

## Electric Vehicle Charging for Buildings

With an increase in installation of the Electric Vehicle Energy Management System (EVEMS) and Electric Vehicle Supply Equipment (EVSE) over the years, this bulletin:

- 1) Discusses the minimum performance requirement for EVEMS required by the VBBL,
- 2) Discusses the CE Code issues involved with EVEMS, circuit loading and demand factors, and
- 3) Clarifies the electrical permit and inspection requirements for installation of EVEMS and EVSE.

This bulletin replaces Bulletin 2016-006-BU/EL.

### 1. Background

**Canadian Electrical Code, Part I (CSA C22.1-18 CE Code) provides the following:**

#### **Rule 8-002 Special terminology**

**Electric vehicle energy management system** — a means used to control electric vehicle supply equipment loads through the process of connecting, disconnecting, increasing, or reducing electric power to the loads and consisting of any of the following: a monitor(s), communications equipment, a controller(s), a timer(s), and other applicable device(s).

#### **Parking Bylaw regarding Electric Vehicle Charging Infrastructure Requirements: 4.14 Electric Vehicle Charging Infrastructure Requirements**

Review the Parking By-law: <https://bylaws.vancouver.ca/parking/Sec04.pdf>

#### **Vancouver Building By-law regarding Electric Vehicle Charging: Section 10.3. Electric Vehicle Charging**

Review the VBBL: <https://free.bcpublications.ca/civix/document/id/public/vbbl2019/1870348814>

For the purpose of Sentence 10.3.1.1.(3) of the VBBL, a minimum performance level of 12 kWh over an eight (8) hour overnight period per EVSE controlled by the EVEMS must be achieved, assuming all parking spaces are in use by a charging electric vehicle.

#### **Electrical By-law No.5563: 7.3.7 Electric Vehicle Charging**

Review the Electrical By-law: <https://bylaws.vancouver.ca/5563c.PDF>

### 2. CE Code Issues

- 1) The Electrical By-law mandates that the electrical equipment installed under provisions of the CE Code be approved in accordance with Rule 2-024.

So far, a certification / product standard does not exist for EVEMS. In order to install the EVEMS, sealed engineering drawings shall be required; see Electrical Permit Submission requirements below.

It is important to note that the EVEMS must establish a fail-safe state that must guarantee the actual loads are in full compliance with CE Code Rule 8-104 5) and/or 6), and EVEMS shall be tested for the correct operation. This responsibility falls on the Registered Professional of Record.

- 2) CE Code Rule 8-202 1) a) does not specify requirements where EVSE loads are supplied from a dwelling unit's panelboard.

For application of the CE Code Rule 8-202 1) a), any EVSE loads supplied from a dwelling unit's panelboard shall be added with a 100% demand factor.

- 3) CE Code Rule 8-202 3) d) does not specify requirements where EVSE loads are controlled by an EVEMS in accordance with Rule 8-106 10) or Rule 86-300 2).

For application of the CE Code Rules 8-202 3) d), 8-204 1) d), 8-206 1) d), 8-208 1) d), and 8-210 c), the demand load for EVSE allowed by any EVEMS is in accordance with Rule 8-106 10) and shall be added with a 100% demand factor; except as permitted by Rule 8-106 11).

- 4) CE Code Rule 8-106 8) permits historical peak demand to be included in a calculated load; Table 38 provides demand factors to be used in conjunction with Rules 8-202 to 8-210, where the new EVSE loads are to be added to an existing service or feeder, Rule 8-106 8) used in conjunction with Table 38 is not acceptable.

### **3. Electrical Permit Submission Online**

- 1) For purpose of Section 5.5 of the Electrical By-law No. 5563, when the intended installation meets any or all of the following conditions:
  - a) Complete integrated EVEMS / Field assembled EVEMS,
  - b) Controller/communication equipment for 6 or more EVSE loads,
  - c) More than 2 DC EVSE – DC Fast Charging chargers/stations,
  - d) EVSE supplied from a solar photovoltaic installation,
  - e) Wiring installation for 6 or more EVSE / EV-Ready / energized outlets,
  - f) Calculated load is based on historical peak demand plus 6 or more new EVSE loads, or
  - g) Calculated load is based on demonstrated load.

The applicant must upload a complete set of drawings with an electronic permit application. The Registered Professional of Record must provide these drawings with their digital stamp and signature. These drawings must include details of item 2) below.

#### Notes:

Question about the foregoing conditions, please contact the electrical inspections group:

<https://vancouver.ca/files/cov/district-electrical-inspector-map.pdf>

Review Bulletin 2001-008-BU/EL for electrical plan review requirements:

<https://vancouver.ca/files/cov/2001-008-electrical-plan-review.pdf>

- 2) Where applicable, the following details are required to be provided (if drawings not required):
  - a) A detailed load calculation as per Section 8 of the CE Code. Where new EVSE loads are to be added to an existing service or feeder, the application of Rule 8-106 8) and 10) must include:
    - i. the historical peak demand, plus
    - ii. the new EVSE loads, and/or the maximum EVSE loads allowed by the EVEMSS.
  - b) A single line diagram must identify:

- i. Site address, project title, date, name of person/company that prepared the diagram,
- ii. Configurations and control methods of EVEMS,
- iii. Markings of EVEMS equipment and EVSE for the purpose of Rule 2-100,
- iv. Service, service equipment, distribution equipment, panelboards and metering equipment,
- v. Conductors for services, feeders, branch circuits, and EVEMS circuits,
- vi. Wiring methods,
- vii. Overcurrent protection and control of electrical circuits and apparatus,
- viii. Location of electrical equipment,
- ix. Differentiation between new and existing equipment,
- x. EVEMS performance level as per Sentence 10.3.1.1.(3) of the VBBL.

c) Floor plans must show the routes of wiring, location of equipment, devices, EV-ready outlets, EVSE, EVEMS, etc.

3) A written approval from the Strata Corporation for the intended installation.

**4. Electrical Inspection**

Upon completion of an EVEMS, the field safety representative (FSR) / permit holder must request an inspection and upload to the electrical permit online a completed contractor declaration and an Electrical Registered Professional’s letter (when drawings submitted as per above item 3. 1); confirming that the installed EVEMS is in full compliance with CE Code Rule 8-104 5) and/or 6).

**5. Annual Permit**

Maintenance and operation of the EVEMS require an annual permit.

Review Bulletin 2019-003-EL Electrical Annual Permit (Operating Permit):

<https://vancouver.ca/files/cov/2019-003-electrical-annual-permit-operating-permit.pdf>

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