

# Electrical Safety for Utilities

4 Days, 2.8 CEUs

Linemen, substation technicians, and other utility maintenance and construction personnel are exposed to some of the highest voltages and electrical hazard levels in the United States. Lean operations and informal on-the-job training can lead to gaps in a technician's electrical safety knowledge. To ensure adequate safe work practices are followed, personnel must understand electrical hazards, safety regulations, and the use of safe work procedures and protective equipment. Because of updates, utilities may have difficulty keeping up with revisions in OSHA, the National Electrical Safety Code (NESC), ASTM and other applicable electrical safety regulations and standards. This course improves the ability to interpret these requirements because applying them is essential to preventing electrical accidents, outages, and equipment damage.

This course provides training for new, multi-craft or experienced electricians, linemen, technicians, engineers, supervisors and safety managers that install, maintain, repair, troubleshoot or work around power generation, transmission and distribution equipment. It meets mandated training requirements of OSHA 1910.332 and .269.

## Lab and Classroom Attire

AVO is committed to the personal safety of each participant and requires long pants and ANSI rated "safety toe" work shoes for class and lab activities. Lecture courses may involve a tour of a work or shop area and for this reason open toe shoes and shorts are not considered appropriate attire for the classroom.

## Learning Objectives

To receive 2.8 CEUs, participants must attend 4 days of classes (28 contact hours) and attain a minimum grade of 80% on the final exam. Upon completion of this course the participants will demonstrate that they are able to:

- Explain the hazards and effects of electricity.
- Interpret and apply hazardous energy control regulations for utilities as required by OSHA.
- Outline installation of temporary grounding for personal protection.
- Utilize safe work practices for work on or around substation equipment, transmission equipment, and overhead lines.
- Recognize appropriate personal protective equipment for a variety of applications.
- Describe the functions of a substation grounding system.

## SCOPE

### Day 1\*

- I. Introduction (0.5 hrs)
  - A. Schedule
  - B. Course Outline
- II. Hazards of Electricity (5 hrs)
  - A. Electrical Shock
  - B. Electrical Arc Flash
  - C. Electrical Arc Blast
- III. Electrical Safety Regulations and Standards (1.5 hrs)
  - A. OSHA
  - B. Overview of Regulations and Standards

### Day 2

- IV. Deenergized Work for Utilities (4 hrs)
  - A. Regulatory Requirements
  - B. One-Line Diagrams
  - C. Locking and Tagging
  - D. Clearance Procedures
  - E. Verification of Deenergization
- V. Personal Protective Grounding (3 hrs)
  - A. Regulatory Requirements for Grounding
  - B. Purpose of Protective Grounds

- C. Sizing of Protective Grounds
- D. Effects of Current and PPE Grounding
- E. Grounding Equipment
- F. Personal Protective Ground Jumper Testing
- G. Grounding Equipment Manufacturers/Suppliers
- H. Application of Protective Grounds
- I. Induced Voltages and Currents on Deenergized Circuits and Equipment

\*Class scheduling times may vary based on discussions and size of class

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## SCOPE (continued)

### Day 3

- VI. Working on Utility and Industrial Power Systems (7 hrs)
  - A. Overview of Electrical Power Systems
  - B. Training Requirements for Qualified Workers
  - C. Safe Work Requirements
  - D. Energized Electrical Power Work

### Day 4

- VII. Personal Protective Equipment (3 hrs)
  - A. Protective Techniques
  - B. Electrical Protective Equipment
  - C. Arc Flash Protective Equipment
  - D. Arc Blast Protective Equipment
  - E. Other Protective Equipment
  - F. Energy Detection Equipment
- VIII. Substation Grounding (3 hrs)
  - A. Functions of Substation Grounding Systems
  - B. Grounding Methods for Electric Supply
  - C. Ground Testing

### IX. Conclusion (1 hr)

- A. Review
- B. Final Exam

# STANDARD EQUIPMENT LIST

## ELECTRICAL SAFETY FOR UTILITIES

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REVISED MAY 2020  
COURSE NUMBER 223, REV 5  
4 DAYS

BY: I. BARAYBAR

### **TEXT**

1 / STUDENT

*ELECTRICAL SAFETY FOR UTILITIES*  
Course #223 Rev5, May 2020

FOR VIRTUAL CLASSES:  
CONTENT MATERIAL WILL BE PROVIDED IN DIGITAL FORMAT