



## Furnace Operations - SIM-FOP

### COURSE

#### About the Course

This interactive 2-day course combines elements of high fidelity, generic process simulators as well as a student-driven learning model centered around the INSTO Methodology. This course teaches operators how to build a mental model of various processes and stress critical thinking skills for operators that can be brought back to the control room. In this course each trainee will have access to their own generic simulators including an Air Cooler, Natural Draft Fired Heater, and Balanced Draft Fired Heater simulator. Trainees will have an opportunity to startup each piece of equipment as well as spend time troubleshooting common heater malfunctions. Furnace operations that promote both safety as well as optimization are stressed throughout the course. The material of the course is applicable to refineries, petrochemical sites, chemical plants, and any other facilities that operate industrial sized fired heaters.

#### Target Audience

Console Operators, Outside Operators, Console Supervisors, and Young Engineers that work with fired heaters

#### You Will Learn

Participants will learn how to:

- Identify key operating points in natural draft and balanced draft (ID/FD) fired heaters
- Examine the different control points for natural draft fired heaters versus balanced draft fired heaters
- Build a mental model of the normal operations of an air cooler and two types of fired heaters
- Analyze trends and relate this information to various normal and abnormal situations for fired heaters
- Utilize the Think EQ.U.I.P.P.E.D.™ method to expand troubleshooting options while operating an air cooler or fired heaters
- Discuss and simulate HAZOP analyses on common troubleshooting scenarios with fired heaters focusing on specific mitigation techniques
- Assess critical safety concerns during the startup or restart of fired heaters as well as simulate these startup procedures
- Practice techniques for heater optimization including maximizing throughput while maintain a minimum, safe level of excess O<sub>2</sub>

#### Course Content

- A complete startup procedure for an air cooler, natural draft fired heater and balanced draft fired heater
- Switching an air cooler from speed to pitch control, as well as examining the effects of weather while operating an Air Cooler
- Simulate the effects to heater systems by changing heater throughput, heater outlet temperature demand and fuel gas pressure on the simulated systems
- Examining safety aspects of air to fuel ratio and the effects these parameters have on oxygen sensors in different types of heaters
- Operating these firing rates with varying levels of controls including simulated safety instrumented systems (SIS), simple cascade control, and complete manual control by the trainee
- Troubleshooting scenarios for heaters including uneven heating, coking, loss of burner(s), complete flame out
- HAZOP analysis on drastic changes to fuel gas BTUs and techniques to avoid flame out
- Simulate total and partial trips of fired heaters including loss of ID/FD fan systems in a balanced draft fired heater with an air preheater
- Integrated dynamic profitability analysis within the simulator to determine heater efficiency

## Product Details

Categories: [Upstream](#)

Disciplines: [Operations & Maintenance](#) [Refining](#)

Levels: [Foundation](#)

Product Type: [Course](#)

Formats Available: [In-Classroom](#)

Instructors: [Donald Glaser](#) [Matthew Garvey](#)