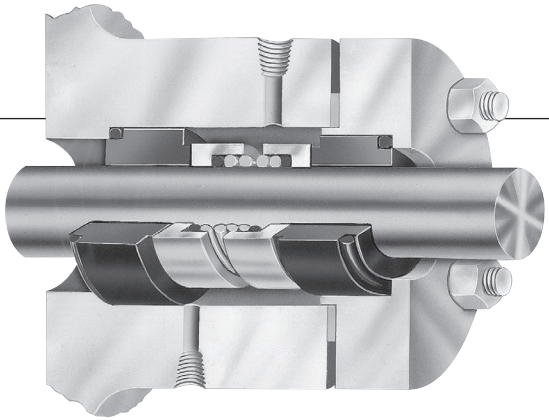
FLOWSERVE

Installation Instructions

Durametallic® Double CRO

Dual single coil spring friction drive for applications with water lubrication properties



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.

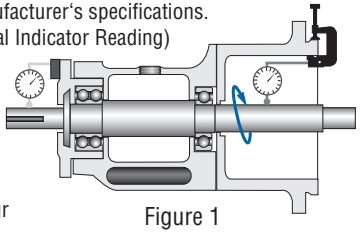


Figure 1

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

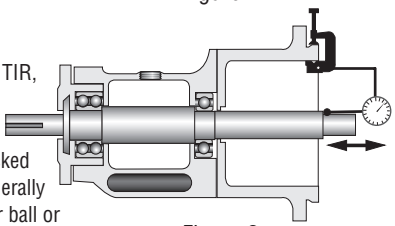


Figure 2

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.

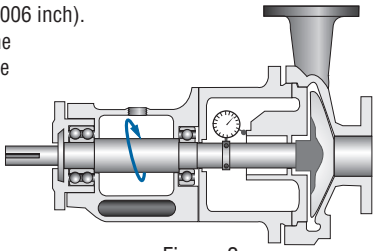


Figure 3

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.

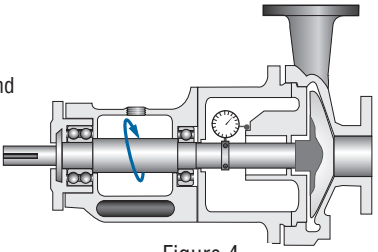
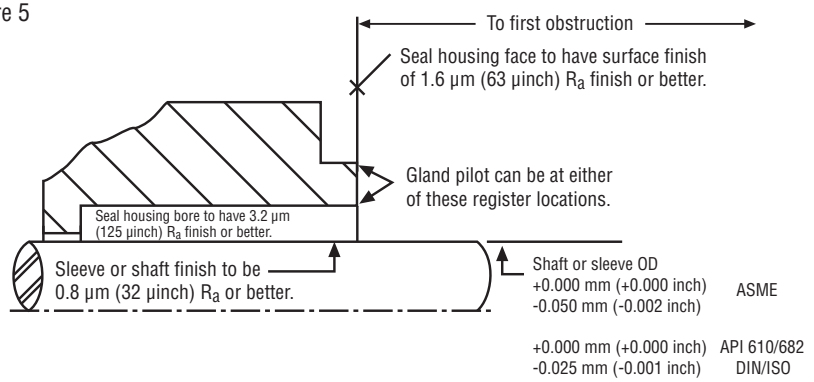


Figure 4

Surface finish requirements

Figure 5



2 Installation on Single End Suction Vertical Split Case and Vertical In-Line Pumps (1 seal chamber)

2.1 **Lubricate** one of the two **stationary face seat gasket O-rings** with water or mild water soluble soap solution and **nest this O-ring in the gland cavity**. **Press the stationary face into the gland** with the sealing face orientated toward the inboard side of the gland. Use hand pressure only. **Position the gland over the shaft** or sleeve with the sealing face orientated toward the seal chamber (stuffing box). Place the gland as close to the bearing bracket as possible. Do not bump the stationary face against the shaft as it may chip, crack, or break.

2.2 **Lubricate the shaft** or sleeve with water or soap solution.

2.3 Install the **rotating seal parts on the shaft or sleeve** one piece at a time:

- **Outer rotating face** with **rotating face gasket O-ring.**
- **Single coil spring**.
- **Inner rotating face** with **rotating face gasket O-ring.**

The rotating seal parts should be as close to their final axial position as possible with the rotating face sealing surfaces facing away from the spring and toward the stationary face sealing surfaces.

2.4 **Lubricate the seal chamber bore** with water or soap solution. The seal chamber is usually the stuffing box contained in the pump back plate.

2.5 **Lubricate the other stationary face seat gasket O-ring** with water or soap solution and place this O-ring on the back shoulder of the remaining stationary face. **Slide the inner stationary face** with the O-ring into position at the bottom of the chamber.

2.6 **Wipe the seal faces clean** with alcohol. Seal faces should not be lubricated but should be left clean and dry.

Caution: Consult material safety data sheets for proper handling of alcohol.

2.7 **Install the seal chamber (pump back-plate) and assemble the pump. Position the gland** to the face of the seal housing. Be sure the gland pilot is properly engaged. **Tighten the gland stud nuts** evenly, cross stagger the adjustment of the nuts. Follow the equipment manufacturer's recommendation for gland stud nut torque. In the absence of recommendations, gland stud nuts should only be torqued to establish a leak tight seal at the gland gasket. Proper land bolt adjustment is especially important with clamp style inserts where torque may damage the insert. In this case, gland stud nuts should be torqued to a maximum of 13.5 N-m (10 ft-lbs).

2.8 See **Section 4, Operational Recommendations,** before starting pump.

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.

3 Double Suction and Multistage Horizontal Split Case Pumps (2 seal chambers)

Note: The parting **gasket** between the upper and lower sections of the pump casing **must be flush** with the seal chamber bore and face or leakage will occur past the O-rings and gaskets.

3.1 **Lubricate the shaft** or sleeve and **the seal chamber bore** with water or a mild water soluble soap solution.

3.2 **Lubricate one stationary face seat gasket O-ring** with water or soap solution and place this O-ring on the back shoulder of the inner stationary face. **Slide the stationary face** with the O-ring into position at the bottom of the chamber. Do not bump the stationary face against the shaft as it may chip, crack, or break.

3.3 **Install the rotating seal parts on the shaft or sleeve** one piece at a time:
- **Inner rotating face** with **rotating face gasket O-ring.**
- **Single coil spring.**
- **Outer rotating face** with **rotating face gasket O-ring.**

3.4 **Wipe the seal faces clean** with alcohol. Seal faces should not be lubricated but should be left clean and dry. **Position the rotating seal parts** as close to their final axial position as possible with the inner rotating face sealing surface in contact with the inner stationary sealing face.

Caution: Consult material safety data sheets for proper handling of alcohol.

3.5 **Lubricate** the remaining **stationary face seat gasket O-ring** with water or soap solution and **nest this O-ring in the gland cavity**. **Press the stationary face into the gland** with the stationary sealing face orientated toward the inboard side of the gland. Use hand pressure only. Wipe the sealing face clean with alcohol.

3.6 **Position the gland over** the shaft or sleeve with the stationary face oriented toward the seal chamber (stuffing box). Do not bump the stationary face against the shaft as it may chip, crack, or break. With the gland and/or stationary face pilot properly engaged, tighten the **gland stud nuts** up evenly, cross staggering the adjustment of the nuts. The gland nuts should be torqued to a maximum of 13 N-m (10 ft-lbs). Excessive gland nut pressure can result in distortion of the stationary face. **Adjust the bearings, coupling, and impeller** so that the shaft is in its operating axial position. The rotating seal parts will automatically position themselves, subsequent axial adjustment of the shaft does not require resetting of the seal.

3.7 See **Section 4, Operational Recommendations,** before starting pump.

4 Operational Recommendations

4.1 **Do not start up the equipment dry**. Vent air from the casing of the pump and the seal chamber before startup.

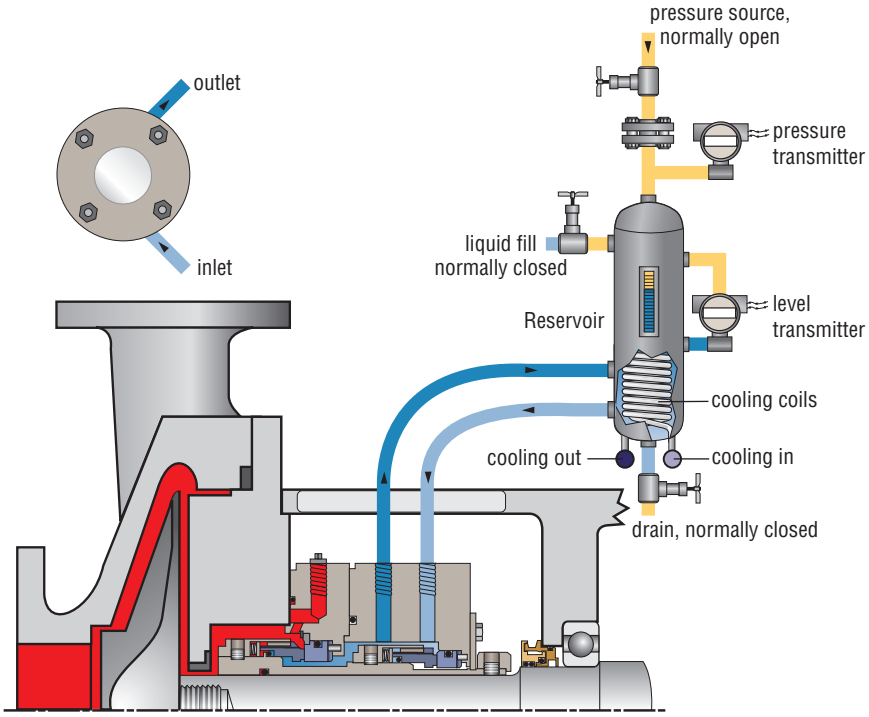
4.2 If soap was used to ease seal installation, **flush the seal chamber** with water before startup to prevent rotating face gasket O-ring slippage and subsequent loss of seal drive.

4.3 Adjust the barrier water flow rate so there is no more than a 11°C (20°F) temperature rise between inlet and outlet temperature. The barrier outlet water temperature should never exceed 51°C (120°F). Consult Flowserve if you have any questions.

4.4 If the seal runs hot, above 51°C (120°F) or squeals, shut down the pump immediately as not to damage the seal. Check to see if the barrier water supply is working properly. If barrier water system is working correctly, check the seal housing dimension to ensure the seal is not over-compressed due to axial dimensional stack up problems.

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

Suggested Barrier Water Supply System - Plan 53A Figure 6



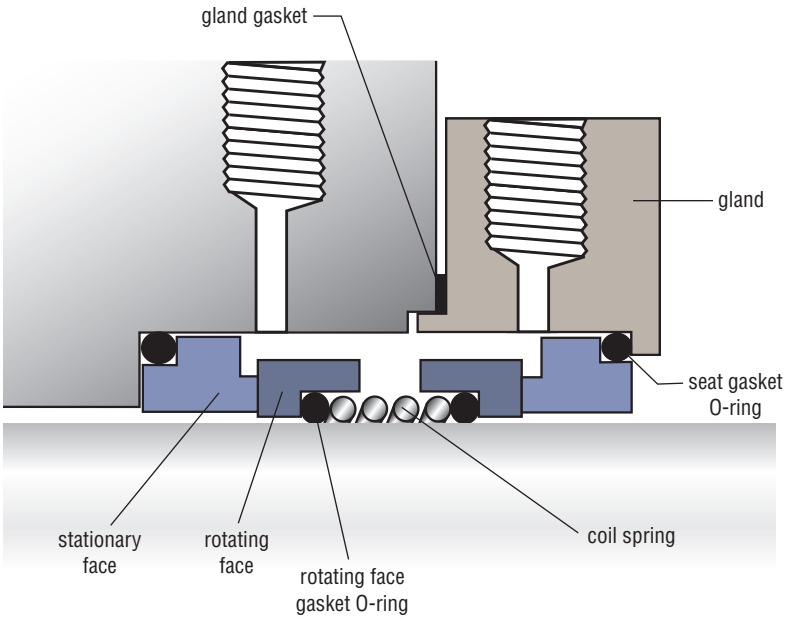
5 Repairs

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 the seal. These parts are available from numerous Flowserve stocking locations.

To order replacement parts, refer to the part code number and B/M number. A spare backup seal should be stocked to reduce repair time. The following partscan also be stocked for emergency needs.

- Rotating Faces
- Rotating Face Gasket O-rings
- Stationary Faces
- Spring
- Gland Gaskets
- Stationary Face Seat Gasket O-rings

When repairs are not conducted at the customer's location, **decontaminate the seal assembly** and return it to Flowserve, with 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 in its original condition.


gland gasket
gland
seat gasket
O-ring
stationary
face
rotating
face
rotating face
gasket O-ring
coil spring

FLOWSERVE®

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

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