



Heat Exchangers Operation and Maintenance

Course Description

The scope of Heat Exchangers Maintenance and Troubleshooting course is to give students knowledge of Heat Exchangers Maintenance and Troubleshooting used industries, which parameters are important for proper work. Course includes a detail operation, inspection, maintenance and troubleshooting procedure.

The subjects covered with previous mentioned standard used in Oil and Gas industry will be regarding design, selection, installation, and testing.

Who Should Attend?

The course is suitable for any industrialist involved in process heat transfer including chemical and Mechanical Process Engineers, Maintenance Engineers, Process Operators, Control Engineers and Scientists working in process operations

Course Outline

- **Fluid Mechanics for Heat Transfer.**
- **Basic Heat Transfer Theory.**
- **Types of Heat Exchangers:**
 - Shell heat exchanger
 - Tube heat exchanger
- **International Standards of Heat Exchangers:**
 - DEP 31.22.10.32 – Gen (pressure vessel)
 - DEP 31.38.01.00 – Gen (piping general requirements)
 - API 660 (shell and tube heat exchangers for general refinery services)
- **Shell and Tube Heat Exchanger Design.**
- **Mechanical Design.**
- **Materials.**
- **Preliminary Activity Prior Heat Exchanger Inspection:**
 - Isolating and draining procedures
 - Emptying circuits and isolating them

- **Installation, Dismantle and Assembly Principles:**
 - Removing the tube bundle
 - Devices for removing the tube bundle
 - Hydraulic bundle remover

- **Heat Exchanger Inspection and Maintenance:**
 - Clearances around the heat exchangers
 - Removing, cleaning and repairing the complete unit
 - Removing the tube bundle for cleaning and repair
 - Cleaning the shell

- **Various Cleaning Methods for the Heat Exchangers:**
 - Conventional (mechanical) cleaning
 - High – pressure water jet cleaning
 - Chemical cleaning
 - Cleaning in a central yard
 - Cleaning in a yard

- **The Inspection Techniques for Heat Exchangers:**
 - Visual
 - Ultrasonic
 - Eddy current
 - Magnetic particles
 - Liquid penertrant

- **Condensing and Boiling Heat Transfer.**

- **Extentended Surface Heat Transfer.**

- **Shell Side Tube Vibration.**

- **Troubleshooting of Heat Exchangers:**
 - Measuring flow temperatures and pressure drops
 - Low Pressure drop
 - Lower Shell Side Pressure Drop
 - Bundle Sealing
 - High pressure drop
 - Problems: Venting, debris, slug for two phase stream, Fabrication, corrosion, etc.