

May 14, 2012

ELECTRICAL BULLETIN

**UNDER THE PROVISIONS OF
THE *PUBLIC SAFETY ACT*
AND
THE *ELECTRICAL REGULATIONS*,
THE CANADIAN ELECTRICAL CODE
PART 1, 2012, 22ND EDITION
WILL COME INTO EFFECT JUNE 30, 2012**

**THESE REQUIREMENTS WILL APPLY TO ALL ELECTRICAL WORK FOR
PERMITS ISSUED ON OR AFTER THIS DATE.**

**ALL ELECTRICAL CONTRACTORS, CONSULTANTS, DESIGNERS AND
INSTALLERS ARE ENCOURAGED TO OBTAIN THE NEW CANADIAN
ELECTRICAL CODE 2012, 22ND EDITION BEFORE THE ABOVE
COMMENCEMENT DATE.**

With the adoption of the 2012 Canadian Electrical Code (CEC) there are a number of code changes. All users of the CEC should ensure they are fully aware of all changes and comply with these revisions in electrical designs and installations where appropriate.

Some of the more significant changes in the 2012 CEC are as follows:

(**Note 1:** the following does not represent all of the CEC revisions)

(**Note 2:** Any change to a section or rule contained in the (CEC) is identified in the code book by a triangle located adjacent to the rule on the left side of the page)

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Section 2 – Maintenance and Operation

Rule 2-314 and Rule 26-704 – Receptacles required for maintenance of equipment on rooftops

Rule 2-314 requires installation of a receptacle on the roof top where any HVAC or similar equipment is installed, except for a dwelling unit. This receptacle is to enable service workers to access power when performing maintenance work for roof top mounted electrical equipment. Any receptacle installed must be in accordance with rule 26-704.

Rule 26-704 provides additional information regarding the roof top receptacle. (For example, the roof top receptacle must have GFCI protection and must be on a separate branch circuit) and specifies the configuration, location and requirements for the mechanical protection of the roof top receptacle (see Section 26).

Section 4 – Conductors

Rule 4-006 Temperature limitations

This new rule has significant impact on the manner in which cable sizes are chosen where the ampacities of Tables 1-4 are used.

This rule requires that the ampacity of the conductors be selected from the corresponding temperature column in Tables 1-4 which corresponds to the temperature rating marked on the equipment.

The temperature rating of the conductor is required to match or exceed the lowest temperature rating of the electrical equipment or any wire connector (terminal connector or lug, etc.).

The temperature rating of wire connectors is typically 90° C and is higher than the electrical equipment conductor temperature termination rating of a typical breaker which is 75° C; therefore it would be the breaker rating that is used not the wire connector rating. The ampacity rating of the conductor would be based on the 75° C temperature column of the ampacity Tables.

Wire that is rated for 90° C can still be used but the maximum conductor termination temperature rating of the electrical equipment dictates which temperature column in the appropriate Table is to be used when determining the maximum allowable ampacity of the conductor.

Where equipment is not marked with a maximum conductor termination temperature, 90° C rating shall be used by default.

Remember that a conductor terminates on both ends, the termination on each end must be considered, and the lowest conductor termination rating of the electrical equipment at one end

dictates which temperature column in the appropriate Table to use in determining the maximum allowable ampacity of the conductor.

Example 1: Based on 2012 CEC – Table 2 ampacities

SCENARIO 1

150 AMP calculated non continuous load terminating on a breaker with 75° C maximum conductor termination temperature rating. RW90 wire is being used to terminate at other end to 90° C rated electrical device.

Step 1 Determine minimum conductor insulation rating which is 75° C – RW90 wire is permitted.

Step 2 Go to Table 2

Step 3 Use 75° C temperature column

Step 4 Find conductor size with ampacity of at least 150 AMP

Step 5 Conductor size to use – 1/0 – RW90

SCENARIO 2 (Same as above but all termination ratings are 60° C)

Step 1 – Minimum conductor insulation 60° C – RW90 wire can be used

Step 2 – Go to Table 2

Step 3 – Use 60° C temperature column

Step 4 – Find conductor size with ampacity of at least 150AMPS

Step 5 – Conductor size to use – 3/0 – RW90. Rule 8-104(2) – the calculated load in a circuit can not exceed the ampere rating of the circuit which is 150 AMP so a 2/0 conductor is not permitted.

Tables 1-4 Allowable ampacities of conductors

Tables 1-4 have been altered to correspond with the US National Electrical Code (NEC).

In many situations the cable size required will remain the same.

The increased ampacities may assist when de-rating factors are applied.

Note: Tables D8A to D15B for underground ampacities are based on 90° C rated cables, to obtain the ampacities for 75° C de-rate by a factor of 0.886 and for 60° C a factor of 0.756. See Appendix B rule 4-004 for further information.

Section 6 – Control and Protective Equipment

Rule 6-206 – Consumer’s service equipment location

This rule no longer requires a deviation to place consumer equipment outside of the building being served.

The rule only allows the service disconnect means (breaker or fuse over current device) to be placed outside, not the service distribution part of the service entrance.

The service disconnect means becomes the service box and may only contain the main over current device and not the feeder or branch over current devices.

The distribution or panel board with the feeder or branch over current devices must be located inside the building.

The service disconnecting means shall be service entrance rated.

When the main over current device is placed outside, the requirement of limiting the un-fused service wires to a maximum distance of 3 meters within the building no longer applies and the incoming conductors may extend beyond the 3 meter maximum.

Section 10 - Grounding and Bonding

Rule 10-812 and Table 17 - Grounding conductor size for alternating current systems and for service equipment.

Table 17 has been removed and rule 10-812 specifies that a grounding conductor connected to a grounding system, meeting grounding electrode requirements of rule 10-700 can be a No. 6 AWG (American Wire Gauge) copper conductor in most circumstances.

The rationale is the majority of the fault current will be taken by the service grounded conductor (Neutral) back to the source and that a No. 6 AWG conductor is sufficient to carry any portion of the fault current that does not flow back on the neutral.

It should be noted that the utility always requires a service grounded conductor (Neutral) for metering purposes sized in accordance with rule 4-024 of the Canadian Electrical Code (CEC).

There are exceptions in other sections of the CEC that may require larger ground conductors, such as in section 36 of the CEC or where the ground fault current has been determined to exceed the withstand capability of a No. 6 AWG conductor in which case a larger conductor would be used to accommodate that fault current.

Section 12 – Wiring Methods

Rules 12-602(6) and 12-902(2) – Armoured Cable and Raceways

Rule 12-602(6) allows armoured cable to be pulled into a conduit when it is installed in accordance with Rule 12-902(2).

The conditions require calculations be provided to indicate the maximum pulling tension of the cable has not been exceeded. Such calculations must be acceptable to the Chief Electrical Inspector and provided upon request.

Where such calculations are not performed, the installation is permitted where the number of bends and length of the cable complies with the conditions specified in rule 12-902(2).

Rule 12-2250 – Cablebus

This rule covers cablebus installations. Please note this is different from cable tray installations.

For additional information and clarity, a definition has been added in section 0 and Appendix B notes.

No certification exists for the complete assembly of a cablebus installation and only the cablebus enclosure can be certified.

The installation of a cablebus system is the assembly of components onsite per the manufacturer's instructions and the installation of the overall assembly is in accordance with the CEC.

The following steps are required for the use of cablebus:

1. Assembly of the cablebus components on site per the manufacturer's direction.
2. Assembly has a Special Inspection (SI) conducted by a certification body (CB) recognized by the Standards Council of Canada.
3. The overall installation is inspected as per rules 12-2250 to 12-2260 in the CEC.

Drawings or calculations from the manufacturer may be requested by the inspector or the CB to clarify or confirm any aspect of the cablebus assembly.

Step 2, as indicated above, is required until such time a standard and acceptable procedure has been developed to accommodate the field assembly of cablebus that is acceptable to the Chief Electrical Inspector.

Section 14 – Protection and Control

Rule 14-104(2) – Rating of over current devices

This rule provides limitations for the maximum over current device that can be used on small conductors, No. 14, No. 12 and No. 10AWG, and overrides rule 14-104(1) (a) and Table 13, even though the ampacities shown in the tables may exceed the rating of the over current device.

The ratings of over current protection for the above wire sizes are not to exceed:

15 AMP for No. 14 AWG copper conductor
20 AMP for No. 12 AWG copper conductor
30 AMP for No. 10 AWG copper conductor
15 AMP for No. 12 AWG aluminum conductor

Section 18 – Hazardous Locations

Equipment protection level (EPL) marking is introduced for Class 1 locations (Explosive Gas Atmospheres) and is identified as Ga, Gb or Gc.

This code recognizes the International Electrotechnical Commission (IEC) system of marking equipment as providing a specific method of protection.

Equipment for Class 1 locations will now contain markings as indicated above and older equipment in stock or in the field may continue to use the methods of protection, as identified in rules 18-100(c) or 18-150(1) (d) of the CEC, to determine suitability for the intended zone.

A table is provided in Appendix B describing some of the equipment and methods of protection permitted in each zone.

Section 26 – Installation of Electrical Equipment

Rule 26-702 requires receptacles installed outside in configurations identified in rule 26-702(2) be installed with cover plates designed to be suitable for use in wet locations whether or not a plug is inserted into the receptacle. These plates are required to be marked “**Wet Locations**” with the marking being visible after installation.

Section 50 – Solar Photovoltaic Systems

Note several changes made to this section, for example:

- Rules pertaining to voltage drop and the requirement for DC arc-fault protection
- Grounding requirements for such systems are located in the new section 64 of the CEC

Section 64 – Renewable Energy Systems

This section deals entirely with renewable energy systems such as:

- Stationary fuel cell systems
- Small wind systems
- Large wind systems
- Micro-hydro power systems; and
- Hydrokinetic power systems

To assist in compliance with this section, extensive notes and diagrams have been added to Appendix B of the CEC.



Mike Mosher
Manager of Electrical Safety Services
Chief Electrical Inspector
Program and Support Services Division