

### **352.220 Electricity in mines and surface installations.**

For purposes of this section, "approved" means that a device, apparatus, equipment, machinery, or practice employed in the mining of coal has been approved by the commissioner of the Department for Natural Resources or accepted by a nationally or federally recognized testing laboratory or the Department of Labor Mine Safety and Health Administration; "suitable" means a design, material, or installation that meets the requirements of its intended use or that is accepted by a nationally or federally recognized testing laboratory or the Department of Labor Mine Safety and Health Administration.

- (1) The following shall apply to underground installations:
  - (a) Nonconductive or insulated materials shall be used when trailing cables or high voltage feeder cables are suspended;
  - (b) Suitable circuit-interrupting devices shall be provided for all power circuits and equipment at the mine;
  - (c) All power wires and cables shall be properly insulated and protected by proper installation or guarding;
  - (d) Ground wires for circuits shall have a total cross-sectional area of not less than one-half ( $1/2$ ) the power conductor;
  - (e) Extra length or long trailing cables shall be spread out in long open loops or in a figure-eight configuration on a clean, well rock-dusted floor where the cable can be protected against mechanical injury, but cables suspended in long open loops shall be acceptable;
  - (f) One (1) temporary splice may be made in any trailing cable. No temporary splice shall be made in a trailing cable within twenty-five (25) feet of the machine except cable reel equipment. Splices in trailing cables shall be made in a workmanlike manner and shall be mechanically strong and well insulated. Splices made in cables shall provide continuity of all components;
  - (g) Three-phase alternating-current circuits used underground shall contain either a direct or derived neutral which shall be grounded through a suitable resistor at the power center, and a grounding circuit, originating at the grounded side of the grounding resistor, shall extend along with the power conductors and serve as a grounding conductor for the frames of all the electrical equipment supplied power from that circuit;
  - (h) The frames of hand-held electrically driven tools shall be properly grounded or double-insulated by design. The frames of all pumps shall be properly grounded. Hand-held tools and all pumps shall be properly protected by suitable fuses, circuit breakers, or other no less effective devices to provide the minimum overload and shortcircuit protection required by the department;
  - (i) All underground high-voltage transmission cables shall be installed only in regularly inspected air courses and haulageways, and shall be covered, buried, or placed so as to afford protection against damage, guarded where men regularly work under or pass under them unless they are six and one-half ( $6-1/2$ ) feet or more above the floor or rail, securely anchored, properly insulated, and guarded at ends, and covered, insulated, or placed to prevent contact with

other circuits. Underground high-voltage cables used in resistance grounded systems shall be equipped with metallic shields around each power conductor, with one (1) or more ground conductors having a total cross-sectional area of not less than one-half (1/2) the power conductor, and with an insulated internal conductor not smaller than No. 10 (AWG) or an insulated external conductor not smaller than No. 8 (AWG) for the ground continuity check circuit. All cables shall be suitable for the current and voltage and shall be properly maintained;

- (j) Power circuits shall have suitable disconnecting devices and short-circuit protective devices at or near the supply end of the circuit. Suitable disconnecting devices shall be provided at the beginning of all branch circuits;
- (k) Underground transformer stations, battery charging stations, substations, rectifiers, and water pumps shall be housed in noncombustible structures or areas or be equipped with a suitable fire-suppression system.
  - 1. When a noncombustible structure or area is used, these installations shall be:
    - a. Ventilated with intake air that is coursed into a return air course or to the surface and that is not used to ventilate working places; or
    - b. Ventilated with intake air that is monitored for carbon monoxide or smoke by an atmospheric monitoring system (AMS) installed and operated in a suitable manner. Monitoring of intake air ventilating battery charging stations shall be done with sensors not affected by hydrogen; or
    - c. Ventilated with intake air and equipped with sensors to monitor for heat, carbon monoxide, or smoke.
  - 2. The sensors used for monitoring shall de-energize power to the installation, activate a visual and audible alarm located outside of and on the intake side of the enclosure, and activate doors that will automatically close when any of the following occurs:
    - a. The temperature in noncombustible structure reaches one hundred sixty-five (165) degrees Fahrenheit;
    - b. The carbon monoxide concentration reaches ten (10) parts per million above the ambient level for the area; or
    - c. The optical density of smoke reaches 0.022 per meter.
  - 3. At least every thirty (30) days, sensors installed to monitor for carbon monoxide shall be calibrated with a known concentration of carbon monoxide and air sufficient to activate the closing door, or each smoke sensor shall be tested to determine that it functions correctly.
  - 4. When a fire suppression system is used, the installation shall be:
    - a. Ventilated with intake air that is coursed into a return air course or to the surface and that is not used to ventilate working places; or
    - b. Ventilated with intake air that is monitored for carbon monoxide

or smoke by an atmospheric monitoring system installed and operated in a suitable manner.

5. All monitoring systems used to monitor intake air ventilating battery charging stations under subparagraphs 1. and 4. of this paragraph shall be done with sensors not affected by hydrogen.
6. This paragraph shall not apply to:
  - a. Rectifiers and power centers with transformers that either are dry-type or contain nonflammable liquid, if they are located at or near the section and are moved as the working section advances or retreats;
  - b. Submersible pumps;
  - c. Permissible pumps, and associated permissible switchgear;
  - d. Pumps located on or near the section that are moved as the working section advances or retreats; or
  - e. Small portable pumps. Underground stations containing transformers or circuit breakers filled with flammable oil shall be provided with door sills or their equivalent, which will confine the oil if leakage or rupture occurs, and shall be of fireproof construction. Underground transformers purchased after June 16, 1972, shall be air cooled or cooled with nonflammable liquid or inert gas. Portable power centers, portable transformers, and distribution centers which are essentially fireproof are not required to be placed on separate splits of air but shall be stationed in well ventilated places outby the last open crosscuts;
- (l) Electrically powered locomotives shall be provided with suitable electrical protective devices;
- (m) Suitable firefighting equipment shall be located at strategic points along the belt conveyor, and proper fire extinguishers shall be provided at the transfer points. The commissioner may prescribe any other safety measures for the prevention and combating of mine fires as they pertain to conveyor belts. Only approved flame resistant belting shall be taken into and used inside any mine, and all underground belt conveyors shall be provided with slippage and sequence switches and with start and stop controls at intervals not to exceed one thousand (1,000) feet. The controls shall be properly installed and positioned so as to be readily accessible;
- (n) Communication wires and cables shall be adequately insulated and protected by proper installation or guarding;
- (o) Telephone wires shall be provided with lightening arresters where the wires enter the mine and at the buildings on the surface;
- (p) Insulating mats shall be placed in front of disconnecting devices and all electrical installations where required;
- (q) Ground wires in trailing cables shall be tested weekly for open circuit and high resistance;

- (r) Power circuits in tipples, buildings, cleaning plants, etc., and all underground electrical circuits shall be deenergized when not in use over a long period;
  - (s) All underground power circuits and electrical equipment shall be de-energized before work is done on the circuits and equipment except when necessary for troubleshooting or testing. When electrical work or major mechanical work is performed, a suitable disconnect providing visible evidence that the power is disconnected shall be locked open and a tag shall be posted by the individuals performing the work. Locks and tags shall be removed only by the persons who installed them, or if those persons are unavailable, by a person authorized by the operator. Repairs or maintenance shall not be performed on machinery until the power is off and the machinery is blocked against motion, except where machinery motion is necessary to make adjustment;
  - (t) Where electric circuits cross over or pass under belt conveyors the wiring shall be suitably protected; and
  - (u) Switch boxes, contactors, controllers, and all other similar devices shall be kept free of significant accumulations of combustible dust.
- (2) The following shall apply to trolley wires and trolley feeder wires:
- (a) On all haulage roads, landings, and partings where persons are required to regularly work or pass under bare power wires placed less than six and one-half (6-1/2) feet above the top of the rail, suitable protection shall be provided. This protection shall consist of channeling the roof, placing boards along the wires and extending below them, or the use of some other approved device that affords protection;
  - (b) All machine feed conductors shall be placed on suitable insulators which shall be so placed as to prevent the conductors coming in contact with combustible or conductive materials;
  - (c) When the machine or feed wires are carried in the same entry as the trolley wire, they shall be placed on the same side as the trolley wire, between the trolley wire and rib, and shall be protected from contact therewith. Positive feed wires crossing places where persons are required to travel shall be safely guarded or protected against persons coming in contact therewith, as required by paragraph (a) of this subsection;
  - (d) All trolley and positive feed wires shall be placed on opposite sides of track from refuge holes or necks of rooms when so ordered by the department, but wires, when protected as required by paragraph (a) of this subsection, may be placed across the necks of rooms. Switches or circuit breakers shall be provided to control the current at the mine and all important sections in the mine;
  - (e) Where track is used for the return circuit, at least one (1) side shall be bonded to the full length of the trolley wire installation. Cross-bonds shall be installed not to exceed two hundred (200) foot intervals along the track; and
  - (f) All mine locomotives shall be fused or otherwise protected at the switch or at the nip.

- (3) The following shall apply to surface installations:
- (a) High-voltage lines shall be at least twenty (20) feet above the ground where there is a possibility of contact by traffic passing underneath;
  - (b) Electrical circuits, wires, and cables shall be supported on insulators except when cables, which are of a design that can be safely used without insulators, are used;
  - (c) Lightning arresters shall be installed on all ungrounded, exposed power conductors and telephone wires entering a mine, regardless of voltage. Overload protection and disconnect switches of suitable sizes and ratings approved by the department shall also be provided, except that they shall not be required of telephone wires;
  - (d) Every metallic building in which electricity is used or connected with any circuit shall be effectively grounded;
  - (e) All transformer tanks shall be effectively grounded;
  - (f) Switch boxes, contactors, controllers, and all other similar devices shall be kept free of significant accumulations of combustible dust that create a fire hazard;
  - (g) Surface transformer stations shall be housed or fenced in when lower than fifteen (15) feet above the earth, and the fences shall be a minimum of six (6) feet in height; and
  - (h) All surface power circuits and electrical equipment shall be de-energized before work is done on the circuits and equipment except when necessary for troubleshooting or testing. When electrical work or major mechanical work is performed, a suitable disconnect providing visible evidence that the power is disconnected shall be locked open and a tag shall be posted by the individuals performing the work. Locks and tags shall be removed only by persons who installed them or, if those persons are unavailable, by a person authorized by the operator. Repairs or maintenance shall not be performed on machinery until the power is off and the machinery is blocked against motion, except where machinery motion is necessary to make adjustments. When disconnects for stationary low and medium voltage equipment that do not provide visual evidence that the power is disconnected are used, an adequately rated voltage detector shall be used to test each phase conductor or circuit part to verify they are de-energized before any work is performed. When practical, confirmation that the voltage detector is operating satisfactorily shall be made before each test.
- (4) (a) Notwithstanding any provisions of subsection (1), (2), or (3) of this section, the department may authorize the construction, maintenance, operation, or conducting of any activity regulated by this section, to be constructed, maintained, operated, or conducted in a different manner than specified in any provision of subsection (1), (2), or (3) of this section, when scientific or engineering information is made available to the department substantially indicating that the different manner would afford equal or greater protection

and safety than the manner required in subsection (1), (2), or (3) of this section; and

- (b) The department may prescribe administrative regulations with respect to the aboveground or underground installations in connection with any mine operation when information is made available indicating that regulation is reasonably necessary to prevent injury to, or loss of, life and property.
- (5) All electrical work shall be performed by a certified electrician, or an electrical trainee under the direct supervision of a certified electrician, at all underground mines and surface mines operating draglines or highwall miners.

**Effective:** June 25, 2009

**History:** Amended 2009 Ky. Acts ch. 26, sec. 1, effective June 25, 2009. -- Amended 2007 Ky. Acts ch. 94, sec. 22, effective June 26, 2007. -- Amended 2004 Ky. Acts ch. 37, sec. 2, effective July 13, 2004. -- Amended 2000 Ky. Acts ch. 104, sec. 18, effective July 14, 2000. -- Amended 1996 Ky. Acts ch. 308, sec. 35, effective April 9, 1996. -- Amended 1994 Ky. Acts ch. 156, sec. 2, effective July 15, 1994. -- Amended 1976 Ky. Acts ch. 174, sec. 13. -- Amended 1972 Ky. Acts ch. 303, sec. 20. -- Amended 1954 Ky. Acts ch. 227, sec. 1, effective June 17, 1954. -- Amended 1952 Ky. Acts ch. 162, sec. 26. -- Recodified 1942 Ky. Acts ch. 208, sec. 1, effective October 1, 1942, from Ky. Stat. sec. 2739-33.

**Legislative Research Commission Note (8/21/2008).** 2005 Ky. Acts chs. 11, 85, 95, 97, 98, 99, 123, and 181 instruct the Reviser of Statutes to correct statutory references to agencies and officers whose names have been changed in 2005 legislation confirming the reorganization of the executive branch. One such correction that was overlooked during codification after the 2005 Regular Session of the General Assembly has been made in this section.

**Legislative Research Commission Note (4/9/96).** The action taken with respect to this statute by 1996 Ky. Acts ch. 308 was to have become effective April 8, 1996, under Section 51 of that Act. The Act, however, did not become effective until April 9, 1996, when the Governor's signed copy of the Act was filed with the Secretary of State.