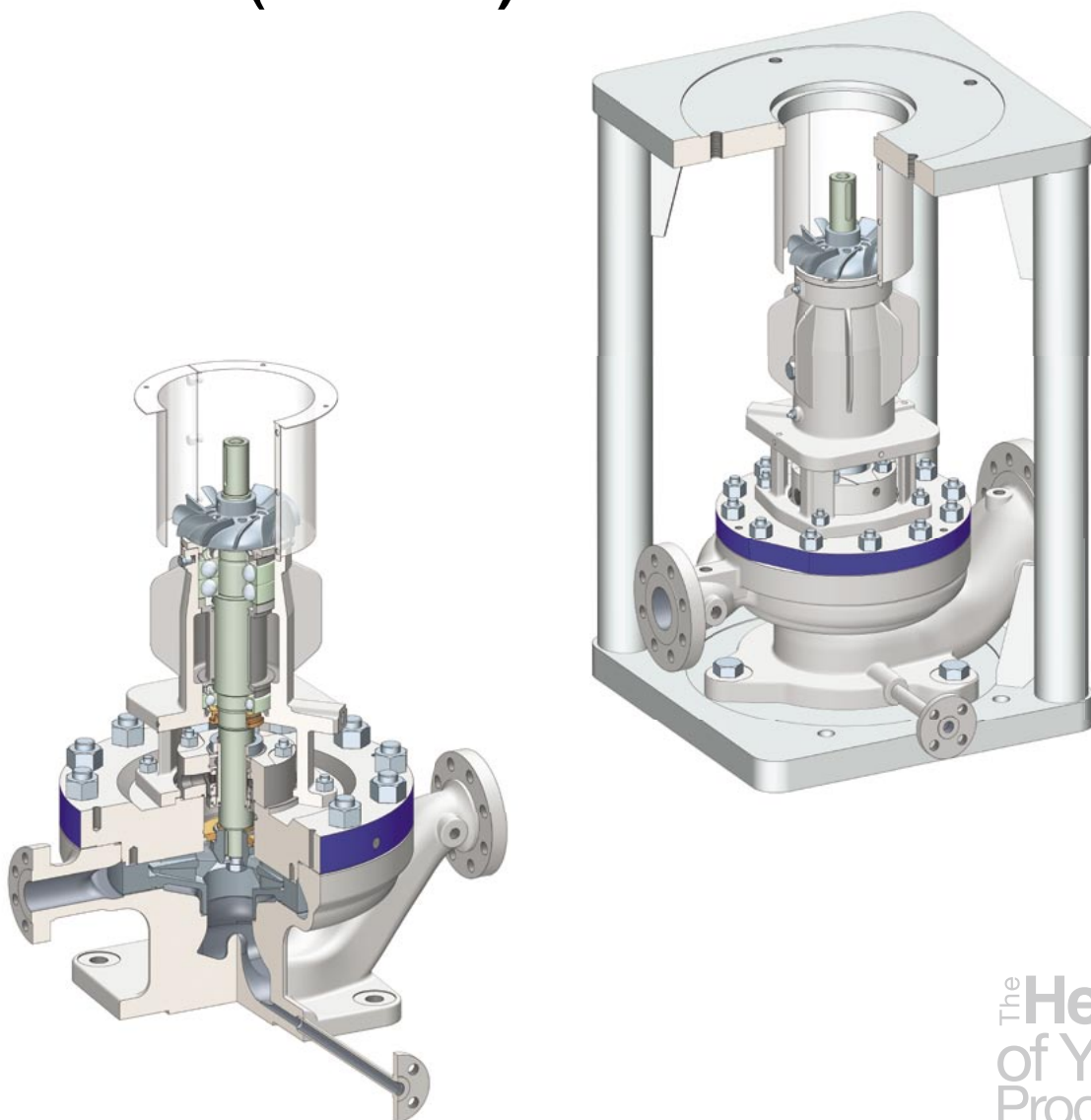
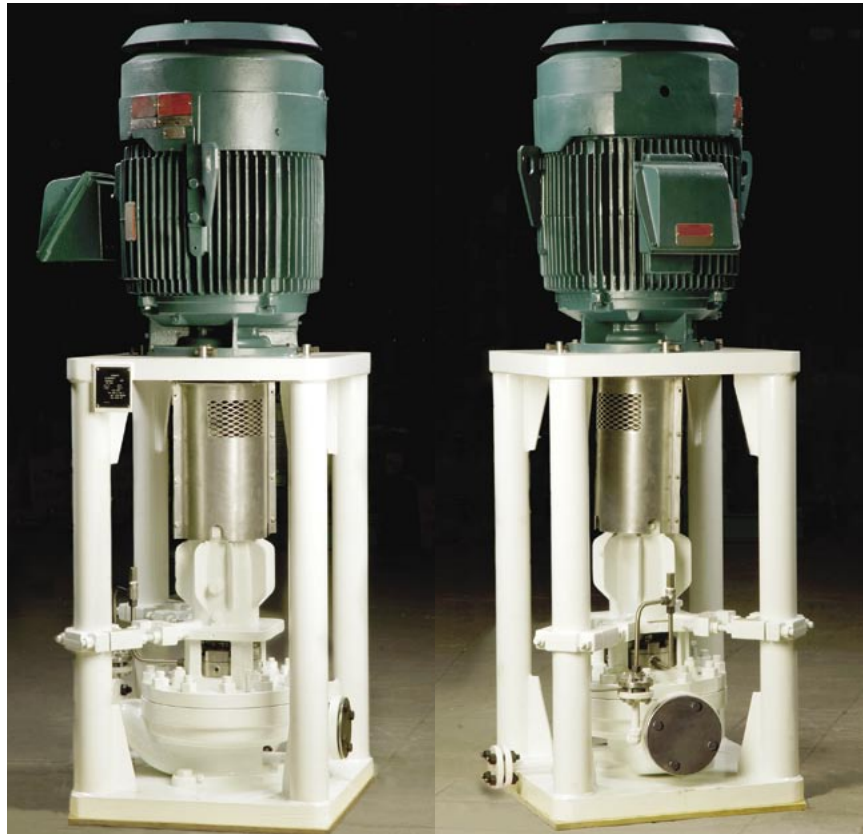


OHV and OHVL Vertical Inline Pumps ISO 13709 (API 610)



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.

Product Development

The OHV incorporates the shaft and hydraulic components of the OHH creating an inline pump that provides hydraulic coverage which duplicates a large portion of the OHH hydraulic map. It combines the proven pump technology from North America and Europe to create a world-class ISO 13709 (API 610) Type OH3 overhung inline pump. Most sizes of the OHV are designed for 51 Bar (740 psi) with 41 Bar (600 psi) on larger sizes. It is engineered and manufactured to meet not only the ISO 13709 (API 610) specifications but also many customer specifications as well. The result is added reliability and ruggedness.

Sulzer Pumps' desire to provide complete hydraulic range coverage prompted development of the OHVL, or low flow version of the OHV. The OHVL utilizes the OHV bearing housing and vertical bearing isolators. These proven components and design are matched to the unique low flow impellers, diffusers and shafts of the OHHL to create an inline pump that duplicates the hydraulic map of the horizontal design.



Engineered to meet the demands of the industry

Application Range

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. They are often installed in:

- Refineries
- Petrochemical plants
- Gas processing plants
- Bitumen processing plants
- Offshore oil production platforms or FPSOs

The small footprint of the OHV inline pump means a smaller foundation or no foundation at all. As more and more process plants are being built in modules, pumps are no longer being grouted to a large foundation—they are simply bolted to a wide flange beam that is the module frame.

That drastically reduces installation time and plant capital cost. It also means that the modules can be constructed in convenient locations and then the modules are installed quickly at jobsites in remote locations. Since pumps are the second most common piece of rotating equipment behind electric motors, the OHV's design greatly facilitates plant modularization and reduces installed cost.

Design

The OHV is an inline pump design that provides much of the OHH hydraulic coverage. The pressure containing components are designed to the same rigorous standard of ISO 13709 (API 610). Most sizes of the OHV are designed for 51 Bar (740 psi) and 41 Bar (600 psi) on larger sizes—per ISO 13709 (API 610). The impellers

and wear rings are interchangeable with the OHH pumps on all but a few sizes. The OHH shafts and bearings are used. The same single, dual, or dual pressurized OHH mechanical seals, and the same couplings may be used also. Grease or pure oil mist lubrication is offered.

The driver support stand is designed to assure that natural frequencies are well away from operating speeds. Horizontal driver jackscrews are suggested to assist with final alignment. The cylindrical coupling guard meets OSHA standards and can easily be supplied to meet ATEX standards. NEMA P-base, HP frame, vertical inline motors are normally furnished.

OHV Design Features and Benefits

Shaft

- Fully machined
- Large diameters
- Low stresses
- Very low deflection
- Interchangeable with OHH

Seal Chamber

- Complies with ISO 13709 (API 610)
- Utilizes ISO 21049 (API 682) full cartridge seals for ease of replacement; seals are interchangeable among OHH, OHHL, OHV, and OHVL
- Single, dual, dual pressurized and gas secondary seals available
- All seal flush systems available for longer seal life

Wear Parts

- Casing and impeller wear rings available
- Interchangeable with OHH on all but a few sizes
- Variety of materials and hard surfacing available for enhanced life

Casing

- All standard ISO 13709 (API 610) materials from S-4 to D-2
- Other materials and/or NACE compliant materials available
- Single volute on smaller sizes, dual volute on larger sizes
- Designed to 25% of ultimate tensile stress and 0.8 casting factor, 3 mm (0.12") corrosion allowance, 2 times ISO 13709 (API 610) Table 4 nozzle loads
- 300# R.F. flanges and flanged drain are standard

Bearing Housing

- Finned carbon steel for added heat dissipation
- Grease fittings or oil mist taps are standard

Bearings

- Interchangeable with OHH, OHHL, and OHVL
- 7300 series 40° angular contact, thrust bearing with machined brass cages
- 6200 series ball radial bearing with C-3 clearances—per ISO 13709 (API 610)

Bearing Isolators

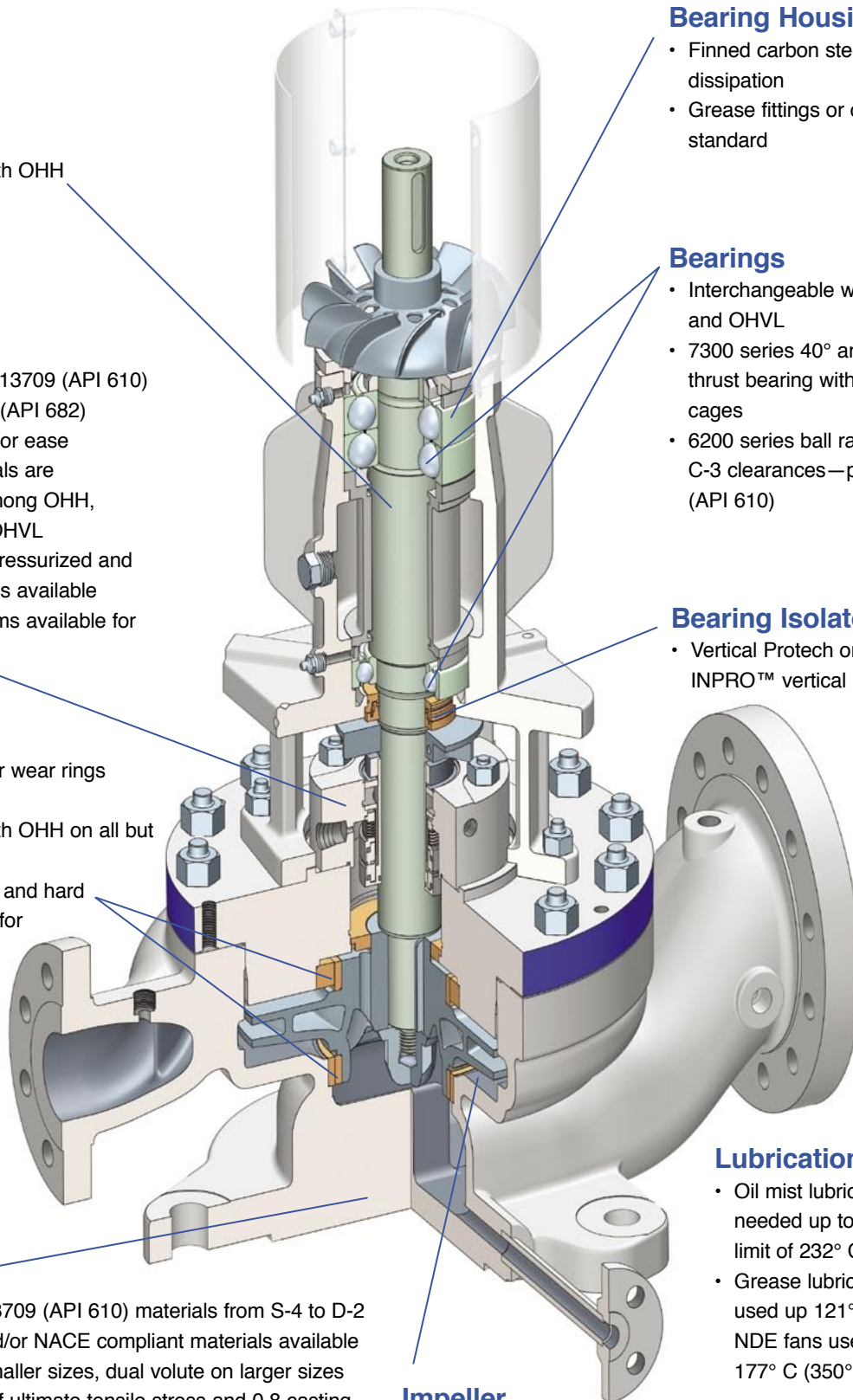
- Vertical Protech or optional INPRO™ vertical isolators

Lubrication/Cooling

- Oil mist lubrication—no fan cooling needed up to pump temperature limit of 232° C (450° F)
- Grease lubrication—drive end fan used up 121° C (250° C); DE and NDE fans used to grease limit of 177° C (350° F)

Impeller

- High efficiency enclosed design
- Standard Nss of 11,000 or less
- Optional low NPSHr design for most larger sizes
- Wide performance range



OHVL Design Features and Benefits

Diffuser

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

Bearing frame, Shaft and Casing Cover

- Bearing housing and bearing isolators interchangeable with OHV—shaft and casing cover interchangeable with OHHL

Impeller

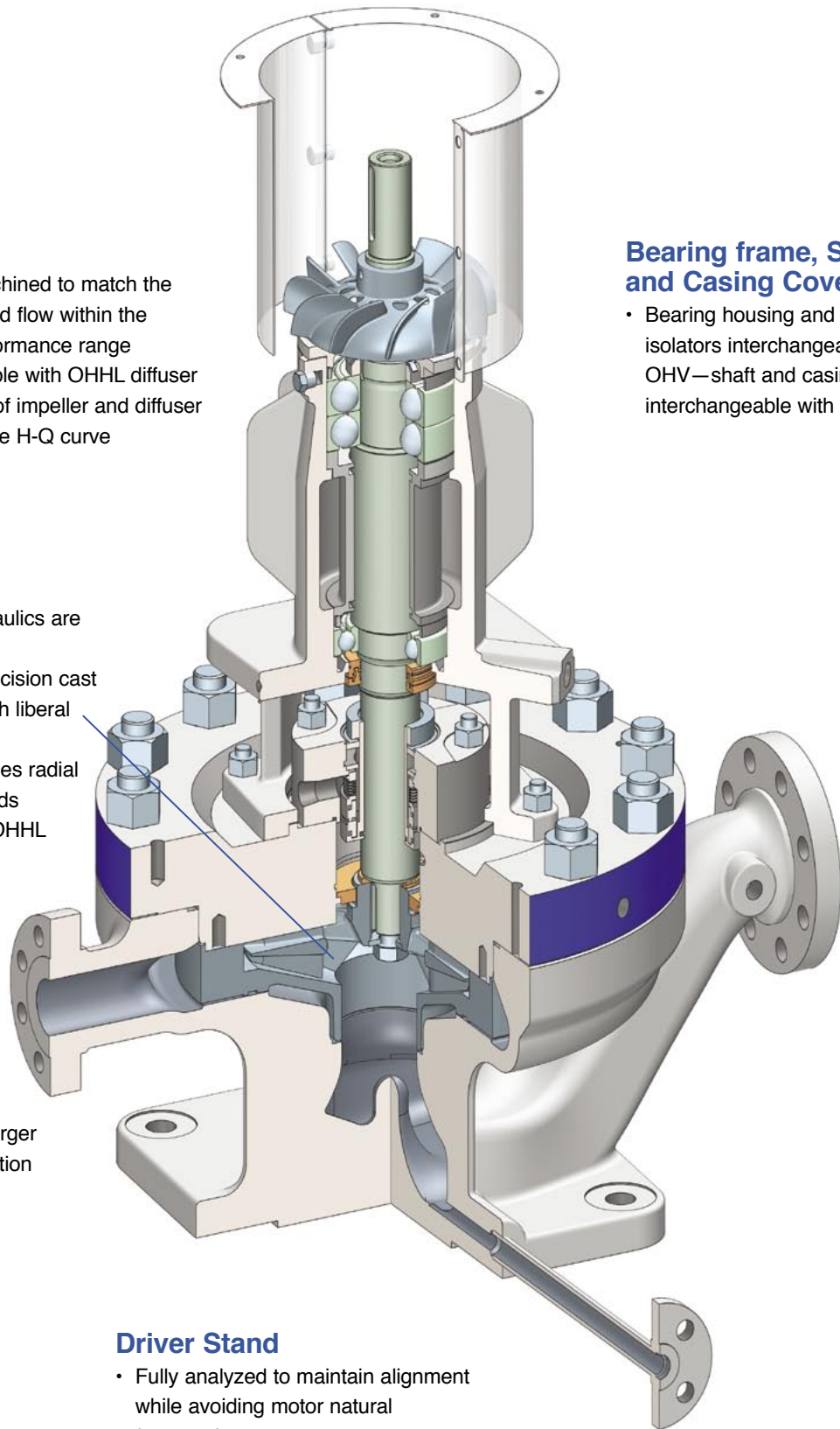
- Over 50 different hydraulics are available as standard
- Specially designed precision cast semi-open impeller with liberal clearances
- Unique design minimizes radial and axial hydraulic loads
- Interchangeable with OHHL impeller

Inducer

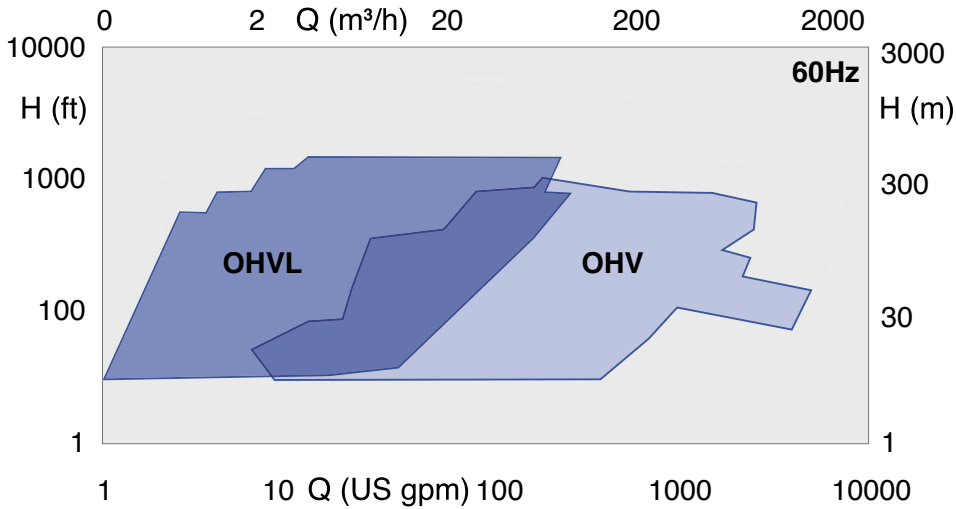
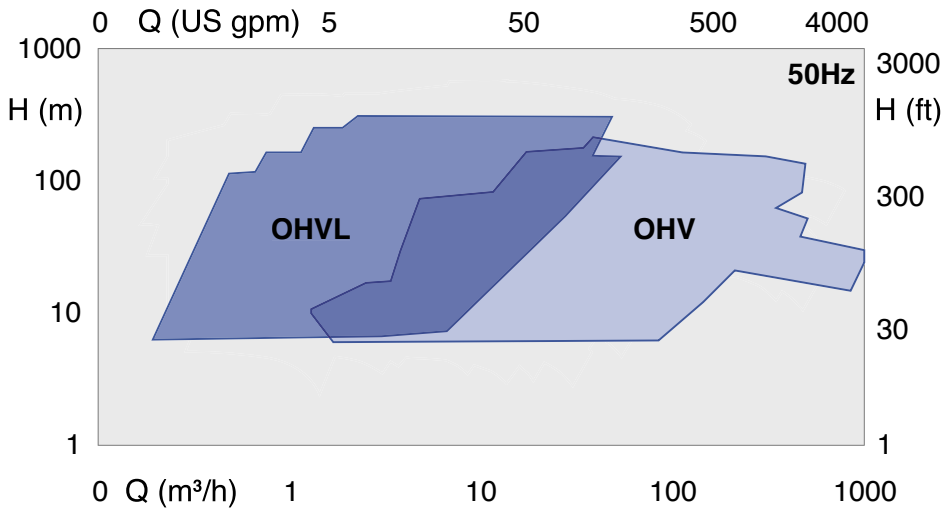
- Inducer available on larger sizes for improved suction performance

Driver Stand

- Fully analyzed to maintain alignment while avoiding motor natural frequencies



Performance Range



Operating Data

	OHV	
Pump Sizes	25 to 250 mm	1 to 10 inches discharge sizes
Capacities	up to 1,150 m³/h	up to 5,000 usgpm
Heads	up to 250 m	up to 820 ft
Pressure	up to 51 bar	up to 740 psi
Temperature	-40° C to 230° C	-40° F to 450° F

	OHVL	
Pump Sizes	25 to 50 mm	1 to 2 inches
Capacities	1m³/h to 60 m³/h	4 to 260 usgpm
Heads	up to 450 m	65 to 1,500 ft
Pressure	up to 51 bar	up to 740 psi
Temperature	-40° C to 230° C	-40° F to 450° F

OHV and OHVL Design Features and Benefits

Feature	Benefit
Inline design	<ul style="list-style-type: none"> Minimal footprint saves space Can float with piping—decreases distortion caused by thermal expansion and contraction Able to be bolted to module frame for reduced installation cost Inline nozzles absorb more loads easily—2 times ISO 13709 (API 610) Table 4 nozzle load capability is standard
Heavy Wall Pressure Casing and 300# R.F. flanges	<ul style="list-style-type: none"> Conservative design for long life Materials: S-5, S-6, S-8, S-9, C-6, A-8, D-1, D-2 commonly supplied. Other materials available on special order ISO 13709 (API 610) compliant
Dual volute in larger size	<ul style="list-style-type: none"> Dual volute in larger sizes decreases radial loads for longer bearing life. Reduces shaft deflection for longer seal and wear ring life
Mechanical Seals and Seal Chamber	<ul style="list-style-type: none"> Single, dual, dual pressurized, non-contacting gas secondary—all types of ISO 21049 (API 682) cartridge seals may be used Seals are interchangeable with OHH for reduced inventory Large seal chamber bore improves face cooling for longer life Variety of ISO/API seal support systems and flush piping available Seal pots and coolers mounted on separate stands to improve maintenance access to seals and back pullout assembly Seal chamber is ISO 13709 (API 610) compliant
Impeller	<ul style="list-style-type: none"> OHV - enclosed for improved efficiency OHVL - semi-open for capacity control. Both are balanced to ISO 1940-1 Grade G2.5 (optional G1.0 or 4W/n)
Wear parts	<ul style="list-style-type: none"> Minimum of 12 % chrome wear rings for improved life Sulzer exclusive material combinations for improved resistance to galling based upon extensive wear tests of hundreds of different materials Non-metallic wear rings (Carbon, PEEK, etc.) and reduced clearances offered on clean fluids for improved efficiency OHVL - large clearance between impeller and diffuser for thermal tolerance
Heavy duty shaft	<ul style="list-style-type: none"> Large diameter shaft for reduced deflection Improved seal and wear ring life Variety of materials for improved corrosion resistance and high torque capacity OHV shaft is interchangeable with OHH; OHVL shaft is interchangeable with OHHL
Bearings	<ul style="list-style-type: none"> 40° angular contact 7300 series thrust bearings with machined brass cages 6200 series ball radial bearings with C-3 clearances Some applications have L-10 Life > 1,000,000 hours Interchangeable with OHH for reduced inventory needs
Bearing isolators	<ul style="list-style-type: none"> ProTech or optional INPRO™ bearing isolators designed for vertical application with grease or oil mist lubrication systems
Coupling	<ul style="list-style-type: none"> Same Metastream TSCS, Thomas 71 or Kopflex KD-2 non-lubricated couplings used for OHH/OHHL pumps are used on OHV/OHVL
Driver	<ul style="list-style-type: none"> NEMA standard P-Base HP frame motors with solid shaft are required to meet ISO 13709 (API 610) motor vibration limits
Driver Support Stand	<ul style="list-style-type: none"> Heavy fabricated support stand maintains alignment between pump and driver FEA analyzed for natural frequencies and vibration to assure compliance with ISO 13709 (API 610) Pre-drilled for optional Sulzer Back Pullout System to aid in pump maintenance



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