



Boiler Operation Performance & Maintenance

Overview

This course will provide a comprehensive practical review of boiler operation and maintenance considerations. Fundamentals of boiler design parameters and design codes and standards that are essential for boiler operation and maintenance are discussed with emphasis on typical problems that can be experienced with utility industrial boilers. The impact of good operating procedures and effective maintenance for optimum reliability and efficiency are addressed. Principles of boiler feed water treatment and control will be reviewed, along with key tips for safe boiler start-up and shutdown. The course includes illustrations of various examples of boiler and auxiliaries failures, guidelines for analyzing the cause of the failure and inspection procedures

Who should attend?

This course will benefit engineers, operators, chemists and maintenance technicians whose jobs require a working knowledge of or have direct responsibility for the operation and maintenance of boilers.

Course Objectives

The Participants will be able

- To find and fix minor faults.
- To carry out routine boiler maintenance.
- To handle boiler operations confidently.
- To carry out routine burner maintenance.
- To pro-actively carry out the maintenance schedule and avoid breakdowns.
- To initiate steps for reducing fuel bills by monitoring boiler efficiency.



Course outline

- **Fundamentals of Boiler Design and Operation:**
 - Fire tube and water tube boilers
 - Fuel and firing systems
 - Old and new boiler
 - Superheated steam
 - Induced draft – forced draft system
- **Optimizing Boiler Basics :**
 - Efficiency parameters – Performance
 - Loss prevention
- **Energy Management Basics :**
 - Heating value of fuels and B.T.U.
 - Input – output efficiency
 - Accounting for heat in steam and water
 - Principles of modern boiler design
- **Boiler Plant Efficiency :**
 - Analyzing thermal performance and costs
 - Stack, blow down and surface losses
 - Tune-up and optimizing efficiency
- **Boiler Plant Operational Procedures and Problems :**
 - High and low water levels
 - High and low superheat temperature and pressure
 - Boiler plant systems
- **Distribution System Losses :**
 - Steam system losses
 - Traps and leaks



- **Efficiency Calculation Methods :**
 - ASME computational methods
 - Comparing the input-output method and heat loss method
 - Use of formulas and calculations in computers
- **Combustion Analysis :**
 - Chemistry of combustion
 - Flame characteristics/smoke testing and control
 - Flue gas heat loss an measurements
 - Use of analyzers and emissions monitoring
- **Flow Measurements :**
 - Characteristics of various flow instrumentation
- **Boiler Plant Calculations :**
 - Combustion losses and calculating efficiency
 - Economic analysis
- **Boiler Controls :**
 - Steam pressure, combustion and water level control
 - Burner management and safety controls
 - Types of control and tuning for optimum performance
- **Boiler Tune-up :**
 - Troubleshooting guide
 - Step by step tune-up procedure
- **Over 60 Ways to Improve Efficiency.**
- **Waste Heat Recovery.**
- **Boiler Water Treatment :**
 - Prevention of scale and corrosion
 - Removing oxygen and CO₂ from boiler water
 - Boiler water limits
- **Pollution Reduction.**