

room, or obstructed in any manner by resistance-frames, meters, or otherwise. If space is required for resistance-frames or other electrical apparatus behind the board, the passage-way must be widened accordingly.

No cable shall cross the passage-way at the back of the board, except below the floor or at a height of not less than 7 ft. above the floor.

The space at the back of the switchboards shall be properly floored, accessible from each end, and, except in the case of low-pressure switchboards, must be kept locked up, but the lock must allow of the door being opened from the inside without the use of a key. The floor at the back shall be firm and even.

308. Every generator shall be provided with a switch on each pole between the generator and the bus-bars.

Suitable instruments shall be provided for measuring the current and pressure of each generator.

Every feeder connected to the bus-bars in the generating-station shall be furnished with an ammeter on the main switchboard.

309. If the transmission-lines from the generating-station to the shaft or mine-entrance are overhead, there shall be lightning-arresters in connection therewith.

310. Automatic cut-outs must be arranged so that when the contact lever opens outwards no danger exists of striking the head of the attendant. If unenclosed fuses are used they must be placed within 2 ft. of the floor, or be otherwise suitably protected.

Where the supply is at a pressure exceeding the limits of medium pressure, there shall be no live metalwork on the front of the main switchboard within 8 ft. of the floor or platform, and the space provided under Regulation No. 307 of this section shall be not less than 4 ft. in the clear. Insulating floors or mats shall be provided for medium-pressure boards where live metalwork is on the front or back.

311. All terminals and live metal on machines over medium pressure above ground, and over low pressure under ground, where practicable, shall be protected with insulating covers or with metal covers connected to earth.

Cables.

312. All conductors inside a mine, except as hereinafter provided, shall be continuously covered with insulating-material.

A continuously insulated cable must be so constructed that when a test-piece of it has been immersed in water for twenty-four hours it will, while still immersed, in the case of cables intended for low or medium pressures, withstand 2,000 volts for ten minutes between the conductor and the water, and between cores if there are more than one in the cable.

If the cable is intended for high or extra-high pressure, twice the working-pressure shall be taken for the test.

Prior to the immersion the test-piece must have been bent six times (three times in one direction and three times in the opposite direction) round a cylindrical surface not more than twelve times the diameter of the finished cable.

313. The sectional area of conductors must be greater than that determined by the heating effect of the current required for the maximum number of motors or other current-using apparatus that can be used simultaneously on the circuit, except in the case of overhead wires upon the surface.

The size of the conductor will be determined in accordance with the table showing maximum current for copper conductors set out in Regulation No. 338, column 3 of which refers to cables having insulations of Class A, and column 4 to cables having insulation of Class B, according to the following definitions:—

(A.) A dielectric which is impervious to moisture, and only needs mechanical protection ("dielectric" does not include braiding or taping).

(B.) A dielectric which must be kept perfectly dry, and therefore needs to be encased in a waterproof sheath, generally of soft metal such as lead drawn closely over the dielectric.

Below ground, however, column 4 may be applied to cables having insulation of Class A, in cases where the atmospheric temperature never exceeds 100° Fahr.

314. All conductors (except as hereinafter provided) shall in every case be maintained completely insulated from earth, but it is permissible to use the concentric system with earthed outer conductors if proper arrangements are made to reduce the danger from fire or shock to the minimum, but the neutral point of polyphase systems and the middle wire of three-wire continuous-current systems may be earthed at one point.

315. Unless fixed as far as is reasonably practicable out of reach of injury, all conductors, other than armoured cables, must be further protected by a suitable covering. Where

lead-covered cable is used the lead shall be earthed and electrically continuous throughout.

The exposed ends of cables where they enter the terminals of switches, fuses, and other appliances must, as far as is reasonably practicable, be properly protected and finished off, so that moisture cannot creep along the insulating-material within the waterproof sheath, nor can the insulating-material if of an oily nature leak out of the cable.

316. All joints must be mechanically and electrically efficient, and, where reasonably practicable, must be suitably soldered. Wires, other than blasting wires or cables, must not be joined by merely twisting them together.

317. Overhead bare wires on the surface must be efficiently supported upon insulators and clear of any traffic, and provided with efficient lightning-arresters.

318. All cables used in shafts must be highly insulated and substantially fixed. Shaft cables not capable of sustaining their own weight shall be properly supported at intervals varying according to the weight of the cable. Where the cables are not completely boxed in and protected from falling material, space shall be left between them and the side of the shaft that they may yield and so lessen a blow given by falling material.

319. Where the cables in levels or main haulage-roads cannot be kept at least 1 ft. from any part of the truck or tram, they shall be specially protected. When separate cables are used they shall, if reasonably practicable, be fixed on opposite sides of the road.

The fixing with metallic fastenings of cables and wires not provided with metallic covering to walls or timbers is prohibited.

Where main or other roads are being repaired, or blasting is being carried out, suitable temporary protection must be used, so that the cables are reasonably protected from damage.

320. Trailing cables for portable machines shall be specially flexible, heavily insulated, and protected with either galvanized steel-wire armouring, extra stout braiding, hose-pipes, or other effective covering. Trailing cables shall be examined at least once in each shift by the person in charge of the machine, and any defects in them promptly repaired.

Except as hereinafter provided, at points where the flexible conductors are joined to the main cables, a fixed terminal box must be provided, and a switch shall be fixed close to or in the terminal box capable of entirely cutting off the supply from the terminal box and motor.

Suitable clips may, however, be used for the temporary connection of portable motors where the voltage does not exceed low pressure.

Switches, Fuses, and Cut-outs.

321. Fuses and automatic cut-outs shall be so constructed as effectually to interrupt the current when a short circuit occurs, or when the current through them exceeds by 200 per cent. the working-current in the case of motors, or by 100 per cent. the permissible current of the cables which the fuses protect. Fuses shall be stamped or marked, or shall have a label attached indicating the current with which they are intended to be used, or, where fuse-wire is used, each coil in use shall be so stamped or labelled. Fuses shall only be adjusted or replaced by an authorized person.

322. All switches, fuses, and cut-outs must have incombustible bases of marble, slate, or porcelain. All live parts of switches, fuses, and cut-outs not in machine-rooms, or in compartments specially arranged for the purpose, must be covered. These covers must be of incombustible material, and must be either non-conducting or of rigid metal, and, as far as practicable, clear of all internal mechanism.

323. Except as provided in Regulation No. 320, all points at which a circuit other than those for signals has to be made or broken shall be fitted with proper switches. The use of hooks or other makeshifts is prohibited.

Motors.

324. All motors, together with their starting resistances, shall be protected by switches capable of entirely cutting off the pressure and fixed in a convenient position near the motor, and every motor of 50-horse power or over in a machine-room underground shall be provided with a suitable ammeter to indicate the load put upon the machine.

325. Where the unarmoured cables or wires pass through metal frames or into boxes or motor-casings, the holes must be substantially bushed with insulating bushes, and, where necessary, with gas-tight bushings which cannot readily become displaced.

326. Terminal boxes or portable motors must be securely attached to the machine, or be designed to form a part thereof,