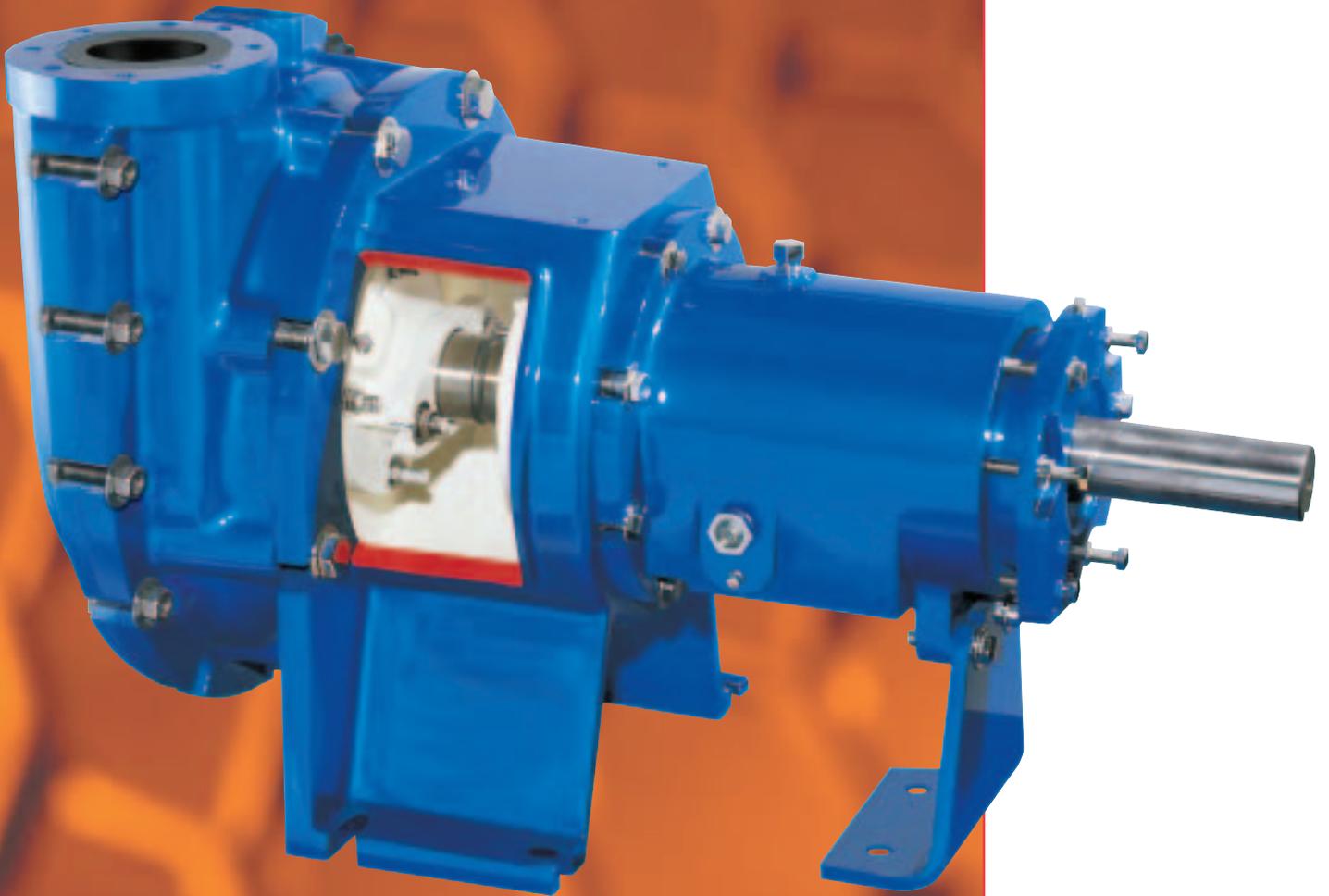




Pump Division

***Type R
Rubber Lined
Slurry 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:

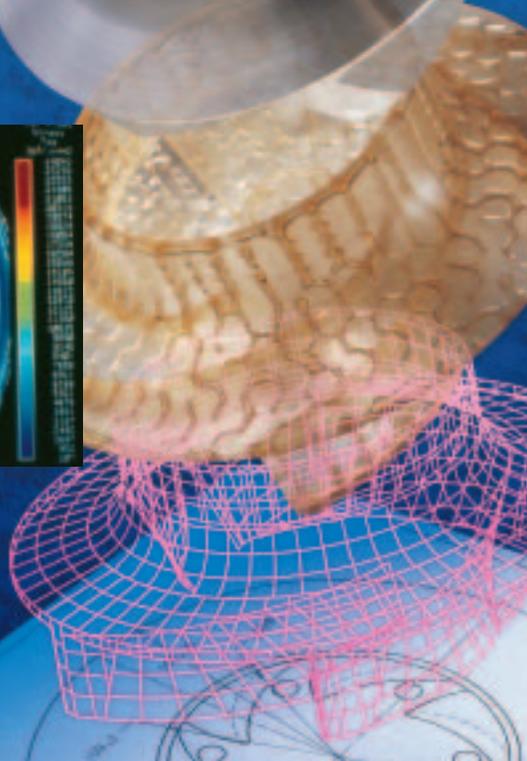
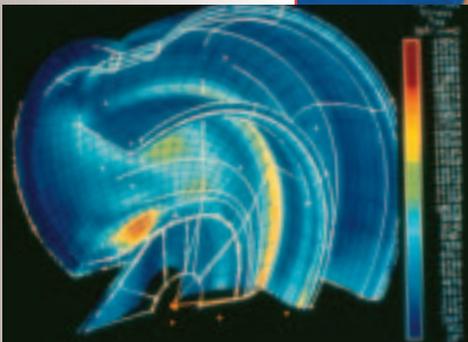
- Hydraulic engineering
- Mechanical design
- Materials science
- Intelligent pumping
- Manufacturing technology

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



**Type R
Rubber Lined
Slurry Pump**

**Engineered to Handle the
Toughest Duties**

Flowserve's type R rubber lined slurry pump reflects a century-old commitment to engineering expertise in the areas of hydraulic design, materials engineering, and manufacturing excellence to combat some of the mining and metal production industries' toughest problems.

The R pump is one of a range of slurry pumps that includes the hard metal M slurry pump. Comprising thirty-four liquid ends, this family of liquid pumps forms the most comprehensive line of slurry pumps available.

Interchangeability of Parts

Interchangeability among the various R pump and M pump configurations translates into reduced inventory requirements and reduced operating costs.

Significant Benefits

- Versatility
 - Multiple configurations
 - Choice of materials
 - Parts interchangeability
 - Several shaft sealing options
- Reliability
 - Extra thick wear allowances
 - Oversized shaft and bearings
 - Stuffing box protector plate
- Ease of maintenance
 - Open stuffing box access
 - Cartridge style bearing frame
- Reduced operating costs
 - Optimal hydraulic selection

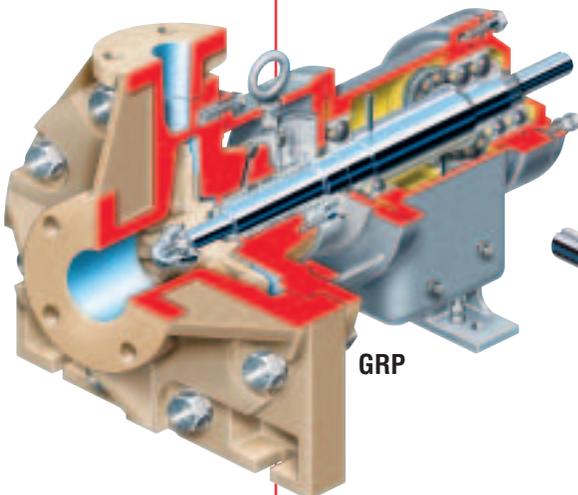
Applications

- Mineral processing
 - Acidic slurries
 - Fine tailings
 - Leaching
 - Electrolysis
- Pulp and paper
 - Lime and mud
 - $\text{Ca}(\text{CO})_3$ and TiO_2
- Air pollution
 - Gypsum slurries
 - Absorber pumps
- Water pollution
 - Mill effluent

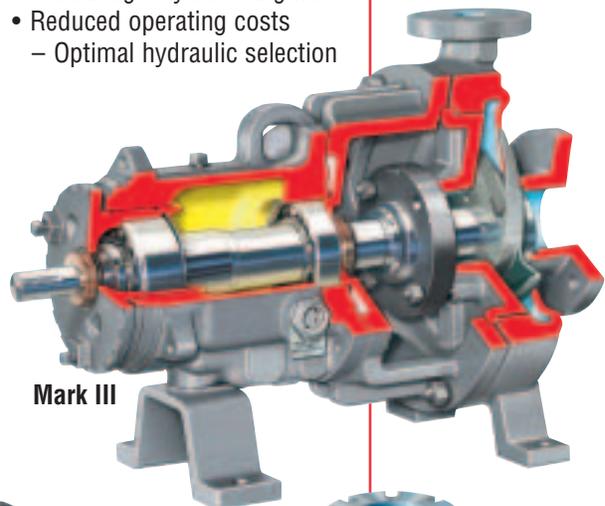
**Complementary
Pump Designs**

Depending upon application, Flowserve also offers the following pump designs:

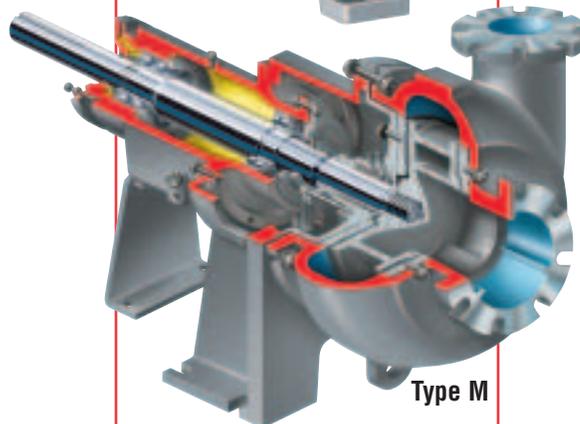
- Type M hard metal slurry pump
- Mark III metallic ASME (ANSI) process pump
- GRP non-metallic ASME (ANSI) pump



GRP



Mark III



Type M

**Type R
Rubber Lined
Slurry Pump**

The type R rubber lined slurry pump is a horizontal, single stage, end suction design, with a tangential discharge nozzle. Engineered to handle high concentrations of fine abrasive solids in suspension or corrosive and abrasive mixtures, the type R is a workhorse in solids handling industries.

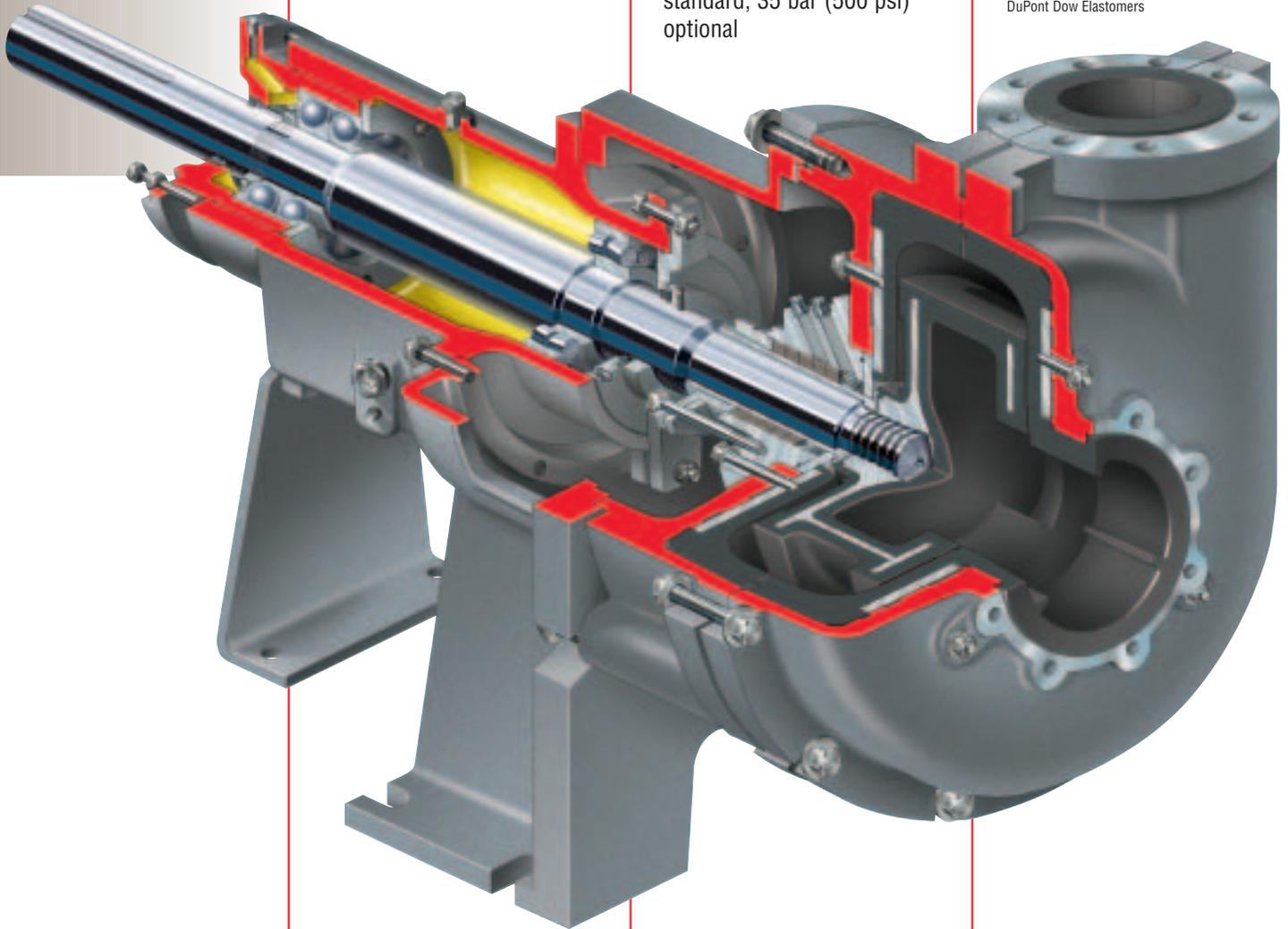
Operating Parameters

- Flows to 10 000 m³/h (44 000 gpm)
- Heads to 50 m (160 ft)
- Temperatures:
 - Natural Rubber 65°C (150°F)
 - Neoprene 100°C (200°F)
 - Nitrile/Hypalon® 110°C (225°F)
- Pressures to 10 bar (150 psi) standard; 35 bar (500 psi) optional

Typical Service Conditions

- Solids from ppm to 70 percent by weight
- Specific gravities from 1.0 to 2.7
- Particle diameter to 3 mm (1/8 in), rounded corners

© Hypalon is a registered trademark of DuPont Dow Elastomers



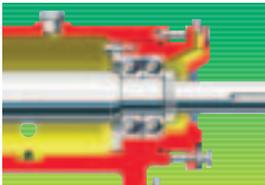
Anti Pre-rotation Vanes reduce suction pipe swirl and extend impeller life

Casing is radially split to provide access to liners. The standard cast iron materials may be upgraded to high tensile strength steel for increased working pressures and temperatures. Raised bosses, or spacers on larger pumps, apply the proper compression on the liners

Flanges are compatible with ASME (ANSI) Class 150 Flat Faced. Liners extend beyond casing to form a gasket seal

Impeller is pressure molded to ductile iron skeleton that can be dynamically balanced. Enclosed design has pump-out vanes on front and rear shrouds to reduce stuffing box pressure and suction recirculation while sweeping away solids

Heavy-Duty Bearing Frame is generously sized to handle belt loads and can be easily removed in one piece for maintenance

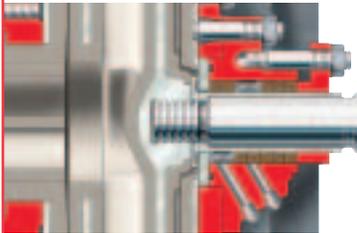


Three-point External End Clearance Adjustment
restores impeller front clearance to optimize efficiency, without using shims

Casing Liners are pressure molded on steel backing plates and anchored with studs and nuts. Multiple materials for abrasion, corrosion and high temperature resistance are available. Squared corners minimize chance of liner collapse under high vacuum

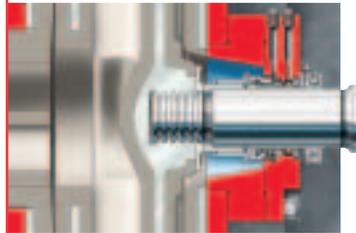
Stuffing Box access is from side openings on smaller units which permits maintenance when motors are mounted above the pumps. For units with motors too large for overhead mounting, the access is from the large top opening

Hook Sleeve and replaceable metallic impeller spacer have gasket seals to isolate shaft and impeller threads from slurry. Extends life of costly parts and eases impeller removal



Flushed Packing or Mechanical Seal

- Cast iron stuffing box standard
- Acid resistant stuffing box kits available for services in which the pH is less than 4.5. These include:
 - 316 SS
 - Duplex stainless steel
 - Hastelloy® G276
- Replaceable protector plate prevents wear on stuffing box and restricts solids entry
- High flow flush option
 - Lantern ring followed by five rings of packing (L5)
- Standard flush option
 - Two rings of packing, the lantern ring and three more rings of packing (2L3)



Product Flush Slurry Seals

- Straight bore stuffing box removed
- Seal is located directly behind impeller and fitted in tapered housing for optimum product circulation



© Hastelloy is a registered trademark of Haynes International

Options and Technical Data

Vertical Rubber Lined Designs

Flowserve also offers rubber lined vertical configurations – RJ water lubricated lineshaft and RJC cantilever designs. Using the horizontal liquid end, the RJ and RJC are suitable for a broad range of wet pit applications. For even greater flexibility, the RJ and RJC pumps may be directly coupled or V-belt driven.

RJC Cantilever Pump

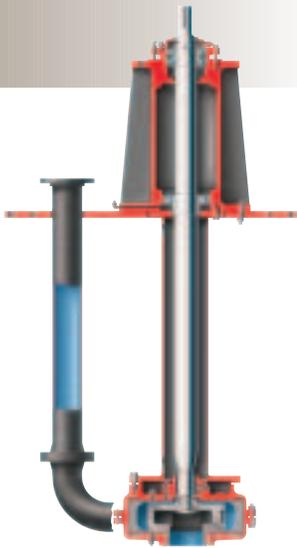
A true stiff-shaft cantilever design, without bottom bearings, the RJC pump is particularly well suited for applications where flushing liquids are not available or cannot be tolerated.

RJ Lineshaft Design

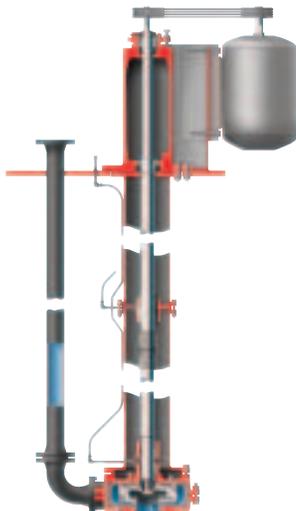
A vertical pump with bottom bearings, the line bearings and any spider bearings are submerged. Thrust bearings are mounted above the sump. The lower bearing housing is fitted with a rubber or graphite fluted bearing. This bearing is contained in a rigid stainless steel shell and lubricated from an external clear liquid source.

RJ and RJC Operating Parameters

- Flows to 1350 m³/h (6000 gpm)
- Heads to 30 m (100 ft)



RJC - Cantilever



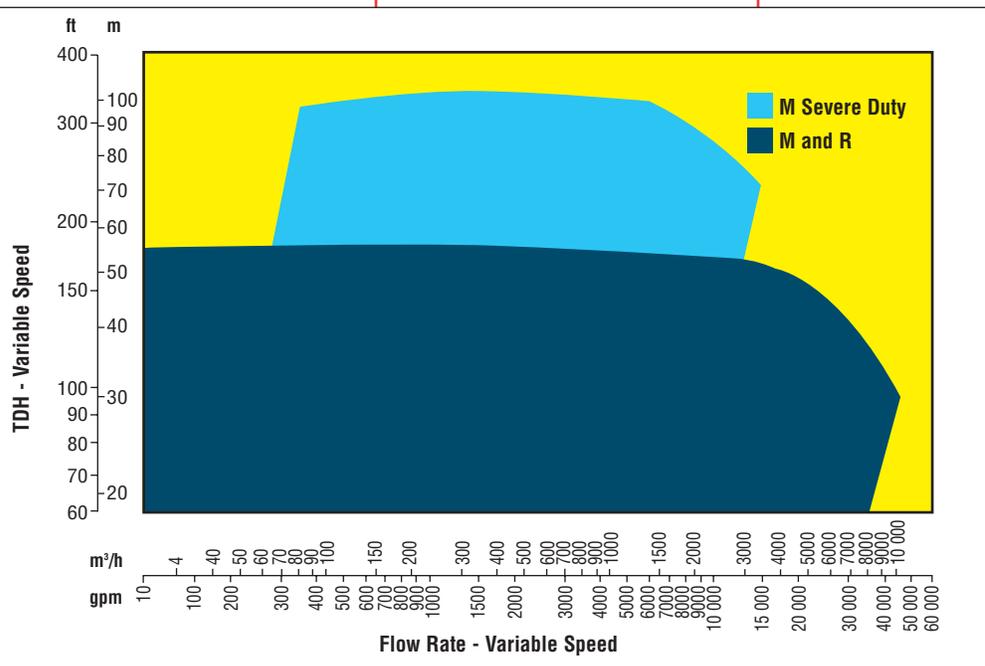
RJ - Lineshaft

Standard Materials of Construction

Component	Material
Suction Side Casing Liner Gland Side Casing Liner Impeller	Natural Rubber, Neoprene, Nitrile, Hypalon, Chlorobutyl, Urethane or Ceramic
Suction Side Casing Gland Side Casing Stuffing Box* Adapter Support Bearing Cartridge Thrust Bearing Cartridge Line Bearing Cover	Cast Iron
Shaft Sleeve*	Hard Faced 317L
Packing	Non-Asbestos Fiber
Shaft*	Steel
Gland Gland Studs and Nuts Seal Cage	Stainless Steel
Protector Plate*	Hard Steel

* Corrosion resistant metallic alloys available.

Type R Range Chart

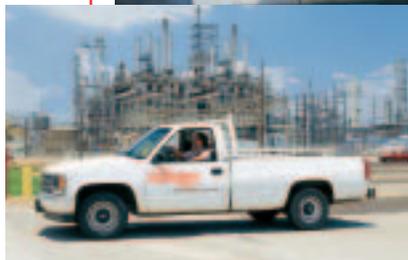
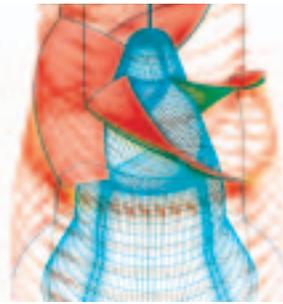


Global Service and Technical Support

Advanced Technologies

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

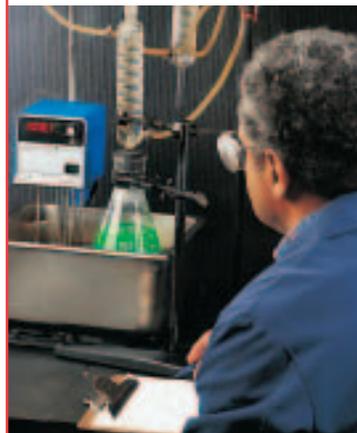
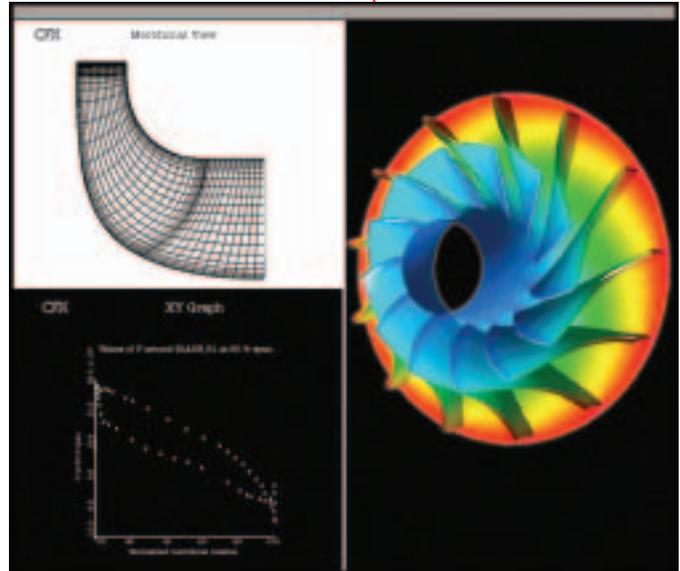
- Computational fluid dynamics
- Flow visualization
- Cavitation studies
- Efficiency optimization
- Finite element analysis
- Rapid prototyping
- Captive high nickel alloy and light reactive alloy foundries
- Non-metallic materials processing and manufacturing



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