Professional Engineering Services

RO Training Course for Intermediates

Course Duration **3 Days**

Who should attend? The course is aimed at engineers, chemists, senior operators & technicians involved in the planning, management, operation and maintenance of reverse osmosis plants.

Course Objectives After successful completion of the course delegates will have adequate theoretical and practical knowledge to enable them to operate the RO plant efficiently and successfully. Also delegates shall be able to easily troubleshoot and correct any deficiency in reverse osmosis (RO) plants.

Course outcome

Delegates will gain valuable know-how related to reverse osmosis plants on:

- ✓ Understand and specify water quality & contaminants.
- ✓ Membrane types, application and configurations.
- ✓ Understand Osmosis & Reverse Osmosis principles.
- ✓ RO Plant Configuration and passes.
- ✓ How to operate smoothly RO plant
- ✓ Monitor RO plant performance and take necessary corrective action
- ✓ Control scaling, fouling and chemical attack by using appropriate pretreatment technologies.
- ✓ Understand RO design.
- ✓ Reverse Osmosis preventive Maintenance.
- ✓ Reverse Osmosis membranes cleaning.

Mahmoud Shokri St. # 4, Smouha- Alexandria – Egypt
Telfax: +203-4242-441 & Tel +203-960-8542 & +2010-0074-241
www.proserve-egypt.com

Course Contents

Part I: Basic Water chemistry

- The nature of water and it's sources.
- Organics
- Hardness
- COD & BOD
- Conductivity
- The Water Molecules (Cations & Anions)

Part II: Membranes Configurations

- Flow Configuration.
- Microfiltration, Ultra-filtration, RO
- Membranes pore size, types, and characteristics.

Part III: RO Process

- Osmotic Pressure phenomena.
- Reverse Osmosis Parameters.
- Parameters Affecting Membrane Performance.
- Pretreatment System.
- ROMAS (Reverse Osmosis Membrane Assembly).
- Post Treatment System.
- Orientation to R.O Plant system
- Instrumentation.
- Flush/ Cleaning System.
- Alarms and Protections.

Part IV: Reverse Osmosis System Design

- Computer Projections of RO System Performance.
- Select the appropriate system Configuration.
- RO components design and selection .
- Introduction to Piping System
  - Pipe types
  - Pipes schedule, pressure ratings, materials, etc

Part V: Plant Operation

- RO System Startup and Operation.
- Daily Operation Instructions.
- Chemicals doses calculation and preparation.
- Back Wash Process.
- Cartridge Filters Replacement.
- Membrane Flow & Probe Test.

Part VI: Corrosion Introduction

- Corrosion definition
- Corrosion types and control
- Introduction to stainless steel material types and grades

Part VII: Technical

- Units conversion.
- Net Driving Pressure NDP.
- HPP & ERT Efficiency calculations.
- Recovery calculations.
- Membranes performance.
- Pumping Systems
  - Types of pumps
  - Pump selection" dozing, feed, etc".

- Mechanical shaft seals
- Proper installation of flow meters.

Part VIII: Maintenance

- Types of maintenance
  - PM
  - CM
- Maintenance & repair of :
  - High pressure pump & motor
  - ERT
  - MMFs & CF
  - Pressure vessels
  - Membranes
  - Feed/ sea water intake / flushing pumps
- ERT inspection, maintenance, repair
- Pump /motors
- Equipments Lubrication

Part IX: Safety

- Hazards & Fire Fighting
- Safety of :
  - Pressure vessels
  - HPP
  - Electric motor
  - ERT

- When to Clean
- Defining a Foulant and Scalant .
- Membrane Fouling Process.
- pH and Temperature Limits
- Cleaning Carbonate Scaling
- Cleaning Sulfate Scaling
- Cleaning Organic Fouling
- Cleaning Biological Fouling
- Cleaning Iron Fouling
- Cleaning Silt Fouling
- Cleaning Carbon Fouling
- Chemical Attack
- Permeate Back Pressure
- The Cleaning Process
- Questions & Answers.

SUMMERY AND CLOSING