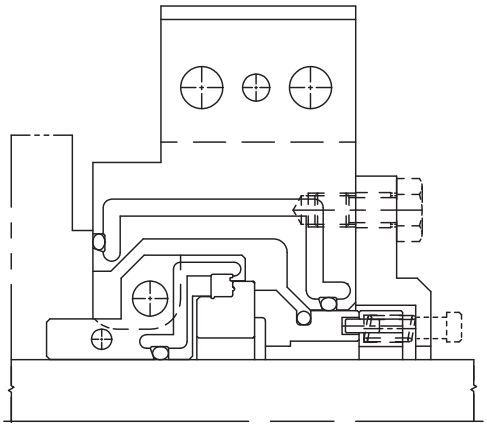
EXTRA LARGE WET RUNNING CARTRIDGE SPLIT SEAL

Installation, Operation & Maintenance Instructions

Foreword

These instructions are provided to familiarize the user with the seal and its designated use. The instructions must be read and applied whenever work is done on the seal, and must be kept available for future reference.



ATTENTION These instructions are for the installation and operation of a seal as used in rotating equipment, and will help to avoid danger and increase reliability. The information required may change with other types of equipment or installation arrangements. These instructions must be read in conjunction with the instruction manuals for both the rotating equipment and any ancillary equipment.

If the seal is to be used for an application other than that originally intended or outside the recommended performance limits, John Crane must be contacted before its installation and use.

Any warranty may be affected by improper handling, installation or use of this seal. Contact John Crane for information as to exclusive product warranty and limitations of liability.

If questions or problems arise, contact your local John Crane representative or the original equipment manufacturer, as appropriate.

ATTENTION John Crane mechanical seals are precision products and must be handled appropriately. Take particular care to avoid damage to lapped sealing faces and to flexible sealing rings. Do not excessively compress the seal before or during installation.

Safety Instructions

1. The following designations are used in the installation instructions to highlight instructions of particular importance.

   NOTE: Refers to special information on how to install or operate the seal most efficiently.

   ATTENTION Refers to special information or instructions directed towards the prevention of damage to the seal or its surroundings.

   ⚠ **Refers to mandatory instructions designed to prevent personal injury or extensive damage to the seal or its surroundings.**

2. Installation, removal and maintenance of the seal must be carried out only by qualified personnel who have read and understood these installation instructions.
3. The seal is designed exclusively for sealing rotating shafts. The manufacturer cannot be held liable for use of the seal for purposes other than this.
4. The seal must only be used in technically perfect condition, and must be operated within the recommended performance limits in accordance with its designated use set out in these installation instructions. Any modifications will void any and all warranties.
5. The Type 3740XL seal is not intended to be used in hazardous or toxic processes. If the process is either hazardous or toxic, please contact your local John Crane representative for a more appropriate seal recommendation.
6. Fluorocarbon components should never be burned or incinerated as the fumes and residues are highly toxic. If fluorocarbons are accidentally heated above 400˚C/750˚F, they can decompose. Protective gloves should be worn as hydrofluoric acid may be present.

Before Starting the Equipment

1. Check the pump at the coupling for proper alignment of the driver or motor.
2. Ensure that the gland plate is bolted securely as described in Install Gland Plate Assembly - Step 3, number 12. on page 5.
3. Complete the assembly of the pump, and turn the shaft (by hand if possible) to ensure free rotation.
4. Consult all available equipment operating instructions to check for correctness of all piping and connections, particularly regarding seal recirculation/flush, heating or cooling requirements, and services external to the seal.

   ATTENTION The Type 3740XL wet running seal is designed to operate in a liquid so the heat energy it creates is adequately removed. The following check should be carried out not only after seal installation, but also after any period of equipment inactivity.

5. For the Type 3740XL ret running split seal, check that the seal chamber fluid lines are open and free of any obstruction, and ensure that the seal chamber is properly vented and filled with liquid — refer to the pump instruction manual.

ATTENTION Dry-running the Type 3740XL wet running split seal will cause overheating and scoring or other damage to the sealing surfaces, resulting in excessive leakage or a much shortened seal life.

⚠ **Before startup, ensure that all personnel and assembly equipment have been moved to a safe distance so there is no contact with rotating parts on the pump, seal, coupling or motor.**

WARNING: Seal installation should be handled only by qualified personnel. If questions arise, contact the local John Crane representative. Improper use and/or installation of this product could result in injury to the person and/or harmful emissions to the environment, and may affect any warranty on the product. Please contact the company for information as to exclusive product warranty and limitations of liability.

Install Mating Ring Adapter Assembly - Step 1

1. Remove the mating ring adapter assembly halves from the packaging.

ATTENTION Do not fit the mating ring adapter assembly halves together before actual installation. Damage to the mating ring split joints may occur.

NOTE: Ensure the set screws are not threaded past the inside diameter of the mating ring adapter assembly halves as they will interfere with the shaft during installation.

NOTE: Ensure the mating ring halves are properly assembled in the mating ring adapter assembly halves. The mating ring halves should be engaged with the sealing strip as shown in Figure 2. The mating ring halves may be adjusted if necessary by pushing on the mating ring halves as shown in Figures 1 and 2.

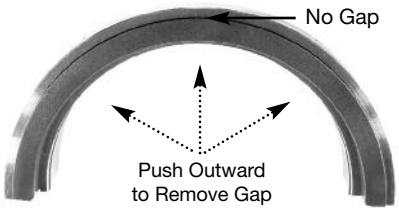


Figure 1

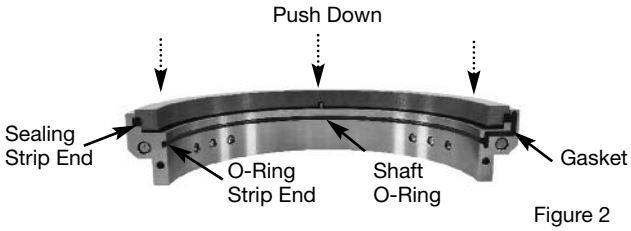


Figure 2

NOTE: Ensure the ends of the sealing strip and shaft O-Ring are properly extended as shown in Figure 3. Also ensure even extension on both ends. They can be pushed in or out to adjust if necessary.

Install Mating Ring Adapter Assembly - Step 1 (cont.)

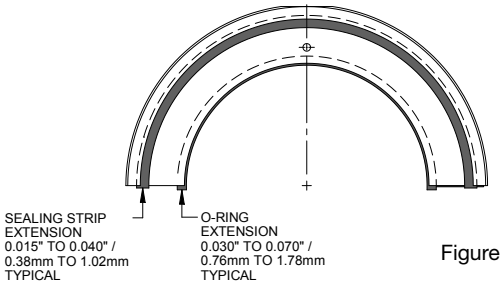


Figure 3

2. Lightly lubricate the exposed inside diameter surface of the shaft O-Ring with the provided lubricant on each mating ring adapter assembly half as shown in Figure 2.

3. Lightly lubricate the exposed surfaces of the split joint gasket, sealing strip free ends and O-Ring strip free ends with the provided lubricant on each mating ring adapter assembly half. Figure 2.

ATTENTION Be careful not to apply lubricant to the mating ring split ends.

4. Place the mating ring adapter assembly halves around the shaft with the mating ring pointing away from the equipment's seal chamber. Bring the halves together to begin engagement of the alignment pins. Evenly tighten the cap screws until approximately a 1/32"/0.8mm gap exists at each split joint. Figure 4.

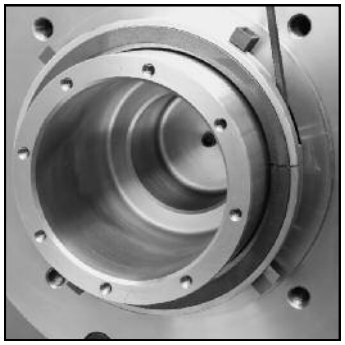


Figure 4


Figure 5

5. Slide the mating ring adapter assembly on the shaft toward the seal chamber until the setting spacers contact the seal chamber face. Figure 5.

Install Mating Ring Adapter Assembly - Step 1 (cont.)

6. Continue evenly tightening the cap screws until the mating ring halves begin to contact. Check that the mating ring split joints are aligned at the lapped sealing surface. If a step exists, push on the high side of the step to correct. Figure 6.

NOTE: Seal faces are flat to within 0.000035"/0.00089mm. As with any split seal, assuring the seal face halves are properly aligned is extremely important to assure optimal performance.


Figure 6

7. Fully tighten the cap screws and again check the mating ring split joints for steps at the lapped sealing surface and the outside diameter (OD). If a step exists at the lapped sealing surface or outside diameter (OD), push on the high side of the step to correct. A setting spacer may be temporarily removed and used to push against the high side of a step at the outside diameter (OD). Figure 7.

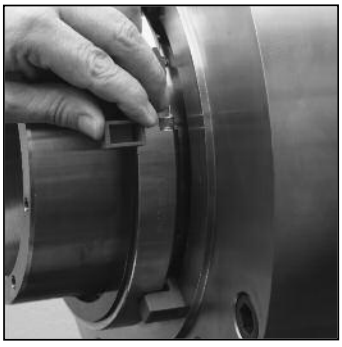


Figure 7


Figure 8

Install Mating Ring Adapter Assembly - Step 1 (cont.)

8. Ensure the setting spacers are contacting the seal chamber face and evenly tighten the set screws. Figure 8.

9. Remove the four plastic setting spacers from the mating ring adapter assembly using the small provided screwdriver.

10. Clean the mating ring sealing surface with the provided alcohol pads. Figure 9.

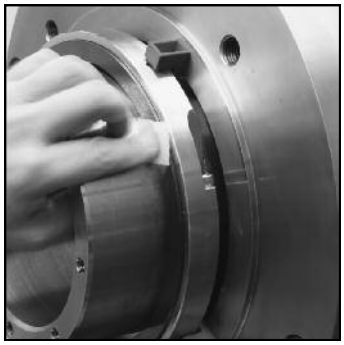


Figure 9

NOTE: The completed mating ring adapter assembly should look like Figure 10.

Figure 10

Install Primary Ring Assembly - Step 2

1. Remove the primary ring halves and retaining ring from the packaging.

ATTENTION Do not fit the primary ring halves together before actual installation. Damage to the primary ring split joints may occur.

2. Place the primary ring halves around the shaft, with the sealing surface facing the mating ring adapter assembly, and bring the halves together. (Note: Placing the primary ring halves against the mating ring face while bringing the halves together will help to steady the primary ring halves and make aligning the split joints easier). Figure 11.

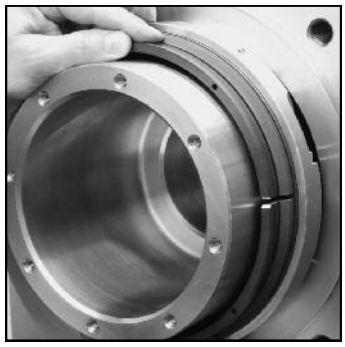


Figure 11

3. While holding the primary ring halves together with the split joints aligned, center the retaining ring over one of the split joints of the primary ring and slide it into the groove on the primary ring outside diameter (OD). Figure 12. Check the primary ring split joints for steps at the lapped sealing surface and outside diameter (OD). Adjust the split joint alignment if necessary.

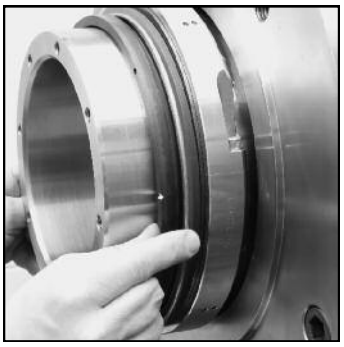


Figure 12

NOTE: Seal faces are flat to within 0.000035"/0.00089mm. As with any split seal, assuring the seal face halves are properly aligned is extremely important to assure optimal performance.

Install Primary Ring Assembly - Step 2 (cont.)

4. Apply a thin, even film of lubricant to the O-Ring contact surface of the primary ring with the provided lubricant. Figure 13.

Figure 13

5. Clean the primary ring sealing surface with the provided alcohol pads. Slide the primary ring face against the mating ring face. Figure 14.

NOTE: The completed primary ring assembly should look like Figure 15.

Figure 14

Figure 15

Install Gland Plate Assembly - Step 3

1. Remove the gland plate assembly halves from the packaging.

NOTE: Ensure the ends of the primary ring O-Rings and gland face O-Rings are properly extended as shown in Figure 16. Also ensure even extensions on both ends. They can be pushed in or out to adjust if necessary.

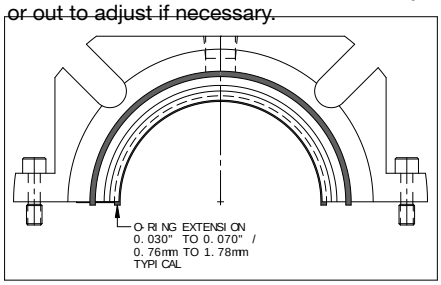


Figure 16

2. Plug any unused flush connection taps with the provided pipe plugs.

3. Lightly lubricate the exposed surfaces of the split joint gasket and the O-Ring strip free ends with the provided lubricant on each gland plate assembly half. Figure 17.

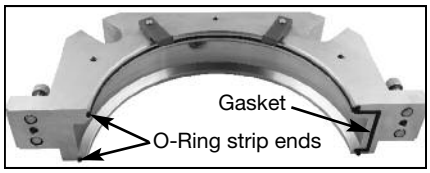


Figure 17

ATTENTION Do not lubricate the exposed inside diameter surface of the primary ring O-Ring or the exposed face surface of the gland face O-Ring.

4. Locate the white alignment marks at the primary ring split joints so that they will line up with the gland plate assembly alignment marks when the first half of the gland plate assembly is installed. The gland plate assembly alignment marks are scribe lines located 90° from the gland plate assembly split surfaces. Figure 18.

EXAMPLE: If it is preferred to place the first gland plate assembly half around the shaft so that the split joints are at the 3 and 9 o'clock positions, locate the primary ring white alignment marks at the 12 and 6 o'clock positions.

Install Gland Plate Assembly - Step 3 (cont.)

5. Bring the first half of the gland plate assembly, with the gland face O-Ring facing the equipment's seal chamber, around the rotating assembly and primary ring assembly so that the gland plate inside diameter angled lip gently engages and goes around the beveled edge of the rotating assembly. Lightly push the gland plate assembly half inboard so that the face O-Ring contacts the seal chamber face. Figure 19.

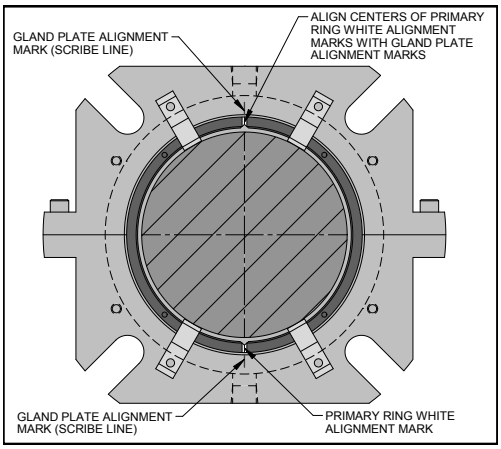


Figure 18

6. Align the nearest primary ring white alignment mark with gland plate half alignment mark. The gland plate alignment marks are scribe lines located 90° from the gland plate split surfaces. Figure 18.

7. Bring the second half of the gland plate assembly around the shaft and towards the first half to engage the alignment pins. Figure 20.

NOTE: Be careful to bring the two halves together with even gaps at each split joint.

Figure 19

Install Gland Plate Assembly - Step 3 (cont.)

8. Evenly tighten the cap screws until approximately a 3/16"/4.8mm gap exists at each split joint. Figure 20.

9. Ensure the centers of the primary white alignment marks are aligned with the gland plate alignment marks (Figure 18). Adjust the primary ring alignment by slightly rotating the primary ring within the gland plate assembly if necessary.

Figure 20

NOTE: The center of the primary ring white alignment marks is at the bottom of the V-slots they are located on. Align these centers as closely as possible with the gland plate alignment marks.

10. Continue evenly tightening the cap screws until the split joints are contacting and the cap screws are only snug. Avoid fully tightening the cap screws at this point as this will cause the gland assembly to tilt/rock from side to side and may result in damage to the primary ring split surfaces. Figure 21.

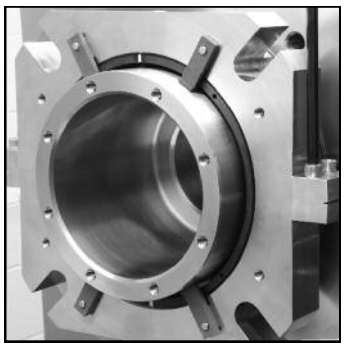


Figure 21

Install Gland Plate Assembly - Step 3 (cont.)

11. Install the seal mounting bolts (typically not supplied). Evenly tighten the bolts but do not fully tighten at this time. Tighten the bolts until the gland plate assembly begins to contact the seal chamber and then back off bolts one-quarter turn. Figure 22.

12. Fully tighten the gland plate assembly cap screws.

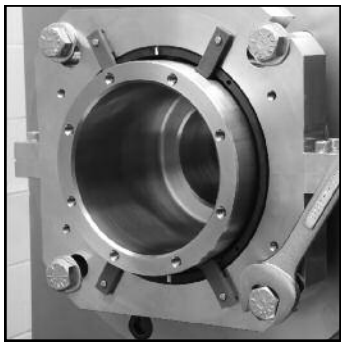
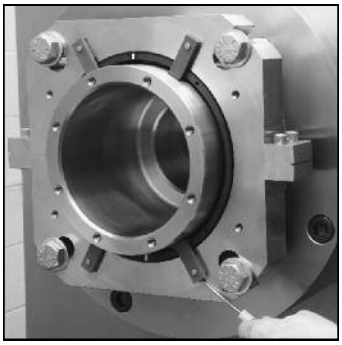


Figure 22

13. Evenly tighten the seal mounting bolts ensuring metal-to-metal contact between the gland plate assembly and seal chamber face is made. Do not over tighten the bolts. Doing so may cause gland plate distortion which could result in excessive leakage.

14. Remove the four plastic centering spacers from the outboard end of the gland plate using the small provided screwdriver. Figure 23.

NOTE: The completed gland plate assembly should look like Figure 24.



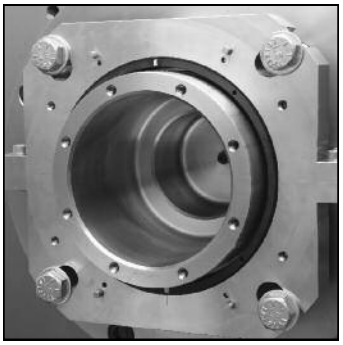


Figure 23

Install Spring Housing Assembly - Step 4

1. Remove the spring housing assembly halves from the packaging.

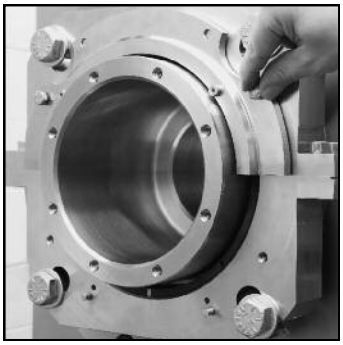
2. Bring the first half of the spring housing assembly around the shaft with the primary ring anti-rotation pins facing the exposed outboard end of the primary ring and the split joints aligned with the gland plate assembly split joints. Align the two holes at the OD of the spring housing assembly half with the two dowel pins extending from either half of the gland plate assembly, and engage the gland plate assembly dowel pins in the holes. Figure 25.

3. While holding the spring housing assembly half against the gland plate with the gland plate dowel pins engaged, ensure the two primary ring anti-rotation pins are engaged in the primary ring end, and hand tighten the cap screws that fasten the spring housing assembly to the gland plate assembly. Figure 25.

NOTE: Ensure the primary ring anti-rotation pins are properly engaged in the primary ring end. The spring adapter face should be contacting the primary ring when the pins are engaged properly. If the primary ring anti-rotation pins are not properly engaged in the holes, damage to the primary ring may result when the spring housing mounting cap screws are tightened.

4. Repeat steps 2 and 3 above to install the second spring housing assembly half. Figure 26.

5. Evenly tighten the spring housing assembly mounting cap screws in a circular order, approximately 1 full turn each, until the spring housing assembly is fully contacting the gland plate assembly. Fully tighten the spring housing assembly cap screws. Figure 26.



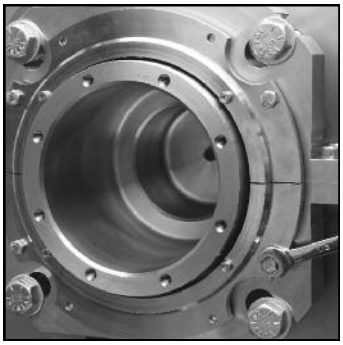


Figure 25

Install Spring Housing Assembly - Step 4 (cont.)

6. Connect seal flush and/or vent connections to the seal gland plate if required.

NOTE: The completed seal installation should look like Figure 27.

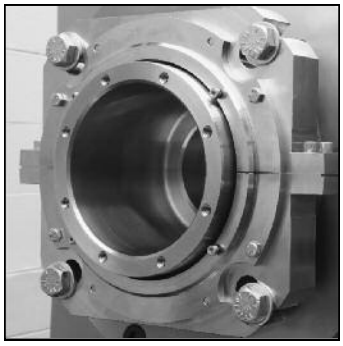


Figure 27

Troubleshooting Tips

1. If there is leakage between the gland plate halves, do not tighten the seal mounting bolts further. Slightly back off each mounting bolt and retighten the gland plate cap screws in Step 3, #12.

2. If there is leakage between the seal gland plate and equipment box face, slightly tighten each seal mounting bolt.

3. Some leakage may occur between the seal faces upon startup. If leakage is less than 60 drops a minute this should improve as the faces 'run in'. If leakage is greater than 60 drops a minute, then the seal, equipment and/or the operating conditions should be examined to determine the probable cause for the leakage. If the seal installation is determined to be the root cause of the leakage, then it should be inspected for nicked or cut O-Rings, misaligned seal face halves, chipped or cracked seal faces, or any other issues that may cause the leakage.

Ordering Information

1. Cartridge seal size = solid shaft or sleeve outside diameter (OD).
2. Select 3740XL cartridge split seal arrangement.
3. For other material combinations or size considerations, consult your local John Crane representative.

3740XL Wet Running Operating Limits

Pressure:	Up to 200 psi(g)/13.8 bar(g)
Temperature:	Up to 250°F/121°C
Shaft Speed:	Up to 3,500 fpm/17.8 m/s
Runout:	Up to 0.180"/4.57mm TIR

Materials of Construction - Standard

Seal Faces	Carbon vs. Silicon Carbide Silicon Carbide vs. Silicon Carbide
Metallurgy	316 Stainless Steel
Springs	Alloy C-276
Retaining Ring	Alloy X-750
Elastomers	Fluorocarbon Ethylene Propylene Rubber (EPR)

Decommissioning the Equipment

1. Ensure that the equipment is electrically isolated.

If the equipment has been used on toxic or hazardous services, ensure that the equipment is correctly decontaminated and made safe prior to commencing work. Remember, fluid is often trapped during draining and may exist outside the seal. The equipment instruction manual should be consulted to check for any special precautions.

2. Ensure that the equipment is isolated by the appropriate valves. Check that the fluid is drained or the gases are vented and the pressure is fully released.

Maintenance

No maintenance of a seal is possible while installed. It is recommended that a spare seal or repair kit be held in stock to allow immediate replacement of a removed seal.

Type 3740XL can be returned to a John Crane service location, as rebuilding to as-new specifications must be carried out by qualified personnel. Otherwise, repair kits are available for field repair.

It is the responsibility of the equipment user to ensure that any parts being sent to a third party have appropriate safe handling instructions externally attached to the package.

Quality Assurance

This seal has been assembled in accordance with John Crane quality assurance standards and with proper maintenance and use will give safe and reliable operation to the maximum recommended performance as shown in any relevant approved John Crane publication.

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