



## Installation of Chesterton Type 442 Mechanical Seal

### I. Preparation

Remove the old sealing device such as packing, packing gland, or mechanic seal and prepare the equipment for installation.

#### A. Shaft or Sleeve

1. The seal will be placed outside the stuffing box with a slight extension into the stuffing box. Sleeve wear inside the stuffing box should have no effect on seal performance.
2. The portion of the shaft (sleeve) which will be used is:
  - 1/8" (3.2 mm) inside the 9/16" (14.3 mm) outside the stuffing box for sizes up to 2.50" (60 mm)
  - 1/4" (6.4 mm) inside to 9/16" (14.3 mm) outside the stuffing box for sizes up to 4.75" (120 mm)

Remove all burrs and scratches in this area and polish if necessary to achieve a 32 microinch ( 0.8 microns ) AA finish.

3. *Make sure the shaft or sleeve diameter is within .002" (0.05 mm) of nominal.*

Example: A 1.75" (50 mm) shaft should not be larger than 1.752" (50.05 mm) or smaller than 1.748" (49.95 mm).

4. Use a dial indicator to measure the shaft runout just outside the stuffing box. *Readings should not exceed .001" TIR per inch (0.001 mm TIR per millimeter) of shaft diameter.*
5. If practical, place the dial indicator tip on the end of the shaft sleeve or on a step in the shaft (sleeve) 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 .005" (0.13 mm) TIR.

#### B. Stuffing Box or Seal Chamber

1. Remove existing stuffing box studs. Hex or socket head bolts will be used. The required length is:
  - 2-3/8" to 2-1/2" for sizes up to 2.50"; (60 mm to 63.5 mm for sizes up to 60 mm).
  - 2-3/4" to 2-7/8" for sizes up to 4.75"; (70 mm to 73 mm for sizes up to 120 mm).

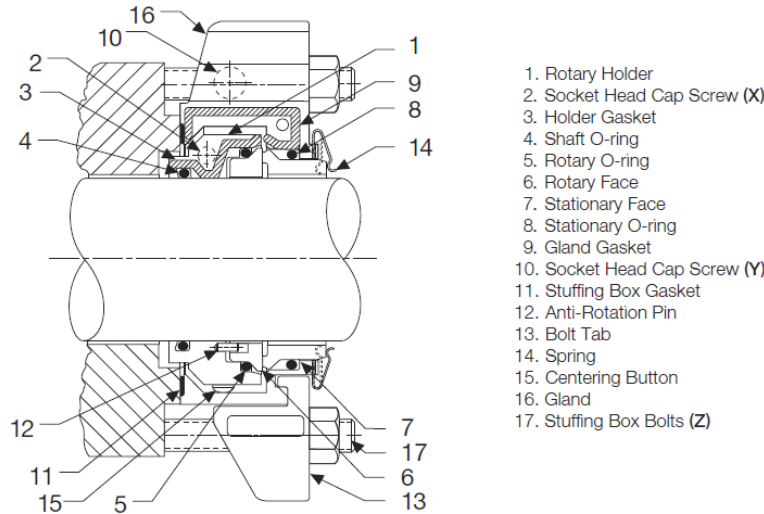
If the mouth of the stuffing box protrudes beyond the stud/bolt mounting surface, add the protrusion length to the bolt lengths listed above.

2. The stuffing box face must be flat and smooth enough to seal a gasket; maximum 125 microinches (3.2 microns) AA.



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3. If practical, attach the dial indicator base to the shaft and slowly rotate the shaft and indicator to measure the runout of the stuffing box. Misalignment of the stuffing box relative to the shaft should not exceed .003” TIR per inch (0.003 mm TIR per millimeter) of shaft diameter.



### SCREW AND BOLT TORQUE

SEAL SIZE	HOLDER CAP SCREWS*	GLAND CAP SCREWS**	STUFFING BOX BOLTS**
Up to 2.50” (60 mm)	40 in-lbf (4.5 Nm)	125 – 175 in-lbf (14 – 20 Nm)	125 – 175 in-lbf (14 – 20 Nm)
Up to 4.75” (120 mm)	100 in-lbf (11.3 Nm)	150 – 200 in-lbf (17 – 23 Nm)	25 – 35 in-lbf (34 – 48 Nm)
Up to 7.75” (195 mm)	325 in-lbf (36.8 Nm)	200 – 300 in-lbf (23 – 34 Nm)	30 – 40 in-lbf (40 – 54 Nm)

\*Recommended maximum.

\*\*Typical values.

Torque necessary to seat stuffing box gasket varies with bolt size and gasket sealing surface

#### **CAUTIONS:**

These instructions are general in nature. It is assumed that the installer is familiar with seals and certainly with the requirements of the 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 is a particular service is the customer’s responsibility.

NOTE: The socket head cap screws can be installed from either side of the holder or gland halves.

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

CAUTION: Do not glue the ball and socket joints

NOTE: Handle parts carefully. Greasy fingerprints on seal faces or misaligned face splits may cause leakage.



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### II. Seal Installation

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. Make sure your hands are clean. Any dirt particles placed on the seal faces or splits during handling may cause seal failure.

Prepare the Seal for Installation (1-5):

1. Disengage the socket head cap screws (Fig. 1, item 10) from one half of the gland. With the gland in a horizontal position, springs, up, separate the halves and place them on the clean work surface.
2. You now have access to the rotary holder (Fig. 1, item 1). Disengage the two socket head cap screws (Fig. 1, item 2) from one half of the rotary holder and place the holder halves on the work surface.
3. Remove the rotary and stationary seal faces from their packages and place on the clean work surface
4. Make sure that the gland gaskets (Fig. 1, item 9), holder gaskets (Fig. 1, item 3), stuffing box gasket (Fig. 1, item 11, no grease) and static O-ring (Fig. 1, item 4) are properly greased and seated in their grooves. Note the gold mark on one end of each half of the cut static O-ring. Assure that the O-ring is placed in the rotary holder such that the two gold marks mate at one joint. 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 and is marked with a purple dot.) Do not apply grease to the balls and sockets of O-rings.

### III. Assembly (1-15) – See numbered diagrams on page 5 of 5 for visual aid

1. The gland, holder, and face halves are matched pairs; mixing components from different seals will result in seal failure. The following tools have been provided to ease assembly: hex keys, installation spacer, and silicone grease.
- 2-3. Assemble the holder halves around the shaft and tighten the two socket head cap screws until engaged, but not tight, on the shaft. (NOTE: The socket head cap screws can be installed from either side of the holder halves.)
- 4-5. Slide the holder against the stuffing box using the “Y” spacer provided against the holder step for the correct installation dimension:
- 6-7. Assemble both O-rings around the shaft; the longer rotary O-ring inboard. (NOTE: Do not glue the ball and socket joints). Place a small dab of silicone grease on the surface of the split of one half of each face. This grease will aid in assembly and alignment of the seal faces.



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## **XCEL Series of Turbine Mixers**

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## III . Assembly (continued)

8. Carefully Press the two stationary halves together around the shaft between the two O-rings and wrap the outboard O-ring around them. Line up the O-ring joint with one of the stationary drive notches to ensure that it does not align with the face or gland splits. Locate the O-ring midway along the flat, off the incline.
- 8-10. Carefully press the two rotary face halves together around the shaft and wrap the remaining O-ring over the halves. Again, check that the O-ring joint does not line up with the face splits. Coat the outside diameter of the O-rings with an ample film of silicone grease. Align the rotary and stationary faces by pushing them together.
- 10-11. Align the rotary face notch marking with the drive pin alignment mark indicated by an indentation or white mark on the holder OD and carefully press the rotary halves into the holder using the stationary face. With the installation spacer in place, alternately tighten both holder cap screws evenly. Remove the spacer.
- 12-13. Place the gland halve without gaskets around the seal. (NOTE: The stationary face splits should be as close to 90° from the gland splits as possible.) Place the remaining gland half with gland gaskets around the seal. Fully tighten the socket head cap screws. (NOTE: The socket head cap screws can be installed from either side of the gland halves.) Install the adjustable gland tabs as needed.
14. Evenly snug the mounting bolts to the stuffing box keeping the seal perpendicular to the shaft. Do not over-tighten the bolts.

## IV. Equipment Start –UP

1. Rotate the shaft by hand to ensure no metal-to-metal contact within the seal. A slight drag may be found due to the seal faces but the shaft should rotate freely.
2. Attach appropriate plumbing 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 degreases and stops over a period of time as a carbon face wears in or leak paths are clogged. However, leakage greater than 60 drops per minute should be investigated immediately, if the leakage remains steady, check O-rings and gaskets for proper installation and check the faces for chips, scratches, and proper alignment.



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