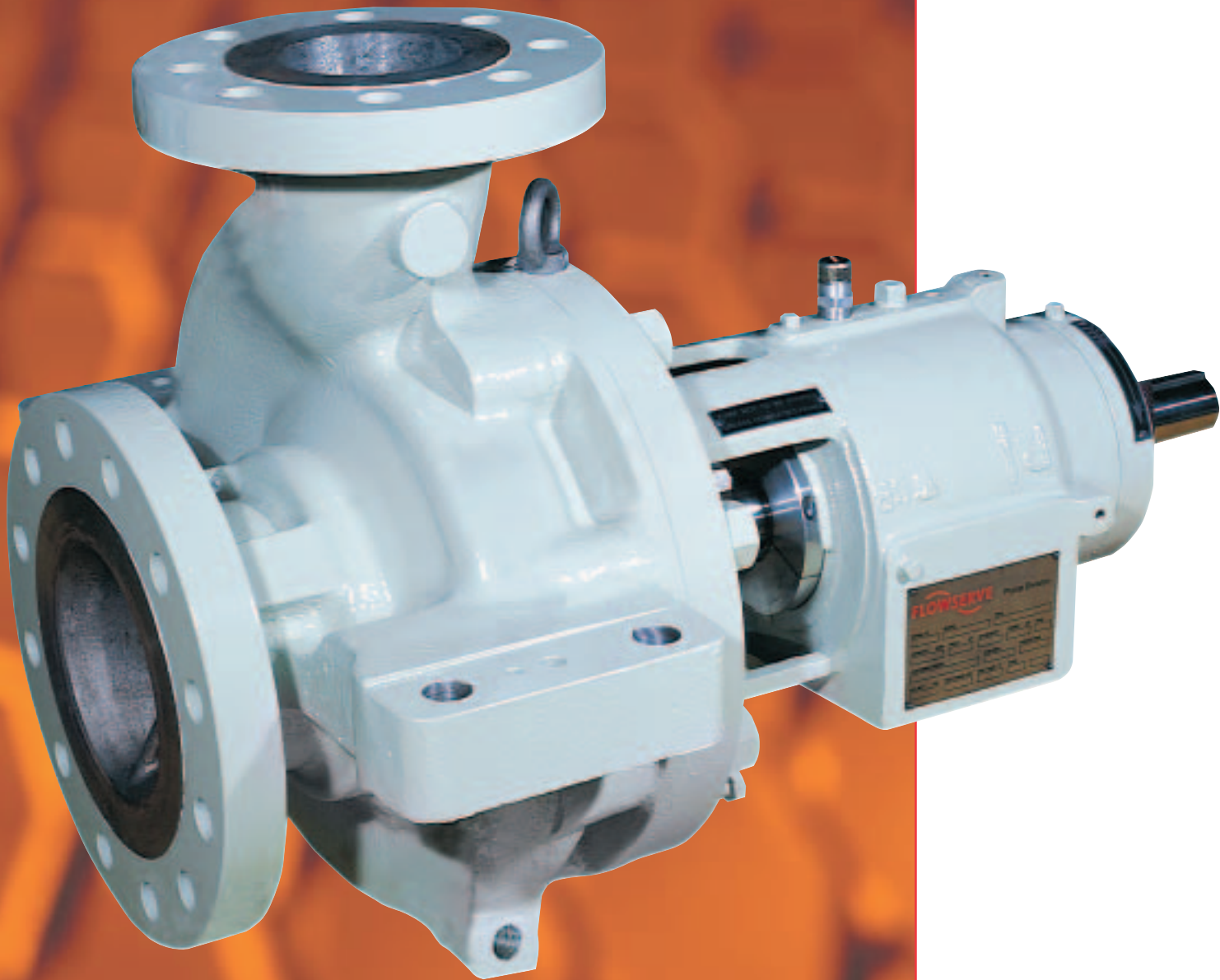


FLOWSERVE

Pump Division

***HPX
API 610
Hydrocarbon
Processing Pump***



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:

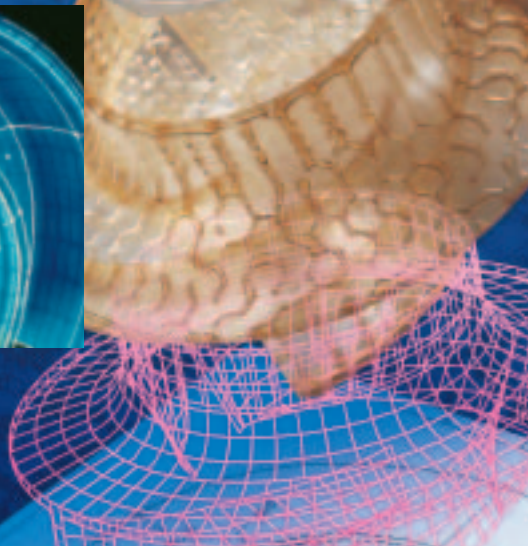
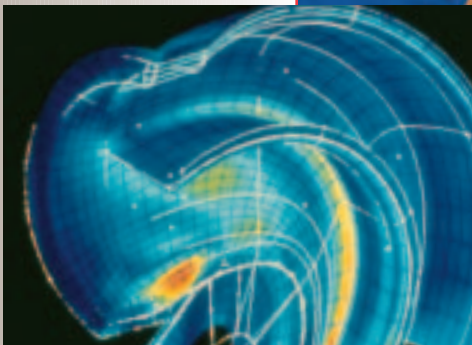
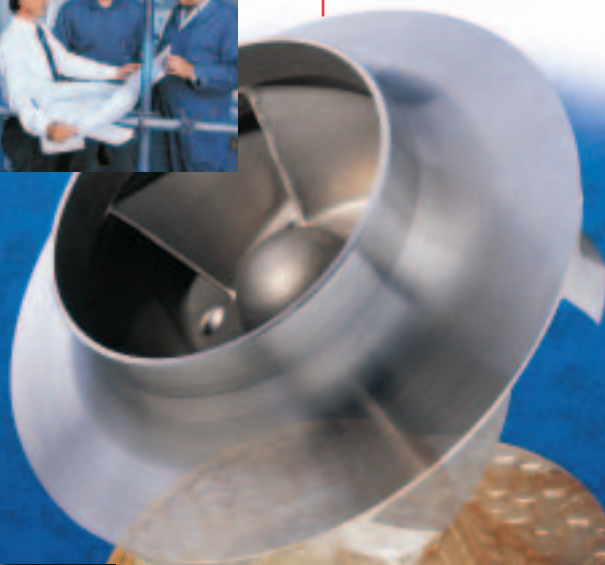
- Hydraulic engineering
- Mechanical design
- Materials science
- Intelligent pumping
- Manufacturing technology

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



**HPX
API 610
Hydrocarbon
Processing
Pump**

Number One in The Industry
Fully compliant with API 610, latest edition design criteria, the HPX pump is of horizontal, end suction – top discharge, overhung, centerline mounted configuration. Flowserve’s HPX pump is the *workhorse of the hydrocarbon processing industry* due to its unequalled versatility, reliability and safety. The most stringent emissions containment is achieved as the API 682 seal

chamber accommodates all combinations of seal models and styles including advanced gas barrier seal technology.

The HPX pump is the industry leader for these reasons:

- Robust construction to meet or exceed API 610, latest edition criteria
- Widest hydraulic coverage available
- Back pull-out design
- Wide range of materials and configurations

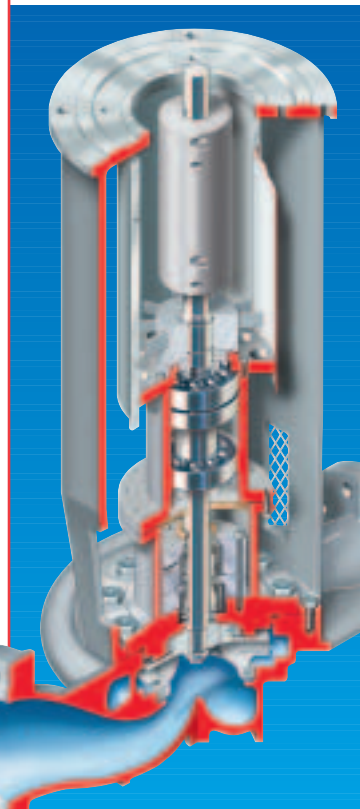
Broad Application

- 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

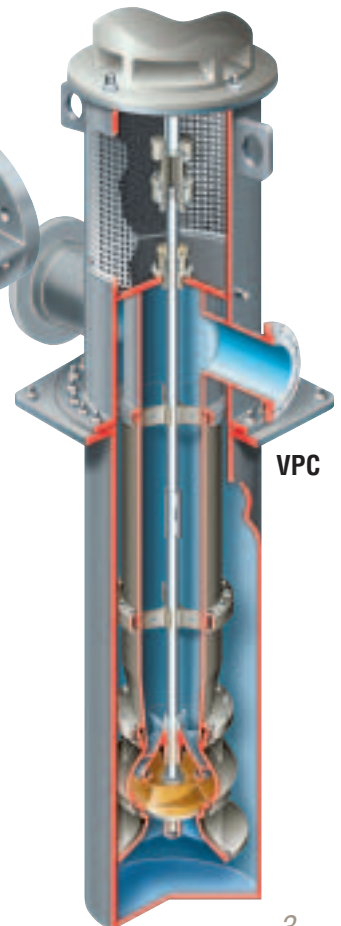
Complementary Pump Designs

HPX pumps may be used with other Flowserve models of API design. These include:

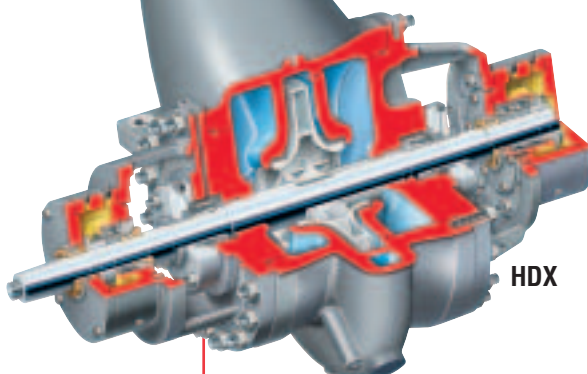
- Single and two stage, between bearing pumps
- Multistage between bearing pumps
- Vertical, double casing pumps
- Specialty pumps



HW



VPC

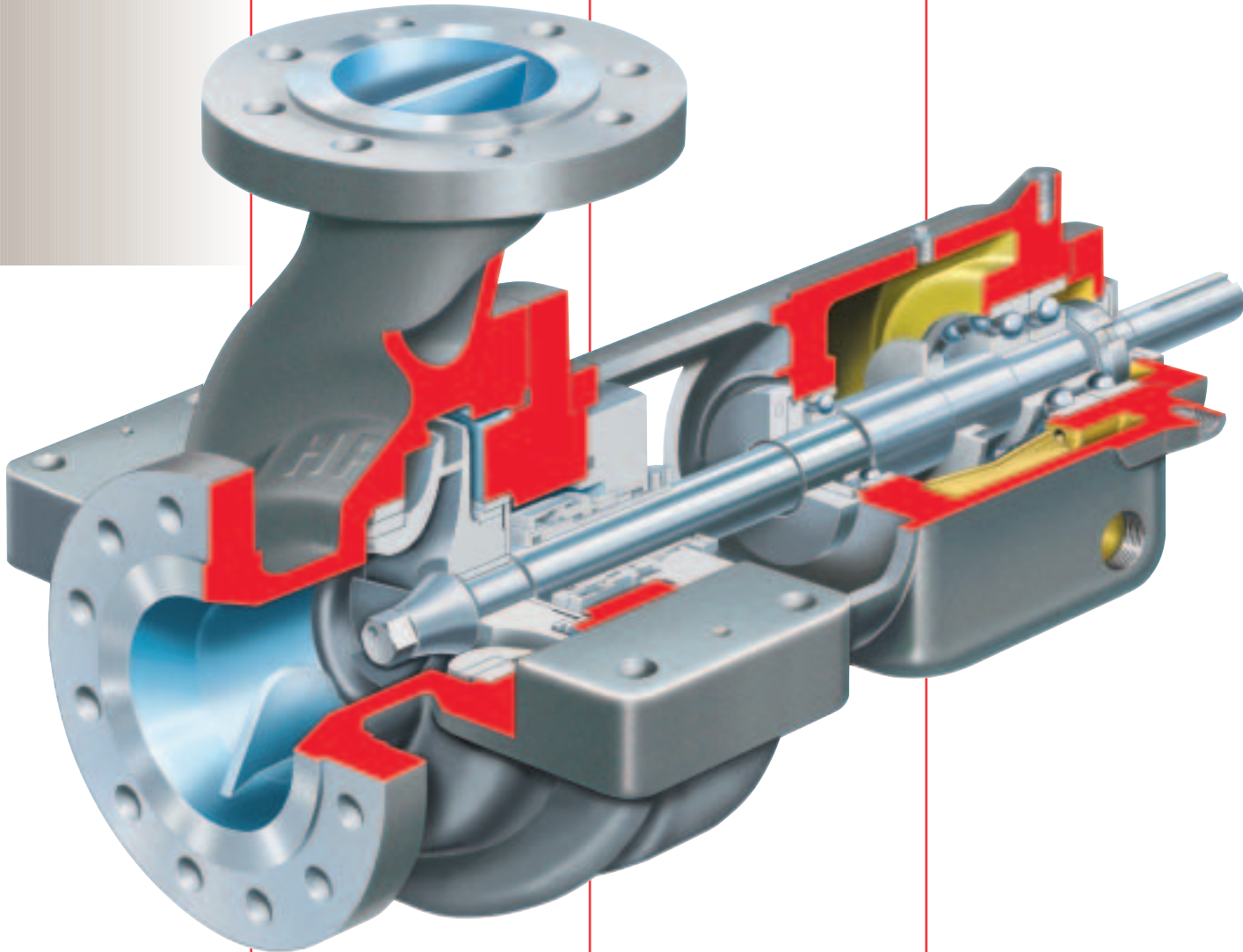


HDX

HPX
API 610
Hydrocarbon
Processing
Pump

Flowserve's HPX pump meets or exceeds the rigorous requirements of API 610, latest edition. Engineered and built for reliable, safe performance, it also provides optimal emissions containment.

Further, the HPX represents the most comprehensive range of hydraulic coverage available to the industry, thereby permitting precise selection for best operating efficiency.



Operating Parameters

- Flows to 2000 m³/h (9000 gpm)
- Heads to 350 m (1100 ft)
- Temperatures from -160°C (-250°F) to 450°C (850°F)
- Pressures to 80 bar (1160 psi)

Raised Face Flanges are to ASME B16.5 criteria for Class 300 or 600. Surface finish meets API 610 standard. ISO and JIS flanges are available.

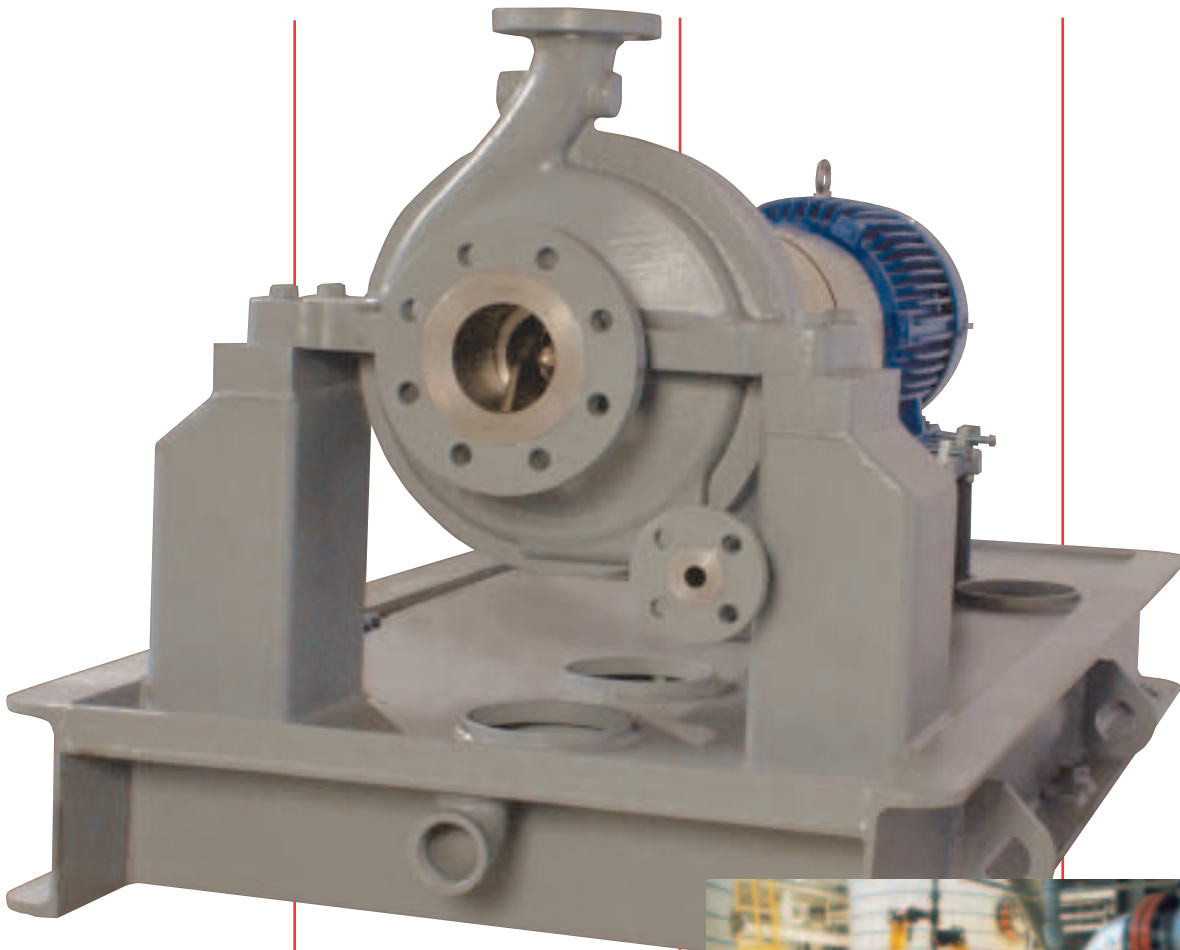
Centerline Supported Pump Casing

Nozzle loads beyond API 610 design requirements.

- Minimal shaft misalignment for extended rotor, bearing and seal life

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

Guide Vane in suction nozzle preserves available NPSHA while reducing vortexing and assuring uniform flow to pump inlet.



Renewable Wear Rings

- for both the casing and impeller reduce replacement parts cost.
- Secured by locking pins or threaded dowels
 - Back wear ring standard on larger models; optional on all other sizes

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 API 610 seal flush piping plans is available.

Cartridge Seal Mounting

- assures:
- Ease of maintenance
 - Precise seal face setting for maximum seal life

Back Pull-out of rotating assembly simplifies maintenance as neither the motor nor piping connections are disturbed.

Dynamically Balanced Impeller

- limits vibration and assures smooth operation, over wide flow range.
- Casting techniques and manufacturing processes for fine finish, high efficiency
 - Positively locked, anti-rotation impeller nut with threads unexposed to pumped liquid

Rugged Shaft design is well within API 610 shaft deflection and run-out criteria.

Shaft Sleeve and gland plate are constructed of stainless steel for optimum life.

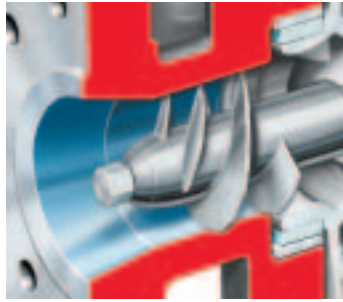
Bearing Configurations

- Standard – single row, deep groove, radial bearing and duplex, single row, 40° angular contact thrust bearings
- Special bearing arrangements for high suction pressures

Bearing Housing is made of heavy duty carbon steel.

- Labyrinth type oil seals retain oil and exclude atmospheric contaminants and moisture
- Optional bearing isolators available
- Standard ring or oil slinger lubrication, depending upon pump size, ensures optimal bearing lubrication

Options and Technical Data



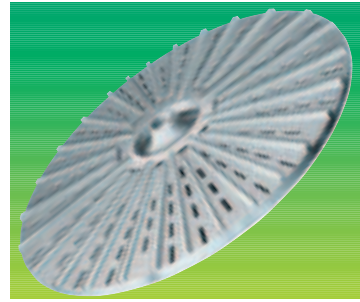
Inducer

A high specific speed, axial flow pumping device, an inducer provides significant improvement in suction performance by reducing pump NPSHR.

Bearing Lubrication and Cooling Options

- Oil mist and oil purge for continuous bearing lubrication
- Fan cooling for high operating or high ambient temperatures
- Finned cooling insert for efficient water cooling

HPX Range Chart



Low Flow Hydraulics (HPXM)

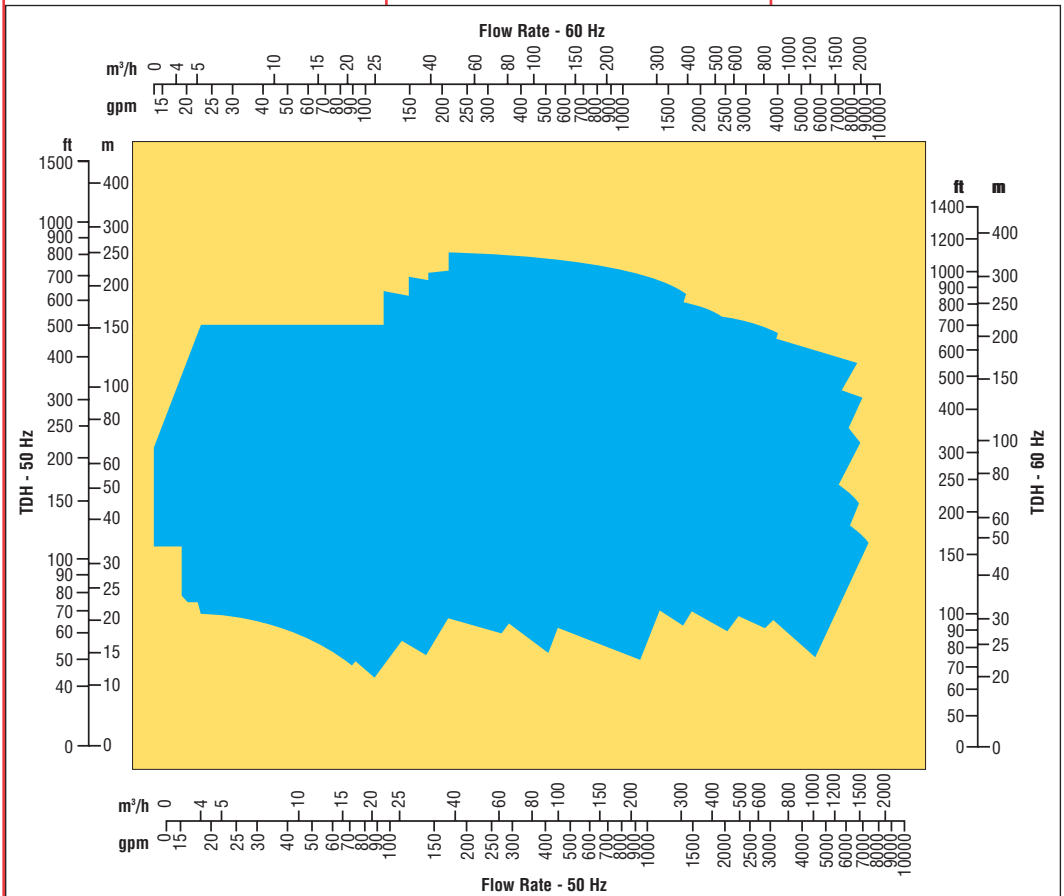
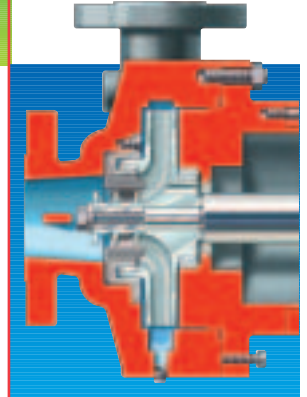
Multiple, radial blade impeller provides better hydraulic fit for low flow applications and continuously rising performance curve.

Top Suction Nozzle Configuration

- This option is available for ease of piping configuration by:
- Reducing space requirements
 - Reducing installation costs

Coke Crusher Design

Special cutter screw construction facilitates the handling of coke particles in suspension by reducing their size to easily pass through the impeller.

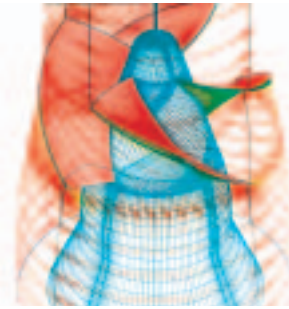


Global Service and Technical Support

Advanced Technologies

Few if any pump companies can match Flowserve's capabilities in hydraulic and mechanical design or in materials engineering. These capabilities include:

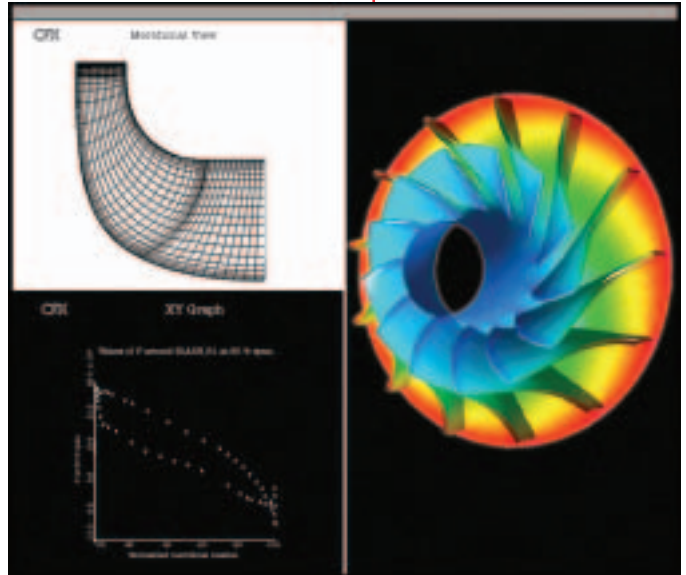
- Computational fluid dynamics
- Flow visualization
- Cavitation studies
- Efficiency optimization
- Finite element analysis
- Rapid prototyping
- Captive high nickel alloy and light reactive alloy foundries
- Non-metallic materials processing and manufacturing



Service and Repair Group

Flowserve's Service and Repair Group is dedicated to maximizing equipment performance and reliability-centered maintenance programs. Pump related services include:

- Startup and commissioning
- Diagnostics and prognostics
- Routine and repair maintenance
- ANSI and ISO power end exchange program
- Re-rates, upgrades and retrofits
- Spare parts inventory and management programs
- Training



Pump Improvement Engineering Services

Flowserve is committed to helping customers obtain the best possible return on their pump equipment investment. Engineering assistance and technological solutions for pumping problems are readily available.

These services include:

- Field performance testing
- Vibration analysis
- Design analysis and root-cause problem solving
- Material improvements
- Pump and system audit
- Advanced technology solutions
- PumpTrac™ remote pump monitoring and diagnostic services
- Instruction manual updates
- Training courses

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



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