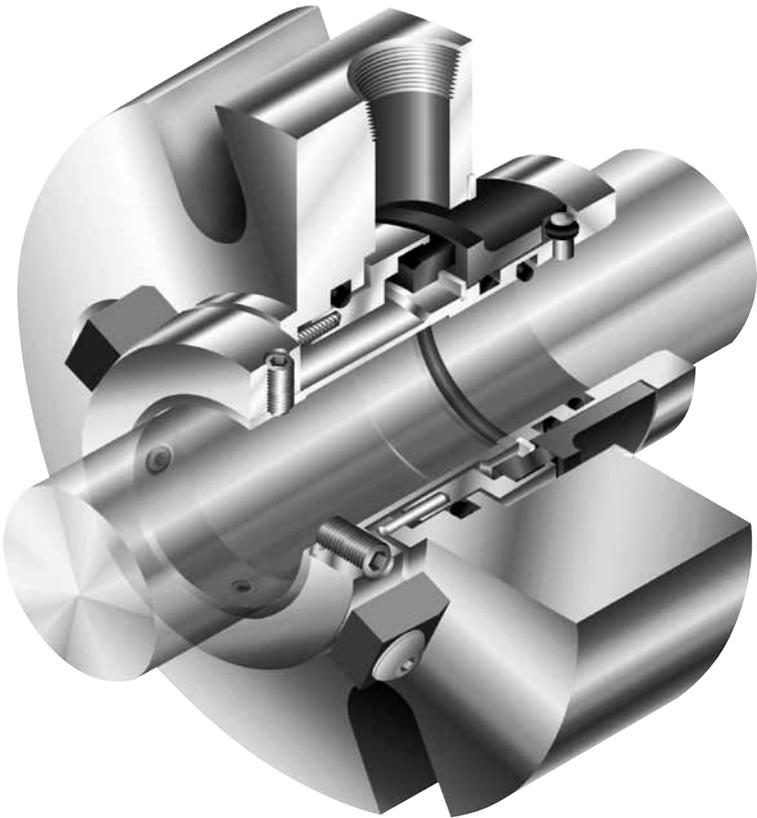




Installation Instructions

Durametallic® P-50

A cartridge mounted, flexible stator
pusher seal design for general
service applications



Congratulations

You have just purchased a reliable, long-life product manufactured by the leading manufacturer of sealing systems in the world. With proper installation and operation, this P-50 seal can be a valuable contributor to your operation by significantly reducing the mean time between planned maintenance (MTBPM) of your rotary equipment.

Description

This P-50 seal is a cartridge mounted mechanical seal, designed for ease of installation and reliable operation. **No seal setting dimensions are required.** Removable setting devices provide proper alignment. The flexible stationary face design compensates for inadvertent misalignment of the seal chamber face. Multiple springs provide uniform face loading and are external of the pumpage, resisting clogging or hang-up. Installation according to the following steps will assure long trouble free life of the P-50 seal.

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 **Disassemble equipment** in accordance with equipment manufacturer's instructions to allow access to seal installation area.

1.3 **Remove existing mechanical seal and gland** or compression packing and packing gland.

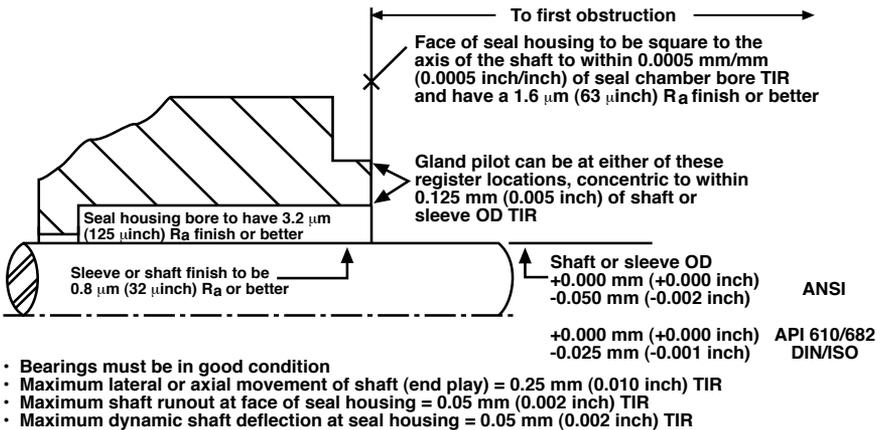
1.4 Make sure the shaft or sleeve and the **seal housing face are clean** and free of burrs, cuts, dents, or corrosion that might cause leakage past the sleeve gasket O-ring or gland gasket. Replace worn shaft or sleeve. **Remove sharp edges** from keyways and threads.

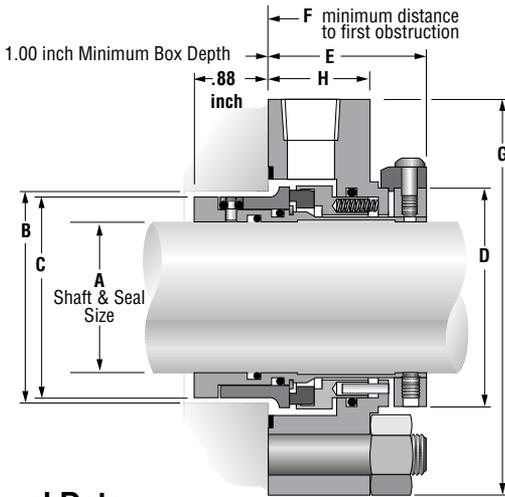
The images of parts shown in these instructions may differ visually from the actual parts due to manufacturing processes that do not affect the part function or quality.

- 1.5 **Check equipment dimensions** to ensure that they are within the dimensions shown in **Figures 1 and 2**. Critical dimensions include shaft or sleeve OD (**A**), a chamber depth of at least 25.4 mm (1.000 inch), minimum and maximum seal housing bore (**B**), and the minimum distance to the first obstruction (**F**).
- 1.6 **Check gland bolting** to ensure that bolt diameter and bolt circle conform to the dimensions shown in Figure 2.
- 1.7 **Handle the P-50 with care**, it is manufactured to precise tolerances. The stationary and rotating sealing faces are of special importance. They are lapped flat to within three light bands (34.8 millionths of an inch). Keep the seal faces perfectly **clean at all times**.

Seal Chamber Requirements

Figure 1





Dimensional Data
(inches)

A	B	B	C	D	E	F	G	H	Min. Bolt Circle for Bolt Dia.			
Shaft & Seal Size	(Min)	(Max)							.375	.500	.625	.750
1.000	1.625	2.000	1.50	1.750	1.88	2.00	3.69 - 3.75	1.19	2.75	2.88		
1.125	1.750	2.125	1.62	1.875	1.88	2.00	3.81 - 3.88	1.19	2.88	3.00		
1.250	1.875	2.250	1.75	2.000	1.88	2.00	4.19 - 4.25	1.19	3.00	3.12		
1.375	2.000	2.375	1.88	2.125	1.88	2.00	4.19 - 4.25	1.19	3.12	3.25		
1.500	2.250	2.625	2.12	2.375	1.88	2.00	4.69 - 4.75	1.19	3.44	3.56		
1.625	2.375	2.750	2.25	2.500	1.88	2.00	4.69 - 4.75	1.19	3.56	3.69		
1.750	2.500	2.875	2.38	2.625	1.88	2.00	4.94 - 5.00	0.96	3.62	3.75		
1.875	2.625	3.000	2.50	2.750	1.88	2.00	4.94 - 5.00	1.19	3.75	3.88		
2.000	2.750	3.125	2.62	2.875	1.88	2.00	5.06 - 5.12	1.19	3.94	4.06	4.25	
2.125	2.875	3.250	2.75	3.000	1.88	2.00	5.94 - 6.00	1.06	4.06	4.19	4.38	
2.250	3.000	3.375	2.88	3.125	1.88	2.00	6.44 - 6.50	1.19	4.19	4.31	4.50	
2.375	3.250	3.625	3.12	3.375	2.00	2.12	6.31 - 6.38	1.19	4.44	4.56	4.75	
2.500	3.375	3.750	3.25	3.500	2.00	2.12	6.56 - 6.62	1.00	4.56	4.69	4.88	
2.625	3.500	3.875	3.38	3.625	2.00	2.12	7.19 - 7.25	1.19	4.69	4.81	5.00	5.25
2.750	3.625	4.000	3.50	3.750	2.00	2.12	7.69 - 7.75	1.19	4.81	4.94	5.12	5.38
2.875	3.750	4.125	3.62	3.875	2.00	2.12	7.94 - 8.00	1.19	4.94	5.06	5.25	5.50
3.000	3.875	4.250	3.75	4.000	2.00	2.12	8.06 - 8.12	1.19	5.06	5.19	5.38	5.62
3.125	4.000	4.375	3.88	4.125	2.00	2.12	8.19 - 8.25	1.19	5.19	5.31	5.50	5.75
3.250	4.125	4.500	4.00	4.250	2.00	2.12	8.31 - 8.38	1.19	5.31	5.44	5.62	5.88
3.375	4.250	4.625	4.12	4.375	2.00	2.12	8.44 - 8.50	1.19	5.44	5.56	5.75	6.00
3.500	4.375	4.750	4.25	4.500	2.00	2.12	8.56 - 8.62	1.19	5.56	5.69	5.88	6.12
3.625	4.500	4.875	4.38	4.625	2.00	2.12	8.69 - 8.75	1.19	5.69	5.81	6.00	6.25
3.750	4.625	5.000	4.50	4.750	2.00	2.12	8.81 - 8.88	1.19	5.81	5.94	6.12	6.38
3.875	4.750	5.125	4.62	4.875	2.00	2.12	8.94 - 9.00	1.19	5.94	6.06	6.25	6.50
4.000	4.875	5.250	4.75	5.000	2.00	2.12	8.94 - 9.00	1.19	6.06	6.19	6.38	6.62

2 P-50 Installation

Note: No seal setting measurements are needed to install the P-50 seal. Instructions are for vertically split case end-suction ANSI pumps. Modifications of the procedure may be required for other style pumps. Consult Flowserve.

2.1 **Tools needed** for installation:

- An open end wrench for the gland bolt nuts
- 1/8" Allen wrench (provided)
- 3/32" Allen wrench (provided)
- 3/16" Allen wrench (provided) for sizes > 2.250 inch

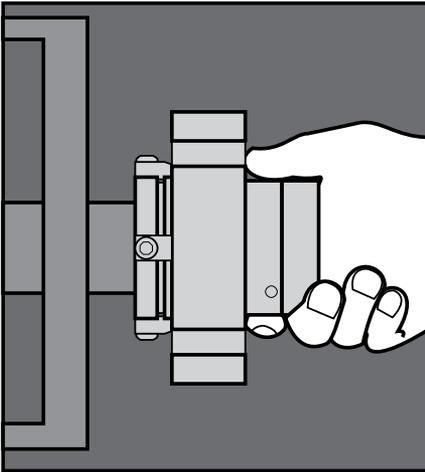


Figure 3

2.2 **Lubricate the shaft** or sleeve lightly with silicone lubricant.

2.3 **Install the complete P-50** cartridge assembly onto the shaft or sleeve with the setting devices near the bearing housing. See Figure 3.

2.4 **Install the pump back plate** (seal chamber) and bolt it in place on the bearing frame. See Figure 4.

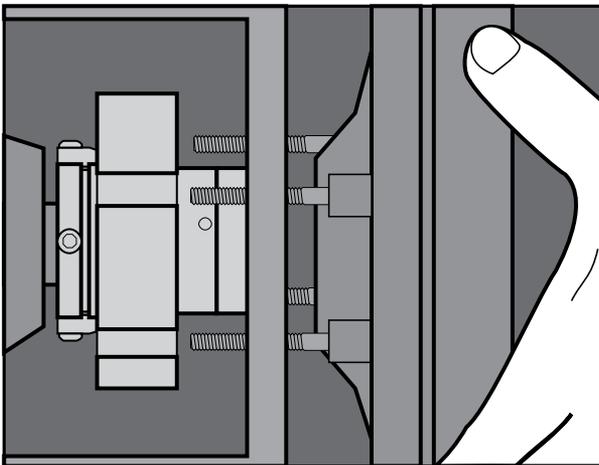


Figure 4

2.5 **Position the P-50** with the gland tight against the seal chamber face. Turn the gland so that the flush tap is as close to the 12:00 o'clock position as possible and so that the flush piping will clear the bearing frame. **Tighten the gland nuts** evenly in a diagonal sequence. Do not overtighten the gland nuts, as this can warp seal parts and cause leakage.

2.6 **Assemble the pump.** Avoid pipe strain. Align coupling properly.

2.7 With the impeller, shaft, coupling, and bearings in their final operating positions, **tighten the P-50 set screws.** See Figure 5.

2.8 **Remove the setting devices** from the drive collar. See Figure 6. Save the setting devices for future use when the pump impeller is reset or when the seal is removed for repairs.

2.9 **Turn the shaft** by hand to ensure unobstructed operation.

2.10 See **Operational Recommendations** before start-up.

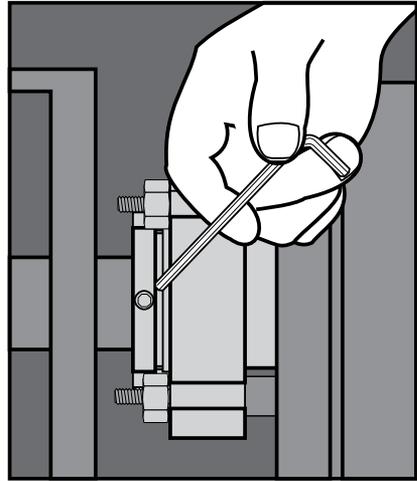


Figure 5

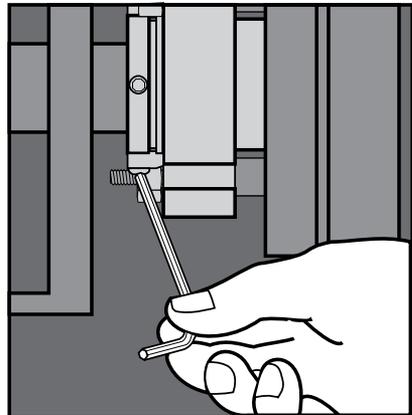


Figure 6

3 Operational Recommendations

- 3.1 Install an **adequate seal flush** system. The P-50 requires a clean cool environment for maximum seal life. With a clean cool product use a bypass flush from the pump discharge (plan 13). With clean hot product, use a bypass flush through a cooler (plan 21). With abrasive products or products that are incompatible with the seal, use a flush from a clean external source (plan 32).

Note: All piping plan designations used in these instructions are from API 682. For the corresponding ASME B73 piping plan designation, please add a 73 in front of the referenced piping plan.

- 3.2 **Remove lock outs** on pump and valves.
- 3.3 **Do not start up the equipment dry** to check motor rotation, etc. Open valves to flood pump with product fluid. Ensure that the seal flush system is operating. Vent air from the casing of the pump and the seal chamber before startup.
- 3.4 **Observe the start-up.** If the seal runs hot or squeals, check the seal flush system. Do not allow the equipment to run for any extended time if the seal gets hot or squeals.

4 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.

4.1 Repair Procedures

4.1.1 These instructions are to be used in conjunction with the P-50 Repair Kit. The Repair Kit contains replacement seal faces, secondary seals, and other special hardware. The parts are identified in Figure 7. The repair should be done in a clean, well lit area. The **tools you will need** to do the repair include:

- Alcohol
- Paper towels or cloths
- Small screw driver
- 1/8" Allen wrench (provided)
- 3/32" Allen wrench (provided)
- 3/16" Allen wrench (provided) for sizes > 2.250 inch

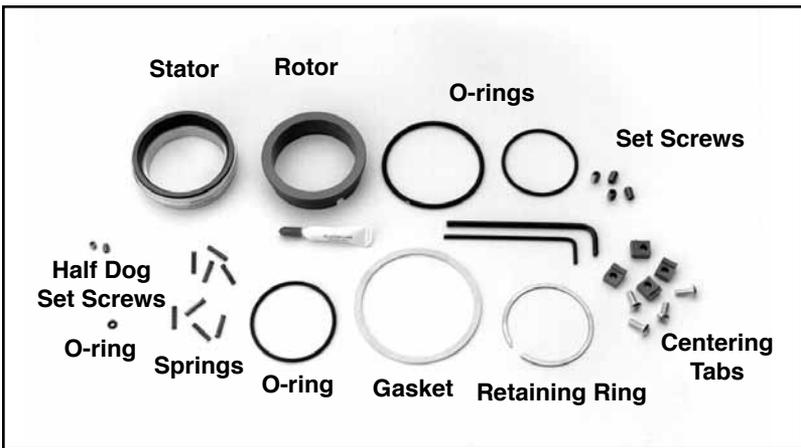


Figure 7

For special problems encountered during the repair procedure, contact your nearest Flowserve Sales and Service Representative.

4.2 Disassembly

- 4.2.1 **Replace the centering tabs** on the sleeve collar before removal of the gland bolt nuts.
- 4.2.2 **Remove the seal** from the pump.
- 4.2.3 **Remove** and discard the **centering tabs and set screws**.
- 4.2.4 **Remove the sleeve collar**.
- 4.2.5 **Turn the assembly "gasket side up"** and lift out the sleeve and rotor. See Figure 8.



Figure 8

4.2.6 **Remove the rotor retaining ring** from the sleeve and remove the rotor from the sleeve.

4.2.7 **Remove the O-rings** from the sleeve and discard. Be careful not to mar the sleeve.

4.2.8 **Pull the stator** from the gland ring bore and remove and discard the springs. See Figure 9.



Figure 9

4.2.9 **Remove the stator mounting O-ring and face gasket**, from the gland and discard.

Note: Parts which should be discarded include the O-rings, gasket, springs, centering tabs and centering tab cap screws and set screws.

Parts which may be reused if in satisfactory condition include the sleeve, gland and sleeve collar.

Parts which may be reconditioned by an authorized Flowserve repair facility include the rotor and stator.

4.3 Re-assembly

4.3.1 **Install new set screws** into the collar. Be careful to locate the cup point and half dog point set screws in the proper holes. See Figure 10.

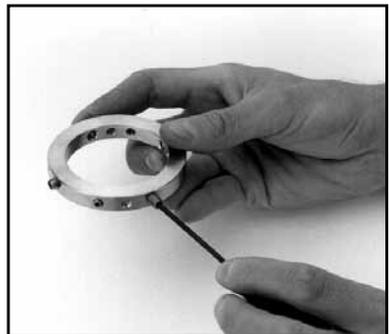


Figure 10

4.3.2 Coat all **sleeve O-rings** with silicone lubricant and **install them onto the sleeve**. See Figure 11.

Note: Earlier versions of the P-50 utilized a different pin drive design which does not require O-ring. If the pin in the sleeve is not grooved for an O-ring, the O-ring will not be used.

Note: If Duraflon encapsulated O-rings are to be installed, contact your local Flowserve repair facility for proper installation.

4.3.3 **Install the rotor** onto the sleeve aligning the drive slot with the pin. See Figure 12.

4.3.4 **Install the rotor retaining ring**. Be careful not to nick, scratch or damage the rotor face.

4.3.5 Place the sleeve/rotor assembly rotor face up and **clean the face** with alcohol. See Figure 13.

4.3.6 **Install new springs** into the stator, **clean the stator face** with alcohol and place it down onto the rotor. Be sure the springs are placed in the proper (deeper) holes. See Figure 14.



Figure 11



Figure 12



Figure 13

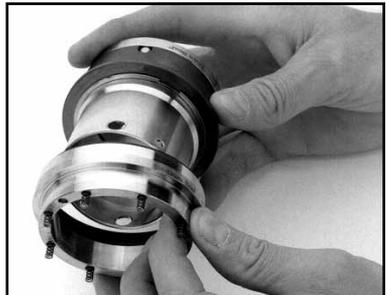


Figure 14

4.3.7 Coat the **stator O-ring** with silicone lubricant and **install it into the gland ring groove**.

4.3.8 **Place the gland ring over the stator** being careful to engage the anti-rotation pins. See Figure 15.

4.3.9 **Install the sleeve collar** onto the sleeve and align the set screws with the holes. See Figure 16.

4.3.10 **Engage all set screws into the holes.** Back off the dog point set screws by one quarter turn after bottoming.

4.3.11 **Install the centering tabs** by pressing the gland ring down to compress the springs. Locate the tab lips into the gap between the gland and sleeve collar. See Figure 17.

4.3.12 **Apply a light coating of silicone lubricant** to one side of the gland face gasket to help the gasket adhere to the gland.

4.3.13 **Rotate the sleeve by hand** to ensure freedom of movement of the rotating parts.

4.3.14 The P-50 is now ready for installation. Follow the procedures in Section 2 of these instructions for proper installation.



Figure 15

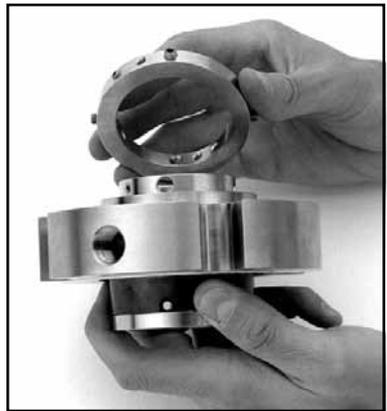


Figure 16

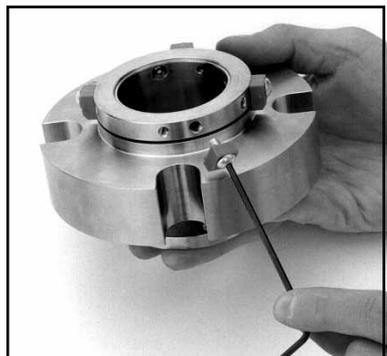


Figure 17



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