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COURSE BROCHURE

# ESP Surface Electrical Equipment Maintenance Training Course

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Registered in the United Kingdom and Saudi Arabia

# ESP Surface Electrical Equipment Maintenance Training Course

ESP Surface Electrical Equipment Maintenance is a 1-week training course for production and artificial lift engineers that delivers an ESP surface equipment maintenance and test plan for one well pad or pump station. Many electric submersible pump failures start above ground, in drives, transformers, junction boxes and wellhead penetrators, and each trip costs lost barrels or water supply. Jupiter Prime Training delivers this ESP Surface Electrical Equipment Maintenance course.

## Why ESP Surface Electrical Equipment Maintenance Matters Now

Three forces push surface electrical care up the agenda. Operators run more pumps on variable speed drives to handle changing inflow, which adds harmonics, heat and electronic failure points. Remote fields and dewatering sites have few electrical specialists, so artificial lift engineers must judge drive alarms and cable test results. Power quality from generators and weak grids is variable. Teams that maintain drives, step-up transformers and power cable on condition extend downhole run life; teams that wait for trips repeat costly pulls. The course frames this work with ISO 55001 asset management and EN 13306 maintenance terminology.

## Who Gains Most from ESP Surface Electrical Equipment Maintenance

- Artificial lift engineers who set drive parameters and review trip histories
- Production engineers responsible for well uptime and pump start-stop decisions
- Field electrical leads who test cable insulation and maintain switchboards
- Maintenance planners who schedule drive filter, fan and transformer servicing
- Surveillance engineers who monitor amperage charts and downhole sensor data

Artificial lift groups gain most when production and electrical members attend together and share one surface test routine.

## ESP Surface Electrical Equipment Maintenance Capabilities

Participants learn to read what the surface electrical chain is saying about the pump below and to act before a trip becomes a pull.

- Interpret amperage charts and drive trip logs — the decision to restart, retune or pull
- Test power cable and motor insulation with resistance and polarisation index readings — workover planning
- Assess variable speed drive health through filters, fans and DC bus checks — field electrical leads
- Specify step-up transformer tap settings and oil checks — voltage delivered to the motor
- Apply harmonic mitigation and protection relay settings — generator and grid supply owners
- Build a surface equipment preventive routine in the CMMS — maintenance planners

## Key ESP Surface Electrical Equipment Maintenance Terms

- Variable speed drive — power electronics that change motor frequency so pump rate can follow well inflow.
- Step-up transformer — a transformer that raises drive output voltage to the level the downhole motor and long cable require.
- Amperage chart — a record of motor current over time whose shape reveals gas locking, underload, overload or cycling.
- Polarisation index — the ratio of insulation resistance readings over time, showing moisture or contamination in cable and motor windings.
- Wellhead penetrator — the sealed electrical feedthrough that carries power cable through the wellhead to the downhole motor.
- Underload trip — a protection action that stops the pump when current falls, often signalling gas or low inflow.

## ESP Surface Electrical Equipment Maintenance Day by Day

### Day 1: The ESP Power Chain

- Surface-to-Downhole Electrical Layout — Locating Each Failure Point
- Pump Sizing and Motor Load Basics — Matching Surface Equipment Ratings
- Switchboards, Drives and Transformers Compared — Fixed or Variable Speed Choices
- Electrical Safety and Isolation at the Wellsite — Safe Access Rules
- Oilfield and Mine Dewatering Case Histories — Common Surface Failure Patterns

### Day 2: Drives and Transformers

- Variable Speed Drive Architecture — Rectifier, DC Bus and Inverter Checks
- Drive Cooling, Filters and Enclosure Care — Preventing Heat Trips
- Step-Up Transformer Taps and Oil Tests — Delivering Correct Motor Voltage
- Sine Wave Filters and Harmonic Mitigation — Protecting Cable and Motor Insulation
- Drive Firmware and Parameter Backups — Restoring Settings After Faults

### Day 3: Cable, Junction Box and Wellhead

- Insulation Resistance and Polarisation Index Testing — Cable and Motor Condition
- Phase Balance and Continuity Measurements — Locating Splice Problems
- Junction Box Venting and Gas Migration — Preventing Fire Risk
- Wellhead Penetrator Inspection — Seal Integrity and Hot Spots
- Surface Cable Routing and Mechanical Protection — Avoiding Third-Party Damage

### Day 4: Surveillance, Trips and Run Life

- Amperage Chart Interpretation — Diagnosing Gas, Underload and Cycling
- Protection Relay and Trip Setpoints — Balancing Uptime Against Motor Safety
- Downhole Gauge and Drive Data Trending — Early Warning of Decline
- Restart Rules and Backspin Precautions — Avoiding Shaft and Cable Damage
- Pull Reports and Failure Coding — Linking Surface Faults to Run-Life Loss

## Day 5: Practising the ESP Surface Equipment Plan

- Diagnosing a Trip Sequence From Case Data — Applying Chart Interpretation
- Insulation Test Results Review — Applying Cable Acceptance Limits
- Drive and Transformer Service Tasks — Applying Preventive Intervals
- Spare Drives, Filters and Penetrators — Critical Spares Decisions
- ESP Surface Equipment Maintenance and Test Plan — Completing the Site Plan

## Applying ESP Surface Electrical Equipment Maintenance After the Course

- Review the last month of amperage charts for five wells and log trips by cause.
- Run insulation resistance and polarisation index tests on one cable string and record results against acceptance limits.

## ESP Surface Electrical Equipment Maintenance Questions FAQ

### What is ESP Surface Electrical Equipment Maintenance and why does it matter now?

It is the care and testing of drives, transformers, cable and wellhead connections that power electric submersible pumps. It matters now because drives and fewer specialists make surface faults a frequent trip cause.

### Which roles gain most from ESP Surface Electrical Equipment Maintenance training?

Artificial lift and production engineers gain most. Field electrical leads, maintenance planners and surveillance engineers also benefit.

### How does ESP Surface Electrical Equipment Maintenance differ from an ESP design and troubleshooting course?

It concentrates on the surface electrical chain rather than downhole hydraulics and pump selection. You test cable and service drives instead of sizing stages.

### What do you bring back from ESP Surface Electrical Equipment Maintenance training?

You bring back a surface equipment maintenance and test plan for your well pad or station. It sets test intervals, drive service tasks, trip responses and critical spares.

## ESP Surface Electrical Equipment Maintenance: The Way Forward

The ESP surface equipment maintenance and test plan first informs which drives, transformers and cable strings need attention before the next pump change. Artificial lift engineers own it, field electricians execute it and planners schedule it in the CMMS. After the first quarter, compare trip counts and insulation trends to judge whether test intervals are right.