



# **THE WINNIPEG ELECTRICAL BY-LAW**

**By-law No. 74/2009**

including  
**TECHNICAL INTERPRETATIONS**  
2009

**A PUBLICATION ISSUED BY**

**The City of Winnipeg  
Planning, Property and Development Department  
Development and Inspections Division**

An electronic copy of this publication is also available under "Related By-laws" on the City of Winnipeg Electrical Info Centre at:

[www.winnipeg.ca/ppd/electrical\\_info.stm](http://www.winnipeg.ca/ppd/electrical_info.stm)

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PREFACE

This publication is produced by:

**THE CITY OF WINNIPEG, DEVELOPMENT AND INSPECTIONS DIVISION**

It forms a compilation of the following documents:

- **The Winnipeg Electrical By-law No. 74/2009**
- **The City of Winnipeg Technical Interpretations**

**THE 2009 CANADIAN ELECTRICAL CODE, PART I, 21<sup>ST</sup> EDITION**

The Twenty-first Edition of the Canadian Electrical Code Part I, CSA Standard C22.1-09 has been adopted, with specific amendments, by City of Winnipeg By-law (effective May 1, 2009) and is known as:

**THE WINNIPEG ELECTRICAL BY-LAW NO. 74/2009**

The amendments are reprinted in this publication.

In addition to a copy of the City of Winnipeg By-law, this publication contains technical interpretations for use in the application of the Code.

The spiral-bound 21<sup>st</sup> Edition of the Canadian Electrical Code, Part I, the Canadian Electrical Code Handbook and the Canadian Electrical Code on CD Rom are available from the Manitoba Electrical League Inc. at 104 – 1780 Wellington Avenue in Winnipeg, Manitoba.

## PREFACE

### **THE MANITOBA BUILDING CODE**

Code users should be aware that in addition to the electrical requirements of the Winnipeg Electrical By-law, the Manitoba Building Code specifies minimum standards for electrical facilities in buildings including emergency lighting, emergency power and fire alarm systems.

The Manitoba Building Code references other publications of which electrical installers should be aware:

1. ULC Standard CAN/ULC-S524  
"Installation of Fire Alarm Systems"
2. ULC Standard CAN/ULC-S537  
"Verification of Fire Alarm Systems"

The above ULC Standards are available from Underwriters' Laboratories of Canada, 7 Underwriters Road, Toronto, Ontario, M1R 3B4 or at [www.ulc.ca](http://www.ulc.ca).

3. CSA Standard CAN/CSA-C282  
"Emergency Electrical Power Supply for Buildings"
4. CSA Standard CAN/CSA-Z32  
"Electrical Safety and Essential Electrical Systems in Health Care Facilities"

The above CSA Standards are available from Canadian Standards Association, Standard Sales, 5060 Spectrum Way, Suite 100, Mississauga, Ontario, L4W 5N6 or at [www.csa.ca](http://www.csa.ca).

### **ELECTRICAL INFORMATION CENTRE**

The following brochures and forms, produced by The City of Winnipeg, are available from the City Permits Office at Unit 31 – 30 Fort Street or on-line from our Electrical Info Centre at:

[www.winnipeg.ca/ppd/electrical\\_info.stm](http://www.winnipeg.ca/ppd/electrical_info.stm):

#### **Informational Brochures**

- Electromagnetic Locks
- Woodworking Shops
- Electrical Plan Req'mts for New Construction
- Emergency Lighting and Exit Signs
- Fire Alarm Verifications
- High Voltage Installations
- Life Safety Tests
- Electrical Requirements in the Building Code
- Commercial Building Permit Process
- Flooded Buildings
- Homeowners' Guides for:
  - Electrical Installations
  - Rec Room Development
  - Swimming Pools
  - Detached Garages
  - Electrical & Plumbing Permits
  - Decks

#### **Downloadable Forms**

- Electromagnetic Locks Checklist
- Schedule 'A' for Fire Alarm Monitoring
- Building Design Summary
- Request for Code Deviation Form
- Electrical Permit Applications

**THE CITY OF WINNIPEG**

**THE WINNIPEG ELECTRICAL BY-LAW  
NO. 74/2009**

**A By-law of THE CITY OF WINNIPEG  
adopting and varying the 2009 Canadian Electrical Code.**

**THE CITY OF WINNIPEG**, in Council assembled, enacts as follows:

**Title**

1. This By-law shall be referred to as "The Winnipeg Electrical By-law".

**Definitions**

2. In this By-law:

**"Code"** means the 2009 Canadian Electrical Code, Part I, Twenty-first Edition, C22.1-09, Safety Standard for Electrical Installations, adopted by this By-law or a subsequent and similar Code adopted by this By-law.

**"Designated employee"** means the Manager of Development and Inspections of the Planning, Property and Development Department of the City of Winnipeg and any employee of the City to whom he or she has delegated authority to administer or enforce all or part of this By-law.

**Adoption of Canadian Electrical Code**

- 3(1) Except as varied by this By-law, the 2009 Canadian Electrical Code, Part I, Twenty-first Edition, C22.1-09, Safety Standard for Electrical Installations, published by the Canadian Standards Association is hereby adopted as part of this By-law, and a violation or contravention of the Code is a violation or contravention of this By-law.
- 3(2) Where in this By-law reference is made to a Rule or Section number, the reference shall be understood to mean that rule or section in the Code.
- 3(3) In the event of any conflict, explicit or implied, between the provisions set out in the Code and the provisions set out in this By-law, the provisions set out in this By-law shall prevail.

**Application**

4. No person shall install electrical wiring or electrical apparatus and no person shall use electrical current except as provided in this By-law.

**Authority**

- 5(1) Designated employees are authorized to conduct inspections and take steps to administer and enforce this By-law or remedy a contravention of this By-law in accordance with *The City of Winnipeg Charter* and, for those purposes, have the powers of a "designated employee" under *The City of Winnipeg Charter*.

- 5(2) The details of any construction which are not specifically dealt within this By-law shall be performed to the satisfaction of a designated employee, which authority shall be reasonably exercised by the designated employee.
- 5(3) Designated employees are hereby authorized to determine whether equipment, techniques, conditions, circumstances and all other matters meet the standards and requirements of this By-law or are otherwise acceptable and, where in this By-law such terms as “proper”, “adequate”, “sufficient”, “ample”, “suitable”, “substantial”, “secure”, “necessary”, “dangerous” and the like or derivatives thereof, are used, they mean “proper”, “adequate”, “sufficient”, “ample”, “suitable”, “substantial”, “secure”, “necessary”, “dangerous” to the satisfaction or in the reasonable opinion of the designated employee, and such terms as “where practicable”, “where required”, “as far as possible” have a like significance.

**Authority to conduct certain Electrical Inspections**

6. Electrical inspections of one and two family dwellings, row housing and related structures and equipment may be carried out by inspectors who are employed by the City of Winnipeg and who
- (a) hold an electrician’s journeyperson Licence; or
  - (b) have successfully completed an inspection training program provided by
    - (i) the City of Winnipeg;
    - (ii) an educational institution approved by the Manager of Development and Inspections; or
    - (iii) a building code development, training and certification organization with a course content approved for the purpose of this section by the Manager of Development and Inspections.

**Variations to the Code**

7. The Code is varied by the provisions of Schedule “A” to this By-law, which is hereby incorporated into and forms part of this by-law.

**Repeal of By-law No. 133/2006**


8. The Winnipeg Electrical By-law No. 133/2006 is hereby repealed.

**Coming into effect**

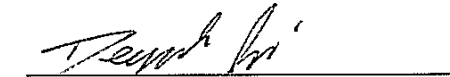
9. This By-law comes into effect on May 1, 2009.

DONE AND PASSED, in Council assembled, this 29<sup>th</sup> day of April, 2009.

  
\_\_\_\_\_  
Mayor

  
\_\_\_\_\_  
City Clerk

Approved as to content:

  
\_\_\_\_\_  
Director of Planning, Property  
and Development

Certified as to form:

  
\_\_\_\_\_  
for Acting City Solicitor/Manager of  
Legal Services

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**SCHEDULE "A"**

**TO**

**THE WINNIPEG ELECTRICAL BY-LAW NO. 74/2009**

The 2009 Canadian Electrical Code, Part I, Twenty-first Edition, C22.1-09, Safety Standard for Electrical Installations, published by the Canadian Standards Association is hereby varied as follows:

**Variations to Section 0 of the Code**

**OBJECT, SCOPE AND DEFINITIONS**

**Definitions**

Section 0 is varied by:

- (a) striking out the following definitions:

***Acceptable***  
***Approved***  
***Electrical Contractor***  
***Inspection Department***

- (b) adding the following definitions in alphabetical order:

***Acceptable*** means acceptable to a designated employee.

***Accredited Field Evaluation Agency*** means an agency that has been accredited by the Standards Council of Canada, in accordance with specific criteria, procedures and requirements, to operate on a continuing basis as a special inspection body for electrical equipment.

***Approved***, when used with reference to any electrical equipment means:

- (a) that the equipment has been certified by an accredited certification organization as

- (i) meeting CSA standards; or,  
(ii) where CSA Standards do not exist or are not applicable, other recognized standards; or

- (b) alternatively, that the equipment:

- (i) has been approved by the Minister of Labour of the Province of Manitoba or an accredited field evaluation agency after examining the equipment or a sample and finding that it conforms to the applicable standards for the equipment and presents no undue hazard to persons or property; and  
(ii) is acceptable to the designated employee.

***City*** means the City of Winnipeg.

**Construction** means the installation of electrical equipment in or about any building or premises and includes all electrical equipment installed.

**Designated employee** means the Manager of Development and Inspections of the Planning, Property and Development Department of the City of Winnipeg and any employee of the City to whom he or she has delegated authority to administer or enforce all or part of this Code.

**Electrical contractor** means an individual to whom an Electrical Contractor's Licence has been issued.

**Examining Committee** means the committee established pursuant to Rule 2-008(6).

**Inspection Department** means the Electrical Section of the Commercial Inspections Branch and the Housing Inspections Branch of the Development and Inspections Division of the Planning, Property and Development Department of the City of Winnipeg.

**Licence** means an electrical contractor's licence as provided for in this Code.

**Owner** means a person or the agent, servant or employee of a person who owns, manages or is in possession of land or a building to which this By-law applies, or who is in receipt of the whole or a part of any rents or profits therefrom, whether the rents and profits are received on the person's own account, or as agent or trustee for another person.

**Person** includes an individual, corporation, partnership, firm or entity.

**Professional Engineer** means a professional engineer who is a member of the Association of Professional Engineers and Geoscientists of Manitoba and who is entitled to practice in the Province of Manitoba.

**Structure** means anything constructed or erected with a fixed location on or in the ground or attached to something having a fixed location on the ground and includes but is not limited to buildings, walls, fences, signs, billboards, poster panels, light standards, and swimming pools.

## Variations to Section 2 of the Code

### GENERAL RULES

#### Administrative

Section 2 is varied by striking out Rules 2-000 to 2-032 and substituting the following:

#### ADMINISTRATIVE

##### **2-000 Duty of Owner Regarding Design and Inspection**

*The owner shall appoint a Professional Engineer entitled to practice in the Province of Manitoba to be responsible for the preparation of electrical drawings, supervision of the electrical installation and certification that the installation has been installed in accordance with the applicable by-laws, on the following types of electrical installations:*

- (a) *High Voltage;*
- (b) *Buildings referred to in Sentence 1.3.3.2.(1) of the Manitoba Building Code;*
- (c) *Buildings where the electrical service requirements exceed 750 KVA;*
- (d) *Power factor correction of electrical installations, other than individual motor applications; and*
- (e) *Any other type of installation where it is considered necessary by the designated employee.*

**2-002 Engineer's Responsibility**

- (1) *Where in the opinion of a designated employee, the character of the proposed construction requires technical knowledge for the preparation of drawings and specifications, as provided in Rule 2-000, the drawings and specifications shall be prepared and the construction inspected and certified by a Professional Engineer.*
- (2) *Where Rule 2-000 applies, a designated employee shall not issue a Building Permit or, where a Building Permit is not required, an Electrical Permit, until the responsible Professional Engineer has submitted a certificate to the designated employee setting out his/her responsibility for the preparation of drawings and specifications and for the inspection of construction to ensure conformity with the accepted plans and specifications and the applicable Sections of the By-law.*
- (3) *Before a Building Occupancy Permit is issued or, where a Building Occupancy Permit is not required, upon completion of the construction, the responsible Professional Engineer shall submit a certificate to the designated employee stating:*

*"I hereby certify that I have inspected the construction of the electrical facilities on the subject project and that, to the best of my knowledge, the electrical facilities of this project were constructed in accordance with the accepted plans and specifications and the requirements of the Winnipeg Electrical By-law and the Winnipeg Building By-law."*
- (4) *The responsible Professional Engineer shall sign and seal all the documents referred to in this Rule.*

**2-004 Electrical Permit**

- (1) *Subject to subrule (2), no person shall commence electrical construction or permit commencement of electrical construction until an electrical permit for the construction has been issued by the designated employee and no construction, connection, reconnection, alteration, repair or extension of any electrical installation may take place prior to an electrical permit being issued by the Designated employee for that construction.*

- (2) *Notwithstanding subrule (1), if*
  - (a) *the electrical construction is within the category that is authorized to be done by the holder of a Voice Data Video Licence; and*
  - (b) *the electrical construction takes place in a single-family detached house;*  
*no permit is required.*
- (3) *A Designated employee shall issue an electrical permit only*
  - (a) *to a person who holds an Electrical Contractor's Licence authorizing him or her to carry on his occupation, trade or business in the City of Winnipeg; or*
  - (b) *to an individual to do construction on a single dwelling owned by him or her and occupied by him or her as his domestic domicile provided that he or she has satisfied a designated employee that he or she is competent to perform such construction; or*
  - (c) *to an individual to do construction on a single dwelling owned by him or her which will be occupied by him or her upon completion as his domestic domicile provided that he or she has satisfied a designated employee that he or she is competent to perform such construction.*
- (4) *An electrical permit expires if construction is not commenced within six months from the date of issue of the permit and is not reasonably continued without interruption thereafter.*
- (5) *A permit is void and all rights under the permit are terminated if the negotiable instrument used for payment of the permit fee is returned for any reason.*
- (6) *All construction being carried out under an electrical permit issued prior to the effective date of this By-law shall:*
  - (a) *be completed in accordance with the previous By-law requirements and any special conditions described on the electrical permit and approved plans; and*
  - (b) *proceed at a satisfactory rate in the reasonable opinion of a designated employee.*
- (7) *If the requirements set out in Subrule (6) are not met, a designated employee may cancel the electrical permit, in which case,*
  - (a) *a new electrical permit shall be obtained before construction may be continued and*
  - (b) *all construction undertaken under the authority of the new permit shall comply with the provisions of this Bylaw.*

**2-006 Annual Electrical Permit**

- (1) *Notwithstanding section 2-004, a designated employee may issue an Annual Electrical Permit to an individual holding an Electrical Contractor's Licence "A" or "B" and the Permit must specify the particular site or sites to which it applies.*

- (2) *Notwithstanding subsection 2-004(1), construction, connection, re-connection, alteration, repair or extension of an electrical installation may take place under the supervision and responsibility of the holder of an Annual Electrical Permit without the necessity of a permit being issued for the specific construction, connection, re-connection, alteration, repair or extension of an electrical installation.*
- (3) *The designated employee may issue an Annual Electrical Permit subject to reasonable terms or conditions.*
- (4) *An Annual Electrical Permit expires on the thirty-first day of December of the year in which it was issued.*
- (5) *The designated employee may suspend, withdraw or refuse to re-issue an Annual Electrical Permit where*
  - (a) *the permit holder has failed to comply with the applicable codes and by-laws or the terms and conditions of the Annual Electrical Permit;*
  - (b) *the permit holder has failed to remit the permit fees applicable to the construction, connection, re-connection, alteration, repair or extension of an electrical installation that has taken place under the authority of the Annual Electrical Permit within the time set out in the Planning, Development and Building Fees By-law.*

**2-008 Electrical Contractor's Licences**

- (1) *Except for a homeowner who has obtained a permit under paragraphs (b) or (c) of Rule 2-004(3), and subject to subrule 2-004(3), no person may place, install, maintain, repair or replace any electrical equipment in the City of Winnipeg unless the person is operating under the authority of an Electrical Contractor's Licence issued under this By-law.*
- (2) *An Electrical Contractor's Licence may only be issued to an individual; in order for a corporation, partnership, governmental department or some other legal entity to operate as an Electrical Contractor, an employee or officer of the entity shall obtain for an Electrical Contractor's Licence on behalf of the entity.*
- (3) *An individual applying for a licence, whether on his or her own behalf or on behalf of a legal entity, shall satisfy the licensing requirements and pay the established licensing and examination fees before being issued a licence.*
- (4) *The holder of a licence, or an agent authorized in writing to do so on behalf of the licence holder, is eligible to obtain permits to perform electrical construction within the scope of the licence as follows:*
  - (a) *The holder of an Electrical Contractor's Licence "A" or his/her agent may obtain permits for any electrical construction governed by City of Winnipeg By-laws and The Electricians' Licence Act; and*
  - (b) *The holder of an Electrical Contractor's Licence "B" or his/her agent may obtain permits to install and maintain electrical facilities in premises owned, leased or managed by the corporation, firm, company or government department on behalf of whom the Licence is held as permitted by City of Winnipeg By-laws and The Electricians' Licence Act; and*

- (c) *The holder of an Electrical Contractor's Licence "C" or his/her agent may obtain permits for limited electrical construction as authorized by this By-law and the Limited Specialized Trade Electrician's Licence issued under The Electricians' Licence Act.*
- (5) *In order to obtain a licence, an individual shall meet the following requirements:*
  - (a) *To qualify for an Electrical Contractor's Licence "A" the applicant shall:*
    - (i) *hold a valid, current Journeyperson Electrician's Licence as required by The Electrician's Licence Act; and*
    - (ii) *have passed an examination set out by the Examining Committee;*
  - (b) *To qualify for an Electrical Contractor's Licence "B", the applicant shall:*
    - (i) *hold a valid, current Journeyperson Electrician's Licence as required by The Electrician's Licence Act; and*
    - (ii) *have passed an examination set out by the Examining Committee;*
  - (c) *To qualify for an Electrical Contractor's Licence "C", the applicant shall:*
    - (i) *hold a limited specialized trade electrician's Licence, issued under The Electrician's Licence Act; and*
    - (ii) *have passed an examination set out by the Examining Committee.*
- (6) *An Examining Committee, consisting of the designated employee and any other person whom the designated employee may appoint, is hereby established with responsibility to:*
  - (a) *prescribe the subjects on which candidates for the Electrical Contractor's Licence shall be examined;*
  - (b) *prepare, organize and conduct or supervise the examination of the candidates; and*
  - (c) *report on the results of the examinations to the designated employee.*
- (7) *Where an applicant fails to pass an examination set out by the Examining Committee on two successive occasions, he or she must complete a training course acceptable to the designated employee before being eligible to apply again for a licence.*
- (8) *Every licence holder is responsible for construction carried out under the authority of a permit issued to him or her and, where an individual holds a licence on behalf of a corporation, partnership, governmental department or some other legal entity, the licence holder is responsible and may be prosecuted under this By-law for the activities of all individuals operating under that licence, even if the licence holder is no longer employed or retained by the corporation, partnership, governmental department or other legal entity.*

- (9) *Where it appears that a licence holder may have violated any provisions of this By-law or that construction carried on under the authority of a licence holder fails to meet the standards and requirements set out in this Code, the designated employee may hold a hearing to investigate the matter and may revoke or suspend any licence as a result of the hearing.*
- (10) *Notwithstanding Subrule (9), the designated employee may immediately suspend a licence for a period of up to 30 days where it appears that the licence holder has violated this Bylaw in a way that endangers the life or health of an individual or endangers property but the designated employee must reinstate the licence after 30 days unless a hearing to investigate the matter provides justification to further suspend or to revoke the licence.*
- (11) *Licences may not be transferred, sold or assigned.*
- (12) *A licence may be issued for multiple years and terminates on December 31 of the year of its expiration.*
- (13) *Electrical contractor's licences, terms and fees, including administrative fees for licences that are renewed after their expiry date, are set out in the Planning, Property and Development Fees By-law.*
- (14) *Where an individual is unlicensed for more than 12 months, he or she must re-qualify for a licence under Subrule (5).*

**2-010 Electrical Permit Fees**

*The electrical permit fees are set out in the Planning, Development and Building Fees By-law.*

**2-012 Special Requirements**

*Requirements and standards in this Code that apply to particular types of installations are in addition to general requirements and standards in this Code and, in the event of a conflict between them, the requirements and standards that apply to particular types of installations shall prevail.*

**2-014 Inspection and Availability of work for inspection**

- (1) *An electrical contractor is responsible for notifying the inspection department when construction is ready for inspection and shall do so at such time or times as will permit inspection being made before any construction or portion thereof is concealed.*
- (2) *No electrical construction may be rendered inaccessible by lathing, boarding, or other building construction until it has been inspected and approved by a designated employee.*

**2-016 Plans and Specifications**

- (1) *No person may begin construction on*
  - (a) *wiring installations of public buildings, industrial establishments, factories, and other buildings in which public safety is involved; or*

(b) *large light and power installations and the installation of apparatus such as generators, transformers, switchboards, large storage batteries, etc.;*  
or

(c) *other installations specified by the designated employee*

*until the designated employee has reviewed and accepted plans and specifications for the construction and an electrical permit has been issued.*

(2) *The owner is responsible for submitting the plans and specifications referred to in Subrule (1) in quantities reasonably required by the designated employee.*

**2-018 Connection**

(1) *No electrical installation, extension, alteration, or addition shall be connected or reconnected to any service or other source of electrical energy by a supply authority, electrical contractor, or other person, until the designated employee has issued an electrical permit and given authorization to make such connection or reconnection.*

(2) *Subrule (1) does not apply to Manitoba Hydro when it reconnects electrical power to a location where the service has been cut off for non-payment of bills or a change of occupant, provided there have been no alterations or additions to the installation subsequent to the last authorization.*

**2-020 Re-Inspection**

*The designated employee may re-inspect any installation if and when he or she considers such action to be necessary.*

**2-024 Use of Approved Equipment**

(1) *Electrical equipment used in electrical installations shall be approved, and shall be of a kind or type and rating approved for the specific purpose for which it is to be employed.*

(2) *No person may connect unapproved electrical equipment.*

**2-026 Withdrawal of Approval (See Appendix B)**

*The designated employee may withdraw approval of electrical equipment at any time if*

(a) *the equipment is of lesser quality than the sample on which approval was based;*

(b) *the conditions of use indicate that the equipment is not suitable; or*

(c) *the terms of the approval agreement are not being carried out.*

**2-028 Damage and Interference with Electrical Equipment**

(1) *No person shall damage any electrical installation or a component of an electrical installation.*

(2) *Unless prior permission has been obtained from the designated employee, no*

*person shall cut, break or interfere with any lock or seal that has been placed on any electrical equipment by or at the direction of the designated employee.*

- (3) *No person shall interfere with any electrical installation or component of an electrical installation except when, in the course of alterations or repairs to non-electrical equipment or structures, it is necessary to disconnect or move components of an electrical installation, in which case it is the responsibility of the person carrying out the alterations or repairs to ensure that the electrical installation is restored to a safe operating condition as soon as the progress of the alterations or repairs will permit.*

**2-030 Deviations or postponements**

- (1) *The designated employee may grant special permission to deviate from or postpone compliance with the requirements and standards of this Code where the deviation or postponement will not, in the reasonable opinion of the designated employee, jeopardize the safety of people or property and will permit substantial compliance with the objects of the requirement or standard, but such permission applies solely to the specific installation and circumstances for which it is granted.*
- (2) *Requests for special permission or deviation must be submitted to the designated employee via a "Request for code deviation" form.*

**2-032 Role of the Designated Employee**

- (1) *The designated employee is responsible for the administration and enforcement of this Code and for these purposes he or she and all individuals to whom he or she has delegated authority to administer or enforce all or part of this Code have all the powers of a "designated employee" under The City of Winnipeg Charter.*
- (2) *An order from a designated employee requiring that construction be stopped on a project shall set out the conditions under which the construction may be resumed.*
- (3) *The designated employee shall accept any construction or condition that lawfully existed prior to the effective date of this By-law, so long as the construction or condition does not constitute an unsafe condition.*
- (4) *The designated employee may refuse to issue an electrical permit or permits:*
  - (a) *whenever information submitted is inadequate to determine compliance with the provision of this By-law;*
  - (b) *whenever incorrect information is submitted;*
  - (c) *to any person who has failed to pay any fee or payment due and owing to the City of Winnipeg under this or the Planning, Development and Building Fees By-law;*
  - (d) *if a violation of another By-law, standard, act or regulation could result from the electrical construction permitted by it; or*
  - (e) *if, in the case of an addition, alteration, repair or extension to any wiring system, in, on or through any building or place, the existing wiring is not in accordance with the provisions of this By-law.*

- (5) *The designated employee may cancel any electrical permit if:*
  - (a) *in the opinion of the designated employee, the privileges granted by that permit are being misused;*
  - (b) *any condition under which the permit was issued is not being observed;*
  - (c) *the permit was issued in error;*
  - (d) *the permit was issued on the basis of incorrect information; or*
  - (e) *in the reasonable opinion of the designated employee, the electrical construction is not proceeding at a satisfactory rate.*

**2-034 Duties of the Owner**

- (1) *Every owner shall make or have made at his own expense such tests or inspections as are necessary to demonstrate to the designated employee that the equipment or action proposed complies with this By-law.*
- (2) *When required by the designated employee, every owner shall uncover and replace at his own expense any construction that has been covered contrary to Rule 2-014.*
- (3) *The owner shall maintain the electrical facilities associated with the property in a safe condition.*
- (4) *When the electrical facilities on a property are in an unsafe condition, the owner shall immediately take all necessary action to put the building electrical facilities in a safe condition.*
- (5) *The owner shall maintain in good working order all safeguards or devices that are required to be installed in the building by the Winnipeg Building By-law or this Code.*
- (6) *Every owner shall ensure that no unsafe condition exists or will exist because of the work being undertaken and not completed, should occupancy exist or occur prior to the completion of any work being undertaken that requires a permit.*
- (7) *When a "stop work" order is issued by a designated employee, the owner shall ensure that the person or persons to whom it is directed stops construction immediately, except for the installation or erection of covers or guards so as to be able to maintain the site in a safe condition.*
- (8) *When required by the designated employee, every owner shall provide a letter to certify compliance with the requirements of this By-law and of any permits required.*
- (9) *An owner shall ensure that electrical installations on his or her premises are not overloaded, defective or being misused.*
- (10) *An owner shall remove or cause to be removed from the premises*
  - (a) *unsafe electrical appliances or wiring;*

(b) *dead or unused electrical wires or equipment that are or may become a hazard.*

(11) *An owner shall comply with orders made by a designated employee.*

**2-036 Duties of the Permit Holder**

(1) *Every permit holder shall ensure that all construction safety requirements of this By-law are complied with.*

(2) *Every permit holder shall ensure that all construction is carried out in accordance with this By-law and all provisions as described on the permit and accepted drawings.*

(3) *Every permit holder shall give notice to a designated employee:*

(a) *when construction is ready to be inspected prior to covering; and*

(b) *when construction has been completed so that a final inspection can be made.*

(4) *Every permit holder is jointly and severally responsible with the owner for any construction actually undertaken.*

(5) *When required by the designated employee, the permit holder shall provide a statutory declaration that the electrical installation was constructed in accordance to the accepted plans, specifications and requirements of the Winnipeg Electrical By-law and the Winnipeg Building By-law.*

(6) *When a "stop work" order is issued by a designated employee, a permit holder shall ensure that the construction ceases immediately, except for the installation or erection of covers or guards so as to be able to maintain the site in a safe condition.*

(7) *A permit holder shall comply with orders made by a designated employee.*

**2-038 Service of orders and other documents**

*Orders to remedy a contravention of this By-law or a decision made by the designated employee that is subject to an appeal shall be served in accordance with The City of Winnipeg Charter and, where an address for sending an order or decision is required; one of the following shall be used:*

(a) *if the person to be served is the owner of real property, the address maintained by the tax collector for the purpose of issuing the tax notice for that property; and*

(b) *if the person to be served is the occupant of real property, the street address for that property; and*

(c) *if the document to be served relates to a permit, licence or other document for which the person to be served has applied, the address provided by the person in the application.*

**2-040 Appeals**

*An appeal from an order to remedy a contravention of this By-law or a decision made by the designated employee that is subject to appeal may be made to the Standing Policy Committee on Property and Development in accordance with The City of Winnipeg Charter.*

**Variations to Section 6 of the Code**

**SERVICES AND SERVICE EQUIPMENT**

**Control and Protective Equipment**

**6-206 Consumer's Service Equipment Location**

Rule 6-206 is amended by striking out Paragraphs (1)(d) and (e) and substituting the following:

- (d) *Permitted to be placed on the outside of the building or on a pole and shall be:*
  - (i) *Protected from the weather or be weatherproof; and*
  - (ii) *Protected from mechanical injury if less than 2m above ground; and*
- (e) *Except for paragraph (1)(d), as close as practicable to the point where the consumer's service conductors enter the building.*

**Metering Equipment**

**6-400 Metering Equipment**

Section 6 of the Code is varied by renumbering the present Rule 6-400 as Subrule 6-400(1) and by adding the following Subrule immediately after it:

- (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 inclusive.

**Variations to Section 10 of the Code**

**GROUNDING AND BONDING**

**Grounding Electrodes**

**10-700 Grounding Electrodes**

Section 10 of the Code is varied by striking out Item 10-700(2)(a) and substituting the following:

- (a) *in the case of rod grounding electrodes (except for a chemically charged rod electrode where only one need to be installed),*
  - (i) *consist of 2 copper-clad rod electrodes;*
  - (ii) *be not less 15.8mm in diameter;*
  - (iii) *be spaced no less than 3 m apart;*
  - (iv) *be bonded together with a grounding conductor sized in accordance with Table 17; and*
  - (v) *be driven to the full length of the rod; or*

**Variations to Section 12 of the Code**

**WIRING METHODS**

**Exposed Wiring on Exteriors of Buildings and Between Buildings on the Same Premises**

**12-300 Exterior Exposed Wiring Rules**

Section 12 of the Code is varied by renumbering the existing Rule 12-300 as Subrule 12-300(1) and by adding the following Subrule immediately after it:

- (2) Exposed overhead wiring on the exteriors of buildings and between buildings or structures on the same premises shall not be permitted, except by special permission or deviation from the designated employee.

**Cable Trays**

**12-2208 Provisions for Bonding**

Section 12 of the Code is varied by striking out Subrules 12-2208(1) and (2) and substituting the following:

- (1) Metal cable trays shall be adequately bonded at intervals not exceeding 15 m and the size of bonding conductors shall be based on the ampacity of the largest ungrounded conductor in the circuits or equivalent for multiple parallel conductors carried by the cable tray in accordance with the requirements of Rule 10-814.

**Variations to Section 26 of the Code**

**INSTALLATION OF ELECTRICAL EQUIPMENT**

**General**

**26-008 Sprinklered Equipment**

Section 26 of the Code is varied by striking out Rule 26-008 and substituting the following:

*Electrical service and distribution equipment with ventilation openings located in sprinklered buildings or spaces shall be protected where needed by non-combustible hoods or shields so arranged as to minimize interference with the sprinkler equipment.*

**Receptacles**

**26-700 General**

Section 26 of the Code is varied by adding the following Subrule to Rule 26-700:

- (12) *Where a sump pump is required by the Winnipeg Building By-law for the control of water from a subsurface drainage (weeping tile) system:*
  - (a) *A 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.*

**Receptacles for Residential Occupancies**

**26-714 Receptacles for Single Dwellings**

Section 26 of the Code is varied by adding the following Item to Rule 26-714:

- (c) *At least one receptacle shall be provided for each driveway.*

**Branch Circuits for Residential Occupancies**

**26-724 Branch circuits for single dwellings**

Section 26 of the Code is varied by adding the following Item to Rule 26-724:

- (c) *At least one branch circuit shall be provided solely for receptacle(s) for the driveway in accordance with 26-714(c).*

**Variations to Section 30 of the Code**

**INSTALLATION OF LIGHTING EQUIPMENT**

**Luminaires in Buildings of Residential Occupancy**

**30-504 Stairways**

Section 30 of the Code is varied by adding the following Subrule to Rule 30-504:

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

**Variations to Section 46 of the Code**

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

**General**

**46-108 Method of Wiring**

Section 46 of the Code is varied by deleting Subrule 46-108(3) and substituting the following:

- (3) *Conductors installed in buildings of combustible construction in accordance with the Rules of Section 12 shall be:*
- (a) *Non-metallic sheathed cable; or*
- (b) *Installed in totally enclosed non-metallic raceway.*

**Variations to Section 60 of the Code**

**ELECTRICAL COMMUNICATION SYSTEMS**

**Outside Conductors**

**60-500 Overhead Conductors on Poles**

Section 60 of the Code is varied by renumbering Rule 60-500 as Subrule 60-500(1) and adding the following Subrule immediately after it:

- (2) *Exposed overhead wiring on the exteriors of buildings and between buildings or structures on the same premises shall not be permitted, except by special permission from the designated employee.*

**Variations to Section 76 of the Code**

**TEMPORARY WIRING**

**76-006 Service Entrance Equipment**

Section 76 of the Code is varied by deleting Rule 76-006 and substituting the following:

- (1) *Service entrance equipment shall be permitted to be in a temporary building adjacent to the construction or demolition site but if such a building is not available the equipment shall be:*
  - (a) *Accessible to authorized persons only; and*
  - (b) *Capable of being locked; and*
  - (c) *Protected against the weather and mechanical damage.*
- (2) *If not in or on a building, the temporary service shall be mounted:*
  - (a) *On a pole, or solid wood post measuring at least 89 mm x 140 mm nominal and adequately braced for overhead and underground services not exceeding 200 amperes; or*
  - (b) *On a substantial pole structure for services exceeding 200 amperes.*



THE WINNIPEG ELECTRICAL BY-LAW NO. 74/2009

## **TECHNICAL INTERPRETATIONS 2009**

**The Technical Interpretations (T.I.'s) are not amendments but clarifications of how their associated Rules are interpreted by the City of Winnipeg.**

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**T.I. # 1      INTERFACE POINT BETWEEN UTILITY COMMUNICATION OR COMMUNITY ANTENNA DISTRIBUTION SYSTEMS AND CUSTOMER SYSTEMS**  
**Section 0 Scope**

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

**T.I. # 2      ANNUAL PERMITS**  
**Rule 2-006 Annual Electrical Permit**

An annual permit can be issued to a contractor who holds a contractor licence "A" or "B" to do minor work on Electrical Facilities in a building over the course of a year.

Some examples of minor work include changing wall switches, changing light fixture ballasts, wiring motors, wiring light fixtures or making changes to a product assembly line.

It is intended for the installation and maintenance of Electrical Facilities in premises owned, leased or managed by the corporation, firm, company or government department so named on the permit application.

It is specific to one site.

Separate electrical permits are required for capital works or renovations. The electrical contractor will be responsible for maintaining a record of all work done and an Inspector will attend the building, either as called or on a quarterly basis, to inspect all work that has been done, and to ensure the appropriate fees are being applied.

**T.I. # 3      BREAKERS OF DIFFERING MANUFACTURERS INSTALLED IN PANELBOARDS**  
**Rule 2-024 Use of Approved Equipment**

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

**T.I. # 4      FIELD MODIFICATIONS OF ELECTRICAL EQUIPMENT**  
**Rule 2-024 Use of Approved 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-certified by an accreditation organization.

**T.I. # 5      APPROVAL OF ELECTRICAL EQUIPMENT**  
**Rule 2-024 Use of Approved 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.

**T.I. # 6      INSULATION AND VAPOUR BARRIER BEHIND ELECTRICAL EQUIPMENT**

Note that the Manitoba Building Code requires the upper part of foundation walls enclosing a heated space to be insulated from the underside of the sub-floor to not less than 2.4 m (8 feet) below finished ground level. The insulation may be installed on the interior or the exterior of the foundation wall.

Installers are reminded that electrical equipment shall be installed to accommodate the vapour barrier and insulation requirements as per Clauses 9.25.4.3 and 9.25.5.3.(1) of the Manitoba Building Code.

**T.I. # 7      IDENTIFICATION OF UNDERGROUND INSTALLATIONS**  
**Rule 2-100 Marking of Equipment**

Rule 2-100 – Identification of equipment serviced by underground cables.  
All new underground conductor installations shall be identified with a label indicating the Code year to which the installation was designed, including the U/G Detail and Table utilized to achieve the rated ampacity of the IEEE ampacity calculation.

Rule 2-100 & 4-004 Label – Equipment serviced by underground installations of #1/0 AWG and larger shall be identified with a permanently secured lamicoid label (minimum size: 3” x 5”) posted on or near each service or overcurrent supplying equipment indicating the following:

UNDERGROUND CONDUCTORS		
CIRCUIT I.D.	_____	
YEAR INSTALLED	_____	
DIAGRAM	DETAIL	TABLE
_____	_____	_____
SIZE/TYPE OF CONDUCTOR	_____	
AMPACITY	MAX. OVERCURRENT	_____

**T.I. # 8      MECHANICAL PROTECTION OF CONDUCTORS INSTALLED IN METAL STUDS**  
**Rule 2-108 Quality of Work**

For conductors/cables installed under Sections 12, 16, 54, 56 & 60, Rule 2-108 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.

**T.I. # 9      GROUPING OF CABLES IN INSULATED SPACES**  
**Rule 2-122 Use of Thermal Insulation**

Subrule (1)(a) of Rule 2-122 requires the use of “special care” to assure safe conductor operating temperatures when heat dissipation is restricted by conductor/cable grouping in thermal insulation.

Cables in insulated spaces shall be separated by at least one cable diameter. Except that two cables shall be permitted to be in contact where passing through holes in structural members.

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

**T.I. # 10     FIRESTOPPING**  
**Rule 2-124 Fire Spread**

To delay the spread of fire within a building, certain walls, floors and ceilings are constructed as “fire separations” (See Note 1). Rule 2-126 and Manitoba Building Code Article 3.1.9.1. require 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 3).

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 2) 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.(1)(a).

- 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. *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.*
  3. *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.*

**T.I. # 11 FLEXIBLE CORD FOR LUMINAIRES AND GREEN INSULATED CONDUCTORS  
INSTALLED IN NON-COMBUSTIBLE CONSTRUCTION  
Rule 2-126 Flame Spread Requirements for Electrical Wire and Cables**

All wiring that is installed in buildings required to be of non-combustible construction must be FT-4 rated to meet the flame spread requirements of Rule 2-126.

Note that this includes flexible cords for luminaires that are not usually FT-4 rated unless specified otherwise and exposed green insulated conductors that may be used for grounding of services, grounding of transformers or for bonding to supplement single conductor cables.

SECTION 4  
CONDUCTORS

**T.I. # 12 SINGLE CONDUCTOR CABLES  
Rule 4-004 Ampacity of Wires and Cables**

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

**T.I. # 13 “TEE” SERVICES  
Rule 4-004 Ampacity of Wires and Cables**

Where “Tee” services are used and the number of conductors in the raceway exceeds three (3) for a distance exceeding 600 mm, the ampacity of the conductors shall be corrected by applying the correction factors of Table 5C.

**T.I. # 14 RATINGS OF CONDUCTORS IN FIBRE SPACERS, METAL THROATS AND  
NIPPLES  
Rule 4-004(7)(b) Ampacity of Wires and Cables**

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)(b) in which case no de-rating for multiple conductors need be applied to the Table 2 or 4 ratings.

**T.I. # 15 SHEATH CURRENTS IN DIRECT BURIED SINGLE CONDUCTOR CABLE  
INSTALLATIONS OTHER THAN CONSUMER’S SERVICE  
Rule 4-008 Sheath Currents in Single Conductor Metal Sheathed Cables and  
Associated Appendix B note**

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

**T.I. # 16 HARMONICS**  
**Rule 4-022 Size of Neutral Conductor**  
**Rule 4-024 Common Neutral Conductor**

Harmonic distortion is a regularly appearing distortion of the voltage and current sine waveforms whose frequency is an integral multiple of the fundamental frequency. With a fundamental frequency of 60 Hertz, the 2nd harmonic would be 120 Hz., the 3rd harmonic would be 180 Hz. and so on.

Harmonic distortion has become a problem in electrical systems due to the proliferation of non-linear loads. Examples of high harmonic producing loads are computers, electronic ballasts, variable speed AC and DC drive systems, UPS systems, SCR's, thyristors, welders, arc furnaces, etc.

**Damaging Effects of Harmonics:**

1. Overheating of Neutrals - "Triplen" harmonics (3rd, 6th, 9th, 12th, 15th, etc.) are considered "zero sequence". Instead of canceling on the neutral for balanced loads, triplen harmonics add. In some cases the neutral current may be 1.73 times the phase current. Care should be taken when sizing neutrals and applying the requirements of rule 4-004(3), 4-022 and 4-024.
2. Temperature Rise of Transformers - Harmonic currents also circulate within transformers resulting in overheating. Care should be taken in the selection and sizing of transformers.
3. Temperature Rise and Reduced Life in Motors
4. Capacitor Failures
5. Disruption in the Operation of Electrical and Computer Controlled Equipment
6. Malfunction of Circuit Breakers
7. Communications Interference (Voice and Data)

**Harmonic Study**

If harmonic problems are suspected, it is recommended that a harmonic study by a qualified person be undertaken to determine the best solution.

**T.I. # 17 SMALL SERVICES**  
**Rule 6-110 Three-Wire Consumer's Services**

Rule 6-110 states:

*"A three-wire consumer's service shall be provided in all cases where more than two 120V branch circuits are installed, unless such supply is not available from the supply authority."*

Refer to Section 0 definitions for Consumer's Service and Service Box.

Intent of this rule:

An overcurrent device is required ahead of a panelboard containing more than two circuits.

**T.I. # 18     UPGRADING OF EXISTING RESIDENTIAL ELECTRICAL SERVICES**  
**Rule 6-112   Support for the Attachment of Overhead Supply or Consumer's**  
**Service Conductors**

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:

- the building is a single dwelling;
- the service attachment point is acceptable to the utility;
- the existing conduit is of sufficient size;
- the service drop clearances in effect at the time of installation have not been decreased through landscaping, addition of buildings, or pools, etc.; and
- 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.

**NOTE:** *Prior to 1972, a 9 foot (2.7 m) service head and supply service clearance was in effect; between 1972 and 1980, this was increased to 11 feet (3.5 m).*

**T.I. # 19     SERVICE MASTS AND ATTACHMENTS**  
**Rule 6-112   Support for the Attachment of Overhead Supply or Consumer's**  
**Service Conductors**

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.

**T.I. # 20     AERIAL SERVICE ATTACHMENT**  
**Rule 6-116   Consumer's Service Head Location**

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.*

**T.I. # 21     CONSUMER'S SERVICE BOXES**  
**Rule 6-200   Service Equipment**

1. The requirements of 6-200(2) are 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 1.(a), (b) and (c) above 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:** *CSTE's may be wall, pad or pole mounted provided the location is acceptable to the supply authority. For the definition of CSTE's, see Manitoba Hydro Customer Metering Standards.*

**T.I. # 22    HOT SPLITTERS**  
**Rule 6-200 Service equipment**

Where existing electrical services utilize "hot splitters," no more than four subdivisions are allowed. Existing "hot splitters" in single dwellings will be allowed 2 – 100A subdivisions. Should the relocation or addition of loads beyond the capacity of the service, as determined by Rule 8-106(8), require service changes, a single service box in accordance with Rule 6-200 will be required.

**T.I. # 23    ELECTRICAL REQUIREMENTS FOR THE DESIGNATED FLOOD FRINGE AREA**  
**Rule 6-206 Consumer's Service Equipment Location**

For buildings located within the designated floodway fringe area, the requirements of Provincial Regulation 266/91 must be met. Section 8, Item (b) of the regulation states:

*"the electrical service and panelboard shall be located above the main floor unless the existing service and panelboard located below the main floor within a structure existing before August 15, 1981 is being replaced or added to in the same location;"*

For the purpose of this Regulation, we interpret "electrical service and panelboard" to mean the main service switch such that the main service switch must be located above the main floor. If the service switch is part of a combination-style service entrance panelboard, the entire panelboard must be located above the main floor.

**T.I. # 24    INSULATION RATING FOR OVERHEAD CONSUMER'S SERVICE CONDUCTORS**  
**Rule 6-302(5) Overhead Consumer's Service Conductors**

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

**T.I. # 25    METER SOCKETS SERVED FROM UNDERGROUND SUPPLY SYSTEMS**

Single Phase Meter Sockets 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.

**T.I. # 26 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%.

Confirmation of the cable size should be obtained from your local Manitoba Hydro district office prior to installation of this conduit.

<b>INSULATED CONDUCTOR SIZE</b>	<b>MINIMUM CONDUIT SIZE</b>	<b>MAXIMUM NUMBER OF CONDUCTORS</b>
1/0 AWG	53	5
4/0 AWG	63	3
3-4/0 & 1-#2	63	4
350 KCMIL	78	4
750 KCMIL	103	4
1000 KCMIL	129	5

**T.I. # 27 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 procedures shall be adhered to:

When the customer required 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.

**T.I. # 28 ATTACHMENTS TO MANITOBA HYDRO POLES**

Except for an overhead service attachment to the secondary rack on a farm yard pole, no attachments may be made to a Manitoba Hydro pole without written permission. Anyone wishing to install a standby transfer switch or splitter for underground wiring or a sign or any other item on a Manitoba Hydro pole must apply to the local District Office giving the location and details of the installation.

**T.I. # 29 VOLTAGE DROP TABLE**  
**Rule 8-102 Voltage Drop**

The following tables provide a quick reference for voltage drop calculations with values pre-calculated for 3% voltage drop. For accurate voltage drop calculations, the reader is directed to Table D3 in Appendix D of the Code.

The table values are given for copper conductors. For aluminum conductors find the correct size of copper conductor and add two AWG sizes.

**Voltage Drop Table**  
(Values given in Ampere-feet\*)

1 $\Phi$		Nominal Voltage	
		120V	240V
Conductor Size (AWG)	#14	604	1208
	#12	960	1920
	#10	1527	3053
	#8	2429	4858
	#6	3854	7709
	#4	6143	12,287
	#3	7725	15,451
	#2	9730	19,459
	#1	12,329	24,658
	#1/0	15,517	31,034
	#2/0	19,587	39,173
	#3/0	24,658	49,315
	#4/0	31,101	62,202

3 $\Phi$		Nominal Voltage		
		208V	480V	600V
Conductor Size (AWG)	#14	1047	2416	3020
	#12	1664	3840	4800
	#10	2646	6107	7634
	#8	4211	9717	12,146
	#6	6681	15,418	19,272
	#4	10,648	24,573	30,717
	#3	13,391	30,901	38,627
	#2	16,865	38,919	48,649
	#1	21,370	49,315	61,644
	#1/0	26,897	62,069	77,586
	#2/0	33,950	78,346	97,933
	#3/0	42,740	98,630	123,288
	#4/0	53,908	124,404	155,505

- Table values are given in Ampere-feet.
- Divide the table value by the total circuit Amperes to obtain the maximum distance in feet for each conductor.
- Example:  
10A at 120V, using #14 RW90 =  $604 \div 10 \text{ A} = 60.4 \text{ ft. max.}$  for a 3% voltage drop.

**T.I. # 30 SINGLE CONDUCTORS IN FREE AIR**  
**Rule 8-104 Maximum Circuit Loading**

We offer the following sample calculations for clarification of the application of Subrules 8-104(4) & (5) using a 400A overcurrent device:

**CONDUCTORS IN FREE AIR**  
 Tables 1 and 3

Non-Continuous Load Rule 8-104	Continuous Load using 100% rated equipment Rule 8-104(4)(b)	Continuous Load using 80% rated equipment Rule 8-104(5)(b)
max. allowable circuit loading = 100% of 400A = 400A	max. allowable circuit loading = 85% of 400A = 340A	max. allowable circuit loading = 70% of 400A = 280A

Minimum required conductor ampacity = **400A**  
 Use #250 kcmil cu (425A) or #350 kcmil al (415A)

**MULTI-CONDUCTOR CABLE AND RACEWAYS**  
 Tables 2 and 4

Non-Continuous Load Rule 8-104	Continuous Load using 100% rated equipment Rule 8-104(4)(a)	Continuous Load using 80% rated equipment Rule 8-104(5)(a)
max. allowable circuit loading = 100% of 400A = 400A	max. allowable circuit loading = 100% of 400A = 400A	max. allowable circuit loading = 80% of 400A = 320A

Minimum required conductor ampacity = **400A**  
 Use #500 kcmil cu (395A – as allowed in Rule 8-106(1)) or #750 kcmil al (405A)

Note that the conductor rating must equal the rating of the overcurrent device because the maximum continuous load is based on the circuit rating which, by definition, is the lesser of either the rating of the overcurrent device or the rating of the conductors.

Refer to Rule 8-104, Subrules (4) & (5) in the CEC Handbook for additional examples.

**T.I. # 31 LOADS ADDED TO EXISTING UNDERGROUND INSTALLATIONS**  
**Rule 8-106 Use of Demand Factors**

Where load is to be added to an existing underground conductor installation, the requirements of Rule 8-106(8) will be acceptable for the rating applied to the original installation.

Rule 8-106(8) refers the code user to Rule 8-104(4) & (5) for the application of applicable demand factors for continuous loads.

**T.I. # 32    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 Underground Secondary Network Area, Manitoba Hydro requires notification prior to the addition of 5 hp or more to an existing single phase service.

SECTION 10  
GROUNDING AND BONDING

**T.I. # 33    TINGLE VOLTAGE**  
**Rules 10-204, 10-406, 10-806**

- (a) Subrules 10-204(1)(b), 10-406(5) and 10-806(1) 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.

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.

**(b) 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 equi-potential 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 most Manitoba Hydro offices.

**T.I. # 34    BONDING OF INTERIOR GAS PIPING**  
**Rule 10-406 Non-electrical Equipment**

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 Subrule 10-406(4).

**T.I. # 35    BONDING BETWEEN ENCLOSURES INTERCONNECTED WITH FIBRE SPACERS OR METAL THROATS**  
**Rule 10-616 Bonding Methods – Short Section of Raceway**

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.

**T.I. # 36 USE OF SINGLE ROD GROUNDING ELECTRODES**  
**Rule 10-700 Grounding Electrodes**

1. Rule 10-700(2)(a) for manufactured rod grounding electrodes 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. In underground locations, rod electrodes are not acceptable for temporary builders' services as the utility is concerned about damage to the buried conductors. The supply utility's grounding shall be the sole electrode used. To facilitate this, the customer shall supply a grounding conductor between the temporary builders' service and the utility supply point.
3. Where the conductor is larger than No. 3 AWG, an approved wire connector shall be used instead of the washer provided with the eye bolt type rods.

SECTION 12  
WIRING METHODS

**T.I. # 37 WIRING IN DUCTS AND PLENUM CHAMBERS**  
**Rule 12-010 Wiring in Ducts and Plenum Chambers**

Subrule 12-010(5) is relaxed to include all return air plenums that are constructed of combustible joists in single dwellings.

**T.I. # 38 TRANSFORMERS IN RETURN AIR PLENUMS**  
**Rule 12-010 Wiring in Ducts and Plenum Chambers**

In order to comply with Article 3.6.4.3. of the Manitoba Building Code, flame spread requirements and smoke developed classifications must be met for electrical installations in plenums. Transformers do not meet these requirements and therefore are not permitted to be installed in plenums.

**T.I. # 39 CAPACITIES FOR DIRECT BURIED CABLES AND RACEWAYS**  
**Rule 12-012 Underground Installations**

Subrule 12-012(8) is relaxed to include cables:

Armoured and aluminum sheathed cables approved for the purpose shall be permitted to be enclosed or encased in at least 50 mm of concrete or be installed directly below a concrete slab at grade level provided the slab is not less than a nominal 100 mm in thickness and, where practical, the location of the conduits or cables are marked.

**NOTE:** *A concrete slab at grade level denotes a building floor slab.*

The ampacities for direct buried cables and conductors in raceways shall be in accordance with Tables 2 and 4 where the installation is not in conformity with the applicable arrangements shown in diagrams B4-1 to B4-4.

**T.I. # 40      CONDUITS AND CABLES RUN IN OR UNDER FLOORS OF ATTACHED GARAGES**

**Rule 12-012 Underground Installations**

Conduits or cables shall not be run in or under the floors of attached garages when they are subject to mechanical damage due to the settling of the disturbed earth or movement of the garage floor relative to the building.

**T.I. # 41      TYPE USEB90 AND USEI90 CABLES**

**Rule 12-012 Underground Installations**

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

- a) The installation is in accordance with the requirements of Rule 12-012; and
- b) The cables are not installed in or on a building unless in a raceway; and
- c) When used on a pole, type USEB90 is installed in rigid conduit to a point at least 2 m above grade or ground level; and
- d) 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
- e) All conduits are sealed to prevent the entrance of moisture.

**T.I. # 42      VERTICAL RUNS OF CABLE**

**Rule 12-120 Supporting of Conductors**

The design of cable types Teck90 and RA90 does not provide internal support between the sheath or armour and the internal cable assembly. To avoid injurious strain on conductor terminations, vertical runs of Teck90 and RA90 that exceed 30 m in length shall incorporate a bend or bends equivalent to a total of not less than 90 degrees, in addition to the normal cable supports for each 30 meters of vertical run or portion thereof.

**T.I. # 43      WIRING SYSTEMS FOR MODULAR OFFICE FURNITURE**

**Rule 12-904 Conductors in Raceways**

Office areas are often designed with relocateable partitions that are pre-wired with communication and or branch circuit wiring by the manufacturer. 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 Subrule 12-904(2).

**T.I. # 44 CONDUCTORS OF THE SAME CIRCUIT CONTAINED IN THE SAME RACEWAY**  
**Rule 12-904 Conductors in Raceways**

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

**T.I. # 45 ELECTRICAL RACEWAY SUPPORTS**  
**Rule 12-918 Support of Raceways**

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

**T.I. # 46 RACEWAYS INSTALLED WHERE MOISTURE MAY ACCUMULATE**  
**Rule 12-928 Raceways Installed Underground or Where Moisture may Accumulate**

Areas where conductors are subject to moisture, as noted in Item 12-928(1)(c), include locations where raceways are embedded in concrete in areas such as concrete floors exposed to periodic hosing down or rain, indoor loading docks, car washes, parkades, etc.

Wiring methods in these and similar areas are required to be of the type approved for Category 1 locations.

**T.I. # 47 PNEUMATIC TUBING IN RACEWAYS**  
**Rule 12-1014 Conductors in Conduit**

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 12-1014 using the diameter of the tubing where the Rule specifies "cable diameter."

**T.I. # 48 ELECTRICAL NON-METALLIC TUBING IN EXTERIOR LOCATIONS**  
**Rule 12-1500 Use of Electrical Non-metallic Tubing**

Electrical Non-metallic Tubing shall not be installed exposed in exterior locations unless specifically approved for sunlight resistance, and so marked as per 2-130.

**T.I. # 49      ELECTRICAL CONDUIT FITTINGS**  
**Rule 12-3014 Accessibility of Junction Boxes**

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

**T.I. # 50      WIRING SPACE IN ENCLOSURES**  
**Rule 12-3022 Entrance of Conductors into Boxes, Cabinets, and Fittings**

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 Subrule 12-3022(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.

**T.I. # 51      TIEWRAPS AS CONDUIT OR CABLE SUPPORTS**

Tiewraps are not an acceptable supporting means for electrical conduits or cables. Tiewraps 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.

**T.I. # 52      PRESERVED WOOD FOUNDATIONS**

Installers are advised that the Manitoba Building Code requires preserved wood foundations to conform to CSA Standard CAN/CSA S406-92, "Construction of Preserved Wood Foundations." 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 S406-92.

**T.I. # 53 INTERRUPTING RATINGS OF OVERCURRENT DEVICES**  
**Rule 14-012 Ratings of Protective and Control Equipment**

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 at any location is governed by a number of criteria and must therefore be calculated for each installation. Fault current information for individual installations is available from Manitoba Hydro.

To ensure compliance with Rule 14-012, where the available fault current exceeds 10,000 Amperes at any point in the system, 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:

1. The calculation will assume an infinite primary bus.
2. The percent impedance for dry-type transformers will be the percent impedance of the installed transformer.
3. The percent impedance for oil filled transformers will be based on the lesser of:
  - (a) The percent impedance of the installed transformer.
  - (b) Table No. 1 (below) for all polyphase pole mounted transformers.
  - (c) Table No. 2 (below) for all single phase transformers.
  - (d) Table No. 3 (below) for all polyphase padmounted transformers.

Table No. 1

<b>POLYPHASE POLE MOUNTED TRANSFORMERS</b>	
<b>RATING</b>	<b>MINIMUM IMPEDANCE (P.U.)</b>
Up to 75 kVA	1.5%

Table No. 2

<b>SINGLE PHASE POLE MOUNTED AND PADMOUNTED TRANSFORMERS</b>	
<b>RATING</b>	<b>MINIMUM IMPEDANCE (P.U.)</b>
0 – 50 kVA	1.5%
75 kVA	2.0 %
100 – 167 kVA	2.5%

Table No. 3

POLYPHASE PADMOUNTED TRANSFORMERS	
RATING	MINIMUM IMPEDANCE (P.U.)
0 – 299 kVA	1.8%
300 kVA	2.0 %
500 kVA	3.0%
750 kVA	3.5%
Above 750 kVA	4.0%

**IMPORTANT NOTE:**

For installations for all new services or modifications to existing services within the 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 Class J, Form 1 high rupturing capacity fuses.

**T.I. # 54      PANELBOARD/SPLITTER OVERCURRENT PROTECTION**  
**Rule 14-606 Panelboard 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**

**T.I. # 55      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 fixtures 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.

**T.I. # 56 CLASS 2 SYSTEMS**

**Rule 16-212 Separation of Class 2 Circuit Conductors from Other Circuits**

Rule 16-212 is relaxed to permit Class 2 circuits in the same enclosure or raceway as other systems where the function of the different systems are associated such as the connection to associated remote control equipment.

Where different systems occupy the same enclosure or raceway:

- a) All conductors shall be insulated to the highest voltage in the enclosure or raceway; and
- b) Class 2 systems shall be marked by colour or other acceptable means to clearly indicate the different systems.

**T.I. # 57 WOODWORKING SHOPS**

**Rules 18-300 to 18-326 Class III, Division 1 Locations**

**1. Classification**

The Electrical Code classifies wood working shops as Class III, Division 1 locations. The following relaxations to Class III requirements will be permitted where:

- a) Adequate dust control equipment is installed; or
- b) The accumulation of dust and flyings will be minimal.

**2. Wiring Methods**

- a) Surface wiring may be rigid PVC conduit. Boxes and fittings shall comply with Rule 18-302(2).
- b) Concealed wiring may be type AC or NM cable. Concealed boxes and fittings may be ordinary type.

**3. Covers for Switches and Receptacles**

Switch and receptacle covers may be of the weatherproof type. Where duplex receptacles are used a separate self-closing cover will be required for each section of the receptacle.

**4. Lighting**

General purpose fluorescent lighting fixtures may be installed:

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

*Note: Industrial-type fluorescent fixtures with solid reflectors are not considered to have adequate dust shields as required in (b) above. The dust shields must prevent dust from accumulating on the ballast compartment.*

**T.I. # 57 WOODWORKING SHOPS (continued)**

**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.

6. The bonding requirements of Rule 18-074 need not apply.

\* *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 20  
FLAMMABLE LIQUID AND GAS DISPENSING AND SERVICE STATIONS,  
GARAGES, BULK STORAGE PLANTS, FINISHING PROCESSES,  
AND AIRCRAFT HANGARS

**T.I. # 58 AIRCRAFT HANGARS**  
**Rules 20-500 to 20-522 Aircraft Hangars**

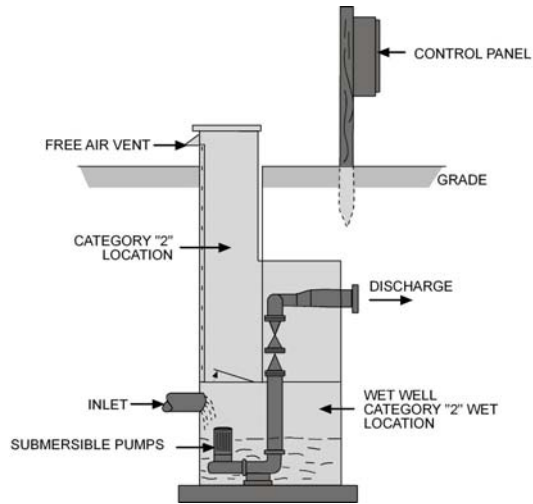
Rules 20-500 to 20-522, inclusive, apply to locations used for storage or service of aircraft.

These requirements may be relaxed by special permission for hangars designed for "private use" aircraft provided the electrical installation meets the minimum requirements of Rules 20-200 to 20-206, inclusive, for a residential storage garage.

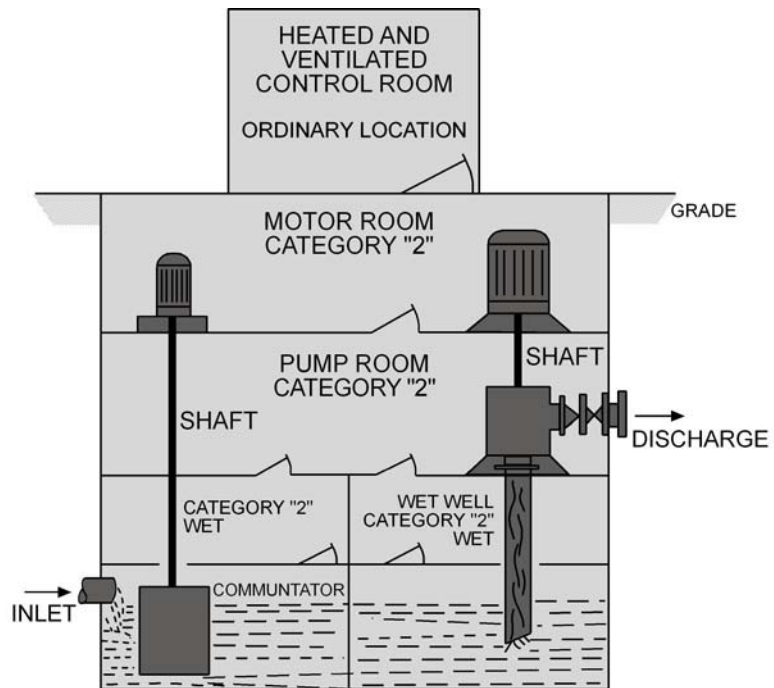
**T.I. # 59    DIAGRAMS FOR SEWAGE LIFT AND TREATMENT PLANTS**  
**Rules 22-700 to 22-710 Sewage Lift and Treatment Plants**

The following diagrams detail typical installations and area classifications for sewage lift and treatment plants:

**Typical Sewage Lift Station (Self-Contained)**

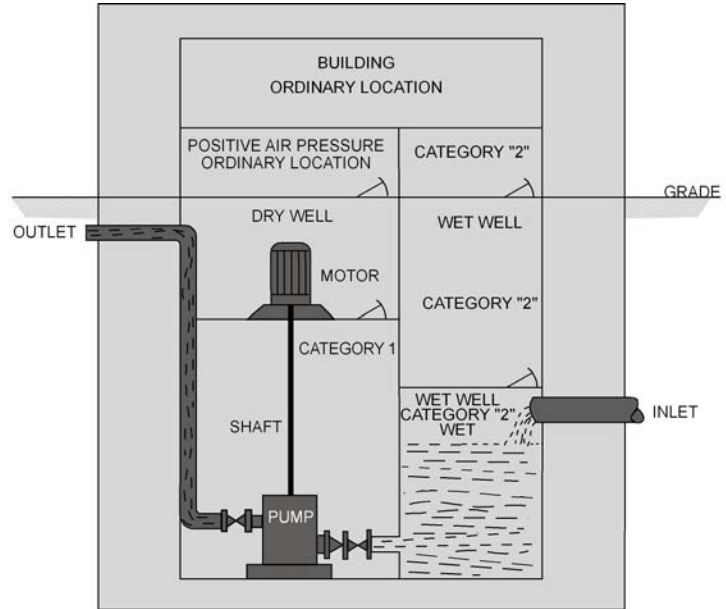


**Typical Sewage Lift Station (Control Building on top of wet well)**



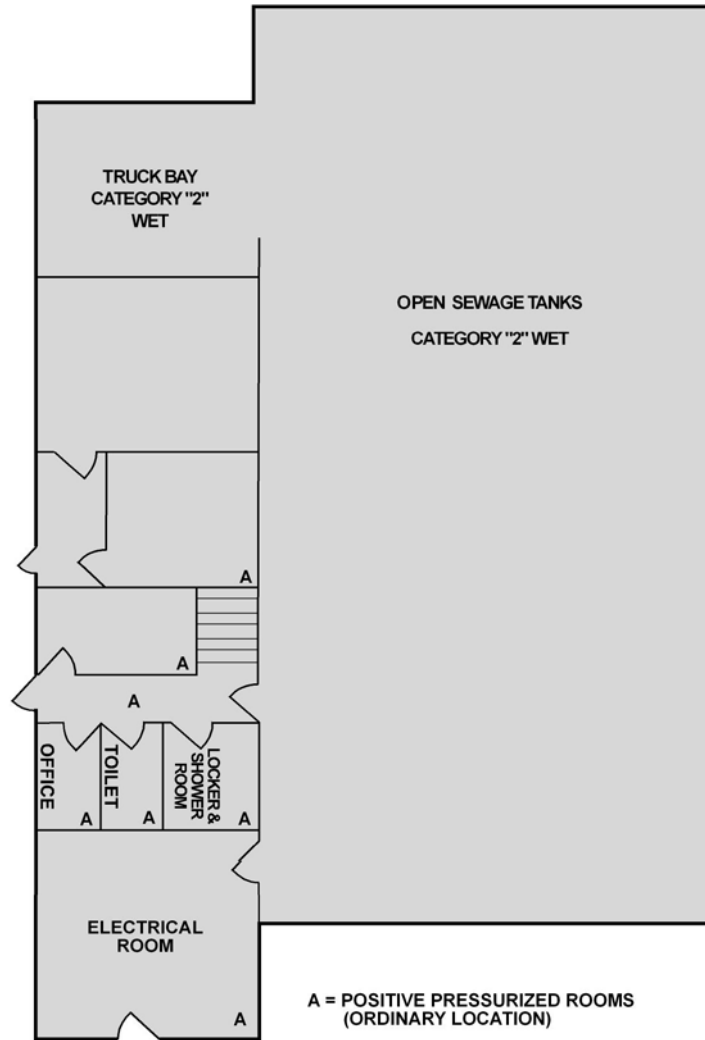
T.I. # 59    **DIAGRAMS FOR SEWAGE LIFT AND TREATMENT PLANTS (continued)**

**Typical Sewage Lift Station (Side-by-Side)**



TI # 59     **DIAGRAMS FOR SEWAGE LIFT AND TREATMENT PLANTS (continued)**

**Typical Sewage Treatment Plant**



**T.I. # 60     LIGHTING EQUIPMENT IN BUILDINGS HOUSING POULTRY OR HORSES**

The environment found in these applications is generally dry with some dust and minimal corrosion.

In recognition of this environment, standard fluorescent lighting fixtures will be permitted for use in poultry housing provided protection against dust layering is made by mounting the fixtures on the ceiling or, if suspended, provided with adequate dust shields to prevent the accumulation of dust.

**T.I. # 61      PATIENT CARE AREAS**  
**Rule 24-100 Rules for Patient Care Areas**

The Appendix B note to Rule 24-100 references the standard CAN/CSA-Z32, Electrical safety and essential electrical systems in health care facilities. While the definitions of Basic, Intermediate and Critical Care Areas are identical to those found in the CEC, Item 4.2.6.1 of this standard, Patient Area Classification, suggests that medical facilities such as dental clinics, chiropractic clinics, physicians offices and physiotherapy departments may be classified as Intermediate Care areas.

The facilities administrator is required to define the use of all patient care areas. For this reason, an analysis of the facility in relation to Standard Z32 is required for all above mentioned facilities.

Furthermore, Manitoba Hydro requires that a professional engineer perform the Z32 Analysis for facilities in their jurisdictional area (i.e.: outside the City of Winnipeg).

SECTION 26  
INSTALLATION OF ELECTRICAL EQUIPMENT

**T.I. # 62      "STEP-UP / STEP-DOWN" TRANSFORMER INSTALLATIONS**  
**Rule 26-250 Disconnecting Means for Transformers**

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.

**T.I. # 63      CHOKING TRANSFORMERS**  
**Rule 26-256 Overcurrent Protection for Dry-Type Transformer Circuits Rated 750V or Less**

"Choking" of transformers smaller than 75 kVA shall not be permitted.

By special permission only, transformers 75 kVA or larger shall be permitted to be "choked" by a maximum of one standard transformer size.

Example: If primary overcurrent protection adequate for a 75 kVA, 600 Volt transformer is installed (i.e.: 90 Amp or 100 Amp circuit breaker), the maximum larger size transformer permitted to be installed with that size of overcurrent device is 112½ kVA (one standard transformer size larger).

A transformer is considered as being "choked" if the primary protection is less than the rated primary current of the transformer. For example, a 75 kVA, 600 Volt transformer is considered as "choked" when protected by a 70 Amp primary breaker since the rated primary current of the transformer is 72.2 Amps.

When a "choked" transformer is installed, a mechanically secured (riveted) lamicoïd label is required on the primary overcurrent device indicating the maximum allowable size of overcurrent protection.

**T.I. # 64    PANELBOARD MOUNTING HEIGHTS AND HEADROOM CLEARANCES IN DWELLING UNITS**  
**Rule 26-402 Locations of Panelboards**

Subrule 26-402(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.

**T.I. # 65    KITCHEN ISLAND RECEPTACLES**  
**Rule 26-712 Receptacles for Dwelling Units**

Item 26-712(d)(iv) requires that at least one receptacle (15A split or 20A T-slot) be installed at each permanently fixed island counter space with a 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.

**T.I. # 66    GAS FIRED UNIT HEATERS**  
**Rule 26-806 Heating Equipment Rated 117 kW and Less**

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

**T.I. # 67    OVERCURRENT PROTECTION MARKED ON HERMETIC REFRIGERANT MOTOR-COMPRESSORS**  
**Rule 28-202 Overcurrent Protection Marked on Equipment and Rule 28-702 Marking**

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

**T.I. # 68    MOTORS CONTROLLED BY VFD's/ASD's**  
**Rule 28-314 Overheating Protection Required**

For motors controlled by Variable Frequency Drives (VFD's) or Adjustable Speed Drives (ASD's), refer to Appendix B notes for Rules 18-114 and 28-314.

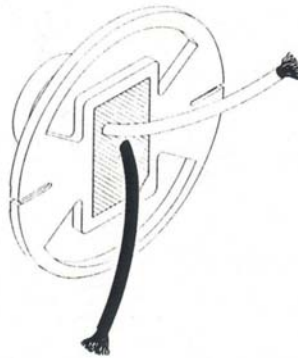
**T.I. # 69    MOTOR DISCONNECTING MEANS**  
**Rule 28-604 Location of Disconnecting Means**

For the purpose of Rule 28-604(1)(b)(ii) an acceptable locking device will require the use of a tool for the removal of the device mechanism and will utilize a padlock for the lock-off facility.

SECTION 30  
INSTALLATION OF LIGHTING EQUIPMENT

**T.I. # 70    LAMPHOLDERS IN CATEGORY 1 LOCATIONS**  
**Rule 30-606 Lampholders in Wet or Damp Locations**

Where porcelain type keyless lampholders are installed in Category 1 Locations such as livestock housing, the lampholders shall be approved for outdoor use. These lampholders are fitted with pigtails and potted terminations and have the words "outdoor use" marked on the container.



**T.I. # 71     **INSTALLATION OF RECESSED LUMINAIRES IN INSULATED SPACES****  
**Rule 30-900 Recessed Luminaires, General**

Rule 30-900 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 ceiling is desired, a box shall be constructed around the fixture 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 the rules of 30-900.

***Example:***

Rating of luminaire	= 100 watts
100 W X 800	= 80,000 cubic cm
Proposed box length and width	= 40 cm X 40 cm = 1600 cm <sup>3</sup>
Minimum depth	= 80,000/1,600
	= 50 cm deep
Box dimensions	= 40 X 40 X 50 cm

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

**T.I. # 72     **FIRE ALARM SYSTEMS****  
**Rules 32-000 Scope**

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

**T.I. # 73     **SUPPLY VOLTAGE FOR SMOKE ALARMS****  
**Rule 32-110 Installation of Smoke Alarm and Carbon Monoxide Alarms in Dwelling Units**

To meet the requirements of Rule 32-110(a), 120V smoke alarms will be required.

**T.I. # 74     **TRANSFER SWITCHES USED FOR FIRE PUMPS****  
**Rule 32-208 Transfer Switch**

As required in Rule 32-208(1)(c), transfer switches used to provide emergency power to fire pump equipment shall be ULC listed. All other transfer switches used solely to provide emergency power to building systems need only be approved by an accredited organization.

**T.I. # 75    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.*

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

**T.I. # 76    USE OF NONMETALLIC RACEWAYS FOR EMERGENCY LIGHTING AND EXIT SIGNS**  
**Rule 46-108 Method of Wiring**

The present wording of Rule 46-108(2) permits the use of Nonmetallic raceways, such as Rigid PVC Conduit, for emergency lighting and exit signs, but only where embedded in at least 50 mm of masonry or concrete, or installed underground.

In buildings that are permitted by the Manitoba Building Code to be of combustible construction as described in Subrules 46-108(3), the use of exposed nonmetallic raceway as a wiring method for emergency lighting and exit signs will be permitted.

**T.I. # 77    EMERGENCY LIGHTING SUPPLIES**  
**Rule 46-304 Supply Connections**

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.*

**T.I. # 78    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 C282-05, "**Emergency Electrical Power Supply for Buildings**".

Section 9 of CSA Standard C282-05, 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 CAN/CSA C282-05, "**Emergency Electrical Power Supply for Buildings**," is available from the Canadian Standards Association, Standard Sales, 5060 Spectrum Way, Mississauga, Ontario, L4W 5N6.

SECTION 62  
FIXED ELECTRIC SPACE AND SURFACE HEATING SYSTEMS

**T.I. # 79    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 manufacturers instructions. Failure to use the specified materials and methods will void the heating cable approval.

SECTION 68  
POOLS, TUBS, AND SPAS

**T.I. # 80    GFCI REQUIREMENTS FOR SPAS AND HOT TUBS**  
**Rule 68-068 Ground Fault Circuit Interrupters**

Factory assembled units manufactured to CSA specifications are factory equipped with a G.F.C.I. as required. Electrical components which are electrically connected to a remote packaged unit and intended to be installed within 3 meters of a spa or hot tub shall be protected by a ground fault circuit interrupter of the Class A type as per Rule 68-068.

**T.I. # 81 THE USE OF T90 NYLON CONDUCTORS AND DUAL RATED T90 NYLON/TWN75**  
**Table 19**

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 12-928),
  - b) For installation at ambient temperatures below minus 10 degrees Celsius (Refer to Rule 12-102(1)), or
  - c) As consumers service conductors where exposed to the weather. (Refer to Rule 6-302(5)).
  - 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.

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