



## Course Introduction:

This course is designed to equip participants with a comprehensive understanding of coalescer filtration technology, focusing on its principle of operation, design, applications, and maintenance practices. Coalescers are vital components in separation systems, primarily used to remove water and particulate contaminants from oils, fuels, and other liquids. This theoretical training will guide participants through the various aspects of coalescer filters, offering insights into their working mechanisms, types, and selection criteria. The course also covers critical maintenance techniques to ensure optimal performance and longevity of coalescing systems.

Through structured learning, participants will gain in-depth knowledge of the coalescer filtration process, including the physics of droplet coalescence, material selection, and the impact of operational conditions on filter performance. The course emphasizes a strong theoretical foundation for engineers, operators, and professionals involved in the design, selection, and maintenance of filtration systems, preparing them for real-world applications and problem-solving in their respective industries.

## Course Objectives:

**By the end of the training, participants will be able to:**

- Provide a detailed understanding of coalescer filter principles and operations.
- Educate on the design and construction of coalescer filters and their components.
- Familiarize with the various types of coalescer filters and their respective applications.
- Discuss the impact of operational conditions and process parameters on filter efficiency.
- Introduce maintenance strategies to optimize the performance and life cycle of coalescer filters.
- Analyze troubleshooting techniques and how to interpret filter performance data.
- Understand the selection criteria for coalescer filters based on specific industry needs.

## Who Should Attend?

This course is designed for all:

- Process engineers and designers involved in filtration systems
- Maintenance engineers and technicians responsible for coalescer filter upkeep

- Operators in industries that utilize filtration systems (e.g., oil & gas, petrochemical, water treatment)
- Quality control and assurance personnel overseeing filtration system performance
- Environmental engineers and professionals managing waste and contamination mitigation
- Equipment suppliers and consultants in filtration technology

## Course Outline:

### Day 1: Introduction to Coalescer Filtration

- **Principle of Coalescence**
  - Definition and Mechanism of Coalescence
  - Importance in Separation Processes
  - Physics Behind Droplet Coalescence
- **Overview of Coalescer Filters**
  - Definition and Function
  - Types of Coalescer Filters (e.g., liquid-liquid, liquid-solid)
  - Key Differences between Coalescer and Other Filtration Technologies
- **Key Applications**
  - Oil and Gas Industry
  - Water and Wastewater Treatment
  - Industrial Manufacturing
  - Fuel Filtration

### Day 2: Design and Construction of Coalescer Filters

- **Filter Elements and Materials**
  - Types of Coalescing Media (e.g., fibrous, mesh, microfibre)
  - Material Properties (e.g., hydrophilicity, porosity)
- **Design Considerations**
  - Flow Dynamics and Pressure Drop
  - Coalescer Configuration (e.g., single-stage vs. multi-stage)
  - Size, Shape, and Efficiency Parameters
- **Structural Components**
  - Filter Housings and End Fittings
  - Gaskets, Seals, and Other Parts
  - Considerations for Corrosion and Chemical Resistance

### Day 3: Operational Conditions and Process Parameters

- **Fluid Properties and Their Impact**
  - Viscosity, Surface Tension, and Density Effects
  - Water and Contaminant Load
- **Operational Parameters**
  - Flow Rates and Pressure Profiles
  - Temperature and Chemical Compatibility
- **Filter Performance Factors**
  - Droplet Size and Distribution
  - Separation Efficiency and Breakthrough
  - Coalescer Filter Life Cycle and Fouling

#### Day 4: Maintenance and Troubleshooting of Coalescer Filters

- **Maintenance Best Practices**
  - Regular Inspection and Monitoring
  - Cleaning Procedures and Techniques
  - Scheduled Replacement of Filter Elements
- **Common Issues and Solutions**
  - Blockage and Clogging
  - Poor Coalescing Performance
  - Decreased Flow Rate and Increased Pressure Drop
- **Troubleshooting Strategies**
  - Diagnosing Common Failures
  - Performance Testing Methods
  - Monitoring Key Indicators (e.g., differential pressure, flow rate)

#### Day 5: Selection Criteria and Industry-Specific Applications

- **Selection Guidelines**
  - Understanding Application Needs (e.g., oil content, type of contamination)
  - Matching Coalescer Filter Types to Industry Requirements
  - Efficiency vs. Cost Considerations
- **Industry-Specific Requirements**
  - Coalescers in Oil & Gas: Offshore and Onshore Applications
  - Fuel Filtration in Aviation and Automotive Industries
  - Water Treatment and Environmental Filtration
- **Future Trends and Innovations in Coalescer Technology**
  - Advances in Filter Materials
  - Automation and Monitoring of Filter Performance
  - Sustainability and Environmental Considerations

## Course Methodology:

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A variety of methodologies will be used during the course that including:

- (30%) Based on Case Studies
- (30%) Techniques
- (30%) Role Play
- (10%) Concepts
- Pre-test and Post-test
- Variety of Learning Methods
- Lectures
- Case Studies and Self Questionnaires
- Group Work
- Discussion
- Presentation

## Course Certificate:

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**International Center for Training & Development (ICTD)** will award an internationally recognized certificate(s) for each delegate on completion of training.

## Course Fees:

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**To be advised as per course location.** This rate includes participant's manual, Hand-Outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

## Course Timings:

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### Daily Course Timings:

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|---------------|----------------------------|
| 08:00 - 08:20 | Morning Coffee / Tea       |
| 08:20 - 10:00 | First Session              |
| 10:00 - 10:20 | Coffee / Tea / Snacks      |
| 10:20 - 12:20 | Second Session             |
| 12:20 - 13:30 | Lunch Break & Prayer Break |
| 13:30 - 15:00 | Last Session               |