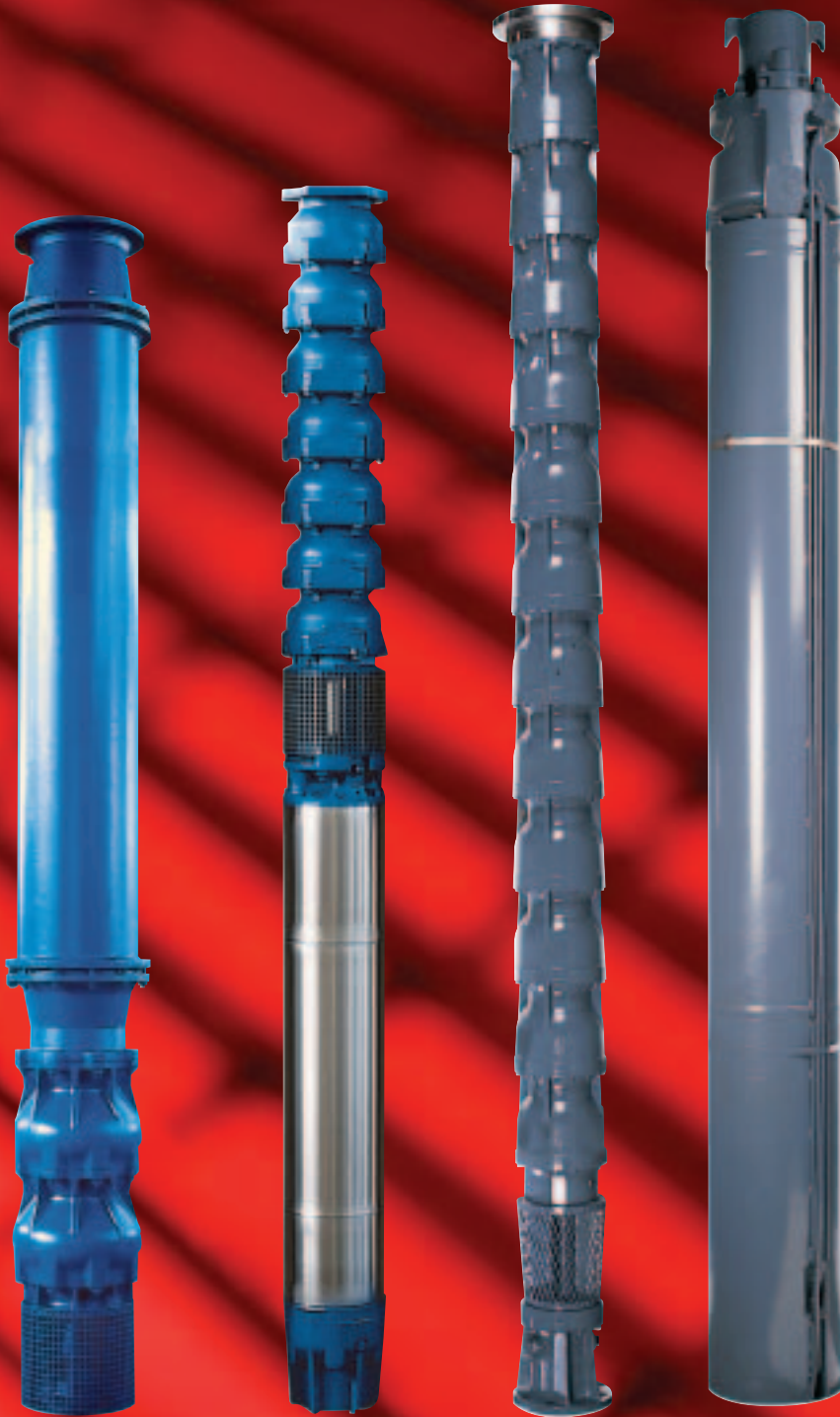




Pump Division



SUBM

***Submersible
Motors - Pumps***

***Byron Jackson[®]
Oil Filled
Design***

***Pleuger[®]
Water Filled
Design***

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:

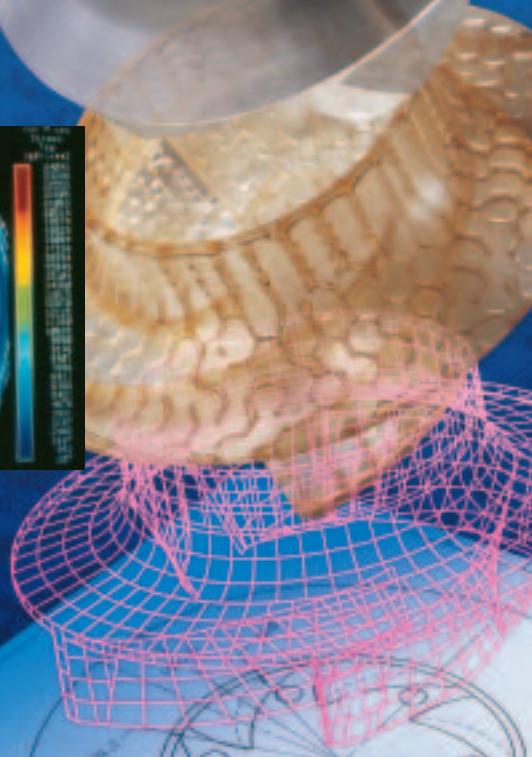
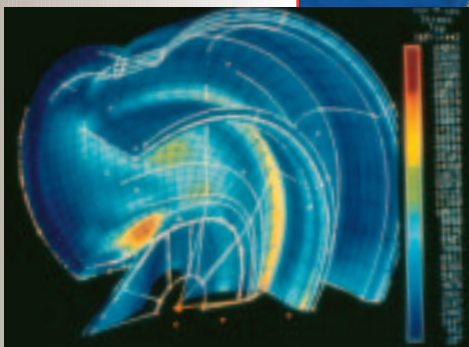
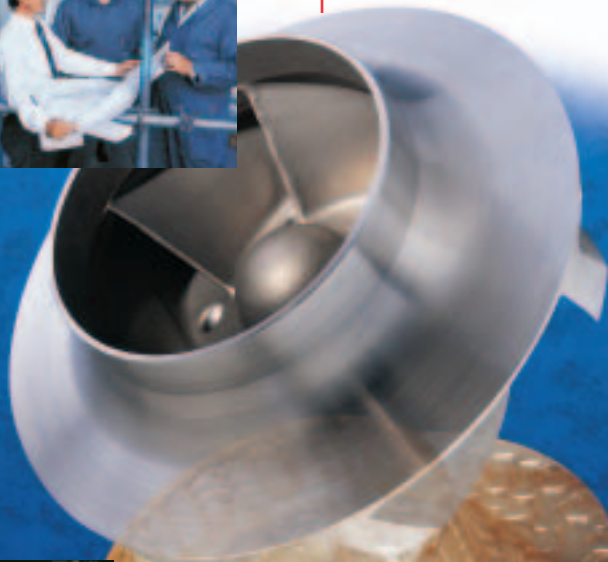
- Hydraulic engineering
- Mechanical design
- Materials science
- Intelligent pumping
- Manufacturing technology

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



SUBM
Submersible
Motors - Pumps

Byron Jackson
Oil Filled
Design

Pleuger
Water Filled
Design

A Choice of Design

Flowserve is unique as the only company capable of offering its customers a choice of either oil filled or water filled submersible motors complete with proprietary pump ends. This enables customers to select the design that best meets their needs in terms of:

- Application
- Preference and specifications
- Initial purchase cost versus total life cycle costs

Both designs have been proven with more than 150 years of combined, successful application experience. Flowserve submersible motor pumps offer these important advantages:

- Single source motor and pump with unit responsibility for quality, engineering, service and warranty
- Broadest range of submersible-deep well pumps and motors in the world
- Largest range of motor horsepower per caisson size
- Choice of cooling - lubrication systems
- Extensive seal options including zero-leakage, zero-wear design
- High efficiency and maximum flow rate per well size
- Robust design for long service life
- Re-windable motors for lower maintenance costs
- Special designs and materials for offshore, geothermal and other demanding applications

Worldwide Repair

Factory authorized service centers are located in North America, Europe and the Middle East. Submersible Motor Exchange Program is available for most standard motor sizes.

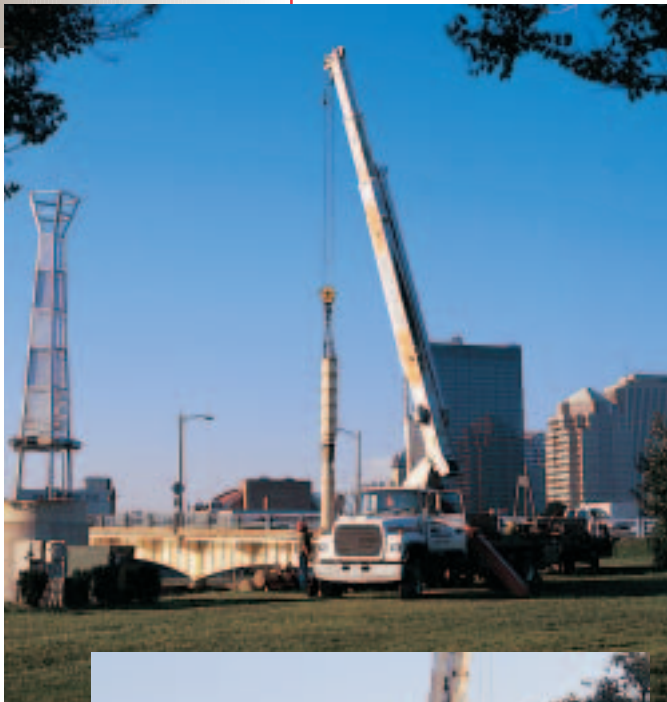
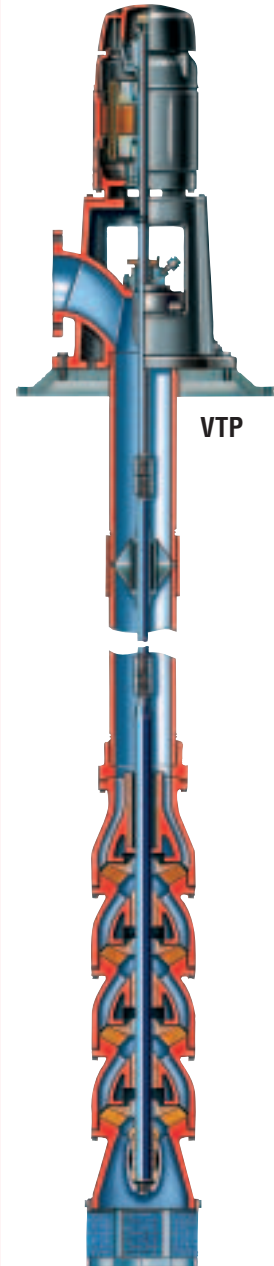
Submersible Advantages

- Reliable
- Explosion proof
- Cost effective
- Silent
- Out of sight
- Vandal proof
- Crooked well compatible
- Safe from flooding and freezing
- Ideal for deep settings

Complementary Pump Designs

Depending upon application requirements, Flowserve can also provide these vertical design pumps:

- Vertical turbine
- Mixed-axial flow
- Double suction



Pleuger Water Filled Design

Pleuger submersible motors offer an extraordinary range of performance.

The water filled and wet wound motors are environmentally friendly, provide high efficiency and offer great reliability. Superior thrust bearing design, a 100% pressure compensation system, re-windable stators and a choice of materials for both strength and dielectric characteristics are several features making Pleuger submersible motors an exceptional value.

Services

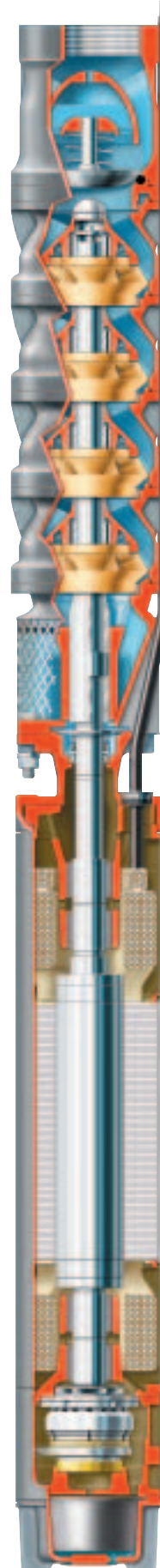
- Municipal
- Industrial
- Process
- Offshore
- Mining
- Irrigation
- Power

Typical Applications

- Potable water
 - Fire protection
 - Ballast
- Dewatering
- Pressure boosting
 - High rise buildings
 - Fountains
- Subsea drives
- Pipelines

Operating Parameters

- Flows to 4500 m³/h (19 800 gpm)
- Heads to 800 m (2600 ft)
- Motor sizes to 5000 kW (6700 hp)
 - Speeds from 200 to 3600 rpm
 - 2, 4 and 6 pole designs (other designs available)
 - 200 to 6600 volt
 - 50 & 60 Hz frequency
 - Variable frequency drive and high temperature motor options



Standard Design Features Motors

- Pressure balanced mechanical seal available in many materials to best suit application
- Large, double journal bearings water lubricated and maintenance free for extended service life
- Wet type motors with water tight insulated windings for easy service
- Prefilled motors with food grade additives for freeze and rust protection
- Heavy duty, adjustable, self-aligning thrust bearings for extended motor life
- NEMA connections for universal fit
- Non-toxic Class Y winding insulation for potable water services
- Friction welded shafts for maximum shaft strength and highest efficiency
- Motors with CSA, WIMES 3.03, EMV, KTV, CE, VDE and other authority certifications

Pumps

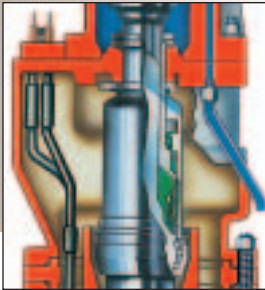
- Heavy duty and high efficiency impellers and bowl cases
- Wide variety of bearing, impeller and bowl casing materials to suit any application
- Dynamically balanced impellers to minimize vibration and maximize service life
- Compact adaption system between pump and motor for maximum shaft support

Cables

- Power cable internally connected to eliminate potential leaks

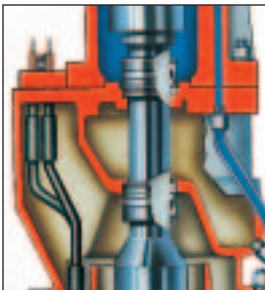
Byron Jackson Oil Filled Design

Seal Options



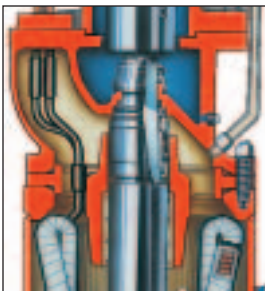
Mercury seal

Zero leakage, zero wear for absolute reliability



Double mechanical seal

A high quality alternative to the mercury seal



Single, pressurized mechanical seal

For hydrocarbon services and non-vertical applications

Byron Jackson oil filled submersible units are built for the most demanding deep well services. Rugged, reliable and long lasting, these units offer significant total life cycle cost savings.

Services

- Municipal
- Industrial
- Process
- Offshore
- Mining
- Irrigation
- Power

Typical Applications

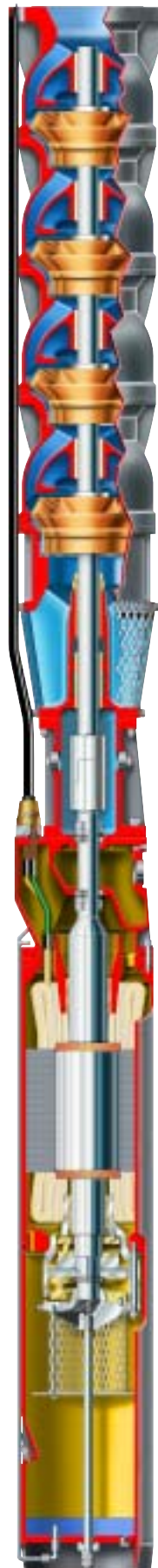
- Potable water
- Storage cavern
- Sea water
 - Fire protection
 - Ballast
- Dewatering
- Pressure boosting
 - Fountains
- Geothermal
- Water injection system
- Pipelines

Operating Parameters

- Flows to 4500 m³/h (19 800 gpm)
- Heads to 800 m (2600 ft)
- Motor sizes to 1500 kW (2000 hp)
 - Speeds from 1000 to 3600 rpm
 - 2, 4 and 6 pole designs (other designs available)
 - 200 to 6600 volt
 - 50 & 60 Hz frequencies
 - Variable frequency drive and high temperature motor options

Accredited for water handling services

- NSF Standard 61 Certification according to criteria established jointly by the U.S. ASME and NSF International
- Certification program accredited by RvA, the Dutch Council for Accreditation



Standard Design Features Motors

- Oil filled with internal self contained force feed, filtered, cooled oil circulation system to maintain continuous lubrication
- Vacuum pressure impregnated (VPI) epoxy, Class F insulation system for superior insulation and long service life
- Double-acting thrust bearing system for continuous up or down thrust capability
- Special metallurgy available for corrosive services
- Suitable for use with variable frequency drives for improved pumping efficiency
- Models available for high temperature ($\geq 90^{\circ}\text{C}$ [200°F]) and high suction pressure services

Pumps

- Heavy duty and high efficiency impellers and bowl cases
- Wide variety of materials available to suit any application
- Dynamically balanced impellers to minimize vibration and maximize service life
- Dual bearings between pump and motor for maximum shaft support
- Highly efficient suction inlet design

Cables

- Sealed power cable plug-in feature for reliability and ease of installation; no need for field splicing

Options and Technical Data

Pump Impellers

- Low NPSHR for hydrocarbons and low submergence
- Non-metallic for enhanced performance and corrosion resistance
- Multiple specific speeds for optimum selection

Pump Materials

- Cast iron
- Bronze
- Stainless steel
- Duplex and super duplex stainless steel
- Reinforced composite (Noryl®)

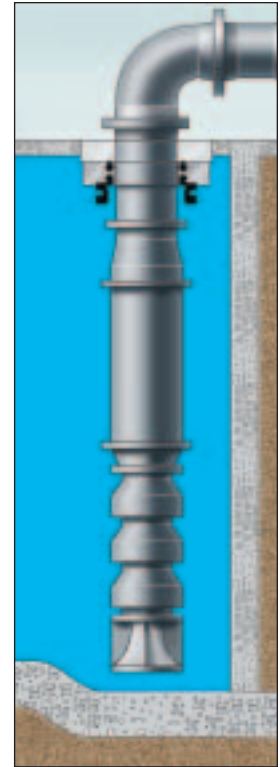
Accessories

- Power cable assemblies
- Surface plates
- Junction boxes
- Suction sleeves
- Booster barrels
- Starters and control panels
- Monitoring instrumentation
- Lightning arresters
- Check valves

Bottom Intake

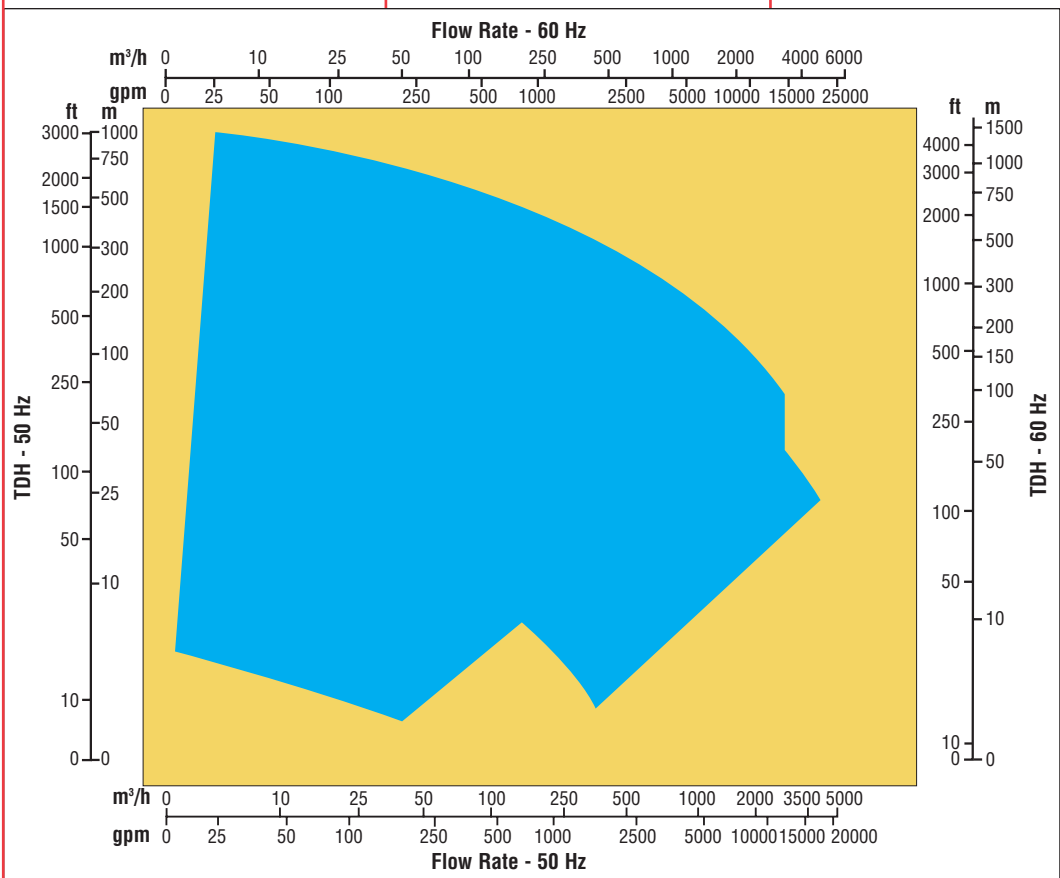
- Reduced civil cost (sump design)
- Minimum submergence design
- Modular design
- Tank installation
- Open sump installation

© Noryl is a registered trademark of General Electric Company Corporation.



Bottom suction multistage

SUBM Range Chart

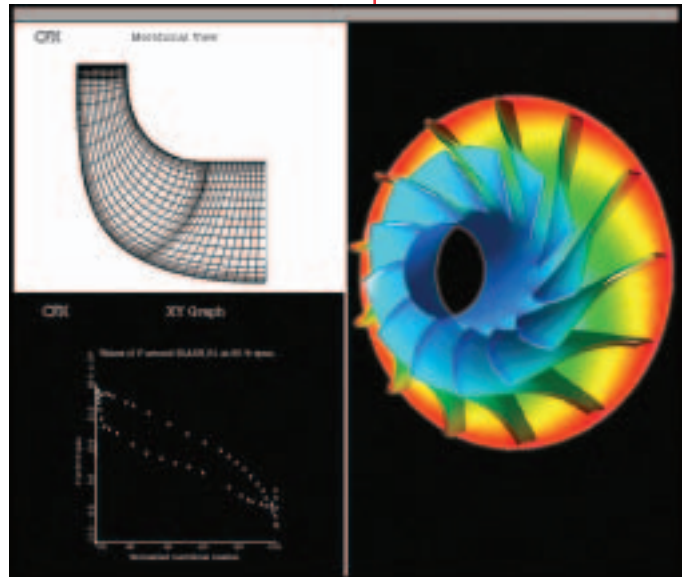
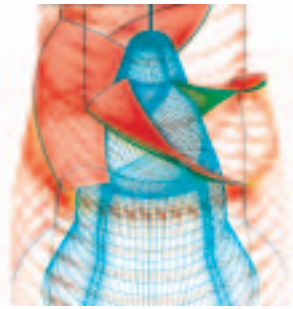


Global Service and Technical Support

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**



USA and Canada

Flowserve Corporation
Pump Division
Millennium Center
222 Las Colinas Blvd., 15th Floor
Irving, Texas 75039-5421 USA
Telephone: 1 972 443 6500
Telefax: 1 972 443 6800

Europe, Middle East, Africa

Worthington S.P.A.
Flowserve Corporation
Via Rossini 90/92
20033 Desio (Milan), Italy
Telephone: 39 0362 6121
Telefax: 39 0362 303396



Pump Division

Your local Flowserve representative:

**To find your local Flowserve representative
please use the Sales Support Locator System
found at www.flowserve.com**

Or call toll free: 1 800 728 PUMP

Latin America and Caribbean

Flowserve Corporation
Pump Division
6840 Wynnwood Lane
Houston, Texas 77008 USA
Telephone: 1 713 803 4434
Telefax: 1 713 803 4497

Asia Pacific

Flowserve Pte. Ltd.
Pump Division
200 Pandan Loop #06-03/04
Pantech 21
Singapore 128388
Telephone: 65 6775 3003
Telefax: 65 6779 4607