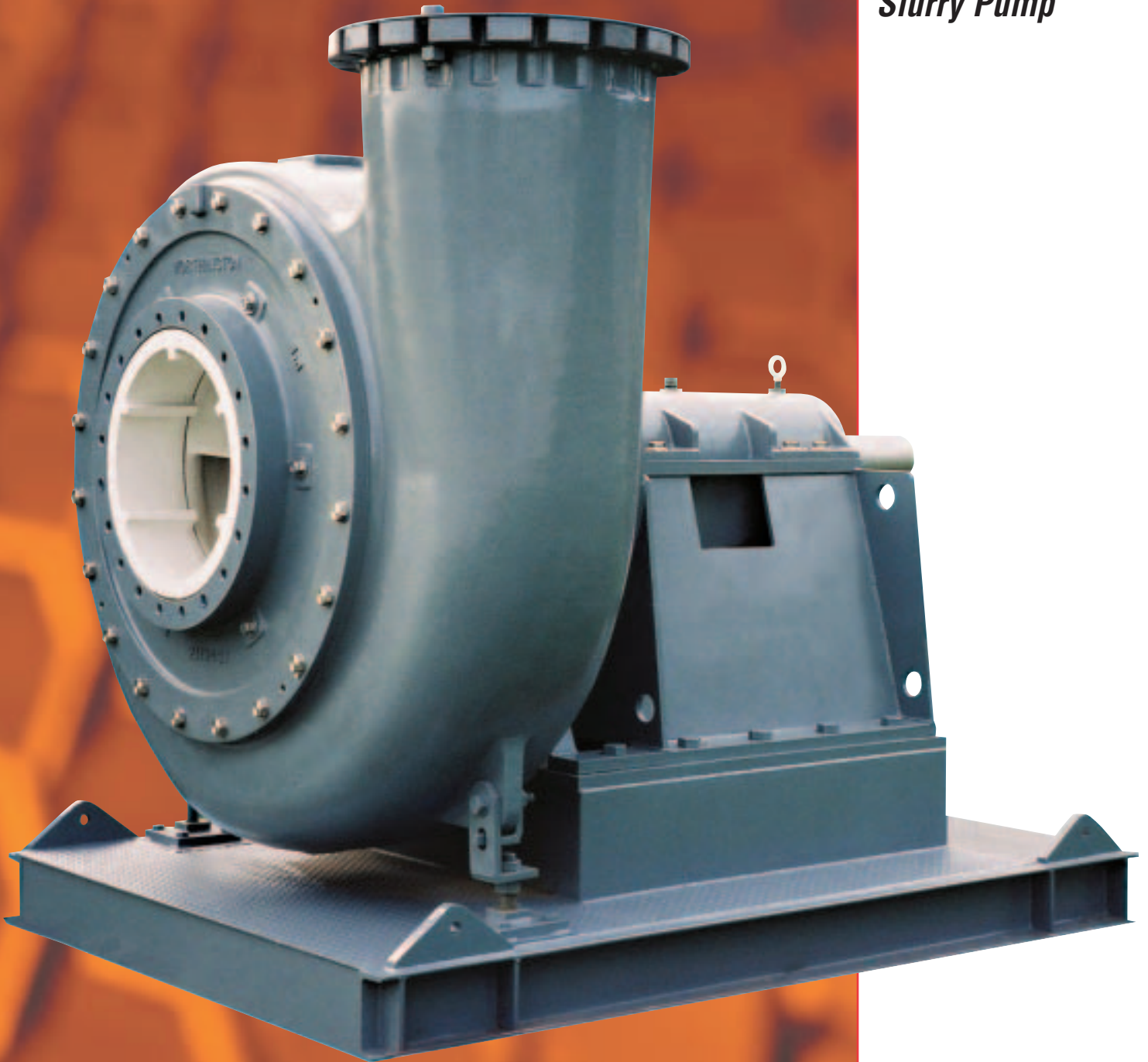




Pump Division

***Type M
Hard Metal
Abrasive
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:

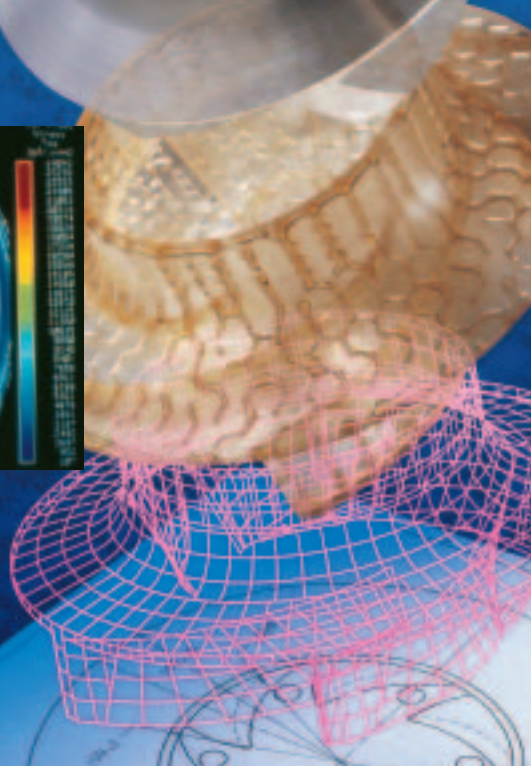
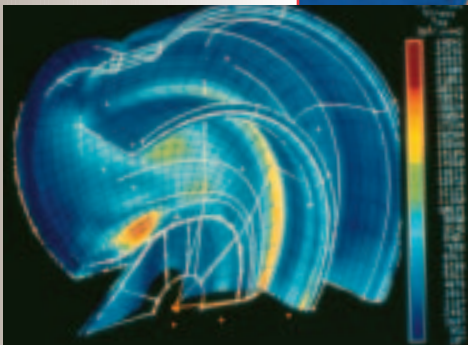
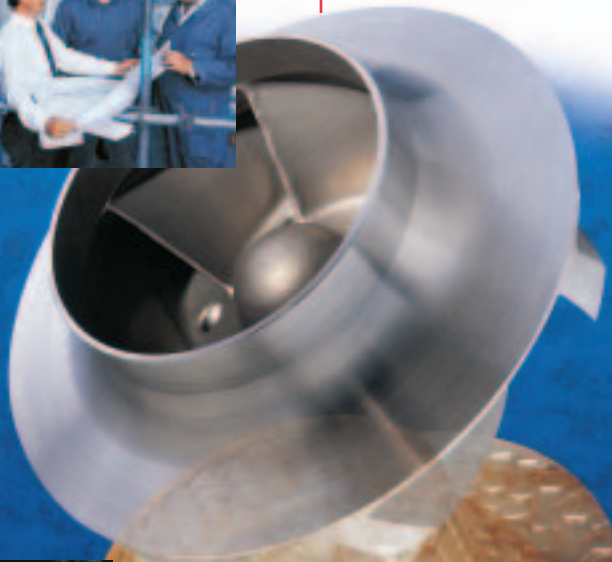
- Hydraulic engineering
- Mechanical design
- Materials science
- Intelligent pumping
- Manufacturing technology

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 M
Hard Metal
Abrasive
Slurry Pump**

**Engineered to Handle the
Toughest Duties**

Flowserve's type M hard metal abrasive 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 applications.

Interchangeability of Parts

Interchangeability among the various slurry pump configurations translates into reduced inventory requirements and reduced operating costs. Facilitating changes in service or operating conditions, the liquid end can be converted to or from the rubber lined design.

Applications

- Mining and mineral processing
- Primary metals processing
- Sand and gravel
- Flue gas wet scrubbing
- Synthetic fuels
- Ethanol production
- Vertical sump

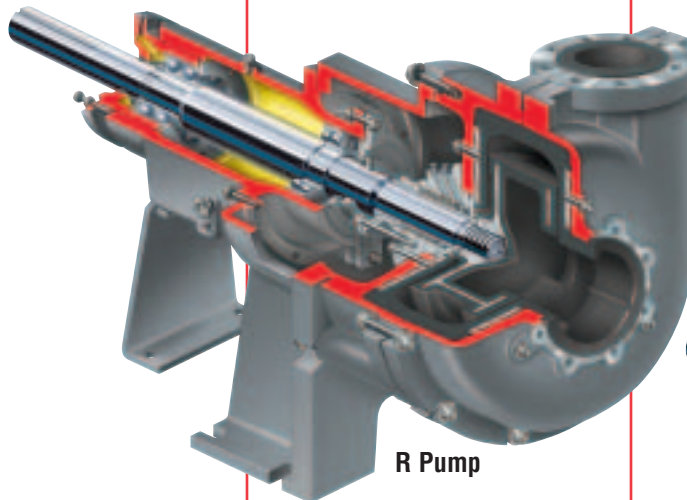
Significant Benefits

- Versatility
 - Multiple configurations
 - Choice of materials
 - Various impeller designs
 - 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

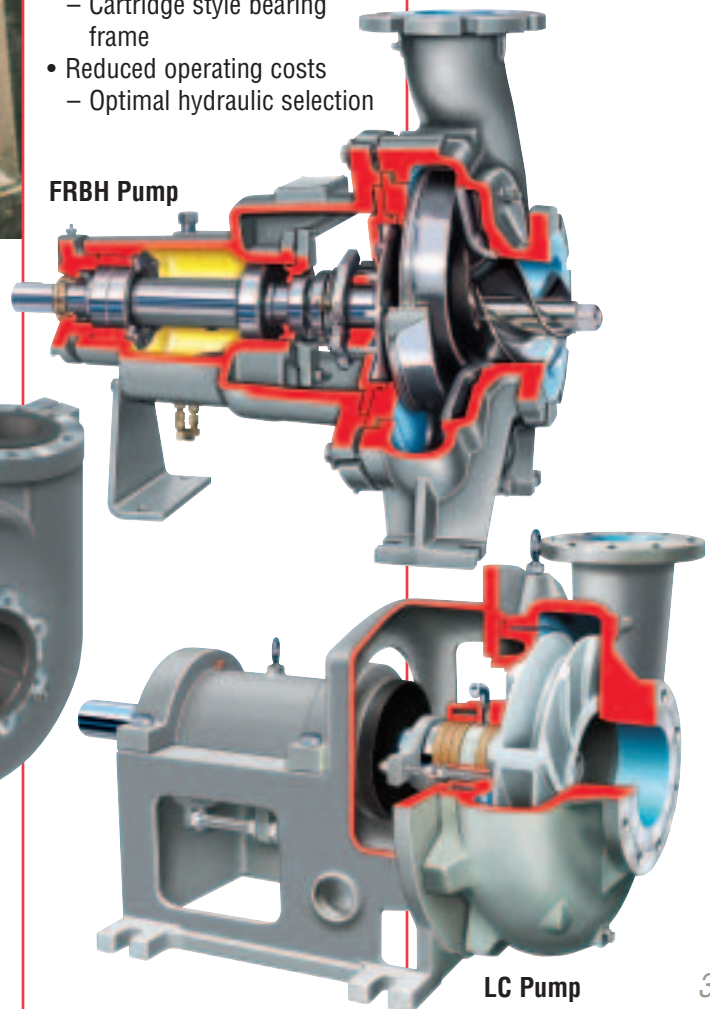
**Complementary
Pump Designs**

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

- Type R rubber lined slurry pump
- FRBH medium duty process pump
- Type LC metallic acidic slurry pump



R Pump



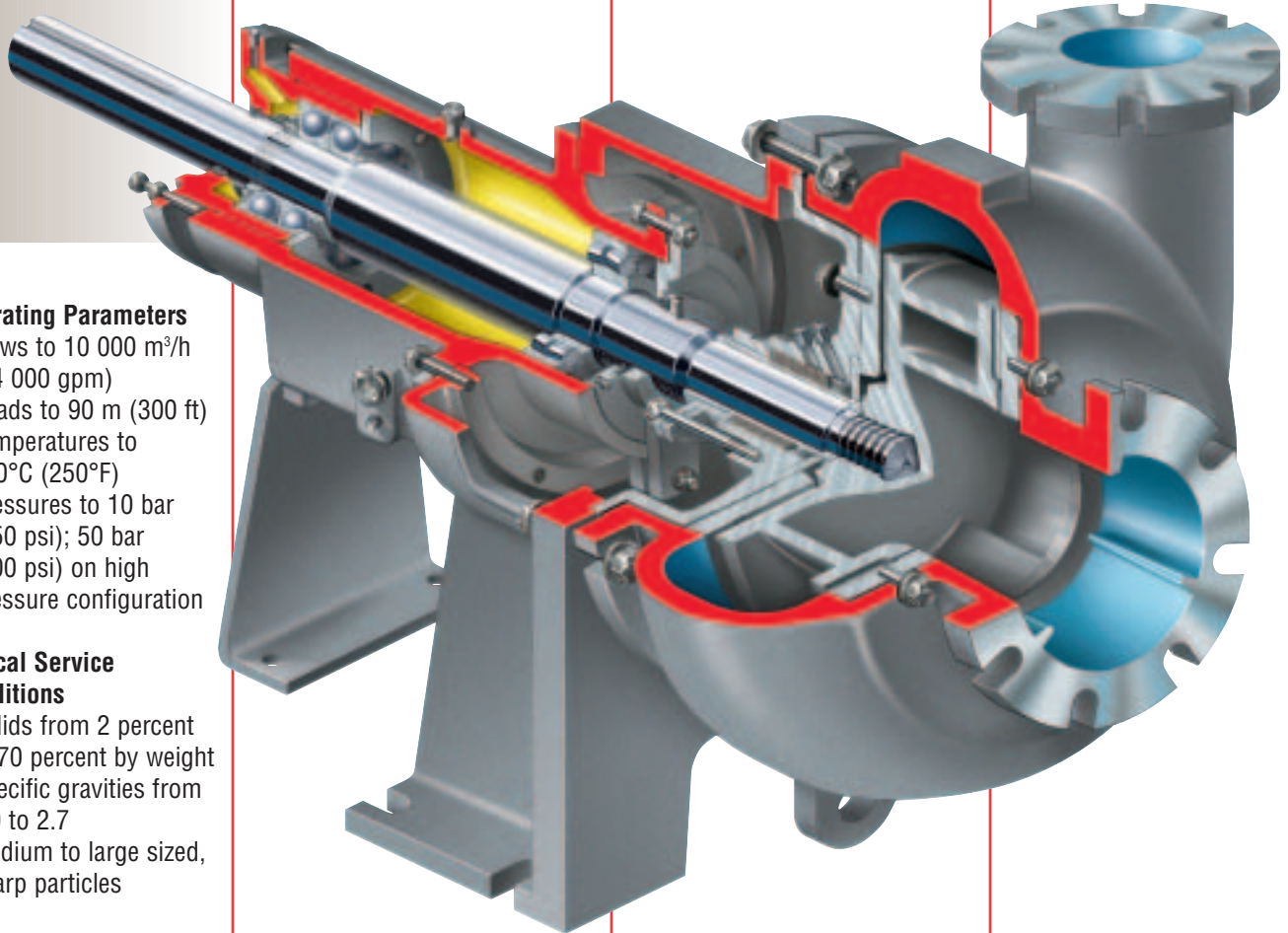
FRBH Pump

LC Pump

Type M Hard Metal Abrasive Slurry Pump

Flowserve's type M hard metal slurry pump is a horizontal, single stage, end suction design with a tangential discharge nozzle. Fitted with a hard metal liquid end, the M pump is engineered to handle high concentrations of coarse, abrasive solids in suspension.

The M pump is one of thirty-four liquid ends, forming the most comprehensive family of slurry pumps available. This comprehensive product line allows pumps to be sized near their peak efficiency.

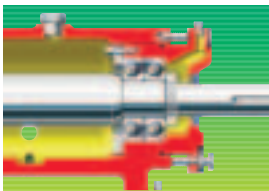


Operating Parameters

- Flows to 10 000 m³/h (44 000 gpm)
- Heads to 90 m (300 ft)
- Temperatures to 120°C (250°F)
- Pressures to 10 bar (150 psi); 50 bar (700 psi) on high pressure configuration

Typical Service Conditions

- Solids from 2 percent to 70 percent by weight
- Specific gravities from 1.0 to 2.7
- Medium to large sized, sharp particles



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

Closed Impeller with external pumping vanes on front and rear shroud reduces stuffing box pressure and suction recirculation while sweeping away solids

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

Hook Sleeve and replaceable metallic impeller spacer have gasket seals to isolate shaft and impeller threads from slurry and to ease impeller removal. Locking collar and straight sleeve are used for largest sizes

Hard Metal Casing is free from cavities or other obstructions that cause wear

Hard Metal Wear Plates on front and rear sides of casing are secured externally by heavy-duty studs. Close clearance machined fits eliminate rubber wedge rings and simplify pump assembly

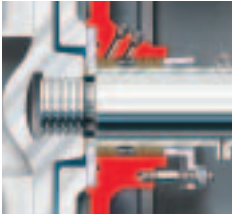
Stuffing Box access is from side openings on smaller units which permits maintenance when motors are mounted above the pumps. For units with motors too large for overhead mounting, the access is from the large top opening



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

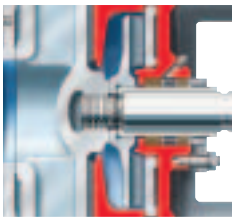
Slotted Flanges to 300 mm (12 in) diameter are compatible with ASME (ANSI) Class 150 Flat Face, and ISO PN16 ratings without adapters

Shaft Sealing Options



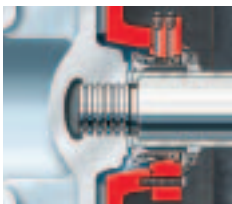
Flushed Packing or Mechanical Seal

- Cast iron or stainless
- Replaceable protector plate prevents wear on stuffing box and restricts solids from entering
- 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)



Expeller Seal

- Eliminates external flush and product dilution
- Dry running
- Grease lubricated packing forms static seal



Product Flush Slurry Seals

- Stuffing box and gland side wear plate replaced with hard metal seal housing
- Seal located behind impeller and fitted in tapered housing for optimum product circulation



M Severe Duty pump is available for aggressive applications that require higher heads in a single stage design, or for high concentrations of coarse solids.

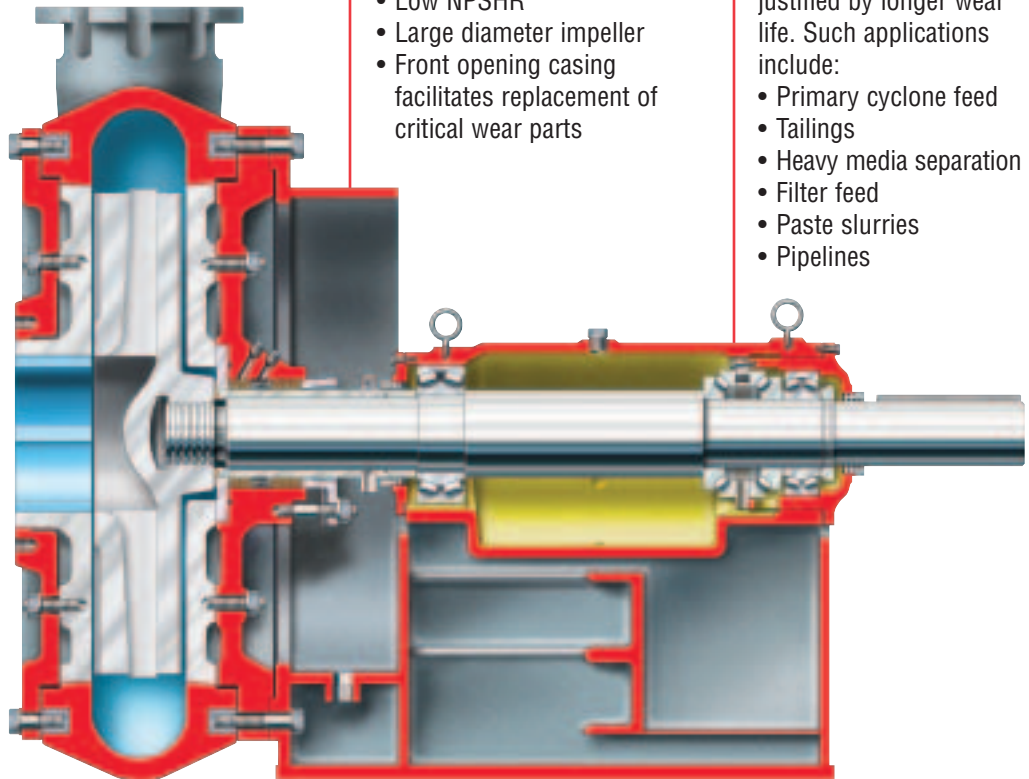
M Severe Duty Pump Characteristics

- Thicker wear parts
- Full diameter wear plates
- Low specific speeds
- Low NPSHR
- Large diameter impeller
- Front opening casing facilitates replacement of critical wear parts

Severe Duty Applications

place extra demands on pumping equipment. The higher cost for this equipment can be easily justified by longer wear life. Such applications include:

- Primary cyclone feed
- Tailings
- Heavy media separation
- Filter feed
- Paste slurries
- Pipelines



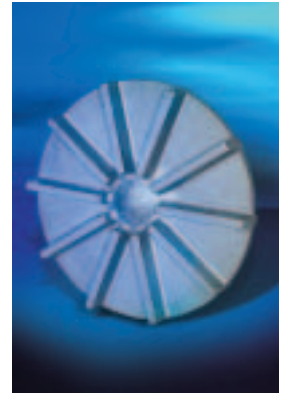
Type M Severe Duty

Options and Technical Data

Vertical Hard Metal Slurry Pumps
Flowserve also offers MJ and MJC vertical sump configurations. Designed to use horizontal liquid end parts, the MJ and MJC are suitable for wet and dry pit applications and can be directly coupled or V-belt driven.

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

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

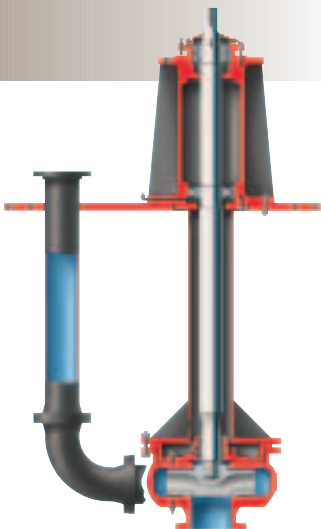


High Pressure Modifications
are available for series pumping and dewatering applications. Working pressures to 50 bar (700 psi). May include 7-ring stuffing box, high tensile yield materials and casing ribs.

Optional Vortex Impeller is a semi-open straight vane design that allows for handling of large or stringy solids and entrained air.

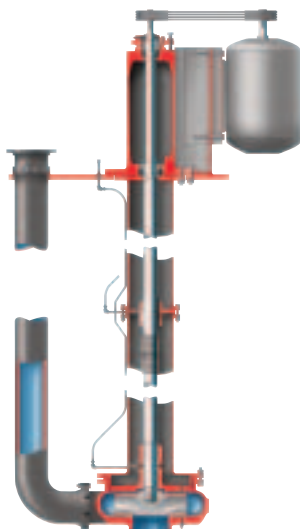
MJ and MJC Operating Parameters

- Flows to 1350 m³/h (6000 gpm)
- Heads to 75 m (250 ft)

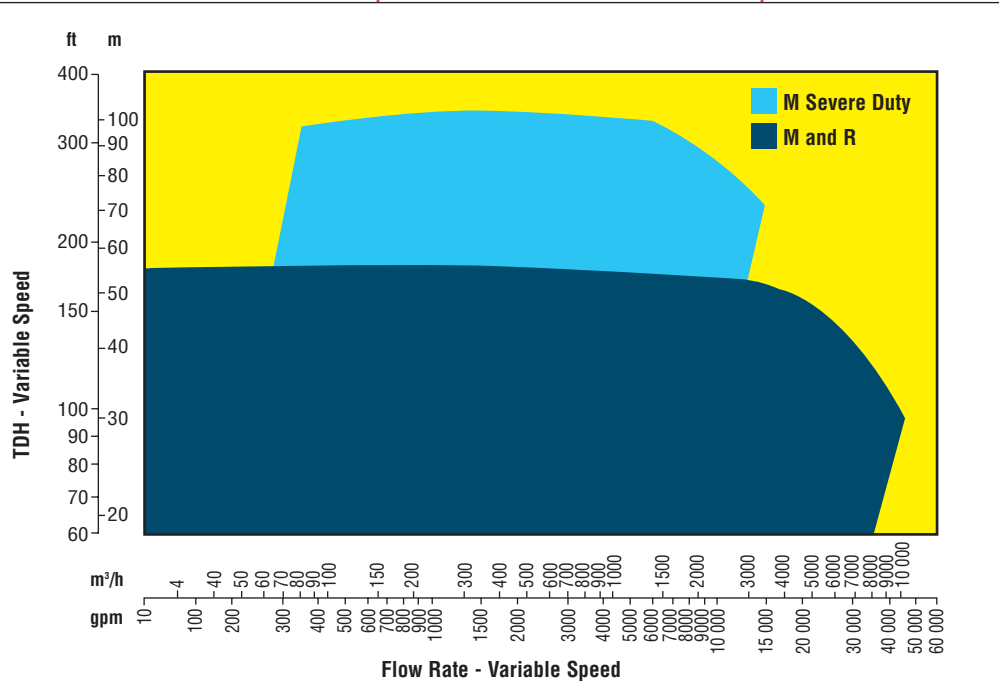


MJC - Cantilever

Type M Range Chart



MJ - Lineshaft

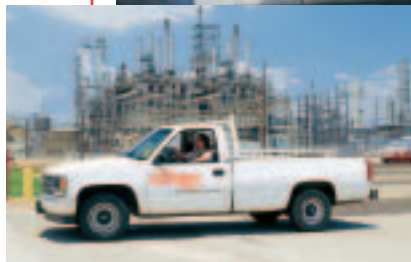
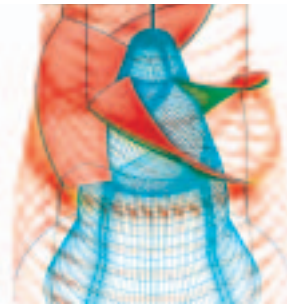


Global Service and Technical Support

Advanced Technologies

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

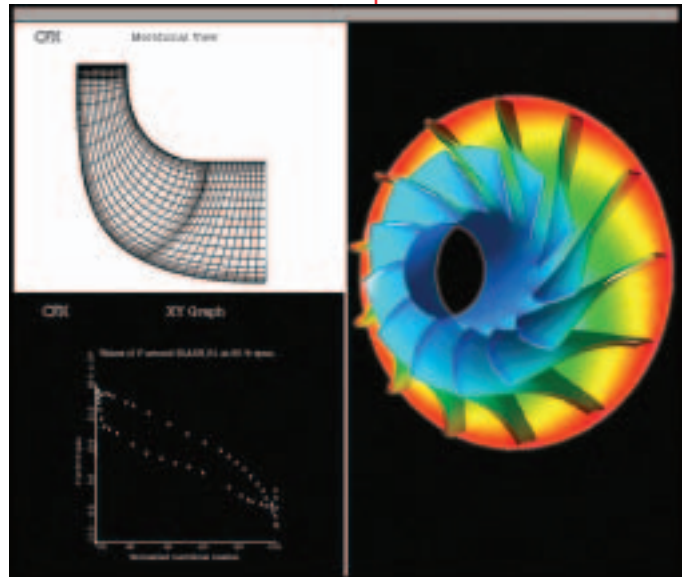
- Computational fluid dynamics
- Flow visualization
- Cavitation studies
- Efficiency optimization
- Finite element analysis
- Rapid prototyping
- Captive high nickel alloy and light reactive alloy foundries
- Non-metallic materials processing and manufacturing



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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