MERCURY

Heat Transfer: Augmentation Techniques in the Process Industry Conference

Istanbul - Turkey: +90 539 599 12 06
Amman - Jordan: +962 785 666 966
London - UK: +44 748 136 28 02

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Introduction

Progress in developing high-performance thermal systems has stimulated interest in methods to improve heat transfer, popularly known as heat transfer augmentation. As an emerging second-generation heat transfer technology, these techniques are increasingly vital in various thermal apparatuses across the process and chemical industries.

Understanding and applying heat transfer enhancement techniques is essential for oil refineries, gas production facilities, and power generation infrastructures. This advanced heat transfer enhancement techniques conference provides an in-depth exploration of the most effective passive and active heat transfer enhancement techniques.

The advanced heat transfer enhancement techniques conference comprehensively reviews performance evaluation criteria, technical issues, and economic considerations such as manufacturing costs and operational maintenance.

Heat Transfer Augmentation: Enabling Efficiency and Innovation

The pursuit of enhanced heat transfer techniques is driven by the need to bolster thermal efficiency and innovation in industrial thermal management systems. The heat transfer process is central to numerous applications, with many industries striving to optimize heat transfer rates while minimizing energy consumption.

The advanced heat transfer enhancement techniques course will focus on both active heat transfer enhancement techniques, such as surface and fluid vibration, and passive heat transfer enhancement techniques, which include the integration of fins and swirl flow devices.

Targeted Groups

- Supervisors and Operators.
- Process Plant Shift Leaders.
- Environmental and Safety Technicians.
- Mechanical Technicians.
- Maintenance Engineers.

Conference Objectives

At the end of this heat transfer training conference, participants will be able to:

- Understand thermal equipment's primary heat transfer process and fluid flow to apply suitable heat augmentation techniques.
- Familiarize themselves with the principles of thermal design of heat exchangers.
- Select the optimal heat transfer augmentation techniques for specific industrial applications.
- Estimate the degree of inefficiency in heat exchangers and improve it through heat transfer augmentation.
- Analyze operational problems and combine heat exchanger alteration with heat transfer augmentation.

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Targeted Competencies

By the end of this heat transfer training conference, target competencies will be able to:

- Select the appropriate heat augmentation technique for a given application.
- Learn guidance on performance evaluation criteria for heat transfer augmentation.
- Understand real-life examples of the operation and maintenance challenges with finned tubes and tube inserts.
- Understanding of design parameters and how different techniques can compound for enhanced augmentation.
- Economic considerations: evaluating the cost versus benefit of augmentation techniques.

Conference Content

Unit 1: Overview of Heat Transfer Equipment in the Process Industry

- Thermal Efficiency of Heat Transfer Equipment.
- Performance Indicators.
- Analysis of Costs: Operating and Maintenance Costs.
- Need for Heat Transfer Augmentation.
- Classification of Augmentation Techniques.
- Performance Evaluation Criteria PEC.

Unit 2: Basics of Heat Transfer and Fluid Flow Mechanisms in Thermal Equipment

- Conduction Heat Transfer - Concept of Thermal Resistance.
- Basics of Fluid Flow in Various Geometries.
- Understand pressure drop calculation and selection of pumps and compressors.
- Convection Heat Transfer.
- Heat transfer with phase change: Boiling and Condensation.
- Overview of solutions to various Heat Transfer problems.

Unit 3: Augmentation Techniques for Single-Phase Fluid Flow

- Most Efficient Passive Techniques.
- Extended Surfaces and Fins.
- Swirl Flow Devices and Fluid Additives.
- Most Efficient Active Techniques.
- Stir devices and Rotating surfaces.
- Surface and Fluid Vibration.
- Applications of Finned Surfaces in Forced Convection.

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Unit 4: Augmentation Techniques for Fluids with Phase Change

- Most Efficient Passive Techniques.
- Treated and Rough Surfaces.
- Extended Surfaces and Displaced Enhanced Devices.
- Swirl Flow Devices and Fluid Additives.
- Most Efficient Active Techniques.
- Surface and Fluid Vibration.
- Electromagnetic Field.
- Learn solutions to problems of boiling and condensation.

Unit 5: Technical and Economic Issues

- Application of Compound Augmentation.
- Cost-benefit Analysis: Manufacturing Costs vs. Benefits of Augmentation Techniques.
- Problems in Operation.
- Maintenance Issues.
- Future Trends.