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Seal Data Reference
(From Box Label)
ITEM # ________________________________________________________
SEAL _________________________________________________________
(Example: 180H -15 SSC/CB)
INSTALLATION DATE __________________________

Product may be provided with either cast or machined gland
1.0 CAUTIONS

These instructions are general in nature. It is assumed that the installer is familiar with seals and certainly with the requirements of their 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 decision to use this seal or any other Chesterton seal in a particular service is the customer’s responsibility.

2.0 TRANSPORT AND STORAGE

Transport and store seals in their original packaging. Mechanical seals contain components that may be subject to alteration and ageing. It is therefore important to observe the following conditions for storage:

- Dust free environment
- Moderately ventilated at room temperature
- Avoid exposure to direct sunlight and heat
- For elastomers, storage conditions according to ISO 2230 should be observed.

3.0 DESCRIPTION

3.1 Parts Identification

3.1.1 Seal Sizes: 25 mm to 43 mm (1.000" to 1.625") – Figure 1

KEY
1 - Sleeve Assembly
2 - Shaft O-Ring
3 - Rotary Gasket
4 - Rotary O-Ring
5 - Rotary Seal Ring
6 - Gland Gasket
7 - Stationary Seal Ring
8 - Gland O-Ring
9 - Pusher
10 - Spring
11 - Bushing
12 - Inner Gland Assembly
13 - Outer Gland
14 - Centering Clip Screw
15 - Centering Clip
16 - Lock Ring
17 - Stationary O-Ring
18 - Dog Pt Set Screw
19 - Cup Pt Set Screw
20 - Socket Head Cap Screw
21 - Caplug

Do not touch the mechanical seal for any reason while it is operating. Lockout or uncouple the driver prior to personal contact with the seal. Do not touch the mechanical seal while it is in contact with hot or cold fluids. Ensure that all the mechanical seal materials are compatible with the process fluid. This will prevent possible personal injury.
3.0 DESCRIPTION (cont.)

3.1 Parts Identification

3.1.2 Seal Sizes: 1.125" & 1.375" OVERSIZE – Figure 2

KEY
1 - Sleeve Assembly
2 - Shaft O-Ring
3 - Rotary Gasket
4 - Rotary O-Ring
5 - Rotary Seal Ring
6 - Gland Gasket(s)**
7 - Stationary Seal Ring
8 - Adapter Assembly
9 - Stationary O-Ring
10 - Pusher Assembly
11 - Spring
12 - Snap Ring*
13 - Shim*
14 - Wave Spring*
15 - Throttle Bushing*
16 - Gland
17 - Centering Clip Screw
18 - Centering Clip
19 - Lock Ring
20 - Adapter O-Ring(s)**
21 - Dog Pt Set Screw
22 - Cup Pt Set Screw
23 - Caplug

*Optional
**OVERSIZE design uses 1 O-Ring (20) and 2 gaskets (6)

3.1.3 Seal Sizes: 45 mm to 120 mm (1.750" to 4.750") – Figure 3

KEY
1 - Sleeve Assembly
2 - Shaft O-Ring
3 - Rotary Gasket
4 - Rotary O-Ring
5 - Rotary Seal Ring
6 - Gland Gasket
7 - Stationary Seal Ring
8 - Adapter Assembly
9 - Pusher
10 - Spring
11 - Bushing
12 - Gland
13 - Adapter O-Rings
14 - Centering Clip Screw
15 - Centering Clip
16 - Lock Ring
17 - Stationary O-Ring
18 - Dog Pt Set Screw
19 - Cup Pt Set Screw
20 - Caplug
3.2 Operating Parameters*

Pressure Limits:
All 180 & 180H Seals can withstand operating pressures from full vacuum (710 mm Hg/28") to the maximum pressures at the conditions listed.
- 25 to 60 mm (1.000" to 2.500")
- Up to 26 bar g (600 psig)*
- 65 to 120 mm (2.625" to 4.750")
- 20 bar g to 26 bar g (300 to 600 psig) *

* Seal pressure capabilities are dependent on the fluid sealed, temperature, speed, and seal face combinations.

Speed Limits:
Up to 5000 fpm (25 m/s)

Temperature Limits:
Elastomers
- To 150°C (300°F) EPDM
- To 205°C (400°F) FEP, FKM
- To 260°C (500°F) FFKM

* Consult Chesterton Mechanical Seal Application Engineering for higher operating conditions.

3.3 Intended Use

The mechanical seal is specifically designed for the intended application and is to be operated within the operating parameters as specified. For use beyond the intended application and/or outside the operating parameters, consult Chesterton Mechanical Seal Application Engineering to confirm the suitability of the mechanical seal prior to putting the mechanical seal in operation.
### 3.0 DESCRIPTION (cont.)

#### 3.4.1 Dimensional Data - Seal Sizes: 25 mm to 43 mm (1.000" to 1.625")

**METRIC - Millimeters**

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<th>STUFFING BOX BORE</th>
<th>IB SEAL BORE</th>
<th>SB DEPTH</th>
<th>OB LENGTH</th>
<th>BOLT CIRCLE BY BOLT SIZE</th>
<th>SLOT WIDTH</th>
<th>GLAND WIDTH</th>
<th>O-RINGS</th>
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*Requires SHCS or D shaped washers.

**INCH**

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<th>STUFFING BOX BORE</th>
<th>IB SEAL BORE</th>
<th>SB DEPTH</th>
<th>OB LENGTH</th>
<th>BOLT CIRCLE BY BOLT SIZE</th>
<th>SLOT WIDTH</th>
<th>GLAND WIDTH</th>
<th>O-RINGS</th>
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*Requires SHCS or D shaped washers.

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**Seal Sizes 25 mm to 43 mm (1.000" to 1.625") - NPT SIZES**

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<th>QUENCH/DRAIN PORTS</th>
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<td>25 mm to 43 mm</td>
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Chesterton
Global Sealing. Local Service.
### 3.4.2 Dimensional Data - Seal Sizes: 1.125" & 1.375" with OVERSIZE Gland

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<th>GLAND OD</th>
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<th>SB DEPTH</th>
<th>OB LENGTH</th>
<th>BOLT CIRCLE BY BOLT SIZE</th>
<th>SLOT WIDTH</th>
<th>GLAND WIDTH</th>
<th>O-RINGS</th>
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<td>C MIN</td>
<td>CMAX</td>
<td>D MAX</td>
<td>E MIN</td>
<td>F MAX</td>
<td>3/8&quot;</td>
<td>1/2&quot;</td>
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<td>H MIN</td>
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### 3.4.3 Dimensional Data - Seal Sizes: 45 mm to 120 mm (1.750" to 4.750")

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### Seal Sizes: 45 mm to 120 mm (1.750" to 4.750") - NPT SIZES

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#### METRIC (millimeters)

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<th>OB LENGTH</th>
<th>BOLT CIRCLE BY BOLT SIZE</th>
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*Requires SHCS or D shaped washers.

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<th>OB LENGTH</th>
<th>BOLT CIRCLE BY BOLT SIZE</th>
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<th>GLAND WIDTH</th>
<th>O-RINGS</th>
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<td>F</td>
<td>G MIN</td>
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<td>12 mm</td>
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*Requires SHCS or D shaped washers.
### Dimensional Data - Seal Sizes: 1.750" to 4.750" with OVERSIZE Gland

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**KEY (drawings & charts)**

- A – Shaft Size
- B – Maximum Gland Diameter
- C – Stuffing Box Inside Diameter
- D – Inboard Seal Diameter
- E – Required Stuffing Box Depth
- F – Outboard Seal Length
- G – Minimum Bolt Circle by Bolt Size
- H – Slot Width
- J – Gland Width
- V – Shaft O-Ring
- W – Rotary Seal O-Ring
- X – Stationary Seal O-Ring
- Y – Gland (or Adapter) O-Ring
- A – Maximum Gland Diameter
- B – Shaft Size

**Seal Sizes: 1.750" to 4.750" OVERSIZE Gland - NPT SIZES**

<table>
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<th>DASH NO.</th>
<th>SHAFT SIZE</th>
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<th>QUENCH/DRAIN PORTS</th>
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4.0 PREPARATION FOR INSTALLATION

4.1 Equipment

If practical, place the dial indicator tip on the end of the shaft sleeve or on a step in the shaft 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 0.13 mm (.005").

If possible, attach a base dial indicator to the shaft and rotate both the indicator and shaft slowly while reading the runout of the stuffing box face. Misalignment of the stuffing box face relative to the shaft should not exceed 0.005 mm TIR per mm (.005 in per inch) of shaft diameter.

The stuffing box face must be flat and smooth enough to seal the gland. Surface roughness should be 3.2 microns (125 microinch) Ra maximum for gaskets and 0.8 micron (32 microinch) Ra for O-Rings. Steps between halves of split case pumps should be machined flat. Make sure the stuffing box is clean and clear along its entire length.

Remove all sharp corners, burrs, and scratches on the shaft, especially in areas where the O-Ring will slide, and polish if necessary to achieve a 0.8 micron (32 microinch) Ra finish. Make sure the shaft or sleeve diameter is within 0.05 mm (.002") of nominal.

4.2 Mechanical Seal

1. Check the chemical listing to determine if the O-Rings installed in this seal are compatible with the fluid being sealed.

2. CAUTION: If the seal is operating at a stuffing box pressure over 20 bar (300 psig) for sizes 25 to 60 mm (1" to 2 1/2"), or 16 bar (250 psig) for sizes 65 to 120 mm (2 5/8" to 4 3/4"), or if the shaft is case-hardened, replace the 316 stainless steel set screws with the hardened steel set screws supplied with the seal. The 1/4 dog point set screws go into the small holes in the sleeve. Do not disengage these screws from the sleeve when positioning the seal. The cup point set screws go through the larger holes in the sleeve. Make sure all screws are engaged in the sleeve but do not protrude into the ID bore. Also, when repositioning or removing the seal, make sure the centering clips and socket head cap screws are engaged.

3. Centering clips have been preset at the factory. If for any reason you loosen or remove the centering clip cap screw, retighten as follows prior to installing the seal on the equipment: Tighten the cap screw finger tight. Then using hex wrench, tighten cap screw an additional 1/8 turn. This will approximate the 3.4 Nm (30 inch-pounds) of torque for sizes 45 to 60 mm (1.75" to 2 1/2"), and 4.5 Nm (40 inch-pounds) of torque for 65 to 120 mm (2 5/8" to 4 3/4") set at the factory. For sizes 25 to 43 mm (1" to 1.625") tighten the button head screws to 2.3 Nm (20 inch-pounds) of torque.
Seal depicted is with a cast gland. Product may be provided with machined gland.

1. Tools required for installation: Hex wrenches and grease (supplied with seal); open end or socket wrench (size dependent on mounting bolt size).

2. Ensure that the gland face gasket or O-Ring is fixed in the gland gasket (or O-Ring) groove. **CAUTION:** Some gland gaskets are supplied as a loose item with no adhesive. Ensure that gasket remains in place during installation.

3. Apply a thin film of grease to the shaft O-Ring and slide seal onto the shaft by pushing on the lock ring. **CAUTION:** Ensure that all set screws are engaged through the sleeve but do not protrude into the sleeve ID bore.

4. Reassemble the pump and make necessary shaft alignments and impeller adjustments. The impeller can be reset at any time, as long as the centering clips are in place and the seal set screws are loosened while the shaft is being moved.

5. Orient the flush connection (marked F) to the location required. The port is plugged prior to shipping.

6. Tighten the gland bolts evenly. **IMPORTANT:** The gland bolts must be tightened before tightening the screws onto the shaft. **IMPORTANT:** Piping connections should not be made prior to tightening the gland bolts.

7. **IMPORTANT:** 1/4 dog point set screws (1) must be tightened FIRST and cup point set screws (2) must be tightened last.

8. Tighten three 1/4 dog point set screws (1) evenly with the hex key provided.

9. **IMPORTANT:** After all sets screws have been tightened by hand, retighten with a torque wrench:
   - Sizes 25 to 60 mm (1" to 2 1/2") to 5,6 to 6,8 Nm (50 to 60 in-lbs)
   - Sizes 65 to 120 mm (2 5/8" to 4 3/4") 7,3 to 8,5 Nm (65 to 75 in-lbs)

10. Tighten three cup point set screws (2) evenly with the hex key provided.

11. **IMPORTANT:** To ensure that the gland is properly centered over the sleeve turn the shaft by hand to make sure the seal turns freely. If you hear metal to metal contact within the seal, it was improperly centered. Re-install the centering clips finger tight. Loosen the gland bolts. Fully tighten clips. Loosen the set screws. Re-tighten the gland bolts. Re-tighten the set screws. Remove the clips. If metal to metal contact still exists check the centering of the stuffing box.
6.0 COMMISSIONING / EQUIPMENT START UP

6.1 Attach appropriate plumbing/environmental controls to the seal.

![Image 1](To connect FLUSH: Remove pipe plug from gland to allow for installation of flush connections. Torque required to remove plug: Sizes 25 to 60 mm (1" to 2 1/2") 67 Nm (50 ft-lbs.). Sizes 65 to 120 mm (2 5/8" to 4 3/4") 108 Nm (80 ft-lbs.).)

![Image 2](Ensure that the port being used for flush connection is that which is marked “F”. Ready to install flush. CAUTION: Quench and Drain ports are marked “Q/D” and will be plugged with plastic cap plugs or pipe plugs and will also be covered with a caution sticker.)

![Image 3](Install flush line and other piping as required.)

![Image 4](Take all necessary precautions and follow normal safety procedures before starting the equipment. Please contact Chesterton Mechanical Seal Application Engineering for assistance regarding cartridge dual seals.)

7.0 DECOMMISSIONING / EQUIPMENT SHUT DOWN

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. Ensure that the pump is isolated and check that the stuffing box is drained from any fluid and pressure is fully released. Disassemble the seal and remove from equipment in the reverse order from installation instructions. Incase of disposal, ensure the local regulations and requirements for disposal or recycling of the different components in the seal are adhered to.

8.0 SPARE PARTS

Use only Chesterton original spare parts. Use of non-original spare parts represents risk of failure, danger to persons/equipment and voids the product warranty. Spare Parts Kit can be purchased from Chesterton, referencing the recorded seal data from cover page.

9.0 SEAL MAINTENANCE AND REPAIR

9.1 Seal Maintenance

A correctly installed and operated mechanical seal requires little maintenance. It is recommended to periodically check the seal for leakage. Wearing components of a mechanical seal such as seal faces, O-Ring, etc., require replacement over time. While a seal is installed and operating, maintenance is not possible. Therefore it is recommended that a spare seal unit or a spare parts kit be held in stock to allow quick repair.

Note the condition of the parts, including elastomer surfaces and gland springs. Analyze the cause of failure and correct the problem, if possible, before reinstalling the seal.

Clean all elastomer and gasket surfaces with cleaning solvent.
9.1.1 Standard Seal Assembly - Seal Sizes: 25 mm to 43 mm (1.000" to 1.625")
9.0  SEAL MAINTENANCE AND REPAIR (cont.)

9.1.1  Standard Seal Assembly - Seal Sizes: 25 mm to 43 mm (1.000" to 1.625") (cont.)
9.0 SEAL MAINTENANCE AND REPAIR (cont.)

9.1.2 OVERSIZE Gland Seal Assembly - Seal Sizes: 1.125" & 1.375"

1. [Image]
2. [Image]
3. [Image]
4. [Image]
5. [Image]
6. [Image]
7. [Image]
8. [Image]
9. [Image]
10. [Image]
11. [Image]
12. [Image]
13. [Image]
9.0  SEAL MAINTENANCE AND REPAIR (cont.)

9.1.2  **OVERSIZE** Gland Seal Assembly - Seal Sizes: 1.125” & 1.375” (cont.)
9.1.3 Seal Assembly - Seal Sizes: 45 mm to 120 mm (1.750" to 4.750")
9.2 Returning Seals For Repair and Hazard Communication Requirements

Any mechanical seal returned to Chesterton that has been in operation, must comply with our Hazard Communication requirements. Please go to our web page at [www.chesterton.com/Mechanical_Seam_Returns](http://www.chesterton.com/Mechanical_Seam_Returns) to obtain information required for returning seals for repair or seal analysis.
10.0 180H SEAL

10.1 180H Seal Overview

The 180H Seal is a standard 180 Cartridge Single Seal that uses an advanced hydropad geometry rotary seal face that improves film formation between the mechanical seal faces and significantly enhances face lubricity.

Hydropad designs are useful in high pressure applications, where pressure has a tendency to distort the seal faces, high speed applications, where the face velocity increases heat generation and in sealing fluids that have poor lubrication properties. Combinations of pressure and speed that exceed the limits of the standard 180 Seal faces would also be potential applications for hydropad use.

10.2 180H Environmental Control Considerations

Due to the special operating conditions the 180H is designed for, the seal typically requires environmental controls for sealing reliability.

In hot water applications such as condensate return pumps, a Plan 21 Cooled Discharge Recirculation for cooling will reduce the temperature of the process water, requiring additional energy requirements to elevate the water temperature. Where cooling the stuffing box is not acceptable to the process, there are cases where environmental controls are not utilized or a Plan 11 Discharge Recirculation arrangement has been used to improve the conditions inside the stuffing box without cooling or dilution.

Chesterton Application Engineering can help you specify the right seal recommendation for the end user including your environmental control options. The 2 diagrams below illustrate the most common plans used with the 180H Cartridge Single Seal.
Plan 11

Discharge Recirculation

What  Discharge recirculation through an orifice to the seal flush port. The orifice is used to control discharge pressure to the seal chamber. A smaller orifice allows less pressure to enter the seal chamber.

Why  To raise the pressure in the stuffing box to prevent flashing at the seal faces; To lower the temperature at the seal faces by using product to remove heat from the seal faces.

When  With clean process fluids. Process fluids with particulate may cause abrasion.

Plan 21

Cooled Discharge Recirculation

What  Discharge recirculation through an orifice and a heat exchanger to the flush port of the seal. A temperature indicator can be installed when specified.

Why  To raise the pressure in the stuffing box to prevent flashing at the seal faces; To lower the temperature at the seal faces by using cooled product to remove heat from the seal faces.

When  Used with clean fluids. High velocity solids may cause seal abrasion and score the seal faces if directed by the flush port.
10.0  180H SEAL (cont.)

10.2.1  180H Flush Port Connection

Remove pipe plug from flush port. Connect discharge re-circulation to flush port. **DO NOT CONNECT DISCHARGE RECIRCULATION TO EITHER PORT IDENTIFIED WITH STICKER AS LEAKAGE WILL RESULT.**