



2810 Heavy-Duty Modular Double Cartridge Seal

For Large Shaft Diameters – 125 mm – 200 mm (5.00" – 8.00")

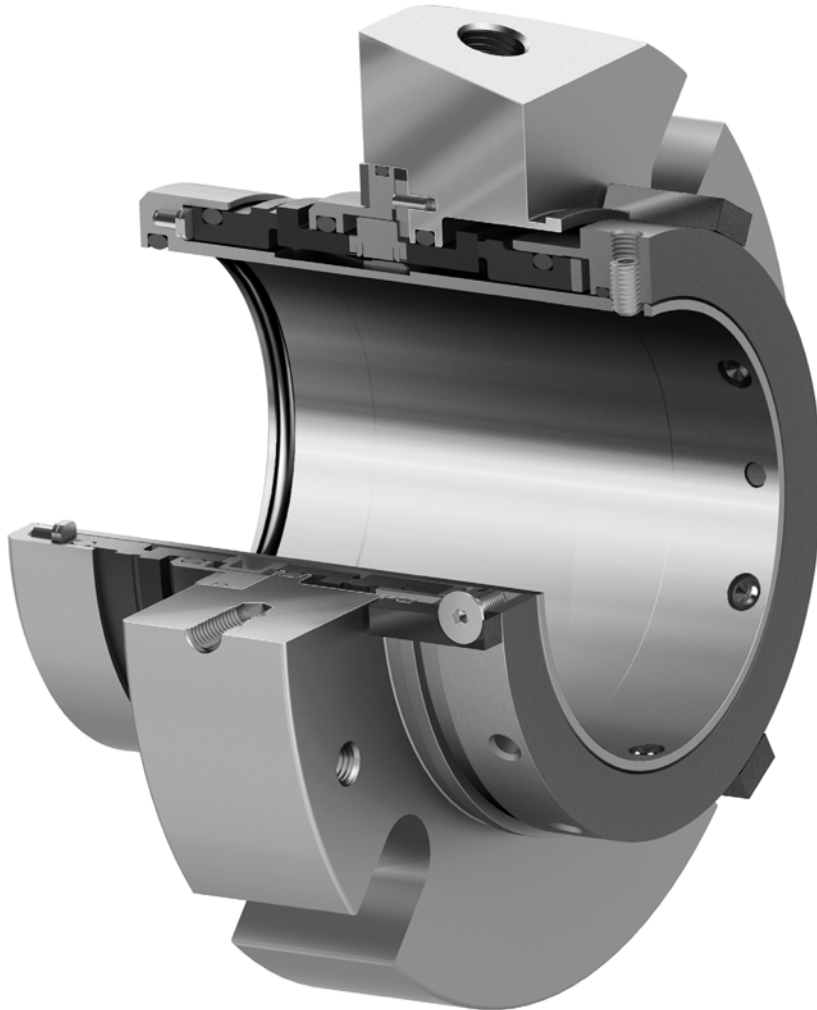


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Seal Data Reference

(From Box Label)

ITEM # _____

SEAL _____

(Example: 2810 6.000 SA CB/SSC S FKM)

INSTALLATION DATE _____

1.0 CAUTIONS

These instructions are general in nature. It is assumed that the installer is familiar with seals and certainly with the requirements of their plant for the successful use of mechanical seals. If in doubt, seek assistance from someone in the plant who is familiar with seals or delay the installation until a seal representative is available. All necessary auxiliary arrangements for successful operation (heating, cooling, flushing) as well as safety devices must be employed. These decisions are to be made by the user. The decision to use this seal or any other Chesterton seal in a particular service is the customer's responsibility.

Do not touch the mechanical seal for any reason while it is operating. Lockout or uncouple the driver prior to personal contact with the seal. Do not touch the mechanical seal while it is in contact with hot or cold fluids. Ensure that all the mechanical seal materials are compatible with the process fluid. This will prevent possible personal injury. Take care when disassembling mechanical seals. Internal components may be loaded by springs and can unexpectedly eject. Take appropriate steps to assess the needs for personal safety equipment. If you are unfamiliar with Seal disassembly, contact your nearest Chesterton authorized distributor or representative. This will reduce the likelihood of injury.

2.0 TRANSPORT AND STORAGE

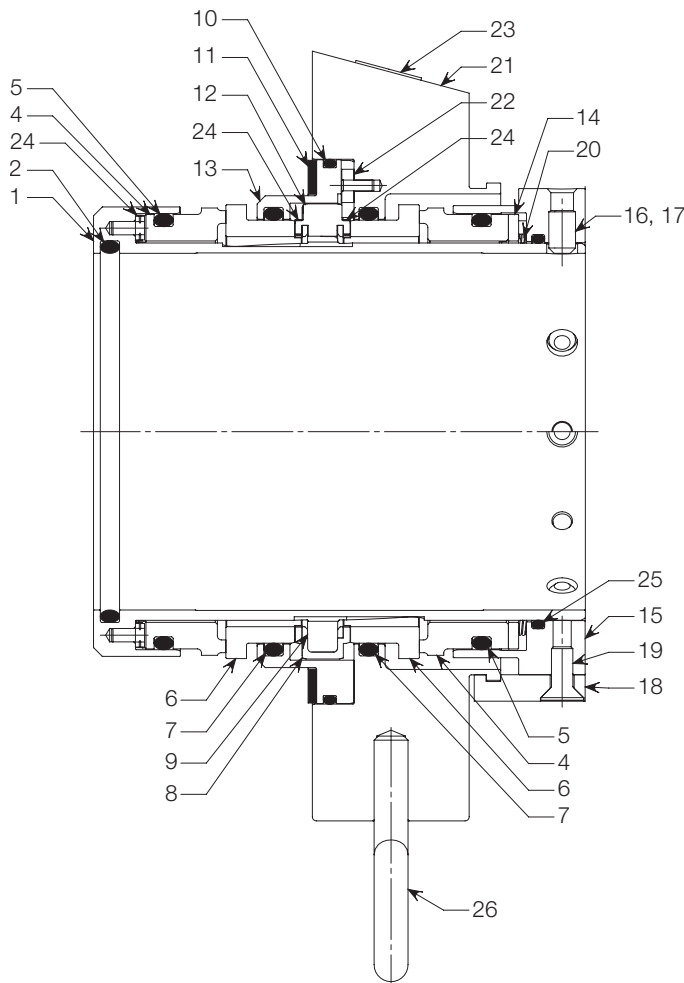
Transport and store seals in their original packaging. Mechanical seals contain components that may be subject to alteration and aging. It is therefore important to observe the following conditions for storage:

- Dust free environment
- Moderately ventilated at room temperature
- Avoid exposure to direct sunlight and heat
- For elastomers, storage conditions according to ISO 2230 should be observed.

3.0 DESCRIPTION

3.1 Parts Identification

Figure 1



KEY

- 1 – Sleeve Assembly
- 2 – Shaft O-Ring (V)
- 3 – Rotary Cushion
- 4 – Rotary Seal Ring
- 5 – Rotary O-Ring (W)
- 6 – Stationary Seal Ring
- 7 – Stationary O-Ring (X)
- 8 – Drive Channel
- 9 – Channel Clip
- 10 – Adapter O-Ring (Z)
- 11 – Gasket
- 12 – Flow Deflector
- 13 – Adapter
- 14 – Follower Assembly
- 15 – Lock Ring
- 16 – Cup Point Set Screw
- 17 – Dog Set Screw (not shown)
- 18 – Centering Clip
- 19 – Flat Head Screw
- 20 – Spring
- 21 – Gland
- 22 – Drive Assembly
- 23 – Cap Plug
- 24 – Drive Tube
- 25 – Lock Ring O-Ring (Y)
- 26 – Eye Bolt

3.0 DESCRIPTION cont.

3.2 Operating Parameters*

Pressure Limits:

2810 Seals can operate at pressures from vacuum (710 mm or 28" Hg) to the maximum pressures.

Process Pressure:

up to 300 psi (20 bar) inboard.

Barrier Pressure:

up to 30 psi (2 bar) minimum (Max 200 psi) barrier fluid pressure recommended to properly lubricate outboard seal.

200 psi (13 bar) outboard.

Standard Materials:**All Metal Parts:**

316 Stainless Steel/EN 1.4401

Springs: Alloy C-276/EN 2.4819

Rotary Face: CB; SSC; TC

Stationary Face: SSC; TC

Elastomers:** FKM, EPDM, FEPM, or FFKM

****Other materials available upon request.**

Speed Limits:

up to 4000 FPM (20 mps)

Temperature Limits:

Elastomers

To 150°C (300°F) EPDM

To 205°C (400°F) FEPM, FKM

To 260°C (500°F) FFKM

***Environmental controls are specific for the application.**

Limits can change depending on operating conditions, size and seal ring material.

Consult Chesterton Mechanical Seal Application Engineering for operating conditions outside of these published parameters.

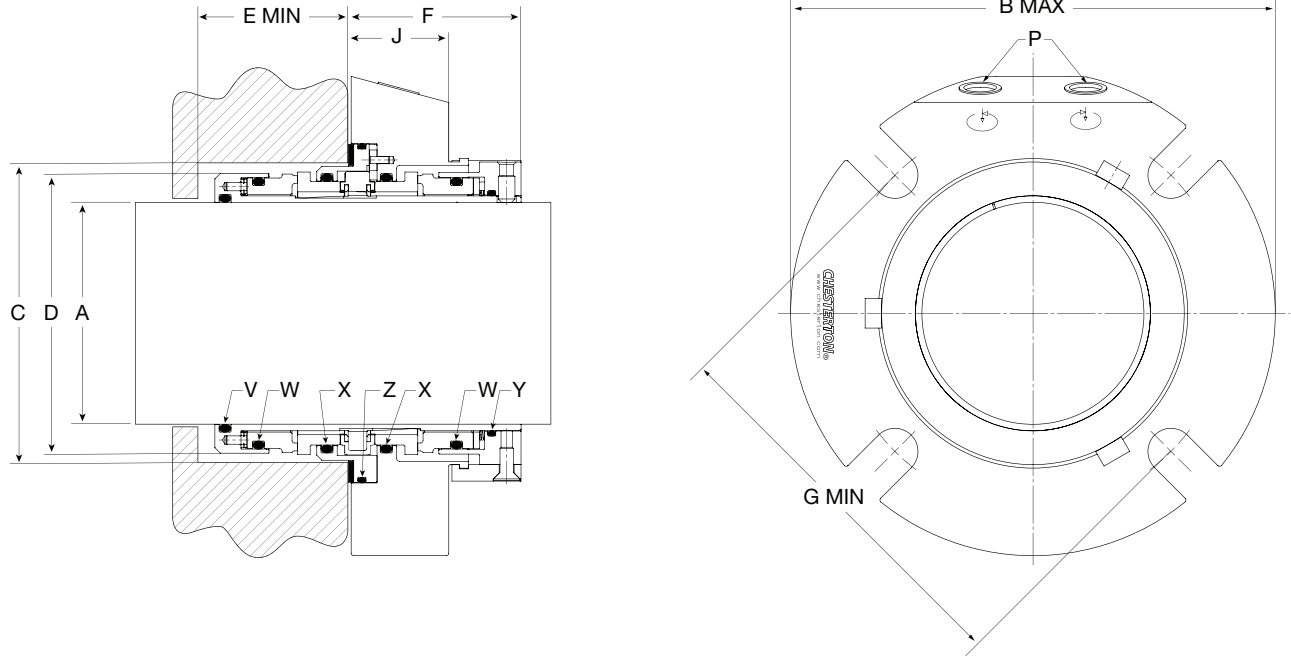
3.3 Intended Use

The mechanical seal is to be operated within the operating parameters as specified. For use beyond the intended application and/or outside the operating parameters, consult Chesterton Mechanical Seal Application Engineering to confirm the suitability of the mechanical seal prior to putting the mechanical seal in operation.

3.0 DESCRIPTION cont.

3.4 Dimensional Data (Drawings)

Figure 2



3.4.1 Dimensional Data

METRIC - Millimeters

SHAFT SIZE	GLAND OD	STUFFING BOX BORE		IB SEAL DIA	SB DEPTH	OB LENGTH	BOLT CIRCLE BY BOLT SIZE			STUFFING BOX TO BOLT SURFACE	NPT SIZE
		C MIN	C MAX				G MIN				
A	B MAX			D MAX	E MIN	F MAX	16 mm	20 mm	24 mm		
125	285	171	190	162	83	104	218	222	226	60	1/2 - 14
130	292	178	197	168	83	104	224	228	232	60	1/2 - 14
140	298	184	203	175	83	104	231	235	239	60	1/2 - 14
150	311	197	215	187	83	104	243	247	251	60	1/2 - 14
160	323	210	228	200	83	104	256	260	264	60	1/2 - 14
170	330	216	234	206	83	104	262	266	270	60	1/2 - 14
180	343	229	247	219	83	104	275	279	283	60	1/2 - 14
190	349	234	253	225	83	104	281	285	289	60	1/2 - 14
200	362	248	266	238	83	104	294	298	302	60	1/2 - 14

3.0 DESCRIPTION cont.

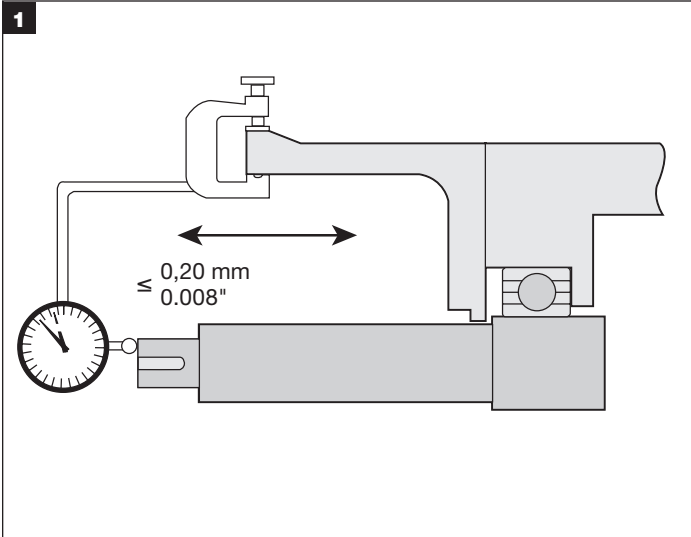
3.4.2 Dimensional Data

INCH

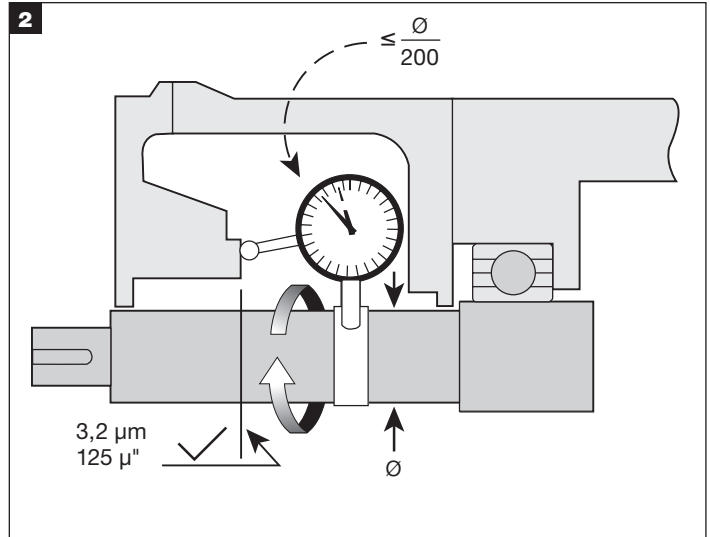
SHAFT SIZE	GLAND OD	STUFFING BOX BORE		IB SEAL DIA	SB DEPTH	OB LENGTH	BOLT CIRCLE BY BOLT SIZE			STUFFING BOX TO BOLT SURFACE	NPT SIZE
							G MIN				
							3/4"	7/8"	1.00"		
A	B MAX	C MIN	C MAX	D MAX	E MIN	F MAX				J MAX	P
5.000	11.24	6.75	7.48	6.38	3.25	4.09	8.70	8.83	8.95	2.37	1/2 – 14
5.250	11.49	7.00	7.73	6.63	3.25	4.09	8.95	9.08	9.20	2.37	1/2 – 14
5.500	11.74	7.25	7.98	6.88	3.25	4.09	9.20	9.33	9.45	2.37	1/2 – 14
5.750	11.99	7.50	8.23	7.13	3.25	4.09	9.45	9.58	9.70	2.37	1/2 – 14
6.000	12.24	7.75	8.48	7.38	3.25	4.09	9.70	9.83	9.95	2.37	1/2 – 14
6.250	12.49	8.00	8.73	7.63	3.25	4.09	9.95	10.08	10.20	2.37	1/2 – 14
6.500	12.74	8.25	8.98	7.88	3.25	4.09	10.20	10.33	10.45	2.37	1/2 – 14
6.750	12.99	8.50	9.23	8.13	3.25	4.09	10.45	10.58	10.70	2.37	1/2 – 14
7.000	13.24	8.75	9.48	8.38	3.25	4.09	10.70	10.83	10.95	2.37	1/2 – 14
7.250	13.49	9.00	9.73	8.63	3.25	4.09	10.95	11.08	11.20	2.37	1/2 – 14
7.500	13.74	9.25	9.98	8.88	3.25	4.09	11.20	11.33	11.45	2.37	1/2 – 14
7.750	13.99	9.50	10.23	9.13	3.25	4.09	11.45	11.58	11.70	2.37	1/2 – 14
8.000	14.24	8.00	10.48	9.38	3.25	4.09	11.70	11.83	11.95	2.37	1/2 – 14

4.0 PREPARATION FOR INSTALLATION

4.1 Equipment

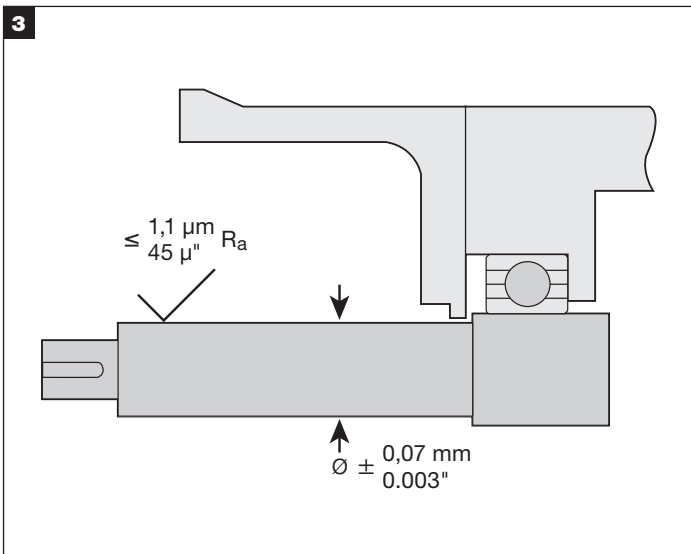


If practical, place the dial indicator tip on the end of the shaft sleeve or on a step in the shaft to measure end play. Alternately push and pull the shaft in the axial direction. If the bearings are in good condition, end play should not exceed 0,20 mm (.008").

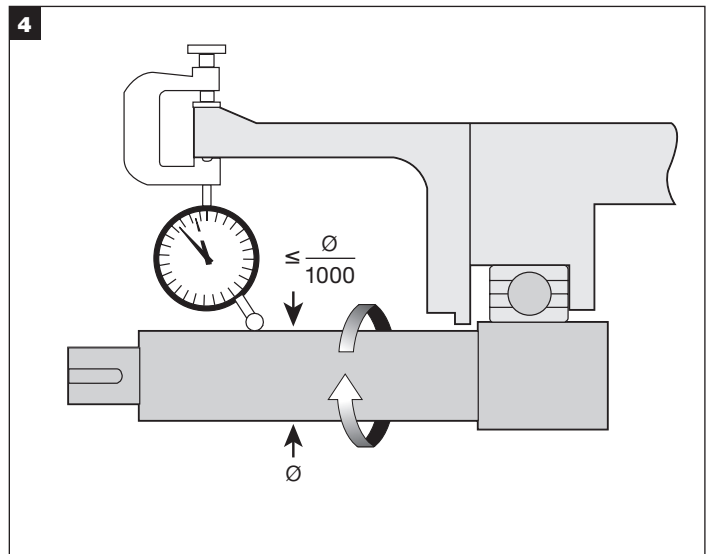


If possible, attach a base dial indicator to the shaft and rotate both the indicator and shaft slowly while reading the runout of the stuffing box face. Misalignment of the stuffing box face relative to the shaft should not exceed 0,63 mm TIR per mm (.025 inch per inch) of shaft diameter. Maximum limit for stuffing box to the shaft is 0,63 mm (.025 inch).

The stuffing box face must be flat and smooth enough to seal the gland. Surface roughness should be 3,2 microns (125 microinch) Ra maximum for gaskets and 1,1 micron (45 microinch) Ra for O-Rings. Steps between halves of split case pumps should be machined flat. Make sure the stuffing box is clean and clear along its entire length.



Remove all sharp corners, burrs, and scratches on the shaft, especially in areas where the O-Ring will slide, and polish if necessary to achieve a 1,1 micron (45 microinch) Ra finish. Make sure the shaft or sleeve diameter is within 0,07 mm (.003") of nominal.

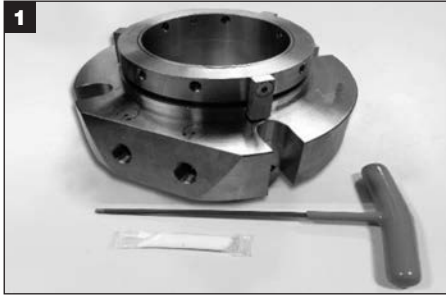


Use a dial indicator to measure the shaft runout in the area where the seal will be installed. Runout should not exceed 0,03 mm TIR per mm (.001 in per inch) of shaft diameter.

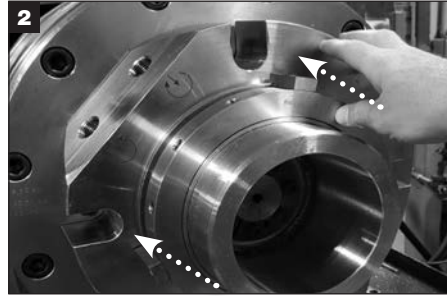
4.2 Mechanical Seal

1. Check to ensure that the O-Rings installed in this seal are compatible with the fluid being sealed.
2. The 1/2 dog set screws go into the smaller holes in the sleeve. The dimples on the outside diameter of the lock ring indicate the position of the 1/2 dog set screws. Do not disengage these screws from the sleeve when positioning the seal. The cup point set screws go through the larger holes in the sleeve. Make sure all screws are engaged in the sleeve but do not protrude into the sleeve's inside diameter bore. Also, when repositioning or removing the seal, make sure the centering clips and flat head screws are engaged.
3. Centering clips have been preset at the factory. If for any reason you loosen or remove the centering clip flat head screws, retighten as follows prior to installing the seal on the equipment: Tighten the flat head screw finger tight, ensuring the centering clips are properly engaged. Then using a hex key, tighten flat head screw an additional 1/8 turn. This will approximate the 4,5 Nm (40 inch-pounds) of torque.

5.0 SEAL INSTALLATION



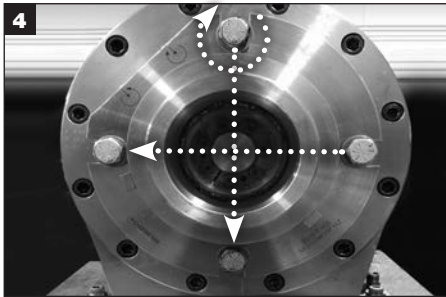
Tools required for installation: Hex key and grease (**supplied with seal**). Open end or socket/torque wrench (size dependent on mounting bolt size; **supplied by customer**). **IMPORTANT: As manufactured seal data can be accessed from the installed RFID tag; you may also choose to fill in seal data reference from the box label on the cover page of these instructions. Remove cap plugs from fluid ports (not shown).**



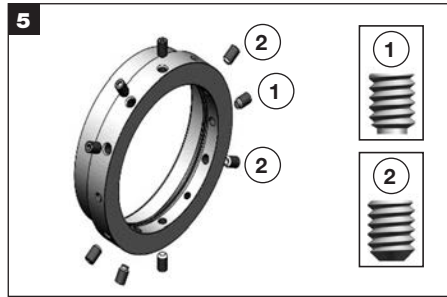
Apply a thin film of grease to the shaft/O-Ring (V) and slide seal onto the shaft by pushing on the gland. **CAUTION: Ensure that all set screws are engaged through the sleeve but do not protrude into the sleeve inside diameter bore.**



Reassemble the pump and make necessary shaft alignments and impeller adjustments. The impeller can be reset at any time, as long as the centering clips are in place and the seal set screws are loosened while the shaft is being moved. (see Figure 3) for port orientation. **CAUTION: See (4.2.3 Preparation for Installation – Mechanical Seal step 3.)**



Tighten the gland bolts evenly. **IMPORTANT: The gland bolts must be tightened before tightening the set screws onto the shaft. Gland bolt torque is dependent on application. IMPORTANT: Piping connections should not be made prior to tightening the gland bolts.**



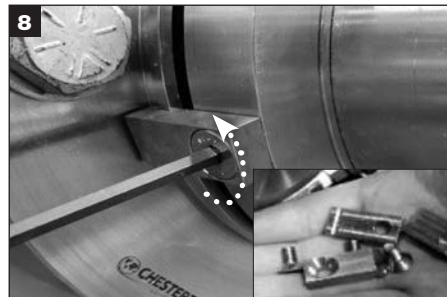
IMPORTANT: 1/2 dog set screws ① must be tightened FIRST and cup point set screws ② must be tightened last. 1/2 dog set screw locations are marked with a dimple on the outside diameter of the lock ring, next to the screw holes.



Tighten three 1/2 dog set screws ① (see inset image, marked with a dimple) evenly with the hex key provided.



Tighten cup point set screws ② evenly with the hex key provided. **IMPORTANT: After all set screws have been tightened by hand, retighten with a torque wrench: Size to 5,5 – 6,5 Nm (105 – 115 in-lbs.)**



Remove all flat head screws and centering clips and retain for future use when making impeller adjustments and/or seal removal.



IMPORTANT: To ensure that the gland is properly centered over the sleeve turn the shaft by hand and make sure the seal turns freely. If you hear/feel metal to metal contact within the seal, it was improperly centered. Re-install the centering clips finger tight. Remove any piping connections. Loosen the gland bolts. Fully tighten clips. Loosen the set screws. Re-tighten the gland bolts. Re-tighten the set screws. Remove the clips. If metal to metal contact still exists check the centering of the stuffing box.

6.0 COMMISSIONING / EQUIPMENT START-UP

1. Attach appropriate environmental controls to the seal. (see Figure 3)
2. Take all necessary precautions and follow normal safety procedures before starting the equipment

* Please contact Chesterton Mechanical Seal Application Engineering for assistance regarding cartridge seals.

Figure 3

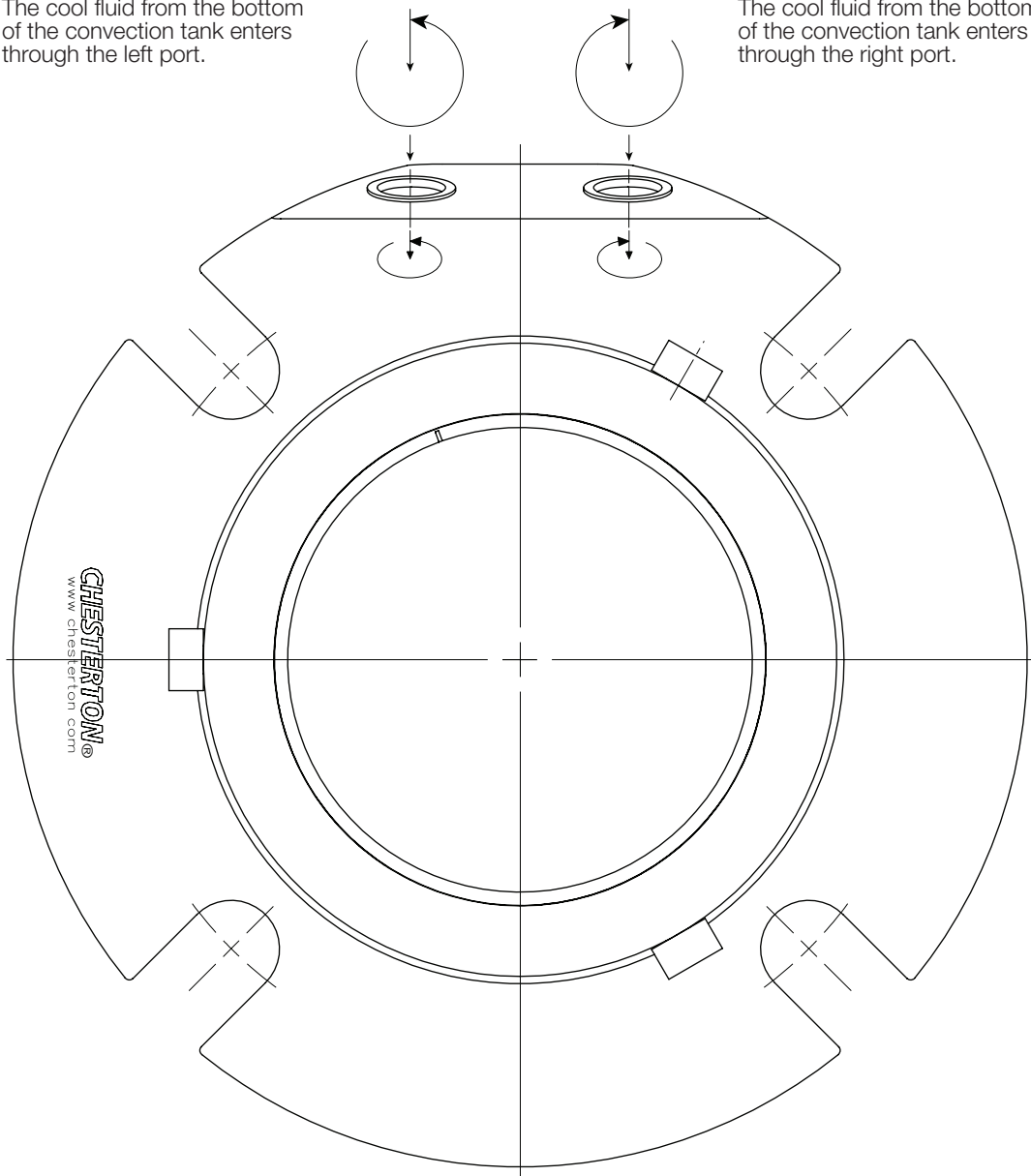
Barrier/Buffer Fluid

COUNTER-CLOCKWISE
shaft rotation

The cool fluid from the bottom of the convection tank enters through the left port.

CLOCKWISE
shaft rotation

The cool fluid from the bottom of the convection tank enters through the right port.



7.0 DECOMMISSIONING / EQUIPMENT SHUT DOWN

Ensure that the equipment is electrically isolated. If the equipment has been used on toxic or hazardous fluids, ensure that the equipment is correctly decontaminated and made safe prior to commencing work. Ensure that the pump is isolated and check that the stuffing box is drained from any fluid and

pressure is fully released. **IMPORTANT: Replace centering clips prior to seal removal from equipment!** Remove the seal from equipment in the reverse order from installation instructions. In case of disposal, ensure the local regulations and requirements for disposal or recycling of the different components in the seal are adhered to.

8.0 SPARE PARTS

Use only Chesterton original spare parts. Use of non-original spare parts represents risk of failure, danger to persons/ equipment and voids the product warranty.

Spare Parts Kit can be purchased from Chesterton, referencing the (as manufactured) seal data from the installed RFID tag or from recorded data on the cover page of these instructions.

9.0 SEAL REBUILD

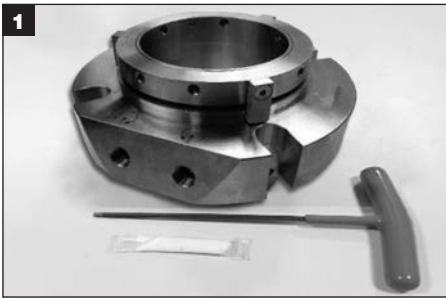
9.1 Seal Rebuild

A correctly installed and operated mechanical seal requires little maintenance. It is recommended to periodically check the seal for leakage. Some components of a mechanical seal such as seal rings, O-Rings, etc., require replacement over time. While a seal is installed and operating, maintenance is not possible. Therefore it is recommended that a spare seal unit or a spare parts kit be held in stock to allow quick repair.

1. Note the condition of the parts, including elastomer surfaces and gland springs. Analyze the cause of failure and correct the problem, if possible, before reinstalling the seal.
2. Clean all elastomer and gasket surfaces with an approved cleaning solvent that complies with local and site regulations.

9.0 SEAL REBUILD

9.1.1 Seal Disassembly



Tools required for disassembly of seal: Hex key (supplied with seal); tweezers and a curved pick (supplied by customer; for removal of O-Rings and drive tube).



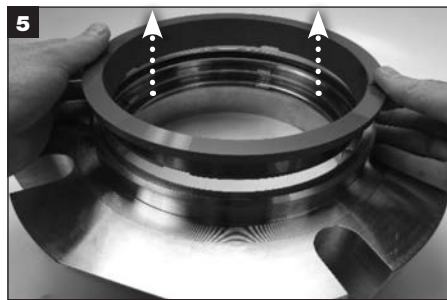
Remove the centering clips and discard.



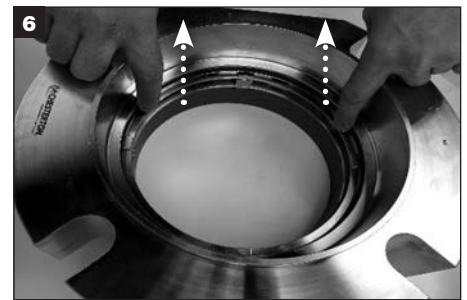
Remove all cup point and 1/2 dog set screws from the lock ring and discard.



Remove the lock ring from sleeve and set aside.



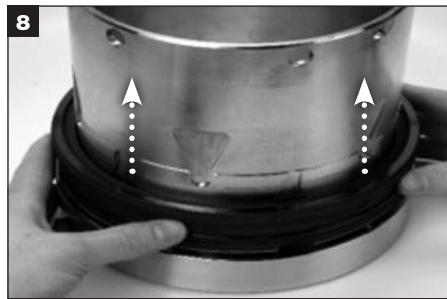
Remove outboard rotary seal ring and discard.



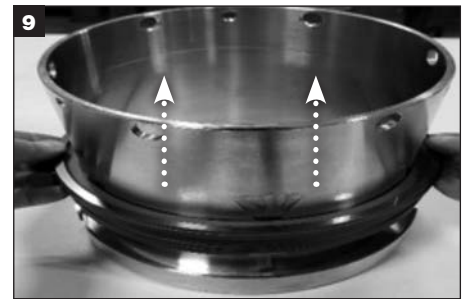
Remove the follower assembly. Remove the drive tube and discard. Set aside follower assembly.



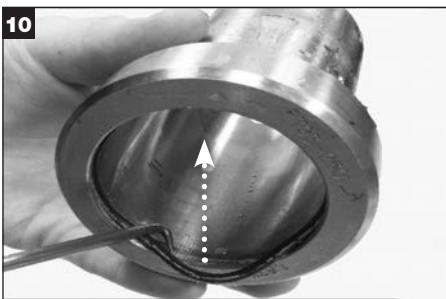
Separate gland assembly from sleeve assembly and set aside.



Remove the inboard stationary seal ring from the sleeve and discard.



Remove the inboard rotary seal ring from the sleeve and discard.



Remove the shaft O-Ring (V) from sleeve and discard.



Remove the drive tube from the sleeve drive lugs and discard.



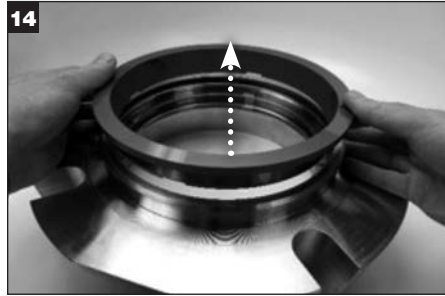
Remove all springs from the lock ring and discard.

9.0 SEAL REBUILD cont.

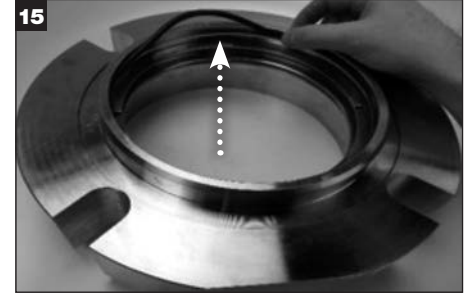
9.1.1 Seal Disassembly cont.



Remove the lock ring O-Ring (Y) and discard.



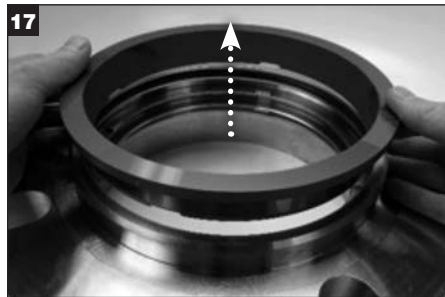
Remove the outboard stationary seal ring from gland and discard.



Remove the O-Ring (X) from the gland inside diameter and discard.



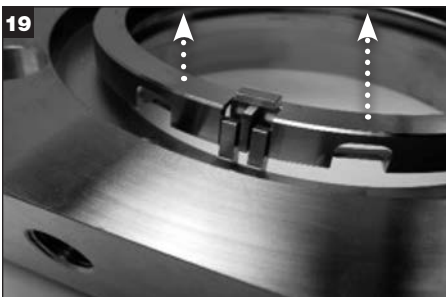
Remove the gasket from the adapter and discard.



Remove the inboard stationary seal ring from gland and discard.



Remove the adapter from the gland. Remove the adapter O-Ring (Z) and discard. Set the adapter aside.



Remove the drive channel from gland; remove the channel clips and the flow deflector from the channel and discard.



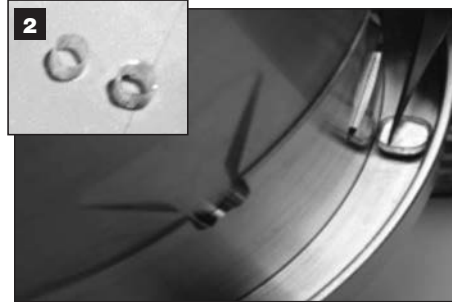
Remove the drive assembly from the gland and discard.

9.0 SEAL REBUILD cont.

9.1.2 Seal Assembly



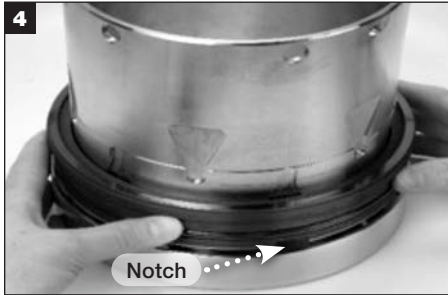
Tools required for assembly of seal: Hex key and two types of grease (supplied with seal); lint-free cloth, tweezers or a thin pick (supplied by customer); for installation of O-Rings and drive tube). Clean all metal components with an approved solvent, including all gasket and O-Ring surfaces. Place metal components and all spare seal components on a clean dry surface.



Pick up the drive tubes with tweezers or a thin pick and install onto each of the lugs in the sleeve counter bore. Ensure the drive tube is fully seated on the lug (it will bottom out).



Apply a thin film of **white** grease to the rotary O-Ring (W) and install into the groove on the outer diameter of the rotary face. Ensure cushions are on the back of the rotary face. **IMPORTANT: rotary seal ring in the bag marked ROTARY INBOARD MUST be installed on the sleeve (see step 4).**



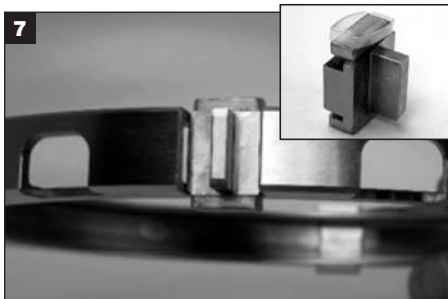
Align the mark on the rotary face with the notch on the sleeve. Slide the rotary face down to the sleeve and gently compress until it is seated. The sleeve drive lugs should engage the slots on the rotary face. **CAUTION: Do not compress drive tube.**



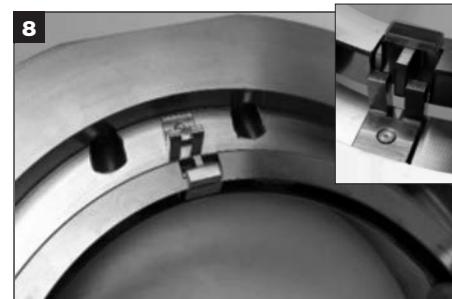
Insert the drive assembly into the gland pin hole. Ensure all surfaces are clean and free of debris.



Install drive tubes (2x) on Flow Deflector.



Apply a thin film of grease to the drive channel clip and drive channel flow deflector. Install the drive channel flow deflector in the slot between the two cutaways. Install the three drive channel clips in the remaining slots.

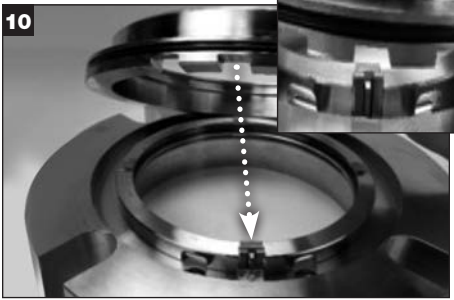


Insert the drive channel assembly into the gland, with open drive slots facing down, engaging the flow deflector into the drive assembly. The dimple on the gland will align with the mark on the outside of the drive channel, 60° CW from 12 o'clock position. **CAUTION: Correct installation is required for proper seal performance.**



Apply a thin film of grease to the adapter O-Ring (Z) and install on outside diameter of adapter plate.

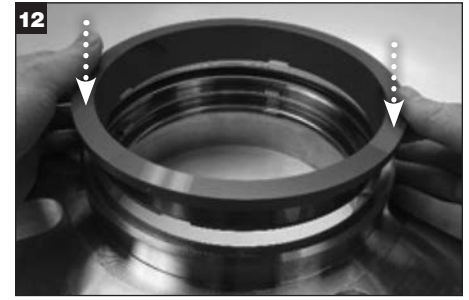
9.1.2 Seal Assembly cont.



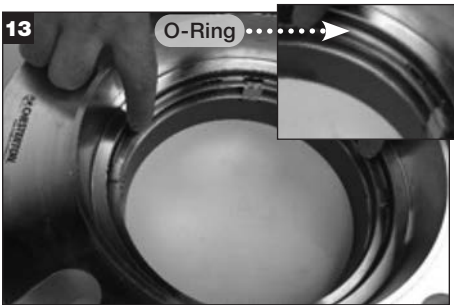
Align the adapter slots with the slots in the drive channel, engaging assembly and seat the adapter plate. **IMPORTANT: Adapter surface must be below gland surface to be fully seated and installed.**



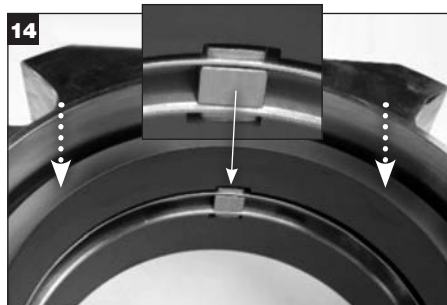
Apply a thin film of grease to the stationary O-Ring (X) and install in the inside diameter groove in the adapter.



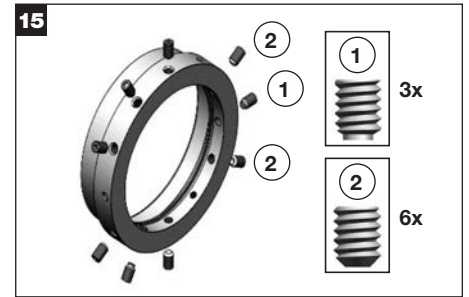
Align the slots in one stationary seal ring with the anti-rotation channel clips and flow deflector, and carefully press into place. Ensure the seal ring is fully seated.



Carefully invert the gland and place on a clean cloth to protect the inboard sealing surface. Apply a thin film of grease to the remaining stationary O-Ring (X) and install into the inside diameter groove in the gland.



Align the slots in the remaining stationary seal ring with the anti-rotation channel clips and flow deflector and carefully press into place. Ensure the seal ring is fully seated.



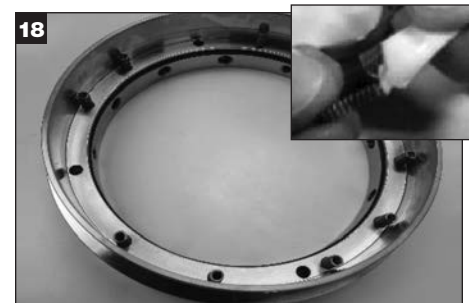
Install the dog set screws ① into the screw holes marked with a dimple on the outside diameter of the lock ring. Install the cup point set screws ② into the remaining through holes in the lock ring. **CAUTION: The dog set screws must not protrude into the sleeve inside diameter. The cup point screws must not protrude into the sleeve inside diameter.**



IMPORTANT: The set screws should not protrude into the inner diameter of the lock ring prior to installing onto the seal sleeve.



Apply a thin film of grease to the lock ring O-Ring (Y) and insert it into the inside diameter groove in the lock ring.



Apply a small amount of grease to one end of each spring and insert into the unmarked holes in the lock ring. **CAUTION: DO NOT install springs into the marked holes intended for the follower plate pins.**

9.0 SEAL REBUILD cont.

9.1.2 Seal Assembly cont.



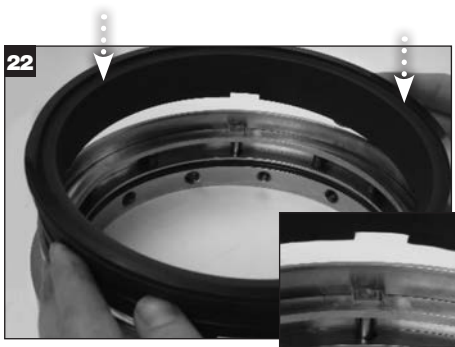
Pick up the drive tubes (use tweezers if necessary) and install onto each of the lugs in the follower assembly. Ensure the drive tubes are fully seated on the lugs (it will bottom out).



Align the pins in the follower assembly with the marked holes in the lock ring and press to seat into position.



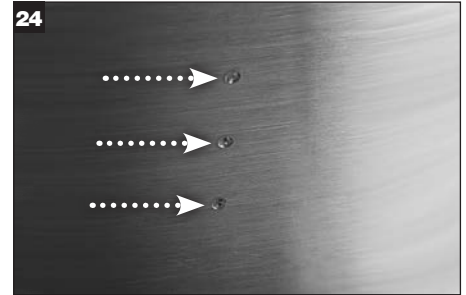
Apply a thin film of grease to the rotary O-Ring (W) and install it into the groove on the outside diameter of the outboard rotary seal ring.



Align the drive slots in the rotary seal ring with the follower lugs; press gently on the rotary seal ring to seat into position in the lock ring. **CAUTION: Do not compress drive tube.**



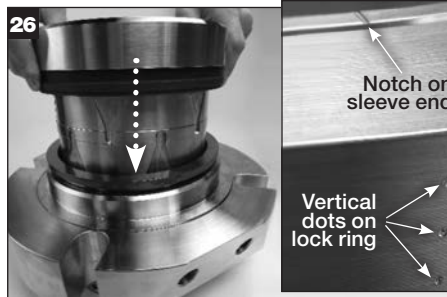
Clean all seal face surfaces with a clean cloth and approved solvent prior to final assembly of components.



Note the position of the three vertical dots on the lock ring outer diameter.



Place the gland over the lock ring assembly, Chesterton marking facing down, aligning the stationary seal ring face with the rotary seal ring face.



Invert the sleeve assembly, holding around the outside diameter of the rotary seal ring, and slide it into the gland and lock ring assemblies. **IMPORTANT: The notch on the end of the sleeve should be aligned with the three vertical dots on the lock ring outside diameter when properly installed.**



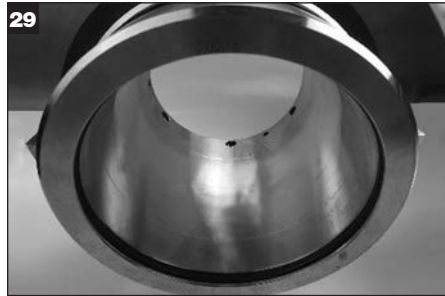
Hold the entire seal assembly and carefully invert it, and place on a clean work surface. Press firmly on the top of the lock ring and engage the dog set screws into the small holes in the sleeve. Tighten dog set screws evenly to keep lock ring centered properly with the sleeve. **CAUTION: DO NOT deflect sleeve by overtightening the dog set screws. All set screws must not protrude into the sleeve inside diameter.**

9.0 SEAL REBUILD cont.

9.1.2 Seal Assembly cont.



Press down on the top of the gland to compress the assembly and turn each centering clip to engage the groove on the top of the gland and hand-tighten the centering clip flat head screw. Repeat this step for all centering clips. Retighten with a torque wrench: to 18 Nm (160 in-lbs.).



Apply a thin film of grease to the shaft O-Ring (V) and insert into the groove in the sleeve inside diameter.



Remove the protective adhesive covering and adhere the stuffing box gasket in the gland recess.



The seal is ready for installation.

10.0 MECHANICAL SEAL RETURNS AND HAZARD COMMUNICATION REQUIREMENTS

Any mechanical seal returned to Chesterton that has been in operation, must comply with our Hazard Communication requirements. Please go to our web page at **chesterton.com/Mechanical_Seal>Returns** to obtain information required for returning seals for repair or seal analysis.



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