

transmission-line connecting his or its premises with the transmission-line erected by the licensee in pursuance of this license.

21. The deposit of £500 which the licensee has lodged with the Public Trustee as a guarantee of good faith shall be retained as security for the due fulfilment by the licensee of the terms and conditions contained in this license to be performed by him: Provided, however, that when and so soon as the licensee shall have submitted the drawings and specifications required by clause 9 hereof, and those drawings and specifications have been duly approved, and the licensee shall have constructed permanent works in connection with headworks, race, pipe-lines, and generating-station mentioned in the said clause to the satisfaction of the Minister to the value of £1,000 at the least, then the Minister shall require the Public Trustee to return the said deposit to the licensee; but if this license is determined, cancelled, or revoked under the powers herein contained before such works to such value have been constructed, then and in any such case the said sum of £500 shall be forfeited to the Crown as ascertained and liquidated damages.

22. The conditions stated in this license to be observed and performed by the licensee may be altered or modified from time to time if found necessary, and if duly agreed upon between the licensee and the Governor in Council, in which case particulars of such alteration or modification shall be endorsed upon this license and signed by the licensee and the Governor in Council, whereupon all the terms and conditions in this license contained (save and except as they may have been so altered or modified by any such alterations) shall, *mutatis mutandis*, apply to such alterations as if the latter had formed part of this license as originally issued.

23. Nothing herein shall prevent the Governor in Council from granting to any person or body corporate other than the licensee a license to take water from any portion of the said stream except at the place where the licensee is by this license empowered to take it; provided that no such license shall so operate as to reduce the volume of the water which the licensee is by this license authorized to take from the said stream.

24. Electrical energy shall be generated in the form of three-phase current at a frequency of 50 cycles per second, and pressure not exceeding 11,000 volts between phases. This shall be transformed up to 22,000 volts or 33,000 volts between phases for transmission to the main sub-stations, and there transformed down to 3,300 volts for primary distribution. In the secondary sub-stations or in pole transformers it shall be transformed down to 400 volts between phases, and 230 volts between each phase and the neutral for low-tension supply, or converted to direct current at 500 to 600 volts for tramway and power supply. Single-phase constant-current series circuits up to a pressure of 3,300 volts may also be used for outside lighting.

25. The neutral point of one or more of the generators in service shall be earthed.

The neutral point of the star connection of the high-tension system shall be earthed at the main sub-stations. The neutral point of each secondary distributing system shall be earthed at the transformer.

26. The pressure shall be maintained within 4 per cent. on lighting-distributing circuits above or below the declared pressure at the consumers' terminals. The licensee shall supply a suitable recording voltmeter for this service, and on complaint by any consumer that the variations in voltage exceed these limits, or on the instructions of the Inspecting Engineer, the licensee shall connect a recording voltmeter to record the pressure between the lines at their entrance to the consumers' premises, and shall supply to the Inspecting Engineer a chart showing the variations in voltage between the lines at this point for a period of seven consecutive days. If the variations thus recorded exceed the above limits, the licensee shall take immediate steps to comply with this regulation. If after thirty days a similar chart shows that the above limits of variation in voltage are not complied with, a breach of these regulations shall be deemed to have been committed. If the accuracy of the licensee's recording voltmeter is questioned by the consumer, a standard instrument shall be supplied by the Inspecting Engineer, the reading of which shall be accepted as final.

27. All switchboards shall be made of and mounted on material that is not inflammable, and no switchboard conductor shall carry electric current at a density exceeding 1,000 amperes per square inch. No conductor at a pressure above 600 volts shall be exposed on the front of any switchboard, and the back of any switchboard carrying exposed conductors at a pressure over 600 volts shall be screened off and accessible only to authorized persons.

All power-house and sub-station switchboards shall be provided with two efficient and independent earth connections connected in parallel, to one of which all frames, instrument-

cases, and other metal parts shall be connected. Means shall be provided for testing and resistance between these two connections through the earth. Such tests shall be made at least once a month and recorded.

28. All outgoing feeders and distributors from any transformer or transformer-house or sub-station shall be provided with automatic circuit-breakers or fuses set to open at 50 per cent. excess current over the rated full load of such feeder or distributor.

29. Overhead electric lines shall consist of conductors of stranded hard-drawn copper, aluminium, and other material of not less than 0.0229 square inch section in spans spreading 200 ft., nor less than 0.0129 square inch section in spans exceeding 100 ft., and with less than 0.0072 square inch section in spans under 100 ft.

The stress in overhead conductors shall not exceed 25,000 lb. per square inch for copper and 12,000 per square inch for aluminium, 34,000 lb. per square inch for steel and 22,500 lb. per square inch for iron in the extreme case of a temperature of 32° Fahr., and a wind-pressure of 18 lb. per square foot of diametrical plane occurring simultaneously. The span between supports and the sag shall be determined to conform with the above limiting stresses.

No overhead low-pressure electric lines shall come within 2 ft. of any aerial wires or cables belonging to another authority, except where it may be permitted to pass either set of wires between other wires at a pole or support.

Electric lines at low pressure shall be insulated throughout with jute braiding impregnated with waterproof compound; provided that, where circumstances permit, the lines may, with the consent of the Minister, be bare.

Earthed neutrals may in all cases be bare, except in the case of neutrals of high-pressure circuits that may be permitted to be attached to telegraph poles, in which case the neutrals shall be insulated with 300-megohm grade vulcanized rubber where so supported.

Electric lines at high pressure shall be covered with vulcanized rubber of at least 300-megohm grade, provided that where circumstances permit the lines may, with the consent of the Minister, be bare.

Electric lines at extra high pressure shall be bare.

High-pressure and extra-high-pressure lines shall not be carried on the same poles or supports, except in special circumstances and with the consent of the Minister.

Low-pressure and extra-high-pressure lines shall not be carried on the same poles or supports, except in special circumstances and with the consent of the Minister.

30. All overhead electric lines at low pressure shall be carried at a minimum height of 18 ft. above the ground.

All overhead lines at high pressure shall be carried at a minimum height of 20 feet above the ground.

All overhead lines at extra high pressure shall be carried at a minimum height of 23 ft. above the ground.

All aerial wires shall be attached to suitable insulators carried on cross-arms of suitable material and cross-section, and they shall be so attached to the insulators or guarded that they cannot fall from the support. Conductors covered with insulating material shall be so attached that their insulation shall not be impaired where they are secured to the insulator.

Every support for an aerial line shall be of durable material, and properly strengthened against forces due to wind-pressure, change of direction of line, and unequal length of span. The factor of safety of such supports outside borough limits shall be such that the moment resulting from a wind-pressure of 30 lb. per square foot of plane surface and 18 lb. per square foot of diametrical plane upon a cylindrical surface upon the lines and supports shall not exceed one-half of the applied moment which is sufficient to cripple the support if of iron, steel, or ferro-concrete, and shall not exceed one-fourth of the breaki g-stress in the case of wood. The factor of safety of supports within borough limits shall be four in the case of steel, iron, or ferro-concrete, and five in the case of wood, calculated upon the ultimate strength of material under the same conditions of wind-pressure as hereinbefore mentioned.

The distance between supports within borough limits shall not exceed 200 ft., except by approval of the Minister.

31. Except by permission of the Minister of Telegraphs, or subject to an agreement between the Post and Telegraph Department and the licensee, all overhead electric lines shall be placed on the opposite side of the road or street to that on which any telegraph lines exist; and where the erection of the electric lines necessitates the alteration of any telegraph lines, and such alteration is approved by the Minister of Telegraphs, the cost of the alteration shall be borne by the licensee.

Wherever it may be necessary to cross telegraph wires the electric lines shall cross above as far as may be practicable, and shall be at least 2 ft. distant. Where it is impracticable to cross above, the electric lines may be taken under or