Level 1: Fundamentals
Fluid Power—Hydraulics

FESTO

Level 1

This hydraulic training certification equips students with comprehensive knowledge of hydraulic components' construction and operation. By examining a wide range of hydraulic equipment, the certification delves into fundamental hydraulic principles and the specifics of individual components. It covers key elements such as valves that control pressure, flow rate, sequence, and direction. Through practical exercises and standard symbol circuits, students gain hands-on experience in operating these valves. Additionally, the certification emphasizes maintenance practices and a systematic approach to fault finding, ensuring students are prepared for real-world applications.

Industry Recognized Certification Topics

- Equipment and circuit diagram symbols, reading and interpreting basic hydraulic circuit diagrams
- Physical principles of hydraulics
- Structure and mode of operation of basic components
- Measure volumetric flow and pressure
- Technology and characteristic data of valves and drive elements
- Intensive training for industrial practice: setting up systems in accordance with circuit diagrams, commissioning systems
- Fundamentals of proportional hydraulics

Industry Recognized Certification Competencies

- Design, assemble, test, and troubleshoot basic hydraulic circuits
- Identify and describe the construction, design features, and operation of hydraulic components
- Interpret technical specifications and data relating to hydraulic components and systems
- Identify and explain graphical symbols for hydraulic components
- Describe fundamentals of oil flow

Units - 3 / Labs - 12

Level 1: Fundamentals
Fluid Power—Pneumatics

FESTO

Level 1

This pneumatic training certification covers the use of compressed air for control and signaling. It provides a comprehensive overview of compressors, storage, dryers, distribution, and the design, construction, and operation of various actuators, valves, and ancillary equipment. Relevant ISO symbols are introduced and included in circuit diagrams. This certification ensures competence in the safe operation and maintenance of one of the most common automation elements in industry.

Industry Recognized Certification Topics

- Safety practices for working with pneumatic systems
- Basis design principles for creating pneumatic systems
- Pascal and Boyle's Laws
- Structure, function and application of single-acting and double-acting cylinders
- Calculating basic parameters
- Direct and indirect actuation
- Application and function of 3/2 and 5/2-way valves
- Methods of actuation of directional control valves
- Analyzing circuits
- Options for pressure measurement
- Pressure-dependent control systems
- Distinguishing flow control
- Logic operations: explaining and implementing AND/OR/NOT operations
- Function and application of limit switches
- Time delay valves
- Realizing oscillating movement
- Economic considerations of using pneumatic components

Industry Recognized Certification Competencies

- Demonstrate safety standards and best practices adhering to safety protocols in pneumantic systems
- Interpret and draw pneumatic symbols
- Identify components of a pneumatic system
- Utilize circuit simulation software to design, test and optimize circuits
- Understand the principles and applications fo vacuum systems
- Construct and troubleshoot pneumatic circuits
- Understand the practical application of Pascal and Boyles law
- Explain and understand conditioning and distribution of air
- Determine root cause of component failure
- Make speed adjustments to actuators
- Explain the force/pressure/area relationship
- Describe the different states an actuator can assume and the importance of each
- Utilize simulation software to demonstrate basic diagnositic principles
- Identify/explain function of pneumatic components

Units - 4 / Labs - 12

Level 2: Advanced Mechatronics

Applied Fluid Power—Maintenance & Troubleshooting

FESTO

Estimated Duration: 16 hours

Level 2

This industry recognized certification adds on to the Basic Pneumatics course in Level I. Students will learn how to read and interpret electro-pneumatics circuits and dive deeper into how to maintain, troubleshoot, and repair pneumatic systems. This extends your knowledge of complex pneumatic systems and improves your troubleshooting skills. Practical exercises on training equipment for setup, commissioning, troubleshooting, and fault elimination facilitate the transfer of knowledge to real world industrial applications.

Industry Recognized Certification Topics

- Setup and commissioning of pneumatic and electro-pneumatic systems
- Analysis of control tasks using GRAFCET in accordance with DIN EN 60848
- Design and function of pneumatic and electro-pneumatic circuits
- Common failures of components
- Characteristics and behaviors of failing components
- Disassembly, inspection, and repair of failed components
- Identifying root causes of component failures
- Troubleshooting of various pneumatic circuits

Core Competencies

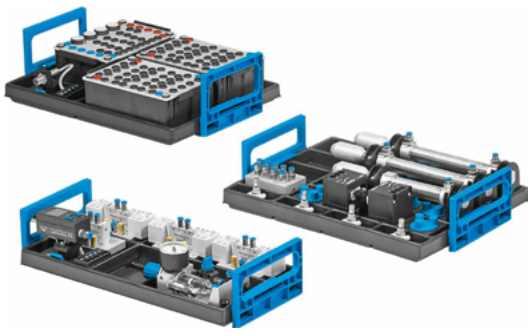
- Set up and commission complex pneumatic systems
- Systematically troubleshoot pneumatic systems
- Know the role of PLC in automation and to integrate the PLC into the control section
- Work with valve terminals
- Interpret latest standards and regulations

Equipment

Electropneumatics System Training Package

This training systems is a direct add-on to the level one Pneumatics Systems. It easily integrates into the bench and includes the following elements:

- Signal input, electrical
- Relay, three-fold
- Mechanical Limit Switches
- Proximity sensor, optical and magnetic
- 2 x 3/2-way solenoid valve with LED, normally closed
- 5/2-way solenoid valve with LED
- 5/2-way double solenoid valve with LED
- Pressure sensor with display
- One-way flow control valve
- Single-acting and Double-acting cylinders
- Faulty component package for real-world trouble-shooting



Level 2: Advanced Mechatronics

Applied Fluid Power—Vacuum Technology

FESTO

Estimated Duration: 8 hours

Level 2

The use of suction grippers to handle workpieces has become an integral part of handling technology as they offer advantages such as the ease of construction and the gentleness of the grippers. Suction grippers also enable rapid cycle times, and the investment required is comparatively low. Yet, many technicians are not familiar with how it works. This course follows Basic Electropnuematics Training, focusing on the topic of handling technology using a vacuum.

Course Topics

- Introduction to vacuum technology
- Vacuum generation in handling technology
- Vacuum components in handling technology
- Component selection criteria

Core Competencies

- Understand and explain the generation and provision of vacuum
- Able to describe the fundamentals of vacuum
- Select and dimensions suction cups
- Interpret the material properties of handling with vacuum
- Interpret the vacuum generator properties
- Design simple vacuum circuits

Equipment

Vacuum Technology Training Package

This learning package directly integrates into the other pneumatics systems and includes a wide range of vacuum elements:

- Air pressure reservoir
- Pressure switch
- Vacuum gauge
- Flow control valve
- Vacuum generator, type H
- Vacuum generator, type L
- Non-return valve
- Non-return valve, delockable
- Six types of suction grippers