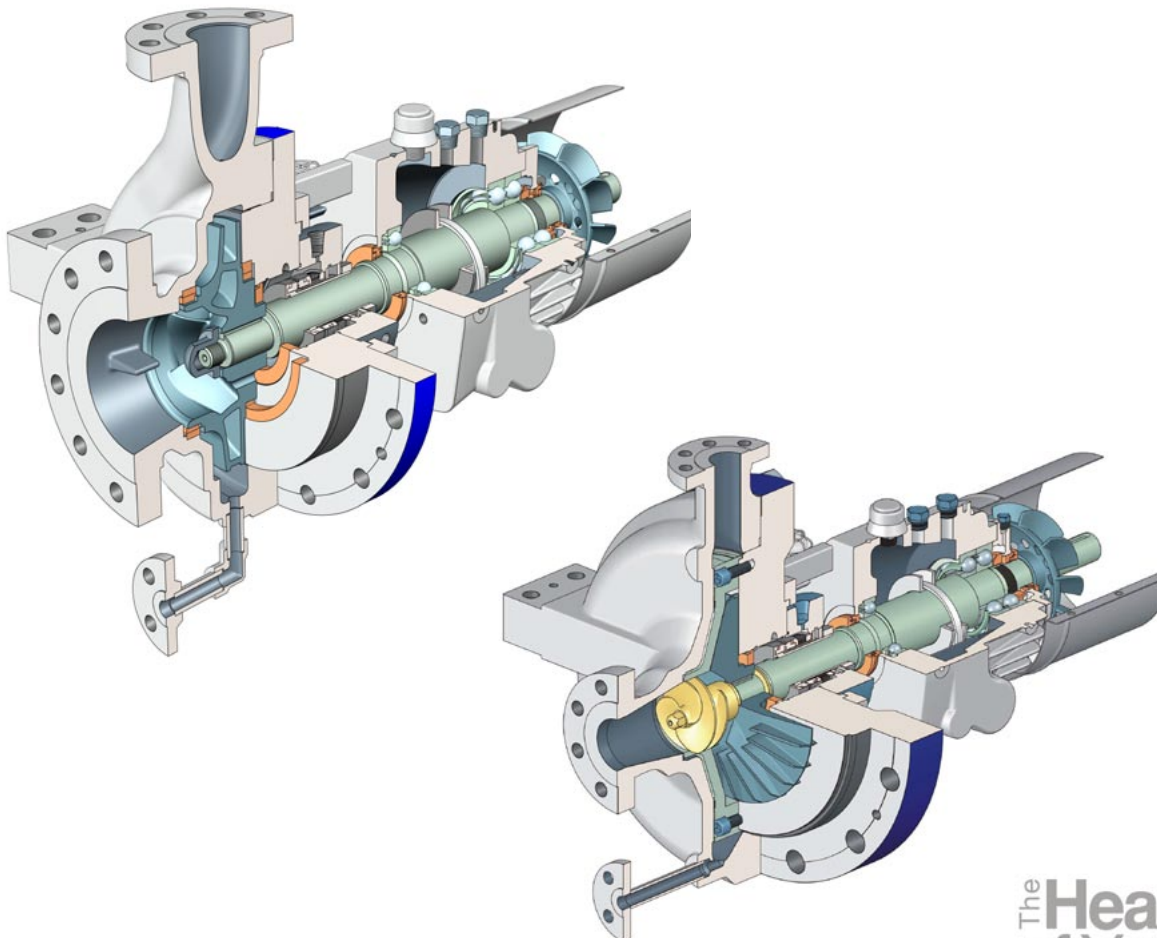


OHH and OHHL Process Pumps ISO 13709 (API 610)



Sulzer Pumps



Sulzer Pumps is a leading global supplier of reliable products and innovative pumping solutions for end users. Our active research and development, detailed process and application knowledge together with a comprehensive understanding of market demands keeps us consistently at the leading edge of technical development. Our global network of modern manufacturing and packaging facilities together with sales offices, service centers and representatives located close to major markets provide fast responses to customer needs.

Innovation, Expertise and Research

Innovation

Sulzer Pumps has a long history of providing innovative pumping solutions to business partners in the following industries:

- Oil & Gas
- Hydrocarbon Processing
- Pulp and Paper
- Power Generation
- Food, Metals & Fertilizers
- Water and Wastewater

Expertise

Sulzer Pumps' innovative technological solutions and equipment support the sophisticated processes which convert crude oil into transportation fuel and feed stocks for the petrochemical industry. Sulzer Pumps has always been at the forefront of pre-engineered

and engineered pumps designs, using the widest range of materials to produce safe and reliable equipment for handling process liquids at a full range of pressures and temperatures.

Research

Research and Development have always received top priority at Sulzer Pumps. Basic research focuses on hydraulics, cavitation, erosion, corrosion and mechanical design, which is then applied to advanced product development. Our engineers work closely with customers all over the world on the practical implementation of innovative ideas. At any point, our customers can call upon the diverse expertise of the many research specialists working in our laboratories. Successful

research and development activities require continuous investment. Beyond immediate job results, Sulzer Pumps' commitment to research and development benefits our customers by ensuring that they have a stable business partner at the leading edge of pump technology.

Product Development

Sulzer Pumps provides a broad range of ISO13709/API 610 centrifugal pumps for the demanding applications of the Hydrocarbon Processing Industry.

The conventional OHH features over 110 hydraulics—from 1" discharge to 16" discharge (25 mm to 400 mm) and power levels that can exceed one MW. The OHH is designed to ISO 13709 (API 610) with ISO 21049 (API 682) cartridge type mechanical seals.

The OHH product line could not use conventional hydraulic components to cover the low flow applications in the market. Sulzer Pumps' desire to provide complete hydraulic range coverage prompted development of the OHHL, or low flow version of the OHH. The OHHL utilizes the same extra heavy shaft and bearing frame as the OHH. Only the shaft end under the impeller is modified to accommodate the OHHL's unique, low flow impeller design.



Evolving Industry Standards

The OHH is an overhung, horizontal, centerline mounted, single stage, radially split process pump. The existing world renowned bearing frame was further improved by fitting a low noise cooling fan and options such as magnetic oil seals and monitoring instrumentation. This made the OHH

the first API end suction process pump to fully comply with ISO 13709 (API 610) standards.

The OHH process pump includes the latest in mechanical seals technology and is used in heavy-duty refinery services, petrochemical plants, gas processing and offshore services.

The mechanical seals and auxiliaries supplied are in full compliance with the requirements of ISO 21049 (API 682). The fluids pumped include sour water, gasoline, light hydrocarbons,

and vacuum bottoms. The customers benefit from the robust construction, the versatility in application, and the long reliable service life.

The OHHL is designed to provide an optimum solution for lower flows and higher heads. Some applications require a horizontal direct drive pump capable of delivering 3 m³/h (13 USgpm) capacity and head to 360 m (1,200 ft). Customers require low NPSHr, while meeting ISO 13709 (API 610) vibration levels.

The OHHL utilizes a precision cast, semi-open, multi-vaned impeller that produces much more head per mm of impeller diameter than does a conventional enclosed impeller. The impeller design provides geometric flexibility to adjust the best efficiency flow while providing excellent efficiency and a stable performance curve. On larger sizes inducers are available for low NPSH applications. All the standard ISO 13709 (API 610) material combinations are available from S-4 to D-2 for hot or cold services.

OHH Design Features and Benefits

Casing feet and Base plate

- Centerline mounted pump casing and base plate designed to meet ISO 13709 (API 610) nozzle loads
- 2 x API nozzle load option available depending on size
- Non-grouted or pre-grouted base plates available for motor or steam turbine
- API 610 defined base plate dimensions are standard
- Similar designs and standards are used where larger bases are required to accommodate oversize pumps or drivers

Impeller

- Dynamically balanced impeller
- Enclosed impellers provided for increased efficiency
- Optional impellers in most sizes for low NPSHr
- Wear ring diameters and balance holes are optimized to maximize seal and bearing life
- Proven Coke Crusher available for coking applications

Shaft

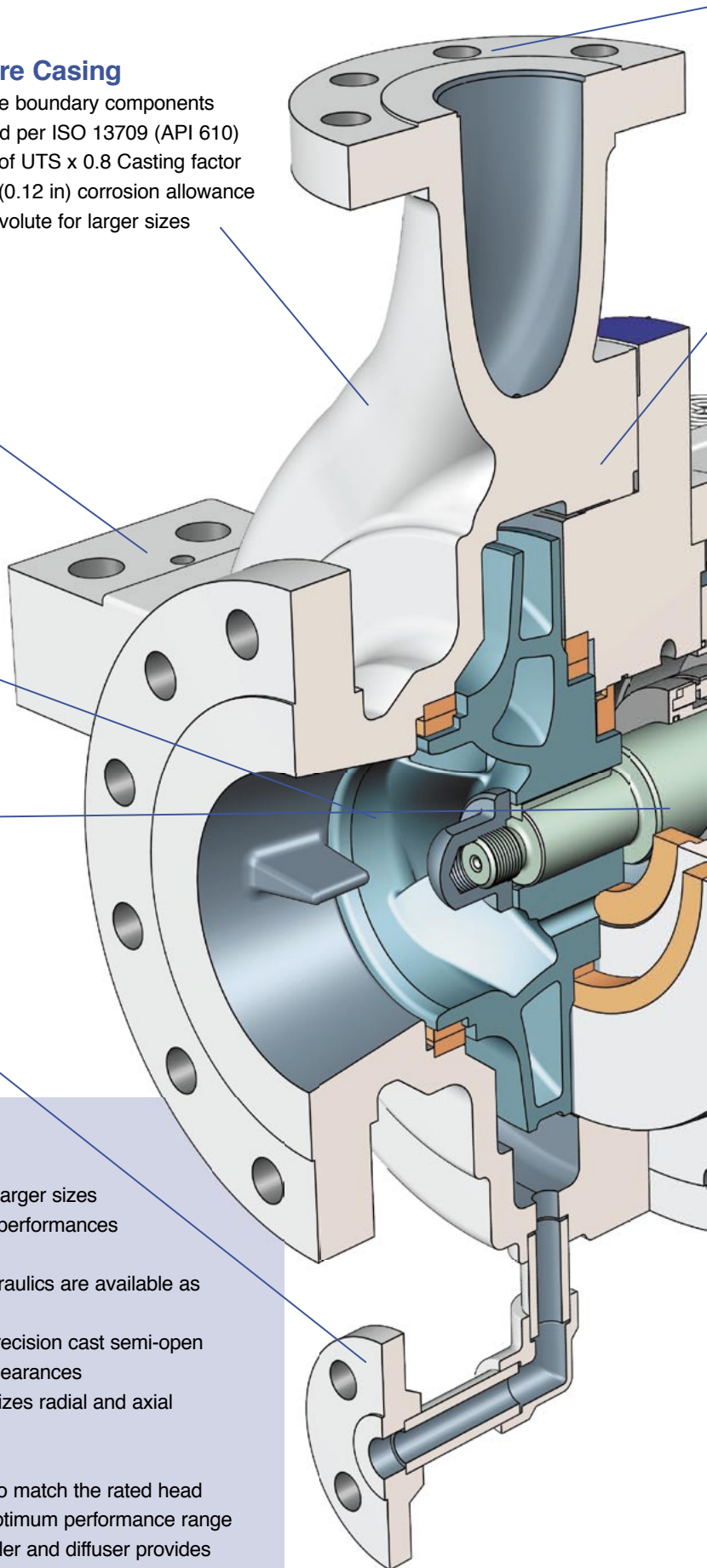
- Extra heavy duty, large diameter shaft for low shaft deflection and long life

Case Drain

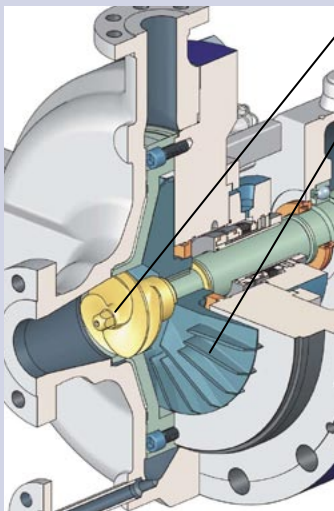
- Socket welded flanged drains are standard
- Butt welding also available
- Gussets or bracing available to suit customer specifications

Pressure Casing

- Pressure boundary components designed per ISO 13709 (API 610) to 25% of UTS x 0.8 Casting factor
- +3 mm (0.12 in) corrosion allowance
- Double volute for larger sizes



OHHL Design Features and Benefits



Inducer

- Inducer available on larger sizes for improved suction performances

Impeller

- Over 50 different hydraulics are available as standard
- Specially designed precision cast semi-open impeller with liberal clearances
- Unique design minimizes radial and axial hydraulic loads

Diffuser

- Precision machined to match the rated head and flow within the optimum performance range
- Combination of impeller and diffuser provides stable H-Q-curve

Flanges

- backfaced ANSI B16.5 300#R.F. flanges with required serrations
- ISO/DIN flanges available
- Top Suction available on OHH

Casing gasket

- Fully confined with controlled compression and metal-to-metal fit

Coupling Guard

- Standard coupling guard meets ISO 13709 (API 610), ATEX and OSHA requirements
- Other type of guards are available

Bearings

- 7300 series, heavy duty 40° angular contact thrust bearings with machined brass cages—mounted back-to-back
- Deep groove ball radial bearing with increased clearance as required by ISO 13709

Coupling

- Flexible disk spacer couplings are supplied to comply with customer and ISO 13709 requirements

Bearing Housing

- Carbon steel construction with cooling fins for improved heat dissipation
- Variety of instrumentation available for condition monitoring
- Dimples are provided for consistent location when taking vibration measurements with a portable instrument

Bearing Isolators

- Non-metallic, bronze, INPRO™ or magnetic type oil seals provided to meet a variety of customer requirements

Bearing Assembly

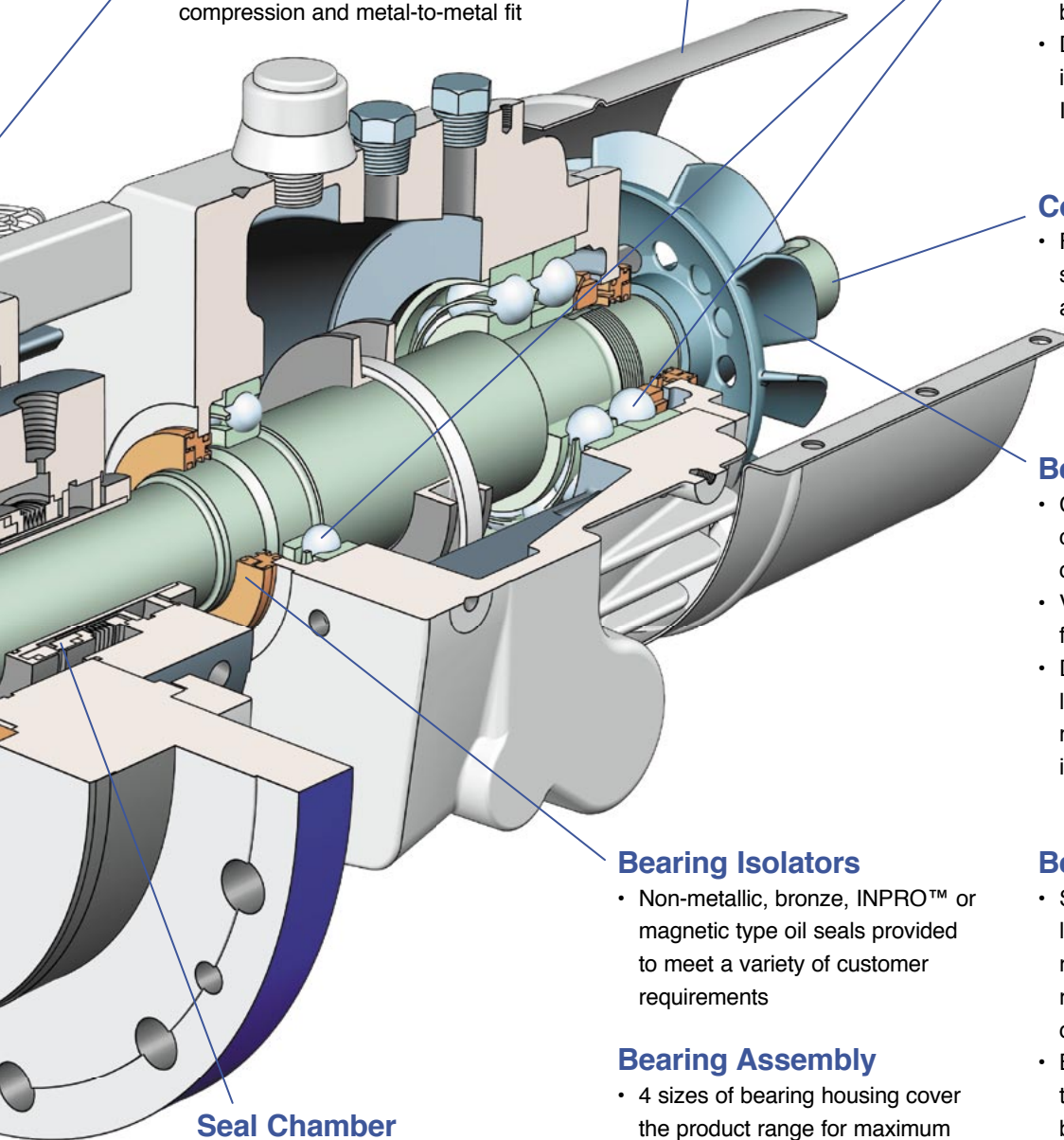
- 4 sizes of bearing housing cover the product range for maximum interchangeability
- Pre-defined list of features available to meet the most difficult operating conditions
- Low noise fan added for high ambient or high product temperatures
- Oil sump heater added for low ambient or low product temperatures

Seal Chamber

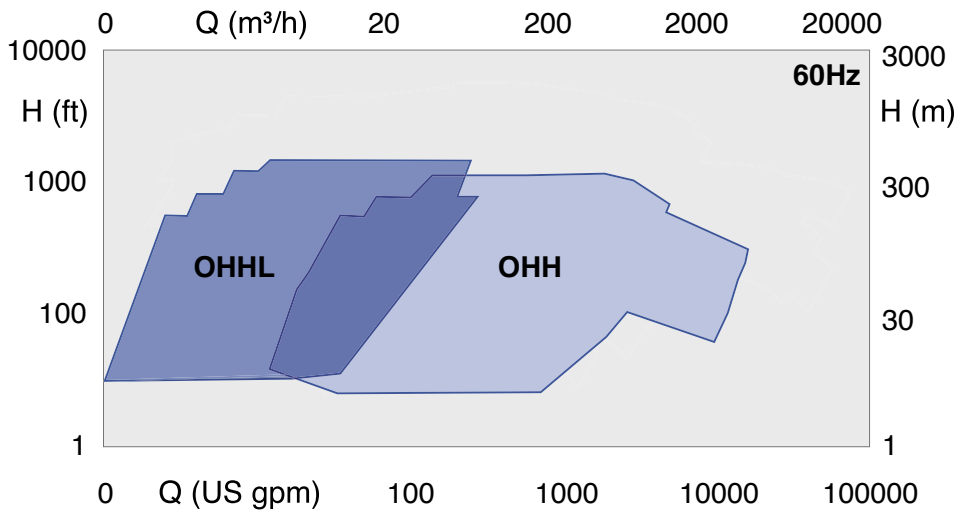
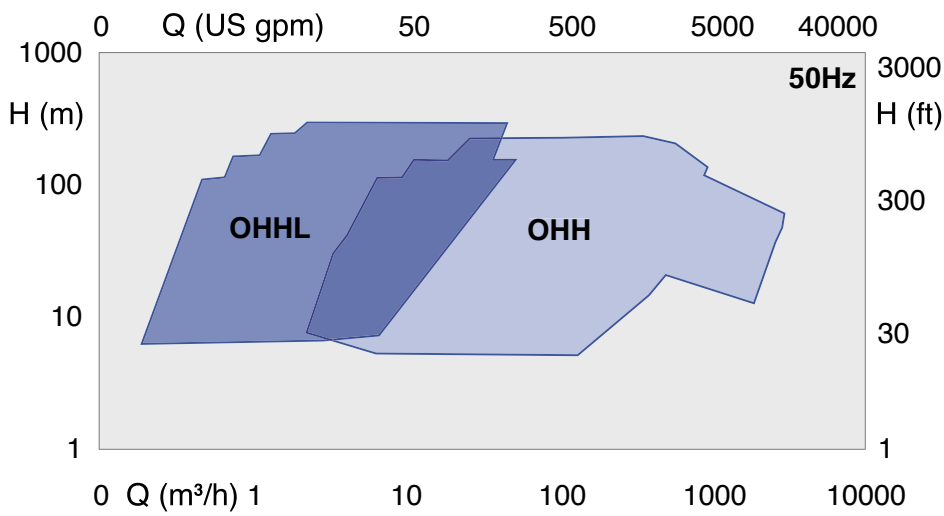
- Standardized dimensions according to ISO 21049 (API 682)
- Furnished with all ISO 21049 (API 682) piping plans for improved seal life
- Single or dual cartridge type mechanical seals available to meet all process requirements
- Standard and close clearance throat bushing for control of seal chamber pressure

Bearing Lubrication

- Standard highly effective ring oil lubrication system utilizes an oil ring mounted within a deep groove retainer that guarantees the oil ring does not become displaced
- Bearing housing oil channel routes the lubricant to the rear of each bearing to ensure positive lubrication under all conditions
- Housing is supplied with connections for purge oil mist or pure oil mist
- Oil mist ports are located on the outboard side of each bearing to ensure positive oil mist flow through each bearing



OHH and OHHL Performance Ranges



Operating Data

	OHH	
Pump Sizes	25 to 400mm	1 to 16 inches
Capacities	up to 2,250 m ³ /h	up to 10,000 usgpm
Heads	up to 360 m	up to 1,200 ft
Pressure	up to 51 bar	up to 740 psi
Temperature	-40° C to 425° C	-40° F to 800° F

	OHHL	
Pump Sizes	25 to 50mm	1 to 2 inches
Capacities	1 m ³ /h to 60 m ³ /h	4 to 260 usgpm
Heads	20 m to 450 m	65 to 1,500 feet
Pressure	up to 51 bar	up to 740 psi
Temperature	-40° C to 425° C	-40° F to 800° F

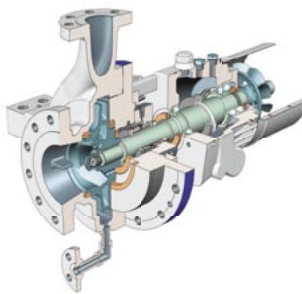
Sulzer Overhung Process Pumps Applications

Application Diversity

Sulzer Pump's heavy duty, overhung process pump product range is one of the pump industry's most versatile, serving a diverse number of applications in several market segments. Many users have a preference for its rugged centerline support, radial split casing, extra heavy shaft and ease of maintenance.

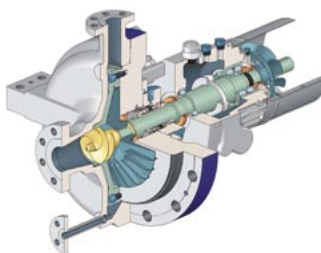
Type OHH

Overhung horizontal centerline mounted single stage, radially split ISO 13709 (API 610) process pump. Available with single, dual-pressurized and dual un-pressurized mechanical seals, including dry gas seals to the latest ISO 21049 (API 682) Seal Standard.



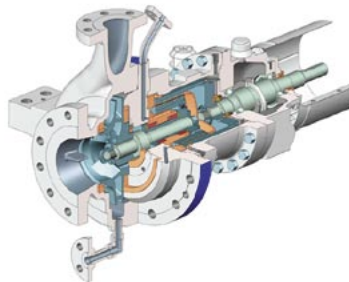
Type OHHL

The OHHL is the same rugged design with low flow hydraulics for improved hydraulic fit—even at low flow conditions.



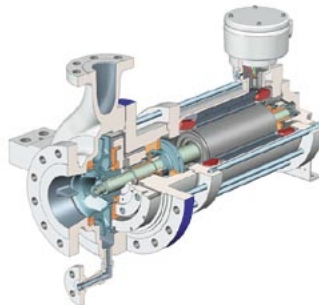
Type OHM

Utilizes the OHH hydraulic components in a fully compliant API 685 sealless magdrive pump. High efficiency magdrive and secondary containment offer improved integrity.



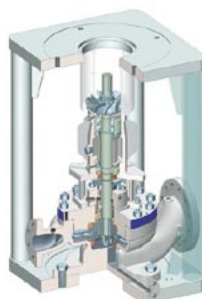
Type OHC

Utilizes the OHH hydraulic components and Hermetic's canned motor for the ultimate in sealless pump integrity. Fully compliant with API 685.



Type OHV

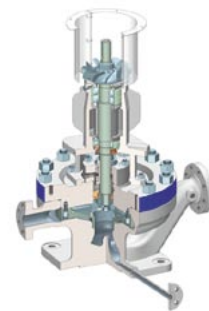
The OHV is an inline version of much of the OHH pump product line. It combines proven pump technology to create a world-class ISO 13709



(API 610) Type OH3 overhung inline pump. OHV inline pumps are designed for pumping applications covering a myriad of produced or process fluids such as produced water booster, crude oil booster, propane transfer, reflux, gas oil, etc.

Type OHVL

The OHVL is an inline version of the OHHL and covers the low flow range. It utilizes the OHHL shaft. The OHH, OHV, OHHL and OHVL all use the same rugged bearing and ISO 21049 (API 682) cartridge type mechanical seals for durability and maximum interchangeability.



Standardized Materials of construction

- S-4, S-5, S-6, C-6, S-8, S-9, A-8, D-1, D-2
- Special alloys including Alloy 20, 317L and Hastelloy
- Low temperature materials
- Sour service materials for compliance with NACE MR 01-75 or MR 01-03

Non-metallic Wear Parts:

PEEK and Graphalloy™ allowing operation with reduced internal clearances.

Abrasive Service Materials:

Unique design features plus HVOF and CVD coatings for improved life on abrasive services.



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