Training - Furnaces: Safe Operation and Optimization

FURNSOO-EN-P | **Face-to-face only** | **4 days**

This course provides in-depth knowledge of furnace operation in the petroleum and petrochemical industries. The course covers also the safety and reliability constraints

Level

Skilled

Public

- Operators, panel operators, supervisors and plant managers of refining, chemical and petrochemical plants, involved in furnace operation
- Engineers and supervisors concerned with safety, optimization and operating issues of furnaces

Objectives

Attendees will be able to implement the following skills:

- Describe the phenomena involved in industrial combustion and establish the conditions necessary for efficient combustion
- Identify the optimization parameters of a furnace and explain the operation of the main control loops
- List the main phases of a start-up procedure

Pedagogical & technical resources

- Use of a dynamic simulator to understand the impact of operating conditions on thermal performance and furnace operation
- Use of case studies and exercises based on industrial situations
- Special emphasis on safety issues and abnormal situations that can lead to accidents
- The course content can be tailored to different types of furnaces and includes specificities linked to some processing units such as the steam reformer or steamcracker

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

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FURNACE CONSTRUCTION & OPERATING CONDITIONS — 0.75 day

Different types of furnace and operating conditions. Scope and limitations for improving furnace efficiency.
Construction of heat exchange areas and refractory materials: tube bundle arrangement, insulation, type of material used and operating limits.

COMBUSTION - BURNERS - DRAFT — 1.25 days

Combustion conditions: liquid and fuel gas characteristics, liquid spray.
Burners: fuel and air supply and mixture. Conventional and low NOx burners operation.
Combustion quality: analysis of the oxygen and the unburned material in the flue gases, control of combustion air flowrate and air/fuel ratio.
Combustion safety: flame detection, control and safety devices.
Air and flue gas circulation: natural draft, forced draft, pressure differential control, automatic safety devices.
Damper or induced draft fan role.
Application:

- Natural and forced draft pressure profile drawing. Review of draft constraints.
- Different types of burners and spraying systems.

HEAT TRANSFER & FURNACE OPERATION — 2 days

Heat transfer to the tube coil: control parameters. Impact of internal or external fouling.
Heat control: process fluid outlet temperature, fuel flowrate control.
Most important furnace temperature and constraints: skin temperature, bridgewall temperature, limits and risk of overcoming.
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.
Start-up and shutdown: preparation, safe ignition procedures, ignition after a short shutdown, normal shutdown, emergency shutdown.
Incidents.
Troubleshooting. Prevention.
Application:

- Case study of furnace accidents.
- Start-up procedure study.

To French entities : IFP Training is referenced to DataDock ; you may contact your OPCO about potential funding.
Please contact our disabled persons referent to check the accessibility of this training program : referent.handicap@ifptraining.com

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