

# € TRAINING

Rotating Equipment Management





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## Introduction:

This training program provides comprehensive instruction on the selection, operation, and maintenance of these critical rotating equipment types. By the program's conclusion, attendees acquire the knowledge and skills necessary to effectively operate, maintain, and troubleshoot pumps, compressors, and turbines, ensuring optimal performance and reliability in industrial processes.

## Program Objectives:

At the end of this program, participants will be able to:

- Understand the technical features of different types of pumps, compressors and turbines, and their capabilities and limitations.
- Learn how to be familiar with principles of hydraulic and mechanical design of pumps, compressors, and turbines according to existing world standards and codes.
- Gain knowledge on the selection of optimal type and size for a given industrial application.
- Diagnose and estimate the degree of deterioration and inefficiency of pumps, compressors and turbines and the ways to improve them.
- Learn the best practices and techniques of pinpointing the problems, and choosing the most efficient remedies, in operation, such as cavitation, surge, stall, choking, corrosion, erosion.

## Targeted Audience:

- Chemical, Process and Mechanical Engineers.
- Product Engineers and Technologists.
- The operation, technical service, and maintenance professionals.
- Engineers, Consultants, and Professionals.
- Technical professionals responsible for interdisciplinary energy projects.

## Program Outlines:

### Unit 1:

#### Centrifugal Pumps:

- Overview of various types of pumps based on design and application.
- World standards and codes related to pump design.
- Main elements of centrifugal pump construction.
- Design of pump-suction piping.
- Selection and sizing of centrifugal pump.
- Solving problems in the operation.

## Unit 2:

### Positive Displacement Pumps:

- Positive displacement pumps: reciprocating and rotary.
- Pump requirements for chemical, process and oil industry, power generation.
- Pumps for special applications.
- Guidelines for pump installation and operation.
- Pump inspection, control, and performance testing.
- Maintenance and troubleshooting of pumps.

## Unit 3:

### Centrifugal Compressors:

- Overview of the main features of various types of compressors.
- Classification of compressors based on design and application.
- World standards and codes related to compressor design.
- Main elements of centrifugal compressor construction.
- Analysis of centrifugal compressor efficiency.
- Guidelines for trouble-free centrifugal compressor operation.

## Unit 4:

### Positive Displacement Compressors:

- Positive displacement compressors: Reciprocating and Rotary.

- Basic criteria for selecting the optimum cost-effective compressor.
- Compressor loadings and speeds; noise control and protection.
- Compressors for special applications.
- Guidelines for compressor installation and operation.
- Compressor inspection, maintenance, control, performance testing, and troubleshooting.

## Unit 5:

### Industrial Gas Turbines:

- Overview and classification of gas turbines.
- World standards and codes related to gas turbine design.
- Main elements and technical characteristics of gas turbine design.
- Radial and Axial-flow gas turbines.
- Combustor performance - types of fuels, combustion and pollution control.
- Gas turbine deterioration - corrosion and erosion prevention.
- Mechanical vibrations - monitoring, measurements, diagnostics and analysis.
- Installation, operation, maintenance, and troubleshooting of gas turbines.