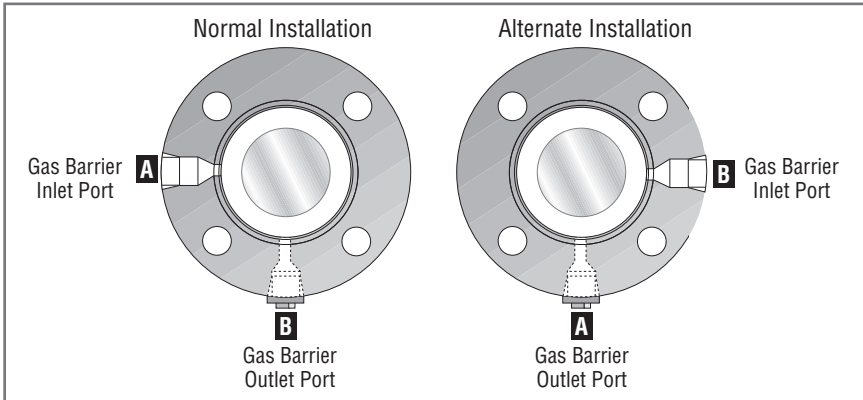
Install pump seal chamber

Figure 8



Position gland inlet

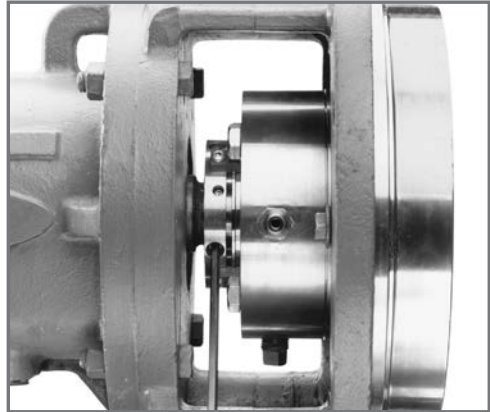
Figure 9



- 2.3 **Assemble the pump, adjust the bearings, set the impeller, connect pump piping.** Allow no pipe strain on the pump casing. **Connect the coupling** so that the shaft is in its operating axial position.
- 2.4 **Position the seal** with housing O-ring gasket in place against the seal chamber face and **tighten the gland nuts** evenly in a diagonal sequence. Do not over tighten the gland nuts.
- 2.5 **Using a cross-tightening method tighten the set screws** on the seal cartridge drive collar, Figure 10.
- 2.6 **Remove setting devices** by removing the screws with an Allen wrench, Figure 11. Save the setting devices and screws for future use in either removing the seal from service or to reset the pump impeller, see section 5.
- 2.7 **Turn the shaft by hand to ensure free operation.**
- 2.8 **Pipe up the gland connections** to the seal, see Section 3.
- 2.9 **See Operational Recommendations, Section 4, before starting pump.**

Tighten drive collar set screws

Figure 10



Remove setting devices

Figure 11



3 Piping

The Dual Gas Barrier Seal is designed to be operated in a normally dry running mode with a pressurized clean inert gas (nitrogen) or air between the two seals.

The gland is equipped with a gas barrier inlet and outlet connection.

3.1 **Vent out the gas barrier line** prior to connecting to the seal gland to ensure that foreign material has not collected in the piping.

3.2 **Connect gas barrier Plan 74 shown in Figure 12 to the gas barrier inlet port** (refer to Figure 9). The pressure gage and regulator are required to set the barrier gas pressure 2 to 4 bar (25 to 50 psig) higher than that of the product being sealed (seal chamber pressure).

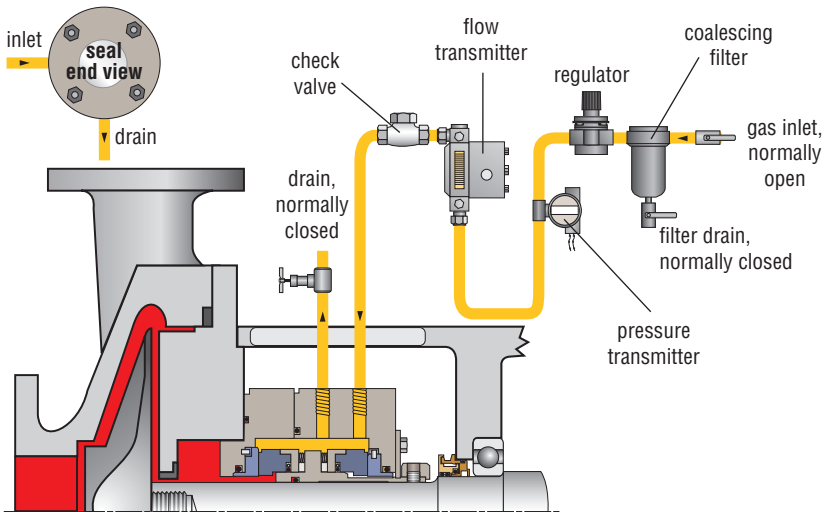
Note: It is important that the pressure gage and the low pressure alarm be installed close to the gas barrier inlet port for accurate values.

An optional control panel that incorporates all the equipment in a Plan 74 for a Dual Gas Barrier Seal is available from Flowserve.

3.3 Plug the gas barrier outlet port, (refer to Figure 9), or connect to a block valve.

Plan 74 for Dual Gas Barrier Seal

Figure 12



4 Operation

To assure reliable, long-life operation of your Dual Gas Barrier Seal, the following guidelines should be observed.

- 4.1 **Do not exceed corrosion limits.** Your Flowserve seal is designed to resist corrosion by most chemicals. However, do not expose the seal materials of construction to products outside of their corrosion limits. The seal assembly drawing lists the materials of construction. Consult Flowserve for chemical resistance ratings.
- 4.2 **Do not exceed the pressure limits** of the seal design. **Do not let the barrier gas pressure fall** below 2 bar (25 psi) above the seal chamber pressure.
- 4.3 **Do not exceed the maximum temperature** limits of the seal design.
- 4.4 **Do not operate at speeds lower** than the seal's minimum speed, if applicable.
 - 4.4.1 On startup and shutdown, the seal's speed should be transitioned between stationary and the seal's minimum speed as quickly as possible.
- 4.5 **For uni-directional designs**, do not turn the shaft opposite to the direction arrow indicated on the gland.
- 4.6 **Observe the start-up.** The seal barrier cavity must be pressurized before pump start-up and at all times during pump operation. For best performance, do not cavitate or run the pump dry. Open valves to flood pump with product fluid before start-up. Maintain the seal barrier gas pressure even when the pump is not running.

5 Reset pump impeller

To reset the pump impeller, follow plant safety procedures, etc., see Section 1.1.

- Reinstall the setting devices.
- Loosen the cartridge drive collar set screws.
- Adjust the impeller clearance following pump manufacturer's instructions.
- Tighten the set screws on the cartridge drive collar.
- Remove the setting devices. Save the setting devices and screws.
- Perform steps 2.7 to 2.9.



TO REORDER REFER TO
 B/M # _____
 F.O. _____

6 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 Safety Data Sheet (SDS) 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.

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USA and Canada

Kalamazoo, Michigan USA
 Telephone: 1 269 381 2650
 Telefax: 1 269 382 8726

Europe, Middle East, Africa

Roosendaal, the Netherlands
 Telephone: 31 165 581400
 Telefax: 31 165 554590

Asia Pacific

Singapore
 Telephone: 65 6544 6800
 Telefax: 65 6214 0541

Latin America

Mexico City
 Telephone: 52 55 5567 7170
 Telefax: 52 55 5567 4224