

CORPORATION OF THE DISTRICT OF BURNABY

BY-LAW NO. 761

A BY-LAW for the regulation and inspection of electric and other wires and electric lights and apparatus in the Municipality of Burnaby.

THE REEVE AND COUNCIL of the Corporation of the District of Burnaby, in open meeting assembled, enacts as follows:-

1. This By-law may be cited as the "BURNABY ELECTRICAL INSPECTION BY-LAW 1928"

INTERPRETATION

2. In the construction and for the purpose of this by-law the following words shall have the meaning hereinafter assigned to them, unless repugnant to the context hereof:-

(a) The words "Electrical Inspector" shall mean the person from time to time duly appointed by the Council as head of the Electrical Department of the said Municipality.

(b) The words "electrical works" shall mean and include any wires, cables, conductors, or conduits situate within the Municipality, and all fittings, appliances, and connections therewith; and shall also mean and include any lamps, generators, transformers, or motors in connection therewith, and all apparatus, poles and equipment within the Municipality when used in the generation, distribution, or use of electrical energy for any purpose;

(c) the words "approval" or "approved" when used with reference to any particular equipment, shall mean and include only such equipment as has been submitted for examination and test to the Underwriters' Laboratories or the Laboratories of the Hydro Electric Power Commission of Ontario, and a formal written report has been obtained thereon to the effect that such equipment is suitable for sale and use. When such words are used with reference to any form of electrical construction

or method of electrical installation, they shall mean such electrical construction or method of electrical installation as shall be acceptable to the Chief Electrical Inspector.

(d) The words "special permission" shall mean the written authority of the Chief Electrical Inspector.

(e) The words "person" or "persons" shall mean and include any party, corporation or company;

(f) The words "qualified person" shall mean any person who, as the result of training and practical experience, is familiar with electrical equipment and competent to discern and avoid the danger of handling and installing or equipping electrical works.

(g) The word "repairs" shall mean the reconstruction or renewal of any part of any existing electrical installation required for the purpose of its maintenance;

(h) The word "service" shall mean and include all wires by which a supply of electrical energy is carried from any supply line to any building or premises;

(i) The words "Canadian Electric Code 1928" and all amendments thereto shall mean the rules and regulations adopted by the Canadian Engineering Standards Association for and in respect to Electric wiring and apparatus and being the exact code of rules and regulations incorporated in this by-law as schedule "A" hereto; and the said rules and regulations are to be construed to be, and shall be, taken as expressly incorporated herein as part of this by-law; and the said rules and regulations therein contained shall be deemed to be, and are hereby declared to be, express provisions of this by-law, and shall have the same force and effect as if expressly enacted herein save and except where otherwise amended, altered, or varied by any of the express provisions of this by-law.

3. There is hereby created an Electrical Department of the Municipality of Barnaby, and the Council may, by resolution, from time to time appoint a Chief Electrical Inspector to supervise the same, among whose duties it shall be to see that the provisions of this By-law are enforced and carried out.

4. The Chief Electrical Inspector shall have power, subject to the approval of the Council, to employ such assistants and inspectors as he shall deem necessary for the purpose of effectually carrying out the provisions of this by-law; and whenever the Chief Electrical Inspector is authorized or directed to perform any act or duty under this by-law, such act or duty may be performed by any inspector or employee authorized by such Chief Electrical Inspector to perform such act or duty.

5. The Chief Electrical Inspector is hereby authorized to have, and shall have, general supervision over the installation, construction, alteration, repair, and maintenance of all electrical works in the Municipality and it shall be the duty of the Chief Electrical Inspector to see that all electrical works installed, constructed, altered, repaired, or maintained in the Municipality are installed, constructed, altered, repaired, and maintained in such condition that they will not cause damage to life or property; and in the event of any such electrical works becoming defective or out of repair from any cause whatsoever, the Chief Electrical Inspector shall, on becoming aware of the fact, at once notify the owner of such electrical works to remove such works or repair the same; and should such owner fail to remove or repair such works, pursuant to such notice, within twenty-four hours after the giving of such notice, then the Chief Electrical Inspector may cause such works to be repaired, removed, cut down, or disconnected at the expense of the person so in default; and any owner failing to repair or remove such works after having been notified by the Chief Electrical Inspector, as aforesaid, shall be deemed to be guilty of a violation of the provisions of this by-law and liable to the penalties hereby imposed.

6. It shall be the duty of the Chief Electrical Inspector to designate and regulate the position of all overhead wires on any poles in the Municipality, and the distance at which such wires shall be placed and maintained in relation to each other, and also to regulate the direction in which such wires shall be run for any purpose, or from any fixtures upon any building, and the points at which such wires shall enter any building.

7. It shall be the duty of the Chief Electrical Inspector to notify the owner of any dead wires, unused poles, or electrical works placed on the inside or outside of any building, or in any public place in the Municipality, to remove the same within three days after the giving of such notice; and the owner of any dead wires, unused poles, or unused electrical works shall, within three days after the giving of such notice, remove and take away such dead wires, unused poles, or unused electrical works from the places in which they may be placed; and in the event of any such owner failing to take the same away within three days after the giving of such notice so to do, as aforesaid, the Chief Electrical Inspector shall cause such dead wires, poles, or electrical works to be removed and taken away at the expense of the owner so in default

8. (1) It shall be the duty of the Chief Electrical Inspector to make an inspection of all electrical works in the Municipality as often as it may be necessary so to do, and should the said Inspector discover that any electrical works are dangerous to life or property, he shall give twenty-four hours' notice to the owner of such electrical works to have the same disconnected; and in the event of said owner failing to comply with such notice, then the Chief Electrical Inspector shall disconnect or cause said electrical works to be disconnected at the expense of such owner and any person failing or refusing to disconnect any such works after having been notified so to do, as aforesaid, shall be guilty of a violation of the provisions of this by-law and liable to the penalties hereby imposed.

(2) The owner of any electrical works to be inspected shall pay for every such inspection at the rate of \$1.50 per hour for the time so occupied, and for any time under one hour at the same

rate, except that the minimum charge shall in no event be less than \$1.50.

9. Nothing contained in this by-law shall be deemed or construed to relieve any person owning, operating, constructing, installing, altering, or repairing any electrical works from any liability for damages to any person injured by the construction, installation, alteration, repair, or operation of the same, nor shall the Municipality be deemed to have assumed any liability by the reason of the inspection hereinbefore authorized.

10. In the event of the occurrence of a fire or of a storm, should life or property become endangered by the existence or operation of any electrical works, the person owning any such works shall, upon the request of the Chief Electrical Inspector or the Chief of the Fire Department of the Municipality, forthwith disconnect or remove such works as may be designated by the said officials or either of them; and should such person refuse or fail to so disconnect or remove the same, then the Chief Electrical Inspector or the Chief of the Fire Department of the Municipality may disconnect or remove such works, and the person so ordered, on failing to comply with the directions of the said officials, or either of them, shall be deemed to be guilty of a violation of the provisions of this by-law and shall be liable to the penalty hereby imposed.

11. Every person installing, constructing, altering, repairing, or maintaining, any electrical works in the Municipality shall install, construct, alter, repair, and maintain the same in accordance with the provisions of this by-law in that behalf. In the event of the Chief Electrical Inspector discovering that any such electrical works have been installed, constructed, altered, or repaired, or are being maintained, or have been connected with any source of electrical energy contrary to any of the provisions of this by-law, it shall be his duty to cause such works to be disconnected immediately, and he shall thereupon notify the person installing, constructing, altering, repairing, or maintaining such works to have such works reconstructed, altered, or repaired, so

that the same shall comply with the provisions of this by-law; and any person failing to comply with the requirements of such notice within twenty-four hours after the giving of the same, shall be deemed to be guilty of a violation of the provisions of this by-law, and shall be liable to the penalties hereby imposed.

12. No installation of electrical works shall be connected to any service until a certificate has been obtained from the Chief Electrical Inspector authorizing said connection.

13. The Chief Electrical Inspector is hereby authorized and empowered to refuse to issue a permit for any addition, alteration, or repairs, or any extension to any wiring system in or on any building, where the existing wiring is not in accordance with the provisions of this by-law.

PERMITS

14. (1). Before any person shall install, construct, alter or repair any electrical works in the Municipality, or shall commence doing any construction work in relation to or in connection with any such electrical works, he shall make application in writing for a permit therefor to the Chief Electrical Inspector.

(2). Such application may be filed with the Chief Electrical Inspector at his office in the Municipality between the hours of 9 a.m. and 5 p.m. on any week day except Saturday, on which day it may be filed between the hours of 9 a.m. and 12 noon.

(3). Such application shall describe in detail;

(a) The street and street number and the purpose for which the building is to be used;

(b) The number and a description of the outlets, fittings, or power equipment, and, when desired by the Chief Electrical Inspector, a plan and specification of the proposed wiring shall also be furnished.

This plan shall be submitted in duplicate and shall be drawn to a scale of not less than one-eighth of an inch to

the foot on substantial paper or cloth, or reproduced by some indelible process. One copy shall be retained by the Chief Electrical Inspector, and shall show the location of all outlets, switches, and distribution centres. It shall also show the sizes of conduits and wires, and shall have attached thereto a riser plan. If the application is for a power installation, the plan shall show the location of the power equipment, description, and type of the equipment to be used therein. Plans shall be approved by the Chief Electrical Inspector before a permit is issued thereon.

(4). The applicant for a permit shall in no case proceed with any portion of the proposed work set forth in such application until the application, plans and specifications (when required) have been approved of and a permit issued therefor by the Chief Electrical Inspector.

(5). If an applicant for a permit shall have committed a breach of this by-law, and such breach shall have continued after notice to remedy same has been given, the Chief Electrical Inspector may refuse the application for such permit until such breach shall have been remedied to his satisfaction.

15. The Chief Electrical Inspector shall deal with such application within forty-eight hours after he shall have received the same (exclusive of any holiday); provided, however, that the Chief Electrical Inspector shall in no case issue a permit for the installation or construction of any electrical works, permission to install or construct which is sought, unless the application shows on the face of it that the work is to be constructed in accordance with the provisions of this by-law, and that the fees provided for in this by-law have been paid at the time of filing such application by the applicant. If the Chief Electrical Inspector finds that the proposed installation or construction of any electrical works is to be carried out in accordance with the provisions of this by-law, then he shall issue a permit to the applicant therefor.

16. (1). A list of approved materials, and the appliances approved pursuant to the provisions of this by-law, shall be at all

times kept on file at the office of the Chief Electrical Inspector and all materials and appliances sold or offered for sale or installed in any electrical works shall be in accordance with the kind, quality, and standard set forth in such approved list, and shall in all other respects comply with the provisions of this by-law in that behalf, and shall at all times be subject to inspection and the approval of the Chief Electrical Inspector.

(2) The approved list of materials and appliances as herein set out shall be construed to be, and shall be taken as, expressly incorporated herein as schedule "B" to this by-law, and shall have the same force and effect as if expressly enacted herein, save and except where otherwise amended, altered, or varied by any of the express provisions of this by-law.

17. All persons making application for permits to install, construct, alter, repair, or maintain any electrical works in the Municipality shall pay the following fees applicable thereto for such permits as hereinafter set forth:

(a).	Cleat Work	Knob & Tube	Concealed Conduits	Open Conduits	Metal Mouldings	Fittings
10 outlets and under....	\$1.00	\$1.00	\$1.20	\$1.45	\$1.45	\$1.00
Each over 10 up to 20	.09	.08	.12	.14	.14	.07
Each over 20 up to 40	.08	.07	.11	.13	.13	.06
Each over 40 up to 80	.07	.06	.10	.12	.12	.05
Each over 80 up to 100	.06	.05	.09	.11	.11	.05
Each over 100.05	.05	.08	.10	.10	.05
Min.ch'ge for insp'tn.	1.00	1.00	1.00	1.00	1.00	1.00

NOTE:- All ceiling and wall outlets, and all single-pole, double-pole, and three-way switch outlets, and all base, wall plug, heating outlets and meters shall count as outlets.

(b) For decorative lights, such as cove lighting, borders and proscenium lights, footlights, outline lighting on the outside of buildings, five cents per light; minimum \$1.00. For projector rooms, including all equipment within the room, \$5.00.

ELECTRIC RANGES

For each electric range	\$1.00
For each electric range and water heater	1.50
For each water heater	1.00
For each outlet wired for electric appliances, such as electric ironing machines or electric appliances using 1000 watts or over	1.00

SIGNS

Sign wiring, two cents per light, minimum	\$1.00
Sign connections	1.00
Supply wires to signs	1.00
If the sign is connected at the same time as the supply wires are installed	1.50
Sign erection permit	1.00

MOTORS, ETC.

(e) For each motor, rectifier, or generator, the fee shall be as follows:

1 h.p. or less	\$1.00
Over 1 h.p. and up to and including 5 h.p.	1.50
Over 5 h.p. and up to and including 7½ h.p.	2.00
Over 7½ h.p. and up to and including 15 h.p.	2.50
Over 15 h.p. and up to and including 20 h.p.	3.00
Over 20 h.p. and up to and including 45 h.p.	3.50
Over 45 h.p.	5.00

(f) For each group of motors taking 1000 watts or less \$1.00.

(g) For each transformer vault located inside buildings, each installation, \$5.00.

(h) For each underground service, \$1.00.

(i) For electric ovens or other devices and appliances not provided for in the foregoing schedule, the charge shall be made on the same rating as specified for motors.

(j) For the inspection of electrical works for which no fee is herein prescribed, payment shall be made for the time actually consumed in making such inspections at the rate of \$2.00 per hour for the first hour or part thereof, and \$1.50 for each additional hour or part thereof.

(k) For all inspections required after the first inspection, or for examining corrections or errors on any of the foregoing inspections, the applicant for the permit shall be charged and shall pay at the rate of \$1.50 per hour for the time so occupied; and for any time under one hour at the same rate, except that the minimum charge shall be \$1.50.

(l) Temporary permits may be issued during the construction of a building or for temporary decorative lighting or when it is necessary for the supply company to make service connection to a building before a final certificate can be issued. When such permits are issued, they shall be void after the date as set forth in the permit, and all works as mentioned in the application shall be disconnected and removed by the person to whom the permit is granted when notified so to do by the Chief Electrical Inspector in writing. Provided, however, that no permit shall be issued for a period exceeding ninety days unless by special permission from the Municipal Council. The applicant for such permit shall pay at the rate of \$1.50 for the first thirty days, and \$1.00 for each succeeding thirty days or portion thereof.

(m) Any permit authorizing any work which is not commenced within sixty days after the permit has been issued, shall become void and of no effect.

(n) A permit shall be valid only for the location for

which the permit has been granted.

18. (1) Every person who has received a permit from the Chief Electrical Inspector to install or construct any electrical works in the Municipality, shall post a card, supplied by the Chief Electrical Inspector, at the entrance of the building, or in a conspicuous place near the point where such electrical works are being installed and constructed, and shall keep such card posted until a card of approval shall have been posted by the Chief Electrical Inspector as provided hereunder. It shall be the duty of the Chief Electrical Inspector to carefully inspect all electrical works during the installation and construction thereof and until the installation and construction of same is completed.

(2) For the purpose of inspecting such electrical works, the Chief Electrical Inspector shall cause any obstruction, matters, or things which may interfere with such inspection to be removed; and no person shall interfere or prevent said Inspector from removing any obstruction, matter or thing which may interfere with or prevent his making a thorough inspection of any electrical works.

19. (1) Immediately after the completion of any electrical works or part of such works (permit for which has been sought and obtained as hereinbefore provided), and before such work or any part of such works shall have been covered or concealed, and before any fittings or fixtures are attached thereto, the person to whom the permit for construction of such works has been granted, shall notify the Chief Electrical Inspector in writing that such works or any part thereof have or has been completed, and shall, in such notice, state the number of the permit under which the same has been installed or constructed.

(2) On receipt of such notice, the Chief Electrical Inspector shall inspect such works within two days thereafter (not including Sundays or holidays), and should he condemn or order change to be made in or to such works or any portions thereof on the ground that the provisions of this by-law have not been complied with, such portions thereof so condemned or ordered to be changed

shall be so altered or changed in such a manner as may be required by the Chief Electrical Inspector within forty-eight hours after such person shall have been notified to make such alteration or change, and such person shall notify the Chief Electrical Inspector in writing upon the completion of such alterations or changes.

20. No person shall cover, or permit to be covered, any electrical work, or any part thereof, in the Municipality, before the same has been inspected by the Chief Electrical Inspector, and a card of approval has been posted by such Inspector on the work.

21. If the Chief Electrical Inspector, on making such inspection shall find that such electrical works have been installed and constructed in accordance with the provisions and requirements of this by-law, he shall post a card of approval on the work; but if he shall find such electrical works have not been installed or constructed in accordance with the provisions and requirements of this by-law, he shall refuse to post such card of approval on the work; and no person shall cover or use, or permit to be covered or used, any electrical works, or part thereof, unless and until such works have been installed and completed in accordance with the provisions of this by-law, and until such card of approval shall have been posted by the Chief Electrical Inspector.

22. (1) After the Chief Electrical Inspector has inspected any electrical works and has posted his card of approval therefor, as provided for in the next preceding section, it shall be unlawful for any person to in any way cut, disturb, alter, or change such electrical works, or permit such electrical works to be cut, disturbed, altered, or changed in such a manner as to constitute a contravention of the provisions of this by-law; and no person shall, after such inspection and posting of a card of approval as aforesaid, place or permit to be placed any pipe or other metal or substance of any kind within one inch of any electrical works.

(2) It shall be unlawful for any person to overfuse any main or sub-main above the capacity allowed in this by-law, or a branch circuit in excess of the maximum allowed in this by-law, or to install any substitute in lieu of an approved fuse, or to interfere with any

circuit or automatic device so as to remove or reduce the factor of safety of same.

23. Every person owning or operating any electrical works over or under any street, lane, or place or building in the Municipality, shall, at the request of the Chief Electrical Inspector and within fifteen days thereafter, furnish the Chief Electrical Inspector with a detailed statement of the number and location of poles owned by him; the number of cross-arms on each pole, and the distance between each cross-arm; the number of wires attached to each cross-arm; and the distance between the wires; and also the location of all subways and manholes constructed or maintained by him in connection therewith.

24. It shall not be necessary for any person carrying on the business of manufacturing or producing electrical energy for his own use or for sale, to apply for a permit before making emergency repairs within his own generating station or dynamo room; but such emergency repairs must be reported to the Chief Electrical Inspector within twenty-four hours after such repairs have been commenced; provided, however, that nothing in this section contained shall be construed to exempt such person from the provisions of this by-law relating to inspection, regulation, or payment of fees.

25. No person shall obstruct or prevent the Chief Electrical Inspector or any person duly authorized by him from carrying out any or all of the provisions of this by-law; nor shall any person refuse to grant the Chief Electrical Inspector, or any person duly authorized by him, permission to inspect any electrical works at any reasonable time.

26. (1) The Chief Electrical Inspector is hereby authorized and empowered, whenever he may deem it necessary in order to ensure the efficient carrying out of the provisions of this by-law, to employ a sufficient number of assistants and inspectors for that purpose (subject to the approval of the Council), and the Chief Electrical Inspector shall in no case have authority to arrange what compensation shall be paid to such assistants or inspectors.

(2) Whenever the Chief Electrical Inspector is authorized by this by-law to perform any duty or to make any inspection, the same shall be deemed to be done in accordance with the provisions of this by-law if performed and carried out by any assistant or inspector duly appointed as herein provided.

27. Any person who is desirous of constructing or installing any electrical works underground in the Municipality shall first obtain permission so to do from the Municipal Council, and shall, at the time of making his application to install and construct such electrical works, file with the Chief Electrical Inspector and Municipal Engineer a map or plan showing the location of such underground system, the number of ducts to be used; the construction and size of all manholes or junctions; and no person shall install or construct any works underground until he shall have first obtained permission so to do as herein required.

28. Every person installing overhead conducting wires shall cause the same to be supported on poles; provided, that in cases where it is found impossible to support such wires on poles, the Chief Electrical Inspector may grant a special permit allowing them to be carried over or attached to buildings, if such wires shall be in all other respects installed and constructed in accordance with the provisions of this by-law.

29. Every person causing any wires to enter any building shall place such wires so as not to be within reach of any occupant of such building.

30. There shall be provided in all hotels, apartments or tenement houses, and rooming houses, adequate lighting in the halls, passageways, corridors, and stairways, fed from separate circuits controlled from indicating switches as may be directed by the Chief Electrical Inspector. There shall also be installed, where directed by the Chief of the Fire Department of the Municipality, electric lights indicating the location of all fire escapes. These lights shall be enclosed in ruby glass globes of not less than eight (8)

inches in diameter, upon which shall be inscribed in letters of not less than one (1) inch high the words "fire escape". Such lights shall be fed from separate circuits and controlled from indicating switches located as may be directed by the Chief Electrical Inspector. There shall be provided in all rooms containing rotating machinery and its control equipment, and in all corridors and stairways in public buildings, schools, factories, and buildings of a similar character, adequate lighting controlled by wall switches placed as may be directed by the Chief Electrical Inspector.

31. No poles shall be erected for the carrying of electric wires over the streets of the Municipality until reported on favourably by the Chief Electrical Inspector and the Municipal Engineer and approved by the Board of Works and the Council of the Municipality; and no application for a permit therefor shall be considered in proper form unless it provides that the Municipality may use the poles so erected and such cross-arms or other appliances attached thereto as may be deemed necessary for the police patrol, fire alarm, and other electrical services of the Municipality; and no permit shall be issued which does not provide therefor.

32. Every person applying for any such permit shall pay a fee of ten cents per pole for each permit issued by the Municipal Engineer for the erection of any poles within the limits of the Municipality.

33. No person shall construct, erect, alter or repair, maintain or use, or cause or permit to be constructed, erected, altered or repaired, maintained or used, any pole, line, or wire, or electrical conductor of any description whatsoever within the limits of the Municipality without first having obtained a permit for the construction and erection thereof from the Chief Electrical Inspector.

GENERAL RULES AND REGULATIONS

34. In any case where a modification from the following rules and regulations may be necessary, such modification will only be permitted on the written approval of the Chief Electrical Inspector

Modification will only be permitted in the case of temporary installations and in other cases where it is satisfactorily shown to the Chief Electrical Inspector that equivalent protection is afforded by other means.

SERVICES.

35. (1) Conductors for low potential services shall be installed in rigid metal conduit or lead sheathed armoured cable from the point of entrance to the building into the service cabinet.

(2) The length of the service conductors in the building shall be as short as is reasonably possible; but in no case shall the length of the service conductors in the building exceed fifteen feet. Conductors in conduit installed under the following conditions will not be considered as being in the building:

(a) If it is buried in or under a concrete, brick or tile floor which is laid on the ground and there is at least two inches of concrete, brick, or tile between the conduit and the inside of the floor:

(b) If it is buried in an exterior wall of concrete or brick and there is at least two inches of concrete or brick between the conduit and the interior surface of the wall.

(3) Service conduit shall not be run on the exterior surface of a side wall of a building if there is no clearance between such wall and the lot line.

(4) No fuse or circuit breaker shall be placed in the neutral of a three-wire service, feeder, or branch circuit, nor in any permanently grounded conductor. Where the grounded conductor is identified throughout the entire installation and properly connected, branch circuits shall be protected by fuses in the ungrounded conductors; but when the grounded conductor is not identified throughout the entire installation, the branch circuit shall be protected by fuses on both the grounded and ungrounded conductors.

(5) Not more than one set of service conductors shall be installed in the same service conduit.

(6) The service conduit shall have an internal diameter of not less than one-half inch and the outer end of the service conduit shall be fitted with an approved service conduit waterproof fitting, which shall be so installed that water will not enter the fitting or the conduit.

(7) Not more than one service of similar character or voltage shall be run from the supply lines to any one building; and no service shall supply more than one building, except as follows:-

(a) Any number of buildings located in the same factory yard and under the same occupancy may be supplied through one service. A service switch and cutout shall, however, be required in each individual building;

(b) Adjacent buildings on the same lot and under the same occupancy may be supplied through one service.

(c) Services in different buildings may be supplied through a bus service.

(8) When an existing service becomes inadequate on account of an increase in the load supplied thereby, such service shall be increased to one of a required capacity, except that if it is shown to be impracticable to increase such service to the required capacity, separate services may be run on the exterior of the building terminating at the same location as the existing services.

(9) The bus service is usually required for buildings fed from an underground system which have neither excavated basements nor an excavation under the sidewalk. If fed from an overhead system to separate services to two or more consumers, each of which are supplied through an individual service and cutout in that part of the building occupied by him, the bus service conductors shall be installed in approved metal conduit. All taps and connections shall be made in approved cast metal junction or

cutout boxes. No bus service conductors shall be run open on the exterior of any building, and no bus service conductor shall be open or exposed at any point on the building. The bus service must be run entirely on the exterior of the building, and shall be protected by suitable fuses. The service conduits shall be extended into the service box, and at least eighteen inches of service conductors shall be left in the box to permit splices to be properly made and soldered.

(10) No service outlet shall be at a lesser height than twenty feet above the sidewalk or grate level, nor at a greater height than thirty-two feet above the sidewalk or grade level, except that, in cases where the height of the building is less than twenty-five (25) feet, the service outlet shall be brought out at the highest point of such building, and the supply lines shall be attached in such a manner that they shall not be at any point less than eighteen (18) feet above the sidewalk or grade level.

(11) In locating the service outlet for any building, the electrical contractor shall consider the accessibility of such point to the supply company's lines. If there should be any doubt as to the location of the service outlet, the contractor shall obtain written instructions from the supply company as to the location of such outlet, and in every case where the location of a service entrance for light and power, or for communication circuits, is to be fed from an underground distribution system, such location must be approved by the Chief Electrical Inspector and the Municipal Engineer; also a plan shall be submitted for approval showing the location of the service entrance and the location of the supply company's manhole at which such service connection is proposed to be made. In all residences wired for over 4 circuits or 4 K.W., the service shall be for a three wire connection. In all residences where the load is 4 circuits or 4 K.W., or under, the service shall be wired for a two wire connection.

(12) In three-wire services the grounded conductor shall enter the service fitting between the other two conductors. The conductors shall be left projecting from the fitting not less than eighteen inches, and in every case a sufficient distance to provide for drip loops and for splicing to the service drops.

(13) The service entrance fitting shall be so located that the service conductors on the exterior walls of the building will be clear of fire escapes, awnings, signs, or similar attachments to the building and out of easy reach of unauthorized persons.

(14) The service switch shall be of the totally enclosed and externally operated type capable of interrupting its rated current at its rated voltage, and shall be located, where practicable, in the basement of the building.

(15) Such service switch shall be so arranged and installed that the opening of the switch will, with one operation, automatically open the ungrounded conductors of the service and disconnect therefrom all fuses, meters, and other equipment supplied from the service. Terminals and a disconnecting link shall be provided on the switch base for the grounded conductor.

(16) The service switch and cutout shall be located in a readily and safely accessible place and as near as possible to the point where the service conductors first enter the building and not more than fifteen (15) feet within such building. If the service switch and cutout is located on the outside of such building, it shall be not more than fifteen (15) feet from the service outlet, and shall be placed in a location protected from the weather. Access and passage to such service switch and cutout shall be kept clear and unobstructed.

(17) No service switch, service cutout, or branch circuit cutout shall be installed in attics, toilets, bedrooms, bathrooms, kitchens, or placed over sinks or laundry tubs, or in any place which is not easily accessible at all times.

(18) Such service switch and cutout shall be placed within

seven feet of the floor, ground, or permanent platform so that they may be reached quickly without climbing over or removing obstructions, or resorting to the use of boxes or portable ladders and so that, in operating the switch or replacing fuses, a person will not have to place himself in a hazardous position.

SERVICE MAINS AND SUB-MAINS

36. (1) The required sizes of the service conductors shall be determined in accordance with the following table; but no service conductor shall have a carrying capacity less than No. 12 B. and S. Gauge.

(2) In determining the size of service conductors and mains and sub-mains, each branch circuit shall be considered as carrying a connected load of ten amperes.

(a) For residences and apartments, the size of the service conductors and mains shall be as follows:

1 to 2 circuits	No. 12
3 circuits	No. 10
4 circuits	No. 8

Over four circuits, the following demand factor may be used;

5 to 10 circuits	85%
11 to 20 circuits	80%
21 to 30 circuits	75%
above 30 circuits	70%

(b) For installation of more than ten circuits in:

Stores, general lighting	100%
Hotels	75%
Hospitals	75%
Restaurants	100%
Churches	90%
Schools, services only	90%
Office Buildings	90%
Garages (except display rooms)	75%

Machine shops	75%
Factories	75%
Warehouses	65%

(3) For lighting installations in theatres and motion picture houses, the service conductors and mains may be calculated for a load less than the total connected load in accordance with a demand factor which will be given by the Chief Electrical Inspector in each individual case when details of the installation are given.

(4) In determining the sizes of the service conductors and branch feeders for domestic range loads and when not more than two ranges are installed and when used in combination with 1000-watt branch circuits, the wiring capacity of the service conductors shall permit the installation of ranges not smaller than 8 K.W. The size of the service conductor and branch feeder shall be not less than as shown in the following table;

Range Capacity in K.W.	Size of Service Conductor and Branch Feeder				
	for Range only	Up to two cir.	Up to four cir.	Up to six cir.	Up to eight cir.
Not over 8 K. W.	8	6	6	4	4
Not over 10 K.W.	6	6	4	4	2
Not over 11 K.W.	6	6	4	2	2

(5) For calculating the size of feeders for domestic range loads, the per cent. of the total connected load which may be used in determining the size of feeders shall not be less than the following:

1 to 2 ranges	100%
3 to 4 ranges	95%
5 to 6 ranges	90%
7 to 8 ranges	80%
9 to 11 ranges	70%
12 to 15 ranges	60%
16 to 20 ranges	55%
Over 20 ranges	50%

(6) The neutral or grounded conductor shall be separately grounded, and the ground shall be made at the service on the line side of the service switch and within the service cabinet, and shall be installed in accordance with the rules governing the grounding of low potential circuits.

(7) On all low potential installations where a total maximum capacity requires an installation of over six hundred (600) ampere switches, automatic circuit breakers of the oil-break type shall be used in lieu of a service switch especially approved for service conditions. When the total maximum capacity of the installation is over 1200 amperes, a high potential service and transformer vault shall be installed.

METERS /

37. (1) It is a requirement of the service agency that a meter loop shall be provided for each and every electric service whether for light or power, and also whether the service is to be metered or flat rate; that, on all new installations and old ones where practicable, the range and all house circuits (except flat rate circuits) must be wired for one meter. Meters shall be installed at as few different locations as is reasonably practicable. When two or more meters are grouped at one location, the contractor shall plainly and permanently label each meter location in such manner as will clearly identify the load to be supplied through each meter.

(2) Meters shall be located in safe, assessable, and dry places about six feet and not more than eight feet above the floor. They shall be located so as to be easily accessible for reading and inspection, and shall not be placed in toilets, bedrooms, bathrooms, kitchens, elevator shafts, over sinks, or in or over show windows. When installed without protective trims, the length of wires beyond the outlet shall be at least eighteen inches long, and shall be so arranged that the length of exposed leads will be as short as practicable. When brought out at the side of

the cabinet, they shall be installed in conduit with the meter, outlet fitting located at the bottom and centre of the meter board.

(3) An individual cutout shall be installed on the line side of each meter, and if instrument transformers are used in connection with the meter, the cutout shall be connected on the line side of such transformers. The cutout shall be installed immediately adjacent to the meter. Exception to this rule may be taken when a service supplies only one meter.

(4) Suitable provision shall be made for the support and attachment of meters and metering devices.

(5) Meters shall be protected against moisture, excessive heat, and mechanical injury. When installed in locations exposed to rain or similar conditions, they shall be enclosed in cabinets of a thoroughly substantial and weatherproof type. If these cabinets are made of wood, they shall be made of well-seasoned lumber of not less than three-quarters of an inch in thickness.

(6) Instrument transformers used in connection with meters shall be installed in approved metal cabinets or boxes, except when mounted on approved switchboards or in transformer rooms or similar enclosures.

(7) In arranging meter locations, sufficient space shall be provided to permit the meter and other devices used in connection therewith to be readily and safely installed and inspected.

(8) For meter installations of the types and capacities shown in the following table, and in absence of specific information from the supply company, a clear space shall be provided equal to the space provided for each self-contained meter. For installations not included in the table, the contractor shall consult the supply company and obtain specific information as to spacing required.

Meter Amps.	Switch Volts	Space in Inches			Length of Meter leads.
		Width	H'gth	Depth	
30	240 or less 1 phase	12	12	8	10
60	240 or less 1 phase	14	14	8	10
100	240	16	14	8	10
30	480 or less polyphase	16	18	9	18
60	480 or less polyphase	18	18	9	18
100	480 or less polyphase	20	18	9	18

BRANCH CIRCUITS AND WATTAGE
REQUIREMENTS

38. (1) All cutouts and fuses shall be installed and enclosed in metal cabinets or cutout boxes of the dead front type, except that the fuses may be installed on the outside of the cabinet or cutout box, if protected by suitable metal covers.

(2) Branch circuits, in general, shall be protected by fuses of a rated capacity not greater than fifteen amperes, and, unless otherwise provided, shall be considered as having a connected load of 1000 watts.

(3) Unless otherwise approved by the Chief Electrical Inspector, the wattage and circuit requirements set forth in the following table shall be considered as the minimum requirements. In arranging the circuits in residences and apartment houses, the outlets shall be wired for not less than the wattage specified below.

The wattage for ceiling outlets shall total not less per room than shown in the following table; provided, however, that where the floor area of any room exceeds three hundred (300) square feet, the wattage specified shall be doubled;

Parlours	200 watts
Living-rooms	200 watts
Dining-rooms	200 watts
Libraries	150 watts
Dens	150 watts
Sun-rooms	150 watts
Billiard rooms	400 watts
Bedrooms	100 watts
Kitchens	100 watts
Breakfast Rooms	100 watts
Reception Halls	100 watts
Basements	100 watts
Unfinished attics	100 watts

Outlets not provided in the above table shall be rated at not less than fifty watts each. In residences and apartment houses, the maximum number of outlets per circuit shall not exceed ten.

(4) Where convenience outlets are installed in dining-rooms, breakfast nooks, combination living and dining-rooms, kitchens, and basements, such outlets shall be calculated on a basis of six hundred and sixty (660) watts per outlet. In locations other than as aforesaid, they shall be calculated on a basis of three hundred (300) watts per room. Appliance outlets may be attached to branch lighting circuits; provided, however, that the total load on a branch circuit shall not exceed one thousand (1000) watts, and the total number of outlets shall not exceed ten.

(5) Where convenience outlets are installed on special circuits, and where the appliances are rated at not more than six hundred and sixty (660) watts, such circuits may be based on 1320 watts per circuit.

(6) (a) The number of circuits which shall be provided for lighting outlets shall be determined from the wattage requirements as prescribed in this section hereof on the basis of 1000 watts per circuit, except as provided in subsection 7.

(b)

Stores, inside fire limits	3.5 watts per sq.ft.
Store windows, inside fire limits	10.0 watts per sq.ft.
Stores, outside fire limits	2.0 watts per sq.ft.
Store windows, outside fire limits ...	7.0 watts per sq.ft.
Hallways5 watts per sq.ft.
Dining rooms	1.5 watts per sq.ft.
Auditoriums	1.5 watts per sq.ft.
Assembly-rooms	1.5 watts per sq.ft.
Sales and display rooms	1.5 watts per sq.ft.
Factories - General illumination when working lights are not provided	1.5 watts per sq.ft.

Factories - General illumination when working lights are pre- vided	1.0 watts per sq.ft.
Billiard rooms - General illumina- tion5 watts per sq.ft.
Billiard rooms - Over tables	2.5 watts per sq.ft.

(e) For the general lighting of working spaces in factories, workshops, garages, and other industrial buildings, and in buildings not specified in these rules, the capacity shall be based on one watt per square foot of floor area.

(d) It is not the intent of the foregoing rules to require that circuit wiring be actually installed where a portion of the floor is not to be used, but it is the intent to require a sufficient number of circuit outlets and feeder capacity to be provided at distributing centers to permit the use of the total wattage required in the event of the total floor area being used. Permission, however, may be granted to vary these requirements in such places where adequate illumination can be provided by modifying these rules but in no case shall the wattage requirement be less than one watt per square foot.

(7) In arranging the lighting circuits for theatre footlights, border and proscenium lights, signs, outside decorative lighting, marquee and outline lighting, they shall be determined on a basis of 1320 watts per circuit. In no case, except as provided for in respect of electric signs, shall the number of the sockets and receptacles on any one circuit exceed twenty for marquee lighting, and thirty for outline lighting.

(8) In determining the maximum number of outlets per circuit in commercial and industrial buildings, outlets shall be considered as taking not less than 100 watts each, except as provided in subsection (7) hereof.

(9) Store window and show case lighting, signs and all exterior lighting, shall be connected to separate circuits

to which no other outlets are connected. Store entrance outlets, when not exposed to the weather, may be connected to the window circuits if the capacity thereof does not exceed 250 watts.

(10) An individual switch of the externally operated type shall be installed directly ahead of every fusible outlet, except as follows:-

(a) An individual switch shall not be required ahead of approved plug type fuses.

(11) All motors used for the operation of oil burners, and A.C. Motors rated at more than one-quarter H. P., shall not be connected to branch lighting or appliance circuits, and no motor-operated device shall be connected to any branch lighting or appliance circuit if the total connected load, including the device itself, exceeds 1000 watts; nor shall any motor or motor-operated device be attached to any branch lighting circuit if the starting current requires fusing of the circuit to more than fifteen (15) amperes.

(12) The neutral conductors on all feeders and branch circuits shall be connected to a terminal strip which shall be marked, numbered, or arranged in such a manner as to correspond with the numbering or marking of the branch outlets.

GENERAL REQUIREMENTS

39. (1) In open wiring, conductors shall be supported on approved split knobs or cleats. Either screws or nails may be used to fasten the knobs in place, but screws must be used for all cleats. When nails are used, they shall penetrate the wood at least one-half the depth of the knob. Approved cushion washers must be used on all nails.

(2) The use of wooden moulding is prohibited.

(3) Sockets and receptacles installed within reach of grounded surfaces shall be of porcelain, or shall have non-conducting shells. Metal cap switches shall not be installed in places subject to moisture.

(4) On concealed conduit work, and where fixtures are to

be installed on knob and tube work, fixture studs shall be furnished in place. In all outlet boxes the ends of all unused wires at outlets shall be insulated with rubber and friction tape, and shall be equipped with blank covers.

(5) Heating appliances which are in fixed locations in bathrooms, and within five feet of any grounded or conducting surface, shall have their frames permanently and effectively grounded and shall be controlled by a wall switch. Portable appliances shall not be installed or used in bathrooms.

(6) Outlets intended to be used for electric irons shall not be placed in any cabinet built for storing such irons.

(7) On grounded circuits the screw shells of sockets and receptacles, including sockets on drop cords and sign receptacles shall be connected to the grounded conductor of such circuits.

(8) Unless the outer shell is permanently grounded, metal shell key sockets or metal shell pendant switches shall not be installed where they are within reach from permanently damp or conducting floors, or from other conducting surfaces. Sockets and receptacles installed within eight feet vertically, or five feet horizontally, of grounded surfaces shall be considered within reach. Sockets installed in kitchens, pantries, bathrooms, toilets and basements shall have non-conducting shells and shall be controlled by wall switches.

(9) Sockets shall have an approved rating of not less than 660 watts.

(10) Receptacles for attachment plugs shall have an approved rating of not less than 660 watts, and shall be recessed, or of the concealed contact type, so constructed and designed that the plug may be removed without leaving any live parts. Screw base receptacles shall not be installed for use as attachment plugs, and shall not be installed at a lesser height than four feet six inches from the floor.

(11) All taps for three-way and gang switches shall be made and secured outside of boxes.

(12) Each complete electrically-heated appliance, whether containing one or more heating elements shall, except as provided in subsection (13) of this section, be controlled by an externally operated switch, arranged to disconnect all ungrounded conductors. Such switch shall, unless means of control are provided on the heater, be located immediately adjacent to such appliance or at location approved by the Chief Electrical Inspector.

(13) Switches controlling the individual units of electric ranges and heating appliances shall not be considered as taking the place of the switch required in subsection (12) of this section; but an approved attachment plug and receptacle may serve in lieu of the switch when used with portable or semi-portable appliances; provided, however, that for range installations in single family dwellings, the switch and fuse as provided for in Subsection (10) of Section 38 may, when located adjacent to the service switch, serve as the range disconnecting switch.

(14) Each electric iron installed in laundries, tailor shops, cleaning establishments, and other similar places shall be equipped with an approved signal device to indicate when such appliance is in use. In cases where two or more irons are installed in one room, the signal device may be installed ahead of all the irons installed in that room, provided they are controlled by an externally operated master switch, and the signal device is installed in plain view and close to the exit from such room.

(15) Approved outlet boxes shall be installed at all outlets and flexible tubing shall extend from the last knob into and be secured to such boxes by approved clips.

(16) Knobs shall not be placed on the same header board which is used to support a light or switch outlet.

(17) Stranded conductors, including flexible cords, shall be soldered before being fastened under clamps or binding screws; and, whether stranded or solid, when they have a conductivity greater than that of #10 B. and S. gauge, they shall be soldered into lugs for terminal connections unless an approved

solderless terminal connector is used. No flexible cord of any description shall be placed on knobs or cleats, nor shall it be used for wiring any part of a circuit for which standard rubber-covered wire is required.

(18) Flexible cords shall not be used for the support of more than one medium screw base socket complete with its reflector equipment, and shall not be used for the support of fixtures equipped with mogul sockets.

(19) Pendants shall not hang nearer to the floor than five feet six inches. Exception may be taken to this rule when portable cord is used. Extension cords used in garages shall be of a type approved for hard usage, and when used in places where it is necessary to prevent portable lamps from coming into contact with inflammable materials or grounded surfaces, or to protect the lamp from breakage, the cords shall be equipped with a handle socket and substantial guard, the guard being securely attached to and insulated from the socket or handle.

(20) Flexible cords shall not be used in clothes closets. When lights are installed in clothes closets, they shall be controlled by pull chain receptacles or wall or door switches.

(21) Weatherproof sockets especially approved for the location shall be employed in places where flying dust accumulates or where sockets are exposed to moisture or corrosive vapours, as, for example, in stables, barns, breweries, public laundries, packing houses, dye works, blacksmith shops, foundries, wood working plants flour mills and similar locations. If not attached to fixtures, they shall be hung from separate stranded conductors not smaller than No. 14 B. and S. Gauge which are soldered directly to the circuit conductors but supported independently thereof.

(22) All devices provided with terminals for the attachment of wires, and intended for connection to grounded circuits shall have their terminals properly marked for identification.

(23) Three-way and four-way switches shall be classed as single-pole switches and shall be so wired that only one side of the

circuit will be carried to the switch.

(24) Conductors of different systems shall not be installed in the same conduit, junction box, pull box, cutout box or cabinet, gutter or wireway.

When a junction box, pull box, cutout box or cabinet gutter or wireway, is separated into two or more compartments by partitions of approved gauge metal, conductors of the different systems may be installed in the separate compartments.

(25) Separately metered circuits or feeders supplying different consumers shall not be installed in the same conduit.

(26) All cabinets and cutouts and entrance switch and meter loops shall be in place and properly connected to all circuit and service conductors before asking for inspection on the wiring installation of any residence.

(27) Outlet boxes must be securely fastened to header boards with screws; nails will not be permitted for this purpose.

GROUNDING LOW POTENTIAL CIRCUITS

40. (1) All single phase, two-wire, and three-wire services shall be grounded where the potential to ground does not exceed one hundred and fifty (150) volts. The grounding conductor shall be connected to the service conductor, ahead and on the line side of the service switch and within the service cabinet. The grounding conductor shall be connected to the service conductor and to the cabinet by means of approved lugs.

(2) The ground connection shall be made on the neutral conductor.

(3) The grounding conductors shall be of copper, and shall have a current-carrying capacity of not less than one-fifth that of the conductor to which it is attached. The grounding conductor shall not be smaller than #8 B. and S. Gauge, except that a #10 B. and S. Gauge grounding conductor may be used for grounding a service that is not larger than #10 B. and S. Gauge.

(4) The circuit-grounding conductor shall be installed in conduit from the point of connection with the service conductor to the point of connection with the water pipe, except as otherwise provided for in subsection (13) of this Section.

(5) The conduit containing the grounding conductor shall be secured to the service cabinet by means of locknuts and a bushing and shall terminate in a fitting similar and equal to the Grouse-Hinds, Type G.C. Condulet, close to the water pipe. This fitting

shall protect the ground connection from mechanical injury, and shall have attached thereto an approved ground clamp and a lug to which the ground conductor shall be soldered.

(6) The ground connection shall be made to the cold water piping system and as close to the water service entrance as is practicable, if one is available within the building. The point of connection shall be made on the street side of the water meter when a water meter is installed within the building, or the water meter shall be shunted or bonded by means of an approved shunt or jumper.

(7) When water meters are located on the outside of buildings, or in pits within the buildings, such ground connections may be made on the building side of the meters, but as close to such meters as is practicable.

(8) All ground connections shall be in plain sight and readily accessible.

(9) The entire conduit system, including cabinet boxes, etc., to which any conduit is connected, shall be permanently and effectively grounded.

(10) When it is not practicable to ground to an underground water-piping system, artificial grounds may be used by special permission. These artificial grounds shall consist of buried plates, driven pipes, or driven rods, which shall be embedded below the permanent moisture level. Ground pipes shall be galvanized, and shall not be less than three-quarters of an inch internal diameter.

(11) For conduit, armored cable, metal race-ways, or metal wireways, the grounding conductor shall be attached, as near as practicable, to the point where the conductors in the conduit, armored cable, metal raceways, or wireways receive their supply. The point of attachment shall be in plain sight and readily accessible. Exposed non-current carrying metal parts of motors, generators, cases of transformers, and control apparatus shall be permanently and effectively grounded. Motors which are combined with ceiling fans, shall be hung from insulated hooks or shall have an insulator

interposed between the motor and its support.

(12) The size of the ground conductor shall not be less than that given in the following table:

0 to 100 amperes	#10 B. and S. Gauge
101 to 200 amperes	# 6 B. and S. Gauge
201 to 500 amperes	# 4 B. and S. Gauge
Over 500 amperes	# 2 B. and S. Gauge

(13) If the circuit ground conductor is not installed in conduit, the grounding conductor for the conduit system and the like shall have a separate grounding conductor of its own. This conductor shall be installed so that it will not be subject to mechanical injury, and shall be installed to comply with Knob and Tube Rules.

(14) Such grounding conductor shall be rubber covered, and shall have a continuous identifying marker distinguishing it from other conductors. This marker shall consist of a white or natural gray covering.

(15) The use of conduit, outlet, boxes, and switch boxes used on conduit work, which are coated with a non-metallic covering, will not be permitted.

(16) If cabinet boxes, cutout boxes, etc., which have a non-metallic covering are used, they shall be securely bonded by means of approved ground clamps secured to the conduits entering such box.

(17) A bond wire of not less than #8 B. and S. gauge shall be used, which shall be soldered to each clamp by an approved lug. Such bond wire shall be securely and effectively grounded to the inside of the box by an approved lug.

(18) If galvanized boxes are used, the bonding may be substituted by securing the conduits to the box by means of a lock nut and bushing on the inside of the box, and two locknuts on the outside of the box.

(19) Conduits entering cabinet boxes, control boxes, outlet boxes, switch boxes, and all other boxes constructed of metal shall be securely fastened to such boxes by using a bushing and a lock nut on the inside of the box, and a lock nut on the outside of such boxes.

(20) On conductors of sizes #14 to #6 B. & S. Gauge, ~~xxx~~ inclusive, the neutral conductor on all three-wire circuits, and one conductor on all two-wire circuits, shall have an exterior braid of either white or natural gray color. The exterior braid of the ungrounded conductor or conductors shall be black or of a solid dark color.

(21) For flexible cords, one conductor shall have a continuous identifying marker readily distinguishing it from the other conductors. This marker shall be a tracer, in the braid, of any color contrasting with that of the braid.

(22) Single pole switches shall not be placed on any neutral or grounded conductor.

CONDUIT WIRING

41. (1) All conductors, including the conductors of fire-alarm systems, installed in or on buildings other than residences and outbuildings used in connection with such residences situated in the Municipality shall be enclosed in approved metal conduit or where approved, in armored cable or metal mouldings. Exception may be made to this rule in places subject to extreme temperatures, such as cold storage plants, refrigerator rooms, and rooms subject to corrosive vapors and where the environment is such as to cause rapid deterioration of conduits and conductors. In such excepted cases, open wiring may be used, provided that the conductors are suitably enclosed, coated, or otherwise protected to the satisfaction of the Chief Electrical Inspector.

When minor additions, alterations, or repairs are made to existing systems, the Chief Electrical Inspector may modify the aforesaid requirements.

(2) Tables for the minimum sizes of conduits allowed

for the installation of wires and cables;

Number of Wires in Conduit

Size of Wire B.&S. Gauge	Minimum Size of Conduit in Inches								
	1	2	3	4	5	6	7	8	9
14	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	1	1	1	1
12	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	1	1	1	$1\frac{1}{2}$
10	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$	1	1	1	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$
8	$\frac{1}{2}$	$\frac{3}{4}$	1	1	1	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$
6	$\frac{1}{2}$	1	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	2	2	2
5	$\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	2	2	2	2
4	$\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	2	2	2	2	$2\frac{1}{2}$
3	$\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	2	2	2	$2\frac{1}{2}$	$2\frac{1}{2}$
2	$\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	2	2	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$
1	$\frac{3}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$	2	2	$2\frac{1}{2}$	$2\frac{1}{2}$	3	3
0	1	$1\frac{1}{2}$	2	2	$2\frac{1}{2}$	$2\frac{1}{2}$	3	3	3
00	1	2	2	$2\frac{1}{2}$	$2\frac{1}{2}$	3	3	3	$3\frac{1}{2}$
000	1	2	2	$2\frac{1}{2}$	3	3	3	$3\frac{1}{2}$	$3\frac{1}{2}$
0000	$1\frac{1}{2}$	2	$2\frac{1}{2}$	$2\frac{1}{2}$	3	3	$3\frac{1}{2}$	$3\frac{1}{2}$	4
200000 C.M.	$1\frac{1}{2}$	2	$2\frac{1}{2}$	$2\frac{1}{2}$	3	3	$3\frac{1}{2}$	$3\frac{1}{2}$	4
225000	$1\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	3	3	$3\frac{1}{2}$			
250000	$1\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	3	3	$3\frac{1}{2}$			
300000	$1\frac{1}{2}$	$2\frac{1}{2}$	3	3	$3\frac{1}{2}$	$3\frac{1}{2}$			
350000	$1\frac{1}{2}$	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$3\frac{1}{2}$	4			
400000	$1\frac{1}{2}$	3	3	$3\frac{1}{2}$	4	4			
450000	$1\frac{1}{2}$	3	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$			
500000	$1\frac{1}{2}$	3	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$			
550000	$1\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5			
600000	2	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5			
650000	2	$3\frac{1}{2}$	$3\frac{1}{2}$	4					
700000	2	$3\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$					
750000	2	$3\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$					
800000	2	$3\frac{1}{2}$	4	$4\frac{1}{2}$					
850000	2	$3\frac{1}{2}$	4	$4\frac{1}{2}$					

Number of Wires in Conduit (cont'd)

Size of Wire B. & S. Gauge	Minimum Size of Conduit in Inches								
	1	2	3	4	5	6	7	8	9
900000 C.M.	2	3½	4	4½					
950000	2	4	4	5					
1000000	2	4	4	5					

For open wiring and for sizes not greater than #10 B. and S. gauge, one more conductor than permitted by the preceding table may be installed in the specified conduit, provided such conduit is not longer than thirty feet and has not more than the equivalent of two quarter bends from outlet to outlet, the bends at the outlets not being counted.

(3) If conduits are installed in such manner as to form a pocket or trap, or be formed in such manner as to retain moisture from any cause whatever, lead-covered wire shall be used, unless such conduit is properly drained.

(4) Allowable Carrying Capacities of Wires:

B. & S. Gauge	Diameter of Solid Wires in MILS.	Area in Circular MILS.	Rubber Insulation Amperes	Varnished Cloth Insulation Amperes	Other Insulation Amperes
18	40.3	1,624	3		5
16	50.8	2,583	6		10
14	64.1	4,107	15	18	20
12	80.8	6,530	20	25	25
10	101.9	10,380	25	30	30
8	128.5	16,510	35	40	50
6	162.0	26,550	50	60	70
5	181.9	33,200	55	65	80

P. & S. Gauge	Diameter of Solid Wires in Mils.	Area in Circular mils.	Rubber Insulation Amperes	Waxed Cloth Insulation Amperes	Other Insulation Amperes.
4	204.3	41,740	70	85	90
3	229.4	52,630	80	95	100
2	257.6	56,370	90	110	125
1	289.3	83,690	100	120	150
0	325.	105,500	125	150	200
00	364.8	133,100	150	180	225
000	409.6	167,800	175	210	275
		200,000	200	240	300
0000	460.	211,600	225	270	325
		250,000	250	300	350
		300,000	275	330	400
		350,000	300	360	450
		400,000	325	390	500
		500,000	400	480	600
		600,000	450	540	680
		700,000	500	600	760
		800,000	550	660	840
		900,000	600	720	920
		1,000,000	650	780	1000

MOTORS

42. (1) The following tables are intended for use only as a general guide, and shall only apply to the installation of motors of the standard type and ratings most commonly used when operating conditions are of the average or ordinary character. Care must be exercised before applying these tables.

(2) The conductor sizes indicated in the tables for

squirrel cage A.C. Motors shall apply to the installation of a single motor, and, except when a demand factor is permitted, conductors supplying current to a number of motors shall be of sufficient size to carry the starting current of the largest motor in the group plus the sum of the full load currents of the remaining motors. The carrying capacity of such conductors shall be in accordance with section 41 (4) for Rubber Insulation, Regardless of the kind of insulation used.

INDUCTION MOTORS

TABLE (a). Single Phase
Standard Speed, 1750 R.P.M., 60 cycles

H. P.	Voltage	Full Load Amperes	Starting Fuses Amps.	Running Fuses Amps.	Size of Switch Amps.	Size of wire, B. & S. Gauge
½	110					
	220					
¾	110	6.8	20	10	30	12
	220	3.4	10	5	30	14
1	110	13.3	35	20	60	8
	220	6.6	20	10	30	12
2	110	24.8	60	30	60	6
	220	12.4	35	15	60	8
3	110	36.	75	45	100	4
	220	18.	45	25	60	8
5	110	58.4	120	75	200	2
	220	29.2	70	40	100	6
7½	110	85.2	170	100	200	0
	220	42.6	85	55	100	4
10	110	110.	175	150	200	00
	220	55.	110	65	200	2

INDUCTION MOTORS

TABLE (b) Three-phase, 220 volts, Standard Speed,
from 1200 to 1800 R.P.M. 60 cycles

H. & P.	Full Load Amperes	Starting Fuses, Amps.	Running Fuses Amps.	Size of Switch, Amps.	Size of Wire B. & S. gauge
½	1.8	5	5	30	14
1	3.5	10	5	30	14
2	6.5	20	10	30	12
3	9.5	30	15	30	10
5	15.4	35	20	60	8
7½	22.4	60	35	60	6
10	29.	70	40	100	6
15	42.5	85	50	100	4
20	55.	110	80	200	2
25	68.	140	85	200	1
30	80.	160	100	200	0
35	94.	185	125	200	0
40	105.	190	130	200	00
50	130.	195	165	200	000
60	155.	230	190	400	200,000 C.M.
75	192.	290	240	400	300,000 C.M.
100	252.	380	310	400	400,000 C.M.
150	368.	550	460		650,000 C.M.
200	484.	720	600		900,000 C.M.

INDUCTION MOTORS

TABLE (c). Three-phase, 440 volts, Standard Speed, from 1200
to 1800 R.P.M., 60 cycles.

H.P.	Full Load, Amperes.	Starting Fuses, Amps.	Running Fuses, Amps.	Size of Switch	Size of Wire B. & S. gauge
½	1.	5	5	30	14

Table (c) (cont'd).

H.P.	Full load, Amperes	Starting Fuses, Amps.	Running Fuses, Amps.	Size of Switch.	Size of Wire B. & S. Gauge
1	1.75	5	5	30	14
2	3.25	15	5	30	14
3	4.75	20	5	30	14
5	7.7	25	10	30	12
7½	11.2	30	15	30	10
10	14.5	40	20	30	8
15	21.2	50	25	60	8
20	27.5	65	35	100	6
25	34.	70	40	100	6
30	40.	80	50	100	4
35	47.	95	60	100	2
40	52.5	110	65	200	2
50	65.	130	80	200	1
60	77.5	160	95	200	0
75	86.	175	100	200	0
100	126.	190	150	200	00
150	185.	275	230	400	250,000 C.M.
200	242.	360	300	400	400,000 C.M.

Table (d) Three-phase, 2200 Volts.

H. P.	FULL Load, Amperes	Starting Fuses, Amps.	Running Fuses, Amps.	Oil Switch, Amperes	Entrance Switch Amps.	Size of Wire, B. & S. Gauge
15	3.9	10	5	60	30	12
20	5.8	15	10	60	30	12
25	7.2	20	10	60	30	12
35	9.8	25	15	60	30	12
50	14.3	40	20	60	60	8

Table (d) (cont'd)

H.P.	Full load, Amperes	Starting Fuses, Amps	Running Fuses, Amps.	Oil Switch, Amperes.	Entrance Switch, Amps.	Size of wire B.& S. Gauge
75	20.7	60	30	60	60	6
100	27.2	65	45	100	100	6
150	40.9	90	50	100	100	4
200	54.5	125	65	200	200	2
300	72.5	150	90	200	200	1
400	96.6	175	125	200	200	0
500	121.	200	150	200	200	0

DIRECT CURRENT MOTORS

500 to 700 volts

Table (e). The tables for direct current motors give the size for supplying a single motor. In order to find the size of mains and submains for more than one motor, take the full load amperes of all and add twenty-five (25) per cent of the full load of the largest motor, and from this total select a wire size from Section 41 (4)

H.P.	Full load Amperes	Size of Fuses Amperes	Size of Switch, Amps.	Size of wire B.& S. Gauge
1	1.8	3	30	14
2	3.7	5	30	14
3	5.3	6	30	12
5	8.8	10	30	12
7½	13.5	16	30	12
10	17.5	20	30	10
15	25.	35	60	8

Table (e) (cont'd)

H. P.	Full load Amperes	Size of Fuses, Amperes	Size of Switch, Amps.	Size of Wires, B. & S. gauge
20	34.	40	60	6
25	42.	50	60	6
30	50.	60	60	4
35	59.	70	100	4
40	68.	75	100	2
50	83.	90	100	2
60	100.	125	200	0
70	116.	150	200	00
75	124.	150	200	00
80	133.	170	200	000
90	149.	200	200	200,000 C.M.
100	164.	200	200	200,000 C.M.

(3) All A.C. motors up to and including five H.P. shall be controlled and operated by totally enclosed and externally operated switches of the quick-break type or other approved starting devices. The operating switch or starting device shall be independent of the entrance switch and shall be installed on the load side of the meter.

(4) A.C. motors rated at over five H.P., except as noted in subsections (5) and (6) of this section, shall be started by means of a compensator or an equivalent device which will limit the starting current to a value not greater than prescribed in Section 42.

(5) A.C. motors not larger than ten H.P. having a rated speed of 1800 r.p.m. and less, if furnished with air or oil motor-starting switches of the free-handle type or remote-controlled con-

tractors, and provided with overload inverse time limit protection which will limit the protection to a value of not more than 125% of the name-plate rating of the motor need not be provided with compensators. Motors of 20 h.p. or less having a rated speed of over 1800 r.p.m. may be used without compensators by special permission.

(6) All A. C. motors of five H.P. or less shall be controlled and operated by totally enclosed and externally operated switches of the quick-break type or other approved starting devices. For motors not over 1/2 H.P. a snap switch may be used if this switch is of a type specially approved for this purpose. These switches or starting devices shall be independent of the entrance switch and shall be installed on the load side of the meter.

(7) High torque motors having high reactance rotors, or motors that have automatically inserted in their windings at the time of starting, resistance or reactance which will limit the starting protection to a value of not more than 125% of the name-plate rating of the motor, need not be provided with compensators for all sizes up to 100 H.P. if provided with approved starting equipment.

(8) The inverse-time-limit protection shall be of the manual reset type, and the overload protection shall be obtained through the use of thermal or magnetic overload relays. The motors shall be protected during starting and running. Resetting of the relays after the overload has subsided shall be manual unless it is necessary, due to operating conditions, to have the reset automatic.

The low voltage protection shall be such that should the line voltage drop to a very low value or fail altogether, the motor will stop, and will not restart upon return of voltage until the reset is again operated.

(9) Starters shall be equipped with low-voltage protection and if provided with overload protection which will limit the starting current of the motor to values not greater than permitted in Section (5), the overload protection may take the place of the running fuses.

(10) Where the unexpected restarting of any motor would probably cause injury or fire, or where a motor of more than 2 H.P. drives a group of machines, such motors shall be provided with suitable protective devices that will automatically open the circuit to the motor upon the failure of the voltage, and cause such circuit to remain open until manually reclosed.

(11) Each motor with its starting device shall be controlled by an externally operated switch which will disconnect all ungrounded conductors. The switch shall have a continuous duty rating at least equal to the carrying capacity of the conductors between the motor and its running overload protective device.

(12) Special permission shall be obtained from the supply company for the installation of all A. C. Squirrel Cage Motors over ten H.P. which are to be started without compensators.

(13) Compensators shall be equipped with no-volt protection; and if provided with over-load protection which will limit the starting current of the motor to values not greater than prescribed in section 42, the over-load protection may take the place of the running fuses.

(14) Each motor with its starting device shall be controlled by an externally operated switch which will disconnect all ungrounded conductors. The switch shall have a continuous duty rating at least equal to the carrying capacity of the conductor between the motor and its running overload protective device.

(15) If the motor is supplied by a separate branch circuit which is individually controlled by a switch, then such switch may serve as the switch required in subsection (14) of this section, provided that this switch is so arranged that it can be locked in the open position.

(16) Metal conduit, armour, etc., terminating at cabinet or casings which enclose switches, starters, or control equipment,

shall properly enter and be secured to such enclosures, except where conductors terminate at resistor grids and similar places. Terminal boxes or casings shall be provided for all control equipment.

(17) Metal conduit, armour, etc., terminating at motors shall properly enter and be secured to a terminal box or casing attached to the motor frame and enclosing the motor terminal leads. This rule shall not apply to the secondary leads terminating at any slip ring motor, provided there are no bare live parts, and provided that the open leads shall be protected with cord or tape or other suitable means.

(18) Snap switches used for the control of A. C. motors over 1/2 H.P. shall be of a type especially approved for this purpose, and shall have a rating of at least 200% of the name-plate current rating of the motor.

(19) Motor-starting switches and controllers, and other starters such as the starting obtained by remote control, shall be located within sight of the motor, or within sight of the machinery driven by the motor.

(20) All exposed non-current carrying metal parts of motor and control apparatus shall be effectively and permanently grounded, in accordance with subsection (11) of section 40.

(21) Each motor shall be provided with a name-plate giving the maker's name, capacity in volts and amperes, and the normal full-load speed; also, the interval during which they can safely operate at full-rated load. The time interval given shall be either 5, 10, 15, 30, 60 or 120 minutes, or continuous.

When a motor is rebuilt or rewound, with any change in its rating or characteristics, it shall be provided with a name plate giving the name of the person or firms by whom such change was made, and giving the new rating and characteristics in the same detail as specified in the preceding paragraph.

(22) Each motor-starting device shall be provided with markings giving the maker's name and rating, which may be readily

seen after such device has been installed.

(23) Where the unexpected re-starting of any motor would probably cause injury or fire, or where a motor of more than two horse-power drives a group of machines, such motors shall be provided with suitable protective devices that will automatically open the circuit to the motor upon the failure of the voltage, and cause such circuit to remain open until manually reclosed.

(24) D. C. Motors over 110 volts shall not be approved except for the operation of passenger and freight elevators and hoisting machinery.

TRANSFORMER VAULTS

43. (1) A plan of the transformer vault, giving details of the construction, number, and capacity of all transformers and the type of operative device used, shall be submitted to the Chief Electrical Inspector for his approval before a permit shall be granted therefor.

(2) Such transformer vault shall be constructed of reinforced concrete of not less than six inches in thickness; or, if brick or tile is used, not less than eight inches in thickness,

A suitable drain shall be provided to carry off an accumulation of oil in the vault. If such oil is drained to sewers, suitable traps shall be provided.

The drain shall have a pitch of not less than $\frac{1}{4}$ inch per foot.

In transformer vaults containing transformers having a total capacity of 100 K.V.A. or less, such drain may be omitted if the enclosure is so constructed as to retain all the oil used within such vault.

(3) Unless access is from the outside only of the building containing the vault, the doorway of such vault shall be effectually closed by means of a standard Underwriter's Fire-door Hanging, with Standard Underwriters' Hardware.

A door sill of not less than four inches in height above the floor shall be provided. In all cases such sill shall be of suf-

ficient height to confine within the vault the quantity of oil used in the largest transformer within such vault.

(4) The vault enclosure shall be ventilated by means of an air inlet placed not more than six inches above the floor and shall be provided with an outlet which shall be equal to not less than one square inch of K. V. A. of installed transformer capacity.

No ventilating opening therein shall have an area of less than sixty square inches.

Such air outlet shall be directly connected to a chimney, flue, or other suitable vent leading to the outside of the building.

Such air inlet and outlet vent contained in such vaults shall be provided with Standard Underwriters vertical sliding fire doors or shutters, unless such openings lead directly to the outside air.

All such fire doors or shutters shall be automatically controlled.

(5) Such vault enclosure shall be used only for transformers and such necessary apparatus pertaining thereto, and shall at all times be kept securely locked, and access therein allowed only to authorized persons.

(6) Adequate working space, with secure footing therein, shall be provided and maintained in and about all the electrical equipment in such transformer vault which may require adjustment or examination during its operation, and such space shall be maintained so as to give ready and safe access to all parts of such equipment requiring attention.

(7) The service of the transformer vault shall be run underground from the supply line to the building containing such vault, unless special permission has first been obtained from the Chief Electrical Inspector to run such service otherwise,

The service conductors shall be multiple-conductor, lead-sheathed, rubber-covered cable installed in rigid metal conduit.

The service shall be controlled and operated by an automatic over-load circuit breaker. Such circuit breaker shall be con-

trolled from the outside of the transformer vault.

(8) Open wiring may be employed in such vault.

Conductors shall be rigidly supported on glass or porcelain insulators which will keep such conductors at least one inch from the surface wired over and not less than eight inches apart, except immediately adjacent to the apparatus and devices.

Rigid supporting shall be provided which shall require supports at least four and one-half feet apart when wiring along flat surfaces.

(9) Each and every transformer, or bank of transformers, shall be protected by overload circuit breakers which shall have an interrupting capacity equal to that of the main circuit breaker. Primary cutouts and fuses of the expulsion type, encased in porcelain, metal, or their equal, shall be installed, which will effectually isolate each circuit breaker from its respective sources of supply. Such primary cutouts shall be installed immediately ahead of and adjacent to the circuit breakers. In addition to such primary cutouts, and immediately ahead of each transformer, approved disconnectors of the enclosed type shall be installed.

(10) If the secondary grounded conductor is grounded within the transformer vault, it shall be grounded in accordance with the rules governing low potential grounding.

(11) All disconnectors shall be provided with warning signs which shall have the following words in legible letters prominently displayed at such disconnectors:

*WARNING
DISCONNECTORS -DO NOT OPEN WHILE
UNDER LOAD*

(12) When a group of disconnectors is installed in one compartment, a single conspicuous sign with the foregoing words shall be sufficient.

STATIC CONDENSERS

44. Static condensers of the type made up of small units, each of which contains less than three gallons of oil, may be installed in power-houses. If installed in places other than

power-houses and fire-proof rooms, such condensers shall be surrounded by an enclosure constructed of fire-resisting material. Condensers which have all units in single tanks filled with oil shall be installed in transformer vaults or in fireproof rooms. All condensers shall be protected by automatic circuit breakers and thermal relays. The thermal relays shall be designed to actuate the no-volt release-coil of the circuit breaker immediately a dangerous rise in temperature takes place in the condenser tank. Transformers of the oil-cooled type used with static condensers, if surrounded by concrete curbs of not less than six inches in height, which will form a basin of sufficient capacity to retain, if necessary, all the oil contained in such transformers, may be installed in power-houses. Transformers of the air-cooled type may also be installed in power-houses; but if installed in other places than power houses or fire-proof rooms, they shall be surrounded by fire-resisting enclosures. All transformers shall be protected by automatic circuit breakers set to operate at not more than 150% of the rated capacity of the condenser.

HIGH POTENTIAL MOTORS

45. (1) The service for all motors operating at potentials greater than 600 volts and not more than 2,500 volts, shall be run underground from the respective supply lines to the building, unless otherwise permitted by the Chief Electrical Inspector.

(2) Multiple-conductor, lead-sheathed, rubber-covered cable shall be used and installed in rigid metal conduit. Where the cable emerges from the lead-sheath at the service entrance, it shall be protected from moisture and mechanical injury by an approved pothead.

(3) An oil switch or oil circuit-breaker shall be installed as a service switch, protected by suitable disconnectors and fuses. Such disconnectors and fuses shall be of the expulsion type, enclosed in metal or porcelain housings. If such disconnectors are of the porcelain-clad type, they shall be enclosed in metal cabinets, and where the cable emerges from the lead-sheath, such lead sheath shall be belled and the conductors shall be taped and painted with an insulating compound. If such disconnectors are of

the metal-clad type, the conduit shall be secured to the metal casing by an effective mechanical bond.

(4) All motor-starting apparatus, and all wiring, shall be completely enclosed in substantial metal casings or shields. Conduit shall properly enter and be so secured to such casings or shields, or to suitable terminal boxes secured or bolted to the casings, that an effective and mechanical bond will be established.

(5) When more than one motor is installed, each motor shall be protected by approved automatic circuit breakers and approved enclosed disconnectors and fuses. If the motor-starting device at the motor is equipped with overload and no-voltage release devices, the circuit breaker may be omitted.

(6) The entire system, including motor frames, conduit and all boxes and casing, shall be permanently and effectively grounded.

(7) When motors operating at potentials of over 600 volts, and not exceeding 2500 volts, are installed, an oil switch shall be installed on the service riser pole, or on a pole not more than one span removed from the service pole. This switch shall be so arranged that it can be easily operated from the ground.

(8) A sign, having the following words, shall be placed at the service pothead and other parts of the equipment where directed printed in clear and legible letters, and prominently displayed at such service pothead:

"DANGER, 2300 VOLTS"

CABINET AND CUT-OUT BOXES

46. (1) The design and construction of cabinets and cut-out boxes must be such as to insure ample strength, rigidity, and interior spacings.

(2) Cabinet and cutout boxes shall be of the dead-front type.

Interior Dimensions

(3) The spacing within cabinets and cutout boxes must be sufficient to provide ample room for the distribution of wires

and cables placed in them, and also for separation between metal parts of the cabinet and current carrying parts of devices and apparatus mounted within them, as follows:-

There shall be an air space of at least one-sixteenth inch (except at points of support) between the base of such device and the wall of the box on which such device is mounted.

There shall be an air space of at least one inch between the current-carrying parts of any enclosed fuse or other device and the door of such cabinets or cutout boxes, unless such door is lined with a standard insulating material, or is of a thickness at least that of No. 12, U.S. gauge, when the air space shall be not less than one-half inch. If double doors are used with or without a lining of insulating material, a minimum air space of at least one inch shall be provided in all cases.

Limitations of air spaces between doors and non-current carrying caps of edison plug fuses are considered to be unnecessary.

There shall be a space of at least two inches between open link fuses and metal-lined walls, or metal, metal-lined, or glass-panneled doors.

There shall be an air space of at least one-half inch between the walls, backs, gutter partitions (if of metal), or doors and the nearest exposed current-carrying part of the devices mounted within such cabinets where the potentials do not exceed 250 volts. This spacing shall be increased to at least one inch where the potentials exceed 250 volts A.C.

All cabinets and cutout boxes shall be deep enough to allow the doors thereof to be closed when thirty-ampere branch circuit panel-board switches having spool or composition handles or when switches of combination cutouts are in any position, and doors closed when other single-throw switches are thrown open, in so far as their construction and installation will permit. Cabinets and cutout boxes, when used to enclose devices carrying over 500 volts A.C. and less than 700 volts D.C. between conductors, shall have linings of asbestos board or other standard insulating material mounted within the cabinet between the nearest current-carrying

parts of such device and all walls doors, or partitions thereof constructed of metal, unless an air space of at least three inches has otherwise been provided. The backs of these cabinets shall be lined with asbestos-wood, or insulating material of at least one-fourth of an inch in thickness.

MARKING

(4) Each outlet box or cabinet shall be marked so as to positively identify the factory in which it was made. This marking may consist of a stamping in the metal or of a transfer or of a metal plate riveted in place. It may be placed at any point on the box or door where it may be seen after the device is installed.

SPECIAL REQUIREMENTS

(5) For wet locations and outdoor services cabinets and cutout boxes shall be so designed and constructed so that a beating rain and moisture running down conduits or wall will not permit water to enter. They shall be provided with external fastenings for mountings. Hinges to be of cast metal, brass or hot dipped galvanized steel, provided with brass pins. Threaded holes for conduits shall be reinforced so as to provide metal at least one-quarter inch in thickness. Bushed holes for open wiring shall not be located either in the top or back, except when special hood fittings are provided, and when located in the sides, shall be formed so as to provide a downward direction for wires leaving the cabinet. Devices made of sheet metal lighter than No. 10 U.S.Gauge shall be galvanized by the hot-dip process after forming and assembly.

Cabinets and cutout boxes made of sheet metal of No. 10 U.S.Gauge in thickness, or heavier, need not be galvanized after forming and assembly, provided galvanized sheets are used and all

cut edges are painted. Other materials to be treated in order to give protection from corrosion.

THEATRES, INCLUDING MOTION
PICTURE THEATRES

47. (1) All conductors shall be installed in rigid metal conduit or metal raceways, except that where flexibility of connection is necessary, flexible metal conduit and armoured cable may be used. Metal raceways shall not be used for stage wiring.

(2) Two separate and distinct services shall be installed, one service being of sufficient capacity to supply the entire equipment of such theatre, the other service being of sufficient capacity to supply the emergency and exit lights.

(3) Emergency lights shall be deemed to be lights in exit signs, halls, stairways, corridors, (including the corridors and stairways to the dressing-rooms), and other portions of the theatre to which the public has access, and which are normally kept lighted during any performance therein.

All auditoriums lights on the emergency circuit of a moving picture theatre shall be operated and controlled by double-pole switches in parallel, placed in the lobby and in the projection room of such theatre. Such switches shall be placed so as to be within easy reach at all times of attendants of such theatre.

(4) There shall be provided on the emergency circuit in the auditorium of moving picture theatres, circuits of sufficient capacity to permit the use of at least .5 watts per one hundred square feet of floor area. This area shall include the main floor, balconies, galleries, boxes and loges.

EXIT LIGHTS

At all exits there shall be provided illuminated signs displaying through red-coloured glass the word "EXIT" in letters not less than six inches in height. Such sign shall be kept contin-

nously illuminated while such theatre is being used.

(5) The switchboard shall be of the dead-front type, and shall carry a metal hood running the full length of the board protecting the latter from falling objects.

Dimmers shall be so connected that they will be dead when their respective switches are open.

(6) Approved slow-burning wire shall be used in the wiring for footlights, portable strips, borders, proscenium side lights, and incandescent floodlights.

(7) All foot lights shall be wired by either the conduit or the armoured cable method, receptacles being enclosed in approved boxes; or the wires thereof shall be encased in a metal trough composed of not less than No. 20 U.S. sheet metal gauge (.0375 inch) treated to prevent oxidation. Conductors shall be soldered to all receptacles. Terminals shall be kept at least one-half inch from the metal of the trough.

(8) All footlights, border lights, and proscenium side lights shall be so wired that the number of outlets, and the lamps connected to them, shall in no case be such as to place more than fifteen amperes on any branch circuit fuse.

(9) All borders and proscenium side lights shall be constructed as prescribed in subsection (7) of this section, shall be suitably stayed and supported, and so designed that the flanges of the reflectors or other adequate guards will protect the lamps from mechanical injury and from accidental contact with scenery or other combustible material.

(10) All border cables shall be of the approved type and suitably supported. They shall be employed only where flexibility be required.

(11) All borders shall be suitably suspended. If wire rope is used, each length shall be insulated by at least one strain insulator, placed close to such border.

(12) All stage and gallery pockets shall be of the approved type, and controlled from the switch-board. Feeds for

pockets shall not be smaller than No. 6 B. and S. Gauge and the receptacles shall have a capacity of not less than thirty-five amperes. Feeds for incandescent pockets shall be not smaller than No. 12, B. and S. Gauge and the receptacles shall have a capacity of not less than fifteen amperes. Feeds to pockets shall be of ample size to supply all receptacles therein at full rating. Plugs for arc and incandescent pockets shall not be interchangeable.

(13) All lamps installed in scene docks shall be so located and guarded as to be free from mechanical injury.

(14) All curtain motors shall be of the enclosed type.

DRESSING-ROOMS

(15) Pendants for lights shall be composed of approved reinforced cord, armored cable, or armored cord. Lamps shall be protected by approved guards sealed or locked in place.

PORTABLE ARC LAMPS

(16) All arc lamps shall be substantially constructed entirely of metal of not less than No. 20 U.S. sheet metal gauge (.0375 inch), except where approved insulating material is necessary. The design shall be such as to provide proper ventilation while retaining sparks, and to prevent carbons or other live parts of the lamp from making contact with the metal of the hood.

All hoods for other than lens lamps shall have their front opening equipped with a self-closing hinged door frame carrying either wire gauze or glass. Hoods for lens lamps may have a stationary front, and a solid door on either back or side.

Mica shall be used for the insulation of such lamp frames.

Arc lamp frames and standards shall be installed and guarded so as to prevent their becoming grounded.

The switch on each standard shall be of such design so that accidental contact with any live part will be impossible.

Stranded connections in the lamp and at the switch and rheostat shall be provided with approved lugs.

All rheostats shall be enclosed in a substantial properly ventilated metal case affording a clearance of at least one inch between case and resistance element. If the rheostat is mounted on the standard, a clearance of at least three inches above the floor shall be maintained.

A qualified operator shall be employed for each lamp; or for each two lamps when placed not more than ten feet apart, and arranged so that one operator can properly watch and care for both.

PORTABLE BUNCHES AND PORTABLE STRIPS

(17) Substantial metal shall be employed, and no wiring shall be exposed.

Where the cable passes through such metal, an approved bushing shall be used, and such cable shall be anchored so as to relieve the connections of any mechanical strain.

Portable strips shall conform to the requirements of subsections (7), (8) and (9) of this section.

Where any cable passes through metal, an approved bushing shall be employed, and such cable shall be anchored so as to relieve the connections from serious mechanical strain.

(18) The construction thereof shall be such that no current-carrying part will be exposed.

Each receptacle shall have a current-carrying capacity of at least thirty amperes, and shall be protected by approved fuses mounted on slate or marble bases enclosed in a fireproof cabinet equipped with self-closing doors.

Bus-bars shall have a current-carrying capacity equal to the sum of the ampere ratings of all the receptacles. Approved lugs shall be provided for the connection with the master cable.

PORTABLE CONDUCTORS

(19) Pin-plug connectors shall be so designed that tension on the cable will not cause serious mechanical strain on such connections. The female half of such connectors shall be

attached to the live end of such cable.

Flexible conductors used from receptacles to arc lamps, bunches, and other portable equipments, shall be of approved stage cable, except for the purpose of feeding a stand lamp under conditions where conductors are not liable to severe mechanical injury, when an improved reinforced cord may be used, if the cutout designed to protect such conductors is not fused over fifteen amperes capacity.

LIGHTS AND SCENERY

(20) All brackets shall be wired internally, and the fixture stem shall be carried through to the back of the scenery, where a suitable bushing shall be placed on the end of the stem. Such fixtures shall be securely fastened in place.

(21) In motion-picture theatres, no electrical equipment such as rheostats, motor-generators, rectifiers, transformers and fuses, shall be installed in the projection-room but shall be installed in a separate fireproof room. Switches installed in the projection-room shall be of the dead-front type, and no exposed live parts shall be allowed in such projection-room. The arc lamps shall be controlled by double-pole switches, and shall be within easy reach of the projectionist while standing in the observation position in the projection room. Wires not smaller than No. 4 B. and S. Gauge shall be used to supply the projection outlet.

No more than one light outlet shall be provided for each projector installed; and one light outlet for the rewind apparatus. All lights used in the projection-room shall be protected by approved wire guards; and reinforced cord shall be used for pendant lights.

The projection-room shall be built in accordance with the Building By-law of the Municipality of Burnaby.

SIGNS

48. (1) All electric signs, and the electrical wiring and equipment of all bill boards, signboards, and other electrically equipped advertising structures, shall, in addition to the requirements of this by-law, be constructed, installed, and maintained in

compliance with the Building By-law of the Municipality of Burnaby.

(2) All wiring for outlets shall be installed in conduit when such outlets and conduit are installed on the exterior of buildings, and be made waterproof. Threaded fittings, of types approved for the purpose, shall be used. When such conduit is installed in any location where moisture is liable to penetrate into the system, such conduit shall be arranged to drain at low points, in order to prevent the accumulation of moisture in such conduit and fittings.

(3) In marquee wiring, when the wires are installed inside the marquee structure, metal wireways may be used. Such wireways shall be constructed of sheet metal of not less than no. 28 U.S. sheet metal gauge in thickness. All sockets and receptacles, and the wiring therein, shall be as prescribed for electric sign wiring.

49. All interior installations shall be wired with conductors of such size that the drop in voltage shall not exceed 2% in the mains and sub-mains and 2% in the branch circuits. (This drop shall be calculated on the wattage requirements as specified in sections 36 and 38). The Chief Electrical Inspector shall condemn any installation where the drop in voltage is eight per cent. or over, in which case the installation shall be removed, by the owner, or lessee, or his or her agent, within forty-eight hours after he shall have been notified by the Chief Electrical Inspector so to do; and in default thereof the same may be removed by the Chief Electrical Inspector.

50. The rules and regulations set forth in the Canadian Electric Code, 1928, and all amendments thereto (except as otherwise in this By-law altered, varied or amended), and which is hereby incorporated in and made a part of this by-law as Schedule "A" hereto, and hereby declared to form and to be a part of this by-law and to have full force and effect as if the said rules and regulations were expressly contained herein; and any reference thereto shall be construed as if the same were an express provision of this by-law.

51. Any person installing, constructing, altering, repairing, or maintaining any electrical works, or using any building, premises or property which shall not comply in all respects with the provisions

of this by-law shall be guilty of an infraction of the provisions of this by-law and shall be liable to the penalty hereby imposed.

52. Nothing in this by-law contained is intended to affect the rights which any person now has under any contract or agreement with the Municipality, or under any Act, general or special, of the Legislature of British Columbia, or of the Parliament of Canada.

53. All inspectors, assistant inspectors, and employees of the Municipality engaged in work under this by-law shall be on duty from the hour of nine o'clock in the forenoon until five o'clock in the afternoon, except on Saturdays, when they may cease work at twelve o'clock in the afternoon.

54. Every person who violates any of the provisions of this by-law, or who suffers or permits any act or thing to be done in contravention of or in violation of any of the provisions of this by-law, or who neglects to do or who refrains from doing any act or thing required to be done by any of the provisions of this by-law and who, by so neglecting or refraining from so doing, violates any of the provisions of this by-law shall be guilty of an infraction of this by-law, and shall be liable to the penalties hereby imposed.

55. Any person guilty of an infraction of this by-law, shall, upon conviction thereof before the Reeve, Police Magistrate, or any two Justices of the Peace, or other Magistrate or Magistrates having jurisdiction in the Municipality of Burnaby, on the oath or affirmation of any credible witness, forfeit and pay at the discretion of said Reeve, Police Magistrate, Justices, or other Magistrate or Magistrates convicting, a fine or penalty not exceeding the sum of one hundred dollars and costs for each offence and in default of payment thereof, forthwith it shall be lawful for such Reeve, Police Magistrate, Justices, or other Magistrate or Magistrates convicting as aforesaid, to issue a warrant under his or their hand and seal to levy the said fine, penalty, and costs, or costs only, by distress and sale of the offender's goods and chattels; and in case of no sufficient distress found to satisfy the said fine or penalty, it shall and may be lawful for the Reeve, Police Magistrate, Justices, or other Magistrate or Magistrates convicting as aforesaid, to

commit the offender to the common gaol or any lock-up house in the Municipality of Burnaby for any period not exceeding two months (with or without hard labour), unless the said fine or penalty be sooner paid.

56. By-laws number 112 and 225 are hereby repealed.

57. This By-law shall come into force and take effect on and after the date of the passing hereof.

DONE AND PASSED in open Council this Thirtieth (30th) day of July A.D. 1928.

RECONSIDERED AND FINALLY PASSED this Fifteenth (15th) day of October A.D. 1928.



Arthur G. Moore
REEVE.

Arthur G. Moore
CLERK.

I, Arthur G. Moore, Clerk to the Municipal Council of the Corporation of the District of Burnaby hereby certify that the foregoing is a true copy of a bylaw passed by the Municipal Council on the 15th day of October A.D. 1928.

Arthur G. Moore
CLERK.