

Circuit voltage	Type of glove required
Greater than 120 volts (nominal) (not intrinsically safe) .....	Rubber insulating gloves with leather protectors.
40 volts to 120 volts (nominal) (both intrinsically safe and non-intrinsically safe).	Either rubber insulating gloves with leather protectors or dry work gloves.
Greater than 120 volts (nominal) (intrinsically safe) .....	Either rubber insulating gloves with leather protectors or dry work gloves.

(4) Rubber insulating gloves must be rated at least for the nominal voltage of the circuit when the voltage of the circuit exceeds 120 volts nominal and is not intrinsically safe.

(e) Before troubleshooting and testing a low- or medium-voltage circuit contained in a compartment with a high-voltage circuit, the high-voltage circuit must be deenergized, disconnected, grounded, locked out and tagged in accordance with paragraph (b) of this section.

(f) Prior to the installation or removal of conveyor belt structure, high-voltage cables extending from the section power center to longwall equipment and located in the belt entries must be:

- (1) Deenergized; or
- (2) Guarded in accordance with §75.816 of this part, at the location where the belt structure is being installed or removed; or
- (3) Located at least 6.5 feet above the mine floor.

#### **§75.821 Testing, examination and maintenance.**

(a) At least once every 7 days, a person qualified in accordance with §75.153 to perform electrical work on all circuits and equipment must test and examine each unit of high-voltage longwall equipment and circuits to determine that electrical protection, equipment grounding, permissibility, cable insulation, and control devices are being properly maintained to prevent fire, electrical shock, ignition, or operational hazards from existing on the equipment. Tests must include activating the ground-fault test circuit as required by §75.814(c).

(b) Each ground-wire monitor and associated circuits must be examined and tested at least once each 30 days to verify proper operation and that it will cause the corresponding circuit-interrupting device to open.

(c) When examinations or tests of equipment reveal a fire, electrical shock, ignition, or operational hazard, the equipment must be removed from service immediately or repaired immediately.

(d) At the completion of examinations and tests required by this section, the person who makes the examinations and tests must certify by signature and date that they have been conducted. A record must be made of any unsafe condition found and any corrective action taken. Certifications and records must be kept for at least one year and must be made available for inspection by authorized representatives of the Secretary and representatives of miners.

#### **§ 75.822 Underground high-voltage longwall cables.**

In addition to the high-voltage cable design specifications in §75.804 of this part, high-voltage cables for use on longwalls may be a type SHD cable with a center ground-check conductor no smaller than a No. 16 AWG stranded conductor. The cables must be MSHA accepted as flame-resistant under part 18 or approved under subpart K of part 7.

#### **§ 75.823 Scope.**

Sections 75.823 through 75.834 of this part are electrical safety standards applicable to 2,400 volt continuous mining machines and circuits. A "qualified person" as used in these sections means a person meeting the requirements of §75.153. Other standards in 30 CFR apply to these circuits and equipment where appropriate.

[75 FR 17549, Apr. 6, 2010]

#### **§ 75.824 Electrical protection.**

(a) *Trailing cable protection.* The trailing cable extending to the high-voltage continuous mining machine must be

## § 75.825

## 30 CFR Ch. I (7–1–23 Edition)

protected by a circuit-interrupting device of adequate interrupting capacity and voltage that provides short-circuit, overload, ground-fault, and under-voltage protection as follows:

(1) *Short-circuit protection.*

(i) The current setting of the device must be the setting specified in the approval documentation or 75 percent of the minimum available phase-to-phase short-circuit current, whichever is less; and

(ii) The time-delay setting must not exceed 0.050 seconds.

(2) *Ground-fault protection.*

(i) Neutral grounding resistors must limit the ground-fault current to no more than 0.5 ampere.

(ii) Ground-fault devices must cause de-energization of the circuit extending to the continuous mining machine at not more than 0.125 ampere. The time-delay of the device must not exceed 0.050 seconds.

(iii) Look-ahead circuits must detect a ground-fault condition and prevent the circuit-interrupting device from closing as long as the ground-fault condition exists.

(iv) Backup ground-fault devices must cause de-energization of the circuit extending to the continuous mining machine at not more than 40 percent of the voltage developed across the neutral grounding resistor when a ground fault occurs with the neutral grounding resistor open. The time-delay setting of the backup device must not exceed 0.25 seconds.

(v) Thermal devices must detect a sustained ground-fault current in the neutral grounding resistor and must de-energize the incoming power. The device must operate at either 50 percent of the maximum temperature rise of the neutral grounding resistor or 302 °F (150 °C), whichever is less. Thermal protection must not be dependent on control power and may consist of a current transformer and over-current relay in the neutral grounding resistor circuit.

(vi) A single window-type current transformer that encircles all three-phase conductors must be used to activate the ground-fault device protecting the continuous mining machine. Equipment grounding conductors must not pass through the current transformer.

(vii) A test circuit for the ground-fault device must be provided. The test circuit must inject no more than 50 percent of the current rating of the neutral grounding resistor through the current transformer. When the test circuit is activated, the circuit-interrupting device must open.

(3) *Under-voltage protection.* The under-voltage device must operate on a loss of voltage, de-energize the circuit, and prevent the equipment from automatically restarting.

(b) *Re-closing.* Circuit-interrupting devices must not re-close automatically.

(c) *Onboard Power Circuits.* When a grounded-phase indicator light circuit is used and it indicates a grounded-phase fault, the following corrective actions must be taken:

(1) The machine must be moved immediately to a location with a properly supported roof; and

(2) The grounded-phase condition must be located and corrected prior to placing the continuous mining machine back into operation.

[75 FR 17549, Apr. 6, 2010]

## § 75.825 Power centers.

(a) *Main disconnecting switch.* The power center supplying high voltage power to the continuous mining machine must be equipped with a main disconnecting switch that, when in the open position, de-energizes input to all power transformers.

(b) *Trailing cable disconnecting device.* In addition to the main disconnecting switch required in paragraph (a) of this section, the power center must be equipped with a disconnecting device for each circuit that supplies power to a high-voltage continuous mining machine. A disconnecting device is defined as a disconnecting switch or a cable coupler.

(c) *Disconnecting switches.* Each disconnecting switch must be labeled to clearly identify the circuit it disconnects, and be designed and installed as follows:

(1) Rated for the maximum phase-to-phase voltage of the circuit;

(2) Rated for the full-load current of the circuit that is supplied power through the device.