

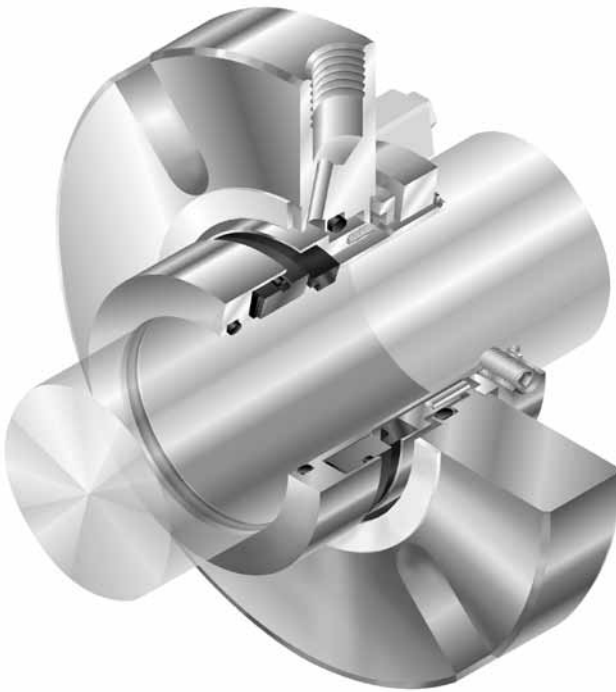


Installation Instructions

Five Star Seal™ 80 Series

Single, cartridge mounted, flexible stator pusher seal designed for general service applications

84 and 85



Description

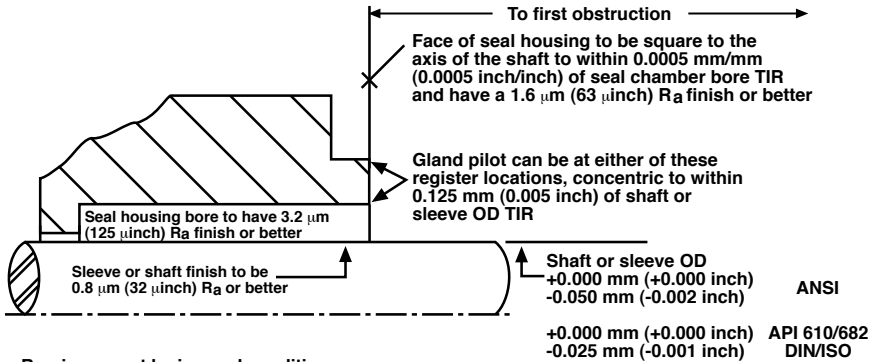
The 84/85 seals are cartridge mounted mechanical seals, designed for ease of installation and reliable operation. **No seal setting dimensions are required.** Rotatable setting devices provide proper alignment. The flexible stationary face design compensates for inadvertent misalignment of the seal chamber 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 84/85 seals.

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. See Figures 1 & 2. Replace worn shaft or sleeve if it is worn in the sleeve gasket area. **Remove sharp edges** from keyways and threads.
- 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 dimension (**G**), minimum and maximum seal housing bore (**C**), and the minimum distance to the first obstruction (**K**). See Figure 2.

Seal Chamber Requirements

Figure 1



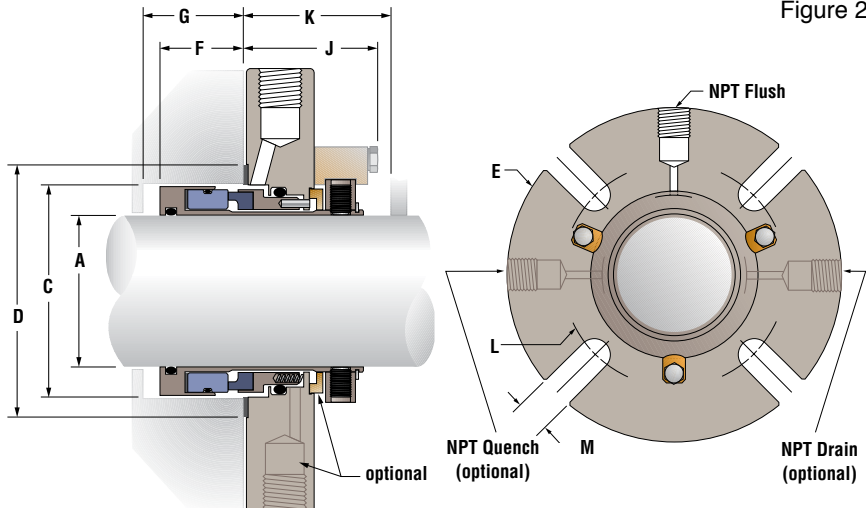
- Bearings must be in good condition
- Maximum lateral or axial movement of shaft (end play) = 0.25 mm (0.010 inch) TIR
- Maximum shaft runout at face of seal housing = 0.05 mm (0.002 inch) TIR
- Maximum dynamic shaft deflection at seal housing = 0.05 mm (0.002 inch) TIR

1.6 **Check gland bolting** to ensure that bolt diameter (**M**) and bolt circle diameter (**L**) conform to the dimensions shown in Figure 2.

1.7 **Handle the 84/85 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**.

84/85 Dimensional Data (inches) for standard bore seal chambers

Figure 2



84/85 Dimensional Data (inches) for standard bore seal chambers continued

Figure 2

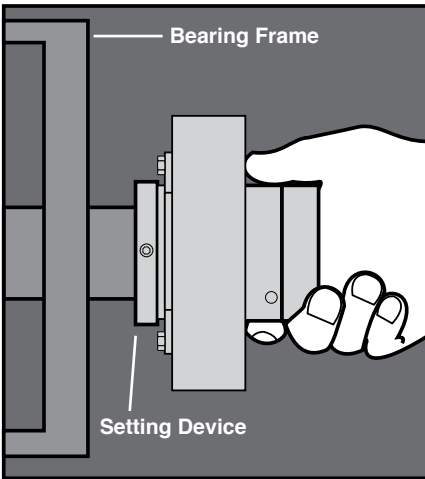
A	C		D	E	F	G		J	K	L	M
Shaft & Seal Size	Box Bore (Min)	Box Bore (Max)	Gasket OD	Gland OD		Box Depth (Min)			Dist to Obst (Min)	Slot Bolt Circle	Bolt Slot Dia.
1.000	1.750	2.010	2.250	4.000	1.025	1.087	1.663	1.725	2.743	0.438	
1.125	1.750	2.135	2.375	4.000	1.025	1.087	1.663	1.725	2.868	0.438	
1.250	2.000	2.260	2.500	4.000	1.025	1.087	1.663	1.725	3.087	0.531	
1.375	2.000	2.385	2.625	4.000	1.025	1.087	1.663	1.725	3.212	0.531	
1.500	2.250	2.510	2.750	4.500	1.025	1.087	1.663	1.725	3.337	0.531	
1.625	2.375	2.635	2.875	5.000	1.025	1.087	1.663	1.725	3.462	0.531	
1.750	2.500	2.760	3.000	5.500	1.025	1.087	1.663	1.725	3.587	0.531	
1.875	2.625	2.885	3.125	5.500	1.025	1.087	1.663	1.725	3.712	0.531	
2.000	2.750	3.010	3.250	5.400	1.025	1.087	1.663	1.725	3.837	0.531	
2.125	2.875	3.135	3.375	6.000	1.025	1.087	1.663	1.725	4.118	0.688	
2.250	3.250	3.760	4.000	6.000	1.025	1.087	1.663	1.725	4.739	0.688	
2.375	3.375	3.885	4.125	6.000	1.025	1.087	1.663	1.725	4.864	0.688	
2.500	3.250	3.760	4.000	6.000	1.025	1.087	1.663	1.725	4.989	0.688	
2.625	3.625	4.135	4.375	6.000	1.025	1.087	1.663	1.725	5.114	0.688	
2.750	3.750	4.260	4.500	7.000	0.860	0.922	1.828	1.890	5.239	0.688	
2.875	3.875	4.385	4.625	7.000	0.860	0.922	1.828	1.890	5.364	0.688	
3.000	4.000	4.510	4.750	8.000	0.860	0.922	1.828	1.890	5.489	0.688	
3.125	4.125	4.635	4.875	8.000	0.860	0.922	1.828	1.890	5.614	0.688	
3.250	4.375	5.135	5.375	8.000	1.548	1.610	2.298	2.360	6.345	0.813	
3.375	4.500	5.260	5.500	8.000	1.548	1.610	2.298	2.360	6.470	0.813	
3.500	4.625	5.385	5.625	8.500	1.548	1.610	2.298	2.360	6.595	0.813	
3.625	4.750	5.510	5.750	8.500	1.548	1.610	2.298	2.360	6.720	0.813	
3.750	4.750	5.510	5.750	8.750	0.893	0.955	1.828	1.890	6.708	0.813	
4.000	5.250	6.010	6.250	9.000	1.420	1.482	2.553	2.615	7.220	0.813	
4.250	5.500	6.260	6.500	9.500	1.420	1.482	2.553	2.615	7.470	0.813	
4.375	5.625	6.385	6.625	9.500	1.420	1.482	2.553	2.615	7.595	0.813	
4.500	5.750	6.510	6.750	10.000	1.420	1.482	2.553	2.615	7.720	0.813	
4.625	5.875	6.635	6.875	10.500	1.420	1.482	2.553	2.615	8.032	1.000	
4.750	5.750	6.573	6.813	9.500	1.298	1.360	2.298	2.360	7.719	0.813	
4.875	6.125	6.885	7.125	11.000	1.420	1.482	2.553	2.615	8.282	1.000	
5.000	6.500	7.510	7.750	11.000	1.709	1.771	2.673	2.735	8.907	1.000	
5.125	6.625	7.635	7.875	11.500	1.709	1.771	2.673	2.735	9.032	1.000	
5.250	6.750	7.760	8.000	11.500	1.709	1.771	2.673	2.735	9.157	1.000	
5.375	6.875	7.885	8.125	11.500	1.709	1.771	2.673	2.735	9.282	1.000	
5.500	7.000	8.010	8.250	11.500	1.709	1.771	2.673	2.735	9.407	1.000	
5.625	7.125	8.135	8.375	11.500	1.709	1.771	2.673	2.735	9.532	1.000	
5.750	7.250	8.260	8.500	12.000	1.709	1.771	2.673	2.735	9.657	1.000	
5.875	7.375	8.385	8.625	12.000	1.709	1.771	2.673	2.735	9.782	1.000	
6.000	7.500	8.510	8.750	12.000	1.709	1.771	2.673	2.735	9.907	1.000	
6.500	8.500	9.510	9.750	12.000	1.987	2.049	2.923	2.985	10.907	1.000	
7.000	9.000	10.010	10.250	14.000	1.987	2.049	2.923	2.985	11.407	1.000	

2 84/85 Installation

Note: No seal setting measurements are needed to install the 84/85 seals. Instructions are for vertically split case end-suction ANSI pumps. Modification 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" and 3/16" hex wrench (provided)
- 5/16" and 3/8" open end wrench (provided)
- Silicone Lubricant



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

2.3 **Install the complete 84/85 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 3

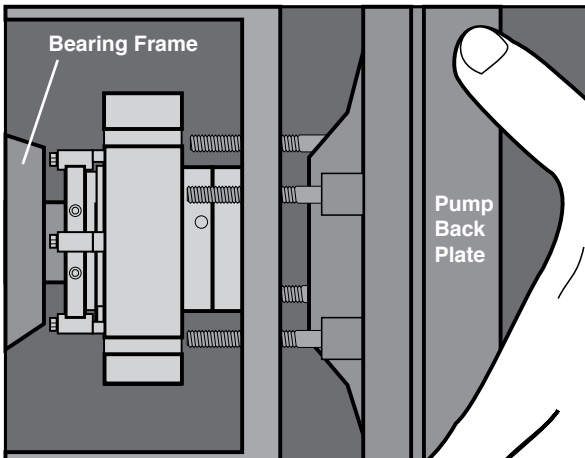


Figure 4

2.5 **Position the 84/85** 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 84/85 set screws**. See Figure 5.

2.8 **Rotate the setting devices** 180° from the drive collar and retighten. See Figure 6. Loosen the hex head bolts in the bronze centering tabs, rotate 180° to clear the drive collar. Retighten the hex head bolts to store the setting device on the gland.

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

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

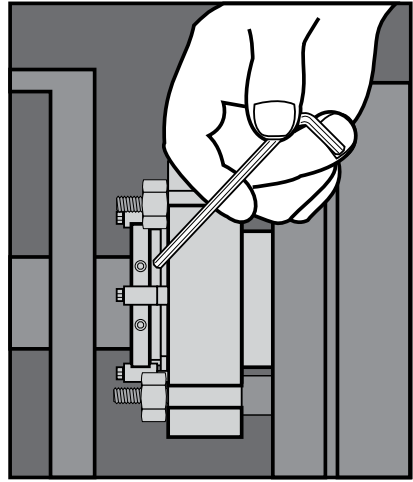


Figure 5

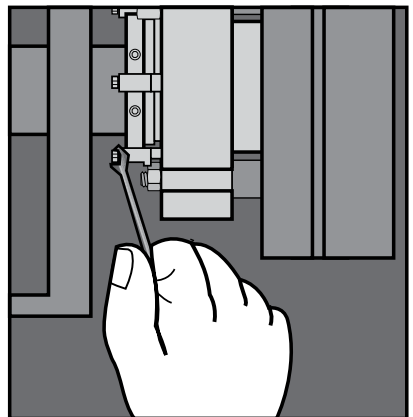


Figure 6

3 Operational Recommendations

- 3.1 Install an **adequate seal flush** system. The 84/85 requires a clean cool environment for maximum seal life. With a clean cool product, use a bypass flush from the pump discharge (plan 11) or a bypass flush to the pump suction (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 start-up.
- 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 Operational Recommendations

- 4.1 **Do not exceed corrosion limits.** The 84/85 seal is designed to resist corrosion by most chemicals. However, do not expose the 84/85 materials of construction to products outside of their corrosion limits.
- 4.2 **Do not exceed the Pressure limits** of the 84/85 seal, contact your nearest Flowserve Sales and Service Representative or Authorized Distributor.
- 4.3 **Do not exceed the temperature limits** of the 84/85 seal. The materials of construction are listed on the box label. Turn on cooling water to the supply tank before start up if the tank has coils.

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



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

5 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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