

About IHS Markit

IHS Markit (Nasdaq: INFO) is a world leader in critical information, analytics and solutions for the major industries and markets that drive economies worldwide. The company delivers next-generation information, analytics and solutions to customers in business, finance and government, improving their operational efficiency and providing deep insights that lead to well-informed, confident decisions. IHS Markit has more than 50,000 key business and government customers, including 85 percent of the Fortune Global 500 and the world's leading financial institutions. Headquartered in London, IHS Markit is committed to sustainable, profitable growth.

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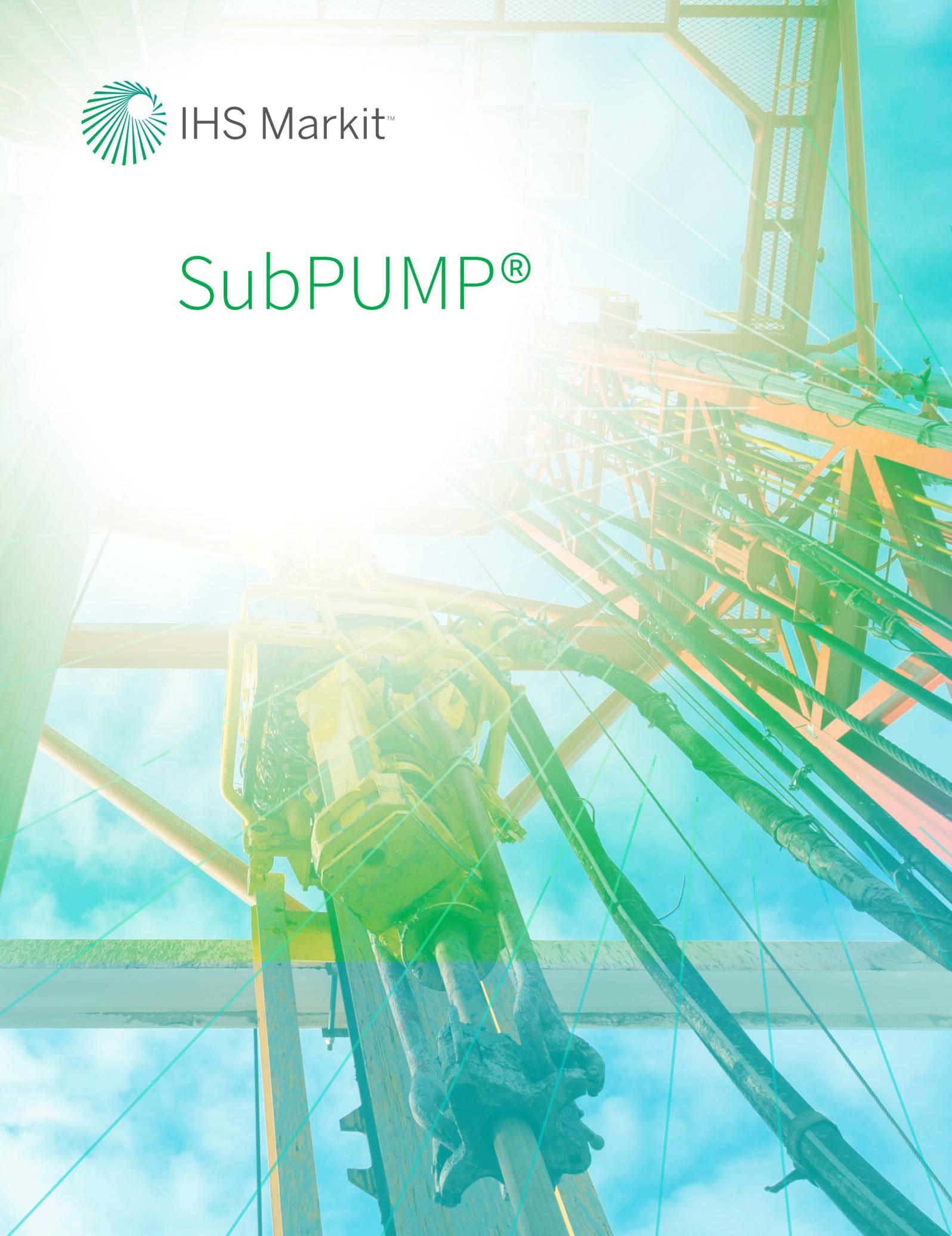
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IHS Markit™

SubPUMP®



Investing in Electric Submersible Pump's (ESPs) is a costly investment for operators. Before you buy an esp system, let SubPUMP® help you to design and evaluate your ESP selection.

If your goal is to design a new ESP installation or to evaluate an existing one, SubPUMP intends to provide you with the information you need that will help to improve production and reduce costs. SubPUMP is the most popular, comprehensive ESP design and analysis software solution that consists of neutral and unbiased technology.

The investment of ESP equipment from 100,000 to \$1M in one well. Equipment selection and reliability is critical to the overall well performance. SubPUMP is designed to help you make better decisions.

What is SubPUMP?

SubPUMP is the only comprehensive ESP design and analysis software tool offered by an independent source.

With no vested interest in equipment sales, sources ESP equipment data from every leading manufacturer worldwide. As a result, you get unbiased designs truly customized to your specific needs.

SubPUMP is also widely used by most ESP pump/motor manufacturers to verify and service ESP wells.

The screenshot displays the SubPUMP software interface, which is divided into several functional areas:

- Automatic Equipment Selection:** A panel on the left with dropdown menus for 'Select Pump Manufacturer' (Almaz) and 'Select Cable Manufacturer' (None). It includes radio buttons for selection criteria like 'BEP Closest to Liquid Rate at Brake Conditions' and 'Highest Efficiency'. Below are sections for 'Suggested Equipment', 'Suggested Pump' (Almaz 5 DPS-80), 'Suggested Motor' (Almaz 103 7M22-M1B5), and 'Suggested Cable' (No cable suggested).
- Standard Catalog Pump Curve:** A graph showing Head (ft) vs. Rate (Bbl/D) for an Almaz 5 DPS-80 pump. The y-axis ranges from 4.0 to 28.0, and the x-axis from 300.0 to 900.0. A yellow shaded region highlights the operating point.
- Pump Performance:** A graph showing TDH (ft) vs. Liquid + Gas Rate (Bbl/D). The y-axis ranges from 1000.0 to 6000.0, and the x-axis from 300.0 to 600.0.
- Equipment Selection:** A central vertical diagram of a wellbore with various components labeled: Surface Equipment, Pump & Housing, Gas Separation, Motor & Seal, and Cable Data.
- Auto Select Equipment:** A panel on the right with 'Design Frequency' set to 60.000 Hz. It includes sections for 'Pump Selection' (Manufacturer: Almaz, Model: 5, Series: DNS-100, BEP/DP Rate: 795, Stages: 172) and 'Motor Selection' (Manufacturer: Almaz, Model: 103, Series: 7M22-M1B5, HP: 45.1, Volts: 1080, Amps: 27.0, Nmp: 60).
- Bottom Hole Pressure:** A table on the far right titled 'THEORETICAL PUMP PERFORMANCE' with columns for 'Design' and 'Catalog' values.

Parameter	Design	Catalog
Pump Data		
Number of Stages	172	
Stages with Free Gas	172	
Free Gas into Pump, %	5.0	
Total Dynamic Head (TDH), ft	4079.58	4087.34
Surface Rate (Q-W), Bbl/D	600.00	601.04
Avg. Rate per Stage (D-G-W), Bbl/D	N/A	688.09
Pump Intake Pressure, psig	611.9	609.9
Operating Power, HP	N/A	32.9
Pump Efficiency, %	N/A	49.4
Motor Data		
Adjust for Motor Slip	Yes	
Operating Current, Amps	21.5	
Operating Voltage, Volts	1080.00	
Operating Motor Load HP	32.8	
Operating Power Factor, frac	0.730	
Operating Motor Load %	72.71	
Operating Efficiency, %	82.33	
Total Stages	172	174
Slip Stages	0	2
Total Dynamic Head (TDH), ft	4087.34	4086.27
Surface Rate (Q-W), Bbl/D	601.04	600.43
Avg. Rate per Stage (D-G-W), Bbl/D	688.09	687.39
Pump Intake Pressure, psig	609.9	611.1
Operating Power, HP	32.9	32.8
Operating Speed, RPM	3500	3481

Automatic Equipment Selection

Equipment Selection that interfaces with a database of more than 3500 items.

SubPUMP Major Capabilities

SubPUMP works as an optimization tool and it offers a number of unique capabilities that help engineers to easily access information, analyze and make the most informed decision. Some of these major capabilities include:

Verify performance of gas separation / gas handlers using test efficiency data

Compare actual vs. modeled parameters

Design an ESP system

Conduct a combined ESP and gas lift study

Select equipment from a database of 3,500+ pieces of entry from 10 different leading ESP manufacturers worldwide

Real-time equipment updates like pump, motors, variable speed drives, switchboards, etc

Automatically calibrate and optimize performance of existing ESP's

Verify your service company's ESP design recommendations

Diagnose ESP problems

Dogleg Severity Calculation for deviated wellbore

Perform side-by-side comparisons of various ESP components (pump, motor, cable, etc.) from different vendors

Go beyond ESP design with SubPUMP:



Keep well models up to date by adjusting equipment design, enhancing well reliability



Compare different vendors' equipment from around the world



Use the latest ESP technology available in the market with every new release



Import third Party ESP equipment data using IHS Excel format: SubPUMP allows engineers to import ESP equipment performance data from any vendor via IHS Markit data link

Benefits of Purchasing SubPUMP from IHS Markit

Users will discover that SubPUMP is the easiest tool on the market and provides up-to-date, neutral and unbiased information to design and analyze your ESP system.

Other benefits from IHS Markit include:

✔ Competitive pricing

✔ Flexible licensing including perpetual licenses, annual leases, or network/ standalone licenses.

✔ Worldwide support based upon contract terms.

✔ Customized training options

Our support engineers are globally positioned to help you get started using SubPUMP. To request your free trial, contact sales at [ihsmarkit.com/energy/subpump](https://www.ihsmarkit.com/energy/subpump)