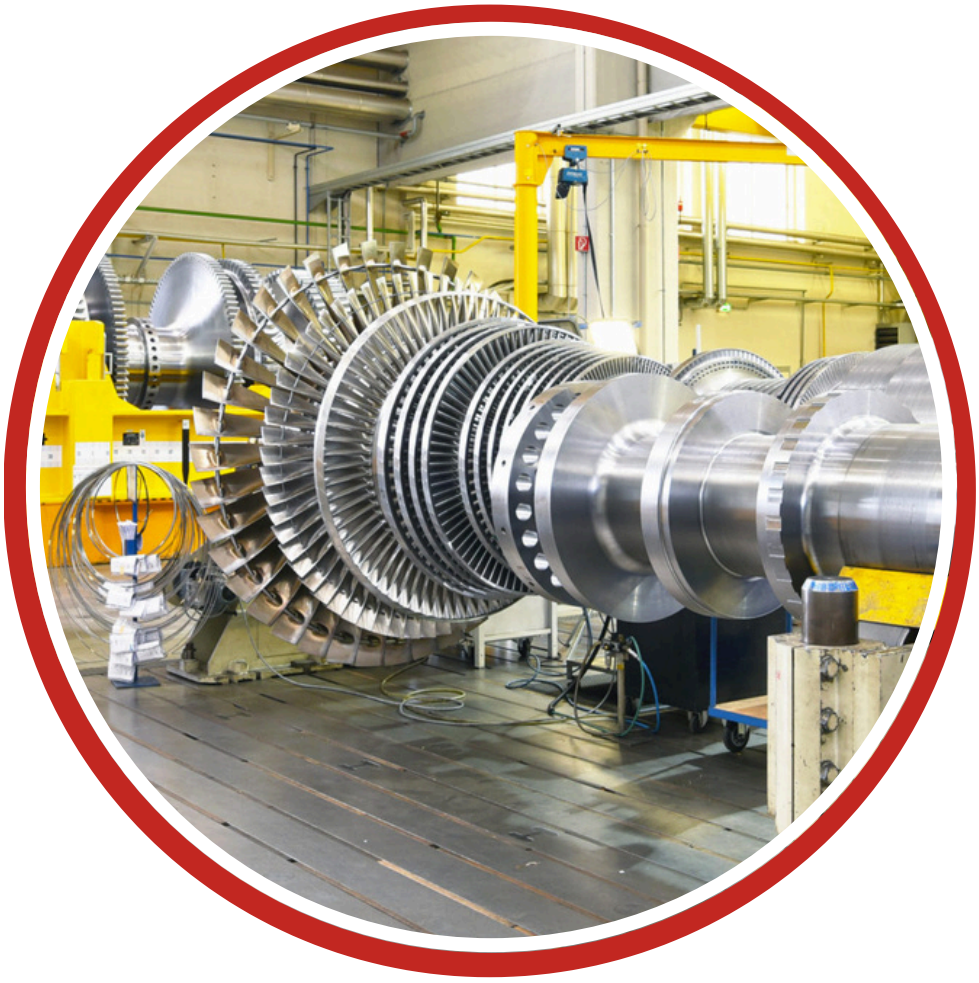
Fundamentals of Mechanical Equipment: Compressors, Pumps, And Motors



Energy Milestones Corporation

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Fundamentals of Mechanical Equipment Compressors Pumps And Motors

Overview

This Mechanical Equipment training course will provide a comprehensive understanding of equipment operating characteristics. It will introduce delegates to essential types of mechanical equipment, including positive displacement and dynamic pumps and compressors, motors and drives and their associated systems and components. The applications of this equipment will be discussed, along with their suitability for various operational duties and the corresponding selection criteria. In addition, the course will focus on associated equipment, including packing, mechanical sealing systems, bearings and valves.

Course Objectives

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

- Identify the different types of pumps & compressors & learn about selection, operation and maintenance strategies.
- Operate pumps and compressors as close as possible to the design efficiency and monitor their availability and reliability.
- Identify and learn about associated components, such as mechanical seals & bearings, and understand their failure mechanisms.s
- Condition, monitor and troubleshoot pump and compressor problems
- Specify, operate and maintain fluid movers (Motors) and drivers (Variable Speed Drives)

Course Content

1. Pumps and Pumping Systems

- Pump categories and selection - Dynamic and positive displacement
- Pump Theory of Operation - Governing fluid laws and performance curves
- Dynamic Pumps - Centrifugal, axial, mixed flow
- General Performance Characteristics - Cavitations, net positive suction head

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Course Content

1. Pumps and Pumping Systems
   - Positive Displacement Pumps - Reciprocating, rotary
   - Engineering of System Requirements - Fluid type, system head curves

2. Compressors and Compressor Systems
   - Positive Displacement Compressors - Reciprocating and rotary
   - Dynamic Compressors - Centrifugal, axial, mixed flow
   - Compressor Operation - Gas laws, operation curves
   - Compressor Performance Measurement and Sizing
   - Compressor Equipment
   - Surging and Choking

3. Motors and Variable Speed Drives
   - Characteristics and Operation of AC Induction Motors
   - Starting and Speed Control of AC Induction Motors
   - Speed Control Methods of AC Motors
   - Construction, Enclosures and Cooling Methods of AC Motors
   - Basic principles of AC Variable-Speed Drives (VSDs)
   - Electromagnetic Interferences, Cable Details and Filtering

4. Maintenance and Troubleshooting
   - Types of maintenance
   - Factors affecting pump, compressor and motor maintenance
   - Vibration Analysis and Condition Monitoring
   - Electrical Signature Condition Monitoring
   - Thermal Imaging condition monitoring
   - Oil Analysis

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Course Content

5. Associated Mechanical Equipment
   - Mechanical Seals
   - Bearings
   - Faults associated with bearings and mechanical seals
   - Lubrication
   - Control Valve

Targeted Audience

This course is designed for supervisors, Team Leaders, and Professionals in Maintenance, Engineering, and Production. It is suitable for those who expect to become involved at any stage in project applications and applicable maintenance technologies. The course will also benefit anyone who wishes to update themselves on pump and compressor technology, judge the suitability of different types of pumps and compressors for their needs, and learn how to operate and maintain them for the benefit of their organisations.

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