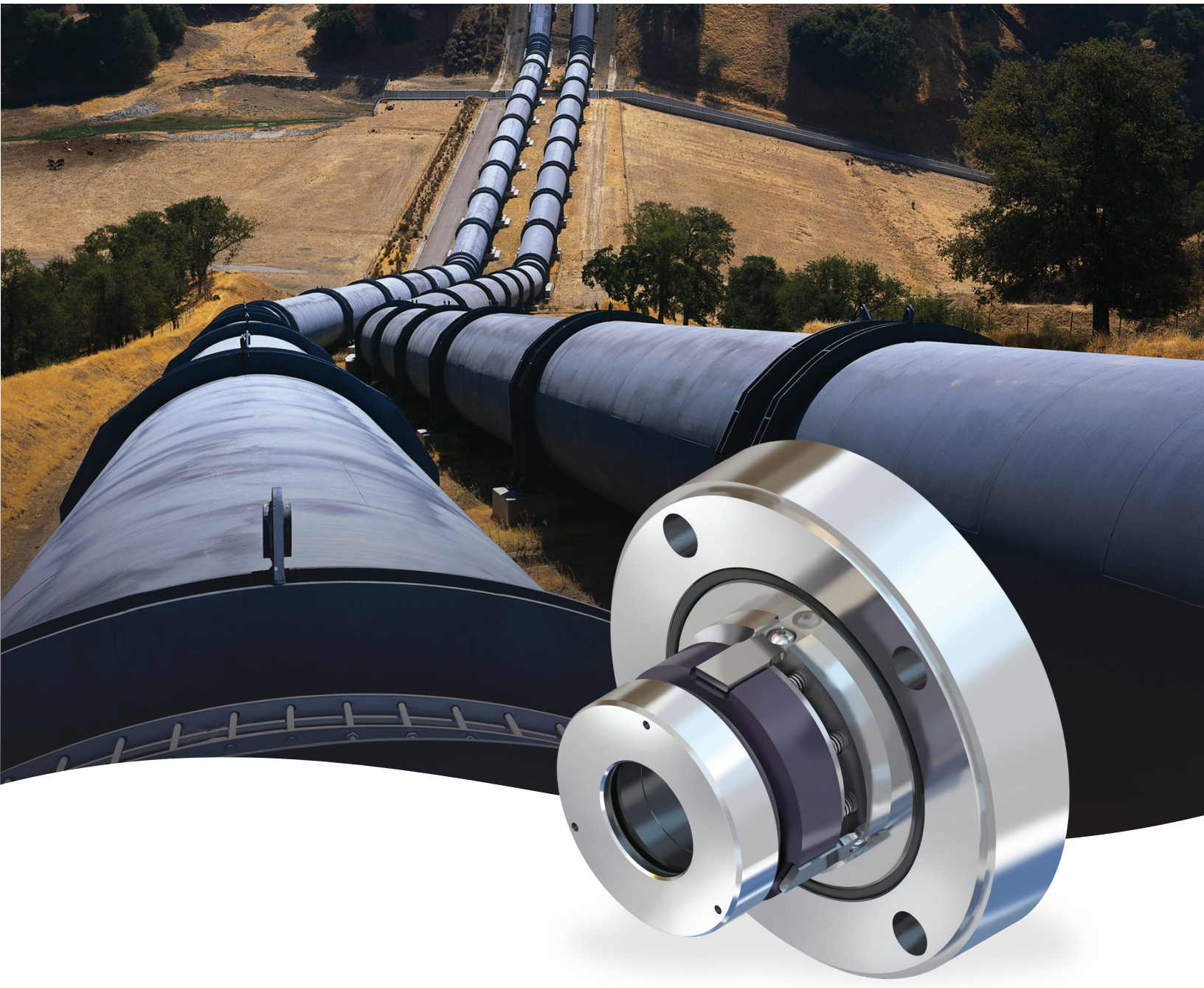
FLOWSERVE

# HSH Series

## Balanced high-pressure pusher seal



*Experience In Motion*

*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.

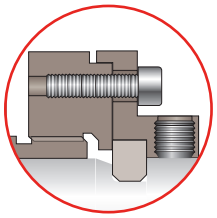
When large, high-energy pumps are utilized in pipelines or inside petrochemical plants, refineries and power plants, the HSH seal can be deployed to handle the associated high torque loads, pressures and surface speeds.

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.

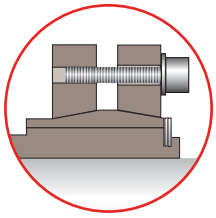
## Applications

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

## Available high-pressure drives

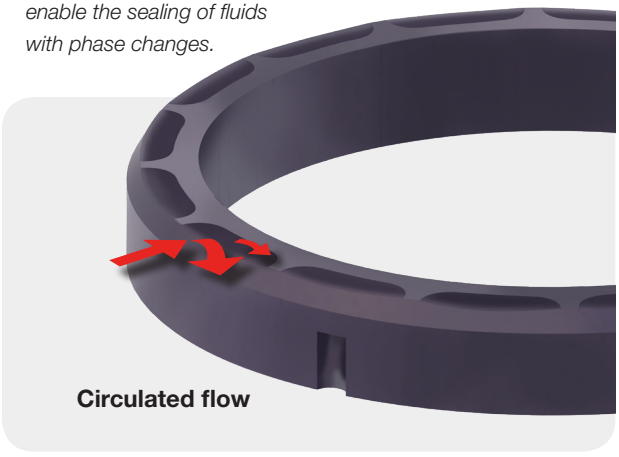


*Split ring*



*Shrink disc*

*Available precision face topography waves enable the sealing of fluids with phase changes.*




## Available configurations

**HSH**
Arrangement 1 single seal
(common Piping Plans 11, 13, 23, 32, 62)

**HSH/HSH**
Arrangement 2 unpressurized dual-liquid buffer seal face-to-back configuration (common Piping Plans 52, 55)

**HSH/GSL**
Arrangement 2 unpressurized dual seal with dry running containment seal (common Piping Plans 72, 75, 76)

**HSH/HSH**
Arrangement 3 pressurized dual-liquid barrier seal face-to-face configuration (common Piping Plans 53A, 53B, 53C, 54)

## Features and benefits

**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 Plans 11, 14, 21, 31 and 32 by injecting the flush flow 360 degrees around the seal faces.

**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 lower wear, especially for high viscosities.

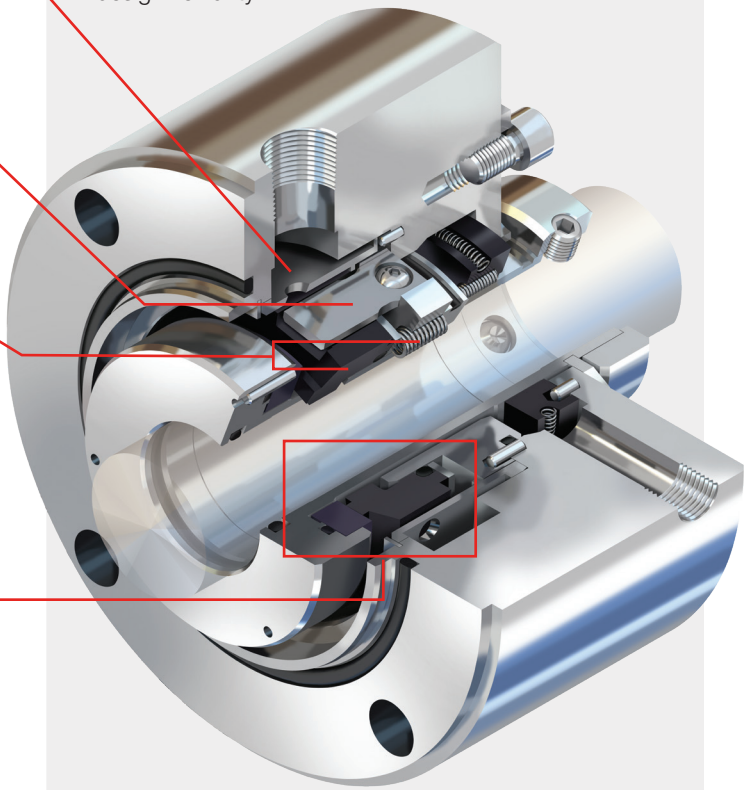
**Designed for high speeds and large shaft diameters**
Flexible stator design with Alloy C-276 springs allows high-speed operation and is better able to tolerate out-of-square misalignment of the pump shaft to the seal chamber face.

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

**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.

A block-style rotating seal face is mounted squarely against a lapped support surface and driven by equally distributed pins to stabilize the effects of mechanical and thermal loads.

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



*Single HSH seal model with floating segmented throttle bushing outboard*

## Reliability-enhancing features from the custom options library meet specific customer needs

HSH Series seals 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

## 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**
to 103.4 bar (1500 psi)

**Static pressure**
to 206.8 (3000 psi)

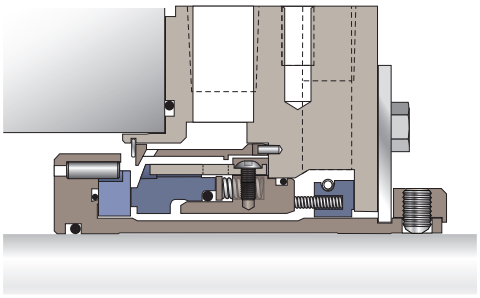
**Temperatures**
-40°C to 260°C (-40°F to 500°F)

**Specific gravity**
0.3 and higher

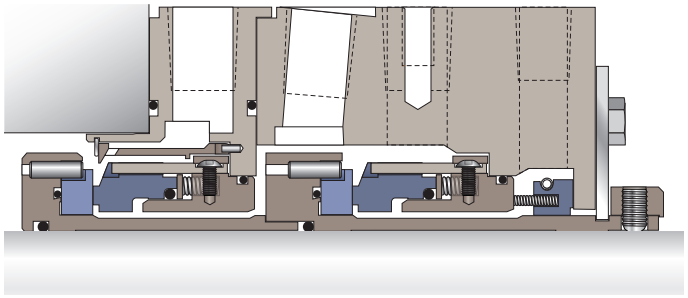
**Surface speed**
to 46 m/s (150 fps)

**Shaft sizes**
25.4 to 156 mm
(1.000 to 6.125 in)

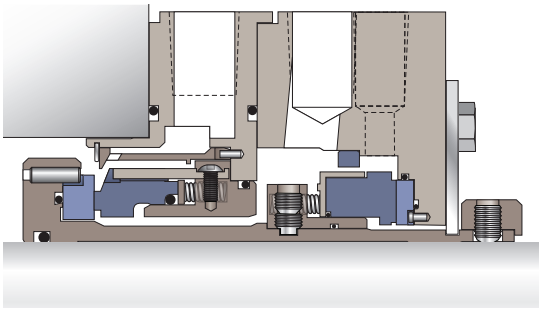
## Available arrangements



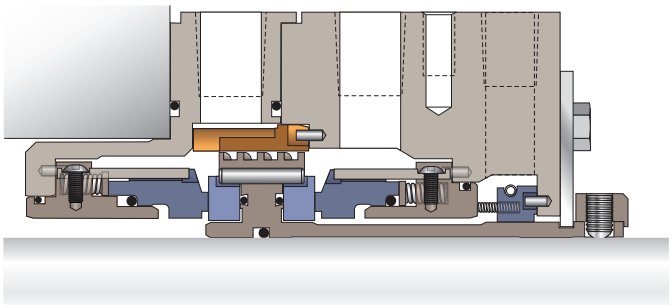
*Arrangement 1 HSH single seal with floating balanced segmented throttle bushing for secondary containment*



*Arrangement 2 HSH/HSH unpressurized dual seal with liquid buffer fluid provides near-zero emissions sealing*



*Arrangement 2 HSH/GSL unpressurized dual seal with gas buffer fluid provides near-zero emissions sealing*



*Arrangement 3 HSH/HSH face-to-face pressurized dual seal with barrier fluid provides zero-emissions sealing and reverse pressurization containment capability*


**Headquarters**
Flowserve Corporation
5215 North O'Connor Blvd.
Suite 2300
Irving, Texas 75039-5421 USA
Telephone: +1 937 890 5839

**USA and Canada**
Kalamazoo, Michigan USA
Telephone: +1 269 381 2650

**Europe, Middle East, Africa**
Etten-Leur, The Netherlands
Telephone: +31 765 028 200

**Asia Pacific**
Singapore
Telephone: +65 6544 6800

**Latin America**
Mexico City
Telephone: +52 55 5567 7170



**SSFLY000074 (EN/AQ)** October 2019