Advanced Compressor & Pump Technology

www.masterpeaktraining.com
phone: +905302682631
Email:info@masterpeaktraining.com

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10 days training course

For detailed information on training course dates, please click the link:

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Target Audience:

- Operation and Maintenance Operators.
- Supervisors and Technicians.
- Facility Engineers.
- Utility Engineers.
- This compressor and pump technology control course is for anyone requiring a working-level knowledge of rotating equipment and compressors.
- Technical Professionals deal with condition monitoring, reliability, and integrity analysis.
- Mechanical engineers, maintenance engineers, and reliability professionals.
- Plant managers, supervisors, and technical personnel responsible for compressors and pumps.
- Oil & gas, power generation, and process industry professionals seeking advanced knowledge of compressor and pump technologies.

Introduction:

Efficient and reliable compressor and pump systems are critical to industrial operations, particularly in the oil and gas, power generation, and process industries. This comprehensive course provides in-depth knowledge of compressor and pump technologies, including performance optimization, troubleshooting, and predictive maintenance. Participants will gain hands-on experience in design, selection, and diagnostics, ensuring operational excellence and cost-effective maintenance strategies.

Training Objectives:

By the end of this course, participants will be able to:

- Understand gas laws, compressor types, and key performance parameters.
- Analyze and troubleshoot positive displacement and dynamic compressors.
- Gain insights into compressor seals, surge prevention, and auxiliary systems.

- Master pump selection, performance calculations, and predictive maintenance techniques.
- Develop expertise in diagnosing and optimizing compressor and pump systems for industrial applications.

Course Outline:

Day 1: Fundamentals of Compressors & Gas Laws

- Understanding Perfect and Imperfect Gases
- Compressor Efficiency & Power Requirements
- Volumetric Flow Rate & Efficiency
- Overview of Compressor Types:
    1. **Rotary & Reciprocating Compressors**
    2. **Dynamic Compressors (Centrifugal & Axial)**
- Compressor Performance Measurement
- Compressor Control, Unloading Systems & Receivers
- Preventive Maintenance Best Practices

Day 2: Positive Displacement Compressors

- Working Principles & Performance Metrics
- Reciprocating Compressors:
    - Troubleshooting & Maintenance Strategies
- Diaphragm Compressors & Their Applications
- Rotary Screw Compressors & Filter Separators
- Straight Lobe Compressors & Efficiency Considerations
- Advances in Liquid/Gas Separation Technologies

Day 3: Dynamic Compressors – Principles & Performance

- Fundamentals of Dynamic Compressor Technology
- Centrifugal & Axial Compressors:
    - Components, Characteristics & Performance Analysis
- Performance Calculation Using Simplified Equations
- Surge Prevention & Balancing Techniques

Day 4: Advanced Compressor Performance & Sealing Systems

- Surge Limits, Stonewall & Anti-Surge Control Systems
- Sealing Technologies in Compressors:
    - Gas Seals, Liquid Seals & Restricted Bushing Seals
    - Dry Seals & Magnetic Bearings
- Compressor System Calculations:
- Sizing Components & Gas Receiver Design
- **Workshop:** Design & Selection of Compressors for Oil & Gas and Power Industries

Day 5: Bearings, Lubrication & Predictive Maintenance

- Types & Applications of Bearings
- Thrust Bearings & Their Role in Compressors
- Lubrication Fundamentals:
  - Viscosity, Non-Newtonian Fluids & Grease Applications
- Used Oil Analysis & Its Importance in Maintenance
- Vibration Analysis for Predictive Maintenance
- Diagnostic Testing for Early Failure Detection

Day 6: Pump Fundamentals & Centrifugal Pump Technology

- Overview of Pump Categories:
  - **Dynamic (Centrifugal) vs. Positive Displacement Pumps**
- Centrifugal Pump Components & Operations:
  - Casings, Diffusers & Hydraulic Balancing
  - Mechanical Seals & Minimum Flow Requirements
- Performance Characteristics & Net Positive Suction Head (NPSH)
- Cavitation & Its Impact on Pump Efficiency

Day 7: Mechanical Seals & Maintenance of Centrifugal Pumps

- Mechanical Seals:
  - Components, Temperature Control & Seal Lubrication
  - Common Failure Modes & Refurbishment Strategies
- Centrifugal Pump Maintenance Best Practices
- Vibration Analysis & Early Fault Detection Techniques

Day 8: Positive Displacement Pumps & Specialized Applications

- Reciprocating Pumps:
  - Piston, Plunger & Diaphragm Pumps
- Rotary Pumps:
  - Screw, Lobe, Cam & Vane Pumps
- Seal-Less Pumps & Canned Motor Pumps for Critical Applications

Day 9: Pump Troubleshooting & Diagnostics

- Common Pump Failures & Maintenance Best Practices
- Diagnosing Issues in:
  - **Centrifugal Pumps**
  - **Rotary Pumps**
  - **Reciprocating Pumps**
- Water Hammer: Causes & Prevention
- Bearings & Used Oil Analysis for Pumps
- Smart Instrumentation for Pump Monitoring

Day 10: Pump Selection, System Design & Performance Optimization

- Selection Criteria for Industrial Pumping Systems
- Pumping System Performance Calculations
- **Workshop:** Designing & Selecting Pumping Systems for Oil & Gas & Power Industries
- Control Valve Selection & Noise Reduction Strategies
- Diagnostics of Pumping Systems & Variable Frequency Drives (VFDs)
- Motors, Actuators, & Positioners for Efficient Pump Operation

DOCUMENTATION

The **MTC team** has meticulously prepared **high-quality training materials** for distribution to all delegates.

CERTIFICATES

An **accredited Certificate of Completion** will be awarded to participants who successfully attend and complete the program.

SCHEDULE

Course sessions are scheduled as follows:

- **Morning Session:** 09:00 AM – 1:00 PM
- **Afternoon Session:** 01:00 PM – 05:00 PM

REGISTRATION & PAYMENT

To register, please complete the **registration form** available on the course page and submit it with your **preferred payment method**. Alternatively, you can contact us via **email or WhatsApp** for assistance.

TRAVEL & TRANSPORT

We ensure a **seamless travel experience** by providing **airport-hotel-airport** transfers for all participants.