



Pump Division



LR
*Single Stage
Horizontal*

LRV
*Single Stage
Vertical*

LLR
*Two Stage
Horizontal*

*Axially Split,
General Industry
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:

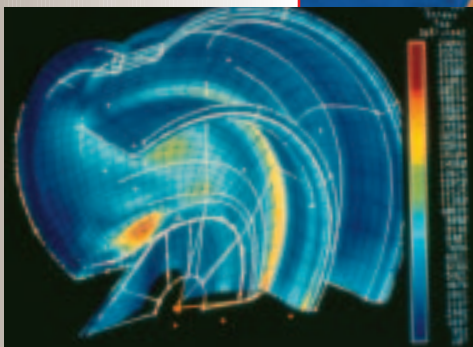
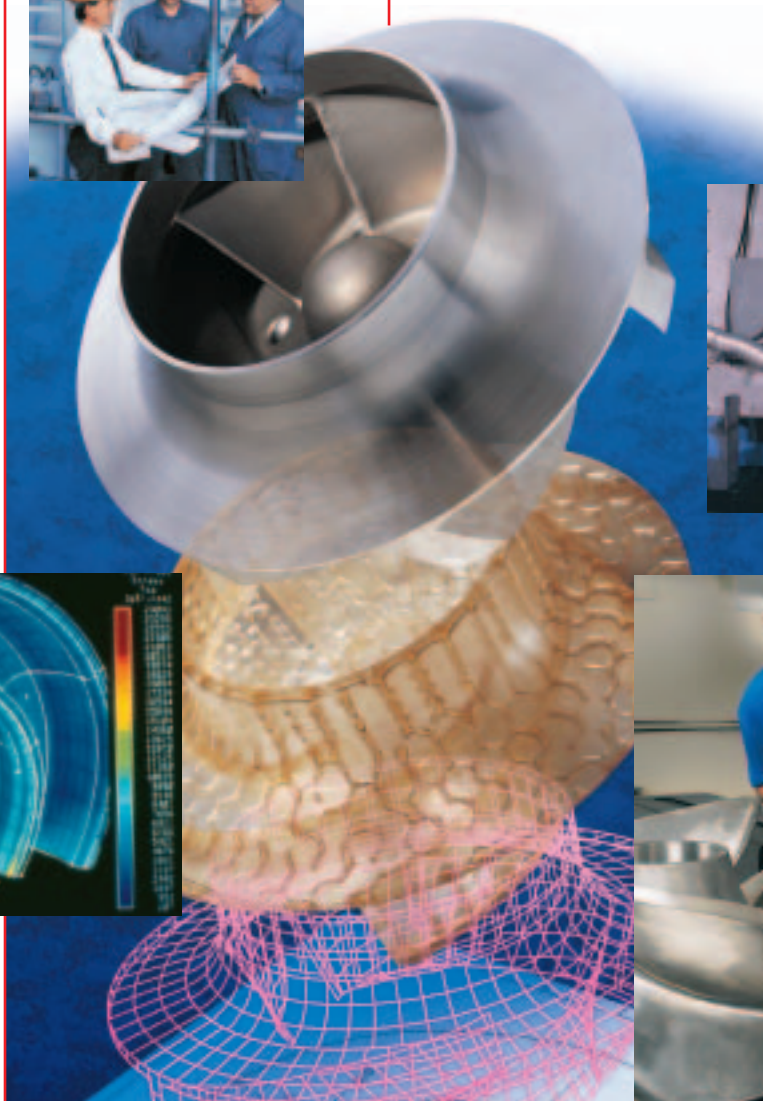
- Hydraulic engineering
- Mechanical design
- Materials science
- Intelligent pumping
- Manufacturing technology

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



LR, LRV, LLR
Axially Split,
General Industry
Pumps

The Between Bearings Choice
for General Industrial Pumping

The single stage LR and LRV and the two stage LLR family of pumps are part of a broad range of axially split, heavy-duty between bearings pumps. These pumps complement the similarly designed LNN and LNNV. Together these products offer 150 impeller-volute combinations, industry's largest array of efficient hydraulic solutions.

These time-tested pumps incorporate pre-engineered and packaged combinations of design features, as well as application-driven options which are superior to competitors' offerings. This leads to increased value in terms of lower maintenance requirements and higher efficiency.

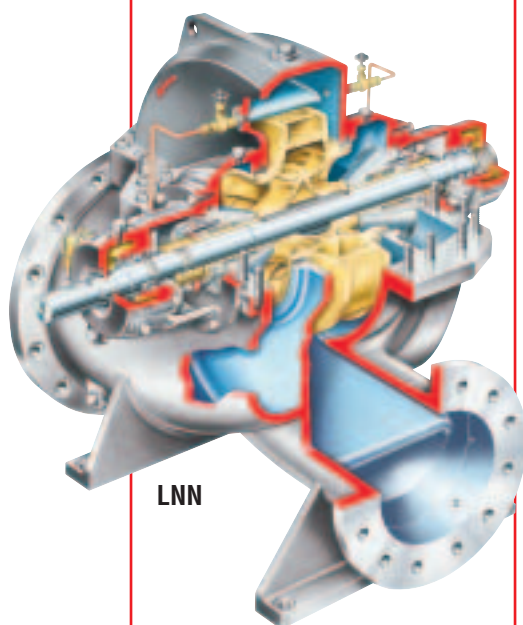
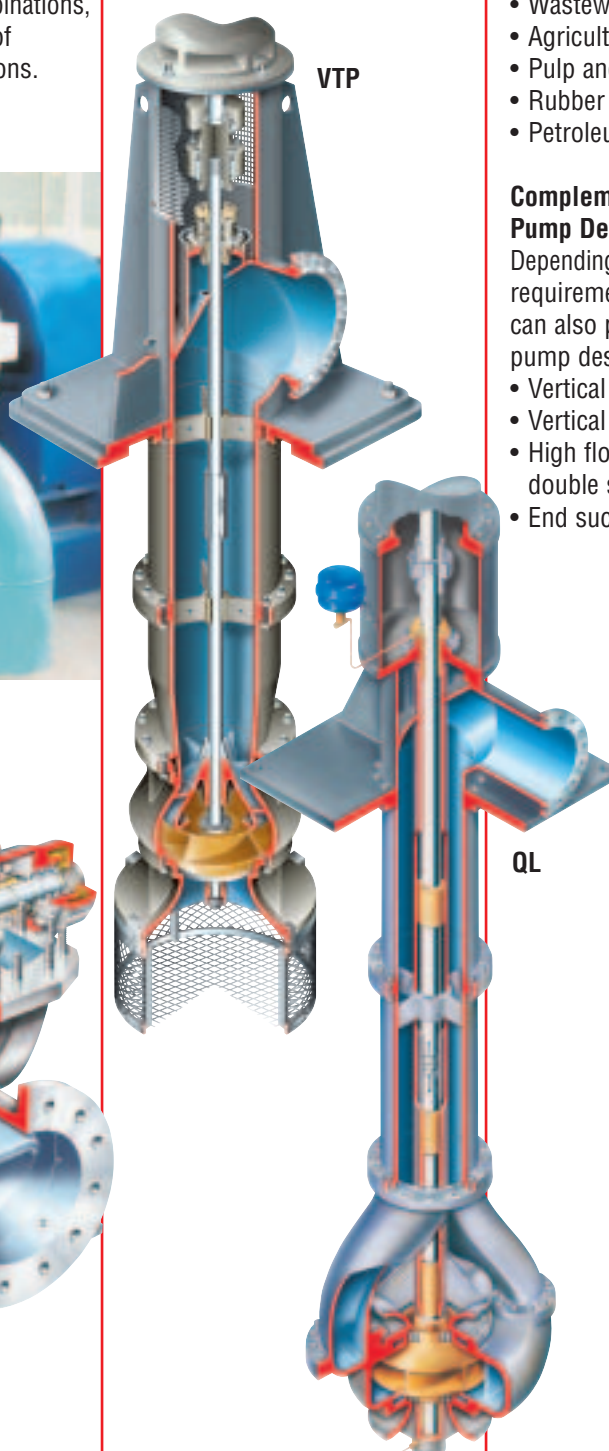
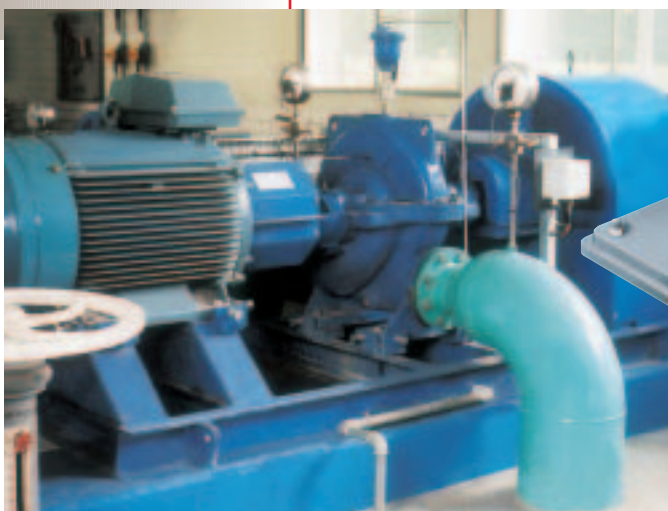
Typical Industries Served

- Building trades
- Building services
- OEM
- Food and beverage
- Mining
- Steel
- Utility
- Pharmaceutical
- Water distribution
- Wastewater
- Agriculture
- Pulp and paper
- Rubber
- Petroleum

Complementary Pump Designs

Depending upon application requirements, Flowserve can also provide these pump designs:

- Vertical double suction
- Vertical turbine
- High flow axially split, double suction
- End suction centrifugal



LNN

VTP

QL

LR, LRV, LLR
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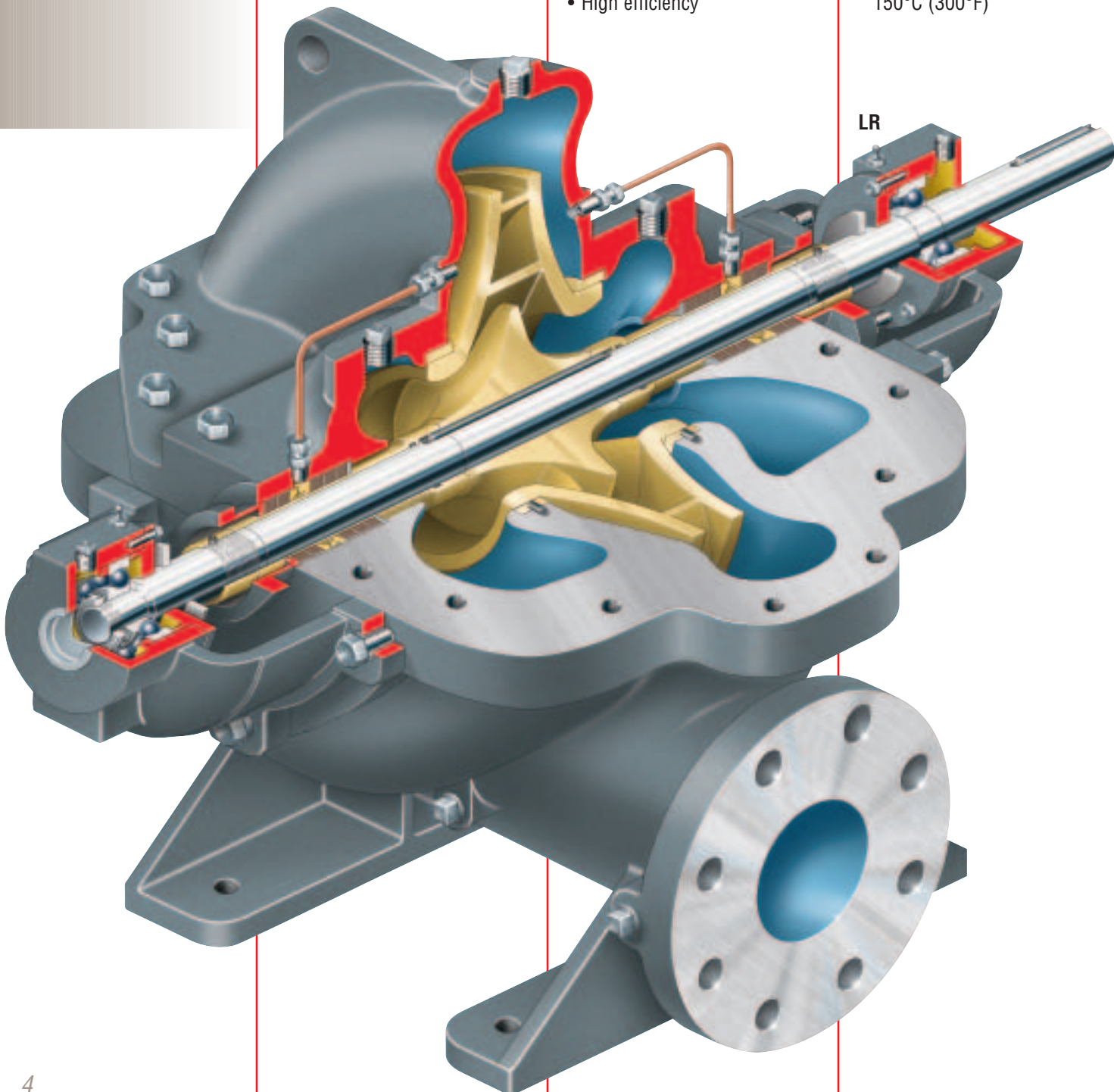
The LR, LRV and LLR family of pumps provides a broad range of hydraulic coverage and low total cost of ownership. With thousands of units installed over the years, these pumps provide reliable and efficient performance in applications ranging from water supply to circulation duties to petroleum distribution.

Designed for easy maintenance and maximum parts interchangeability, the superior engineering and construction of these pumps result in reduced downtime and minimized parts inventory for users.

- Rugged, heavy-duty construction
- Superior design features
- Low initial investment
- High efficiency

LR (29 Sizes)
Operating Parameters

- Standard flows to 2000 m³/h (8800 US gpm)
- Heads to 170 m (560 ft)
- Pressures to 21 bar (300 psi)
- Temperatures from -30°C (-20°F) to 150°C (300°F)



LR

Split Case Design with lifting lugs simplifies maintenance by allowing access to the rotating element without disturbing piping or driver

Low NPSH Enclosed Impellers provide high efficiency and optimum performance over a wide flow range. Most LR and LRV models feature double suction impellers. The LLR incorporates back-to-back single suction impellers

Radial and Thrust Bearings are available with oil or grease lubrication. Designs include single row, deep groove ball bearings or duplex thrust ball bearings. Typical L10 bearing life is 100 000 hours

Heat Treated Steel Shaft limits deflection to 0.05 mm (0.002 in), prolonging seal life

Shaft Sleeves are secured by external nuts and include O-rings to ensure reliable internal sealing

Mounting Feet transmit pipe strain loads to the base and foundation, extending bearing life

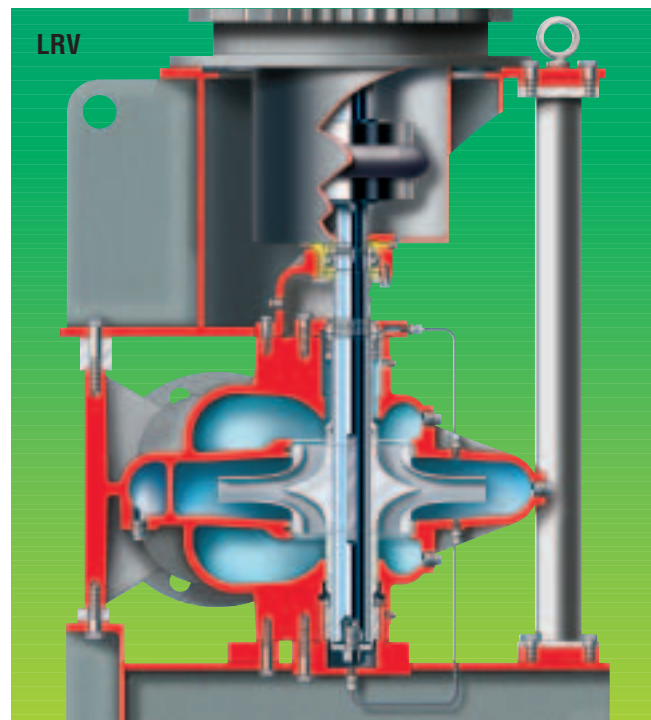
Dowel Bushing maintains concentricity between the bearing bracket and the casing

Ease of Maintenance Features

- Replaceable seal chamber bushings maintain proper packing and lantern ring location
- Shaft sleeve nuts lock impeller and shaft sleeve in position
- Short distance between bearings reduces shaft deflection and resultant wear to components
- Removable bearing brackets allow bearing maintenance without disturbing upper casing
- Rectangular cross section gland packing permits quick and easy replacement
- Optional component and cartridge mechanical seals provide leak free operation
- A range of corrosion resistant materials reduces maintenance costs

Standard Case Wear Rings

allow economical renewal of operating clearances. Special serrated groove designs are available.

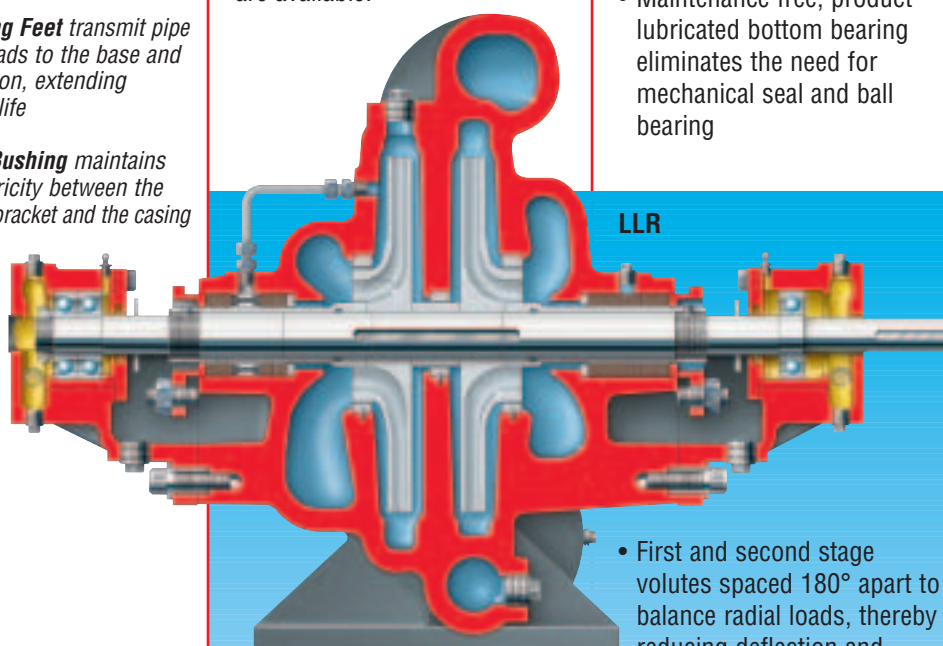


LRV Vertical Shaft Design

- Small footprint reduces floor space requirement
- Pump parts interchangeable with LR design
- Maintenance free, product-lubricated bottom bearing eliminates the need for mechanical seal and ball bearing

LRV (20 Sizes) Operating Parameters

- Flows to 2000 m³/h (8800 US gpm)
- Heads to 137 m (450 ft)
- Pressures to 21 bar (300 psi)
- Temperatures from -30°C (-20°F) to 150°C (300°F)



LLR Two Stage Design for High Head Applications

- Back-to-back mounted, single suction impellers reduce axial thrust, prolonging bearing life

LLR

- First and second stage volutes spaced 180° apart to balance radial loads, thereby reducing deflection and prolonging bearing life
- Crossover cast-in upper casing half provides the rigidity necessary for high pressure applications

- Interstage bushing minimizes interstage leaking and maximizes efficiency
- Back-to-back mounted duplex angular contact thrust bearing

LLR (6 Sizes) Operating Parameters

- Flows to 295 m³/h (1300 US gpm)
- Heads to 290 m (950 ft)
- Pressures to 31 bar (450 psi)
- Temperatures from -30°C (-20°F) to 150°C (300°F)

Options and Technical Data

Shaft Sealing

The seal chamber design readily accommodates component or cartridge type mechanical seals and graphite impregnated non-asbestos packing with a lantern ring. The user can choose or convert to the sealing option most appropriate to the service.

Optional Casing Materials

Erosion and corrosion resistant materials are available to suit service conditions.

- Cast iron
- Ductile iron
- Ductile Ni-Resist D2
- Bronze
- Nickel aluminum bronze
- Carbon steel
- 316 stainless steel
- Duplex stainless steel

Optional Impeller Wear Rings

Impeller wear rings are available as an option or may be retrofitted by re-machining the impeller.

High Performance Coatings

Performance enhancing coatings may be applied to internal casing surfaces to maximize pump efficiency. Corrosion and erosion resistant coatings also are available.

Extended Motor Mount

LRV vertical pumps are available with intermediate shafting that enables the motor to be mounted at a high level, avoiding potential flooding.

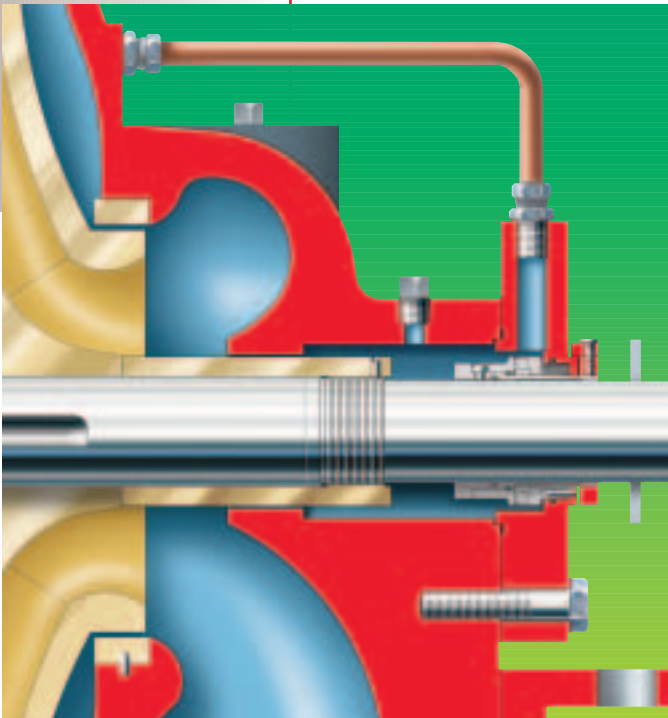
Flange Designs

Suction and discharge flanges are available in flat or raised face and to the following standards:

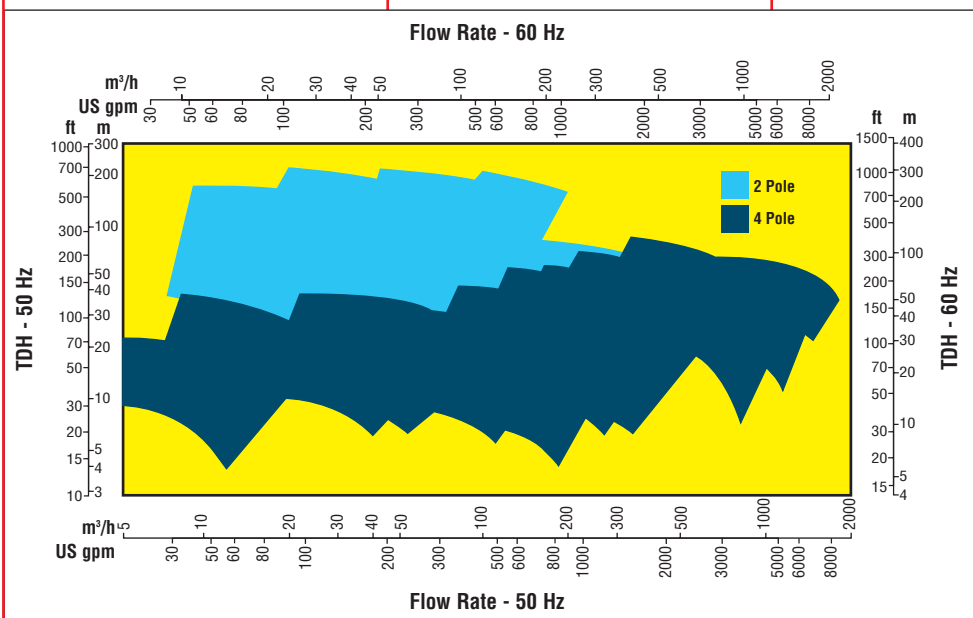
- ASME (ANSI)
- DIN
- ISO

Baseplate Options

- Channel steel
- Folded steel
- Folded steel with drip rim
- Raised rim with grout holes



LR-LRV-LLR Range Chart

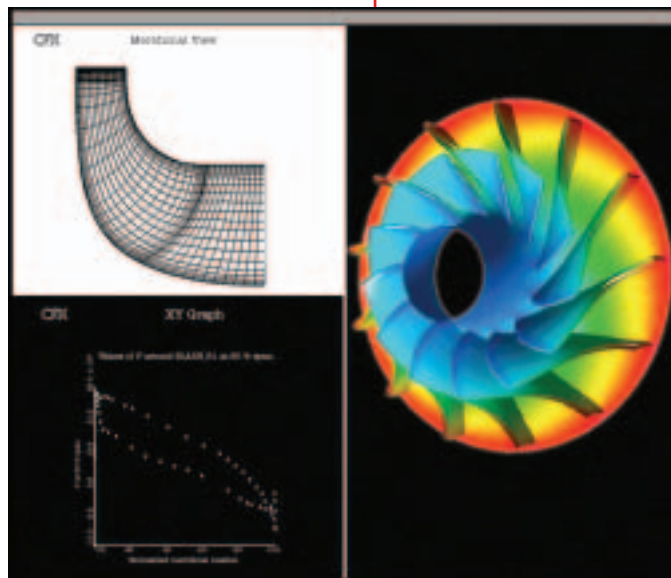
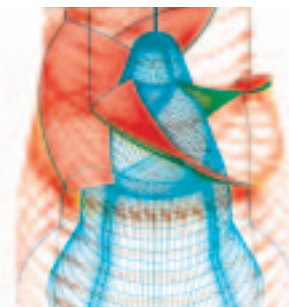


Global Service and Technical Support

Advanced Technologies

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

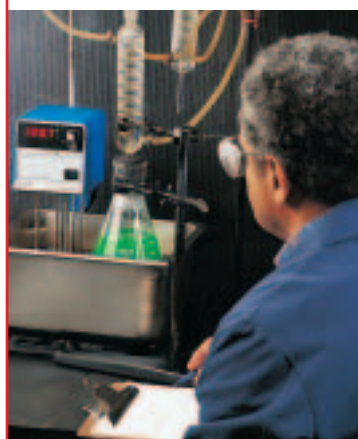
- Computational fluid dynamics
- Flow visualization
- Cavitation studies
- Efficiency optimization
- Finite element analysis
- Rapid prototyping
- Captive high nickel alloy and light reactive alloy foundries
- Non-metallic materials processing and manufacturing



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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Pump Division

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