



THE CHEMICAL ENGINEERING MAJOR

Process Burner Fundamentals

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Introduction

This BTS training course is designed to improve the overall understanding of process burners, define common burners' terminology, and identify the best installation & testing practices.

This BTS training course illustrates the proper and safe burner operating procedures including how to increase burner thermal efficiency, reduce pollutant emissions, and provides tools for troubleshooting problems.

This training course will highlight:

- The fundamentals of combustion and heat transfer
- The Burner design, installation, and testing
- The burner operation, combustion control, and troubleshooting
- Flare system design and operation
- Pollutant emissions and combustion safety

Training Objectives

What are the Goals?

By the end of this BTS training course, participants will learn to:

- Discuss the basics of combustion and heat transfer
- Operate a heater safely and more efficiently
- Distinguish a good flame from a poor flame
- Discuss different types of burners, their operation, maintenance, and troubleshooting
- Diagnose problems with heaters and burners, and determine corrective actions

Target Audience

Who is this Training Course for?

This BTS training course is suitable to a wide range of professionals but will greatly benefit:

- Operations personnel
- Production personnel
- Maintenance personnel
- Technical Support Engineers
- Operators and technicians

Training Methods

How will this Training Course be Presented?

Participants to this BTS training course will receive a thorough training on the subjects covered by the seminar outline with the Tutor utilizing a variety of proven adult learning, teaching, and facilitation techniques. Seminar methodology includes presentation & slides, audio visual aids, interactive discussion, class activities, and workshops.

Organisational Impact

When the organization invests money in training its employees, employees feel worthy and more loyal. This training will improve essential work-related skills, techniques, and knowledge needed for safe, environmentally sound, and efficient operation of a plant.

Personal Impact

Trained employees tend to benefit both their own careers and the company they work for. The participant will gain better understanding of process burners, define common burners' terminology, identify the best installation and testing practices, follow proper and safe operating procedures, increase burner thermal efficiency, reduce pollutant emissions, and provides tools for troubleshooting problems.

Daily Agenda

Day One: Introduction & Fundamentals

- Burners and Combustion in Process Industries
- Fired Heaters and Reformers
- Burners Competing Priorities
- Air preheat and Fuel Blending Effect
- Stoichiometric Combustion and Excess Air
- Flame Properties
- Heat Transfer in process Furnaces
- Burner Fuels (Gaseous, Liquid)

Day Two: Burner Design, Installation, and Testing

- Burner Design (Air Control, Air Fuel Ratio)
- Burner Types (Premix, Raw gas, Oil)
- Burner Configuration (Mounting & Direction of Firing)
- Burner Installation
- Burner Maintenance
- Fundamentals of combustion control
- Burner Test Setup
- Instrumentation & Measurements

Day Three: Burner Operation & Troubleshooting

- Burner/Heater Operation
- Measurements Pressure (Draft, Fuel flow, Fuel)
- Operational Considerations
- Heater Performance
- Heater Inspection & Observation
- Burner Troubleshooting (flashback, Flame lift off, irregular flame pattern)

Day Four: Flare System Design & Operation

- Flare System Types
- Flare System Objectives and applications
- Flare System Components
- Flare System Design Factors
- Flare System Design Consideration
- Flare System Equipment
- Flare Combustion Products

Day Five: Pollutant Emissions & Combustion Safety

- Nitrogen Oxides (NO_x) & Sulphur Oxides (SO_x)
- Combustibles & Particulates
- Carbon Dioxide
- Noise (OSHA & International requirements)
- Combustion Tetrahedron
- Fire & Explosion Hazards
- Process Hazard Analysis (PHA)
- Design Engineering (Flammability Characteristics, Fire Extinguishment)