

Hydraulics/Pneumatics (Hands-On)

This five-day course provides participants with an excellent understanding of the principles of hydrostatics and hydrodynamics operation and maintenance principles involved with hydraulic and pneumatic systems, including pipes and piping components. The course then progresses to a hands-on application of hydraulic and pneumatic systems, including troubleshooting methodology as applied to both complex and simple systems.

I. Hydraulic/Pneumatic Theory

- Advantages of Fluid Power
- Transmission of Forces
- Force and Pressure
- Computing Force, Pressure, and Area
- Force and Pressure in Fluid Power
- Compressibility and Expansion of Gases
- Work and Energy
- Work and Power
- Factors Involved in Flow
- Bernoulli's Principle
- Hydraulic and Pneumatic Applications
- Hydraulic and Pneumatic Symbols

II. Hydraulic Components

- System Familiarization
- Introduction to Hydraulics
- Hydraulic Fluids
- Filtration Systems
- Hydraulic Pumps
- Pressure Control Devices
- Manual Directional Control Valves
- Check Valves and Needle Valves
- Hydraulic Cylinders
- Hydraulic Flow Control Valves

III. Pneumatic Components

- System Familiarization
- Introduction to Pneumatics
- Filtration Systems
- Pressure Control Devices
- Directional Control Valves
- Purification Equipment
- Check Valves and Needle Valves
- Pneumatic Cylinders
- Pneumatic Flow Control Valves

IV. Physical Properties of Hydraulic Systems

- Flow Rate in Hydraulic Systems
- Force In Hydraulic Systems
- Hydraulic Force Transformers
- Work Done with Hydraulic Systems
- Power in Hydraulic Systems
- Energy in Hydraulic Systems
- Pressure Drop in Pipes and Components

V. Physical Properties of Pneumatic Systems

- Flow Rate in Pneumatic Systems
- Force in Pneumatic Systems
- Work Done with Pneumatic Systems
- Energy in Pneumatic Systems
- Pressure Drop in Pipes and Components

VI. Pipes and Piping Components

- Metal Piping
- Forged Pipe and Welded Pipe
- Non-metallic Piping
- Tubing
- Welded Connections
- Flanged Connections
- Threaded Connections
- Joint Preparation and Fit-Up
- Expansion Joints
- Moisture Separators and Lubricators
- Temperature Measuring Devices
- Flow Measuring Devices
- Pressure Measuring