HSH Series
Balanced high pressure pusher seal
HSH seals are built for extended reliability in high pressure, high speed and highly viscous services such as mainline crude oil pipeline pumps. HSH seals are balanced, flexible stator cartridge seals with drive mechanisms and seal face geometries engineered for high torque loads and long-term performance. The HSH seal is fully compliant with API 682 Type A requirements.

High performance meets broad capability

Typically, high duty seals are custom designed to fit specific pieces of equipment and operating conditions. The HSH seal breaks this tradition by providing the widest standard operating range in terms of size, speed, and pressure handling capability of any Flowserve pump seal. All of this performance is included in a seal cartridge which fits in the standard seal chamber dimensions of API 610 pumps without requiring any equipment modifications.

When large, high energy pumps are utilized in pipelines or inside petrochemical plants, refineries, and power plants, the HSH seal can be deployed to handle the associated high torque loads, pressures, and surface speeds.

From boiler feed water to crude oil and light hydrocarbons, the HSH seal is easily configured to cover the vast majority of moderate and high duty services.

Applications
- Crude oil
- Amine
- Bitumen
- Middle distillates
- Produced water
- Sea water
- Boiler feed water
- Ammonia
- Liquefied natural gas, ethane, and ethylene

Available high pressure drives

Available Configurations

<table>
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<th>Arrangement</th>
<th>Description</th>
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<td>1 single seal</td>
<td>Unpressurized dual liquid buffer seal face-to-back configuration (Common Piping Plans 52, 55)</td>
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<tr>
<td>HSH/HSH</td>
<td>Pressurized dual liquid barrier seal face-to-face configuration (Common Piping Plans 53A, 53B, 53C, 54)</td>
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Available Precision Face Topography Waves enable the sealing of fluids with phase changes

Split ring
Shrink disc
Multiport flush design improves heat dissipation for uniform face cooling
A standard distribution ring connected to the seal’s flush port and located co-axially with the sealing interface improves the cooling efficiency of Piping Plan 11, 14, 21, 31, and 32 by injecting the flush flow 360° around the seal faces.

Reliability-enhancing features from the custom options library meet specific customer needs
The HSH Series can be configured with a number of additional features including:
- Flow circulating devices
- Isolating seal chamber throat bushings
- Wear resistant overlays for metal parts
- Secondary containment devices
- High pressure sleeve drive collars
- Thermal isolation devices and cooling jackets

Designed for high pressures
Thick cross-section seal faces are designed with proven FEA techniques to minimize deflections and stresses for reliable, low-leakage operation.

Part interchangeability between single and dual seal arrangements
Minimizes inventory requirements and maximizes design flexibility.

Withstand high torque with heavy duty anti-rotation lugs engaged in seal face
High torque-capable anti-rotation lugs along the length of the stationary seal face distribute contact loads, minimize distortion and minimize wear especially for high-viscosity applications.

Designed for high speeds and large shaft diameters
Flexible stator design with Alloy C-276 springs allows high speed operation and is better able to tolerate out-of-square misalignment of the pump shaft to the seal chamber face.

Low drag rotating element minimizes turbulence around the seal faces and the associated seal generated heat from fluid shearing.

Materials of Construction
- Rotating Face: Silicon Carbide, Tungsten Carbide, Diamond Coating
- Stationary Face: Silicon Carbide, Carbon, Diamond Coating
- Metal Components: 316 Stainless Steel, 17-4 PH Stainless Steel, Alloy C-276
- Gaskets: Fluoroelastomer, Perfluoroelastomer
- Springs: Alloy C-276
- Bushing: Carbon

Operating Parameters
- Dynamic Pressure: up to 103.4 bar (1500 psi)
- Static Pressure: up to 206.8 (3000 psi)
- Temperatures: -40° to 260°C (-40° to 500°F)
- Specific Gravity: 0.3 and higher
- Surface Speed: up to 46 m/s (150 fps)
- Shaft Sizes: 25.4 to 156 mm (1.000 to 6.125 inches)
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