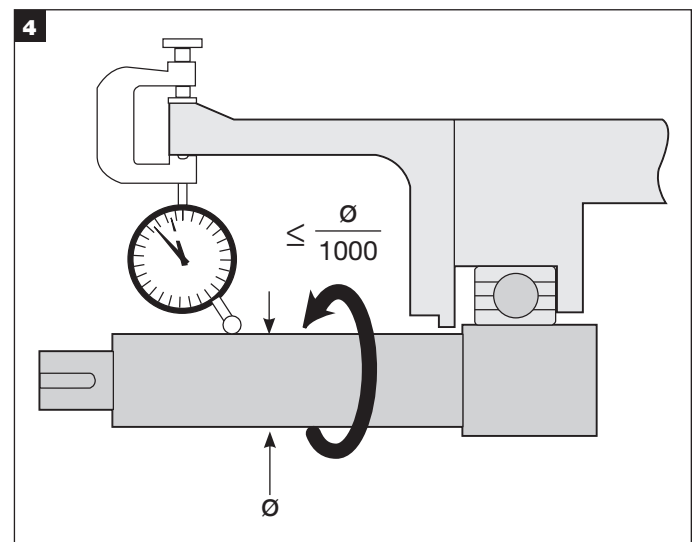
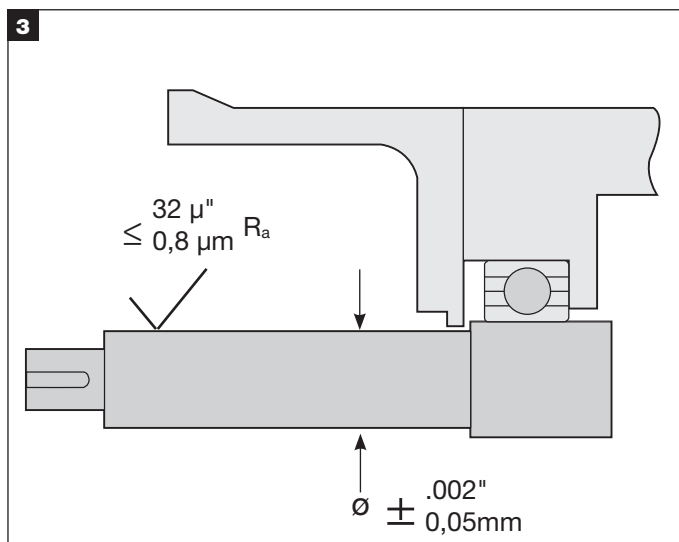
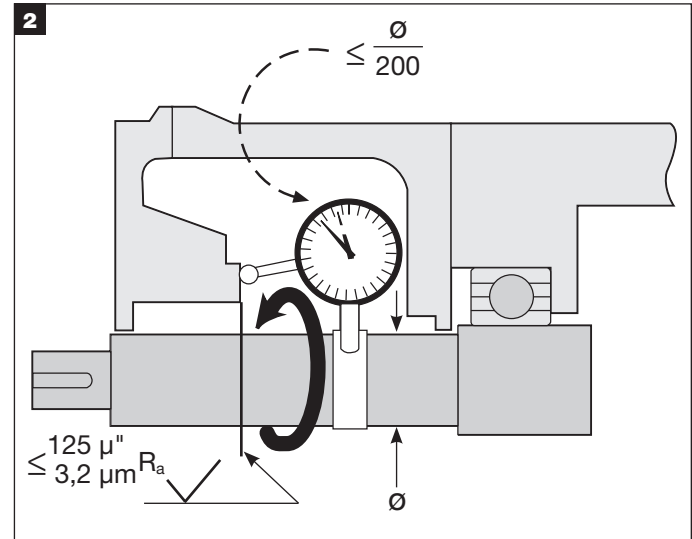
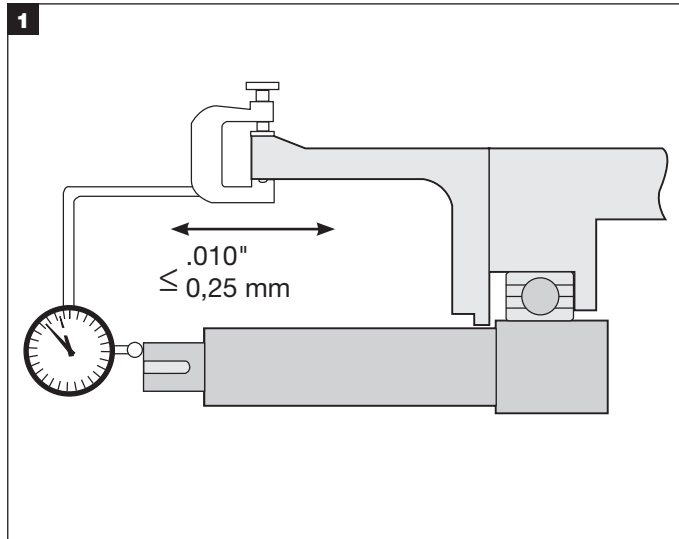


442™ Split Mechanical Seal

For Large Shaft Diameter Equipment - 8 in. to 12 in.
(200 mm to 305 mm)

EQUIPMENT PREPARATION



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, get 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 chemical listing is intended as a **general** reference for this seal **only**. The decision to use this seal or any other Chesterton seal in a particular service is the customer's responsibility.

SEAL PREPARATION

Please read these instructions and make sure you understand them before installing the seal.

Installation is easy provided the parts are handled and installed carefully. Before you remove the parts from the carton, prepare a clean work surface and make sure your hands are clean. Any contaminants on the seal faces or splits during handling may cause seal failure. Prepare a clean work surface on which to place parts during assembly/disassembly.

Prepare the Seal for Installation

The gland and holder come assembled; the split seal faces, O-Rings, holder and gland gaskets, and springs are packaged separately to protect against damage during shipping.

1. Disengage the socket head cap screws from the gland halves. With the gland in a horizontal position, separate the halves and place them on the clean work surface.
2. Disengage the socket head cap screws from the rotary holder halves and place the holder halves on the work surface. Check to ensure that the split O-Ring halves protrude equally (protrusion of 1/4" in opposing halves). See Repair Instructions for details.

3. Remove the rotary and stationary seal faces from their packages and place on the clean work surface, face sides up.
4. Apply a thin film of grease to the gland gaskets and holder gaskets and seat them in their respective grooves.
Do not glue the gland or holder gaskets in place.
5. Snap open the ball and socket joint of the O-Rings by pulling at the seam.
NOTE: The rotary O-Ring is slightly longer than the stationary O-Ring and is marked with a purple dot.
Do not apply grease or glue to the balls and sockets of the O-Rings.
6. Install seal per instructions (pages 3 through 7).

NOTES:

The gland, rotary holder, and face halves are matched pairs; mixing components from different seals **will** result in seal failure.

Handle parts carefully. Remove greasy fingerprints from seal faces; check for misaligned face splits. These conditions may cause leakage.

Splits in all seal components should be staggered; refer to **Figure 1 (page 7)** throughout installation for details.

EQUIPMENT START UP

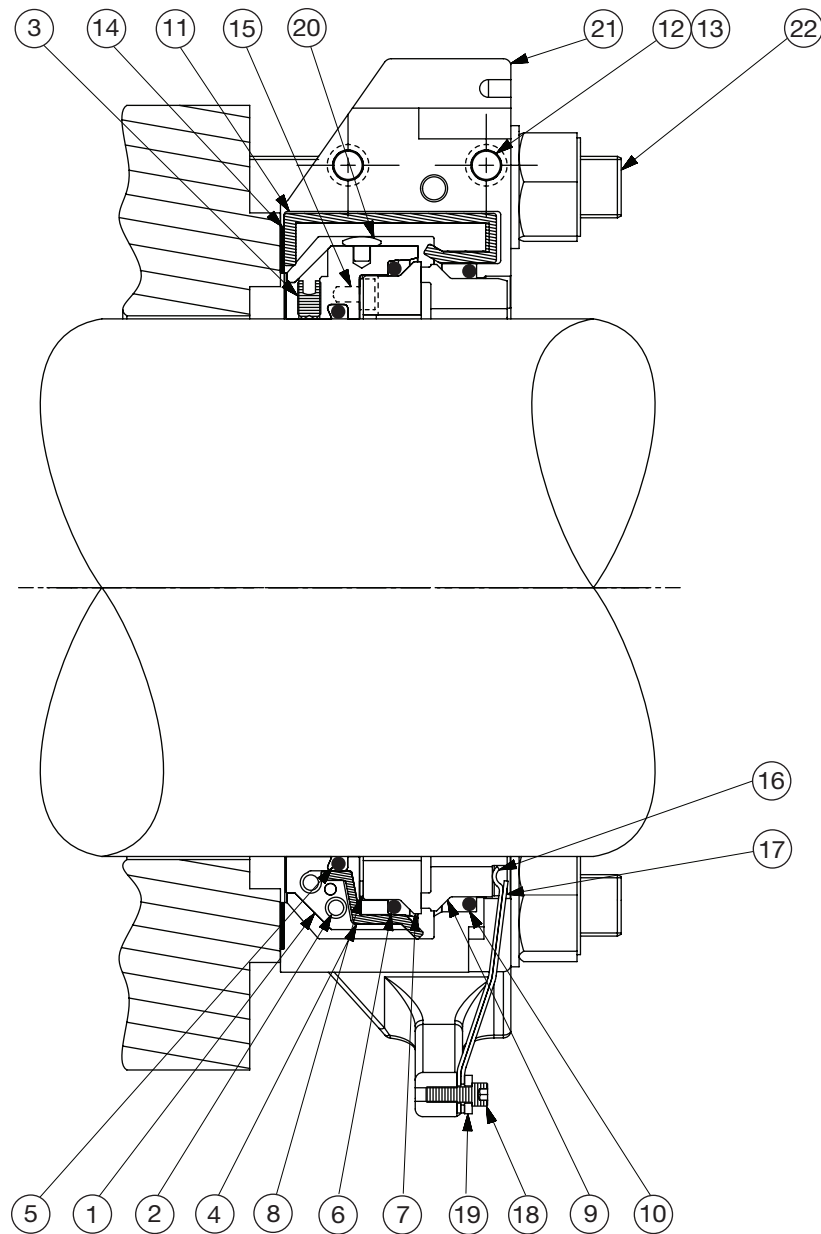
1. Rotate the shaft by hand, if possible, to ensure no metal-to-metal contact within the seal. A slight drag may be found due to the seal face to face contact but the shaft should rotate.
2. Attach appropriate environmental controls to the seal. Take all necessary precautions and follow normal safety procedures before starting the equipment.
3. Depending on how carefully the seal components were handled during installation, split seals may drip on startup. For example, greasy fingerprints on the faces or misaligned face splits may cause leakage. This type of leakage usually decreases and stops over a period of time as a carbon face wears in or leak paths are sealed. However, leakage greater than 150 drops per minute should be investigated immediately. If leakage remains steady, check O-Rings and gaskets for proper installation and check faces for chips, scratches and proper alignment.

Please Contact Chesterton Mechanical Seal Application Engineering for assistance regarding split seals.

SCREW AND BOLT TORQUE

Holder Cup Point Set Screws	180 – 200 in-lbf	20,3 – 22,6 Nm
Spring Cap Screws (W)	150 in-lbf	17,0 Nm
Holder Cap Screws (X)	230 in-lbf	26,0 Nm
Gland Cap Screws (Y)	30 – 40 ft-lbf	40,7 – 54,2 Nm
Stuffing Box Bolts (Z)	80 – 100 ft-lbf	108,5 – 135,6 Nm

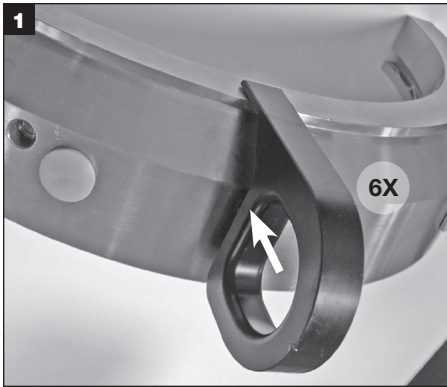
PARTS IDENTIFICATION



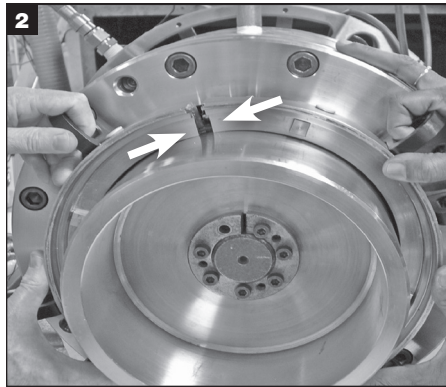
KEY

- | | | |
|--------------------------------|---------------------------------|---|
| 1 – Rotary Holder | 10 – Stationary O-Ring | 19 – Flat Washer |
| 2 – Socket Head Cap Screw (X) | 11 – Gland Gasket | 20 – Centering Button |
| 3 – Cup Point Set Screw | 12 – Socket Head Cap Screw (Y) | 21 – Gland Assembly |
| 4 – Holder Gasket | 13 – Retaining Ring (Not shown) | 22 – Stuffing Box Bolt (Z) |
| 5 – Shaft O-Ring | 14 – Stuffing Box Gasket | 23 – P-Spacer (Not shown - for Installation only) |
| 6 – Rotary O-Ring | 15 – Anti-Rotation Lug | |
| 7 – Rotary Seal Ring | 16 – Spring | |
| 8 – Rotary Support Gasket | 17 – Spring, Auxiliary | |
| 9 – Stationary Seal Ring (SSR) | 18 – Socket Head Cap Screw (W) | |

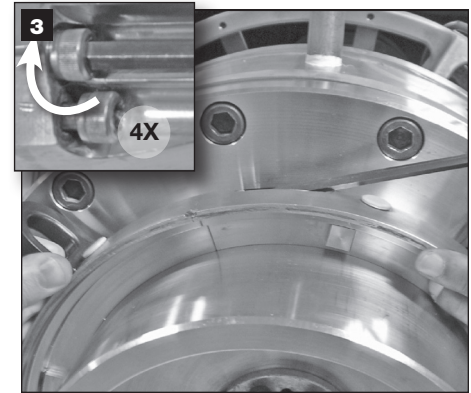
SEAL INSTALLATION



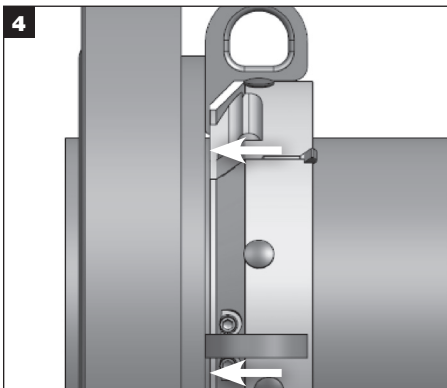
Remove seal from packaging and disassemble on clean work surface. **See Seal Preparation page 2**, for details. Install P-Spacers in holes on OD of holder halves. **Note:** this can be done when holder is assembled around shaft.



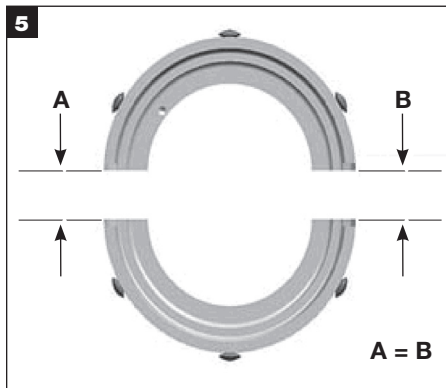
Assemble rotary holder halves on to shaft and finger-tighten holder cap screws to keep holder in place. **Note** that holder gaskets are engaged in opposing grooves.



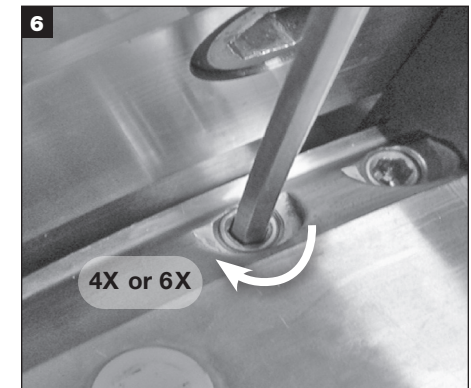
Push on holder assembly to bottom out P-Spacers to stuffing box face. Use hex wrench and alternately tighten holder cap screws (**see Screw and Bolt Torque page 2**).



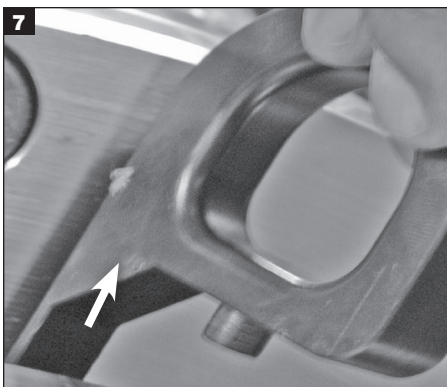
P-Spacers should seat evenly and firmly against stuffing box face.



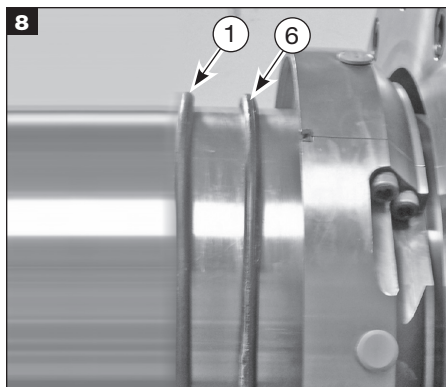
Check gaps at holder splits; gaps should be equal on both sides.



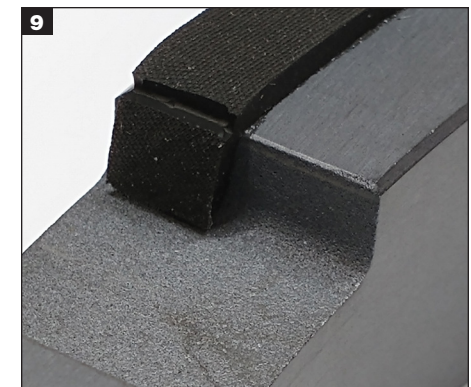
Tighten holder set screws to shaft (**see Screw and Bolt Torque page 2**).



Remove P-Spacers and retain for future use.

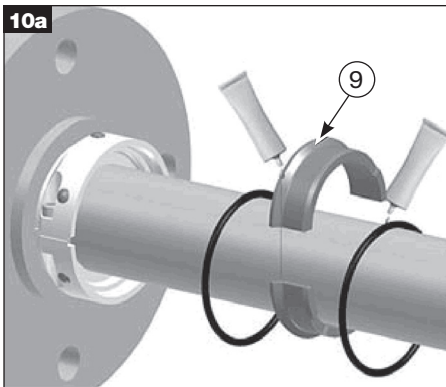


Assemble rotary O-Ring and stationary O-Ring around shaft. **Note:** Rotary O-Ring is slightly longer than stationary O-Ring and is marked with a purple dot.

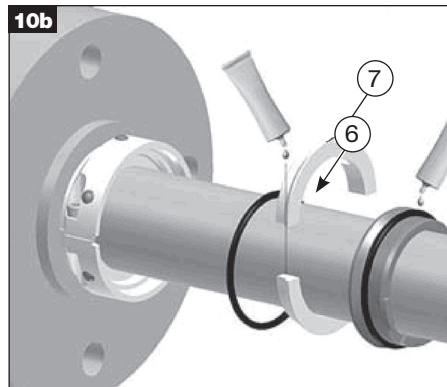


Ensure Rotary Support Gasket is located on the Rotary Seal Ring and the tabs (8X) are folded into the drive slots. If needed, install per instructions in **SEAL REBUILD**

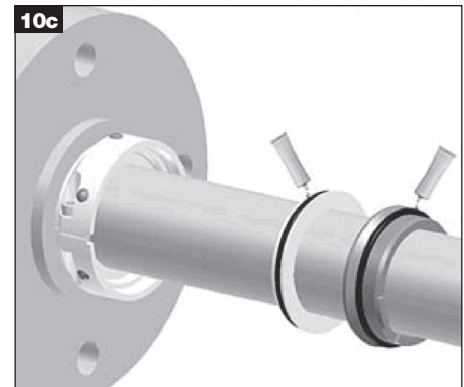
SEAL INSTALLATION



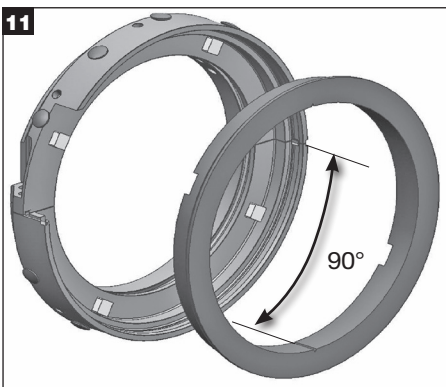
Apply a thin film of grease to ends of one stationary seal face half; assemble around shaft. Slide seal face into stationary O-Ring and apply a thin film of grease to O-Ring.



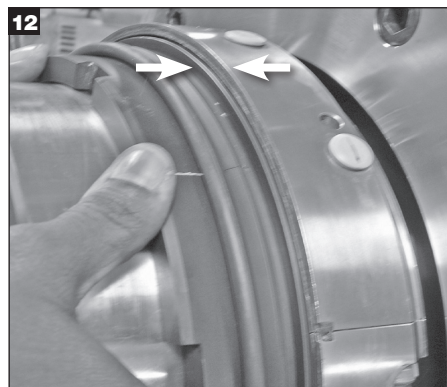
Apply a thin film of grease to ends of one rotary seal face half; assemble around shaft. Slide seal face into rotary O-Ring.



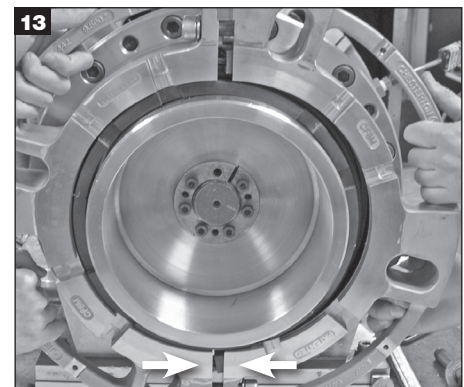
Apply a thin film of grease to rotary O-Ring.



Align rotary face slots with drive lugs in rotary holder. **Note:** For ease of installation the slot location is indicated by a mark on the OD of the rotary face; the lug location is indicated by a score mark on the OD of the rotary holder; when properly installed splits in seal face will be 90° apart from the holder splits. (Refer to Figure 1 page 7).

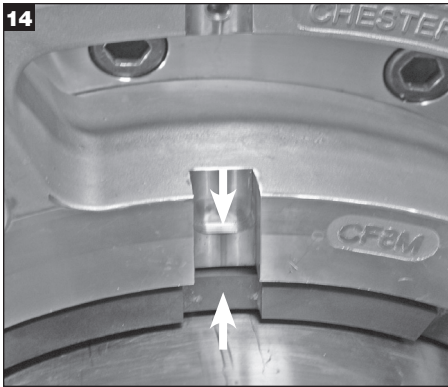


Press evenly on the back of the stationary seal face to engage rotary seal face slots into drive lugs. When engaged correctly, the rotary face surface at the splits should feel smooth, without any step or roughness. Wipe face surfaces clean, removing all greasy fingerprints left from installation.

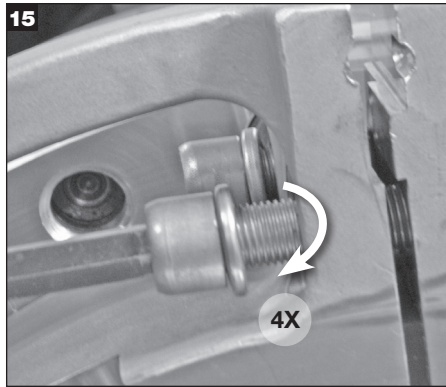


Assemble gland halves around seal components on shaft; splits in the gland halves should align the stationary seal ring splits with the scribe mark on the gland labeled "SSR", and 45° from the splits in the holder halves. (Refer to Figure 1 page 7). Note that gland gaskets are engaged in grooves. Finger-tighten gland socket head cap screws to hold gland halves in place.

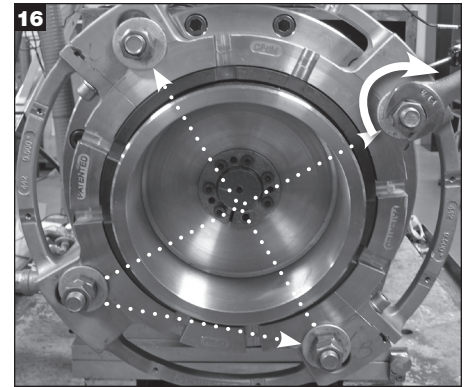
SEAL INSTALLATION



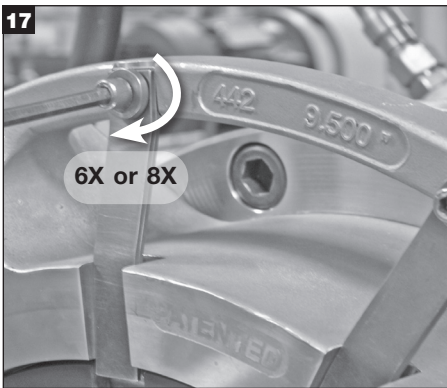
Align slots in stationary with spring slots in gland.



Press gland halves together and alternately hand tighten gland cap screws for even compression. Use torque wrench to tighten gland cap screw (see **Screw and Bolt Torque** page 2).



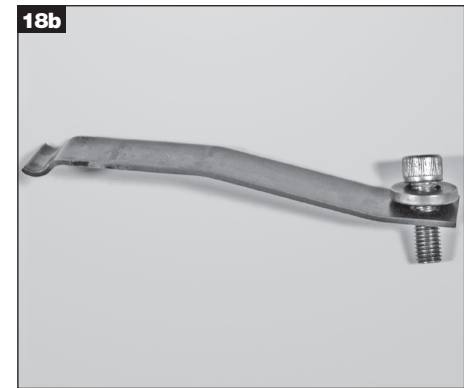
Install stuffing box bolts and alternately tighten; (see **Screw and Bolt Torque** page 2).



Install springs, washers and tighten cap screws (see **Torque Chart**). **Pictured:** Standard 2-piece spring configuration.



Standard 2-piece spring configuration.



Optional for Dry Running Applications: Use spring without flat auxiliary spring.



Installation Complete; (see **Equipment Start Up** page 2).

SEAL INSTALLATION

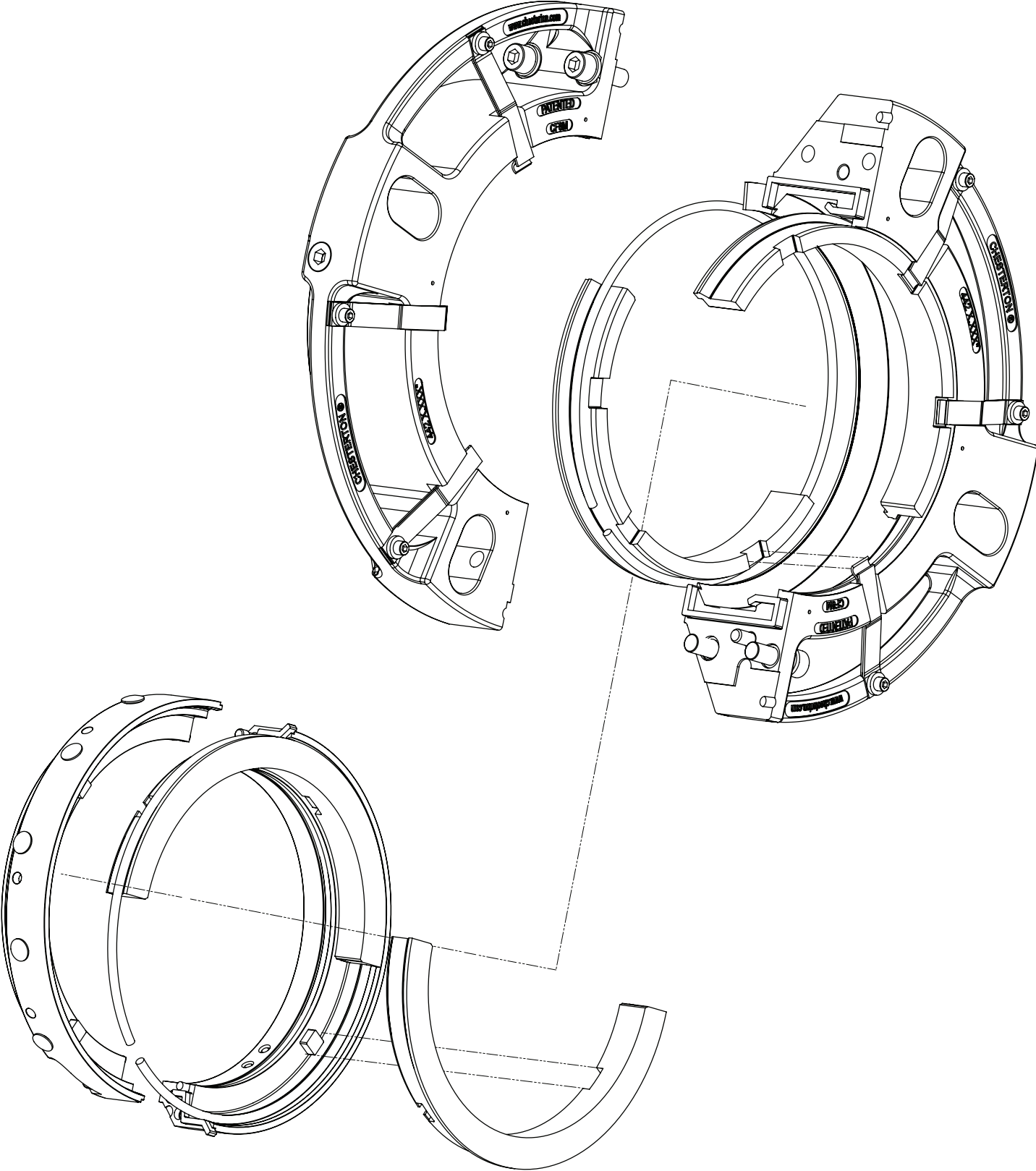
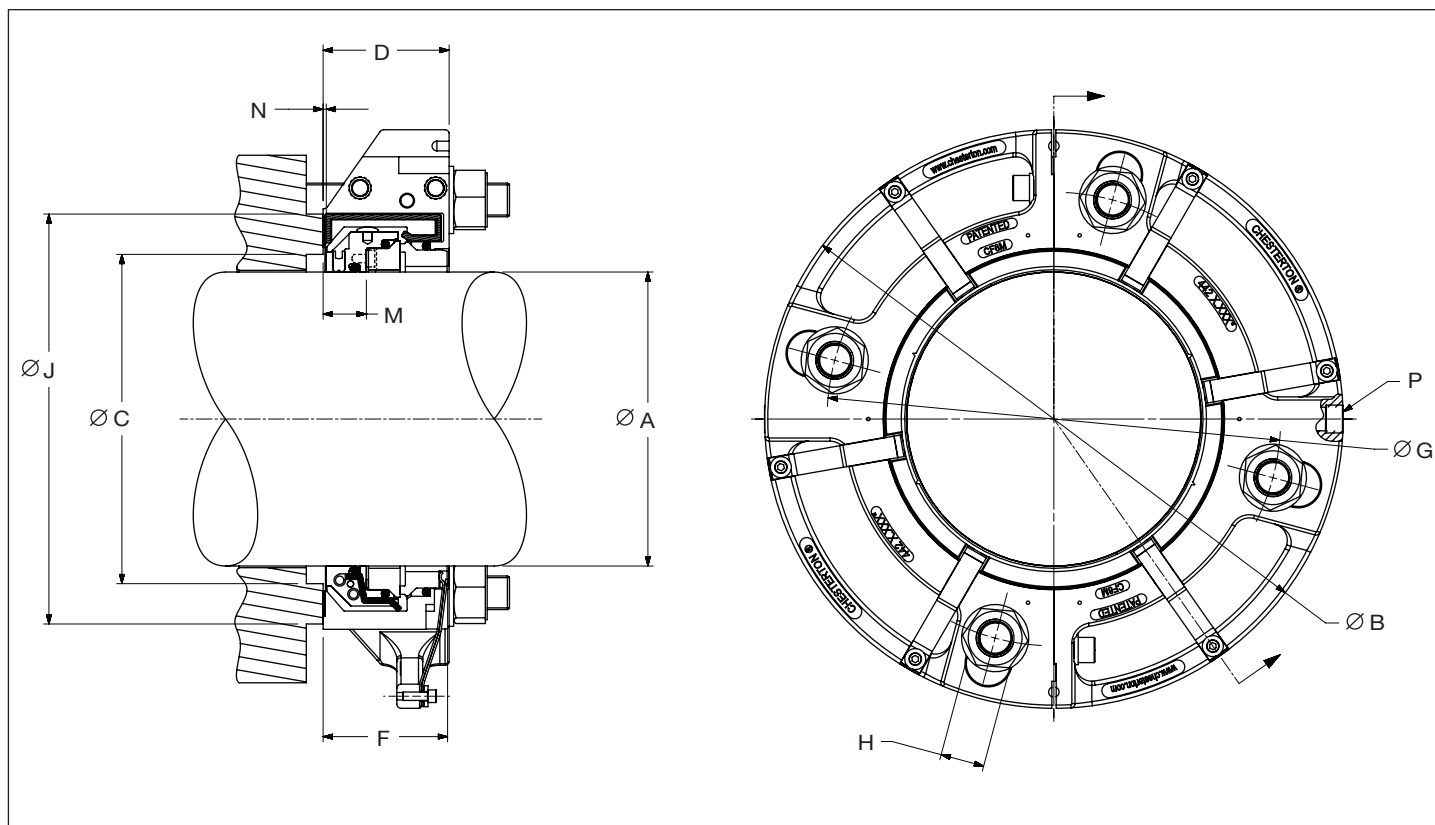


FIGURE 1
Stagger all joints such that no split lines up

DIMENSIONAL DATA (INCH AND METRIC)



Dimensional Data Key

A – Shaft Size
 B – Max. Gland Dia.
 C – Min./Max. Stuffing Box Dia.
 D – Gland Length

F – Outboard Length Required
 G – Min./Max. Bolt Circle by Bolt Size
 H – Min. Slot Width
 J – Min. Stuffing Box Face OD
 M – Holder ID from Box

N – Installation Dimension
 P – NPT Size

HOLDER ID SHAFT SIZE	M HOLDER ID FROM BOX		N INSTALLATION DIMENSION		P NPT SIZE
	INCH	METRIC	INCH	METRIC	
8.000" to 12.000" (200 mm to 305 mm)	1.29	32,8	0.094	2,4	1/2"

DIMENSIONAL DATA (INCH)

A	B	C		D	F	G						H	J
		MIN	MAX			3/4"		7/8"		1"			
						MIN	MAX	MIN	MAX	MIN	MAX		
8.000	16.65	9.51	10.26	3.75	4.00	12.07	14.69	12.20	14.56	12.32	14.44	1.25	11.26
8.250	16.90	9.76	10.51	3.75	4.00	12.32	14.94	12.45	14.81	12.57	14.69	1.25	11.51
8.500	17.15	10.01	10.76	3.75	4.00	12.57	15.19	12.70	15.06	12.82	14.94	1.25	11.76
8.750	17.40	10.26	11.01	3.75	4.00	12.82	15.44	12.95	15.31	13.07	15.19	1.25	12.01
9.000	17.65	10.51	11.26	3.75	4.00	13.07	15.69	13.20	15.56	13.32	15.44	1.25	12.26
9.250	17.90	10.76	11.51	3.75	4.00	13.32	15.94	13.45	15.81	13.57	15.69	1.25	12.51
9.500	18.15	11.01	11.76	3.75	4.00	13.57	16.19	13.70	16.06	13.82	15.94	1.25	12.76
9.750	18.40	11.26	12.01	3.75	4.00	13.82	16.44	13.95	16.31	14.07	16.19	1.25	13.01
10.00	18.65	11.51	12.26	3.75	4.00	14.07	16.69	14.20	16.56	14.32	16.44	1.25	13.26
10.250	18.90	11.76	12.51	3.75	4.00	14.32	16.94	14.45	16.81	14.57	16.69	1.25	13.51
10.500	19.15	12.01	12.76	3.75	4.00	14.57	17.19	14.70	17.06	14.82	16.94	1.25	13.76
10.750	19.40	12.26	13.01	3.75	4.00	14.82	17.44	14.95	17.31	15.07	17.19	1.25	14.01
11.000	19.65	12.51	13.26	3.75	4.00	15.07	17.69	15.20	17.56	15.32	17.44	1.25	14.26
11.250	19.90	12.76	13.51	3.75	4.00	15.32	17.94	15.45	17.81	15.57	17.69	1.25	14.51
11.500	20.15	13.01	13.76	3.75	4.00	15.57	18.19	15.70	18.06	15.82	17.94	1.25	14.76
11.750	20.40	13.26	14.01	3.75	4.00	15.82	18.44	15.95	18.31	16.07	18.19	1.25	15.01
12.000	20.65	13.51	14.26	3.75	4.00	16.17	18.68	16.29	18.56	16.42	18.44	1.25	15.26

DIMENSIONAL DATA (METRIC)

A	B	C		D	F	G						H	J
		MIN	MAX			20 mm		22 mm		25 mm			
						MIN	MAX	MIN	MAX	MIN	MAX		
200	422,9	241,4	260,5	95,3	101,6	308	372	310	370	313	367	31,8	285,9
205	429,3	247,8	266,8	95,3	101,6	314	378	316	376	319	373	31,8	292,2
210	435,6	254,1	273,2	95,3	101,6	320	385	323	383	326	379	31,8	298,6
215	435,6	254,1	273,2	95,3	101,6	320	385	323	383	326	379	31,8	298,6
220	442,0	260,5	279,5	95,3	101,6	327	391	329	389	332	386	31,8	304,9
225	448,3	266,8	285,9	95,3	101,6	333	397	335	395	338	392	31,8	311,3
230	454,7	273,2	292,2	95,3	101,6	339	404	342	402	345	398	31,8	317,6
235	461,0	279,5	298,6	95,3	101,6	346	410	348	408	351	405	31,8	324,0
240	461,0	279,5	298,6	95,3	101,6	346	410	348	408	351	405	31,8	324,0
245	467,4	285,9	304,9	95,3	101,6	352	417	354	414	357	411	31,8	330,3
250	473,7	292,2	311,3	95,3	101,6	358	423	361	421	364	418	31,8	336,7
255	480,1	298,6	317,6	95,3	101,6	365	429	367	427	370	424	31,8	343,0
260	480,1	298,6	317,6	95,3	101,6	365	429	367	427	370	424	31,8	343,0
265	486,4	304,9	324,0	95,3	101,6	371	436	373	433	376	430	31,8	349,4
270	492,8	311,3	330,3	95,3	101,6	377	442	380	440	383	437	31,8	355,7
275	499,1	317,6	336,7	95,3	101,6	384	448	386	446	389	443	31,8	362,1
280	505,5	324,0	343,0	95,3	101,6	390	455	392	452	396	449	31,8	368,4
285	505,5	324,0	343,0	95,3	101,6	390	455	392	452	396	449	31,8	368,4
290	511,8	330,3	349,4	95,3	101,6	397	461	399	459	402	456	31,8	374,8
295	518,2	336,7	355,7	95,3	101,6	403	467	405	465	408	462	31,8	381,1
300	524,5	343,0	362,1	95,3	101,6	412	474	414	472	417	468	31,8	387,5
305	524,5	343,0	362,1	95,3	101,6	412	474	414	472	417	468	31,8	387,5

SEAL REBUILD

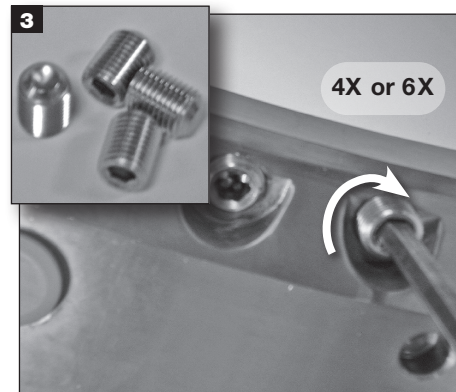
1. Only the gland, rotary holder and springs are reused.
Caution: The gland, holder and face halves are matched pairs; do not mix halves from different seals since this will cause seal failure.
2. The following tools may be required for rebuild:
 - Blunt thin lever (remove centering buttons)
 - Rubber mallet (replace centering buttons)
 - Cleaning solvent (clean gasket surface)
3. Disassemble the seal, noting the condition of the parts, including O-Ring surfaces. Analyze the cause of failure and correct the problem, if possible, before reinstalling the seal.
4. Clean all O-Ring and gasket surfaces with cleaning solvent.



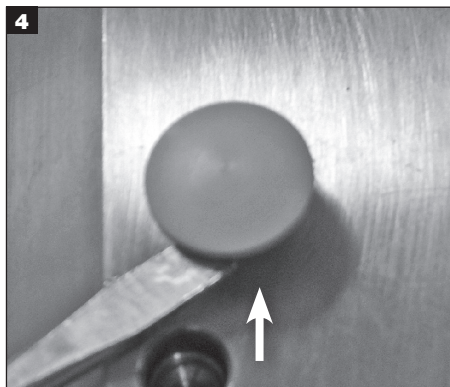
Place seal parts on work surface.



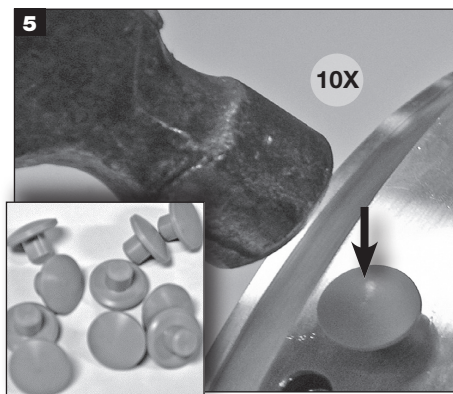
Remove used cup point set screws from rotary holder.



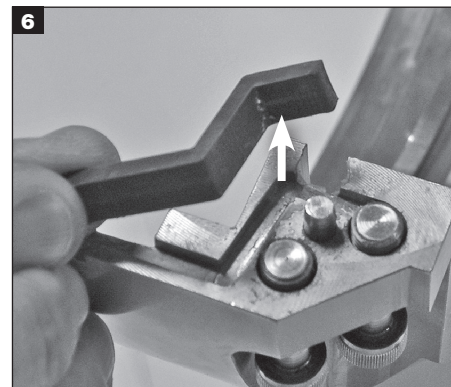
Lubricate and install new cup point set screws in rotary holder.



Remove old centering buttons from OD of rotary holder.

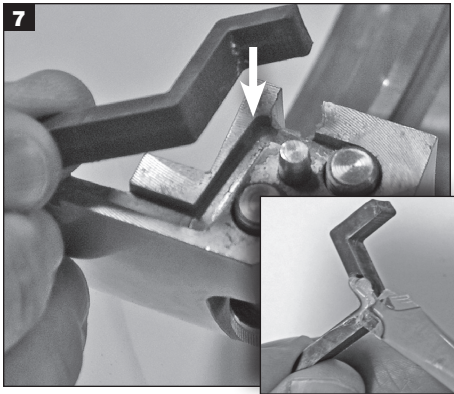


Install new centering buttons on OD of rotary holder. Make sure buttons are fully seated.

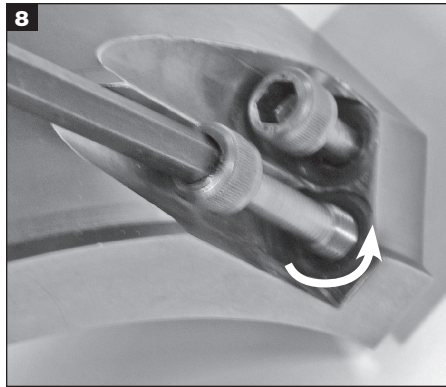


Remove old holder gaskets from holder halves grooves. Clean grooves with cleaning solvent.

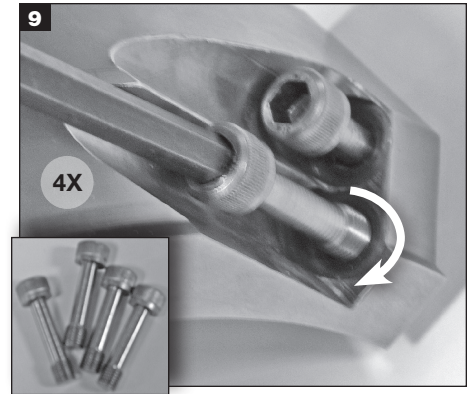
SEAL REBUILD



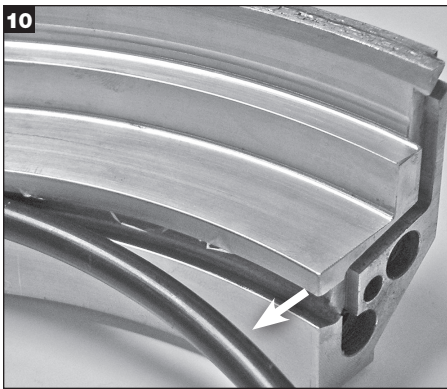
Apply a thin coat film of grease to new holder gaskets and install in grooves in holder halves.



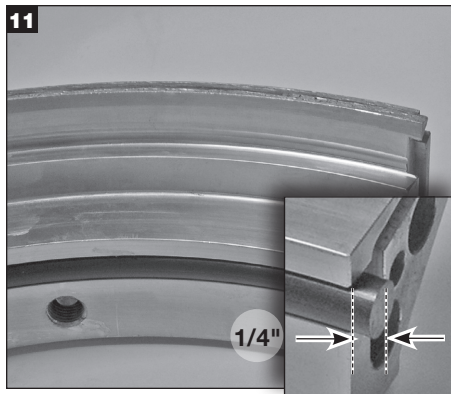
Remove old socket head cap screws from holder halves.



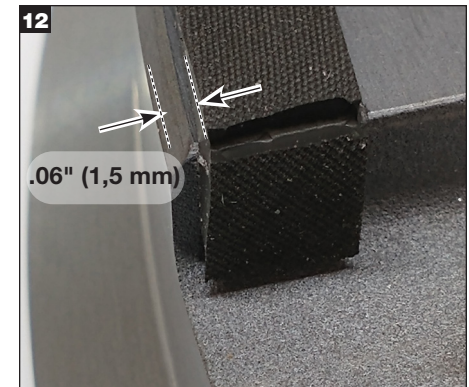
Lubricate and install new socket head cap screws in holder half.



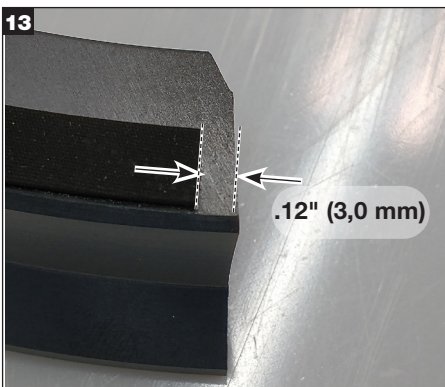
Remove old shaft O-Ring from holder halves. Clean O-Ring groove with cleaning solvent.



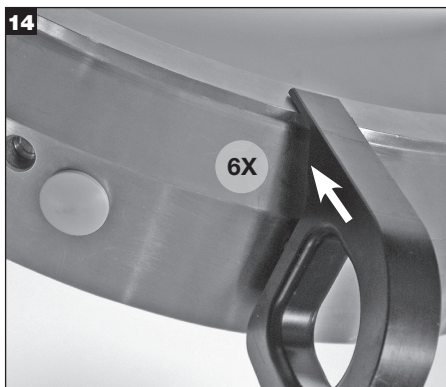
Apply a thin coat film of grease to new 2-piece shaft O-Ring and install in holder halves such that there is equal protrusion of 1/4" (6,3 mm) in opposing halves.



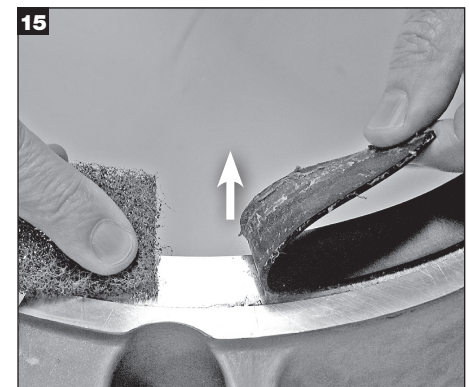
After peeling off the protective backing, position the Rotary Support Gasket so the tab fits into the Rotary Seal Ring drive slot and is .06" (1,5 mm) off the shoulder. Ensure the tab adheres to the side of the drive slot (8X). 2 segments will be cut at the splits.



The Rotary Support Gasket must be cut at the Rotary Seal ring split (4X)

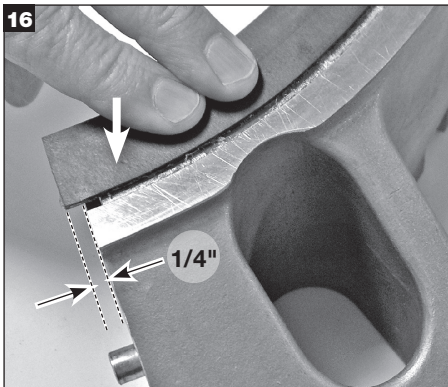


Install P-Spacers on OD of holder halves. **Note:** This step can be done when holder halves are installed around shaft.

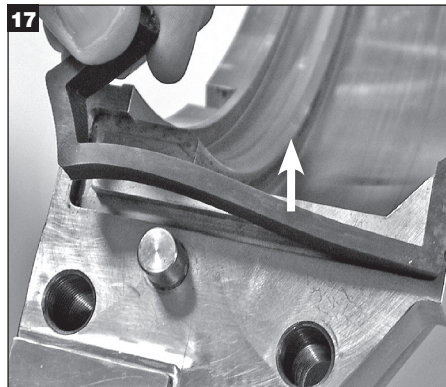


Remove old stuffing box gasket from gland face and remove adhesive residue with cleaning solvent.

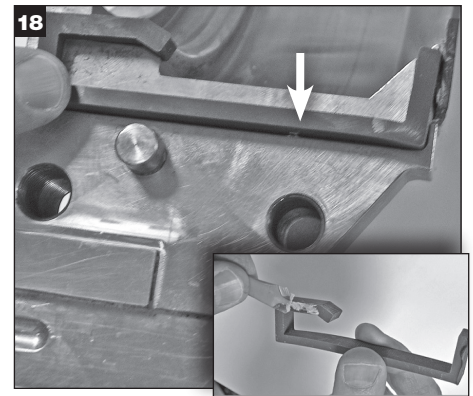
SEAL REBUILD



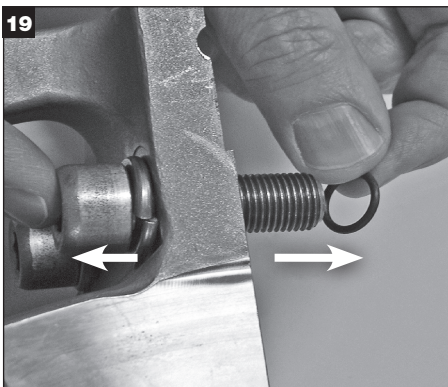
After peeling off the protective backing, seat the gasket halves in gland recess, overlapping gland splits $\frac{1}{4}$ " (6,3 mm) as shown. **Caution: Do not wrinkle gasket during installation.**



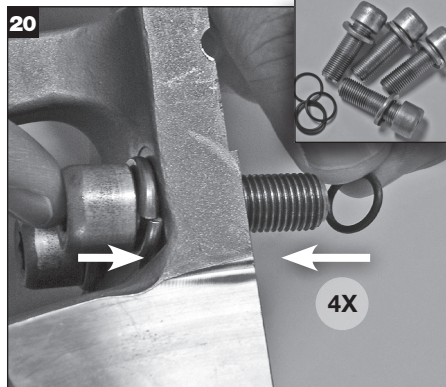
Remove old gland gaskets from gland grooves. Clean grooves with cleaning solvent.



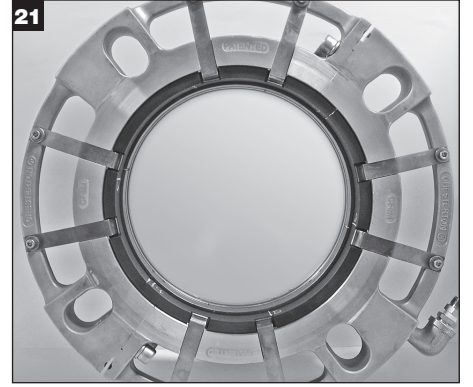
Apply a thin coat film of grease to new gland gaskets and install in gland grooves.



Remove old gland socket head cap screws and retaining rings.



Lubricate and install new socket head cap screws in gland halves and install retaining rings on ends of screws.



For installation see Installation Instructions page 2.

442 SPLIT MECHANICAL SEAL OPERATING PARAMETERS†

PRESSURE CAPABILITIES (INCH and METRIC)

SIZE RANGE	SHAFT SPEED	FACE MATERIAL COMBINATION			
		CARBON/RSC		RSC/RSC	
		Psig	bar g	Psig	bar g
8.000" to 12.000" (200 mm to 305 mm)	875	28" Hg to 150 Psig	710 mm Hg to 10 bar g	28" Hg to 150 Psig	710 mm Hg to 10 bar g

OPERATING LIMITS

SPEED:

- To 3000 fpm (15 mps)

TEMPERATURE:

- To 250 °F (120 °C)

RSC - Reaction bonded silicon carbide

† Consult Chesterton Application Engineering for applications exceeding published operating parameters and for additional seal sizes. Significantly higher limits can be achieved depending on the application.



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