



شركة ميرك العربية السعودية  
MEIRC Saudi Arabia

## Fans, Blowers & Compressors

### **Duration 5 Days**

### **Introduction**

This course provides information on the concepts associated with air systems, air system functions, air system design, air system maintenance, installation and removal, and air system faults. Upon completion of this course, the participants will be able to explain the function, design, and construction of air systems; install, remove and maintain air systems, and identify causes of air system failures.

### **Who Should Attend**

This course is recommended for mechanical and electrical maintenance technicians.

### **Course Objectives**

- Explain the purpose of a fan as compared to a blower.
- State the differences in operation between a centrifugal fan and an axial fan.
- State the major design classification of blowers.
- Explain the operation of a positive displacement blower.
- Explain the operation of an axial flow blower.

### **Course Outlines:**

Introduction to Fluid Machines & Systems

Fluid Properties

Basic properties of gases and liquids: gas laws & compressibility effects

Definitions & units of measurement: mass/ volume flow rates, absolute & gauge pressures/ heads, machine power and efficiency, density/ specific volume

Energy transfer

Fluid Machines & Systems

Machine types: Dynamic & Positive Displacement machines

Machine efficiency

The basic performance chart

System types, machine and system interaction

Machine drivers

Affinity laws; uses and limitations

### **Compressors**

Fundamentals

Compressor types: Positive Displacement (reciprocating and rotary) and Dynamic (centrifugal and axial) compressors

Compressor performance measurement, inlet conditions, compressor performance, energy available for recovery.

Intercoolers and aftercoolers, filters and air intake screens

Positive Displacement (PD) Compressors

PD compressor types: reciprocating and rotary machines



Reciprocating piston compressors, double and single acting, trunk and sliding crosshead arrangements, the compression cycle

Valves and seals (design and operation), other key mechanical components

Other reciprocating PD compressors, including diaphragm and bellow types

Rotary PD compressors: screw and lobe types (oil lubricated and oil-free), sliding vane and liquid ring machines

Capacity control of PD compressors

Dynamic Compressors (Turbocompressors)

Principle of operation of centrifugal and axial flow compressors, performance range & characteristics

Centrifugal compressors: single and multistage machines, compression process, impeller designs, inlet nozzles and inlet guide vanes, power requirement

Axial compressors: single and multistage types

Key mechanical components: seals, diaphragms, bearings

Performance characteristics of turbocompressors, surge control

Capacity control of turbocompressors

Compressor Applications

Compressor selection, calculations of air system requirements

Calculation of air leaks from compressed-air systems, annual of leakage cost.

Selection of compressor drivers

Compressor installation, commissioning, operation & maintenance

## **Fans**

Fundamentals

Fan types: Centrifugal, Axial and Mixed Flow fans

Fan performance characteristics

Standardized performance measurement

Fan System Calculations

Calculation of duct system pressure

Effects of change in gas density

Selecting appropriate fan and driver

Methods for varying fan flow rate/ pressure

Operation of fans in series or parallel

Coping with system changes, increase/ decrease in flow rate and/ or pressure

Fan Applications

Fan installation, commissioning, operation & maintenance

Installation & Operation Commissioning

## **Blowers**

Fundamentals

Blower types, performance characteristics, calculation

Blower installation, commissioning, operation & maintenance

Common application problems