Agriculture Equipment Technician Apprenticeship Level 2
**Test Type:** The apprenticeship level assessments are based on industry standards determined by Equipment Dealerships in the Northeast. Participants can earn certification and a digital badge.

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**CIP Code**

01.0201 Agriculture Mechanization, General

**Career Cluster 1-Agriculture, Food, and Natural Resources**

**O*NET**

49-3041.00 Farm Equipment Mechanics and Service Technicians
This written assessment consists of questions to measure an individual’s factual theoretical knowledge.

**Administration Time:** 2 hours  
**Number of Questions:** 63  
**Number of Sessions:** This assessment may be administered in one session.

### Areas Covered

- **Interpersonal Skills** 2%
- **Engine Systems: 4-Stroke Gasoline** 14%
- **Engine Systems: Diesel** 14%
- **Machinery Systems: Powertrains** 9%
- **Farm Equipment Systems: Planting, Harvesting, Tillage** 3%
- **Precision Agriculture Systems** 2%
- **Material Fabrication and Welding** 6%
- **Problem Solving/Critical Thinking** 8%
- **Hydraulic/Hydrostatic (Fluid Power) Systems** 13%
- **Electrical Systems** 29%
Specific Competencies and Skills Tested in this Assessment

Interpersonal Skills
  • Demonstrate the ability to log repairs using the "complaint, cause and correction" technique

Engine Systems: 4-Stroke Gasoline
  • List and describe the operation of a 4-stroke engine
  • Identify worn out or out-of-specification parts
  • Demonstrate testing and adjustment for proper performance
  • Demonstrate the proper selection, use, and calculation of measuring devices needed for the job
  • Describe general engine repair procedures
  • Define components of an internal combustion engine
  • Determine 4-stroke engine specifications

Engine Systems: Diesel
  • Explain the difference between a gas engine vs diesel
  • Describe uses of diesel engine components
  • Identify injectors and pumps of a diesel engine
  • Identify diesel cold starting aids and describe how they function
  • Identify and explain the function of a turbocharger

(Continued on the following page)
Specific Competencies and Skills (continued)

**Machinery Systems: Powertrains**
- Inspect and identify all belts and pulleys that are worn out and replace
- Define the purpose of gears, bearings, and seals

**Farm Equipment Systems: Planting, Harvesting, Tillage**
- Select, connect, engage, and operate machinery and power units

**Precision Agriculture Systems**
- Identify the meaning of precision agriculture and its components

**Material Fabrication and Welding**
- Identify and select various types of metals
- Identify and select various types of welding and cutting equipment
Specific Competencies and Skills (continued)

Problem Solving/Critical Thinking
• Identify how to manage the problem solving process
• Make a decision on options to solve problem
• Implement action plan to resolve problem
• Communicate effectively with others in figuring out solutions to complex problems

Hydraulic/Hydrostatic (Fluid Power) Systems
• Analyze hydraulic/hydrostatic systems by using the proper technical/service information
• Identify components of fluid power systems including pumps, valves, and controls
• Interpret the systems, diagrams, and schematics, including symbol identification
• Identify components of a hydraulic system
• Describe the four typical hydraulic systems used in agricultural systems

Electrical Systems
• Explain how a relay works in a system
• Use wiring diagrams and schematics to troubleshoot and repair an electrical circuit
• Test and replace electrical components and wiring using proper tools
• Identify parallel and series electrical circuits
• Properly test fields, ground, and wiring
• Differentiate the relationship among voltage, current, resistance, and power in circuits
• Identify the basic components that make up the cranking system
Sample Questions

How should a technician determine if an engine has a cylinder head gasket leak?
A. use a torque wrench
B. timing light
C. fuel rail pressure tester
D. cooling system pressure tester

In a diesel engine, fuel ignition is created by
A. compression
B. cooling
C. glow plugs
D. spark plugs

Proper drive of a V-belt comes from the
A. sides
B. bottom
C. top
D. middle

The _____ transmits power to auxiliary equipment.
A. auxiliary power source
B. power take-off
C. free power source
D. independent drive order

A weld used to hold parts in their proper place until the final weld is made is a _____ weld.
A. pass
B. butt
C. bevel
D. tack
NOCTI performance assessments allow individuals to demonstrate their acquired skills by completing actual jobs using the tools, materials, machines, and equipment related to the technical area.

**Administration Time:** 1 hour and 5 minutes (4 hours and 40 minutes including instructor preparation and evaluation time)

**Number of Jobs:** 3

**Areas Covered:**

- **23% Test Electrical Charging System**
  Participants will follow proper safety procedures, use the proper tester, and evaluate the charging system provided.

- **44% Change a Fuel Filter**
  Participants will use appropriate safety equipment, select the proper fuel filter, use the proper tools, and change the fuel filter.

- **33% Torque a Cylinder Head**
  Participants will follow safety procedures, use the proper torque wrench, and torque the head bolts using the proper torque and sequence.
Sample Job

**Torque a Cylinder Head**

**Maximum Time:** 30 minutes

**Participant Activity:** Participants will follow safety procedures and use all necessary protective clothing and safety equipment. Select the proper torque wrench to torque the head bolts using the proper torque and sequence. Participants will have access to the engine’s service manual to calculate and convert torque values.