



Arabian Institute For Training

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# Combustion and Heat Transfer for Refinery Operations

## INTRODUCTION

- Combustion and Heat Transfer for Refinery Operations training seminar will present an overview of fuel combustion principles and heat transfer basics and discuss their direct implication to refinery fired process heaters and steam boilers operation, efficiency and reliability.
- In spite of its large energy consumption and undeniable significance refinery fired heaters and boilers had been usually “taken for granted” in refinery operation. The mounting need to accommodate the concepts of plant efficiency and equipment reliability into day-to-day refinery operation requires a more technical approach to the operation of these units. Plant operators and technicians, being the first and most immediate interface with this critical plant equipment, need to be fully prepared to handle their significant role in an efficient, safe, environmentally conscious manner. Exposing these personnel to combustion and heat transfer issues and to their repercussions to energy savings, equipment integrity and global climate change would be a straightforward manner to enhance refinery returns.

This training seminar will highlight:

- Typical fired heater and boiler fuels
- Combustion principles and heat transfer basics
- Process heater types, components and service applications
- Burners, function, types and characteristics
- Fired heaters performance
- Refinery boilers and operational performance

## OBJECTIVES

At the end of this training seminar, attendees will learn to:

- Relate refinery fuels to gaseous emissions
  - Learn combustion and heat transfer fundamentals
  - Understand fired heater and boiler components and functions
  - Evaluate fired heater and boiler performance
  - Undertake effective measures to enhance equipment efficiency
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## TRAINING METHODOLOGY

- This Combustion and Heat Transfer for Refinery Operations training seminar is intended to be a dynamic and interactive learning experience for delegates whose questions and comments will be welcome by the instructor. It uses theory but emphasizes hands-on working exercises and guided discussions to provide thorough coverage of concepts and methodologies and to gain access to essential skills leading to enhanced process heater and steam boiler operation.

## ORGANISATIONAL IMPACT

- A more methodical and efficient plant operation
- Improved equipment reliability and mechanical integrity
- Time and money savings by less maintenance and extended heater runs
- Increased plant and staff safety
- Motivated operators by their individual contribution to plant productivity
- Enhanced plant preparedness into environmental compliance

## PERSONAL IMPACT

Seminar attendees will learn to:

- Apply combustion and heat transfer fundamentals
- Improve heaters and boilers energy utilization
- Reduce operating costs
- Increase heater charge rates and run lengths
- Preserve equipment integrity
- Contribute to superior plant safety records and emission compliance

## WHO SHOULD ATTEND?

- This training seminar will greatly benefit plant personnel who need a pragmatic understanding of theory to complement and improve their hands-on grasp of process heaters and boilers.

**This training course is suitable to plant operators and technicians but will greatly benefit:**

- Process Plant Shift Leaders
  - Process Heater Maintenance, Control and Service Technicians
  - Refinery Inspection, Materials, Environmental and Safety Technicians
  - Field Operators Applicant to Handle Heater / Boiler Console Operation
  - Entry Level Refinery Engineers
  - Refinery Personnel dealing with Risk Assessment and Integrity Analysis
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## Course Outline

### Fuels, Heat Transfer, Steam and Combustion Principles

- Fuels, Properties and Emissions
- Heat Transfer and Steam Generation Basics
- Combustion Reactions and Excess Air

### Fired Heaters and Performance Evaluation

- Heater Types and Main Components
- Heater Duty, Process Coils and Tube Skin Thermocouples
- Key Operational Factors
- Operational Adjustment for Thermal Efficiency: Draft and Excess Oxygen

### Refinery Steam Boilers and Performance Evaluation

- Refinery Boilers and Components
  - Energy Balances and Thermal Efficiency
  - Combustion Control, Boiler Tune Up
  - Boiler Reliability and Best Practices
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