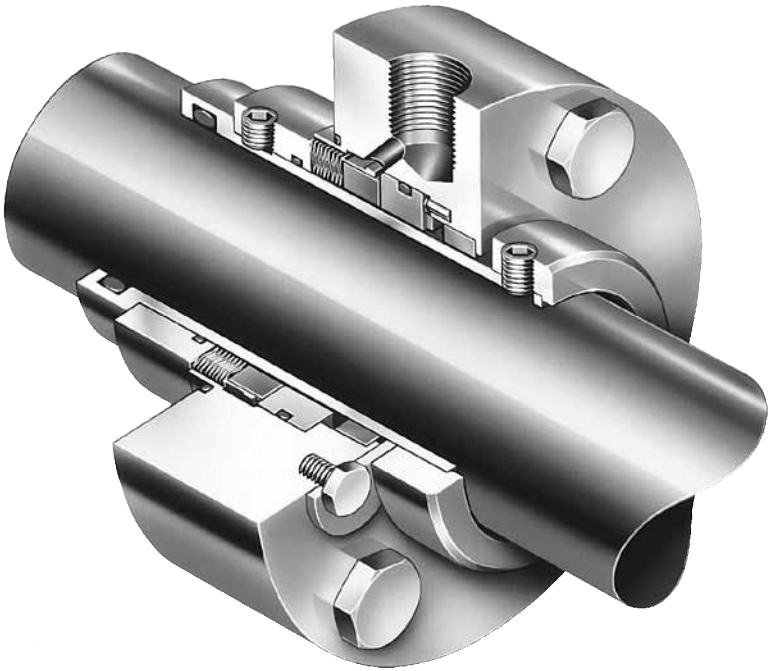
FLOWSERVE

Installation Instructions

BW Seals® BX Series

General Service Bellows Seal
BX, BXLS, BXR, BXQ, BXU



Experience In Motion

1 Equipment Check

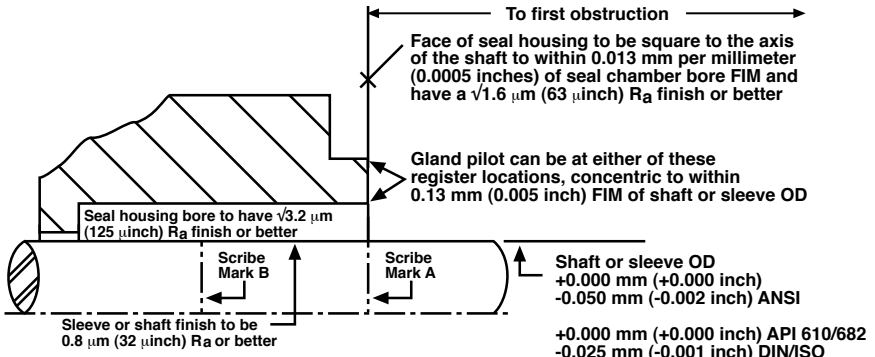
1.1 **Follow plant safety regulations** prior to equipment disassembly:

- Lock out motor and valves.
- Wear designated personal safety equipment.
- Relieve any pressure in the system.
- Consult plant MSDS files for hazardous material regulations.

1.2 **Adjust the bearings, coupling, and impeller** so that the shaft is in its operating axial position. This shaft position must be used to check all seal setting (SS) dimensions during installation. **Disassemble equipment to allow access to seal installation area.**

1.3 **Remove all burrs, nicks or scratches, and sharp edges** from the shaft and sleeve including sharp edges of keyways and treads. Replace worn shaft or sleeve. Make sure the seal housing bore, face, and sealing fluid flush taps are clean and free of burrs and sharp edges that might damage gasket.

Seal Chamber Requirements Figure 1



- **Bearings must be in good condition**
- **Maximum lateral or axial movement of shaft (end play) = 0.25 mm (0.010 inch) FIM**
- **Maximum shaft runout at face of seal housing = 0.05 mm (0.002 inch) FIM**
- **Maximum dynamic shaft deflection at seal housing = 0.05 mm (0.002 inch) FIM**

1.4 **Check requirements** for shaft, sleeve, and seal housing. See Figure 1.

1.5 **Check assembly drawing** included with the seal for equipment dimensions, seal design, materials of construction, and piping connections.

1.6 **Check shaft or sleeve OD, box depth, box bore, and distance to the first obstruction** to ensure that they are dimensionally the same as shown on the seal assembly drawing.

1.7 **Check gland pilot and bolt holes** to ensure they are adaptable to the equipment and are the same as shown on the assembly drawing.

1.8 **Handle all seal parts with care**, they are manufactured to precise tolerances. The seal faces are of special importance. These two sealing faces are lapped flat to within two light bands (23.2 millionths of an inch). **Keep the seal faces perfectly clean at all times.**

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 Assembly of Seal Components

2.1 **Prepare bellows assembly for installation.**

2.1.1 Install the set screws in bellows assembly.

Caution: Be sure set screws do not protrude into bellows assembly bore which would cause interference when sliding bellows assembly onto shaft.

2.1.2 Lubricate and install bellows assembly O-ring, using silicone base grease only, unless otherwise specified on the drawing.

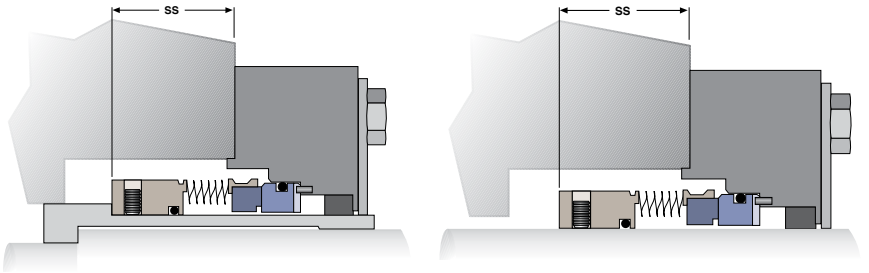
3 Seal Setting for Seal on Shaft or Customer's Sleeve

For proper seal installation, you must obtain the correct seal assembly drawing for your application.

3.1 Inspect pump shaft. Clean and remove any burrs, nicks, scratches, etc. which could cause damage to gaskets when assembling seal.

3.2 Secure the seal assembly in place at its correct seal setting position (SS) by tightening the rotating assembly set screws. See Figure 2. Refer to the seal assembly drawing for correct seal setting dimension.

Installed Seal Assembly on Shaft or Customer's Sleeve Figure 2

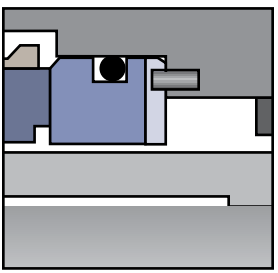


O-ring Mounted Stationary Face

3.2.1 Assemble seat gasket to stationary face lubricate gasket with silicone base grease only, unless otherwise specified on seal drawing) and install in gland.

Caution: If anti-rotation pin is used, make sure stationary face is properly seated. Do not get grease on running face.

3.2.2 Install gland gasket - Use silicone grease if necessary to retain gasket.



O-ring Mounted Face

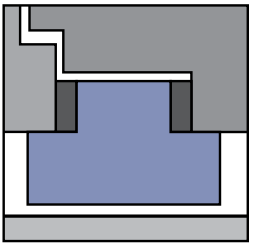
Clamped Stationary Face

3.2.3 Install flat gasket into gland.

3.2.4 Install stationary face into gland.

3.2.5 Install second flat gasket to stationary face.

Note: If two gasket materials are supplied, install PTFE gasket at this location. Use silicone grease to retain gasket if necessary. **Do not** get grease on running face.



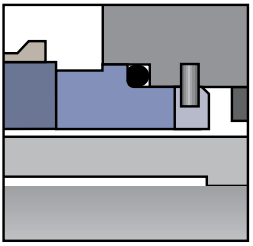
Clamped Mounted Face

L-Shaped Stationary Face (BXLS)

3.2.6 Assemble seat gasket to stationary face (lubricate gasket with silicone base grease only, unless otherwise specified on seal drawing) and install in gland.

Caution: If anti-rotation pin is used, make sure stationary face is properly seated. Do not get grease on running face.

3.2.7 Install gland - Use silicone grease if necessary to retain gasket.



L-Shaped Mounted Face

3.3 **Using lint free tissue, clean stationary and rotating face** mating surfaces. Alcohol or acetone can be used as a cleaning agent to assure clean, film free, dry faces. Any other materials may cause premature seal failure.

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

3.4 Assemble gland to seal chamber face. See Figure 2.

Caution: During gland assembly over shaft, be sure stationary face is not damaged. Secure bolts attaching gland to housing.

Note: Even torque is required on all flange bolts to assure proper seal operation.

4 Hook Sleeve Mount

For proper seal installation. You must obtain the correct seal assembly drawing for your application.

4.1 **Inspect pump shaft.** Clean and remove any burrs, nicks, scratches, etc. which could cause damage to gaskets when assembling seal.

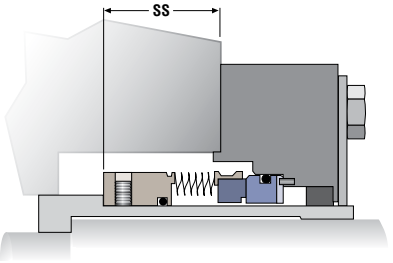
4.2 **Assemble shaft sleeve and flat gasket** to pump shaft and seat in accordance with pump manufacturer's specifications. Inspect for and remove any burrs.

4.3 **Verify seal setting (SS)** reference dimension on the seal drawing. This is the dimension from the seal chamber face to a machined step or locator on the shaft. See Figure 3.

4.4 If shaft sleeve has no locating shoulder, blue sleeve and scribe line for location of spring holder as shown on assembly drawing.

4.5 **Slide rotating assembly** onto shaft sleeve, locating in accordance with the seal assembly drawing. Use caution not to dislodge rotating gasket.

Seal Setting on Hook Sleeve Figure 3



4.6 **Tighten seal assembly** set screws to shaft sleeve insuring seal assembly is retained at proper seal setting location as noted on seal assembly drawing.

O-ring Mounted Stationary Face

4.6.1 Assemble seal gasket to stationary face (lubricate gasket with silicone base grease only, unless otherwise specified on seal drawing) and install in gland.

Caution: If anti-rotation pin is used make sure stationary face is properly seated. **Do not** get grease on running face.

4.6.2 Install gland gasket, use silicon grease if necessary to retain gasket. See O-ring mounted face.

Clamped Stationary Face

4.6.3 Install flat gasket into inner gland.
4.6.4 Install stationary face into gland.

4.6.5 Install second flat gasket to stationary face.

Note: If two gasket materials are supplied, install PTFE gasket at this location. Use silicone grease to retain gasket if necessary. **Do not** get grease on running face See clamped mounted face.

L-Shaped Stationary Face

4.6.6 Assemble seat gasket to stationary face (lubricate gasket with silicone base grease only, unless otherwise specified on seal drawing) and install in gland.

Caution: If anti-rotation pin is used, make sure stationary face is properly seated. **Do not** get grease on running face.

4.6.7 Install gland gasket - Use silicone grease if necessary to retain gasket.

4.7 **Using lint free tissue, clean stationary and rotating face** mating surfaces. Alcohol or acetone can be used as a cleaning agent to assure clean, film free, dry faces. Any other materials may cause premature seal failure.

Caution: Consult material safety data sheet for proper handling of alcohol or acetone.

4.8 **Assemble gland to seal chamber face.** See Figure 3.

Caution: During gland assembly over shaft and sleeve, be sure stationary face is not damaged. Secure bolts attaching gland to housing.

Note: Even torque is required on all gland bolts to assure proper seal operation.

5 Cartridge Mounted

5.1 **For proper seal installation**, you must obtain the correct seal assembly drawing for your application.

5.2 **Inspect pump shaft.** Clean and remove any burrs, nicks, scratches, etc., which could cause damage to gaskets when installing cartridge seal. Ensure gland and sleeve gaskets are installed. It may be necessary to lubricate the shaft with grease to prevent damage to sleeve gasket during installation.

5.3 Carefully install the seal onto the shaft and locate against the face of the seal chamber. Take care not to impact the seal cartridge as damage to internal components can occur.

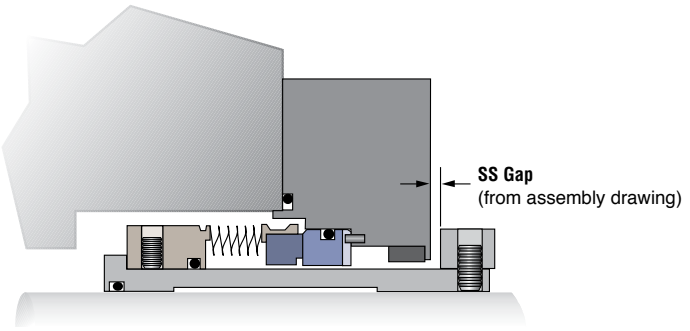
5.4 Orient ports on the seal cartridge as shown on the seal assembly drawing.

5.5 Evenly torque gland bolts/nuts to prevent uneven gland pressure against the seal chamber.

5.6 Adjust bearings, coupling, and impeller so that the shaft is in its final operating position.

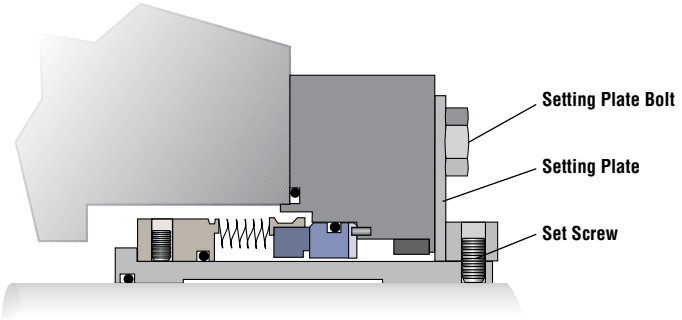
5.7 Setting Devices
A - Type 1 (none)
B - Type 2 (setting plates)
C - Type 3 (setting blocks)

Type 1 (none) Figure 4



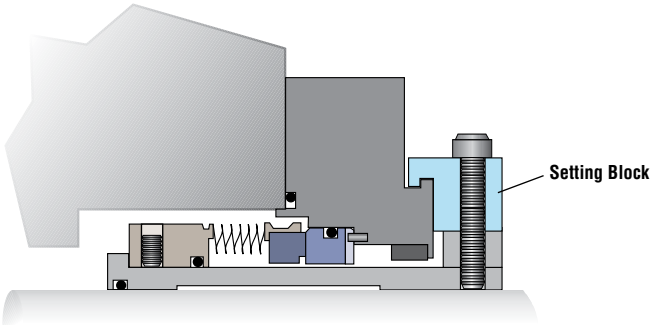
- Determine proper seal setting (SS) gap specified in seal assembly drawing.
- Adjust sleeve drive collar position relative to gland to establish proper gap.
- Tighten drive collar set screws.

Type 2 (setting plates) Figure 5



- Tighten drive collar set screws to shaft.
- Loosen setting plate attachment bolts and rotate setting plates clear of drive collar.
- Retighten setting plate attachment bolts with setting plates clear of drive collar.

Type 3 (setting blocks) Figure 6



- Tighten drive collar set screws to shaft.
- Loosen and remove setting blocks.

6 Piping Instructions

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

Refer to seal assembly drawing for mechanical seal piping instructions.

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

FLOWSERVE®

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

7 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.

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