

# COMPRESSORS TYPES & MAINTENANCE

““Enhancing Equipment Reliability and Operational Efficiency Through Best-in-Class Compressor Practices””

## Schedule

| Date             | Venue           | Fees (Face-to-Face)   |
|------------------|-----------------|-----------------------|
| 01 – 05 Feb 2026 | Manama, Bahrain | USD 3495 per delegate |

## Introduction

Compressors play a vital role in various industrial processes, particularly in oil and gas, petrochemicals, and power generation. With a wide range of types—reciprocating, rotary, centrifugal, and screw—each demands specific design considerations, performance requirements, and maintenance strategies to ensure optimal functionality and longevity.

This intensive five-day course provides participants with a comprehensive understanding of compressor types, operating principles, failure modes, and best practices in maintenance. It emphasizes reliability improvement, condition monitoring, and troubleshooting techniques through real-world case studies and interactive workshops.

## Objectives

- By the end of this course, participants will be able to:
- Identify and differentiate between various types of industrial compressors
  - Understand compressor operating principles, key components, and performance metrics
  - Diagnose common compressor failures and implement effective maintenance strategies
  - Apply condition monitoring tools and techniques to prevent unplanned shutdowns
  - Enhance the reliability, efficiency, and safety of compressor systems

## Why Attend

- Gain in-depth technical knowledge of centrifugal, reciprocating, screw, and rotary compressors
- Minimize equipment downtime and optimize maintenance intervals
- Improve troubleshooting skills and root cause identification
- Ensure compliance with operational and safety standards
- Learn hands-on techniques to assess compressor health and performance

## Target Audience

This program is designed for:

- Maintenance and reliability engineers
- Mechanical technicians and equipment specialists
- Plant engineers and operations supervisors
- Rotating equipment engineers
- Maintenance planners and asset managers

## Individual Benefits

Key competencies that will be developed include:

- Compressor selection and classification knowledge
- Condition monitoring and predictive maintenance skills
- Failure analysis and troubleshooting methodology
- Equipment inspection and performance evaluation techniques
- Preventive maintenance scheduling and documentation

## Organizational Benefits

Upon completing the training course, participants will demonstrate:

- Reduced compressor-related downtime and repair costs
- Improved reliability and lifespan of critical rotating equipment
- Better maintenance planning and inventory control
- Enhanced safety and operational readiness
- Stronger compliance with mechanical integrity and performance standards

## Instructional Methodology

The course follows a blended learning approach combining theory with practice:

- Strategy Briefings – Compressor design principles, standards, and specifications
- Case Studies – Real-life failure incidents and corrective actions
- Workshops – Maintenance planning, vibration analysis, and performance troubleshooting
- Peer Exchange – Group discussions on operational challenges and solutions
- Tools – Checklists for inspections, maintenance logs, and troubleshooting guides

## Course Outline

### Detailed 5-Day Course Outline

**Training Hours:** 07:30 AM – 3:30 PM **Daily Format:** 3–4 Learning Modules | Coffee breaks: 09:30 & 11:15 | Lunch Buffet: 01:00 – 02:00

#### Day 1: Compressor Fundamentals and Classifications

- Module 1: Introduction to Compressors and Their Applications (07:30 – 09:30) • Role of compressors in industrial systems • Classification: positive displacement vs dynamic compressors
- Module 2: Reciprocating Compressors (09:45 – 11:15) • Components, operating cycle, and performance parameters • Common issues and failure modes
- Module 3: Rotary and Screw Compressors (11:30 – 01:00) • Operating principles, applications, and advantages • Lubrication, sealing, and rotor wear issues
- Module 4: Workshop – Compressor Type Selection Exercise (02:00 – 03:30) • Choose suitable compressor types based on system requirements

#### Day 2: Centrifugal Compressors and Performance Metrics

- Module 1: Centrifugal Compressor Design and Operation (07:30 – 09:30) • Impeller design, diffuser, and casing functions • Pressure ratios, flow characteristics, and efficiency
- Module 2: Compressor Performance Curves (09:45 – 11:15) • Head, flow, and surge behavior • Operating windows and control
- Module 3: Surge and Stall Conditions (11:30 – 01:00) • Causes, consequences, and prevention techniques
- Module 4: Workshop – Interpreting Performance Data (02:00 – 03:30) • Analyze performance curves and identify efficiency losses

#### Day 3: Maintenance Planning and Condition Monitoring

- Module 1: Preventive and Predictive Maintenance (07:30 – 09:30) • Maintenance intervals, best practices, and recordkeeping • Lubrication systems and filter management
- Module 2: Condition Monitoring Techniques (09:45 – 11:15) • Vibration analysis, thermography, and oil analysis • Setting baselines and alarms
- Module 3: Alignment, Balancing, and Wear Detection (11:30 – 01:00) • Misalignment detection and correction • Rotor balancing techniques
- Module 4: Workshop – Creating a Maintenance Schedule (02:00 – 03:30) • Develop a preventive maintenance plan for multi-compressor systems

#### Day 4: Troubleshooting and Failure Analysis

- Module 1: Common Compressor Failures and Root Causes (07:30 – 09:30) • Overheating, valve failure, piston damage, and seal degradation • Troubleshooting checklists and diagnostics
- Module 2: Root Cause Failure Analysis (09:45 – 11:15) • Fault tree and cause-effect methods • Field investigation and evidence gathering
- Module 3: Repair vs Replacement Decisions (11:30 – 01:00) • Economic evaluation and lifecycle cost considerations
- Module 4: Workshop – Case Study Analysis (02:00 – 03:30) • Investigate a real compressor failure and recommend corrective action

#### Day 5: Safety, Standards, and Best Practices

- Module 1: Safety Procedures and Hazards in Compressor Systems (07:30 – 09:30) • Pressure relief systems, safety valves, and shutdown procedures • PPE and confined space precautions
- Module 2: International Standards and OEM Guidelines (09:45 – 11:15) • API, ISO, and ASME standards for compressor operation and inspection
- Module 3: Spare Parts Management and Documentation (11:30 – 01:00) • Spare part classification and inventory planning • Maintenance logs, documentation, and reporting
- Module 4: Certification and Wrap-Up (02:00 – 03:30) • Final review and Q&A • Certificate distribution and course closure

Certification

Participants will receive a Certificate of Completion in Compressors Types & Maintenance, validating their technical knowledge and applied skills in compressor operation, maintenance, and reliability improvement across industrial environments.

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