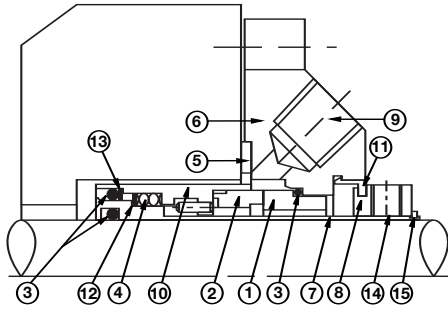




Type 4610 Single O-Ring Cartridge Seal Assembly and Installation Instructions

Typical Type 4610 Cartridge Seal Arrangement



Part Name

1 Seat/Mating Ring	6 Gland Plate	11 Centralizing Ring
2 Face/Primary Ring	7 Sleeve	12 Anti-X Ring
3 O-Ring	8 Collar	13 Back-up Ring
4 Spring	9 Plug (not shown)	14 Set Screws
5 Gasket	10 Primary Ring Adapter	15 Snap Ring

Safety Instructions

- 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 toward 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.

- Installation, removal and maintenance of the seal must be carried out only by qualified personnel who have read and understood these installation instructions.
- 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.
- The seal must only be used in technically perfect condition, and must be operated within the recommended performance limits stated in the published Technical Data Sheet and the instructions in this manual. Copies of the Technical Data Sheet are available from John Crane.
- If the pumped fluid is hazardous or toxic, appropriate precautions must be taken to ensure that any seal leakage is adequately contained. Further information on sealing hazardous or toxic fluids should be obtained from John Crane prior to seal installation.
- 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. Therefore, protective gloves should be worn as hydrofluoric acid may be present.
- PTFE components should never be burned or incinerated as the fumes are highly toxic.

Installing the Seal

NOTE: To assure satisfactory operation, the seal must be handled with care. All Type 4610 seals are pre-assembled and pressure tested at the factory.

- Before starting the installation, please ensure the following instructions are read carefully.
- Remove the seal from its packaging, inspect for any damage, and wipe clean.
- The pump equipment should be clean and meet the criteria outlined in the pre-installation checks above.
- Lubricate the shaft/sleeve(7) using soft hand soap/water solution, glycerine or silicone grease.
- Slide the seal on to the shaft and rotate until the flush port is in a suitable position for equipment piping.
- Slide the cartridge over the seal chamber studs until the gasket(5) abuts against the seal chamber face.
- Fit nuts, with suitable washers, and equally tighten to the torque levels recommended by the pump manufacturer.
- Ensure the shaft is in its working position and evenly tighten the collar(8)/set screws using the allen key provided, which secures the cartridge sleeve to the shaft. Recommended torque values for seals of size 60mm/2.375" and below are 8Nm and 13Nm for seal sizes between 63mm and 70mm or 2.5" and 2.75". The centralizing ring(11) automatically maintains the set location of the seal components and there are no setting clips to remove.
- Turn the shaft by hand to ensure free rotation with no shaft binding.
- Complete the required piping to the seal-see figures 1, 2, and 3. If no flush is fitted and the seal chamber is not self-venting, it is recommended a vent pipe and valve are fitted. If neither flush connection or vent pipe/valve can be fitted, do not remove the 1/4" NPT plug.

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 pump 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 the Company for information as to exclusive product warranty and limitations of liability.

If questions or problems arise, contact your local John Crane Sales/Service Engineer 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.

Performance Parameters

Pressure:	21 bar/300 psi*maximum
Temperature:	205°C/400°F*maximum
Seal Size:	24mm to 70mm/1.00" to 2.75"
Speed:	3600 rpm

*depending on materials / product sealed

Pre-Installation Checks

Shaft/Sleeve Tolerance:	+0.00mm/0.000" / -0.05mm/0.002"
Shaft/Sleeve Surface:	>1.6µm Ra/65µ"
Shaft End Play/Axial Float:	<0.15mm/0.006"
Shaft Run Out:	<0.1mm/0.004"

The shaft/sleeve over which the seal slides must be free from burrs or sharp edges and have a suitable lead-on chamfer/radius (ideally 1.5mm x 20° chamfer = 0.06" x 20°). The pump seal chamber face must be in good condition (<12.5µm Ra/0.50µ") to allow the cartridge gasket to achieve a seal.

Piping Arrangements

Product Recirculation from High Pressure Side of Pump Discharge

Typically used on horizontal applications where lubricating flow is taken from the discharge flange of the pump or from a clean injection.

- Provides a cool lubricating flow to the seal faces.
- Used in conjunction with a restriction bushing to raise the pressure in the stuffing box.

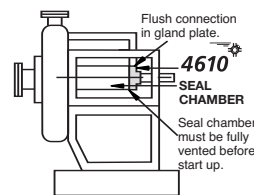


FIGURE 1

Product Circulation from Seal Chamber Back to Pump Suction

Typically used on vertical pump applications to ensure proper venting of seal chamber.

- Provides a cool lubricating flow to the seal faces.
- Ensures proper venting and lubrication of seal faces on vertical applications.

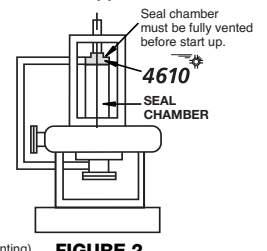


FIGURE 2

No Product Circulation

Dead-ended arrangement should only be used on low duty applications (except for conical shaped seal chambers) where overheating is unlikely to occur.

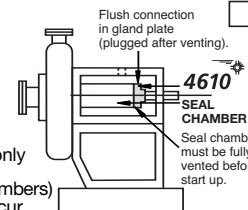


FIGURE 3

Before Starting the Equipment

1. Ensure all nuts and screws are securely fastened.
2. Turn the shaft by hand to ensure free rotation with no shaft binding.
3. Ensure the pump is primed and flush connection is correct.
4. If vent valve fitted, vent the seal chamber of all free air/gas. However, if not fitted it is recommended that the cartridge be vented via the plug if possible.

WARNING: Only vent if sealed product can be safely exposed to atmosphere. Also, do not vent if the sealed product is hot or under high pressure.

5. The pump is now ready to start.

ATTENTION This mechanical seal is designed to operate in a liquid so the heat energy it creates is adequately removed. Therefore, the above checks should be carried out not only after seal installation, but also after any period of equipment inactivity.

ATTENTION Dry-running - often indicated by a squealing noise from the seal area will cause over-heating and scoring or other damage to the sealing surfaces, resulting in excessive leakage or a much shortened seal life.



Before start-up, 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 Sales/Service Engineer. 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.

Decommissioning the Equipment

1. 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. 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 and pressure is fully released.

Maintenance

No maintenance of a seal is possible while installed. Therefore, it is recommended that a spare seal unit be held in stock to allow immediate replacement of a removed seal.

It is recommended that used seals are returned to John Crane and an Exchange/Rebuilt seal purchased.

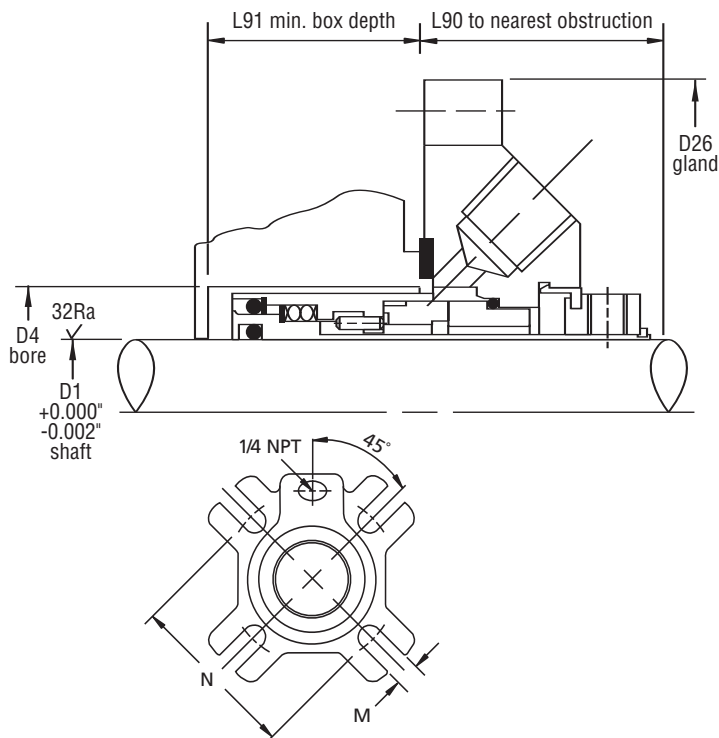


It is the responsibility of the equipment user to ensure that any parts being sent to a third party have appropriate safe handling instructions externally attached to the package.

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.

Typical Type 4610 Installation Dimensions



Type 4610 Cartridge Seal Dimensional Data (inches)

D1 Shaft Size (in.)	D4 Box Bore		D26	L90		N		
	Min.	Max.		Min.	L91	Min.	Max.	M
1.000	1.615	1.940	4.125	1.422	1.267	2.62	3.75	0.437
1.125	1.730	2.060	4.250	1.422	1.267	2.75	3.87	0.437
1.250	1.875	2.190	4.370	1.422	1.267	2.87	4.00	0.437
1.375	2.000	2.310	4.500	1.422	1.267	3.06	4.12	0.437
1.500	2.250	2.500	5.000	1.462	1.313	3.43	4.50	0.563
1.625	2.360	2.500	5.000	1.462	1.313	3.43	4.50	0.563
1.750	2.500	2.625	5.250	1.462	1.313	3.56	4.75	0.563
1.875	2.625	3.000	5.500	1.462	1.313	3.87	5.00	0.563
2.000	2.750	3.000	5.500	1.462	1.313	3.87	5.00	0.563
2.125	2.875	3.310	5.750	1.462	1.313	4.37	5.12	0.563
2.250	3.000	3.310	5.750	1.462	1.313	4.37	5.12	0.689
2.375	3.130	3.560	6.000	1.462	1.313	4.62	5.37	0.689
2.500	3.250	3.875	6.250	1.462	1.433	4.87	5.62	0.689
2.625	3.500	3.875	6.250	1.482	1.433	4.87	5.62	0.689
2.750	3.740	3.875	6.250	1.482	1.433	4.87	5.62	0.689

Type 4610 Cartridge Seal Dimensional Data (mm)

Seal Size	D1 Shaft (mm.)	D4 Box Bore		D26	L90		N		
		Min.	Max.		Min.	L91	Min.	Max.	M
0240	24	40.0	49.2	104.8	36	32	66.7	95.3	11.1
0250	25	41.0	49.2	104.8	36	32	66.7	95.3	11.1
0280	28	44.0	52.4	108.0	36	32	69.9	98.4	11.1
0300	30	46.0	55.6	111.0	36	32	73.0	101.6	11.1
0320	32	47.6	55.6	111.0	36	32	73.0	101.6	11.1
0330	33	49.0	58.7	114.3	36	32	73.0	101.6	11.1
0350	35	50.8	58.7	114.3	36	32	77.8	104.8	11.1
0380	38	57.15	63.5	127.0	37	33	87.3	114.3	14.3
0400	40	60.0	63.5	127.0	37	33	87.3	114.3	14.3
0430	43	63.0	66.7	133.4	37	33	90.5	120.7	14.3
0450	45	63.5	66.7	133.4	37	33	90.5	120.7	14.3
0480	48	66.7	76.2	139.7	37	33	98.4	127.0	14.3
0500	50	69.8	76.2	139.7	37	33	98.4	127.0	14.3
0530	53	73.0	84.1	146.0	37	33	111.1	130.2	17.5
0555	55	73.0	84.1	146.0	37	33	111.1	130.2	17.5
0580	58	79.4	90.5	152.4	37	33	117.5	136.5	17.5
0600	60	79.4	90.5	152.4	37	33	117.5	136.5	17.5
0630	63	82.6	98.4	158.8	37	36	123.8	142.9	17.5
0650	65	88.9	98.4	158.8	37.5	36	123.8	142.9	17.5
0700	70	95.0	98.4	158.8	37.5	36	123.8	142.9	17.5



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If the products featured will be used in a potentially dangerous and/or hazardous process, your John Crane representative should be consulted prior to their selection and use. In the interest of continuous development, John Crane Companies reserve the right to alter designs and specifications without prior notice. It is dangerous to smoke while handling products made from PTFE. Old and new PTFE products must not be incinerated.

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