



## **INTRODUCTION TO AIR-COOLED HEAT EXCHANGERS**

### **Course Description**

This training course is intended to provide an introduction to the technology of air-cooled heat exchangers. Such heat exchangers are commonly used in the process industries, where they provide an economic means of heat rejection to the environment. The course details the design, fabrication, inspection and maintenance of this heat exchanger type, focussing on the mechanical and practical aspects. Thermal design is conducted using sophisticated computer software, and this course is intended to complement thermal design training based on such software.

### **Training Objectives**

For those engineers unfamiliar with air-cooled heat exchangers this course will provide a broad understanding of the technology and an excellent base for further learning. For those responsible for thermal design the training is intended to illustrate the interaction between the thermal, mechanical and aerodynamic design, the understanding of which will lead to more reliable design outcomes. For those coming from an operating environment, the course will lead to a greater knowledge of the maintenance, inspection and repair needs of air-cooled heat exchangers, including information on common causes of failure.

### **Who should attend?**

This course is targeted at the chemical, petrochemical and oil refining industry, even though other industrial sectors, e.g. power plants, food processing, pulp and paper, will also benefit. The profile of participants includes:

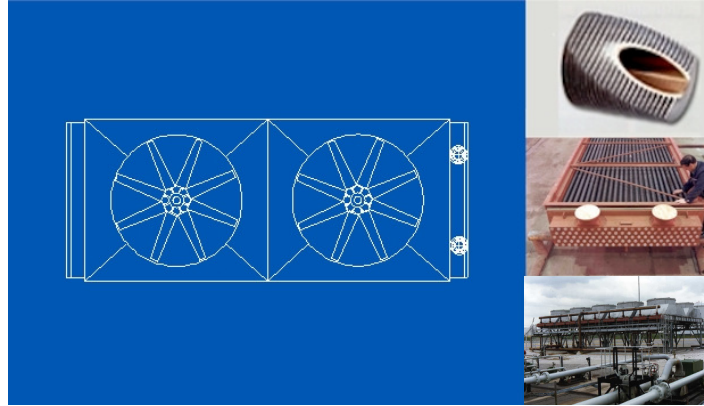
- Process Engineering
- Thermal Engineering
- Maintenance Engineering
- Reliability Engineering
- Inspection Engineering
- Stationary Equipment Engineering
- Plant Engineering
- Production Engineering
- Shutdown Engineering

### **The Presenter**

The course will be presented by Ian Gibbard, who has more than twenty years of experience in the design, fabrication and troubleshooting of heat exchangers. He is the principal consultant of Progressive Thermal Engineering, a company providing heat exchanger consultancy and training services on a worldwide basis. Mr Gibbard has presented training courses in more than 15 countries and is a regular presenter for Heat Transfer Research Incorporated (HTRI).

<b>Dates</b>	TBA
<b>Venue</b>	Stratford Upon Avon, Warwickshire, UK
<b>Times</b>	9.00am – 5.00pm each day
<b>Fees</b>	£1000 + VAT

# Introduction to Air-Cooled Heat Exchangers



## Day One

### Principles of Air Cooling

- Plant cooling requirements
- Air vs. water cooling
- Natural vs. forced draft
- ACHE for the process industry

### Introduction to ACHE

- ACHE configurations
- Identification of major components
  - Tube bundles
  - Fans / drives
  - Plenum
  - Structures
  - Ancillaries
- Tube bundle construction
  - Finned tubes
  - Headers/nozzles
  - Pass arrangements
  - Tube-to-tubesheet joints
  - Thermal expansion
  - Structural
- Modular construction
- Typical fabrication sequence

### Thermal Design Considerations

- Tubeside heat transfer and pressure drop
- Airside heat transfer and pressure drop
- Temperature driving force

## Day Two

### Aerodynamic Design

- Forced vs induced draft
- Fan types
- Fan curves
- Fan selection
- Air distribution
- Air recirculation
- Noise

### ACHE Control

- Control requirements
- Control methods
  - Airflow control
  - Process fluid control
- Winterisation
- Fan failure

### Codes and Standards

- Codes and Standards
- ISO 13706 (API661)

### Maintenance and Inspection

- Routine Maintenance
- Inspection
- Common problems
- Fouling and cleaning