
Crude Oil Treatment Training Course: Dehydration, Desalting, Stabilisation and Export Quality

4 – 8 April 2027
Muscat





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Ref: 531_28546 Date: 4 – 8 April 2027 Location: Muscat Fees: 4300 GBP

Programme Summary

Crude oil treatment is the subject of this one-week training course for process engineers, facility managers and operations supervisors, ending in a treatment plant review for one facility. Export crude must meet limits on water, salt and vapour pressure, yet emulsions, mixing faults and unplanned dosing changes often push plants off specification. The programme links dehydration, desalting, stabilisation and fault response, applying each tool to a plant of the participant's own. Mars Training Centre UK delivers this programme on crude oil treatment to mixed-organisation cohorts.

The Business Case

Plants that treat crude by habit rather than by measurement carry water and salt downstream, over-dose chemicals and spend energy on heat that does not improve quality. Those that tie each treatment step to a measured specification can show where off-specification crude arises, reduce rework and discuss quality disputes with buyers using evidence, not opinion, at the next scheduled quality review.

- Export Quality: Improves as water, salt and vapour pressure are held inside agreed limits.
- Chemical and Energy Cost: Falls as dosing and heating are matched to measured need.
- Plant Reliability: Strengthens as emulsion and mixing faults are found before they upset the train.

Principles and Evidence Base

- ASTM D4007: This test method measures water and sediment in crude oil by centrifuge, and it supports Sessions 1 and 2.
- ASTM D3230: This electrometric method measures salts in crude oil, and it supports Sessions 1 and 3.
- ASTM D323: This Reid method measures vapour pressure of petroleum products, and it frames the stabilisation targets in Session 3.
- Electrostatic coalescence in crude desalting: It describes how wash water is mixed with crude and brine is separated, and it informs Session 3.

Intended Participants

- Process engineers who set operating windows for treatment units.
- Facility managers who answer for export quality and treatment cost.
- Operations supervisors who run shift routines and respond to off-specification crude.
- Laboratory leads who report water, salt and vapour pressure results.
- Utilities coordinators who control dosing and heating.

Typical sectors include upstream production, export terminals, refinery crude receipt and pipeline operations.



Learning Outcomes

1. Participants will be able to diagnose the causes of water carry-over and high salt in treated crude.
2. Participants will be able to evaluate dehydration train performance against measured data.
3. Participants will be able to construct desalting and stabilisation targets from the export specification.
4. Participants will be able to prioritise chemical dosing and energy actions by effect on quality and cost.
5. Participants will be able to design a response flow for off-specification crude.
6. Participants will be able to justify a treatment plant review to leadership.

Programme Structure

Day 1: Crude Oil Treatment Principles and Specifications

Why are water and salt hard to remove, and what must the export stream meet?

- Emulsion Stability Factors Chart
- Export Crude Specification Sheet
- ASTM D4007 Water and Sediment Review
- ASTM D3230 Salt Measurement Review
- Treatment Train Block Diagram

Day 2: Dehydration and Emulsion Diagnosis

How are emulsion problems located in a dehydration train and ranked by cause?

- Free Water Knockout Performance Check
- Heater Treater Operating Window
- Demulsifier Bottle Test Record
- Wash Water Mixing Assessment
- Emulsion Pad Troubleshooting Tree

Day 3: Desalting and Stabilisation Design

How are desalting and stabilisation set to meet salt and vapour targets?

- Desalter Mixing Valve Sizing Sheet
- Electrostatic Coalescer Grid Review
- Stabiliser Column Heat Balance
- ASTM D323 Vapour Pressure Target Table
- Sweetening Option Screen



Day 4: Chemical Dosing, Energy Use and Fault Response

How are dosing, energy and off-specification events managed at lower cost?

- Chemical Dosing Optimisation Log
- Treatment Energy Use Ledger
- Brine and Produced Water Handling Plan
- Off-Specification Response Flowchart
- Treatment Performance Dashboard

Day 5: Applying the Tools to One Treatment Plant

Do the specification, dehydration, desalting and fault tools hold together?

- Applying the Session 1 Specification Sheet
- Using the Session 2 Troubleshooting Tree
- Testing the Session 3 Targets
- Checking the Session 4 Dosing Log
- Completing the Treatment Plant Review

Methodology

The programme uses a case analysis method built on anonymised treatment plant logs, laboratory results, dosing records and fault reports from field facilities and terminals. Participants work in peer groups on a plant of their own, challenge one another's diagnoses and receive written facilitator feedback on every written exercise set.

- Suggested activity: Tracing a rise in treated crude water content back through each stage to its first cause.
- Suggested activity: Comparing two demulsifier bottle test records and choosing a dosing change.
- Suggested activity: Drafting an off-specification response for a night shift.

Capstone Output

Each participant completes a treatment plant review for one facility. It holds a specification sheet, a treatment train diagram, an emulsion troubleshooting tree, desalting and stabilisation targets, a dosing and energy log and an off-specification response flowchart. The review is used at work to brief leaders and plan the next improvement cycle.



Frequently Asked Questions

Is training in crude oil treatment suitable for engineers new to desalting?

Yes. Crude oil treatment assumes experience in process or production operations and builds desalting and stabilisation knowledge from the export specification upward.

Which standards does crude oil treatment rest on?

Crude oil treatment rests on the ASTM test methods D4007 for water and sediment, D3230 for salts and D323 for vapour pressure, together with desalting practice.

How is the plant review from crude oil treatment used at work?

You use the treatment plant review to brief facility leaders and plan the next quality improvement cycle at your own site.

How does crude oil treatment differ from general oil production operations?

Crude oil treatment centres on meeting water, salt and vapour pressure limits for export, while general production operations centre on wells, separation, safety and routine plant running.