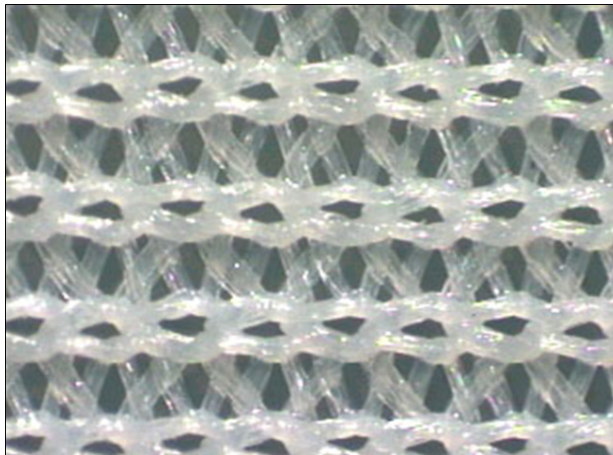


Reverse Osmosis

Operation & Maintenance of

RO Systems

OLC117



Online Training

Information Packet

Costs

- \$319 USD
 - Price includes
 - Narration
 - Many illustrations
 - Video clips
 - Animations
 - Pictures
 - Interactive questions
 - Practice exams
 - Final exam
 - Discounts may apply
 - Bundled discount for RO Certification
 - Multiple-course discount
 - Multiple-trainee discount
 - From time to time DHP runs special discounts

Length:

Eleven (11) hours

What you will learn:

David H. Paul, Inc Certificate upon successfully passing an exam based on the knowledge and proficiencies learned in this course

Description:

You will learn all of the practical information necessary to thoroughly understand Reverse Osmosis (RO) and Nanofiltration (NF) water treatment technologies and apply your knowledge while operating an industrial reverse osmosis water treatment facility.

Overview of Topics

- Water Contaminants Overview
- Semipermeable RO/NF Membranes
- Osmosis & Reverse Osmosis
- Membranes
- Membrane Elements
- Pressure Vessels
- RO/NF Units
- RO Unit Operation
- Seawater RO Unit Operation
- Potential Problems
- Brackish water pretreatment to minimize problems
- Seawater pretreatment to minimize problems
- Chemical Cleaning of RO/NF units

Topic Breakdown

Water Contaminants

- Ions
- Gases
- Organics
- Silica

Semipermeable Membranes RO/NF

- Structure
- Water Flux
- Salt Flux
- Rejection of contaminants

Osmosis & Reverse Osmosis

- Osmotic pressure
- Applied pressure
- Net Driving Pressure
- Water flux
- Salt flux

Membranes & Membrane Elements

- Flat sheet, hollow fiber
- Brackish, seawater
- Low pressure, low fouling, high rejection
- 2" (5 cm), 2.5" (6 cm), 4" (10 cm), 8" (20 cm), 8.5" (22 cm) elements
- 12.75" (32 cm), New 16" (41 cm) and new 18.25" (46 cm) elements
- Envelopes
- Feed water spacer
- Permeate spacer
- Flow path
- Low pressure, low fouling, high area & high rejection

Pressure Vessels

- 2", 2.5", 4", 8", 16", 18.25"
- End port, side port, multi-port
- Stainless steel, fiberglass
- Shimming elements

Reverse Osmosis Units

- POU, POE, industrial, municipal
- Single stage, multi-stage
- Single pass, double pass
- Brackish water RO, seawater RO

Brackish Water RO Unit Operation

- POU
- Single pass
- Double pass
- Recovery rate
- Concentration
- Water flux per element
- Net driving pressure (NDP) per element
- Salt passage per element
- NDP and SP versus temperature

Seawater RO Unit Operation

- Single stage, double stage
- Single pass, double pass

Potential Problems

- Scaling
- Fouling
- Chemical Attack

Pretreatment

- Minimize scaling
 - Softening
 - Acid injection
 - Scale inhibitor injection
- Minimize fouling
 - Clarification
 - Media filtration
 - Cartridge filtration
 - Microfiltration/ultrafiltration
- Minimize chemical attack
 - Activated carbon
 - Sulfite injection
 - Ultraviolet irradiation
- Seawater pretreatment
 - Conventional
 - Advanced

Chemical Cleaning

- Removing scalants
- Removing foulants
- A good cleaning procedure
- How to determine when to stop cleaning
- How to determine the effectiveness of a cleaning

DHP's Training Methodology

DHP uses the consulting services of a Doctor of Education from Columbia University (Dr. Linda Paul) in the development of its online training courses.

DHP's training methodology includes:

- Short, interesting, interactive lecture sessions using:
 - Lecture slides
 - Video clips
 - Animations
- Pop quizzes to enhance understanding and retention
- Practice exams

Who Should Take This Course

Everyone who works with, or will work with, the reverse osmosis and pretreatment technologies in operating plants needs to know the tips, techniques and proficiencies taught in this online training, including:

- Operators
- Maintenance personnel
- I & C Technicians
- Supervisors/Managers
- Engineers
- Original Equipment Manufacturers
- Service technicians
- More

What You'll Receive

- 11 hours of interesting, easy-to-understand training
- David H. Paul, Inc Certificate upon successfully passing an exam based on the knowledge and proficiencies learned in this course