

INTRODUCTION TO SHELL AND TUBE HEAT EXCHANGERS

Course Description

This training course is intended to provide an introduction to the technology of shell and tube heat exchangers. Such heat exchangers are the workhorses of the process industries, where they provide flexibility, robustness and ease of cleaning. 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 shell and tube 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 and mechanical 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 shell and tube 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:

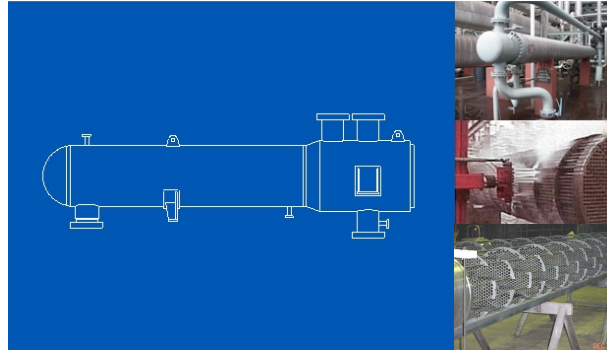
- Process Engineering
- Thermal Engineering
- Maintenance Engineering
- Reliability Engineering
- Inspection Engineering
- Stationary Equipment Engineering
- Plant Engineering
- Production Engineering
- Shutdown Engineering

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).

Dates	TBA
Venue	Stratford Upon Avon, Warwickshire, UK
Times	9.00am – 5.00pm each day
Fees	£1500 + VAT

Introduction to Shell and Tube Heat Exchangers



Introduction to Heat Exchangers

- Purpose
 - Heating / cooling
 - Condensation
 - Boiling
- Basic Heat Transfer Principles
 - Heat duty
 - Surface area
 - Heat transfer coefficient
 - Temperature driving force
 - Pressure drop

Heat Exchangers in the Process Industry

- Review of major types
- Why use the Shell & Tube type?

Introduction to Shell & Tube Heat Exchangers

- General description
- Identification of key components
- Typical fabrication sequence
- Heat exchanger tubes
- Tube bundle construction
- Tube-to-tubesheet joints

TEMA Standards

- Background to TEMA
- TEMA Nomenclature
- TEMA type selection
- Mechanical standards
- Thermal/mechanical design interaction

Tube Vibration

- Vibration mechanisms
- Common vibration problems
- Avoiding vibration

Heat Exchanger Fouling

- Fouling mechanisms
- Common fouling problems
- Avoiding fouling

Specifying Shell & Tube Heat Exchangers

- Codes and standards
- Datasheets
- Purchaser's responsibilities

Maintenance and Inspection

- Access for maintenance and inspection
- Pressure testing
- Heat exchanger inspection
 - Identifying common problems
 - Leak detection
 - Tube wall thickness survey

Heat Exchanger Cleaning

- Mechanical cleaning
- Chemical cleaning

Heat Exchanger Repair

- Tube joint repair
- Tube plugging
- Re-tubing