Heat Exchangers Operation, Maintenance & Inspection

Introduction:

A heat exchanger is a component that allows the transfer of heat from one fluid (liquid or gas) to another fluid. Reasons for heat transfer include the following:

- To heat a cooler fluid by means of a hotter fluid
- To reduce the temperature of hot fluid by means of a cooler fluid
- To boil a liquid by means of a hotter fluid
- To condense a gaseous fluid by means of a cooler fluid
- To boil a liquid while condensing a hotter gaseous fluid

Who Should Attend?

This course is recommended for anyone involved with the selection, operation, maintenance and troubleshooting of Heat Exchangers. Such as Mechanical Maintenance Engineers, Under Development Engineers, Mechanical Maintenance Supervisors &Technicians and Operation Engineer

Methodolgy:

This interactive Training will be highly interactive, with opportunities to advance your opinions and ideas and will include:

- Lectures
- Workshop & Work Presentation
- Case Studies and Practical Exercise
- Videos and General Discussions

Certificate:

BTS attendance certificate will be issued to all attendees completing minimum of 80% of the total course duration.

Course objectives:

By the end of this course the participants will:

- Know more information about heat exchanger classification.
- Know the heat Transfer Heat Transfer Methods
- Know the Factors affecting in heat Transfer system
- Know and understanding the heat exchanger Selection and Performance.
- Understanding Heat Exchanger Operation Procedure.
- understanding Heat Exchanger Maintenance .

Course outline:

Chapter (01) Principles of Heat Transfer.

- Heat and heat transfer.
- Types of heat transfer.
- Conduction
- Convection.
- Radiation.
- Factors that affect heat transfer.
- Shell and Tube Heat Exchanger.
- Components and operation.
- Flow paths in shell and tube heat exchangers, Types of flow

Chapter (02) Heat Exchangers

- Heat Exchangers and How They Work?
- Types and Functions
- Heat Transfer Methods
- Categories of Heat Exchangers
- Common Types of Heat Exchangers
- Shell and Tube Heat Exchangers
- Arrangement and Flow

Module (03) Direct Contact Heat Exchangers

- Types Shell and Storage Tank Arrangements
- Typical Heat Exchanger Maintenance Problems

- Heat Exchanger Equipment
- Tube Bundle – Tube sheets
- Tube Joints – Tube sheet Lay-out
- Classification of Heat Exchangers

Module (04) Heat Transfer through Tubes

- Heat Exchanger Applications
- Large Steam System Condenser
- Air Conditioner Evaporator And Condenser
- Radiator
- Pre heater
- Boiler
- Gas Heaters
- Liquid Heaters
- Newer Design of Shell and Tube Exchangers

Module (05) Shell and Tube Heat Exchanger

- Shell and Tube Heat Exchanger Applications.
- Heat exchanger used as a cooler.
- Heat exchanger used as a heater.
- Shell and Tube Heat Exchanger Operations.
- Heat exchanger in a distillation system.
- Operator responsibilities during heat exchanger operation.

Module (06) Heat Exchanger Operation and Troubleshooting

- Fouling, Corrosion, and Vibration
- Cavitation and Recirculation

- Flow Turbulence
- Blockage – Leakage – Using Sacrificial Anodes
- Removing Blockage – Stopping Leaks
- Heat Exchanger Shutdown & Safety Considerations.

Module (07) Cooling Tower Design

- Natural draft cooling towers.
- Mechanical draft cooling towers.
- Induced draft cooling towers.
- Forced draft cooling towers.
- Cooling tower cells.

Module (08) Condenser Operations

- Condenser functions.
- Condenser operation.
- Startup procedure.
- Summarize Lesson Learnt
- Evaluation / Examination
- Course Closeout