



شركة ميرك العربية السعودية
MEIRC Saudi Arabia

Pumps/Compressors Operation & Maintenance

Duration 5 Days

Introduction

This course will cover the operating principles of centrifugal pumps/compressors, specifications, effects of efficiency on operating costs, energy usage, selection, troubleshooting and maintenance. The course will provide the participant with a basic, as well as advanced, centrifugal pumps/compressor technology inventory required to successfully select, apply, troubleshoot and maintain compression equipment.

Who Should Attend This seminar is directed towards:

This application and component course is intended to be of direct use by persons in staff (Senior Technicians, Operators, Supervisors, Superintendents) and corporate engineering, plant planning and design, systems design, equipment selection and evaluation, and equipment maintenance areas. Throughout the course, participants will have ample opportunity to have equipment-related questions answered by the Instructor.

Course Objectives

Upon completion the course participants will be able to:

- Understand the various centrifugal pumps/compressor configurations available to virtually every industrial user.
- Determine the most appropriate and efficient matching of pump/compressor to driver.
- Acquire knowledge of operating and maintenance issues by getting to know mechanical design, machinery components, piping design, as well as proven approaches to monitoring,
- Troubleshoot and maintenance of pumps/compressor installations.

Course Outlines

- **Pumps**
 - Definition types of pumps.
 - Construction details of centrifugal pump impeller, wearing, seals, bearing packing ... etc.
 - Centrifugal pumps application, capacity, head, efficiency, ...
 - Assembling and disassembling of centrifugal pump.
 - High pressure multistage pumps assembling and disassembling.
 - Performance, expected problems, troubleshooting and maintenance.
 - Pump installation and maintenance – How to install mechanical seal.
 - Causes of failure of mechanical seal.
 - Types of coupling, installation and removal.
 - Shaft alignment for split horizontal pump.
 - Positive displacement pumps (types and application).



- **Compressors**
 - Different types and application.
 - Compressors installation and maintenance.
 - Construction details for centrifugal compressors, rotor, impeller, labyrinth seal, diaphragm thrust collar, balancing drum, journal bearings thrust bearings, seals.
 - Assembling and disassembling of centrifugal compressor.
 - Types of coupling installation and removal.
 - Shaft alignment for centrifugal compressor.
 - Construction details for positive displacement compressor piston, pistonrings, pulsation dampeners, valves....
 - Performance, expect problems and troubleshooting and maintenance.
 - Vibration monitoring and analysis
- **Bearings**
 - Types and type selection
 - Sizes and size selection
 - life and limiting speeds
 - load carrying capacity
 - Dynamic loads
 - Static loads
- **Rolling Contact Bearing**
 - Introduction
 - Load-life Relation for Constant Reliability
 - Survival Relation at Steady Load
 - Relating Load, Life and Reliability Goal
 - Combined Radial and Thrust Loading
- **Journal Bearings**
 - Bearing and Journal Configurations
 - Bearing materials and Selection Criteria
 - Pressure Equation for a Lubricating Film
 - Hydrostatic Journal Bearings Design
- **Gaskets and Seals**
 - Standard Classification System for Nonmetallic Gasket Materials
 - Gasket Properties, Test Methods and their Significance in Gasket joints
 - Permeability properties
 - Load-Bearing properties
 - Environmental Conditions
 - Gasket Design and Selection Procedure
 - Gasket Compression and Stress-Distribution Testing
 - Installation Specifications
 - Elastomeric Seal Rings
 - Seals for Rotary Motion
 - Seals for Reciprocating Motion
- **Couplings**
 - Purpose
 - How couplings accommodate misalignment



- Types
- Rigid coupling

- Flexible couplings
- Material flexible couplings
- Sleeve-type electrometric coupling
- Horizontal driven system
- **Shaft Systems**
 - Spacers
 - Floating shafts
 - Rigid shafts
 - Case studies on coupling types and selection for specific applications
- **Functions and Types of Lubricants**
 - Selection of Lubricant Type
 - Liquid Lubricants : Principles and Requirements
 - Lubricant Viscosity
 - Boundary Lubrication
 - Deterioration Problems
 - Selecting the Oil Type
 - Lubricating Greases
 - Solid Lubricants
 - Gas Lubrication
 - Lubricate Feed Systems
 - Lubricant Storage