



# THE CHEMICAL ENGINEERING MAJOR

## Desalting, Dehydration & Emulsion Operations

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# Desalting, Dehydration & Emulsion Operations

## Introduction:

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Many oil production processes present a significant challenge to oil and water treating equipment design and operations. The nature of crude oil emulsions changes continuously as the producing field depletes and conditions change with time. This creates the need to consider future performance when designing treatment systems and requires an understanding of scale and up-scaling. The course explores all the theories and technologies involved in crude oil and water treatment, starting with emulsion theory formation, stabilization and the mechanism and technology to destabilize and separate water from oil.

After the oil has been dehydrated, some oil will still not meet contract specifications due to the amount of salt present. For this reason, the course also discusses desalting technologies and processes needed to achieve required oil specifications. Due to environmental regulations and water injection specifications, produced water must also be treated. The course provides a summary of the technologies, processes and operational conditions needed to achieve the required specifications for the produced water.

## Who Should Attend?

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Surface Facilities Operation Engineers, MGC Supervisors and Key Personnel, Production Chemistry Engineers, Flow Assurance Engineers, Surface Facilities Engineers, Production Engineers.

## Course Objectives:

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**By the end of this course delegates will be able to:**

- Know about oil treatment basic concept
- Be familiar with desalting and dehydration theories and practices
- Know about dehydration equipments
- Be familiar with emulsion treating
- Be familiar with separation principles and theory
- How to size, select, specify, operate, maintain, test and trouble-shoot surface equipment used in gas/oil/water facilities such as separators, heater treaters, wash tanks, gun-barrels, storage tanks, pumps, ACT units and produced water disposal and injection equipment
- Safety procedure for isolation
- Tag out and lock out
- Prepare for shutdown and start up the unit
- How to evaluate and choose the correct process for a given situation

## Course Outline:

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### Oil Treatment Basic Concept

- Dehydration
- Desalting
- Water solubility
- Viscosity
- Emulsion

### Overview of Desalting and Dehydration

- Salt contamination
- Measurement of salt related parameters
- Desalting systems schemes
- Electric field on desalting vessels (grid ) and the effect of this grid for processing

### Dehydration Equipments

- Vertical treater
- Types and components
- Horizontal treaters
- Types and components
- Electrostatic coalescers
- Dehydration performance factors
- Design procedures

### Emulsion Treating

- Theory
- Stabilization
- Destabilization
- De-emulsifier
- Test nurture and formation of emulsions
- Factors affecting emulsion stability viscosity water percentage

- Droplet size in emulsions
- Emulsion breaking
- Gravity settling
- Emulsion treating methods
- Emulsion treating equipment
- FWKO™s
- Gun-barrels
- Wash Tanks with external gas boots
- Emulsion treating equipment sizing
- Practical design of an oil treating system

Chemical Reaction

Deformer

Scale Habiter

Heating Reaction

Separation

- Separator design
- Principles of separation
- Fundamentals
- Separator construction
- Factors affecting separation
- Gas-liquid separation
- Vessel operation
- Vessel internals
- Separator operation considerations
- Liquid-liquid separation
- Two-phase sizing
- Three-phase sizing
- ASME Code