XCELERATE TRAINING INSTITUTE

your learning & development partner

MECHANICAL ENGINEERING

Heat Ex-changers and Fired Heaters Design, Repair and Maintenance Training Course

DURATION	LANGUAGE	FORMAT
5 days	**English**	**Classroom / Online**

Upcoming dates

Dates	Venue	Format	Fee
3 – 7 May 2027	Live online	Online (live)	**€1,200**
14 – 18 Jun 2027	Dubai	Classroom	**€4,800**
8 – 12 Nov 2027	Live online	Online (live)	**€1,200**

Register or ask a question

Online: x8ti.com/course/heat-ex-changers-and-fired-heaters-design-repair-and…

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Heat Ex-changers and Fired Heaters Design, Repair and Maintenance Training Course

Introduction

Introduction

What are heat ex-changers used for? Heat ex-changers are important and expensive items of equipment that are used in a wide range of industries. An enhanced understanding of the basic principles of heat transfer and fluid flow and their application to the design and operation of shell and tube heat ex-changers as well as plate heat ex-changers, air-cooled ex-changers, and other specialty heat ex-changers that you can benefit from this course. It will enable you to improve their effectiveness and extend their life.

The Xcelerate Training Institute course provides an in-depth presentation of the main types of industrial heat ex-changers, their key features and aspects, and provides practical guidelines for selecting the appropriate type for specific applications.

You will better comprehend how to use the applicable API, TEMA and ASME codes, standards and recommended practices. The course will have discussions that cover fabrication, materials of construction and costs of tubular units; condensers and re-boilers; effect and mitigation of fouling; and causes and prevention of ex-changer tubes vibration and damage.

Learning Objectives

- Gain a comprehensive understanding of the key principles of Heat Ex-changer operation and design and how these relate to the efficient and safe use of these types of equipment
- Improve understanding of the operation and maintenance considerations, deliberations of Heat Ex-changer equipment with regard to overall process plant integration
- To provide methodologies for the mechanical design of heat ex-changers in line with industry codes, standards and best practices, specifically ASME BPVC Section VIII, TEMA, and API 660, 661, and 662

Training Methodology

The course is comprehensive and highly interactive. It combines organized and focused presentations and discussions of topics covered with actual relevant examples. It combines sound engineering principles, methods, procedures and applicable codes & standards and best industry practices with workshops that cover worked examples to enforce the learning. To maximize learning, optional Question & Answer sessions are used at the end of each day to allow participants the opportunity to ask questions relating to topics discussed and specific heat ex-changer problems they may experience.

Benefits for Your Organization

- Achieve better and improved financial performance through the proper selection and application of the appropriate type of heat ex-changers that achieves optimum balance between capital investment and energy costs

- Attain measurable improvement in energy efficiency through effective interaction between engineering, operation and maintenance functions throughout the life cycle of heat exchange equipment
- Enhance your ability to use best industry practices in inspection, maintenance, and repairs resulting in lower life cycle costs while complying with applicable codes and standards, and other regulatory requirements

Benefits for You

- Become aware of cost-effective technologies and best practices for improving the performance of heat ex-changers
- Develop technical and analytical skills essential for conducting technical and troubleshooting evaluations
- Enhance your competence and productivity thereby enhance your performance level and make additional value-added contributions to your organization

Target Audience

The course is designed to benefit project, process, mechanical and plant engineers as well as operations and maintenance managers and supervisors involved in the design, operations, troubleshooting and maintenance of heat ex-changers and energy conservation in the oil, power, chemical & other industries.

Course Outline

Types and Application of Heat Ex-changers

- Overview and basic fundamentals
- Significance and importance of heat exchange in the petroleum, petrochemical, and process industries
- Heat Transfer Fundamentals and Heat Transfer Coefficients
- Heat Ex-changer types and application
- Shell and Tube heat ex-changers
- Compact heat ex-changers
- Plate heat ex-changers
- Printed circuit heat ex-changers
- Heat pipes
- Air-cooled heat ex-changers
- Regenerative heat ex-changers
- Geometry of Shell & Tube Heat Ex-changers (STHE) and Double Pipes – TEMA nomenclature, front end head types, shell types, rear end types, double pipe units, selection guidelines
- Worked examples – heat transfer

Thermal and Hydraulic Design of Heat Ex-changers

- Sizing and Specifying the heat ex-changer
- Temperature Difference in STHE
- Counter-current, co-current, and cross-current
- TEMA flow arrangements, comparisons
- worked example

- First Principles: Velocity Triangles and Performance Derivation
- Pump performance curves: head-capacity, power, efficiency
- System curve: static, friction, pressure head components
- Fluid Flow and Pressure Drop
- Shell & Tube heat ex-changers
- Plate heat ex-changers
- Condensers and Re-boilers
- Types and application
- General design considerations
- Worked examples: Tube heat ex-changers, Thermal design and rating shell

Mechanical Design of Heat Ex-changers

- Design and construction codes and best practices
- ASME B&PVC Section VIII
- API 660, 661, and 662
- TEMA
- S&THE, PHE, ACHE – Basic design of heat ex-changers
- Special design considerations
- Piping loads on ex-changer nozzles
- Materials of construction for heat ex-changers
- Impact of service conditions on material selection
- Fabrication of heat ex-changers
- Shell & tube heat ex-changers
- Plate heat ex-changers
- Worked examples: Mechanical design of STHE

Operation and Maintenance of Heat Ex-changers

- Fouling in Heat Ex-changers
- Types and mechanisms, economic impact on design and operation
- Fouling mitigation by design
- Fouling mitigation by operation and maintenance
- Corrosion and erosion in heat ex-changers
- Heat Ex-changer Inspection Methods
- Operation and Troubleshooting
- Performance monitoring and Testing
- Flow-induced vibration, mechanisms, vibration prediction, damage numbers, design procedure to avoid vibration including baffle selection, rod baffle ex-changers, twisted tube ex-changers
- Cost-effective maintenance and repair of heat ex-changers
- Cleaning strategies and methods: S&THE, PHE, ACHE
- Heat Ex changer Repairs
- Removal and Replacement of Heat Ex-changers

Performance Enhancement and Optimization of Heat Ex-changers

- Heat transfer augmentation techniques
- Finned tubes
- In-tube Enhancement – Tube inserts, sintered coatings
- Tube Bundle Replacement – Alternative enhanced tube bundle designs
- Rod baffle
- Heli baffle
- Twisted tube
- Heat Integration Basics
- Pinch technology
- heat ex-changer train optimization
- Illustrative example: Heat ex-changer network optimization

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Registration Form

Heat Ex-changers and Fired Heaters Design, Repair and Maintenance Training Course

Preferred dates: ..... Venue or online: .....

Duration: 5 days Language: .....

Please complete and email this form to us, or register online. We confirm your place and send the invoice within one working day.

Delegate information

Full name (Mr / Ms / Dr / Eng): .....

Position: ..... Telephone / mobile: .....

Official email: ..... Personal email: .....

Company information

Company name: .....

Address: .....

City / country: ..... VAT / tax number: .....

Person responsible for training & development

Full name (Mr / Ms / Dr / Eng): .....

Position: ..... Telephone / mobile: .....

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