

## Saskatchewan Interpretations



**Electrical Inspections Department**

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**Version 1.0**

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## **Preface and Scope**

The Canadian Electrical Code Part 1, Twenty-Third Edition, as supplemented and amended by these requirements, issued under Section 5 of *The Electrical Inspection Act, 1993*, shall govern the workmanship and all other matters whatever pertaining to electrical equipment and the installation of electrical equipment in or upon any land, buildings, structures, and premises. It contains supplementary and amendatory requirements which by their inclusion herein are adopted as requirements under Section 5 of *The Electrical Inspection Act, 1993*.

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**Website Information**

Electrical Inspection Act: <http://www.qp.gov.sk.ca/documents/English/Statutes/Statutes/E6-3.pdf>

Electrical Inspection Regulations: <http://www.qp.gov.sk.ca/documents/English/Regulations/Regulations/E6-3R1.pdf>

Electrical Licensing Act: <http://www.qp.gov.sk.ca/documents/English/Statutes/Statutes/E7-2.pdf>

Electrical Licensing Regulations: <http://www.qp.gov.sk.ca/documents/English/Regulations/Regulations/E7-2R2.pdf>

SaskPower New Connect Process: <http://www.saskpower.com/accounts-and-services/service-requests/new-connections/>

**[www.saskpower.com](http://www.saskpower.com) now contains the following information:**

2015 CEC Saskatchewan Interpretations and Information

District Inspector Contact Numbers

District Inspector Territory Maps

Electrical Fee Schedule

Code for Electrical Installations at Oil & Gas Facilities

Link to Electrical Inspections Act and Regulations

SaskPower Electric Service Requirements

Approved Field Inspection Agencies and Certification Bodies

Generator Brochure

Wind & Solar Information

**Bond Notice Administration Fees**

When defects are due, a bond notice will be issued and a \$125.00 administration fee as per Table 4 of the Electric Fee schedule, will be assessed. The invoice will be issued to the contractor at the same time the bond notice is issued to the applicable bond company for completion of said defect.

## SECTION 2 - GENERAL RULES

### **2-004 - Permit**

#### **Permit Information**

It is the responsibility of the contractor to ensure that the information given on the permit application is accurate and complete. Inaccurate details may result in delayed service connects. In an effort to make the permit process more efficient, please follow these simple rules:

1. If a utility connection or reconnection is required, mark the appropriate **YES** box on the permit.
2. If there is no action required by the utility staff, mark the **NO** box.
3. **Ensure the address where the work was performed is accurate and complete.** Additional information is required where no civic address is available (i.e. beaches, new subdivisions, oilfield lease sites and reserves).
4. Supply work/cell contact phone number in the work description. **Failure to provide accurate and legible information on any permit application could result in the following:**
  - a. a **\$125.00** assessment fee may be charged to locate missing or inaccurate information; or
  - b. the application and payment may be returned to the contractor to update missing or inaccurate information. A fine for unreported work as per *The Electrical Inspection Regulations* may be assessed for any work that is not authorized by a valid permit.

Section 16 of *The Electrical Inspection Act, 1993* and Section 7 of *The Electrical Inspection Regulations* specifies that **all permit applications must be accompanied by the appropriate permit fee.**

#### **Permits for Low Voltage and Extra Low Voltage Installations**

All low voltage and extra low voltage installations including lighting, “Home Automation control wiring” process controls, control/communication cable tray and conduit systems, solar powered systems, cathodic protection and SCADA systems require permits. *The Electrical Inspections Regulations* (available at the Queen’s Printer) have been amended to exempt the requirement of an Electrical Permit for the installation of communication cabling.

#### **6.1(1) In this section:**

- “code” means the latest prescribed edition of the Canadian Electrical Code within the meaning of subsection 5(2) of the Act;
- “communication system” means a communication system as defined in Section 0 of the code;
- “control circuit” means a control circuit as defined in Section 0 of the code;
- “hazardous location” means a location to which Section 18, 19 (2015 Oil & Gas Code) and 20 of the code applies;
- “patient care area” means an area to which Section 24 of the code applies.

**6.1(2)**

Subsection 16(2) of the Act does not apply to the following types of work of electrical installation:

- a. the replacement of switches, receptacles, ballasts, lighting fixtures or motors in single-family dwelling units and in non-detached dwelling units with separate entrances that are intended for the use of one family; and
- b. the installation of a communication system, other than a communication system:
  - that is located in a hazardous location;
  - that is located in a patient care area; or
  - in which control circuits operate the electrical equipment ie Home Automation or SCADA systems
- c. This exemption also applies to security systems, except that permits will still be required under the following conditions:
  - a) Security systems installed in hazardous locations;
  - b) Security systems installed in patient care areas; or
  - c) Security systems that have a hard-wired 120 Volt supply (not a plug-in device).

**Note** – the installation of the associated equipment, conduit system, etc. still requires a permit

**Permits for Oil Field Installations**

All low voltage and extra low voltage installations including lighting, process controls, solar powered systems and SCADA systems require permits.

**2-012 - Inspection Request Required**

Two (2) weeks' notice is required, and the contractor shall be present to provide access, for an inspection for the following installations to be approved before concealment, operation and/or utility connection:

- a. main service and/or feeders 600 amps or larger;
- b. medical facilities that contain patient care areas;
- c. high voltage services, including grounding;
- d. renewable energy production such as solar and wind;
- e. buildings housing livestock or poultry;
- f. high voltage neon signs and outline lighting;
- g. sewage lift and treatment plants; and
- h. irrigation systems.

**2-014 - Plans and Specifications**

- Note:
1. The electrical contractor shall ensure that the plans have been submitted to Electrical Inspections.
  2. The electrical contractor shall ensure that any main service and/or feeder conductor/cable changes made during construction be re-submitted to Electrical Inspections.
  3. **Where plans have not been submitted and reviewed by Electrical Inspections, service energization may be denied.**

4. **Plans are entered in the queue and reviewed in the order they are received. Submissions missing any of the following information will be moved back in the queue.**
5. **Construction set of electrical plans should be submitted prior to construction or at least 6 weeks prior to the required pre-inspection and the service energization. The standard turnaround time for review process is approximately four (4) weeks. For high voltage submissions, the review process is approximately six (6) weeks. The review process timeline may be longer depending on the number of submissions received.**
6. **Upon completion of review, the Plans Review Transmittal Slip will be issued to the submitter.**

**NOTE - A copy of Plans Review Transmittal Slip should be made available at the time of the inspection.**

1. One set of construction electrical plans and specifications, as required by Section 19 of *The Electrical Inspections Act, 1993* or as requested by the Electrical Inspections department, shall be submitted and reviewed by the Electrical Inspections department for:
  - a. wiring installations of public buildings, and other buildings in which public safety is involved;
  - b. main service and or feeders where ampacity is 600A or larger;
  - c. all renewable energy systems installations (Note: Only 5 KW and larger will be reviewed with Plans Review Transmittal Slip);
  - d. sewage lift and treatment facilities;
  - e. Class A, B and C health care facilities as indicated by Z32-09, including identification of the patient care areas (See Section 24 in the Saskatchewan Interpretation for definitions);
  - f. hazardous installations covered by Sections 18, 19 (2015 Oil & Gas Code) and 20 (excluding single oil well sites);
  - g. high voltage installations covered by Section 36;
  - h. generation systems over 12 KW; or
  - i. any other installation as deemed necessary by the Electrical Inspections department.
2. Submissions shall include the following information:
  - Submitter (Consultant/contractor/client) contact information: company name, mailing address, phone number, e-mail address.
  - Project name, construction site address and/or land location.
  - Clearly specify the scope of the work.
  - Where an emergency generator is installed to supply power to life safety systems, a selective coordination report (as per 46-208) will be required and shall be submitted to Electrical Inspections.
  - Clearly identify existing, new and future part of the project.
    - (a) Electrical plans shall include the following:
      - Detailed site plan
      - An overall one-line diagram complete with:
        - main service ampacity, voltage and phase;

- main and feeder conductor type and sizes including installation method i.e. underground (as per D Tables and Diagrams), conduit, free air, bundled or raceway;
    - panel schedules indicating current and voltage ratings;
    - breaker/fuse size;
    - conductor material (copper or aluminum);
    - maximum short circuit current available at main service;
    - grounding and bonding details; and
    - transformer ratings, primary and secondary overcurrent protection devices and conductor sizes.
  - Hazardous area classification drawings, which shall include the Auto Ignition Temperature (AIT) of the hazardous product present at the site
  - Patient care areas (clearly identify the different patient care levels)
  - Calculated loads
  - Cable schedule
  - Cable buss
  - Electrical equipment layout
  - Voltage drop calculation for feeders
- b) For **high voltage** (over 750 V) installations, in addition to the applicable items in (a), the following information shall be submitted:
- Electrical arrangement complete with plan, elevation, profile views and physical arrangement of the electrical equipment dimensions to clearly indicate the electrical, physical and work clearances and relative locations of the equipment;
  - Fencing arrangement and details;
  - Grounding details (includes NGR wiring details);
  - Ground Potential Rise (GPR) study;
  - Provisions for metering equipment; and
  - Other design information and documents as requested by Electrical Inspections.
- (c) Plans submission for **renewable energy system** shall include, but not limited to:
- Contact information of the submitter;
  - Land location or civic address;
  - A detailed electrical equipment list that shall contain electrical rating and manufacturer's make and model numbers for this equipment;
  - A detailed site plan showing the relative locations of all electrical equipment including the length of all feeders and any applicable voltage drop calculations; and
  - An overall single line or three-line diagram shall contain, but not limited to, the following:
    - All electrical equipment (new and existing) and where this equipment connects to any electrical systems on the property such as each photovoltaic/DC combiner, inverter, disconnect, breaker/fuse, panel, etc.
    - Show all specific wiring and installation methods for the entire electrical installation (i.e. copper or aluminum conductors, PVC conduit, EMT, ACWU or Teck cables, underground, indoor/outdoor location, etc.)

- All AC or DC grounding and bonding details as applicable in Rule 64-068 and Appendix B.
  - The utility-interactive point of connection as applicable in Rule 64-112, shall be shown. For example, if the connection is on the load side of the service disconnecting means such as a panelboard, splitter or other distribution equipment, provide bus amperage rating, utility source breaker and the renewable energy system input breaker ratings.
  - Solar array details required are:
    - The maximum photovoltaic source circuit voltage as calculated by Rule 64-202 (N/A for micro-inverters);
    - The rated short-circuit current (N/A for micro-inverters);
    - The rated operating current and voltage;
    - The type and number of PV modules connected in each series string; and
    - The specific wiring methods for the solar array as applicable in Rule 64-210.
3. Submit plans to:
- SaskPower**  
**Gas & Electrical Inspections Division**  
**#177-1621 Albert Street**  
**Regina, SK S4P 0S1**
- Telephone: 1-888-757-6937 (option 5)**  
**Fax: 1-306-566-2906**  
**E-mail: [electricalplansreview@saskpower.com](mailto:electricalplansreview@saskpower.com)**
4. Plans review fees are as follows:
- 750V System or less – no fees
  - High voltage system (over 750V) - \$375 (min) and additional \$125/hr plus GST
  - Expedite (rush review) - \$375 plus GST (subject to agreement)

## **2-022 - Renovations of Existing Installations**

### **Connection or Reconnection**

Where a permit is required for an electrical service alteration or for a reconnection of a service which has been disconnected for more than twelve (12) months, the service shall be made to comply with the requirements of the current Canadian Electrical Code. **NOTE - Wooden masts will no longer be connected when a permit is required.**

A pre-inspection and plans may also be required in accordance with [2-012](#) and [2-014](#).

### Flood Procedures

When restoring power to a flood damaged premise, there are several conditions to be aware of and processes to comply with. **An Electrical Contractor must make the electrical system safe to be reconnected. A permit must be submitted and a SaskPower Electrical Inspector must be notified before reconnection.** All work must meet the requirements of the current Canadian Electrical Code. When electrical equipment is exposed to water, corrosion is enhanced rapidly. The equipment may look safe on the outside, but it can be extremely dangerous to reuse.

1. Circuits and equipment that were subjected to the flood must be disconnected and isolated before power can be restored.
2. If the service (panel box, etc.) has been exposed to water, it must be replaced or completely disassembled and cleaned. All the breakers must be replaced and the damaged breakers must be destroyed. When service equipment is replaced, the entire service must be brought up to current Canadian Electrical Code.
3. All meter sockets must be securely mounted.
4. Grounding must be checked and if repairs are required, they must meet the requirements of the current Canadian Electrical Code. Ground clamps should be cleaned or replaced.
5. All submerged conductors, cable, equipment, receptacles, switches, etc. must be replaced and the damaged material destroyed.
6. Conduit systems that have been flooded shall be cleaned as good as possible and a bond wire will have to be installed with the new conductors.
7. Furnaces and water heaters must be checked over by a qualified Gas Contractor.

### Electrical Systems Exposed to Fire

When a building has had a fire and the panel has been exposed to smoke and or water, all of the breakers must be replaced and the old ones destroyed. If the panel has not been damaged by heat etc., it may be thoroughly cleaned and reused. All receptacles, switches, lighting and heating fixtures that have been exposed to the smoke and/or water must be replaced and the old ones destroyed. Any wiring that may have been exposed to flames or heat in excess of its maximum temperature rating must be replaced. All repair/replacement work must meet the requirements of the current Canadian Electrical Code.

### **2-022 - Renovating of Existing Installations**

Where it is a renovation or repair work, if the walls are opened up or if cabinetry is removed/replaced, then every effort shall be made to ensure that the electrical wiring and circuitry for all outlets be brought up to the current electrical code. Electrical Inspections can be consulted for clarification on what is required specifically to satisfy this policy.

## **2-024 - Use of Approved Equipment**

### **Labels Required for Manufactured Homes and Movable Equipment**

Skids and movable equipment that have been wired off site shall have a suitable, weatherproof if required, label affixed to the electrical panel or skid. The label shall include the Saskatchewan Electrical Contractor's name, the permit number that was issued for the installation and the date.

Manufactured homes (Ready To Move Homes) shall have a label affixed to the electrical panel or the inside of the kitchen cabinet. The label shall include the Saskatchewan Electrical Contractor's name, the permit number that was issued for the installation and the date. If you require labels, please contact your local electrical inspector to make arrangements.

### **Cable Ties**

The Canadian Electrical Code mandates the use of approved cable ties, straps or other devices to support cables and raceways. However, cable ties used for securing need not be approved. "Securing" should not be confused with "support". For example, a cable in a horizontal cable tray is supported by the cable tray and may be secured to the tray with cable ties. In the case of a vertical cable tray, the cable must be supported by an APPROVED clamp or fastener with the exception of short drops of 1.5 meters or less. See rule 12-510, Appendix B for approved cable ties.

### **Equipment Approval Certification**

All electrical equipment requires an overall approval from a Saskatchewan recognized Certification Body prior to being connected or reconnected electrically. This includes Mobile Homes, Ready to Move Homes (RTM), as well as any other manufactured product (new or used). For a complete list of approved certification bodies and certification marks, please visit the website at [www.saskpower.com](http://www.saskpower.com).

## **2-024 - Use of Approved Equipment - Exceptions**

There may be occasions where certification standards do not exist to approve electrical equipment to. A deviation shall be applied for in accordance with Rule 2-030.

In the specific situation of liquid-filled transformers, certification organizations have yet to identify a demand for developing a product certification program around this particular electrical equipment. Consequently, certified liquid-filled transformers are not available.

## Conditions

Owners/users required to use liquid-filled transformers are permitted to deviate from Rule 2-024 of the Canadian Electrical Code provided they meet the following conditions:

### 1. a) Manufactured to Canadian Standards

Liquid-filled transformers are acceptable when the manufacturer declares that they have manufactured, inspected and tested the transformer to the requirements of the appropriate and current Canadian standards. These standards include, but are not limited, to:

CAN/CSA-C2	Single Phase and Three Phase Distribution Transformers
CAN/CSA-C88	Power Transformers and Reactors
CAN/CSA-C227.3	Low Profile, Single Phase, Dead Front Pad-mounted, Distribution Transformers
CAN/CSA-C227.4	Three Phase, Dead Front Pad-mounted, Distribution Transformers

### b) Manufactured to Other than Canadian Standards

Where liquid-filled transformers are manufactured to other than Canadian standards, the manufacturer must declare that the product has equivalent safety performance as one manufactured to Canadian standards. Alternatively, a licensed engineering professional may evaluate and accept the product standard to which the liquid-filled transformer was manufactured if it compares favorably with the appropriate Canadian standards concerning safety performance.

### 2. Product Identification

In addition to meeting the requirements of Rule 2-100 of the Canadian Electrical Code, the liquid-filled transformer must identify the standard to which it was manufactured.

The following documentation of appropriate marking must also accompany the product;

- a manufacturer's declaration stating that they have manufactured the product to one or more appropriate Canadian standards, or
- when manufactured to other than Canadian standards:
  - i. a manufacturer's declaration that the product has equivalent safety performance as one manufactured to the appropriate Canadian standards, or
  - ii. a licensed engineering professional's evaluation report indicating the product as having equivalent safety performance as one manufactured to appropriate Canadian standards.

### 3. Maintenance

The owner of the equipment shall ensure the product is maintained to industry standards and manufacturer's specifications.

## **2-024 - Use of Approved Equipment**

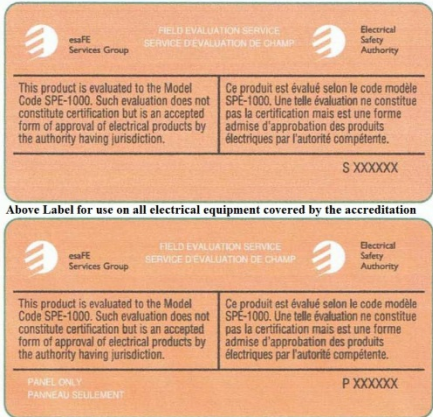

All electrical equipment shall be approved as per Rule 2-024 and Appendix B note with the exception as per Rule 16-222.



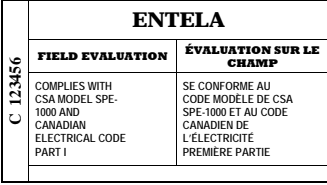



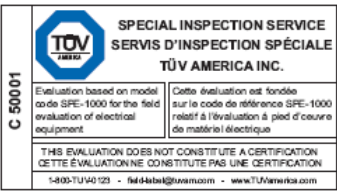

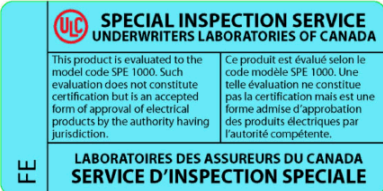

### **Field Inspection Certification**




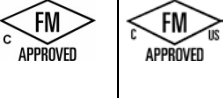



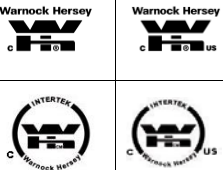


For a list of current recognized field certification labels for the Province of Saskatchewan, contact SaskPower Electrical Inspections at our Toll-Free number 1-888-757-6937, or visit us online at [www.saskpower.com](http://www.saskpower.com).














### **Field Inspection Reports**



Field Inspection reports on skids or moveable equipment shall become part of the equipment and shall be made available on request. Report shall remain with the equipment.

<b>Name of Field Inspection Agency</b>	<b>Special Inspection Label All labels must read: “SPE-1000”</b>	<b>Name of Field Inspection Agency</b>	<b>Special Inspection Label All labels must read: “SPE-1000”</b>
<b>ELECTRICAL SAFETY AUTHORITY (ESA)</b>	 <p>Above Label for use on all electrical equipment covered by the accreditation</p> <p>For use on panels only</p>	<b>LabTest Certification</b>	

Name of Field Inspection Agency	Special Inspection Label All labels must read: “SPE-1000”	Name of Field Inspection Agency	Special Inspection Label All labels must read: “SPE-1000”
CSA International		QPS	
ETL Intertek Entela		INTERTEK TESTING SERVICES	
ETL Intertek Semko		Quality Auditing Institute	
TÜV America Inc.		TÜV Rheinland of North America, Inc.	
Underwriter's Laboratories of Canada		Nemko Canada Inc.	

Name of Certification Body	<u><b>Certification Marks</b></u>	
<b>CSA International</b>		The CSA certification mark alone without any identifier indicates products approved to Canadian National Standards. If another country's identifier is present (i.e. US, NRTL), then the small 'c' Canadian identifier is required to indicate that the product also complies with Canadian National Standards.
		The 'Blue Flame' certification mark is a Canada only mark indicating compliance to Canadian National Standards. They do not require a small 'c' Canadian identifier.
<b>QPS Evaluation Services Inc.</b>		The QPS certification mark requires the small 'c' Canadian identifier to indicate compliance to Canadian National Standards. Identifiers for other countries may be present but in all cases, the small 'c' is required
<b>FM Approvals</b>		The FM certification mark requires the small 'c' Canadian identifier to indicate compliance to Canadian National Standards. Identifiers for other countries may be present but in all cases, the small 'c' is required.
<b>Met Laboratories</b>		The MET certification mark requires the small 'c' Canadian identifier to indicate compliance to Canadian National Standards. Identifiers for other countries may be present but in all cases, the small 'c' is required.
<b>Intertek Testing Services NA Ltd. (ETL) (Entela)</b>		The ETL Intertek Entela certification mark requires the small 'c' Canadian identifier at the 8 o'clock position to indicate compliance to Canadian National Standards. Identifiers for other countries may be present but in all cases, the small 'c' is required.
		ETL Intertek Semko has 2 certification marks; the ETL mark and the WH mark. Each mark requires the small 'c' Canadian identifier to indicate compliance to Canadian National Standards.
		Identifiers for other countries may be present but in all cases, the small 'c' is required.
<b>Quality Auditing Institute</b>		The QAI certification mark requires the small 'c' Canadian identifier to indicate compliance to Canadian National Standards. Identifiers for other countries may be present but in all cases, the small 'c' is required.
<b>TÜV Product Service</b>		The TÜV Product Service certification mark requires the small 'c' Canadian identifier to indicate compliance to Canadian National Standards. Identifiers for other countries may be present but in all cases, the small 'c' is required.

Name of Certification Body	Certification Marks	
<b>TÜV Rheinland of North America</b>		The TÜV Rheinland certification mark requires the small 'c' Canadian identifier to indicate compliance to Canadian National Standards. Identifiers for other countries may be present but in all cases, the small 'c' is required.
<b>Underwriter's Laboratory</b>	 	The UL certification mark requires the small 'c' Canadian identifier to indicate compliance to Canadian National Standards. Identifiers for other countries may be present but in all cases, the small 'c' is required.
		The ULC certification mark is a Canada only mark indicating compliance to Canadian National Standards. It does not require a small 'c' Canadian identifier.
		The ULC certification mark is a Canada only mark indicating compliance to Canadian National Standards. It does not require a small 'c' Canadian identifier.
<b>Curtis-Straus LLC</b>		The Curtis – Straus LLC certification mark requires the small 'c' Canadian identifier to indicate compliance to Canadian National Standards. Identifiers for other countries may be present but in all cases, the small 'c' is required.
<b>NSF International</b>		The NSF International certification mark requires the small 'c' Canadian identifier to indicate compliance to Canadian National Standards. Identifiers for other countries may be present but in all cases, the small 'c' is required.
<b>Nemko Canada Inc.</b>		The Nemko Canada certification mark requires the small 'c' Canadian identifier to indicate compliance to Canadian National Standards. Identifiers for other countries may be present but in all cases, the small 'c' is required.
<b>Nemko CCL Inc.</b>	 	The Nemko CCL Inc. certification mark requires the small 'c' Canadian identifier to indicate compliance to Canadian National Standards. Identifiers for other countries may be present but in all cases, the small 'c' is required.
<b>OMNI Environmental Services Inc.**</b>		The OMNI Environmental certification mark requires the small 'c' Canadian identifier to indicate compliance to Canadian National Standards. Identifiers for other countries may be present but in all cases, the small 'c' is required.
<b>LabTest Certification Inc.</b>	 	The LabTest certification mark requires the small 'c' Canadian identifier to indicate compliance to Canadian National Standards. Identifiers for other countries may be present but in all cases, the small 'c' is required.

Name of Certification Body	Certification Marks	
<b>ENEFEN</b> <b>Energy</b> <b>Efficiency</b> <b>Engineering</b> <b>Ltd.</b>		<p>The ENEFEN certification mark is a Canada only mark indicating compliance to Canadian National Standards. It does not require a small 'c' Canadian identifier.</p>
<b>SGS NORTH</b> <b>AMERICA,</b> <b>INC.</b>		<p>The SGS North America Inc. certification mark requires the small 'c' Canadian identifier to indicate compliance to Canadian National Standards. Identifiers for other countries may be present but in all cases, the small 'c' is required.</p>
<b>ELECTRICAL</b> <b>SAFETY</b> <b>AUTHORITY</b> <b>(ESAFE)</b>		<p>The ESAFE certification mark requires the small 'c' Canadian identifier to indicate compliance to Canadian National Standards. Identifiers for other countries may be present but in all cases, the small 'c' is required.</p>

<b><u>Certification Body</u></b>		<b>SPECIAL/FIELD INSPECTION AGENCIES</b>
<b>CSA (Canadian Standards Association)</b>  1707 94th Street NW Edmonton, Alberta T6N 1E6 Canada	General Queries – (780) 450-2111 Standard Sales & Seminars - (780) 490-2007 1-800-463-6727 Fax: (780) 490-2059 E-mail: <a href="mailto:info@csagroup.org">info@csagroup.org</a> Website: <a href="http://www.csa.ca">http://www.csa.ca</a>	Dora Vendrig Field Service Representative, Special Inspections Regina & Saskatoon, SK Office Phone # (306) 882-3448 Cell Phone # (306) 301-0049 E-mail: <a href="mailto:dora.vendrig@csagroup.org">dora.vendrig@csagroup.org</a> .  Jeff Tuttle Field Service Representative, Factory Inspections Saskatoon, SK Office Phone # (306) 882-3399 Cell Phone # (306) 716-2306 E-mail: <a href="mailto:jeff.tuttle@csagroup.org">jeff.tuttle@csagroup.org</a>
<b>CSA International</b> 178 Rexdale Boulevard TORONTO, ON M9W 1R3 Canada	Mr. Walter Vance, Manager Accreditations and Conformity Assessment (216) 524-4990 Fax: (216) 328-8138 E-mail: <a href="mailto:walter.vance@csa-international.org">walter.vance@csa-international.org</a> Website: <a href="http://www.csa-international.org/">http://www.csa-international.org/</a>	See link for applicable marks:  <a href="http://www.csa-international.org/product_areas/hazloc_equipment/special_services/field_certification/">http://www.csa-international.org/product_areas/hazloc_equipment/special_services/field_certification/</a>
<b>QPS Evaluation Services</b> Winnipeg, Manitoba Canada	Gerry Dyrda Mobile: (204) 632-4509 Fax: (204) 632-4386 1-888-819-9248 Website: <a href="http://www.qps.ca">http://www.qps.ca</a> E-mail: <a href="mailto:info@qps.ca">info@qps.ca</a>	Performs field inspections
<b>Intertek Testing Services NA Ltd. (ETL)</b> 1500 Brigantine Drive Coquitlam, BC V3K 7C1	<b>Inspections Group Inc.</b> 12010 – 111 Ave. Edmonton, Alberta T5G 0E6 Phone: (780) 454-5048 Fax: (780) 454-5222 Toll-Free: (866) 554-5048 Toll-Free Fax: (866) 454-5222 E-mail: <a href="mailto:questions@inspectionsgroup.com">questions@inspectionsgroup.com</a>  <b>Hazardous Locations</b> Janice Trainor Edmonton, Alberta Cell (587) 338-4696 Office (587) 881-0959	Jason Short Saskatoon, Saskatchewan Mobile: (306) 229-7594 1-800-668-8378 Website: <a href="http://www.intertek.com">http://www.intertek.com</a> E-mail: <a href="mailto:inspections@intertek.com">inspections@intertek.com</a>  Brad Helgason Regina, Saskatchewan Phone (306) 545-3551 Fax (306) 790-7267 Website: <a href="http://www.intertek.com">http://www.intertek.com</a> E-mail: <a href="mailto:Brad.helgason@intertek.com">Brad.helgason@intertek.com</a>
<b>FM Approvals</b> 1151 Boston Providence Turnpike; P.O. Box 9102 Norwood, MA 02062 USA	Mr. J. Hill - Group Manager Technical Auditing Services Ph: (781) 255-4972 Fax: (781) 762-9375 E-mail: <a href="mailto:john.hill@fmglobal.com">john.hill@fmglobal.com</a> Website: <a href="http://www.fmglobal.com">http://www.fmglobal.com</a>	

<b><u>Certification Body</u></b>		<b>SPECIAL/FIELD INSPECTION AGENCIES</b>
<b>MET Laboratories, Inc.</b> 914 West Patapsco Avenue BALTIMORE, MD 21230-3432 USA	Mr. R. Frier, President Ph: (410) 354-3300 Fax: (410) 354-3313 E-mail: <a href="mailto:rfrier@metlabs.com">rfrier@metlabs.com</a> Website: <a href="http://www.metlabs.com">http://www.metlabs.com</a>	
<b>Quality Auditing Institute</b> 2825 Murray Street PORT MOODY, BC V3H 1X3 Canada	Mr. S. Harris, Manager Ph: (604) 461-8378 Fax: (604) 461-8377 E-mail: <a href="mailto:sharris@qai.org">sharris@qai.org</a> E-mail: <a href="mailto:info@qai.org">info@qai.org</a> Website: <a href="http://www.qai.org">http://www.qai.org</a>	<b>Testing Tech</b> Saskatoon, SK 1-306-664-2415 E-mail: <a href="mailto:inspections@testing-tech.com">inspections@testing-tech.com</a>
<b>TÜV Product Service, a division of TÜV America Inc.</b> 5 Cherry Hill Drive DANVERS, MA 01923 USA	Mr. G. Minks, Director Certification Body Ph: (978) 739-7000 Fax: (978) 777-8441 E-mail: <a href="mailto:gminks@tuvam.com">gminks@tuvam.com</a> Website: <a href="http://www.tuvamerica.com">www.tuvamerica.com</a>	Performs field inspections.
<b>TÜV Rheinland of North America, Inc.</b> 12 Commerce Road NEWTOWN, CT 06470 USA	Mr. T. R. Calland, P.E., Program Manager Product Safety and Quality International Approvals Ph: (203) 426-0888 Fax: (203) 426-4009 E-mail: <a href="mailto:tcalland@us.tuv.com">tcalland@us.tuv.com</a> Website: <a href="http://www.us.tuv.com">http://www.us.tuv.com</a>	
<b>Underwriters' Laboratories of Canada</b> 7 Underwriters Road TORONTO, ON M1R 3B4 Canada	Mr. Gunsimar Paintal Regional Quality Manager & UL Mark Program Owner Ph: (416) 757-5250 Fax: (416) 757-1781 E-mail: <a href="mailto:gunsimarbir.paintal@ca.ul.com">gunsimarbir.paintal@ca.ul.com</a> Website: <a href="http://www.ulc.ca">http://www.ulc.ca</a>	Mr. Andrew Saunders CAS Manager & IB Program Owner Ph: (416) 757-5250 Fax: (416) 757-1781 E-Mail: <a href="mailto:andrew.saunders@ca.ul.com">andrew.saunders@ca.ul.com</a> Website: <a href="http://www.ulc.ca">http://www.ulc.ca</a>
<b>CURTIS-STRAUS LLC</b> 527 Great Road Littleton, MA 01460 U.S.A.	Mr. Jon D. Curtis, P.E. Director of Operations Ph: (978) 486-8880 Fax: (978) 486-3529 E-mail: <a href="mailto:jcurtis@curtis-straus.com">jcurtis@curtis-straus.com</a> Website: <a href="http://www.curtis-straus.com">http://www.curtis-straus.com</a>	
<b>NSF INTERNATIONAL</b> 789 Dixboro Road Ann Arbor, MI 48105	Mr. Craig S. Morr, CEI/CEM Q A & Organization Safety Manager Ph: (734) 769-5143 Telefax: (734) 827-6849 E-mail: <a href="mailto:information@nsf-isr.org">information@nsf-isr.org</a>	
<b>Nemko Canada Inc</b> 303 River Road, Ottawa Ontario, Canada K1V 1H2	Mr. Stuart Beck Director of Certification Ph: (613) 737-9680, ex. 246 Fax: (613) 737-9691 E-mail: <a href="mailto:stuart.beck@nemko.com">stuart.beck@nemko.com</a> Website: <a href="http://www.nemko.com">http://www.nemko.com</a>	Performs field inspections

<b><u>Certification Body</u></b>		<b>SPECIAL/FIELD INSPECTION AGENCIES</b>
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<b>OMNI-Test Laboratories, Inc.</b> 5465 SW Western Avenue Suite G Post Office Box 743 Beaverton, OR 97075 USA	Ms. Alana Smith Accreditation Manager Ph: (503) 643-3788 Fax: (503) 643-3799 E-mail: <a href="mailto:asmith@omni-test.com">asmith@omni-test.com</a> Website: <a href="http://www.omni-test.com">http://www.omni-test.com</a>	
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## **2-030 - Deviation or Postponement**

Requests for special permission shall be made in writing to the Chief Electrical Inspector, giving all details pertaining to the requests. If acceptable, permission applying to the particular installation will be confirmed in writing.

## **2-100(3) - Marking of Equipment**

Labels shall be on the exterior and readily visible without opening equipment doors

## **2-106 - Rebuilt Equipment**

### **Retrofit kits and installation requirements**

With the application of energy efficiency programs in Saskatchewan, high efficiency lighting technologies and various lighting retrofit kits are popular. There are several options for retrofitting standard **tubular fluorescent luminaries**, with more energy efficient lamps.

The program that is in place where fluorescent luminaries that are suitable for T12 lamps are modified to accept T8 or T5 lamps are as follows:

- Luminaries that have modifications done to the reflectors or lamp holders shall be recertified and labeled by an accredited certification organization.
- The retrofit of luminaries may be accepted under the original certification when the following conditions apply:
  - the work is covered by an electrical permit;
  - the replacement equipment bears the mark of a recognized certification agency;
  - the replacement equipment is rated for the application and draws no more power than the original equipment; and
  - the replacement equipment is physically compatible with the luminaire with no modifications.
- Please note that in all cases, each retrofitted luminaire must be provided with a label containing the following information:
  - voltage;
  - amperage;
  - date of install;
  - installed by (contractor name); and
  - permit number.

Some retrofit options are:

- **Fluorescent retrofit kit** – consists of fluorescent tube and electronic ballast that is an integral part of the device.
- **LED retrofit kit** – consists of a LED retrofit tube and the LED driver components that are remote from (not an integral part of) the device.
- **LED retrofit kit with integral driver** – consists of a LED tube and the LED driver components that are an integral part of the device.

Retrofit kits specified above require a luminaire conversion and usually involve replacing the lamp, rewiring the luminaire and in some cases, replacing an existing ballast with an LED driver, or directly connecting the lamp to the supply circuit.

Although there are differences in installation of various retrofit kits, for all of them it is very important to consider the following requirements:

- disconnect the fluorescent luminaire from the power source before starting the retrofit installation;
- the retrofit kits are certified as assemblies to appropriate Canadian standard(s);
  - **Note:** for LED retrofits where LED driver is an integral part of the lamp, retrofit kits approved to UL standard, UL 1598C Outline of investigation will be used until the CSA standard C22.2 No. 1993 *Self-Ballasted Lamps and Lamp Adapters* is updated to include certification requirements for LED retrofits.
- the retrofit kits are required to be marked:
  - **Note:** In accordance with standards, some examples of markings required on the retrofitted luminaires with LED lamps are:
    - **USE ONLY WITH [Manufacturer] [Catalogue Number] LUMINAIRE**, as applicable
    - **REPLACE ONLY WITH [Manufacturer] [Catalogue Number] XXX**  
XXX is replaced with: LED Lamp or LED driver, as applicable
- the retrofit kits are installed in accordance with manufacturer's wiring installation instruction.

### **Hazardous Location Luminaires**

Hazardous location luminaire certifications investigate all components to ensure they are not, or will not become an ignition source.

Electrical Inspections requires that luminaire retrofit kits be certified to the appropriate standard.

Field modifications to luminaires including internal wiring re-work bypassing existing ballast and wiring directly to the socket with phase voltage, shall be field certified by an approved inspection body.

## **2-200 - Protection of Equipment**

### **Commercial Automobile Receptacles**

Receptacles shall be installed with mechanical protection to prevent damage by vehicles by one of the following or other equivalent means:

- a. Approved manufactured pedestals provided with mechanical protection;
- b. Where mechanical protection is not utilized, the receptacles and conduit shall be installed on structures of adequate strength, such as fences or walls and the receptacles and conduit shall be installed no less than 750 mm above finished grade;

- c. A reinforced concrete post with a dimension of not less than 300 mm may be used and shall be installed to a height of not less than 750 mm and to a depth of not less than 750 mm below grade. The receptacles and conduit shall be installed on the face of the post not exposed to vehicular damage. The receptacles may, if desired, be installed on the face of the post exposed to vehicles provided the conduit and outlet box are installed within the post. Mounting height of the receptacles shall not be less than 750 mm above finished grade. As an alternate to the concrete post, a treated wooden post of minimum 150 mm x 150 mm may be used; or
- d. Bollards or permanently installed curb stops, mounted 1.2m from the center of the curb stop to the pedestal or receptacle, for drive in parking locations and placed in front of the receptacles to prevent vehicles from coming in contact with receptacles, shall be accepted as mechanical protection.

Conductors for wiring of these receptacles shall have insulation or covering suitable for installation and use at temperatures down to minus 40 degrees C except for conductors approved for and installed underground.

A separate bonding conductor is required in metal raceway as per Rule 10-804.

### **2-300 - General Requirements for Maintenance and Operation**

Currently there is a concern with free standing services falling over from a lack of support. Free standing services shall meet the following requirements with all posts set into a minimum depth of 750mm and additional support to deal with any cantilever forces placed upon the structure.

- a) 100A - 200A services shall be supported on a minimum of 2 pressure treated 4x4 posts with a ¾" pressure treated backing.
- b) 400A - 800A services shall be supported on a minimum of 3 pressure treated 4x6 posts with a ¾ " pressure treated backing.
- c) 1000A and larger - same as (b) and shall have additional support as required.

### **2-306 - Shock and Flash Protection**

Contractors are required to field mark equipment requiring adjustment, examination, servicing or maintenance while energized with a warning label identifying potential electric shock and arc flash hazard. This applies to all new equipment as well as used equipment that is being returned to service. See Appendix B for labeling requirements.

### **2-324 - Electrical Equipment near Combustible Gas Equipment (see also 6-408)**

The clearance around a natural gas regulator relief vent to arc-producing electrical equipment shall be 1 meter and 3 meters for propane regulator relief vents as per CSA B149.1-15. **Note** – This clearance is a spherical radius.

Revenue meters, hot tub and air-conditioning disconnects are examples of arc-producing electrical equipment.

## SECTION 4 - CONDUCTORS

### **4-004 & 4-006 - Application of New Changes to Conductor Sizing**

#### **Application Examples**

Examples 1 to 3 below illustrate how to apply correction factors to the ampacity for the temperature rating of the conductor (90°C).

Note: D Tables ampacities are based on 90°C conductors.

Underground ampacities for a conductor temperature of 75°C may be obtained by multiplying the appropriate ampacity at 90°C conductor temperature by the derating factor 0.886. See Rule 4-006 for equipment termination temperature requirements.

### **4-004(23) - Service Conductors for Common Residential Services**

#### **Table 39**

Minimum permitted size for 3-wire 120/240 V and 120/208 V service conductors for single dwellings, or feeder conductors supplying single dwelling units of row housing of apartment and similar buildings and terminating on equipment having a conductor termination temperature of not less than 75 °C [See Rule 4-004(23)]

**\* These ampacities are the ampacities given in Tables 2 and 4 for 75°C, increased by 5% in accordance with Rule 8-106(1). See Note 2**

#### **Notes:**

- (1) This Table applies only to conductors, sized in accordance with Rules 8-200(1), 8-200(2), and 8-202(1)*
- (2) The 5% allowance in Rule 8-106 (1) cannot be applied to these values as the 5% allowance has already been added to the applicable 75°C ampacities from Tables 2 and 4*
- (3) If the calculated load exceeds the limit shown in the table, the next larger size conductor shall be used*

#### **Example 1**

Find the minimum size of service conductors required for a service with the following criteria:

- 2000 amp, 120/208 volt, 3 phase/4 wire.
  - It is buried underground for more than 3 meters and there are more than four conductors. [4-004(18)]
  - 4 conductor ACWU90, 600 volt cable larger than 1/0. [4-004(1)(d)]
  - The main breaker does not have a maximum conductor termination temperature marked on it.
  - 4 conductors per phase.
- 
- 2000 amps ÷ 4 conductors per phase = 500 amps per conductor
  - 500 amps – 5% [8-106(1)] = 475 amps per conductor minimum
  - Because we are using a 90°C rated multiple aluminum conductor cable, or single conductors in contact, or multiplexed single aluminum conductor, directly buried in earth we would use Table D10B.
  - From Diagram D10 we use Detail 4 (4 conductors per phase)

- Because our main breaker does not have a maximum conductor termination temperature marked on it, [4-006(2)(b)], we have to derate the conductors for 75 °C. As per Note (2) under Table D10B. “Underground ampacities for a conductor temperature of 75 °C may be obtained by multiplying the appropriate ampacity at 90 °C conductor temperature by the derating factor 0.886”  
From the column “4/phase, Detail 4” we multiply the values by 0.886 until we find one that exceeds 475 amps.  
 $552 \text{ amps (1750 MCM)} \times 0.886 = 489 \text{ amps}$
- This service requires 4 conductors of 1750 MCM ACWU90 per phase.

**Example 2**

Find the minimum size of service conductors required for a service with the following criteria:

- 2000 amp, 120/208 volt, 3 phase/4 wire.
  - It is buried underground for more than 3 meters and there are more than four conductors. [4-004(18)]
  - 4 conductor TECK90, 600 volt cable larger than 1/0. [4-004(1)(d)]
  - The main breaker has a maximum conductor termination temperature of 75 °C marked on it.
  - 6 conductors per phase.
- 
- $2000 \text{ amps} \div 6 \text{ conductors per phase} = 333.3 \text{ amps per conductor}$
  - $333.3 \text{ amps} - 5\% [8-106(1)] = 316.6 \text{ amps per conductor minimum}$
  - Because we are using a 90 °C rated multiple copper conductor cable, or single conductors in contact, or multiplexed single copper conductor, directly buried in earth we would use Table D10A.
  - From Diagram D10 we use Detail 6 (6 conductors per phase)
  - Because our main breaker does have a maximum conductor termination temperature marked on it, [4-006(6)], we have to derate the conductors for 75 °C. As per Note (2) under Table D10A. “Underground ampacities for a conductor temperature of 75 °C may be obtained by multiplying the appropriate ampacity at 90 °C conductor temperature by the derating factor 0.886”.  
From the column “6/phase, Detail 6” we multiply the values by 0.886 until we find one that exceeds 316.6 amps.  
 $387 \text{ amps (600 MCM)} \times 0.886 = 342.9 \text{ amps}$
  - This service requires 6 conductors of 600 MCM TECK90 per phase.

**D8 Tables with 75° Calculations**

**Table D8A**  
**Allowable copper conductor ampacities for cables**  
**rated not more than 5000 V and unshielded for the**  
**installation configurations of Diagram D8**  
(see Rule 4-004.)

Size, AWG or Kcmil	1/phase, Detail 1		2/phase, Detail 2		2/phase, Detail 3		4/phase, Detail 4		4/phase, Detail 5		6/phase, Detail 6		6/phase, Detail 7	
	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C
1 / 0	315	279	269	238	288	255	204	181	221	196	171	152	186	165
2 / 0	357	316	304	269	326	289	230	204	249	221	192	170	209	185
3 / 0	405	359	343	304	369	327	259	229	281	249	217	192	236	209
4 / 0	458	406	388	344	418	370	292	259	317	281	244	216	265	235
250	499	442	422	374	454	402	317	281	344	305	265	235	289	256
300	550	487	464	411	500	443	348	308	378	335	291	258	317	281
350	597	529	503	446	543	481	376	333	409	362	314	278	342	303
400	642	569	540	478	582	516	403	357	439	389	336	298	366	324
500	721	639	605	536	654	579	451	400	491	435	375	332	409	362
600	790	700	662	587	716	634	493	437	536	475	410	363	447	396
750	885	784	740	656	801	710	549	486	598	530	457	405	498	441
900	972	861	810	718	877	777	599	531	653	579	498	441	543	481
1000	1020	904	850	753	921	816	629	557	686	608	522	462	570	505
1250	1132	1003	941	834	1020	904	694	615	757	671	576	510	629	557
1500	1227	1087	1017	901	1104	978	749	664	817	724	621	550	678	601
1750	1308	1159	1083	960	1176	1042	796	705	869	770	659	584	720	638
2000	1376	1219	1138	1008	1236	1095	835	740	911	807	691	612	755	669

**Notes:**

- (1) This table gives the allowable current for 90 °C rated single copper conductors with spacings directly buried in earth.
- (2) Underground ampacities for a conductor temperature of 75 °C may be obtained by multiplying the appropriate ampacity at 90 °C conductor temperature by the derating factor 0.886.
- (3) See Rule 4-006 for equipment termination temperature requirements.

**Table D8B**  
**Allowable aluminum conductor ampacities for cables**  
**rated not more than 5000 V and unshielded for the**  
**installation configurations of Diagram D8**  
(see Rule 4-004.)

Size, AWG or Kcmil	1/phase, Detail 1		2/phase, Detail 2		2/phase, Detail 3		4/phase, Detail 4		4/phase, Detail 5		6/phase, Detail 6		6/phase, Detail 7	
	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C
1 / 0	244	216	208	184	223	198	158	140	172	152	133	118	144	128
2 / 0	276	245	236	209	253	224	179	159	194	172	150	133	163	144
3 / 0	313	277	266	236	286	253	201	178	218	193	169	150	183	162
4 / 0	356	315	302	268	325	288	227	201	247	219	190	168	207	183
250	387	343	328	291	353	313	247	219	268	237	206	183	225	199
300	427	378	361	320	389	345	271	240	294	260	226	200	247	219
350	464	411	391	346	422	374	293	260	319	283	245	217	267	237
400	498	441	420	372	453	401	314	278	342	303	262	232	286	253
500	561	497	472	418	509	451	352	312	383	339	293	260	320	284
600	617	547	518	459	559	495	386	342	420	372	321	284	350	310
750	694	615	581	515	628	556	432	383	470	416	359	318	392	347
900	764	677	638	565	691	612	473	419	515	456	393	348	429	380
1000	807	715	673	596	729	646	498	441	543	481	414	367	452	400
1250	906	803	753	667	817	724	556	493	606	537	461	408	503	446
1500	992	879	822	728	893	791	605	536	661	586	502	445	548	486
1750	1068	946	884	783	960	851	649	575	709	628	538	477	588	521
2000	1134	1005	937	830	1018	902	687	609	751	665	569	504	622	551

**Notes:**

- (1) This table gives the allowable current for 90 °C rated single aluminum conductors with spacings directly buried in earth.
- (2) Underground ampacities for a conductor temperature of 75 °C may be obtained by multiplying the appropriate ampacity at 90 °C conductor temperature by the derating factor 0.886.
- (3) See Rule 4-006 for equipment termination temperature requirements.

**D9 Tables with 75° Calculations**

**Table D9A**  
**Allowable copper conductor ampacities for cables**  
**rated not more than 5000 V and unshielded for the**  
**installation configurations of Diagram D9**  
 (see Rule 4-004.)

Size,AWG or Kcmil	1/phase, Detail 1		2/phase, Detail 2		4/phase, Detail 3		6/phase, Detail 4	
	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C
1 / 0	258	229	221	196	181	160	165	146
2 / 0	293	260	250	222	205	182	186	165
3 / 0	333	295	283	251	231	205	210	186
4 / 0	378	335	321	284	261	231	237	210
250	414	367	351	311	285	253	258	229
300	458	406	387	343	313	277	284	252
350	499	442	420	372	339	300	307	272
400	537	476	451	400	364	323	329	291
500	607	538	507	449	408	361	369	327
600	669	593	558	494	447	396	404	358
750	754	668	626	555	500	443	451	400
900	832	737	687	609	547	485	492	436
1000	875	775	722	640	574	509	517	458
1250	978	867	803	711	635	563	572	507
1500	1065	944	870	771	687	609	617	547
1750	1140	1010	928	822	731	648	656	581
2000	1203	1066	976	865	767	680	689	610

**Notes:**

- (1) This table gives the allowable current for 90 °C rated single copper conductors with spacings installed in non-metallic underground raceways.
- (2) Underground ampacities for a conductor temperature of 75 °C may be obtained by multiplying the appropriate ampacity at 90 °C conductor temperature by the derating factor 0.886.
- (3) See Rule 4-006 for equipment termination temperature requirements.

**Table D9B**  
**Allowable aluminum conductor ampacities for cables**  
**rated not more than 5000 V and unshielded for the**  
**installation configurations of Diagram D9**  
 (see Rule 4-004.)

Size,AWG or Kcmil	1/phase, Detail 1		2/phase, Detail 2		4/phase, Detail 3		6/phase, Detail 4	
	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C
1 / 0	199	176	171	152	141	125	128	113
2 / 0	226	200	194	172	159	141	145	128
3 / 0	257	228	219	194	179	159	163	144
4 / 0	293	260	249	221	203	180	184	163
250	321	284	272	241	221	196	201	178
300	355	315	300	266	243	215	221	196
350	386	342	326	289	264	234	239	212
400	416	369	351	311	283	251	256	227
500	471	417	395	350	318	282	288	255
600	521	462	435	385	350	310	316	280
750	590	523	491	435	392	347	354	314
900	652	578	540	478	431	382	388	344
1000	690	611	570	505	454	402	409	362
1250	783	694	643	570	509	451	458	406
1500	861	763	703	623	555	492	499	442
1750	930	824	757	671	596	528	536	475
2000	991	878	804	712	632	560	567	502

**Notes:**

- (1) This table gives the allowable current for 90 °C rated single aluminum conductors with spacings installed in non-metallic underground raceways.
- (2) Underground ampacities for a conductor temperature of 75 °C may be obtained by multiplying the appropriate ampacity at 90 °C conductor temperature by the derating factor 0.886.
- (3) See Rule 4-006 for equipment termination temperature requirements.

## **D10 Tables with 75° Calculations**

**Table D10A**  
**Allowable copper conductor ampacities for cables**  
**rated not more than 5000 V and unshielded for the**  
**installation configurations of Diagram D10**  
 (see Rule 4-004.)

Size, AWG or Kcmil	1/phase, Detail 1		2/phase, Detail 2		3/phase, Detail 3		4/phase, Detail 4		5/phase, Detail 5		6/phase, Detail 6	
	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C
1 / 0	262	232	221	196	195	173	181	160	170	151	163	144
2 / 0	298	264	250	222	220	195	205	182	192	170	184	163
3 / 0	337	299	282	250	248	220	230	204	216	191	207	183
4 / 0	382	338	319	283	280	248	260	230	244	216	233	206
250	418	370	348	308	306	271	283	251	265	235	253	224
300	462	409	382	338	336	298	310	275	291	258	278	246
350	500	443	413	366	362	321	335	297	314	278	300	266
400	538	477	443	392	388	344	358	317	336	298	320	284
500	602	533	494	438	432	383	398	353	373	330	356	315
600	658	583	538	477	470	416	433	384	405	359	387	343
750	731	648	595	527	518	459	478	424	447	396	426	377
900	795	704	643	570	560	496	515	456	481	426	458	406
1000	827	733	669	593	582	516	535	474	500	443	476	422
1250	907	804	728	645	632	560	581	515	542	480	516	457
1500	966	856	772	684	670	594	615	545	574	509	546	484
1750	1017	901	809	717	702	622	643	570	600	532	571	506
2000	1060	939	840	744	728	645	667	591	622	551	591	524

**Notes:**

- (1) This table gives the allowable current for 90 °C rated copper conductor cables, or single copper conductors in contact, or multiplexed single copper conductors, directly buried in earth.
- (2) Underground ampacities for a conductor temperature of 75 °C may be obtained by multiplying the appropriate ampacity at 90 °C conductor temperature by the derating factor 0.886.
- (3) See Rule 4-006 for equipment termination temperature requirements.

**Table D10B**  
**Allowable aluminum conductor ampacities for cables**  
**rated not more than 5000 V and unshielded for the**  
**installation configurations of Diagram D10**  
 (see Rule 4-004.)

Size, AWG or Kcmil	1/phase, Detail 1		2/phase, Detail 2		3/phase, Detail 3		4/phase, Detail 4		5/phase, Detail 5		6/phase, Detail 6	
	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C
1 / 0	203	180	172	152	152	135	141	125	132	117	127	113
2 / 0	230	204	193	171	171	152	159	141	149	132	143	127
3 / 0	261	231	219	194	193	171	179	159	168	149	161	143
4 / 0	298	264	249	221	219	194	203	180	190	168	182	161
250	324	287	270	239	238	211	220	195	207	183	197	175
300	359	318	298	264	262	232	242	214	227	201	217	192
350	390	346	323	286	284	252	262	232	246	218	235	208
400	419	371	347	307	304	269	281	249	263	233	251	222
500	473	419	389	345	340	301	314	278	294	260	281	249
600	522	462	428	379	374	331	345	306	323	286	308	273
750	586	519	478	424	417	369	384	340	359	318	342	303
900	643	570	522	462	455	403	418	370	391	346	373	330
1000	677	600	548	486	477	423	439	389	410	363	391	346
1250	757	671	608	539	528	468	485	430	453	401	431	382
1500	819	726	655	580	568	503	521	462	487	431	463	410
1750	873	773	695	616	602	533	552	489	515	456	490	434
2000	917	812	727	644	630	558	577	511	538	477	512	454

**Notes:**

- (1) This table gives the allowable current for 90 °C rated aluminum conductor cables, or single aluminum conductors in contact, or multiplexed single aluminum conductors, directly buried in earth.
- (2) Underground ampacities for a conductor temperature of 75 °C may be obtained by multiplying the appropriate ampacity at 90 °C conductor temperature by the derating factor 0.886.
- (3) See Rule 4-006 for equipment termination temperature requirements.

## D11 Tables with 75° Calculations

**Table D11A**

**Allowable copper conductor ampacities for cables  
rated not more than 5000 V and unshielded for the  
installation configurations of Diagram D11**

(see Rule 4-004.)

Size,AWG or Kcmil	1/phase, Detail 1		2/phase, Detail 2		3/phase, Detail 3		4/phase, Detail 4		5/phase, Detail 5		6/phase, Detail 6		8/phase, Detail 8	
	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C
1 / 0	205	182	185	164	169	150	158	140	147	130	139	123	130	115
2 / 0	233	206	210	186	192	170	179	159	166	147	157	139	147	130
3 / 0	266	236	239	212	218	193	202	179	188	167	178	158	166	147
4 / 0	303	268	271	240	247	219	229	203	212	188	201	178	187	166
250	335	297	298	264	271	240	251	222	232	206	219	194	204	181
300	370	328	329	291	298	264	276	245	255	226	241	214	224	198
350	403	357	357	316	323	286	299	265	276	245	261	231	242	214
400	434	385	384	340	347	307	320	284	295	261	279	247	259	229
500	489	433	430	381	388	344	357	316	329	291	310	275	288	255
600	539	478	472	418	424	376	390	346	359	318	339	300	314	278
750	601	532	524	464	470	416	431	382	397	352	374	331	346	307
900	655	580	569	504	509	451	466	413	428	379	403	357	373	330
1000	683	605	593	525	530	470	485	430	445	394	419	371	388	344
1250	752	666	649	575	578	512	528	468	484	429	455	403	421	373
1500	804	712	691	612	614	544	561	497	513	455	482	427	445	394
1750	847	750	726	643	644	571	587	520	537	476	504	447	466	413
2000	901	798	744	659	659	584	601	532	549	486	515	456	476	422

**Notes:**

- (1) This table gives the allowable current for 90 °C rated multiple copper conductor cables, or single copper conductors in contact, or multiplexed single copper conductors, installed in underground raceway.
- (2) Underground ampacities for a conductor temperature of 75 °C may be obtained by multiplying the appropriate ampacity at 90 °C conductor temperature by the derating factor 0.886.
- (3) See Rule 4-006 for equipment termination temperature requirements.

**Table D11B**

**Allowable aluminum conductor ampacities for cables  
rated not more than 5000 V and unshielded for the  
installation configurations of Diagram D11**

(see Rule 4-004.)

Size,AWG or Kcmil	1/phase, Detail 1		2/phase, Detail 2		3/phase, Detail 3		4/phase, Detail 4		5/phase, Detail 5		6/phase, Detail 6		8/phase, Detail 8	
	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C	90 °C	75 °C
1 / 0	157	139	143	127	131	116	122	108	114	101	108	96	101	89
2 / 0	179	159	162	144	148	131	138	122	129	114	122	108	114	101
3 / 0	205	182	184	163	168	149	157	139	146	129	138	122	129	114
4 / 0	235	208	210	186	192	170	178	158	165	146	156	138	146	129
250	258	229	231	205	210	186	195	173	180	159	171	152	159	141
300	286	253	255	226	232	206	215	190	199	176	188	167	175	155
350	312	276	278	246	252	223	233	206	215	190	204	181	189	167
400	337	299	299	265	271	240	250	222	231	205	218	193	203	180
500	382	338	337	299	305	270	281	249	259	229	245	217	227	201
600	424	376	373	330	336	298	309	274	285	253	269	238	249	221
750	478	424	419	371	376	333	346	307	318	282	300	266	278	246
900	527	467	459	407	412	365	378	335	347	307	327	290	303	268
1000	555	492	483	428	433	384	397	352	364	323	343	304	318	282
1250	626	555	541	479	482	427	441	391	404	358	380	337	351	311
1500	679	602	585	518	520	461	475	421	435	385	409	362	377	334
1750	724	641	621	550	552	489	503	446	461	408	432	383	399	354
2000	777	688	646	572	573	508	522	462	477	423	448	397	413	366

**Notes:**

- (1) This table gives the allowable current for 90 °C rated multiple aluminum conductor cables, or single aluminum conductors in contact, or multiplexed single aluminum conductors, installed in underground raceway.
- (2) Underground ampacities for a conductor temperature of 75 °C may be obtained by multiplying the appropriate ampacity at 90 °C conductor temperature by the derating factor 0.886.
- (3) See Rule 4-006 for equipment termination temperature requirements.

#### **4-006 - Termination Temperature Limitations**

Where a conductor is terminated on equipment with a 60°C or 75°C rating, the maximum conductor ampacity shall be based on the 60°C or 75°C column of Tables 1, 2, 3 or 4.

When equipment termination temperature rating is not marked on the equipment it is to be:

##### **60°C for equipment:**

- rated not more than 100 A; or
- marked for use with a No. 1 AWG or smaller conductor: and

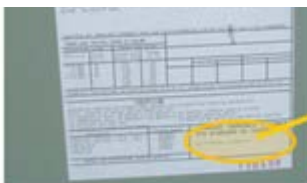
##### **75°C for equipment:**

- rated more than 100 A; or
- marked for use with conductors larger than No. 1 AWG.
- All relevant correction factors being determined from Rule 4-004, such as Table 5A, will apply to ampacity rating from the equipment termination temperature rating **not** the insulation temperature rating when the equipment termination temperature rating is required to be used.
- High voltage equipment's termination temperature rating when not marked you are allowed to consult the manufacturer.
- Equipment termination temperature rating applies to the first 1.2 m of conductor from the connection point on the equipment.



**When not listed,  
refer to  
Rule 4-006(2)(a)(b)**

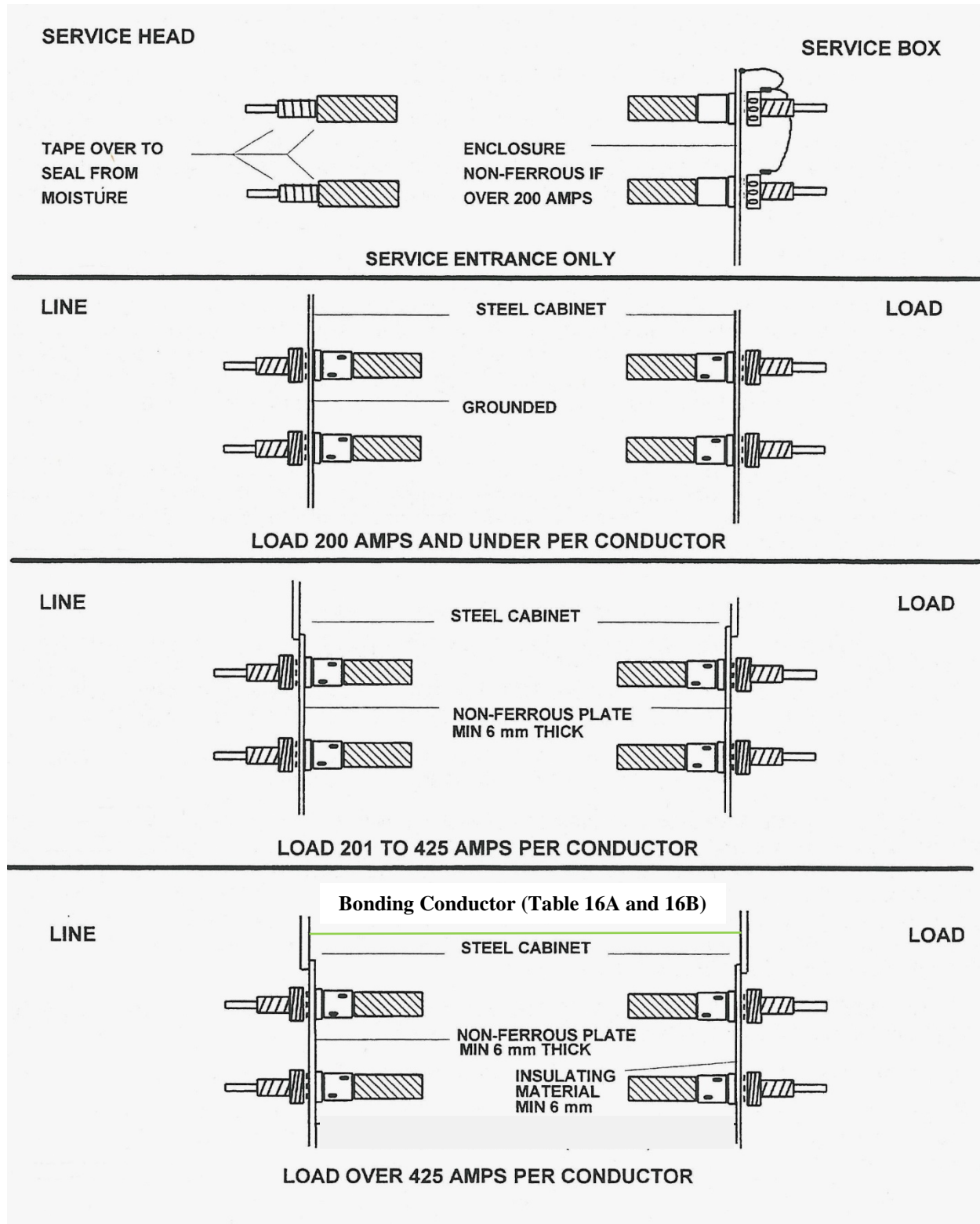
**"60/75 °C Wire –  
125 Amp & Lower Only"**



**"Use 75 Degrees C  
conductors"**

# 4-010 - Induced Voltages and Currents in Metal Armour or Sheaths of Single Conductor Cables

See Rule 4-010 and Appendix B.



#### **4-024 - Harmonics - Sizing Neutral Conductors**

Although the Canadian Electrical Code, Part I does not specifically mention harmonics, harmonics cause heating in the *neutral conductor*. Harmonics caused by certain types of non-linear loads (e.g. office computers, printers, variable speed motor drives, or certain types of electric discharge lighting) should be taken into consideration when sizing *neutral conductors*.

#### **4-038(3) - Colour Coding of Conductors**

Colour coding of branch circuit conductors and service conductors are not a mandatory requirement. This rule states that where colour coding is required, the colours shall be red, black and blue. The SaskPower Electric Service Requirements, Clause 3.6.1(b) states that where termination is made by SaskPower such as splitter box or CT metering, conductors must be colour coded. If CT metering is used after the main disconnect, then colour coding must be used to that point.

### **SECTION 6 - SERVICES AND SERVICE EQUIPMENT**

#### **6-104 - Number of Consumer Services**

The maximum number of consumer services from a single supply service is four. Where more than four meters are required, the contractor must make arrangements with the utility and **meet Utility requirements**.

The following options may be allowed:

1. The utility will run two services to the same location on a building. The Electrical Contractor can install two weatherproof splitters with a maximum of four meter sockets from each splitter; providing a maximum of eight meters on a building. Splitter sizes may vary;
2. The utility will run one service to each end of a building. The Electrical Contractor can install one weatherproof splitter on each end and four meter sockets; providing a maximum of eight meters on a building. Splitter sizes may vary; or
3. Install an approved metering electrical room.

**Note:** If the two services are permitted, then they will require a label stating that there are two services and the location of each.

#### **6-112 - Support for the Attachment of Overhead Service Conductors**

6-112(2) - For the purpose of this rule 'ground normally accessible to pedestrians' includes patios and decks.

6-112(4) - Appendix B note to Rule 6-112(4) states an acceptable manner for mast support is one where three (3) support clamps are used, of these, the upper most is required to be a complete through bolt assembly consisting of a minimum 12 mm bolt, nut and washer.

As an alternative to the “through bolt” requirement, **with the permission of the district electrical inspector**, a unistrut support **may** be allowed to be lag bolted to the exterior of the building (into structural members) for mast support. A rigid 2-hole strap and spring nuts shall be used on the mast to secure it to the unistrut. **This may be allowed on a case by case basis, after review and acceptance by the local inspector**. It should only be considered when it is impractical or impossible to install the normal through bolt support.

### **6-200 - Dual Lug Meter Sockets**

200A and 400A dual lug meter sockets may be installed where a customer wants two consumer services and is acceptable to the Utility. The subdivision of the consumer services can be accomplished within the dual lug meter socket provided that the total current rating of the two consumer service disconnects does not exceed the ampere rating of the meter socket.

**In rural areas** where the 400A self-contained meter socket is used, a service rated disconnect(s) is required immediately after the meter socket.

**e.g. 1-400A or 2-200A disconnects, etc.**

### **6-200(1) - Single Breaker Service Equipment**

Each consumer’s service shall be provided with a single service box, except where a panelboard can employ no more than two single-pole breakers, one two-pole breaker, or one three-pole breaker and is **service entrance rated**.

### **6-206(1)(a) - Electric Service Requirements**

- SaskPower Electric Service Requirements can be found online at [www.saskpower.com](http://www.saskpower.com) or call SaskPower at 1-888-757-6937.
- City of Saskatoon - [www.saskatoon.ca](http://www.saskatoon.ca) - Saskatoon Light & Power - Service Guide.
- City of Swift Current - Use SaskPower Electric Service Requirements.

### **6-206 - Service Equipment Location**

#### **6-206(1)(c) - Panels**

Insulated exterior walls are considered an undesirable location for recessing of panels.

**Panelboards** shall be installed in the building being served and the length of unfused service conductors shall not exceed six (6) conduit meters. Where the service box or other consumer’s service equipment is located beyond six (6) conduit meters from the point where unfused service conductors enter the building, the conductors shall be run in threaded rigid metal conduit for the entire length inside the building.

**Note:** Metallic service conduits or service cables with metallic armor require bonding bushings in the main service. See 10-604 and 10-606 - Assuring Continuity at Service Equipment on [page 44](#).

### 6-206(3) - Service Disconnect

1. The service **disconnecting means** shall be permitted to be placed on the outside of the building or on a pole, provided it is:
  - a. installed in an enclosure approved for the location or protected against the weather;
  - b. protected against mechanical damage if it is located less than 2 m above ground; and
  - c. service entrance rated.
2. Grounding must be done at the service disconnect (neutral grounded), after the disconnect the neutral must be insulated and isolated from the bond. See Rule 10-200 [Page 42 & 43](#)

NOTE: The SaskPower supplied F cabinet breaker shall not be considered as overcurrent protection for the service or cables.

### 6-206(3) - Oil Field Service Disconnect

The oil field well controller shall not be considered a service disconnect unless approved as such. This deviation has been removed from the oil and gas code.

1. The service **disconnecting means** shall be permitted to be placed on the outside of the building, on a pole, or at the first well site, provided it is:
  - a. installed in an enclosure approved for the location or protected against the weather;
  - b. protected against mechanical damage if it is located less than 2 m above ground; and
  - c. service entrance rated.
2. Grounding must be done at the F cabinet and a bond conductor carried to each individual service at the well site. All electrical equipment beyond the service disconnect shall be bonded together in accordance with Table 16A and each site shall have a ground plate or two ground rods installed with a minimum #6 copper for an equipotential plane.

NOTE: The SaskPower supplied F cabinet breaker shall not be considered as overcurrent protection for the service or cables and are not permitted to be operated by 'other than SaskPower district staff'.

### 6-208 - Service Conductors Under House Trailer/Mobile Homes

Service conductors installed underneath a house trailer/mobile home must be approved for the location and supported to the underside of the mobile home or buried. Unarmoured service conductors must be installed in a raceway from the point where they issue from the earth.

For the purposes of 6-206(1)(c), the 6 m rule does not apply to underneath the mobile home.

### **6-300 - Underground Consumer's Services on New Housing**

Caution must be taken by the Electrical Contractor when installing a customer owned underground service from the meter socket to the panel location. The consumer's underground cable must be installed tight to the basement wall anywhere within 1.5 meters of the meter socket location. This

will prevent the cable from being damaged when the utility trenches in their underground service cable from the pole or pedestal to the socket. Once the cable is past the 1.5 meter distance, it may then be installed out away from the basement wall.

As per 12-012(11) & (12), the installation will also require frost sleeves at both ends and marking tape must be installed in the cable trench.

Underground service entrance cable as described in Table 19 shall be allowed to be supplied from a branch circuit overcurrent device when used as an underground feeder to a new service.

### **6-312 - Condensation in consumer's service raceway**

**It is recommended that the sealing be performed on the warm side to prevent condensation build-up in the conduit. Conduit may be sealed on both the warm and the cold side.**

### **6-404 - Grounded Circuit Conductor (Neutral) in CT Cabinets**

The grounded circuit conductor must be brought into the CT cabinet and terminated to meet metering requirements.

### **6-408(1)(f) - Location of Meters (see also 2-324)**

As per Utility Service Requirements:

Furnace, water heater, air exchanger, dryer and similar exhaust vents shall not be installed directly above or directly below or within 1 m horizontally of a meter socket.

## **SECTION 8 - CIRCUIT LOADING AND DEMAND FACTORS**

### **8-002 - Special Terminology**

**Basic load** – the load of lighting and receptacle circuits, based on the outside dimensions of a specific area of building occupancy, as listed in Table 14.

**Calculated load** – the load calculated in accordance with the applicable requirements of Section 8

**Demonstrated Load** - historical maximum demand watt information recorded over at least a 24 month period for the same type of facility equated to watts per m<sup>2</sup>.

### **8-102 - Voltage Drop**

Precautions must be taken to prevent any services or branch circuits from exceeding 5% voltage drop from the utility to the end use, with no feeder or branch circuit exceeding 3%. The calculation of voltage drop on services and branch circuits is based on the connected load, or 80% of the overcurrent device for unknown loads. See Rule 8-102 and Table D-3 in the CEC and Table D-23 as shown below.

**Table D-23 – Max 3% Voltage Drop**

Values in Ampere-feet - Copper Conductors

Distances shown are in Ampere-feet.

Divide the number in the table, by the number of Amps to obtain the distance in feet

3 - Phase	#14	#12	#10	#8	#6	#4	#3
208V	1047	1664	2646	4211	6681	10648	13391
480V	2416	3840	6107	9717	15418	24573	30901
600V	3020	4800	7634	12146	19272	30717	38627
3 - Phase	#2	#1	1/0	2/0	3/0	4/0	
208V	16865	21370	26897	33950	42740	53908	
480V	38919	49315	62069	78346	98630	124404	
600V	48649	61644	77586	97933	123288	155505	
1 -Phase	#14	#12	#10	#8	#6	#4	#3
120V	604	960	1527	2429	3854	6143	7725
240V	1208	1920	3053	4858	7709	12287	15451
347V	1790	2840	4520	7180	11352	18078	22638
1 - Phase	#2	#1	1/0	2/0	3/0	4/0	
120V	9730	12329	15517	19587	24658	31101	
240V	19459	24658	31034	39173	49315	62202	
347V	28740	36419	45868	57975	73035	91343	

For Aluminum Conductors, find the correct size copper and add 2 AWG sizes

### **8-102(3) - Voltage Drop in Dwelling units**

**Table 68**

**This refers to general purpose circuits (general purpose receptacles)**  
**not lighting circuits or appliance circuits.**

Maximum conductor length (meter) measured from the supply side of the consumer's service to the furthest point of utilization on a circuit using 90°C rated copper conductor at 30°C ambient temperature for 120V single phase ac circuits (2 wire circuits)

<b><u>AWG</u></b> <b><u>(Cu)</u></b>	<b><u>Overcurrent</u></b> <b><u>Protection</u></b> <b><u>Setting/Rating</u></b>	
	15A	20A
#14	38m	
#12	60m	50m
#10	96m	78m

**8-104(3)(a) - Water Heaters**

Water heaters are considered continuous loads and, therefore, the circuit conductor and the overcurrent device shall be loaded to a maximum of 80%. Example - if the water heater is rated at 3000 watts on 240 volts (12.5A), you will require a #12 AWG conductor and a 20 amp breaker.

**8-200 & 8-202 - Demand for Electric Vehicle Charging (see also 86-300)****Single Dwellings**

8-200(1)(a)(vi) - Electric vehicle charging equipment loads with demand of 100%.

**Apartment and Similar Multi-family**

8-202(3)(d) - Any electric vehicle charging equipment not located in dwelling units with demand of 100%.

For applications other than the above, refer to Rule 86-302.

**8-304(1) - Maximum Number of Outlets per Circuit**

The maximum number of “unspecified load” or “general purpose” receptacles on a branch circuit is 12 regardless of the circuit rating.

**SECTION 10 - GROUNDING & BONDING****10-106(3) - AC Systems (Ungrounded Supply)**

Ground fault indication activated by a ground fault shall be labeled and visible to persons monitoring the status of the system regardless of other monitoring systems being implemented. In oil field distribution, all loads require ground fault indication lights at each site.

**10-200 - Current over Grounding and Bonding Conductors**

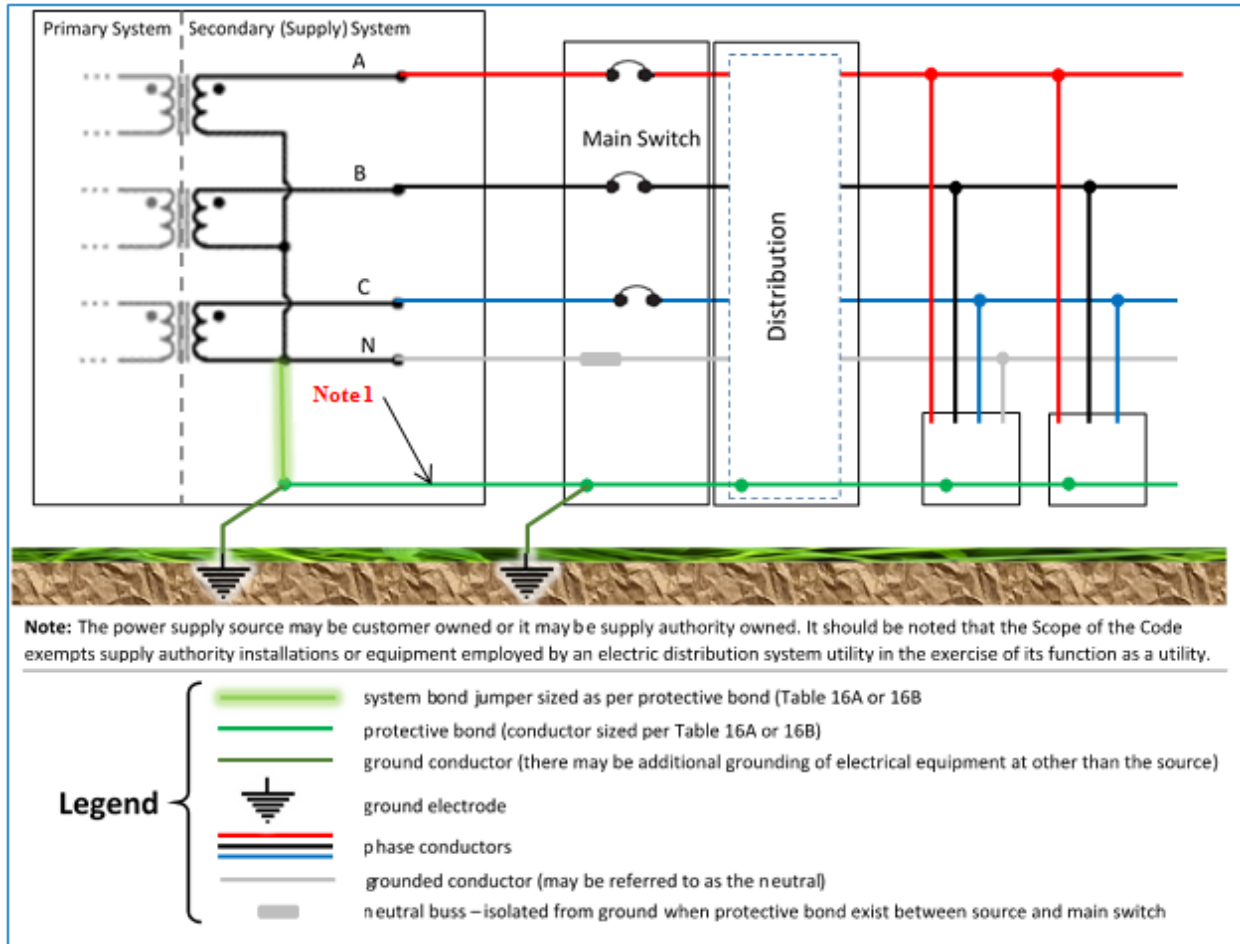
For the purposes of Rule 10-200, the term ‘objectionable flow of current’ shall be defined as “any current that flows over conductors for which they were not intended and/or designed to accommodate; such as neutral current over bonding and/or grounding conductors, neutral current over metallic piping”. Caution shall be exercised to prevent this situation from occurring.

An example of this is where the interconnection of system neutrals and the bonding of metallic objects creates a path by which, all of or part of, the neutral current can flow through the bonding and/or grounding conductors.

## Method for Grounding & Bonding

Electrical Inspections has become aware of some unsafe conditions due to parallel neutral current return paths. In an effort to minimize this potential hazard, Inspections will now require the following methods of grounding and bonding for low voltage services (not exceeding 750V).

Note: Buildings housing livestock are mandated to have a bonding conductor to be run with the feeder conductors as well as a recommended grounding electrode at the building as per Figure 1.



Note 1 - Consumer owned transformer is grounded in accordance with Section 10 and the protective bond is sized to Table 16A and is carried with the main conductors beyond this point. This is because there will be known primary protection installed on this installation.

All other equipment grounding is for the purpose of establishing an equipotential plane.

**Figure 1**



The service point of connection may be at the meter socket, (overhead or underground services), utility transformer or the customer owned splitter.

**Note 1 - The protective bond on the line side of the consumer overcurrent protection shall be sized as per Table 16A.**

- Where multiple conductors are used, the protective bond conductors shall be paralleled as well.

**Figure 2**

### **10-204(2) - Grounding Connections for AC Systems**

For solidly grounded systems, the system grounded circuit conductor/neutral shall be installed from the system to the main service, whether neutral loads are being served or not. This conductor, when neutral loads are not being served, shall be sized as per Rule 10-814.

If a neutral is not required or utilized, the bond or bare conductor incorporated in the cable may be acceptable as the system grounded circuit conductor on the line side of the service.

#### **Connecting NGR Equipment to the Utility Transformer**

When an NGR is installed on the service, the neutral conductor should not be brought into the main switchgear, unless otherwise required for metering purposes, or to service line to neutral loads.

NGR systems are not solidly grounded systems. The conductor from the transformer to the NGR must take the most direct route and is not required to enter the main service disconnect. Rule 10-

1108 provides a number of conditions that must be met with regards to this conductor:

- be installed in an approved manner;
- not be grounded; and
- have an ampacity rating equal to or greater than the rating of the neutral grounding device but not smaller than No. 8 AWG.

### **10-204 & 10-206 - Grounding Connections for AC Systems**

The Xo point of many transformers are being installed without a connection to the transformer enclosure. The Xo shall be grounded as per Rule 10-106 and the grounding conductor shall be sized as per Rule 10-812. The connection between the Xo and the enclosure shall be electrically continuous to provide a fault current return path to the Xo of the transformer secondary. This conductor or busbar shall be sized as per Table 16A for conductors or 16B for busbars.

### **10-208(1)(b) - Grounding Connections for Two or More Buildings or Structures Supplied from a Single Service**

#### **Buildings Housing Livestock**

- The non-current-carrying metal parts of the electrical equipment in or on the building or structure shall be bonded to ground by a bonding conductor run with the feeder or branch circuit conductors. If USEB is used, the concentric neutral shall be taped to isolate it from the cabinet and the bonding conductor. **The bond screw in the panel must be removed.**
- To create an equal potential plane at the building, a grounding electrode should be installed and connected to the panel bonding system. **The neutral shall remain isolated.**

### **10-402(4) - Fixed Equipment Specific (Watering Bowls)**

The area around buildings housing livestock and livestock watering bowls is considered to be a corrosive environment and aluminum wiring shall not be allowed.

### **10-406(4) - Replacement of Furnaces**

When a furnace or similar piece of equipment is being replaced, the Electrical Contractor is responsible for bonding the gas line as required by the Canadian Electrical Code. The branch circuit cable, providing it has an internal bond conductor and the low voltage thermostat cable, does not require replacement. Also see Section 26, Rule 26-806(1)(5)(6)(7), page [78](#).

**Caution: Some new furnaces require 20 amp circuits.**

### **10-604 & 10-606 - Assuring Continuity at Service Equipment**

The requirements for bonding are more restrictive at services than downstream from the main disconnect. Service equipment and enclosures may be called upon to carry heavy fault currents in the event of a line-to-ground fault. The service conductors in these enclosures have only short circuit protection provided by the overcurrent device on the line side of the utility transformer. While there are various options available to assure the continuity of service equipment and enclosures, the use of a **Bonding Bushing** is the **only** acceptable method to ensure the bonding of

metal conduits or the metal armour of cables that use locknuts as a method of attachment to an enclosure. It is important to recognize that concentric or eccentric knockouts in enclosures such as panelboards have never been investigated for their ability to carry fault current.

### **10-624(4) - Bonding Splitters to Ground**

All weatherproof splitters must be bonded. This may be achieved by bonding the enclosure to the neutral when on the line side of the service disconnect. When the splitter or junction box is on the branch circuit side, the enclosure shall be bonded with a bond conductor or a metallic raceway.

### **10-700 - Grounding Electrodes**

One ground plate, two ground rods or a field assembled electrode are required for:

- a temporary service;
- bus shelter;
- phone booth;
- cable television distribution equipment;
- signs; or
- other similar installations: and
- row housing such as semi-detached, duplex, triplex or fourplex;
- additional services on farms;
- acreages; or
- single family dwellings.

**Be aware of 10-200 and the new grounding drawings Figure 1 & Figure 2**

### **10-706 - Lightning Protection**

Recommended practices for the installation of a lightning protection system, including lightning rods, interconnecting conductors and ground electrodes, are given in CAN/CSA-B72. Other national and international industry-recognized standards on lightning protection may also be available. Also as per Rule 12-016 where lightning down conductors are installed, electrical wiring shall, where practicable, be kept at least 2 m from such conductors, except where bonding is provided in accordance with Rule 10-702.

**Note:** Lightning protection system installations are to be installed by a licensed contractor and require an electrical permit.

### **10-802 - Material For Grounding Conductors**

10-802(2) – Bare aluminum shall not be installed in corrosive locations such as direct earth burial or masonry.

### **10-1102(2) - Use of Neutral Grounding Devices**

Ground fault indication activated by a ground fault detection shall be labeled and visible to persons monitoring the status of the system regardless of other monitoring systems being implemented.

**10-1102 - [Appendix B note and also Rule 10-106(2)]**

These Rules speak to ungrounded systems and impedance grounded systems. Our department has become aware that, oftentimes, the grounding electrodes of the system supply and the facility are not being connected (bonded together). It is felt that, unless there are extenuating circumstances in play, these electrodes should always be bonded together. The reasoning is that, without this connection, unsafe conditions can be present. These unsafe conditions are concerns over dangerous 'touch' and 'step' potentials and also the inability of the detection devices to function as designed. In the 'ungrounded' scenario, the fault detection device would not sense a fault at the source. With respect to an 'impedance grounded system', the fault at the source would not flow through the impedance device, thereby not allowing the detective devices of the impedance grounding device to recognize the fault and perform alerting functions.

An example of 'an extenuating circumstance' is where the Utility is not mandated by the Canadian Electrical Code to provide a conductor for the purposes of this interconnection. We would still suggest that this connection be provided, by others, to mitigate the unsafe conditions described above.

As always, should anyone have questions or concerns, contact the Electrical Inspections Department.

**10-1108 - Conductors Used with Neutral Grounding Devices**

The conductor connecting the neutral grounding device to the neutral point of the transformer, generator or grounding transformer shall meet the requirements of Rule 10-1108 and should not be installed to the main switchgear, unless otherwise required for metering purposes or to facilitate neutral loads as per subrule (4).

NGR systems are not solidly grounded systems. The conductor from the transformer/source to the NGR must take the most direct route and is not required to enter the main service disconnect. Rule 10-1108 provides a number of conditions that must be met with regard to this conductor.

The addition of subrule (5) mandates that the path from the neutral point through the neutral grounding device to the system grounding electrode shall be continuous.

**SECTION 12 - WIRING METHODS****12-010(3) - Wiring in Ducts and Plenums**

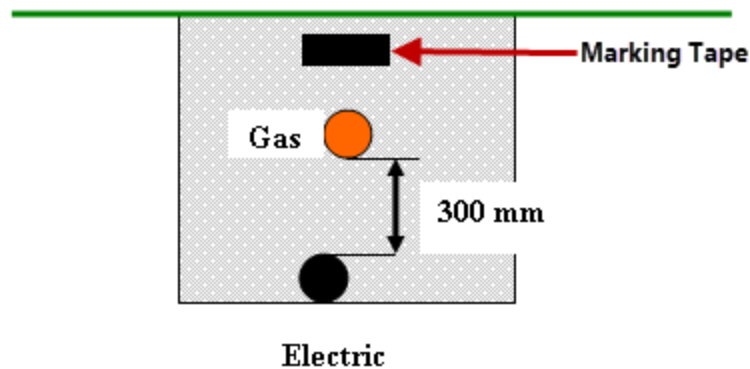
When a ceiling space such as a truss floor system is used as a return air space, the wiring in this space must be FT-4 rated; i.e. Armoured cable.

### **12-012 - Burial of Conductors in Proximity to Gas Lines**

Electrical wiring shall not be installed within 600 mm of a utility natural gas line.

Electrical wiring may be installed in the same trench as customer-owned propane or natural gas lines provided the conductors are placed at a greater depth and a separation of at least 300 mm of earth or 150 mm if a treated plank is installed between the piping and conductor.

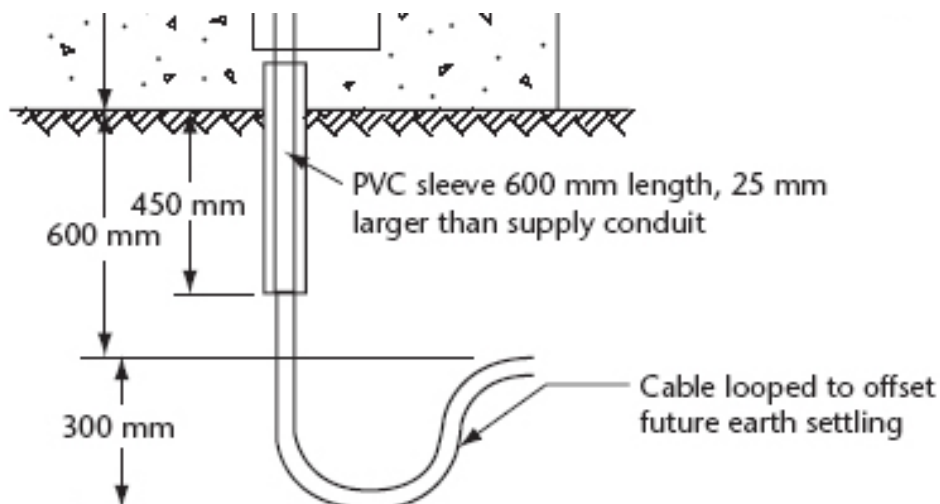
Customer owned propane or natural gas lines refers to customer lines supplying customer premises. Customer owned propane or natural gas lines are to be buried at a minimum of 381 mm (15 in.) and, if subject to vehicular traffic, a minimum of 600 mm.



### **12-012(11)(12) - Frost Sleeves and Marking Tape**

All underground raceways or cables subject to movement require provisions to be made to prevent damage to the conductors or the electrical equipment. The intent of this rule is to avoid damage to the raceway or cable (during settlement/frost).

Underground installations must have a suitable marking tape buried halfway between the cable and grade level and the tape must extend the entire length of the trench.



## **12-120 - Supporting of Cables**

### **12-120(1) - Horizontal**

Permanently installed cables and conduits supplying motors, pumps, pressure switches or any other electrical equipment shall be supported as required by Section 12. Cables and conduits where exposed and subject to damage must be supported off of the ground by an approved method such as cable tray, strut, etc. Cables must be supported within 300 mm of any junction box (**this includes oil wells**). When installing cables, you must ensure that there is no stress on the connectors from the weight of the cable.

### **12-120(2)(4) - Vertical**

Vertical runs of armoured or sheathed cable such as TECK90, RA90, RC90, AC90 and ACWU90 shall have the internal cable assembly supported at intervals not exceeding those specified in Table 21 or by:

- incorporating a bend or bends equivalent to a total of not less than 90 degrees at intervals not exceeding the distances specified in Table 21;
- installation of a horizontal run of the cable not less than the length of the vertical run; or
- use of cable that is specifically designed for vertical runs.

The design and construction of cable types such as TECK90, RA90, RC90, AC90 and ACWU90 do not provide internal support between the sheath or armour and internal cable assembly. Horizontal runs of TECK90, RA90, RC90, AC90 and ACWU90 that equal or exceed the vertical length or that incorporate a bend or bends equivalent to a total of not less than 90 degrees reduces the strain on conductor terminations.

## **12-510 - Running of Cable Between Boxes & Fittings**

The use of cable ties shall be of the specific type approved for the purpose.

<b><u>Type 1 and Type 11*</u></b>	Approved type of cable tie but not specifically approved to provide primary support for a flexible conduit, flexible tubing, or cable in accordance with the Code. Examples of uses: in approved equipment; to bundle wires for circuit identification or to maintain critical spacing in cabinets, or to otherwise provide supplemental means for routing wires, flexible conduits, flexible tubing or cables.
<b><u>Type 2 or Type 21*</u></b>	Approved type of cable tie but not specifically approved to provide primary support for a flexible conduit, flexible tubing, or cable in accordance with the Code. Examples of uses: in approved equipment; to bundle wires for circuit identification or to maintain critical spacing in cabinets, or to otherwise provide supplemental means for routing wires, flexible conduits, flexible tubing or cables.

<b><u>Type 2 also identified as AH-2</u></b>	Approved type of cable tie but not specifically approved to provide primary support for a flexible conduit, flexible tubing, or cable in accordance with the Code. Examples of uses: in approved equipment; to bundle wires for circuit identification or to maintain critical spacing in cabinets, or to otherwise provide supplemental means for routing wires, flexible conduits, flexible tubing or cables, and suitable for use in air-handling spaces (plenums) in accordance with Rules 12-010 (3), (4), and (5), and 12-020.
<b><u>Type 2S or Type 21S†</u></b>	Specifically approved to provide primary support for a flexible conduit, flexible tubing, or cable in accordance with the Code.
<b><u>Type 2S or Type 21S† also identified as AH-2</u></b>	Specifically approved to provide primary support for a flexible conduit, flexible tubing, or cable in accordance with the Code, and suitable for use in air-handling spaces (plenums) in accordance with Rules 12-010 (3), (4), (5), and 12-020.
<b><u>Note:</u></b> <b><u>* For the purpose of this Code, Type 1 is identical to Type 11, and Type 2 is identical to Type 21,</u></b> <b><u>† For the purpose of this Code, Type 2S is identical to Type 21S</u></b>	

### **12-610 - Terminating Armoured Cable**

ACWU or other metallic armoured cables without an inner protective jacket shall incorporate an anti-short or other approved protective devices.

### **12-910(4) - Conductors in Conduit and Tubing**

Table 6 was revised to Tables 6A to 6K to cover the maximum number of stranded conductors of one size in conduit and tubing. New Tables were added to correspond with the different stranded conductor insulation types and sizes given in Tables 10A and 10B.

Tables 9A to 9J covering the diameter and cross-sectional area of conduit and tubing were added and revised to correspond with the dimensions required from each Standard for the specific type of conduit and tubing.

Table 10C was added to give the dimensions of solid conductors.

Calculating fill utilizing values from Tables 9A to 9J and Table 10C will give the maximum results for fill using solid conductors. See charts below as examples.

**Notes** - These are for 600V unjacketed wires as listed in column 1

## 12-910 - Tables

**RW90XLPE 600 volt**

Raceway size	Raceway type											
	Table 6A (stranded conductor)			Rigid metallic conduit (T-9A)			Flexible metal conduit (T-9B)			Rigid PVC conduit (T-9C)		
	16 mm	21 mm	27 mm	16 mm	21 mm	27 mm	16 mm	21 mm	27 mm	16 mm	21 mm	27 mm
#14 awg	5	11	21	10*	18*	29*	10*	17*	26*	8*	15*	26*
#12 awg	3	9	16	8*	14*	22*	7*	13*	20*	6*	12*	20*
#10 awg	2	6	12	6*	10*	17*	5*	10*	15*	5*	9*	15*
#8 awg	1	3	6	2	5	8	2	4	7	2	4	7
#6 awg	1	2	5	2	3	6	2	3	5	1	3	5

Raceway size	Raceway type											
	Metallic liquid-tight flexible conduit (T-9G)			Non-metallic Liquid-tight flexible conduit (T-9H)			Electrical metallic tubing (T-9I)			Electrical non-metallic tubing (T-9J)		
	16 mm	21 mm	27 mm	16 mm	21 mm	27 mm	16 mm	21 mm	27 mm	16 mm	21 mm	27 mm
#14 awg	10*	17*	28*	9*	16*	27*	9*	16*	27*	8*	15*	25*
#12 awg	7*	13*	21*	7*	13*	21*	7*	13*	21*	6*	12*	20*
#10 awg	5*	10*	16*	5*	9*	15*	5*	9*	16*	5*	9*	15*
#8 awg	2	4	7	2	4	7	2	4	7	2	4	7
#6 awg	2	3	5	1	3	5	1	3	5	1	3	5

See 12-910 \*Solid conductors

**T90 NYLON**

Raceway size	Raceway type											
	Table 6K (stranded conductor)			Rigid metallic conduit (T-9A)			Flexible metal conduit (T-9B)			Rigid PVC conduit (T-9C)		
	16 mm	21 mm	27 mm	16 mm	21 mm	27 mm	16 mm	21 mm	27 mm	16 mm	21 mm	27 mm
#14 awg	7	16	30	15*	26*	43*	15*	25*	38*	12*	23*	38*
#12 awg	5	12	22	11*	19*	32*	11*	18*	28*	9*	17*	28*
#10 awg	3	7	14	7*	12*	20*	6*	11*	17*	5*	10*	17*
#8 awg	1	4	8	3	6	9	3	5	8	2	5	8
#6 awg	1	3	5	2	4	7	2	4	6	2	3	6

Raceway size	Raceway type											
	Metallic liquid-tight flexible conduit (T-9G)			Non-metallic Liquid-tight flexible conduit (T-9H)			Electrical metallic tubing (T-9I)			Electrical non-metallic tubing (T-9J)		
	16 mm	21 mm	27 mm	16 mm	21 mm	27 mm	16 mm	21 mm	27 mm	16 mm	21 mm	27 mm
#14 awg	14*	25*	41*	14*	24*	40*	14*	25*	41*	12*	23*	38*
#12 awg	10*	19*	30*	10*	18*	29*	10*	18*	30*	9*	16*	28*
#10 awg	6*	11*	19*	6*	11*	18*	6*	11*	18*	5*	10*	17*
#8 awg	3	5	9	3	5	8	3	5	9	2	5	8
#6 awg	2	4	6	2	4	6	2	4	6	2	3	6

See 12-910 \*Solid conductors

### **12-1118 - Expansion of Rigid PVC Conduit**

PVC conduit shall be installed as per manufacturer's specifications and the CEC. For example, assuming a temperature change of 70 degrees C, this would mean a minimum of one expansion joint or more may be required depending on the maximum range of the expansion joint. See Rule 12-1012 and Appendix B.

#### **Rules 12-1012, 12-1118, 12-1214 and Appendix B notes**

Conduits shall be installed as per manufacture's specifications and the CEC. The formula to determine if excessive expansion requires mitigation is as follows:

$E_T = L_R T_C C_E$  Where:  $E_T$  is the total expansion in mm.  
 $L_R$  is the length of the run in meters  
 $T_C$  is the temperature change in  $^{\circ}C$ , and  
 $C_E$  is the coefficient of linear expansion as per the Table in Appendix B note to Rule 10-1012

We want to find the total expansion of the length of the run to determine if we have expansion concerns.

#### **Example:**

For a 20m run of rigid PVC conduit when the minimum expected temperature is  $-40^{\circ}C$  and the maximum expected temperature is  $30^{\circ}C$  the total expansion is:

$E_T = 20m \times (40 + 30) \times 0.520 = 73mm$ . So, as per the Rules, this exceeds the maximum allowed of 45mm. Therefore, depending on the travel of the expansion joint, one or more would be required.

### **12-1404 - Restrictions on Use of EMT**

EMT shall not be used in car wash bay area's due to salt and chemical contaminants. [See also [22-200\(1\)](#)]

### **12-1414 - Provision for Bonding Continuity**

Bonding conductors are required for EMT installations in the following uses:

- (a) concrete or masonry slabs in contact with the earth;
- (b) a wet location; or
- (c) outdoor locations.

### **12-2200 - Clearance for the Installation of Cable Tray**

12-2200(6) - Cable trays require 600 mm horizontal clearance **on one** side of cable trays mounted adjacent to one another, or to walls or other obstructions where the width of the cable tray installation does not exceed 1 m. Where the width of the cable tray installation exceeds 1 m, 600 mm horizontal clearance is required **on each** side of the tray.

12-2200(7) - Cable trays shall be permitted to have reduced clearances through chases, under grating, under process pipes, and other such obstructions.

12-2200(8) - At least one expansion joint shall be installed in any cable tray run where the expansion of the cable tray, due to the maximum probable temperature change during and after installation, can damage the cable tray as per the manufacturer's instructions.

### **12-2202 & 36-100(3) - Conductors of Different Voltages in Cable Tray**

The requirements for the installation of Teck cable and tray cable of different voltages that run adjacent to each other in cable trays are as follows:

1. A barrier **is not required** to separate **Teck** cable or armored cable of different voltages that are installed in the same cable tray.
2. A barrier **is only required** when **tray** cables type TC of different voltages are installed in the same cable tray, if the voltage in one or more cables exceed 750 volts.

### **12-2208(3) - Provisions for Bonding**

Where Non-Jacketed interlocking metal armour/continuous metal sheath cable is installed in cable tray, bonding is not required for the tray as long as it is labelled "INTERLOCKING METAL ARMOUR OR CONTINUOUS METAL SHEATH CABLES ONLY" every 10M or less.

Metal cable tray must be bonded to ground when containing only PVC or similar jacketed armoured cables i.e. Teck or ACWU cable.

### **12-2250 - Cable Bus**

Cable bus is a self-contained engineered system incorporating a special tray, cables, cable supports and cover. Rules apply only to the installation of cable bus as a *complete system approved for the purpose*.

A complete set of engineering and installation drawings must be submitted to the Electrical Inspections Department.

### **12-3000(2)(3) - Continuity of Cables and Conduits Entering Non-Metallic Boxes**

Entry of metallic conduit or cables into non-conductive junction boxes, i.e. fiberglass or PVC, requires bonding bushings and all bushings must be bonded together. Metallic fittings used in a non-;

Where a pendant ceiling fan and all possible accessories weigh less than 16 kg and are intended to be supported on an outlet box, the outlet box shall be **approved and marked for fan support** and:

- a. securely attached directly to the building structure; or
- b. attached by a bar hanger securely attached directly to the building structure.

Pendant ceiling fan and all possible accessories weighing 16 kg or more shall be supported independent of the outlet box.

**12-3000(10) & 12-3002(2)** - Floor boxes shall be installed in accordance with the manufacturer's installation instructions for the type of floor intended. Flush mounted floor box covers shall be specifically approved for the type of floor intended.

## **SECTION 14 - PROTECTION AND CONTROL**

### **14-100(g) - Loading Cables**

Caution must be taken to prevent overloading of cables which do not have customer protection on the supply side. Example - on a farm service center, where the feeder cable terminates in an exterior splitter for the purpose of supplying more than one service, the total amperage of all main breakers may not exceed the ampacity of the feeder cable.

### **14-104(1) - Adjustable Main Breakers**

- a) Ensure the trip settings for the adjustable overcurrent protection device are **documented and on-site for the inspection**;
- b) A lamacoid plate with the overcurrent setting displayed on the main breaker is required; and
- c) Feeder markings may be required.

### **14-104(2) - Rating of Overcurrent Devices**

- 1. The rating or setting of overcurrent devices shall not exceed the allowable ampacity of the conductors they protect; and
- 2. Except as provided by other sections of the Code, the rating of overcurrent protection shall not exceed:
  - a. 15 A for No. 14 AWG copper conductors;
  - b. 20 A for No. 12 AWG copper conductors;
  - c. 30 A for No. 10 AWG copper conductors;
  - d. 15 A for No. 12 AWG aluminum conductors; and
  - e. 25 A for No. 10 AWG aluminum conductors.

## **SECTION 16 - CLASS 1 AND CLASS 2 CIRCUITS**

### **16-008 - Hazardous Locations**

Extra low-voltage power circuits installed in hazardous locations on oil field sites (i.e. Solar and 12 volt equipment) must be installed in accordance with the applicable rules of Section 18.

## SECTION 18 - HAZARDOUS LOCATIONS

### 18-006 - Ammonia Compressor Rooms

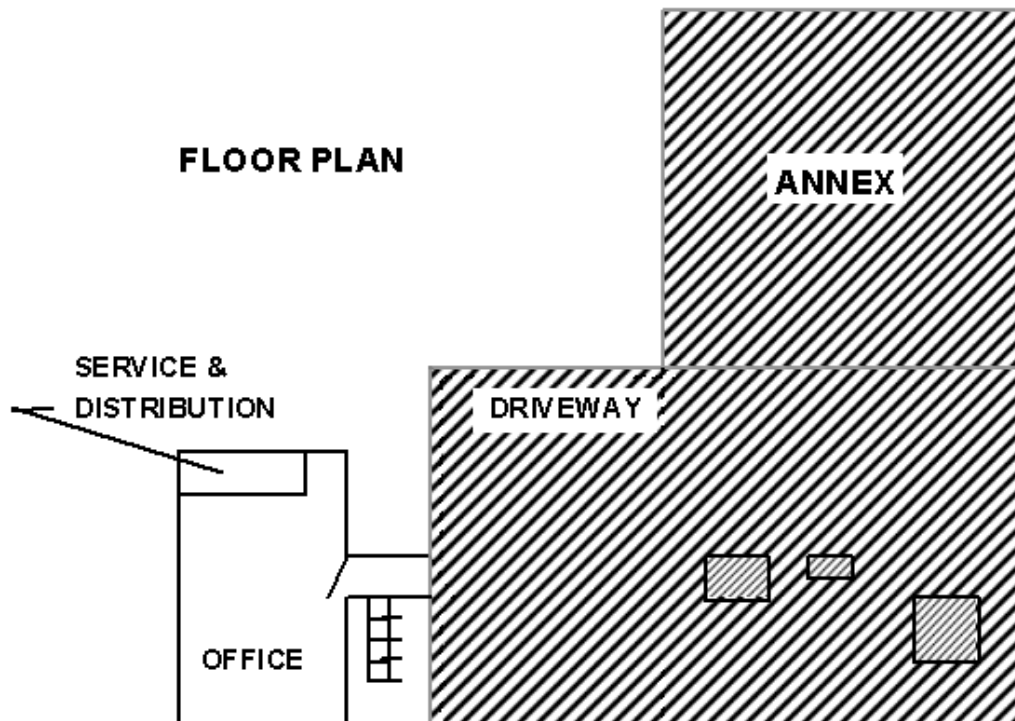
When ammonia is used in a refrigerant system, the room shall be considered a Zone 2 hazardous location unless the room is constructed to a Class T machinery room as specified in the CSA standard B52-95 Mechanical Refrigeration Code.

### 18-008 - Locations Containing an Explosive Dust Atmosphere

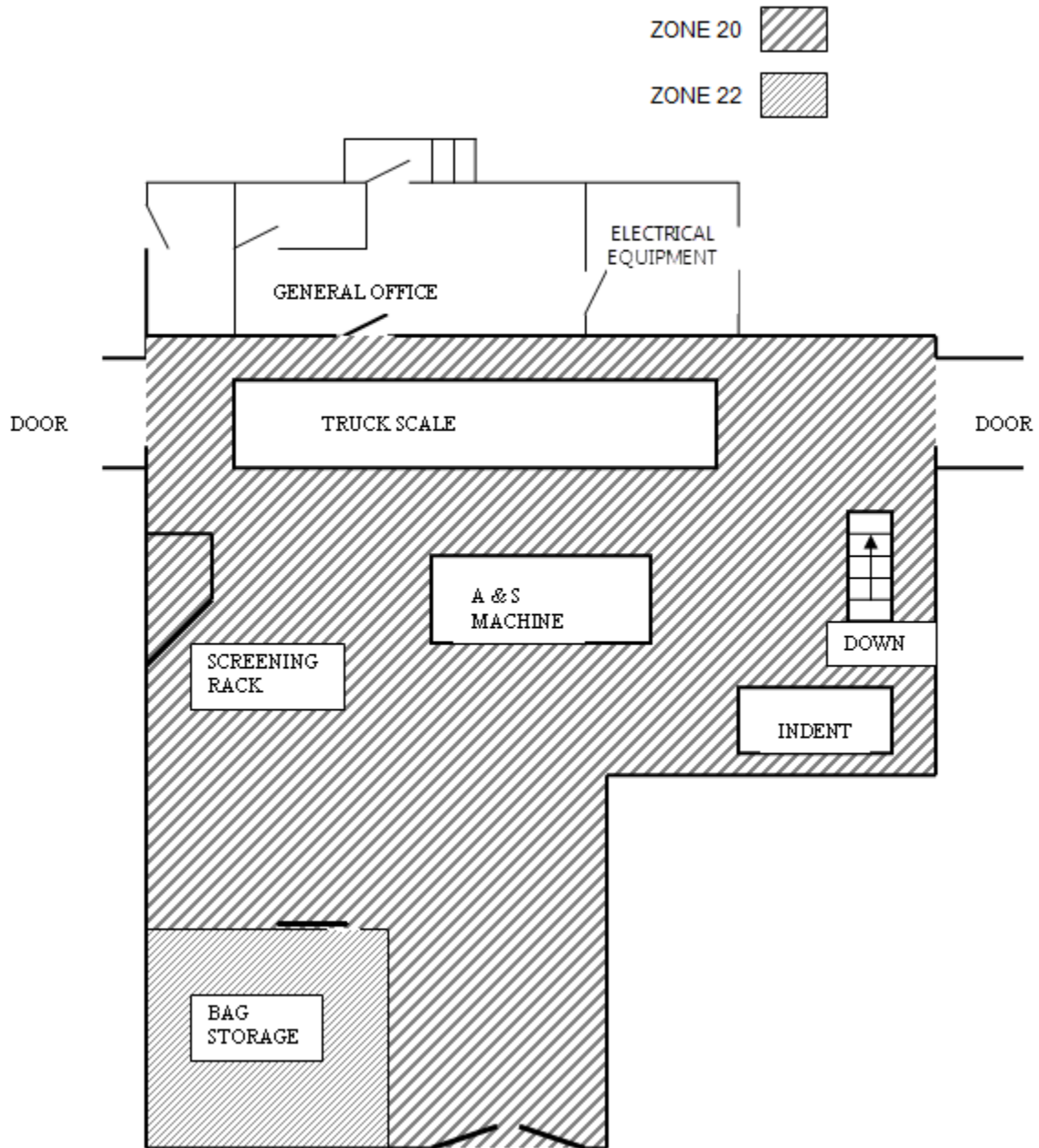
All grain handling systems are classified Zone 20 locations, with the exception of areas re-classified by a Professional Engineer.

### 18-008 - Hazardous Area Classification - Grain Elevator

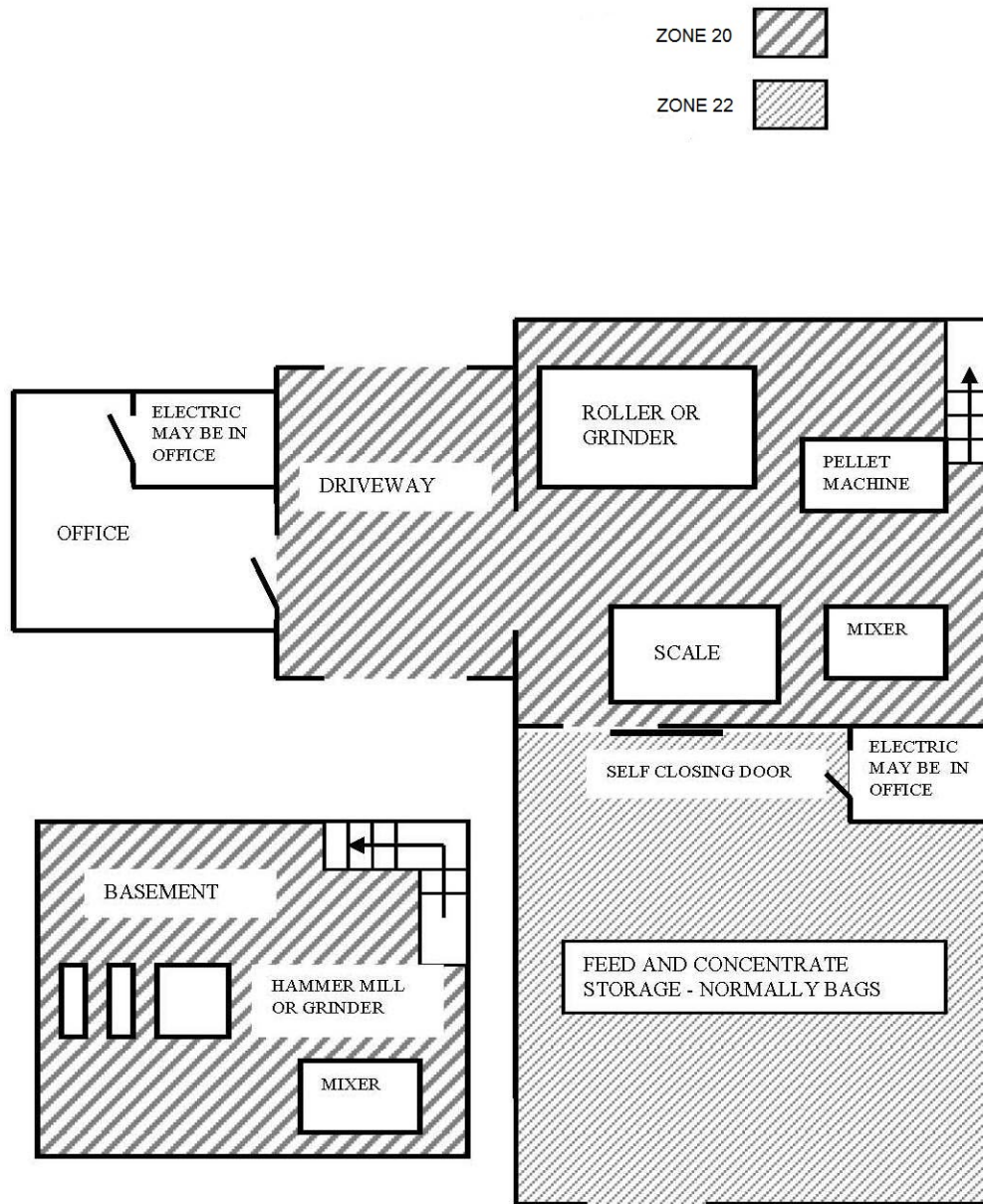
Zone 20



**18-008 - Hazardous Area Classification - Main Floor Plan - Seed Cleaning Plant**



**18-008 - Hazardous Area Classification - Feed Mill Floor Plan**



### **18-008 - Bio Diesel and Canola Crushing Plants**

Recently, there has been an increased interest in the development of bio diesel facilities throughout the province. SaskPower Inspections wants to inform all Electrical Contractors of items that may affect an installation.

These facilities must be classified by an Electrical Engineering firm to the proper classification of the Canadian Electrical Code. Plans must be submitted to [Electrical Inspections Plans review](#).

As per Rule 18-008 of the CEC, Canola crushing is a Zone 20 location unless engineered otherwise, and all wiring must meet the minimum Canadian Electrical Code requirements for the installation. Canola storage and product transferring would fall under the same area classification.

In the process of creating bio diesel, an additive must be added. If that product is methanol or another volatile additive, a hazard arises. The process must now meet the intent of Rule 18-006 classification; the area classification is either Zone 0, 1 or 2 depending on the engineering area classification. Storage of methanol is under the same area classification. Bio diesel storage is the same as regular diesel and must also meet all other provincial codes and rules.

SaskPower Inspections wants to maintain a safe installation for both the facility and its employees. All electrical work must be completed by a Saskatchewan Licensed Electrical Contractor and meet the requirements of the Canadian Electrical Code.

### **18-008 - Woodworking Plants and Sawmills**

The CEC classifies these areas as Zone 22 locations without adequate dust collection. Areas may be reclassified by a Professional Engineer. For the purposes of this rule, non-commercial residential garages and farm shops may not be considered wood working plants.

**The following will be permitted where good housekeeping habits and adequate dust collection equipment is installed:**

- a. Panel boxes, controllers, etc. shall be dust tight or in dust tight enclosures.
- b. Wall surface wiring shall be threaded rigid, EMT (with rain-tight connectors) or Teck cable with dust-tight Teck connectors.
- c. Ceiling surface wiring may be ordinary location wiring methods.
- d. Boxes shall comply with Rule 18-302(2).
- e. Concealed wiring may be type AC or NM cable.
- f. Concealed boxes and fittings may be ordinary type.
- g. Switch and receptacle covers shall be of the weatherproof type.
- h. Where duplex receptacles are used, a separate self-closing cover will be required for each section of the receptacle.
- i. General purpose fluorescent lighting fixtures may be installed:
  - i) if mounted directly on the ceiling; or
  - ii) if suspended and provided with adequate dust shields to prevent the accumulation of dust.

### **18-052 - Marking of Equipment**

CSA has adopted the IEC Standard for Equipment Protection Levels (**EPL's**) as a requirement for marking on equipment in Hazardous Locations. This marking system will now appear on new hazardous location equipment.

<b>Zone</b>	<b>Acceptable Equipment Protection Level</b>
Zone 0	Ga
Zone 1	Ga or Gb
Zone 2	Ga, Gb or Gc

<b>Zone</b>	<b>Acceptable Equipment Protection Level</b>
Zone 20	Da
Zone 21	Da or Db
Zone 22	Da, Db or Dc

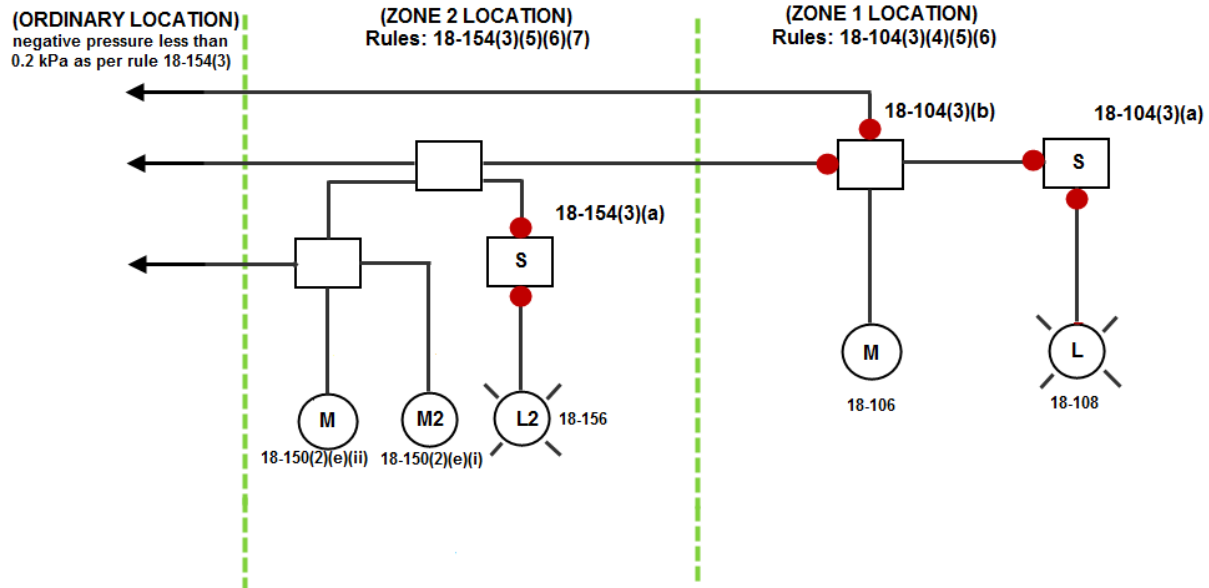
### **18-068 - Combustible gas detection**

The intent of this rule is **not** to declassify an area; it is only to be used where suitable equipment approved for the area is **not available** with proper classification for a hazardous area.

- i.e.
- General equipment to be installed in a Zone 2 location
  - Zone 2 equipment to be installed in a Zone 1 location

## 18-104 - Sealing Zone 1

### Zones 1 & 2 - CABLE Sealing Diagram (●)



Rule 18-104(4)(a) - All motors approved under the applicable Part II standards for Class 1 locations are required to have a seal provided by the manufacturer between the main motor enclosure and the connection box enclosure; therefore a seal may not be required at the connection box enclosure.

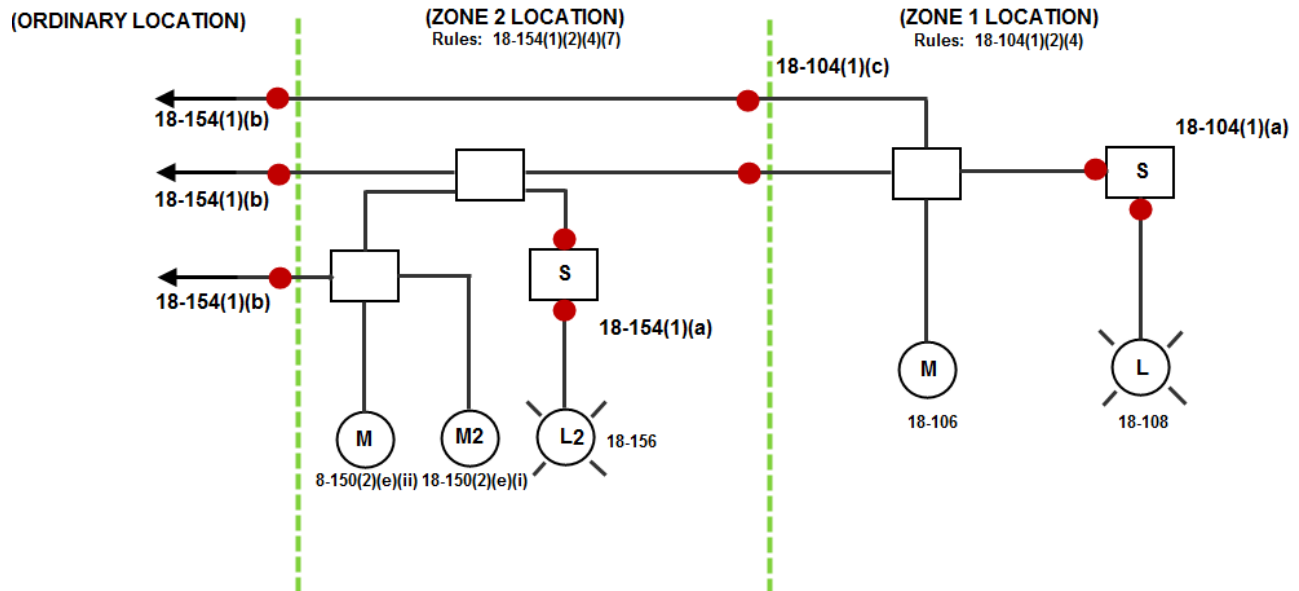
Rule 18-108 - Luminaires and portable lighting installed in a Zone 1 location shall be approved as complete assemblies in accordance with Rule 18-100. These light fixtures are also sealed by the manufacturer.

**Legend:**

- (M) = Approved explosion-proof motor (CSA C22.2 No. 145)
- (M2) = Open or non-explosion-proof motor, non arcing and sparking
- (L) = Approved explosion-proof luminaire (CSA C22.2 No. 137)
- (L2) = Luminaire protected by guards or location

[S] = Non-factory sealed switch

**Zone 1 & 2 - CONDUIT Sealing Diagram (●)**



Rule 18-104(4)(a) - All motors approved under the applicable Part II standards for Class 1 locations are required to have a seal provided by the manufacturer between the main motor enclosure and the connection box enclosure; therefore a seal may not be required at the connection box enclosure.

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(L) = Approved explosion-proof luminaire (CSA C22.2 No. 137)

(L2) = Luminaire protected by guards or location

[S] = Non-factory sealed switch

Cable Seals

A cable entering or leaving a Zone 1 location must be sealed where it first terminates in the hazardous location regardless of the type of box it enters.

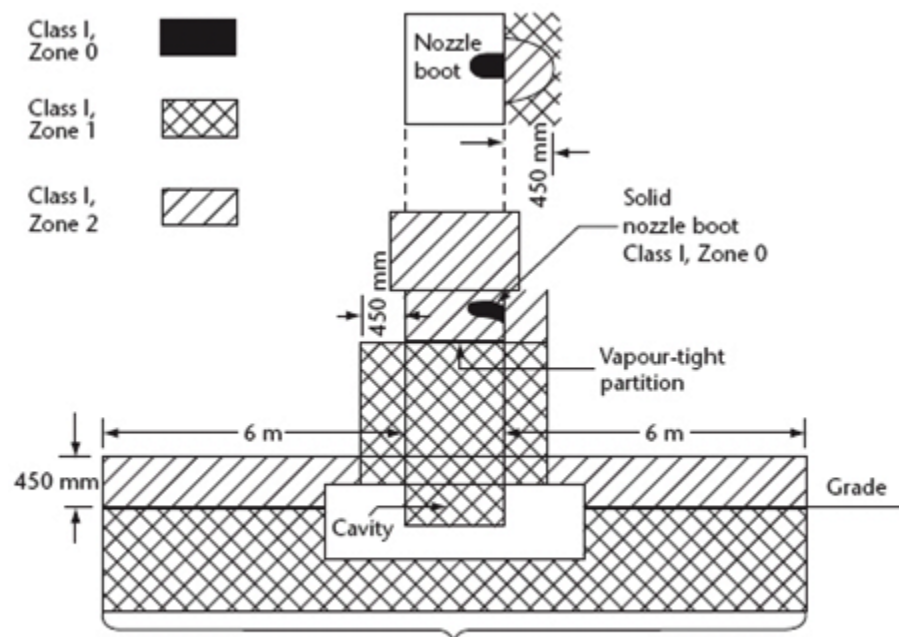
**18-154(3)(b) - Sealing Zone 2**

Cable Seals

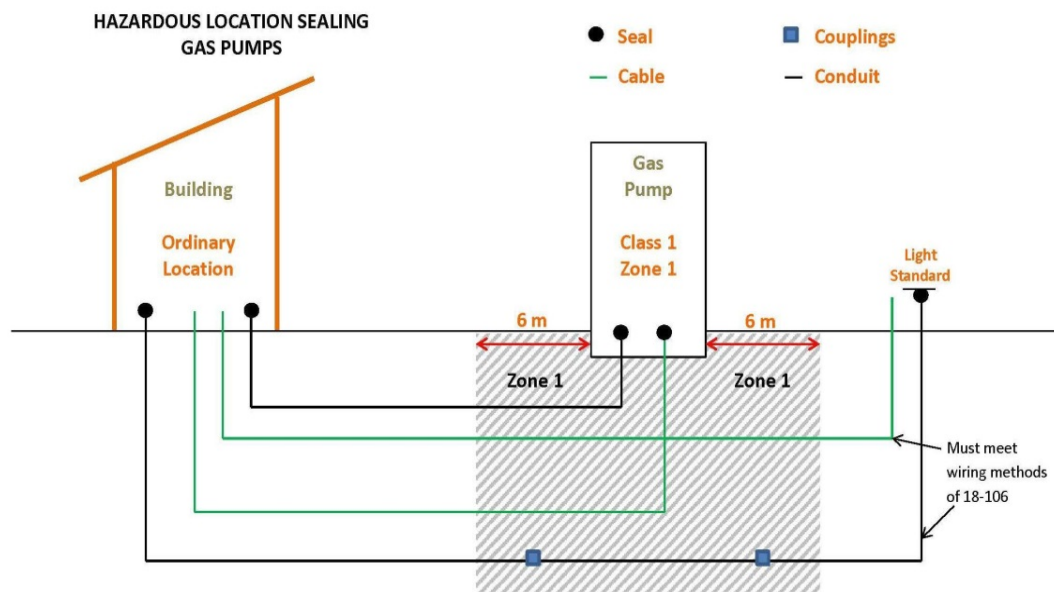
When a cable is leaving the hazardous area from a box that was not required to be explosion proof, a seal is not required regardless of the cable length, except if the cable is terminating in a non-hazardous location with a negative atmospheric pressure greater than 0.2 kPa or unless engineered otherwise.

## SECTION 20 - FLAMMABLE LIQUID AND GAS DISPENSING AND SERVICE STATIONS, GARAGES, BULK STORAGE PLANTS, FINISHING PROCESSES AND AIRCRAFT HANGARS

### 20-004 - Island Gas Pump



Any conduits leaving the hazardous area where the electrical wiring emerge from the ground shall meet the sealing requirements of Section 18 or 20



Cables and conduits that are ran through the Zone 1 area need to meet the wiring methods and sealing requirements of Section 18 whether they are associated with the pump or not.

**20-062 - Compressed Natural Gas Refueling Stations, Compressors and Storage Facilities**

Compressed natural gas refueling stations, compressors and storage facilities shall be classified as shown in Table 64.

**20-100 - Commercial Repair Garages**

Section 20 now only applies to commercial garages where vehicles powered by gasoline, propane, or other flammable fuels are serviced or repaired.

**20-102(1) - Hazardous Area Commercial Repair Garages**

All adjacent rooms not suitably cut off with a 50 mm barrier are classified as hazardous up to 50 mm above the parking floor.

**20-102(3) - Clarification of Pits or Depressions Below Floor Level**

For the purpose of Rule 20-102(3), a pit is defined as:

“Any area below grade where every day work does not take place; i.e. sump pit, etc.”

For the purpose of Rule 20-102(2), a Below Grade Room is defined as:

“Any area where daily work and storage of product takes place; i.e. vehicle service area, storage areas, etc.”

“Reclassification” of any areas with regards to ventilation must be done through a Professional Engineer, complete with stamped drawings.

**20-110(2) - Equipment Above the Hazardous Area**

This rule had called for the use of totally enclosed type light fixtures below 3.6 m in a commercial repair garage but has been relaxed to being protected from mechanical injury by a guard or by location.

**20-200 - Anhydrous Ammonia**

Anhydrous ammonia is considered to be a volatile flammable liquid and, as such, shall be wired in accordance with Rules 20-202 to 20-212, regardless of the aggregate capacity of the tank.

**20-300 - Finishing Processes**

We are starting to see the use of “water base” or “waterborne” paints in automotive and other finishing processes. While the base coat may be “water base” or “waterborne”, other components of the paint are flammable and therefore Section 20 still applies, unless it can be proven with the MSDS sheets that there are no flammable components involved.

Applies to Areas Where:

- Paints, lacquers or other flammable finishes and fiberglass processes are regularly or frequently applied by spraying, dipping, brushing or by other means;
- volatile flammable solvents or thinners are used; or
- readily ignitable deposits or residues from such paints, lacquers or finishes may occur.

**20-302 - Paint Mixing Rooms**

All paint mixing rooms are classified as Class I, Zone 1 locations unless it can be proven that all the products involved are non-flammable.

**DEFINITIONS AS PER NFPA 33**

**SPRAY AREA** - Any area in which dangerous quantities of flammable or combustible vapours, mists, residues, dusts or deposits are present due to the operation of spray processes. It can be either enclosed or unenclosed and includes:

- a. any area in the direct path of a spray application process;
- b. the interior of any exhaust plenum and any exhaust duct leading from the spray process;
- c. the interior of any limited finishing workstation, spray booth or spray room, as herein defined; and
- d. the interior of any recirculation particulate filter, solvent concentrator unit, solvent distillation (recovery) unit, or recirculation air supply unit.

**UNENCLOSED SPRAY AREA** - Any spray area that is not confined by a limited finishing workstation, spray booth or spray room, as herein defined.

**SPRAY BOOTH** - A power-ventilated enclosure for a spray application operation or process that confines and limits the escape of the material being sprayed, including vapours, mists, dusts and residues that are produced by the spraying operation and conducts or directs these material to an exhaust system.

**SPRAY ROOM** - A power-ventilated fully enclosed room used exclusively for open spraying of flammable or combustible materials.

**VENTILATION** - Movement of air that is provided for the prevention of fire and explosion. It is considered adequate if it is sufficient to prevent accumulation of significant quantities of vapour-air mixtures in concentration over one-fourth of the lower flammable limit.

**PREPARATION WORKSTATION** - An enclosed, partially enclosed, or unenclosed power-ventilated apparatus that is used to control the dusts and residues generated by surface preparation activities, such as sanding. A preparation workstation is not a limited finishing workstation, spray booth or spray room, as defined herein.

**FLUIDIZED BED** - A chamber holding powder coating material that is aerated from below to form an air-supported, expanded cloud of the powder. The object or material being coated is preheated, then immersed into the cloud.

**ELECTROSTATIC FLUIDIZED BED** - A chamber holding powder coating material that is aerated from below to form an air-supported, expanded cloud of the powder. The powder is electrically charged with a charge opposite to that of the object or material being coated.

**LIMITED FINISHING WORKSTATIONS** - An apparatus that is capable of confining the vapours, mists, residues, dusts or deposits that are generated by a spray application process and that meets the requirements of NFPA 33, but does not meet the requirements of a spray booth or spray room, as herein defined.

For more information, see NFPA 33.

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

### **22-002 - Category 1 - Greenhouses, Grow-Ops, Freezers and Walk-In Coolers**

All **greenhouses** are considered a Category 1 location. EMT with wet location fittings will be permitted. The area classification may be reduced to a standard location if ventilation and humidity controls are present.

All walk-in **freezers** are a Category 1 location. All walk-in **coolers** are standard locations.

See Rule 12-1414 provisions for bonding using EMT for Category 1 locations.

### **22-200(1) - Car Wash**

Car washes are classified as Category 1 locations. All wiring methods and equipment must be approved for wet locations.

EMT shall not be used in car wash bay areas' due to salt and chemical contaminants. (See also Rule [12-1404](#))

### **22-202 - Granular Fertilizer Storage**

All bulk granular fertilizer storage areas are subject to corrosion from a combination of the fertilizer dust and moisture. All equipment must be approved for the location in accordance with Rule 2-116.

Raceways shall be PVC, or aluminum, with fittings and enclosure entries of such design as to not constitute dissimilar metals in contact with each other, and to exclude dust.

Teck 90 cable with non-corrosive fittings shall be permitted to be installed in bulk fertilizer storage structures.

**22-204 - Buildings Housing Livestock or Poultry**

Wiring in buildings housing livestock or poultry shall be the type listed in Table 19 for Category 1 and Category 2 locations.

With adequate ventilation, wiring approved for a **damp location** as per Table 19 may be used.

**Note:** Aluminum conductors and Bx (AC 90, ACWU) cables are not approved for use in buildings housing livestock. Non-metallic sheathed cable is not approved for installation in a continuous raceway system.

Wiring Methods

[See also 10-208\(1\)\(b\)](#)

The wiring methods that are acceptable in buildings housing livestock or poultry are:

1. PVC Conduit along with PVC boxes, straps and approved expansion joints as required. Wire within the conduit must be approved for a wet location or damp location if the barn is equipped with adequate humidity control;
2. Teck 90 Cable along with approved connectors, non-corrosive boxes and straps. Note the electrical continuity of the metal armour must be maintained throughout the cable runs; or
3. Non-Metallic Sheath Cable cannot be used in any location where it may be susceptible to damage by rodents; and.
4. All screws and equipment must be of the corrosion resistant type.

Non-metallic sheath cable cannot be run inside the walls, ceiling/attics or any other concealed space in a barn, office, tack room or similar area attached to or within the barn unless provided with mechanical protection.

When non-metallic sheath cable is used and it has to pass through a location where it may be exposed to rodents, it must be provided with mechanical protection in the form of rigid steel, rigid non-metallic conduit or other suitable material when:

1. Installed in exposed locations within 300 mm above any horizontal surface; or
2. Installed in exposed locations on the sides of floor joists or other structural members less than 100 mm below the upper surface.

**NOTE:** When an office, tack room, riding arena, sales arena or similar room is attached or within the barn, the wiring methods are the same as the rest of the building. If the room is separated from the barn by vapour tight walls, ceiling, floor and a sealed door, normal equipment (i.e. panel, lighting, etc.) may be installed in the interior of this room.

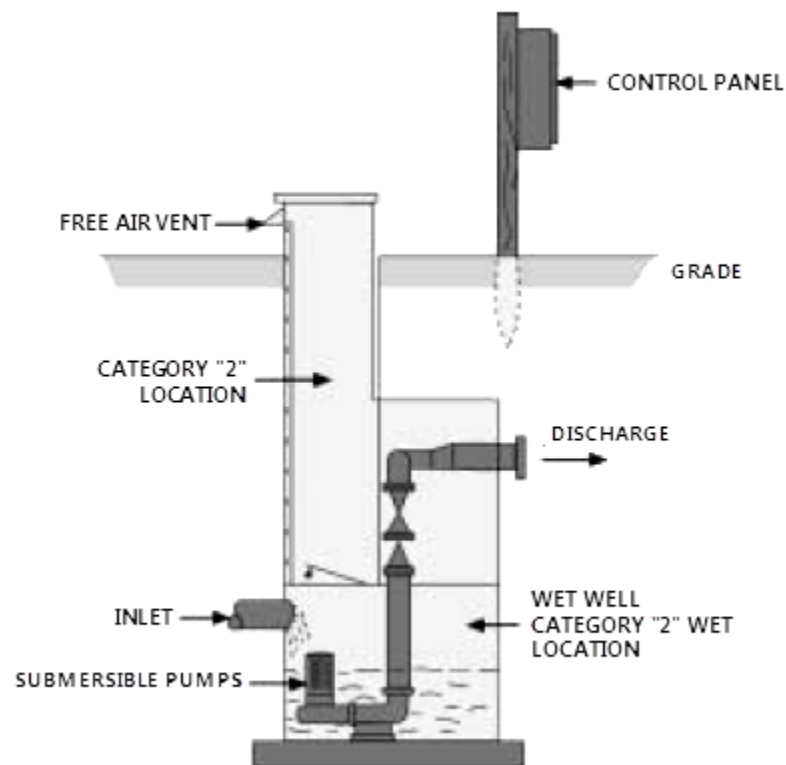
## SEWAGE LIFT AND TREATMENT PLANTS

### 22-704 - Sewage Lift - Classification of Areas

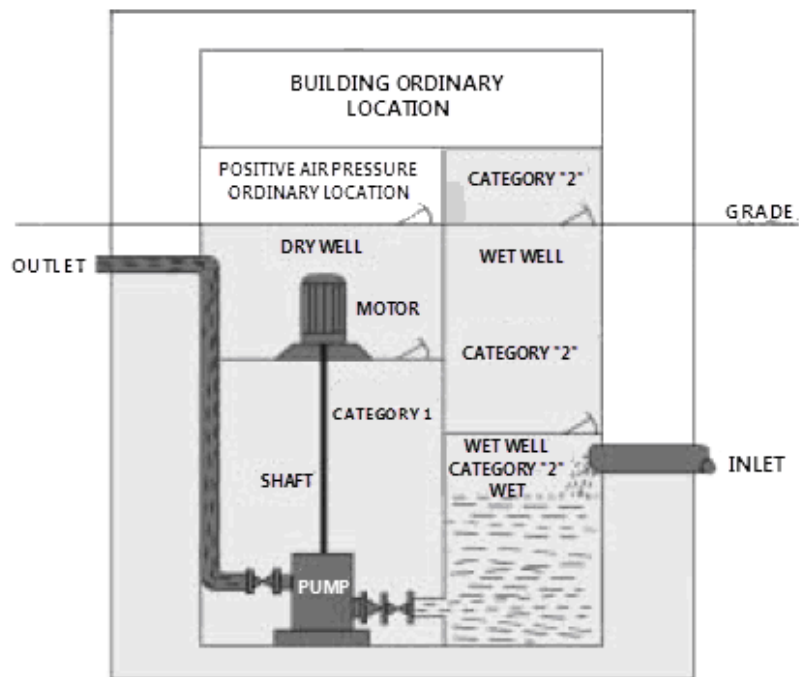
#### Sewage Lift & Handling

The following chart shows the classification of various locations in sewage lift and treatment plants		
Location	Condition	Classification
Wet Wells	With adequate continuous positive pressure ventilation	Zone 2
All below-ground location	Suitably cut off from sewage gas location	Category 1 location
All locations	Sewage gas is present in explosive concentrations	Hazardous area and Category 2 location
All locations	Suitably cut off from a Category 2 location and not classified as a Category 1 location.	Ordinary location
All locations	Not suitably cut off from a Category 2 location but with adequate continuous positive pressure ventilation.	Ordinary location
Below-ground dry well locations	With adequate heating and adequate continuous positive pressure ventilation	Ordinary location

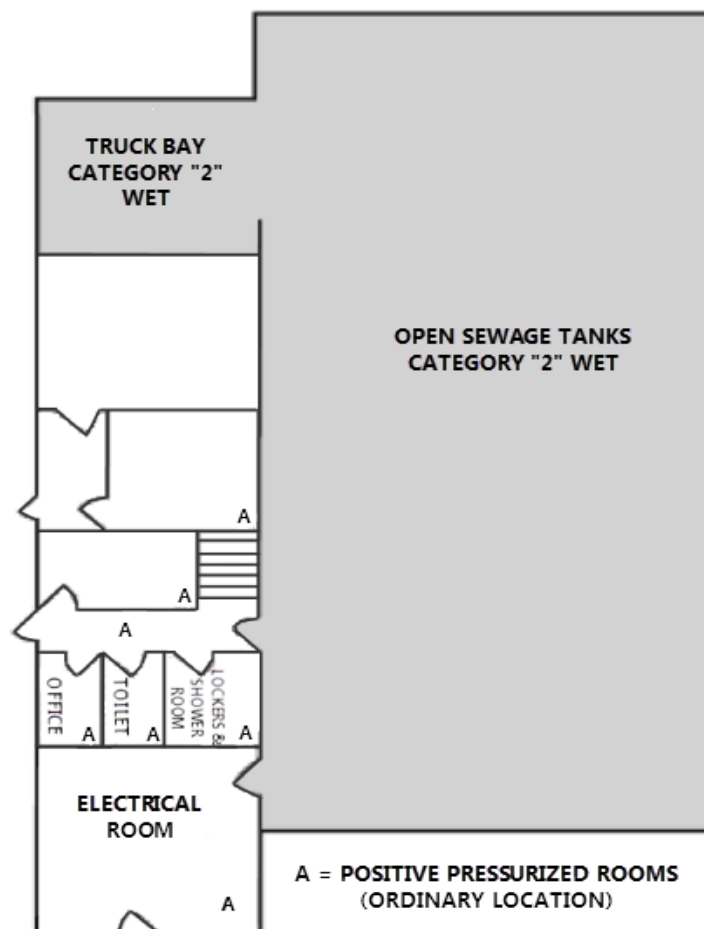
#### Typical Sewage Lift Station (self-contained)



Building - Ordinary Location



Typical Sewage Treatment Plant



## SECTION 24 - PATIENT CARE AREAS

### **Definitions - Health Care Facilities**

#### **Health Care Facility - Class A**

A hospital so designated by Canada or one of its Provinces or Territories, where patients are accommodated on the basis of medical need and are provided with continuing medical care and supporting diagnostic and therapeutic services.

**Note:** Class A Facilities include acute and complex care.

#### **Health Care Facility - Class B**

A facility where residents, as a result of physical or mental disabilities, are unable to function independently and are accommodated due to a need for daily care by health care professionals.

**Note:** Class B Facilities provide, e.g. extended, multi-level, hospice, psychiatric or intermediate care. The definition includes rehabilitation facilities.

#### **Health Care Facility - Class C**

A facility where ambulatory patients are accommodated on the basis of medical need and are provided with supportive, diagnostic and treatment services.

**Note:** Class C Facilities include, e.g. outpatient and surgical clinics, dental offices, doctors' clinics, private residences and group homes.

### **24-000 - Classification of Areas**

Patient Care Areas are defined by the CAN/CSA-Z32 standard and include, but are not limited to, walk-in medical clinics, dental clinics, chiropractic clinics, optometrists and others. The CEC definition of a health care facility was changed to recognize that more and more treatment and testing, previously done in hospitals, is now being done in these facilities. This means that the specific rooms of a clinic in which treatment is given must be wired in accordance with Section 24 methods.

The health region, clinic or hospital administrators are the personnel who will determine the area use for their facilities.

**Plans shall be submitted with indication of different patient care levels, patient care environments (basic, intermediate or critical) and branch circuit wiring details. See [Rule 2-014](#)**

**24-102(6) - Receptacles or Equipment Not Part of Essential System**

A branch circuit that supplies receptacles or permanently connected electrical equipment described in **Rule 24-302** shall not supply receptacles or permanently connected electrical equipment that are not part of the essential electrical system.

**24-104 - Bonding to Ground**

A panelboard that supplies branch circuits in a patient care environment shall have an insulated copper bond conductor installed with the circuit conductors supplying the panelboard unless incorporated in the cable assembly supplying the panel.

The minimum size equipment bonding conductor shall be sized in accordance with Table 16A, and not smaller than the minimum size required for circuit conductors. The minimum size circuit conductor shall be not smaller than No. 12 AWG.

**Examples:**

1. 40A equipment requires No. 8 AWG (45A) conductor in conduit, this would require a #10 bonding conductor to conform to Table 16A.
2. 5A equipment or a receptacle circuit would require No. 12 AWG circuit conductors and a No. 12 AWG bond conductor.

Rules 24-104(2) and 4-036 excludes the use of three wire armoured cables, other than ISO-ground cable, as the bonding conductor needs to be insulated and shall have a continuous outer finish that is either green or green with one or more yellow stripes.

Non-metallic conduit, NMD cable and armoured cables with a PVC inner jacket (Teck), provide sufficient insulation to permit the use of a bare copper bonding conductor, minimum 12 AWG.

If they could become energized, exposed non-current carrying metal parts of non-electrical equipment, in a patient care environment, shall be bonded to ground using a copper bonding conductor sized in accordance with Table 16A by connection to equipment bonding conductor or 16 B for a bonding busbar for that patient care environment.

Examples of such equipment are metal parts of medical gas equipment, support arms, consoles, etc.

**24-106(7) - Receptacles in Basic Care Areas**

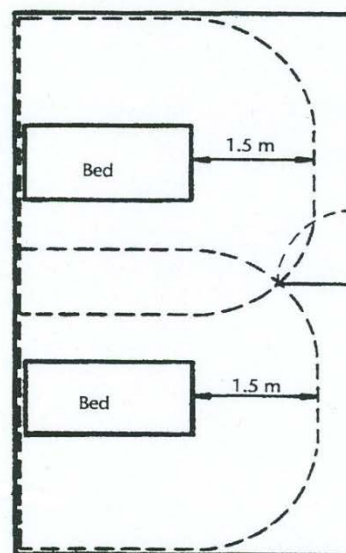
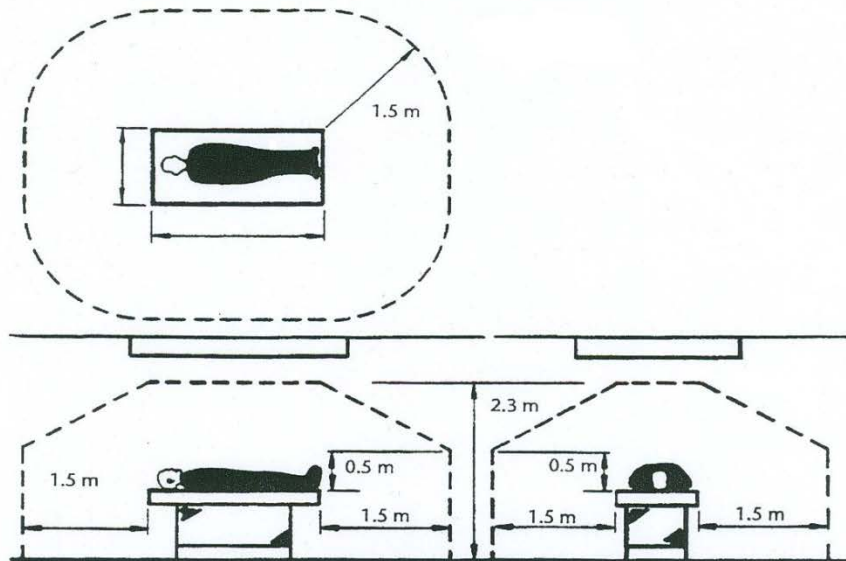
Isolated ground receptacles shall not be used in any patient care area.

**24-110 - Circuits in Intermediate and Critical Care Areas**

The requirement of 2-wire circuits (i.e. dedicated grounded circuit conductors/neutral) applies to the patient care environments within intermediate and critical care areas.

### CAN/CSA-Z32-Patient Care Environment

A zone in a patient care area that has been preselected for the accommodation of a patient bed, table or other supporting mechanism, and for the accommodation of equipment involved in patient treatment and which includes space within the room 1.5 meters beyond the perimeter of the bed in its normal location and to within 2.3 meters of the floor. The patient environment is a zone fixed to the supporting mechanism and does not move with the patient as the patient moves through the health care facilities.



**Patient Care Environment**

## SECTION 26 - INSTALLATION OF ELECTRICAL EQUIPMENT

### 26-210 - Capacitor Switching Devices

240 Volts			480 Volts			600 Volts		
Cap Rating	Amperes		Cap Rating	Amperes		kCap Rating	Amperes	
kVar	Cap Amps	Fuse PC or MC Breaker	kVar	Cap Amps	Fuse PC or MC Breaker	kVar	Cap Amps	Fuse PC or MC Breaker
2.5	6.01	15	2	2.41	15	5	4.81	15
5	12	20	5	6.01	15	10	9.62	15
7.5	18	30	7.5	9	15	15	14.4	20
10	24.1	40	10	12	20	20	19.2	30
15	36.1	50	15	18	30	25	24.1	40
30	72.2	100	20	24	40	30	28.9	40
			25	30	50	40	38.5	70
45	108	150	30	36.1	50	50	48.1	70
60	144	200						
75	180	250	40	48.1	70	60	57.8	90
90	217	300	50	60.1	90	75	72.2	100
120	289	400	60	72.2	100	80	77	125
135	325	500	75	90.2	125	100	96.2	150
			80	96.2	150	120	115	175
150	361	500	90	108	150	125	120	175
180	433	600	100	120	175	150	144	200
225	541	800	120	144	200			
240	578	800				160	154	225
270	650	1000	125	150	200	180	173	250
360	866	1200	150	180	250	200	192	300
			160	192	300	225	217	300
			180	216	300	240	231	350
			200	241	350	250	241	350
			225	271	400	300	289	400
			240	289	400			
			250	301	400	320	306	500
						360	347	500
			300	361	500	375	361	500
			320	385	600	400	385	600
			360	433	600	450	433	600
			375	451	600			
			400	481	800			
			450	541	800			

**Note – For Reference Only. Use manufacturer provided data to design installations**

### SINGLE PHASE TRANSFORMER FULL LOAD CURRENT IN AMPERES

kVA	120v	240v	480v	600v	2400v	4160v	14400v
2	16.7	8.3	4.2	3.3	0.83	0.48	0.14
3	25	12.5	6.3	5.0	1.25	0.73	0.21
5	41.7	20.8	10.4	8.3	2.08	1.2	0.35
7.5	62.5	31.3	15.6	12.5	3.13	1.8	0.52
10	83.3	41.7	20.8	16.7	4.17	2.4	0.69
15	125	62.5	31.3	25.0	6.25	3.6	1.04
20	167	83.3	41.7	33.3	8.33	4.8	1.39
25	208	104	52.1	41.7	10.4	6.0	1.74
30	250	125	62.5	50.0	12.5	7.2	2.08
37.5	313	156	78.0	62.5	15.6	9.0	2.61
50	417	208	104	83.3	20.8	12	3.47
75	625	313	156	125	31.3	18	5.21
100	833	417	208	167	41.7	24	6.94
167	1391	695	347	278	69.6	40.1	11.6
200	1667	833	417	333	83.3	48.1	13.9
250	2083	1041	520	416	104	60.1	17.4
333	2115	1387	693	555	138	80	23.1
500	4167	2083	1042	833	208	120	34.7
750	6250	3125	1563	1250	313	180	52.1
1000	8333	4167	2083	1667	417	240	69.4

$$\text{KVA} = \text{Voltage (Current)} / 1000$$

### THREE PHASE TRANSFORMER FULL LOAD CURRENT IN AMPERES

kVA	208v	240v	480v	600v	2400v	4160v	13800v	14400v
3	8.3	7.2	3.6	2.9	0.72	0.42	0.126	0.120
6	16.6	14.4	7.2	5.8	1.46	0.82	0.251	0.241
9	25	21.7	10.8	8.7	2.17	1.25	0.377	0.361
15	41.7	36.1	18.2	14.5	3.61	2.09	0.628	0.601
30	83.4	72.3	36.1	28.9	7.23	4.17	1.26	1.202
45	125	108	54.2	43.4	10.8	6.26	1.88	1.805
50	139	120	60.2	48.2	12	6.96	2.09	2
75	208	181	90.3	72.3	18.1	10.4	3.14	3.005
112.5	313	271	135	108	27.1	15.7	4.71	4.51
150	417	361	181	145	36.1	20.9	6.28	60.1
200	556	482	241	193	48.2	27.8	8.37	8.02
225	625	542	271	217	54.2	31.3	9.41	9.025
300	834	723	361	289	72.3	41.7	12.55	12.02
450	1249	1083	541	433	108	62.5	18.83	18.04
500	1390	1204	602	482	120	69.6	20.92	20.07
750	2082	1804	902	722	180	104	31.38	30.07
1000	2776	2406	1203	962	241	139	41.84	40.09
1500	4164	3608	1804	1443	361	208	62.76	60.14
2000	5552	4811	2406	1925	481	278	83.67	80.19

$$\text{KVA} = 1.73 (\text{Voltage}) (\text{Current}) / 1000$$

**26-256 - 3 Phase Dry-Core Transformers**

3 Phase Dry Core Transformers-Rule 26-256 & 26-258																					
KVA	600 Volt						208 Volt						480 Volt								
	FLA	1.25	*COND.			O.C.	FLA	125%	*COND.			O.C.	EQUIP. RATING	FLA	125%	*COND.			O.C.		
			75 °	90 °	90 °				75 °	90 °	90 °					75 °	90 °	90 °			
4.5	4.3353	5.4191	14	14	14	15	12.506	15.632	12	12	12	20	30	5.4191	6.7738	14	14	14	15		
9	8.6705	10.838	14	14	14	15	25.011	31.264	8	8	8	40	60	10.838	13.548	14	14	14	15		
15	14.451	18.064	12	12	12	20	41.685	52.106	6	6	6	60	60	18.064	22.579	10	10	10	25		
22.5	21.676	27.095	10	10	10	30	62.528	78.16	4	4	4	100	100	27.095	33.869	8	8	8	40		
30	28.902	36.127	8	8	8	40	83.37	104.21	2	3	3	125	200	36.127	45.159	8	8	8	50		
45	43.353	54.191	6	8	8	60	125.06	156.32	2/0	1/0	175	200	200	54.191	67.738	4	6	6	70		
75	72.254	90.318	3	4	4	100	208.43	260.53	300	250	300	400	400	90.318	112.9	2	3	3	125		
100	96.339	120.42	1	2	2	125	277.9	347.38	500	350	350	400	400	120.42	150.53	2/0	1/0	1/0	150		
112.5	108.38	135.48	1/0	1	1	150	312.64	390.8	600	500	400	400	400	135.48	169.35	2/0	1/0	1/0	175		
150	144.51	180.64	3/0	2/0	2/0	200	416.85	521.06	2 x 300	2 x 250	600	600	600	180.64	225.79	4/0	4/0	4/0	225		
200	192.68	240.85	250	4/0	4/0	250	555.8	694.75	2 x 500	2 x 350	700	800	800	240.85	301.06	350	300	300	350		
225	216.76	270.95	300	250	250	300	625.28	781.6	2 x 600	2 x 500	800	800	800	270.95	338.69	500	350	350	350		
300	289.02	361.27	500	400	400	400	833.7	1042.1	4 x 300	4 x 250	1100	1200	1200	361.27	451.59	2 x 4/0	2 x 4/0	2 x 4/0	500		
500	481.7	602.12	2 x 350	2 x 300	2 x 300	800	1389.5	1736.9	4 x 700	4 x 600	1800	2000	2000	602.12	752.65	2 x 500	2 x 400	2 x 400	800		
750	722.54	903.18	3 x 350	3 x 300	3 x 300	1000	2084.3	2605.3	6 x 700	6 x 600	2700	3000	3000	903.18	1129	4 x 300	4 x 250	4 x 250	1200		
600 Volt														208 Volt						480 Volt	

\* All conductors are copper.

Amperes = ( KVA x 1000 ) / ( Volts x 1.73 )

**26-402 - Location of Panelboards**

In a retrofit where an existing service is upgraded at the same location, the new panel need not be lowered. If the location is otherwise undesirable, reference 6-206(1)(c), the new panel shall be made to comply with the current CEC and not located in an **insulated** exterior wall.

In all new installations in dwelling units, with the exception of the main breaker or disconnect switch, no branch circuit overcurrent device shall be located at a height greater than 1.7 m above the finished floor.

**26-700(11) - Receptacles**

All 5-15R and 5-20R receptacles, located within 1.5 meters of any sink, shall be protected by a GFCI.

**26-700 - Tamper-Resistant Receptacles**

26-700(12) - All receptacles of CSA Configuration 5-15R and 5-20R installed in a child care facility shall be tamper-resistant receptacles. For the purpose of this rule “child care facility” means a supervised area containing one or more rooms intended for the designated use of providing educational and personal care services to children.

26-700(13) - Notwithstanding subrule (12), receptacles dedicated for stationary appliances such that the receptacle is rendered inaccessible or those located 2 m from the floor or finished grade shall not be required to be tamper resistant.

**26-702 - Receptacles Exposed to the Weather (see Appendix B)**

Receptacles exposed to weather shall be provided with wet location cover plates as follows:

1. Receptacles of configurations 5-15R, 5-20R, 5-20RA, 6-15R, 6-20R and 6-20RA shall have a wet location cover plate that is approved for wet locations whether or not a plug is inserted into the receptacle and marked “Extra Duty”;
2. Notwithstanding the requirements in subrule (1) when these receptacles are installed facing downward, at an angle of 45° or less from the horizontal, cover plates marked “Wet Location Only When Cover Closed” shall be permitted; and
3. Where receptacles exposed to the weather are installed on surface-mounted outlet boxes, the cover plates shall be held in place by four screws or by some other equivalent means.

**26-704 - Receptacles for Maintenance of Equipment on Rooftops**

A receptacle is now required, for maintenance purposes, on all commercial or industrial buildings that have rooftop electrical equipment such as RTU’s, ventilation, solar panels, etc. This receptacle shall be:

- Protected by a ground fault circuit interrupter of the class “A” type;
- Supplied by a separate branch circuit that does not supply any other outlets or equipment;
- CSA configuration 5-20R;

- Located within 7.5 m of rooftop equipment;
- At least 750 mm off finished roof; and
- Protected from mechanical damage.

**A receptacle that is an integral part of the rooftop unit meets the intent of this rule.**

### **26-710(a) - Finished Wall**

For the purposes of this Rule, “finished wall” means any wall finished to within 450 mm of the floor with drywall, wood paneling or other like material.

No reference is made to the drywall being taped or painted, only that it be installed.

In a basement, regardless of how it is finished, if the gypsum is installed then the receptacles are required.

**Note:** If the basement is of Styrofoam block or is insulated with Styrofoam, the National Building Code may require these walls to be finished.

### **26-710(n) - Outdoor Receptacles for Residential Occupancies**

The intent of this rule is that all receptacles installed outdoors of residential occupancies and within 2.5 meters of finished grade, shall be protected by a GFCI. This includes receptacles installed on buildings or structures associated with the residential occupancy such as garages, carports, sheds, posts and fences.

### **26-712(d) - Kitchen Receptacles (see also 2-022) [page 14](#)**

At least one receptacle installed at each permanently fixed island counter space with a **continuous** long dimension of 600 mm or greater and a short dimension of 300 mm or greater.

At least one receptacle installed at each peninsular counter space with a **continuous** long dimension of 600 mm or greater and a short dimension of 300 mm or greater.

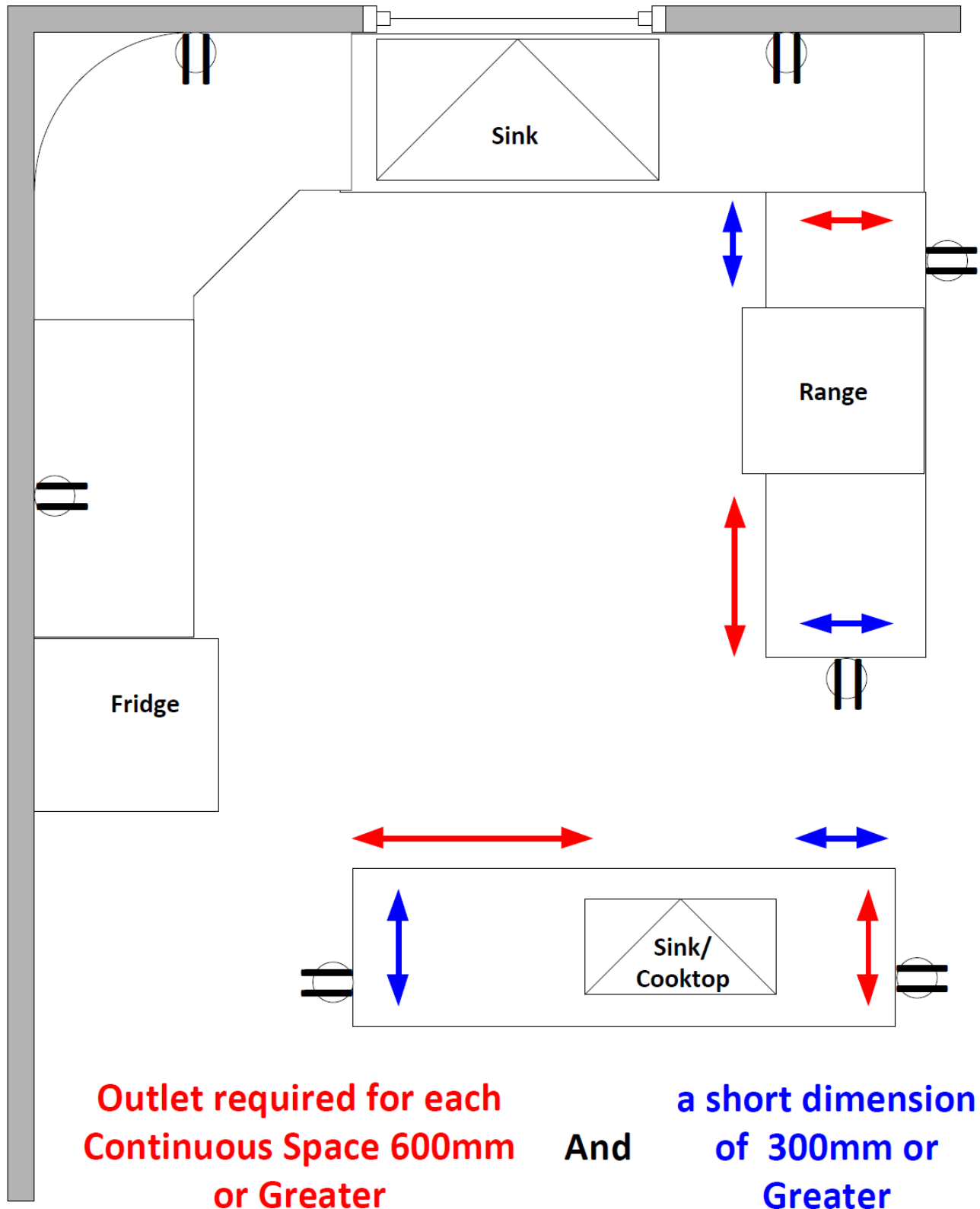
**Where a dining area forms part of a kitchen, a sufficient number of duplex receptacles shall be installed as per subrule (a). These receptacles shall be connected to a separate circuit as per Rule 26-724(e).**

### **26-712(g)(h) - Tamper-Resistant Receptacles**

All 5-15R and 5-20R receptacles in a dwelling unit shall be tamper resistant with the exception of receptacles located over 2 m above the floor and receptacles located behind stationary appliances.

This includes receptacles installed on buildings or structures associated with the residential occupancy such as garages, carports, sheds, posts and fences.

Continuous Counter Space Excluding Sinks or Cooktops



**26-714(a) - Receptacles for Single Dwellings**

At least one dedicated separate circuit is required for all outdoor receptacles. More than one dedicated circuit may be installed for outdoor receptacles, but there shall be no interconnection of indoor and outdoor receptacles. This does not include the receptacles on a balcony of apartment buildings.

As per rule 26-710 all 5-15R or 5-20R receptacles installed within 2.5 m of the finished grade shall be protected by a GFCI and as per Rule 26-724, protected by an AFCI.

Receptacles located in parking lots of apartments, or similar multi-family dwellings, installed solely for the use of automobile heater receptacles in accordance with Rule 8-400, are not required to be protected by a GFCI. (See also Rule 2-200)

**26-714(c) - Receptacles for Garage Door Openers**

At least one receptacle shall be provided in a garage for cord connected garage door openers, and located adjacent to and within 1 m of each garage door opener.

**26-722(f) - T-Slot Receptacles**

The ampere rating of the branch circuit wiring supplying receptacles with CSA Configuration 5-20R shall be 20A.

**26-724 - Branch Circuits for Dwelling Units**

Arc fault protection as defined in Rule 26-720 is required for all branch circuits in new construction or renovations/additions of dwelling units. Except for receptacles listed in Rule 26-724(f) which includes:

- Bathroom receptacles
- Refrigerator receptacles
- Kitchen receptacles
- Island receptacles
- Peninsula receptacles
- A single receptacle for a sump pump that does not supply any other receptacles.

A dwelling unit with permanently installed cooking facilities (i.e. gas or electric range, cooktop) is deemed to have a cooking facility and thus requires arc fault protection.

An “outlet branch circuit type arc fault circuit interrupter” may be used (instead of an AFCI breaker) when installed as per Rule 26-724(g).

Newly constructed rooms require all receptacles to be arc fault protected and receptacles added to an existing room shall also require arc fault protection.

Cord connected hot plates and/or microwaves do not constitute a cooking facility

**26-806(1)(5)(6)(7) - Gas Furnaces**

The furnace shall be provided with a dedicated circuit. The disconnect shall be located as required by the CEC. Garage unit heaters must also meet all these requirements. See also Section 10, Rule 10-406(4) on page [43](#).

**26-956(2) - Submersible Pumps Installed in Bodies of Water**

Electrical Inspections shall be notified regarding submersible pump installations in bodies of water where the voltage exceeds 150 volts-to-ground.

The area around the submersible pump shall be protected from public access by isolation and so marked with a series double buoy systems to accommodate different water levels.

Signage marked (WARNING DANGER HIGH VOLTAGE [480 VOLT] SUBMERSIBLE PUMP) shall be attached to both buoys and the controller structure facing the river.

**SECTION 28 - MOTORS & GENERATORS****28-104(1) - Motor Supply Conductor Insulation Temperature**

Supply conductors to a motor connection box shall have an insulation temperature rating equal to or greater than that required by Table 37 (example: heating circulating pumps, automotive car lifts).

When there is a discrepancy between the manufacturer and the values in Table 37, the higher value shall be used.

**28-110(1) - Aeration Fans**

Services for the supply of motors shall be sized in accordance with Section 28 of the CEC.

The service calculation is based on the total number of fans permanently wired into the electrical panel. The motor disconnect shall be installed within sight of and within 9 meters of the motor, or be lockable at the source. If receptacles are installed to plug in the motors, then the service may be calculated by the number of fans to be utilized at one time.

**28-604(1) - Location of Disconnecting Means**

Lock off devices shall be an Original Equipment Manufacturer device designed for the disconnecting means.

## SECTION 30 - INSTALLATION OF LIGHTING EQUIPMENT

[See Rule 2-106 - For Lighting Retrofits](#)

### **30-100 - Farm Yard Lights**

Subject to Supply Authority approval, the yard light may be mounted on the transformer pole, provided:

- it is located below the secondary rack where there is one; or
- with a separation of at least 500 mm between the bottom of the transformer and the fixture base where there is no secondary rack; and
- on the quadrant of the pole which would not interfere with pole climbing and transformer removal.

The pole mount yard light may be fed from the splitter with a minimum #14 AWG cable approved for the location. A pigtail socket and a 15A fuse (located in the splitter) may be used as overcurrent protection.

## SECTION 32 - FIRE ALARMS AND FIRE PUMPS

### **32-000 - Scope**

Installation of smoke alarms, carbon monoxide detectors, fire alarm systems and fire pumps shall meet the requirements of Section 32 of the CEC.

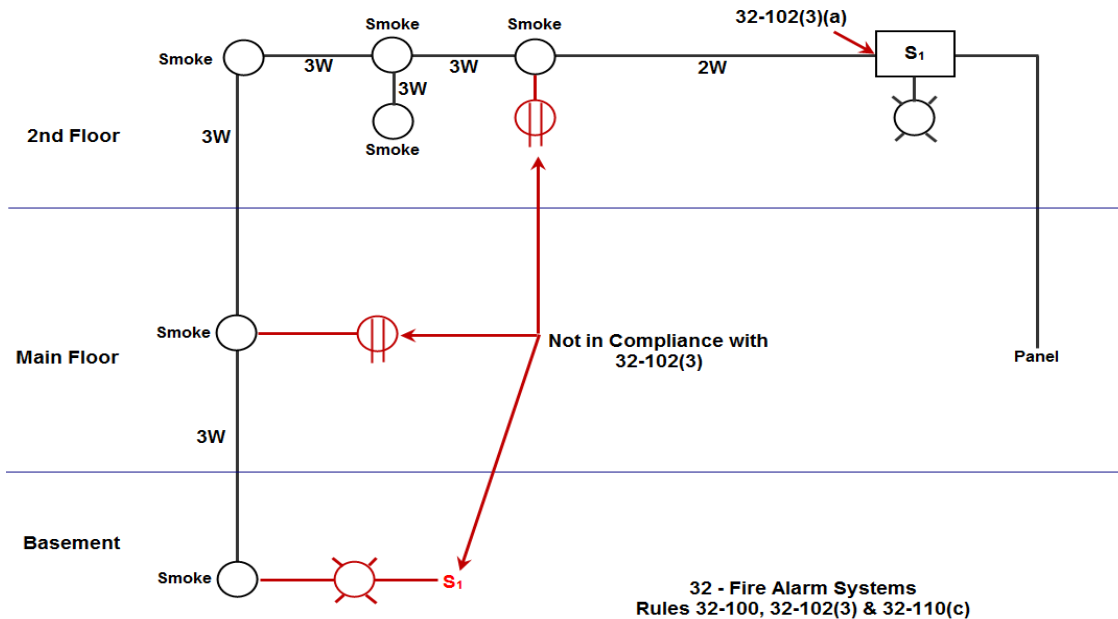
### **32-102 - Wiring Methods**

New rule allows conductors in PVC as a wiring method for fire alarm systems and does not have to be encased in concrete.

**Note:** Not allowed for fire pumps, conductors for fire pumps in PVC must still be encased in 50 mm of concrete.

Conductors shall be installed to be entirely independent of all other wiring, except for connection to:

- point of supply;
- a signal;
- an ancillary device; and
- a communication circuit.



### **32-110 - Smoke Alarms and Carbon Monoxide (CO) Detectors in Dwelling Units**

New construction of residential units shall be pre-wired for interconnected smoke alarms. CO alarms shall be installed as required by the National Building Code. CO alarms will be required in residences with fuel burning appliances or an attached garage.

The National Building Code requires smoke alarms to be permanently connected to an electrical circuit. This circuit may be 120 volt or an extra low voltage system. In either case, the circuit must be permanently installed and supplied from a lighting branch circuit. This circuit must not be arc-faulted or ground fault protected. As per Rule 32-102(3) this circuit must be kept totally independent of all other wiring. In the case of an extra low voltage circuit, the transformer must be permanently connected.

#### **Smoke Alarm Requirements**

The requirements for smoke alarms are specified in the Code and in Part 9 of the 2010 edition of the *National Building Code of Canada* (see Articles 9.10.19 and 9.10.21.7).

#### **Location Requirements**

Smoke alarms must be installed on each floor level, including basements, 900 mm or more above or below an adjacent floor level. Each bedroom must be protected by a smoke alarm in each bedroom and one outside the bedrooms installed within 5 m of the bedroom doors. This measurement must be made along the corridors and through the bedroom door, not through walls or openings in walls.

The maximum distance between smoke alarms on the same floor in rooms other than bedrooms is 15 m. This measurement must be made along corridors and through doorways, not through walls or openings in walls.

Smoke alarms must be installed on the ceiling or near the ceiling (see Article 9.10.19.2 of the *National Building Code of Canada*).

#### Carbon Monoxide (CO) Alarm Requirements

The requirements for CO alarms are specified in the Code and in the 2010 edition of the *National Building Code of Canada* (see Articles 6.2.4, 9.32.3.8 and 9.32.3.9).

#### Location Requirements

A CO alarm must be mounted at the manufacturer's recommended mounting height or if not available, on or near the ceiling of a room or area in a dwelling unit containing a solid-fuel-burning appliance (see Article 6.2.4 of the *National Building Code of Canada*).

If the unit/suite in a residential occupancy contains a fuel-burning appliance or shares a wall with a storage garage, a CO alarm must be located inside each bedroom or outside each bedroom within 5 m of each bedroom door, measured following corridors and doorways (see Articles 8.2.4 and 9.32.3.9 of the *National Building Code of Canada*).

#### **32-208 - Fire Pump Transfer Switch**

Where an on-site electrical transfer switch is used to provide emergency power supply to fire pump equipment, this transfer switch shall be used solely for the fire pump.

**Note:** See Figure 8 on page [83](#).

## SECTION 36 - HIGH VOLTAGE INSTALLATIONS

### **36-214(2) - Disconnecting Means**

This rule previously called for Load Break Disconnects, other than the draw-out type, to have contacts visible for inspection in the open and closed positions. **This has been changed to only require being visible in the open position.**

### **Minimum Distances from Exposed Energized High Voltage Electrical Conductors**

Risk Factor		Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Voltage Phase to Phase	Voltage to Ground	Non-electrical Workers, Material, Equipment	Qualified Electrical Workers	Vehicles and Load	Limit of approach for utility tree trimmers using conducting objects exposed to energized parts	Limit of approach for utility tree trimmers using rated tools to exposed energized parts	Limit of approach for utility tree trimmers using rated insulating booms
kV	kV	Metres	Metres	Metres	Metres	Metres	Metres
230	133	6.1	1.4	1.83	2.4	1.41	1.85
138	79.8	4.6	1	1.22	1.9	0.92	1.35
72	41.6	4.6	0.6	0.8	1.6	0.61	1.05
25	14.4	3	0.3	0.6	1.2	0.12	0.55
15	8.6	3	0.3	0.6	1.1	0.12	0.55
4.16	2.4	3	0.15	0.6	1.05	0.04	0.50
0.75	0.75	3	0.15	0.6	1.05	0.04	0.05

Reference OH&S Regulations Table 22

## SECTION 38 - LIFT FOR PERSONS WITH PHYSICAL DISABILITIES

### **38-061 - Outdoor Wheelchair Lifts**

In accordance with the manufacturer's instructions, when a receptacle is required for an outdoor wheelchair lift, it shall be a single receptacle connected to a separate circuit and shall not be arc fault or ground fault protected.

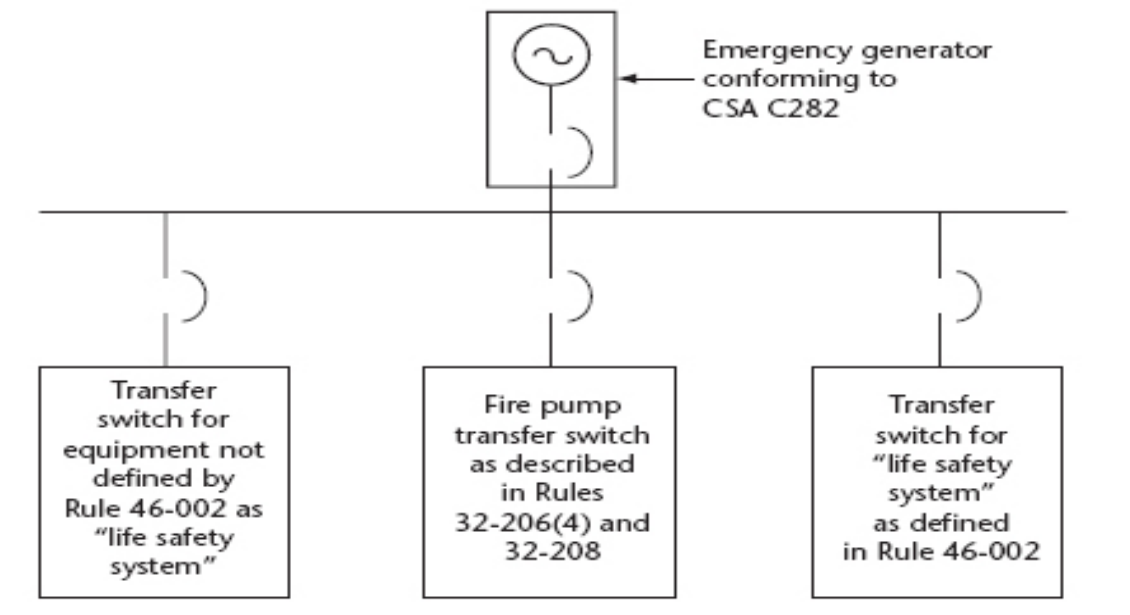
## SECTION 46 - EMERGENCY SYSTEMS, UNIT EQUIPMENT AND EXIT SIGNS AND LIFE SAFETY SYSTEMS

### 46-202 - Types of Emergency Power Supply

(3)(b) Where a generator is used, it shall be arranged to start automatically without failure and without undue delay upon the failure of the normal power supply to any transfer switch connected to the generator.

I.E. - fire pump, life safety system, emergency or backup power...etc.

46-108(5), Figure 8, Appendix B



### 46-204 - Protection of Electrical Conductors

**Definition: Emergency Power Supply** - emergency power supplied by a generator, batteries or a combination thereof, that is required by the National Building Code of Canada.

All power, control and communication conductors between an emergency generator and electrical equipment required to be installed as a part of the emergency power supply and **located outside the generator** room shall be protected against fire exposure to provide continued operation in compliance with the National Building Code (NBC) of Canada.

The requirement of one (1) hour fire rating is per the NBC and may be achieved by using cable with at least one (1) hour fire rating, encasing in concrete with thickness to achieve this rating or being in a shaft with a one (1) hour fire rating.

### **46-208(1) - Overcurrent Protection (Emergency Power Supply)**

Where an emergency generator is installed to supply power to life safety systems as defined in 46-002, a selective coordination report will be required and submitted to Electrical Inspections. The intent of selective coordination is to isolate the faulted circuit due to overcurrent or short circuit while maintaining power to the rest of the electrical distribution. This includes, but is not limited to, the following systems or circuits: fire alarms, lighting, elevators and fire pumps in health care facilities, commercial buildings, industrial facilities, public buildings, etc.

## **SECTION 62 - FIXED ELECTRICAL SPACE AND SURFACE HEATING SYSTEMS**

### **62-114 - Overcurrent Protection**

The following information has been prepared for ease of reference when sizing overcurrent protection and conductor sizes for heating equipment as per Rule 4-006.

<b>Electric Furnace and Other Heating Equipment</b> <b>Single Phase 240V</b> <b>Ref. C.E.C. 62-114(6) and (7)</b>			
<b>Nameplate Furnace or Rating (KW)</b>	<b>Conductor Size at 75°C Equipment Marking 75°C</b>		<b>Fuse/Breaker Rating</b>
	<b>Copper</b>	<b>Aluminum</b>	
5 KW	No. 12 AWG R90	No. 10 AWG R90	30 Ampere
10 KW	No. 8 AWG R90	No. 6 AWG R90	60 Ampere
15 KW	No. 4 AWG R90	No. 2 AWG R90	100 Ampere
18 KW	No. 4 AWG R90	No. 2 AWG R90	100 Ampere
20 KW	No. 3 AWG R90	No. 1 AWG R90	125 Ampere
23 KW	No. 3 AWG R90	No. 1 AWG R90	125 Ampere
25 KW	No. 1 AWG R90	No. 0 AWG R90	150 Ampere
30 KW	No. 0 AWG R90	No. 000 AWG R90	175 Ampere

A sample selection for a 20 KW furnace follows: The ampacity of the conductors supplying the furnace and the size of the overcurrent devices are determined by applying Rule 62-114.

The overcurrent device for the service must be sized so that the total connected load of the heating equipment does not exceed 80% of the rating of the overcurrent device in accordance with subrule (6). In this case, the load is 83.3 amps; the minimum size of overcurrent device is  $83.3/0.8 = 104$  Amperes. The next available fuse is 125 A.

Since this fuse is supplying a heating load, Rule 14-610 requires that the fuses be a time delay type or HRC Form I.

The conductor size is determined by applying Rule 62-114(7). The conductor must have the ampacity sufficient to carry the load and must have an ampacity rating at least 80% of the rating or setting of the branch circuit overcurrent device. A conductor rated at 100 amperes, i.e. #3 AWG R90 (Column 3 of Table 2) would satisfy these requirements.

Based on the conduit fill requirements of Rule 12-910 and Tables 6 through 10, it can be determined that the 2 #3 AWG R90 conductors require a 1" diameter conduit.

### **62-118 - Demand Factors for Service Conductors and Feeders**

(4) Electric furnace loads shall be deemed to have a demand factor of 100% when calculating service size for residential occupancy.

### **62-200 - Electric Space Heating**

Table 67 has been added to the code to provide installation clearance requirements for space heating systems (i.e. in-floor systems). See drawings in Appendix B.

### **62-202 - Location for Temperature Control**

1. A manually operable controls for an electric heater in a bathroom is to be located at least 1 m from the bathtub or shower stall.
2. If 1 m is not practicable, it is allowed to be located not less than 500 mm from a bathtub or shower stall, provided it is:
  - a) protected by a ground fault circuit interrupter of the class A type; or
  - b) supplied by a Class 2 circuit operating at not more than 42.4 V peak or DC.

### **62-206(3)(4)(5) - Installation of Central Units**

Each unit requires a single disconnect or if more than 1 circuit is required, the disconnects must be grouped together, i.e. Geothermal systems.

The disconnect(s) must be within sight of the unit and within 9 meters. This does not include internal disconnects that are part of the central unit.

### **62-220 - Infrared Radiant Heaters of the Metal Sheath-Glowing Element Type**

Ground fault protection is required to de-energize all normally ungrounded conductors of fixed infrared heaters with a ground fault setting sufficient to allow normal operation of the heater.

## **SECTION 64 - RENEWABLE ENERGY SYSTEMS**

**Please refer to 2-014 Plans Review Requirements for Section 64 – Renewable Energy Systems.**

### **64-052 - Conductors of Different Systems (All Renewable Energy Systems)**

Conductors of renewable energy systems shall be separated from different systems in accordance with Rules 12-904(2) and 12-3030.

For the purpose of this Rule, multiple inverters and associated components connected to the same renewable source are considered as one generation source and associated wiring may be contained in the same raceway.

### **64-058 - Overcurrent Protection (All Renewable Energy Systems)**

Where circuit conductors are connected to more than one source, all overcurrent devices shall be located in such a way that they provide overcurrent protection from all sources.

Overcurrent devices marked or **approved only for AC use** shall not be used in DC circuits.

Equipment acceptable for automotive, marine and telecommunications applications, although used in these DC systems, is not suitable for use in permanent renewable energy systems meeting the requirements of this Code.

Circuit breakers that are marked “Line” and “Load” have been evaluated for connection only in the direction marked.

Circuit breakers without “Line” and “Load” have been evaluated for connection in both directions.

### **64-060 - Disconnecting Means**

A single, effective disconnecting means shall be provided to disconnect all ungrounded conductors of a renewable energy system simultaneously from all other conductors in a building or structure.

Because renewable energy is a power production source, the disconnect shall:

- be installed in accordance with Rule 84-024 and be located within sight of and within 9 m of the equipment or integral to the equipment and readily accessible;
- be suitable for service entrance equipment when used as a service disconnecting means;
- disconnect equipment such as inverters, batteries and charge controllers from all ungrounded conductors of all sources;
- not be connected in any grounded conductor if the opening of the disconnect would cause the grounded conductor to become ungrounded and energized;
- disconnect a fuse from all sources in accordance with Rule 14-402 if the fuse can be energized from both directions; and
- be grouped, identified and marked as the disconnecting means with a warning that the terminals on both the line and load sides may be energized when open where the equipment is energized from more than one supply source.

**64-060(12) - Disconnecting Means (Photovoltaic Combiner)**

- Photovoltaic combiners with source circuits require an output circuit disconnecting means;
- Disconnecting means must be located within 2 m of the photovoltaic combiner; and
- For photovoltaic combiners with source circuit fuses, the photovoltaic output circuit disconnecting means shall be located integral with or within 2 m of the combiner and interlocked with the combiner door.

**64-062 - Wiring Methods (All Renewable Energy Systems)**

Except as provided for by Rule 64-210, conductors for DC renewable energy sources or supply circuits of a utility-interactive inverter, installed inside a building or structure, shall be contained in metallic raceways, metal enclosures or cables with a metal armor from the point of penetration of the building to the first readily accessible disconnecting means.

**64-064 & 64-066 - Grounded or Ungrounded Systems**

The inverter installation/instruction manual should be consulted to determine whether the inverter is to be used with a grounded or ungrounded solar photovoltaic array.

An inverter designed for use with a grounded PV array is called an isolated inverter. The term isolated means an internal transformer isolates the AC circuits from the DC circuits in the inverter. A non-isolated or transformerless inverter would require the PV array to be ungrounded.

**64-064 - System Grounding**

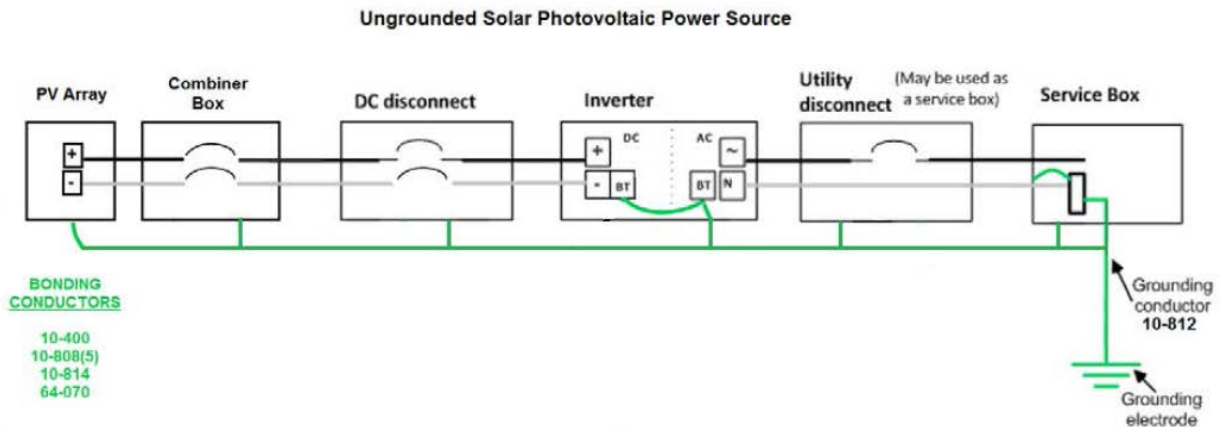
Ground fault protection is required for grounded DC supply circuits with a renewable energy system of 50V or greater. This ground fault protection shall:

- detect a ground fault;
- interrupt the fault current;
- indicate that there was a ground fault; and
- open all ungrounded PV conductors or disconnect or turn off the connected equipment.

**64-066 - Ungrounded Renewable Energy Power Systems**

Renewable energy systems are permitted to operate with ungrounded source and supply circuits if the system complies with the following:

- All source and supply conductors must have overcurrent protection (positive and negative conductors);
- Conductors must be in metal-sheathed cables or metallic raceways;
- Inverters or charge controllers must be suitable for the purpose;
- The system must be provided with ground fault protection; and
- A suitable warning must be installed at each junction box, disconnect or any other device where these circuits can be exposed during service. See Rule 64-066(1)(c) Appendix “B” for an equivalent wording example.

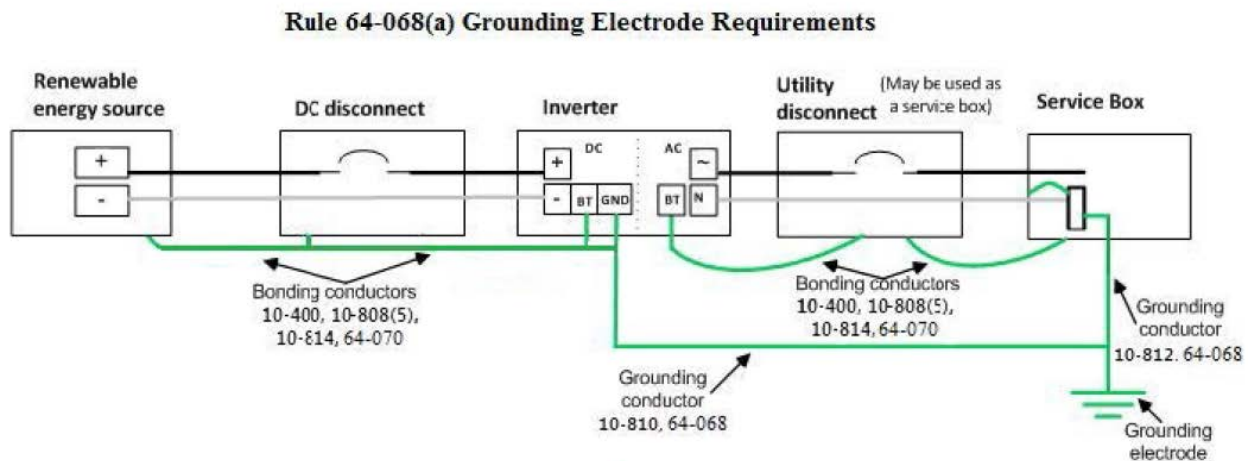


**Legend**

**BT** – equipment bonding terminals - refer to 64-222 for interconnection requirements

**64-068 - Grounding Electrodes and Conductors**

AC and DC renewable energy power systems to be grounded shall be connected to a grounding conductor by one of the following means.

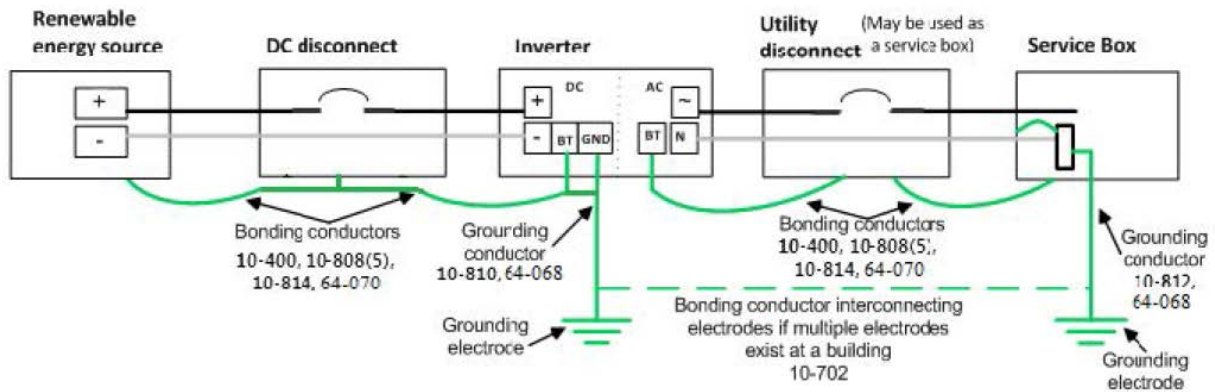


**Legend**

**BT** – equipment bonding terminals

**GND** – DC grounding electrode terminal

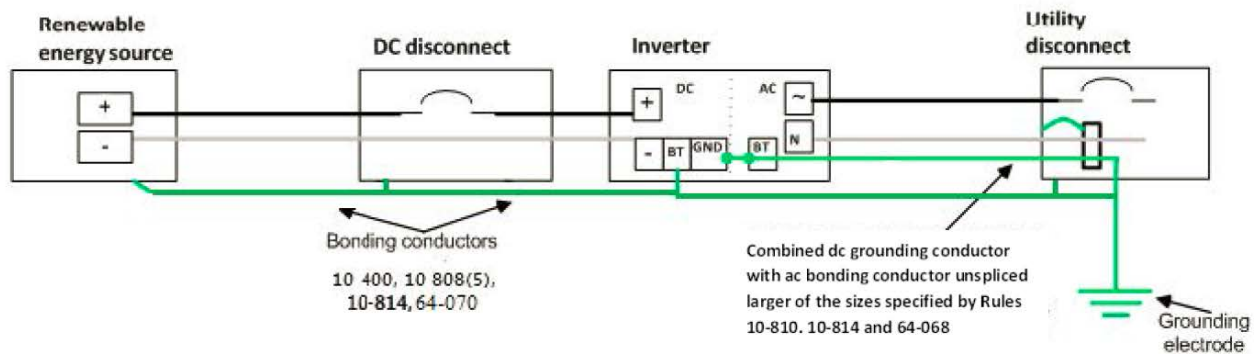
### Rule 64-068(b) Grounding Electrode Requirements



#### Legend

**BT** – equipment bonding terminals  
**GND** – DC grounding electrode terminal

### Rule 64-068(c) Grounding Electrode Requirements



#### Legend

**BT** – equipment bonding terminals  
**GND** – DC grounding electrode terminal

### 64-070 - Equipment Bonding

The installation of a #6 copper bond conductor, continuous from the module bonding system, to the system ground in conjunction with and external to the feeder cable, shall be installed to meet the intent of this rule for the removal of combiner boxes, inverters or other equipment.

See also Rule 64-222

## **64-072 - Marking (All Renewable Energy Systems)**

For interactive system(s) at the points of interconnection, each disconnecting means shall be marked with the **maximum AC output operating voltage and current**.

### **Rules for Marking, Warning Notices and Diagrams**

<b>Bi-polar System</b>	<b>Rule 64-056(5)</b>
<b>Disconnecting Means (General)</b>	<b>Rules 64-060(10) &amp; 84-024(1)(i)</b>
<b>Disconnecting Means (Utility)</b>	<b>Rule 84-030</b>
<b>Ungrounded Systems</b>	<b>Rule 64-066(1)(c)</b>
<b>Stand-alone Systems</b>	<b>Rules 64-102(c)(iv) &amp; 64-074(1)</b>
<b>Inverters Not Readily Accessible</b>	<b>Rules 64-104(c) &amp; 84-030(2)</b>
<b>Utility-Interactive Point of Connection</b>	<b>Rule 64-112(4)(b)(i)(iii)</b>
<b>Disconnecting Means (PV Output)</b>	<b>Rule 64-200(1)(3)</b>
<b>Rapid Shutdown</b>	<b>Rule 64-200(2)(3)</b>
<b>All Multi-Circuit PV Junction boxes</b>	<b>Rule 64-210(10)(b)</b>
<b>Small Wind Systems</b>	<b>Rules 64-300(1)(2) &amp; 64-310(5)</b>
<b>Large Wind Systems</b>	<b>Rules 64-400(1)(2), 64-406(5) &amp; 64-414</b>

## **64-074 - Warning Notice and Diagram (All Renewable Energy Systems)**

In buildings with a utility service and a renewable energy system, where practical their disconnects shall be grouped. Where not practicable, permanent plaques shall be posted on or near each disconnecting means indicating the location of all other service boxes supplying power to the building. See also 64-072

### **64-100 - Max Circuit Loading Inverters**

The maximum current of the inverter output circuit shall be the inverter continuous output rating. Some inverters may also have specifications listing sustained maximum output currents. The higher of the two output ratings shall be used.

Each inverter must have a dedicated circuit breaker or fusible disconnecting means and rated as applicable for the voltage and current.

#### **Example**

Rated inverter output - 30 Amps  
Continuous rating is 125%  
 $30A \times 125\% = 37.5 A$

The AC output conductors connected to this inverter must be sized for a minimum of 37.5 Amps.

### **64-110 - Unbalanced Interconnections (Inverters)**

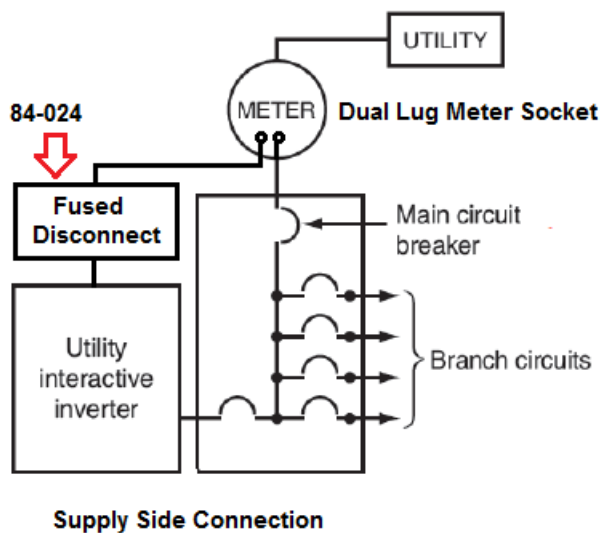
Single phase inverters shall not be connected to a three-phase utility system unless:

- The inverters used are certified as utility interconnected and approved for use in three-phase systems;
- The single-phase inverters are connected to provide three-phase balanced output;
- The installation complies with Rules 84-008 and 84-018;
- Confirmation that the installation is acceptable to the supply authority; and
- The installation meets the inverter manufacturer's requirements.

### **64-112 - Utility-Interactive Point of Connection (Inverters)**

(1) The output of a utility-interactive inverter shall be connected to the supply authority system in accordance with Section 84.

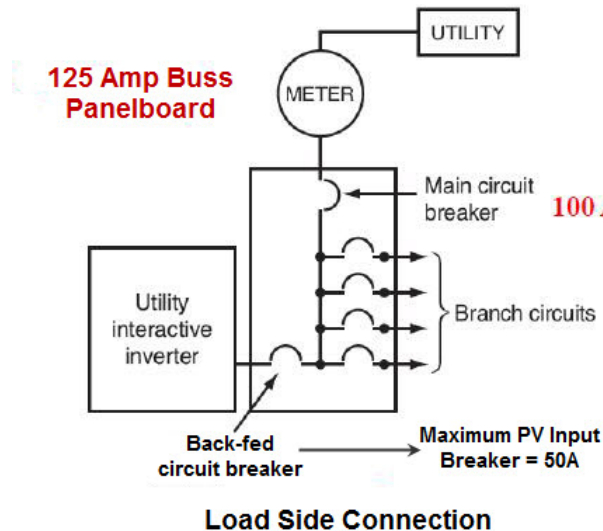
(2) The output of a utility-interactive inverter is allowed to be connected to the line side of the service disconnecting means at a dual lug meter socket or other source(s).



The output of a utility-interactive inverter is allowed to be connected to the load side of the service disconnecting means provided that each source interconnection is made at a dedicated circuit breaker or fused disconnecting means. This point of connection shall be positioned at the opposite (load) end of the panelboard, busbar or conductor from the input feeder location or main circuit breaker location.

### 64-112(4)(c) - Non-Dwelling Units

The sum of the overcurrent devices supplying power to a busbar or conductor is allowed to exceed the rating of the busbar or conductor to a maximum of 120%.



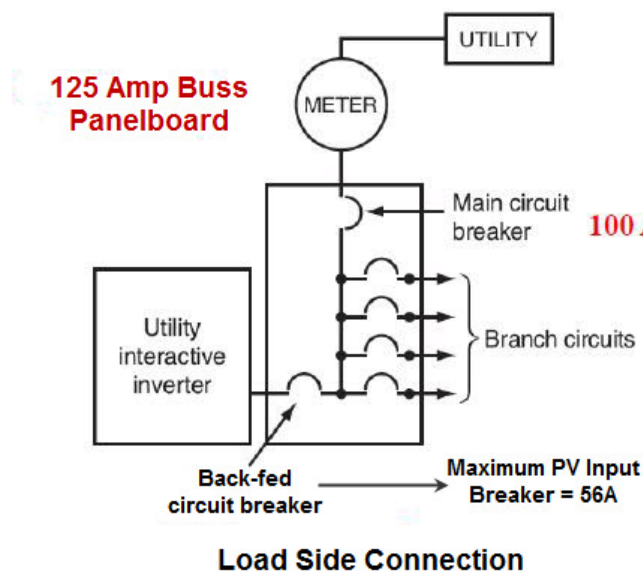
Utility Input = 100A  
Panel Bus = 125A  
120% of Bus = 150A

$150A - 100A = 50A$

The maximum PV input current allowed is 50A

### 64-112(4)(d) - Dwelling Units

The sum of the overcurrent devices supplying power to a busbar or conductor is allowed to exceed the rating of the busbar or conductor to a maximum of 125%.



Utility Input = 100A  
Panel Bus = 125A  
125% of Bus = 156.25A

$156A - 100A = 56A$

The maximum PV input current allowed is 56A.

### **64-200 - Marking (Solar Photovoltaic Systems)**

In addition to the requirements of Rule 64-072, a permanent marking shall be installed at an accessible location for the photovoltaic output circuit with:

- rated operating current and voltage;
- maximum source circuit voltage as calculated in accordance with Rule 64-202(1) or (2); and
- rated short-circuit current.

A warning sign for a photovoltaic system shall be in capital letters with a minimum height of 9.5 mm, in white on a red background. See also 64-072

### **64-208 - Photovoltaic Module Application Class Use**

Photovoltaic modules marked with application Class A or C shall be permitted to be installed in a location accessible to the public. Photovoltaic modules marked with an **application Class B shall not** be permitted for installations accessible to the public. Photovoltaic modules without an application class marking are considered to be application Class A.

For the application of this Rule, photovoltaic modules are considered inaccessible to the public where they are:

- located within a fenced enclosure in accordance with Rule 26-304, 26-312, and 26-314;
- guarded by locked doors;
- elevated 3 m or more above grade level or above any surface that a person can stand on; or
- where access is restricted by other effective means.

### **64-210 - Wiring Methods (Acceptable Wiring Methods Within an Array)**

- The wiring for a solar PV installation is deemed inaccessible to the public and not readily accessible if it is:
  - contained in a raceway;
  - contained behind screening or guarding;
  - elevated 3 m or more above grade level; or
  - located within a fenced enclosure in accordance with Rule 26-304, 26-312, and 26-314
- Flexible cords suitable for extra hard usage shall be permitted for interconnection of modules in accordance with Rule 64-210(1);
- Conductors approved as part of an approved panel assembly shall be permitted for the module interconnections in accordance with Rule 64-210(2);
- RPV conductors shall be permitted for the module interconnections if they are contained in a raceway;
- Conductors and cables shall be supported 300 mm from every box and at intervals not more than 1 m throughout the run;
- Where DC arc-fault protection is not located at the module, conductors or cables installed on or above a building shall be provided with mechanical protection against damage from rodents by enclosing them in material such as expanded metal, solid metal, screening or other acceptable protection; and
- Types RPV and RPVU conductors installed inside a building or structure shall be contained in a raceway.

**64-212 - Conductor Marking or Colour Coding (Solar Photovoltaic Systems)**

Reversal of DC sources can create series circuits that will produce voltages well in excess of the rated system voltage.

DC photovoltaic circuits installed between the photovoltaic modules and the inverter shall be identified:

- red for positive/black for negative;
- black conductors manufactured with permanent surface printing indicating the polarity of the conductor; or
- RPV or RPVU conductors; +/-, Pos/Neg or Positive/Negative.

Field marking or labeling of single conductors **shall not** be allowed. Field colour-coding for multi-conductor cables shall be permitted, provided the colour-coding for conductors are located at every point where the separate conductors are accessible.

**64-214 - Overcurrent Protection for Apparatus and Conductors (Solar Photovoltaic Systems)**

Overcurrent protection for PV strings shall not be greater than the maximum fuse rating on the module nameplate. The overcurrent protection for individual photovoltaic source circuits shall not be greater than 100% of the rated short-circuit current of that source circuit. Where this value does not correspond to the standard rating, the next higher standard size can be used.

Overcurrent devices for photovoltaic source circuits shall be accessible and grouped where practicable.

**64-216 - Photovoltaic DC Arc-Fault Protection (Solar Photovoltaic Systems)**

Photovoltaic systems with DC source or output circuits, or both, and operating at a maximum system voltage of 80V or greater, shall be protected by:

- a) a DC arc-fault circuit interrupter; or
- b) other system equipment approved to provide equivalent protection.

**64-218 - Rapid Shutdown**

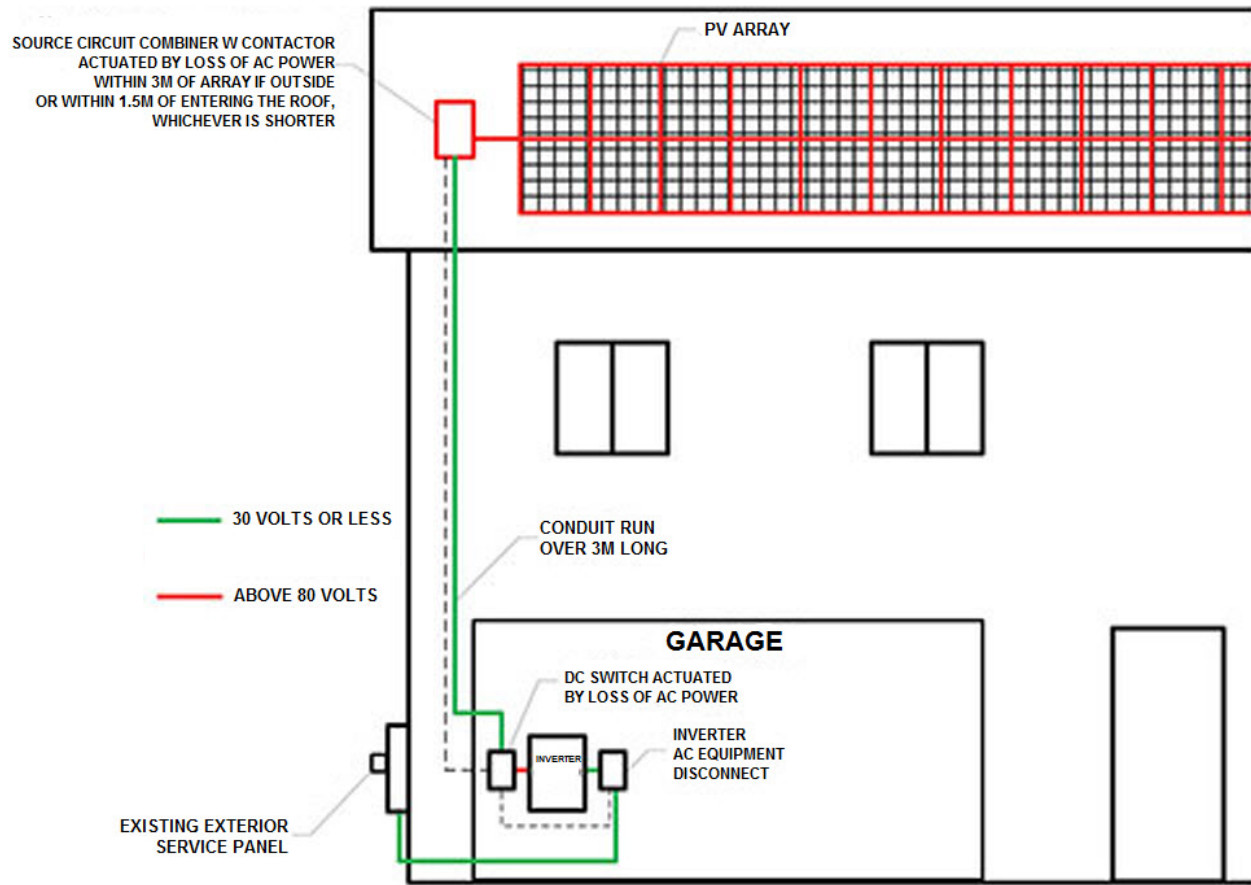
A photovoltaic system rapid shutdown device shall be provided for a photovoltaic system installed on buildings or structures where the photovoltaic source or output conductors installed on or in buildings are more than 1.5 m in length or more than 3 m from the photovoltaic array.

A photovoltaic system rapid shutdown device shall limit photovoltaic source or output circuits to not more than 30 volts and 240 VA within 10 seconds of rapid shutdown initiation.

The intent of this Rule is to have a disconnecting means for the output circuit of a photovoltaic combiner capable of making and interrupting its full load rating and that may be opened with safety to the operator with a fault on the system [see Rule 64-060(12)].

If the utility disconnect serves a dual function as a rapid shutdown, it shall be labeled as such.

E.g. systems using micro-inverters or optimizers



**String Inverter with Remote Switches**

#### **64-220 - Attachment Plugs and Similar Wiring Devices (Solar Photovoltaic Systems)**

Attachment plugs connected to cables between photovoltaic modules in readily accessible locations and over 30V shall require a tool to open the connector. When connectors and attachment plugs are used to interconnect modules or arrays, they shall be used in such a manner that the blades of the attachment plug are not energized when withdrawn. Only attachment plugs approved as a mated pair from the same manufacturer shall be interconnected.

#### **64-222 - Photovoltaic Module Bonding (Solar Photovoltaic Systems)**

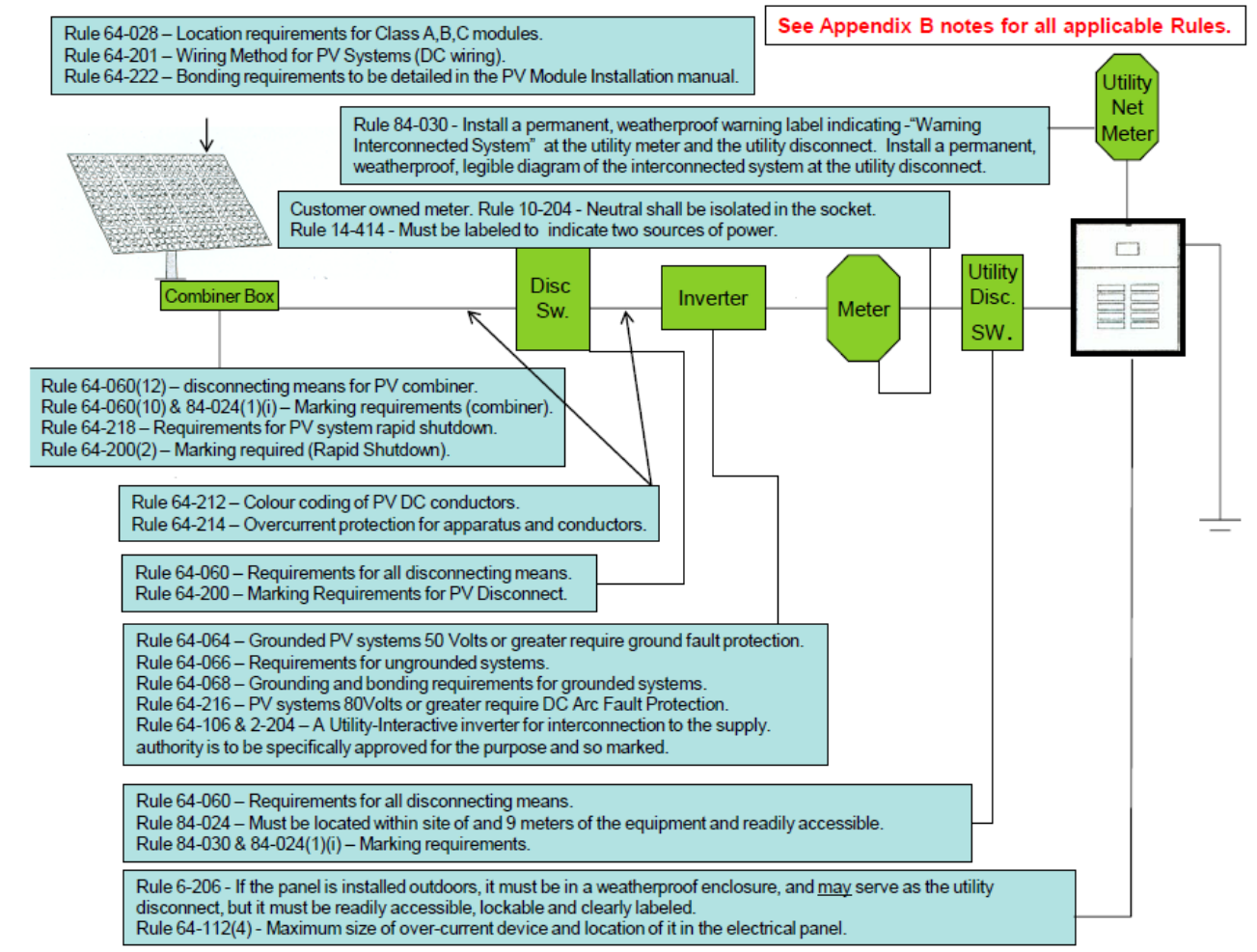
All exposed metal parts of photovoltaic modules shall be bonded to ground in accordance with the module or bonding connector manufacturer's installation instructions. During the approval process, all components such as bonding clips, brackets, hardware, lugs, etc. used for bonding are tested in accordance with CSA-C22.2, No. 61730-2.

These bonding connections shall be arranged so that removal of a photovoltaic module from a source circuit does not interrupt a bonding conductor to other equipment.

## Section 64 Renewable Energy Drawings

### Electrical Inspections

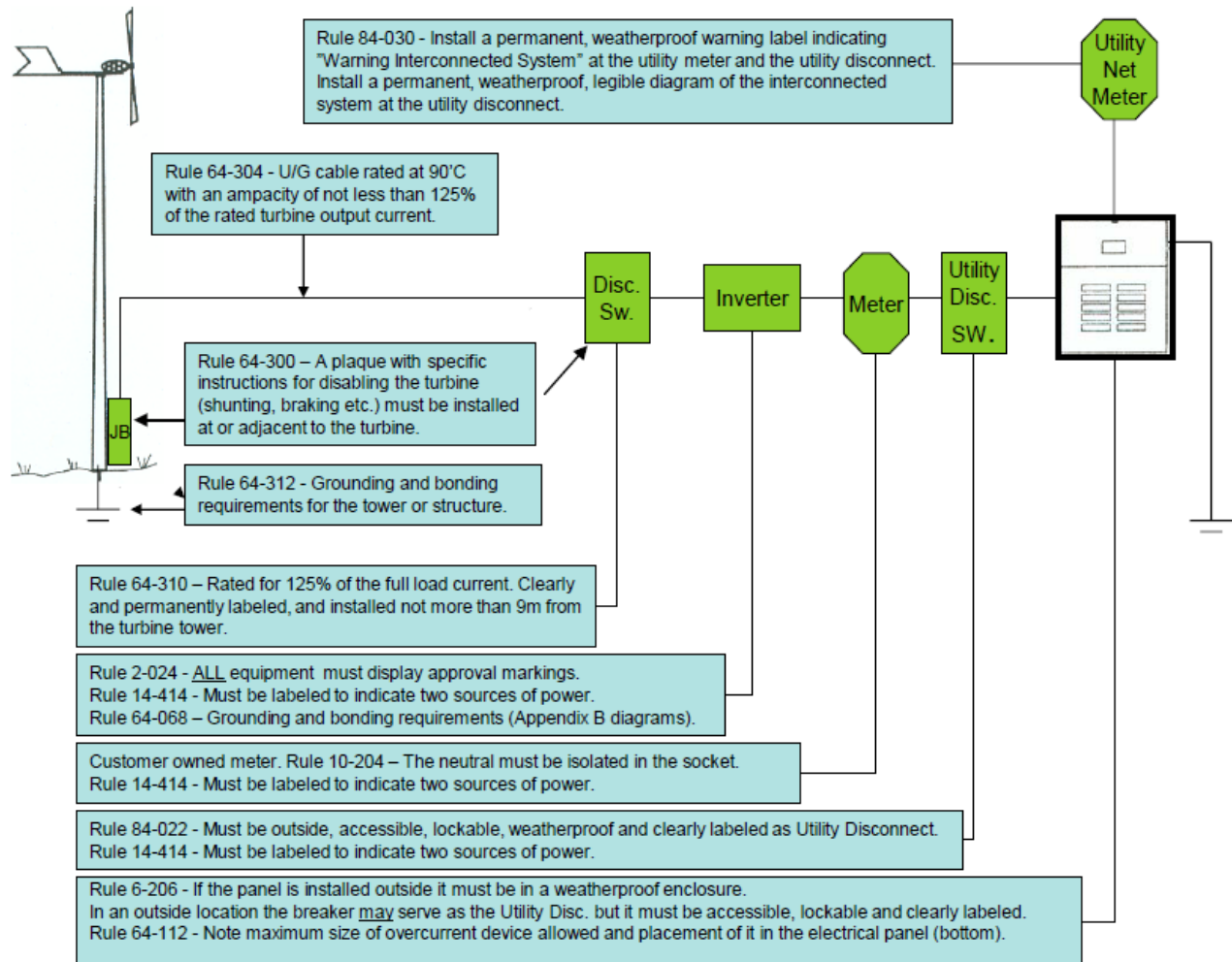
### Solar Installation



- Note:**
1. All labels and diagrams **must** be installed **before** the installation will be approved. All labels and diagrams installed outdoors and exposed to the weather shall meet the requirements listed under **Rule 64-074**.
  2. All wiring must be done by a licensed Saskatchewan Electrical Contractor and be covered by an appropriate electrical permit. Homeowner Permits are not allowed.
  3. It is the responsibility of the Electrical Contractor to arrange for an inspection 2 weeks prior to requesting a network service connection.
  4. When Network Metering is installed, the Local Utility must approve all connection diagrams **before** the installation begins.
  5. All renewable energy installations require electrical construction plans to be submitted to Electrical Inspections and **reviewed before** approval will be granted. See [Rule 2-014](#).

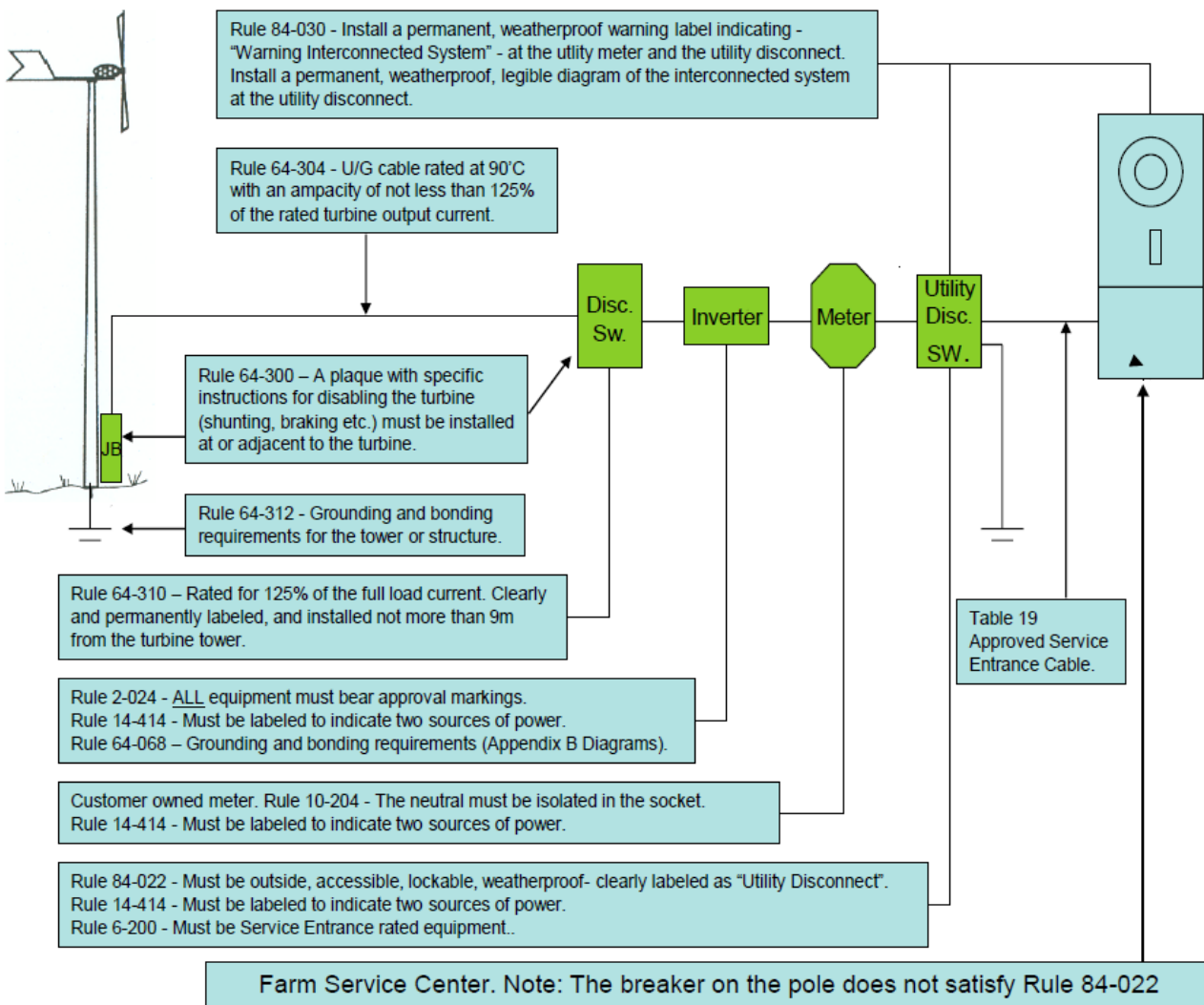
## Electrical Inspections

## Wind Turbine Installation



- Note:**
1. All labels and diagrams **must** be installed **before** the installation will be approved. All labels and diagrams installed outdoors and exposed to the weather shall meet the requirements listed under **Rule 64-074**.
  2. All wiring must be done by a licensed Saskatchewan Electrical Contractor and be covered by an appropriate electrical permit. Homeowner Permits are not allowed.
  3. It is the responsibility of the Electrical Contractor to arrange for an inspection 2 weeks prior to requesting a network service connection.
  4. When Network Metering is installed, the Local Utility must approve all connection diagrams **before** the installation begins.
  5. All renewable energy installations require electrical construction plans to be submitted to Electrical Inspections and **reviewed before** approval will be granted. See [Rule 2-014](#).

## Electrical Inspections Rural Wind Turbine Installation (option)



- Note:**
1. All labels and diagrams **must** be installed **before** the installation will be approved. All labels and diagrams installed outdoors and exposed to the weather shall meet the requirements listed under Rule 64-074.
  2. On services above 400 Amp – the labels required by Rule 84-030 will need to be installed at the meter and at the main switch.
  3. All wiring must be done by a licensed Saskatchewan Electrical Contractor and be covered by an appropriate electrical permit. Homeowner Permits are not allowed.
  4. It is the responsibility of the Electrical Contractor to arrange for an inspection 2 weeks prior to requesting a network service connection.
  5. When Network Metering is installed, the Local Utility must approve all connection diagrams **before** the installation begins.
  6. All renewable energy installations require electrical construction plans to be submitted to Electrical Inspections and **reviewed before** approval will be granted. See [Rule 2-014](#).

**SECTION 66 – AMUSEMENT PARKS, MIDWAYS, CARNIVALS, FILM AND TV SETS, TV REMOTE BROADCASTING LOCATIONS, AND TRAVELLING SHOWS****66-404 - Receptacles**

Receptacles having CSA configuration 5-15R or 5-20R installed in itinerant midways, carnivals, fairs and festivals and intended to supply loads in outdoor or damp locations shall be protected by ground fault circuit interrupters of the Class A type.

**SECTION 68 - POOLS, TUBS AND SPAS****68-054 - Utility Conductors Over Pools**

Electric utilities may not permit open service conductors to be located directly over a pool, hot tub or spa.

A structure that will adequately provide a permanent barrier between overhead conductors and the hot tub shall be acceptable as protection from overhead lines crossing above a hot tub. If the structure is metal and within 1.5M of the hot tub, it shall be bonded to ground.

**A pool shall be deemed to include:**

- permanently installed and storable swimming pools;
- hydromassage bathtubs;
- spas and hot tubs;
- wading pools;
- baptismal pools;
- decorative pools; and
- splash pads.

**68-068 - Ground Fault Circuit Interrupters**

Spas and Hot Tubs require Class A GFCI protection regardless of equipment location.

**68-308 - Other Electrical Equipment**

No other (unrelated) equipment is to be fed from a circuit feeding a hydro massage bathtub.

Access must be provided to all electrical equipment including the pump motor.

**See Rule 2-122 -** Minimum 400 mm x 400 mm access panel.

## Section 68 - Pool Diagrams

### Canadian Electrical Code, Part I

#### Section 68 – Pools, tubs & spas

##### 68-068 Ground fault circuit interrupters

- (6) Ground fault circuit interrupters shall be installed (a) in a location that will facilitate the testing required in Subrule(5); (b) not closer than 3 m to the pool water except as permitted by item (c); and (c) not closer than 3 m to the pool water in a spa or hot tub and not closer than 1.5 m to a hydromassage bathtub, unless the ground fault circuit interrupter is an integral part of an approved factory-built spa, hot tub, or hydromassage bathtub or is located behind a barrier that will prevent the occupant of the pool from contacting the device.

- (7) Except as permitted by Rule 68-070, the following equipment shall be protected by a ground fault circuit interrupter:

- (d) electrical equipment located within the confines of the pool walls or within 3 m of the inside walls of the pool and not suitably separated from the pool area by a fence, wall or other permanent barrier.



Electrical Service Equipment and any associated piping

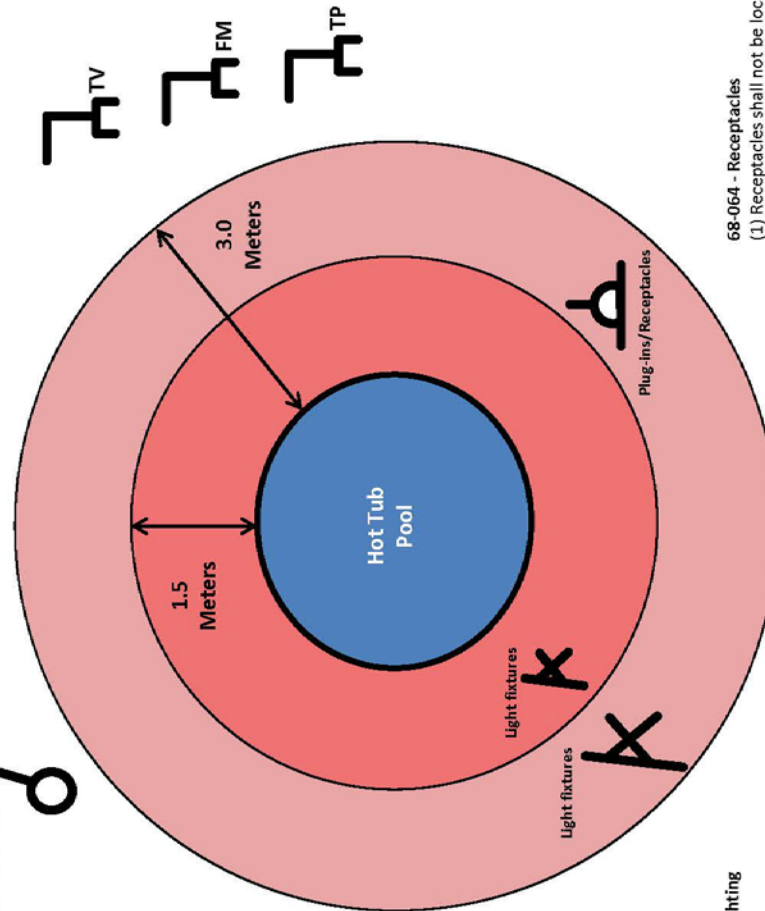


Switches or Disconnects

- 68-070 Other electrical equipment (1) Loudspeakers installed beneath the pool surface shall be (a) mounted in a recess in the wall or floor of the pool and enclosed by a separate, rigid, corrosion resistant metal screen; and (b) connected to their audio isolating transformers by ungrounded wiring.

- (2) Communication equipment installed within 3 m of the inside walls of the pool shall be (a) permanently fixed on the wall and located so that no part is within 1.5 m of the inside walls of the pool or can be used from the pool, unless actuated by means of a cord with an insulating link; or (b) separated from the pool area by a fence, wall, or other permanent barrier.

- (3) Notwithstanding Subrule (2), communication jacks shall not be installed within 3 m from the inside walls of the pool.



##### 68-066 Luminaries and lighting equipment

- (6) Luminaries installed within 3 m of the pool surface or walls and not suitably separated from the pool area by a fence, wall or other permanent barrier, shall be electrically protected by a ground fault circuit interrupter

##### 68-064 - Receptacles

- (1) Receptacles shall not be located within 1.5 m of the inside walls of the pools. (2) Receptacles located between 1.5 m and 3 m of the inside walls of a pool shall be protected by a ground fault circuit interrupter of the Class A type.

## **Section 68 - Pool Diagrams**

### Things you should know Before Installing a Swimming Pool

A pool is deemed to Include:

- \* Permanently installed and storable swimming pools;
- \* Spas, hot tubs;
- \* Wading Pools, baptismal pools;
- \* Decorative pools;
- \* Splash pads.

**Permanently installed swimming pool** - means a pool constructed in such a manner that it cannot be disassembled for storage.

**Storable swimming pool** - means a pool constructed in such a manner that it may be readily disassembled for storage and reassembled to its original integrity.

**Spa, or hot tub** - means a pool or tub designed for the immersion of persons in heated water circulated in a closed system incorporating a filter, heater, pump and with or without a motor-driven blower but not intended to be filled and drained with each use.

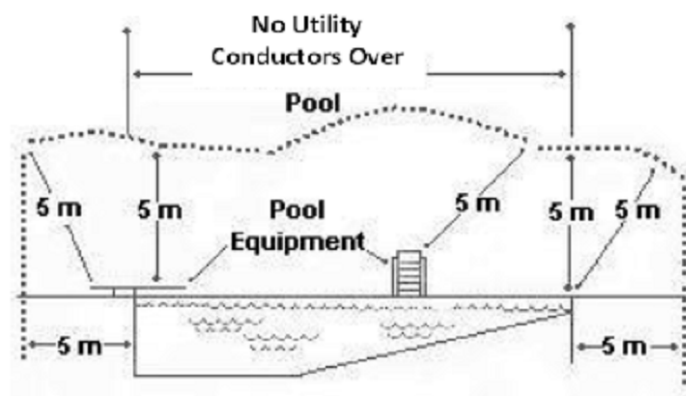
**Decorative Pool or baptismal pool** - means a pool that could be used as a wading pool or the immersion of persons, that is larger than 1.5 m in any dimension, and that is readily accessible to the public.

**Overhead Wiring** (includes overhead telephone, cable TV and power conductors)

Customer owned overhead wiring including insulated communication conductors, communication antenna distribution conductors, and neutral supported cables not exceeding 750 V shall be permitted to be located over a pool, diving structure, slide, observation stand, tower, or platform, providing there is a vertically clearance of 5 m above the pool and/or pool equipment. This also includes the area extending 5 m horizontally from the pool edge, and 5 m measured radially.

**Utilities do not permit any service conductors to be located directly over a swimming pool or hot tub.**

Utility service conductors may be located adjacent to a pool or hot tub provided there is at least 5M measured radially from the edge of the pool, hot tub, and diving or play structure.  
(See figure to the right)



Underground Wiring (includes underground telephone, cable TV and Power Utility service cables) The horizontal separation between the inside walls of an in ground pool or splash pad and underground conductors, except for bonding conductors or conductors supplying electrical equipment associated with the pool and protected by a ground fault circuit interrupter, shall not be less than:

<i>Type of Installation</i>	<i>Conductors Buried Directly in earth</i>	<i>Conductors in non-conducting Ducts</i>
Communications conductors	<i>1.5m</i>	<i>1m</i>
Power Conductors:		
0 - 750 V	<i>1.5m</i>	<i>1.0m</i>
751 - 15,000 V	<i>3.0m</i>	<i>1.5m</i>
15,001 - 28,000 V	<i>6.0m</i>	<i>2.0m</i>

Receptacles (wall plugs)

Receptacles shall not be located within 1.5 m of the inside walls of a pool.

Receptacles located between 1.5 m and 3 m of the inside walls of a pool shall be protected by a ground fault circuit interrupter outside of the 3 m distance.

Ground fault circuit interrupters shall not be installed closer than 3 m to the pool water unless the ground fault circuit interrupter is an integral part of an approved factory built spa or hot tub and is located behind a barrier that will prevent the occupant of the tub from contacting the device.

#### **Other Electrical Equipment (air conditioning equipment, pumps, etc.)**

Electrical equipment located within 3 m of the inside walls of the pool and not suitably separated from the pool area by a fence, wall or other permanent barrier, shall be protected by a ground fault circuit interrupter.

#### **Electrical Utility Meter**

A swimming pool or hot tub shall not be located within 3 m of the Electrical Utility meter unless it is suitably separated from the pool area by a fence, wall or other permanent barrier that provides no less than 1 m clearance about the electric meter. (*Metal poles used for pool servicing can present a shock hazard to persons in the pool area coming in contact with the electric service equipment*)

#### **Lighting**

Lighting installed below, or within 3 m of the pool surface or walls, and not suitably separated from the pool area by a fence, wall, or other permanent barrier shall be electrically protected by a ground fault circuit interrupter.

Standards or supports for lighting shall not be installed within 3 m of the inside walls of a swimming pool unless a ground fault circuit interrupter protects such lighting.

#### **Bonding to ground**

Pool reinforcing steel and the pool shell shall be bonded at four equally spaced points around the pool. All metallic components associated with the pool and metallic fences within 1.5 m of the pool shall be bonded to ground by a copper conductor.

## SECTION 72 - MOBILE HOME AND RECREATIONAL VEHICLE PARKS

### 72-102(2) - Demand Factors for Service and Feeders

When doing a service or feeder calculation for an RV park, the calculated load is considered a continuous load as per Rule 8-104.

#### 72-102(2),(3),(4)

#### Campground service calculation Example A

A campground has 30 sites. 10 of the sites have a pedestal with a 50A, 240V receptacle and a 30A, 120V receptacle. 20 of the sites have a pedestal with a 30A, 120V receptacle and a 15A, 120V receptacle. Panel A is protected by a 100A breaker (rated at 80%) and serves the shower building. Panel B is protected by a 100A breaker (rated at 100%) and serves site lighting, etc.

What size 120/240V service is required?

<b>Panel 'A' =</b>	<b><math>[(100A \times 240V) \times .80] =</math></b>	<b>19,200 watts</b>
<b>Panel 'B' =</b>	<b><math>[(100A \times 240V) \times 1] =</math></b>	<b>24,000 watts</b>
<b>First 5 sites at 100% =</b>	<b><math>(5 \times 50A \times 240V) =</math></b>	<b>60,000 watts</b>
<b>Next 10 sites at 75% =</b>	<b><math>[(5 \times 50A \times 240V) +</math> <b><math>(5 \times 30A \times 120V) \times .75] =</math></b></b>	<b>58,500 watts</b>
<b>Next 10 sites at 50% =</b>	<b><math>[(10 \times 30A \times 120V) \times .5] =</math></b>	<b>18,000 watts</b>
<b>Remainder at 25% =</b>	<b><math>[(5 \times 30A \times 120V) \times .25] =</math></b>	<b>4,500 watts</b>
	<b>Total watts</b>	<b>184,200 watts</b>
	<b><math>184,200 \div 240V =</math></b>	<b>767.5 Amps</b>

**This campground would require an 800Amp service with a 100% rated main breaker; or  
This campground could install a 1000Amp 80% rated main breaker.**

#### 72-102(2),(3),(4)

#### Campground service calculation Example B

A campground has 40 sites. 14 of the sites have a pedestal with a 50A, 208V single phase receptacle and a 30A, 120V receptacle. 17 of the sites have a pedestal with a 30A, 120V receptacle and a 15A, 120V receptacle. 9 of the sites have a 20A, 120V receptacle. Panel A is a 120/208V single phase panel with a 60A breaker (rated at 80%) and serves the shower building. Panel B is a 120/208V 3 phase panel protected by a 150A breaker (rated at 100%) and serves the site lighting etc.

What size 120/208V service is required?

<b>Panel 'A' =</b>	<b><math>[(60A \times 208V) \times .80] =</math></b>	<b>9984 watts</b>
<b>Panel 'B' =</b>	<b><math>[(150A \times 208V \times 1.73) \times 1] =</math></b>	<b>53,976 watts</b>
<b>First 5 sites at 100% =</b>	<b><math>[(5 \times 50A \times 208V) \times 1] =</math></b>	<b>52,000 watts</b>
<b>Next 10 sites at 75% =</b>	<b><math>[(9 \times 50A \times 208V) +</math> <b><math>(1 \times 30A \times 120V) \times .75] =</math></b></b>	<b>72,900 watts</b>
<b>Next 10 sites at 50% =</b>	<b><math>[9 \times 30A \times 120V] \times .5] =</math></b>	<b>18,000 watts</b>
<b>Remainder of sites at 25% =</b>	<b><math>[(6 \times 30A \times 120V) +</math> <b><math>(9 \times 20A \times 120V) \times .25] =</math></b></b>	<b>10,800 watts</b>
	<b>Total Watts</b>	<b>217,660 watts</b>
	<b><math>217,660 \div (208 \times 1.73) =</math></b>	<b>604.88Amps</b>

**This campground will require an 800Amp 120/208V 3 phase service**

## SECTION 76 - TEMPORARY WIRING

### 76-000 - Scope

This section of the code covers temporary wiring installations for buildings or projects under construction or demolition and experimental or testing facilities of a temporary nature.

### 76-004 - Grounding and Bonding

Temporary Services must have a service entrance rated main breaker and be grounded with **two ground rods, one ground plate or a field assembled grounding electrode.** (See Rule 10-700)

### 76-006 - Service Entrance Equipment

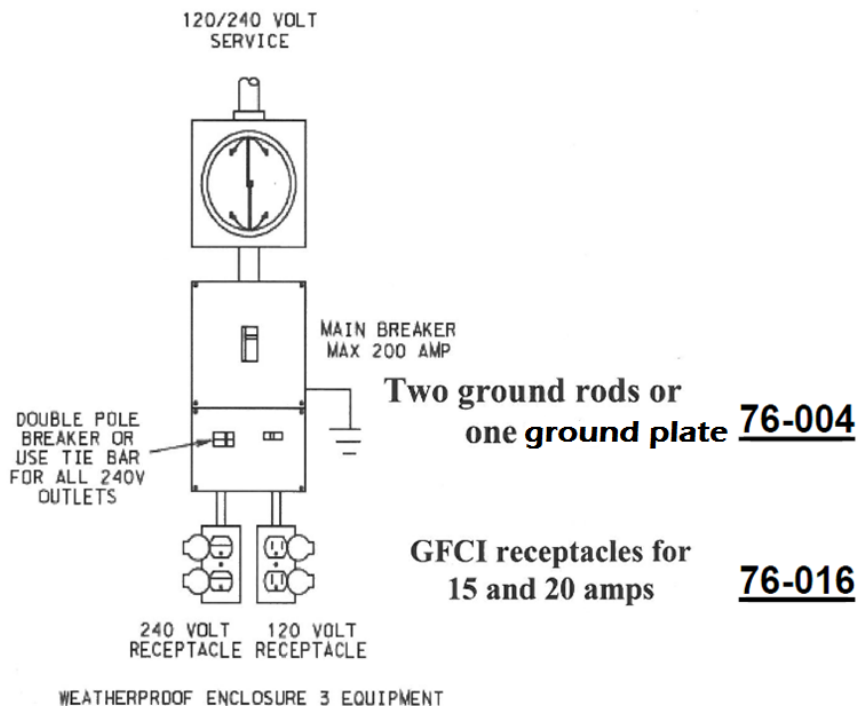
When located in an outdoor location, these services must be of weather-proof construction.

Temporary Services are allowed to be connected for no more than 24 months in accordance with the Electrical Service Requirements (ESR).

### 76-016 - Receptacles

All temporary service receptacles of 5-15R and 5-20R are to be ground fault protected. In use 'extra duty' covers will not be required on temporary construction services.

Receptacles installed in a building under construction that are part of the permanent wiring system will not require ground fault protection.



## **SECTION 80 - CATHODIC PROTECTION**

### **80-008 - Branch Circuit**

A cathodic rectifier shall be fed from a separate circuit. The new rule has removed the **lockable** requirement.

### **80-010 - Disconnecting Means**

(1) A separate disconnecting means shall be installed at a point readily accessible to the users and within sight of and within 15 m of a rectifier unit of a cathodic protection system.

(2) Notwithstanding subrule (1), a disconnecting means integral to the rectifier unit shall be permitted to serve as the disconnecting means required in subrule (1) provided the rectifier enclosure is rendered inaccessible to unauthorized persons by an external lockable cover.

(3) The disconnecting means referred to in subrule (1) shall be labeled in a conspicuous, legible and permanent manner identifying it as the disconnecting means for a cathodic protection system.

## **SECTION 84 - INTERCONNECTION OF ELECTRIC POWER PRODUCTION SOURCES**

### **84-000 - Portable Generators**

As with all electrical equipment, portable generators and associated equipment must be approved and carry the mark of a recognized certification agency. Although recommended in the manuals of many power take-off generators, welding cable is not an approved wiring method and will not be accepted.

Recessed male receptacles shall be used as an interface to the generator.

Generators and associated equipment (i.e. transfer switches, etc.) must be installed by a licensed electrical contractor and the appropriate permit must be submitted. Plans may be required for review as per [Rule 2-014](#)

The following diagrams show typical generator installation configurations. For other installation configurations contact a licensed electrical contractor or a SaskPower Gas and Electrical Inspections.

### **Portable Electric Power Plants (as per OH&S Regulations 1996)**

**460(1)** An employer, contractor or supplier shall ensure that:

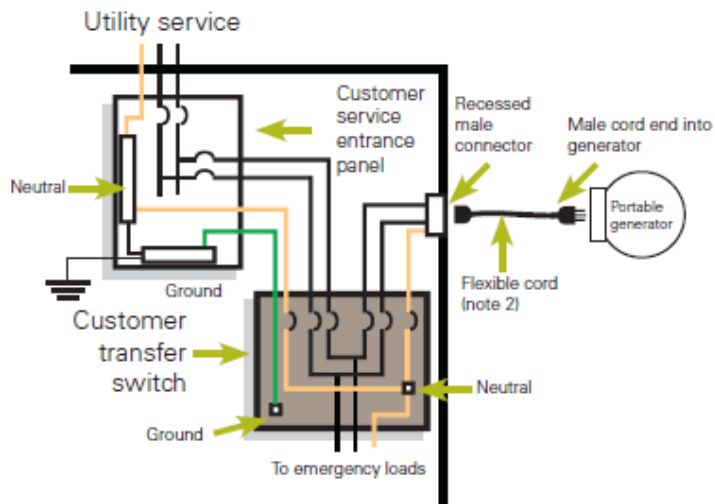
- (a) a portable electric power plant that is operated at voltages exceeding 240 volts to ground or is rated in excess of 12.0 kilovolt-amperes is connected to ground in a manner approved pursuant to *The Electrical Inspection Act, 1993*; and
- (b) all electrical equipment connected to an ungrounded portable electric power plant:
  - (i) is of the double insulated type; and

- (ii) is clearly marked as being of the double insulated type or is supplied from a class A ground fault interrupting device.

### Residential Service

Customer transfer switch required.

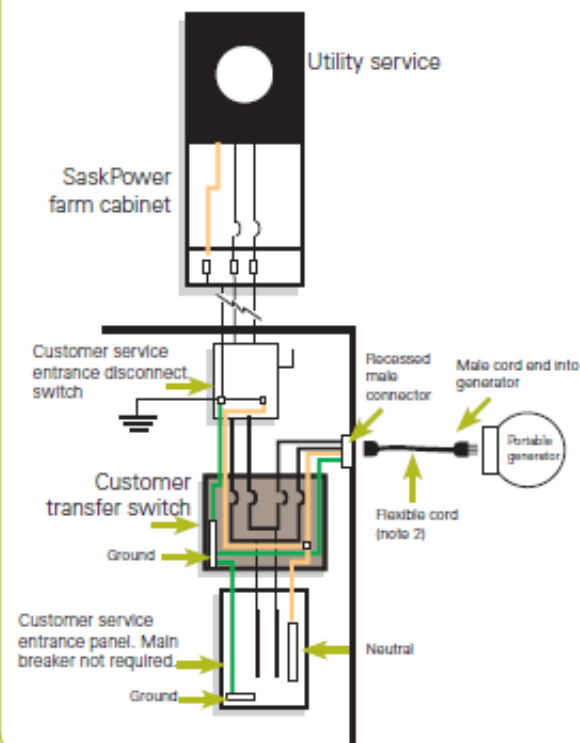
Example with neutral bonded to frame  
(note 3 & 4)

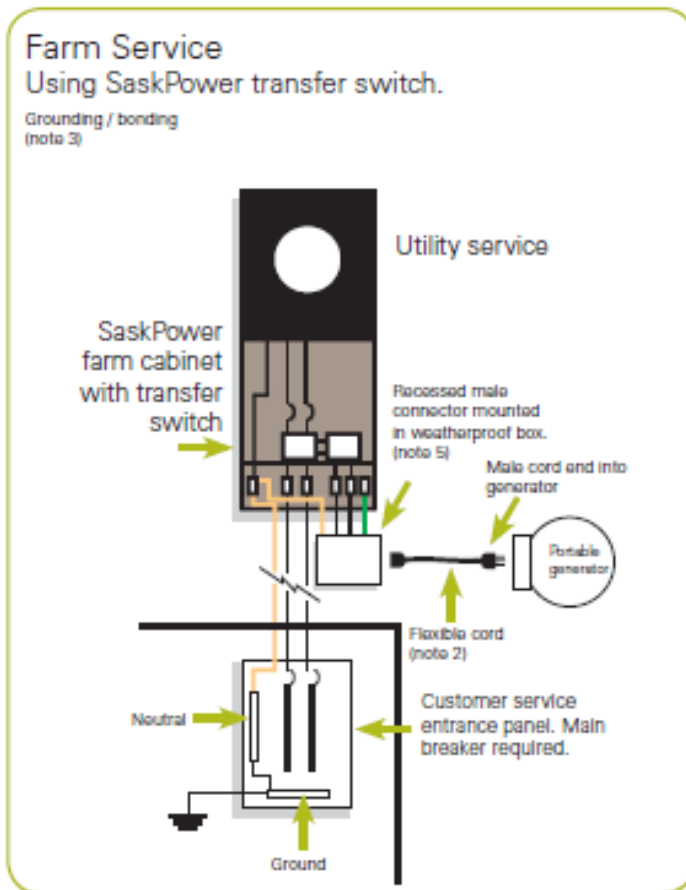


### Farm Service

Using customer transfer switch.

Example with neutral floating  
(note 3)





### Notes

1. Rewiring or tampering with a generator unit voids CSA certification.
2. Conductors must be sized to match the maximum output of the generator.
3. Follow generator manufacturer's installation, grounding and operation instructions.
4. A transfer switch must be capable of switching the neutral when the generator neutral is bonded to the frame.
5. Permission is required from your local **SaskPower District Office** to install this recessed male connector on a transformer pole.
6. A portable electric power plant that is operated at voltages exceeding 240 volts to ground or is rated in excess of 12.0 kW shall be grounded as per Section 10 of the current Canadian Electrical Code.

### **84-030 - Warning Notice and Diagram (Utility Disconnecting Means)**

A single-line, permanent, legible diagram of the interconnected system shall be installed in a conspicuous place at the supply authority disconnecting means and supply authority meter location.

This diagram should show the physical location of the interconnected sources, the interlocks between the switching equipment and isolation points so that personnel are able to isolate the section being serviced.

See Figure 12, Rule 64-002 in Appendix B for an illustration of an interconnected photovoltaic system.

## **OIL & GAS FIELD INSTALLATIONS**

Installations for oil and gas fields shall comply with Section 19, *Code for Electrical Installations at Oil and Gas Facilities, Fourth Edition, 2015*, as published and distributed by SaskPower. It is available on our website at [www.saskpower.com](http://www.saskpower.com).

## **MINING INSTALLATIONS**

### **Standards Applications**

*Canadian Electrical Code, Part 1 C22.1 – Safety Standards for Electrical Installations*

The electrical works, facilities and plant that are on surface and are used for housing, maintenance, and processing of extracted minerals

*M421 - Use of Electricity in Mines*

Supplemental to the requirements of C22.1, including the electrical works, facilities and plant that are both underground and on surface that are used in the extraction of minerals

*The Electrical Licensing Act, 1993 -c.E-7.2 s.8(1), 23(1)(2)(3)*

### **License required**

**8(1)** Subject to subsection (2), no person shall do any work of electrical installation unless he holds a license.

### **License**

**23(1)** No employer shall do any work of electrical installation unless he holds an employer's license.

(2) An employer's license may be issued to a person who employs at least one individual who holds a journeyman's license;

(3) No employer shall require or permit any apprentice or other unlicensed individual to perform any work of electrical installation except as an assistant to, and under the supervision of, a journeyman.

### **Approved Electrical Equipment**

- C22.1-15 2-024 – Use of Approved Equipment,
- M421 4.1.2 – Application,
- The Electrical Inspection Act, 1993 - c.E-6.3 s.18(1)(2) – Equipment Approval

All surface and sub-surface electrical equipment requires an overall approval from a Saskatchewan recognized Certification Body prior to being electrically connected or reconnected (2015 Saskatchewan Interpretations pg. 17-24), and must bear evidence of the approval or certification.

**Report of Accident**

*The Electrical Inspections Act, 1993 c.E-6.3 s.27* requires:

“Where an accident involving an electrical installation or electrical equipment occurs and results in a death or injury of a person or in a fire or an explosion, the contractor or the contractor’s agent or the owner of the electrical equipment or the owner’s agent shall immediately notify the chief inspector, stating the precise location of the accident, its general nature and results”.

**Investigation of Accident**

*The Electrical Inspections Act, 1993 c.E-6.3 s.28* requires:

The accident site to be preserved, “no part of any electrical plant or electrical equipment involved is to be removed or its position altered by any person”, “until the written permission of an inspector has been obtained”

**2-012 Notification of Inspection**

Applies to Owner’s new installations, either installed by employees or by a contractor.

**2-014 Plans and Specifications**

Applies to Owner’s new installations installed by employees or contractors, other than maintenance replacement of existing equipment.

**4-012 Use of Flexible Cable**

(3) Flexible cord shall not be used (a) as a substitute for fixed wiring (i) permanently secured to any structural member.

**36-006 Warning Notice**

(1) Permanent warning notice shall be placed (b) on all high voltage cables at points of access (d) on all exposed portions of all high voltage cables at a spacing not to exceed 10m.

**M421-11 4.2.1.2 Mine Plans**

Plans and diagrams shall be reviewed and updated every 4 months, and shall be posted at each power skid, electrical room, substation, load break / switch, and distribution location.

**M421-11 4.3.3.4 Identification of Cables**

Each cable assembly operating at a voltage above 300v, shall be labeled:

- at the distribution / source end of the cable
- where the cable terminates or which equipment the cable is connected to in the field
- at the equipment end of the cable – the overcurrent device location for the cable and its source location

## Electrical Inspections Phone Listing

### SaskPower Electrical Inspections Division

Mike Anderson - Chief Electrical Inspector & Director of Electrical Inspections  
 Regina 306-566-2515; Cellular 306-535-9920

Scott McCriston - Manager Electrical Inspections, Regina---- 306-566-2516; Cellular 306-536-4122

Rod Pack - Manager Electrical Inspector, Saskatoon -----306-934-7720; Cellular 306-291-8126

Phoukham Phommavong - Electrical Plans Review, Regina ---306-566-2596; Cellular 306-531-6445

David Pilon - Training Coordinator, Saskatoon -----Cellular 306-229-7986

Mark Woitas - Compliance Inspector, Regina ----- 306-566-2531; Cellular 306-536-6549

Blaine Ganchar - Compliance Inspector, Saskatoon ----- 306-934-7891; Cellular 306-221-0916

Regina Office Address #177-1621 Albert Street Regina, SK, S4P 0S1 Toll Free: 1-888-757-6937 (option5) Fax 306-566-2906	Saskatoon Office Address 1370 Fletcher Road; P.O. Box 1560 Saskatoon, SK, S7H 0V1 Toll Free: 1-888-757-6937 (option 5) Fax 306-934-7736
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Office Location & Area	Electrical Inspector	Address
Estevan	Cell 306-421-9390	234-5th Street Estevan S4A 0X8
Estevan	Cell 306-421-5996	234-5th Street Estevan S4A 0X8
Kindersley	Cell 306-463-7196	P.O. Box 1119, Hwy#7 East Kindersley S0L 1S0
Kindersley	Cell 306-460-9608	P.O. Box 1119, Hwy#7 East Kindersley S0L 1S0
Lloydminster	Cell 306-821-0330	4005-52nd Street Lloydminster S9V 2B5
Lloydminster	Cell 306-821-6649	4005-52nd Street Lloydminster S9V 2B5
Moose Jaw	Cell 306-630-5311	880 Lillooet St. West, Box 1240 Moose Jaw S6H 4P9
Moose Jaw	Cell 306-630-5788	880 Lillooet St. West, Box 1240 Moose Jaw S6H 4P9
North Battleford	Cell 306-441-0511	P.O. Box 550; 9905 Thatcher Ave North Battleford S9A 2Y7
North Battleford	Cell 306-441-3219	P.O. Box 550; 9905 Thatcher Ave North Battleford S9A 2Y7
Prince Albert	Cell 306-961-2634	Box 5900; 3050 2 <sup>nd</sup> Ave W Prince Albert S6V 7V6
Prince Albert	Cell 306-930-9268	Box 5900; 3050 2nd Ave W Prince Albert S6V 7V6
Prince Albert	Cell 306-961-7470	Box 5900; 3050 2nd Ave W Prince Albert S6V 7V6

Office Location & Area	Electrical Inspector	Address
Regina	Cell 306-536-6550	#177-1621 Albert Street. Regina S4P 0S1
Regina	Cell 306-529-6992	#177-1621 Albert Street. Regina S4P 0S1
Regina	Cell 306-536-4665	#177-1621 Albert Street. Regina S4P 0S1
Regina	Cell 306-536-4121	#177-1621 Albert Street. Regina S4P 0S1
Regina	Cell 306-529-6035	#177-1621 Albert Street. Regina S4P 0S1
Regina	Cell 306-533-0922	#177-1621 Albert Street. Regina S4P 0S1
Regina	Cell 306-526-8950	#177-1621 Albert Street. Regina S4P 0S1
Regina	Cell 306-550-1480	#177-1621 Albert Street. Regina S4P 0S1
Regina	Cell 306-526-9006	#177-1621 Albert Street. Regina S4P 0S1
Saskatoon	Cell 306-221-2960	1370 Fletcher Road, P.O. Box 1560 Saskatoon S7K 3R3
Saskatoon	Cell 306-222-7794	1370 Fletcher Road, P.O. Box 1560 Saskatoon S7K 3R3
Saskatoon	Cell 306-221-0918	1370 Fletcher Road, P.O. Box 1560 Saskatoon S7K 3R3
Saskatoon	Cell 306-221-0916	1370 Fletcher Road, P.O. Box 1560 Saskatoon S7K 3R3
Saskatoon	Cell 306-221-0913	1370 Fletcher Road, P.O. Box 1560 Saskatoon S7K 3R3
Saskatoon	Cell 306-222-4819	1370 Fletcher Road, P.O. Box 1560 Saskatoon S7K 3R3
Saskatoon	Cell 306-220-8233	1370 Fletcher Road, P.O. Box 1560 Saskatoon S7K 3R3
Saskatoon	Cell 306-221-6877	1370 Fletcher Road, P.O. Box 1560 Saskatoon S7K 3R3
Saskatoon	Cell 306-227-5540	1370 Fletcher Road, P.O. Box 1560 Saskatoon S7K 3R3
Saskatoon	Cell 306-227-1848	1370 Fletcher Road, P.O. Box 1560 Saskatoon S7K 3R3
Swift Current	Cell 306-741-2807	1800 Aberdeen St., Box 580 Swift Current S9H 3W4
Swift Current	Cell 306-741-0690	1800 Aberdeen St., Box 580 Swift Current S9H 3W4

Office Location & Area	Electrical Inspector	Address
Swift Current	Cell 306-750-1489	1800 Aberdeen St., Box 580 Swift Current S9H 3W4
Tisdale	Cell 306-873-7399	Box 1900; 316 Heritage Road Tisdale S0E 1T0
Tisdale	Cell 306-852-7946	Box 1900; 204-1105 99th St Tisdale S0E 1T0
Tisdale ( <b>Mines</b> )	Cell 306-370-6875	Box 1900; 316 Heritage Road Tisdale S0E 1T0
Weyburn	Cell 306-461-9961	1665 Ebel Road Weyburn S4H 1V3
Weyburn	Cell 306-861-5866	1665 Ebel Road Weyburn S4H 1V3
Yorkton	Cell 306-621-1592	300 Broadway Street W Yorkton S3N 0M1
Yorkton	Cell 306-621-1102	300 Broadway St. W Yorkton S3N 0M1
Yorkton	Cell 306-516-7115	300 Broadway St. W Yorkton S3N 0M1

Other Contacts:

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**Annex B**

**TO:** The Code Coordinator for the Saskatchewan Electrical Interpretations

**FROM:**

**AFFILIATION:**

**DATE:**

**RE:** Request for an amendment to Rule(s)

---

Request (Specifically Worded):

Reason for Request:

Supporting Information:

**For office use only:**

**Subject No. Assigned:**

*Completed form to be sent to: Saskatchewan Interpretations Code Coordinator – geis@saskpower.com*

*Submitter:*

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