

Industrial Furnace Technology

Principles and practices involved in the efficient design and optimum performance of fuel fired furnaces.

Duration

2 days

Venue

The course will normally be held at the BIFCA offices. Alternatively, it can be held at your premises - please contact BIFCA for details.



Course Overview

High temperature furnaces are major sources of carbon and other emissions from industrial processes. As a result of rising fuel costs and changing legislation, it is becoming increasingly important to enhance the thermal efficiency of furnaces by improving their design and operation. The furnace designer and user must satisfy the often conflicting requirements of reducing operating costs, increasing production throughput, and improving product quality.

This course will provide greater understanding of the principles and practices associated with efficient design and optimum operation of fuel-fired furnaces, with emphasis on enabling participants to improve the thermal efficiency of their plant and products.

The course has evolved over several years as a result of discussion and feedback from industrial advisors and earlier course participants. Content will be delivered through lectures supported by comprehensive course notes, but to obtain maximum benefit, delegates are invited to participate in discussion sessions.

Course Syllabus

- **Fuels and Combustion:** Properties of gaseous and liquid fuels - basics of combustion reactants and products. Combustion and burner aero-dynamics. Design and operation of gas burners and oil burners.
- **Heat Transfer in Furnaces:** Radiation properties of flames and combustion products. Thermal radiation from gas and oil flames. Convective heat transfer in combustion systems. Conduction in furnaces, heat losses through furnace walls, load temperature uniformity.
- **Efficient Operation of Furnaces:** Thermal efficiency, specific fuel consumption. Effects of furnace operation on thermal efficiency. Instrumentation and control of furnaces, air/fuel ratio control, control of furnace pressure and temperature. Recovery of waste heat from exchangers, recuperative and regenerative burners. Reduction of wall and structural losses, low thermal mass refractories, high emissivity coatings. Effect of oxygen addition in combustion processes.
- **Control of Furnace Emissions:** Pollutant formation, smoke, SO_x, NO_x - techniques for NO_x reduction in high temperature furnaces. "Flameless" combustion.
- **Thermal Design of Furnaces:** Mathematical models as an aid to furnace design and operation. Application of computational fluid dynamics (CFD) and zone models - furnace design case study. Small scale experimental modelling techniques and applications.

Who will benefit from this course?

- Staff who are responsible for the efficient management and operation of industrial furnaces.
- Personnel involved in the specification, design and development of industrial furnaces.
- Staff involved in technical sales and marketing of combustion equipment.
- Research staff working in relevant areas such as combustion and heat transfer.

Certification

Attendees are presented with a certificate on successful completion of the course.

Refreshments / Notes

Course notes and all refreshments including a buffet lunch are provided.

Delegate Comments

"A detailed and in-depth look at efficiency in fuel fired furnaces - a lot of useful and thought provoking information"

Nigel Troth
Stork Cooperheat
Ltd

To attend this course please complete the accompanying booking form Ref: BIFCA/A2123