ISTANBUL- TURKEY **02 - 06 NOV 2026**

Distillation Operation, Control, Design and Troubleshooting

Introduction

The success of every company depends of each employee's understanding of the business's key components. Employee training and development will unlock the companies' profitability and reliability. When people, processes and technology work together as a team developing practical solutions, companies can maximize profitability and assets in a sustainable manner.

Distillation is the most common separation technique and is energy intensive. Distillation can consume more than 50% of a process plant's operating energy cost. A way to improve an existing plant's operating cost or to reduce a new distillation system's operating cost is to improve the efficiency and operations by correct equipment selection, maintenance, process optimization and control.

It is strategically important that your operations team understands the fundamentals of process unit operations concepts. This is the difference between being in the best quartile of operational ability and being in the last quartile. There is vast difference in the operational ability of operating companies and most benchmarking studies have confirmed this gap in operational abilities.

Whether you have a team of new or seasoned employees, an introduction or review of these concepts is very beneficial in closing the gap if you are not in the best quartile, or maintaining a leadership position. Most studies show that a continuous reinforcement of best practices in operational principles is the most effective way to obtain the desired results. Training and learning should be an ongoing continuous lifelong goal.

www.5m-int.com admin@5m-int.com +965-66066346

Course Objective

This course will guide the participates to develop key concepts and techniques to design, operate, maintain and troubleshoot a distillation system. These key concepts can be utilized to make design, maintenance and operating decisions. Training and development is an investment in future success - give yourself and your employees the keys to success.

Product recoveries, purities and energy utilization can be improved in most distillation systems. This cannot be achieved without first an understanding of distillation principles and design. These principles need to be understood in advance of designing, operating, maintaining and troubleshooting a distillation column for the operator, maintenance, designer, or problem solving to be effective.

The goal of the course would be to refresh the knowledge of those who have a basic understanding of distillation and process simulation software techniques and to build a foundation to those who are new to the distillation.

Who Should Attend

People who are making day to day decisions regarding operation, design, maintenance, and economics of process industry plants.

1. 1st Line Operations personnel
2. Operation Supervisors
3. 1st Line Maintenance personnel
4. Maintenance Supervisors
5. Senior Plant Supervisors
6. Operations Engineers

www.5m-int.com admin@5m-int.com +965-66066346

7. Process Support Engineers
8. Design Engineers
9. Cost Engineers

- A supervisor or engineer who must troubleshoot and solve distillation problems in a plant.
- Technical Engineers, Operating Engineers, Process Support Personnel, and Managers
- Plant Operation Support Engineers checking plant performance under different operating conditions, and who are involved in design of new facilities or revamps of existing facilities.
- Ideal for veterans and those with only a few years of experience who want to review or broaden their understanding of process safety.

Other professionals who desire a better understanding of the subject matte

Course Outlines

DAY 1

1) Introduction to the Chemical Processing Industry

2) Safety for the Chemical Processing Industry

3) Characteristics of Crude Oil

- Sources of Crude
- Composition of Crude
- Description of Crude Oil Fractions
- Definition of Physical and Chemical Processes
- Crude Oil Testing
- Crude Assays

www.5m-int.com admin@5m-int.com +965-66066346

4) Introduction to the Refinery Flow Sheet

- Refinery Flow Sheet
- Gasoline Processing Options
- Bottoms Heavy Oil Processing Options
- Alkylation
- Hydrotreating
- Gas Sweeting
- Sulfur Recovery

5) Introduction to Distillation

6) General Column Design

- The components of a distillation system, more than just a tower – it is a system of different components
- History of distillation
- Different types of distillation columns
- Differences among batch, flash, and multistage distillation process
- Relative advantages of tray and packed columns
- Steps in the process design

DAY 2

1) Column Design

2) Tray Column Design

- The major design differences between tray types Baffle Trays
- Bubble Cap Trays
- Sieve Deck Trays
- Valve Trays
- Downcomer Types
- Feed Nozzles

3) The operational limits for trays – operating window

4) Process Design

- Tray Efficiency
- Tray Capacities
- Collector Trays

5) Mechanical Design

- Metallurgy Selection
- Mechanical Strength
- Collector Tray Design
- Packed Column Design

6) The different types of packing and their characteristics

- Grids
- Random Packing
- Structured Packing

7) The best type of packing for a given system

DAY 3

1) Process Design

- Packing Efficiency
- Packing Capacities
- Distributor Design

2) Mechanical Design

- Metallurgy Selection
- Mechanical Strength
- Distributor Tray Design

3) Crude Oil Distillation

- Description of the Distillation Process
- Cut Points of the Various Fractions
- Crude Tower Design
- Vacuum Tower Design

4) Troubleshooting

5) Introduction

- Evaluate operation of a packed column
- Evaluate operation of a tray column
- Use tools to diagnosis problems

6) Crude Oil Trouble Shooting Case Studies

7) Distillation

- Typical Problems
- Flooding and Its Detection
- Pressure Surveys
- Saltation
- Entrapment
- Damaged Equipment
- Entrainment and Product Quality
- Intermittent Draws

8) Heat Exchangers

- Preheat and Crude Fouling
- Leaks
- Flooded Exchangers and Tube sheet Failures
- Hot Vapor Bypass and Sealing
- Vapor Blanketing
- Heat Integration and Startup
- Heat Flux Limits
- Thermosyphon Reboilers

DAY 4

1) Process Control

2) Distillation Column Control

- Functions of Process Control
- Characteristics of a Continuous Process

3) Typical controlled and manipulated process variables

- Level
- Pressure
- Composition
- Temperature
- Flow

4) Controller Performance Criteria

- Final Control Elements
- Control Algorithms

5) Feed Forward Control of an Ideal Process

6) Feedback and Feed forward Control Loops

7) Reboiler and Condenser

- Review Heat Exchange Design Fundamentals
- Reboiler Design, Operation and Maintenance
- Condenser Design Operation and Maintenance

8) Demister Pad

- Demister Pad Design Review
- Demister Pad Mechanical Review

www.5m-int.com admin@5m-int.com +965-66066346

DAY 5

1) Designing Columns for improved operation and maintenance

- Maintenance Intervals
- Designing for Fouling Service
- Designing for Vacuum Service

2) Installation

- Common column installation mistakes
- List tasks to insure a proper installation
- Revamp Installation Case Study

3) Inspection

- New tower inspection guidelines
- Turn Around inspection

4) guidelines Tower Scanning

- Tower Scanning Overview
- Tower Scanning

5) Case Study Commissioning

- Tower Pre Commissioning Guidelines
- Tower Start Up Guidelines
    a. Common startup problems and understand how to correct them
- Tower Shut Down Guidelines

6) Turn Around Planning

- Estimating Replacement Parts Needed
- Estimating Inspection
- Project Management

www.5m-int.com admin@5m-int.com +965-66066346

Training course Price:

Number of Participants	Course Price
1 Participant	KWD 1550.000
2 Participants	KWD 1500.000
3 Participants	KWD 1450.000
4 Participants	KWD 1400.000
5 Participants	KWD 1350.000
6 and above Participants	KWD 1300.000

www.5m-int.com admin@5m-int.com +965-66066346