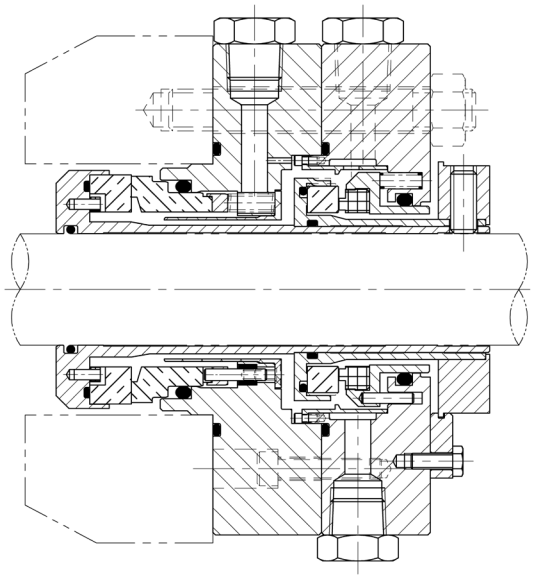
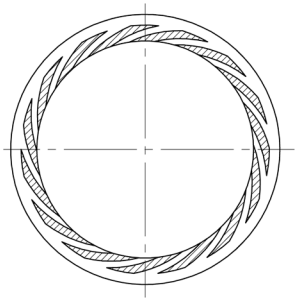
TYPE 588USP SEAL

HIGH DUTY CARTRIDGE O-RING SEAL

Installation, Operation & Maintenance Instructions





INBOARD UPSTREAM PUMPING GROOVES

Foreword

This instruction manual is provided to familiarise 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. The instructions will help to avoid danger and increase reliability. The information required may change with other types of equipment or installation arrangements. This manual 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 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 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.

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Before starting the equipment

1. Check the pump and the coupling for proper alignment to the motor or driver.
2. Ensure that the gland plate nuts/bolts are securely tightened according to the pump manual instructions, and all screws are securely fastened.
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 This mechanical seal is part of a family of upstream pumping products designed to provide reliable service in poor lubricating and dirty environments. This upstream pumping seal is ideally suited for abrasive services. The following check should be carried out not only after seal installation, but also after any period of equipment inactivity.

5. 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.

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.

ATTENTION 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.

Operating Conditions

The following are the operating limits of the 588USP seals. The selection of materials used in the construction of the seal should be made with regard to their temperature and chemical resistance and compatibility with the liquid being sealed.

Temperature limit: 80 °C (176 °F)

Pressure limits: 42 Barg (609 psig) dynamic sealing pressure rating DSPR
62 Barg (900 psig) static sealing pressure rating SSPR

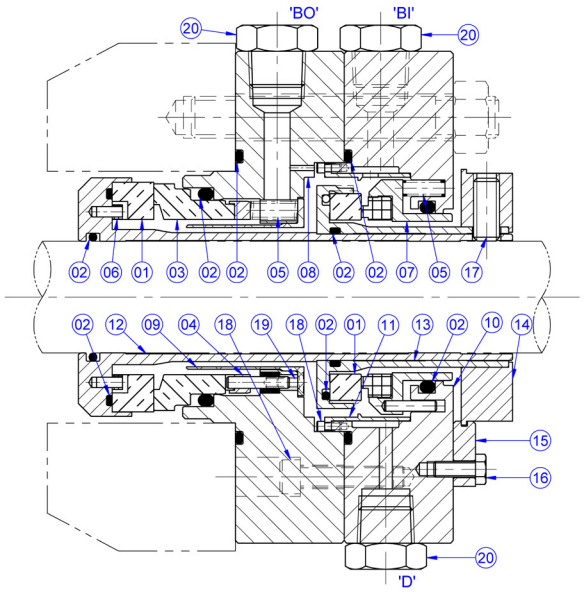
Speed limits: 2.5 m/s (500 fpm)** to 25 m/s (5000 fpm)

**Minimum speed based on designated seal size and process pressure.

Axial Flexibility limit: Static setting tolerance: ±1mm (±0.04")

GENERAL INSTRUCTIONS

1. Be sure to read all instructions carefully before installing seal.
2. The John Crane 588USP seals are precision products and are shipped as completely assembled cartridge seals for ease of installation.
3. Review the application specific installation (Layout) drawing and become familiar with the seal components, their location and function within the cartridge. The application specific seal may differ from that shown here.
4. Seals are uni-directional and can only be operated in the correct direction of shaft rotation (Clockwise or Counter-Clockwise). Be sure that you are installing the appropriate seal in the pump position which ensures the correct direction of shaft rotation.



Item	Description	Item	Description
1	Mating Ring	11	Multi-point sleeve
2	O-ring	12	Sleeve assembly
3	Primary ring	13	Auxiliary sleeve
4	Thrust ring assembly	14	Drive Collar
5	Spring	15	Setting washer (spacer)
6	Mating ring pin sleeve	16	Hex head screw
7	Primary ring assembly	17	Set screw
8	Inner gland plate assembly	18	Cap head screw
9	Guide sleeve	19	Countersink screw
10	Outer gland plate assembly	20	Plug

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588USP INSTALLATION DIMENSIONS

For dimensional data on the seal installation, please refer to the specific John Crane layout drawing.

IMPERIAL/METRIC CONVERSIONS:

0.060" x 20° = 1.6 mm x 20°

63√ (µin) = 1.6√ (micrometre)

0.005" = 125 micrometre

0.001" per inch bore = 30 micrometer/3cm

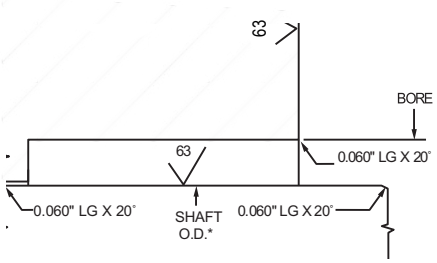
0.002" = 50 micrometre

0.006" = 150 micrometre

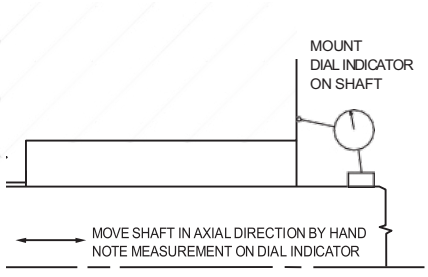
NOTE It is recommended that the pump and its installation meet the requirements of the latest edition of API Standard 610. Equipment that meets these requirements will aid in extending mean time between planned maintenance.

PREPARING THE EQUIPMENT

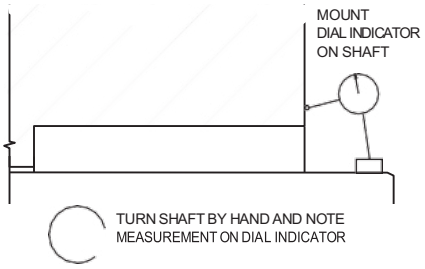
1. Check the shaft and seal chamber dimensions and finishes as noted. Check dimensions per specific John Crane layout drawing.



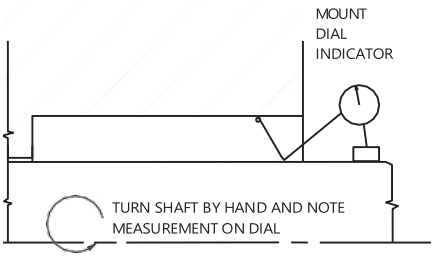
2. Measure the shaft end float/end play. The maximum value should not exceed 0.005" F.I.M.. Remove all sharp edges and burrs over which the seal sleeve must pass.



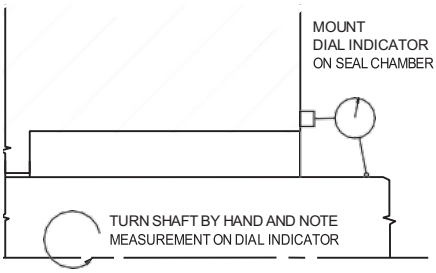
3. Check the squareness or face runout of the seal chamber face to the shaft. The maximum value should not exceed 0.001" per inch of seal chamber bore diameter, F.I.M.



4. Measure the concentricity of the seal chamber bore to the shaft. This value should not exceed 0.006" F.I.M.



5. Measure the shaft runout at the seal location. The maximum value should not exceed 0.002" F.I.M.



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

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Installing the Seal

1. Before starting the installation, read through the following instructions carefully, as the sequence may be different depending on the construction of the pump.
2. Remove the seal from its packaging, inspect the seal for any damage and wipe clean.
3. The equipment should be clean and meet the specifications noted in "Preparing the Equipment". Check the sleeve and gland secondary seal. Apply an appropriate lubricant, if necessary, to assist in assembly. The gland plate nuts should be lubricated in order to achieve proper torque values.
4. The typical seal cartridge contains spacers that set the working height of the seal. On some equipment, the lower spacer is not accessible once the seal is installed onto the shaft. In these instances, remove the lower spacer.
5. Place the seal cartridge on the pump shaft, make sure it is oriented so that the customer supplied studs are aligned with seal cartridge thru holes. Jack the cartridge SQUARELY into the pump using a pusher plate. DO NOT USE HAMMERS. Install customer supplied nuts onto the studs to secure the stator.
6. Review and follow the applicable pump assembly instructions. Review the application specific seal installation drawing and have qualified assembly personnel install the seal as indicated. If questions arise, contact the local John Crane representative.
7. Use the spacers any time the gland nuts or collar set screws are loosened to properly set the seal to its working height.
8. Piping connections can now be made to the gland plate.

WARNING Be sure to make the proper gland plate connections to the process and atmospheric sides of the seal.

The spacers must be positioned out of the way of the collar and tightened down prior to starting up the pump.

Removing the Seal Cartridge

1. Ensure that the pump 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 pump instruction manual should be consulted to check for any special precautions.

2. Ensure that the pump is isolated by the appropriate valves. Check that the fluid is drained, and pressure is fully released.
3. Referring to the pump installation manual, dismantle the equipment sufficiently to expose the gland plate and seal chamber. It is assumed that the pump is in the state where the seal can be removed.

The spacers need to be in place prior to seal assembly removal. Failure to install the spacers can result in damage to the seal faces.

4. Remove customer supplied studs/nuts that secure the seal to the pump.
5. Slowly and SQUARELY remove the seal cartridge using a pusher plate tool.

Storage and transport

1. Mechanical seal assemblies and component parts must be treated with extreme care to protect them from damage due to handling and deterioration. In all cases if established company procedures differ from the instructions provided in this document, the established procedures shall be followed.
2. Warehouse shelf storage:
   A. John Crane mechanical seals and components are packaged to protect them from airborne dirt and grit, as well as from mishandling. If the packaging is removed for inspection, it should be replaced. Seals are generally packaged dry. Elastomer shelf life can be a factor if the storage period is in excess of two years.
   B. If storage is in excess of one year, it is recommended that the primary and mating rings be inspected for flatness prior to installing the seals into the pump.

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.

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 a John Crane service location, as rebuilding to as-new specifications must be carried out by qualified personnel. Instructions for the handling, packaging, storage and transport of seal units given in the John Crane Instruction Sheet ref. I-Storage, available on request.

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.

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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