## Training Title

**HEAT EXCHANGER SPECIALIST: HEAT EXCHANGER DESIGN & PERFORMANCE EVALUATION**

## Training Duration

**5 days**

## Training Venue and Dates

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|---|---|---|---|---|---|
| REF ME099 | Heat Exchanger Specialist: Heat Exchanger Design & Performance Evaluation | 5 | 02 – 06 Feb. 2026 | $5,500 | Dubai, UAE |

**Will be held in any of the 4 or 5-star hotels. The exact venue will be informed upon finalization.**

## Training Fees

**$5,500 per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Lunch**

## Training Certificate

**Define Management Consultancy & Training Certificate of course completion will be issued to all attendees.**

## TRAINING OVERVIEW

## TRAINING DESCRIPTION

**This course provides professionals with a comprehensive understanding of heat exchanger design, performance evaluation, and optimization. Participants will explore key principles of heat transfer, fluid dynamics, and material selection, along with methods for evaluating and enhancing heat exchanger efficiency. Covering various types of heat exchangers, including shell-and-tube and plate models, the course emphasizes practical application, advanced design techniques, and troubleshooting for real-world industrial settings. Ideal for engineers and plant operators in sectors like chemical, oil & gas, HVAC, and power generation, this course equips participants with the skills to design and optimize heat exchanger systems for maximum performance and reliability.**



## TRAINING OBJECTIVES

- **Understand Heat Transfer Principles: Gain a strong foundation in the basic principles of heat transfer, including conduction, convection, and radiation, as applied to heat exchangers.**



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- **Design Heat Exchangers: Apply thermal and hydraulic design methodologies to design various types of heat exchangers (e.g., shell-and-tube, plate, air-cooled) for diverse industrial applications.**
- **Evaluate Performance: Assess the performance of heat exchangers using techniques like effectiveness and NTU methods, and calculate the overall heat transfer coefficient (U-value).**
- **Optimize Efficiency: Utilize advanced methods and tools, such as Computational Fluid Dynamics (CFD), to troubleshoot and optimize heat exchanger systems for improved thermal and hydraulic performance.**
- **Address Operational Issues: Identify and solve common operational problems like fouling, corrosion, and scaling that affect heat exchanger performance.**
- **Understand Sustainability: Incorporate sustainability considerations, energy recovery, and the latest advancements in materials and technologies into heat exchanger design.**
- **Apply Knowledge to Real-World Scenarios: Use case studies and hands-on exercises to apply learned concepts to practical design and troubleshooting challenges in industrial settings.**

## WHO SHOULD ATTEND?

- **Mechanical Engineers**
- **Process Engineers**
- **Plant Operators**
- **HVAC Professionals**
- **Chemical Engineers**
- **Power Generation Engineers**
- **Maintenance and Reliability Engineers**
- **Heat Transfer Specialists**
- **Energy Efficiency Consultants**
- **Project Managers in Relevant Industries**



## TRAINING METHODOLOGY:

**A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions and motivate everybody to find the right answers. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on a daily basis to examine the effectiveness of delivering the course.**

**Very useful Course Materials will be given.**



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- 30% Lectures
- 30% Workshops and work presentation
- 20% Group Work& Practical Exercises
- 20% Videos& General Discussions

**DAILY OUTLINE**
**Following topics will be covered in 5 days.**

**Day 1: Introduction to Heat Exchangers and Heat Transfer Fundamentals**

- Overview of Heat Exchanger Types and Applications
- Fundamental Heat Transfer Principles: Conduction, Convection, Radiation
- Heat Exchanger Terminology and Classification
- Basic Thermodynamics for Heat Exchangers
- Flow Arrangements: Counterflow, Parallel Flow, Shell-and-Tube, Plate Heat Exchangers
- Practical Exercises: Identifying Heat Exchanger Types and Flow Patterns

**Day 2: Heat Exchanger Design Fundamentals**

- Thermal Design of Heat Exchangers: Heat Transfer Coefficients, Temperature Profiles
- Hydraulic Design: Pressure Drop, Flow Velocity, and Distribution
- Material Selection and Corrosion Considerations
- Heat Exchanger Sizing and Calculations
- Case Study: Designing a Shell-and-Tube Heat Exchanger
- Group Exercise: Basic Design Problem Solving

**Day 3: Performance Evaluation and Advanced Calculation Methods**

- Evaluating Heat Exchanger Performance: Effectiveness, NTU Method
- Calculating Overall Heat Transfer Coefficient (U-value)
- Using CFD for Heat Exchanger Design Optimization
- Performance Measurement Techniques and Field Testing
- Troubleshooting Common Issues: Fouling, Scaling, and Leakage
- Hands-On Exercise: Performance Evaluation Using Software Tools

**Day 4: Operational Issues and Troubleshooting**

- Operational Problems: Fouling, Corrosion, and Maintenance
- Predictive Maintenance and Performance Monitoring
- Design Modifications to Address Operational Challenges



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- **Case Studies: Identifying and Solving Real-World Heat Exchanger Problems**
- **Group Activity: Troubleshooting Heat Exchanger Issues in Small Teams**
- **Discussion: Operational Best Practices for Longevity and Efficiency**

**Day 5: Advanced Design Concepts and Practical Application**

- **Heat Exchanger Network Design: Pinch Analysis and Energy Recovery**
- **Sustainable Design Practices: Reducing Environmental Impact and Energy Use**
- **Emerging Technologies and Materials in Heat Exchanger Design**
- **Final Project: Design, Evaluate, and Optimize a Heat Exchanger System**
- **Group Presentation of Final Project Results**
- **Q&A, Course Wrap-Up, and Certification**

**NOTE:**
**Pre & Post Tests will be conducted.**
**Case Studies, Group Exercises, Group Discussions, Last Day Review & Assessments will be carried out.**

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