



Pumps

## ***SUBM***

***Submersible  
Motors - Pumps***



***Byron Jackson<sup>®</sup>  
Oil Filled  
Design***

***Pleuger<sup>®</sup>  
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:

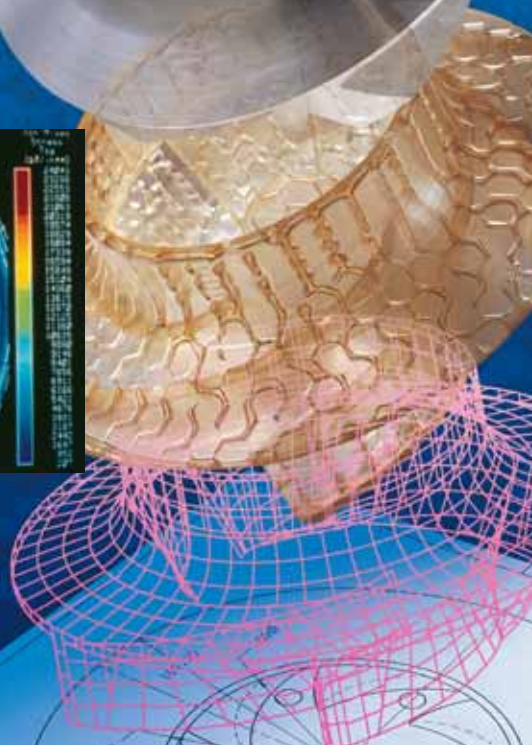
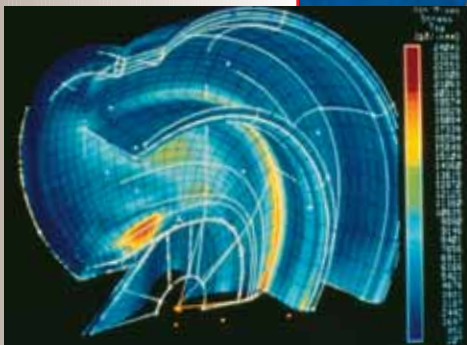
- Hydraulic engineering
- Mechanical design
- Materials science
- Intelligent pumping
- Manufacturing technology

### 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



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**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.

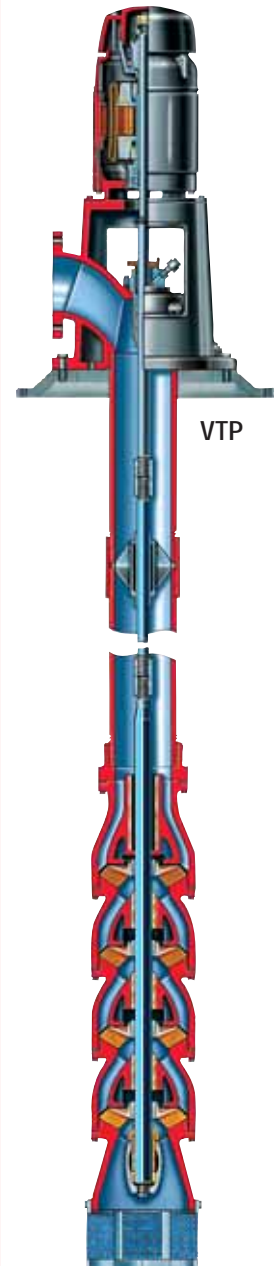
**Submersible Advantages**

- 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**

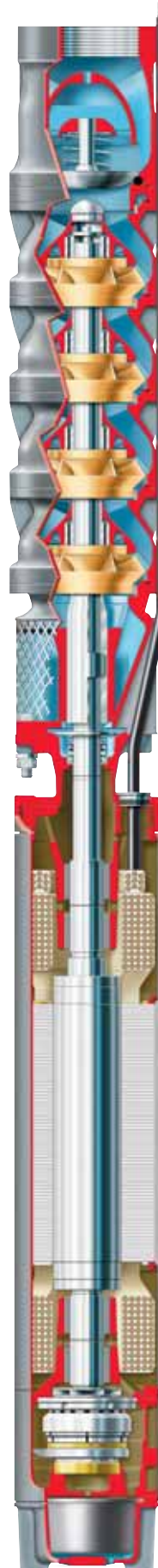
- Municipal
- Industrial
- Process
- Offshore
- Mining
- Irrigation
- Power

**Typical Applications**

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

**Operating Parameters**

- Flows to 4500 m<sup>3</sup>/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, EMV, KTV, CE, VDE and other authority certifications

**Pumps**

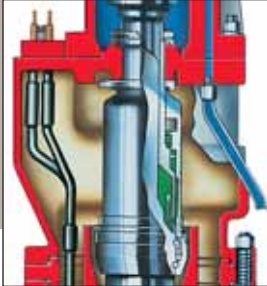
- Heavy duty and high efficiency impellers and bowl cases
- Wide variety of bearing, impeller and bowl casing materials to suit any application
- Dynamically balanced impellers to minimize vibration and maximize service life
- Compact adaption system between pump and motor for maximum shaft support

**Cables**

- Power cable internally connected to eliminate potential leaks

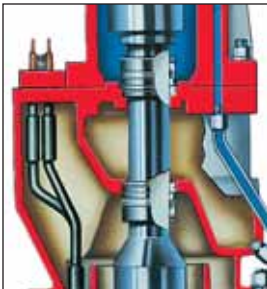
## Byron Jackson Oil Filled Design

### Seal Options



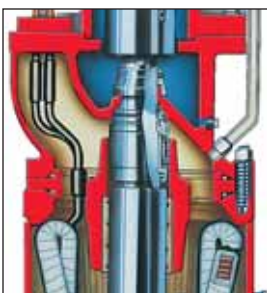
#### Mercury seal

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

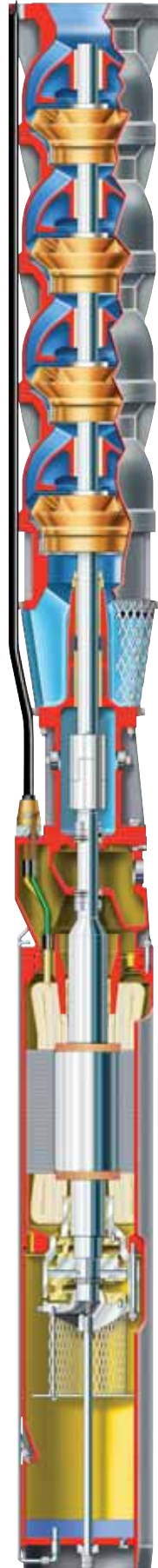
- Potable water
- Storage cavern
- Sea water
  - Fire protection
  - Ballast
- Dewatering
- Pressure boosting
  - Fountains
- Geothermal
- Water injection system
- Pipelines

### Operating Parameters

- Flows to 4500 m<sup>3</sup>/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®)

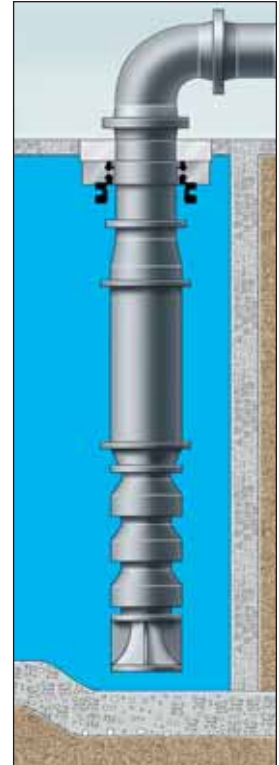
**Accessories**

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

**Bottom Intake**

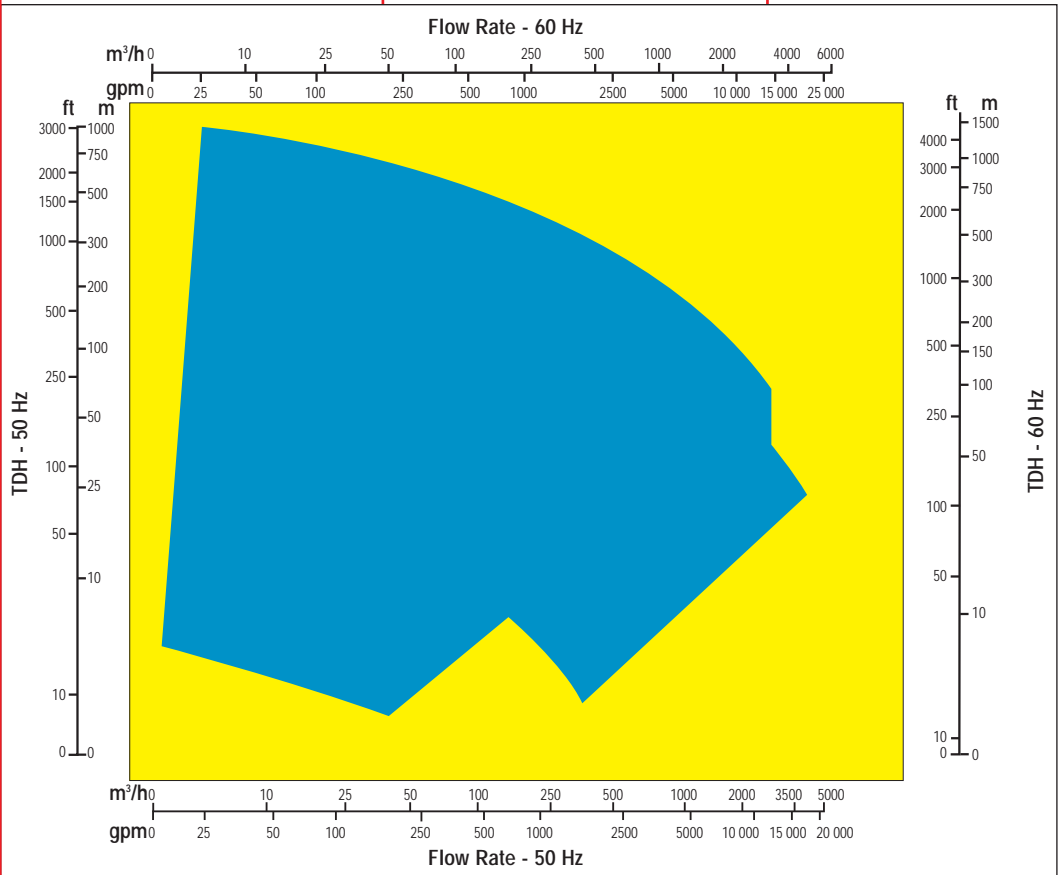
- Reduced civil cost (sump design)
- Minimum submergence design
- Modular design
- Tank installation
- Open sump installation

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



Bottom suction multistage

**SUBM Range Chart**



**Global Engineered Services and Support**

- Total Cost Reduction*
- Asset Management*
- Product Life Cycle*
- Performance Re-rates*
- Site Diagnostics*
- Repair Services*
- Energy Management*
- Spare Parts*
- Maintenance Contracts*
- Materials Upgrades*
- Turnkey Services*
- Field Repairs*
- Installation*
- Project Supervision*
- Commissioning*
- Equipment Upgrades*
- Condition Monitoring*
- Systems Analysis*
- Field Machining*

**Service Dedication**

Flowserve Engineered Services is focused on providing customers with uncompromising service and support, where and when needed. Dedicated to delivering the highest quality support, Engineered Services integrates its extensive pump and materials engineering knowledge with creative service solutions. Engineered Services fully understands the business challenges facing customers and is prepared to manage solutions to succeed as a team.

A worldwide network of service and repair centers staffed by highly skilled engineers and technicians is available around the clock, seven days a week to respond to customer queries, to evaluate and troubleshoot problems and to provide reliable solutions.

**Strength of Experience, Commitment to Excellence**

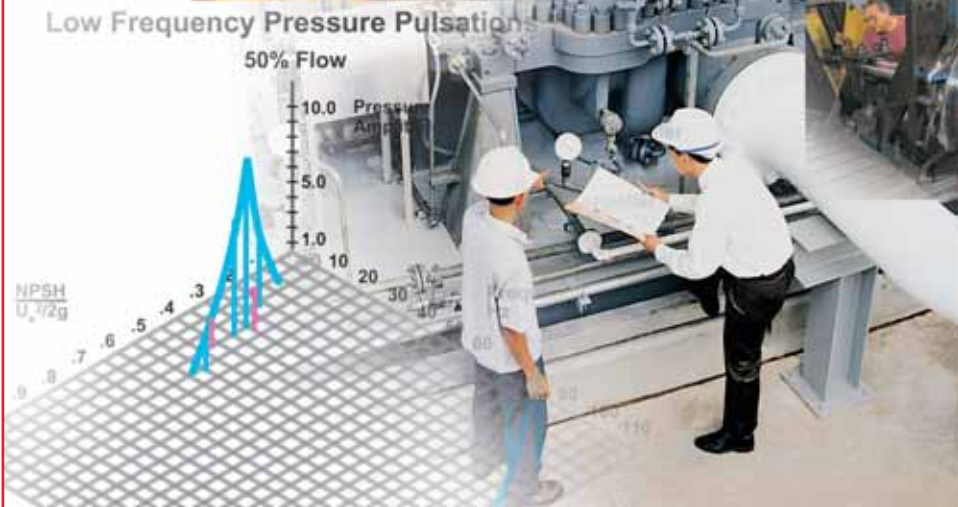
Flowserve has long served industries requiring superior equipment performance and service life.

- Oil and gas production
- Hydrocarbon processing
- Chemical processing
- Water resources
- Power generation
- Nuclear
- Mining and mineral processing
- Pulp and paper
- General industry

Engineered Services is dedicated to maximizing equipment performance and providing reliability-centered maintenance programs for pumps and related equipment, regardless of manufacturer. Using the FlowStar™ asset management software, Engineered Services tracks performance and supports improvement programs using a service life cycle cost business approach. The results are improved reliability and increased profitability.

**Business Partner**

Flowserve partners with customers to respond to the dynamic business conditions that affect them. Flowserve will work with customers to drive efficiency, maximize throughput and control process quality. Whether user needs involve on-site technical assistance or broader project planning with full turnkey responsibility, Flowserve Engineered Services will deliver professional, reliable results.



*Flowserve... Supporting Our Customers  
With The World's Leading  
Pump Brands*



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**Pumps**

*Your local Flowserve representative:*

To find your local Flowserve representative  
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Or call toll free: 1 800 728 PUMP (7867)

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