

Combustion Fundamentals

This three-day course is designed to provide participants with a working knowledge of the combustion process used in modern power plant applications. Different fuels, the equipment used to burn these fuels, and the monitoring of the emissions is covered in detail. Emission monitoring and the requirements of the Clean Air Act are also discussed in detail.

I. Fuels

- Fuel Characteristics
- Solid Fuels
- Gaseous Fuels
- Safety
- Liquid Fuels

II. Combustions

- Coal Oil and Gas
- Combustion Process

III. Basic and Ideal combustion

- Basic Combustion
- Ideal Combustion
- Combustion Control

IV. Components of a Burner Port

- Diffuser
- Air Register
- Burner Throat
- Ignitor
- Flame Detectors

V. Factors Affecting Proper Combustion

- Flame Characteristics
- Oil Flame
- Gas Flame
- Smoke

VI. Performance Monitoring

- Checking Combustion Efficiency
- Performance Monitoring
- Corrosion, Deposits, and Emissions Control
- Boiler Efficiency Related Factors
- Combustion Related Factors
- Stack Gas Waste Heat Losses
- Combustible Losses
- Radiation Losses
- Waterside Losses
- Steam Heat Loss Factors
- Boiler Maintenance Practices
- Blower Factors
- Air Heaters
- Boiler Auxiliaries

VII. Furnace Safeguards Supervisory System (FSSS)

- Overview
- FSSS Role in Steam Generating Process

VIII. Unintentional Fires External to the Furnace

IX. Plant Emissions and the Clean Air Act

- Emissions
- Particulate

- Sulfur Oxide
- Nitrogen Oxide
- Thermal NOX
- Fuel NOX
- NOX Reduction Processes
- Fly Ash
- Optical Properties of Fly Ash

X. Overview of Continuous Emission Monitoring (CEM)

- SO₂ Monitoring
- NOX Monitoring
- Volumetric Flow
- Opacity
- Diluent Gas (O₂ or CO₂)
- Records