



1810 Heavy-Duty Modular Single Cartridge Seal

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



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Seal Data Reference

(from Box Label)

ITEM # _____

SEAL _____

(Example: 1810 6.000 SA CB/SSC S FKM)

INSTALLATION DATE _____

1.0 CAUTIONS

1.1 General

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.

1.2 Label Warnings

635 SXC Synthetic, Extreme Pressure, Corrosion Resistant Grease. Chesterton International GmbH, Am Lenzenfleck 23, D85737, Ismaning, Germany – Tel. +49-89-996-5460.

Contains Benzenesulfonic acid, C10-16-alkyl derivs., calcium salts, Sulfonic acids, petroleum, calcium salts and Benzenesulfonic acid, mono-C16-24-alkyl derivs., calcium salts. May produce an allergic reaction. Safety Data Sheet available on request.

2.0 TRANSPORT AND STORAGE

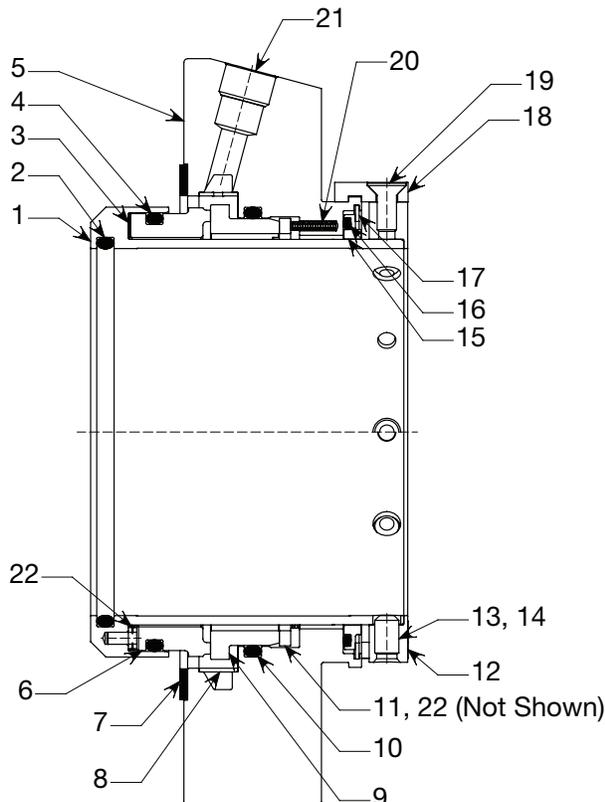
Transport and store seals in their original packaging. Mechanical seals contain components that may be subject to alteration and aging. It is therefore important to observe the following conditions for storage:

- 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 O-Ring (W)
- 5 – Gland
- 6 – Rotary Seal Ring
- 7 – Gasket
- 8 – Injector (Optional)
- 9 – Stationary Seal Ring
- 10 – Stationary O-Ring (X)
- 11 – Follower Assembly
- 12 – Lock Ring
- 13 – Dog Point Set Screw
- 14 – Cup Point Set Screw (not shown)
- 15 – Bushing (Optional)
- 16 – Bushing O-Ring (Optional) (Y)
- 17 – Snap Ring (Optional)
- 18 – Centering Clip
- 19 – Flat Head Screw
- 20 – Spring
- 21 – Pipe Plug
- 22 – Drive Tube

3.0 DESCRIPTION cont.

3.2 Operating Parameters*

Pressure Limits:

1810 Seals can withstand operating pressures from vacuum (710 mm or 28" Hg) to the maximum pressures up to 20 bar g (300 psig)

Standard Materials:**All Metal Parts:**

EN 1.4401(316 SS)

Bronze

Springs: EN 2.4819 (Alloy C-276)

Rotary Face: CB; SSC; TC

Stationary Face: SSC; TC

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

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

Speed Limits:

Up to 20 mps (4000 fpm)

Temperature Limits:

Elastomers

To 150°C (300°F) EPDM

To 205°C (400°F) FEPM, FKM

To 260°C (500°F) FFKM

** Environmental controls may be required for the specific application.*

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

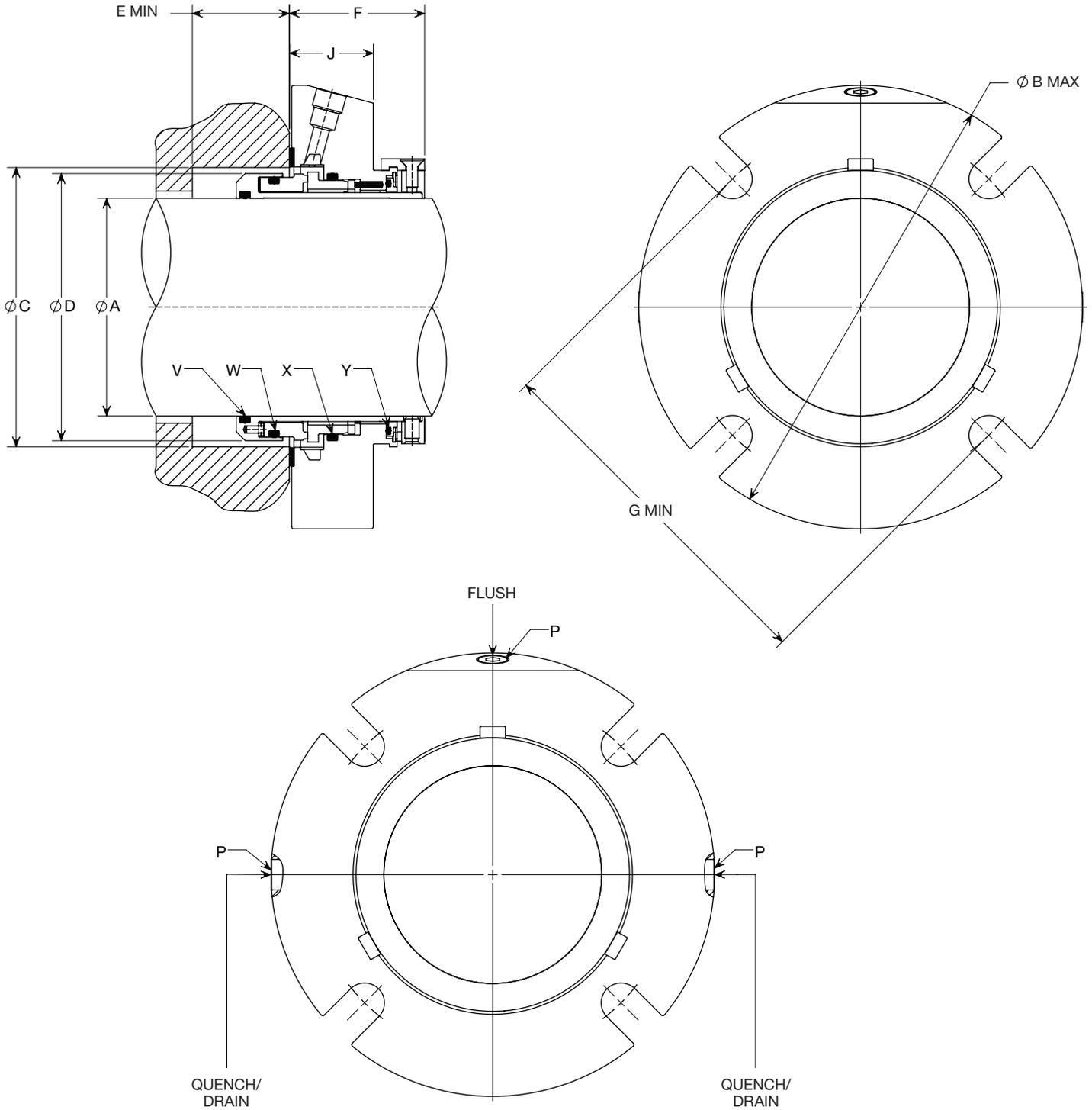
** Consult Chesterton Mechanical Seal Application Engineering for operating conditions outside of these published parameters.*

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.

3.4 Dimensional Data (Drawings)

Figure 2



3.0 DESCRIPTION cont.

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	J MAX	P
125	285	171	190	162	39	95	218	222	226	59	1/2 - 14
130	291	178	196	168	39	95	224	228	232	59	1/2 - 14
140	298	184	202	174	39	95	231	235	239	59	1/2 - 14
150	311	197	215	187	39	95	243	247	251	59	1/2 - 14
160	323	210	228	200	39	95	256	260	264	59	1/2 - 14
170	330	216	234	206	39	95	262	266	270	59	1/2 - 14
180	342	229	247	219	39	95	275	279	283	59	1/2 - 14
190	349	235	253	225	39	95	281	285	289	59	1/2 - 14
200	361	248	266	238	39	95	294	298	302	59	1/2 - 14

3.0 DESCRIPTION cont.

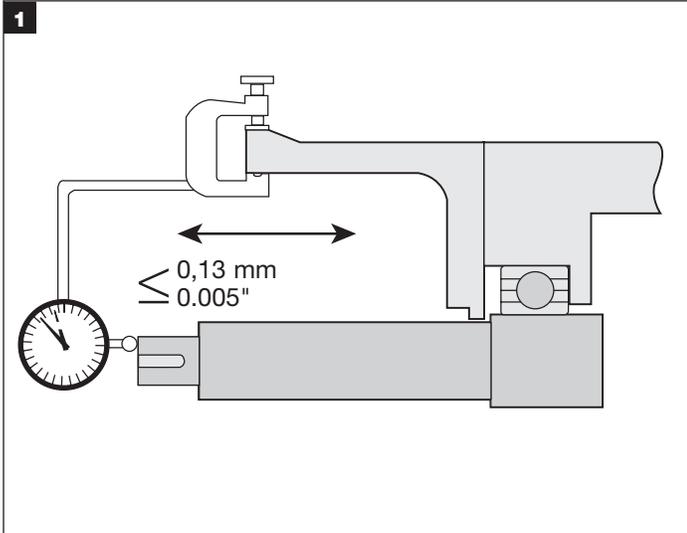
3.4.2 Dimensional Data

INCH

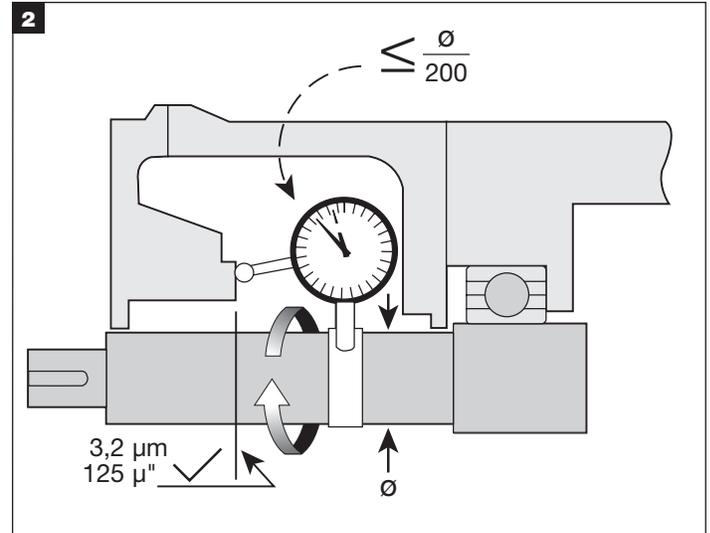
SHAFT SIZE	GLAND OD	STUFFING BOX BORE		IB SEAL DIA	SB DEPTH	OB LENGTH	BOLT CIRCLE BY BOLT SIZE			STUFFING BOX TO BOLT SURFACE	NPT SIZE
		C MIN	C MAX				G MIN				
A	B MAX	C MIN	C MAX	D MAX	E MIN	F MAX	3/8"	1/2"	5/8"	J MAX	P
5.000	11.24	6.75	7.48	6.37	1.53	3.73	8.70	8.83	8.95	2.31	1/2 – 14
5.250	11.49	7.00	7.73	6.62	1.53	3.73	8.95	9.08	9.20	2.31	1/2 – 14
5.500	11.74	7.25	7.98	6.87	1.53	3.73	9.20	9.33	9.45	2.31	1/2 – 14
5.750	11.99	7.50	8.23	7.12	1.53	3.73	9.45	9.58	9.70	2.31	1/2 – 14
6.000	12.24	7.75	8.48	7.37	1.53	3.73	9.70	9.83	9.95	2.31	1/2 – 14
6.250	12.49	8.00	8.73	7.62	1.53	3.73	9.95	10.10	10.20	2.31	1/2 – 14
6.500	12.74	8.25	8.98	7.87	1.53	3.73	10.20	10.30	10.50	2.31	1/2 – 14
6.750	12.99	8.50	9.23	8.12	1.53	3.73	10.50	10.60	10.70	2.31	1/2 – 14
7.000	13.24	8.75	9.48	8.37	1.53	3.73	10.70	10.80	11.00	2.31	1/2 – 14
7.250	13.49	9.00	9.73	8.62	1.53	3.73	11.00	11.10	11.20	2.31	1/2 – 14
7.500	13.74	9.25	9.98	8.87	1.53	3.73	11.20	11.30	11.50	2.31	1/2 – 14
7.750	13.99	9.50	10.23	9.12	1.53	3.73	11.50	11.60	11.70	2.31	1/2 – 14
8.000	14.24	9.75	10.48	9.37	1.53	3.73	11.70	11.80	12.00	2.31	1/2 – 14

4.0 PREPARATION FOR INSTALLATION

4.1 Equipment

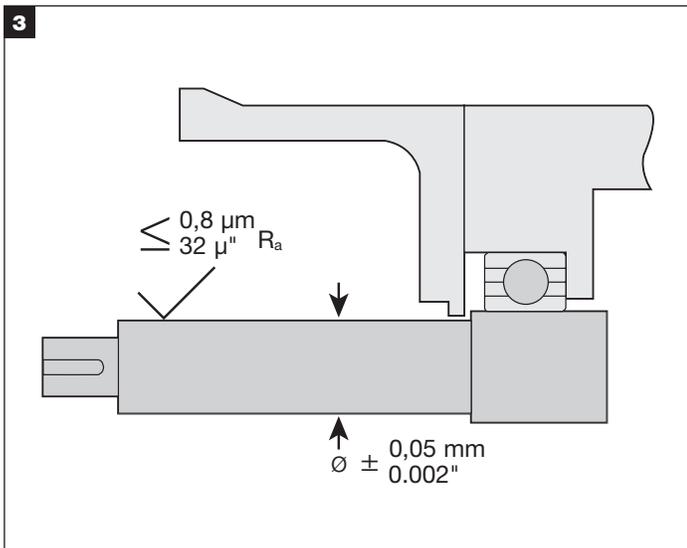


If practical, place the dial indicator tip on the end of the shaft sleeve or on a step in the shaft to measure end play. Alternately push and pull the shaft in the axial direction. If the bearings are in good condition, end play should not exceed 0,13 mm (.005").

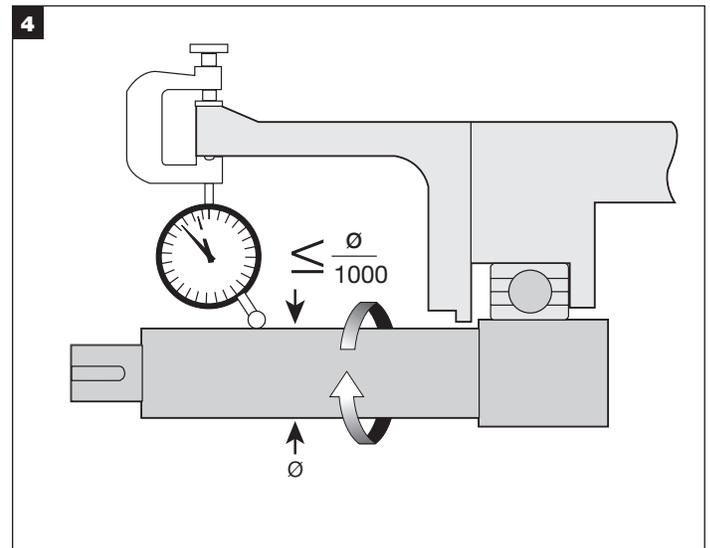


If possible, attach a base dial indicator to the shaft and rotate both the indicator and shaft slowly while reading the runout of the stuffing box face. Misalignment of the stuffing box face relative to the shaft should not exceed 0,005 mm TIR per mm (.005 in per inch) of shaft diameter.

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 0,05 mm (.002") of nominal.



Use a dial indicator to measure the shaft runout in the area where the seal will be installed. Runout should not exceed 0,001 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 dog point 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 dog point 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 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 for sizes 8 Nm (71 inch-pounds) set at the factory.
4. **IMPORTANT:** When seal is purchased without the bushing option the quench and drain ports will be plugged. **DO NOT** remove these plugs or attempt to use the quench/drain environmental controls without the bushing option.
5. With Injector option (distributed flush) seals require environmental controls (API Plan 11 or equivalent) connected to "F" port.

5.0 SEAL INSTALLATION



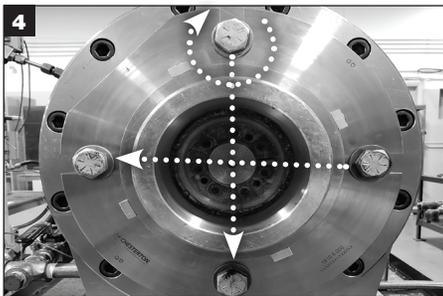
Tools required for installation: Hex key and white grease (supplied with seal); open end or socket wrench (size dependent on mounting bolt size; supplied by customer). **IMPORTANT: Seal data can be accessed from the installed RFID tag; you may also choose to fill in seal data reference from the box label on the cover page of these instructions.**



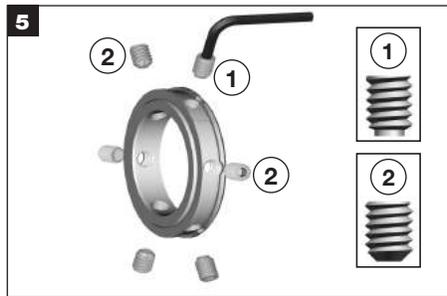
Apply a thin film of **white** grease to the shaft O-Ring (V) and slide seal onto the shaft by pushing on the gland. **CAUTION: Ensure that all set screws are engaged through the sleeve but do not protrude into the sleeve inside diameter bore.**



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 Figures 4 and 5) 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: dog point set screws ① must be tightened FIRST and cup point set screws ② must be tightened last. Dog point set screw locations are marked with a dimple on the outside diameter of the lock ring, next to the screw holes.



Tighten three dog point 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 sets screws have been tightened by hand, retighten with a torque wrench: to 13,6 – 15,3 Nm (120 – 135 in-lbs.)**



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



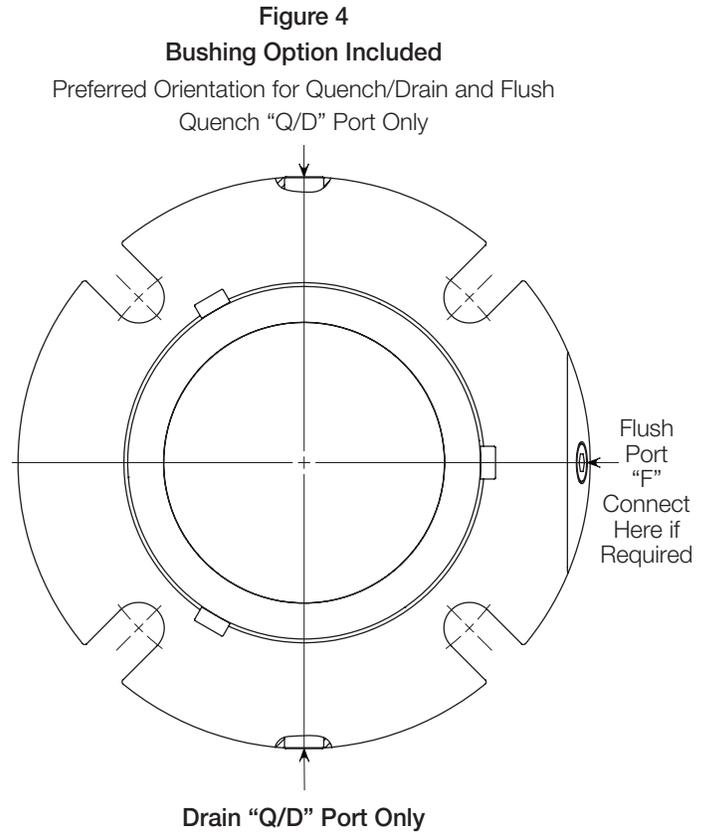
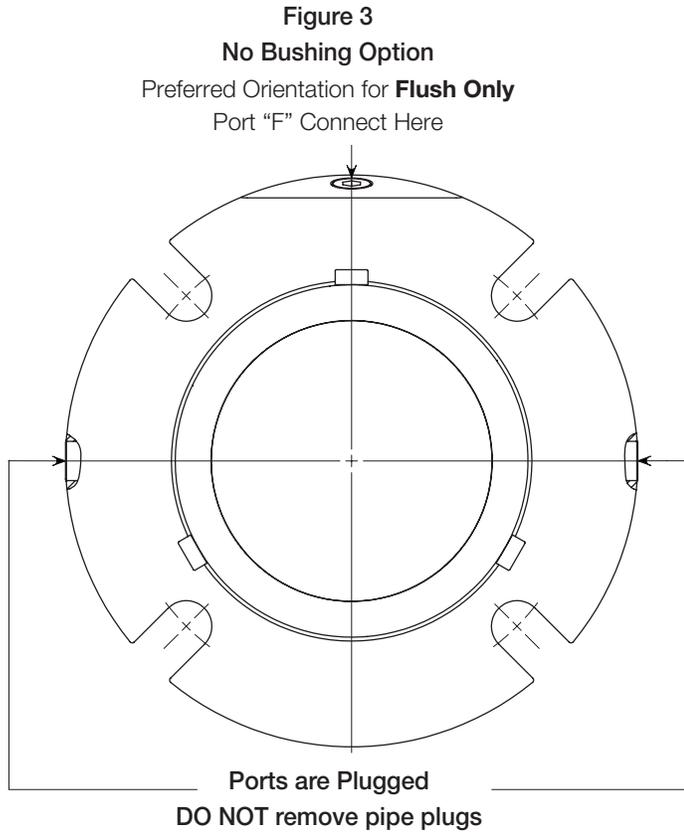
IMPORTANT: To ensure that the gland is properly centered over the sleeve turn the shaft slowly and make sure the seal turns freely. If you hear/feel metal to metal contact within the seal, it was improperly centered. Re-install the centering clips finger tight. Remove any piping connections. Loosen the 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

6.1 Attach appropriate environmental controls to the seal. (see Figure 3 and 4)

6.2 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.



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 faces, 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 / bushing 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.

9.1.1 Seal Disassembly



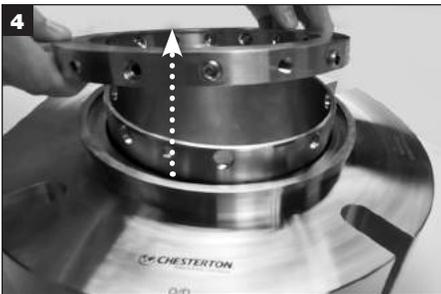
Tools required for disassembly of seal: Hex key (supplied with seal); tweezers and a curved pick (supplied by customer; for removal of O-Rings and drive tube).



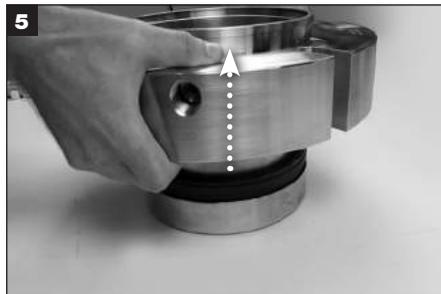
Remove the centering clips and discard.



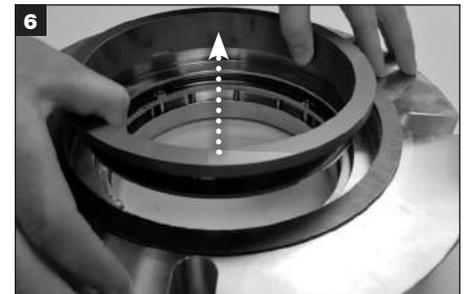
Remove all cup point and dog point set screws from the lock ring and discard.



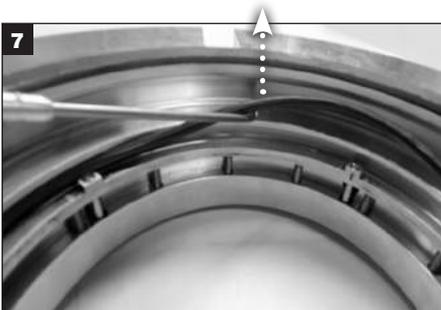
Remove the lock ring from sleeve and set aside.



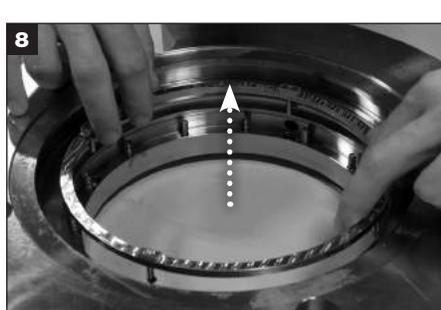
Separate the sleeve from the gland and set the sleeve aside.



Remove the stationary seal ring from the gland and discard.



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



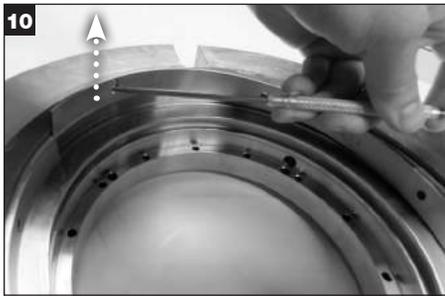
Remove the follower assembly from the gland. Remove and discard drive tubes from drive lugs, set follower assembly aside.



Remove all springs from the gland spring holes and discard.

9.0 SEAL REBUILD cont.

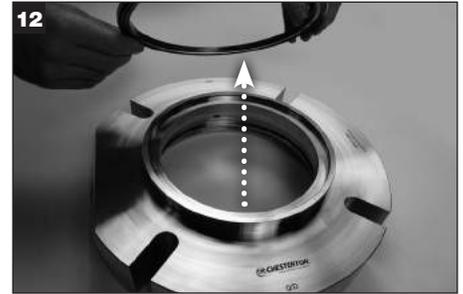
9.1.1 Seal Disassembly cont.



10 For seals with **Injector option**: Carefully remove the injector, and set it aside.



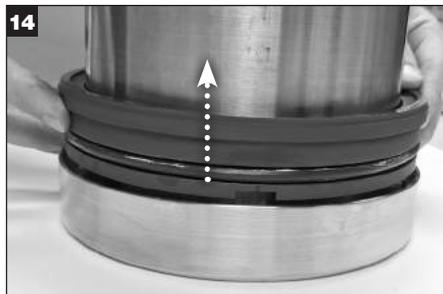
11 For seals with **Bushing kit**: Remove the snap ring from the gland and discard.



12 For seals with **Bushing kit**: Remove the bushing and bushing O-Ring (Y) from the gland bore and discard.



13 Remove the stuffing box face gasket from the gland and discard.



14 Remove rotary seal ring from sleeve and discard.



15 Remove drive from drive lugs in the sleeve and discard.



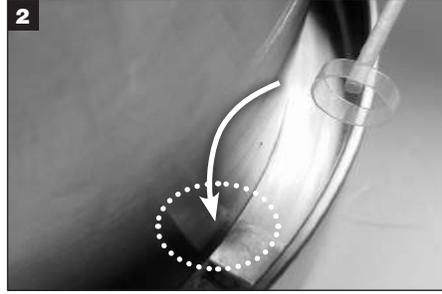
16 Remove the shaft O-Ring (V) from the sleeve and discard.

9.0 SEAL REBUILD cont.

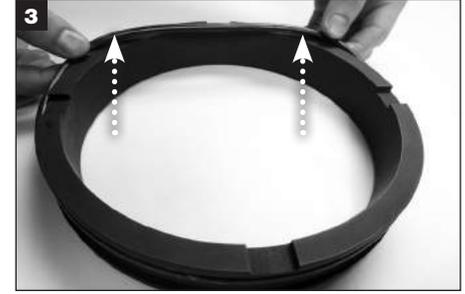
9.1.2 Seal Assembly



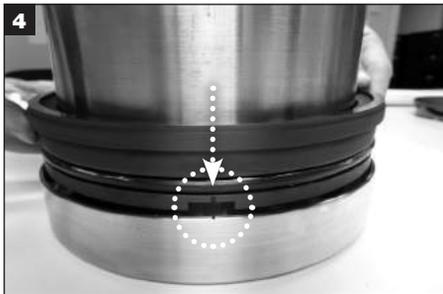
Tools required for assembly of seal: Hex key and two types of grease (supplied with seal); lint-free cloth, tweezers or a thin pick (supplied by customer); for installation of O-Rings and drive tube). Clean all metal components with an approved solvent, including all gasket and O-Ring surfaces. Place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



Pick up the drive tube (use tweezers if necessary) and install onto each of the lugs in the sleeve assembly. Ensure the drive tube are fully seated on the lugs.



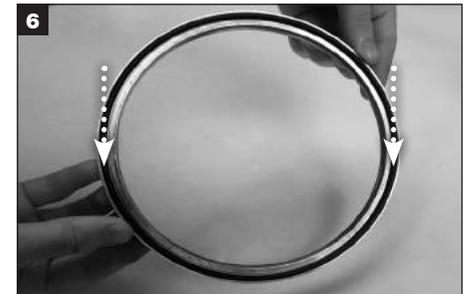
Apply a thin film of **white** grease to the rotary O-Ring (W) and install into the groove on the outer diameter of the rotary face. Ensure cushions are on the back of the rotary face.



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.**



Clean the rotary face with an approved solvent and a lint-free cloth.



For seals with Bushing kit: Apply a thin film of **white** grease to the bushing O-Ring (Y) and install into the groove on the bronze bushing. **IMPORTANT: Ensure the O-Ring is completely seated and fully captured within the O-Ring groove. The O-Ring may appear to be oversize when installing and will need to be worked in.**



For seals with Bushing kit: Install the bushing into the counter bore of the gland with the bushing O-Ring (Y) facing downward.



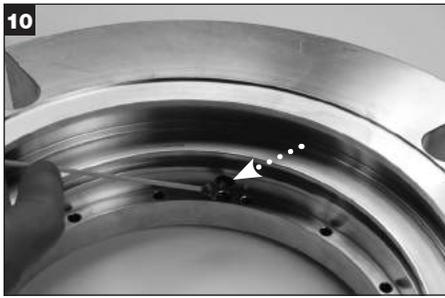
For seals with Bushing kit: Install the snap ring on top of the bushing and into the groove in the gland to secure the bushing into the gland.



For seals with Injector option: Invert the gland. Compress and overlap the ends of the injector, position the splits opposite the F (flush) port and install in the gland groove. **IMPORTANT: The injector should snap into place. Ensure the split ends do not overlap when fully installed.**

9.0 SEAL REBUILD cont.

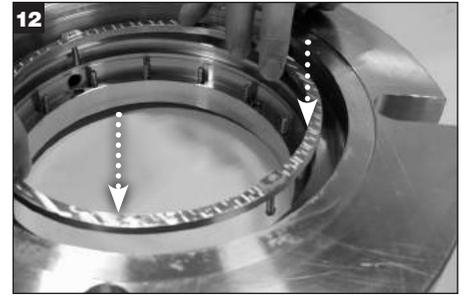
9.1.2 Seal Assembly cont.



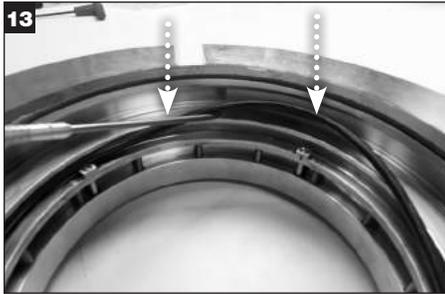
Fill the four evenly spaced holes, marked by dimples, with the **635 SXC grease** supplied with the seal. Wipe off excess grease. **Helpful Hint:** Use the follower plate as a guide to confirm that grease will be applied to the correct holes.



Dip the ends of the springs into white grease and insert into each spring hole. **IMPORTANT: DO NOT** insert springs into the four evenly spaced holes marked by dimples and previously filled with 635 SXC grease.



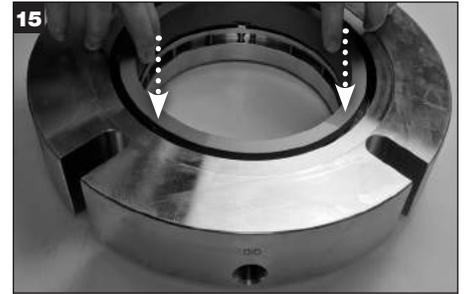
Install Drive Tubes on the follower



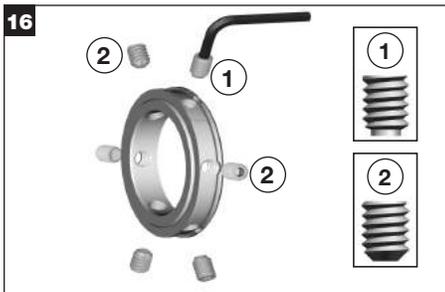
Align the pins on the follower plate with the marked, **635 SXC grease** filled holes in the gland and press down the plate into the gland until the follower plate rests on the springs.



Apply a thin film of **white** grease to the stationary face O-Ring (X) and install into the groove in the gland above the follower plate assembly.



Align the slots on the stationary face with the lugs on the follower plate and gently compress the stationary face down until it is fully seated. **CAUTION: Improper alignment will result in chipping at the slot edges of the face.** Clean the stationary face with a lint-free cloth and an approved cleaning solvent that complies with local and site regulations. **CAUTION: Do not compress drive tube.**



Install the dog point 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 holes in the lock ring. **IMPORTANT: The screws should not protrude into the inner diameter of the lock ring prior to installing onto the seal sleeve.**



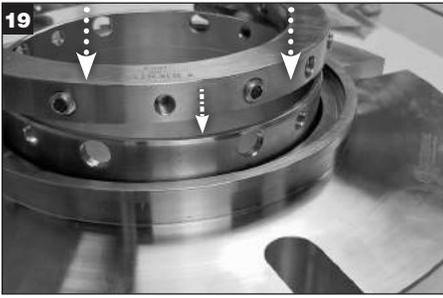
Invert the sleeve assembly and insert it into the gland bore.



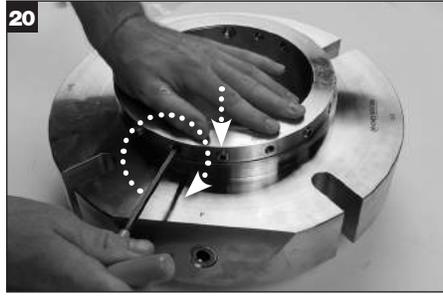
Lift up on the gland and hold the bottom of the sleeve to invert and gently set down to initiate contact between the stationary and rotary faces.

9.0 SEAL REBUILD cont.

9.1.2 Seal Assembly cont.



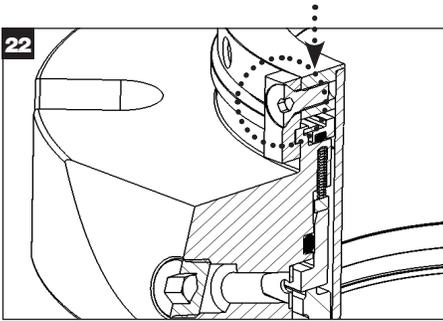
Place the lock ring on top of the sleeve and align the three vertical dimples on the outer diameter of the lock ring with the notch on the top edge of the sleeve.



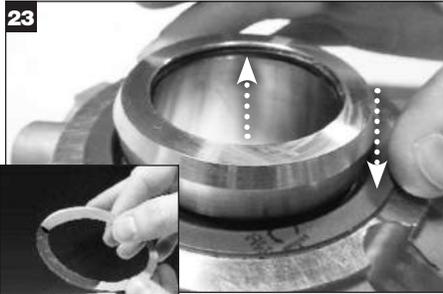
Gently press down on the top of the lock ring and tighten the dog point set screws and then the cup point screws with the hex key supplied with the seal. **IMPORTANT: The set screws should be tightened just enough to ensure that they are secure but should not protrude into the inner diameter of the sleeve.**



Install the centering clips on the outer diameter of the lock ring with the centering clip flat head screws.



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-tight the centering clip flat head screw. Repeat this step for all centering clips. Retighten with a torque wrench: **8 Nm (71 inch-pounds)**.



Apply a thin film of **white** grease to the shaft O-Ring (V) and install on the sleeve inside diameter O-Ring groove. Peel off the adhesive backing from the gland gasket and install in the gland gasket 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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