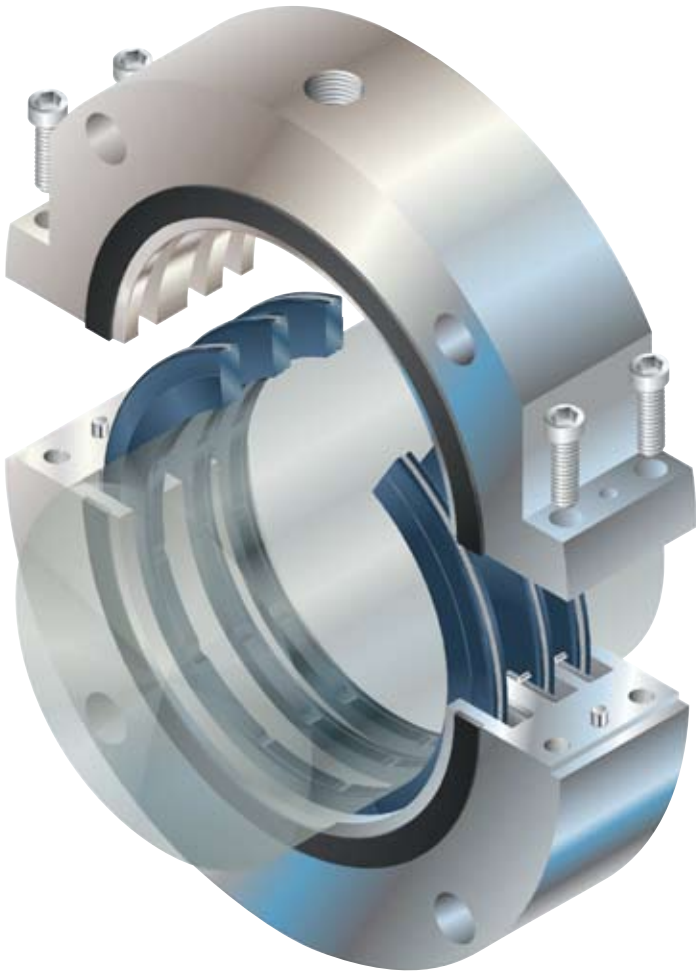




Installation Instructions

Circpac MD

Split Segmented
Circumferential Gas Seal



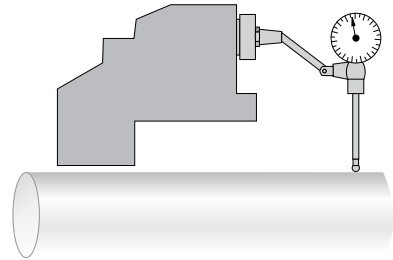
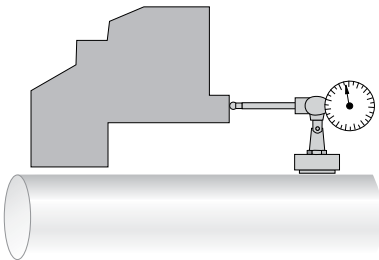
1 Equipment Check and Seal Preparation

- 1.1 Refer to Figure 1 for sleeve/shaft and equipment requirements.
- 1.2 The equipment sleeve/shaft must be clean and free of any burrs, nicks or scratches.
- 1.3 Check seal assembly drawing for specific equipment requirements, reference dimensions, special instructions, piping connections, and materials of construction.

Figure 1

Seal chamber squareness to the shaft centerline should be within 0.25 mm per 25 mm shaft diameter (0.010" per 1" shaft diameter). Seal chamber face surface finish should be 125 RMS or better.

Shaft runout should not exceed 0.10 mm (0.004") FIM. Shaft surface finish should be 16 RMS or better.

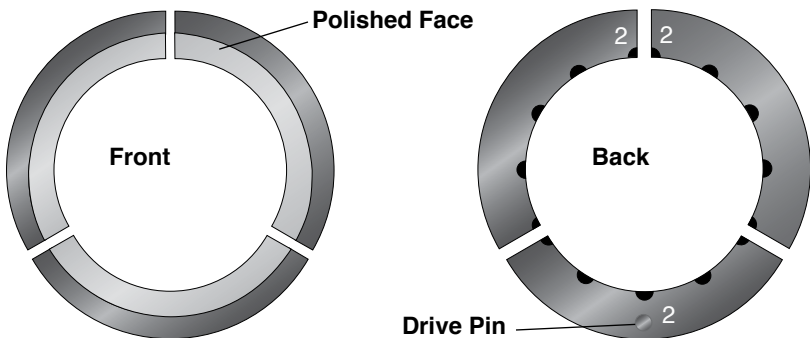


- 1.4 Segmented rings have matched joints and must be mated together per the segment numbering scheme shown in Figure 2 for 3 segment rings. During assembly, keep all numbers facing the same direction. The polished side is a sealing surface and should be handled carefully.

Note: Do not use grease or other lubricants on segmented carbon rings, housing, or shaft.

- 1.5 Use caution when handling heavy gland ring halves. Maneuver and support large parts carefully to avoid personal injury and/or damage to segmented rings.

Figure 2

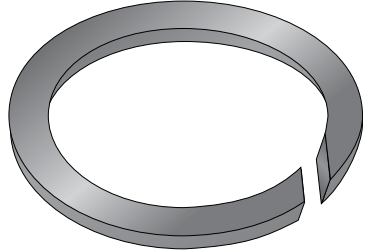


2 Seal Installation (Split Housing Designs)

Seal components are assembled in the following order: housing gasket (if separate), bottom housing half, segmented rings, and upper housing half. Housing gasketing, housing weight support, centering methods, and multiple ring sequencing should be considered prior to starting.

- 2.1 The housing gasket may be supplied split and bonded to the housing halves or as a solid ring, depending on gasket type. If the gasket is already bonded to the housing halves, no extra preparation is necessary. Otherwise, with a sharp cutting instrument, carefully cut the gasket tangential to the gasket ID with a 45° bias in the thickness, as shown in Figure 3. At the cut joint, bend the gasket to fit around the shaft. Position the gasket near the equipment face.

Figure 3



- 2.2 The housing half with drive pin slots at the joint surface is the bottom half of the housing ring and is installed first. Orient the lower housing half toward the equipment in the direction indicated on the seal assembly drawing or marked on the housing. Support the lower half of the housing on the equipment with loosely engaged bolts or studs such that the gasket area is accessible and the segmented ring grooves are fully exposed.

Figure 4



- 2.3 If the seal is designed with multiple segmented rings, start at the housing end that will be obstructed by additional rings. Complete each ring before starting the next. Complete each ring before starting the next.

- 2.4 Feed the garter spring into the ring groove in the lower housing half. Leave an equal amount of spring hanging out on each side.

Figure 5



Figure 6

- 2.5 Select a ring segment that does not have the drive pin. Position it over the groove in the lower housing half. Make sure the numbered side faces the pin slot in the housing joint surface. Rotate the first segment into the groove. The garter spring should be on the outside diameter of the segment.



- 2.6 For 3 segment rings, select the other ring segment that does not have the drive pin, keeping the numbered ends in order as described in Figure 2. Make sure the numbered side faces the pin slot in the housing joint surface. Rotate the second segment into the groove such that the segment ends are exposed. The garter spring should be on the outside diameter of both segments.

Figure 7

- 2.7 Complete the ring with the final segment, again with the numbered side facing the pin slot in the housing joint surface. There will be a gap between one of the joints.

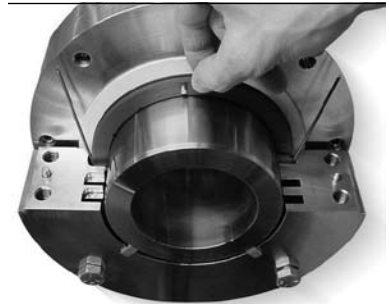


Figure 8

- 2.8 Carefully hook the ends of the garter spring within the groove in the segmented ring. Do not overstretch the spring.



Figure 9

- 2.9 Rotate the ring assembly until the drive pin engages the pin slot at the housing joint.



Figure 10

- 2.10 Repeat steps 2.3-2.9 with all segmented rings. Figure 10 shows a completed 3 ring assembly.



Figure 11

- 2.11 Carefully and slowly lower the upper housing half onto the lower housing half. Install the housing joint cap screws and tighten to 14 N-m (10 ft-lbs) minimum.

- 2.12 If necessary, complete the housing gasket installation as shown on the assembly drawing. A general purpose adhesive may be used to hold the gasket in place. Take care not to contaminate the shaft or rings.

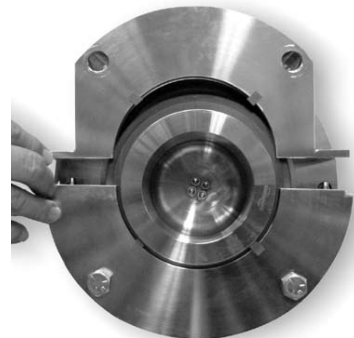


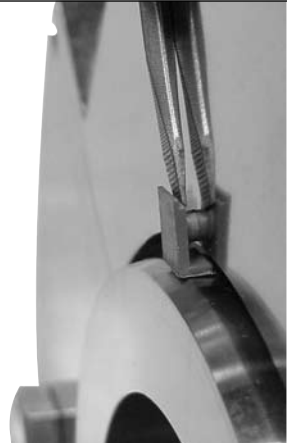
Figure 12

- 2.13 Center the housing assembly on the shaft as required. If centering devices are used, release any housing supports so that the centering devices are properly engaged on the shaft.
- 2.14 Evenly tighten the housing to the equipment until the face gasket is fully compressed and the housing is squarely seated. Torque housing bolts to 34 N-m (25 ft-lbs) minimum.



Figure 13

- 2.15 Remove centering devices, if applicable.
- 2.16 Connect piping if required.



3 Seal Installation (Non-split Housing Designs)

- 3.1 Circpac MD seals with non-split housings are pre-assembled at the factory for cartridge installation. Unless otherwise indicated on the seal assembly drawing, an installation plug is installed in the seal bore to guide the rings onto the equipment shaft during installation. If no installation plug is used, the shaft/sleeve end must have a smooth, 30 degree by 3.2 mm (0.125") lead-in chamfer to ramp the rings onto the shaft.
- 3.2 Check that the housing gasket is properly installed at the face of the housing.
- 3.3 Carefully slide the housing assembly onto the shaft. The installation plug should be displaced by the shaft and fall away once the last ring has mounted the shaft.
- 3.4 Center the housing assembly on the shaft as required.
- 3.5 Evenly tighten the housing to the equipment until the face gasket is fully compressed and the housing is squarely seated. Torque housing bolts to 34 N-m (25 ft-lbs) minimum.
- 3.6 Remove centering devices, if applicable.
- 3.7 Connect piping if required.

4 Operational Recommendations

For dual seals, barrier pressure and other controls should be energized prior to starting the equipment or introducing product. Likewise, do not remove pressure or controls until the equipment has been fully shut down and vented.

The Circpac MD is designed to operate with clean air or nitrogen barrier gas. Check seal assembly drawing for recommended barrier pressure setting.

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

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 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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