

# Electrical Safety for Mining

4.5 Days, 3.2 CEUs

The harsh environment of mines – moisture, flammable substances, and dust – creates electrical hazard risks unheard of in any other industry. MSHA compliance officers are very active in every mine within the United States. Compliance with MSHA and OSHA electrical safety regulations minimizes the risk of electrical accidents, and reduces losses associated with shutdowns and outages. Staying up-to-date with electrical safety standards often places a burden on understaffed mine operations.

This course provides up-to-date information that will aid in establishing an effective electrical safety program in mines. This course is intended for new, multi-craft or experienced electricians, technicians, engineers, supervisors and safety managers that install, maintain, repair, troubleshoot or work around low and medium voltage electrical systems in mines.

## 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 3.2 CEUs, participants must attend 4.5 days of class (32 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.
- Select appropriate personal protective equipment for a variety of applications.
- Utilize safe work practices, both above and below ground.
- Outline installation and testing of permanent and temporary grounding systems for personal protection.
- Identify specific hazards for working with electrical equipment in mines.
- Apply lockout/tagout procedures, energized work permits, and overhead line clearances.
- Interpret MSHA and applicable OSHA regulations.

## SCOPE

### Day 1\* (7 contact hours)

- I. Introduction (0.5 hrs)
  - A. Schedule
  - B. Course Outline
- II. Hazards of Electricity (3.5 hrs)
  - A. Electrical Shock
- AM Break
  - B. Electrical Arc Flash
  - C. Electrical Arc Blast
- Lunch
- III. Electrical Safety Regulations and Standards for Mining (3 hrs)
  - A. MSHA

- PM Break
- B. OSHA
- C. Industry Consensus Standards

### Day 2 (7 contact hours)

- IV. Deenergized Work (LOTO) (4 hrs)
  - A. Deenergization
  - B. Confirming System is Deenergized
  - C. One-Line Diagrams
  - D. Lockout/Tagout
  - E. Application of Control
- AM Break

- F. Reenergization
- G. Additional Requirements
- H. Additional Regulatory Requirements for Electrical Lockout
- I. Typical Minimal Lockout or Tagout System Procedures

Lunch

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

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## SCOPE (continued)

- 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
- PM Break
- 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

- Day 3 (7 contact hours)**
- VI. Energized Work (5 hrs)
  - A. Definition of Energized Work
  - B. Definition of Qualified Person
- AM Break
- C. Electrical Hazard Risk Assessment
- D. Training Requirements for a Qualified Person
- Lunch
- E. Regulatory Requirements for Energized Work
- F. Overhead Line Clearances
- G. Protective Equipment and Tools
- PM Break
- VII. Personal Protective Equipment (2 hr)
  - A. Protective Techniques
  - B. Electrical Protective Equipment

- Day 4 (7 contact hours)**
- VII. Personal Protective Equipment (cont'd) (2 hrs)
  - C. Arc Flash Protective Equipment
  - D. Arc Blast Protective Equipment
  - E. Other Protective Equipment
  - F. Energy Detection Equipment
- AM Break
- VIII. General Requirements (2.5 hrs)
  - A. Examination, Installation, and Use of Electrical Equipment
  - B. Working Space for Electrical Equipment
  - C. Requirements for Industrial Facilities with Utility-Like Installations
- Lunch
- IX. Permanent System Grounding (2.5 hrs)
  - A. Purpose of Grounding Systems
  - B. NESC – Section 9, Grounding Methods for Electrical Supply and Communication Facilities
- PM Break
- C. Ground Testing
- Day 5 (Half Day) (4 hrs)**
- X. Specific Equipment Hazards (3 hrs)
  - A. Transformers
  - B. Circuit Breakers
  - C. Fuses
  - D. Capacitors
  - E. Batteries
  - F. Emergency Generators
- AM Break
- XI. Conclusion (1 hr)
  - A. Review
  - B. Final Exam



## STANDARD EQUIPMENT LIST

Electrical Safety For Mining

COURSE NO. 500, REV 5

REVISED: 1/27/15

BY: C. HELMICK

DAYS: 4.5 DAYS

TEXT ( PER 1 STUDENT)	
1	ELECTRICAL SAFETY FOR MINING COURSE #500, REV5, JAN 2024

HANDOUTS (PER STUDENT)	
QUANTITY	ITEM
1	30 CFR 46/47/48-56/57/58 & 62 (POCKET MSHA BOOK) 14th EDITION

MATERIALS NEEDED (PER CLASSROOM)	
QUANTITY	ITEM
*1	PROJECTOR OR TV WITH PROJECTION CAPABILITIES
*1	DRY ERASE BOARD WITH MARKERS AND ERASERS
*10	STUDENT TABLES
*10	STUDENT CHAIRS

EQUIPMENT (OPTIONAL)	
QUANTITY	ITEM
*1	WHEN AN ON-SITE COURSE IS PERFORMED IT WOULD BE HELPFUL TO HAVE A SAMPLE ASSORTMENT OF PPE PROVIDED BY THE CLIENT

**\*\*ORDER FROM:**

MINE SAFETY ASSOCIATES,

PO BOX 872,

PRICE, UTAH, 84501,

PHONE # (800)-430-2377

<http://www.minesafetyassoc.com/products/pocketeditions/list/>

Federal Metal & Nonmetallic Mine Training, Safety & Health Standards 30 CFR 46/47/48, 56/57/58 & 62

The day-to-day regulations which affect your metal & nonmetallic mining operations plus parts 46 & 48 of the training regulations. This book is carried by MSHA Metal & Nonmetal inspectors. 14th Edition, 336 pages of regulations, 59 pages of index

Single book price = \$15

\$15.00 EACH / (QUANTITY DISCOUNT 10 @ \$10.00-11/12/12)



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

NOTE: All items indicated with an asterisk (\*) must be supplied by the client on On-Site courses