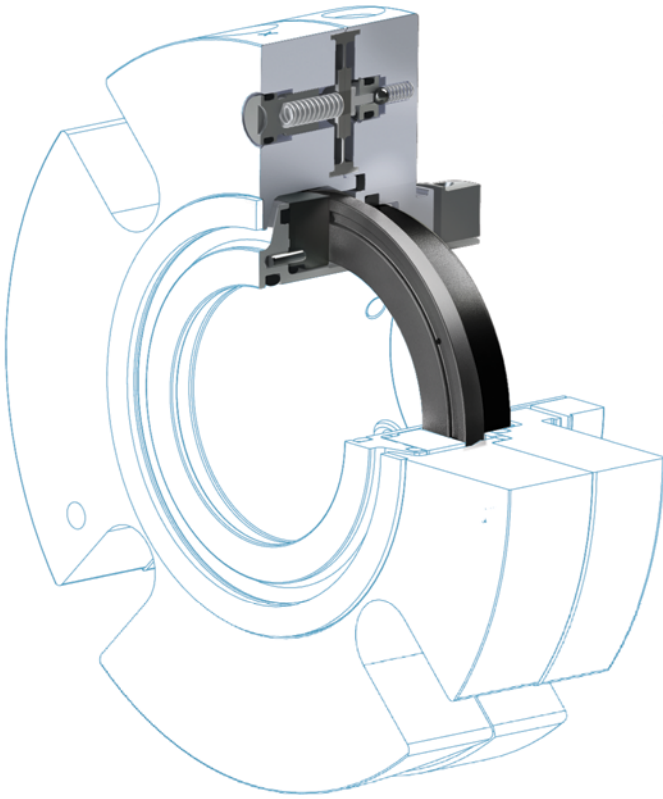


4400 DUAL CONCENTRIC GAS SEAL

INNOVATIVE DUAL DESIGN ACCOMMODATES LOSS OF BARRIER GAS
FOR GREATER SEALING RELIABILITY



Advanced Techn Through Innova



Advantages

- Zero fugitive emission, monitoring exempt, dual gas seal design
- Full sealing recovery following loss of barrier gas
- Unique design minimizes profiled gas face wear due to loss of barrier fluid
- Seal transitions to a contacting wet mode during gas disruptions for greater sealing reliability
- Innovative *In-Gland Control System* (IGCS) dynamically tracks process pressure changes to minimize gas consumption
- Low-speed designs provide lift-off at speeds down to 10 RPM
- No heat generation
- Designed for ANSI/API pumps, mixers, compressors, and blowers



Technology Made Simple tion

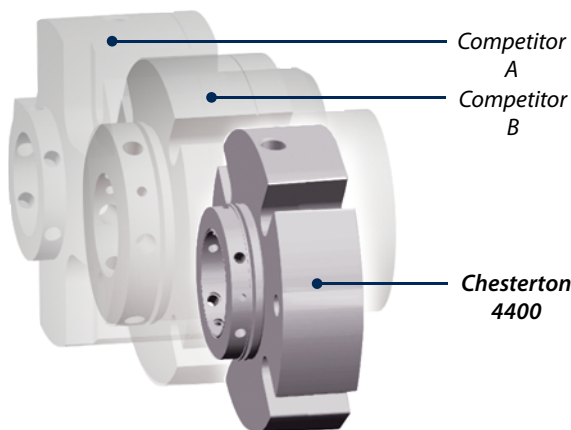
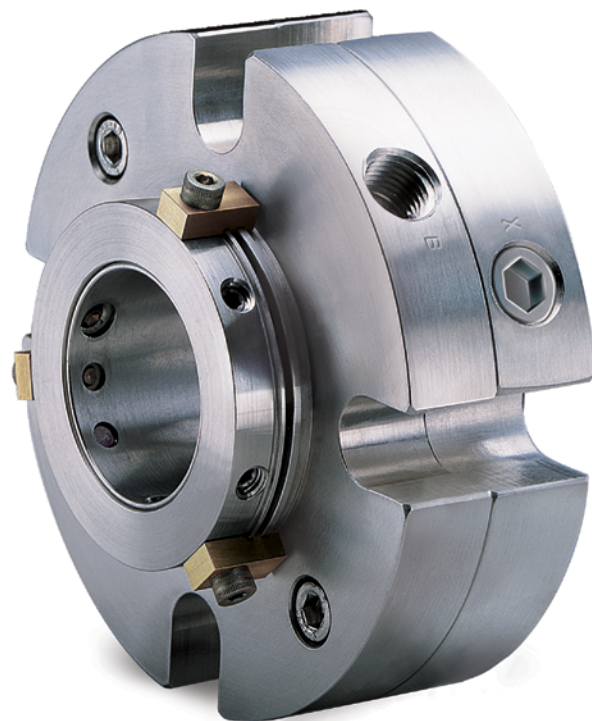
4400 DUAL CONCENTRIC GAS SEAL

The Chesterton® 4400 Dual Concentric Gas Seal is a unique seal design that provides the benefits of gas seal technology while enhancing sealing reliability, reducing gas consumption requirements, and accommodating gas supply disruptions that are common during gas seal operation.

This innovative design takes into account the operating parameters that are typically encountered during gas seal operation and accommodates these changes to maximize the 4400 Gas Seal performance and enhance sealing reliability for your processes.

Compact Design for Greater Equipment Fit

The 4400 Gas Seal has been designed to fit popular process equipment including ANSI and API process pumps, top entry mixers, blowers, and compressors without equipment modification. Besides the obvious fitting and installation benefits, this also makes Chesterton gas-sealing technology available for a wider range of applications. Costly equipment modification is avoided.



The 4400 surpasses other technologies in a wide array of services such as:

- Terminal and tank pumping
- Chemical processing
- Petroleum refining
- Pharmaceutical processes
- Non-lubricating fluids
- Slow speed mixer applications
- Hazardous emissions
- Oxygen-sensitive fluids
- High viscosity or "sticky" fluids
- LNG



Innovation, Reliability

The Chesterton 4400 Dual Concentric Gas Seal has a unique design that enables the seal to operate as a non-contacting gas seal when there is gas present, operate as a contacting low-emission liquid back up seal during loss of barrier gas events, and, then, recover and return to gas seal operating mode upon the reintroduction of barrier gas. No pump modifications are needed.

Reliability during Loss of Barrier Gas (LOB) Conditions

Unlike conventional gas seal designs, the 4400 Seal enhances sealing reliability due to its unique design. One pair of seal rings has two sets of sealing interfaces that accommodate gas supply disruptions that can occur during gas seal operation. Secondary O-Ring seal design and placement enable the seal to shift to a wet contacting seal during gas supply disruptions and revert to gas seal operation when gas supply is reestablished. Conventional gas seals cannot reliably adjust and recover during supply disruptions, resulting in equipment downtime.

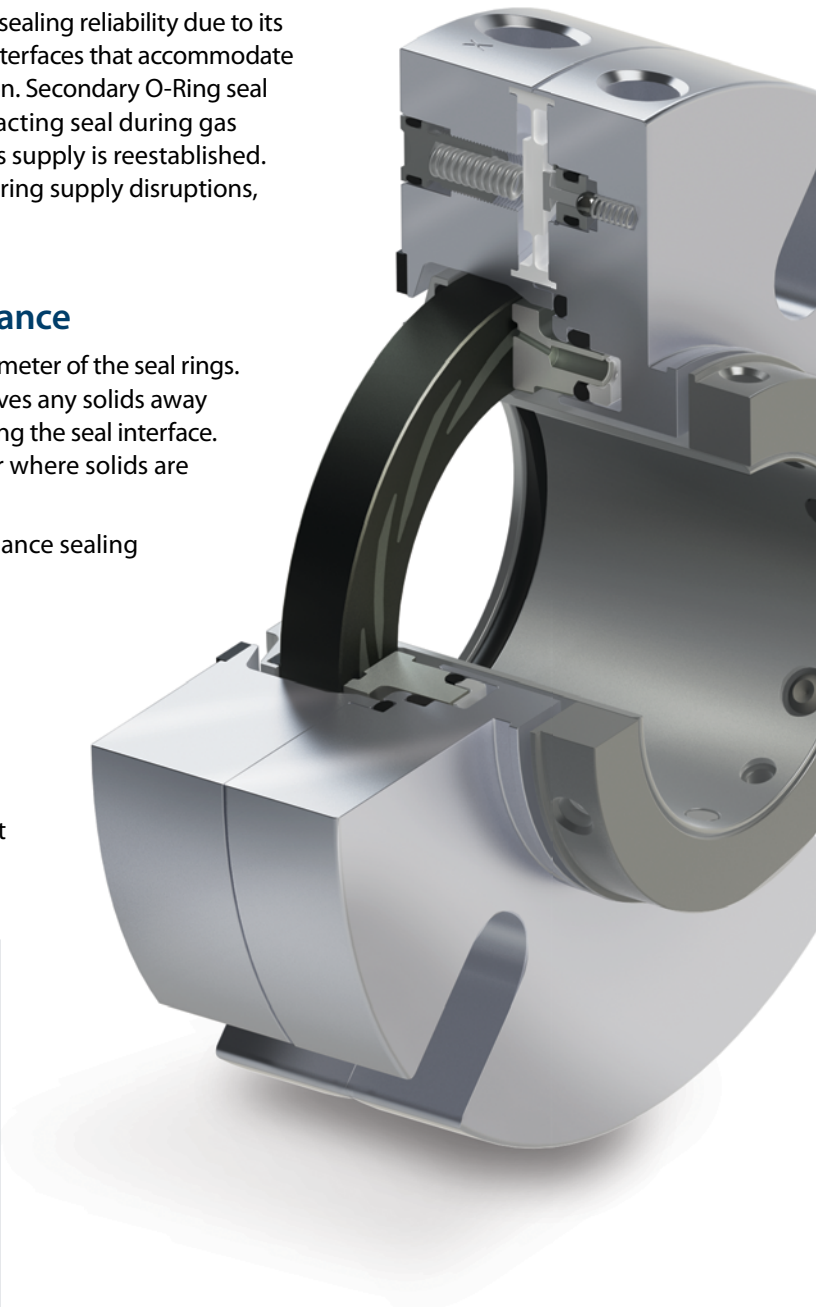
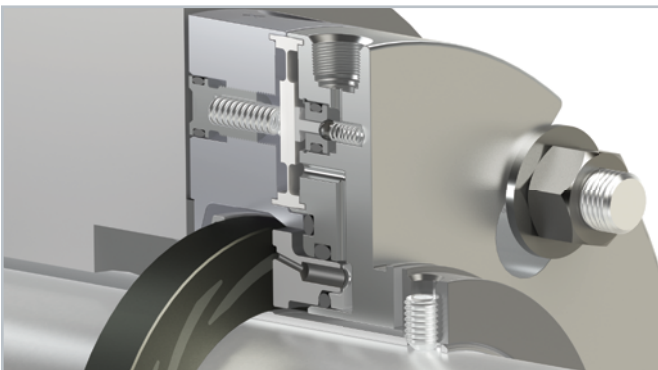
Innovative Design Enhances Seal Performance

With the 4400 Seal, the process fluid is sealed on the outer diameter of the seal rings. Where solids are present in the process, centrifugal force moves any solids away from the faces. This prevents solids from entering and damaging the seal interface. Conventional gas seals for pumps seal on the inner diameter where solids are driven into the seal interface.

Standard environmental control plans can be utilized to enhance sealing reliability with the 4400 Gas Seal.

Seal Monitoring Capabilities for Process Control

Many things can happen in a dynamic pumping operation. Pumps can run dry, gas supply to the sealing device can be intermittent, and pressure and temperature swings can affect seal life and reliability. The 4400 Gas Seal gland design can give you seal and gas monitoring capabilities.

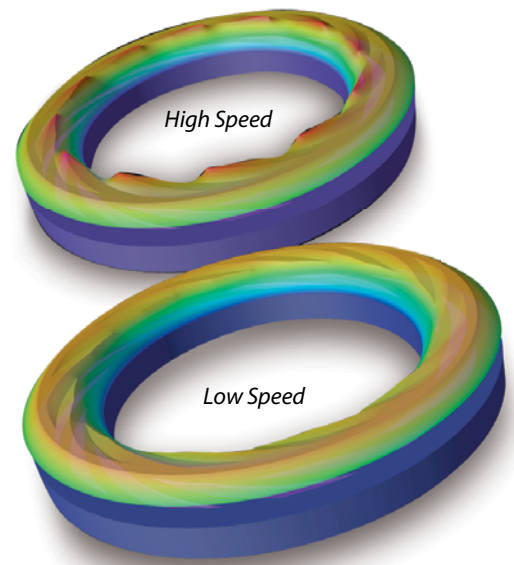


and Sustainability

Design Flexibility Allows for Adjustments Based on Equipment Speed: Quick Lift-Off

The 4400 Gas Seal design flexibility can accommodate a large range of operating conditions and speed requirements to provide crucial face lift-off needed for reliable sealing under many diverse applications. The combination of hydrodynamic and hydrostatic actions can supply lift-off at speeds as low as 10 RPM.

The quick lift-off capabilities on start-up and cushioned landings at shutdown make the 4400 Gas Seal ideal for equipment with soft starts, repeated starts and stops, slow roll, or simply slow turning. These capabilities enhance seal performance and reliability for your operations.



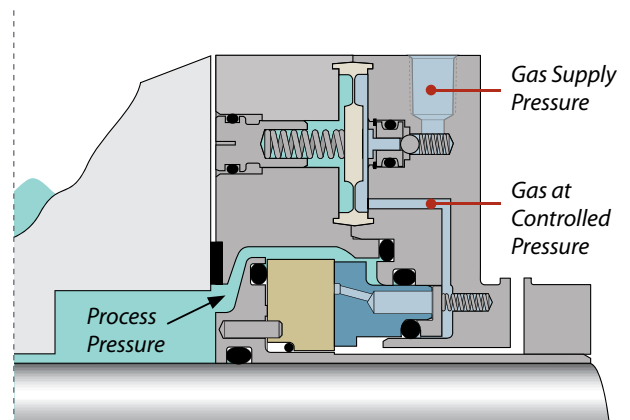
Zero Fugitive Emission, Monitoring Exempt, Dual Gas Seal

The 4400 Gas Seal meets the requirements of API, EPA, and the Code of Federal Regulations and is exempt from LDAR monitoring.

The gas-lubricated 4400 Gas Seal produces almost no seal generated heat and is ideally suited for thermally sensitive fluids such as polymerizing, coking, flashing, or salting products.

Innovative In-Gland Control System (IGCS)

The 4400 Gas Seal features the In-Gland Control System (IGCS), an innovative barrier gas pressure regulating system that dynamically tracks seal process pressure and maintains the optimum, fixed, gas pressure differential for low gas consumption rates. As process pressure fluctuates, the IGCS automatically adjusts barrier gas pressure. The 4400 Gas Seal monitors and regulates itself, minimizing barrier gas consumption for greater sealing reliability.



Simplicity and Reliability Throu

UNIQUE, COMPACT, DUAL CONCENTRIC TECHNOLOGY DESIGN

The Chesterton 4400 Dual Concentric Gas Seal will fit more ANSI and API pumps without equipment modification than standard dual gas seal arrangements and is designed to accommodate typical gas seal operating conditions, for greater sealing reliability.

4400 SEAL FEATURES AND BENEFITS

1 Dual Concentric Technology Design

One pair of seal rings has two sets of sealing interfaces allowing both wet and dry sealing, including non-contacting dry gas sealing and contacting wet back-up sealing.

2 LOB Recovery Protected Lift-Off Groove Technology

Prevents deterioration and contamination of gas grooves providing LOB protection and recoverability.

3 Exclusive In-Gland Control System (IGCS)

Tracks process pressure fluctuations with barrier gas pressure adjustments to assure proper gas pressure differential under system upset conditions.

4 Gas-Lubricated Faces

Eliminates seal-generated heat.

5 Measurement/Flush Port

Allows monitoring of barrier gas pressure at the faces. Track differential pressure between barrier gas pressure and process pressure simply by attaching a pressure gauge to the seal gland flush port.

6 Compact Design

No part of the seal protrudes into the stuffing box. This allows the seal to fit seal chambers of any size, even 5/16" (8 mm) cross-section and less.

7 Self-Centering Lock Ring

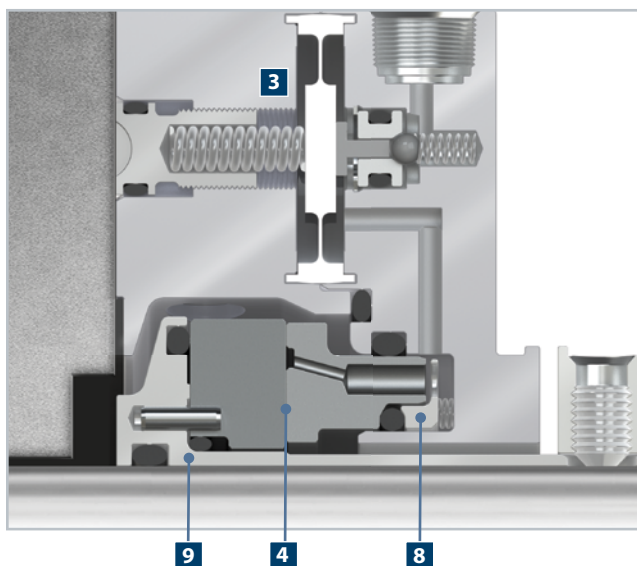
Assures stationary seal ring perpendicularity to the axis of shaft rotation, preventing rotary seal ring oscillation. This provides simple, reliable, stationary seal operation.

8 Spring Loading Mechanism and Micro-Polished O-Ring Travel Surface

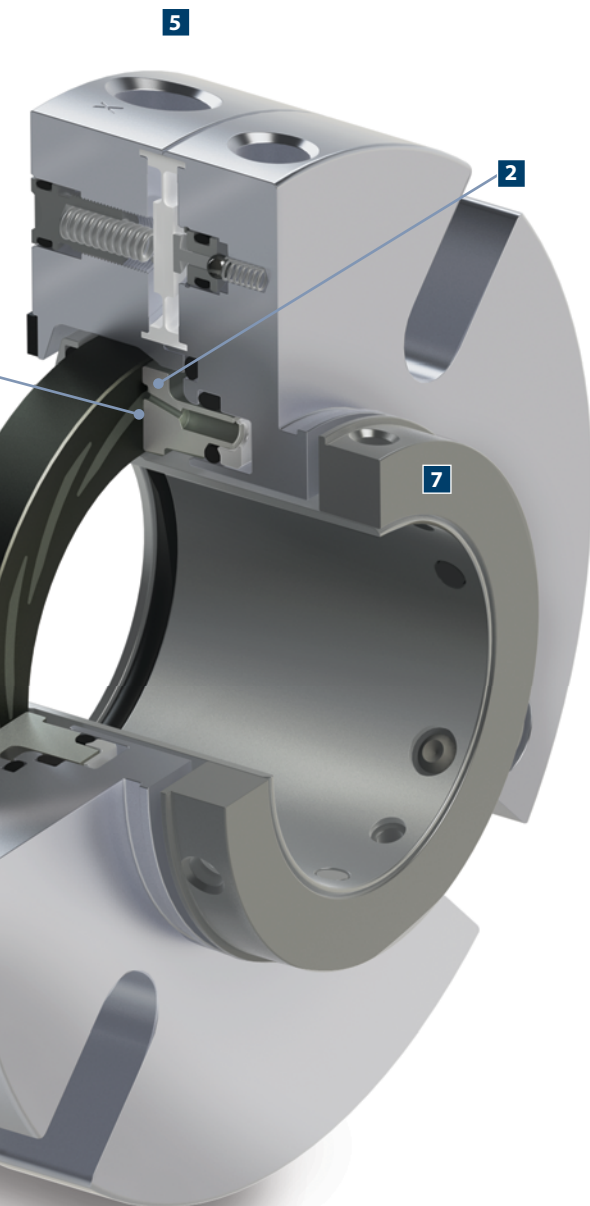
Eliminates O-Ring hang-up by allowing the seal to quickly respond to process and gas barrier pressure changes.

9 Rotary Cushion O-Ring

Provides proper rotary seal ring centering and support.



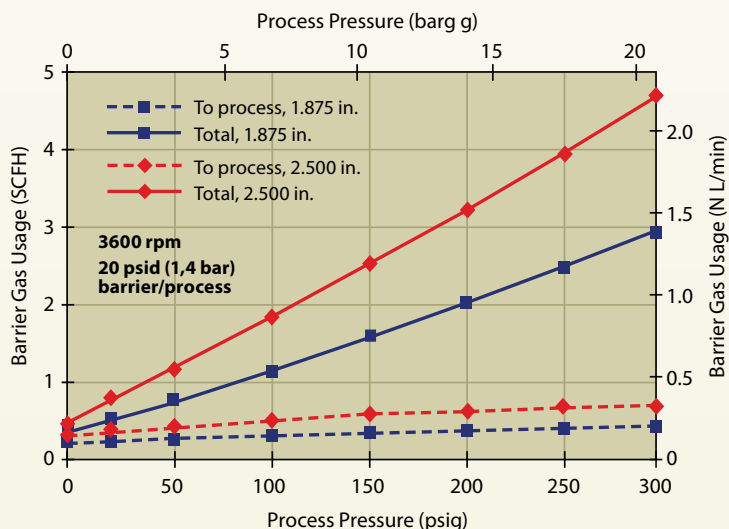
gh Innovation



Low Gas Consumption

The 4400 Gas Seal provides *zero* fugitive emissions sealing with minimal barrier gas consumption. Due to the efficiencies of the dual concentric design and the exclusive In-Gland Control System, only a fraction of the overall gas consumed is introduced to process. The remainder of the gas introduced to the seal is transferred to atmosphere after performing the critical function of face separation.

Estimated Barrier Gas Usage by Seal Size



Operating Parameters

Pressure*	25 mm (1.000") to 65 mm (2.625")— Vacuum to 20 bar g (300 psig) 70 mm (2.750") to 90 mm (3.625")— Vacuum to 17 bar g (250 psig)
Temperature	260°C (500°F)
Speed	1.3 m/s (250 fpm) to 25 m/s (5000 fpm) 250 fpm – standard; to 10 fpm optional

Materials of Construction

Component	Standard Materials
Rotary Faces	Silicon Carbide
Stationary Faces	Premium Carbon Silicon Carbide
Elastomers	FEPM, Ethylene Propylene, Fluorocarbon, ChemLast™, Perfluoroelastomer
Spring	Alloy C-276 / EN 2.4819
Metal Parts	316 Stainless Steel (EN 1.4401)

Fit Standards

ANSI/ASME B73.1, B73.2, ISO 3069-S, EN 12756, API 610

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

Consult Chesterton Engineering for your applications, including applications exceeding published operating parameters, and for additional seal sizes.

Gas Control Panel

Chesterton supplies gas control panels to ensure a clean and controlled barrier gas supply for the 4400 Dual Concentric Gas Seal. Application-specific gas control systems are available to monitor and regulate your process and to enhance seal performance and seal life.



Global Solutions, Local Service

Since its founding in 1884, the A.W. Chesterton Company has successfully met the critical needs of its diverse customer base. Today, as always, customers count on Chesterton solutions to increase equipment reliability, optimize energy consumption, and provide local technical support and service wherever they are in the world.

Chesterton's global capabilities include:

- Servicing plants in over 100 countries
- Global manufacturing operations
- More than 500 Service Centers and Sales Offices worldwide
- Over 1200 trained local Service Specialists and Technicians

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