five hundred feet of the bottoms of shafts and boreholes through which main power circuits enter the underground area of the mine and within five hundred feet of all other places where main power circuits enter the underground area of the mine.

(*o*) Switches

All electric equipment shall be provided with switches or other controls that are safely designed, constructed, and installed.

(p) Lightning arresters

Each ungrounded, exposed power conductor that leads underground shall be equipped with suitable lightning arresters of approved type within one hundred feet of the point where the circuit enters the mine. Lightning arresters shall be connected to a low resistance grounding medium on the surface which shall be separated from neutral grounds by a distance of not less than twenty-five feet.

(q) Nonapproved devices

No device for the purpose of lighting any coal mine which has not been approved by the Secretary or his authorized representative shall be permitted in such mine.

(r) Deenergizing of electric face equipment

An authorized representative of the Secretary may require in any mine that electric face equipment be provided with devices that will permit the equipment to be deenergized quickly in the event of an emergency.

(Pub. L. 91–173, title III, §305, Dec. 30, 1969, 83 Stat. 775.)

REFERENCES IN TEXT

For the operative date of this subchapter, referred to in subsecs. (a)(1), (2), (4) to (6), (10)(B), (C), (11), (12), and (c), see section 509 of Pub. L. 91–173, set out as an Effective Date note under section 801 of this title.

§ 866. Trailing cables

(a) Requirements established for flame resistant cables

Trailing cables used in coal mines shall meet the requirements established by the Secretary for flame-resistant cables.

(b) Circuit breakers; markings and visual observation of position of disconnection devices

Short-circuit protection for trailing cables shall be provided by an automatic circuit breaker or other no less effective device approved by the Secretary of adequate current-interrupting capacity in each ungrounded conductor. Disconnecting devices used to disconnect power from trailing cables shall be plainly marked and identified and such devices shall be equipped or designed in such a manner that it can be determined by visual observation that the power is disconnected.

(c) Distribution center junctions; safety connections

When two or more trailing cables junction to the same distribution center, means shall be provided to assure against connecting a trailing cable to the wrong size circuit breaker.

(d) Temporary splices; usable period; exceptions; quality

One temporary splice may be made in any trailing cable. Such trailing cable may only be used for the next twenty-four hour period. No temporary splice shall be made in a trailing cable within twenty-five feet of the machine, except cable reel equipment. Temporary splices in trailing cables shall be made in a workmanlike manner and shall be mechanically strong and well insulated. Trailing cables or hand cables which have exposed wires or which have splices that heat or spark under load shall not be used. As used in this subsection, the term ''splice'' means the mechanical joining of one or more conductors that have been severed.

(e) Permanent splices; quality

When permanent splices in trailing cables are made, they shall be—

(1) mechanically strong with adequate electrical conductivity and flexibility;

(2) effectively insulated and sealed so as to exclude moisture; and

(3) vulcanized or otherwise treated with suitable materials to provide flame-resistant qualities and good bonding to the outer jacket.

(f) Clamping of cables

Trailing cables shall be clamped to machines in a manner to protect the cables from damage and to prevent strain on the electrical connections. Trailing cables shall be adequately protected to prevent damage by mobile equipment.

(g) Making and breaking of connections to junction boxes

Trailing cable and power cable connections to junction boxes shall not be made or broken under load.

(Pub. L. 91–173, title III, §306, Dec. 30, 1969, 83 Stat. 779.)

§ 867. Grounding of equipment

(a) Metallic enclosed power conductors; metallic frames and other equipment; methods

All metallic sheaths, armors, and conduits enclosing power conductors shall be electrically continuous throughout and shall be grounded by methods approved by an authorized representative of the Secretary. Metallic frames, casings, and other enclosures of electric equipment that can become ''alive'' through failure of insulation or by contact with energized parts shall be grounded by methods approved by an authorized representative of the Secretary. Methods other than grounding which provide no less effective protection may be permitted by the Secretary or his authorized representative.

(b) Frames of offtrack direct current machines; enclosures of related detached components

The frames of all offtrack direct current machines and the enclosures of related detached components shall be effectively grounded, or otherwise maintained at no less safe voltages, by methods approved by an authorized representative of the Secretary.

(c) Stationary high-voltage equipment powered by underground delta systems

The frames of all stationary high-voltage equipment receiving power from ungrounded