

C- 209 Pneumatic Systems 1 Course Credential

About this course

This SACA certified C- 209 Pneumatic Systems 1 course prepares students for a career in an industrial automated 4.0 industry environment. Participants are taught to connect, adjust, operate, and analyze pneumatic circuits using these components: quick connect fittings, tee and cross fittings, air compressors, filters, regulators, lubricators, gauges, rotameters, directional control valves, flow control valves, check valves, cylinders, and motors.

Modules to be covered

1. Standard 209.1 Apply pneumatic system safety procedures

- Performance Indicators
 - Identify and correct pneumatic system hazards
- Knowledge Indicators
 - Describe PPE and safe dress for operation of pneumatic systems
 - Describe types of pneumatic system hazards ID potential injuries/hazards
 - Describe pneumatic system safety guidelines
 - Define pneumatics and give applications

2. Standard 209.2 Connect and adjust a pneumatic supply line

- Performance Indicators:
 - Connect an air hose that uses quick-connect fittings
 - Operate pneumatic branch line shutoff valve
 - Adjust pressure regulator to specified operating pressure
 - Read a pressure gauge



- Knowledge Indicators:
 - Describe the operation/construction of a pneumatic regulator
 - Describe the components of a pneumatic branch line
 - Define pneumatic pressure and give SI and US Customary units
 - Compare types of fittings
 - Describe operation/construction of a pressure gauge

3. Standard 209.3 Start up and shut down a reciprocating air compressor

- Performance Indicators:
 - Perform startup and normal shutdown of an air compressor
 - Adjust air compressor pressure switch
 - Drain an air compressor
- Knowledge Indicators:
 - Describe how compressed air is generated and its characteristics
 - Describe the operation/components of a reciprocating air compressor
 - Describe how air compressor flow capacity is measured
 - Define absolute and gage units of pressure measurement
 - Define the combined gas law and explain its importance

4. Standard 209.4 Interpret pneumatic schematics

- Performance Indicators:
 - Interpret a pneumatic schematic in NFPA/ISO symbols
- Knowledge Indicators:
 - Describe the guidelines for drawing pneumatic schematics
 - Describe the operation/construction of basic pneumatic circuits, directional valves (2/3/5 way; 2-3 position), cylinders (single and double active), motors, and conductors
 - Describe the NFPA/ISO pneumatic component schematic symbols



5. Standard 209.5 Connect and operate basic pneumatic circuits

- Performance Indicators:
 - Connect a pneumatic circuit given a schematic
 - Operate a basic pneumatic valve circuit with manual operator
 - Use pneumatic valve manual overrides to test actuators
 - Adjust the stroke length of a pneumatic cylinder
 - Connect and disconnect pneumatic hoses using push-lok fittings
 - Install a subplate-mounted valve
- Knowledge Indicators:
 - Describe the operation of manual overrides
 - Describe types and sizes of pneumatic conductors and fittings

6. Standard 209.6 Connect and adjust flow control and needle valves

- Performance Indicators:
 - Adjust pneumatic actuator speed using a flow control valve
 - Adjust pneumatic actuator speed using a needle valve
 - Connect flow control valves in meter-in and meter-out circuits
 - Connect a needle valve to control pneumatic actuator speed
- Knowledge Indicators:
 - Describe the operation of a needle valve and flow control valve
 - Describe fluid power speed control circuits (meter-in, out, etc.)
 - Describe the factors that affect pneumatic actuator speed

7. Standard 209.7 Monitor performance of pneumatic system pressure and force

- Performance Indicators:
 - Measure across a pneumatic component
 - Identify factors that affect pneumatic actuator speed and force
- Knowledge Indicators:
 - Describe types of resistance in a pneumatic system
 - Calculate net force output of a cylinder
 - State Pascal's law and explain its significance in fluid power
 - Define absolute and gage units of pressure measurement



8. Standard 209.8 Monitor pneumatic system operation

- Performance Indicators:
 - Connect and read a rotameter
 - Connect and read a pneumatic pressure gage
 - Read an air temperature gage
- Knowledge Indicators:
 - Describe SI and US Customary pneumatic flow units
 - Describe the operation of a rotameter
 - State Pascal's law and explain its significance in pneumatics
 - Explain the effect of air temperature in pneumatics

9. Standard 209.9 Perform basic pneumatic system servicing

- Performance Indicators:
 - Drain a pneumatic filter
 - Inspect and refill an air lubricator
 - Adjust air lubricator rate
 - Inspect and replace an air filter element
- Knowledge Indicators:
 - Describe the operation of an air lubricator
 - Describe the operation of a pneumatic filter

