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**Course Name**

# Industrial Compressors Performance & Troubleshooting

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**Sector Name**

Mechanical Engineering

**Document Type**

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## Industrial Compressors Performance & Troubleshooting

### Course Introduction

Industrial compressors operate under demanding combinations of pressure, temperature, flow, speed, and process conditions. When compressor performance changes, symptoms such as reduced capacity, high discharge temperature, excessive power consumption, unstable operation, vibration, or abnormal pressure may originate from the compressor itself, its control system, or changing operating conditions. Troubleshooting becomes difficult when these factors are considered separately rather than as part of the complete compression process.

**Boost Consulting & Training** offers this course to develop a practical engineering approach to compressor performance and troubleshooting. Participants examine the behavior of major compressor types, compression principles, performance characteristics, capacity control, operating limits, efficiency, and common performance problems. The course uses operating data and realistic equipment scenarios to help participants distinguish between mechanical, process, and control-related causes before selecting corrective action.

The **main concept of this course** is to diagnose compressor problems by connecting compression behavior, operating conditions,

equipment limits, and mechanical evidence into one structured engineering assessment.

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## Industrial Compressors Performance & Troubleshooting

### Target Audience

- ✓ Mechanical and rotating equipment engineers
- ✓ Plant and process engineers
- ✓ Compressor and equipment specialists
- ✓ Technical supervisors responsible for compressor performance

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## Industrial Compressors Performance & Troubleshooting

### Learning Objectives

- ✓ Explain the operating principles of major industrial compressor types.
- ✓ Interpret key compressor performance parameters and operating characteristics.
- ✓ Evaluate the effects of suction, discharge, temperature, pressure, and flow conditions on performance.
- ✓ Recognize compressor operating limits and unstable operating conditions.
- ✓ Assess common capacity-control methods and their impact on compressor behavior.
- ✓ Diagnose mechanical, process, and control-related compressor problems.
- ✓ Evaluate compressor efficiency and identify sources of performance loss.
- ✓ Apply a structured troubleshooting process to compressor performance problems.

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## Industrial Compressors Performance & Troubleshooting

### Course Outline

#### ✓ Day 01

##### **Understanding Industrial Compression**

##### **Comparing Compressor Technologies**

- ✓ Distinguish centrifugal, reciprocating, screw, and other common compressor configurations.
- ✓ Understand how different compressor types generate pressure and deliver flow.
- ✓ Match compressor characteristics with typical industrial operating requirements.

##### **Reading Compressor Performance**

- ✓ Examine pressure ratio, capacity, power, temperature, and efficiency relationships.
- ✓ Understand how suction conditions influence compressor output and required power.
- ✓ Build a **Compressor Operating Profile** from practical performance data.

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## Industrial Compressors Performance & Troubleshooting

### Course Outline

#### ✓ Day 02

##### **Understanding Changing Compressor Performance**

##### **Interpreting Performance Characteristics**

- ✓ Read compressor curves and operating maps across changing system conditions.
- ✓ Evaluate the effects of pressure, temperature, gas properties, and speed on performance.
- ✓ Compare expected compressor behavior with actual operating data.

##### **Managing Capacity and Demand**

- ✓ Examine throttling, unloading, recycling, variable speed, and other capacity-control methods.
- ✓ Understand how control actions affect flow, energy use, and operating stability.
- ✓ Complete a **Compressor Capacity Control Challenge** under variable process demand.

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## Industrial Compressors Performance & Troubleshooting

### Course Outline

#### ✓ Day 03

##### **Controlling Compressor Operating Limits**

##### **Recognizing Unstable Operation**

- ✓ Understand surge, choke, and other operating limitations relevant to dynamic compressors.
- ✓ Identify operating conditions that move compressors toward unstable regions.
- ✓ Interpret changes in pressure, flow, vibration, and temperature associated with instability.

##### **Protecting the Operating Envelope**

- ✓ Examine anti-surge and recycle concepts used to maintain stable compressor operation.
- ✓ Evaluate the relationship between process demand, controls, and compressor limits.
- ✓ Run a **Compressor Operating Envelope Simulation** involving changing process conditions.

## Industrial Compressors Performance & Troubleshooting

### Course Outline

#### ✓ Day 04

##### **Diagnosing Performance Deterioration**

##### **Investigating Process and Performance Problems**

- ✓ Diagnose reduced capacity, abnormal pressure, high discharge temperature, and excessive power demand.
- ✓ Evaluate fouling, leakage, restriction, cooling, and changing process conditions.
- ✓ Separate genuine compressor deterioration from changes elsewhere in the system.

##### **Investigating Mechanical Symptoms**

- ✓ Assess vibration, abnormal noise, lubrication issues, sealing problems, and component condition.
- ✓ Connect mechanical symptoms with changes in compressor operating behavior.
- ✓ Conduct a **Compressor Diagnostic Case** using mechanical and process evidence.

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## Industrial Compressors Performance & Troubleshooting

### Course Outline

#### ✓ Day 05

##### **Restoring and Optimizing Compressor Performance**

##### **Evaluating Compressor Efficiency**

- ✓ Compare actual compressor performance with expected operating behavior.
- ✓ Identify energy losses associated with poor control, inappropriate operating points, leakage, and system conditions.
- ✓ Determine where operating adjustments can improve performance without compromising stability.

##### **Solving Complex Compressor Problems**

- ✓ Build possible causes from operating trends, mechanical observations, and control behavior.
- ✓ Select corrective actions according to diagnostic evidence and operational impact.
- ✓ Complete an **Industrial Compressor Troubleshooting Case** from initial symptoms through diagnosis to an optimized operating response.

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## Industrial Compressors Performance & Troubleshooting

### Confirmed Sessions

| FROM         | TO            | DURATION | FEES       | LOCATION    |
|--------------|---------------|----------|------------|-------------|
| Dec. 7, 2026 | Dec. 11, 2026 | 5 days   | 4250.00 \$ | UAE , Dubai |

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