

**Training Title**

**IMPROVING THE PERFORMANCE AND RELIABILITY OF FIRED HEATER AND BOILERS**

**Training Duration**

5 days

**Training Venue and Dates**

REF RM044	Improving the Performance and Reliability of Fired Heaters and Boilers	5	02 – 06 June 2025	\$5,500	Dubai, UAE
--------------	---	---	----------------------	---------	------------

In any of the 4 or 5- Star hotels & Resorts. The exact venue will be informed soon.

**Training Fees**

\$5,500 per participant for Public Training. Fees Include Course Materials/Handouts, Tea/ Coffee, refreshments, Lunch.

**Training Certificate**

Define Management Consultancy & Training Certificate of course completion will be issued to all attendees.

**COURSE OVERVIEW**

**TRAINING DESCRIPTION**

The success of every company depends of each employee's understanding of the key business components. Employee training and development will unlock the companies' profitability and reliability. When people, processes and technology work together as a team developing practical solutions, companies can maximize profitability and assets in a sustainable manner.

Training and development is an investment in future success – give yourself and your employees the keys to success It is strategically important that your operations team understands the fundamentals of process unit operations concepts.

This is the difference between being in the best quartile of operational ability and being in the last quartile. There is vast difference in the operational ability of operating companies and most benchmarking studies have confirmed this gap in operational abilities.

Whether you have a team of new or seasoned employees, an introduction or review of these concepts is very beneficial in closing the gap if you are not in the best quartile, or maintaining a leadership position. Most studies show that a continuous reinforcement of best practices in operational principles is the most effective way to obtain the desired results. Training and learning should be an ongoing continuous lifelong goal.

**TRAINING OBJECTIVES**

This course will guide the participates to develop key concepts and techniques for the optimization of fired heaters. These key concepts can be utilized to make operating decisions that can improve your unit's performance.

*DMCT/OL/9/18(Rev3Dt:23/9/18)*

Many aspects of fired heaters operations and management can be improved including, energy utilization, product improvements, furnace tube life, and safety. This cannot be achieved without first an understanding of basic fundamental principles of design and operation.

These principles need to be understood in advance of operating and troubleshooting a process unit operation for the manager or problem solving to be effective.

This seminar focuses on the core building blocks of the fired heater systems, equipment and economics. This program will emphasize fired heater unit operation fundamentals, safe utilization of these fundamentals by operations and maintenance personnel, and equipment troubleshooting techniques. This program can be 3-5 days depending on the needs analysis of the participants.

### WHO SHOULD ATTEND?

People who are making day to day decisions regarding operation, design, and economics of processing plants;

1. Operation Supervisors,
2. Maintenance Supervisors,
3. Senior Plant Supervisors,
4. Operations Engineers
5. Process Support Engineers,

- Ideal for veterans and those with only a few years of experience who want to review or broaden their understanding in Processing Plant Operations.
- Other professionals who desire a better understanding of subject matter

### 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 motivate everybody 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 OUTLINE

Following Topics will be covered in 5 days

Introduction

- Overview of the Chemical Processing Industry

DMCT/OL/9/18(Rev3Dt:23/9/18)

## Review of Process Incidents

- Safety for the Chemical Processing Groups

## Fundamentals of Petroleum Chemistry

- Description of a Hydrocarbon Molecule
- Types of Hydrocarbon Molecules
- Chemistry of Combustion

## Introduction to Process Equipment

- Distillation
- Absorption
- Heat Exchange
- Reactors
- Pumps
- Compressors

## Furnace Construction and Operating

Different types of furnaces and their functions.

Operating conditions. Distribution of heat supplied, influence of operating conditions.

Efficiency of energy recovery. Estimation rule, parameters governing furnace efficiency, scope and limitations for improving furnace efficiency.

Construction of heat exchange areas and refractory materials: tube bundle arrangement, insulation, type of materials used.

## Combustion-Burners

Combustion conditions: stoichiometric air/fuel ratio, heating value, liquid and gas fuel characteristics, liquid spray.

Burners: fuel and air supply and mixture, burner operation, low NO<sub>x</sub> burners characteristics.

Combustion quality: analysis of the oxygen and the unburned material in the flue gases, control of the combustion air flow rate, air/fuel ratio control.

Combustion safety: flame detection, control and safety devices on the fuel circuits.

Air and flue gas circulation: natural draft, forced draft, pressure differential control, automatic safety devices. Damper or forced draft fan role. Impact of a furnace positive pressure.

*Application: natural and forced draft pressure profile drawing. Presentation of different types of burners and spraying systems.*

## Heat Transfer and Tube Bundle

DMCT/OL/9/18(Rev3Dt:23/9/18)

Heat transfer to the tube bundle: heat flux, conduction, convection and radiation, parameters governing heat transfer, tube skin temperature, type of fuel burned, tube temperatures, fouling effects.

Division of the heated fluid into several passes: control of partition, low flow rate safety systems.

Heating control: process fluid outlet temperature, fuel flow rate control.

#### Fired Heater Engineering

- Fluid Flow
- Heat Transfer
- Fuels
- Design Guidelines

#### Introduction to Refinery Fired Heaters

#### Introduction to Olefins Fired Heaters

#### Introduction to VCM Fired Heaters Improve the Efficiency of Fired Heaters

- Excess Air
- Burner Types
- Flame types

#### Introduction to Fired Heater Control

#### Introduction to Fired Heater Boilers

- Boiler Film

#### Fired Heater Safety

- Boiler Case Study

#### Revamping Fired Heaters

- Upgrade Convection Section
- Upgrade instrumentation and Controls
- Maximizing furnace life
- Designing for improved maintenance

#### Reducing NOx Emissions

*Application: furnace temperature profile and heat recovery distribution as a function of fuel burned and combustion air excess.*

**On-stream furnace operations:** monitoring of combustion and heating. Modifying operating conditions. Analysis of disturbances. Key points for safe operation, operating conditions control and follow-up.

DMCT/OL/9/18(Rev3Dt:23/9/18)

**Startup and shutdown:** preparation, safe ignition procedures, ignition after a short shutdown, normal shutdown, emergency shutdown.

Incidents: explosive atmosphere in the radiation zone, tube rupture, unbalancing of the heat,

Diagnostic facilities; ways of solving problems.

Summary Open and Close Forum

**NOTE:**

**Pre & Post Tests will be conducted**

**Case Studies, Group Exercises, Group Discussions, Last Day Review & Assessments will be carried out.**



[www.definettraining.com](http://www.definettraining.com)

DMCT/OL/9/18(Rev3Dt:23/9/18)

P.O BOX 45304  
ABU DHABI, U.A.E

T +971 2 6264455  
F +971 2 6275344

[www.definettraining.com](http://www.definettraining.com)