

44. LIGHTNING-ARRESTERS.

Where any portion of any electric line, or support for an electric line, is exposed in such a position as to be liable to injury from lightning it shall be effectively protected against injury by suitable lightning-arresters.

Earth-wires for circuits or equipments shall not be utilized for also earthing lightning-arresters, for which a separate earth-connection must be provided.

45. TRANSFORMERS.

Where transformers are placed on poles they shall be fitted with watertight cases, and either thoroughly protected against interference or attached to the poles at such a height as to make them inaccessible except by means of a ladder or other special appliance. Where pole-platform type of construction is adopted a substantial railing shall be built around the platform. Where transformers are placed within a building or enclosure the same shall be inaccessible except to authorized persons; all high-pressure or extra-high-pressure conductors therein shall be screened and protected against accidental contact. Each pole-transformer shall be equipped with primary fuses. The cases of all transformers, whether within or without a substation, shall be earthed by a copper conductor in accordance with the rules for earthing. Pole-steps shall not be placed less than 9 ft. above the ground-level.

46. MOTOR, GENERATOR, AND ELECTRIC COOKING-RANGE INSTALLATIONS.

The frames of fixed motors, generators, and electric cooking-ranges shall be earthed in accordance with the rules of the Institution of Electrical Engineers of Great Britain for earthing. All metal casings of switches, resistances, fuses, cables, and wires shall be earthed also in accordance with such rules. The earth-wire shall be of sufficient current-carrying capacity for the protection of the apparatus to which it is connected. The minimum sectional area shall be 0.003 square inches (No. 16 S.W.G.), and the maximum shall be 0.028 square inches (No. 6 S.W.G.) Reliance on partial or variable insulators (such as concrete foundations) between the frame and adjacent grounded parts does not offer suitable protection either for equipment or attendants.

Every motor must be controlled by a quick-break protected switch conveniently placed so that the person in charge of the motor can cut off the supply from the motor and from all auxiliary devices connected therewith.

Fuses or other automatic cut-out must be provided to protect effectively the conductors in each circuit from excess of current.

Every precaution shall be taken in choosing positions for and in wiring and setting-up of motors, generators, and electric cooking-ranges, and the necessary devices in connection therewith, so as to eliminate all risk of fire or shock.

Terminals of motors, generators, and electric cooking-ranges must be so guarded that they cannot be accidentally touched or short-circuited.

The insulation resistance to earth of each motor, generator, and electric cooking-range circuit, including all auxiliary devices, shall not be less than 1 megohm.

47. ARC LAMPS.

All arc lamps shall be so guarded as to prevent pieces of ignited carbon or broken glass falling from them, and shall not be used where there is any danger arising out of the presence of explosive dust or gas.

Arc lamps or any part thereof used in any street for public lighting shall be at least 10 ft. from the ground.

Arc lamps used in any street for private lighting shall be at least 8 ft. from the ground, and shall be so screened as to prevent risk of contact with persons.

Arc lamps must be insulated from earth, and be fixed so that they cannot swing into contact with any substance, metallic or otherwise, that might connect them with earth.

Every precaution must be taken against the danger of shock during trimming of arc lamps.

Resistances for the regulation of arc lamps, if exterior to the lamp, shall be mounted on incombustible bases, shall be so placed that they cannot by conduction or radiation set fire to any contiguous material, and shall be of ample size to carry with safety the maximum current that normally flows through them.

Each arc-lamp circuit, if wholly insulated, shall be provided with a fuse on each pole, but if one terminal is connected to an earthed neutral or intermediate conductor a fuse shall not be inserted in the connection to the neutral or intermediate conductor.

48. UNDERGROUND CONDUCTORS.

Underground conductors shall be thoroughly insulated, and shall be protected from mechanical damage by steel armouring, wooden boxing, or earthenware, concrete, iron, or fibre conduits or pipes. They shall be laid, wherever possible, under the footpaths, and with a cover of at least 9 in. from the surface of the pavement. Where laid under the roadway this cover shall be not less than 2 ft.

Except by permission of the Minister of Telegraphs, all underground electric lines must be placed on the same side of the street as overhead electric lines, and on the opposite side of the street to that on which underground or overhead telegraph-lines exist.

All conduits, pipes, casings, and street-boxes used as receptacles for electric lines shall be constructed of durable material, and shall be of ample strength to prevent damage from heavy traffic; and reasonable means shall be taken to prevent the accumulation of gas in such receptacles.

Where any underground electric line crosses or is in proximity to any metallic substance, special precaution shall be taken by the licensee against the possibility of any electrical charging of the metallic substance from the electric line, or from any metallic conduit, pipe, or casing enclosing such line.

Where any underground electric line is brought through the surface of the ground to connect with overhead electric lines it shall be completely enclosed in an effectively earthed metal pipe for a height of at least 12 ft. above the ground.

Electric lines placed in a tunnel or subway not in the sole occupation of the licensee must be insulated and protected by a metallic sheath or enclosed in a metal pipe, both being effectively earthed.

When any high or extra-high pressure electric line is laid beneath the surface of the ground efficient means shall be taken to render it impossible that the surface of the ground, or any other electric line or conductor, shall become charged by leakage from the high or extra-high pressure electric line.

A high or extra-high pressure electric line shall not be used for the supply of energy before it has been completely laid, properly jointed, examined, and tested.

49. STREET-BOXES.

The covers of street-boxes shall be so secured that they cannot be opened except by means of a special appliance; and such boxes shall be inspected from time to time for the presence of gas, and suitable action shall be taken to check the influx and accumulation of gas.

50. EARTHING CONDUITS.

All metal conduits, pipes, or casings containing high or extra-high pressure electric lines shall be effectively earthed, and shall be so jointed and connected across all street-boxes and other openings as to make good electrical contact throughout their whole length.

51. INSULATION OF ELECTRIC LINES.

Every low-pressure electric line, after having been placed in position and before it is used for the purpose of supply, shall be tested for insulation at a pressure of at least 500 volts, and the licensee shall keep a record of the results of such tests.

A high or extra-high pressure electric line shall not be brought into use until it has withstood the continuous application for half an hour of the maximum pressure for which the electric line is to be used. A record of such test shall be kept by the licensee.

The insulation of every complete circuit used for the supply of energy, including all machinery, apparatus, and devices forming part of or in connection with such circuit, shall be so maintained that the leakage-current shall not under any condition exceed one-thousandth part of the maximum supply-current. Suitable steps shall be taken to promptly locate such leakage, and every such leakage shall be remedied without delay.

52. ELECTRIC-SERVICE LINES.

Service connections from aerial lines shall be taken direct from insulators, and shall not be tapped off the aerial lines between supports. They shall be led as directly as possible to insulators firmly attached to some portion of the consumer's premises which is not accessible to any person without the use of a ladder or other special appliance. Service leads must not be brought out through the roof or attached to insulators fixed on the roof of a building. The portion of any low-tension electric-service line passing over a street shall be not less than 18 ft. above the crown of the road. Within the boundary of the consumer's property the height of the low-tension electric-service lines shall be not less than 14 ft. above the ground-level; provided that if the conductors other than earthed conductors are bare such height shall be not less than 16 ft. High-pressure or extra-high-pressure service lines shall be of a height not less than those specified in clause 33.

Every portion of any electric-service line, except an earthed neutral or intermediate conductor, which is outside a building shall be effectively protected by triple braiding or rubber insulation in the span between the pole and the building.

53. SERVICE CONNECTIONS.

The licensee shall be responsible for all electric lines, wires, fittings, and apparatus, belonging to it or under its control which may be upon a consumer's premises, being erected and maintained in a safe condition and in all respects fit for supplying energy.