

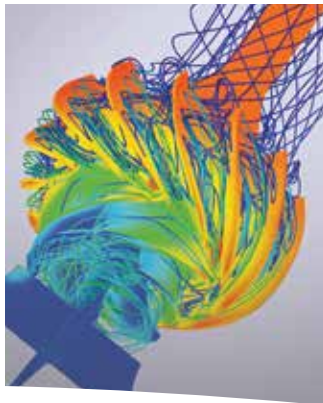


SUBM ***Electrical Submersible Pumps and Motors***

Pleuger® Water-Filled Design
Byron Jackson® Oil-Filled Design



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.

Life Cycle Cost Solutions

Flowserve provides pumping solutions that permit customers to reduce total life cycle costs and 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.

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

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

INNOMAG® Sealless 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

SUBM **Electrical Submersible** **Pumps and Motors**

Pleuger
Water-Filled Design

Byron Jackson
Oil-Filled Design



Versatility in Design

Flowserve is unique as the only company capable of offering its customers a choice of 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, specification and life cycle costs. Both designs have been proven, with more than 150 years of combined, successful application experience.

Flowserve offers more than 250 types of submersible pumps and motors under the following brand names:

- *Byron Jackson Pumps*
- *Flowserve Pumps*
- *IDP Pumps*
- *Pleuger Pumps*
- *Worthington Pumps*

Motor Exchange Program

Flowserve offers a submersible motor exchange program for most standard motor sizes. Factory-authorized service centers are located in North America, Europe and the Middle East to provide the highest quality of service.

Engineered Flexibility

Flowserve offers the broadest range of submersible deep well pumps and motors in the world. With the largest range of horsepower per caisson size, these pumps are designed to suit varying application requirements and feature:

- Choice of cooling and lubrication systems
- Extensive seal options including zero-leakage, zero-wear designs
- High efficiency and maximum flow rate per well size
- Robust design for long service life
- Rewindable motors for lower maintenance costs
- Special designs and materials for offshore, geothermal and other demanding applications

Submersible Advantages

Flowserve submersible motor pumps are:

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

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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 increased reliability. A superior thrust bearing design, a 100% pressure compensation system, rewindable stators and a choice of materials for both strength and dielectric characteristics make Pleuger submersible motors an exceptional value.

Operating Parameters

- Flows to 6000 m³/h (26 415 gpm)
- Heads to 800 m (2625 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 and 60 Hz frequency
 - Variable frequency drive and high-temperature motor options

Typical Applications

- | | |
|-----------------------------|-----------------------|
| • Potable water | • Pressure boosting |
| • Seawater | – High-rise buildings |
| – Fire protection | – Fountains |
| – Ballast | • Subsea drives |
| • Dewatering | • Pipelines |
| • Hot water to 60°C (140°F) | |



Pump Features and Benefits

Heavy-duty Impellers and Bowl Cases are designed to provide maximum efficiency over a broad operating range. Impellers are dynamically balanced to minimize vibration and extend service life.

Compact Adaption System between pump and motor provides maximum shaft support. A power cable is internally connected to eliminate potential leaks.

Motor Features and Benefits

Submersible, Water-filled Motor Design simplifies installation and reduces costs.

Three-phase Squirrel Cage Induction Motor provides reliable operation and extends product life.

Pressure-balanced Mechanical Seal available in many materials to best suit application.

Water and Antifreeze Motor Lubrication simplifies installation and enables pump to operate over a wide range of ambient temperatures.

Wet Type Motor with water-tight insulated windings ensures easy service, improves cooling and extends motor life. Motor is prefilled with food grade additives for freeze and rust protection, making it suitable for potable water applications.

Large, Double Journal Bearings are water lubricated and maintenance free.

Thrust Bearings are heavy-duty, adjustable and self-aligning for extended motor life.

Non-toxic Class Y Winding Insulation improves cooling and extends the life of the motor.

Friction-welded Shaft ensures maximum shaft strength and highest efficiency.

Motors Certified with CSA, EMV, KTV, CE, VDE, IEC and other authority certifications.

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Byron Jackson
Oil-Filled Design



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.

Operating Parameters

- Flows to 6000 m³/h (26 415 gpm)
- Heads to 800 m (2625 ft)
- Motor sizes to 1650 kW (2200 hp)
 - Speeds from 1000 to 3600 rpm
 - 2, 4 and 6 pole designs (other designs available)
 - 200 to 6600 volt
 - 50 and 60 Hz frequency
 - Variable frequency drive and high-temperature motor options

Typical Applications

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

Certifications

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



Pump Features and Benefits

Heavy-duty Impellers and Bowl Cases are designed to provide maximum efficiency over a broad operating range. Impellers are dynamically balanced to minimize vibration and extend service life.

Dual Bearings are provided between pump and motor for minimum bearing span and maximum shaft support.

Suction Inlet is designed to be highly efficient.

Single and Double Mechanical Seal Designs are available to suit varying application requirements.

Sealed Power Cable plug-in feature ensures reliable operation and ease of installation by eliminating the need for field splicing.

Motor Features and Benefits

Oil-filled Design with internal self-contained force feed, filtered, cooled oil circulation system maintains continuous lubrication and provides excellent insulation and corrosion resistance.

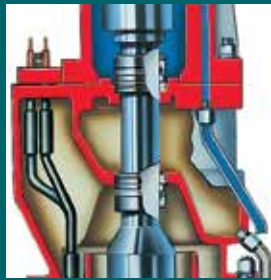
Three-phase Squirrel Cage Induction Motor provides reliable operation and extends product life.

Class F Insulation System is designed with vacuum pressure impregnated (VPI) epoxy for superior insulation and long service life.

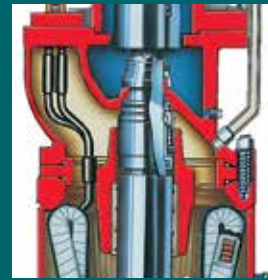
Double-acting Thrust Bearing System offers continuous up or down thrust capability.

Special Metallurgy is available for corrosive services.

*Options and
Technical Data*



Double Mechanical Seal



*Single, Pressurized
Mechanical Seal*

Optional Impeller Designs

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

Materials of Construction Choices

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

Available Accessories

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

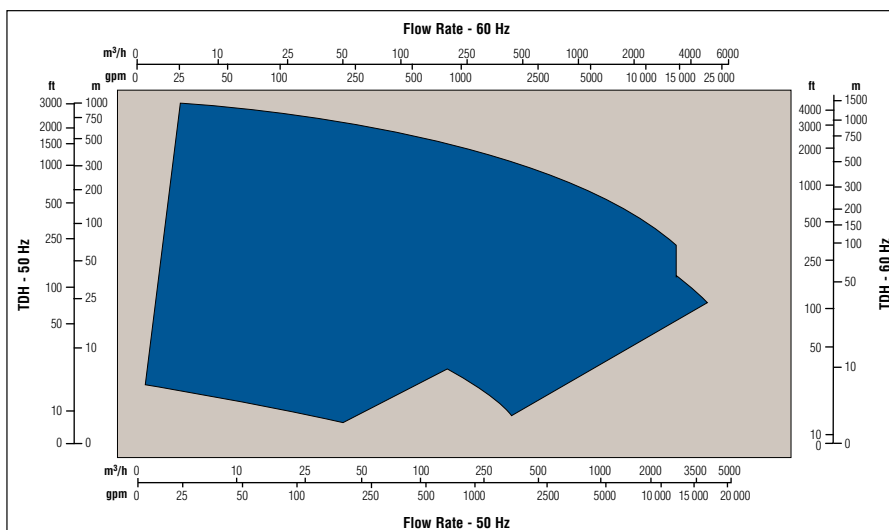
**Seal Options for the
Byron Jackson Pumps**

- **Double Mechanical Seal** incorporates two separate highly engineered bellows seals, providing dual protection for the motor.
- **Single, Pressurized Mechanical Seal** is designed for hydrocarbon services and non-vertical applications.

Optional Bottom Intake Configuration

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

SUBM Range Chart



**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

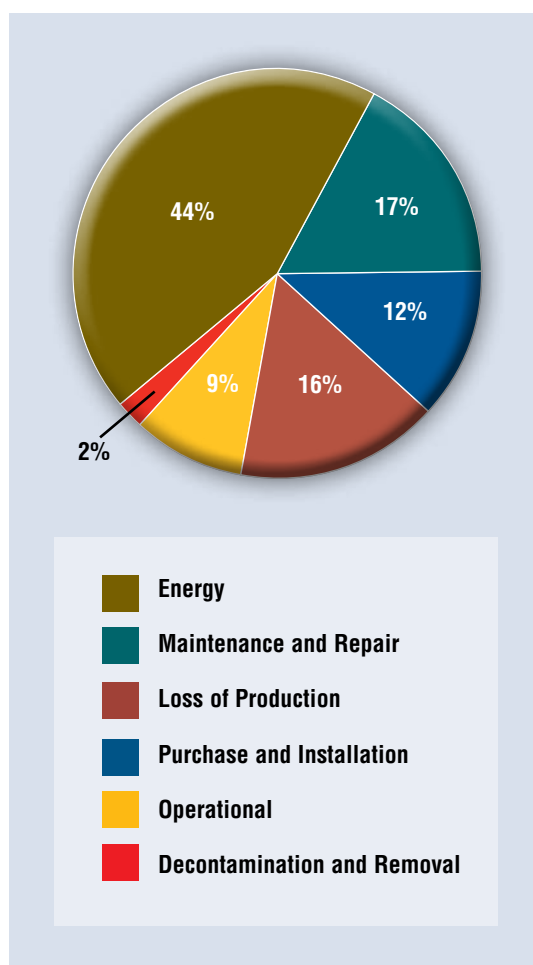
Operating Expenses

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

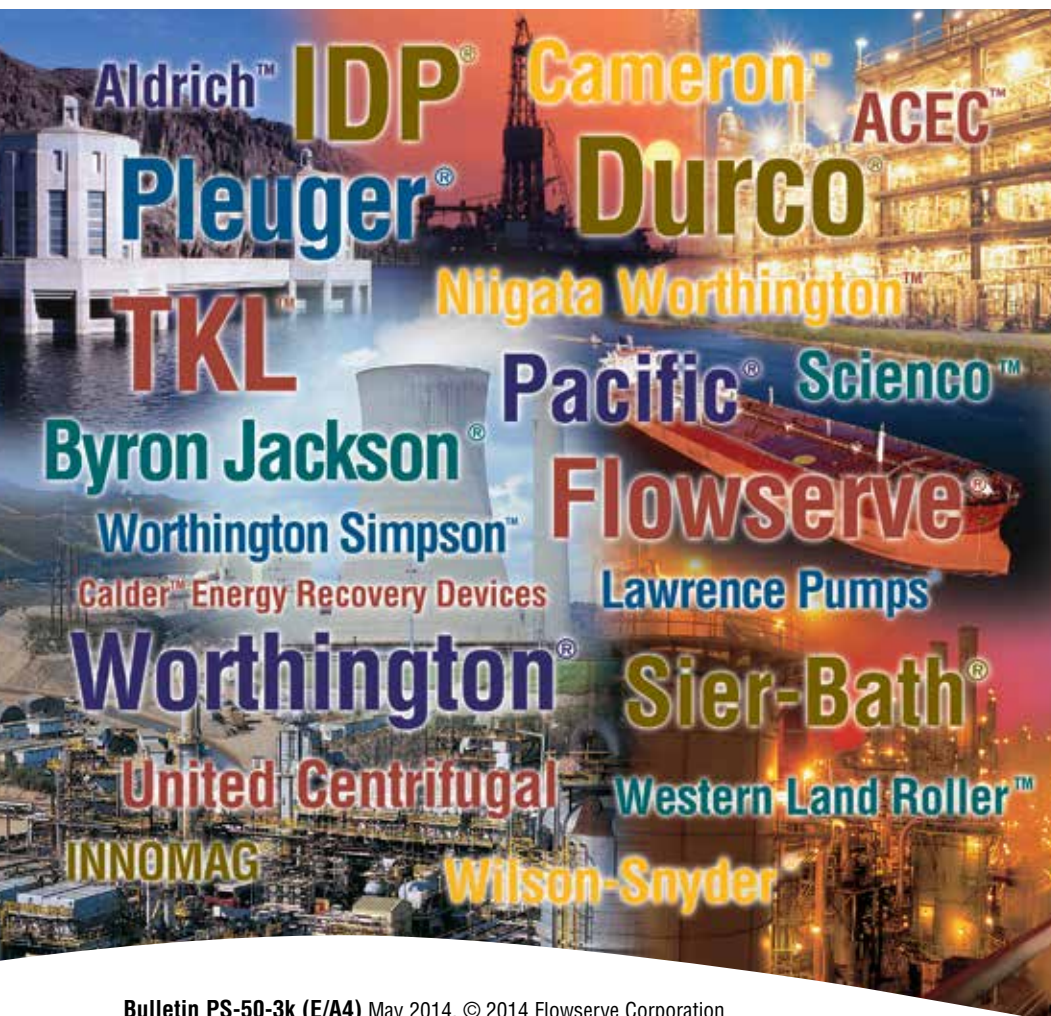
Innovative Life Cycle Cost Solutions

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

Typical Pump Life Cycle Costs¹



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.



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