HANDS-ON, INTERACTIVE LEARNING MODULES

Summit ESP® – A Halliburton Service offers hands-on training where students have the opportunity to learn by using the latest training technologies under the guidance of our highly experienced cadre of professional technical instructors.

Our comprehensive training is targeted to those new to the use of electric submersible pumps (ESPs), and also to those who are already familiar with the systems but are seeking to improve their operational and troubleshooting skills.

All students should be prepared to learn in an interactive environment. Many courses offer a variety of learning modalities, including small group projects, hands-on applications, and self-paced learning. We seek to provide a stimulating, challenging, and safe learning experience. Facilities and manufacturing tours are provided to all customers during the course.

Summit ESP Technology
Offered Quarterly
Following are the components of the three-day Summit ESP Technology customer training. Qualified instructors teach these classes, which are well suited to the majority of customers who need to thoroughly know and understand the equipment they will be operating.

» SESP 102 – ESP Pump Technology
» SESP 103 – ESP Seal Section Technology
» SESP 104 – ESP Motor Technology
» SESP 105 – Motor Controller Technology
» SESP 106 – Downhole Sensor Technology

Who Should Attend
» Production Engineers
» Supervisors/Managers
» Pumpers
» Support Technicians

How to Enroll
Contact your Summit ESP representative for registration information. Visit SummitESP.com/Training to see dates of upcoming training.
ESP Pump Technology

This module serves as the foundation for all further equipment technology courses. It provides an in-depth understanding of the design and operational principles of the electric submersible pump.

Topics

» Downhole Components
» Equipment Series and Nomenclature
» Pump Components
» The Pump Stage
» Centripetal and Centrifugal Forces
» Single-Speed Pump Curve
  - Head Capacity
  - Brake Horsepower
  - Efficiency
  - Operating Range
» Hydraulic Design
  - Radial-Stage Design
  - Mixed-Flow Stages
  - Axial Stages
» Pump Hydraulic Thrust
» Affinity Laws and Performance Prediction
» Variable-Speed Performance Curves
» The Operating Envelope

Duration: 6–8 hours
Prerequisites: None

ESP Seal Section Technology

Due to the critical nature of the seal section in supporting the full service life of the pump and motor, a thorough understanding of the operation and limitations of the seal is of utmost importance. In this course, all components of the seal are discussed to bring the students to a full understanding of the tool and its operation.

Topics

» Labyrinth Chamber Design
» Bag (Bladder) Chambers
» Mechanical Seals
» Fluid (Pressure) Distribution Within the Seal
» Thrust Bearing Design
» Seal Servicing
  - Series Bag Seals
  - Parallel Bag Seals
  - Summit ESP Sand Seals

Duration: 4 hours
Prerequisites: ESP Pump Technology
The ESP motor must produce torque under the most severe conditions. This course provides the students with an understanding of the design principles and operation of the tool. Throughout this course, the student will also become familiar with many fundamental electrical principles, including current flow, system voltage requirements, and three-phase power supplies.

Topics
- Motor Components
- Operational Principles of Three-Phase Motors
- Motor-Rated Horsepower vs. Brake Horsepower
- Horsepower, Voltage, and Current
- Motor Temperature Factors
- Application-Dependent Rating

Duration: 6 hours
Prerequisites: ESP Pump Technology, Seal Technology

The surface control system not only provides control to the operation of the ESP system, but also serves as a critical interface with the operator. This course examines the operational principles and design of single-speed switchboards and variable-speed motor controllers.

Topics
- Fundamentals of Motor Controllers
- Across-the-Line Motor Starters
- Switchboard Components
- Understanding Analog and Digital Inputs
- Switchboard Wiring Diagram
- Variable-Speed-Drive Principles
- Variable-Speed-Drive Power Conversion
- Active-Front-End (AFE) Rectifier
- 6-, 12-, and 18-Pulse Rectifier
- PWM Output Waveform
- Sine-Wave Filtering
- Controller Interface

Duration: 4–6 hours
Prerequisites: ESP Pump Technology, Seal Technology, Motor Technology

“Very informative training. The trainer kept the class entertained and explained things in ways that all participants could understand the functions and limitations of ESPs. I would recommend this for those seeking a better understanding of ESPs.”

— Jason Pelton, EOR Sr. Production Foreman, Chaparral Energy
Downhole Sensor Technology

The development of reliable, accurate downhole sensors now provides operators with information critical to improve production and increase system run life. This course provides the students with a thorough understanding of the data channels available using ESP sensors, along with the operational fundamentals of the tool.

Topics
» Intelligent Production Management
» Sensor Channels
» Surface System Options
» System Diagram
» Comms-On (DC Impressed)
» Communications

Duration: 2–3 hours
Prerequisites: ESP Pump Technology, Seal Technology, Motor Technology, Motor Controller Technology

Gas-Handling Technology

Specialized gas-handling tools have greatly improved production potential in challenging high-gas conditions. This course will provide the students with an understanding of gas production and gas-handling tools.

Topics
» Reservoir Drive Mechanisms (Gas Cap, Solution Gas, Water Drive)
» Free Gas Effects
» Gas Locking
» Gas Blocking
» Cavitation
» Gas Separators
» Gas-Handling Stages
» Net Positive Suction Head (NPSH) Stages

Duration: 4 hours
Prerequisites: ESP Pump Technology
Sales of Halliburton products and services will be in accord solely with the terms and conditions contained in the contract between Halliburton and the customer that is applicable to the sale.

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