
Electric Submersible Pump Run-Life Management and Failure Analysis Training Course

1 – 5 November 2026
Muscat





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Ref: 203_17394 **Date:** 1 – 5 November 2026 **Location:** Muscat **Fees:** 4300 GBP

Programme Summary

Electric submersible pump run-life management and failure analysis form the subject of this one-week training course for production and artificial lift leaders at advanced level, ending in an ESP run-life improvement plan for their field. Each premature ESP failure costs a workover, lost oil and replacement equipment, yet many operators still treat failures as isolated events. The approach moves from system design and sizing to surveillance, dismantle inspection and failure analysis, run-life measurement and vendor performance. Mars Training Centre UK delivers this programme in electric submersible pump run-life management.

The Business Case

In fields where most wells are on ESP lift, run-life drives operating cost, deferred production and rig demand. Leaders who link design choices, surveillance data and teardown evidence can break repeat failure patterns and hold vendors to measurable performance.

- ESP Run-Life and Mean Time Between Failures: Extend as root causes are removed rather than equipment replaced.
- Deferred Production: Falls as surveillance detects gas locking, pump-off and electrical faults before shutdown.
- Workover and Equipment Spend: Declines as failure trends inform design, procurement and contract terms.

Principles and Evidence Base

- ISO 15551-1: Requirements for electric submersible pump systems for artificial lift frame the component and qualification review in Session 1.
- API RP 11S4: Sizing practice links inflow performance and pump selection in Session 2.
- API RP 11S: Operation, maintenance and troubleshooting practice structures the surveillance work in Session 3.
- API RP 11S1: Teardown reporting provides the dismantle inspection and failure analysis method applied in Session 4.

Intended Participants

- Leaders accountable for production engineering and well performance across a field or asset.
- Managers who run artificial lift teams and approve ESP designs and replacements.
- Engineers who lead ESP failure investigations and teardown reviews.
- Asset and contract managers who set ESP vendor terms and performance targets.



The programme serves national and international oil companies, ESP service providers, field development teams and well services contractors.

Learning Outcomes

1. Participants will be able to evaluate ESP component choices for the well conditions they face.
2. Participants will be able to construct an ESP sizing case from inflow performance and pump curves.
3. Participants will be able to diagnose abnormal operation from amperage, pressure and drive data.
4. Participants will be able to lead a dismantle inspection and failure analysis that reaches a root cause.
5. Participants will be able to design run-life indicators and a failure database for the field.
6. Participants will be able to justify ESP contract terms that reward run-life.

Programme Structure

Day 1: Electric Submersible Pump Systems and Components

What does each part of the ESP string do, and where does it fail?

- Pump Stages, Intake and Operating Range
- Motor, Seal Section and Thermal Limits
- Power Cable, Penetrators and Surface Equipment
- Gas Separators, Gas Handlers and Abrasion-Resistant Stages
- Qualification and Testing Under ISO 15551-1

Day 2: ESP Sizing and Well Conditions

How is the right ESP matched to the well and the reservoir?

- Inflow Performance Relationship and Productivity Index
- Total Dynamic Head and Pump Selection Under API RP 11S4
- Free Gas, Viscosity and Solids Correction
- Variable Speed Drive Selection and Operating Envelope
- Sizing Sensitivity to Water Cut and Reservoir Decline

Day 3: Surveillance and Optimisation

How can operating data predict and prevent failure?

- Amperage Charts and Their Signatures
- Downhole Gauge Data: Intake Pressure and Motor Temperature
- Drive Data Trends and Protection Settings
- Real-Time Surveillance and Exception-Based Alarms
- Start-Up, Restart and Troubleshooting Practice Under API RP 11S



Day 4: Dismantle Inspection and Failure Analysis

Why did the ESP fail, and how is recurrence stopped?

- Pull Decision, Handling and Chain of Custody
- Teardown Reporting Under API RP 11S1
- Failure Mode Codes: Electrical, Mechanical and Hydraulic
- Root Cause Analysis Linking Teardown to Operating History
- Failure Database Design and Trend Analysis

Day 5: Applying ESP Run-Life Management

Is the field ready to manage ESP run-life as a measured programme?

- Run-Life, Mean Time Between Failures and Survival Analysis
- Applying Day 4 Failure Trends to Day 2 Design Standards
- Embedding Day 3 Surveillance Rules in Field Routines
- ESP Contract Models and Vendor Performance Reviews
- ESP Run-Life Improvement Plan Completion

Methodology

The programme relies on case analysis supported by field data. Participants work with well tests, amperage charts, gauge data and teardown reports from a fictional ESP field, then compare onshore and offshore cases to see how environment changes failure patterns.

- Suggested activity: Resizing an ESP for a well with rising water cut and free gas.
- Suggested activity: Interpreting a set of amperage charts and gauge trends before a shutdown.
- Suggested activity: Conducting a mock teardown review and agreeing the root cause.

Capstone Output

Each participant completes an ESP run-life improvement plan for their field. It sets the run-life baseline, the dominant failure modes, design and surveillance changes, failure database requirements and the contract and vendor review cycle. It is used to agree targets with operations and service providers.

Frequently Asked Questions

Is electric submersible pump run-life training suitable for asset managers as well as engineers?

Yes. It is set at advanced level for leaders who own ESP performance, assumes familiarity with well production and links technical topics to cost and contract decisions.



Which standards does the electric submersible pump run-life programme rest on?

It rests on ISO 15551-1 for ESP systems, API RP 11S4 for sizing, API RP 11S for operation and troubleshooting, and API RP 11S1 for teardown reporting.

How is the ESP run-life improvement plan from electric submersible pump training used at work?

You can use it to set run-life targets, prioritise design and surveillance changes and structure vendor performance reviews.

How does electric submersible pump run-life training differ from a general artificial lift course?

General artificial lift courses compare lift methods. This programme concentrates on ESP systems, their failures and the management of run-life.