

CONTENT STANDARD 1.0: SAFETY

Performance Standard 1.1: Shop Safety

- 1.1.1. Explain the idea of a safety culture and its importance to industrial maintenance.
- 1.1.2. Identify causes of accidents and the impact of accident costs.
- 1.1.3. Review worker's rights and responsibilities.
- 1.1.4. Recognize hazard recognition and risk assessment techniques.
- 1.1.5. Explain fall protection and ladder, stair, and scaffold procedures and requirements.
- 1.1.6. Identify equipment power sources.
- 1.1.7. Knowledge of lock out and tag out procedures.
- 1.1.8. Demonstrate safe work procedures to use around electrical hazards.
- 1.1.9. Demonstrate the use and care of appropriate personal protective equipment (PPE).
- 1.1.10. Explain the importance of hazard communications (HazCom) and Safety Data.
- 1.1.11. Identify other construction hazards on your job site, including hazardous material exposures, environmental elements, welding and cutting hazards, confined spaces, and fires.

CONTENT STANDARD 2.0: TECHNICAL DRAWINGS

Performance Standard 2.1: Blueprints and Schematics

- 2.1.1 Explain the purpose of blueprints.
- 2.1.2 Explain and interpret machine parts and machine drawings.
- 2.1.3 Develop sketches.
- 2.1.4 Read and interpret schematics and symbols (i.e electrical, hydraulic, and welding).

CONTENT STANDARD 3.0: SHOP SKILLS

Performance Standard 3.1: Shop Skills

- 3.1.1. Apply basic mathematical principles.
- 3.1.2. Explain techniques of measurement, e.g. motion, fluids, electricity, and temperature.
- 3.1.3. Explain the mechanical and chemical properties of ferrous and non-ferrous metals.
- 3.1.4. Understand lean and continuous improvement manufacturing processes.
- 3.1.5. Determine sequence of work on a specified project.
- 3.1.6. Determine tolerances and finishes.
- 3.1.7. Explain the variables that affect job efficiency.
- 3.1.8. Demonstrate knowledge of record keeping practices.
- 3.1.9. Complete a work order.
- 3.1.10. Complete a requisition.

CONTENT STANDARD 4.0: TOOLS

Performance Standard 4.1: Shop equipment

- 4.1.1. Demonstrate use and maintenance of basic hand and power tools properly.
- 4.1.2 Convert English/standard to metric.
- 4.1.3 Demonstrate the ability to perform layout work.
- 4.1.4. Demonstrate the use and care of test and safety equipment.

CONTENT STANDARD 5.0: WELDING

Performance Standard 5.1: Gas Welding/Cutting

- 5.1.1. Set up gas welding and cutting equipment and accessories.
- 5.1.2. Identify personal protective equipment required for welding and cutting.
- 5.1.3. Demonstrate proper lighting, adjusting, and shutting down of a gas torch.
- 5.1.4. Layout and cut mild steel.
- 5.1.5. Braze/Solder miscellaneous materials.

Performance Standard 5.2: Arc Welding/Cutting

- 5.2.1. Set up and adjust a variety of arc welders.
- 5.2.2. Identify and select electrodes.
- 5.2.3. Weld build-up pads and/or shafts or round surfaces
- 5.2.4. Hard surface metals with S.M.A.W.
- 5.2.5. Weld basic joints in flat, horizontal, and vertical positions.

CONTENT STANDARD 6.0: ELECTRICITY & ELECTRONICS

Performance Standard 6.1: Elements of Electricity & Electronics

- 6.1.1. Define common terms used in electricity and electronics.
- 6.1.2. Discuss electrical safe work practices and the governing organizations.
- 6.1.3. Describe theory and the industrial uses of magnets and electromagnets.
- 6.1.4. Explain the purpose and use of transformers.
- 6.1.5. Explain and apply Ohm's Law.
- 6.1.6. Use instruments which measure current, resistance, and potential difference.
- 6.1.7. Explain the fundamentals and differences between AC/DC circuits.
- 6.1.8. Demonstrate knowledge of the instruments used to measure electrical circuits.
- 6.1.9. Know the difference between a single phase and a three phase circuit.
- 6.1.10. Install, troubleshoot, and maintain electric motors.
- 6.1.11. Demonstrate knowledge of troubleshooting procedures for electric circuits and control systems.
- 6.2.12. Understand the differences and properties between series and parallel circuits.

CONTENT STANDARD 7.0: PREVENTIVE AND PREDICTIVE MAINTENANCE

Performance Standard 7.1: Maintenance Scheduling

- 7.1.1. Explain the function of lubricants.
- 7.1.2. Explain the factors determining the selection of lubricants.
- 7.1.3. Describe lubricating systems, including the charts and methods used.
- 7.1.4. Demonstrate proper grease application.
- 7.1.5. Practice lubrication on various equipment.
- 7.1.6. Preventative maintenance scheduling and maintaining records.
- 7.1.7. Know the preventive maintenance techniques of various equipment.
- 7.1.8. Perform preventive maintenance on drive components.
- 7.1.9. List rules for good bearing lubrication.

CONTENT STANDARD 8.0: DRIVE COMPONENTS

Performance Standard 8.1: Drive Component Installation and Maintenance

- 8.1.1. Identify and understand various drive component couplings.
- 8.1.2. Understand different type of power transfer methods.
- 8.1.3. Understand use of shaft alignment techniques.
- 8.1.4. Explain the function of gear boxes.
- 8.1.5. Explain the function of drive sprockets and chains.
- 8.1.6. Explain the function of sheaves and pulleys.

CONTENT STANDARD 9.0: BEARINGS

Performance Standard 9.1: Bearing Installation, Inspection and Repair

- 9.1.1. Identify various bearing types and their applications.
- 9.1.2. Identify and select bearing seals.
- 9.1.3. Explain bearing load, wear patterns, & maintenance.

CONTENT STANDARD 10.0: PUMPS

Performance Standard 10.1: Pump Maintenance and Repair

- 10.1.1. Determine pump capacity and system requirements.
- 10.1.2. Identify packing and seal requirements.
- 10.1.3. Explain the operating principles of various types of pumps, e.g. centrifugal, propeller and turbine rotary, reciprocating and metering pumps.

CONTENT STANDARD 11.0: PIPING SYSTEMS

Performance Standard 11.1: Piping Systems and Accessory Maintenance

- 11.1.1. Identify the components of a piping system.
- 11.1.2. Explain the maintenance features of piping systems.
- 11.1.3. Explain valve operation and maintenance.
- 11.1.4. Explain the use and maintenance of strainers, filters, and traps in piping systems.

CONTENT STANDARD 12.0: HYDRAULIC SYSTEMS

Performance Standard 12.1: Hydraulic Component Maintenance and Repair

- 12.1.1. Explain laws and principles of hydraulic systems.
- 12.1.2. Explain the characteristics and components of a hydraulic system.
- 12.1.3. Identify hydraulic system components.
- 12.1.4. Troubleshoot hydraulic systems.

CONTENT STANDARD 13.0: PNEUMATIC SYSTEMS

Performance Standard 13.1: Pneumatic Component Maintenance and Repair

- 13.1.1. Identify schematic symbols and diagrams used in pneumatic systems.
- 13.1.2. Diagram an air supply system.
- 13.1.3. Identify pneumatic system components.
- 13.1.4. Explain pneumatic system maintenance techniques.
- 13.1.5. Demonstrate pneumatic system troubleshooting procedures.

CONTENT STANDARD 14.0: RIGGING SYSTEMS

Performance Standard 14.1: Rigging

- 14.1.1. Estimate the weight of a load.
- 14.1.2. Find the center of gravity.
- 14.1.3. Identify the rigging and slings used in maintenance work.
- 14.1.4. Explain safety inspection procedures for rigging, ropes, and slings.

CONTENT STANDARD 15.0: PROGRAMMABLE LOGIC CONTROLLERS

Performance Standard 15.1: Programmable Logic Controllers

- 15.1.1. Describe the function and purpose of a programmable logic controller (PLC).
- 15.1.2. Analyze a binary logic network.
- 15.1.3. Construct input/output (I/O) circuits.
- 15.1.4. State the characteristics of the different types of memory.
- 15.1.5. Identify and explain the features of relay ladder logic instruction categories.
- 15.1.6. Explain the use and function of electrical and electronic control equipment.
- 15.1.7. Explain the function of variable frequency drive (VFD).

CONTENT STANDARD 16.0: MACHINE SHOP OPERATIONS

Performance Standard 16.1: Turning

- 16.1.1. Identify the principal parts of a lathe.
- 16.1.2. Demonstrate the use of a lathe and attachments.
- 16.1.3. Bore and drill holes with a lathe.
- 16.1.4. Cut threads with a lathe.

Performance Standard 16.2: Milling

- 16.2.1. Identify types of milling machines and tooling.
- 16.2.2. Select and set feeds and speeds for milling work.
- 16.2.3. Perform a variety of milling operations.