



**HWM**  
**HWM2**

*ISO 13709/  
API 610 (OH3)  
Pump Bearing Frame*

**WM**  
**WM2**

*ISO 13709/  
API 610 (OH5)  
Close Coupled*

*Vertical In-Line, One- and  
Two-Stage, Low-Flow,  
High-Head Process Pumps*

## **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.*

### **Pumping Solutions**

Flowserve is providing pumping solutions which permit customers to continuously 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 inquiry.



### **Dynamic Technologies**

Flowserve is without peer in the development and application of pump technology, including:

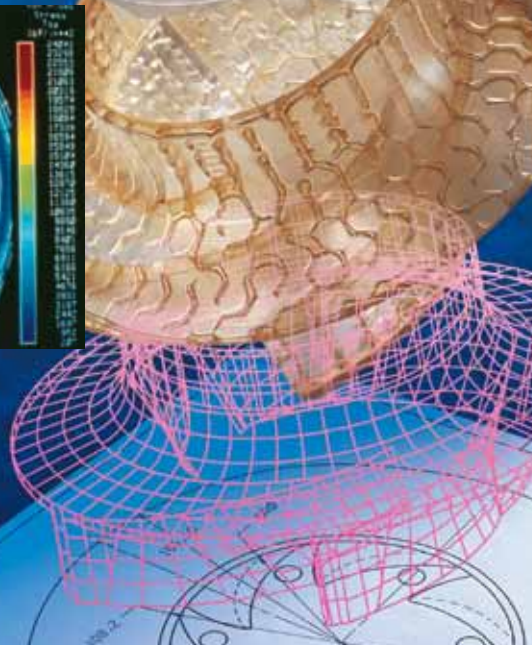
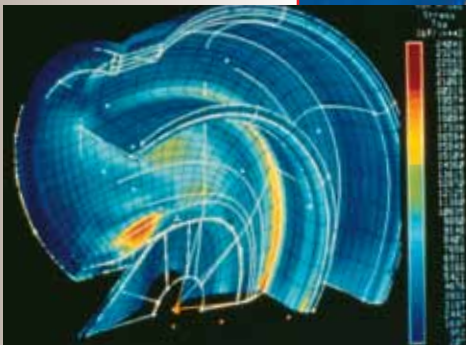
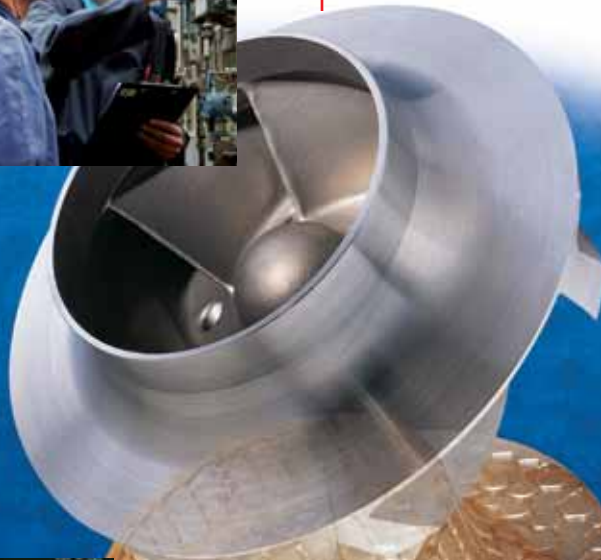
- Hydraulic engineering
- Mechanical design
- Materials science
- Intelligent pumping
- Manufacturing technology

### **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
- Rotary
- Reciprocating
- Nuclear
- Specialty





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**Close Coupled**

**One- and Two-Stage,  
 Low-Flow, High-Head  
 Vertical In-Line,  
 Process Pumps**

**The Choice for Modular  
 Low-Flow Vertical  
 In-line Pumping**

The single-stage HWM and the two-stage HWM2 are the OH3 bearing housing designs to the latest edition of ISO 13709/API 610. They are space-saving, low-flow alternatives for many overhung process pumps in upstream and downstream services.

The single-stage WM and the two-stage WM2 are the OH5, direct coupled versions to the latest edition of ISO 13709/API 610. These offer the same space-savings benefits of all Flowserve in-line models.

As part of the Flowserve HWX family of in-line pumps, these four models provide the most comprehensive hydraulic range of low flows and medium to high heads available to the industry. The modular design provides more than 100 BEP fits in one pump size, thereby permitting precise selection for best operating efficiency. All models are available with an optional inducer for reduced NPSHR.

The most stringent emissions containment is achieved as the ISO 21049/API 682 seal chambers accommodate all conventional single and dual mechanical seal styles.

The WM, HWM, WM2 and HWM2 pumps are the industry leaders for these reasons:

- Hydraulic superiority for low-flow applications
- Robust construction to meet or exceed ISO 13709/API 610, latest edition criteria
- Increased MTBF and best life cycle cost by operating pump at customized BEP
- No need to select pump far back on curve or use orifice for low-flow services
- Replaceable volute inserts to accommodate future system changes
- Complete back pullout OH3 design
- Simple two-stage design for high heads without need for gearbox
- Engineered and built for reliable and safe performance in cryogenic and high-temperature services

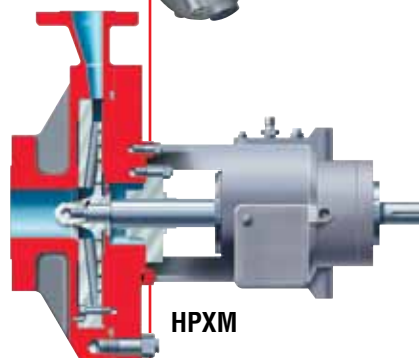
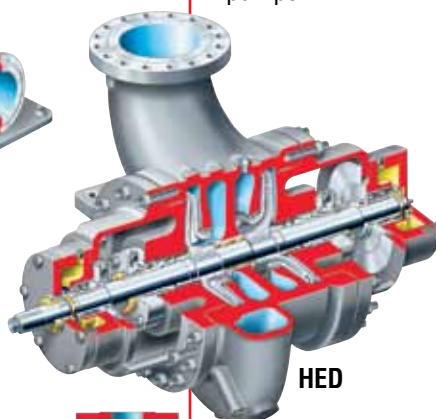
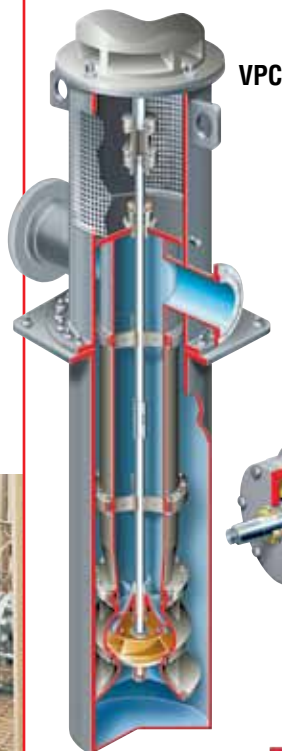
**Broad Application**

- Petroleum refining, production and distribution
- Petrochemical and heavy-duty chemical processing
- Gas industry services
- Boiler circulation and other high-temperature services
- Water and general industrial pump

**Complementary Pump Designs**

HWM and WM one- and two-stage pumps may be used with other Flowserve models of API design. These include:

- Single-stage, horizontal overhung pumps, including the centerline mounted HPXM, which features hydraulics identical to the HWM and WM models
- Single- and two-stage between bearings pumps
- Multistage between bearings pumps
- Vertical, double-casing pumps



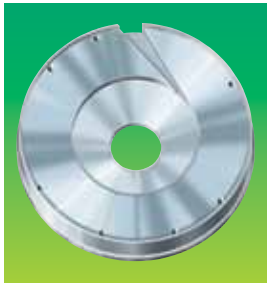
**HWM, HWM2**

**ISO 13709/  
API 610 (OH3)  
Pump Bearing Frame**

**WM, WM2**

**ISO 13709/  
API 610 (OH5)  
Close Coupled**

**One- and Two-Stage,  
Low-Flow, High-Head  
Vertical In-Line,  
Process Pumps**



**Volute Inserts**, replaceable for future hydraulic customizing, are individually engineered and machined for specified head-flow requirements. The volute inserts for the two-stage designs have cutwaters 180° apart for equalized radial thrust.



**Optional Inducers** are available for low NPSH requirements.

**Modular Pump Hydraulic Features**

The Flowserve WM, WM2, HWM and HWM2 in-line pumps, designed to ISO 13709/API 610, latest edition requirements, answer industry's need for stable and efficient low flow pumping. The rated flow is at least 80% of the pump's BEP even at extremely low flows. Over 100 precision machined impeller and volute insert combinations are contained within one pump size for:

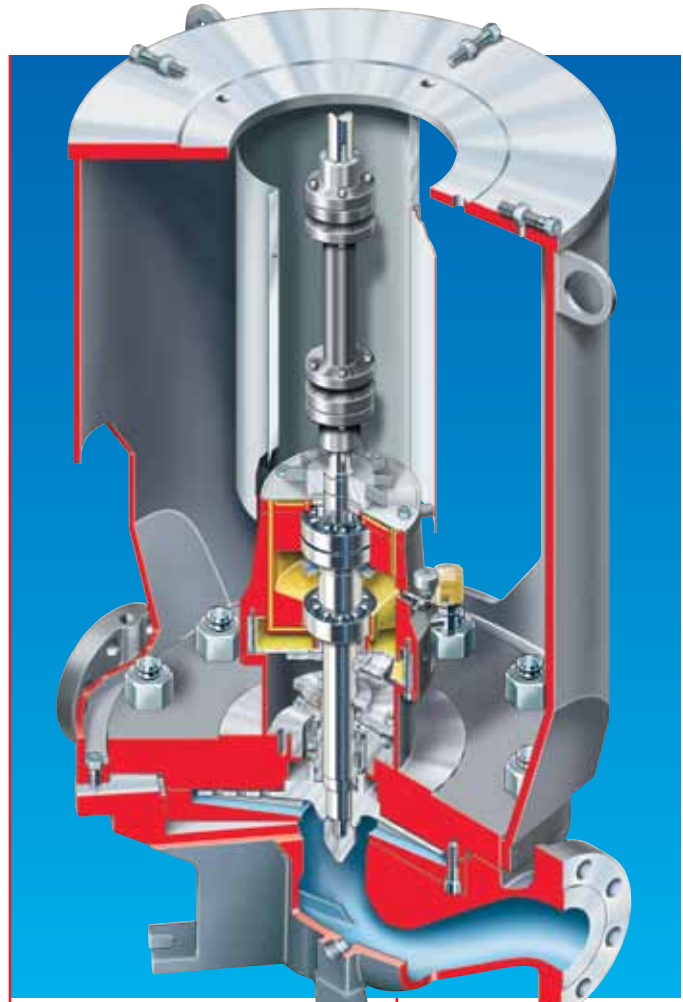
- Optimal hydraulic performance
- Reduced power consumption
- Low-flow stability

The end result is a lower total cost of ownership than enclosed impeller designs, which operate far back on the curve, or those relying on flow-restriction orifices. The modular design extends MTBPM, with low maintenance costs.

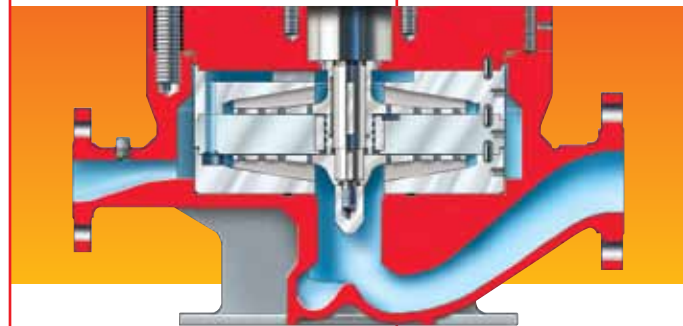
**Multiple Radial Blade Impeller Design**

provides a continuously rising performance curve with low-flow stability. Investment pattern produces highest quality castings for precise, repeatable hydraulic performances.

Dynamically balanced for low vibration over a wide flow range, the impeller is secured by an anti-rotation impeller nut with threads unexposed to the pumped fluid. This ringless design impeller operates with 1.27 mm (0.050 in) axial clearance per side. Impellers for the two-stage designs are arranged back-to-back for equalized axial thrust.



**HWM OH3 Design  
With Oil Cascade Lube  
Bearing Housing Design**



**Two-Stage OH3 and OH5 Design**

**Operating Parameters\***

- Flows to 30 m<sup>3</sup>/h (130 gpm)
- Heads to:  
220 m (725 ft) one-stage;  
440 m (1450 ft) two-stage
- Pressures to:  
50 bar (750 psi) one-stage;  
60 bar (850 psi) two-stage

- WM, WM2 temperatures from -46°C (-50°F) to 260°C (500°F)
- HWM, HWM2 temperatures from -185°C (-300°F) to 400°C (750°F)

\* Increased flow and head is possible by using VFD (variable frequency drive) at 4000 rpm or high-flow volute designs

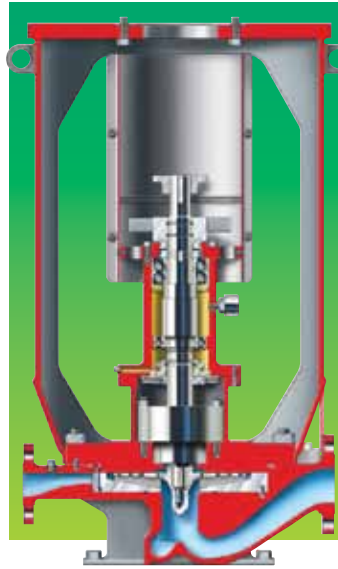


**Special HWM OH3 Mechanical Design Features**

- Choice of bearing lubrication
  - Oil cascade lube design for temperatures to 400°C (750°F)
  - Oil mist design for temperatures to 400°C (750°F)
  - Grease lube design for temperatures to 285°C (550°F)
- Only one bearing housing frame and bearing set, identical to the housing used on the majority of HWX OH3 type pumps
- Standard top bearing isolator, optional Inpro
- Flexible disc spacer coupling
- Standard fan air cooling for extreme operating temperatures (not applicable or needed for oil mist designs)
- Adjustable axial screws for easy driver mount positioning and provided where dowelling of driver is not possible or practical
- Coupling guard to enclose coupling, pump shaft and motor shaft areas
- Optional field extraction tool for easy removal of complete rotor



**Two-Stage HWM2 Pumps with Oil and Grease Bearing Housings**



**Oil Mist or Grease OH3 Design**

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

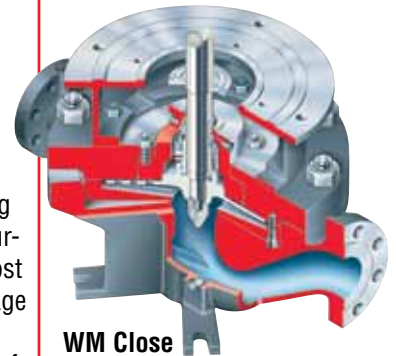
**ISO 21049/API 682 Seal Chamber** accommodates a wide variety of seal configurations including dual pressurized and unpressurized cartridge types for the most severe services. In the two-stage design, first-stage discharge pressure assures suppression of light hydrocarbon vapor in the seal chamber.

**Stiff Shaft Design** limits maximum deflection at seal faces to 0.05 mm (0.002 in). Vibration levels for one- and two-stage machines meet and exceed ISO 13709/API 610 requirements.

**High Head Hydraulics** in the two-stage design are achieved with conventional 2-pole motors and without traditionally used high speed gear boxes for reduced maintenance cost and improved reliability. Variable frequency drive option to 4000 rpm provides increased hydraulic coverage.

**Motor Support Head** is a heavy-duty design with a registered fit motor mount, and no spacer plates. It accommodates NEMA, IEC and existing C-face and P-base field drivers. Generous size open compartments in the HWM design allow easy access to all bolting and removal of the complete pumping assembly, including mechanical seal, without removal of casing or driver.

**Raised Face Flanges** are to ASME B16.5, Class 300 for one-stage and Class 600 for two-stage models.



**WM Close Coupled OH5**



**Two-Stage Model WM2 Close Coupled OH5**

## Options and Technical Data

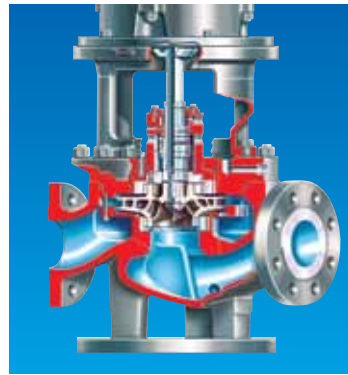
Flowserve offers vertical in-line pumps in all configurations and sizes to meet all service conditions, preferences and budgets. Each model is fully compliant with ISO 13709/ API 610, latest edition.

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

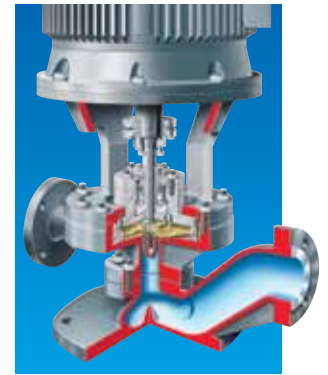
API Code	Design Type	Single-Stage	Two-Stage
OH3	Flexible Coupled with Pump Bearing Housing	HWX	
	Flexible Coupled with Pump Bearing Housing, Low-Flow Impeller, Volute Insert	HWM	HWM2
OH4	Rigid Coupled Fixed Speed	W	
	Rigid Coupled Variable Speed Low Flow/High Head with VFD	MSP	MSP
	Rigid Coupled Double-Suction Impeller	DSVP	
OH5	Extended Motor Shaft with Low-Flow Impeller, Volute Insert	WM	WM2
	Extended Motor Shaft Diffuser Casing	PVML	
API 685	Magnetic Drive with Diffuser Casing	PVML-MAG	



**HWX**  
ISO 13709/API 610 (OH3)  
Flexible Coupled

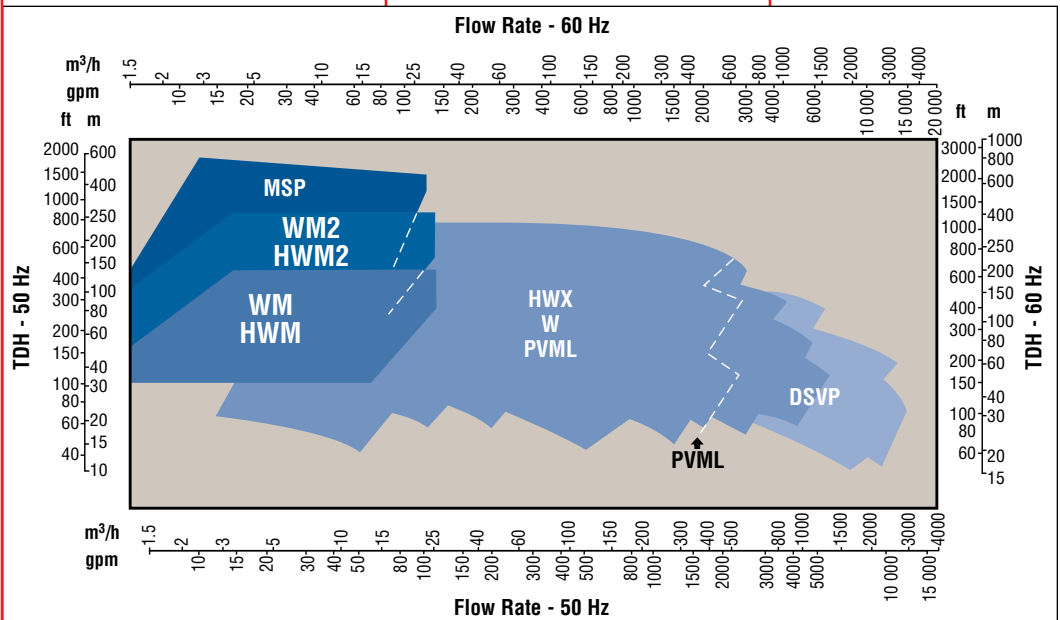


**PVML**  
ISO 13709/API 610 (OH5)  
Extended Motor Shaft



**MSP**  
ISO 13709/API 610 (OH4)  
Rigid Coupled  
Variable Speed

**WM-HWM Family Range Chart**



**Global Engineered Services and Support**

- Total Cost Reduction*
- Asset Management*
- Product Life Cycle*
- Performance Re-rates*
- Site Diagnostics*
- Repair Services*
- Energy Management*
- Spare Parts*
- Maintenance Contracts*
- Materials Upgrades*
- Turnkey Services*
- Field Repairs*
- Installation*
- Project Supervision*
- Commissioning*
- Equipment Upgrades*
- Condition Monitoring*
- Systems Analysis*
- Field Machining*

**Service Dedication**

Flowserve Engineered Services is focused on providing customers with uncompromising service and support, where and when needed. Dedicated to delivering the highest quality support, Engineered Services integrates its extensive pump and materials engineering knowledge with creative service solutions. Engineered Services fully understands the business challenges facing customers and is prepared to manage solutions to succeed as a team.

A worldwide network of service and repair centers staffed by highly skilled engineers and technicians is available around the clock, seven days a week to respond to customer queries, to evaluate and troubleshoot problems and to provide reliable solutions.



**Strength of Experience, Commitment to Excellence**

Flowserve has long served industries requiring superior equipment performance and service life.

- Oil and gas production
- Hydrocarbon processing
- Chemical processing
- Water resources
- Power generation
- Nuclear
- Mining and mineral processing
- Pulp and paper
- General industry

Engineered Services is dedicated to maximizing equipment performance and providing reliability-centered maintenance programs for pumps and related equipment, regardless of manufacturer. Using the FlowStar™ asset management software, Engineered Services tracks performance and supports improvement programs using a service life cycle cost business approach. The results are improved reliability and increased profitability.

**Business Partner**

Flowserve partners with customers to respond to the dynamic business conditions that affect them. Flowserve will work with customers to drive efficiency, maximize throughput and control process quality. Whether user needs involve on-site technical assistance or broader project planning with full turnkey responsibility, Flowserve Engineered Services will deliver professional, reliable results.





**Flowserve... Supporting Our Customers  
With The World's Leading  
Pump Brands**



**Cameron™**  
**Pleuger®** **Durco®**  
**Niigata Worthington™**  
**TKL™** **IDP®** **Pacific®** **Scienco™**  
**Byron Jackson®** **Flowserve®**  
**Worthington Simpson™**  
**Calder™ Energy Recovery Devices** **Lawrence Pumps®**  
**Worthington®** **Sier-Bath®**  
**United Centrifugal®** **Western Land Roller™**  
**Wilson-Snyder®**  
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