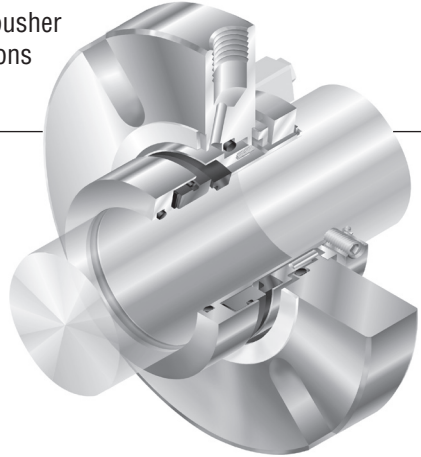


## ***CPM Series***

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



## **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.

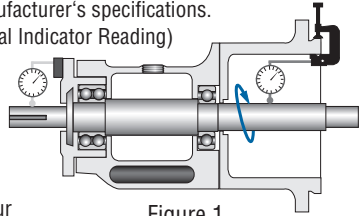


Figure 1

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

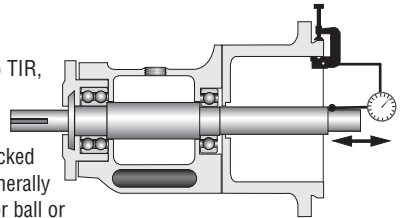


Figure 2

**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.

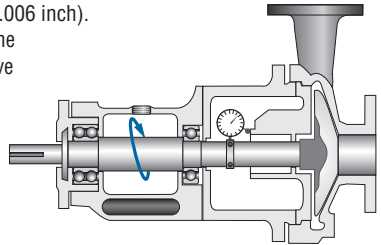


Figure 3

**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.

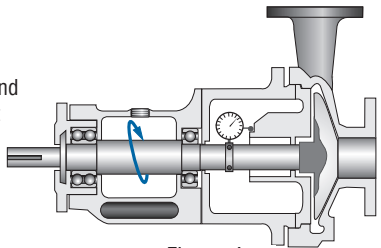
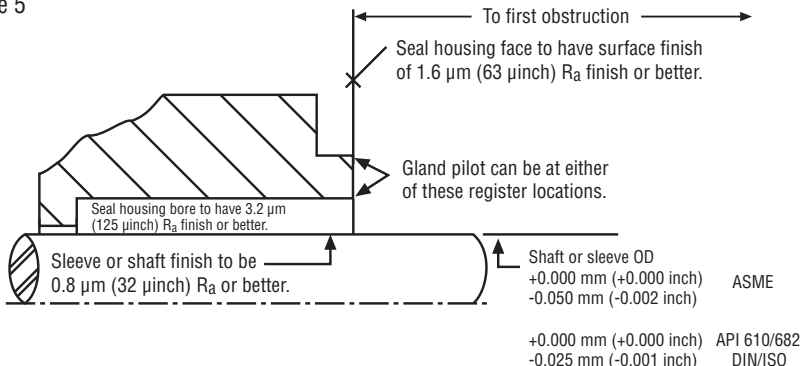
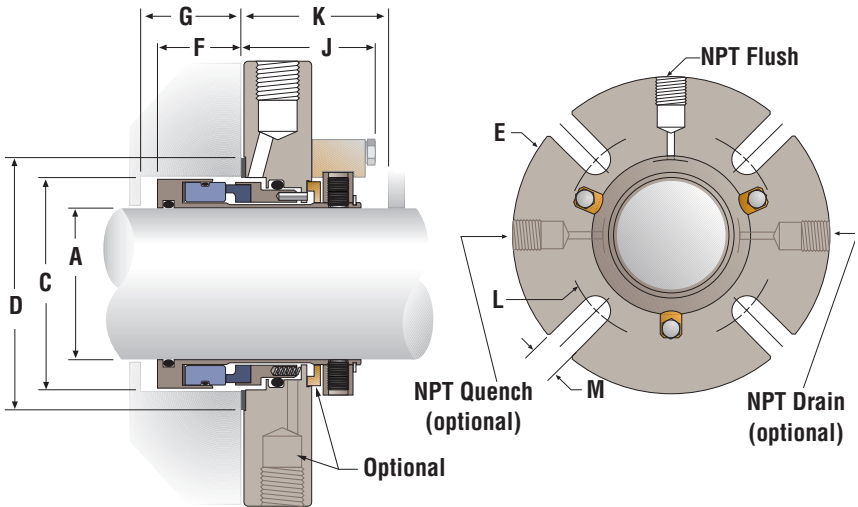


Figure 4

## Surface finish requirements

Figure 5





CPM PX Dimensional Data (inches) for standard bore seal chambers

Figure 7

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.	
1.375	2.000	2.385	2.625	4.000	1.025	1.087	1.663	1.725	3.212	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
2.500	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
3.000	4.000	4.510	4.750	8.000	0.860	0.922	1.828	1.890	5.489	0.688
3.750	4.750	5.510	5.750	8.750	0.893	0.955	1.828	1.890	6.708	0.813
4.750	5.750	6.573	6.813	9.500	1.298	1.360	2.298	2.360	7.719	0.813

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.

## Description

The CPM PX seal is a cartridge mounted mechanical seal, designed for ease of installation and reliable operation. No seal setting dimensions are required. Rotatable setting devices provide proper alignment. The flexible stator 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 CPM PX seal.

## 2 CPM PX Installation

**Note:** No seal setting measurements are needed to install the CPM PX seal. 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 **Check gland bolting** to ensure that bolt diameter (**M**) and bolt circle diameter (**L**) conform to the dimensions shown in Figure 6.

2.3 **Handle the CPM PX 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**.

2.4 **Lubricate the shaft** or sleeve lightly with the lubricant.

2.5 **Install the complete CPM PX** cartridge assembly onto the shaft or sleeve with the setting device toward the bearing housing.

2.4 **Install the pump back plate** (seal chamber) and bolt it in place on the bearing frame. See Figure 9.

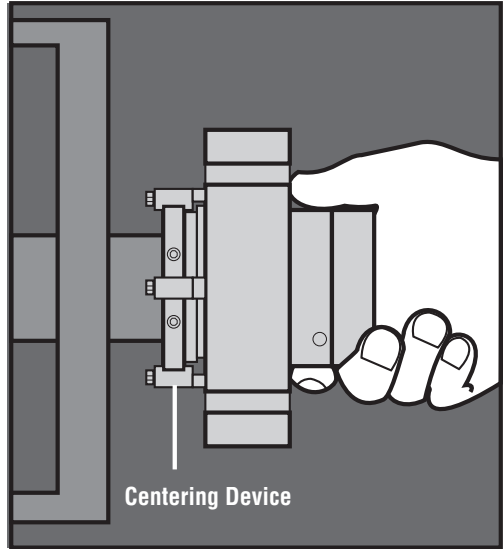


Figure 8

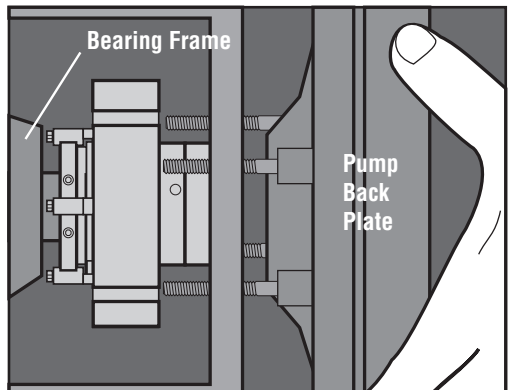


Figure 9

2.5 **Position the CPM PX** 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 CPM PX drive collar set screws.** See Figure 10.

2.8 **Rotate the setting devices 180°** from the sleeve drive collar and retighten. See Figure 11. Loosen the hex head bolts attaching theabronze centering devices to the gland setting devices, rotate 180° to clear the drive collar. Retighten the hex head bolts to store the tabs on the gland.

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

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

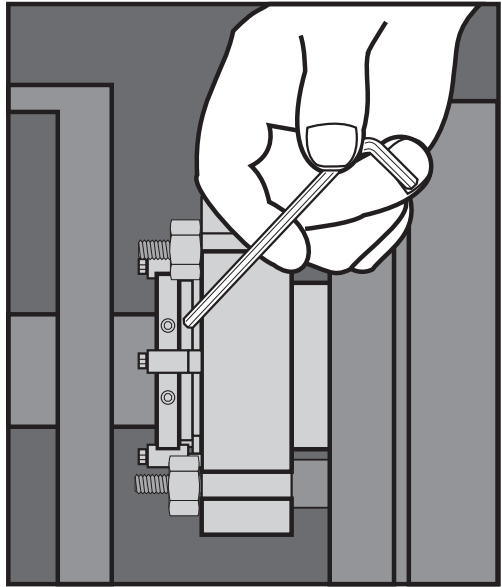


Figure 10

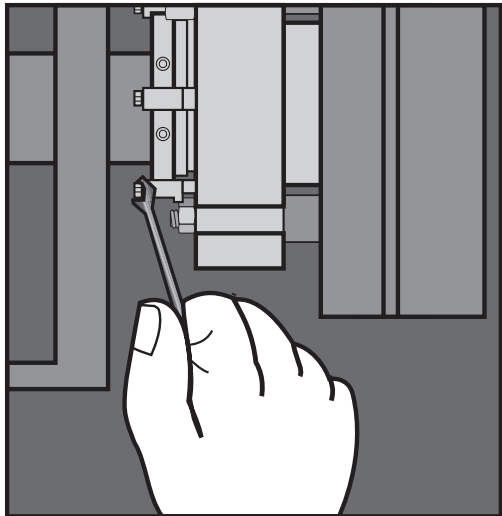


Figure 11

### 3 Piping Recommendations

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- 3.1 Install an **adequate seal flush** system. The CPM PX 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 a clean hot product, use a bypass flush through a cooler (plan 21) or circulation from the seal chamber through a cooling system (plan 23). With abrasive products or products that are incompatible with the seal, use a flush from a clean external source (plan 32).
- 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

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- 4.1 **Do not exceed corrosion limits.** The CPM PX seal is designed to resist corrosion by most chemicals. However, do not expose the CPM PX materials of construction to products outside of their corrosion limits. Consult Flowserve, Flow Solutions for assistance.
- 4.2 **Do not exceed the Pressure limits** of the CPM PX seal, consult Flowserve Flow for assistance.
- 4.3 **Do not exceed the temperature limits** of the CPM PX 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.

## 5 Repair

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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 Safety Data Sheet (SDS) 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.



TO REORDER REFER TO

B/M # \_\_\_\_\_

F.O. \_\_\_\_\_

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**USA and Canada**

Kalamazoo, Michigan USA  
Telephone: 1 269 381 2650  
Telefax: 1 269 382 8726

**Europe, Middle East, Africa**

Etten-Leur, the Netherlands  
Telephone: 31 765 028 200  
Telefax: 31 765 028 487

**Asia Pacific**

Singapore  
Telephone: 65 6544 6800  
Telefax: 65 6214 0541

**Latin America**

Mexico City  
Telephone: 52 55 5567 7170  
Telefax: 52 55 5567 4224