

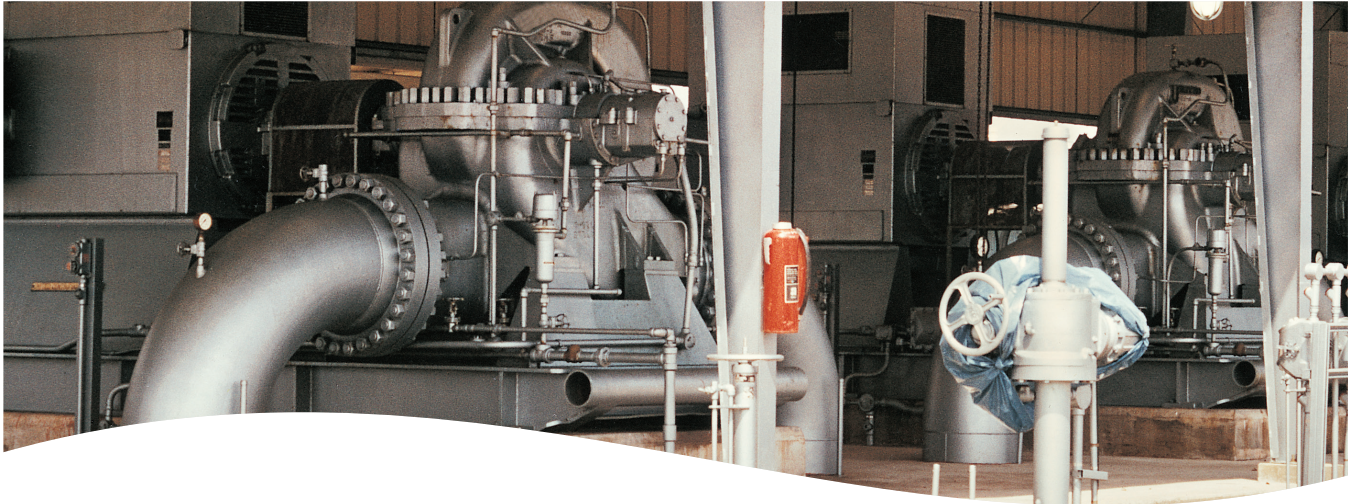


# **DVSH** **Heavy-Duty, Between Bearings,** **Axially Split, Single-Stage,** **Double-Suction Pump**

ISO 13709/API 610 (BB1)



*Experience In Motion*



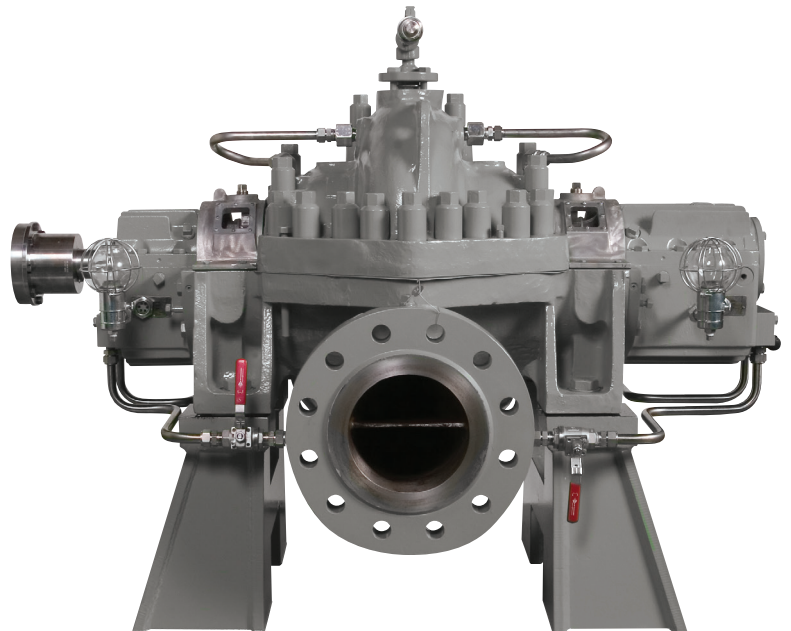
## Unequaled might, unequaled operating experience

With thousands of units in operation around the world, the Flowserve DVSH pump is the preferred choice for applications requiring heavy-duty, between bearings, single-stage, axially split units. Fully compliant with ISO 13709/API 610 (BB1), latest edition, the DVSH pump features the side/side nozzle configuration preferred in a broad range of applications. It is particularly well suited for use in process charge, transfer and pipeline services where uncompromising reliability over wide flow ranges is of utmost importance. With more than 100 distinct hydraulics, the DVSH suite of pumps provides the industry's most comprehensive coverage. This broad range enables precise selection for the best hydraulic fit, operating efficiency and stability.

### Engineered performance and reliability

Consisting of a double-suction impeller operating in a heavy-duty, double-volute casing, the DVSH pump's design inherently results in optimal axial and radial thrust balance over the pump's full operating range.

- Double-suction impeller provides axial hydraulic thrust balance and is designed for maximum hydraulic efficiency.
- Double-volute design minimizes hydraulic radial loads, even at minimum flow.
- Heavy-duty shaft design ensures trouble-free performance by operating under the first critical speed.
- Extensive hydraulic coverage



## Broad applications

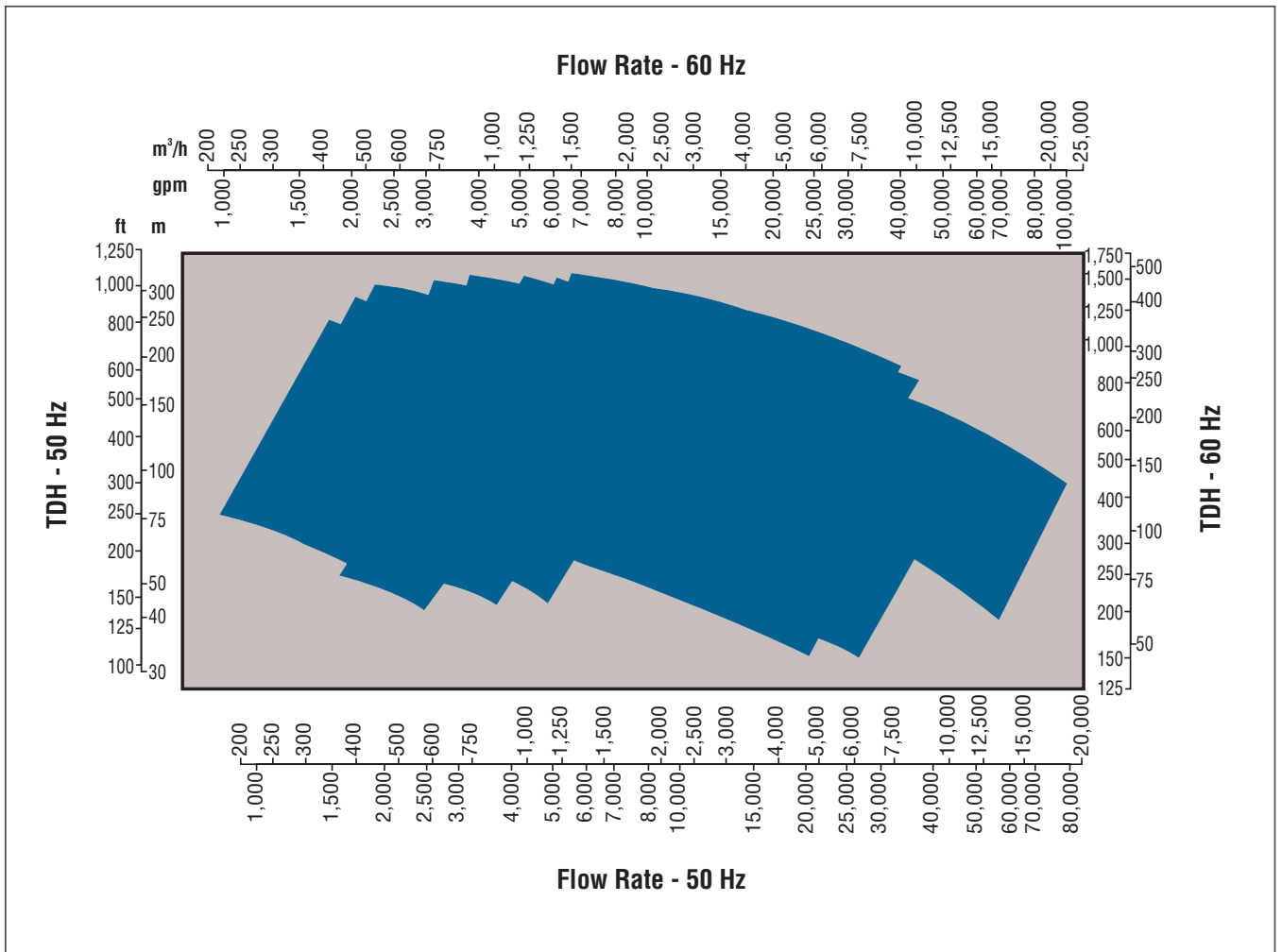
- Pipeline, booster and mainline
- Process charge
- Liquefied CO<sub>2</sub>
- Power recovery
- Oil shipping
- Transfer

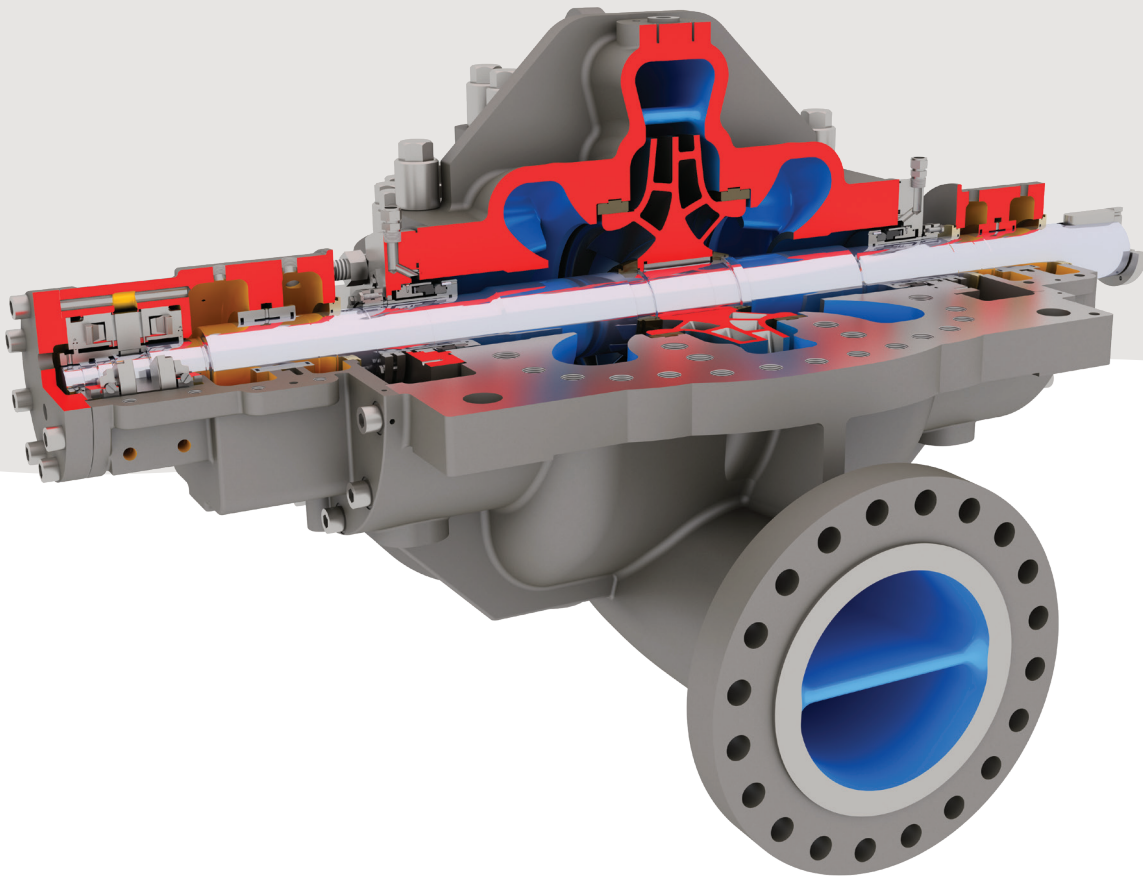
## Operating parameters

- Flows to 12,000 m<sup>3</sup>/h (53,000 gpm)
- Heads to 550 m (1,850 ft)
- Pressures to 150 bar (2,175 psi)
- Temperatures to 200°C (400°F)
- Specific gravities to 0.5
- Speeds to 5,000 rpm



## Range chart





## Heavy-duty construction

The Flowserve DVSH single-stage, double-suction pump is fully compliant with ISO 13709/API 610 (BB1), latest edition. It is engineered and built for heavy-duty applications commonly found in the oil and gas industry, such as pipeline, process charge and liquefied CO<sub>2</sub>. Boasting comprehensive hydraulic coverage, it permits precise selection to ensure the best hydraulic fit and low total cost of ownership.

### Features and benefits

**Double-volute, axially split casing design** minimizes hydraulic radial forces in any condition down to the minimum flow, thereby reducing shaft deflection and increasing the life of bearings, seals and wear rings.

**Suction and discharge nozzles** are integrally cast in the lower casing half to permit pump disassembly without disturbing the piping. Nozzles are designed to handle external forces and moments equal to or in excess of ISO 13709/API 610 specifications.

**Near centerline mounting** provides superior pump alignment and performance at elevated temperatures.

**Raised face flanges** meet ASME B16.5 dimensional requirements. Class 600 (PN 100) flanges are standard; Class 900 (PN 160) and Class 1500 (PN 250) flanges are available to meet required operating pressures. *Note: Includes integral flange connection for drain, vent and flush.*



**Double-suction impeller** provides axial hydraulic thrust balance and allows minimal NPSHR. The impeller is dynamically balanced to assure vibration-free operation as per API/ISO requirements.

**API 682/ISO 21049 seal chambers** ensure ample flow around the seal faces and allow for installation of cartridge-style single, dual unpressurized and dual pressurized mechanical seals to meet required safety and environmental requirements. Waterproof cover optional.

**Heavy-duty shaft design** ensures trouble-free operation below the first critical speed. Large diameter shaft and short bearing span minimize deflection. Options include double extension for connection to auxiliary pumps or hydraulic turbines, and special shaft end machining for hydraulic fitted couplings. The simple rotor design allows for easy maintenance with quicker assembly and disassembly.

**Carbon steel bearing housings** feature 180° (360° optional for special application) bolting and heavy-duty mounting brackets to facilitate maintenance. Bearing isolators are standard.

**Standard renewable casing and impeller wear rings** provide hydraulic stability and high operating efficiency. They also ensure proper thrust loading on bearings. Optional laser-hardened or non-metallic wear rings in Graphalloy®, PEEK® and other materials are available.

® Graphalloy is a registered trademark of the Graphite Metallizing Corporation.

® PEEK is a registered trademark of Victrex Plc Corp.

## Available radially split design

The DVSH pump is available in a radially split configuration called the DVSR (see above). This design is preferred for applications at very high pressures or low specific gravity, such as liquefied gases, including CO<sub>2</sub>.



## Multiple bearing designs

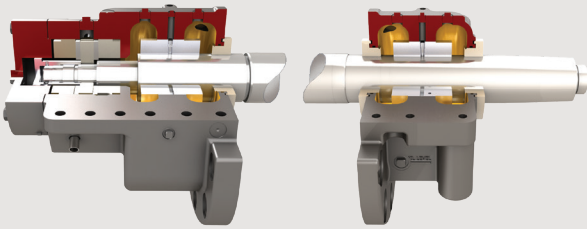
The DVSH pump is offered with a variety of bearing designs to meet application requirements. The standard bearings are axially split, shell type, steel-backed, babbitt-lined sleeve bearings on both the radial and thrust ends to carry radial loads. Preloaded angular contact ball bearings are duplex mounted (i.e., back-to-back) to carry thrust loads.

Optional bearing designs include the following:

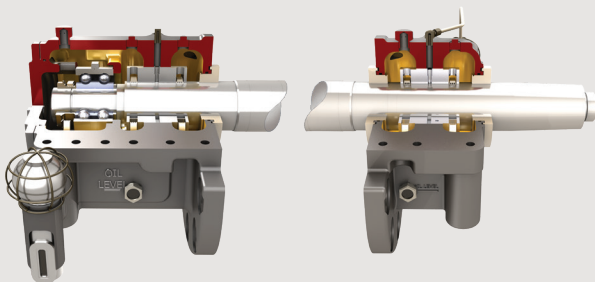
- Split sleeve radial and tilting pad thrust with force feed lubrication
  - Applied when energy density ratings and bearing speed or life is beyond the limits for rolling element bearings as defined by ISO 13709/API 610.
  - Tilting pad thrust bearings require an external forced feed lubrication system. Pump shaft driven or separate lube pumps available.

- Split sleeve radial and ball thrust
  - Available for applications with energy densities exceeding the limits of ISO 13709/API 610 with good success
- Ball radial and ball thrust
  - Single-row, deep-groove 6200 Series ball bearings on the inboard side carry radial loads.
  - Preloaded duplex-mounted (back-to-back), angular contact bearings carry thrust loads.

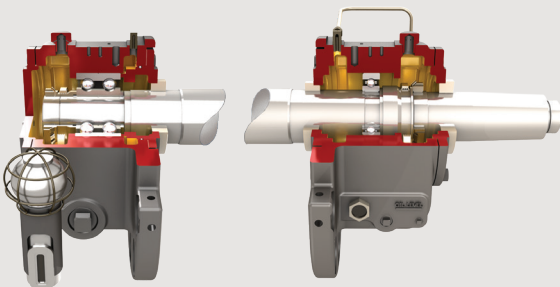
Flowserve engineers will help select the optimal construction based on ISO/API specifications, the application and the speed, and horsepower rating of the pump.



*Split sleeve radial and tilting pad thrust*



*Split sleeve radial and ball thrust*



*Ball radial and ball thrust*

## Pump packages

Pump packages are provided to specification and include the pump and driver mounted on a rigid, structural baseplate that is fully designed for Flowserve mechanical seals and seal plans (Plan 11/65) as well as wiring for standard or customized instrumentation.

## Baseplate designs

Engineered to contract requirements, baseplate designs may include any of the following:

- Conventional welded steel with drain rim; suitable for grouting
- Skid-type, non-grouted
- Three-element design accommodates lube oil system or gearbox.

Pumps mounted with engine or turbine drivers as well as multiple pump modules also are available.

## Standard testing and balance

- A certified hydrotest is performed on each casing.
- Final two-plane dynamic balancing plus mechanical and electrical TIR verifications are conducted on every assembled rotor.
- Performance and vibration testing assure optimum mechanical performance throughout the entire operating range.



## Advances in analytics

**Monitor and predict DVSH performance with the Flowserve suite of IIoT products, software and services.**

Our advances in analytics expand the depth, breadth and speed of our diagnostic and predictive capabilities. By partnering with Flowserve, you'll gain access to the most experienced engineering minds in fluid motion and control as well as our new program that turns physics into data, data into actions, and actions into results. Our complete IIoT solution helps plant reliability engineers, operators and maintenance personnel take prompt actions and reduce unplanned downtime.



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