Training Solutions, Delivered!

ELECTRICAL SAFETY FOR EVERYONE *(Concise)*

Leader's Guide, Fact Sheet & Quiz

Item Number: 4610

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This easy-to-use Leader's Guide is provided to assist in conducting a successful presentation.

PREPARING FOR THE MEETING

Here are a few suggestions for using this program:

a) Review the contents of the Fact Sheet that immediately follows this page to familiarize yourself with the program topic and the training points discussed in the program. The Fact Sheet also includes a list of Program Objectives that details the information that participants should learn from watching the program.

b) If required by your organization, make an attendance record to be signed by each participant to document the training to be conducted.

c) Prepare the area and equipment to be used for the training. Make sure the watching environment is comfortable and free from outside distractions. Also, ensure that participants can see and hear the TV screen or computer monitor without obstructions.

d) Make copies of the Review Quiz included at the end of this Leader's Guide to be completed by participants at the conclusion of the presentation. Be aware that the page containing the answers to the quiz comes *before* the quiz itself, which is on the final page.

CONDUCTING THE PRESENTATION

a) Begin the meeting by welcoming the participants. Introduce yourself and give each person an opportunity to become acquainted if there are new people joining the training session.

b) Introduce the program by its title and explain to participants what they are expected to learn as stated in the Program Objectives of the Fact Sheet.

c) Play the program without interruption. Upon completion, lead discussions about your organization's specific policies regarding the subject matter. Make sure to note any unique hazards associated with the program's topic that participants may encounter while performing their job duties at your facility.

d) Hand out copies of the review quiz to all of the participants and make sure each one completes it before concluding the training session.

4610 ELECTRICAL SAFETY FOR EVERYONE *(Concise)*
FACT SHEET

LENGTH: 11 MINUTES **PRODUCTION YEAR: 2014**

PROGRAM SYNOPSIS:
Because electricity is so important to our everyday lives, it is surprising that many of us know very little about it or the hazards it presents. Many workers don't understand the dangers of electricity and don't follow safe work practices when working with or around electricity or electrical equipment. You don't have to be a qualified electrical worker or electrician to have a need to understand electrical safety. In fact, all workers should know and practice basic electrical safety. This program provides viewers with a general understanding of how electricity works while showing them the actions they can take to prevent becoming part of an energized electrical circuit.

Topics include why electricity is dangerous, resistance and Ohm's Law, two electrical safety concepts, grounding, avoiding electrical contact, safe work practices and use of double-insulated tools and ground fault circuit interrupters.

PROGRAM OBJECTIVES:
After watching the program, the participant should be able to explain:
- How electricity works and why it is dangerous;
- How resistance relates to the flow of electricity;
- What the two concepts of electrical safety are;
- How employees can avoid contacting energized conductors;
- How grounding, double-insulated tools and ground fault circuit interrupters protect workers from electric shock;

PROGRAM OUTLINE

HOW ELECTRICITY WORKS
- Electricity can be confusing because there are multiple ways to measure and describe its properties. You may be familiar with the term voltage.
- You may have heard your car battery described as being 12 volts or your home's receptacles as being 120 volts.
- Voltage is a measurement of the potential difference in electric charge between two points in an electric field. Its unit of measure is the volt.
- When these two points are connected by a conductor, an electric current will flow from one point to the other. As voltage increases, so too does the amount of electric current which will flow through the conductor connecting the two points.
- The flow of electrical current through a conductor is measured in amperes, more commonly known as amps.
- Two points in an electric field with enough voltage to cause current flow can also be referred to as a power source. Examples of common power sources are batteries, generators or solar panels.
- When a conductor is connected to both points or terminals of a power source, electric current will flow and an electric circuit has been created.
- It is this flow of electric current, measured in amps, which can be harnessed to do useful work by connecting the circuit to tools, motors, lights or other devices. These types of devices, when connected to a circuit, are referred to as a load.

RESISTANCE
- Some materials are resistant to the flow of electric current. Materials that do not allow the flow of electric current are called insulators. Insulators, such as plastic and rubber, have very high resistance, while materials that make good conductors, like copper, aluminum and other metals, have very low resistance.
- Resistance is measured in Ohms. For a power source with a given voltage, the amount of current which will flow through an electric circuit depends on the resistance of the circuit. When resistance is low, more current will flow.
- When resistance is high, less current will flow. This relationship is known as Ohm's Law.
- Electrical safety can really be reduced down to two simple safety concepts, each based on Ohm's Law: one, prevent electric shock by not allowing our body to become part of an electric circuit; and, two, reduce the amount of current flowing through our body should we fail at safety rule number one.

GROUNDING

- In order to maintain electrical safety rule number one, not becoming part of a circuit, it's important to understand that electrical systems connect one terminal of the power source directly into the ground.
- This is commonly achieved by driving a grounding rod into the ground and connecting one side of the power source to it.
- The side of the power source connected to the ground is often called the neutral, negative or grounded side.
- The ungrounded side of the power source is often called the positive or hot side.
- This creates a condition which allows the electric circuit to be completed anytime a conductor, such as the human body, comes into contact with the hot conductor and the ground at the same time.
- In other words, if you are "grounded" and come into contact with the hot conductor, you will get shocked. This is the meaning behind the expression "electricity always seeks a path to ground."

AVOIDING CONTACT

- To avoid being shocked you must avoid contact with the "hot" conductor.
- When using extension cords, power tools and other devices, you are protected from contact with conductors by the rubber insulation on the power cord.
- Recall that insulators such as rubber have very high resistance and Ohm's Law does not allow electric current to pass through them; however, power cords with damaged, cracked or cut insulation may expose the copper conductors leading to electric shock.
- Power tools or equipment with damaged casings or missing covers may also allow contact with exposed conductors leading to electric shock. This is why you must inspect tools, cords and extension cords prior to use and never use damaged electrical tools or equipment.
- Another good insulating material protecting you from electric shock is air. Air does a good job resisting the flow of electricity.
- This is why many electrical conductors suspended in the air do not have protective insulation; however, air is not a perfect insulator and allowing a conductive object to come too close to an overhead conductor can allow electric current to flow through the air, completing the circuit and causing an electrocution.
- This is why you and all conductive objects you may be carrying must remain at least 10 feet away from any overhead conductors or exposed live parts.
- Be vigilant in checking for overhead conductors when using metal ladders, pool cleaning equipment, elevating work platforms or other conductive objects.
- Avoid becoming part of the electric circuit by always staying at least 10 feet away from overhead conductors and other exposed live parts.

SAFETY TIPS

- Another way to maintain electric safety rule number one is to never work on energized electrical circuits and to never attempt to perform electrical work for which you are not qualified.
- Here are some safety tips to keep in mind to avoid becoming part of an energized circuit. Turn off the circuit breaker powering the circuit you are working on and place a locking device on the breaker so no one inadvertently turns it back on.
- Remember that water conducts electricity and greatly increases the shock hazard. Never plug in cords that are wet or touch electrically powered equipment if your hands are wet.
- Never use aluminum or metal ladders near power lines or while performing any type of electrical work. Metal ladders are conductive and can easily lead to an electric shock. Use a fiberglass ladder instead.
- Watches and rings are also conductive and should be removed before you work around sources of electricity.
- To recap electrical safety rule number one: make sure you do not become part of the electric circuit by inspecting the insulation on cords and tools prior to use, maintaining a 10-foot distance from exposed conductors, never performing work on an energized circuit and by not performing any electrical work for which you are not qualified.
- Let's now discuss electrical safety rule number two: reducing the amount of electric shock you receive should you fail at rule number one.
- You may have noticed that many power cords, but not all, have a ground prong. If your cord is designed to have a ground prong, it must be present and in good condition.

DOUBLE-INSULATED TOOLS

- To provide even better protection from electric shock many power tools are double-insulated. Double-insulated tools protect the frame of the tool from contact with conductors by means of a special insulating system.
- These tools are labeled "double-insulated" and also display a "square within a square" symbol.
- Double insulated tools do not have a grounded frame and their cords do not have ground prongs; however, the tool itself and its cord must still be inspected and verified to be in good condition before use.

GROUND FAULT CIRCUIT INTERRUPTER

- One of the best ways to reduce the amount of current flowing through your body during a shock event is to use a ground fault circuit interrupter.
- The ground fault circuit interrupter constantly compares the amount of current flowing in both the hot and neutral conductors. Any difference in these current flows represents the amount of ground fault current flowing through a shock victim's body and into the ground.
- When a difference of just five milliamps or .005 amps is detected, the GFCI will quickly trip, interrupting the circuit and stopping the flow of current. Five milliamps is below the threshold for a person to feel an electric shock.
- In other words, the GFCI will trip before you can even perceive that a problem exists. This is why GFCIs are so popular and required by many work places anytime an extension cord or corded power tool is used.

ANSWERS TO THE REVIEW QUIZ

1. b
2. a
3. d
4. c
5. b

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REVIEW QUIZ

The following questions are provided to determine how well you understand the information presented in this program.

Name_____Date_____

1. The flow of electric current through a conductor is measured in _____.

a. Volts
b. Amps
c Ohms

2. Materials that do not allow the flow of electric current have very _____ resistance.

a. High
b. Low

3. The side of the power source that is connected to the ground is often called the _____ side.

a. Neutral
b. Negative
c Grounded
d. All of the above

4. To avoid becoming part of an electric circuit, you must stay at least _____ away from overhead conductors or exposed live parts

a. 3 feet
b. 5 feet
c 10 feet

5. Double-insulated tools display a _____ symbol.

a. Circle within a circle
b. Square within a square
c Triangle within a triangle