



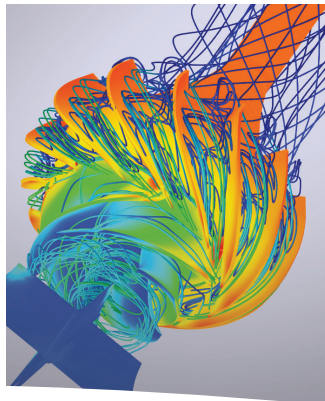
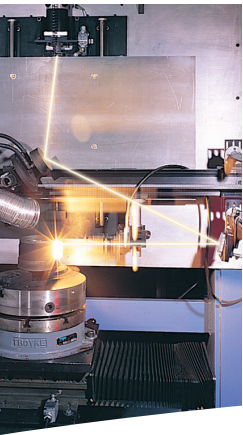
HWX

Vertical In-Line Process Pumps

ISO 13709/API 610 (OH3)



Experience In Motion



Pump Supplier to the World

Flowserve is the driving force in the global industrial pump marketplace. No other pump company in the world has the depth or breadth of expertise in the successful application of pre-engineered, engineered, and special purpose pumps and systems.

Life Cycle Cost Solutions

Flowserve provides pumping solutions that permit customers to reduce total life cycle costs and improve productivity, profitability and pumping system reliability.

Market-Focused Customer Support

Product and industry specialists develop effective proposals and solutions directed toward market and customer preferences. They offer technical advice and assistance throughout each stage of the product life cycle, beginning with the initial inquiry.

Broad Product Lines

Flowserve offers a wide range of complementary pump types, from pre-engineered process pumps to highly engineered and special purpose pumps and systems. Pumps are built to recognized global standards and customer specifications.

Pump designs include:

- Single-stage process
- Between bearings single-stage
- Between bearings multistage
- Vertical
- Submersible motor
- Positive displacement
- Nuclear
- Specialty

Product Brands of Distinction

ACEC™

Aldrich™

Byron Jackson®

Calder™ Energy Recovery Devices

Cameron™

Durco®

Flowserve®

HALBERG™

IDP®

INNOMAG®

Lawrence Pumps®

Niigata Worthington™

Pacific®

Pleuger®

Scienco™

Sier-Bath®

SIHI®

TKL™

United Centrifugal®

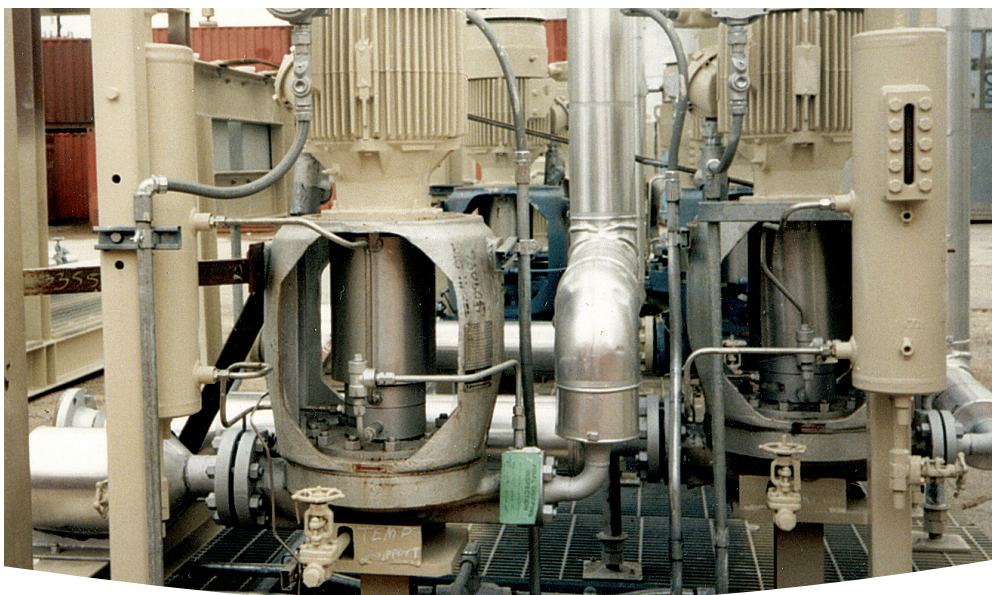
Western Land Roller™

Wilson-Snyder®

Worthington®

Worthington Simpson™

HWX
Vertical In-Line Process Pumps
 ISO 13709/API 610 (OH3)



First Choice for Vertical In-line Pumping

The HWX pump is the ISO 13709/API 610 latest edition type OH3, bearing housing design and space-saving in-line alternative for many overhung process pumps in upstream and downstream services. The most stringent emissions containment is achieved as the ISO 21049/API 682 seal chambers accommodate all mechanical seal styles, including advanced gas barrier seal technology.

The HWX pump is the industry leader for these reasons:

- Robust construction to meet pressure, temperature, nozzle loading and safety considerations required by ISO 13709/API 610 and other industry or user specifications
- Most comprehensive hydraulic coverage in the industry
- Variety of materials and bearing housing lubrication options
- Completely removable, back pull-out design

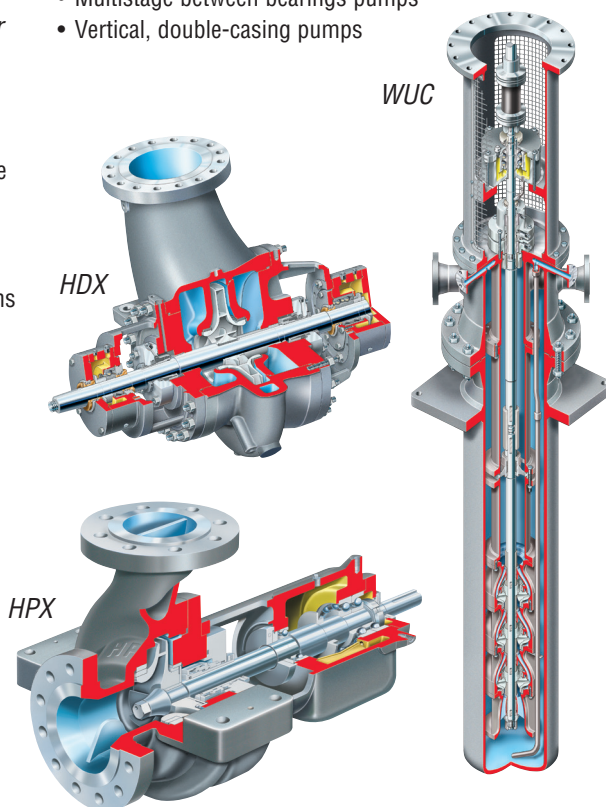
Applications

- Petroleum refining, production and distribution
- Petrochemical processing
- Heavy-duty chemical processing
- Gas industry services
- Boiler circulation
- Water services
- High-temperature applications
- General industrial

Complementary Pump Designs

HWX pumps may be used with other Flowserve models of API design, including:

- Single-stage, horizontal overhung pumps
- Single- and two-stage between bearings pumps
- Multistage between bearings pumps
- Vertical, double-casing pumps



HWX
Vertical In-Line Process Pumps
 ISO 13709/API 610 (OH3)

The Flowserve HWX pump line meets or exceeds the rigorous requirements of ISO 13709/API 610, latest edition. It encompasses a family of 11 distinct designs, providing the most comprehensive range of pump configurations and hydraulic coverage available to the industry. These space-saving pumps are engineered and built for reliable and safe performance in high-temperature and high-working pressure services.

Operating Parameters

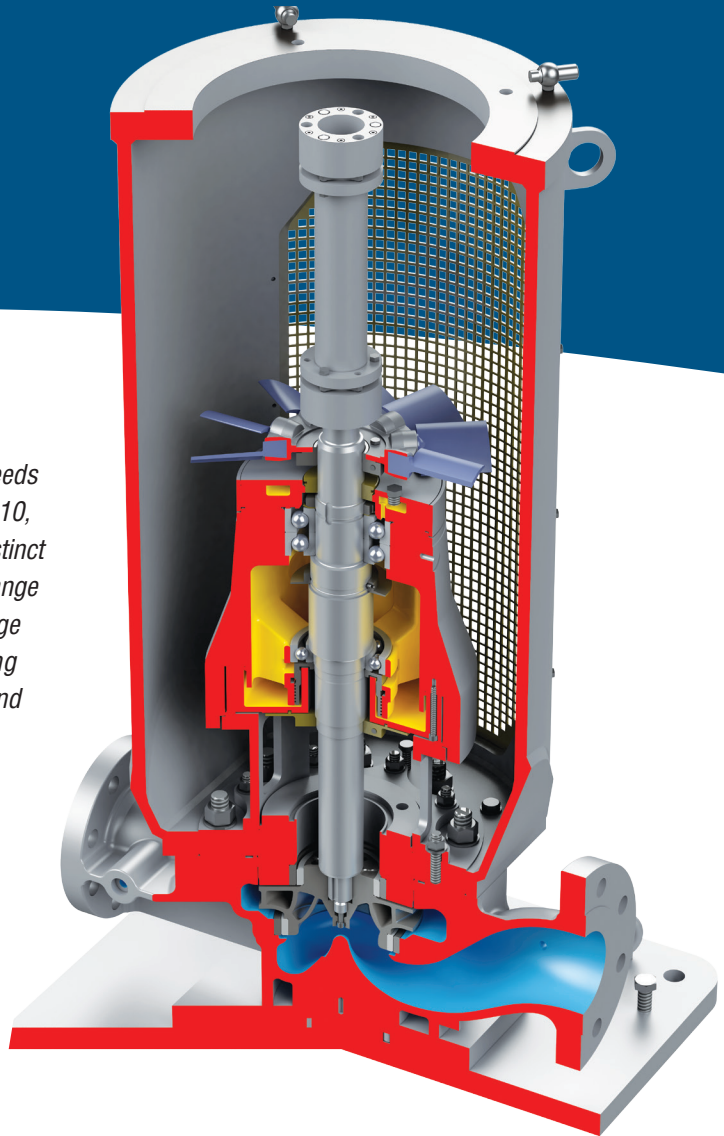
- Flows to 1300 m³/h (5725 gpm)
- Heads to 370 m (1215 ft)
- Temperatures from -46°C (-50°F) to 400°C (750°F)
- Pressures to 42 bar (600 psi)

Features and Benefits

Raised Face Flanges are to ASME B16.5 for Class 300. Surface finish meets ISO 13709/API 610 standard. ISO flanges and flanges with JIS drilling are available.

Pump Casing and Cover feature metal to metal fit with fully confined, controlled compression gasket to ensure proper sealing and alignment.

Motor Support Head is heavy-duty design with a registered fit motor mount. Generous sized open compartments allow easy access to all bolting and removal of the complete pumping assembly, including mechanical seal, without removal of casing. Accommodates NEMA, IEC and existing C-face and P-base field drivers.



Stiff Shaft Design limits maximum deflection at seal faces to 0.05 mm (0.002 in). Shaft stiffness factors (L^3/D^4) are the best in the industry.

ISO 21049/API 682 Seal Chamber accommodates a wide variety of seal configurations, including dual-pressurized and unpressurized cartridge types for the most severe services. A full complement of ISO 13709/API 610 seal flush plans is available.

Fan cooling¹ of bearing housing permits handling of extreme temperatures without the need for cooling water.

¹ Not applicable or needed for oil mist designs



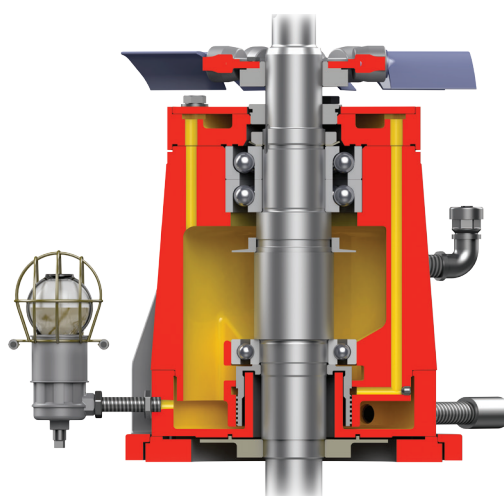
Reliability, Maintenance and Safety Enhancing Design Features

- **Cartridge Seal Mounting** assures ease of maintenance and precise seal face setting for maximum seal life.
- **Dynamically Balanced Impeller** limits vibration and assures smooth operation over a wide flow range.
 - Casting techniques and manufacturing processes for fine finish and high efficiency
 - Positively locked, anti-rotation impeller nut with threads are unexposed to pumped liquid.
- **Standardized Mounting Plate** is provided to maintain the API 3:1 ratio from the unit center of gravity to prevent tipping. Larger plates provided as required to accommodate mounting of seal pot assemblies and heat exchangers.
- **Back Pull-out** of rotating assembly simplifies maintenance, as neither the motor nor piping connections are disturbed.
- **Coupling Guard** is provided to enclose the coupling, pump shaft and motor shaft areas.
- **Renewable Wear Rings** for both casing and impeller reduce replacement cost.
 - Secured by axial screws, with option for tack welding
 - Back wear ring standard

Bearing Housing Design

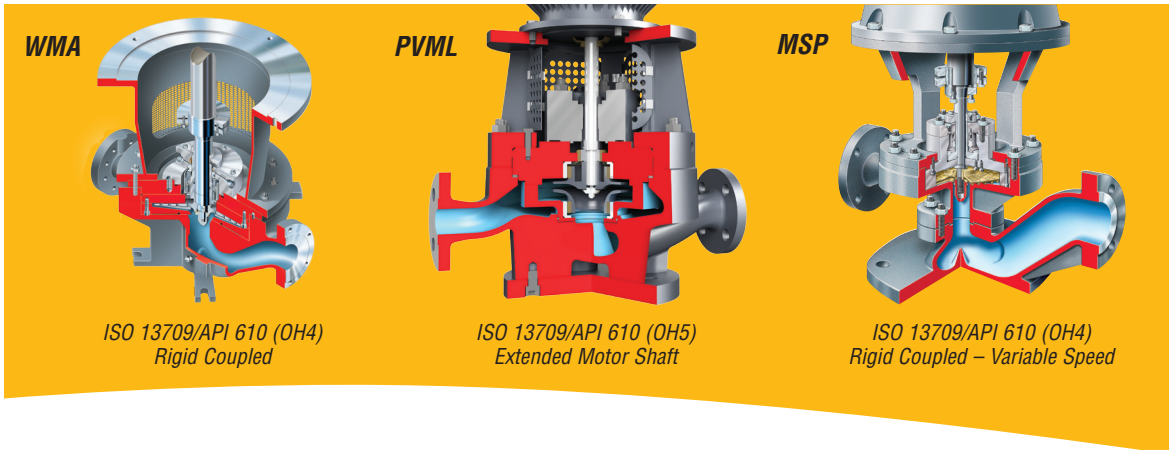
Flowserve offers a choice of two bearing lubrication types: oil cascade up to 260°C (500°F) and oil mist up to 400°C (752°F). Both have a top bearing isolator and use a flexible disc spacer coupling design. For temperatures above 150°C (302°F), the oil sump bearing housings are cooled using a standard fan air cooling.

Only two bearing housing frames and bearing sets are used for all HWX sizes.



Oil cascade design detail

**Options and
Technical Data**



Available In-Line Designs

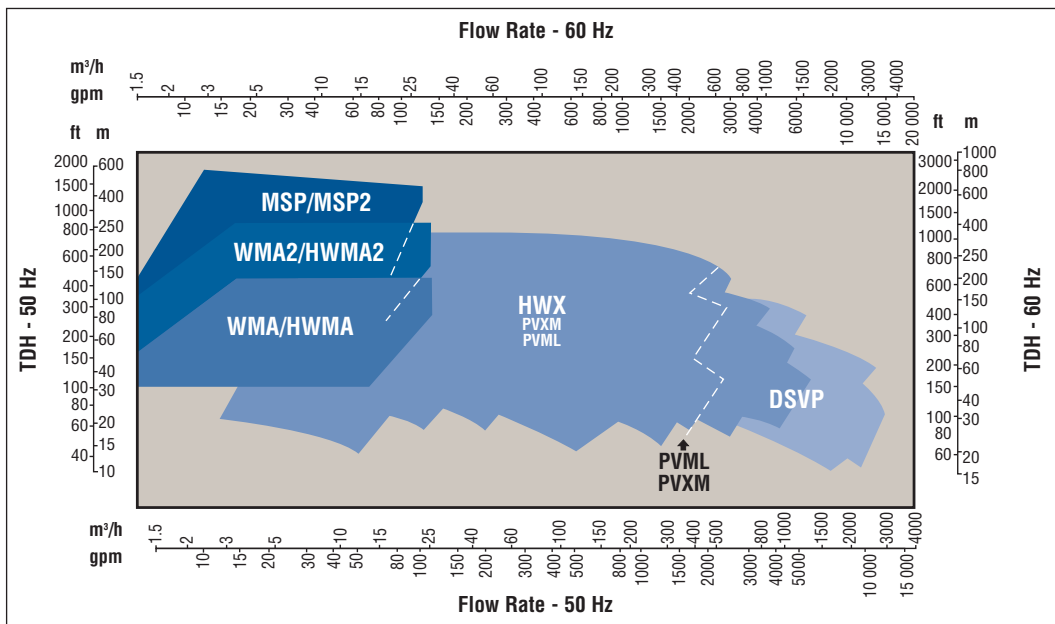
Flowserve offers vertical in-line pumps in all configurations and sizes to meet all service conditions, preferences and budgets.

Each model is fully compliant with ISO 13709/API 610, latest edition.

Options include customized hydraulics, using volute inserts/diffusers, radial blade impellers, inducers and double-suction impellers.

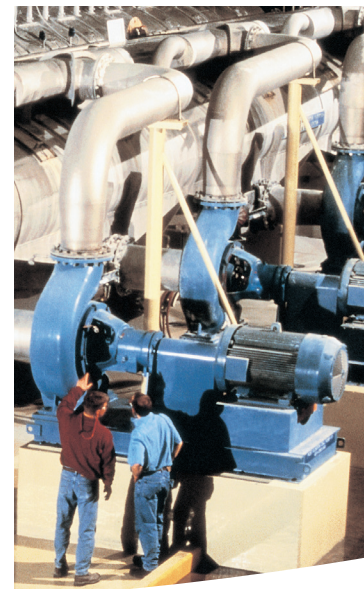
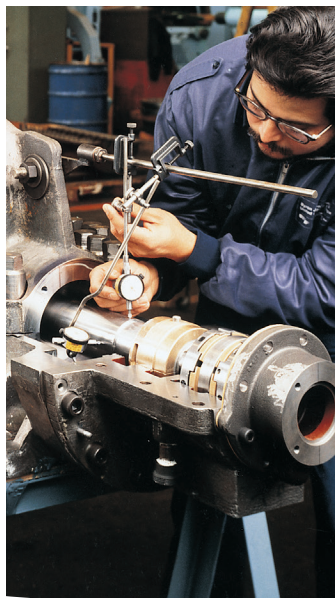
API Code	Design Type	Single-Stage	Two-Stage
OH3	Flexible Coupled With Pump Bearing Housing	HWX	
		PVXM	
	Flexible Coupled With Pump Bearing Housing, Low Flow Impeller, Volute Insert	HWMA	HWMA2
OH4	Rigid Coupled Fixed Speed	WMA	WMA2
	Rigid Coupled Variable Speed Low Flow/High Head With VFD	MSP	MSP2
	Rigid Coupled Double-Suction Impeller	DSVP	
OH5	Extended Motor Shaft Diffuser Casing	PVML	

HWX Range Chart



PRODUCT Code

**Global Service
and Technical
Support**



Life Cycle Cost Solutions

Typically, 90% of the total life cycle cost (LCC) of a pumping system is accumulated after the equipment is purchased and installed. Flowserve has developed a comprehensive suite of solutions aimed at providing customers with unprecedented value and cost savings throughout the life span of the pumping system. These solutions account for every facet of life cycle cost, including:

Capital Expenses

- Initial purchase
- Installation

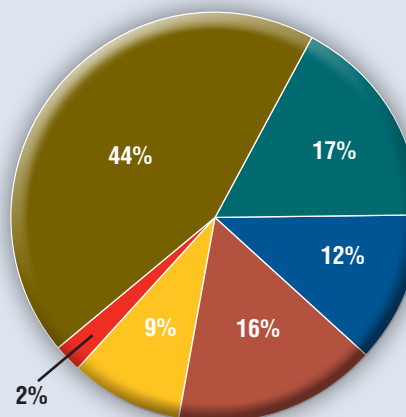
Operating Expenses

- Energy consumption
- Maintenance
- Production losses
- Environmental
- Inventory
- Operating
- Removal

Innovative Life Cycle Cost Solutions

- New Pump Selection
- Turnkey Engineering and Field Service
- Energy Management
- Pump Availability
- Proactive Maintenance
- Inventory Management

Typical Pump Life Cycle Costs¹



- Energy
- Maintenance and Repair
- Loss of Production
- Purchase and Installation
- Operational
- Decontamination and Removal

¹ While exact values may differ, these percentages are consistent with those published by leading pump manufacturers and end users, as well as industry associations and government agencies worldwide.



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