



# Youth Worker Safety Electrical Safety-Related Work Practices for Schools

## Guidelines

The MIOSHA regulations covering persons who are at risk of electrical shock are:

- Part 40. ELECTRICAL SAFETY-RELATED WORK PRACTICES
- Part 39. DESIGN SAFETY STANDARDS FOR ELECTRICAL SYSTEMS
- Part 85. THE CONTROL OF HAZARDOUS ENERGY SOURCES
- Part 33/433. PERSONAL PROTECTIVE EQUIPMENT

## Training

1. Are students or employees who are at risk of electric shock trained in and familiar with the safety-related work practices required by MIOSHA regulations?
2. Are qualified employees (those who are permitted to work on or near exposed energized parts) given the following training? (a) The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment; (b) The skills and techniques necessary to determine the nominal voltage of exposed live parts; and (c) The clearance distances specified in Table 1 and the corresponding voltages to which the qualified person will be exposed.

Table 1: Minimum Distance for Voltage Ranges

Voltage range* (phase to phase)	Required minimum distance between workers and exposed, energized parts "with appropriate PPE"
<b>300V and less</b>	<b>Avoid contact</b>
>300V ≤750V	1 ft. 0 in. (30.5 cm)
>750V ≤2kV	1 ft. 6 in. (46 cm)
>2kV ≤15kV	2 ft. 0 in. (61 cm)
>15kV ≤37kV	3 ft. 0 in. (91 cm)
>37kV ≤87.5kV	3 ft. 6 in. (107 cm)
>87.5kV ≤121kV	4 ft. 0 in. (122 cm)
>121kV ≤140kV	4 ft. 6 in. (137 cm)

\*Note: > is "greater than;" < is "less than or equal to"

3. Is the degree of training provided determined by the risk to the person?

**Note:** The training requirements contained in this Part 40. rule 4002 apply to employees who face a risk of electric shock that is not reduced to a safe level by the electrical installation requirements of 29 C.F.R. §§1910.303 to 1910.308, which are adopted by reference in the rules and which are available at a cost as of the time of adoption of the rules of \$24.00, by ordering Title 29, Parts 1900 to 1910 – Part 1, Safety Standards, #869-011-00109-2, from the Superintendent of Documents, Congressional Sales Office, United States Government Printing Office, Washington, DC 20402, or from the Safety Standards Division, Michigan Department of Licensing and Regulatory Affairs, Box 30643, Lansing, Michigan 48909.

(2) Employees who are in occupations that are listed in table 1 face such a risk of electric shock and are required to be trained. Other employees who also may reasonably be expected to face a comparable risk of injury due to electrical shock or other electrical hazards shall also be trained.

(3) Employees shall be trained in, and familiar with, the safety-related work practices required by these rules that pertain to their respective job assignments.

(4) Employees who are regulated by the provisions of sub rules (1) to (3) of this rule, but who are not qualified persons, shall also be trained in, and familiar with, any electrically related safety practices which are not specifically addressed by these rules, but which are necessary for employee safety.

(5) Qualified persons, that is, those who are permitted to work on or near exposed energized parts, shall, at a minimum, be trained in, and familiar with, all of the following:

(a) The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment.

(b) The skills and techniques necessary to determine the nominal voltage of exposed live parts.

(c) The clearance distances specified in R 408.14005 and the corresponding voltages to which the person will be exposed.

For the purpose of these rules, a person shall have the training that is required by the provisions of this sub rule to be considered a qualified person. Qualified persons whose work on energized equipment involves either direct contact or contact by means of tools or materials shall also have the training that is needed to meet the requirements of R 408.14005(2).

(6) The training that is required by this rule shall be classroom or on-the-job training. The degree of training provided shall be determined by the risk to the employee.

(7) Is training provided and documented to ensure that (a) the purpose and function of the energy control procedures are understood, and (b) the knowledge and skills required for the safe application and removal of energy controls are acquired?

(8) Is this training repeated periodically when changes or deviations occur in the energy control procedure?

(9) Table 1 reads as follows:

Table 1

Typical Occupational Categories of Employees Who Face a Higher Than Normal Risk of Electrical Accident

OCCUPATION

Blue collar supervisors\*

Electrical and electronic engineers\*

Electrical and electronic equipment assemblers\*

Electrical and electronic technicians\*

Electricians

Industrial machine operators\*

Material handling equipment operators\*

Mechanics and repairers\*

Painters\*

Riggers and roustabouts\*

Stationary engineers\*

Welders

**\*Workers in these groups do not need to be trained if their work or the work of those they supervise does not bring them or the employees they supervise close enough to exposed parts of electric circuits that operate at 50 volts or more to ground for a hazard to exist.**

## **Work Practices**

1. Are all live parts deenergized before students or employees work on them, unless deenergizing increases hazards or is not possible because of equipment design or operational limitations?

**Note:** Live parts that operate at less than 50 volts to ground need not be deenergized if they do not cause increased exposure to electrical burns or explosion due to electrical arcs.

2. If live parts are not deenergized, are other practices used to protect persons who may be exposed to electrical hazards?
3. Do these work practices protect the body against direct contact with energized parts and against indirect contact through a conductive object?

## **Working On or Near Exposed Deenergized Parts**

1. If an employee or student has contact with parts of fixed electrical equipment or circuits that have been deenergized, have the circuits energizing the parts been locked and/or tagged?
2. Is a copy of Part 40. Electrical Safety-Related Work Practices and a written copy of safety procedures (including lockout and tagging) available for inspection?
3. Are safe procedures determined before circuits or equipment is deenergized?

4. Are the circuits and equipment to be worked on disconnected from all energy sources?

**Note:** Control circuit devices, such as push buttons, selector switches, and interlocks may not be used as the sole means for deenergizing circuits or equipment. Interlocks for electric equipment may not be used as a substitute for lockout and tagging procedures.

5. Has stored, hazardous electric energy been released?

**Note:** Capacitors shall be discharged. If the stored electric energy might endanger personnel, high capacitance elements shall be short-circuited and grounded.

6. Is stored nonelectrical energy in devices that could reenergize electric circuit parts blocked or relieved enough to prevent circuit parts from being accidentally energized by the device?
7. Is a lock and tag placed on each disconnecting means used to deenergize circuits and equipment?
8. Is the lock attached so no one can operate the disconnecting means?
9. Does each tag have a statement prohibiting unauthorized operation of the disconnecting means and removal of the tag?  
**Note:** If a lock cannot be applied, or if the tagging procedures will provide a level of safety equivalent to that of a lock, a tag may be used without a lock.
10. When a tag is used without a lock, is at least one additional safety measure used that provides a level of safety equivalent to that obtained from a lock?
11. Is a lock placed without a tag only under all the following conditions?
  - a. Only one circuit or piece of equipment is deenergized.
  - b. The lockout period does not extend beyond the school day.
  - c. Students or employees exposed to the hazards associated with reenergizing the circuit or equipment are familiar with this procedure.
12. Are the requirements below met before any circuit or equipment can be considered deenergized?
  - a. A qualified person verifies that the equipment cannot be restarted.
  - b. A qualified person verifies that the circuit elements and electric parts of equipment to which students or employees will be exposed are deenergized. The qualified person must also determine whether any energized conditions exist as a result of inadvertently induced voltage or unrelated voltage feedback (even though parts of the circuit have been deenergized and presumed to be safe).
13. Are all of the following requirements met (in the order given) before circuits or equipment are reenergized, even temporarily?
  - a. A qualified person verifies that all tools, electrical jumpers, shorts, grounds, and other such devices have been removed so that the circuits and equipment can be safely energized.
  - b. Persons exposed to the hazards associated with reenergizing the circuit or equipment are warned to stay clear of circuits and equipment.
  - c. Each lock and tag is removed by the person who applied it or under his or her direct supervision. However, if the person who applied the lock or tag is absent from the workplace, the lock or tag may be removed by a qualified person designated to perform this task provided that:
    - i. The person who applied the lock or tag is not available at the school and reasonable efforts (phone, email) have been made to contact the person.
    - ii. The person who applied the lock or tag is aware that the lock or tag has been removed before he or she resumes work.
  - d. All persons are clear of the circuits and equipment.

### **Working On or Near Exposed Energized Parts**

1. Are only qualified persons permitted to work on electric circuit parts or equipment that have not been deenergized?

**Note:** This paragraph applies to work performed on exposed live parts (involving either direct contact or contact by means of tools or material) or near enough to them for persons to be exposed to hazards they present.

2. Are students and employees restricted from entering spaces containing exposed energized parts, unless illumination is provided that enables them to perform the work safely?

3. Are students and employees prevented from handling conductive materials and equipment that are in contact with the person's body that may contact exposed energized conductors or circuit parts?
4. If students or employees must handle long-dimensional conductive objects (such as ducts and pipes) in areas with exposed live parts, have work practices been instituted (such as the use of insulation, guarding, and material handling techniques) that will minimize the hazard?
5. Do portable ladders have nonconducting siderails when they could contact exposed, energized parts?
6. Is the use of conductive articles of jewelry, clothing (such as watchbands, bracelets, rings, keychains, necklaces, metalized aprons, cloth with conductive threads, or metal head gear) prohibited for persons working with electricity?
7. Are students and employees prohibited from performing housekeeping duties where live parts present an electrical contact hazard due to housekeeping duties that must be performed near such parts?
8. If students or employees do conduct housekeeping duties near live electrical circuits, are adequate safeguards (such as insulating equipment or barriers) used?

## **General Energy Control**

1. Does the program require that all hazardous energy sources be isolated, locked or tagged, and otherwise disabled before anyone performs any activity where the unexpected energization, startup, or release of stored energy could occur and cause injury?
2. Have procedures been developed, documented, and implemented for the control of hazardous energy when working with such equipment? Do the procedures clearly outline the scope, purpose, responsibility, authorization, rules, and techniques to be applied to the control of hazardous energy, and measures to enforce compliance
3. Do procedures exist for shutting down, isolating, blocking, and securing (locks and tags) energy?
4. Do procedures exist and is someone assigned responsibility for removing and transferring locks and tags?
5. Do requirements exist for testing a machine or equipment to determine and verify the effectiveness of lockout/tagout and other energy control measures?

## **INSPECTIONS**

1. Are inspections conducted at least annually by an authorized person (other than the ones using the energy control procedures) to ensure control procedures are being implemented?
2. Is each inspection certified by identifying the machine or equipment on which the energy control procedure was being used, the date of the inspection, the people included in the inspection, and the person performing the inspection?

## Protective Materials and Hardware

1. Are locks, tags, chains, adapter pins, or other hardware available for securing or blocking energy sources?
  2. Are these devices durable and substantial?
  3. Are these devices standardized in color, shape, size, or format?
  4. Do these devices have a provision for identifying the person applying the device?
  5. Do tagout devices or danger tags warn against hazardous conditions if the equipment is re-energized?
- Note:** Acceptable wording includes Do Not Open, Do Not Start, Do Not Close, and Do Not Energize.

## Energy-Isolating Devices

Are all energy-isolating devices operated only by authorized persons or under the direct supervision of an authorized person?

## Notification of Employees

Are all employees notified of the application and removal of lockout and tagout controls whenever such controls directly affect their work activities?

## Application of Control

1. Does the application of energy control follow the sequence listed below?
  - a. Machine or equipment shutdown by authorized personnel.
  - b. Machine or equipment isolation: all energy-isolating devices that are needed shall be located and operated in a manner that isolates the machine or equipment from the energy source(s).
  - c. Lockout and tagout device application.
    - i. Lockout devices shall be affixed in a manner that will hold the energy-isolating device in a safe or off position.
    - ii. Tagout devices shall be affixed in a manner that clearly indicates that the operation or movement of energy isolating devices from the safe or off position is prohibited.
    - iii. If a tag cannot be affixed directly to the energy isolating device, the tag shall be located as close as safely possible to the device, in a position that will be immediately obvious to anyone operating the device.
  - d. Stored energy: following the application of lockout and tagout devices, all hazardous, stored, or residual energy shall be relieved, disconnected, restrained, or otherwise rendered safe.
  - e. Verification of isolation: before starting work on the isolated equipment or process, an authorized person must verify that isolation and de-energization of the machine or equipment has been accomplished.
2. Has the work area been inspected before the removal of lockout and tagout devices?
3. Has the lockout and tagout device been removed by the person who put it on?
4. Are outside servicing personnel informed of the lockout and tagout procedures before equipment is serviced?

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