

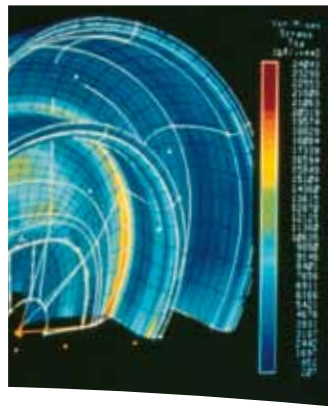


PVXM
API 610 / ISO 13709 (OH3)

Vertical In-line Diffuser Process Pump With Bearing Housing



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.

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 bearing single stage
- Between bearing multistage
- Vertical
- Submersible motor
- Rotary
- Reciprocating
- Nuclear
- Specialty

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Vertical In-line
Diffuser Process Pump
With Bearing Housing



In-line Pump Offers Modular, Precision Hydraulics

The FlowsERVE PVXM vertical process pump features a diffuser design and a rugged in-line bearing housing. Compliant with API 610 / ISO 13709 and BS 4082R, latest editions, the PVXM is a space-saving alternative to horizontal overhung process pumps in upstream and downstream services.

Customized Hydraulics

Hydraulically identical to the PVML (OH5) and PHL (OH2) pumps, the PVXM features precision machined and interchangeable diffuser channels, customized to make virtually any specific duty conditions the hydraulic best efficiency point (BEP). This provides users great flexibility in addressing changing operating parameters. A total of 150 hydraulics can be achieved with the 10 pump casings in the family.

Significant Benefits

The FlowsERVE PVXM vertical in-line pump offers these industry-leading benefits:

- Robust construction to meet pressure, temperature, nozzle loading and safety considerations required by API 610 / ISO 13709 and other industry or user specifications
- High pump efficiency resulting from optimized diffuser and impeller combinations
- Extra low energy consumption at part load flows achieved by specific diffuser tuning
- Variety of materials, pressure ratings and flange configurations to suit specific service requirements
- Stiff rotor design and diffusers minimize shaft deflection and guarantee 20% lower vibration levels than required by API 610 / ISO 13709

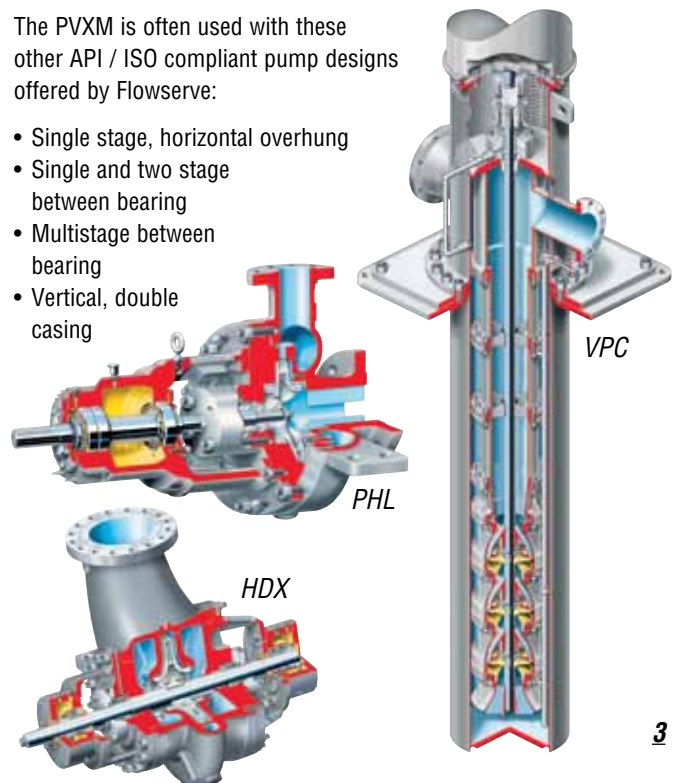
Applications

- Petroleum refining, production and distribution
- Petrochemical and heavy-duty chemical processing
- Gas industry services
- Water and general industry

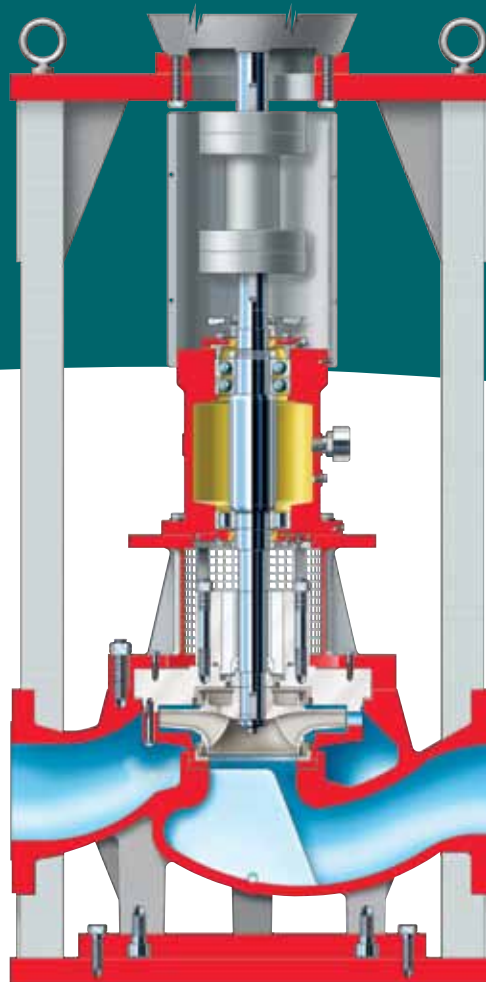
Complementary Pump Designs

The PVXM is often used with these other API / ISO compliant pump designs offered by FlowsERVE:

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



PVXM
API 610 / ISO 13709 (OH3)
Vertical In-line
Diffuser Process Pump
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The PVXM meets and exceeds the rigorous requirements of API 610 / ISO 13709, latest edition, type OH3: mechanically sealed, flexibly coupled, vertical in-line pumps with a bearing frame. The PVXM design permits customized hydraulics for lowest total cost of ownership based upon:

- Long MTBR
- Low maintenance cost
- Near-zero seal emission
- Low vibration level
- High efficiency

Operating Parameters

- Flows to 500 m³/h (2200 gpm)
- Heads to 275 m (900 ft)
- Pressures to 40 bar (600 psi)
- Temperatures to 250°C (480°F)

State-of-the-art Diffuser Technology guarantees vibration limits 20% lower than those required by API 610 / ISO 13709

Suction Box Design provides shockless impeller entry and optimized NPSHR

Dynamically Balanced Impeller limits vibration and ensures smooth operation over wide flow range. A smooth, investment cast surface provides excellent hydraulic efficiency

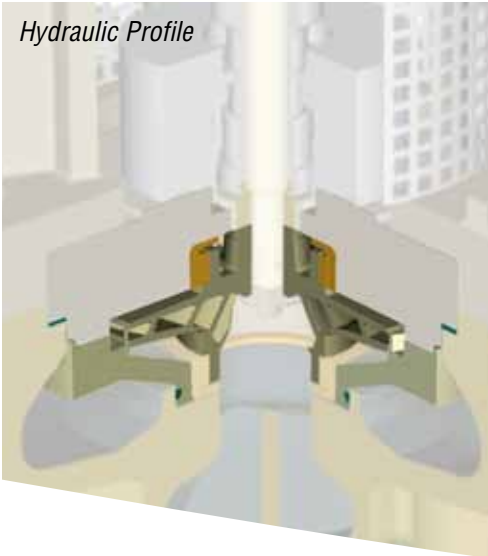
Pump Casing and Cover feature metal-to-metal fit with fully confined, controlled compression gasket to ensure proper sealing and alignment

Performance Tuning capabilities include field hydraulic customization

Motor Support Head machined to accept NEMA C-Face and IEC motor designs and provide 100% back pull-out compliance

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

API 682 / ISO 21049 Seal Chamber holds a wide variety of seal types, including single and dual type cartridge mechanical seals



Hydraulic Profile



Diffuser/Impeller Combination



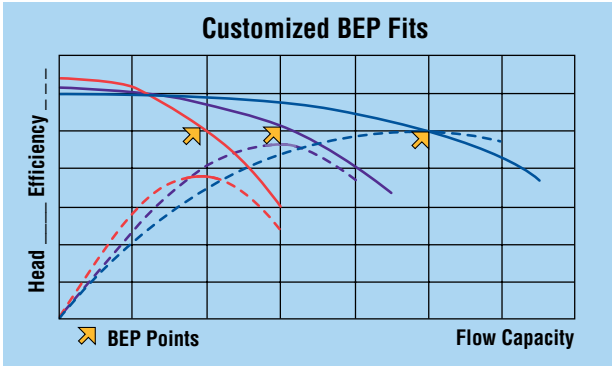
Precision Diffuser

The Ultimate in Hydraulic Excellence

Precision Machined Diffuser for Customized BEP Fits

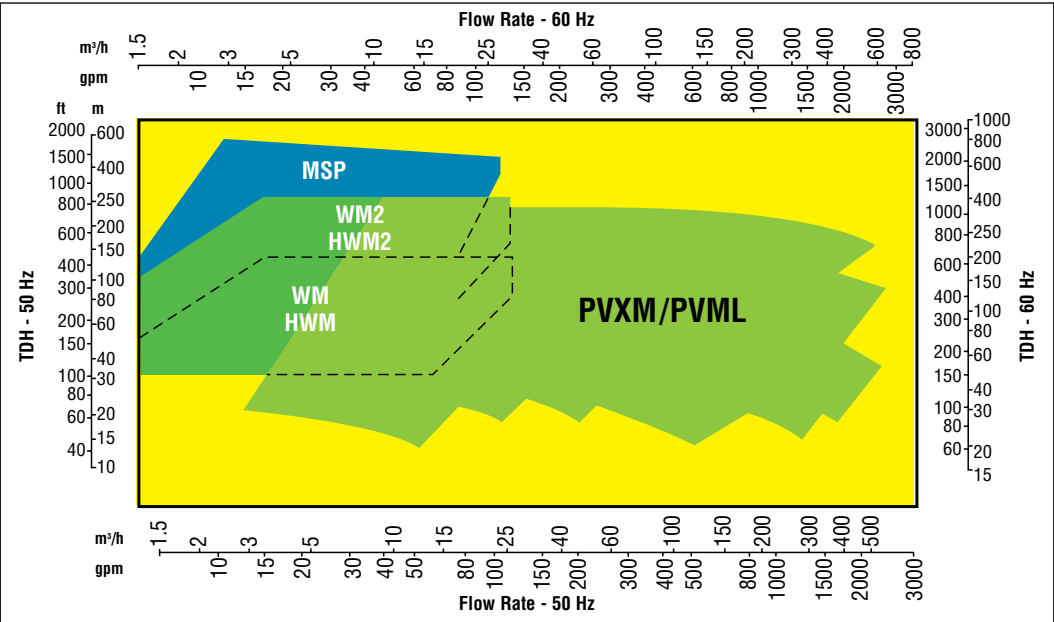
Diffuser technology provides numerous advantages:

- Low vibration level at any flow – guaranteed 20% lower vibration levels than required by API 610 / ISO 13709
- Minimum continuous flows at 10-20% of BEP
- Very low shaft deflection and virtually zero radial hydraulic thrust at any flow rate
- Reduced noise level; at least 3dB(A) lower at off-BEP duty points compared to volute type pumps
- Continuously rising head to shut-off, typically 10% irrespective of rated flow



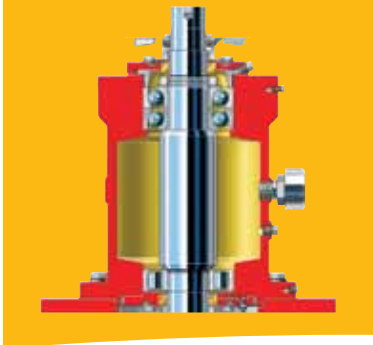
- Highest Possible Efficiencies – typically 5 points better at rated, 10 to 15 points back-on-curve vs. conventional volutes
- Hundreds of BEP (best efficiency point) fits throughout the entire hydraulic range

PVXM Range Chart



**PVXM OH3
Key Design
and Technical
Features**

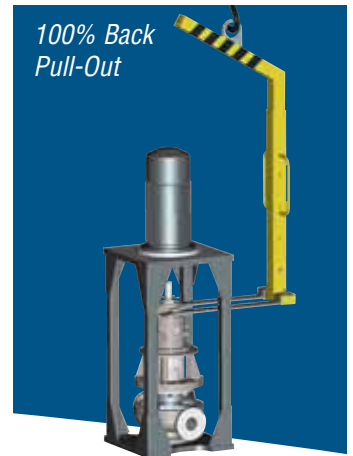
Oil Mist or Grease OH3 Design



*Four-Side
Easy
Access*



*100% Back
Pull-Out*



Bearing Housing Design

- Choice of three bearing lubrication types suitable for temperatures to 250°C (480°F): grease, oil mist and oil cascade
- Only two bearing housing frames and bearing sets
- Standard upper and lower labyrinth bearing isolators; option for Inpro or equivalent
- Flexible disc spacer coupling design
- Standard fan air cooling for extreme operating temperatures (not needed for oil mist designs)
- Coupling guard to enclose coupling, pump shaft and motor shaft areas

Stiff Shaft Design

The PVXM stiff shaft design limits maximum deflection at the seal faces to well below the 0.050 mm (0.002 in) API 610 / ISO 13709 requirement.

Materials of Construction

- As standard, API 610 / ISO 13709 materials: S1, S4, S5, S6, S8, C6, A8, D1, D2
- Compliance with both NACE MR0103 and NACE MR0175
- Option for non-metallic wear rings
- TMT and other coatings for abrasive services

Heavy-Duty Motor Support Head

The PVXM motor support head is a tubular construction heavy-duty design with a registered fit motor mount and no spacer plates. Unique mounting arrangement isolates the pump from the driver weight to prevent influences of forces and vibration. Generous openings allow for easy access from all four sides and enables removal of the back pull-out assembly without disturbing the casing or driver for 100% full compliance with API 610 / ISO 13709. Removal of complete pump is also possible with this independent motor support head design. Its rugged structure is ideal for modularized skid constructions.

Emissions Containment

The PVXM achieves the most stringent emissions containment of liquids for severe services by employing dual pressurized and unpressurized cartridge seals as well as the latest barrier seal technology.

Global Service and Technical Support



Service Dedication

Flowserve Engineered Services focus on providing customers with uncompromising service and support, where and when needed. Dedicated to delivering the highest quality support, Engineered Services integrate pump and materials engineering knowledge with creative service solutions.

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.

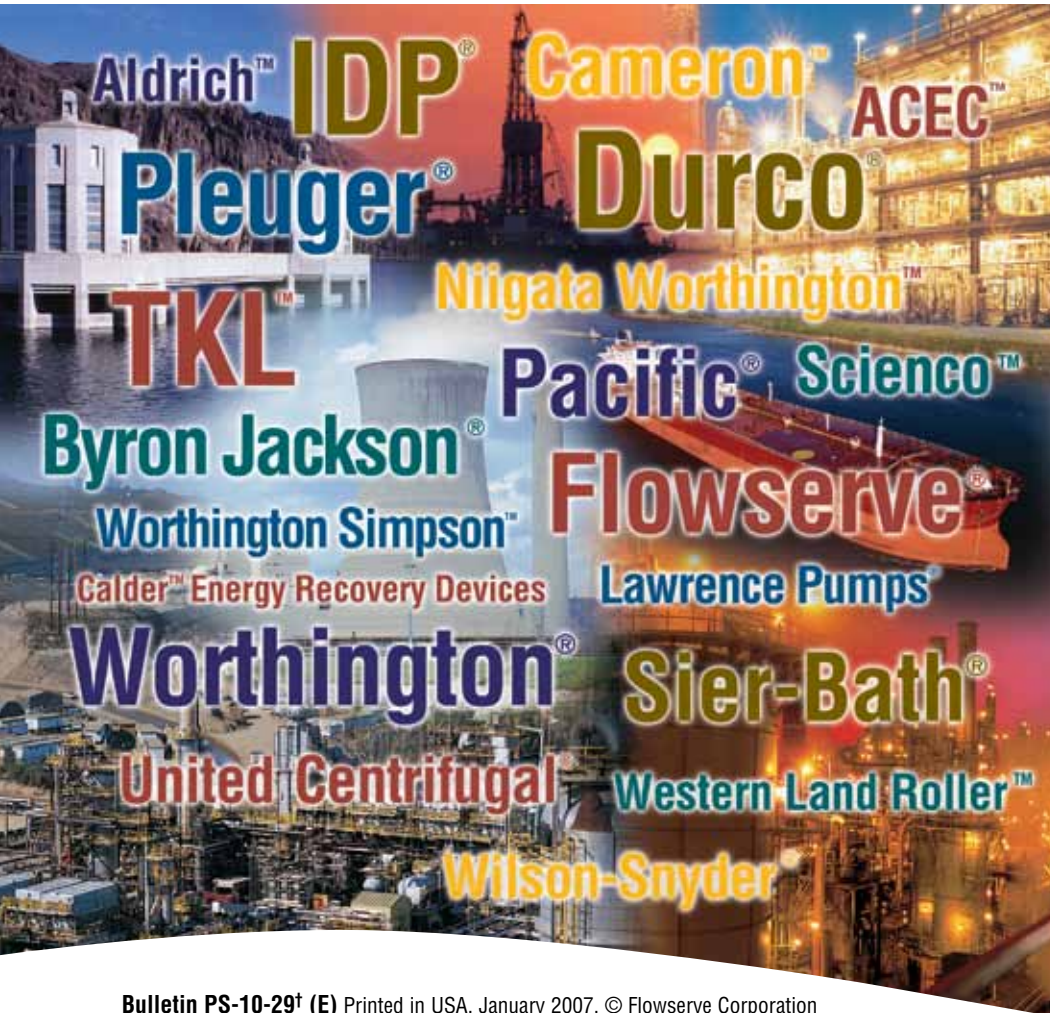
- Oil and gas production
- Hydrocarbon processing
- Chemical processing
- Water resources
- Power generation
- Nuclear
- Mining and mineral processing
- Pulp and paper
- General industry

Flowserve is dedicated to maximizing equipment performance and providing reliability-centered maintenance programs for pumps and related equipment, regardless of manufacturer. Using the FlowStar.net™ asset management software, Flowserve engineers and technicians track performance and support 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 turn-key responsibility, Flowserve Engineered Services will deliver professional, reliable results.





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Bulletin PS-10-29† (E) Printed in USA. January 2007. © Flowserve Corporation

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