

Course No. 1138

Compressors Engineering Training Course

MECHANICAL ENGINEERING
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION

5 Days

DELIVERY

Classroom



Course Overview

The Compressors Engineering Training Course is a comprehensive professional development program designed to equip engineers, maintenance professionals, operations personnel, technical specialists, and engineering managers with the knowledge and practical skills required to select, operate, maintain, troubleshoot, and optimize industrial compressors and compressed air and gas systems. As compressors are among the most critical rotating equipment in industrial facilities, their efficient operation is essential for maintaining production continuity, process reliability, energy efficiency, equipment integrity, and operational safety.

Compressors are widely used across oil and gas facilities, petrochemical plants, power generation stations, manufacturing industries, mining operations, water treatment facilities, pharmaceutical plants, food processing industries, and large industrial complexes. Improper compressor selection, inadequate maintenance, inefficient operation, and poor system design can result in excessive energy consumption, equipment failures, unplanned downtime, increased maintenance costs, and reduced operational performance. This course provides participants with internationally recognized engineering principles and industry best practices for maximizing compressor reliability and optimizing compressed air and gas system performance.

Throughout the program, participants will develop a comprehensive understanding of compressor technologies, including reciprocating, rotary screw, centrifugal, axial, and scroll compressors. The course covers compressor operating principles, thermodynamics of gas compression, compressor performance analysis, system design, compressor selection, capacity control, lubrication systems, cooling systems, vibration analysis, condition monitoring, maintenance strategies, failure analysis, energy optimization, and lifecycle management. Practical engineering applications and real industrial case studies enable participants to apply engineering concepts to operational challenges and improve decision-making in the workplace.

The Compressors Engineering Training Course also demonstrates how compressor engineering integrates with reliability engineering, maintenance management, asset management, energy management, process optimization, operational excellence, and engineering safety. By completing this course, participants will be prepared to improve compressor reliability, reduce operating costs, optimize energy efficiency, extend equipment lifecycle, strengthen maintenance programs, and support sustainable engineering operations across government entities, ministries, public sector organizations, financial institutions managing engineering infrastructure, oil and gas companies, power generation facilities, manufacturing industries, utilities, infrastructure organizations, and

multinational corporations.

Objectives

- Analyze the operating principles and engineering applications of industrial compressors and compressed air systems.
- Develop practical knowledge for selecting compressors based on process requirements and operating conditions.
- Evaluate compressor performance using engineering calculations, performance curves, and operational data.
- Apply thermodynamic and fluid mechanics principles to compressor operation and system analysis.
- Design efficient compressed air and gas systems that maximize operational performance and energy efficiency.
- Improve compressor operation through proper installation, commissioning, monitoring, and maintenance practices.
- Strengthen troubleshooting capabilities by identifying common compressor failures and performing root cause analysis.
- Implement preventive, predictive, and reliability-centered maintenance strategies for compressor systems.
- Assess compressor efficiency, energy consumption, and opportunities for operational optimization.
- Align compressor engineering practices with organizational objectives for safety, reliability, asset management, and operational excellence.

Who Should Attend

This course is designed for mechanical engineers, maintenance engineers, operations engineers, rotating equipment engineers, reliability engineers, process engineers, project engineers, plant engineers, utility engineers, maintenance supervisors, operations supervisors, maintenance planners, engineering technicians, equipment inspectors, commissioning engineers, engineering consultants, and technical professionals responsible for compressors and compressed air systems.

The program is equally valuable for engineering managers, maintenance managers, operations

managers, plant managers, facility managers, asset management professionals, project managers, procurement engineers, technical specialists, quality professionals, HSE personnel, and decision makers responsible for equipment reliability, maintenance planning, engineering operations, and industrial asset performance.

Professionals working within government entities, ministries, public sector organizations, financial institutions managing engineering infrastructure, oil and gas companies, petrochemical industries, power generation facilities, manufacturing plants, mining organizations, utility providers, infrastructure developers, marine industries, transportation authorities, and multinational engineering organizations will benefit significantly from the practical engineering methodologies and internationally recognized compressor management practices presented throughout the course.

Learning Outcomes

- By the end of this course, participants will be able to:
- Explain the operating principles, classifications, and industrial applications of compressors.
- Select appropriate compressors based on process requirements, capacity, pressure, and operating conditions.
- Interpret compressor performance curves and evaluate operating efficiency.
- Apply thermodynamic and fluid mechanics principles to compressor system analysis.
- Identify common compressor failures and perform systematic troubleshooting.
- Develop preventive and predictive maintenance programs for compressors and auxiliary equipment.
- Evaluate lubrication systems, cooling systems, vibration behavior, and compressor operating conditions.
- Improve compressor reliability and energy efficiency through system optimization techniques.
- Apply engineering safety practices during compressor installation, operation, inspection, and maintenance.
- Support operational excellence and asset reliability through effective compressor engineering and maintenance management.

Course Outline

DAY 01

Fundamentals of Compressor Engineering

- Principles of gas compression and compressor operation
- Types of compressors and industrial applications
- Compressor components and mechanical construction
- Fundamentals of thermodynamics and gas properties

PRACTICAL

Practical workshop on compressor identification and interpretation of technical specifications

DAY 02

Compressor Selection, Design, and Performance Analysis

- Compressor performance characteristics and operating curves
- Compressor selection methodologies
- Capacity control systems and operational efficiency
- Compressed air and gas system design principles

PRACTICAL EXERCISE

Practical exercise on compressor sizing and system performance evaluation

DAY 03

Compressor Operation, Monitoring, and Maintenance

- Installation, commissioning, and startup procedures
- Compressor operating practices and performance monitoring
- Preventive and predictive maintenance strategies
- Lubrication systems, cooling systems, and auxiliary equipment

DAY 03 — CONTINUED

PRACTICAL

Practical workshop on compressor maintenance planning and inspection procedures

DAY 04

Troubleshooting, Reliability, and Energy Optimization

- Common compressor failures and root cause analysis
- Vibration analysis and condition monitoring techniques
- Reliability improvement methodologies for rotating equipment
- Energy efficiency optimization for compressed air and gas systems

PRACTICAL APPLICATION

Practical application involving compressor failure diagnosis and performance improvement planning

DAY 05

Advanced Compressor Management and Operational Excellence

- Compressor asset lifecycle management
- Safety management and operational risk reduction
- Performance measurement and engineering best practices
- Continuous improvement for compressor systems

FINAL WORKSHOP

Final workshop involving the development of a comprehensive Compressor Engineering management plan integrating compressor selection, performance analysis, maintenance planning, reliability improvement, energy optimization, condition monitoring, safety management, and continuous improvement to maximize equipment reliability and operational excellence.



Register or Request More Information

Course page: <https://quest-training.com/courses/compressors-engineering-training-course>

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