

The following consolidated text of Part 10 of the VBBL is for information only, and is intended to represent the Part 10 of the VBBL in effect as of May 15, 2018. Important text in other sections related to Part 10 is also provided for information only.

Red text represents bylaw #12103 changes approved by Council on May 2, 2018, taking force and effect as of enactment on May 15, 2018.

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In Book I, Division B, Part 1, Council adds references to:

- ASTM E779 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization; and
  - USACE Air Leakage Test Protocol for Building Envelopes, Version 3.
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Part 10  
Energy and Water Efficiency

**Section 10.1. General**

- 10.1.1. Application
- 10.1.2. Definitions

**Section 10.2. Energy Efficiency**

- 10.2.1. Energy Design Building Classification
- 10.2.2. Design Measures for Energy Efficiency

**Section 10.3. Water Efficiency**

- 10.3.1. Design and Installation

**Section 10.4. Electric Vehicle Charging**

- 10.4.3. Electric Vehicle Charging for Buildings

**Section 10.5. Objectives and Functional Statements**

- 10.5.1. Objectives and Functional Statements

# Part 10

## Energy and Water Efficiency

### Section 10.1. General

#### 10.1.1. Application

##### 10.1.1.1. Scope

1) The scope of this Part shall be as described in Subsection 1.3.3. of Division A.

##### 10.1.1.2. Application

1) The application of this Part shall be as described in Subsection 1.3.3. of Division A.

#### 10.1.2. Definitions

##### 10.1.2.1. Defined Terms

1) Words that appear in italics are defined in Article 1.4.1.2. of Division A.

### Section 10.2. Energy Efficiency

#### 10.2.1. Energy Design Building Classification

##### 10.2.1.1. Application

1) Except as permitted by Sentence (2), a *building* shall be designed and constructed in conformance with this Subsection for the purpose of energy efficiency.

2) A structure that cannot be identified by the characteristics of a *building* in this Subsection shall comply with the requirements of 10.2.1.2., or as deemed *acceptable* to the Chief Building Official.

3) To meet the energy efficiency requirements of Articles 10.2.1.2. to 10.2.1.5., the design requirements of Subsection 10.2.2. shall form an integral part of this Subsection.

##### 10.2.1.2. Residential Buildings Over 6 Storeys in Building Height and Commercial Buildings (with or without Residential Components)

1) All *buildings* other than those designed in accordance with 10.2.1.3 through 10.2.1.5., shall

a) be designed in accordance with Article 10.2.2.2. or Article 10.2.2.3.,

b) Reserved,

c) Reserved,

d) Reserved,

e) be provided with vestibules for all doors in accordance with Article 10.2.2.8.,

f) be provided with metering equipment in compliance with Article 10.2.2.9,

g) be provided with lighting controls in conformance with Article 10.2.2.10.,

- h) be provided with mechanical equipment complying with Articles 10.2.2.11. through 10.2.2.14.,
- i) conform with Article 10.2.2.15. where fire places are provided, and
- j) conform with Article 10.2.2.17. where heat recovery ventilators are provided.

#### 10.2.1.3. Residential Buildings of 4 to 6 Storeys (other than 1 or 2 Family Dwellings)

1) Except as otherwise required by this Subsection, a *building*, other than a 1 or 2 Family Dwelling, which is 4 to 6 *storeys* in building height and which is classified as Group C *major occupancy* containing no other *major occupancies*, excluding Group F Division 3 (Storage Garage) occupancy subsidiary to the Group C *major occupancy*, shall

a) **[Reserved.]**

b) be designed in compliance with the enhanced energy requirements of:

- i) Article 10.2.2.5., or
- ii) Energy standards as per Articles 10.2.2.2. or 10.2.2.3., and thermal insulation conforming with 10.2.2.6., windows and doors conforming with 10.2.2.7., and be provided with heat recovery ventilators conforming with 10.2.2.17.,

c) **[Reserved.]**

d) **[Reserved.]**

e) be provided with vestibules for all doors in accordance with Article 10.2.2.8.,

f) be provided with metering equipment in compliance with Article 10.2.2.9.,

g) be provided with lighting controls in conformance with Article 10.2.2.10.,

h) be provided with mechanical equipment complying with Articles 10.2.2.11. through 10.2.2.14.,

i) conform with Article 10.2.2.15. where domestic gas fireplaces are provided,

j) provide documentation in conformance with Article 10.2.2.20, and

k) provide airtightness testing in accordance with Article 10.2.2.21.

#### 10.2.1.4. Residential Buildings of 1 to 3 Storeys (other than 1 or 2 Family Dwellings)

1) Except as otherwise required in this Subsection, a *building*, other than a 1 or 2 Family Dwelling, which is less than 4 *storeys* in building height, and which is entirely classified as Group C *major occupancy*, excluding Group F Division 3 (Storage Garage) *occupancy* subsidiary to the Group C *major occupancy*, shall

a) be provided with thermal insulation in conformance with Article 10.2.2.6.,

b) be provided with windows and doors conforming with Article 10.2.2.7.,

c) be provided with vestibules for all doors in accordance with Article 10.2.2.8.,

d) be provided with metering equipment in compliance with Article 10.2.2.9.,

e) be provided with lighting controls in conformance with Article 10.2.2.10.,

f) where provided, domestic hot water heating shall comply with Article 10.2.2.11. through 10.2.2.13. as applicable,

g) comply with Article 10.2.2.14. where domestic gas heated furnaces or make-up air units are provided,

h) comply with Article 10.2.2.15. where domestic gas fireplaces are provided,

i) be provided with and heat recovery ventilators in conformance with Article 10.2.2.17.,

j) be designed with a solar photovoltaic ready pipe run in accordance with Article 10.2.2.19.,

k) provide documentation in accordance with Article 10.2.2.20., and

l) provide airtightness testing in accordance with Article 10.2.2.21.

### 10.2.1.5. One and Two Family Dwellings

- 1) Except as otherwise required in this Subsection, a *one family dwelling* and *two-family dwelling*, with or without *secondary suites* or *lock-off units*, and including *laneway houses*, shall
  - a) be designed with thermal insulation in conformance with Article 10.2.2.6.,
  - b) be designed with windows and doors conforming with Article 10.2.2.7.,
  - c) be provided with metering equipment in compliance with Article 10.2.2.9.,
  - d) be provided with lighting controls in conformance with Article 10.2.2.10.,
  - e) where provided, domestic hot water heating shall comply with Article 10.2.2.11. through 10.2.2.13. as applicable,
  - f) where provided, domestic gas heated furnaces or make-up air units shall comply with Article 10.2.2.14.,
  - g) where provided, domestic fireplaces shall comply with Article 10.2.2.15. and 10.2.2.16. as applicable,
  - h) be provided with heat recovery ventilators in conformance with Article 10.2.2.17.,
  - i) be designed with a solar ready pipe run in accordance with Article 10.2.2.18.,
  - j) provide documentation and a rating system audit in accordance with Article 10.2.2.20., and
  - l) provide airtightness testing in accordance with Article 10.2.2.21.

## 10.2.2. Design Measures for Energy Efficiency

### 10.2.2.1. Application

- 1) This Subsection applies to all *buildings* and parts of the *buildings* that are required to be energy efficient under Subsection 10.2.1.

### 10.2.2.2. ANSI/ASHRAE/IESNA 90.1

- 1) A building designed in accordance with this Article shall, be designed and constructed in accordance with ANSI/ASHRAE/IESNA 90.1, “Energy Standard for Buildings, except Low-Rise Residential Buildings”, and with
  - a) a climate zone of 5,
  - b) ventilation in conformance with ASHRAE 62 (except addendum n),
  - c) the 5 per cent in Table 11.3.1.5. Building Envelope, Exception a., being replaced by 2 per cent, if designed in accordance with ASHRAE 90.1, Section 11,
  - d) no requirement to comply with the Fenestration Orientation provisions of ASHRAE 90.1, Article 5.5.4.5.,
  - e) no requirement to comply with Automatic Receptacle Control, per ASHRAE 90.1, Article 8.4.2., and
  - f) lighting control per ASHRAE 90.1 Article 9.4.1.3.(b), except that the maximum period of no activity shall be reduced to 20 min.

### 10.2.2.3. National Energy Code of Canada for Buildings

- 1) A *building* designed in accordance with this Article shall be designed and constructed in accordance with the National Energy Code of Canada for Buildings (NECB), except that the provisions of this By-law shall apply where the NECB refers to the National Building Code of Canada (NBCC), and shall be designed with

- a) a climate zone of 4,
- b) ventilation in conformance with ASHRAE 62 (except addendum n),
- c) window-to-wall and skylight-to-roof area ratios of the reference *building* identical to area ratios of the proposed *building*,
- d) a vertical glazing Solar Heat Gain Coefficient which does not exceed an assembly maximum of 0.40,
- e) a Skylight Solar Heat Gain Coefficient without curb, or with curb and glass, which does not exceed an assembly maximum of 0.49, where the ratio of the aggregate skylight area to roof area is less than or equal to 2.0 per cent,
- f) a Skylight Solar Heat Gain Coefficient without curb, or with curb and glass, which does not exceed an assembly maximum of 0.39, where the ratio of the aggregate skylight area to roof area is greater than 2.0 per cent and less than or equal to 5.0 per cent, and
- g) a Skylight Solar Heat Gain Coefficient with curb and plastic which does not exceed an assembly maximum of 0.77, where the ratio of the aggregate skylight area to roof area is less than or equal to 2.0 per cent.

**10.2.2.4. Reserved.**

**10.2.2.5. Building Energy and Emissions Performance**

1) A *building* designed with this Article, shall be simulated in accordance with the City of Vancouver Energy Modelling Guidelines and demonstrate the performance values of the proposed building not exceeding an annual site energy use intensity of 110 kWh/m<sup>2</sup>, and an annual *greenhouse gas* emissions intensity of 5.5 kg/m<sup>2</sup>, and an annual *thermal energy demand intensity* of 25 kWh/m<sup>2</sup>.

**10.2.2.6. Building Envelope Opaque Elements**

1) Except as otherwise required in this Subsection, a *building* required to comply with this Article shall be provided with thermal insulation complying with the values in Table 10.2.2.6., between

- a) heated space and unheated space,
- b) heated space and exterior air,
- c) heated space and exterior *soil*,
- d) heating floor assemblies and heated space,
- e) heating floor assemblies and unheated space,
- f) heating floor assemblies and exterior air, and
- g) heating floor assemblies and exterior *soil*.

<b>Table 10.2.2.6. Minimum Effective Thermal Resistance of Assemblies in Buildings of Group C Major Occupancy Containing No Other Major Occupancies</b> Forming part of Sentences 10.2.2.6.(1)	
<b>Building Assembly</b>	<b>Assembly Minimum RSI Value (m<sup>2</sup>°K/W)</b>
Attic Space other than one and two family dwellings <sup>(1)</sup>	8.5
Attic Space for one and two family dwellings <sup>(1)</sup>	8.5
Roof Joist Assemblies for one and two family dwellings (Cathedral Ceilings/Flat Roofs)	4.3
Roof Assemblies other than one and two family dwellings	5.28

(Cathedral Ceilings / Flat Roofs)	
Frame Walls other than one and two family dwellings (including frame crawl space walls)	3.85
Frame Walls for one and two family dwellings (including frame crawl space walls)	3.85
Concrete or Masonry Walls (other than foundation walls)	3.85
Suspended Floors (framed)	4.2
Suspended Floors (concrete slab)	4.2
Foundation Walls	3.85
Concrete Slabs on Ground at, above, or below grade (insulation under all slab area and around edge of slab))	2.5
Radiant Heating Suspended Floor Assembly Over Heated Area (insulation between heated floor and heated area below) <sup>(2)</sup>	2.5
Concrete Balconies, Eyebrows, and Exposed Slab Edge (wrapped or using manufacturer thermal break in structure)	0.42

**Notes to Table 10.2.2.6.:**

<sup>(1)</sup> The thermal resistance rating of attic space insulation may be reduced to value required for frame walls for a distance of 1.0 m from the exterior wall.

<sup>(2)</sup> Not applicable when heating elements or piping are located within a concrete topping on a suspended floor assembly or within an internally heated suspended slab.

**2)** Insulation and the installation of insulation in a *building* designed to the requirements of Part 9 shall conform to Subsection 9.25.2. or Part 5.

**3)** The effective total “R” value of the opaque envelope area, the non-opaque envelope area, and the overall envelope area, calculated by a design professional, shall be submitted as part of an application for a *building permit*.

**10.2.2.7. Building Envelope Windows, Skylights, Doors and Other Glazed Products**

**1)** Except as otherwise required in this Subsection and as permitted by Sentence (2), exterior windows, skylights, and doors shall have a maximum thermal transmittance (u-value) in conformance with Table 10.2.2.7.(1) and shall be labeled accordingly. (See Appendix A)

<b>Table 10.2.2.7.(1)</b> <b>Maximum Thermal Transmittance of Exterior Closures</b> Forming part of Sentence 10.2.2.7.(1)	
Type of Closure	Maximum Thermal Transmittance (W/(m <sup>2</sup> K))
Windows and sliding doors or folding doors with glazing	1.4
Doors with or without glazing <sup>(1)</sup>	1.8
Doors with a required fire resistance rating	Exempt
Roof access hatches	2.9
Tubular daylight devices	2.6
Skylights larger than 1220mm in two directions	2.95
Skylights, roof windows and sloped glazing systems	2.4
Curtainwall and window wall assemblies	1.4

**Notes to Table 10.2.2.7.(1):**

<sup>(1)</sup>Includes doors swinging on a vertical axis with or without glazing, door transoms, and sidelites.

2) Entry doors consisting of one or two leafs installed in the principle entrance of a building, together with attached transoms and sidelites, need not comply with Table 10.2.2.2.(1), where constructed of thermally broken metal or wood with multiple panes of glass, which may be argon filled, or coated with a low-e coating, and shall be labeled or suitably documented so as to clearly identify their thermal transmittance. (See Appendix A)

3) The thermal transmittance of factory glazed products within the scope of existing certification programs shall be indicated by labels applied to the products at the manufacturing location. The thermal transmittance of site glazed products and products outside the scope of existing certification programs shall be suitably documented. (See Appendix A)

#### 10.2.2.8. Building Envelope Vestibules

1) Except as permitted in Sentence (2), in a *building* required to comply with this Article there shall be an enclosed vestibule in all *building* entrances separating a conditioned space from the exterior, designed such that

- a) all doors opening into and out of the vestibule shall be equipped with self-closing devices,
- b) the interior and exterior doors of the vestibule shall be separated by no less than 2.1 m when closed,
- c) the exterior envelope of a conditioned vestibule shall comply with the design requirements for a conditioned space, and
- d) the interior and exterior envelope of an unconditioned vestibule shall comply with the design requirements for a semi heated space.

2) An enclosed vestibule is not required for

- a) a *building* entrance with revolving doors,
- b) a door not intended to be used as the *building* entrance,
- c) a door opening directly to the exterior from a *dwelling unit*,
- d) a *building* entrance, in a *building* less than 278.7 m<sup>2</sup> in gross *floor area*,
- e) a door which is separate from the *building* entrance and opens directly to the exterior from a space that is less than 278.7 m<sup>2</sup> in gross *floor area*, and
- f) a *building* pursuing certification with the Passive House (PHI) standard.

#### 10.2.2.9. Building Services Submetering

1) Every *building* shall be equipped with metering equipment capable of collecting *building* energy performance data for the *building* and for every portion of the *building* which supports a separate use or *occupancy*.

2) Submetering required by this Article shall include the following

- a) hot water generated by a central hot water generation system
- b) natural gas used for air handling systems in common areas, and
- c) natural gas used for domestic hot water in amenity spaces, pools and spas.

#### 10.2.2.10. Lighting Controls in Residential Buildings

1) Where a portion of a residential *building* or a portion of a multi-use *building* located above a garage or on an adjacent grade contains more than 20 residential *suites*, the *building* shall be designed with

a) *occupancy* based lighting sensor controls, located in all *exit* stair shafts and parking garages, compatible with the requirements of Sentence 3.2.7.3.(1) of Division B, and

b) a switch near the principal entrance of each residential *suite* that controls all overhead lighting fixtures within the *suite*, except overhead lights serving corridors and stairs within the *suite*.

2) Except as permitted by Sentence (3) and except for exterior lighting along paths of pedestrian and vehicular travel, fire department access, and signage and equipment lighting, the permanent ancillary exterior lighting of a *building* of *residential occupancy* that is required to conform to this Article shall

a) be provided with fixtures that are fully shielded or full cut-off optics that:

i) do not emit light upwards or horizontally beyond the property line, and

ii) limit backlighting of building walls, roofs, or reflective surfaces to not more than 4 lux at any given point;

b) minimize lighting of adjacent exterior properties;

c) not exceed an illumination level of 2 lux average on any reflective surface; and  
d) conform with the exterior lighting power requirements of ASHRAE 90.1 of NECB.

3) Exterior directional lighting designed with integral automatic motion sensing devices need not comply with the requirements of Sentence (2) provided it shuts off within 5 minutes.

(see Appendix A)

#### 10.2.2.11. Hot Water Tank Piping

1) In a *building* required to comply with this Article, the first 3 m of non-recirculating hot water piping leading from both electrically heated and gas heated hot water tanks, and the last 1 m of piping leading to the hot water tank connection, shall have insulation with a minimum RSI value of 0.35.

#### 10.2.2.12. Domestic Gas-Heated Hot Water Heaters

1) In a *building* required to comply with this Article, gas-heated appliances providing domestic hot water only shall have a uniform energy factor of not less than 0.78 or alternatively a thermal efficiency of not less than 90%, except that existing homes may have a uniform energy factor of not less than 0.62, as determined by the following

a) CSA P.3-04, "Testing Method for Measuring Energy Consumption and Determining Efficiencies of Gas-Fired Storage Water Heaters",

b) CSA P.7-10, "Testing Method for Measuring Energy Loss of Gas-Fired Instantaneous Water Heaters",

c) CSA C191-04, "Performance of electric storage tank water heaters for domestic hot water service", or

d) CSA 4.3/ANSI Z21.10.3, "Gas Water Heaters Volume III, Storage Water Heaters, with Input Ratings above 75,000 Btu per hour, Circulating and Instantaneous".

**10.2.2.13. Domestic Gas-Heated Boilers**

1) In a *building* required to comply with this Article, domestic gas-heated boilers providing heat, or heat and domestic hot water, shall have an Annual Fuel Utilization Efficiency (AFUE) rating of not less than 92 per cent, as tested using CSA P.2-07, "Testing Method for Measuring the Annual Fuel Utilization Efficiency of Residential Gas-fired Furnaces and Boilers".

**10.2.2.14. Domestic Gas-Heated Furnaces or Make Up Air Units**

1) In a *building* required to comply with this Article, domestic gas-heated furnaces or make up air units shall have an Annual Fuel Utilization Efficiency (AFUE) rating of not less than 92 per cent, as tested using CSA 2.6/ANSI Z83.8, "Gas unit heaters, gas packaged heaters, gas utility heaters and gas-fired duct furnaces".

**10.2.2.15. Domestic Gas-Fired Fireplaces**

1) In a *building* required to comply with this Article, domestic gas-fired fireplaces in conditioned spaces shall be equipped with

- a) intermittent pilot ignition (IPI) systems,
- b) on-demand ignition systems that automatically shut off within

- i) 7 days of appliance non-use in a one or two family dwelling building, or
- ii) 6 hours of appliance non-use in a multifamily dwelling, or

c) match ignition.

2) In a *building* required to comply with this Article, domestic gas-fired fireplaces shall be direct vented.

3) In a *building* required to comply with this Article, domestic gas-fired fireplaces must be on a timer.

4) Where exterior gas fireplaces are provided as an ancillary equipment to a *building* required to comply with this Article, then the exterior fireplaces shall be considered as part of the *building* for the purposes of this Part (see Appendix A).

**10.2.2.16. Domestic Wood Burning Heating Appliances**

1) In a *building* required to comply with this Article, and except for cooking stoves and ranges, a wood domestic burning heating appliance installed in a residential *dwelling unit* shall be tested in accordance with CAN/CSA B415.1-10 "Performance Testing of Solid-Fuel-Burning Heating Appliances" or EPA Title 40, Part 60, Subpart AAA - "Standards of Performance for New Residential Wood Heaters", and shall

- a) produce not more than 2.5 grams per hour of particulate air contaminant emissions for catalytic appliances, or

b) produce not more than 4.5 grams per hour of particulate air contaminant emissions for non-catalytic appliances.

2) Open masonry fireplaces and factory-built fireplaces are not permitted.

#### 10.2.2.17. Domestic Heat Recovery Ventilators

1) In a *building* required to comply with this Article, each dwelling unit shall be served by a heat recovery ventilator located in

a) each dwelling *unit*, or

b) a commonly accessible location if serving multiple *dwelling units*.

2) In a *building* required to comply with this Article, components of mechanical ventilation systems not specifically described in this Subsection shall be designed, constructed and installed in accordance with good engineering practice and as described in the ASHRAE Handbooks and Standards, HRAI Digest, TECA Ventilation Guideline, Hydronics Institute Manuals or the SMACNA manuals.

3) In a *building* required to comply with this Article, a heat recovery ventilator (HRV) shall

a) be sized to run at its rated speed for continuous operation while achieving a 65 per cent sensible heat recovery efficiency (65 per cent Minimum SRE at 0°C) and be designed and tested in conformance with CSA 22.2 No. 113M-1984,

b) be designed and tested to meet the CSA International Standard CAN/CSA-F326-M91, "Residential Mechanical Ventilation Systems",

c) be installed and commissioned by persons trained by the Thermal Environmental Comfort Association (TECA) or the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI) or equivalent,

d) supply outdoor air directly to the principal living area, to each bedroom, and to any *floor area* without a bedroom, including similar rooms within *secondary suites* and *lock-off units*, directly or indirectly, through a central recirculation system with a continuously operating fan,

e) be designed to run continuously to comply with the minimum ventilation rates of Table 9.32.3.3.A of Division B,

f) not be connected to kitchen and bathroom exhaust fans,

g) **except for mechanical ducts cast into concrete structure**, have exterior connected supply-air ducts and exhaust ducts insulated to not less than RSI 0.75 (R 4.25) and shall have an effective vapour barrier,

h) have balanced HRV supply and exhaust air flows within plus or minus 20 per cent of the actual normal operating exhaust capacity,

i) be labelled with tested supply and exhaust air flows for high and low settings, measured in CFM, and

j) be located within *conditioned space* and fully serviceable space in the dwelling unit for access.

4) In a *building* required to comply with this Article, the HRV system contractor or installer shall provide a completed Mechanical Ventilation Checklist to the Chief Building Official.

5) In a *building* required to comply with this Article, a contractor trained in the installation of energy recovery ventilators (ERV) may install an ERV in lieu of a heat recovery ventilator (HRV).

**10.2.2.18. Solar Ready Pipe Run**

1) In a *building* required to comply with this Article, a solar ready pipe chase, consisting of at least two 50 mm PVC pipes, capped at both ends and having at least a 20° angle measured above the horizontal level, shall extend from a location near the *service water heater*, to the attic space.

**10.2.2.19. Solar Photovoltaic Ready Pipe Run**

1) In a *building* required to comply with this Article, a solar ready pipe chase, consisting of at least one 25 mm pipe or liquid tight flexible electrical conduit or electrical metallic tubing capped at both ends and having at least a 20° angle measured above the horizontal level, shall extend from a location near the electrical panel, to the attic space.

**10.2.2.20. Passive House Planning Package (PHPP), EnerGuide, or Other Energy Documentation**

1) In a *building* required to comply with this Article, at the time of building permit application, and at the time of final inspection, the owner shall provide to the Chief Building Official *acceptable* documentation, in the form of

- a) a PHPP file from a Certified Passive House Consultant or Designer, or
- b) an EnerGuide Rating System Audit, or
- c) for *buildings* ineligible for an EnerGuide Rating System Audit, a Hot2000 file modelled in general mode and using the same baseload assumptions as Energuide for New Homes mode, or equivalent energy modelling documentation, *acceptable* to the Chief Building Official.

2) In a *building* required to comply with this Article, and where a *one family dwelling* or *two family dwelling*, with or without *secondary suites* or *lock-off units*, contains *conditioned space* of more than 325 m<sup>2</sup>, including *suites* that are not strata titled, the owner shall

- a) provide a calculation utilizing the EnerGuide rating system to demonstrate that the proposed home has a greenhouse gas (GHG) footprint that is no more than the greenhouse gas (GHG) footprint of a 325 m<sup>2</sup> home built to the minimum standards in the Building Bylaw, and
- b) meet the requirements of the modeling guidelines for large homes.

**10.2.2.21. Building and Dwelling Unit Airtightness Testing**

1) In a *building* required to comply with this Article, the *building* and *dwelling units* shall be tested for airtightness in accordance with

- a) ASTM E 779, Standard Test Method for Determining Air Leakage Rate by Fan Pressurization,
- b) USACE Version 3, Air Leakage Test Protocol for Building Envelopes, or
- c) airtightness protocol recognized by Natural Resources Canada for use in homes and buildings labeled under the EnerGuide for New Homes program.

2) A *building* required to comply with this Article shall have maximum tested air leakage rates in conformance with Table 10.2.2.21., or sealed to the satisfaction of the Chief Building Official.

<b>Table 10.2.2.21.</b> <b>Maximum Tested Air Leakage Rates</b> Forming part of Sentence 10.2.2.21.(2)	
<b>Building Classification</b>	<b>Maximum Tested Air Leakage Rate</b>
<i>Buildings, excluding 1 or 2 Family Dwellings and ground-oriented dwelling units</i>	2.03 L/s/m <sup>2</sup> at 75 pascals
<i>Ground-oriented dwelling units</i>	3.5 air changes per hour at 50 pascals

## Section 10.3. Water Efficiency

### 10.3.1. Design and Installation

#### 10.3.1.1. Compliance

1) In addition to the requirements in this section, all *plumbing fixtures* must comply with Book II Division B, Part 2 of this By-law.

2) In addition to the requirements of this By-law, all water uses and discharges are subject to Water Works By-law 4848 and Sewer and Watercourse By-law 8093.

#### 10.3.1.2. Plumbing Fixture Fitting Maximum Flow Rates

1) The flow rates of fittings that supply water to *plumbing fixtures* must not exceed the maximum flow rate at the test pressures listed for that fitting in Table 10.3.1.2.

<b>Table 10.3.1.2.(1)</b> <b>Maximum Flow Rate</b> Forming part of Sentence 10.3.1.2.(1)		
<b>Fitting</b>	<b>Maximum Flow Rate (L/min)</b>	<b>Test Pressure (kPa)</b>
Lavatory Faucet (for <i>private use</i> )	5.7	415
Lavatory Faucet (for <i>public use</i> )	1.9 <sup>(1)(2)</sup>	415
Kitchen Faucet (non-residential)	8.3	415
Kitchen Faucet (residential)	8.3	415
<i>Shower Head</i>	7.6 <sup>(3)</sup>	550
<i>Pre-Rinse Spray Valve</i>	4.8 <sup>(4)</sup>	415
Wash Fountain, per <i>plumbing fixture fitting</i>	6.8 <sup>(5)</sup>	415

#### Notes to Table 10.3.1.2.(1):

<sup>(1)</sup> A *metering fixture* faucet is limited to 1.0 L per cycle.

<sup>(2)</sup> A lavatory faucet in a health care facility is permitted a maximum flow rate of 8.3 L/min (at 415 kPa test pressure). The *Chief Building Official* may, for human health reasons, permit exemptions within other facilities, to a maximum flow rate of 8.3 L/min (at 415 kPa test pressure).

- (3) Emergency and safety *shower heads* and *shower heads* in health care facilities and correctional facilities are exempted from this requirement.
- (4) Each *pre-rinse spray valve* must be equipped with an automatic shut-off.
- (5) A maximum flow rate of 6.8 L/min is permitted for each 508 mm of rim space. For a wash fountain with *metering fixture* faucets, a maximum of one *metering fixture* faucet is permitted for each 508 mm of rim space. A *metering fixture* faucet is limited to 1.0 L per cycle.

**10.3.1.3. Plumbing Fixture Efficiency**

1) The flush cycle for the installation of a water closet or urinal must not exceed the flush cycle listed for that *plumbing fixture* in Table 10.3.1.3.(1)

<b>Table 10.3.1.3.(1)</b> <b>Maximum Flush Cycle</b> Forming part of Sentence 10.3.1.3.(1)	
<b>Plumbing Fixture</b>	<b>Maximum Flush Cycle (L)</b>
Water Closet (Tank Type)	4.8 <sup>(1)(2)</sup>
Water Closet (Direct Flush)	4.8 <sup>(1)</sup>
Urinal (Tank Type)	1.9 <sup>(3)</sup>
Urinal (Direct Flush)	1.9

**Notes to Table 10.3.1.3.(1):**

- (1) A maximum flush cycle of 6.0 L may be permitted where, in the opinion of the *Chief Building Official*, the existing *plumbing system* cannot accommodate and cannot be updated to accommodate the required flush cycle.
- (2) A water closet with a dual flush cycle of 4.1 L or less and 6.0 L complies with this requirement.
- (3) The water supply to flush tanks equipped for automatic flushing shall be controlled with a timing device that limits operation to the period during which the building is normally occupied.

3) The water supply to flush tanks equipped for automatic flushing shall be controlled with a timing device that limits operation to the period during which the *building* is normally occupied.

**10.3.1.4 Residential Landscape Irrigation Systems**

1) Residential landscape irrigation systems that apply herbicides, fungicides, insecticides, fertilizers, soil amendments or other chemicals or pesticides by means of irrigation water are prohibited.

2) Residential landscape irrigation systems shall be equipped with a shut-off valve, which shall be located upstream of the backflow preventer and provided with unobstructed access.

3) Where the water pressure supplied to a property exceeds 550 kPa, the residential landscape irrigation system shall be equipped with a pressure reducing valve providing a maximum supplied pressure of 415 kPa and located downstream of the backflow preventer.

**10.3.1.5 Geoexchange Systems**

1) Make-up water for a closed loop geoexchange (geothermal) ground heat exchanger must be provided by a feeder tank isolated from the domestic water supply

2) The use of a direct connection to the domestic water supply as a source of make-up water for a closed loop geoexchange (geothermal) ground heat exchanger is prohibited.

#### **10.3.1.6. Vehicle Wash Facilities**

1) The maximum flow rate of a spray wand, foamy brush or similar *plumbing fixture* shall not exceed 11.4 L/min at a *self-service vehicle wash*.

2) A water recycling system that recycles and reuses at least 60% of the water and rinse water shall be installed, used and maintained at a *conveyor vehicle wash* or *in-bay vehicle wash*.

## **Section 10.4. Electric Vehicle Charging**

### **10.4.3. Electric Vehicle Charging for Buildings**

#### **10.4.3.1. Electrical Service and Capacity**

(See Appendix A)

1) The electrical installations, including the service capacity of the installation, the number and distribution of circuits and receptacles, shall meet the requirements of the “Electrical Safety Regulation.”

2) Except as provided by Sentence (3), each storage garage or carport in one-family dwellings, two-family dwellings, one-family dwellings or two family dwellings with secondary suites or lock-off units, or laneway houses shall be provided with an electrical outlet, a receptacle or electric vehicle supply equipment where applicable, supplied by a branch circuit rated not less than 40 A at the nominal voltage of 208 V or 240 V as applicable and labelled to identify its intended use with the electric vehicle supply equipment.

3) Where the requirements of Sentence (2) would cause the dwelling unit calculated load to exceed 200 A, the installation of a 40 A branch circuit may be omitted provided that a minimum nominal trade size of 21 raceway supplied with pull string leading from the dwelling unit panelboard to an electrical outlet box is installed in the storage garage or carport and is labelled to identify its intended use with the electric vehicle supply equipment.

4) One residential parking stall in each group of five residential parking stalls, and, one residential parking stall in any group of less than five residential parking stalls, in a multi-family building or in the multi-family component of a mixed use building that includes three or more dwelling units shall be provided with an electrical outlet, a receptacle or electric vehicle supply equipment where applicable, for the use of electric vehicle charging.

5) One commercial parking stall in each group of 10 commercial parking stalls, and one commercial parking stall in any group of less than 10 commercial parking stalls, in a commercial building, including the commercial component of a mixed use building shall be provided with an electrical outlet, a receptacle or electric vehicle supply equipment where applicable, for the use of electric vehicle charging.

6) The electrical outlet, receptacle or supply equipment described in Sentences (4) and (5) shall be supplied by a branch circuit rated not less than 40 A at the nominal voltage of 208 V or 240 V as applicable.

**10.4.3.2. Electrical Rooms**

1) In a multi-family building or the multi-family component of a mixed use building, with three or more dwelling units, an electrical room or space provided to facilitate the installation of power supply to the electric vehicle supply equipment shall be designed with sufficient space for the future installation of electrical equipment necessary to support electric vehicle charging in all residential parking stalls.

**Section 10.5. Objectives and Functional Statements**

**10.5.1. Objectives and Functional Statements**

**10.5.1.1. Attribution to Acceptable Solutions**

1) For the purposes of compliance with this By-law as required in Clause 1.2.1.1.(1)(b) of Division A of Division A, the objectives and functional statements attributed to the acceptable solutions in this Part shall be the objectives and functional statements listed in Table 10.5.1.1. (See Appendix Note A-1.1.1.2.(1) of Division A in Appendix A)

**Table 10.5.1.1.**

Table 10.5.1.1. Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 10 Forming part of Sentence 10.5.1.1.(1)	
Acceptable Solutions	Functional Statements and Objectives <sup>(1)</sup>
10.2.2.2. ANSI/ASHRAE/IESNA 90.1	
(1)	[F85, F86-OE1]
10.2.2.3. National Energy Code of Canada for Buildings	
(1)	[F85, F86-OE1]
10.2.2.5. Building Energy and Emissions Performance	
(1)	[F85, F86-OE1]
(2)	[F85, F86-OE1]
10.2.2.6. Building Envelope Opaque Elements	
(1)	[F85-OE1]
(2)	[F85-OE1]
10.2.2.7. Windows, Glass Doors and Skylights	
(1)	[F85-OE1]
10.2.2.8. Building Envelope Vestibules	
(1)	[F85-OE1]

10.2.2.9. Sub-metering in Buildings	
(1)	[F86, OE1]
(2)	[F86, OE1]
10.2.2.10. Lighting Controls in Residential Buildings	
(1)	[F86, OE1]
10.2.2.11. Hot Water Tank Piping	
(1)	[F85-OE1]
(2)	[F85, F86-OE1]
(3)	[F100-OE1]
10.2.2.12. Domestic Gas-Heated Hot Water Heaters	
(1)	[F86-OE1]
10.2.2.13. Domestic Gas-Heated Boilers	
(1)	[F86-OE1]
10.2.2.14. Domestic Gas-Heated Furnaces	
(1)	[F86-OE1]
10.2.2.15. Domestic Gas-Fired Fireplaces	
(1)	[F86-OE1]
	[F41, F44-OS3.4]
	[F44-OH1.1]
10.2.2.16. Domestic Wood Burning Heating Appliances	
(1)	[F86-OE1]
	[F44-OS3.4]
	[F44-OH1.1]
10.2.2.17. Domestic Heat Recovery Ventilators	
(1)	[F85-OE1]
(2)	[F85-OE1]
10.2.2.20. Passive House Planning Package (PHPP), EnerGuide, or Other Energy Documentation	
(1)	[F85-OE1]
10.2.2.21. Building and Dwelling Unit Airtightness Testing	
(1)	[F85-OE1]
(2)	[F85-OE1]
10.3.1.1. Fixture Fitting Maximum Flow Rates	
(1)	[F84-OE2]
10.3.1.2. Fixture Efficiency	
(1)	[F83-OE2]
(2)	[F83-OE2]