QTRAINING TITLE

REFINERY-FIRED HEATER AND BOILER INSPECTION

Training Duration

5 days

Training Venue and Dates

RT114	**Refinery-Fired Heater and Boiler Inspection**	**5**	**27-31 Jan. 2025**	**$5,500**	**Abu Dhabi, UAE**

In any of the 4 or 5-star hotels. The exact venue will be informed later.

Training Fees

- **$5,500 per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Lunch**

Training Certificate

Define Management Consultants Certificate of course completion will be issued to all attendees.

TRAINING DESCRIPTION

This course is designed to provide refinery engineers, operators, and maintenance personnel with the essential skills and knowledge required to inspect, maintain, and troubleshoot fired heaters and boilers in a refinery or industrial setting. Fired heaters and boilers are critical equipment in the refining process, serving to provide the necessary heat for various operations such as distillation, cracking, and heat exchange. The course covers inspection techniques, safety considerations, operational performance, and maintenance strategies, focusing on maximizing equipment reliability, efficiency, and safety. Attendees will gain insights into industry best practices for the assessment, troubleshooting, and repair of these vital systems, as well as how to improve their performance and extend their lifespan.

TRAINING OBJECTIVES

By end of course participants will be able to understand

- Understand the design, operation, and function of refinery fired heaters and boilers.
- Learn detailed inspection techniques for fired heaters and boilers, including visual and non-destructive methods.
- Identify potential hazards, equipment failure modes, and performance issues.
- Perform effective troubleshooting and diagnostic techniques to address common heater and boiler issues.

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- Improve the maintenance practices of fired heaters and boilers to ensure long-term operational efficiency and safety.
- Comply with relevant safety standards and regulations regarding fired heaters and boilers.
- Maximize the reliability and operational uptime of fired heaters and boilers through preventive maintenance and proper inspection.
- Assess the efficiency of fired heaters and boilers, recommending improvements where necessary.

WHO SHOULD ATTEND?

- Process engineers and operators
- Refinery maintenance engineers
- Boiler and fired heater technicians
- Safety officers and managers
- Inspection and quality control personnel
- Project managers and maintenance planners
- Engineering consultants and contractors working with refinery or petrochemical equipment

TRAINING METHODOLOGY

A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions and motivating everybody to find the right answers. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course.
Very useful Course Materials will be given.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Group Work& Practical Exercises
- 20% Videos& General Discussions

COURSE PROGRAM

Day 1: Introduction to Fired Heaters and Boilers in Refining

- **Module 1: Overview of Fired Heaters and Boilers**
  - The role of fired heaters and boilers in a refinery

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  - Types of fired heaters and boilers used in refineries
  - Basic principles of operation and design considerations
- **Module 2: Combustion Theory and Heat Transfer**
  - Combustion fundamentals
  - Heat transfer mechanisms in fired heaters and boilers
  - Key factors affecting thermal efficiency
  - The importance of burner performance and control

Day 2: Design, Operation, and Safety of Fired Heaters and Boilers

- **Module 3: Fired Heater and Boiler Design**
  - Construction materials and design codes
  - Key components: burners, tubes, refractory, and controls
  - Sizing and performance requirements
- **Module 4: Operating Principles**
  - Control systems and instrumentation in fired heaters and boilers
  - Heat duty, fuel efficiency, and steam generation
  - Pressure, temperature, and flow management
- **Module 5: Safety Considerations**
  - Understanding safety hazards in fired heaters and boilers
  - Flue gas emissions and management
  - Pressure relief systems and blowdown procedures
  - Fire and explosion risks, and mitigation strategies

Day 3: Inspection Techniques and Methods

- **Module 6: Visual and Non-Destructive Testing (NDT) for Fired Heaters and Boilers**
  - Visual inspection techniques: What to look for during routine inspections
  - Non-destructive testing methods (e.g., ultrasonic, radiographic, and magnetic particle testing)
  - Inspection of burners, refractory, heat exchangers, and pressure parts
- **Module 7: Internal and External Inspection Procedures**
  - Internal inspection during shutdowns or outages
  - External inspection during operation
  - Identifying signs of wear, corrosion, and fatigue
  - Evaluating tube condition, refractory integrity, and burner performance

Day 4: Troubleshooting, Diagnostics, and Maintenance

- **Module 8: Common Boiler and Heater Problems and Solutions**
  - Diagnosing poor combustion, low efficiency, and high emissions
  - Troubleshooting burner malfunctions and flame instability

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  - Identifying tube failures, leaks, and pressure issues
- **Module 9: Preventive and Corrective Maintenance Practices**
  - Maintenance strategies: Preventive vs. corrective
  - Boiler and heater cleaning methods: Chemical, mechanical, and sonic cleaning
  - Handling of refractory damage and tube scaling
  - Overhaul procedures and recommended maintenance schedules
- **Module 10: Performance Optimization and Efficiency Improvements**
  - Enhancing thermal efficiency
  - Combustion tuning and air-fuel ratio optimization
  - Reducing energy consumption through performance monitoring
  - Modifying equipment for better performance

Day 5: Compliance, and Best Practices

- **Module 11: Case Studies and Industry Best Practices**
  - Real-world examples of fired heater and boiler failures and lessons learned
  - Successful inspection and maintenance strategies from top refineries
  - Identifying root causes and implementing corrective actions
- **Module 12: Regulatory Compliance and Industry Standards**
  - Key codes and standards for fired heaters and boilers (e.g., ASME, API, NFPA)
  - Environmental and safety regulations (e.g., emissions, fuel consumption)
  - Compliance monitoring and record-keeping

NOTE:
Pre-& Post Tests will be conducted.
Case Studies, Group Exercises, Group Discussions, Last Day reviews, and assessments will be carried out.

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