

# 2026 AGRICULTURAL POWER, STRUCTURAL, AND MECHANICAL SYSTEMS

## Program Standards

### CONTENT STANDARD 1.0: PROFESSIONAL ORGANIZATIONS AND LEADERSHIP

Performance Standard 1.1: Student Leadership in Career Technical Student Organizations (CTSO) and Professional Associations

- 1.1.1 Explore the role of professional organizations and/or associations in the Agricultural Power, Structural, and Mechanical Systems Industry.
- 1.1.2 Define the values, roles, and opportunities provided through career technical student organizations.
- 1.1.3 Engage in career exploration and leadership development.

Performance Standard 1.2: Supervised Agricultural Experience

- 1.2.1 Maintain SAE record books.
- 1.2.2 Describe the proficiency award areas related to the SAE program area.
- 1.2.3 Describe necessary steps to receive higher degrees in FFA.

### CONTENT STANDARD 2.0: LAB ORGANIZATION AND SAFETY

Performance Standard 2.1: General Safety Rules and Procedures

- 2.1.1 Describe general shop safety rules and procedures (i.e., pass a safety test).
- 2.1.2 Describe the Occupational Safety and Health Administration's (OSHA's) role in ensuring workplace safety.
- 2.1.3 Describe and comply with the required use of safety glasses, ear protection, gloves, and shoes (i.e., personal protection equipment [PPE]) during lab/shop activities.
- 2.1.4 Operate equipment according to manufacturer and general safety guidelines.
- 2.1.5 Operate lifting equipment to manufacturer specifications.
- 2.1.6 Describe work area ventilation requirements and best practices.
- 2.1.7 Identify safety markings and what they indicate.
- 2.1.8 Identify types of fire extinguishers and fire safety equipment.
- 2.1.9 Describe classes of fire extinguishers and procedures for using fire extinguishers and fire safety equipment.
- 2.1.10 Describe procedures for using eyewash stations.
- 2.1.11 Describe and wear appropriate clothing for shop activities.
- 2.1.12 Describe safe working procedures when working with high-voltage circuits.
- 2.1.13 Describe and follow lockout/tagout (LOTO) procedures.
- 2.1.14 Describe information contained on safety data sheets (SDS) and where they are kept.
- 2.1.15 Maintain a safe, clean, and organized work area.
- 2.1.16 Define a confined space.
- 2.1.17 Demonstrate the proper disposal of hazardous waste.

### CONTENT STANDARD 3.0: TOOLS AND HARDWARE

Performance Standard 3.1: Safe and Proper Use of Tools

- 3.1.1 Select hand tools and power tools best suited for particular tasks.
- 3.1.2 Demonstrate use of measuring and marking tools.
- 3.1.3 Convert between metric and standard measuring systems.
- 3.1.4 Inspect tools for defects, repairing or replacing as needed.

Performance Standard 3.2: Hardware and Fasteners

- 3.2.1 Identify common hardware and fasteners.
- 3.2.2 Demonstrate application of hardware and fasteners.

#### **CONTENT STANDARD 4.0: METAL TECHNOLOGY**

##### **Performance Standard 4.1: Welding**

- 4.1.1 Demonstrate safety practices required for welding and metalwork.
- 4.1.2 Describe properties of metal.
- 4.1.3 Identify types of metal and the applicable welding techniques.
- 4.1.4 Determine the intended use of metal workpieces.
- 4.1.5 Select the best welding process based on material composition and intended use of the workpiece.
- 4.1.6 Set up and use oxy-fuel equipment.
- 4.1.7 Set up and use shielded metal arc welding equipment.
- 4.1.8 Set up and use gas metal arc welding equipment.
- 4.1.9 Set up and use gas tungsten arc welding equipment.
- 4.1.10 Set up and use plasma cutting equipment.
- 4.1.11 Select welding consumables (e.g., wire, electrode type, gas, filler rod) based on welding processes.

##### **Performance Standard 4.2: Cold Metal Work**

- 4.2.1 Select specific tools for cold metal work.
- 4.2.2 Interpret metalworking plans.
- 4.2.3 Cut threads with a tap and die.
- 4.2.4 Join metal with fasteners (e.g., rivets, bolts, screws).
- 4.2.5 Thread steel pipe.
- 4.2.6 Lay out and drill holes.
- 4.2.7 Shape sheet and strap metal.

#### **CONTENT STANDARD 5.0: POWER SYSTEMS**

##### **Performance Standard 5.1: Engines Technology**

- 5.1.1 Describe the operating principles of internal combustion engines.
- 5.1.2 Describe the function and operating principles of the fuel, lubrication, governor, and ignition systems.
- 5.1.3 Access owner's manual information, service schedules, and manufacturer's data to perform periodic maintenance.
- 5.1.4 Troubleshoot common failures relating to ignition, fuel, cooling, lubrication, electrical, and compression systems.
- 5.1.5 Perform basic repairs for common failures relating to ignition, fuel, cooling, lubrication, electrical, and compression systems.

##### **Performance Standard 5.2: Electric Motors**

- 5.2.1 Identify types of electric motors (e.g., AC/DC, single-phase, three-phase).
- 5.2.2 Identify basic components of an electric motor.
- 5.2.3 Select motors based on type of application.
- 5.2.4 Troubleshoot common failures relating to electric motors.
- 5.2.5 Perform basic maintenance on electric motors.

##### **Performance Standard 5.3: Agricultural Machinery**

- 5.3.1 Identify common machinery used in local agricultural, food, and natural resource applications.
- 5.3.2 Describe basic equipment maintenance needs for types of agricultural machinery.
- 5.3.3 Identify common systems used by agricultural machinery (e.g., GPS, GIS, onboard measuring equipment, auto-steer).

##### **Performance Standard 5.4: Common Power Systems and Components**

- 5.4.1 Identify common power systems used in agricultural, food, and natural resource applications (e.g., hydraulics, pneumatics, belts, drivetrains).

- 5.4.2 Identify common power systems components used in agricultural, food, and natural resource applications.
- 5.4.3 Identify the applications of common power systems in agriculture.
- 5.4.4 Troubleshoot common power system issues in agricultural, food, and natural resource applications.

#### **CONTENT STANDARD 6.0: ELECTRICITY**

##### **Performance Standard 6.1: Basic Electrical Principles**

- 6.1.1 Identify common tools used in electrical applications (e.g., multimeter, wire cutters, tubing bender, crimping tool).
- 6.1.2 Identify common consumables in electrical applications (e.g., conduit, wire, wire connectors).
- 6.1.3 Demonstrate safety practices and precautions when working with electricity.
- 6.1.4 Define basic electrical terminology.
- 6.1.5 Identify and explain the basic principles of electricity (e.g., single-phase, three-phase, low-voltage, medium-voltage, high-voltage).
- 6.1.6 Access electrical code requirements for wiring tasks.
- 6.1.7 Select and install an electrical circuit suitable for required electrical supply.
- 6.1.8 Measure electrical circuits for voltage, current flow, resistance, and wattage.
- 6.1.9 Troubleshoot problems in electrical circuits.
- 6.1.10 Describe the relationship of volts, amps, and ohms to Ohm's law.

#### **CONTENT STANDARD 7.0: AGRICULTURAL CONSTRUCTION**

##### **Performance Standard 7.1: Drafting in Agricultural Projects**

- 7.1.1 Differentiate between plans used in projects (e.g., blueprints, shop plans, wiring schematics).
- 7.1.2 Select a building design, based on building needs (i.e., use, environment, budget).
- 7.1.3 Develop a bill of materials from a selected set of plans.
- 7.1.4 Draw basic plans, using drafting techniques.

##### **Performance Standard 7.2: Construction of Agricultural Projects**

- 7.2.1 Identify common hand and power tools used in agricultural construction.
- 7.2.2 Describe the steps to prepare a site (e.g., measuring, layout, surveying, leveling).
- 7.2.3 Construct an agricultural project based on specified plans.

#### **CONTENT STANDARD 8.0: WATER AND WASTEWATER MANAGEMENT**

##### **Performance Standard 8.1: Agricultural and Industrial Water Management**

- 8.1.1 Describe the role of water use, management, and conservation in the agricultural industry.
- 8.1.2 Describe the fundamentals of agricultural water systems and irrigation.
- 8.1.3 Select and use safety equipment appropriate to working conditions.

##### **Performance Standard 8.2: Pipe Fitting Skills**

- 8.2.1 Describe how to select and identify fittings and pipe.
- 8.2.2 Describe how to measure, mark, cut, and join pipe.

#### **CONTENT STANDARD 9.0: PRECISION AGRICULTURAL APPLICATIONS**

##### **Performance Standard 9.1: Calculations in Agricultural Power, Structural, and Mechanical Systems**

- 9.1.1 Perform calculations for agricultural applications (e.g., volume, area, rate, ratio, percentages).
- 9.1.2 Identify common units of measure for agricultural applications.
- 9.1.3 Convert common units of measure found in agricultural applications.
- 9.1.4 Compare the terms *accuracy* and *precision*.

##### **Performance Standard 9.2: Precision Agricultural Technologies**

- 9.2.1 Compare predictive, preventative, and corrective maintenance.
- 9.2.2 Describe uses of notification and workflow systems in agricultural applications.
- 9.2.3 Describe uses of precision and emerging technology in agriculture (e.g., GPS/GIS).



#### 9.2.4 Describe opportunities for new technology in agriculture.

## IDCTE Document Control Information

## Program Standard Revision: Agriculture Power, Structural, and Mechanical Systems