

DEPARTMENT OF CONSUMER AND INDUSTRY SERVICES

BUREAU OF SAFETY AND REGULATION

CONSTRUCTION SAFETY STANDARDS COMMISSION

(By authority conferred on the construction safety standards commission by sections 19 and 21 of Act No. 154 of the Public Acts of 1974, as amended, being SS408.1019 and 408.1021 of the Michigan Compiled Laws)

PART 17. ELECTRICAL INSTALLATIONS

R 408.41701 Scope.

Rule 1701. This part applies to the installation and use of temporary and permanent electrical systems for construction operations.

History: 1979 AC.

R 408.41717 Definitions; A to C.

Rule 1717. (1) "Approved label" means a label or other identifying mark of a nationally recognized testing laboratory.

(2) "Bonding" means the joining of metallic parts by pressure, fusing, or mechanical means to form an electrically conductive path which assures electric continuity and the capacity to conduct safely any current likely to be imposed.

(3) "Branch circuit" means that portion of a wiring system extending beyond the final overload device and protecting the circuit and the outlets.

(4) "Circuit breaker" means a device designed to open and close a circuit by manual means and to open a circuit automatically on a predetermined overload of current, without injury to itself, within the rating of the circuit breaker.

(5) "Competent person" means an employer or employee who is capable of identifying an existing or predictable hazard in surroundings or under working conditions which are hazardous or dangerous to an employee, and who has the authority and knowledge to take prompt corrective measures to eliminate the hazards.

History: 1979 AC.

R 408.41718 Definitions; G to W.

Rule 1718. (1) "Ground" means a conducting connection between an electrical circuit or equipment and earth or a conducting body which serves in place of the earth.

(2) "Isolated" means not readily accessible to an employee unless special means of access are used.

(3) "Qualified employee" means an employee who has the training, experience, and technical knowledge necessary to install wiring and equipment in accordance with the standard rules and regulations governing such work.

(4) "Weatherproof" means so constructed or protected that exposure to the weather does not interfere with successful operation.

History: 1979 AC.

R 408.41719 Adoption by reference.

Rule 1719. (1) Electrical wiring, apparatus, and equipment shall be manufactured, installed, and maintained as prescribed in the N.F.P.A. standard, No. 70-1975, national electrical code, which

is incorporated herein by reference and which is available for inspection at the Lansing office of the Michigan department of consumer and industry services. This code may be purchased at a cost of \$5.50 from the National Fire Protection Association, 470 Atlantic Avenue, Boston, Massachusetts 02110, or from the Michigan Department of Consumer and Industry Services, 7150 Harris Drive, Box 30015, Lansing, Michigan 48909.

(2) Section 210-8 of the code incorporated by reference in subrule (1) is excepted. In lieu of this section, the employer shall conform to 1 of the following:

(a) Install ground-fault circuit interrupters as prescribed in R 408.41721.

(b) Establish and implement an assured equipment grounding conductor program as prescribed in R 408.41722.

History: 1979 AC.

#### R 408.41721 Ground fault circuit interrupters.

Rule 1721. All 120-volt, single-phase 15 and 20 ampere receptacle outlets used for construction operations, which are not a part of the permanent wiring of the building or structure and which are in use by an employee, shall have approved ground fault circuit interrupters for personnel protection. A receptacle on a 2-wire, single-phase portable or vehicle mounted generator rated at not more than 5 kilowatt, where the circuit conductors of the generator are insulated from the generator frame and all other grounded surfaces, need not be protected with ground fault interrupters.

History: 1979 AC.

#### R 408.41722 Assured equipment grounding conductor program.

Rule 1722. (1) The employer shall establish and implement an assured equipment grounding conductor program for construction operations. The program shall cover all extension cords, receptacles which are not a part of the permanent wiring of the building or structure, and equipment connected by cord and plug which are available for use or used by employees.

(2) This program shall comply with the following minimum requirements:

(a) A written description of the program, including the specific procedures adopted by the employer, shall be available at the jobsite for inspection and copying by the director, department representative, and any affected employee.

(b) The employer shall designate 1 or more competent persons to implement the program.

(c) Each extension cord, attachment cap, plug and receptacle of cord sets, and any equipment connected by cord and plug, except extension cords and receptacles which are fixed and not exposed to damage, shall be visually inspected before each day's use for external defects, such as deformed or missing pins or insulation damage, and for indications of possible internal damage. Equipment found damaged or defective shall not be used until repaired.

(d) The following tests shall be performed on all extension cords, receptacles which are not a part of the permanent wiring of the building or structure, and cord and plug connected equipment required to be grounded:

(i) All equipment grounding conductors shall be tested for electrical continuity.

(ii) Each receptacle and attachment cap or plug shall be tested for correct attachment of the equipment grounding conductor. The equipment grounding conductor shall be connected to its proper terminal.

(e) All required tests shall be performed at the following time:

(i) Before first use.

(ii) Before equipment is returned to service following any repairs.

(iii) Before equipment is used after any incident which can be reasonably suspected to have caused damage, for example, when an extension cord is run over.

(iv) At intervals not exceeding 3 months, except that extension cords and receptacles which are fixed and not exposed to damage shall be tested at intervals not exceeding 6 months.

(f) The employer shall not make available, or permit the use by employees of, any equipment which does not meet the requirements of this rule.

(g) Tests performed as required in this rule shall be recorded. The test record shall identify each receptacle, extension cord, and cord and plug connected equipment that passed the test, and shall indicate the last date it was tested or the interval for which it was tested. This record shall be kept by means of logs, color coding, or other effective means, and shall be maintained until replaced by a more current record. The record shall be made available at the jobsite for inspection by the director, department representative, and any affected employee.

History: 1979 AC.

#### R 408.41723 Employer responsibility.

Rule 1723. (1) An employer shall assure that an employee does not engage in the installation activities to which this part applies unless the employee is a licensed electrician, or the employee is working with, or under the supervision of, a licensed electrician. A qualified employee is not required to be licensed when working on utility installation or maintenance such as, but not limited to, substations, switch yards, and street or highway lighting.

(2) The employer shall insure that all live parts of electrical equipment operating at 50 volts or more are properly guarded against accidental contact.

(3) The employer shall do all of the following:

(a) Limit access to energized electrical equipment such as, but not limited to, switch gear, transformers, and service panels, to qualified employees.

(b) Provide, and insure the proper use of, an accident prevention sign on electric apparatus, equipment, and enclosures. The voltage shall be indicated.

(c) Provide a conductor of an ampacity of not less than the rating of the circuit breaker or fuses protecting that circuit.

(d) Insure that a bare conductor or earth return is not used for any temporary circuit.

(e) Insure that all electrical wiring is protected from physical damage.

History: 1979 AC.

#### R 408.41724 Electrical installations.

Rule 1724. (1) Electrical apparatus and equipment used for construction operations shall bear an approved label or marking.

(2) Before work begins, a competent person shall ascertain by inquiry, observation, or instruments whether any part of an electric power circuit, exposed or concealed, is so located that, in performance of the work, contact by an employee, tool, or equipment can be made with the circuit.

(3) Any employee shall not be permitted to be in proximity to any part of an electric power circuit that he may contact unless the employee is protected against electric shock by de-energizing the circuit and locking out and tagging it, or unless the employee working on an energized circuit is guarded by insulation, insulated tools, or insulating matting or blankets sufficient to protect against the voltage involved.

(4) Where an electrical power circuit exists that can be contacted by an employee, the employer shall do both of the following:

(a) Post and maintain accident prevention signs prescribed in Part 22. Signals, Signs, Tags, and Barricades, being R 408.42201 et seq. of the Michigan Administrative Code.

(b) Advise the employee of the location of the lines, hazard involved, and protective measures taken or to be taken.

(5) When an employee is using a jack hammer, bar, or other tool which could come in contact with an underground line, the energy source shall be de-energized.

(6) A work space of not less than 3 feet wide and 6 1/2 feet high, in addition to space necessary to open equipment doors not less than 90 degrees, shall be provided and maintained in the area of electrical equipment.

(7) Barriers or other means shall be provided to ensure that the work space for electrical equipment is not used as a passageway during periods when energized parts of electrical equipment are exposed.

History: 1979 AC.

R 408.41725 Wiring; attachment plug receptacles; extension and trailing cords; handlamps; portable electric tools used in wet environment; connector supplying equipment at more than 300 volts.

Rule 1725. (1) When electrical wiring is used in a tank or other confined space, a properly identified disconnect switch shall be provided at the entrance.

(2) A receptacle for an attachment plug shall meet all of the following requirements:

(a) Be of the concealed contact type.

(b) Have a contact for extending ground continuity.

(c) Be designed and constructed so that the plug may be removed without leaving any live parts exposed to contact.

(d) Not be capable of receiving attachment plugs for a voltage, frequency, or type of current different from that for which the receptacle is intended, nor shall a plug of a different style be forced into a receptacle.

(3) An extension cord used with a portable electric tool or appliance shall be a 3-wire type.

(4) Extension cords and trailing cords shall be equipped with a plug cap which is either molded to the cord or equipped with a cord clamp to prevent strain on the terminal screws.

(5) Conductors supplying temporary wiring shall be the minimum protective qualities of type NM wire for use indoors, or type UF wire for use outdoors.

(6) A brass shell, paper lined lamp holder and a pin-type lamp holder which damages the insulation shall not be used.

(7) Wiring for temporary lighting in excess of 12 volts used on barricades, fences, and sidewalk coverings shall be protected against abrasion or accidental damage to the insulation.

(8) Trailing cords and extension cords shall:

(a) Be protected against damage.

(b) Hung in a manner which does not damage the covering.

(c) Retain their insulating value and dielectric and physical strength when spliced.

(d) Be insulated to prevent shock or shorts.

(e) Have a plug body or receptacle which is either molded to the cord or is equipped with a cord clamp to prevent strain on the terminal screws, or a receptacle installed in a steel box with a cover and cord clamp.

(9) A portable handlamp shall be made of molded composition or other approved material and shall have a molded handle with bulb guard attached to it.

(10) A portable light used in moist or other hazardous areas, such as a drum, tank, or vessel, shall be operated at a maximum of 12 volts, or shall be protected by an approved ground fault interrupter.

(11) A portable electric tool used in a wet atmosphere or environment shall be protected by an approved ground fault interrupter.

(12) An attachment plug or other connector supplying equipment at more than 300 volts shall be of the skirted type or shall be otherwise designed to confine any arcs.

History: 1979 AC.

R 408.41726 Exposure to energized conductors or switch gear of 440 volts between phases.

Rule 1726. Where the work requires exposure to, or handling of, energized conductors or switch gear of 440 volts or more between phases, 2 or more qualified employees shall work together.

History: 1979 AC.

R 408.41727 Switches, circuit breakers, disconnectors, transformers, and boxes.

Rule 1727. (1) Each switch, circuit breaker, and disconnector shall meet all of the following requirements:

(a) Be marked to indicate its purpose unless it is so located that the purpose is evident and it is secured against displacement.

(b) Be of the weatherproof type where damp or wet conditions exist.

(2) A box for disconnecting means shall have dead fronts or covers, which shall be kept in place or closed when the panel is energized, or the requirements of R 408.41723 and R 408.41724 shall be complied with.

(3) An arc shield shall be provided on a disconnect of 60 ampere capacity or larger.

(4) A disconnecting means shall be provided to disconnect all energized conductors in a building or structure from the service entrance conductors.

(5) An energized transformer and other related energized equipment over 150 volts to ground shall be protected to prevent accidental contact. The protection shall be an individual housing or an electrical substation fence. A metallic enclosure shall be grounded. Access to this equipment shall require a key or tool. A transformer mounted on a utility pole at a height of more than 12 feet is excepted from the requirements of this subrule.

History: 1979 AC.

R 408.41728 Grounding and bonding.

Rule 1728. (1) Except when an approved ground fault interrupter is provided, exposed noncurrent carrying conductive parts of portable and fixed electrical equipment, including, but not limited to, motors, frames, and tracks of electrically operated cranes and electrically driven machinery shall be grounded. A grounding circuit shall be continuous, be capable of carrying the current imposed on it, and have a resistance low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.

(2) Driven rod electrodes, either singly or connected, shall have a resistance to ground of not more than 25 ohms.

(3) Conductors used for bonding shall be capable of carrying the imposed current. The bonding clamps shall have a secure and positive metal to metal contact.

(4) When it is necessary to protect an employee from ground potential while he is working in proximity to energized primary equipment, such as is encountered in substations and power plants, the employee shall be isolated or insulated from the hazard.

History: 1979 AC.

R 408.41729 Temporary lighting.

Rule 1729. (1) A temporary light shall be equipped with a guard to prevent accidental contact with the bulb, except that a guard is not required when the bulb is fully recessed in the reflector.

(2) A temporary light shall not be suspended by the electric cord unless the cord and light is designed for suspension.

History: 1979 AC.

R 408.41730 Circuit protection.

Rule 1730. (1) Circuit protection shall be provided by fuses or circuit breakers for each feeder and branch circuit and shall be based on the current carrying capacity of the conductors and power load.

(2) A fuse puller shall be used to install or remove a cartridge fuse when 1 or more terminals are energized.

(3) A circuit protection device shall not be placed in a grounded circuit except where the device simultaneously opens both the ground and energized circuit.

(4) Circuit protection in existing installations shall not be changed to increase the load in excess of the load rating of the conductor or equipment.

History: 1979 AC.

R 408.41731 Location and protection of electric lines.

Rule 1731. (1) Electric lines crossing work areas, employee foot or vehicular traffic aisles, shall be fastened overhead or protected by a cover capable of withstanding the imposed loads without creating a tripping hazard.

(2) All wiring installed above grade and used for construction operations shall be maintained at a height which provides safe clearance for all work operations.

History: 1979 AC.

R 408.41732 Electrical equipment used in hazardous locations.

Rule 1732. (1) Electrical components and equipment used in a hazardous location shall have an approved label for the specific hazardous location.

(2) All screws, gaskets, and threaded connections shall maintain a vapor tight, dust tight, or fiber tight condition as required by the type of hazard class.

History: 1979 AC.

R 408.41733 Battery room; safety equipment; charging battery.

Rule 1733. (1) When a battery room is used in conjunction with construction operations it shall meet all of the following requirements:

(a) Be equipped with an exhaust system arranged to remove fumes and gases from any ignition source.

(b) Have floor and racks protected from battery acid.

(c) Have a means of flushing the eyes and body of an employee provided within 25 feet of a battery room.

(d) Have facilities provided for flushing and neutralizing spilled electrolyte.

(e) Have fire protection as required by Part 18. Fire Protection and Prevention, being R 408.41801 et seq. of the Michigan Administrative Code.

(f) Provide protection of charging apparatus from damage by trucks.

(g) Be located in an area designated for that purpose.

(2) An employer shall provide, and require the use of, face and eye protection and rubber gloves and aprons by an employee handling acids and batteries as prescribed in construction safety standard, Part 6. Personal Protective Equipment, being R 408.40601 et seq. of the Michigan Administrative Code.

(a) When charging a battery, the vent caps shall be kept in place and maintained operable.

History: 1979 AC; 1982 AACS.

R 408.41734 Inspection and repair of electrical equipment.

Rule 1734. (1) Electrical equipment shall be inspected periodically. The inspection shall be made at reasonable intervals according to the equipment use and the severity of conditions under which it is used. Worn and frayed cable shall not be used.

(2) Repairs of electrical equipment shall be made by a licensed electrician or an employee supervised by a licensed electrician except as provided in R 408.41723(1).

History: 1979 AC.