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# **Electric Power and Distribution**

## General Assessment Information

### Blueprint Contents

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**Test Type:** The Electric Power and Distribution industry-based credential is included in NOCTI's Job Ready assessment battery. Job Ready assessments measure technical skills at the occupational level and include items which gauge factual and theoretical knowledge. Job Ready assessments typically offer both a written and performance component and can be used at the secondary and post-secondary levels. Job Ready assessments can be delivered in an online or paper/pencil format.

**Revision Team:** The assessment content is based on input from secondary, post-secondary, and business/industry representatives from the state of Kansas.



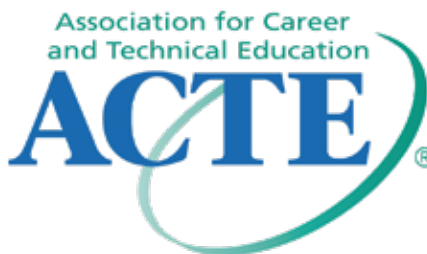
46.0303 - Lineworker



Career Cluster 15 - Science, Technology, Engineering, and Mathematics



49-9051.00 - Electrical Power-Line Installers and Repairers



The Association for Career and Technical Education (ACTE), the leading professional organization for career and technical educators, commends all students who participate in career and technical education programs and choose to validate their educational attainment through rigorous technical assessments. In taking this assessment you demonstrate to your school, your parents and guardians, your future employers and yourself that you understand the concepts and knowledge needed to succeed in the workplace. Good Luck!



In the lower division baccalaureate/associate degree category, 3 semester hours in Electric Power Safety and Distribution

## Written Assessment

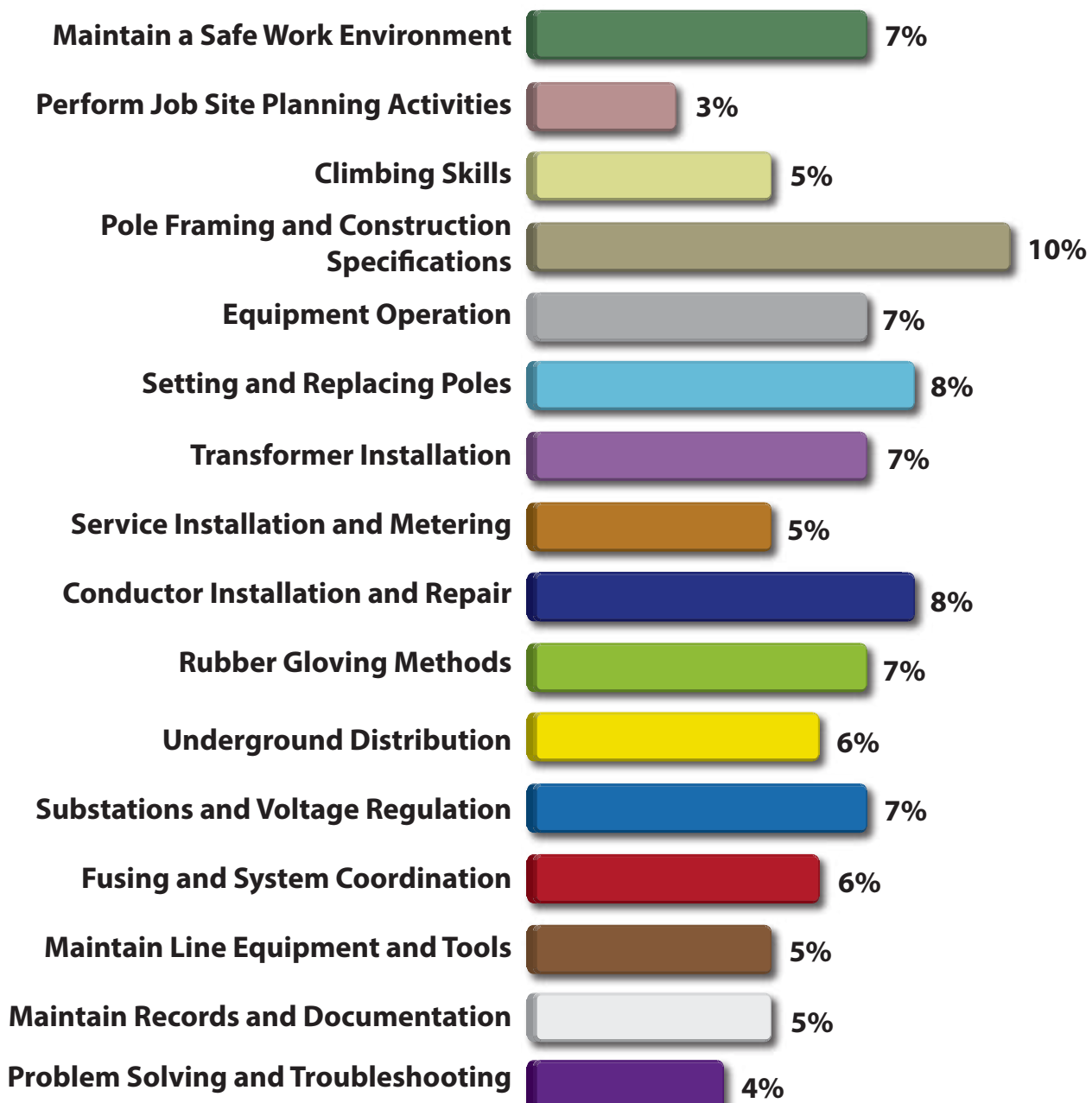
NOCTI written assessments consist of questions to measure an individual's factual theoretical knowledge.

**Administration Time:** 3 hours

**Number of Questions:** 183

**Number of Sessions:** This assessment may be administered in one, two, or three sessions.

### Areas Covered



## Specific Standards and Competencies Included in this Assessment

### **Maintain a Safe Work Environment**

- Demonstrate safe work procedures and responsibilities, including complying with safety procedures and participating in safety meetings
- Perform inspection and maintenance of equipment and vehicles
- Demonstrate appropriate use of tools

### **Perform Job Site Planning Activities**

- Determine job site requirements
- Perform job site protection activities for worker and public safety

### **Climbing Skills**

- Demonstrate proper use and inspection of climbing gear
- Perform basic climbing skills of poles and towers, including pole-top rescue
- Demonstrate proper use and maintenance of climbing tools and equipment

### **Pole Framing and Construction Specifications**

- Recognize, load, transport, and use pole hardware and materials
- Demonstrate pole framing on the ground
- Demonstrate installing pole and equipment grounds
- Perform installation of guy assemblies, cross arms, and insulators
- Demonstrate proper application of attaching a tying-in conductor

### **Equipment Operation**

- Safely perform traffic control and emergency procedures
- Safely operate digger-derrick vehicle
- Demonstrate safe working operation of an aerial platform

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## Specific Standards and Competencies (continued)

### Setting and Replacing Poles

- Demonstrate worksite recognition and safe work practices Perform proper vehicle placement and grounding methods
- Perform proper rigging and setting of poles
- Utilize temporary pole supports

### Transformer Installation

- Install and properly wire transformers
- Maintain and troubleshoot transformers and transformer connections
- Demonstrate proper transformer and sizing applications

### Service Installation and Metering

- Perform grounding and safe work procedures
- Explain meter application and proper meter reading

### Conductor Installation and Repair

- Perform splicing, stringing conductors, dead-ending, and operate hoists
- Safely tie in conductor, carry out hotline re-conductoring, and complete sag charts and tables
- Safely perform grounding practices
- Demonstrate safe work practices for conductor installation and repair

### Rubber Gloving Methods

- Demonstrate proper use and care of rubber gloves and sleeves
- Demonstrate proper bucket truck operation while working on energized lines

### Underground Distribution

- Identify and demonstrate knowledge of underground distribution equipment and safe practices while trenching
- Identify underground safety hazards
- Demonstrate knowledge of UD systems and installation
- Demonstrate installation of a padmount transformer, troubleshooting, and fault location

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## Specific Standards and Competencies (continued)

### **Substations and Voltage Regulation**

- Demonstrate knowledge of substation components and their functions (e.g., voltage regulators, capacitors)
- Demonstrate knowledge of substation design for various applications
- Follow safe practices when performing work in substations (including use of proper PPE)

### **Fusing and System Coordination**

- Demonstrate knowledge of system/fault surges, and over-current/over-voltage protection
- Demonstrate knowledge of oil-circuit reclosers
- Demonstrate knowledge of system application and fusing coordination

### **Maintain Line Equipment and Tools**

- Inspect and maintain tools (including hand tools and hot tools)
- Inspect and maintain equipment components (e.g., regulators, reclosers, capacitors, conductors)

### **Maintain Records and Documentation**

- Maintain daily vehicle inspection records
- Maintain personal protective equipment (PPE) inspection records
- Maintain special equipment and accident reports

### **Problem Solving and Troubleshooting**

- Analyze situations and information, consider alternate solutions
- Apply rules and principles to a process to draw conclusions

## Sample Questions

**After restoring power to a transformer, what should be done before closing the customer's disconnect?**

- A. check the voltage
- B. call the dispatcher
- C. notify the customer
- D. check the load

**Using Ohm's Law, what is the formula for calculating watts?**

- A.  $R \times I = \text{watts}$
- B.  $I \times E = \text{watts}$
- C.  $E \times P = \text{watts}$
- D.  $R^2 \times I = \text{watts}$

**A load-break elbow is identified by**

- A. a red band
- B. a blue band
- C. a white band
- D. no band

**Live line tools carried on utility vehicles should be stored**

- A. upright
- B. in a dry tube and/or tool bag
- C. laying flat
- D. attached to the boom

**Use a \_\_\_\_\_ grip to pull a 3/8-inch guy strand.**

- A. Kellom
- B. bulldog
- C. smooth
- D. hot

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### Sample Questions (continued)

**When a conductor is down in a storm, the first step is to**

- A. ground the line
- B. create a visible open
- C. repair the conductor
- D. patrol remaining line

**When dead-ending energized conductors, the best equipment to use is a \_\_\_\_\_ hoist.**

- A. chain
- B. rope
- C. strap
- D. snatch

**According to the Rural Utilities Service (RUS) specification book, the regulator platform is required to be \_\_\_\_\_ above ground level.**

- A. 10 feet
- B. 12 feet
- C. 15 feet
- D. 21-1/2 feet

**Why is it important to report near-miss accidents?**

- A. to make supervisor aware of unsafe work habits of coworkers
- B. to prevent a similar mistake from happening again
- C. it is an OSHA requirement
- D. it is only important if the incident was life-threatening

**What would be the most important procedure before climbing a pole?**

- A. lay out the handline
- B. ready equipment
- C. sound the pole
- D. roll down sleeves



## Performance Assessment

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 32 minutes

**Number of Jobs:** 7

### Areas Covered:

#### 17% Hurtman Rescue Using a Handline

Participants will demonstrate climbing skills, use of handline, knot tying skills, positioning of the victim, and ability to complete the job in the time allotted.

#### 14% Transformer Connections

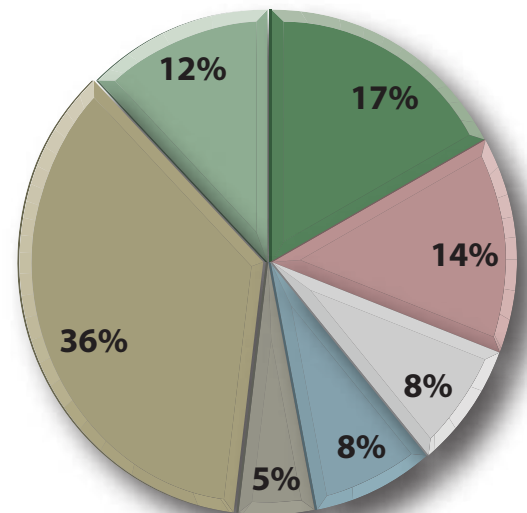
Participants will demonstrate transformer connections, use neatness, identification of voltages, wild leg connection, and ability to complete the job in the time allotted.

#### 8% Material and Tool Identification

Participants will demonstrate accuracy identifying materials, accuracy identifying tools, and ability to complete the job in the time allotted.

#### 8% Tool Identification and Use

Participants will demonstrate accuracy of matching four groups of tools, and ability to complete the job in the time allotted.



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## Areas Covered (continued)

### **5% Knot Tying**

Participant will demonstrate knot tying, and ability to complete the job in the time allotted.

### **36% Truck Operation**

Participant will demonstrate truck grounding, use of controls, location of boom, and awareness of surroundings at three separate stations, and ability to complete the job in the time allotted.

### **12% Meter Installation**

Participant will perform a voltage check; use source side, check customer's breakers, perform source-load side check, perform voltage check; use load side, use safety equipment and safe performance, and ability to complete the job in the time allotted.

## Sample Job

### Hurtman Rescue Using a Handline

**Maximum Time:** 5 minutes

**Participant Activity:** Participant will put on his/her climbing gear, ascend the pole, safety off and, using the handline with three (3) half hitches, will safely and gently lower the victim to the ground.