

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.

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 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.

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 stated in the published Technical Data Sheet and the instructions in this manual. Copies of the Technical Data Sheet are available from John Crane.
5. 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.
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. Therefore, protective gloves should be worn as hydrofluoric acid may be present.
7. PTFE components should never be burned or incinerated as the fumes are highly toxic.

Before Starting the Equipment

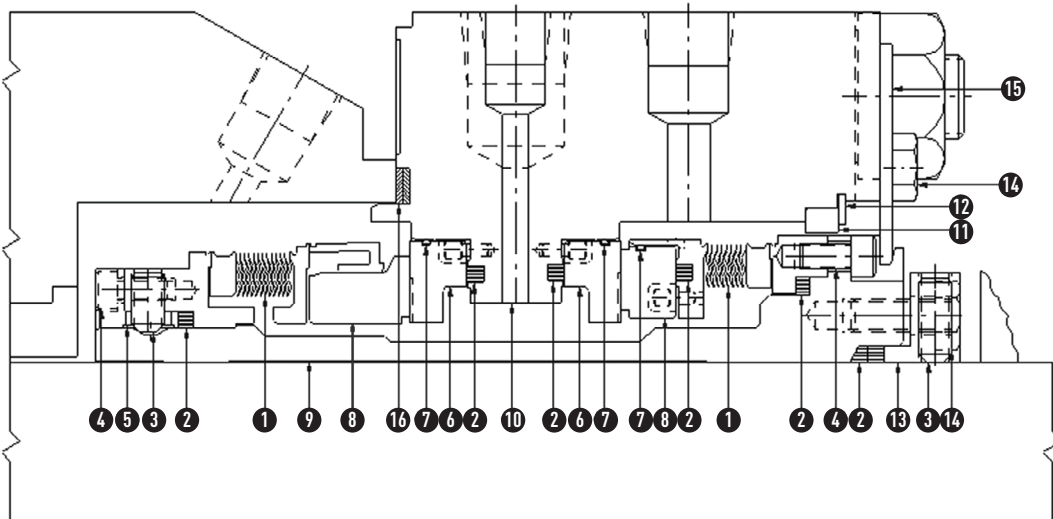
1. Check the pump and coupling for proper alignment to the motor or driver.
2. Ensure that the motor is wired properly and will drive the pump in the correct direction of rotation.
3. Make certain that all gland nuts have been securely fastened in a sequence recommended by the pump manufacturer.
4. Type 2874HTC seals are lubricated with barrier gas. Ensure that the barrier gas pressure is at least 30 psi/2 bar higher than anticipated stuffing box pressure. **Barrier gas pressure must be supplied to the seal before pressurizing the pump.**
5. Check that all barrier gas connections are tight and leak free.
6. Check that all alarm set points and instrumentation is functioning.



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.

Typical Seal Arrangement

- 1 – Bellows
- 2 – Static seal
- 3 – Set screw
- 4 – Socket head cap screw
- 5 – Compression ring
- 6 – Mating ring
- 7 – Canted spring
- 8 – Primary ring (inboard and outboard)
- 9 – Sleeve
- 10 – Gland
- 11 – Bushing (optional)
- 12 – Retainer ring
- 13 – Packing follower
- 14 – Hex head cap screw
- 15 – Spacer
- 16 – Gland gasket



General Instructions

1. Study the engineering layout drawing to confirm the proper seal arrangement for the pump being used. The following instructions describe the standard configurations.
2. The John Crane Type 2874HTC seal is a precision product designed specifically for dry-running operation. Do not lubricate the seal faces. Special care must be taken during installation not to damage or contaminate the sealing faces.

2. The Type 2874HTC Control Panel is recommended for optimal system performance and control.

This system serves these functions:

- Barrier source regulation
- Barrier consumption measurement
- Detection of barrier pressure drop
- Maintains gas integrity
- Provides process containment in the event of primary seal failure

NOTE Be sure to utilize appropriate components for high-temperature applications.

Standard Seal Support System

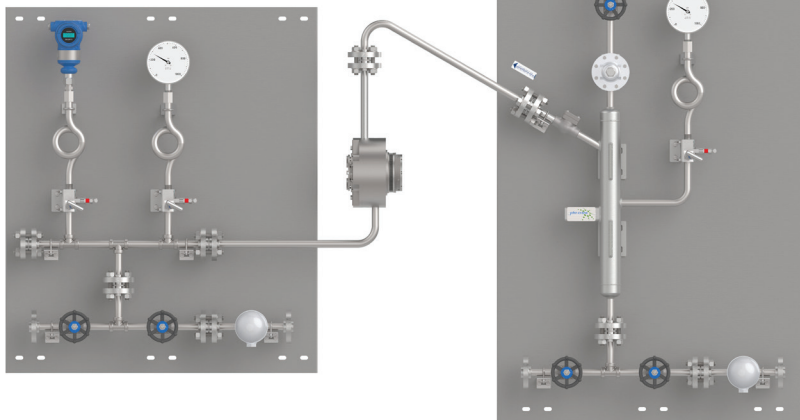
1. The John Crane Type 2874HTC seal requires a clean barrier gas supply (nitrogen) at 30 psi/2 bar above seal chamber pressure. This barrier gas pressure must never drop below the seal chamber pressure.

3. Steam support system is required for use with steam barrier fluid.

Gas barrier system (API Plan 74)

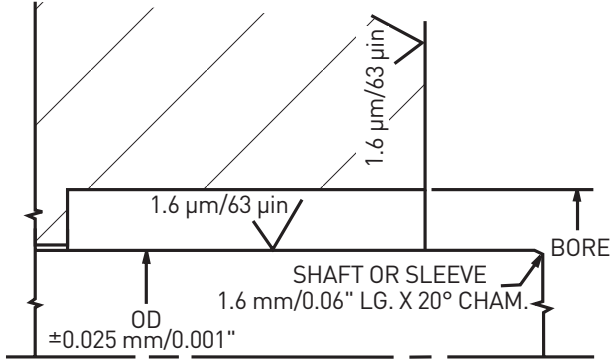


Steam support system

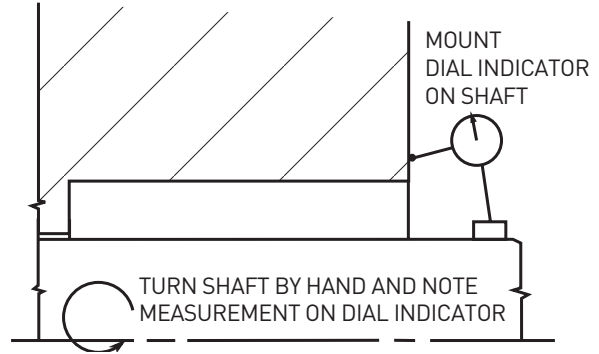


Preparing the Equipment

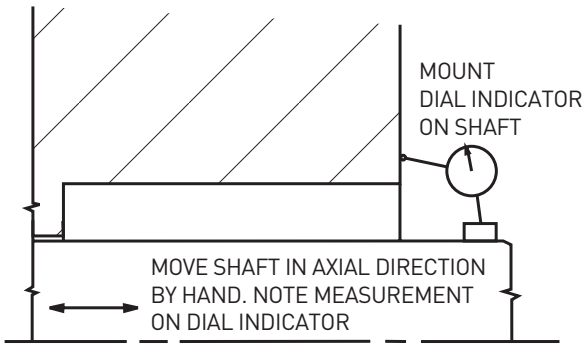
1. Check seal chamber dimensions and finishes.



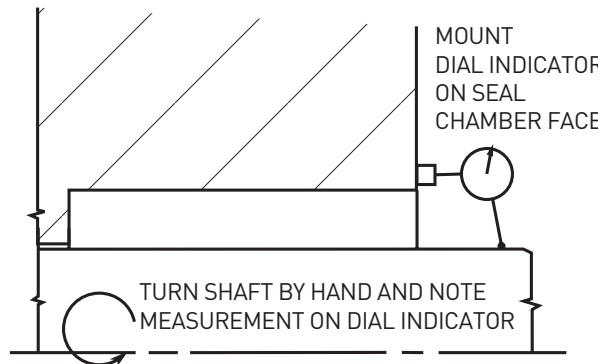
3. Determine squareness of seal chamber face to shaft:
Rotating mating ring - 0.13 mm/0.005" FIM max.



2. Measure shaft end play/axial float (maximum dynamic):
Sizes > 40 mm (1.57"): ±1.016 mm/0.040"
Sizes ≤ 40 mm (1.57"): ±0.762 mm/0.030"

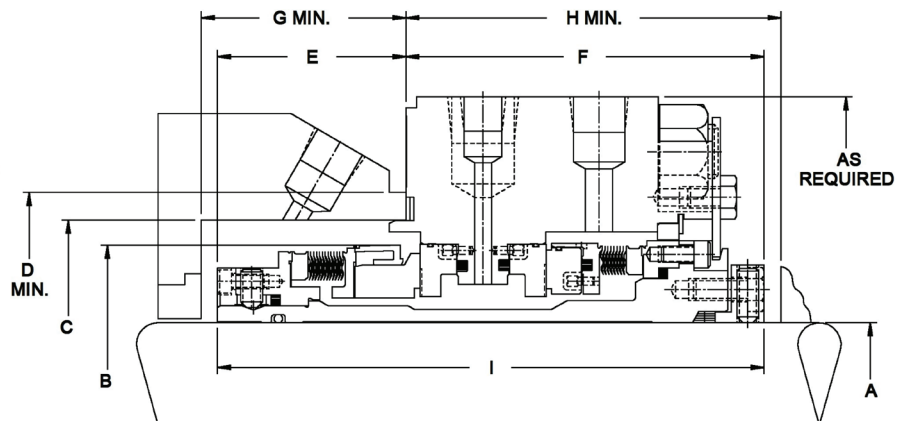
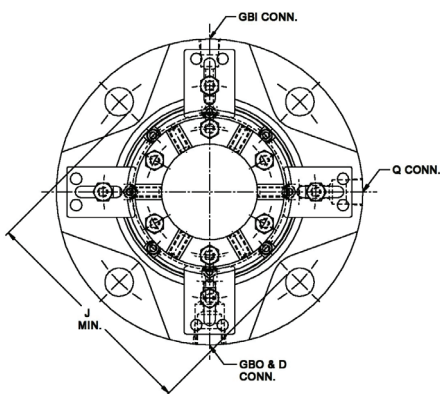


4. Measure shaft runout (0.05 mm/0.002" FIM max.).



NOTE If the measured dimensions exceed the values given, correct the equipment to meet the specifications prior to installing the seal cartridge.

Typical Seal Installation Dimensions



Dimensional Data (mm)

API 610/682 SEAL CHAMBER NUMBER	A		B	C		D	E	F	G	H	I	J
	≤	+0.000 -0.015			+0.036 -0.000							
3	≤ 42.90	+0.000 -0.015	84.51	90	+0.036 -0.000	105	56.77	83.44	59.94	86.61	140.21	109.96
4	≤ 53.04	+0.000 -0.015	90.88	100	+0.036 -0.000	115	50.83	99.52	54.00	102.69	150.34	121.95
5	≤ 61.65	+0.000 -0.020	105.28	120	+0.036 -0.000	135	55.19	104.95	58.37	108.13	160.15	142.01
6	≤ 74.32	+0.000 -0.020	118.29	130	+0.041 -0.000	145	57.25	105.79	60.43	108.97	163.04	151.92
7	≤ 83.85	+0.000 -0.020	130.84	140	+0.041 -0.000	155	66.93	106.81	70.10	109.98	173.74	162.08
8	≤ 97.18	+0.000 -0.023	143.61	160	+0.041 -0.000	175	60.27	116.51	63.45	119.68	176.78	182.98
9	≤ 102.26	+0.000 -0.023	150.04	170	+0.041 -0.000	185	64.69	116.71	67.87	119.89	181.41	191.87
10	≤ 116.23	+0.000 -0.023	162.79	180	+0.041 -0.000	195	71.98	116.71	75.16	119.89	188.70	201.98

Dimensional Data (inches)

API 610/682 SEAL CHAMBER NUMBER	A		B	C		D	E	F	G	H	I	J
	≤	+0.000 -0.006			+0.0014 -0.0000							
3	≤ 1.689	+0.000 -0.006	3.327	3.543	+0.0014 -0.0000	4.134	2.235	3.285	2.360	3.410	5.520	4.329
4	≤ 2.088	+0.000 -0.006	3.578	3.937	+0.0014 -0.0000	4.528	2.001	3.918	2.126	4.043	5.919	4.801
5	≤ 2.427	+0.000 -0.008	4.145	4.724	+0.0014 -0.0000	5.315	2.173	4.132	2.298	4.257	6.305	5.591
6	≤ 2.926	+0.000 -0.008	4.657	5.118	+0.0016 -0.0000	5.709	2.254	4.165	2.379	4.290	6.419	5.981
7	≤ 3.301	+0.000 -0.008	5.151	5.512	+0.0016 -0.0000	6.102	2.635	4.205	2.760	4.330	6.840	6.381
8	≤ 3.826	+0.000 -0.009	5.654	6.299	+0.0016 -0.0000	6.89	2.373	4.587	2.498	4.712	6.960	7.204
9	≤ 4.026	+0.000 -0.009	5.907	6.693	+0.0016 -0.0000	7.283	2.547	4.595	2.672	4.720	7.142	7.554
10	≤ 4.576	+0.000 -0.009	6.409	7.087	+0.0016 -0.0000	7.677	2.834	4.595	2.959	4.720	7.429	7.952

Installing the Seal in an Overhung Pump

1. Disassemble the seal chamber housing. Wipe the shaft/sleeve clean. Take the complete cartridge assembly from its package. Do not disassemble or alter the unit.
2. Slide the packing follower and sleeve packing as far as possible onto the shaft/sleeve, towards the bearings. Slide the complete cartridge assembly as far as possible onto the shaft/sleeve, towards the bearings. Reassemble the seal chamber housing and the impeller.
3. With the gland packing in place, slide the complete assembly into position against the face of the seal chamber. Assemble the gland bolts finger tight. Continue tightening alternately until secure. Do not distort the gland by overtightening.
4. Leave the locking washers or spacers in place to maintain the setting position of the cartridge seal.

5. If the assembly drawing calls for holes or countersinks to be drilled under the cartridge sleeve set screws, remove the set screws and mark their location. Unbolt the cartridge gland and remove the impeller, the seal chamber housing and the cartridge assembly. Drill the shaft/sleeve in the positions marked. Repeat steps 1-4.
6. Tighten the hex head cap screws to compress sleeve packing.
7. Tighten the cartridge sleeve set screws evenly. (If the shaft/sleeve has been drilled, ensure that the set screws align with the appropriate drilled holes.)
8. Remove the locking washers/spacers, or rotate/slide the locking washer/ spacer to clear the slot in the cartridge sleeve.
9. Complete reassembly of the pump, frequently turning the shaft by hand to check for free rotation. If the shaft will not turn, the seal has been improperly set.

Refer to assembly drawing and/or pump manual for piping connections and coupling alignment. Proceed as indicated.

Installing the Seal Between Bearings

1. Disassemble the bearings and bearing housings. Take both complete cartridges from their packages. Do not disassemble or alter the units.
2. Slide the complete cartridge assemblies onto the shaft/sleeves, being careful not to damage the packings inside the cartridge sleeves. Slide the packing follower and sleeve packing as far as possible onto the shaft/sleeve.
Reassemble the bearing housings and bearings, and complete all required axial adjustments to the pump rotating assembly.
3. With the gland packing in place, slide the complete assembly into position against the face of the seal chamber. Assemble the gland bolts finger tight. Continue tightening alternately until secure. Do not distort the gland by overtightening.
4. Leave the locking washers or spacers in place to maintain the setting position of the cartridge seal.
5. If the assembly drawing calls for holes or countersinks to be drilled under the cartridge sleeve set screws, remove the set screws and mark their location. Unbolt the cartridge gland and remove the bearings, bearing housings, and cartridge assemblies. Drill the shaft/sleeves in the positions marked. Repeat steps 1-4.
6. Tighten the hex head cap screws to compress sleeve packings.
7. Tighten the cartridge sleeve set screws evenly. (If the shaft/sleeve has been drilled, ensure that the set screws align with the appropriate drilled holes.)
8. Remove the locking washers/spacers, or rotate/slide the locking washer/spacer to clear the slot in the cartridge sleeve.
9. Complete reassembly of the pump, frequently turning the shaft by hand to check for free rotation. If the shaft will not turn, the seal has been improperly set.

Refer to assembly drawing and/or pump manual for piping connections and coupling alignment. Proceed as indicated.

Maintenance

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

It is recommended that used seals are returned to a John Crane Seal Rebuilding Center, as rebuilding to as-new specifications must be carried out by qualified personnel.



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.

Storage and Transport

Instructions for the handling, packaging, storage and transport of seal units given in the John Crane Instruction Sheet ref. I-Storage, available on request.

Materials of Construction

Seal Components	Materials
Primary ring	Silicon carbide composite
Mating ring	Silicon carbide* (Tungsten carbide option)
Hardware	316 stainless steel
Bellows	Alloy 718 (UNS N07718)
Secondary seal	Flexible carbon graphite

* Silicon carbide mating ring recommended for steam barrier.

Operating Limits

Pressure:	Process fluid: Vacuum to 16 barg/230 psig (N/Ar barrier) Vacuum to 14 barg/200 psig (Steam barrier)
	Barrier: Up to 18 barg/260 psig (N/Ar barrier) Up to 16 barg/230 psig (Steam barrier)
Temperature:	-75°C to 425°C/-100°F to 800°F
Speed:	1,450 rpm minimum/3,600 rpm maximum
Axial movement:	Sizes > 40 mm/1.57": ±1.016 mm/0.040" Sizes ≤ 40 mm/1.57": ±0.762 mm/0.030"
Runout	0.05mm/0.002" FIM maximum



North America
United States of America
Tel: 1-847-967-2400

Europe
United Kingdom
Tel: 44-1753-224000

Latin America
Brazil
Tel: 55-11-3371-2500

Middle East & Africa
United Arab Emirates
Tel: 971-481-27800

Asia Pacific
Singapore
Tel: 65-6518-1800

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. ISO 9001 and ISO14001 Certified, details available on request.