ELECTRIC SUBMERSIBLE PUMPING SYSTEMS

Powered by

Valiant
Artificial Lift Solutions

Weatherford
The Weatherford ESP, Powered by Valiant, is your reliable choice for efficient high-flow production.

Few service providers can maximize electric-submersible-pump (ESP) performance while minimizing operating costs. Now, a company world-renowned for skilled service and unmatched production-optimization expertise brings you unparalleled uptime for ESPs.

Only Weatherford offers comprehensive and end-to-end production workflows, equipment, and optimization for every form of artificial lift. The Weatherford ESP, Powered by Valiant, was born for harsh production environments and abrasive, corrosive, or otherwise challenging wells. This technology expands and completes our differentiated high-flow solutions that maximize performance and reduce lifting costs.

Built for durable downhole performance, our advanced systems provide superior run life and flow assurance in the most challenging applications. We also offer a complete array of shale-specific solutions—including abrasion-resistant modular pumps and gas solutions—that deliver production gains in tight formations. We back our services with complete dismantling, inspection, and failure analysis in all environments.

Meet our ESP partner

**VALIANT ALS SOLUTIONS**

Announced in 2018, the Weatherford and Valiant joint alliance enables delivering a best-in-class product and service infrastructure.

Founded by proven ESP veterans with decades of global experience, Valiant has hundreds of successful ESP runs. As our partner, Valiant—with new, state-of-the-art facilities in Oklahoma, Texas, and Colombia—provides the following ESP components:

- Pumps
- Motors
- Seals
- Gas handlers and separators
- Power cables
- Sensors
- Variable speed drives
- Sizing software
THE WEATHERFORD ADVANTAGE

From initial to late-stage production, our global expertise and broad technological portfolio help you to refine and optimize your artificial-lift system at the well, field, and asset levels. We leverage the world’s deepest and broadest artificial-lift toolbox to create a production plan that delivers exactly what your well requires without favoring one form of lift over another.

Our field-proven workflow begins with identification of the most cost-effective artificial lift method. Whether the answer is high-flow ESP, efficient rod-lift, or other technologies from our extensive toolbox, we devise innovative, life-of-well solutions that help you to transition to more efficient lift systems with minimal downtime and expense.

Like every form of lift, our ESP solution includes everything needed for your asset from artificial-lift design using WellFlo® software, to reliable equipment, to next-generation optimization with ForeSite software.
MAXIMIZE UPTIME PER DOLLAR SPENT WITH FIELD-PROVEN ESP TECHNOLOGY

Born with the benefit of hundreds of ESP installations, the Weatherford ESP, Powered by Valiant, delivers reliable performance for your high-flow wells. From the ESP pump to the sensor, we offer a complete solution for both conventional and shale applications.

ESP Pumps

Lift profitably in any high-flow application. Our multistage centrifugal pumps—built with a rotating impeller, nonrotating diffuser, and tungsten-carbide bearings—can be assembled in floater, compression, or abrasion-resistant (AR) configurations. With the availability of protective coatings and the ability to stack pumps in tandem, our systems can meet a wide range of operating and setting depths.

Abrasion-resistant modular (ARM) pumps deliver more uptime in abrasive, corrosive, gassy, and scaly wells. This technology enables deeper setting depths, provides excellent radial-downthrust protection, and improves flow and durability in high sand and solids-content wells. Leveraging tungsten-carbide sleeves, bushings, and bearings, ARM pumps reduce wear at the bearing-impeller and diffuser contact points.

<table>
<thead>
<tr>
<th>Pump Series</th>
<th>Flow Range (B/D)</th>
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<tbody>
<tr>
<td>388</td>
<td>150 to 3,400</td>
</tr>
<tr>
<td>400</td>
<td>80 to 7,500</td>
</tr>
<tr>
<td>538</td>
<td>400 to 14,000</td>
</tr>
<tr>
<td>562</td>
<td>10,000 to 23,000</td>
</tr>
<tr>
<td>675</td>
<td>2,130 to 40,250</td>
</tr>
<tr>
<td>862</td>
<td>12,500 to 34,300</td>
</tr>
<tr>
<td>950</td>
<td>23,700 to 49,200</td>
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</tbody>
</table>
ESP Seals

**Extend the life of your ESP system.**
Placed between the motor and pump intake, our ESP seals increase pump downthrust capacity and reduce motor failure rates, including CO₂- and H₂S-related failures. Available in tandem configurations for all sizes and applications with optional labyrinth and bag-chamber combinations, these seals feature robust bearings and can include corrosion-resistant Monel® housings, trim fasteners, and plugs.

* Monel is a registered trademark of the Special Metals Corporation group of companies.

ESP Motors

**Power your productivity with reliable performance.**
Based on best-in-class designs currently running in thousands of wells, our motors minimize operating costs, reduce power usage, and deliver reliable uptime in temperatures up to 400° F (204° C). Featuring a tape-in or plug-in MLE (motor lead extension) design and a locking-style rotor bearing that reduces friction and wear, our pumps are available in ferritic stainless steel housings and flame spray coating for added protection in corrosive environments.

**Induction motors** undergo a comprehensive testing battery for peak field performance. These three-phase, two-pole motors reliably convert electricity into mechanical energy to drive productivity in your high-flow assets.

**Permanent magnet motors** offer a higher power density in a shorter package. Well suited for challenging ESP wells, these motors require fewer tandem connections, improve heat transfer, and boost performance in ESP installations below perforations, in tight holes, and in shale wells.

<table>
<thead>
<tr>
<th>Motor Series</th>
<th>Horsepower Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>375</td>
<td>10 to 175 hp</td>
</tr>
<tr>
<td>456</td>
<td>12.5 to 450 hp</td>
</tr>
<tr>
<td>562</td>
<td>40 to 1,000 hp</td>
</tr>
</tbody>
</table>

ESP Sizing Software

**Start high-flow productivity with the right system.**
Essential to maximizing ESP run life, we use a proprietary sizing software to match every system to your production range and well conditions.

**Pump Performance VA2200 1 stage(s) @3,500 RPM, S.G. = 1.00**
These curves represent nominal performance to be used in pump sizing calculation. Actual pump performance will comply with acceptance limits specified in API RP 11S2(R2013), Table 4.1.
ESP GAS SOLUTIONS

Boost production and protect the ESP.

While our pumps manage up to 25% free gas before affecting performance, higher gas content can cause excessive heat, premature stage wear, gas slugs, gas locking, and additional mechanical stress on the entire system. Essential for high-GLR (gas-to-liquid ratio) wells, these technologies manage variable flow rates and extend pump uptime.

Gas handlers manage up to 50% free gas at the intake. Built to withstand abrasion and improve solids handling, this technology features a rotating chamber or induced cortex to move heavier fluids to the outside of the fluid column while free gas migrates to the center.

Gas separators—when combined with a gas handler—manage from 80 to 100% free gas at the intake. A rotary option delivers enhanced separation efficiency at low-to-moderate flow rates and in viscous well fluids. Our vortex separator—constructed with a radial bearing support that improves durability in abrasive, solid-laden well conditions—boosts separation efficiency at high flow rates.

ESP Power Cable

Power high-flow productivity.

Built to withstand harsh downhole environments, our power cables are available for conventional ESP environments, moderate to high gas content wells, and moderate to extreme-temperature wells. With standard galvanized armor or optional Monel protection, our cables are rated for temperatures of -40 to 450°F (-40 to 232°C).
ESP Variable Speed Drive

Manage downhole operations and extend equipment life.
Our VSD units control motor speed and current, maintain motor overload and underload settings, and offer comprehensive start and restart capabilities. Available as a 6-, 12-, and 18-pulse system and ratings from 48 to 1,092 kVA, the drives include application-specific software, expandable communication capabilities, and a 7-in. color touchscreen.

ESP Sensor

Monitor and control pump and motor performance.
Simple to install, our ESP sensors help your ESP system to respond to dynamic wellbore conditions. This technology offers a window into your payzone by monitoring intake pressure and temperature, internal motor temperature, X and Y vibration, and current leakage. For extreme accuracy of 0.032% at full scale, our quartz sensors also add additional water-ingress capabilities and X, Y, and Z vibration.

ACHIEVE PRODUCTION 4.0 CAPABILITIES in your high-flow assets

We help you to realize the field of the future right now. Combining decades of Weatherford production experience with advanced analytics, cloud computing and the internet of things (IoT), our secure ForeSite production optimization and CygNet SCADA platforms connect the entire production ecosystem. This performance network helps you to maximize performance throughout your reservoir, wells, and surface facilities.
MAXIMUM FLOW.  
PEAK UPTIME.

The Weatherford ESP, Powered by Valiant, delivers reliable and efficient productivity in harsh, abrasive, corrosive and otherwise challenging downhole environments. To see how our services can work for you, please visit weatherford.com.

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