

January 2018 - This pdf is for information purposes only, and does not form the replacement package of the BC Building Code print product. This document includes Revisions up to and including Revision 12. Text in red indicates changes to the Code from Revision 11, while text in purple indicates changes to the Code from Revision 12. This document was most recently updated January 30, 2018, and applies to building permit applications submitted on or after January 31, 2018.

Changes to Division A

1.4.2. SYMBOLS AND OTHER ABBREVIATIONS

1.4.2.1. Symbols and Other Abbreviations

- 1) The symbols and other abbreviations in this Code shall have the meanings assigned to them in this Article and Article 1.3.2.1. of Division B.

... kWhkilowatt hour(s)

...

Changes to Division B

1.3.1. REFERENCED DOCUMENTS

1.3.1.2. Applicable Editions

- 1) Where documents are referenced in this Code, they shall be the editions designated in Table 1.3.1.2. (See Appendix A.)

Table 1.3.1.2. Documents Referenced in the Book I (General) of the British Columbia Building Code 2012 Forming part of Sentence 1.3.1.2.(1)			
Issuing Agency	Document Number ⁽¹⁾	Title of Document ⁽²⁾	Code Reference
ASTM	E 779-10	Standard Test Method for Determining Air Leakage Rate by Fan Pressurization	9.36.6.5.(1) 10.2.3.5.(1)
CGSB	CAN/CGSB 149.10-M86	Determination of the Airtightness of Building Envelopes by the Fan Depressurization Method	9.36.5.10.(11) 9.36.6.5.(1)
CCBFC	NRCC 54435-2011	National Energy Code of Canada for Buildings	9.36.1.3.(1) 9.36.1.3.(4) 9.36.3.1.(2) 9.36.4.1.(2) 10.2.2.1.(1) 10.2.3.4.(1)
CoV	2017	City of Vancouver Energy Modelling Guidelines	10.2.3.4.(1)
USACE	Version 3-2012	Air Leakage Test Protocol for Building Envelopes	9.36.6.5.(1) 10.2.3.5.(1)

1.3.2. ORGANIZATIONS

1.3.2.1. Abbreviations of Proper Names

- 1) The abbreviations of proper names in this Code shall have the meanings assigned to them in this Article (the appropriate addresses of the organizations are shown in brackets).

CoV..... City of Vancouver (453 West 12th Ave., Vancouver, BC, V5Y 1V4, www.vancouver.ca)

USACE..... United States Army Corps of Engineers (U.S. Army Engineer Research and Development Center, 2902 Newmark Drive, Champaign, IL, 61826-9005, USA, www.erd.usace.army.mil/Locations/CERL)

6.2.2. VENTILATION

6.2.2.1. Required Ventilation

- 4) For *suites* in *buildings* conforming to Subsection 9.36.6. or 10.2.3., the outdoor air required by Sentence (2) shall be supplied directly to each *suite* by mechanical ventilation through ducting. (See Appendix A.)

6.2.2.2. Natural Ventilation

- 1) Except as permitted by Sentence (2) and except as required by Sentence 6.2.2.1.(4), the ventilation required by Article 6.2.2.1. shall be provided by mechanical ventilation, except that it can be provided by natural ventilation or a combination of natural and mechanical ventilation in...

6.4.1. OBJECTIVES AND FUNCTIONAL STATEMENTS

6.4.1.1. Attributions to Acceptable Solutions

Table 6.4.1.1. Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 6 Forming part of Sentence 6.4.1.1.(1)	
Acceptable Solutions	Functional Statements and Objectives ⁽¹⁾
6.2.2.1. Required Ventilation	
(4)	[F50-OH1.1]

Notes to Table 6.4.1.1.:

- ⁽¹⁾ See Parts 2 and 3 of Division A.

A-6.2.2.1.(4) Ventilation Air Supplied to Suites

The indirect supply of required outdoor ventilation air to normally occupied spaces through corridor pressurization or other indirect systems is not permitted.

9.32.3. HEATING-SEASON (MECHANICAL) VENTILATION

9.32.3.4. Principal Ventilation System Supply Air

- 6) A principal ventilation system need not conform to Sentence (1) if the principal ventilation system
 - a) services a *dwelling unit* that
 - i) is located where the January design temperature, on a 2.5% basis determined in conformance with Article 1.1.3.1., is greater than -20°C ,
 - ii) has only 1 *storey* and a *floor area* of less than 168 m^2 within the *building* envelope (see Appendix A),
 - iii) does not have a ducted forced-air heating system, and
 - iv) except for a *secondary suite*, is not located in a *building* conforming to Subsection 9.36.6. or 10.2.3., and
 - b) provides supply air passively from outdoors through dedicated inlets that
 - i) are located in each bedroom and at least one common area,
 - ii) are located at least 1 800 mm above the floor, and
 - iii) have an unobstructed vent area of not less than 25 cm^2 .

Section 9.36. Energy Efficiency

9.36.1. GENERAL

9.36.1.3. Compliance and Application

- 1) Except as provided in Sentences (2) to (5), *buildings* shall comply with
 - a) the prescriptive or trade-off requirements in Subsections 9.36.2. to 9.36.4.,
 - b) the performance requirements in Subsection 9.36.5.,
 - c) the NECB, or
 - d) Subsection 9.36.6.
- ...
- 3) Subsections 9.36.5. and 9.36.6. apply only to
 - a) houses with or without a *secondary suite*, and
 - b) *buildings* containing only *dwelling units* and common spaces whose total *floor area* does not exceed 20% of the total *floor area* of the *building*.

(See Appendix A.)

9.36.5. ENERGY PERFORMANCE COMPLIANCE

9.36.5.4. Calculation Methods

10) The energy model calculations shall account for the effect of airtightness in accordance with **Article 9.36.5.10.**

9.36.5.10. Modeling Building Envelope of Proposed House

- 9) The airtightness value used in the energy model calculations for the proposed house shall be
- a) **4.5** air changes per hour at 50 Pa pressure differential, where the construction complies with Section 9.25.,
 - b) **3.5** air changes per hour at 50 Pa pressure differential, where it can be shown that the *air barrier system* is constructed in accordance with Subsection 9.25.3. and Articles 9.36.2.9. and 9.36.2.10., or
 - c) tested in accordance with Sentence (11), **and shall be**
 - i) the number of air changes per hour at 50 Pa pressure differential, and
 - ii) the equivalent leakage area (see Appendix A).
- 10) **Where airtightness is measured in accordance with Clause 9.36.5.10.(9)(c), the applicable airtightness value in Clause 9.36.5.10.(9) (a) or (b) shall be** assigned for use in the energy model calculations until the actual airtightness has been measured in accordance with Sentence (11).

...

12) [Reserved.]

9.36.6. ENERGY STEP CODE

9.36.6.1. Application

- 1) Where the *building* contains more than one *dwelling unit*, the requirements of this Subsection shall apply to the energy performance of the *building* and not to individual *dwelling units*.

9.36.6.2. Definitions

(see Appendix A).

- 1) For the purpose of this Subsection, the term “mechanical energy use intensity” shall mean a metric of the energy used over a year by the *building*, estimated by using an energy model in accordance with Article 9.36.6.4., normalized per square metre of floor area of *conditioned space*, expressed in kWh/(m²·year), for all of the following combined:
 - a) space-heating equipment,
 - b) space-cooling equipment,
 - c) fans,
 - d) service water heating equipment,
 - e) pumps, and
 - f) auxiliary HVAC equipment (see Appendix A).
- 2) For the purpose of this Subsection, the term “EnerGuide Rating % lower than EnerGuide Reference House” shall mean the metric that results when, using HOT2000 software, version 11 or newer and Natural Resource Canada’s EnerGuide Rating System, version 15 or newer, the energy consumption of the following are compared:
 - a) the proposed *building*, not including the EnerGuide assumed electric base loads, and
 - b) the corresponding automatically-generated reference house, not including the EnerGuide assumed electric base loads.
- 3) For the purpose of this Subsection, the term “thermal energy demand intensity” shall mean a metric of the annual heating required by the *building* for space conditioning and for conditioning of ventilation air, estimated by using an energy model in accordance with Article 9.36.6.4., normalized per square metre of floor area of *conditioned space* and expressed in kWh/(m²·year), taking into account all of the following:
 - a) thermal transmittance of above-ground walls and roof-ceiling assemblies,
 - b) thermal transmittance of floors and walls in contact with the ground, or with space that is not *conditioned space*,
 - c) thermal transmittance and solar heat gain of windows, doors and skylights,
 - d) air leakage through the *air barrier system*,
 - e) internal heat gains from occupants and equipment, and
 - f) heat recovery from exhaust ventilation.
- 4) For the purpose of this Subsection, the term “peak thermal load” shall mean a metric of the maximum heating energy required by the *building* for space conditioning and for conditioning of ventilation air, estimated by using an energy model in accordance with Article 9.36.6.4., at a 2.5%

January design temperature, normalized per square metre of floor area of *conditioned space* and expressed in W/m^2 , taking into account all of the items referred to in Clauses (3)(a) through (f).

- 5) For the purpose of this Subsection, the term “Step” shall mean a Step referred to in Tables 9.36.6.3.A. to C.

9.36.6.3. Compliance Requirements

- 1) *Buildings* conforming to the requirements of any of Steps 1 to 5 shall be designed and constructed to conform to the applicable energy performance requirements in Tables 9.36.6.3.A. to C.

Table 9.36.6.3.A Requirements for Buildings Located Where the Degree-Days Below 18° C Value is less than 3000⁽¹⁾ Forming Part of Sentence 9.36.6.3.(1)			
Step	Airtightness (Air Changes per Hour at 50 Pa Pressure Differential)	Performance Requirement of <i>Building Equipment and Systems</i>	Performance Requirement of <i>Building Envelope</i>
1	N/A	EnerGuide Rating % lower than EnerGuide Reference House: not less than 0% lower energy consumption or conform to Subsection 9.36.5.	
2	≤ 3.0	EnerGuide Rating % lower than EnerGuide Reference House: not less than 10% lower energy consumption or mechanical energy use intensity ≤ 60 kWh/(m ² ·year)	thermal energy demand intensity ≤ 45 kWh/(m ² ·year) or peak thermal load ≤ 35 W/m ²
3	≤ 2.5	EnerGuide Rating % lower than EnerGuide Reference House: not less than 20% lower energy consumption or mechanical energy use intensity ≤ 45 kWh/(m ² ·year)	thermal energy demand intensity ≤ 40 kWh/(m ² ·year) or peak thermal load ≤ 30 W/m ²
4	≤ 1.5	EnerGuide Rating % lower than EnerGuide Reference House: not less than 40% lower energy consumption or mechanical energy use intensity ≤ 35 kWh/(m ² ·year)	thermal energy demand intensity ≤ 25 kWh/(m ² ·year) or peak thermal load ≤ 25 W/m ²
5	≤ 1.0	mechanical energy use intensity ≤ 25 kWh/(m ² ·year)	thermal energy demand intensity ≤ 15 kWh/(m ² ·year) or peak thermal load ≤ 10 W/m ²

Notes to Table 9.36.6.3.A:

⁽¹⁾ See Sentence 1.1.3.1.(1) of this Division and Table C-2 in Appendix C.

Table 9.36.6.3.B			
Requirements for Buildings Located Where the Degree-Days Below 18° C Value is 3000 to 3999⁽¹⁾			
Forming Part of Sentence 9.36.6.3.(1)			
Step	Airtightness (Air Changes per Hour at 50 Pa Pressure Differential)	Performance Requirement of <i>Building</i> Equipment and Systems	Performance Requirement of <i>Building</i> Envelope
1	N/A	EnerGuide Rating % lower than EnerGuide Reference House: not less than 0% lower energy consumption or conform to Subsection 9.36.5.	
2	≤ 3.0	EnerGuide Rating % lower than EnerGuide Reference House: not less than 10% lower energy consumption or mechanical energy use intensity ≤ 90 kWh/(m ² ·year)	thermal energy demand intensity ≤ 60 kWh/(m ² ·year) or peak thermal load ≤ 55 W/m ²
3	≤ 2.5	EnerGuide Rating % lower than EnerGuide Reference House: not less than 20% lower energy consumption or mechanical energy use intensity ≤ 75 kWh/(m ² ·year)	thermal energy demand intensity ≤ 50 kWh/(m ² ·year) or peak thermal load ≤ 45 W/m ²
4	≤ 1.5	EnerGuide Rating % lower than EnerGuide Reference House: not less than 40% lower energy consumption or mechanical energy use intensity ≤ 45 kWh/(m ² ·year)	thermal energy demand intensity ≤ 40 kWh/(m ² ·year) or peak thermal load ≤ 40 W/m ²
5	≤ 1.0	mechanical energy use intensity ≤ 25 kWh/(m ² ·year)	thermal energy demand intensity ≤ 15 kWh/(m ² ·year) or peak thermal load ≤ 10 W/m ²

Notes to Table 9.36.6.3.B:

⁽¹⁾ See Sentence 1.1.3.1.(1) of this Division and Table C-2 in Appendix C.

Table 9.36.6.3.C			
Requirements for Buildings Located Where the Degree-Days Below 18° C Value is greater than 3999⁽¹⁾			
Forming Part of Sentence 9.36.6.3.(1)			
Step	Airtightness (Air Changes per Hour at 50 Pa Pressure Differential)	Performance Requirement of <i>Building</i> Equipment and Systems	Performance Requirement of <i>Building Envelope</i>
1	N/A	EnerGuide Rating % lower than EnerGuide Reference House: not less than 0% lower energy consumption or conform to Subsection 9.36.5.	
2	≤ 3.0	EnerGuide Rating % lower than EnerGuide Reference House: not less than 10% lower energy consumption or mechanical energy use intensity ≤ 100 kWh/(m ² ·year)	thermal energy demand intensity ≤ 70 kWh/(m ² ·year) or peak thermal load ≤ 55 W/m ²
3	≤ 2.5	EnerGuide Rating % lower than EnerGuide Reference House: not less than 20% lower energy consumption or mechanical energy use intensity ≤ 85 kWh/(m ² ·year)	thermal energy demand intensity ≤ 60 kWh/(m ² ·year) or peak thermal load ≤ 50 W/m ²
4	≤ 1.5	EnerGuide Rating % lower than EnerGuide Reference House: not less than 40% lower energy consumption or mechanical energy use intensity ≤ 55 kWh/(m ² ·year)	thermal energy demand intensity ≤ 50 kWh/(m ² ·year) or peak thermal load ≤ 45 W/m ²
5	≤ 1.0	mechanical energy use intensity ≤ 25 kWh/(m ² ·year)	thermal energy demand intensity ≤ 15 kWh/(m ² ·year) or peak thermal load ≤ 10 W/m ²

Notes to Table 9.36.6.3.C:

⁽¹⁾ See Sentence 1.1.3.1.(1) of this Division and Table C-2 in Appendix C.

- 2) Except as permitted by Sentence (3),
- a) energy performance shall be calculated in conformance with Article 9.36.6.4., and
 - b) airtightness shall be tested in accordance with Article 9.36.6.5.

(See Appendix A.)

- 3) *Buildings* designed and constructed to conform to Step 5 of any of Tables 9.36.6.3.A to C and to the Passive House Planning Package, version 9 or newer, are deemed to comply with this Subsection provided the energy model according to which the *building* is designed and constructed is prepared by a Certified Passive House Designer, or Certified Passive House Consultant, who is approved by the Passive House Institute.

9.36.6.4. Energy Modelling

- 1) Energy modelling shall be performed using a computer program that employs calculations methods that have been tested in accordance with ANSI/ASHRAE 140, "Evaluation of Building Energy Analysis Computer Programs" with variations in the computer program from the range recommended therein reported in accordance with Division C.
- 2) Energy modelling shall conform to
 - a) Subsection 9.36.5.,
 - b) the EnerGuide Rating System, version 15 or newer, or (See Appendix A.)
 - c) Clauses 10.2.3.4.(1)(a) and (b). (See Appendix A.)
- 3) The Performance Requirement of Building Equipment and Systems and the Performance Requirement of Building Envelope required under Sentence 9.36.6.3.(1) shall both be modelled using the same
 - a) energy modelling methods, and
 - b) climatic data, *soil* conditions, operating schedules and temperature set-points.
- 4) For *buildings* conforming to the requirements of any of Steps 2 to 5, energy modelling shall account for the air leakage rate derived in accordance with Article 9.36.6.5.

(See Appendix A.)

9.36.6.5. Building Envelope Airtightness Testing

- 1) *Buildings* shall be tested for airtightness in accordance with
 - a) CAN/CGSB 149.10, "Determination of the Airtightness of Building Envelopes by the Fan Depressurization Method",
 - b) ASTM E 779, "Standard Test Method for Determining Air Leakage Rate by Fan Pressurization", or
 - c) USACE Version 3, "Air Leakage Test Protocol for Building Envelopes".
- 2) Where airtightness is determined in accordance with Sentence (1) with intentional openings for mechanical equipment left unsealed, the airtightness rate shall be adjusted in the energy model calculations to account for air leakage through mechanical equipment.
- 3) *Buildings* shall be tested for airtightness to an induced test pressure of not less than 50 Pa.

9.38.1. OBJECTIVES AND FUNCTIONAL STATEMENTS

9.38.1.1. Attributions to Acceptable Solutions

Table 9.38.1.1. Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 9 Forming Part of Sentence 9.38.1.1.(1)	
Acceptable Solutions	Functional Statements and Objectives⁽¹⁾
9.36.6.3. Compliance Requirements	
(1)	[F85, F86, F90, F91, F92, F93, F95, F96, F98, F99-OE1.1]
9.36.6.5. Building Envelope Airtightness Testing	
(1)	[F90-OE1.1]

Notes to Table 9.38.1.1.:

(1) See Parts 2 and 3 of Division A.

Appendix Notes for Energy Step Code

A-9.36.1.3. Compliance Options According to Building Type and Size

Table A-9.36.1.3. describes the types and sizes of Part 9 buildings to which the various compliance paths within Section 9.36. apply.

Table A-9.36.1.3. Energy Efficiency Compliance Options for Part 9 Buildings				
Building Types and Sizes	Energy Efficiency Compliance Options			
	9.36.2. to 9.36.4. (Prescriptive)	9.36.5. (Performance)	9.36.6. (Energy Step Code)	NECB
<ul style="list-style-type: none"> houses with or without a secondary suite buildings containing only dwelling units with common spaces $\leq 20\%$ of building's total floor area⁽¹⁾ 	✓	✓	✓	✓
<ul style="list-style-type: none"> buildings containing Group D, E or F3 occupancies whose combined total floor area $\leq 300 \text{ m}^2$ (excluding parking garages that serve residential occupancies) buildings with a mix of Group C and Group D, E or F3 occupancies where the non-residential portion's combined total floor area $\leq 300 \text{ m}^2$ (excluding parking garages that serve residential occupancies) 	✓	X	X	✓
<ul style="list-style-type: none"> buildings containing Group D, E or F3 occupancies whose combined total floor area $> 300 \text{ m}^2$ buildings containing F2 occupancies of any size 	X	X	X	✓

Notes to Table A-9.36.1.3.:

⁽¹⁾ The walls that enclose a common space are excluded from the calculation of floor area of that common space.

A-9.36.6.2. Floor Area in the Energy Step Code

The words "floor area" in Sentences 9.36.6.2.(1), 9.36.6.2.(3), 9.36.6.2.(4), 10.2.3.2.(1), and 10.2.3.2.(2) are not italicized, to differentiate them from the defined term floor area in Article 1.4.1.2. of Division A.

Different modelling approaches identify the applicable floor area in various ways (e.g. modelled floor area, heated floor area, treated floor area, etc.), and the use of the words floor area in Sentences 9.36.6.2.(1), 9.36.6.2.(3), 9.36.6.2.(4), 10.2.3.2.(1), and 10.2.3.2.(2) is intended to accommodate the various modelling approaches.

A-9.36.6.2.(1)(f) Auxiliary HVAC Equipment

This category of equipment generally includes cooling tower fans, humidifiers and other devices that do not directly fall under one of the other categories listed in Sentence 8.4.2.2.(1) of the NECB.

A-9.36.6.3.(2) Airtightness Testing for Step 1

Although there is no airtightness requirement for buildings conforming to the requirements of Step 1, these buildings must still be tested in accordance with Article 9.36.6.5. and their air barriers must meet the requirements of Subsection 9.25.3.

Buildings conforming to the requirements of Step 1 may also conform to Subsection 9.36.5. Although Sentence 9.36.5.10.(9) provides the option of using the airtightness as tested in the energy modelling, using the result in the energy model is not required.

A-9.36.6.4.(2)(b) EnerGuide Rating System

Although not a requirement of the British Columbia Building Code, users of the EnerGuide Rating System (ERS) must be energy advisors registered and in good standing with Natural Resources Canada in accordance with the EnerGuide Rating System Administrative Procedures and must adhere to the technical standards and procedures of the ERS. These standards and procedures are available through Natural Resources Canada and include program requirements for energy modelling using the ERS.

A-9.36.6.4.(2)(c) NECB

Although the energy model calculation methods of the NECB are permitted to be used, the results of those calculations must reflect the definitions and the requirements related to mechanical energy use intensity, thermal energy demand intensity, and peak thermal load as set out in Articles 9.36.6.2. and 9.36.6.3., and not the Annual Energy Consumption as required by Part 8 of the NECB.

A-9.36.6.4.(4) Air Leakage Rate in Energy Model Calculations

For Step 1 buildings, airtightness testing must be performed as required by Sentence 9.36.6.3.(2) and reported as required by Division C, but there is no minimum level of airtightness required. See Sentence 9.36.5.10.(9) for requirements for the airtightness value to be used in the energy model calculations for Step 1 buildings using Subsection 9.36.5.

For buildings that must conform to the requirements of any of Steps 2 to 5, higher than expected air leakage may require the building design to be altered and the energy model calculations to be repeated. Alternatively, the air leakage rate could be retested after making alterations to the air barrier system to attain the desired air leakage rate.

Section 10.2. Energy Efficiency

10.2.1. GENERAL

10.2.1.1. Application

1) This Section does not apply to *buildings* described in Sentence 1.3.3.3.(1) of Division A.

10.2.2. DESIGN AND INSTALLATION

10.2.2.1. Design and Installation

- 1) *Buildings* shall be designed and constructed to conform to
 - a) ANSI/ASHRAE/IESNA 90.1, "Energy Standard for Buildings Except Low-Rise Residential Buildings",
 - b) the NECB, or
 - c) Subsection 10.2.3.
- 2) Where a *building* contains one or more *major occupancies* that conform to Subsection 10.2.3., the *major occupancies* that do not conform to Subsection 10.2.3. shall comply with Clause (1)(a) or (b).

10.2.3. ENERGY STEP CODE

10.2.3.1. Application

- 1) This Subsection applies to *buildings*
 - a) containing any of the following *major occupancies*:
 - i) *residential*,
 - ii) *business and personal services*, or
 - iii) *mercantile*, and
 - b) located where the degree-days below 18° C value is less than 3000.

(See Sentence 1.1.3.1.(1) of Division B and Table C-2 in Appendix C.)

10.2.3.2. Definitions

(See A-9.36.6.2. in Appendix A.)

- 1) For the purpose of this Subsection, the term "total energy use intensity" shall mean a metric of the energy used over the year by the *building*, estimated by using an energy model in accordance with Article 10.2.3.4., normalized per square metre of floor area of *conditioned space* and expressed in kWh/(m²·year), for all of the following combined:
 - a) space-heating equipment,
 - b) space-cooling equipment,
 - c) fans,
 - d) interior and exterior lighting devices,
 - e) service water heating equipment,

- f) pumps,
 - g) auxiliary HVAC equipment (see A-9.36.6.2.(1)(f) in Appendix A),
 - h) receptacle loads and miscellaneous equipment,
 - i) appliances, and
 - j) elevators and escalators.
- 2) For the purpose of this Subsection, the term “thermal energy demand intensity” shall mean a metric of the annual heating required by the *building* for space conditioning and conditioning of ventilation air, estimated by using an energy model in accordance with Article 10.2.3.4., normalized per square metre of floor area of *conditioned space* and expressed in kWh/(m²·year), taking into account all of the following:
- a) thermal transmittance of above-ground walls and roof-ceiling assemblies,
 - b) thermal transmittance of floors and walls in contact with the ground, or space that is not *conditioned space*,
 - c) thermal transmittance and solar heat gain of windows, doors and skylights,
 - d) air leakage through the *air barrier system*,
 - e) internal heat gains from occupants and equipment, and
 - f) heat recovery from exhaust ventilation.

(See Appendix A.)

- 3) For the purpose of this Subsection, the term “Step” shall mean a Step referred to in Tables 10.2.3.3.A and B.

10.2.3.3. Compliance Requirements

- 1) *Buildings* and *major occupancies* conforming to the requirements of any of Steps 1 to 4 shall be **designed** and constructed to conform to the applicable energy performance requirements in Tables 10.2.3.3.A and B.

Table 10.2.3.3.A
Energy Performance Requirements for Residential Occupancies
 Forming part of Sentences 10.2.3.3.(1) and (2)

Step	Equipment and Systems – Maximum Total Energy Use Intensity kWh/(m ² ·year)	Building Envelope – Maximum Thermal Energy Demand Intensity kWh/(m ² ·year)
1	Conform to Part 8 of the NECB	
2	130	45
3	120	30
4	100	15

Table 10.2.3.3.B.
Energy Performance Requirements for Business and Personal Services or Mercantile Occupancies
 Forming part of Sentence 10.2.3.3.(1) and (2)

Step	Equipment and Systems – Maximum Total Energy Use Intensity kWh/(m ² ·year)	Building Envelope – Maximum Thermal Energy Demand Intensity kWh/(m ² ·year)
1	Conform to Part 8 of the NECB	
2	170	30
3	120	20

- 2) Except as permitted by Sentence (3),
- a) energy performance shall be calculated in conformance with Article 10.2.3.4., and
 - b) airtightness shall be tested in accordance with Article 10.2.3.5.

(See Appendix A.)

- 3) *Buildings and major occupancies* designed and constructed to conform to Step 4 of Table 10.2.3.3.A or to Step 3 of Table 10.2.3.3.B, and to the Passive House Planning Package, version 9 or newer, are deemed to comply with this Subsection provided the energy model according to which the *building* or the *major occupancy* of the *building* is designed and constructed is prepared by a Certified Passive House Designer, or Certified Passive House Consultant, who is approved by the Passive House Institute.

(See also Sentence 10.2.2.1.(2).)

10.2.3.4. Energy Modelling

- 1) Except as required by Sentence (2), for *buildings* and *major occupancies* conforming to the requirements of any of Steps 1 to 4, energy modelling shall conform to
 - a) the applicable requirements of Part 8 of the NECB, and (See Appendix A.)
 - b) the City of Vancouver Energy Modelling Guidelines.
- 2) Except as permitted by Sentence (3), energy modelling for *buildings* and *major occupancies* conforming to the requirements of any of Steps 2 to 4 shall account for the air leakage rate derived in accordance with Article 10.2.3.5.

(See Appendix A.)

- 3) Energy modelling is permitted to account for an air leakage value of 0.25 L/(s·m²) from total gross above-ground wall and roof areas until the air leakage rate determined by Sentence (2) is available.

(See Appendix A.)

10.2.3.5. Building Envelope Airtightness Testing

- 1) Except as required by Sentence (2), *buildings* and *major occupancies* shall be tested for airtightness in accordance with
 - a) ASTM E 779, “Standard Test Method for Determining Air Leakage Rate by Fan Pressurization”, or
 - b) USACE Version 3, “Air Leakage Test Protocol for Building Envelopes”.

(See Appendix A.)

- 2) Where airtightness is determined in accordance with Sentence (1) with intentional openings for mechanical equipment left unsealed, the airtightness rate shall be adjusted in the energy model calculations to account for air leakage through mechanical equipment.
- 3) *Buildings and major occupancies* shall be tested for airtightness to an induced test pressure of not less than 75 Pa.

10.4.1. OBJECTIVES AND FUNCTIONAL STATEMENTS

10.4.1.1. Attribution to Acceptable Solutions

Table 10.4.1.1.	
Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 10	
Forming Part of Sentence 10.4.1.1.(1) of Division B	
Acceptable Solutions	Functional Statements and Objectives ⁽¹⁾
10.2.3.3. Compliance Requirements	
(3)	[F85, F86, F90, F91, F92, F93, F95, F96, F98, F99, F100-OE1.1]
10.2.3.5. Building Envelope Airtightness Testing	
(1)	[F90-OE1.1]
10.3.1.1. Fixture Fitting Maximum Flow Rates	
(1)	[F84-OE2.1, OE2.2]
10.3.1.2. Fixture Efficiency	
(1)	[F83-OE2.1, OE2.2]
(2)	[F83-OE2.1, OE2.2]

Notes to Table 10.4.1.1.:

⁽¹⁾ See Parts 2 and 3 of Division A.

Appendix Notes for Energy Step Code

A-10.2.3.2.(2) Thermal Energy Demand Intensity (TEDI)

TEDI does not include receptacle loads and energy use from unusual uses such as spas and computer server rooms.

A-10.2.3.3.(2) Energy Model Calculations for Step 1

Although the total energy use intensity and thermal energy demand intensity are not required for NECB conformance, they must still be calculated in conformance with Article 10.2.3.4. and reported in accordance with Subsection 2.2.9. of Division C.

A-10.2.3.4.(1)(a) and (2) Energy Model Calculations for Steps 2 to 4

Notwithstanding the requirements of Part 8 of the NECB, a reference building and building energy target are not required for compliance with the requirements of Step 2 to 4 in Article 10.2.3.3. The performance requirements of Table 10.2.3.3.A and Table 10.2.3.3.B are used to determine compliance.

A-10.2.3.4.(3) Air Leakage Rate

Air Leakage Rate in Energy Model Calculations

The requirement to account for the air leakage rate as tested in all energy model calculations, other than for Step Level 1 buildings, supersedes the NECB, which permits an assumed air leakage value of $0.25 \text{ L}/(\text{s}\cdot\text{m}^2)$ to be used for energy model calculations. For buildings that must conform to the requirements of any of Steps 2 to 4, higher than expected air leakage may require the building design to be altered and the energy model calculations to be repeated. Alternatively, the air leakage rate could be retested after making alterations to the air barrier system to attain the desired air leakage rate.

Air Leakage Rate in Energy Model Calculations for Step 1

Although the air leakage rate as tested of the building need not be used for the purposes of conforming with Part 8 of the NECB and Sentence 10.2.3.4.(2), Article 2.2.9.1. of Division C requires that the air leakage rate as tested be used in the calculation of the total energy use intensity and thermal energy demand intensity for reporting purposes on the drawings and specifications. This will typically require Step 1 energy model calculations to be redone after the airtightness test. It is not intended that the results of the airtightness test for buildings that must conform to the requirements of Step 1 influence the compliance of the building with Article 10.2.3.3.

Air Leakage Rate

The air leakage rate of $0.25 \text{ L}/(\text{s}\cdot\text{m}^2)$, which is a typical infiltration rate at 5 Pa, is for calculation purposes and may not reflect the real rate encountered under actual operating conditions; it is based on assumed typical operating pressure differentials.

A-10.2.3.5.(1) Building Airtightness Testing Requirements

The intent of this testing is to quantify the airtightness level of the air barrier system, not airtightness of the building at in-service operating conditions.

Changes to Division C

2.2.8. DRAWINGS, SPECIFICATIONS AND CALCULATIONS FOR ENERGY PERFORMANCE COMPLIANCE

2.2.8.1. Application

- 1) This Subsection applies only to houses with or without a *secondary suite* and to *buildings* containing only *dwelling units* and common spaces whose total *floor area* does not exceed 20% of the total *floor area* of the *building* that are modeled in accordance with Subsection 9.36.5. or 9.36.6. of Division B to demonstrate compliance with the energy efficiency objectives of Subsections 9.36.2. to 9.36.4. of Division B. (See Appendix A.) (See also Sentence 9.36.1.2.(1) of Division B of Division B and A-9.36.1.3.(3) in Appendix A of Division B.)

2.2.8.3. House Performance Compliance Calculation Report

- 1) A house performance compliance calculation report shall be provided in accordance with Sentence (2) for each proposed house design.
- 2) In addition to the drawings and specifications required in Article 2.2.8.2., the house performance compliance calculation report shall include
 - a) a project information section containing
 - i) the name or identifier of the project,
 - ii) a description of the project,
 - iii) the address of the project,
 - iv) the name and version of the calculation tool,
 - v) the geographic region in which the proposed house is to be built, and
 - vi) the identifier for the climatic data set used for analysis,
 - b) a summary of the characteristics of the building envelope, HVAC system and service water heating system reflecting the information provided in Article 2.2.8.2.,
 - c) an energy performance data summary containing
 - i) the annual energy consumption of all energy sources calculated for the proposed house (see Appendix A), and
 - ii) the house energy target of all energy sources calculated for the reference house,
 - d) where a software program is used to determine compliance,
 - i) the name of the software program(s), and
 - ii) a list of any adaptations made by the user to the software relating to input or output values, and
 - e) a statement that the calculation was performed in compliance with
 - i) Subsection 9.36.5. of Division B,
 - ii) Sentence 9.36.6.3.(3) of Division B, or
 - iii) Sentence 9.36.6.4.(2) of Division B.

- 3) Where a *building* complies with Subsection 9.36.6. of Division B, the energy performance data summary in Clause (2)(c) shall also contain
 - a) the mechanical energy use intensity,
 - b) the thermal energy demand intensity,
 - c) the peak thermal load,
 - d) where applicable, the EnerGuide Rating % lower than EnerGuide Reference House for the *building*,
 - e) for *buildings* conforming to Step 1, the airtightness of the *building* as tested, derived in accordance with Article 9.36.6.5. of Division B, and recorded in air changes per hour at 50 Pa, and
 - f) for *buildings* conforming to any of Steps 2 to 5, the airtightness of the *building* as tested that is accounted for in accordance with Sentence 9.36.6.4.(4) of Division B, and derived in accordance with Article 9.36.6.5., recorded in air changes per hour at 50 Pa.
- 4) The mechanical energy use intensity in Clause (3)(a), the thermal energy demand intensity in Clause (3)(b), the peak thermal load in Clause (3)(c), and the EnerGuide Rating % lower than EnerGuide Reference House in Clause 3(d) shall account for the airtightness referenced in Clauses (3)(e) or (f), as applicable.

2.2.9. Drawings, Specifications and Calculations for Subsection 10.2.3

2.2.9.1. Application

- 1) This Subsection applies to *buildings* and *major occupancies* in *buildings* to which Subsection 10.2.3. of Division B applies.

2.2.9.2. Information Required on Drawings and Specifications

- 1) For *buildings* and *major occupancies* that are designed and constructed in compliance with Subsection 10.2.3. of Division B, *drawings* or specifications shall indicate
 - a) the total energy use intensity as defined by Sentence 10.2.3.2.(1) of Division B,
 - b) the energy use intensity of major energy services separately, including
 - i) space heating,
 - ii) space cooling,
 - iii) service water heating,
 - iv) lighting, and
 - v) other plug loads,
 - c) the thermal energy demand intensity as defined by Sentence 10.2.3.2.(2) of Division B,
 - d) for *buildings* conforming to Step 1, the air leakage rate as tested, derived in accordance with Article 10.2.3.5. of Division B, and recorded in $L/(s \cdot m^2)$ at 75 Pa, and
 - e) for *buildings* conforming to any of Steps 2 to 4, the air leakage rate as tested that is accounted for in accordance with Sentence 10.2.3.4.(2) and derived in accordance with Article 10.2.3.5. of Division B, recorded in $L/(s \cdot m^2)$ at 75 Pa.
- 2) The total energy use intensity in Clause (1)(a) and the thermal energy demand intensity in Clause (1)(c) shall account for the airtightness referenced in Clause (1)(d) or (e), as applicable.