COURSE BROCHURE

Water Treatment and Desalination

A practical course on water chemistry, pretreatment, reverse osmosis, thermal desalination, post-treatment and brine management, with design and operating calculations for desalination and industrial water plants.

Code	HT-OGE-169
Category	Oil & Gas, Engineering & Maintenance
Duration	1 week
Level	Intermediate
City	Dubai

Introduction

The Arabian Gulf states and many cities across the Middle East and Africa rely on desalination as a main source of drinking and industrial water, and energy, membranes and chemicals make up most of the cost of each cubic meter produced. Any gain in pretreatment or membrane operation therefore shows up directly in cost and in plant life.

Objectives

- Interpret feed water analyses and determine scaling and fouling tendency
- Select a pretreatment train suited to the quality of the source water
- Calculate the basic variables of a reverse osmosis system and diagnose loss of performance
- Compare thermal and membrane desalination in terms of energy, cost and operation
- Define post-treatment needs and safe disposal of concentrated brine

Who should attend

- Engineers and operators of desalination and water treatment plants
- Process and utilities engineers in petroleum and industrial facilities
- Design and project engineers in water and power utilities and contractors
- Laboratory chemists and water quality officers

Skills you will develop

- Water chemistry analysis
- Reverse osmosis system design and operation
- Plant performance monitoring and troubleshooting
- Desalination technology selection

Learning Outcomes

- Calculate the Langelier saturation index and silt density index of a sample and judge its suitability for membranes
- Prepare a mass and salt balance for a reverse osmosis unit at a given recovery
- Normalize operating data and decide when and why membranes need chemical cleaning
- Draw up a preliminary cost per cubic meter comparison between two desalination options

Course Outline

Day 1: Water Chemistry and Sources

- Total dissolved solids, hardness, alkalinity, pH, turbidity and silt density index
- Characteristics of seawater, brackish groundwater and produced water, and specifications for drinking, boiler and injection water
- Langelier and Stiff-Davis indices and calculating scaling tendency

Day 2: Intakes and Pretreatment

- Open intakes, beach wells, screens and control of marine growth by chlorination
- Coagulation, flocculation, dissolved air flotation, granular media filtration and ultrafiltration
- Dechlorination, antiscalant dosing and cartridge filters ahead of the membranes

Day 3: Reverse Osmosis Desalination

- Osmotic pressure, recovery, salt rejection and membrane flux
- Stage and pass arrangements for seawater and brackish water, high-pressure pumps and energy recovery devices
- Particulate, scale and biological fouling, normalization of performance data and clean-in-place

Day 4: Thermal Desalination and Post-Treatment

- Multi-stage flash and multi-effect distillation with thermal vapor compression
- Performance ratio, top brine temperature, scale control and coupling with power plants
- Remineralization, corrosion control and disinfection, ion exchange demineralization for boiler water and sulfate removal for injection water

Day 5: Brine and Plant Economics

- Concentrate discharge through marine outfalls, zero liquid discharge options and reuse of treated water
- Operating indicators, specific energy consumption and the capital and operating cost elements per cubic meter
- Applied project in which each team prepares a preliminary design for a seawater reverse osmosis plant with balances and pretreatment selection

Training methodology

Excel calculations of osmotic pressure, recovery and energy consumption
Analysis of operating data from a reverse osmosis unit to find the cause of declining output
Comparison of flow diagrams of membrane and thermal plants operating in the region
Team project on the preliminary design of a desalination plant, presented to the group

Certification

Participants receive a Harbor Training Center certificate of attendance on completing the course.

Upcoming dates

City	Dates	Language	Fee
Dubai	22 – 26 February 2027	EN	EUR 4,800
Dubai	23 – 27 August 2027	AR	EUR 4,800

Fees are per participant.

Contact us

Email info@harbor4training.com

Address istanbul Turkey

To register and for details, scan the code or visit:

https://harbor4training.com/en/courses/water-treatment-desalination