



THE MANITOBA ELECTRICAL CODE

13TH EDITION

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Manitoba Regulation 76/2018

Including Technical Interpretations

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SCHEDULE A

THE MANITOBA HYDRO ACT
(C.C.S.M. c. H190)

Manitoba Electrical Code

Regulation
Registered

Adoption of *Canadian Electrical Code, Part I, 24th edition*

1 Subject to section 3 and the amendments set out in the Schedule, the *Canadian Electrical Code, Part I, 24th edition*, CSA Standard C22.1-18, is incorporated by reference as part of this regulation and is adopted as the electrical code for Manitoba.

Interpretation

2 In this regulation, a reference to "the code" or "this code" (whether capitalized or not) is a reference to the *Canadian Electrical Code, Part I, 24th edition*, CSA Standard C22.1-18, as amended by the Schedule.

Application of code

3 This code governs the construction, installation, maintenance, repair, extension, alteration and use of electric wiring and related facilities using or intended to use power supplied by Manitoba Hydro, except within the City of Winnipeg and in mines and quarries as defined in *The Mines and Minerals Act*.

Referring to code

4 This code may be referred to as the *Manitoba Electrical Code, 13th Edition*.

Repeal

5 The *Manitoba Electrical Code, Manitoba Regulation 124/2015*, is repealed.

Coming into force

6 This regulation comes into force on August 1, 2018 or on the day it is registered under *The Statutes and Regulations Act*, whichever is later.

April 30, 2018
Date

The Manitoba Hydro-Electric Board:



Marina James
Chair of the Board

**SCHEDULE
(Section 1)**

AMENDMENTS TO THE CANADIAN ELECTRICAL CODE, PART I

- 1** For the purpose of this regulation, the *Canadian Electrical Code, Part I, 24th edition, CSA Standard C22.1-18*, is amended as set out in this Schedule.

Amendments to Section 0 — Object, Scope, and Definitions

- 2** Section 0 is amended

(a) by replacing the definition "Approved" and "Inspection department" with the following:

Approved (as applied to electrical equipment)

- (1) equipment that has been certified by a certification organization accredited by the Standards Council of Canada in accordance with the requirements of
- (a) CSA Group Standards; or
 - (b) other standards that have been developed by a standards development organization accredited by the Standards Council of Canada, or other recognized documents, where CSA Group Standards do not exist or are not applicable, provided that such other standards or other recognized documents
 - (i) are correlated with provisions of the *CE Code, Part I*; and
 - (ii) do not create duplication with standards already listed in Appendix A;
- (2) equipment that conforms to the requirements of the regulatory authority (see Appendix B);
- (3) equipment that has been given special acceptance by Manitoba Hydro; or
- (4) equipment that has been given special acceptance by the Minister of Labour and Immigration for Manitoba.

Inspection department means Manitoba Hydro.

(b) by adding the following definitions:

Chief electrical inspector — the person designated by Manitoba Hydro as the chief electrical inspector.

Manitoba Building Code — the regulation entitled "*Manitoba Building Code*", made under *The Buildings and Mobile Homes Act*.

Amendments to Section 2 — General Rules

Rule 2-004

3 Rule 2-004 (Permit) is replaced with the following:

2-004 Electrical permits and requirements respecting work under a permit

- (1) No electrical work with respect to installation, alteration, repair or extension of any electrical equipment shall commence until an electrical permit is issued by the inspection department.
- (2) Notwithstanding Subrule (1), a person licensed under *The Electricians' Licence Act* (Manitoba) is not required to have an electrical permit for the following electrical work:
 - (a) the replacement or repair of wiring devices with an electrical rating no greater than 30 amperes, 150 volts to ground and not associated with a location as described by section 18 or 20 of this Code;
 - (b) the replacement or repair of electrical equipment with an electrical rating no greater than 30 amperes, 150 volts to ground and associated with a dwelling unit;
 - (c) the installation of voice, data or video equipment within a dwelling unit; or
 - (d) electrical installations
 - (i) when the cost of labour and materials (excluding the cost of utilization equipment supplied by the circuitry) does not exceed two hundred dollars (\$200) as determined by the inspection department in accordance with the current schedule of electrical permit fees;
 - (ii) that are not associated with a hazardous location as described by sections 18 or 20 of this Code;
 - (iii) that are not part of a consumer's service; and
 - (iv) that do not involve the replacement or addition of distribution panels, fusible switches, motor controllers and similar equipment.
- (3) An electrical permit may be issued to
 - (a) a person licensed under *The Electricians' Licence Act* (Manitoba) to perform any work that is permitted by the person's licence;
 - (b) an allied trades person licensed by the Province of Manitoba to perform any electrical work that is permitted by the person's licence;
 - (c) a qualified person as defined in the *Canada Occupational Safety and Health Regulations* under the *Canada Labour Code* for the purposes of work on premises regulated by those regulations; or
 - (d) an owner of residential premises if
 - (i) the applicant occupies or will occupy the premises as a dwelling;
 - (ii) the premises, if it is a building, stands alone or is separated from any other occupancy or other part of the building by a fire wall or fire separation;

- (iii) the work to be performed is not in a hazardous location as defined in this Code;
 - (iv) the work to be performed does not include generators or renewable energy systems as defined in this Code;
 - (v) the work to be performed does not include swimming pools or hot tubs;
 - (vi) the work to be performed does not include a consumer's service; and
 - (vii) the electrical rating of the installation in or on any land, building or premises does not exceed 150 volts to ground, single phase and 200 amperes.
- (4) An annual electrical permit may be issued for electrical work of a routine nature in connection with the maintenance or operation of a building or plant that is required to be performed at frequent intervals if the owner or occupant of the building or plant employs their own electricians for that purpose and agrees to
- (a) keep a record of the work that is performed;
 - (b) produce this record to the inspection department upon request;
 - (c) pay to the inspection department the fees that the inspection department charges for an annual permit; and
 - (d) pay in full any outstanding fees due to a change in status of the building or plant before the permit is renewed.
- (5) An application for an electrical permit must be made to the inspection department giving the location and ownership of the premises in, on or about which electrical work is to be done, the purpose of the work, details of the installation as required by Rule 2-014 and any other particulars required by the inspection department.
- (6) If an application is approved by the inspection department an electrical permit will be issued.
- (7) The inspection department may refuse to issue an electrical permit if
- (a) electrical work done previously by the applicant has not been completed to the satisfaction of the inspection department; or
 - (b) there are outstanding fees on previous work done by the applicant.
- (8) A permittee must notify the inspection department as soon as the electrical work authorized by the electrical permit is completed or when an inspection is required.
- (9) At the request of the permittee, or in other circumstances determined by the chief electrical inspector, the inspection department may inspect the electrical installation pursuant to the electrical permit. If the installation conforms to this Code and the appropriate fees have been paid in full in accordance with the current schedule of electrical permit fees, the inspection department will, on request, issue a certificate of approval.
- (10) The chief electrical inspector may establish terms and conditions for the registration of electricians and electrical contractors for the purposes of this Code, based on criteria including but not limited to safety and compliance with this Code. The inspection department may elect to forgo inspections if the permittee or an electrician employed by the permittee has been registered by the inspection department. An electrician must

- (a) notify the inspection department when an installation has been completed; and
- (b) supply the inspection department with a signed declaration that the installation complies with this Code.

The inspection department reserves the right to audit and inspect installations by registered electricians for compliance with this Code and the schedule of electrical permit fees.

- (11) The inspection department may direct the alteration or repair of an existing electrical installation that does not conform with the requirements of this Code.
- (12) If an application for an electrical permit is refused or a permittee does not agree with an electrical inspection report, defect notice or interpretation of Code rules issued on any particular installation, an appeal may be made in writing to the office of the chief electrical inspector. The appeal must specify what is being appealed, the reasons for the appeal and the decision requested.
- (13) The inspection department may do any or all of the following:
 - (a) prohibit the use of an installation until it is inspected, tested and approved;
 - (b) direct the permittee to carry out and produce results of tests on equipment as considered necessary to ensure that the installation is properly installed.
- (14) An electrical permit expires 90 days after the date it is issued unless the installation authorized by the electrical permit is commenced or the inspection department, in its discretion, grants an extension.
- (15) An electrical permit expires 12 calendar months after the date it is issued unless the installation authorized by the electrical permit is not completed and the inspection department, in its discretion, grants an extension.
- (16) The issuance of an electrical permit does not obligate the owner of the premises to have the work done by the permittee.

Rule 2-006

4 Rule 2-006 (Application for inspection) is struck out.

Rule 2-008

5 Rule 2-008 (Fees) is replaced with the following:

2-008 Fees

- (1) The amount of any fee payable for electrical permits or inspection of electrical installations are as specified by the inspection department in the schedule of electrical permit fees.
- (2) The inspection department has the right at any time to make adjustments in the electrical permit fee payable as a result of additions or deletions to the work specified in the electrical permit or to correct errors in the calculation of fees made at the time the electrical permit was issued.
- (3) The inspection department will refund any fee paid for an unused electrical permit if application is made within one year of the date of the issuance of the electrical permit, but reserves the right to deduct an amount equal to any costs and expenses that it incurs in connection with the permit and refund and will in any case deduct an amount equal to the current minimum fee.

Rule 2-010

6 Rule 2-010 (Posting of permit) is struck out.

Rule 2-014

7 Rule 2-014 (Plans and specifications) is replaced with the following:

2-014 Plans and specifications

- (1) Plans and specifications are required for
 - (a) electrical installations when
 - (i) the ampacity of the service entrance equipment exceeds 200 amperes single phase or the supply service is multi-phase; or
 - (ii) the installation operates at voltages in excess of 750 volts;
 - (b) installations covered by Section 18, 20, 22, 24, 36 or 64 of this Code; and
 - (c) other installations as the inspection department may require.
- (2) Plans and specifications required by Subrule (1) must be submitted to the inspection department for acceptance before an electrical permit may be issued.
- (3) Plans and specifications must be prepared and signed by, and bear the seal of, a professional engineer registered to practice in Manitoba and fully qualified in the application of this Code
 - (a) for an installation covered by Section 18, 20, 24 or 36 of this Code, unless the inspection department considers it unnecessary that the plans and specifications be prepared, signed or sealed by an engineer; or
 - (b) if the inspection department considers them necessary for any other installation.
- (4) The responsible professional engineer must submit a letter to the inspection department stating his or her responsibility for the review of construction for the installation to ensure conformity with the approved plans and specifications. Note: Subrule (1) still applies.
- (5) On completion of an installation under Subrule (4), the responsible professional engineer must submit a letter stating:

"I hereby certify that I, or another suitably qualified person that reports to me, have reviewed the installation for compliance with the plans and specifications provided to the inspection department. The installation complies with the requirement of the current version of the *Manitoba Electrical Code*."
- (6) When current transformer revenue metering is required for an installation, plans and a list of loads, as required by Manitoba Hydro's *Customer Metering Standards*, are required to be submitted before the revenue metering will be ordered by the inspection department.

Rule 2-025

8 The following is added to the Code after Rule 2-024 (Use of approved equipment):

2-025 Special acceptance inspection

A special acceptance inspection may be made of electrical equipment that is not approved by or does not bear the approval mark of an accredited certification organization. In general, this applies to electrical equipment

- (a) of other than a regular line of manufacture;
- (b) manufactured or produced singly or in small quantities; or
- (c) built to a customer's order.

Rule 2-030

9 Rule 2-030 (Deviation or Postponement) is replaced with the following:

2-030 Deviation or postponement

Notwithstanding Subrule 2-004(9), the inspection department may by special permission approve an installation that does not conform to the standards established by this Code when, in the inspection department's opinion, the installation provides a standard of safety equivalent to the standard provided by this Code. The request for special permission must specify the aspects of the installation that do not conform to the Code and the equivalent electrical requirements and must be submitted prior to proceeding with the work.

Amendments to Section 4 — Conductors

Rule 4-004(22)

10 Subrule (22) of Rule 4-004 (Ampacity of wires and cables) and Table 39 are struck out.

Rule 4-004(27)

11 The following is added to the Code after Subrule (26) of Rule 4-004 (Ampacity of wires and cables):

- (27) If other derating factors are applied to reduce the conductor ampacity, the conductor size shall be the greater of that so determined or that determined by Rule 8-104 (5) or (6).

Rule 4-006(2)

12 Subrule (2) of Rule 4-006 (Temperature limitations) is replaced with the following:

- (2) For the purpose of Subrule (1) and except as provided for by other Rules of this Code, when the maximum conductor termination temperature for equipment is not marked, the maximum conductor termination temperature is deemed to be 75°C.

Rule 4-022 (2)

13 Subrule (2) of Rule 4-022 (Installation of identified conductor) is struck out.

Rule 4-030 (3)

14 Subrule (3) of rule 4-030 (Use of identified conductors) is struck out.

Amendments to Section 6 — Services and Service Equipment

Rule 6-212(3)

15 Subrule (3) of Rule 6-212 (Wiring space in enclosures) is struck out.

Rule 6-400

16 Rule 6-400 (Metering equipment) is amended by renumbering it as Rule 6-400(1) and adding the following as Subrule (2):

- (2) For determining the type of metering equipment required by the supply authority, reference shall be made to supply authority metering standards, which shall be amendatory or additional to Rules 6-402 to 6-412.

Amendments to Section 8 — Circuit Loading and Demand Factors

Rule 8-102(1)

17 Subrule (1) of Rule 8-102 (Voltage drop) is replaced with the following:

Rule 8-102 (Voltage drop) (see Appendices A and B)

- (1) The voltage drop in an installation shall be based on the connected load of the branch circuit if known. Otherwise, the voltage drop shall be based on 80% of the rating of the overload or overcurrent device protecting the branch circuit or feeder and shall not exceed
 - (a) 3% in a feeder or branch circuit; and
 - (b) 5% from the supply side of the consumer's service (or equivalent) to the point of utilization.

Rules 8-106(5) and (9)

18 Subrules (5) and (9) of Rule 8-106 (Use of demand factors) are struck out.

Rule 8-106(12)

19 The following is added to the Code after Subrule (11) of Rule 8-106 (Use of demand factors):

- (12) The size of service conductors computed in accordance with this Section shall be the minimum used except that, if the next smaller standard size in common use has an ampacity not more than 5% less than this minimum, the smaller size conductor shall be permitted.

Amendments to Section 10 — Grounding and bonding

Rule 10- 102(2)(a)

20 Subrule (2)(a) of Rule 10-102 (Grounding electrodes) is replaced with the following:

- (a) in the case of a rod grounding electrode, consist of two rod electrodes
 - (i) copper clad;

- (ii) not less than 15.8 mm in diameter;
- (iii) spaced not less than 3 m apart;
- (iv) driven to the full length of the rod; and
- (v) interconnected with a grounding conductor sized as prescribed for grounding conductors;

Rule 10-116 (1)and(6)

21 Subrules (1) and (5) of Rule 10-116 (Installation of grounding conductors) are replaced with the following:

- (1) The grounding conductor for a system shall be without joint or splice throughout its length, except in the case of busbars, thermit-welded joints, compression connectors applied with a compression tool compatible with the particular connector.
- (5) A grounding conductor installed in the same raceway with other conductors of the system to which it is connected shall be insulated, except that an uninsulated grounding conductor shall be permitted where the length of the raceway
 - (a) does not exceed 15 m between pull points; and
 - (b) does not contain more than the equivalent of two 90° bends between pull points.

Rule 10-210

22 Rule 10-210 (Grounding connections for solidly grounded ac systems supplied by the supply authority) is replaced with the following:

- (1) The grounded conductor of a solidly grounded ac system supplied by the supply authority shall
 - (a) be connected to a grounding conductor at each consumer's service with the connection being made on the supply side of the service disconnecting means in the service box;
 - (b) have a minimum size as specified
 - i) for a bonding conductor; and
 - ii) for a neutral conductor when the grounded conductor also serves as a neutral;
 - (c) be connected to the equipment bonding terminal by a system bonding jumper; and
 - (d) have no other connection to the non-current carrying conductive parts of electrical equipment on the load side of the grounding connection.
- (2) Where two or more buildings or structures are supplied from a single consumer's service
 - (a) the grounded circuit conductor at each of the buildings or structures shall be connected to a grounding electrode and be connected to the equipment bonding terminal by a system bonding jumper; or
 - (b) the non-current-carrying conductive parts of the electrical equipment in or on the building or structure shall be bonded to ground by a bonding conductor run with the feeder or branch circuit conductors.

- (3) Where the system is grounded at any point, the grounded conductor shall be run to each individual service.

Rule 10-212 (2)

23 Subrule (2) of Rule 10-212 (Grounding connections for solidly grounded separately derived ac systems) is struck out.

Rule 10-616

24 The following is added to the Code after Rule 10-614 (Size of system bonding jumper or bonding conductor):

10-616 Installation of equipment bonding conductors

- (1) The bonding conductor for equipment shall be permitted to be spliced or tapped, but such splices or taps shall be made only within boxes, except in the case of open wiring where they shall be permitted to be made externally from boxes and shall be covered with insulation.
- (2) Where more than one bonding conductor enters a box, all such conductors shall be in good electrical contact with each other by securing all bonding conductors under bonding screws, or by connecting them together with a solderless connector and connecting one conductor only to the box by a bonding screw or a bonding device, and the arrangement shall be such that the disconnection or removal of electrical equipment fed from the box will not interfere with, or interrupt, the bonding continuity.
- (3) Where a bonding conductor is run in the same raceway with other conductors of the system to which it is connected, it shall be insulated, except that where the length of the raceway does not exceed 15 m and does not contain more than the equivalent of two quarter bends, an uninsulated bonding conductor shall be permitted to be used.
- (4) A bonding conductor shall be protected from damage
 - (a) mechanically; or
 - (b) by location.
- (5) Where a separate bonding conductor, required by this Code, is run with single-conductor cables, the bonding conductor shall follow the same route as the cables.
- (6) The bonding jumper, in the case of receptacles having grounding terminals isolated from the mounting strap required for special equipment, shall be permitted to be extended directly back to the distribution panel.
- (7) Electronic equipment rated to operate at a supply voltage not exceeding 150 volts-to-ground and that requires a separate bonding conductor shall be permitted to be bonded to ground by an insulated conductor extending directly back to the distribution panel, provided that
 - (a) the separate bonding conductor is enclosed in the same raceway or cable containing the circuit conductors throughout the length of that cable or raceway;
 - (b) the separate bonding conductor is sized not less than as given in Rule 10-614 for each leg of the run; and
 - (c) the bonding requirements of Rules 10-600 are met.

Amendments to Section 12 — Wiring Methods

Rule 12-904(2)

25 Subrule (2) of Rule 12-904 (Conductors in raceways) is amended by striking out "Except for cable tray, no" and substituting "No".

Rule 12-2200(7)

26 Subrule (7) of Rule 12-2200 (Method of installation) is struck out.

Rule 12-2208

27 Rule 12-2208 (Provisions for bonding) is replaced with the following:

12-2208 Provisions for bonding

Metal cable trays shall be adequately bonded at intervals not exceeding 15 m and the size of bonding conductors shall be based on the size of the largest ungrounded conductor or equivalent for multiple conductors carried by the cable tray in accordance with Rule 10-614.

Amendment to Section 14 — Protection and Control

Rule 14-402

28 Rule 14-402 (Disconnecting means required for fused circuits) is replaced with the following:

14-402 Disconnecting means required for fused circuits (see Appendix B)

Circuits protected by fuses shall be equipped with disconnecting means, integral with or adjacent to the fuseholders, by which all live parts for mounting fuses can be readily and safely made dead. However, such disconnecting means may be omitted in the following cases:

- (a) instrument and control circuits on switchboards when the voltage does not exceed 250 V;
- (b) primary circuits of voltage transformers having a primary voltage of 750 V or less on switchboards; or
- (c) a circuit having only one ungrounded conductor when a plug fuse is used.

Amendments to Section 26 — Installation of Electrical Equipment

Rule 26-014(4)(c)

29 Subrule (4)(c) of Rule 26-014 (Dielectric liquid-filled equipment — Outdoors) is replaced with the following:

- (c) if installed at ground level, be located on a concrete or fibreglass pad draining away from structures or be in a curbed area filled with coarse crushed stone; and

Rule 26-250 (4)

30 Subrule (4) of Rule 26-250 (Overcurrent protection for power and distribution transformer circuits rated over 750 V) is replaced with the following:

- (4) A transformer having an overcurrent device on the secondary side rated or set at not more than the values in Table 50 or a transformer equipped with coordinated thermal overload protection by the manufacturer shall be permitted to:
 - (a) omit the primary branch circuit overcurrent device, provided that the primary feeder overcurrent device is rated or set at not more than the values in Table 50; or
 - (b) increase the primary branch circuit overcurrent device to not more than the values in Table 50.

Rule 26-254 (2)

31 Subrule (2) of Rule 26-254 (Overcurrent protection for dry-type transformer circuits rated 750 V or less) is replaced with the following:

- (2) Notwithstanding Subrule (1), a transformer having an overcurrent device on the secondary side set at not more than 125% of the rated secondary current of the transformer, shall be permitted to:
 - (a) omit the primary branch circuit overcurrent device, provided that the primary feeder overcurrent device is set at not more than 300% of the rated primary current of the transformer; or
 - (b) increase the primary branch circuit overcurrent device to a value of not more than 300% of the rated primary current of the transformer.

Rule 26-654(g)

32 Rule 26-654 (Branch circuits for dwelling units) is amended by striking out "and" at the end of paragraph (e), adding "and" at the end of paragraph (f) and adding the following after paragraph (f):

- (g) at least one branch circuit shall be provided solely for the receptacles provided for each driveway as required by Rule 26-726(d).

Rule 26-700(8)

33 The following is added to the Code after Subrule (7) of Rule 26-700 (General):

- (8) When a sump is required by *The Winnipeg Building By-law* or the *Manitoba Building Code* for the control of water from a subsurface drainage (weeping tile) system
 - (a) a single receptacle shall be installed for the connection of the sump pump; and
 - (b) the receptacle for the sump pump shall be supplied from a branch circuit that supplies no other outlets or equipment.

Rule 26-708

34 Subrules (2) and (3) of Rule 26-708 (Receptacles exposed to the weather) is replaced with the following:

Rule 26-708 Receptacles exposed to the weather

- (2) Receptacles of CSA configurations 5-15R, 5-20R, 5-20RA, 6-15R, 6-20R and 6-20RA shall be provided with cover plates suitable for wet locations and marked “Extra Duty”.
- (3) Notwithstanding Subrule 2), wet location cover plates not marked “Extra Duty” shall be permitted for receptacles
 - a) installed facing downward at an angle of 45° or less from the horizontal; or
 - b) located at least 1 m above finished grade or floor level in a damp location.

Rule 26-726(d)

35 Rule 26-726 (Receptacles for single dwellings) is amended by striking out "and" at the end of paragraph (b), adding "and" at the end of paragraph (c) and adding the following after paragraph (c):

- (d) at least one duplex receptacle shall be provided for each driveway.

Amendment to Section 28 — Motors and Generators

Rule 28-602

36 Subrule (5) of Rule 28-602 (Types and ratings of disconnecting means) is struck out.

Amendment to Section 30 — Installation of Lighting Equipment

Rule 30-504

37 The following is added to the Code after Subrule (3) of Rule 30-504 (Stairways):

- (4) Notwithstanding Subrule (3) and Appendix G, provisions for 3-way switches must be installed for stairway lighting to basements.

Amendment to Section 36 — High-voltage Installations

Rule 36-302(1)(a)

38 Subrule (1)(a) of Rule 36-302 (Station ground electrode) is replaced with the following:

- (a) consist of a minimum of four driven copper-clad ground rods not less than 3 m long and 17.09 mm in diameter spaced at least the rod length apart and, where practicable, located adjacent to the equipment to be grounded;

**Amendment to Section 46 — Emergency Power Supply, Unit Equipment, Exit Signs,
and Life Safety Systems**

Rule 46-108(3)

39 Subrule (3) of Rule 46-108 (Wiring method) is replaced with the following:

- (3) Conductors installed in buildings of combustible construction in accordance with Section 12 of this Code may be:
 - (a) non-metallic-sheathed cable; or
 - (b) installed in totally enclosed non-metallic raceway.

Amendments to Section 64 — Renewable Energy Systems

Rule 64-060 (2)(g)

40 Subrule (2)(g) of Rule 64-060 (Disconnecting means) is replaced with the following:

- (g) be located
 - (i) within sight of the equipment or lockable in the open position; and
 - (ii) within 9 m of the equipment or be integral to the equipment.

Rule 64-110

41 Rule 64-110 (Unbalanced interconnections) is replaced with the following:

64-110 Unbalanced interconnections (see Appendix B)

- (1) Single-phase inverters for renewable energy systems and ac modules in interactive renewable energy systems shall not be connected to three-phase systems.
- (2) Three-phase inverters and three-phase ac modules in interactive systems shall comply with the requirements of Rules 84-008 and 84-018.

Amendment to Section 76 — Temporary Wiring

Rule 76-006

42 Paragraph (d) of Rule 76-006 (Service entrance equipment) is amended by replacing with the following:

- (d) be installed in one of the following ways:
 - (i) for services not exceeding 200 A, on a pole, or on a solid wood post that measures at least 89 mm x 150 mm nominal and is adequately braced;
 - (ii) for services exceeding 200 A, on a substantial pole structure; or
 - (iii) for services supplied from underground distribution, on an adequately braced post.

Amendment to Appendix A

Appendix A

43 Appendix A (Safety Standards for Electrical Equipment, *Canadian Electrical Code, Part II*) is amended in Note (4) by striking out "may be used" and substituting "shall be used".

THE REGULATIONS ACT

C E R T I F I C A T E

The undersigned hereby certifies that the attached regulation marked Schedule A is a true copy of the original regulation:

- (a) entitled *Manitoba Electrical Code*;
- (b) made under *The Manitoba Hydro Act*;
- (c) made by The Manitoba Hydro-Electric Board;
- (d) made on the date indicated in the attached Schedule A.

April 30, 2018
Date

The Manitoba Hydro-Electric Board:



Marina James
Chair of the Board

ADMINISTRATION

LICENCES

Recently we have found electrical installers working at the trade without a current licence. Please assure you have a valid licence and be prepared to produce your licence when requested by the Electrical Inspector on the job site or work location.

Concerns have been raised by the trade regarding Limited Licence holders doing electrical work outside the scope of the Limited Licence.

For information regarding licences and endorsements that authorize any work associated with the electrical trade see the Government of Manitoba - Office of the Fire Commissioner website at <http://www.firecomm.gov.mb.ca/>

PERMITS

Licence holders are reminded that Rule 2-004 requires electrical permits to be obtained prior to any electrical work being commenced.

Electrical work includes the installation, alteration, repair or extension of electrical equipment. Non-compliance with this requirement will require additional permit fees being levied in accordance with the current Manitoba Hydro Schedule of Electrical Permit Fees. Continued non-compliance with this requirement may result in permit privileges being suspended.

Permits may be issued to:

- a) Licence holders to do work within the scope of their licences.
- b) Homeowners to do limited wiring on their own premises.

Note: *Permits expire after 12 calendar months unless an extension is requested prior to the permit expiry date.*

ELECTRICAL PERMIT FEES

Costs incurred by the electrical inspection program are intended to be recovered under the Electrical Permit Fee Schedule.

ADDITIONAL INSPECTIONS

The Fee Schedule requires that additional inspections incurred such as for defects found during the initial inspection or to facilitate construction procedures will be charged to the permittee at the rate defined by the current Manitoba Hydro Schedule of Electrical Permit Fees.

SPECIAL TRIPS

Provision is made in Schedule 5 for cost recovery for special trips whether by road or air. This is in addition to the normal Permit Fee.

PENALTY

When an electrical permit is not obtained prior to the commencement of actual work a penalty will be levied in addition to the normal permit fee as defined in the current Manitoba Hydro Schedule of Electrical Permit Fees.

REFUNDS

Where overpayment is made on an electrical permit or a permit is cancelled, the fee paid may be refunded less the minimum fee. Where the overpayment is due to Manitoba Hydro overcharging, the minimum fee will be waived.

ELECTRICAL PERMIT FEE BILLING

Electrical contractors must establish a permit account to obtain electrical permits. A permit account gives you a monthly billing statement of all your electrical permit charges, and automatically enrolls you in Manitoba Hydro's MyBill program. You can apply for a permit account by visiting www.hydro.mb.ca/permitaccount.

The electrical permit charges will be listed in a bill issued monthly, with payment required by the due date. For your additional convenience, Manitoba Hydro also has a preauthorized payment plan which withdraws the amount due from a financial institution on the due date.

Manitoba Hydro will accept electrical permit applications online, by FAX, mail or in person. Once approved, the electrical permit will be issued by FAX or mail to the contractor.

Note: *No electrical permit applications will be accepted by telephone.*

Once your permit account has been established, we will forward further information to assist you in submitting applications. It is hoped that this change will significantly reduce the time and costs associated in obtaining electrical permits.

PLANS AND SPECIFICATIONS

Rule 2-014(2) stipulates that if required, plans and specifications must be submitted to the inspection department before an electrical permit may be issued.

Note: *This shall serve as notice that this requirement for plans and specifications submission before a permit may be issued will be strictly enforced*

Since metering cannot be ordered until plans are reviewed, non-compliance may also delay connection of the installation.

ELECTRICAL INSPECTIONS

The Inspection Department will normally respond to a request for inspection within five working days. For most requests other than for isolated locations, this may be accomplished in a shorter time frame.

Rule 2-004 (8) requires the permittee to notify the Electrical Inspection Department as soon as an inspection is required or work authorized by the electrical permit is completed.

PROGRESS INSPECTIONS (Rough In, Trenches, etc.)

Unless alternative arrangements have been made with the inspector, no part of the wiring installation shall be covered until approval has been granted by the Inspection Department.

FINAL INSPECTIONS

Final inspections should be completed prior to building occupancy. This is especially important in situations where an occupancy permit is required by the building inspection authority or where there are "high health" concerns with livestock confinement buildings such as swine and poultry.

SPECIAL INSPECTIONS

Where special inspections are requested outside normal working hours, weekends, statutory holidays, etc., arrangements can be made for such provided the permittee agrees to pay double the hourly rate for total time required.

If special travel is required, travelling expenses may be charged in addition to the hourly rate as defined by the current Manitoba Hydro Schedule of Electrical Permit Fees. All special travel fees must be paid prior to inspections being conducted.

2018 MANITOBA ELECTRIC CODE, 13TH EDITION

Canadian Electrical Code, Part I, 24th Edition Code books may be obtained from CSA or in Manitoba from the Electrical Association of Manitoba at:

Phone number: (204) 783-4125
Address: 104-1780 Wellington Ave., Winnipeg, MB R3H 1B3

Note: Work covered under electrical permits issued prior to the effective date of the 13th Edition of the Manitoba Electrical Code may be completed in accordance with the requirements in effect at the date of permit issue.

TECHNICAL INTERPRETATIONS

SECTION 0 OBJECT, SCOPE AND DEFINITIONS

0-1 POINT OF DEMARCATION

INTERFACE POINT BETWEEN UTILITY COMMUNICATION OR COMMUNITY ANTENNA DISTRIBUTION SYSTEMS AND CUSTOMER SYSTEMS

The function of a communication or community antenna distribution utility ends at the point of demarcation as defined by the Canadian Radio Telecommunication Commission (CRTC).

The point of demarcation is the physical point at which the utility's equipment and wiring ends and the customer's equipment and wiring begins.

SECTION 2 GENERAL RULES

2-024 USE OF APPROVED EQUIPMENT

2-024-1 BREAKERS OF DIFFERING MANUFACTURERS INSTALLED IN PANELBOARDS

Breakers to be installed in existing or new panelboards shall be approved for use in that panelboard.

2-024-2 SMOKE AND WATER DAMAGE TO CIRCUIT BREAKERS

CSA Audits and Investigations Department has advised inspection authorities that circuit breakers exposed to water or smoke damage, such as may be experienced in a flood or fire, may not operate under overload or fault conditions. Where circuit breakers have been so exposed they shall be replaced or undergo factory re-certification to ensure safe operation. Equipment taken out of service and deemed unsuitable for use should be destroyed in the presence of the electrical inspector or by the factory.

2-024-3 FIELD MODIFICATIONS OF ELECTRICAL EQUIPMENT

Any field modification of electrical equipment voids the existing certification on the equipment (e.g.: drilling or tapping bus work or modifications to switchboards, panelboards, MCC's or other equipment). The modified equipment shall be re-approved.

2-024-4 APPROVAL OF ELECTRICAL EQUIPMENT

Under the provisions of *The Electrician's Licence Act* of the Province of Manitoba, electrical equipment shall be approved before the equipment is used, sold, displayed, advertised, offered for sale or distributed in Manitoba except as specified here-in.

A maximum of four contactors or relays installed in an approved electrical box (“control box”) will not be deemed as “electrical equipment” and therefore would not be required to be approved under *The Electrician’s Licence Act* and the Manitoba Electrical Code, provided that:

- a) The ampere rating of the control box shall not exceed 20 amperes;
- b) The control box shall have permanent nameplate installed stating the electrical characteristics as stipulated in the Manitoba Electrical Code;
- c) The control box interior shall have a permanently installed electrical wiring diagram;
- d) There shall not be any other electrical equipment (such as control transformers, indicating lights or overload devices) installed in or on the control box;
- e) The control box is marked with the following, if the control box is energized from more than one circuit and does not have a means for disconnecting all ungrounded conductors, **“WARNING: MORE THAN ONE LIVE CIRCUIT”**;
- f) The control box shall only be installed in an ordinary location as stipulated in the Manitoba Electrical Code; and
- g) The installation within the control box is performed by the holder of a valid Journeyman Electrician ‘H’ license as recognized under *The Electrician’s License Act of Manitoba*.”

2-024-5 ELECTRICAL EQUIPMENT DISCONNECTING MEANS

A separate disconnecting means shall be installed for all electrical equipment as required by the Manitoba Electrical Code. An integral disconnecting means will only be considered acceptable when specifically permitted by the Manitoba Electrical Code and the associated CSA Part II Standards have provisions for the installation and marking of the required disconnect.

All disconnecting means required by the Manitoba Electrical Code shall be field-installed external to the equipment.

2-024-6 CIRCUIT BREAKER LOCKING DEVICES

In addition to being approved by an Accredited Certification Organization, circuit breaker lock-off and lock-on devices must be identified with the type or catalogue number of the circuit breaker with which it may be used and shall also comply with the following:

- a) accommodate a padlock that will prevent the operation of the circuit breaker or switch with the padlock in place;
- b) not depend on the panel enclosure cover to retain the device in place;
- c) require the use of a tool for removal;
- d) not interfere with the intended operation of the circuit breaker or switch;
- e) ensure that the ON-OFF marking for the circuit breaker or switch is clearly visible with the padlocking attachment in place;
- f) have the necessary mechanical strength to ensure reliable and positive mechanical performance;
- g) be permanently installed; and
- h) be tested to ensure it operates as intended.

When an approved circuit breaker lock-on or lock-off is required for an installation, it is recommended the breaker manufacturer be consulted for availability prior to the installation.

2-112 QUALITY OF WORK

MECHANICAL PROTECTION OF CONDUCTORS INSTALLED IN METAL STUDS

For conductors/cables installed under Sections 12, 16, 54, 56 & 60, Rule 2-112 requires that care be taken to prevent damage. Grommets or other acceptable means shall be provided to prevent damage to conductors that are to be installed through metal studs.

2-126 USE OF THERMAL INSULATION

GROUPING OF CABLES IN INSULATED SPACES

Rule 2-126(1)(a) requires the use of "special care" to assure safe conductor operating temperatures when heat dissipation is restricted by conductor/cable grouping in thermal insulation.

The practice of bunching or grouping more than two cables in thermal insulation is not acceptable.

2-128 FIRE SPREAD

FIRESTOPPING

To delay the spread of fire within a building, certain walls, floors and ceilings are constructed as "fire separations" (see *Note 1*).

Rule 2-128 and *Manitoba Building Code Article 3.1.9.1* requires that precautions be taken to limit the spread of fire through fire separations where they are penetrated by electrical raceways, cables, or outlet boxes (see *Note 2*).

Listed below are requirements for commonly encountered situations:

1. Where a fire separation is partly or wholly penetrated by an electrical raceway, cable or outlet box, the penetration shall be:
 - a) sealed by an approved fire stop system that complies with Manitoba Building Code Clause 3.1.9.1.(1)(a); or
 - b) cast in place.
2. Where a firewall (see *Note 3*) is partly or wholly penetrated by an electrical raceway, cable or outlet box, the penetration shall be sealed using an approved fire stop system that complies with Manitoba Building Code Clause 3.1.9.1.(2).

Notes:

1. *Manitoba Building Code Article 3.1.9.1* refers to both "fire separations" and "assemblies required to have a fire resistance rating". For clarity, only the term "fire separation" is used in this item.
2. This item deals only with fire stopping. The Manitoba Building Code Articles 3.1.9.2., 3.1.9.3., and 9.10.9.6. should be consulted for the size and type of electrical penetrations that are permitted.
3. A "firewall" is designed to limit the spread of fire from one building to another, whereas a fire separation is only designed to limit the spread of fire within a building. Firewalls are typically constructed of masonry.

2-400 ENCLOSURES, TYPE DESIGNATIONS, AND USE

Δ NON WEATHERPROOF ENCLOSURES FOR ELECTRICAL EQUIPMENT

Enclosures for electrical equipment shall be of the type for use in their environment as per Table 65. The practice of installing non weatherproof electrical equipment in weatherproof enclosures is not acceptable.

Note: This requirement will also be enforced for Section 76 temporary services.

2-402 MARKING OF ENCLOSURES

ENCLOSURES WITH INGRESS PROTECTION (IP) DESIGNATIONS MARKINGS ONLY

Ingress Protection (IP) Designations are not recognized by the Manitoba Electrical Code. An enclosure that is only marked with Ingress Protection (IP) designations will not be accepted by the inspection department.

Table 65 enclosure designations will be accepted by the inspection department.

SECTION 4 CONDUCTORS

4-004 AMPACITY OF WIRES AND CABLES

4-004-1 SINGLE CONDUCTOR CABLES

Where the ratings of Table 1 or Table 3 are being applied, at least 50% of the total cable length shall be outside the equipment being connected.

4-004-2 RATINGS OF CONDUCTORS IN FIBRE SPACERS, METAL THROATS AND NIPPLES

Fibre Spacers, metal throats and nipples not longer than 150 mm in length may be treated as auxiliary gutters in accordance with Rule 4-004(7)(a).

4-008 INDUCED VOLTAGES AND CURRENTS IN METAL ARMOUR OR SHEATHS OF SINGLE-CONDUCTOR CABLES

SHEATH CURRENTS IN DIRECT BURIED SINGLE CONDUCTOR CABLE INSTALLATIONS OTHER THAN CONSUMER'S SERVICE

Where metal sheathed cable is run underground, the sheath shall be isolated at the load end and a separate bonding conductor shall be run adjacent to the cables. Alternatively, if sheath currents are not eliminated, the cable ampacity shall be derated in accordance with Rule 4-008.

SECTION 6 SERVICES AND SERVICE EQUIPMENT

6-100 GENERAL

6-100-1 UNDERGROUND SUPPLY SERVICE TERMINATION REQUIREMENTS

The minimum size of rigid conduit required from a meter mounting device or a customer owned supply service termination enclosure to the supply trench to accommodate Manitoba Hydro supply conductors is shown in the table below.

These sizes are based on a maximum conduit fill of 40% in accordance with the Manitoba Electrical Code governing customer owned installations. Some conduit sizes have been increased to accommodate installation.

Confirmation of the cable size should be obtained from your local Manitoba Hydro Customer Service Centre prior to installation of this conduit.

INSULATED CONDUCTOR SIZE	MINIMUM CONDUIT SIZE	MAXIMUM NUMBER OF CONDUCTORS
1/0 AWG	53 mm (2 in.)	5
4/0 AWG	63 mm (2½ in.)	3
3-4/0 & 1-#2	63 mm (2½ in.)	4
350 KCMIL	78 mm (3 in.)	4
750 KCMIL	129 mm (5 in.)	4
1000 KCMIL	155 mm (6 in.)	5

6-100-2 MANITOBA HYDRO OWNED FARM SERVICE POLES AND STRUCTURES

Manitoba Hydro will not normally permit customer owned electric service facilities to be located on Manitoba Hydro owned poles and structures.

Where customer owned facilities are attached to Manitoba Hydro poles and structures, including existing farm service poles, the following shall be adhered to:

When the customer requires work to be conducted on electric facilities located more than 3m above grade on a Manitoba Hydro owned pole or structure, the primary supply shall first be de-energized by Manitoba Hydro staff before any work is carried out.

6-112 SUPPORT FOR THE ATTACHMENT OF OVERHEAD SUPPLY OR CONSUMER'S SERVICE CONDUCTORS OR CABLES

6-112-1 UPGRADING OF EXISTING RESIDENTIAL ELECTRICAL SERVICES

Where a customer's meter is to be relocated outside or service conductors re-pulled in an existing conduit, the existing supply service attachment point will be acceptable provided:

- a) the building is a single dwelling;
- b) the service attachment point is acceptable to the utility;
- c) the existing conduit is of sufficient size;
- d) the service drop clearances in effect at the time of installation have not been decreased through landscaping, addition of buildings, or pools, etc.; and
- e) the attachment point is not less than 3 m above grade except that a variance of 150 mm may be accepted at the discretion of the Inspection Department.

6-112-2 SERVICE MASTS AND ATTACHMENTS

Prior to installing the supply service attachment means, the supply authority shall be consulted to determine whether a single or multi-point rack will be required.

Note: *When metal racks are being installed as support for the attachment of overhead consumer's service conductors or cables, they shall be welded or bolted through. The use of spring nuts or similar items will not be accepted.*

6-112-3 MEANS OF ATTACHMENT

A means of attachment shall be provided for all supply or consumer's service conductors. The attachment shall be a service mast or attachment provided by the customer on a building or a customer-owned service pole at a location that is acceptable to the supply authority.

Note: *When poles are installed they shall be a minimum of a class 6 pole and must be treated with a wood preservative. A timber or post will not meet the requirements of this rule.*

6-116 CONSUMER'S SERVICE HEAD LOCATION

AERIAL SERVICE ATTACHMENT

Rule 6-116 of the Code has been relaxed to allow the attachment point of an aerial service to be at the same height as the service head where an under-eave bracket is used.

Note: *An under-eave bracket shall be used for its intended purpose and shall not be wall mounted.*

6-200 SERVICE EQUIPMENT

CONSUMER'S SERVICE BOXES

1. The requirements of Rule 6-200(2) are further relaxed to permit outdoor subdivisions of a consumer's service to be made:
 - a) In a transformer rated meter mounting device approved with dual lugs on the load side; or
 - b) In an acceptable Customer Service Termination Enclosure (CSTE); or
 - c) At an overhead rack on a pole or building.
2. For the application of Rule 6-104, each subdivision permitted in Sub rule (1) shall be considered a consumer's service.
3. Each subdivision of the consumer's service shall terminate in a single service box.
4. No other consumer's service may be attached to the supply service.

Note 1: *CSTE's may be wall, structure or pad mounted provided the location is acceptable to the supply authority. For the definition of CSTE's, see Manitoba Hydro Customer Metering Standards.*

- Δ **Note 2:** *Each consumer's service shall have the same voltage and characteristics as the supply service.*

6-202 SUBDIVISION OF MAIN CONSUMER'S SERVICE

USE OF PANELBOARDS TO SUBDIVIDE THE MAIN CONSUMER'S SERVICE

The use of distribution panelboards to subdivide main consumer's services will not be accepted.

Rule 6-202 of the Code states that "*each subdivision of the main consumer's service shall be provided with a separate service box, or equivalent multi-service equipment shall be used.*"

Panelboards, including Central Distribution Panelboards (CDPs), are not approved as equivalent multi-service equipment.

6-302 INSTALLATION OF OVERHEAD CONSUMER'S SERVICE CONDUCTORS

INSULATION RATING FOR OVERHEAD CONSUMER'S SERVICE CONDUCTORS

For compliance with Rule 6-302(5), conductor/cable insulation shall be rated for -40°C.

6-400 METERING EQUIPMENT

METER SOCKETS SERVED FROM UNDERGROUND SUPPLY SYSTEMS

- Δ Single phase meter sockets and meter troughs served from underground supply systems shall be factory equipped with studs on the line side to provide for the connection of compression type wire connectors.

Note: This requirement is not enforced for a combination meter socket and breaker (farm metering unit) or 7 jaw meter sockets

SECTION 8 CIRCUIT LOADING AND DEMAND FACTORS

8-1 LOAD INCREASES TO EXISTING SERVICES

Installers should note that Manitoba Hydro requires notification prior to a load increase of 10 kVA/kW/hp or more to any existing service. Furthermore, in the City of Winnipeg network area, Manitoba Hydro requires notification prior to the addition of 5 hp or more to an existing single phase service.

8-104 MAXIMUM CIRCUIT LOADING

- Δ Sample Calculations for conductor ampacity and maximum continuous loading for a 400 Amp service box:

SINGLE CONDUCTORS IN FREE AIR

Tables 1 and 3

Non-Continuous Load Rule 8-104	Continuous Load using 100% rated equipment Rule 8-104(5)(b)	Continuous Load using 80% rated equipment Rule 8-104(6)(b)
max. cct. loading = 100% of 400A = 400A	max. cct. loading = 85% of 400A = 340A	max. cct. loading = 70% of 400A = 280A
min. conductor ampacity = 400A	min. conductor ampacity = 400A or, max. cct. loading = 100% of 400A = 400A	min. conductor ampacity = 400A or, max. cct. loading = 80% of 400A = 320A
	min. conductor ampacity = 471A	min. conductor ampacity = 458A

MULTI-CONDUCTOR CABLE AND RACEWAYS

Tables 2 and 4

Non-Continuous Load Rule 8-104	Continuous Load using 100% rated equipment Rule 8-104(5)(a)	Continuous Load using 80% rated equipment Rule 8-104(6)(a)
max. cct. loading = 100% of 400A = 400A	max. cct. loading = 100% of 400A = 400A	max. cct. loading = 80% of 400A = 320A
min. conductor ampacity = 400A	min. conductor ampacity = 400A	min. conductor ampacity = 400A

Refer to Rules 8-104(5) & 8-104(6) in the CEC Handbook for additional examples.

SECTION 10 GROUNDING AND BONDING

10-1 TINGLE VOLTAGE

10-116(2) INSTALLATION OF GROUNDING CONDUCTORS

1. Rule 10-116(2) allow for various approved devices to be installed between the system ground and the neutral conductor of a service or distribution system on farm outbuildings.
2. Electrical Inspectors have the expertise and instruments to investigate tingle voltage complaints. If you suspect tingle voltage is creating a problem, you should contact your Electrical Inspector.
3. New Barns: When wiring new barns, be advised that the most effective remedial action to prevent problems with tingle voltage is the installation of an equipotential mat in the floor of the building.

The installation of a mat should be done prior to pouring the floor. When involved in a barn installation, advise your customer of the importance of installing this mat. In dairy and P.M.U. facilities, the important locations are the animal standing areas. For further information Manitoba Hydro has published a data sheet on the problems and remedial actions for tingle voltage. These are available at Manitoba Hydro Customer Service Centres.

10-2 BONDING BETWEEN ENCLOSURES INTERCONNECTED WITH FIBRE SPACERS AND METAL THROATS

The use of fibre spacers or metal throats will be permitted to interconnect component parts of electrical equipment provided bonding jumpers sized in accordance with Table 16 are installed.

10-102 GROUNDING ELECTRODES

USE OF SINGLE ROD GROUNDING ELECTRODES

1. Rule 10-102(2) has been relaxed in its application to permit the use of a single copper-clad rod as a grounding electrode provided the following conditions have been met:
 - a) The service is single phase and not greater than 200 amperes and 150 volts to ground; and
 - b) The service is temporary or supplies a bus shelter, cable television distribution equipment, sign or other similar installation.
2. When a temporary builder's service is located 3 m or less from the supply utility's pad-mounted transformer or cable trench, the supply utility's grounding electrode shall be used in lieu of a customer owned grounding electrode. The customer must supply a grounding conductor between the temporary builder's service and the pad mounted transformer. A customer owned grounding electrode will not be acceptable in order to reduce the risk of damaging buried conductors.

10-112 MATERIAL FOR GROUNDING CONDUCTORS

ALUMINUM GROUNDING CONDUCTORS AND CONNECTIONS

Rule 10-112 permits the use of aluminum grounding conductors only when resistance to corrosion has been considered. Aluminum grounding conductors and connections installed in any corrosive environment must have corrosion protection. For example, bare aluminum grounding conductors or connections to a grounding electrode installed in contact with masonry or earth are subject to corrosion and will not be permitted.

For more information see the Appendix B note to Rule 10-112 (2).

10-210 GROUNDING CONNECTIONS FOR SOLIDLY GROUND AC SYSTEMS SUPPLIED BY THE SUPPLY AUTHORITY

GROUNDING CONDUCTOR CONNECTIONS TO SERVICE BOXES

- Δ For the application of Rule 10-210(1) grounding conductors shall not be terminated in meter mounting devices or customer service termination enclosures (CSTEs).

Note: *Rule 6-308 permits the service neutral to be bare. The grounded service conductor (neutral) on the supply side of the service box may be insulated or bare and will be permitted to bond the meter mounting device.*

10-700 EQUIPOTENTIAL BONDING

10-700-1 BONDING OF INTERIOR GAS PIPING

For the gas pipe bonding requirements in single dwellings, the bonding conductor supplied as an integral part of a cable assembly supplying the appliance may be considered a suitable bonding conductor for the circuit supplied by that cable assembly and may be deemed to meet the intent of Rule 10-700 (c).

10-700-2 BONDING OF RAISED CELLULAR FLOOR ASSEMBLIES

An equipotential plane is defined as: A grid, sheet, mass or masses of conducting material that when bonded together offers negligible impedance to current flow and prevents a difference in voltage from developing within the plane.

This can be achieved by ensuring the equipotential plane conducting material is permanent and continuous, has ample ampacity to conduct safely any currents to be composed on it, and has impedance sufficiently low to limit the voltage above ground and to facilitate the operation of the overcurrent devices in the circuit.

SECTION 12 WIRING METHODS

12-1 CABLE TIES

△ Cable ties will not be accepted as a supporting means for conductors, cables and raceways.

Cable Ties will be permitted to secure cables where the weight of the cable is supported in an acceptable manner, such as in a cable tray or on top of a unistrut type of supporting means.

12-2 PRESERVED WOOD FOUNDATIONS

Installers are advised that the Manitoba Building Code requires preserved wood foundations to conform to CSA Standard CAN/CSA S406-16, "Specification of permanent wood foundations for housing and small buildings". This Standard requires that where receptacles or other wiring is placed in exterior walls of a preserved wood foundation, the wiring shall be run vertically within a single stud space, with holes drilled only in the top plates.

Holes are not permitted to be drilled through studs in preserved wood foundations, according to Standard S406-16.

△ 12-3 LIGHTING POWER AND CONTROL CIRCUITS IN THE SAME CABLE, RACEWAY OR BOX

12-106

Cables are currently being manufactured to carry power and control circuit conductors in the same cable. The Manitoba Electrical Code does not allow the use of these cables for the installation of lighting power circuits and lighting control circuits. For the purpose of this rule luminaires are not considered remote devices.

12-904

The Manitoba Electrical Code does not allow the practice of installing lighting power and lighting control circuits in the same raceway without a barrier. For the purpose of this rule luminaires are not considered remote devices.

12-3030

The Manitoba Electrical Code does not allow the practice of installing lighting power and lighting control circuits in the same box, cabinet or fitting without a barrier. For the purpose of this rule luminaires are not considered remote devices.

For the definition of a remote device see the Appendix B note for rule 12-106 in the 24th edition of the Canadian Electrical Code.

12-012 UNDERGROUND INSTALLATIONS

CONDUITS & CABLES IN OR UNDER FLOORS OF ATTACHED GARAGES

Conduits or cables shall not be run in or under the floors of attached garages unless installed to meet the minimum cover requirements of Table 53.

12-100 TYPES OF INSULATED CONDUCTORS AND CABLES

12-100-1 TYPE USEB90 AND USEI90 UNDERGROUND SERVICE ENTRANCE CABLES

Type USEB90 and USEI90 cables will be permitted for use as underground feeders provided:

- a) A bonding conductor, sized in accordance with Table 16, is installed with the cable, except as permitted for two or more buildings by Rule 10-210;
- b) The installation is in accordance with the requirements of Rule 12-100;
- c) The cables are not installed in or on a building unless in a raceway;
- d) When used on a pole, type USEB90 is installed in rigid conduit to a point at least 2 m above grade or ground level;
- e) Where type USEI90 is installed on a pole or building, it is in a raceway between the underground trench and the above ground termination; and
- f) All conduits are sealed to prevent the entrance of moisture.

Note: *Not for use in overhead services, or portions of overhead services, where no part of the cable installation is installed underground.*

Δ 12-100-2 TYPE ARMoured CONTROL AND INSTRUMENTATION CABLE (ACIC)

Type ACIC cables are approved under CSA part 2 standards as control and instrumentation cable only and will not be permitted for power cable.

12-618 RUNNING OF CABLE BETWEEN BOXES, ETC

SECURING NON JACKETED ARMoured CABLE WITH TIE WIRE

Galvanized tie wire is not an approved method of supporting cables or raceways. It has been an acceptable industry practice to support BX type armoured cable with tie wire providing the cables were installed inside a finished wall.

Galvanized tie wire will be permitted to provide support for BX type armoured cables inside a finished wall. All BX type armoured cables located outside a finished wall shall be supported with an approved strap or device.

12-904 CONDUCTORS IN RACEWAYS

12-904-1 CIRCUIT CONDUCTORS INSTALLED IN RACEWAYS

All conductors of the same circuit shall be contained within the same raceway, unless otherwise permitted in accordance with Rule 12-108 or Rules 4-004(1)(d) and (2)(d).

12-904-2 WIRING SYSTEMS FOR MODULAR OFFICE FURNITURE

Office areas are often designed with relocatable partitions that are pre-wired with communication and or branch circuit wiring. Before connecting such equipment to the building wiring system, installers are advised to carefully check the manufacturer's installation instructions and equipment marking. In some cases, there may be a restriction on the number of circuits or sources that are permitted to supply the pre-wired furniture.

Code users are reminded that where such circuits are supplied from different transformers or different sources of voltage, the circuits shall be separated in accordance with Rule 12-904(2).

12-920 SUPPORT OF RACEWAYS

ELECTRICAL RACEWAY SUPPORTS

Electrical raceways shall be securely fastened in place. The use of suspended ceiling support wires are not considered an acceptable means of fastening a conduit.

12-1014 INSULATED CONDUCTORS AND CABLES IN CONDUIT

PNEUMATIC TUBING IN RACEWAYS

Electrical raceways may only be used for the purpose of carrying electrical conductors. An exception will be permitted to allow pneumatic tubing in a raceway where all the electrical conductors are designated as Class 2 circuits.

Conduit fill for such raceways shall be calculated in accordance with the requirements of Rule 12-910 using the diameter of the tubing where the Rule specifies "cable diameter".

12-1500 ELECTRICAL NON-METALLIC TUBING

ELECTRICAL NON-METALLIC TUBING (ENT) INSTALLED OUTDOORS

Electrical non-metallic tubing shall not be installed exposed in exterior locations unless specifically approved for sunlight resistance, and so marked as per Rule 2-134.

12-3014 ACCESSIBILITY OF JUNCTION BOXES

ELECTRICAL CONDUIT FITTINGS

Under the requirements of Rule 12-3014(1), conduit fittings (LB's, T's, etc.) equipped with a cover shall be accessible.

12-3032 WIRING SPACE IN ENCLOSURES

WIRING SPACE IN ENCLOSURES

Where two or more panelboard interiors are provided in a single enclosure complete with a factory-installed metal barrier between the panelboards, the only openings permitted in this barrier are those required to run the subfeed conductors from one panelboard to the other.

These interconnecting conductors are factory installed. No other conductors may be run through these openings.

For the purpose of Rule 12-3032(3), each panelboard section is deemed a separate enclosure and therefore no branch circuit conductors terminating in any one of the panelboards may be fed through the adjacent panelboard.

SECTION 14 PROTECTION AND CONTROL

14-1 OVERCURRENT PROTECTION FOR SPLIT RECEPTACLES IN PARKING LOTS

14-010 PROTECTIVE AND CONTROL DEVICES REQUIRED 14-302 CONSTRUCTION OF CIRCUIT BREAKERS

Where single phase, 3-wire receptacles are installed in parking lots, they shall be protected in accordance with Rules 14-010 and 14-302.

14-012 RATINGS OF PROTECTIVE AND CONTROL EQUIPMENT

INTERRUPTING RATINGS OF OVERCURRENT DEVICES

Under the requirements of Rule 14-012, electrical equipment which is required to interrupt fault current, (breakers, fuses and switches) must have ratings sufficient for the voltage employed and for the fault current available at the terminals.

The maximum fault current available for the supply service is governed by a number of criteria and must therefore be calculated for each installation. Fault current information must be obtained from Manitoba Hydro.

To ensure compliance with Rule 14-012, electrical drawings submitted for review shall indicate the expected available fault current and the interrupting ratings of all equipment required to interrupt the fault current.

The following criteria will apply to all fault current calculations:

- a) The calculation will assume an infinite primary bus.
- b) The percent impedance for transformers will be the percent impedance of the installed transformer.

Note: *For installations for all new services or modifications to existing services within the City of Winnipeg 125/216V underground secondary network area, service entrance equipment must consist of a circuit breaker or circuit breaker/fuse combination with a rupturing capacity of at least 100,000 Amperes or a disconnecting switch equipped with at least 100,000 Amperes high rupturing capacity fuses.*

14-606 PANELBOARD OVERCURRENT PROTECTION

PANELBOARD/SPLITTER OVERCURRENT PROTECTION

Rule 14-606 allows for panelboards to be installed on the secondary side of transformers with overcurrent protection on the primary side provided the panelboard rating is not less than the overcurrent rating in amperes multiplied by the ratio of the primary to the secondary voltage.

For the application of this rule, the definition of a "panelboard" includes splitters.

SECTION 16 CLASS 1 AND CLASS 2 CIRCUITS

16-1 CLASS 2 CIRCUITS, 30 VOLTS OR LESS

1. Class 2 Circuits shall be supplied from Class 2 transformers, or
 - a) A Class 2 power supply or device; or
 - b) Where the voltage does not exceed 20 volts, a 5 ampere (maximum) mini circuit breaker or a 5 ampere non-interchangeable fuse.
2. Lighting products, electromedical equipment, equipment for hazardous locations and thermostats incorporating heat anticipators shall be approved in accordance with Rule 16-222(2).
3. The wiring method on the load side of the Class 2 power supply may conform to the applicable requirements of Section 16 of the Code for a class 2 system.
4. The wiring method on the line side of the Class 2 power supply shall conform to the applicable requirements of Section 12 of the Code.
5. The Power Supply shall be located and installed in an acceptable manner.

16-212 SEPARATION OF CLASS 2 CIRCUIT CONDUCTORS FROM OTHER CIRCUITS

Δ LIGHTING POWER AND LIGHTING CLASS 2 CONTROL CIRCUITS

The Manitoba Electrical Code does not allow the practice of installing lighting power and lighting Class 2 control circuits in the same cable. For the purpose of this rule luminaires are not considered remote devices.

For the definition of a remote device see the Appendix B note for Rule 12-106 in the 24th edition of the Canadian Electrical Code.

SECTION 18 HAZARDOUS LOCATIONS

18-1 WOODWORKING SHOPS

18-250, 18-252 and 18-254 INSTALLATIONS IN ZONE 22 LOCATIONS

Δ Classification

Wood working shops are considered Zone 22 locations. The following relaxations to Zone 22 requirements will be permitted where adequate dust control equipment is installed and interlocked.

For items not specifically listed below, Zone 22 requirements shall apply.

1. Wiring Methods
 - a) Surface wiring may be Electrical Metallic Tubing (EMT) utilizing couplings and connectors approved for Wet Locations or comply with Rule 18-252(2).
 - b) Concealed wiring may be type AC or NM cable. Concealed boxes and fittings may be ordinary type.
 - c) Surface mounted boxes and fittings shall comply with Rule 18-252 (2)
 - d) Surface mounted enclosures for equipment disconnects must be marked as suitable for circulating dust as per Table 65.
2. Covers for Switches and Receptacles

Light switch and receptacle covers may be of the type marked suitable for a wet location, covers marked Extra Duty are not acceptable. Where duplex receptacles are used a separate self-closing cover will be required for each section of the receptacle.
3. Lighting

General purpose fluorescent luminaires, other than those with T5 lamps, may be installed:

 - a) If mounted directly on the ceiling;
 - b) If suspended, provided with adequate dust shields to prevent the accumulation of dust;

LED luminaires, exit lights and emergency lights must be of dust tight construction with a minimum Nema rating of Type 4 or 12.
4. woodworking equipment shall be of dust tight construction
5. Heating

Unit electric air heaters, other than those approved for the location, will be permitted provided the following requirements are met:

 - a) Motors are of the totally enclosed type;
 - b) The unit is designed to minimize the accumulation of dust and other debris;
 - c) The enclosures for electrical parts of the heater shall prevent the entrance of dust; and
 - d) The exposed surface** temperature of the heater shall not exceed 165 degrees Celsius under normal conditions and 218 degrees Celsius under abnormal conditions, such as fan failure.

*** Exposed surface means a surface exposed to the air. e.g. Motor enclosure, heater sheath, etc. A "GX" rated heater will generally meet these requirements.*

SECTION 22 LOCATIONS IN WHICH CORROSIVE LIQUIDS, VAPOURS, OR EXCESSIVE MOISTURE ARE LIKELY TO BE PRESENT

22-1 WALK-IN FREEZERS AND COOLERS

Walk-in freezers are considered wet locations and walk-in coolers are considered ordinary locations, as defined in Section 0.

22-2 GREENHOUSES

- Δ Commercial greenhouses are considered a category 1 (Wet) location. Greenhouses provided with positive mechanical ventilation could be reduced to a lesser classification with an engineer stamped letter stating measures taken and the new classification.

22-002 CATEGORY DEFINITIONS

22-002-1 AREA CLASSIFICATIONS FOR WATER TREATMENT PLANTS

Water Treatment Plants are considered to be Category 1 locations; when corrosive vapours or liquids are present the treatment areas are considered to be "Category 2 Wet" locations (Category 1 Wet and Category 2 Corrosive locations).

The following conditions will allow for water treatment plant areas to be considered ordinary locations under the Manitoba Electrical Code:

- a) Treatment areas that utilize a completely-closed water treatment process, with all piping insulated (to prevent condensation), and that do not incorporate any open water sources; or
- b) Treatment areas that do not utilize completely-closed systems but that incorporate a continuously-operating ventilation system with adequate temperature control and dehumidification and incorporating a positive means of detecting and annunciating ventilation system failure.

22-002-2 AREA CLASSIFICATIONS FOR BUILDINGS HOUSING LIVESTOCK OR POULTRY

- Δ Dairy barns and stables for horses in rural farm areas will be considered Category 1 Wet locations. All other buildings housing livestock or poultry are considered "Category 2 Wet" locations (Category 1 Wet and Category 2 Corrosive locations).
- a) Category 1 and Category 2 Wet locations shall only contain electrical equipment essential to that operation. Electrical equipment installed in these areas shall be approved, and marked accordingly for that environment.
 - b) Enclosure designations and markings for Category 2 Wet locations shall comply with rule 2-400 and Table 65 for corrosive areas, and hose-down and splashing water (minimum 4X-wet and corrosive). Manitoba Hydro reserves the right to request certified test reports that demonstrates the equipment meets all applicable CSA Part 2 standards. Ingress Protection (IP) standards and markings are not acceptable.

Δ 22-002-3 AREA CLASSIFICATIONS FOR RINKS

The area containing the ice surface in rinks is considered a Category 1 (Wet) location. Rinks provided with positive mechanical ventilation could be reduced to a lesser classification with an engineer stamped letter stating measures taken and the new classification.

22-104 PENDANT LAMPHOLDERS

LAMPHOLDERS IN CATEGORY 2 WET LOCATIONS

- Δ Rule 22-104(1) is relaxed to include box-mounted lampholders. Porcelain type keyless lampholders will be permitted in buildings housing livestock provided. These lampholders are fitted with pigtails and potted terminations.



22-108 RECEPTACLES, PLUGS, AND CORDS FOR PORTABLE EQUIPMENT

RECEPTACLES FOR USE IN BUILDINGS HOUSING LIVESTOCK OR POULTRY

Where receptacles are, or are likely to be exposed to corrosive vapours they shall be of the corrosion resistant type of construction.

22-704 CLASSIFICATION OF AREAS

**SEWAGE LIFT AND TREATMENT PLANTS - TYPICAL INSTALLATION DRAWINGS
(See Appendix B Rule 22-704)**

DIAGRAM 11

**Rule 22-704 Classification of Areas
Typical Sewage Lift Station (Self-Contained)**

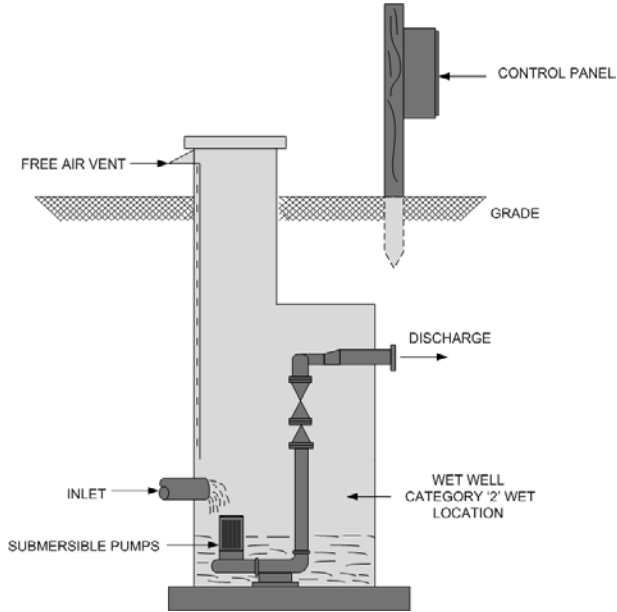


DIAGRAM 12

**Rule 22-704 Classification of Areas
Typical Sewage Lift Station (Control Building on top)**

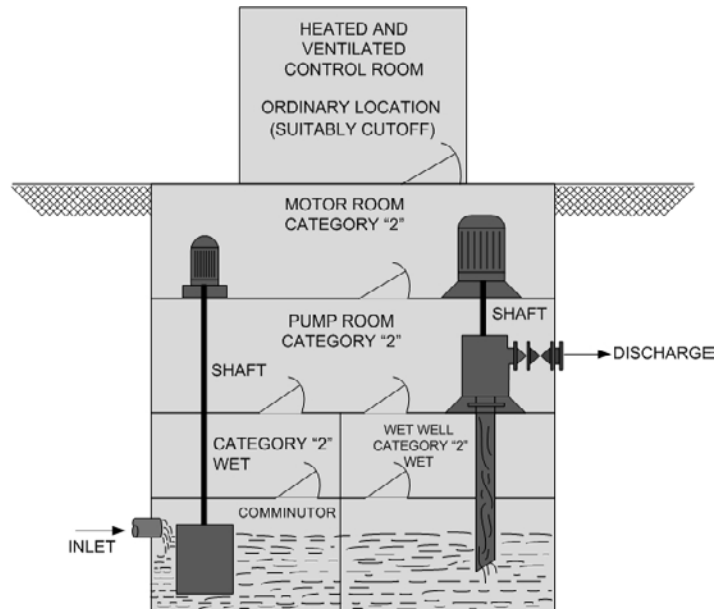


DIAGRAM 13

**Rule 22-704 Classification of Areas
Typical Sewage Lift Station (Side-by-Side)**

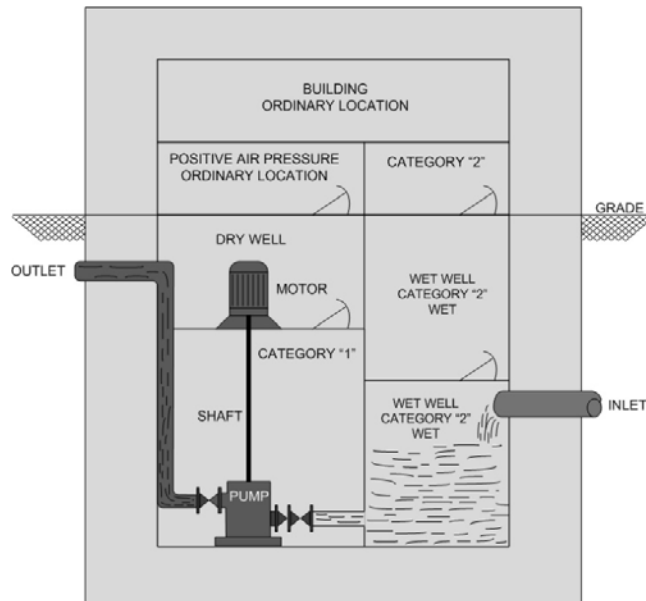
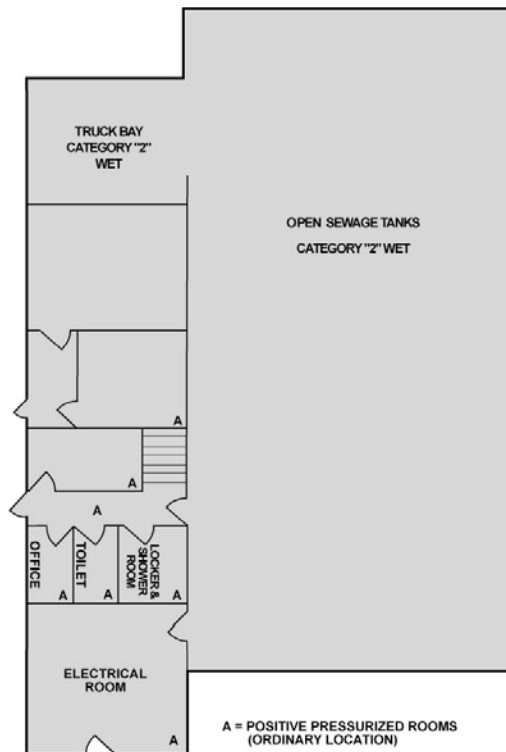


DIAGRAM 14

**Rule 22-704 Classification of Areas
Typical Sewage Treatment Plant**



SECTION 24 PATIENT CARE AREAS

24-1 PATIENT CARE AREAS

Code users should note that patient care areas are defined by the CAN/CSA-Z32 standard and include, but are not limited to dental clinics, physicians' offices, chiropractic clinics, walk-in clinics and optometrists' offices, and others, in addition to the traditional hospital facilities. This means that the specific rooms and rooms of a clinic in which treatment is carried out must be constructed in accordance with Section 24 methods. The relevant Rules of Section 24 apply to the installation of electrical wiring and equipment within patient care areas where permanently- or cord-connected electro-medical equipment is used for the purpose of intentional contact at a patient's skin surface or internally during the patient's treatment, diagnostics or monitoring.

The inspection department is not responsible for determining or classifying the patient care areas within a health care facility. CAN/CSA-Z32 states that the facility administrator is responsible for determining whether an area of a health care facility should be classified as a patient care area and if so, whether it is a basic, intermediate, or critical area. CAN/CSA-Z32 defines the "Administrator" as the person responsible for operating the health care facility (or his or her designee). The administrator shall document those areas that are patient care areas and whether those areas are classified as basic care, intermediate care, or critical care. If no areas are to be classified, then this shall also be documented.

A copy of the patient care area classification document shall be provided to the inspection department for the inspector's use when inspecting the installation of the electrical wiring and equipment within the facility for compliance with the Manitoba Electrical Code. If there are no classified patient care areas within the facility, then a letter stating that is required from the administrator.

SECTION 26 INSTALLATION OF ELECTRICAL EQUIPMENT

Δ 26-1 RECEPTACLES FOR BUILDINGS OR STRUCTURES ASSOCIATED WITH RESIDENTIAL OCCUPANCIES

Clarification of the ground fault circuit interrupter (GFCI), tamper resistant (TR) and arc fault protection (AFP) requirements for receptacles and branch circuits that are installed in or on buildings or structures associated with residential occupancies (includes dwelling units and single dwellings).

GFCI - Rule 26-722 requires that all receptacles of residential occupancies installed outdoors and within 2.5 m of finished grade be protected by a Class A GFCI. This includes receptacles located on buildings or structures associated with the residential occupancy such as detached garages, carports, sheds, and receptacles on posts or fences.

TR - In addition to the tamper resistant requirements set out in Rule 26-706 tamper resistant receptacles will be required for receptacles located in or installed on buildings or structures associated with the residential occupancy such as detached garages, carports, sheds, and receptacles on posts or fences.

AFP – Arc fault protection set out in Rule 26-656 will not be required for branch circuits or receptacles located in or installed on detached garages, sheds, and receptacles on posts or fences.

26-008 SPRINKLERED EQUIPMENT

EQUIPMENT ENTRY IN SPRINKLERED AREAS

If raceways or cables enter the top of electrical equipment in sprinklered areas, weatherproof wiring methods shall be utilized to prevent water from entering the equipment.

26-248 DISCONNECTING MEANS FOR TRANSFORMERS

"STEP-UP / STEP-DOWN" TRANSFORMER INSTALLATIONS

For the application of this Rule, a separate disconnecting means will be required in the primary circuit of each transformer in a "step-up/step-down" application. The disconnect for the step-down transformer shall be located within sight of, and within 3 meters of the transformer.

26-600 LOCATION OF PANELBOARDS

PANELBOARD MOUNTING HEIGHTS AND HEADROOM CLEARANCES IN DWELLING UNITS

Rule 26-600(2) requires that panelboards in dwelling units be installed as high as possible, with no overcurrent device operating handle being more than 1.7 m above the finished floor. Installers are advised that the 1.7 m restriction will not be applied to an overcurrent device located in the service box portion of a combination service entrance panelboard. Code users are also reminded that Rule 6-206 requires a minimum headroom clearance of not less than 2 m where service boxes, including combination service entrance panelboards, are located.

26-724 RECEPTACLES FOR DWELLING UNITS

RECEPTACLES ON PERMANENTLY FIXED ISLAND COUNTERS

Rule 26-724(d)(iv) requires that at least one receptacle (5-15R split or 5-20R T-slot) shall be installed at each permanently fixed island counter space with a continuous long dimension of 600 mm or greater and a short dimension of 300 mm or greater.

For the purpose of this Rule an island is considered to be permanently fixed unless mounted on wheels.

26-806 HEATING EQUIPMENT RATED 117 KW AND LESS

UNIT TYPE GAS FIRED HEATERS

Rule 26-806(1) requires a separate branch circuit for each gas fired unit heater. The grouping of unit heaters, utilizing fractional hp fan motors will be permitted on a single 15 ampere branch circuit provided the requirements of Rule 28-206(a) are met.

SECTION 28 MOTORS AND GENERATORS

28-1 OVERCURRENT PROTECTION MARKED ON REFRIGERANT MOTOR-COMPRESSORS

28-202 OVERCURRENT PROTECTION MARKED ON EQUIPMENT 28-702 MARKING

For the application of these Rules, installations of overcurrent devices exceeding the marked nameplate ratings will not be accepted.

28-2 MOTORS USED IN VARIABLE SPEED APPLICATIONS

New Installations: Motors and Variable Frequency Drives (VFDs) intended for use in variable speed applications must be compatible and motors must be marked accordingly.

Existing installations: Where new VFDs are installed to control existing motors, owners and installers are responsible for assessing the compatibility of the motor with the corresponding VFD. The inspection department will require a record of the compatibility assessment information and documentation from the motor manufacturer stating the motor is compatible with the VFD.

SECTION 30 INSTALLATION OF LIGHTING EQUIPMENT

30-400 WIRING OF LUMINAIRES

CORD CONNECTED NON-RECESSED LUMINAIRES

1. Cord-connected luminaires must be manufactured and certified with the cord.
2. Luminaires that are modified in any way (for example: to alter the length of the cord, incorporate a cord, or remove the cord cap) are no longer approved and will require re-certification as permitted by the Manitoba Electrical Code.
3. An approved chain or hook suspended luminaire's cord, upon reaching the building structure or ceiling, shall:
 - a) Be supported by a Kellems type strain relief grip, and
 - b) Have a maximum length of 1.5 meters, and
 - c) Utilize a strain relief connection if not approved with a cord cap, and
 - d) Meet the requirements of Rule 12-402.

30-900 GENERAL

INSTALLATION OF RECESSED LUMINAIRES IN INSULATED SPACES OR FIRE-RATED CEILINGS

Rule 30-906 requires that recessed luminaires, when blanketed with thermal insulation be identified as approved for such use. A number of approved luminaires are available in the market place.

Where the installation of a standard recessed luminaire in an insulated or fire-rated ceiling is desired, a box shall be constructed around the luminaire to allow adequate heat dissipation. The capacity of the box in cubic cm shall be based on the maximum rated wattage of the luminaire multiplied by 800.

The installation shall comply with Rule 30-900.

Example:

Rating of luminaire:	100 watts
Capacity of the box:	$100 \times 800 = 80,000 \text{ cm}^3$
Proposed box length and width:	$40 \text{ cm} \times 40 \text{ cm} = 1,600 \text{ cm}^2$
Minimum depth:	$80,000 \text{ cm}^3 / 1,600 \text{ cm}^2 = 50 \text{ cm deep}$
Box dimensions:	40 cm X 40 cm X 50 cm

SECTION 32 FIRE ALARM SYSTEMS, SMOKE AND CARBON MONOXIDE ALARMS, AND FIRE PUMPS

32-000 SCOPE

FIRE ALARM SYSTEMS

The intent of this Rule is that all installations of Fire Alarm Systems shall meet the requirements of Section 32.

32-200 INSTALLATION OF SMOKE ALARMS AND CARBON MONOXIDE ALARMS IN DWELLING UNITS

SUPPLY VOLTAGE FOR SMOKE ALARMS

To meet the requirements of Rule 32-200(a), 120V smoke alarms will be required.

SECTION 36 HIGH-VOLTAGE INSTALLATIONS

36-000 SCOPE

Δ APPLICABLE CSA PART III STANDARDS FOR HIGH VOLTAGE INSTALLATIONS

High-voltage installations not covered in the Manitoba Electrical Code shall meet the requirements of the applicable CSA Part III standards.

36-1 OUTDOOR PADMOUNTED HIGH-VOLTAGE SWITCHGEAR

The following conditions shall be met for all Outdoor Padmounted High Voltage Switchgear installations:

1. Outdoor Padmounted High Voltage Switchgear shall be provided with a suitable hasp for Manitoba Hydro to install a padlock on all compartments containing Manitoba Hydro terminations or metering facilities. An exception to this would be front doors of front operated switches where the customer shall have access to replace fuses etc. (In these cases the CSA standard requires a dead front over the line terminations).
2. Where Outdoor Padmounted High Voltage Switchgear is accessible to the public, all doors of "customer compartments" accessing live parts shall be locked or secured with acceptable tamperproof devices.

Notes:

- *Switchgear inside a locked station fence or suitable enclosure is not considered accessible to the public.*
- *Tamperproof devices should be other than those used by Manitoba Hydro on its own equipment.*

Δ 36-2 GROUNDING CONDUCTOR TO BE INSTALLED WITH CIRCUIT CONDUCTORS OTHER THAN OVERHEAD SYSTEMS

To meet the requirements of the Manitoba Electrical Code a grounding conductor shall be installed with every set of circuit conductors. The grounding conductor shall be not less than 2/0 AWG copper and shall have sufficient ampacity to carry the maximum ground fault current in accordance with table 51.

36-204 OVERCURRENT PROTECTION

ACCESSIBLE GROUND OPERATED SWITCH HANDLES

Each break load interrupting device or break air break switch required by Rules 36-204(1)(b) and (c) shall have a ground operated switch handle located in a readily accessible location.

This will apply to single phase and three phase installations.

36-308-1 CONNECTIONS TO THE STATION GROUND ELECTRODE

Δ GROUNDING CONDUCTOR SIZE FOR LOW VOLTAGE SECONDARY NEUTRALS WHEN TRANSFORMER PRIMARY EXCEEDS 750 VOLTS

To meet the requirements of the Manitoba Electrical Code the grounding conductor required by 36-308(6)(b) shall be not less than 2/0 AWG copper. There will be no requirement to increase this conductor based on the ground fault current of the transformer.

36-308-2

△ NEUTRAL GROUNDING REQUIREMENT FOR POLEMOUNTED TRANSFORMERS

It shall be permitted to use the grounding conductor specified in 36-308(2)(b)(i) to ground the neutral of a polemounted transformer provided the size has a sufficient ampacity to carry the maximum ground fault current of the transformer in accordance with table 51.

SECTION 46 EMERGENCY POWER SUPPLY, UNIT EQUIPMENT, EXIT SIGNS, AND LIFE SAFETY SYSTEMS

46-1 EMERGENCY GENERATOR SETS

The Winnipeg Building By-law states that required emergency equipment, such as fire alarm systems, emergency lighting and fire pumps, be provided with emergency power.

Where the emergency power is supplied by a generator, it shall be installed in accordance with the CSA Standard C282-15, “**Emergency Electrical Power Supply for Buildings**”.

Section 10 of CSA Standard C282-15, specifies a number of tests be performed on the completed installation, to ensure conformance to the standard.

Documentation supporting satisfactory performance of the installation during these tests shall be submitted to the Electrical Inspections Section prior to occupancy approval.

CSA Standard CSA C282-15, “**Emergency Electrical Power Supply for Buildings**” is available from the Canadian Standards Association.

46-304 SUPPLY CONNECTIONS

EMERGENCY LIGHTING SUPPLIES

Where emergency lighting is required by the authority having jurisdiction the requirements of Rule 46-304(4) shall be met. The intent of this Rule is to ensure illumination in the area being served by the unit equipment is maintained when power to the normal lighting in the area fails.

Note: Detailed information is available in the *Canadian Electrical Code Handbook*.

SECTION 62 FIXED ELECTRIC HEATING SYSTEMS

62-104 INSTALLATION OF HEATING DEVICES AND BONDING

TERMINATION KITS FOR HEAT TRACE CABLES

Installers are reminded that heating cable terminations shall be made only with the materials and methods specified in the heating cable manufacturer's instructions. Failure to use the specified materials and methods will void the heating cable approval.

SECTION 64 RENEWABLE ENERGY

△ 64-1 INVERTER INTEGRAL DISCONNECTS

Inverter integral DC and AC disconnects will not be considered as meeting the requirements of a disconnecting means as required by the Manitoba Electrical Code. As such the required DC and AC disconnects shall be field installed adjacent and external to the inverter.

△ 64-2 LABELLING

All labels for renewable energy systems as required by the Manitoba Electrical Code shall be a permanently attached engraved lamacoid. The lamacoid shall have a red background with white lettering.

△ 64-3 AC EQUIPMENT DISCONNECTS WITH INTERACTIVE INVERTERS

All AC disconnect switches supplied with two sources of voltage are to be connected utility source to the line side and inverter output to the load side. All AC disconnecting means utilizing fuses and energized from two sources shall be provided with an additional adjacent disconnecting means on the load side as per 64-060 & 14-402.

Note: For Manitoba Hydro owned farm metering facilities with splitters or pole top subdivisions of the consumer's service, the utility owned breaker will not be permitted for the required customers disconnecting means. Furthermore, no customer equipment can be installed on a utility owned pole to facilitate this disconnect. Changes initiated to accommodate solar will necessitate the customer install their own service equipment.

△ 64-4 ARRAY INSTALLATIONS IN ACCESSIBLE LOCATIONS

For the application of rules 64-202(4)(a), 64-210(2)&(3) and 64-220(2) PV installations that are not protected by elevation or fencing require an acceptable barrier for making conductors and connectors inaccessible. An acceptable barrier shall consist of;

1. Sheet steel not less than 1.3 mm thick.
2. Metal screening not less than 1.3 mm thick and where openings are a maximum size of 6.75 mm.

Installations in excess of 750 Volt will require other effective means such as fenced enclosures in accordance with 26-300 or elevation.

Note: For application Class B modules sheet metal or screening is not considered an acceptable method for making installations inaccessible.

64-112 INTERACTIVE POINT OF CONNECTION

Δ 64-112-1 INTERACTIVE POINT OF CONNECTION

The only interactive point of connection Manitoba Hydro as the supply authority will permit is a connection on the load side of the service disconnecting means.

This connection shall be done at a panelboard or switchboard. Each source interconnection at the panelboard or switchboard shall be made at a dedicated circuit breaker or fusible disconnecting means. For the application of this requirement the definition of a panelboard will include splitters with adjacent overcurrent for each source interconnection.

When electrical equipment is supplied by multiple sources an adjacent disconnecting means shall be installed for all sources as per 14-414.

Note: A separate meter and a connection on the line side of the service disconnecting means will not be permitted by Manitoba Hydro.

Δ 64-112-2 METERING FACILITIES AND BUSBAR RATINGS

Metering facilities permitted for the subdivision of the consumer's service and supplied simultaneously by a primary power source and one or more utility-interactive inverters shall comply with the bus bar requirements of 64-112 (4) and the following:

Customer Service Termination Enclosures (CSTE): For calculating busbar ratings the ampere rating of the CSTE shall be used for the utility source overcurrent device ampere rating. The ampere rating of the CSTE shall be deemed the bus bar rating on an existing CSTE that is not marked with a bus bar ampacity. You may also have the manufacturer re-label the CSTE with a bus bar rating provided the equipment is re-approved in accordance with the Manitoba Electrical Code.

The sum of the connected solar cannot exceed the ampere rating of the CSTE.

Transformer Rated Meter Mounting Devices (TRMMD): The sum of the ampere rating of the overcurrent devices for connected consumer's services shall not exceed the ampere rating of the TRMMD.

Dual Lug Meter Sockets (DLMS): The sum of the ampere rating of the overcurrent devices for connected consumer's services shall not exceed the ampere rating of the DLMS.

Examples:

400 amp rated TRMMD - One 400 amp or two 200 amp consumer's services are permitted.

200 amp rated DLMS - Two 100 amp consumer's services are permitted.

Δ 64-112-3 UTILITY DISCONNECT

Rule 64-112 (1) requires the output of an interactive inverter intended to be connected to the supply authority to be in accordance with section 84. As the supply authority Manitoba Hydro will require a utility disconnect to be installed for all Solar Photovoltaic Systems. The utility disconnect shall be installed adjacent to the Manitoba Hydro electric meter where practicable and must always be installed outdoors. When the inspection department has deemed it not

practicable to locate the utility disconnect adjacent to the electric meter a label must be installed on the electric meter enclosure that indicates the location of the utility disconnect.

Manitoba Hydro as the supply authority will not mandate the application of 84-024(1)(c) and will not require the utility disconnect to have the contact operation verifiable by direct visible means (viewing window).

SECTION 68 POOLS, TUBS, AND SPAS

68-058 BONDING

BONDING TO PANELBOARD SUPPLYING POOL EQUIPMENT

The inspection department requires that the pool bonding conductor terminate at the panelboard supplying the pool electrical equipment.

SECTION 72 MOBILE HOME AND RECREATIONAL VEHICLE PARKS

72-102 DEMAND FACTORS FOR SERVICE AND FEEDER CONDUCTORS

RECREATION VEHICLE PARK CALCULATION FOR 50 AMP RECEPTACLES

For the application of this rule, if the panelboard or switch is rated 200 amps or less and the receptacles installed are rated 50 amps, the demand load as calculated in accordance with Rules 72-102 (2) (3) and (4) will not be considered to be a continuous load for the application of Rule 8-104.

TABLE 19 CONDUCTORS AND CABLES – CONDITIONS OF USE

USE OF T90 NYLON CONDUCTORS AND DUAL RATED T90 NYLON / TWN75

1. T90 Nylon may be used in raceways in dry or damp locations.
2. T90 Nylon shall not be used
 - a) For direct buried raceway installations (Refer to Rule 12-930);
 - b) For installation at ambient temperatures below minus 10 degrees Celsius (Refer to Rule 12-102(1));
 - c) As consumer's service conductors where exposed to the weather. (Refer to Rule 6-302(5));and
 - d) For exposed wiring where flexing may be required in temperatures below minus 10 degrees Celsius.
3. Dual rated T90 Nylon / TWN75 may be used
 - a) In raceways in dry, damp or wet locations; and
 - b) For direct buried raceway installations.