

Functioning and Maintenance of Compressors and Steam Turbines

.....



Energy Milestones Corporation Advancing Professionals to the next level

Energy Milestones is proud to be accredited, partner and associated with the following association bodies:



info@energymilestones.com



energymilestones.com

Functioning and Maintenance of Compressors and Steam Turbines



Overview

A complete understanding of the design, functioning and maintenance of compressors and steam turbines is a prerequisite for the successful operation of process plants. This is especially important nowadays when the demand for minimum and continuous production is vital for the competitiveness of organisations. This course is intended to familiarise engineers, technicians and operators with the guidelines and best practices employed in utilising this equipment, including design, operation, maintenance, and repair. The emphasis in the training course will be on gaining a physical understanding of the operational problems and the best way to troubleshoot them.

Course Objectives

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

- Understand the technical features of compressors and steam turbines
- Select the optimal type and size of equipment for a given industrial application
- Use methods of estimating the degree of deterioration and inefficiency of equipment
- Apply the best practices and techniques for pinpointing the root cause of problems
- Choose the most efficient remedies and troubleshooting techniques in operation

Course Content

1. Gas Thermodynamics:

- Gas Properties and Laws
- Centrifugal Compressor Aerodynamics - Thermodynamics
- Changes in Gas Velocity and Pressure in a Centrifugal Compressor
- Mass and Volume Flow Rate as a Function of Pressure, Temperature and Gas Composition
- Molecular Weight of Gas and Its Effect on Performance



Functioning and Maintenance of Compressors and Steam Turbines



Course Content

1. Gas Thermodynamics:

- Discharge Temperature, Power Absorbed as a Function of the Gas Composition and the Operating Conditions
- Investigating and Controlling Surge and Choke

2. Centrifugal Compressors – Design – Operation:

- 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

3. Positive Displacement Compressors

- Positive Displacement Compressors: Reciprocating and Rotary
- Piston and Diaphragm Compressors
- Rotary compressors, rotary screw compressors, lobe-type air compressors, sliding vane compressors, and liquid ring compressors
- Compressor Capacity: Loadings and Speeds
- Compressor Safety, Control, Noise Control, and Protection
- Guidelines for Compressor Installation and Operation

4. Steam Thermodynamics:

- Steam Properties and the Mollier Charts
- The Rankine Cycle
- Steam Requirement per KWH Production
- Ultra-supercritical Conditions



Functioning and Maintenance of Compressors and Steam Turbines



Course Content

5. Steam Turbines – Design - Operation:

- Main Elements and Technical Characteristics of Steam Turbine Design
- The Rotating and Stationary Blades
- The Internal and External Seals
- Radial and Thrust Journal Bearings
- Stop – Control – Non-Return Turbine Valves
- Turbine Controls and Interlocks

6. Maintenance of Rotating Machines:

- Machines, Piping, and Ground Regulations
- Alignment of Thermal Machines
- Balancing of Rotating Machines
- Surface Treatments of Sealing Interfaces
- Online Washing
- Troubleshooting through Vibration Analysis, Oil Analysis and Thermography

Targeted Audience

- Process and Mechanical Engineers
- Operation, Technical Service and Maintenance Professionals
- Engineers and Consultants
- Technical Professionals responsible for interdisciplinary energy projects



Functioning and Maintenance of Compressors and Steam Turbines



Course Methodology

Facilitated by an experienced professional trainer, this training course will be conducted as a highly interactive workshop session. A variety of training methodologies and facilitation techniques will be employed before and during the course, as applicable. These methods are aimed at enhancing individual and group interaction while maximising learning. Some of these methods are:

- Online Pre-post Test
- Colourful Visual Aids
- Gamification
- Self-Assessment Instruments
- Simulations
- Case Studies
- Videos
- Group Exercises & Discussions
- Role plays
- Indoor & Outdoor games

