FLOWSERVE

Water Resources

Source Water and Water Transmission
Treatment and Distribution • Waste Water • Irrigation
Flood Control, Dry Docks and Drainage

Experience In Motion

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.

Supplier of Choice to the Water Resources Industry

Throughout its history, Flowserve has been closely identified with pumping water resources. For more than a century and a half, Flowserve has been in the forefront of virtually every significant advancement in pumping technology to meet water-handling challenges. Today, Flowserve offers the world's most complete line of pumps and systems for water applications along with a full menu of technical and service support.

Steam-driven water pump installed in the late 1800s

Product Brands of Distinction

ACEC™ Centrifugal Pumps

Aldrich™ Pumps

Byron Jackson® Pumps

Calder™ Energy Recovery Devices

Cameron™ Pumps

Durco® Process Pumps

Flowserve® Pumps

IDP® Pumps

Lawrence Pumps®

Niigata Worthington™ Pumps

Pacific® Pumps

Pleuger® Pumps

Scienco™ Pumps

Sier-Bath® Rotary Pumps

TKL™ Pumps

United Centrifugal® Pumps

Western Land Roller™ Irrigation Pumps

Wilson-Snyder® Pumps

Worthington® Pumps

Worthington Simpson™ Pumps

Pump Designs

Flowserve offers a wide range of complementary pump types, built to recognized global standards and customer specifications. These include:

- Single-stage process
- Between bearings single-stage
- Between bearings multistage
- Vertical
- Submersible motor
- Positive displacement
- Nuclear
- Specialty

Available Configurations

- Sealed and sealless
- Axially and radially split
- Volute and diffuser
- Close coupled and spacer coupled
- Single and double casing

Committed to the Complete Pump System Life Cycle

For more than two centuries, Flowserve has served industries requiring solutions that add value and reduce costs throughout the life cycle of a pumping system.

- Water
- Oil and gas
- Power generation
- Chemical
- General industry

Flowserve partners with customers to respond to the dynamic business conditions that affect them and improve efficiency, maximize throughput and control process quality. Whether customer needs involve on-site technical assistance, equipment upgrades or broader project planning with full turnkey responsibility, Flowserve delivers professional, reliable results.

Source Water and Water Transmission

Moving water from its sources to treatment or distribution facilities requires dependable, high-volume pumps. Flowserve has long, proven performance in these vital operations.

Flowserve regularly supplies pumps capable of moving up to 160 000 m^3/h (700 000 gpm) and producing up to 1060 m (3500 ft) of head. These dependable workhorses are the standards for efficiency and operating economy in an industry where these considerations are paramount.

Source Water

Surface water intake applications from streams, rivers, natural lakes and man-made reservoirs typically require a wide range of flows and pressures. Flowserve offers a complete line of vertical and horizontal pumps for these services.

Groundwater and deep well applications frequently present pumping challenges. No other company provides a broader selection of vertical turbine, line-shaft and submersible motor pump solutions than Flowserve.

Pump Types
- Short-coupled and deep well vertical turbine
- Double-suction, wet-pit, vertical centrifugal
- Wet-pit, propeller and axial flow
- Bottom intake submersible motor pumps

Water Transmission

Transporting water to treatment plants is typically handled by horizontal split-case pumps and vertical turbine pumps. These proven, robust pumps are capable of continuous or intermittent operation over a wide range of flow and pressures required to meet system loads.

Pump Types
- Horizontal, axially split, centrifugal
- Standard, end suction, centrifugal
- Overhung, ring section, multistage
- Ring section, multistage
- Deep well, vertical

Water Treatment and Distribution

Contemporary water treatment entails filtration, chemical injection, and, in some parts of the world, desalinization by reverse osmosis. Each of these, or combinations of these operations, requires special pumps with widely varying capacities and pressures. Flowserve can offer more equipment and provide the necessary expertise to select the right pumps and systems to meet exact service requirements.

Configurations from multistage centrifugal to vertical turbines are designed and built to help treat and move water efficiently and cost effectively. Capacities to 160 000 m^3/h (700 000 gpm); heads to 1060 m (3500 ft).

Water Treatment

These varied and demanding services require a broad array of pump designs and types. Flowserve pumps are offered for these applications:

- Low-lift
- Sampling
- Plant water
- Wash water
- High service

Pump Types

- Horizontal, axially split, centrifugal
- Standard, end suction, centrifugal
- Vertical, wet-pit
- Overhung, ring section, multistage
- Ring section, multistage
- Auxiliary

Distribution

Flowserve offers a full complement of both vertical and horizontal pumps to maintain adequate distribution system pressures.

Pump Types

- Horizontal, axially split, centrifugal
- Standard, end suction, centrifugal
- Ring section, multistage
- Overhung, ring section, multistage
- Submersible motor pump
- Short-coupled, vertical turbine

Waste Water

There has been a significant increase in the number of waste water treatment plants around the world. Increased pressure from environmental agencies has elevated the importance of waste water collection and treatment.

Flowserve pumps play an important role in the treatment and purification of both municipal and industrial waste water. These robust, reliable pumps are used throughout the collection — treatment — effluent cycle.

Providing low maintenance, solids handling pumps for waste water applications continue to be a particular strength of Flowserve. Increased attention to pretreatment of industrial waste water also creates a need for dependable solids handling pumps, corrosion-resistant process pumps and other specialized pumping equipment. Capacities to 45 400 m^3/h (200 000 gpm); heads to 92 m (300 ft).

Collection

The collection and conveyance of spent water to a waste treatment plant presents an extremely difficult environment. Pumping station equipment must handle sewage and wastes of almost every form and description, including both solids in suspension and in solution. Absolute reliability is the most critical requirement for these pumps.

Flowserve has an impressive record of performance in collection applications with a superior line of horizontal and vertical solids handling pumps.

Pump Types

- Standard, end suction, centrifugal
- Wet-pit, submersible, solids handling
- Vertical, wet pit, solids handling
- End suction, centrifugal, self-priming

Treatment

Flowserve is among the few companies that can supply the variety of pump types required by the many different kinds of waste water treatment facilities and processes. Applications include:

- Raw sewage
- Settled sewage
- Service water
- Return-activated sludge
- Waste-activated sludge
- Effluent
- Sequencing batch reactors
- Denitrification

Disposal and Reuse

Flowserve pumps are used in effluent discharge and reuse throughout the treatment plant facility.

Pump Types

- Standard, end suction, centrifugal
- End suction, solids handling
- Horizontal, axially split, centrifugal
- Short-coupled, vertical turbine
- Vertical, wet-pit, solids handling
- Wet-pit, propeller and axial flow

Irrigation

Irrigation pumps play an essential role in converting arid land into agriculturally productive farms, housing and recreation sites. Whether drawn from surface or sub-surface sources or, more increasingly, from the final effluent of sewage treatment plants, Flowserve has the pumps to effectively and reliably secure and distribute these essential waters.

Pump Types

- Surface water
  - Standard, end suction, centrifugal
  - Overhung, ring section, multistage
  - Multistage, ring section
  - Double-suction, axially split
  - Vertical, mixed flow
- Groundwater
  - Submersible motor pumps
  - Vertical turbine
  - Wet-pit and dry-pit, axial flow

Flood Control, Dry Docks and Drainage

Reliability is an absolutely essential pump characteristic in drainage applications. A close second is sufficient capacity. Flowserve is without equal in providing pumps for on/off cycling and continuous operation for the evacuation of water due to seepage, runoff and natural forces. Whether it is the daily security of a major city or the ongoing reclamation of a nation's low country, Flowserve has the equipment and applications expertise to accomplish the task.

Pump Types

- Submersible motor pump, bottom intake (Polder)
- Wet-pit and dry-pit, axial and mixed flow
- Concrete volute
- End suction

Vertical Water Pumps

Vertical Turbine Pumps

Single- or multistage designs with above- or below-grade discharge, enclosed or semi-open impellers, open or enclosed lineshafts, single or double case

Operating Parameters

- Flows to 13 600 m^3/h (60 000 gpm)
- Heads to 1070 m (1450 ft)
- Pressures to 100 bar (1450 psi)

Vertical, Double-Suction, Double Volute Pumps

Single- or multistage designs with heavy-wall double volute casing, double-suction (first-stage) impeller, open or enclosed lineshafts, single or double case

Operating Parameters

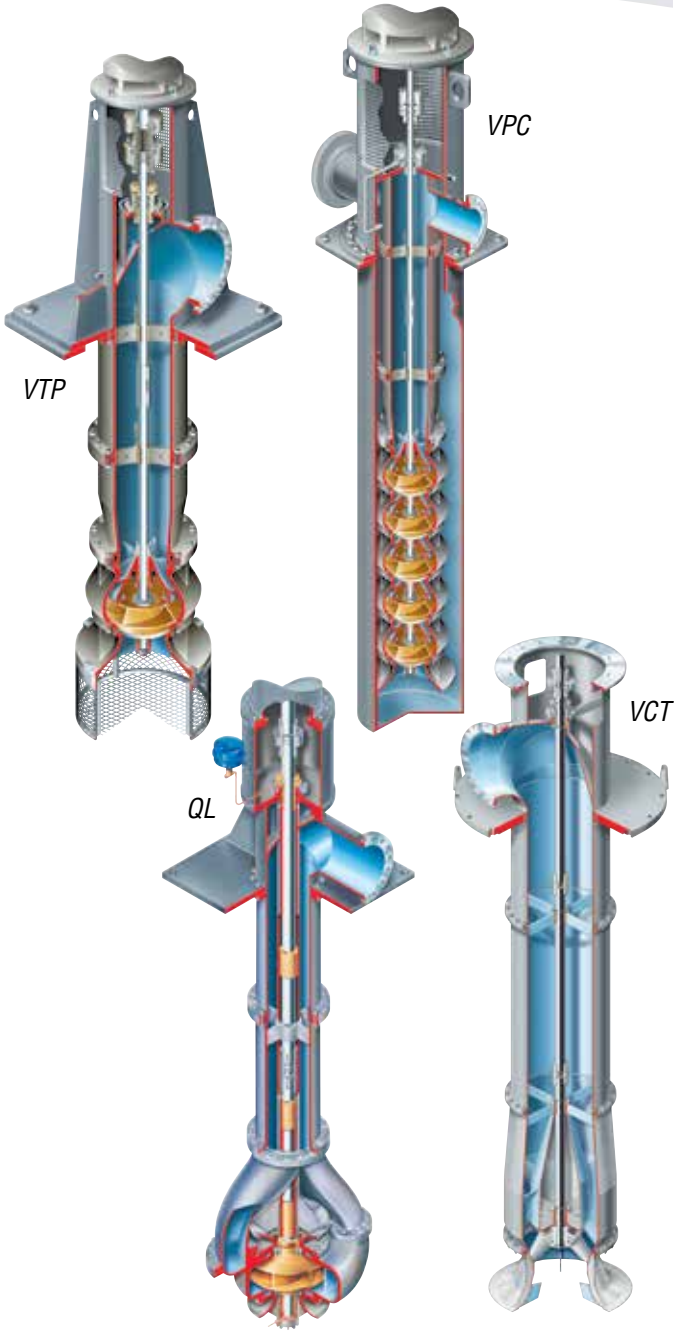
- Flows to 25 000 m^3/h (110 000 gpm)
- Heads to 500 m (1640 ft)
- Pressures to 70 bar (1015 psi)

Vertical Propeller Pumps

Wet-pit, propeller style pumps with axial or mixed flow impeller, above- or below-grade discharge, pullout or non-pullout construction

Operating Parameters

- Flows to 181 700 m^3/h (800 000 gpm)
- Heads to 110 m (350 ft)



Submersible Motor Pumps

Wet type motors with watertight insulated windings or oil-filled motors with self-contained force feed, filtered, cooled oil circulation system

Operating Parameters

- Flows to 4500 m^3/h (19 800 gpm)
- Heads to 800 m (2625 ft)
- Motor sizes to 5000 kW (6700 hp)
- Speeds from 200 to 3600 rpm

Pleuger SUBM

Byron Jackson SUBM

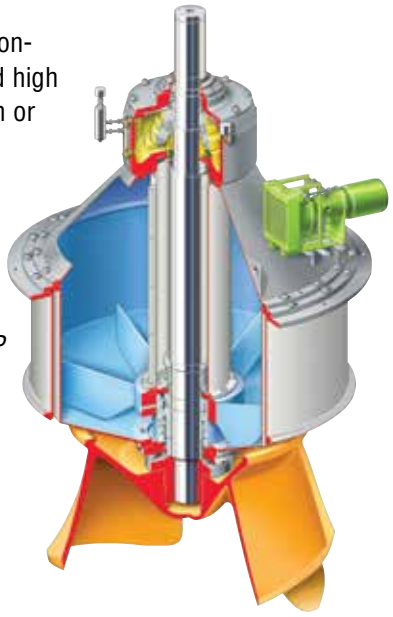
Concrete Volute Pumps

Removable metallic pump pullout unit within a concrete volute; suction bell connected to preformed high efficiency, vortex-free concrete suction box; open or closed mixed flow impeller

Operating Parameters

- Flows to 115 000 m^3/h (500 000 gpm)
- Heads to 45 m (147 ft)

CVP



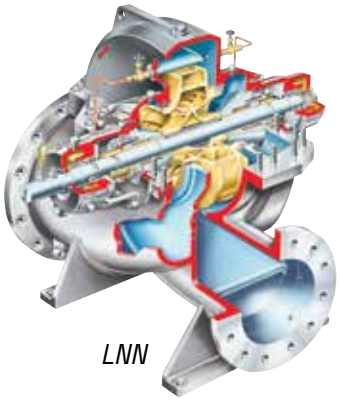
Horizontal Water Pumps

Between Bearings, Single-Stage Pumps

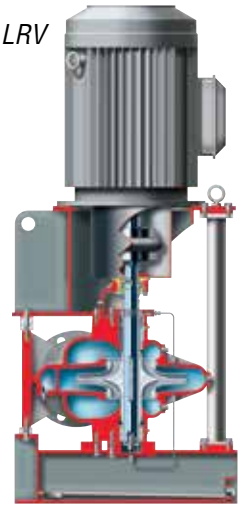
Axially split, double volute casing with double-suction impeller; vertical mounting and bottom suction available

Operating Parameters

- Flows to 30 000 m^3/h (132 000 gpm)
- Heads to 300 m (980 ft)
- Pressures to 150 bar (2175 psi)



LNN



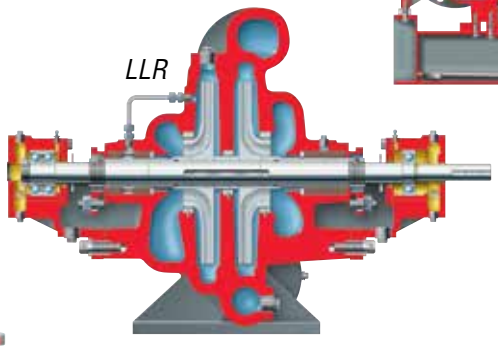
LRV

Between Bearings, Two-Stage Pumps

Axially split, two-stage pumps; back-to-back impellers

Operating Parameters

- Flows to 295 m^3/h (1300 gpm)
- Heads to 290 m (950 ft)
- Pressures to 31 bar (450 psi)



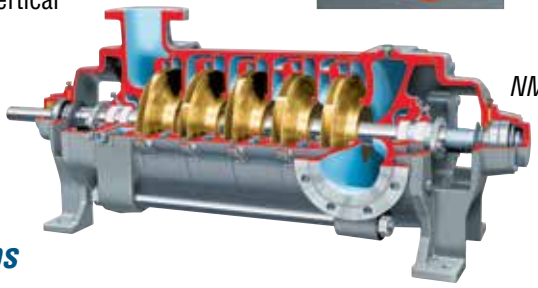
LLR

Radially Split, Multistage Pumps

Between bearings, multistage, ring section, diffuser design with variable flange orientation; vertical mounting available

Operating Parameters

- Flows to 3000 m^3/h (13 210 gpm)
- Heads to 1250 m (4110 ft)
- Pressures to 150 bar (2175 psi)



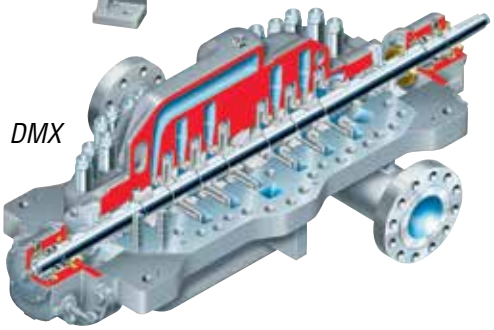
NM

Axially Split, Multistage Pumps

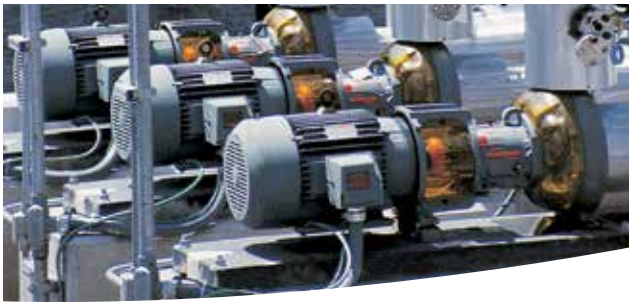
Between bearings, double volute casing with side suction and side discharge

Operating Parameters

- Flows to 2950 m^3/h (13 000 gpm)
- Heads to 2130 m (7000 ft)
- Pressures to 275 bar (4000 psi)



DMX



Overhung, End Suction Pumps

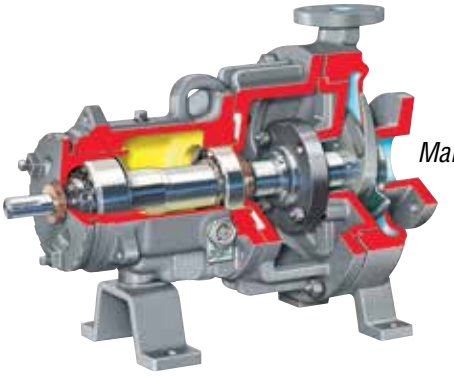
Horizontal, single-stage, end suction frame mounted pumps conforming to:

- ASME B73.1
- ISO 2858 dimensional and ISO 5199 design criteria
- EN733 and DIN 24 255

Optional low flow, self-priming, close coupled, in-line and recessed impeller configurations available.

Operating Parameters

- Flows to 5700 m^3/h (25 000 gpm)
- Heads to 215 m (700 ft)
- Pressures to 27 bar (400 psi)



Mark 3™

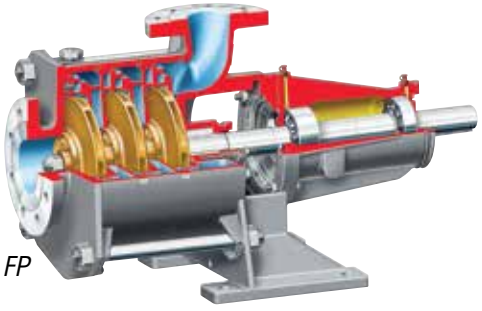
Overhung, Multistage, End Suction Pumps

Horizontal, multistage, diffuser pump; vertical and close coupled configurations available

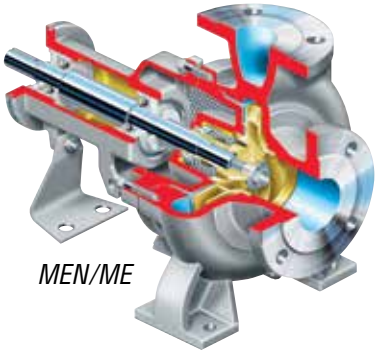
Operating Parameters

- Flows to 600 m^3/h (2650 gpm)
- Heads to 250 m (820 ft)
- Pressures to 25 bar (365 psi)

Mark 3 ISO



FP



MEN/ME

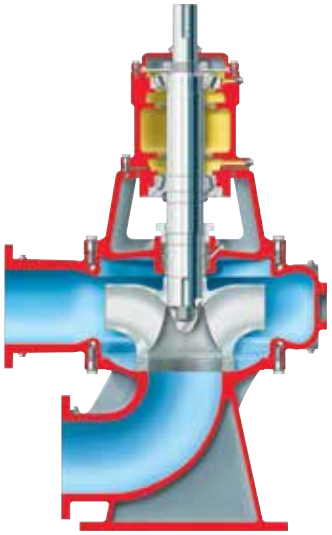
Solids Handling Pumps

Dry-Pit, Solids Handling Pumps

Overhung, single-stage, end suction pump with enclosed impeller; horizontal frame mounted, vertical frame mounted or independently mounted motor with extended shafting

Operating Parameters

- Flows to 45 500 m^3/h (200 000 gpm)
- Heads to 90 m (300 ft)
- Sizes from 80 mm (3 in) to 1800 mm (72 in)



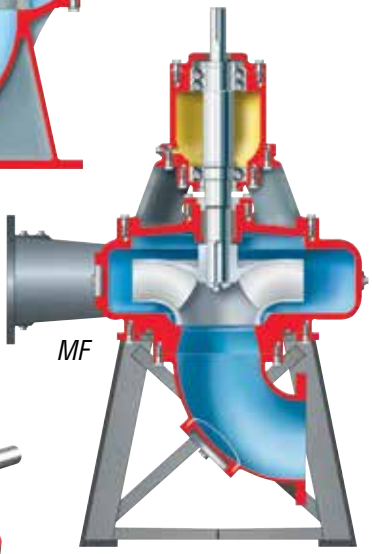
MN

Self-Priming, Solids Handling Pumps

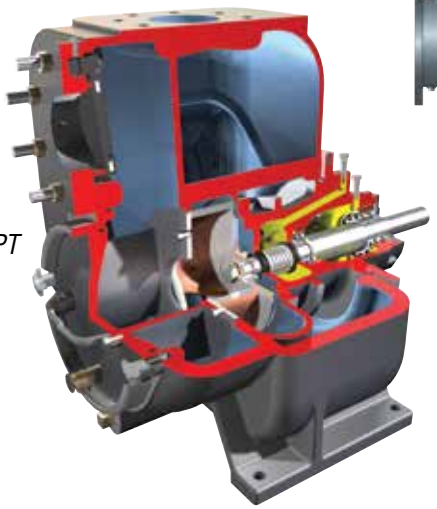
Overhung, single-stage, end suction pump with semi-open impeller and abrasion-resistant double mechanical seal; horizontal frame mounted

Operating Parameters

- Flows to 600 m^3/h (2650 gpm)
- Heads to 35 m (115 ft)
- Sizes from 50 mm (2 in) to 200 mm (8 in)



MF



MPT

Vertical, Solids Handling Pumps

Single-stage design with above-grade discharge, enclosed impeller and enclosed lineshaft

Operating Parameters

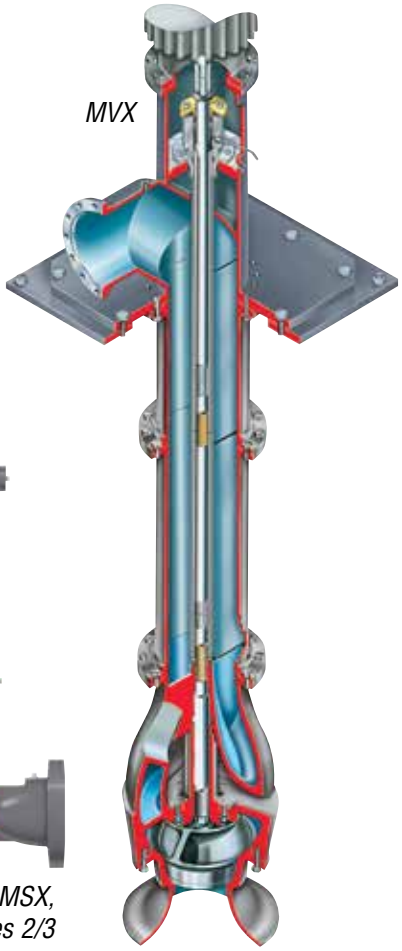
- Flows to 17 000 m^3/h (75 000 gpm)
- Heads to 40 m (130 ft)
- Sizes from 250 mm (10 in) to 1200 mm (48 in)

Submersible, Solids Handling Pumps

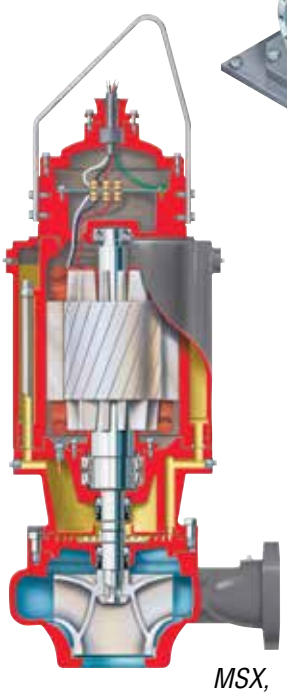
Overhung, single-stage, end suction pump with enclosed impeller; vertically mounted in wet-pit, dry-pit or transportable configuration

Operating Parameters

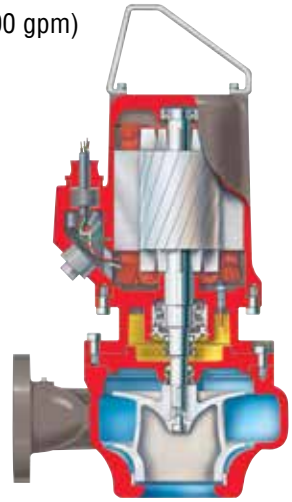
- Flows to 4545 m^3/h (20 000 gpm)
- Heads to 90 m (300 ft)
- Sizes from 80 mm (3 in) to 500 mm (20 in)



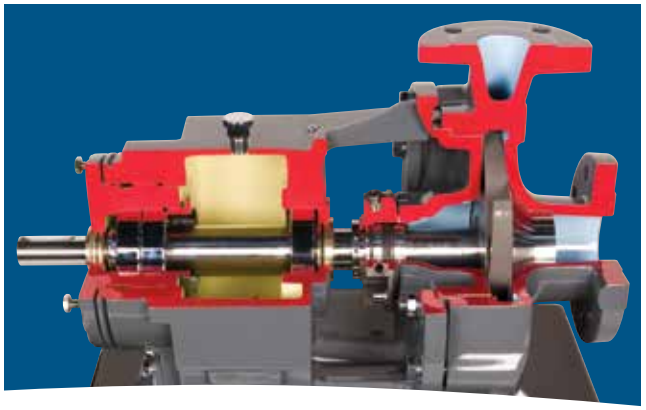
MVX



MSX, Series 2/3



MSX, Series 1



Mechanical Seals

Flowserve supplies a complete range of mechanical seals well suited to sustain long-term continuous operation and the lowest energy cost sealing device for the water industry. Custom-sealing solutions are also available. All Flowserve seals are built on solid engineering practices with high-quality materials and are backed by technical support and local service capabilities.

ISC2 Series General Purpose Seals

Versatile single- and dual-cartridge seals extend equipment reliability.

Pusher Design Operating Parameters
- Pressures to 20.6 bar (300 psi)
- Temperatures from -40°C (-40°F) to 204°C (400°F)
- Sizes from 25 mm (1.000 in) to 200 mm (8.000 in)

Bellows Design Operating Parameters
- Pressures to 13.8 bar (200 psi)
- Temperatures from -40°C (-40°F) to 204°C (400°F)
- Sizes from 25 mm (1.000 in) to 95 mm (3.750 in)

PSS III Split Seal

Semi-cartridge split seal simplifies installation without requiring equipment teardown.

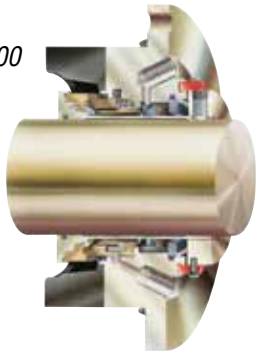
Operating Parameters
- Pressures from full vacuum to 30 bar (450 psi)
- Temperatures from -18°C (0°F) to 120°C (250°F)
- Sizes from 38 mm (1.500 in) to 152 mm (6.000 in)

SLM-6000 Slurry Seal

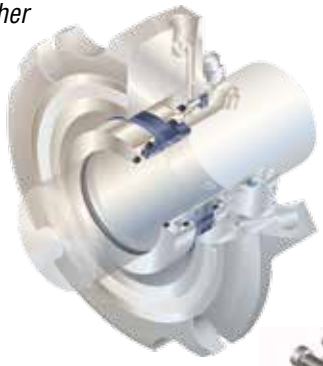
Single-cartridge seal capable of handling extremely dirty services.

Operating Parameters
- Pressures to 17.2 bar (250 psi)
- Temperatures from -18°C (0°F) to 79°C (175°F)
- Sizes from 32 mm (1.250 in) to 235 mm (9.250 in)

SLM-6000



ISC2 Single Pusher



PSS III

Global Service and Technical Support

Life Cycle Cost Solutions

Typically, 90% of the total life cycle cost (LCC) of a pumping system is accumulated after the equipment is purchased and installed. Flowserve has developed a comprehensive suite of solutions aimed at providing customers with unprecedented value and cost savings throughout the life span of the pumping system. These solutions account for every facet of life cycle cost, including:

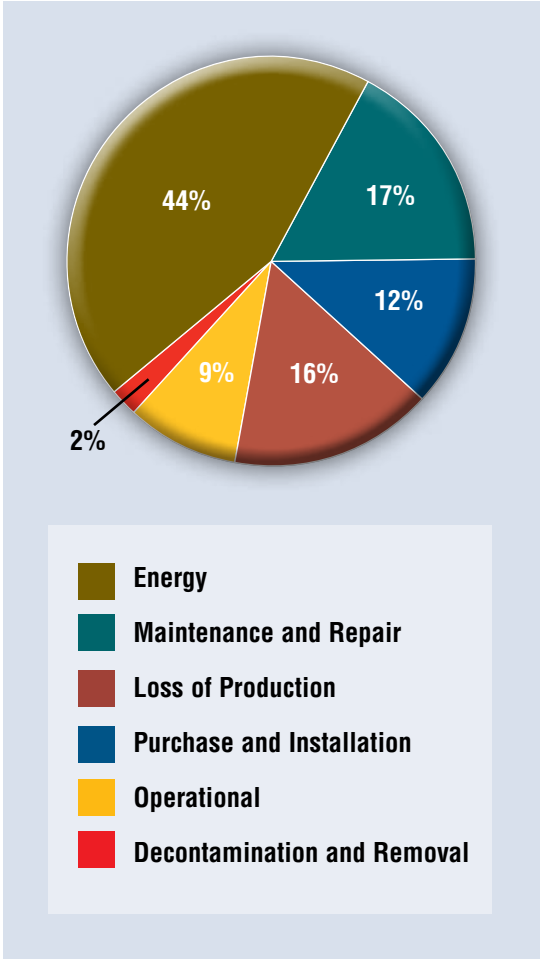
Capital Expenses
- Initial purchase
- Installation

Operating Expenses
- Energy consumption
- Maintenance
- Production losses
- Environmental
- Inventory
- Operating
- Removal

Innovative Life Cycle Cost Solutions

- New Pump Selection
- Turnkey Engineering and Field Service
- Energy Management
- Pump Availability
- Proactive Maintenance
- Inventory Management

Typical Pump Life Cycle Costs[1]



[1] While exact values may differ, these percentages are consistent with those published by leading pump manufacturers and end users, as well as industry associations and government agencies worldwide.

USA and Canada
Flowserve Corporation
5215 North O'Connor Blvd.
Suite 2300
Irving, Texas 75039-5421 USA
Telephone: +1 937 890 5839

Europe, Middle East, Africa
Flowserve Corporation
Parallelweg 13
4878 AH Etten-Leur
The Netherlands
Telephone: +31 76 502 8100

Latin America
Flowserve Corporation
Martín Rodriguez 4460
B1644CGN-Victoria-San Fernando
Buenos Aires, Argentina
Telephone: +54 11 4006 8700
Telefax: +54 11 4714 1610

Asia Pacific
Flowserve Pte. Ltd.
10 Tuas Loop
Singapore 637345
Telephone: +65 6771 0600
Telefax: +65 6862 2329

Bulletin FPD-6h (E) March 2013.

To find your local Flowserve representative:

For more information about Flowserve Corporation, visit www.flowserve.com or call +1 937 890 5839.