

<p style="text-align: center;">KLM Technology Group</p> <p style="text-align: center;">Practical Engineering Guidelines for Processing Plant Solutions</p>	<div style="text-align: center;">  <p>Engineering Solutions Consulting, Guidelines and Training</p> <p>www.klmtechgroup.com</p> </div>	<p style="text-align: center;">Page 1 of 7</p> <p style="text-align: center;">Rev 1.0</p>
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Improving the Performance and Reliability of Fired Heaters and Boilers

Introduction

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 are 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 greatly 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.

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Course Objective

This course will guide the participants 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.

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

Course Duration and Delivery

Typical course duration is 3 to 5 days based on the background of the participants. One of our Senior Technical Professional with over 25 years of experience would lead the class. Instruction can be in house or in an online webinar.

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Outline

Introduction

- Overview of the Chemical Processing Industry

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 Fired Heater

- General Types
- Fire Box
- Convection
- Stack
- Burners

Fired Heater Engineering

- Fluid Flow
- Heat Transfer
- Fuels
- Design Guidelines

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Introduction to Refinery Fired Heaters

- Overview of Refinery Heaters
- Crude Unit Heaters
- Vacuum Unit Heaters
- Hydrotreater Heaters
- Hydrotreater Heater Damage from Fire Case Study
- Troubleshooting

Introduction to Olefins/ Ethylene Fired Heaters

- Overview of Ethylene Furnaces
- Advances in Ethylene Furnaces
- Historical Development
- Design Constraints
- Comparison of Current Designs
- Furnace Run lengths
- Ethylene Furnace Trouble Shooting
 1. Convection Bowing
 2. Insulation
 3. External transition designs

Introduction to Petrochemical Heaters

- Overview of Petrochemical Heaters
- Design of Petrochemical Heaters
- Troubleshooting of Petrochemical Heaters

Introduction to Boilers

- Overview of boilers
- Design of boiler systems
- Boiler Film
- Boiler Safety Case Study
- Troubleshooting of Boilers

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Improve the Efficiency of Fired Heaters

- Excess Air
- Burner Types
- Flame types

Introduction to Fired Heater Control

- Burner Management Systems

Revamping Fired Heaters

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

Reducing NOx Emissions

Conclusions

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Who Should Attend:

- People who are making day to day decisions regarding operation, design, and economics of processing plants;
 1. 1st Line Operations personnel,
 2. Operation Supervisors,
 3. 1st Line Maintenance personnel,
 4. Maintenance Supervisors,
 5. Senior Plant Supervisors,
 6. Operations Engineers
 7. Process Support Engineers,
 8. Design Engineers,
 9. Cost 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

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What you can expect to gain:

- A detailed overview of furnace operations, processes, and economics
- Gain an understanding of the equipment of a process furnace
- Gain an understanding of the Refinery, Olefin and Petrochemical furnaces