Trusted Supplier of Choice for 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 submersible pumps with oil-filled motors and systems (Byron Jackson design) for water applications along with a full menu of technical and service support.

Product Brands of Distinction

Byron Jackson® Pumps
Flowserve® Pumps
IDP® Pumps
Pleuger® Pumps
Worthington® Pumps

Headquarters and Design Center for Submersible Motors – Hamburg, Germany

Submersible Motor Center of Excellence (MCO) – Maryland, USA
Submersible Pumps

50 Hz Flow / Head Chart

60 Hz Flow / Head Chart
Submersible Pump End Feature

Flowserve submersible pumps are multistage centrifugal units which operate below water level, driven by oil-filled AC three-phase induction submersible motors.

Pumps and motors form a single enclosed unit when installed vertically in a water well, which is held in position by the connected discharge pipe at the non-return valve or discharge casing.

Flowserve submersible pump units are offered in a wide range of applications. Pumps are available from 4 in to 48 in bowl diameters with capacities up to 6000 m³/h (25 000 gpm) and heads up to 800 m (2600 ft).

Pump units are designed and manufactured to the highest quality with high pump efficiency and long working life under the most adverse conditions. They are extensively tested and inspected to ensure operational safety.

Flowserve pump units are designed on the principle of a modular structure. Thus, with a limited number of parts, different tailor-made requests can be achieved. Pumps are equipped with non-return valves to guarantee optimal functional safety (water hammer).

Flowserve submersible pump units provide economic solutions for almost every user’s requirements.

To produce high-quality submersible pumps and motors requires both specialized know-how and continually evolving manufacturing processes. All submersible pump products are produced using the most advanced manufacturing techniques – from initial development base CAD to quality-controlled CNC production equipment. It is not by chance that among experts “Flowserve” has been a byword for top product quality for decades.
**Advanced Material and Construction Concept for Pumps**

An important feature of the Byron Jackson submersible pump is the combination of rigid stainless steel shaft construction and extra heavy bearing design. Double-length, extended life strainer bearings are sand capped as an added design feature. Additional renewable heavy-duty sleeve bearings are in each series case. A shaft bearing is provided on each side of each impeller for minimum bearing span and maximum shaft support. The long top case bearing provides additional pump rotor stability.

Standard metallurgy is cast iron bowls, bronze fitted with shaft, collets and couplings of stainless steel. The pump impeller has standardized A48 Class 30 castings to ensure reliability of physical properties and uniform structure. They are also porosity free, pressure tight and wear resistant.

For special applications, other metallurgies are available.

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**Different Materials for Bowls and Impellers Are Available:**

Bronze  
Stainless Steel  
Super Duplex

**Motor Materials Available**

Motor materials available include:

- St. / cast iron-standard material
- Stainless steel (316 Ti) – special material
- Super duplex stainless steel
Submersible Motor

Byron Jackson three-phase AC squirrel cage induction submersible motors have been providing successful and reliable service since 1929. All Byron Jackson submersible motors are filled with a pure non-hygroscopic U.S. Food & Drug Administration (FDA)-approved highly refined mineral oil of superior dielectric strength. This oil is effectively contained by single or double mechanical seal arrangements. The oil-filled design provides excellent insulation with exceptional lubrication fluid corrosion resistance. These benefits are unaffected by time.

The specially designed windings for low voltage and high voltage are insulation class F (155°C/311°F).

The motor cooling is a perfect environment and designed by circulation of the continually filtered oil to all internal motor components. Oil is pumped across both thrust bearing faces and forced up through the rotor gap. It also lubricates the bronze radial sleeve bearings and then flows down the outside of stator lamination through special heat exchanger-type passages, transferring heat to the pumped medium.

The rugged stainless steel coupling provides a positive connection between pump shaft and motor. It is designed to transmit pump thrust in either direction to the motor thrust bearings.

Submersible Motor (Oil-Filled) Description

Power Output*

<table>
<thead>
<tr>
<th>Motor Type</th>
<th>8M</th>
<th>10M</th>
<th>12M</th>
<th>14M</th>
<th>17M</th>
<th>21M</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 Hz Power Output (S.F. 1.0)</td>
<td>kW</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>60 Hz Power Output (S.F. 1.1)</td>
<td>kW</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>3.7 – 22</td>
<td>30 – 75</td>
<td>93 – 150</td>
<td>93 – 225</td>
<td>185 – 450</td>
<td>450 – 1500</td>
</tr>
<tr>
<td></td>
<td>5 – 30</td>
<td>40 – 100</td>
<td>125 – 200</td>
<td>125 – 300</td>
<td>250 – 600</td>
<td>600 – 2000</td>
</tr>
</tbody>
</table>

*Two-Pole, Oil-Filled Submersible Motors on Request
Motor Features

Motor Thrust Bearings

Both up and down pump thrust loads can be continuously carried by the Byron Jackson precision-machined solid or pivot shoe type thrust bearing. There is no metal-to-metal contact, as the mirror-lapped bearing surfaces are supported on a film of filtered oil.

Byron Jackson submersible motor efficiency, as published, includes the thrust bearing losses – no further efficiency reduction is required for this thrust bearing design. Lower thrust bearing face incorporates exclusive lubrication pockets to reduce start-up friction.

Oil Resistance Motor Windings

Winding Process

High-Voltage Windings

Low-Voltage Windings

Low-Voltage Windings
Motor Features Continued

Oil-Filled Submersible Motors With Internal Forced Cooling System

Internal Forced Cooling System
The internal cooling system was developed with a high-efficiency cooling impeller. The design provides an efficiently cooling flow circuit, which ensures sufficient thermal motor reserves and low cooling losses.

Single Mechanical Seal
The Byron Jackson single mechanical seal design is used with the pressurized design motors in hydrocarbon storage caverns and inclined/horizontal installation water services. The motor is pressurized from an external grade mounted oil reservoir tank, permitting use of a single mechanical seal. The operator only needs to monitor the oil reservoir for seal leakage and, in most cases, can add oil, if necessary, without shutting down the pump/motor.

Double Mechanical Seals
The exclusive Byron Jackson double mechanical seal design incorporates two separate highly engineered bellows seals, providing dual protection for the motor. The double mechanical seal system uses a pressure balance process to equalize the pressure differential across the seals, minimizing leakage and providing years of maintenance-free service. The inner seal diverts any pumped fluid leakage via a communication line to a storage reservoir at the bottom of the motor, giving maximum protection to the motor windings.
Motor Cable Plug Connection
The exclusive Byron Jackson power cable sealed plug-in-design, with a replaceable gasket, assures a waterproof connection at the motor terminals. In addition, it eliminates the need for an untested splice in the field. The complete power cable assembly can be boxed and shipped as a separate component, reducing the potential for damage during shipping and installation.

ANSI/NSF 61 – Certificate for the Byron Jackson Submersible Product
For the North America Market (USA), Byron Jackson pumps and oil-filled motors are manufactured in accordance with NSF Standard 61. NSF Standard 61 establishes minimum requirements for control of potential adverse human health effects from products added directly to water for its treatment and indirectly to water via contact with treatment, storage, transmission and distribution system components.
Application of Electric Submersible Pumps
With Oil-Filled Submersible Motors

Potable Water Supply

Dewatering (Mines)

Cavern Application
Offshore Application

- Pump Unit Ready for Shipment
- Gas Platform in Qatar
- Seawater Submersible Lift Pump

Hot Water (Geothermal Application): (Quotation on Customer Request)
To find your local Flowserve representative:

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