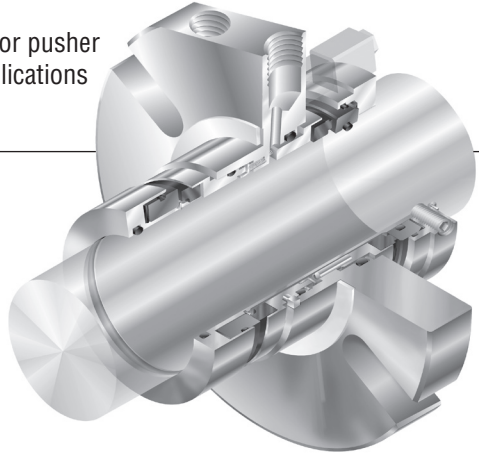


## ***CPM Series***

Dual, cartridge mounted, flexible stator pusher seal designed for general service applications  
CPM PP



## **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.

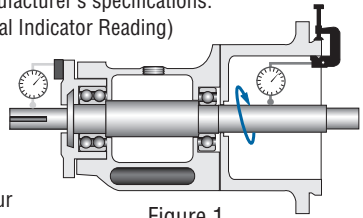


Figure 1

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

**Maximum dynamic shaft deflection** 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).

**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.

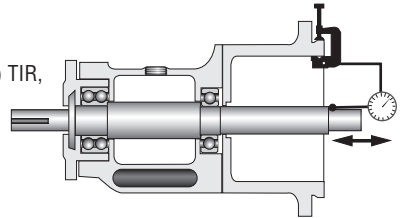


Figure 2

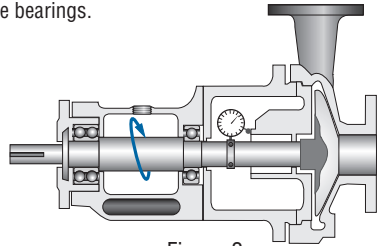


Figure 3

**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.

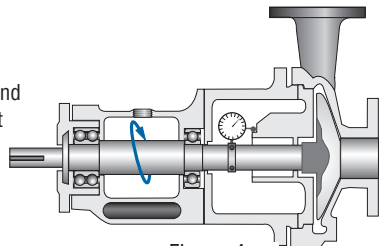
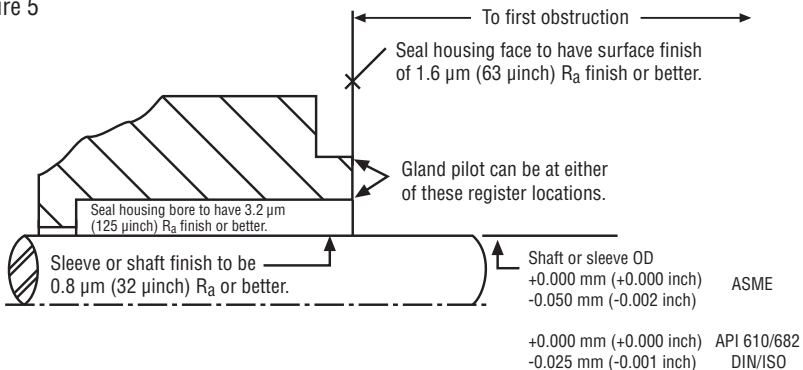


Figure 4

## Surface finish requirements

Figure 5



## Description

The CPM PP 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 PP seal.

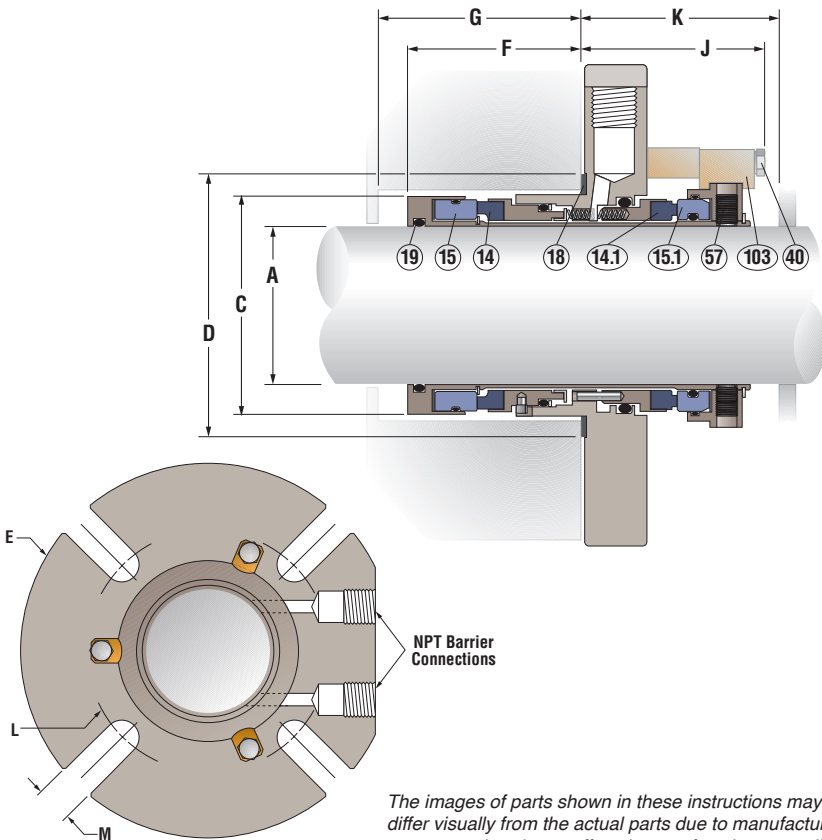
**Check equipment dimensions** to ensure that they are within the dimensions shown in **Figures 5 and 6**. Critical dimensions include shaft or sleeve OD (**A**), a chamber depth of at least dimension (**G**), minimum and maximum seal housing bore (**C**), and the minimum distance to the first obstruction (**K**). See Figure 6.

**Check gland bolting** to ensure that bolt diameter (**M**) and bolt circle diameter (**L**) conform to the dimensions shown in Figure 6.

**Handle the CPM PP with care**, it is manufactured to precise tolerances. The sealing faces consisting of (14) and (14.1) and rotor parts (15) and (15.1) 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**.

### CPM PP Dimensional Data (inches) for standard bore seal chambers

Figure 6



*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.*

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	2.008	2.070	2.146	2.208	3.212	0.531	
1.750	2.500	2.760	3.000	5.500	2.008	2.070	2.146	2.208	3.587	0.531	
1.875	2.625	2.885	3.125	5.500	2.008	2.070	2.146	2.208	3.712	0.531	
2.000	2.750	3.010	3.250	5.400	2.008	2.070	2.146	2.208	3.837	0.531	
2.125	2.875	3.135	3.375	6.000	2.008	2.070	2.146	2.208	4.118	0.688	
2.500	3.250	3.760	4.000	6.000	2.008	2.070	2.146	2.208	4.989	0.688	
2.625	3.625	4.135	4.375	6.000	1.918	1.980	2.146	2.208	5.114	0.688	
3.000	4.000	4.510	4.750	8.000	1.793	1.855	2.271	2.333	5.489	0.688	
3.750	4.750	5.510	5.750	8.750	1.662	1.724	2.825	2.887	6.708	0.813	
4.750	5.750	6.573	6.813	10.500	2.122	2.184	3.156	3.218	7.719	0.813	

## 2 CPM PP Installation

**Note:** No seal setting measurements are needed to install the CPM PP 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 **Lubricate the shaft or sleeve** lightly with silicone lubricant.

2.3 **Install the complete CPM PP cartridge assembly** onto the shaft or sleeve with the setting devices (103) near the bearing housing. See Figure 7.

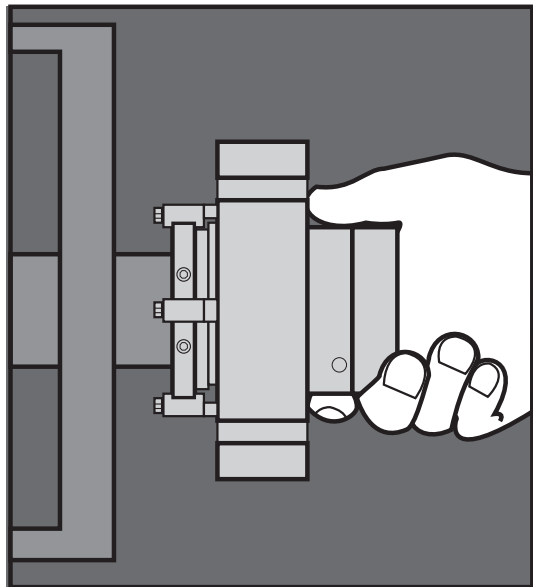


Figure 7

2.4 **Install the pump back plate** (seal chamber) and bolt it in place on the bearing frame. See Figure 8.

2.5 **Position the CPM PP** with the gland tight against the seal chamber face. Turn the gland so that the barrier taps are positioned so that the associated piping will clear the bearing frame. **Tighten the gland nuts** evenly in a diagonal sequence. Do not over tighten the gland nuts, as this can warp seal parts and cause leakage.

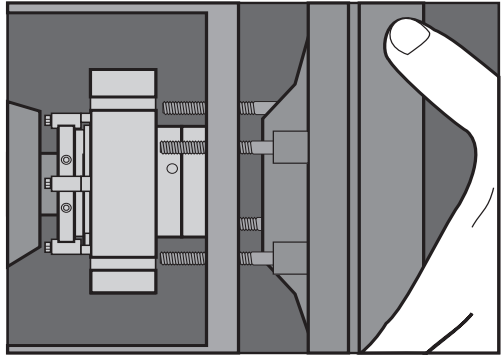


Figure 8

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 PP set screws** (57). See Figure 9.

2.8 **Rotate the setting devices** 180° (103) from the drive collar and retighten. See Figure 10. Loosen the hex head bolts (40) in the bronze setting devices, rotate 180° to clear the drive collar. Retighten the hex head bolts to store the setting devices on the gland.

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

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

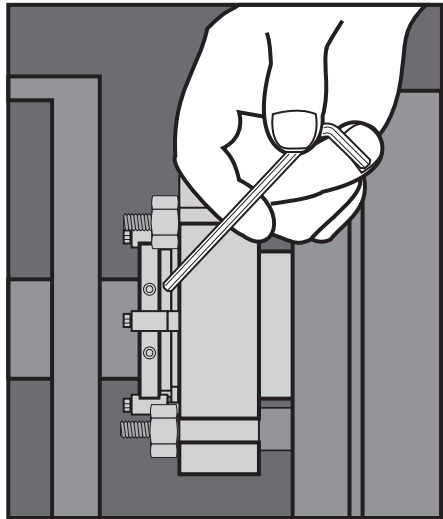


Figure 9

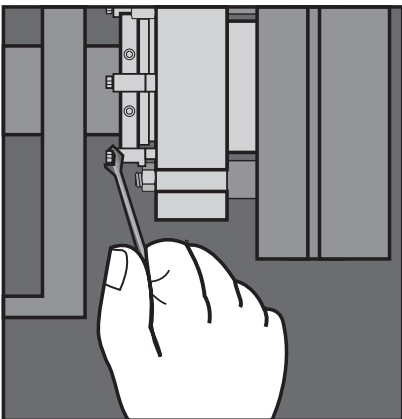
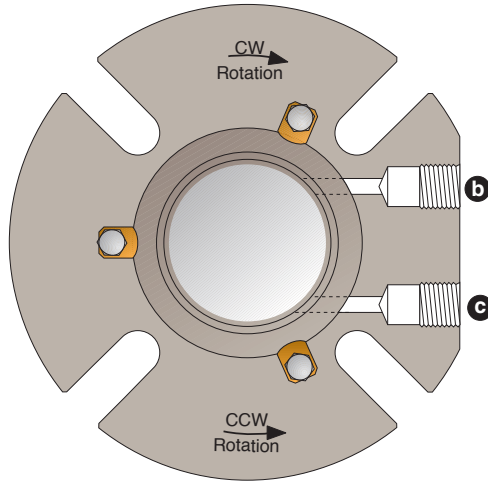


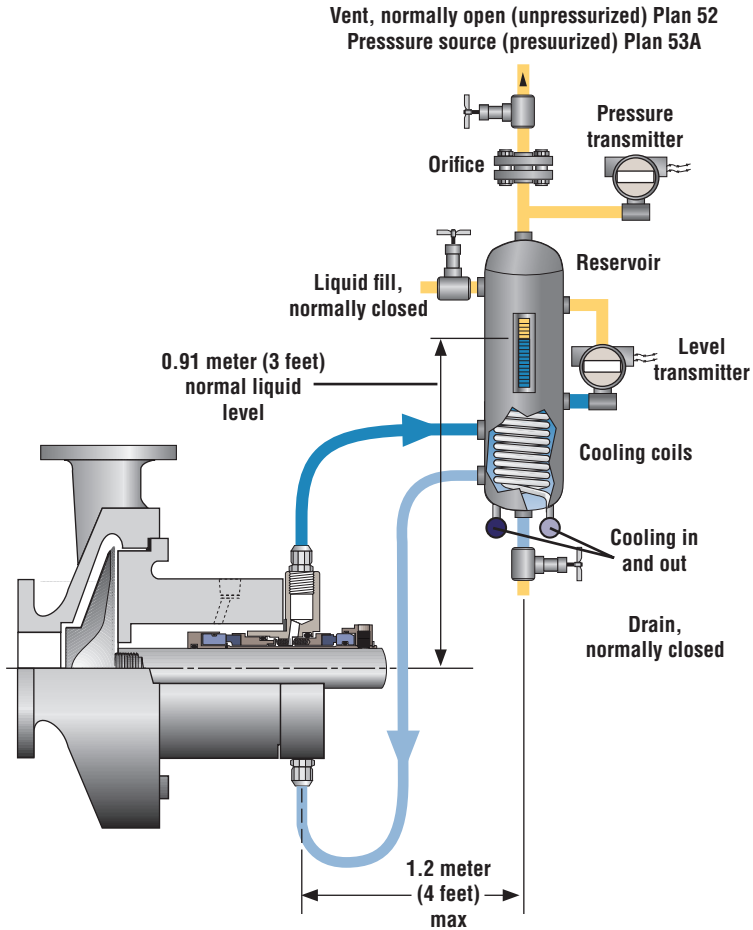
Figure 10

	Inlet	Outlet
Clockwise (CW)	Port <b>c</b>	Port <b>b</b>
Counterclockwise (CCW)	Port <b>b</b>	Port <b>c</b>



### 3 Piping

- 3.1 **Taps **b** and **c** in the gland are barrier fluid inlet and outlet ports.** Use Figure 11 to determine which ports to use as inlet and outlet.
- 3.2 For **dual seal pressurized seal** operation, supply a clean compatible barrier fluid to the inlet port at a pressure at least 170 kPa (25 psi) above the stuffing box pressure. See Figure 12. Flowserve can supply information on barrier fluid flow requirements based on seal size, product temperature, barrier fluid characteristics, and shaft speed. For assistance, contact your nearest Flowserve Sales and Service Representative or Authorized Distributor.
- 3.3 For **dual seal un-pressurized** operation, supply a clean compatible buffer fluid to the inlet port at a pressure below the stuffing box pressure. See Figure 12. Consult your Flowserve Sales and Service Representative for assistance. Flowserve can supply information on buffer fluid flow requirements based on seal size, product temperature, barrier fluid characteristics, and shaft speed.
- 3.4 The **Flowserve Supply Tank** is designed to work with the CPM PP seal to form a self-contained sealing system. The circulating feature in the CPM PP seal provides a positive barrier fluid flow from the seal cavity to the Supply Tank and back to the seal. In most cases the natural cooling of the piping and tank are adequate to remove seal generated heat. Cooling coils are available with the Supply Tank to increase heat dissipation. The Supply Tank can be used with the CPM PP seal in both the dual pressurized or dual unpressurized operating modes.



## 4 Operational Recommendations

- 4.1 **Do not exceed corrosion limits.** The CPM PP seal is designed to resist corrosion by most chemicals. However, do not expose the CPM PP materials of construction to products outside of their corrosion limits. Consult your Flowserve Sales and Service Representative for assistance.
- 4.2 **Do not exceed the Pressure limits** of the CPM PP seal, consult Flowserve, Flow Solutions Division for assistance.
- 4.3 **Do not exceed the temperature limits** of the CPM PP 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.
- 4.4 **Do not start up or run the CPM PP seal dry.** Buffer/barrier fluid must be in the seal cavity at all times during pump operation.

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 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.

FIS165eng REV 9/2018 Printed in USA

**To find your local Flowserve representative**  
and find out more about Flowserve Corporation,  
visit [www.flowserve.com](http://www.flowserve.com)

Flowserve Corporation has established industry leadership in the design and manufacture of its products. When properly selected, this Flowserve product is designed to perform its intended function safely during its useful life. However, the purchaser or user of Flowserve products should be aware that Flowserve products might be used in numerous applications under a wide variety of industrial service conditions. Although Flowserve can provide general guidelines, it cannot provide specific data and warnings for all possible applications. The purchaser/user must therefore assume the ultimate responsibility for the proper sizing and selection, installation, operation, and maintenance of Flowserve products. The purchaser/user should read and understand the Installation Instructions included with the product, and train its employees and contractors in the safe use of Flowserve products in connection with the specific application.

While the information and specifications contained in this literature are believed to be accurate, they are supplied for informative purposes only and should not be considered certified or as a guarantee of satisfactory results by reliance thereon. Nothing contained herein is to be construed as a warranty or guarantee, express or implied, regarding any matter with respect to this product. Because Flowserve is continually improving and upgrading its product design, the specifications, dimensions and information contained herein are subject to change without notice. Should any question arise concerning these provisions, the purchaser/user should contact Flowserve Corporation at any one of its worldwide operations or offices.

© Copyright 2016 Flowserve Corporation

### 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