

MMA Supplementary Standard SB-12

Energy Efficiency For Housing

July 7, 2016 update

COMMENCEMENT

MMAH Supplementary Standard SB-12 comes into force on the 1st day of January, 2014.

- m₁** Ruling of the Minister of Municipal Affairs and Housing (Minister's Ruling) MR-13-S-24 takes effect on the 1st day of January, 2014.
- r₅** SB-12 as amended by Ontario Regulation 191/14 comes into force on the 1st day of January, 2015.
- m₃** Ruling of the Minister of Municipal Affairs (Minister's Ruling) MR-16-S-26 takes effect on 7th day of July, 2016.

EDITORIAL

- e₂** Editorial correction issued for January 1st, 2014.

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m₃ SB-12 Energy Efficiency for Housing

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FOREWORD¹

This Supplementary Standard includes design options regarding the energy efficiency of a building or part of a building of residential occupancy that is within the scope of Part 9 and is intended for occupancy on a continuing basis during the winter months. Conformance with the options in this Supplementary Standard is one method of demonstrating compliance with the requirements in Sentences 12.2.1.1.(3) and 12.2.1.2.(3) of the Building Code (Ontario Regulation 332/12). The options in this Supplementary Standard are intended to recognize the needs of consumers and the building industry for predictable prescriptive and flexible performance-based solutions. Two sets of options are contained in this Supplementary Standard, one that is applicable to construction for which a permit has been applied for before January 1, 2017 and the other that is applicable to permit applications made after December 31, 2016.

The first edition of this Supplementary Standard was published in 2009. The energy efficiency levels achieved in that edition were intended to meet or exceed, on a systematic basis, the EnerGuide 80 level of energy efficiency that would be met by model analogues evaluated against the NRCan “EnerGuide for New Houses: Administrative and Technical Procedures” (2005). The editions published in 2012 and 2013 included certain trade-off options in recognition of the Energy Star program that expanded the number of building component and assembly permutations considered to represent acceptable solutions. The September 2013 also included a new “Chapter 3” with compliance packages that demonstrated how to achieve an additional energy efficiency level increase of 15% over the requirements that took effect on January 1, 2012.

This July 7th, 2016 update of the Supplementary Standard is primarily intended to update the compliance packages set out in Chapter 3. Changes include the identification of credits based on airtightness. The compliance packages and options described in Chapter 3 are applicable to building permits applied for after December 31, 2016. Other changes include the recognition of the technical requirements of Energy Star and R2000 programs as design options for meeting the energy efficiency requirements of the Building Code.

Labelling is not required to demonstrate compliance with this Supplementary Standard.

¹ Unless otherwise indicated, all Building Code references in this foreword refer to provisions located in Division B of the Building Code.

SUMMARY OF THE CONTENTS OF SB-12

Chapter 1: General

This Chapter sets out the scope and application of this Supplementary Standard.

Chapter 2: Acceptable Solutions for Achieving Energy Efficiency Compliance Before January 1, 2017.

This Chapter contains acceptable solutions for achieving energy efficiency compliance with Clause 12.2.1.1.(3)(b) of Division B of the Building Code and applies to construction for which a permit has been applied for before January 1, 2017. Conformance with one of the prescriptive compliance packages in Subsection 2.1.1., the performance compliance method in Subsection 2.1.2. or Energy Star requirements as specified in Subsection 2.1.3. of this Supplementary Standard will achieve an energy efficiency performance level that is intended to meet or exceed, on a systemic basis, the level that would be met by model analogues evaluated against the EnerGuide Rating System-2005.

Chapter 3: Acceptable Solutions for Achieving Energy Efficiency Compliance After December 31, 2016.

This Chapter contains acceptable solutions for achieving energy efficiency compliance with Clause 12.2.1.2.(3)(b) of Division B of the Building Code and applies to construction of buildings for which a permit has been applied for after December 31, 2016. Conformance with one of the prescriptive compliance packages in Subsection 3.1.1., the performance compliance method in Subsection 3.1.2. or Energy Star or R2000 requirements as specified in Subsection 3.1.3. of this Supplementary Standard is intended to achieve, on a systemic basis, an energy efficiency performance level that exceeds the energy efficiency requirements of Sentence 12.2.1.1.(3) of Division B of the Building Code by 15%.

Chapter 1

General

Section 1.1. Scope

1.1.1. Energy Efficiency Compliance

1.1.1.1. Energy Efficiency

- (1) This Section is concerned with the energy used by *buildings* as a result of
 - (a) the design and *construction* of the *building* envelope, and
 - (b) the design and *construction* or specification of systems and equipment for
 - (i) heating, ventilating or *air-conditioning*, and
 - (ii) service water heating.
- (2) Compliance with Chapters 1 and 2 of this Supplementary Standard shall be deemed to meet the energy efficiency requirements in accordance with Sentence 12.2.1.1.(3) of Division B of the *Building Code*.
- (3) Compliance with Chapters 1 and 3 of this Supplementary Standard shall be deemed to meet the energy efficiency requirements in accordance with Sentence 12.2.1.2.(3) of Division B of the *Building Code*.
- (4) The energy efficiency of existing *buildings* shall comply with
 - (a) Part 10 of Division B of the *Building Code* with respect to change of use, or
 - (b) Part 11 of Division B of the *Building Code* for renovation.

1.1.1.2. Compliance Options Before January 1, 2017

- (1) The energy efficiency of a *building* or part of a *building* of *residential occupancy* that is within the scope of Part 9 of Division B of the *Building Code* and is intended for occupancy on a continuing basis during the winter months shall comply with
 - (a) Subsection 2.1.1. (Prescriptive Compliance Packages) of Chapter 2,
 - (b) Subsection 2.1.2. (Performance Compliance) of Chapter 2, or
 - (c) Subsection 2.1.3. (Other Acceptable Compliance Methods) of Chapter 2.
- (2) Factory-built modular homes manufactured before January 1, 2012 in accordance with the *Building Code* as it read on December 31, 2011 shall be deemed to be in compliance with Sentence (1).

1.1.1.3. Compliance Options After December 31, 2016

- (1) The energy efficiency of a *building* or part of a *building* of *residential occupancy* that is within the scope of Part 9 of Division B of the *Building Code* and is intended for occupancy on a continuing basis during the winter months shall comply with
 - (a) Subsection 3.1.1. (Prescriptive Compliance Packages) of Chapter 3,
 - (b) Subsection 3.1.2. (Performance Compliance) of Chapter 3, or
 - (c) Subsection 3.1.3. (Other Acceptable Compliance Methods) of Chapter 3.
- (2) Factory-built modular homes manufactured before January 1, 2017 in accordance with the *Building Code* as it read on December 31, 2016 shall be deemed to be in compliance with Sentence (1).

Section 1.2. Application

1.2.1. Application of Supplementary Standard SB-12

1.2.1.1. Energy Efficiency Design

(1) The energy efficiency of a *building* or part of a *building of residential occupancy* that is within the scope of Part 9 of Division B of the *Building Code* and is intended for occupancy on a continuing basis during the winter months shall comply with this Supplementary Standard in accordance with Subsection 12.2.1. of Division B of the *Building Code*.

Section 1.3. Terms and Abbreviations

1.3.1. Definitions of Words and Phrases

1.3.1.1. Non-Defined Terms

(1) Definitions of words and phrases used in this Supplementary Standard that are not included in the list of definitions in Articles 1.4.1.2. and 1.4.1.3. of Division A of the *Building Code* and are not defined in another provision of the *Building Code* shall have the meanings that are commonly assigned to them in the context in which they are used, taking into account the specialized use of terms by the various trades and professions to which the terminology applies.

1.3.1.2. Defined Terms

(1) Each of the words and terms in italics in this Supplementary Standard has the same meaning as in subsection 1(1) of the *Building Code Act, 1992* or Sentence 1.4.1.2.(1) of Division A of the *Building Code*.

(2) In this Supplementary Standard,

common space means all spaces required to be *conditioned spaces* in accordance with the requirements of the *Building Code* that are not within a *suite* but does not include crawl spaces and *vertical service spaces*;

effective RSI value means the effective thermal resistance, which is the inverse of the *overall thermal transmittance* of a *building* assembly, in $(\text{m}^2 \cdot \text{K})/\text{W}$; (See Appendix A.)

fenestration means a *building* envelope assembly that transfers visible light, such as a window, clerestory, skylight, translucent wall panel, glass block assembly, transom, sidelight, sliding or swinging glass door, or glazed insert in a door, and includes the frames and other components of the assembly;

overall coefficient of heat transfer means *overall thermal transmittance* of *fenestration* and, for greater certainty, includes all components of *fenestration*;

overall thermal transmittance means the rate, in $\text{W}/(\text{m}^2 \cdot \text{K})$, at which heat is transferred through all components of a *building* envelope assembly that is subject to temperature differences and includes interior and exterior air films that are in contact with the assembly, but does not include exterior air films where the assembly is in contact with soil.

1.3.2. Symbols and Other Abbreviations

1.3.2.1. Symbols and Other Abbreviations

(1) Where used in this Supplementary Standard, a symbol or abbreviation listed in Column 2 of Table 1.4.2.1. of Division A of the *Building Code* shall have the meaning listed opposite it in Column 3.

(2) The abbreviations listed in Column 2 of Table 1.3.2.1. shall also apply to this Supplementary Standard and shall have the meaning listed opposite it in Column 3.

Table 1.3.2.1.
Abbreviations
Forming Part of Sentence 1.3.2.1.(2)

Item	Abbreviation	Meaning
1	ACH	air changes per hour
2	AFUE	annual fuel utilization efficiency
3	ASHP	air source heat pump
4	ci	continuous insulation (See Appendix A)
5	EF	energy factor
6	HRV	heat or energy recovery ventilator
7	HSPF	heating seasonal performance factor
8	ICF	insulating concrete form
9	IP	inch-pound - imperial
10	K	Kelvin
11	NLA	normalised leakage area
12	NLR	normalised leakage rate
13	SI	standard international – metric
14	SRE	sensible recovery efficiency
15	TPF	thermal performance factor
16	U-Value	overall thermal transmittance or overall coefficient of heat transfer
Column 1	2	3

Section 1.4. Referenced Documents and Organizations

1.4.1. Referenced Documents

1.4.1.1. Effective Date

(1) Unless otherwise specified in this Supplementary Standard, the documents referenced in this Supplementary Standard shall include all amendments, revisions and supplements effective to October 31, 2011.

1.4.1.2. Applicable Editions

(1) Where documents are referenced in this Supplementary Standard, they shall be the editions designated in Column 2 of Table 1.4.1.2.

Table 1.4.1.2.
Referenced Documents
 Forming Part of Sentence 1.4.1.2.(1)

Issuing Agency	Document Number	Title of Document	Supplementary Standard Reference
CGSB	CAN/CGSB 149.10-M86	Determination of the Airtightness of Building Envelopes by the Fan Depressurization Method	3.1.1.4.(2)
CSA	CAN/CSA-A440.2-09	Fenestration Energy Performance Evaluation of Windows and Sliding Glass Doors	2.1.1.8.(2); 3.1.1.9.(2)
CSA	B55.1-12	Test Method for Measuring Efficiency and Pressure Loss of Drain Water Heat Recovery Units	2.1.1.11.(3); 3.1.1.12.(4)
CSA	B55.2-12	Drain Water Heat Recovery Units	2.1.1.11.(2); 3.1.1.12.(3)
CSA	CAN/CSA-P.9-11	Test Method for Determining the Performance of Combined Space and Water Heating Systems (Combos)	3.1.1.2.(7); 3.1.1.3.(7)
NFRC	NFRC 100-2010	Procedure for Determining Fenestration Product U-factors	2.1.1.8.(2); 3.1.1.9.(2)
NFRC	NFRC 200-2010	Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence	2.1.1.8.(2); 3.1.1.8.(2)
NRCan	NRCan January 2011	Energy Star for New Homes: Technical Specifications – Ontario	2.1.3.1.(1)
NRCan	NRCan January 2012	Energy Star for New Homes Standard Version 12.1	2.1.3.1.(1)
NRCan	NRCan January 2012	Energy Star for New Homes Standard Version 12.6	3.1.3.1.(1)
NRCan	NRCan November 2015	EnerGuide Rating System Technical Procedures Version 15.1	3.1.1.4.(2); 3.1.2.1.
NRCan	NRCan 2012	2012 R-2000 Standard	2.1.3.1.(2); 3.1.3.1.(2); A.3.1.3.1.
Column 1	2	3	4

Notes to Table 1.4.1.2.:

(1) NFRC refers to the National Fenestration Rating Council. (See Appendix A.)

1.4.2. Abbreviations

1.4.2.1. Abbreviations of Proper Names

(1) Where used in this Supplementary Standard, abbreviations of proper names listed in Column 1 of Table 1.3.2.1. of Division B of the *Building Code* shall have the meaning assigned opposite it in Column 2.

Chapter 2

Acceptable Solutions for Energy Efficiency Compliance Before January 1, 2017

(Applies to construction for which a permit has been applied for before January 1, 2017)

Section 2.1. Methods for Achieving Energy Efficiency Compliance

2.1.1. Prescriptive Compliance Packages (See Appendix A.)

2.1.1.1. Energy Efficiency

- (1) Except as permitted in Articles 2.1.1.5. to 2.1.1.10., the minimum thermal performance and energy efficiency of *building* envelope and space heating equipment, domestic water heating equipment and heat or energy recovery ventilator equipment shall conform to
 - (a) Article 2.1.1.2. if the *building* is located in Zone 1 with less than 5000 heating degree days, or
 - (b) Article 2.1.1.3. if the *building* is located in Zone 2 with 5000 or more heating degree days.
- (2) All walls, ceilings, floors, windows and doors that separate heated space from unheated space, the exterior air or the exterior *soil* shall have thermal resistance ratings conforming to this Subsection.
- (3) Where specified in compliance packages in Tables 2.1.1.2.A, 2.1.1.2.B and 2.1.1.2.C and Tables 2.1.1.3.A, 2.1.1.3.B and 2.1.1.3.C, space heating equipment, domestic water heating equipment and heat or energy recovery ventilators shall have the efficiency rating conforming to this Subsection. (See Appendix A.)
- (4) Insulation shall be provided between heated and unheated spaces and between heated spaces and the exterior in accordance with this Chapter.
- (5) Reflective surfaces of insulating materials shall not be considered in calculating the thermal resistance of *building* assemblies.
- (6) Where glass block is used in a wall, the required minimum overall performance of the *building* envelope shall be maintained by increasing thermal performance of other components sufficient to compensate for the additional heat loss through the glass block.
- (7) Except as provided in Sentence (8) and except as permitted in Sentences (9) and 2.1.1.10.(3), where the ratio of the gross area of windows, sidelights, skylights, glazing in doors and sliding glass doors to the gross area of peripheral walls measured from grade to the top of the upper most ceiling is not more than 17%, the *building* shall comply with a compliance package selected from Tables 2.1.1.2.A, 2.1.1.2.B and 2.1.1.2.C and Tables 2.1.1.3.A, 2.1.1.3.B and 2.1.1.3.C. (See Appendix A.)

- (8) Except as permitted in Sentences (9) and 2.1.1.10.(3), where the ratio of the gross area of windows, sidelights, skylights, glazing in doors and sliding glass doors to the gross area of peripheral walls measured from grade to the top of the upper most ceiling is more than 17% but not more than 22%, the *building* shall comply with a compliance package selected from Tables 2.1.1.2.A, 2.1.1.2.B and 2.1.1.2.C and Tables 2.1.1.3.A, 2.1.1.3.B and 2.1.1.3.C, and the *overall coefficient of heat transfer* of the glazing shall be upgraded to
- 1.8 where the selected compliance package requires 2.0,
 - 1.6 where the selected compliance package requires 1.8, and
 - 1.4 where the selected compliance package requires 1.6.
- (See Appendix A.)
- (9) Glazing in main entrance doors and adjacent sidelights to main entrance doors need not be calculated for the purposes of Sentences (7), (8) and (10).
- (10) Except as provided in Sentences (9) and 2.1.1.10.(3), where the ratio of gross area of windows, sidelights, skylights, glazing in doors and sliding glass doors to the gross area of peripheral walls measured from grade to the top of the upper most ceiling is more than 22%, the *building* shall comply with Subsection 2.1.2. (See Appendix A.)
- (11) Where a *dwelling* unit has a walkout *basement*, the thermal performance level of the exterior *basement* wall shall be not less than that required for the above grade wall for
- the *basement* wall containing the door opening, and
 - any *basement* wall that has an exposed wall area above the ground level exceeding 50% of that *basement* wall area.
- (12) The minimum thermal resistance of insulation shall conform to the applicable values specified in Articles 2.1.1.2., 2.1.1.3. and 2.1.1.10.
- (13) The minimum annual fuel utilization efficiency of a natural gas- or propane-fired furnace serving a *building* of *residential occupancy* shall conform to Table 2.1.1.1.A.

Table 2.1.1.1.A.
Furnace Minimum Annual Fuel Utilization Efficiency
 Forming Part of Sentence 2.1.1.1.(13)

Furnace Fuel Source	Minimum AFUE
Natural gas	90%
Propane	90%
Column 1	2

- (14) Where space heating is supplied by a solid fuel-burning *appliance* or an earth energy system, the compliance package is permitted to comply with Tables 2.1.1.2.A. and 2.1.1.3.A.
- (15) Where an enclosed unheated space is separated from a heated space by glazing, the unheated enclosure may be considered to provide a thermal resistance of RSI 0.16.
- (16) Where space heating equipment and domestic water heating equipment efficiencies are specified in a compliance package in Tables 2.1.1.2.A, 2.1.1.2.B and 2.1.1.2.C and Tables 2.1.1.3.A, 2.1.1.3.B and 2.1.1.3.C, the equipment efficiencies shall be determined in accordance with test procedures regulated by an applicable Ontario Regulation, or in the absence of such regulation, determined in accordance with test procedures governed by the applicable equipment standard.
- (17) Where heat or energy recovery ventilators are specified in a compliance package in Tables 2.1.1.2.A, 2.1.1.2.B and 2.1.1.2.C and Tables 2.1.1.3.A, 2.1.1.3.B and 2.1.1.3.C, they shall
- meet the requirements of Article 9.32.3.11. of Division B of the *Building Code*, and
 - meet the minimum efficiency rating required in this Chapter based on a test temperature of 0°C at an air flow rate equal to the principle exhaust flow but need not exceed 30 L/s.

2.1.1.2. Energy Efficiency for Buildings Located in Zone 1

- (1) Except as required in Sentences (2) to (4) and permitted in Sentences (5) to (11), the minimum thermal performance of *building* envelope and equipment shall conform to Table 2.1.1.2.A.
- (2) Except for solid fuel-burning space heating equipment and natural gas and propane furnaces, where the space heating equipment efficiency ranges from 78% to less than 90%, the minimum thermal performance of the *building* envelope and equipment shall conform to Table 2.1.1.2.B.
- (3) Where *electric space heating* is used, the minimum thermal performance of the *building* envelope and equipment shall conform to Table 2.1.1.2.C.
- (4) Except for solid fuel-burning space heating equipment, where the space heating equipment efficiency is less than 78% or it cannot meet the requirements of the applicable compliance packages, energy efficiency compliance shall be achieved in accordance with Clause 12.2.1.1.(3)(a) of Division B of the *Building Code* or Subsection 2.1.2. of this Supplementary Standard.
- (5) Where the thermal performance of above grade walls, windows or *basement* walls is reduced by applying Sentences (6) through (11), only the thermal performance of one of those *building* components is permitted to be reduced.
- (6) Except as permitted in Sentence (7), where compliance package I or J in Table 2.1.1.2.A is used, the minimum RSI value for thermal insulation in exposed above grade walls is permitted to be not less than RSI 3.52 provided that
 - (a) the *overall coefficient of heat transfer* of the glazing is upgraded in accordance with Sentence 2.1.1.1.(8), in addition to an upgrade where it is required due to high fenestration to wall ratio, or (See Appendix A.)
 - (b) the thermal insulation value in *basement* walls has a minimum RSI 3.52 where compliance package J is used.
- (7) Where blown-in insulation or spray-applied foam insulation is used in compliance package I or J in Table 2.1.1.2.A, the minimum RSI value for thermal insulation in exposed above grade walls is permitted to be not less than RSI 3.52 provided that
 - (a) the thermal insulation value in a ceiling with an attic space is not less than RSI 10.55,
 - (b) the minimum efficiency of the HRV is increased by not less than 8 percentage points,
 - (c) the minimum AFUE of the space heating equipment is increased by not less than 2 percentage points,
 - (d) the minimum EF of the domestic water heater is increased by not less than 4 percentage points, or
 - (e) the *building* is in compliance with Sentence (6).
- (8) Except as permitted in Sentence (9), where compliance package D, E, F, G, H or M in Table 2.1.1.2.A is used, the minimum RSI value for thermal insulation of exposed above grade walls is permitted to be not less than RSI 3.52 provided that
 - (a) the *overall coefficient of heat transfer* of the glazing is upgraded in accordance with Sentence 2.1.1.1.(8), in addition to an upgrade where it is required due to high fenestration to wall ratio, and the minimum EF of the domestic water heater is increased by not less than 8 percentage points, or (See Appendix A.)
 - (b) the thermal insulation value in *basement* walls has a minimum RSI 3.52 where compliance package F, G, or H is used, and the *building* is in compliance with at least two requirements of Clauses (7)(a) to (d).
- (9) Where blown-in insulation or spray-applied foam insulation is used in compliance package D, E, F, G, H or M in Table 2.1.1.2.A, the minimum RSI value for thermal insulation in exposed above grade walls is permitted to be not less than RSI 3.52 provided that
 - (a) the *overall coefficient of heat transfer* of the glazing is upgraded in accordance with Sentence 2.1.1.1.(8), in addition to an upgrade where it is required due to high fenestration to wall ratio or the thermal insulation value in *basement* walls has a minimum RSI 3.52 where compliance package F, G, or H is used, and (See Appendix A.)
 - (b) the *building* is in compliance with Clause (7)(a), (b), (c) or (d).

(10) Where a drain water heat recovery unit conforming to Article 2.1.1.11. is provided in addition to the requirements of a compliance package selected from Tables 2.1.1.2.A to 2.1.1.2.C.

- (a) the thermal insulation value in exposed above grade walls is permitted to be not less than RSI 3.52 where it is required to be RSI 3.87,
- (b) the thermal insulation value in exposed above grade walls is permitted to be not less than RSI 3.52 where it is required to be RSI 4.23, provided that the drain water heat recovery unit has a minimum efficiency of not less than 46%,
- (c) the thermal insulation value in *basement* walls is permitted to be not less than RSI 2.11 where it is required to be RSI 3.52,
- (d) the *overall coefficient of heat transfer* of glazing is permitted to be not greater than $1.8 \text{ W}/(\text{m}^2\cdot\text{K})$ where it is required to be $1.6 \text{ W}/(\text{m}^2\cdot\text{K})$, or not greater than $1.6 \text{ W}/(\text{m}^2\cdot\text{K})$ where it is required to be $1.4 \text{ W}/(\text{m}^2\cdot\text{K})$,
- (e) the minimum efficiency of an HRV is permitted to be not less than 55% where it is required to be 75% or less, or
- (f) the minimum efficiency of a furnace is permitted to be not less than 90% where it is required to be 94%.

(11) Where an HRV is only required for the purpose of meeting the energy efficiency requirements of a compliance package included in Table 2.1.1.2.A, the HRV may be omitted provided that a drain water heat recovery unit with a minimum efficiency of not less than 62% is installed in conformance with Article 2.1.1.11.

Table 2.1.1.2.A
ZONE 1 - Compliance Packages for Space Heating Equipment with AFUE ≥ 90%
 Forming Part of Sentence 2.1.1.2.(1)

Component	Compliance Package												
	A	B	C	D	E	F	G	H	I	J	K ⁽³⁾	L ⁽⁴⁾	M ⁽⁵⁾
Ceiling with Attic Space Minimum RSI (R)-Value ⁽¹⁾	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)
Ceiling Without Attic Space Minimum RSI (R)-Value ⁽¹⁾	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)
Exposed Floor Minimum RSI (R)-Value ⁽¹⁾	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)
Walls Above Grade Minimum RSI (R)-Value ⁽¹⁾	4.23 (R24)	4.75 (R27)	4.75 (R27)	4.23 (R24)	4.23 (R24)	4.23 (R24)	4.23 (R24)	4.23 (R24)	3.87 (R22)	3.87 (R22)	3.87 (R22)	4.23 (R24)	4.23 (R24)
Basement Walls Minimum RSI (R)-Value ⁽¹⁾	3.52 (R20)	3.52 (R20)	3.52 (R20)	3.52 (R20)	3.52 (R20)	2.11 (R12)	2.11 (R12)	2.11 (R12)	3.52 (R20)	2.11 (R12)	3.87 (R22)	3.87 (R22)	3.52 (R20)
Below Grade Slab Entire Surface > 600 mm Below Grade Minimum RSI (R)-Value ⁽¹⁾	0.88 (R5)	—	—	—	—	—	—	—	—	—	—	—	—
Edge of Below Grade Slab ≤ 600 mm Below Grade Minimum RSI (R)-Value ⁽¹⁾	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)
Heated Slab or Slab ≤ 600 mm Below Grade Minimum RSI (R)-Value ⁽¹⁾	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)
Windows and Sliding Glass Doors Maximum U-Value ⁽²⁾	1.6	1.6	1.8	1.8	1.8	1.8	1.8	2.0	1.8	1.8	1.8	1.8	1.8
Skylights Maximum U-Value ⁽²⁾	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Space Heating Equipment Minimum AFUE	90%	90%	94%	94%	90%	94%	92%	94%	92%	94%	90%	94%	90% ⁽⁷⁾
HRV ⁽⁶⁾ Minimum Efficiency	—	—	—	—	55%	60%	60%	70%	55%	60%	—	—	—
Domestic Water Heater Minimum EF	0.57	0.57	0.62	0.67	0.57	0.57	0.62	0.67	0.62	0.67	0.57	0.57	0.80 ⁽⁷⁾
Column 1	2	3	4	5	6	7	8	9	10	11	12	13	14

Notes to Table 2.1.1.2.A:

- (1) Except for notes (3) and (4), the values listed are minimum RSI-Values for the thermal insulation component only. RSI-Values are expressed in (m² · K)/W.
- (2) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in W/(m² · K). See exceptions and use of alternative Energy Ratings (ER) in Article 2.1.1.8.
- (3) Compliance package K applies only to a *building* with both ICF *basement* walls and ICF above grade walls. Alternatively, any other compliance package is permitted to be used for a *building* with both ICF *basement* walls and ICF above grade walls. The thermal resistance value of an ICF wall is the total thermal resistance of the entire wall assembly.
- (4) Compliance package L applies only to a *building* with ICF *basement* walls. Alternatively, any other compliance package except compliance package K, is permitted to be used for a *building* with ICF *basement* walls. The thermal resistance value of an ICF wall is the total thermal resistance of the entire wall assembly.
- (5) Applies to a *building* with combined space heating and domestic water heating system.
- (6) Except as required in Subsection 9.32.3. of Division B of the *Building Code*, an HRV is only required as a part of a compliance package where a minimum efficiency level is specified.
- (7) Only the water heating equipment shall meet the minimum AFUE or EF specified in the Table or shall be of the condensing type.

Table 2.1.1.2.B
ZONE 1 - Compliance Packages for Space Heating Equipment with AFUE \geq 78% and $<$ 90%
 Forming Part of Sentence 2.1.1.2.(2)

Component	Compliance Package					
	A	B	C	D	E	F
Ceiling with Attic Space Minimum RSI (R)-Value ⁽¹⁾	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)
Ceiling Without Attic Space Minimum RSI (R)-Value ⁽¹⁾	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)
Exposed Floor Minimum RSI (R)-Value ⁽¹⁾	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)
Walls Above Grade Minimum RSI (R)-Value ⁽¹⁾	5.11 (R29)	5.11 (R29)	5.11 (R29)	4.75 (R27)	4.75 (R27)	4.75 (R27)
Basement Walls Minimum RSI (R)-Value ⁽¹⁾	3.52 (R20)	2.11 (R12)	3.52 (R20)	3.52 (R20)	3.52 (R20)	3.52 (R20)
Below Grade Slab Entire Surface $>$ 600 mm Below Grade Minimum RSI (R)-Value ⁽¹⁾	—	—	—	—	—	—
Edge of Below Grade Slab \leq 600 mm Below Grade Minimum RSI (R)-Value ⁽¹⁾	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)
Heated Slab or Slab \leq 600 mm Below Grade Minimum RSI (R)-Value ⁽¹⁾	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)
Windows and Sliding Glass Doors Maximum U-Value ⁽²⁾	1.6	1.6	1.8	1.6	1.6	1.8
Skylights Maximum U-Value ⁽²⁾	2.8	2.8	2.8	2.8	2.8	2.8
Space Heating Equipment Minimum AFUE	78%	84%	84%	84%	78%	84%
HRV Minimum Efficiency	55%	55%	70%	55%	70%	75%
Domestic Water Heater Minimum EF	—	—	—	—	—	—
Column 1	2	3	4	5	6	7

Notes to Table 2.1.1.2.B:

- (1) The values listed are minimum RSI-Values for the thermal insulation component only. RSI-Values are expressed in $(m^2 \cdot K)/W$.
 (2) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in $W/(m^2 \cdot K)$. See exceptions and use of alternative Energy Ratings (ER) in Article 2.1.1.8.

Table 2.1.1.2.C
ZONE 1 - Compliance Packages for Electric Space Heating
 Forming Part of Sentence 2.1.1.2.(3)

Component	Compliance Package	
	A	B
Ceiling with Attic Space Minimum RSI (R)-Value ⁽¹⁾	8.81 (R50)	8.81 (R50)
Ceiling Without Attic Space Minimum RSI (R)-Value ⁽¹⁾	5.46 (R31)	5.46 (R31)
Exposed Floor Minimum RSI (R)-Value ⁽¹⁾	5.46 (R31)	5.46 (R31)
Walls Above Grade Minimum RSI (R)-Value ⁽¹⁾	5.11 (R29)	5.11 (R29)
Basement Walls Minimum RSI (R)-Value ⁽¹⁾	3.52 (R20)	2.11 (R12)
Below Grade Slab Entire Surface > 600 mm Below Grade Minimum RSI (R)-Value ⁽¹⁾	—	—
Edge of Below Grade Slab ≤ 600 mm Below Grade Minimum RSI (R)-Value ⁽¹⁾	1.76 (R10)	1.76 (R10)
Heated Slab or Slab ≤ 600 mm Below Grade Minimum RSI (R)-Value ⁽¹⁾	1.76 (R10)	1.76 (R10)
Windows and Sliding Glass Doors Maximum U-Value ⁽²⁾	1.6	1.6
Skylights Maximum U-Value ⁽²⁾	2.8	2.8
Space Heating Equipment Minimum AFUE	—	—
HRV Minimum Efficiency	55%	75%
Domestic Water Heater Minimum EF	—	—
Column 1	2	3

Notes to Table 2.1.1.2.C:

- (1) The values listed are minimum RSI-Values for the thermal insulation component only. RSI-Values are expressed in $(\text{m}^2 \cdot \text{K})/\text{W}$.
- (2) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in $\text{W}/(\text{m}^2 \cdot \text{K})$. See exceptions and use of alternative Energy Ratings (ER) in Article 2.1.1.8.

2.1.1.3. Energy Efficiency for Buildings Located in Zone 2

- (1) Except as required in Sentences (2) to (4) and permitted in Sentences (5) to (8), the minimum thermal performance of the *building* envelope and equipment shall conform to Table 2.1.1.3.A.
- (2) Except for solid fuel-burning space heating equipment and natural gas and propane furnaces, where the space heating equipment efficiency ranges from 78% to less than 90%, the minimum thermal performance of *building* envelope and equipment shall conform to Table 2.1.1.3.B.
- (3) Where *electric space heating* is used, the minimum thermal performance of the *building* envelope and equipment shall conform to Table 2.1.1.3.C.
- (4) Except for solid fuel-burning space heating equipment, where the space heating equipment efficiency is less than 78% or it cannot meet the requirements of the applicable compliance packages, energy efficiency compliance shall be achieved in accordance with Clause 12.2.1.1.(3)(a) of Division B of the *Building Code* or Subsection 2.1.2. of this Supplementary Standard.
- (5) Where the thermal performance of above grade walls, windows or *basement* walls is reduced by applying Sentences (6) through (8), only the thermal performance of one of those *building* components is permitted to be reduced.
- (6) Except as permitted in Sentence (7), where compliance package H, I, J or M in Table 2.1.1.3.A is used, the minimum RSI value for thermal insulation of exposed above grade walls is permitted to be not less than RSI 3.52 provided that
 - (a) the *overall coefficient of heat transfer* of the glazing is upgraded in accordance with Sentence 2.1.1.1.(8), in addition to a upgrade where it is required due to high fenestration to wall ratio and the minimum EF of the domestic water heater is increased by not less than 8 percentage points, or (See Appendix A.)
 - (b) the thermal insulation value in *basement* walls has a minimum RSI 3.52 where compliance package J is used, and the *building* is in compliance with at least two requirements of Clauses 2.1.1.2.(7)(a) to (d).
- (7) Where blown-in insulation or spray-applied foam insulation is used in compliance package H, I, J or M in Table 2.1.1.3.A, the minimum RSI value for thermal insulation in exposed above grade walls is permitted to be not less than RSI 3.52 provided that
 - (a) the *overall coefficient of heat transfer* of the glazing is upgraded in accordance with Sentence 2.1.1.1.(8), in addition to a upgrade where it is required due to high fenestration to wall ratio or the thermal insulation value in *basement* walls has a minimum RSI 3.52 where compliance package J is used, and (See Appendix A.)
 - (b) the *building* is in compliance with Clause 2.1.1.2.(7)(a), (b), (c) or (d).
- (8) Where a drain water heat recovery unit conforming to Article 2.1.1.11. is provided in addition to the requirements of a compliance package selected from Tables 2.1.1.3.A to 2.1.1.3.C.
 - (a) the thermal insulation value in exposed above grade walls is permitted to be not less than RSI 3.87 where it is required to be RSI 4.23 provided that the drain water heat recovery unit has a minimum efficiency of not less than 41%,
 - (b) the thermal insulation value in *basement* walls is permitted to be not less than RSI 2.11 where it is required to be RSI 3.52, provided that the drain water heat recovery unit has a minimum efficiency of not less than 46%,
 - (c) the *overall coefficient of heat transfer* of glazing is permitted to be not greater than 1.8 W/(m²•K) where it is required to be 1.6 W/(m²•K),
 - (d) the *overall coefficient of heat transfer* of glazing is permitted to be not greater than 1.6 W/(m²•K) where it is required to be 1.4 W/(m²•K), provided that the drain water heat recovery unit has a minimum efficiency of not less than 41%, or
 - (e) the minimum efficiency of an HRV is permitted to be not less than 55% where it is required to be 75% or less.

Table 2.1.1.3.A
ZONE 2 - Compliance Packages for Space Heating Equipment with AFUE ≥ 90%
 Forming Part of Sentence 2.1.1.3.(1)

Component	Compliance Package												
	A	B	C	D	E	F	G	H	I	J	K ⁽³⁾	L ⁽⁴⁾	M ⁽⁵⁾
Ceiling with Attic Space Minimum RSI (R)-Value ⁽¹⁾	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)	8.81 (R50)
Ceiling Without Attic Space Minimum RSI (R)-Value ⁽¹⁾	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)
Exposed Floor Minimum RSI (R)-Value ⁽¹⁾	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)	5.46 (R31)
Walls Above Grade Minimum RSI (R)-Value ⁽¹⁾	5.11 (R29)	5.11 (R29)	5.11 (R29)	4.75 (R27)	4.75 (R27)	4.75 (R27)	4.75 (R27)	4.23 (R24)	4.23 (R24)	4.23 (R24)	3.87 (R22)	4.23 (R24)	4.23 (R24)
Basement Walls Minimum RSI (R)-Value ⁽¹⁾	3.52 (R20)	3.52 (R20)	3.52 (R20)	3.52 (R20)	3.52 (R20)	3.52 (R20)	2.11 (R12)	3.52 (R20)	3.52 (R20)	2.11 (R12)	3.87 (R22)	3.87 (R22)	3.52 (R20)
Below Grade Slab Entire Surface > 600 mm Below Grade Minimum RSI (R)-Value ⁽¹⁾	0.88 (R5)	—	—	0.88 (R5)	—	—	—	0.88 (R5)	—	—	—	—	—
Edge of Below Grade Slab ≤ 600 mm Below Grade Minimum RSI (R)-Value ⁽¹⁾	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)
Heated Slab or Slab ≤ 600 mm Below Grade Minimum RSI (R)-Value ⁽¹⁾	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)	1.76 (R10)
Windows and Sliding Glass Doors Maximum U-Value ⁽²⁾	1.6	1.6	1.8	1.6	1.6	1.8	1.8	1.6	1.6	1.6	1.8	1.8	1.8
Skylights Maximum U-Value ⁽²⁾	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Space-Heating Equipment Minimum AFUE	90%	94%	92%	94%	94%	94%	94%	94%	90%	94%	94%	94%	90% ⁽⁷⁾
HRV ⁽⁶⁾ Minimum Efficiency	—	—	60%	—	—	60%	75%	—	60%	60%	—	—	55%
Domestic Water Heater Minimum EF	0.57	0.57	0.57	0.57	0.67	0.57	0.62	0.67	0.57	0.67	0.57	0.67	0.80 ⁽⁷⁾
Column 1	2	3	4	5	6	7	8	9	10	11	12	13	14

Notes to Table 2.1.1.3.A.:

- (1) Except for notes (3) and (4), the values listed are minimum RSI-Values for the thermal insulation component only. RSI-Values are expressed in (m² · K)/W.
- (2) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in W/(m² · K). See exceptions and use of alternative Energy Ratings (ER) in Article 2.1.1.8.
- (3) Compliance package K applies only to a *building* with both ICF *basement* walls and ICF above grade walls. Alternatively, any other compliance package is permitted to be used for a *building* with both ICF *basement* walls and ICF above grade walls. The thermal resistance value of an ICF wall is the total thermal resistance of the entire wall assembly.
- (4) Compliance package L applies only to a *building* with ICF *basement* walls. Alternatively, any other compliance package except compliance package K, is permitted to be used for a *building* with ICF *basement* walls. The thermal resistance value of an ICF wall is the total thermal resistance of the entire wall assembly.
- (5) Applies to a *building* with combined space heating and domestic water heating system.
- (6) Except as required in Subsection 9.32.3. of Division B of the *Building Code*, an HRV is only required as a part of a compliance package where a minimum efficiency level is specified.
- (7) Only the water heating equipment shall meet the minimum AFUE or EF specified in the Table or shall be of the condensing type.

Table 2.1.1.3.B
ZONE 2 - Compliance Packages for Space Heating Equipment with AFUE \geq 78% and $<$ 90%
 Forming Part of Sentence 2.1.1.3.(2)

Component	Compliance Package	
	A	B
Ceiling with Attic Space Minimum RSI (R)-Value ⁽¹⁾	8.81 (R50)	8.81 (R50)
Ceiling Without Attic Space Minimum RSI (R)-Value ⁽¹⁾	5.46 (R31)	5.46 (R31)
Exposed Floor Minimum RSI (R)-Value ⁽¹⁾	5.46 (R31)	5.46 (R31)
Walls Above Grade Minimum RSI (R)-Value ⁽¹⁾	5.11 (R29)	5.11 (R29)
Basement Walls Minimum RSI (R)-Value ⁽¹⁾	3.52 (R20)	3.52 (R20)
Below Grade Slab Entire Surface $>$ 600 mm Below Grade Minimum RSI (R)-Value ⁽¹⁾	0.88 (R5)	0.88 (R5)
Edge of Below Grade Slab \leq 600 mm Below Grade Minimum RSI (R)-Value ⁽¹⁾	1.76 (R10)	1.76 (R10)
Heated Slab or Slab \leq 600 mm below grade Minimum RSI (R)-Value ⁽¹⁾	1.76 (R10)	1.76 (R10)
Windows and Sliding Glass Doors Maximum U-Value ⁽²⁾	1.6	1.6
Skylights Maximum U-Value ⁽²⁾	2.8	2.8
Space Heating Equipment Minimum AFUE	78%	84%
HRV Minimum Efficiency	75%	60%
Domestic Water Heater Minimum EF	—	—
Column 1	2	3

Notes to Table 2.1.1.3.B.:

- (1) The values listed are minimum RSI-Values for the thermal insulation component only. RSI-Values are expressed in $(\text{m}^2 \cdot \text{K})/\text{W}$.
- (2) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in $\text{W}/(\text{m}^2 \cdot \text{K})$. See exceptions and use of alternative Energy Ratings (ER) in Article 2.1.1.8.

Table 2.1.1.3.C
 ZONE 2 - Compliance Packages for Electric Space Heating
 Forming Part of Sentence 2.1.1.3.(3)

Component	Compliance Package A
Ceiling with Attic Space Minimum RSI (R)-Value ⁽¹⁾	8.81 (R50)
Ceiling Without Attic Space Minimum RSI (R)-Value ⁽¹⁾	5.46 (R31)
Exposed Floor Minimum RSI (R)-Value ⁽¹⁾	5.46 (R31)
Walls Above Grade Minimum RSI (R)-Value ⁽¹⁾	5.11 (R29)
Basement Walls Minimum RSI (R)-Value ⁽¹⁾	3.52 (R20)
Below Grade Slab Entire Surface > 600 mm Below Grade Minimum RSI (R)-Value ⁽¹⁾	0.88 (R5)
Edge of Below Grade Slab ≤ 600 mm Below Grade Minimum RSI (R)-Value ⁽¹⁾	1.76 (R10)
Heated Slab or Slab ≤ 600 mm Below Grade Minimum RSI (R)-Value ⁽¹⁾	1.76 (R10)
Windows and Sliding Glass Doors Maximum U-Value ⁽²⁾	1.6
Skylights Maximum U-Value ⁽²⁾	2.8
Space Heating Equipment Minimum AFUE	—
HRV Minimum Efficiency	75%
Domestic Water Heater Minimum EF	—
Column 1	2

Notes to Table 2.1.1.3.C:

- (1) The values listed are minimum RSI-Values for the thermal insulation component only. RSI-Values are expressed in $(\text{m}^2 \cdot \text{K})/\text{W}$.
- (2) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in $\text{W}/(\text{m}^2 \cdot \text{K})$. See exceptions and use of alternative Energy Ratings (ER) in Article 2.1.1.8.

2.1.1.4. Elements Acting as a Thermal Bridge

- (1) Except for a *foundation* wall, the insulated portion of a wall that incorporates wood stud framing elements that have a thermal resistance of less than RSI 0.90 shall be insulated to restrict heat flow through the studs by a material providing a thermal resistance at least equal to 25% of the thermal resistance required for the insulated portion of the assembly in Articles 2.1.1.2., 2.1.1.3. and 2.1.1.10.
- (2) Except as provided in Sentence (3), the thermal resistance of the insulated portion of a *building* assembly in Articles 2.1.1.2. and 2.1.1.3. that incorporates metal framing elements, such as steel studs and steel joists, that act as thermal bridges to facilitate heat flow through the assembly, shall be 20% greater than the values shown in Tables 2.1.1.2.A, 2.1.1.2.B and 2.1.1.2.C and Tables 2.1.1.3.A, 2.1.1.3.B and 2.1.1.3.C and Table 2.1.1.10., unless it can be shown that the heat flow is not greater than the heat flow through a wood frame assembly of the same thickness.
- (3) Sentence (2) does not apply to *building* assemblies incorporating thermal bridges where the thermal bridges are insulated to restrict heat flow through the thermal bridges by a material providing a thermal resistance at least equal to 25% of the thermal resistance required for the insulated portion of the assembly in Articles 2.1.1.2., 2.1.1.3. and 2.1.1.10.

2.1.1.5. Log Wall Construction and Post, Beam and Plank Construction

- (1) Except as provided in Sentences (2) and (3), log wall construction and post, beam and plank construction shall have a minimum thermal resistance of RSI 2.1 for the total assembly.
- (2) The thermal resistance value in Sentence (1) for the total wall assembly may be reduced to not less than RSI 1.61 if,
 - (a) the thermal resistance of insulation for the exposed roof or ceiling required in Table 2.1.1.2.A. is increased by an amount equivalent to the reduction permitted in this Sentence, and
 - (b) for log walls, the logs have tongue-and-groove or splined joints.
- (3) Where milled log walls are installed, the thermal resistance value in Sentence (1) for the total wall assembly does not apply if,
 - (a) the mean thickness of each log is not less than 150 mm,
 - (b) the thermal resistance of insulation for the exposed roof or ceiling required in Table 2.1.1.2.A is increased by RSI 0.53, and
 - (c) the logs have tongue-and-groove or splined joints.
- (4) Where a log wall is constructed in accordance with Sentences (1) to (3), the log wall shall be deemed to comply with the requirements in Subsection 9.25.3. of Division B of the *Building Code*.

2.1.1.6. Insulation of Foundation Walls

- (1) *Foundation* walls enclosing heated space shall be insulated from the underside of the subfloor to not more than 200 mm above the finished floor level of the *basement*. (See Appendix A.)
- (2) The insulation required by Sentence (1) may be provided by a system installed,
 - (a) on the interior of the *foundation* wall,
 - (b) on the exterior face of the *foundation* wall, or
 - (c) partially on the interior and partially on the exterior, provided the thermal performance of the system is equivalent to that permitted in Clauses (a) or (b).
- (3) If a *foundation* wall is constructed of hollow masonry units, one or more of the following shall be used to control convection currents in the core spaces,
 - (a) filling the core spaces,
 - (b) at least one row of semi-solid blocks at or below *grade*, or
 - (c) other similar methods.

- (4) Masonry walls of hollow units that penetrate the ceiling shall be sealed at or near the ceiling adjacent to the roof space to prevent air within the voids from entering the *attic or roof space* by,
- capping with masonry units without voids, or
 - installation of flashing material extending across the full width of the masonry.
- (5) Except as provided in Sentences (6) and (7), where a portion of a *basement* slab or a portion of a *basement* slab edge is the only part of the slab that is at the exterior ground level such as a walk-out *basement*, or within 600 mm of the exterior ground level, those portions shall have perimeter insulation extend not less than 600 mm below the slab level. (See Appendix A.)
- (6) Where the entire concrete slab is within 600 mm of the exterior ground level, the entire surface of the slab shall be insulated. (See Appendix A.)
- (7) Where a slab contains heating ducts, pipes, tubes or cables, the entire heated surface of the slab that is in contact with the ground shall be insulated.

2.1.1.7. Thermal Resistance Values for Roof Access Hatches and Eaves

- (1) The thermal resistance values for insulation required by Articles 2.1.1.2., 2.1.1.3. and 2.1.1.10. for exposed ceilings with attic spaces are permitted to be reduced
- directly above access hatches, and
 - near eaves to the extent made necessary by the roof slope and required ventilation clearances,
- except that the thermal insulation value at the location directly above access hatches and inner surfaces of exterior walls shall be not less than RSI 3.52.

2.1.1.8. Thermal Performance of Windows, Skylights and Sliding Glass Doors

- (1) Except as provided in Sentence (3) and except for sidelights to main entrance doors, windows, skylights and sliding glass doors shall meet
- the required *overall coefficient of heat transfer* in Tables 2.1.1.2.A, 2.1.1.2.B and 2.1.1.2.C and Tables 2.1.1.3.A, 2.1.1.3.B and 2.1.1.3.C and Table 2.1.1.10., or
 - the corresponding energy rating in Table 2.1.1.8.

Table 2.1.1.8.
Maximum U-Values and Minimum Energy Ratings (ER) for Windows, Skylights and Sliding Glass Doors
Forming Part of Sentence 2.1.1.8.(1)

Component	Maximum U-Values	Minimum Energy Ratings, (ER)
	U-Value, W/m ² • K (Btu/h • ft ² • °F)	ER
Skylights	2.8 (0.50)	—
Windows and Sliding Glass Doors	2.0 (0.35)	17
	1.8 (0.32)	21
	1.6 (0.28)	25
	1.4 (0.25)	29
Column 1	2	3

- (2) The energy rating and the *overall coefficient of heat transfer* required for windows and sliding glass doors in a *residential occupancy* shall be determined in conformance with
 - (a) CAN/CSA-A440.2, “Fenestration Energy Performance”, or
 - (b) NFRC 100, “Procedure for Determining Fenestration Product U-factors” and NFRC 200, “Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence”.
- (3) A *basement* window that incorporates a *loadbearing* structural frame shall be double glazed with a low-E coating.

2.1.1.9. Minimum Thermal Resistance of Doors

- (1) Except for doors in enclosed unheated vestibules and cold cellars, and except for glazed portions of doors, all doors that separate heated space from unheated space shall have a thermal resistance of not less than RSI 0.7 where a storm door is not provided.

2.1.1.10. Additions to Existing Buildings

- (1) Except as provided in Sentences (2) and (3), an addition to an existing *building* shall be designed to this Subsection and comply with the applicable requirements of

- (a) the Tables referenced in Article 2.1.1.2. or 2.1.1.3. , or
- (b) Table 2.1.1.10. in lieu of the Tables referenced in Sentences 2.1.1.1.(7) and (8).

(See Appendix A.)

- (2) For the purpose of Sentences 2.1.1.1.(7) to (10) and Subsection 2.1.2., the addition may be considered independently or in combination with the existing *building*, regardless of the thermal characteristics of the existing *building* envelope.

(See Appendix A.)

- (3) A *one-storey* sunroom addition to an existing *building* shall be deemed to be in compliance with Articles 2.1.1.2. and 2.1.1.3. and Subsection 2.1.2., provided that the *overall coefficient of heat transfer* of

- (a) doors, windows and walls has a maximum U-Value of
 - (i) 1.6 if the *building* is located in Zone 1 with less than 5000 heating degree days,
 - (ii) 1.4 if the *building* is located in Zone 2 with 5000 or more heating degree days, or
 - (iii) 1.4 if the *building* uses *electric space heating*, and
- (b) roofs and skylights has a maximum U-Value of 2.6.

(See Appendix A.)

Table 2.1.1.10.
Thermal Performance Requirements for Additions to Existing Buildings⁽³⁾
Forming Part of Sentence 2.1.1.10.(2)

Component	Zone 1 Less than 5000 Degree-Days	Zone 2 5000 or more Degree-Days	Electric Space Heating Zones 1 and 2
Ceiling with Attic Space Minimum RSI (R)-Value ⁽¹⁾	8.81 (R50)	8.81 (R50)	8.81 (R50)
Ceiling Without Attic Space Minimum RSI (R)-Value ⁽¹⁾	5.46 (R31)	5.46 (R31)	5.46 (R31)
Exposed Floor Minimum RSI (R)-Value ⁽¹⁾	5.46 (R31)	5.46 (R31)	5.46 (R31)
Walls Above Grade Minimum RSI (R)-Value ⁽¹⁾	4.23 (R24)	4.23 (R24)	5.46 (R31)
Basement Walls Minimum RSI (R)-Value ⁽¹⁾	3.52 (R20)	3.52 (R20)	3.52 (R20)
Edge of Below Grade Slab \leq 600 mm Below Grade Minimum RSI (R)-Value ⁽¹⁾	1.76 (R10)	1.76 (R10)	1.76 (R10)
Heated Slab or Slab \leq 600 mm Below Grade Minimum RSI (R)-Value ⁽¹⁾	1.76 (R10)	1.76 (R10)	1.76 (R10)
Windows and Sliding Glass Doors Maximum U-Value ⁽²⁾	1.8	1.6	1.6
Skylights Maximum U-Value ⁽²⁾	2.8	2.8	2.8
Column 1	2	3	4

Notes to Table 2.1.1.10.:

- (1) The values listed are minimum RSI-Values for the thermal insulation component only. RSI-Values are expressed in $(\text{m}^2 \cdot \text{K})/\text{W}$.
- (2) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in $\text{W}/(\text{m}^2 \cdot \text{K})$. See exceptions and use of alternative Energy Ratings (ER) in Article 2.1.1.8.
- (3) The *building* need not conform to minimum efficiency requirements for HRV's, domestic water heaters and space heating equipment required in Article 2.1.1.2. or 2.1.1.3.

2.1.1.11. Drain Water Heat Recovery

- (1) Where a drain water heat recovery unit is installed to meet the requirements of this Subsection, the unit and its installation shall conform to Sentences (2) to (5).
- (2) Drain water heat recovery units shall conform to CSA B55.2, “Drain Water Heat Recovery Units”.
- (3) The minimum efficiency of a drain water heat recovery unit shall be determined in conformance with CSA B55.1, “Test Method for Measuring Efficiency and Pressure Loss of Drain Water Heat Recovery Units”.
- (4) A drain water heat recovery unit shall be installed
 - (a) to receive drain water from all showers or at least two showers where there are two or more showers in a *dwelling unit*, (See Appendix A.)
 - (b) in an upright position that does not diverge more than 5 degrees from the vertical,
 - (c) in a position such that the cold water inlet connection is at the bottom of the unit,
 - (d) downstream of a water softener where a water softener is installed, and
 - (e) in a *conditioned space* or on the warm side of the dewpoint of the wall assembly.
- (5) Except as required in Clauses 2.1.1.2.(10)(b) and 2.1.1.3.(8)(a), (b) and (d), and Sentence 2.1.1.2.(11), the minimum efficiency of the drain water heat recovery unit shall be not less than 36% when it is tested in accordance with Sentence (3).

2.1.2. Performance Compliance

2.1.2.1. Required Performance Level (See Appendix A.)

- (1) The performance level shall be measured based on the simulated annual energy use of the *building*.
- (2) The simulated annual energy use of the proposed *building* shall not be greater than the simulated annual energy use of the *building* as if it met the performance level of a permitted compliance package in Subsection 2.1.1. selected on the basis of
 - (a) zone location,
 - (b) energy source, and
 - (c) equipment efficiency.
- (3) The simulated annual energy use shall be calculated for the
 - (a) proposed *building*, and
 - (b) *building* conforming to the applicable compliance package.
- (4) For the purpose of calculations required in Sentence (3),
 - (a) a recognized annual energy use simulation software shall be used to calculate annual energy use,
 - (b) local climatic data shall be used, and
 - (c) the equivalent domestic water, appliance and other plug-in loads shall be assumed in both calculations.
- (5) Except as provided in Sentence (6), for the purpose of Clauses (3)(a) and (3)(b), the air leakage rate of a *dwelling unit* may be assumed to be
 - (a) 2.5 air changes per hour at an air pressure differential of 50 Pa for detached homes, and
 - (b) 3.0 air changes per hour at an air pressure differential of 50 Pa for attached homes.
- (6) For the purpose of Clause (3)(a), values less than Sentence (5) may be used provided that the values are verified with air leakage tests as conducted in accordance with the requirements of Clause 12.2.1.(3)(a) of Division B of the *Building Code*.
- (7) For the purpose of calculations required in Clause (3)(b), the *building* shall have identical dimensions and orientation as the proposed design, except where the glazing to wall ratio exceeds 22%, the glazing area shall be reduced proportionally along each exposure until the limit is met.

(8) For the purpose of calculations required in Clause (3)(b), where frame construction is used, the design of the framing system shall assume a spacing of

- (a) 406 mm o.c. for wall studs,
- (b) 406 mm o.c. for exposed floors joists, roof joists and roof rafters, and
- (c) 610 mm o.c. for roof trusses.

(9) For the purpose of calculations required in Clause (3)(b), *building* envelope component properties and characteristics not specifically described in this Subsection and Subsection 2.1.1. shall be modeled the same for both the proposed design and a design based on a permitted compliance package unless it can be shown such properties and characteristics of the proposed design constitute additional energy conservation measures.

(10) Where the overall thermal performance of the proposed *building* envelope is less than the envelope performance of the compliance package that is compared against it, the reduction in the performance level of the *building* envelope shall not be more than 25%.

2.1.3. Other Acceptable Compliance Methods

2.1.3.1. Other Acceptable Compliance Methods (See Appendix A.)

(1) A building shall be deemed to be in compliance with the requirements of Subsection 2.1.1. provided that the building is in compliance with the technical requirements of

- (a) NRCan, “Energy Star for New Homes Standard Version 12.1”, or
- (b) NRCan, “2012 R-2000 Standard”.

Chapter 3

Acceptable Solutions for Energy Efficiency Compliance After December 31, 2016

(Applies to construction for which a permit has been applied for after December 31, 2016)

Section 3.1. Methods for Achieving Energy Efficiency Compliance

3.1.1. Prescriptive Compliance Packages (See Appendix A.)

3.1.1.1. Energy Efficiency

- (1) Except as provided in Articles 3.1.1.4. to 3.1.1.11., the *building* shall conform to
 - (a) Article 3.1.1.2. if the *building* is located in Zone 1 with less than 5000 heating degree days, or
 - (b) Article 3.1.1.3. if the *building* is located in Zone 2 with 5000 or more heating degree days.
- (2) Except as required in Sentence (5), all walls, ceilings, floors, windows and doors that separate heated space from unheated space, the exterior air or the exterior *soil* shall have thermal resistance ratings conforming to this Subsection.
- (3) Where specified in compliance packages in Tables 3.1.1.2.A to 3.1.1.2.C and Tables 3.1.1.3.A to 3.1.1.3.C, space heating equipment, domestic water heating equipment and heat or energy recovery ventilators shall be provided and have the efficiency rating conforming to this Subsection. (See Appendix A.)
- (4) Except as required in Sentence (5), insulation shall be provided between heated and unheated spaces and between heated spaces and the exterior in accordance with this Chapter.
- (5) A *building* envelope assembly that separates a *conditioned space* from an adjoining *storage garage* shall be treated as an assembly separating heated space from exterior, even if the *storage garage* is intended to be heated.
- (6) Reflective surfaces of insulating materials shall not be considered in calculating the thermal resistance of *building* assemblies.
- (7) Except as provided in Sentences (8) and 3.1.1.11.(3), where the ratio of the gross area of windows, sidelights, skylights, glazing in doors and sliding glass doors to the gross area of peripheral walls measured from grade to the top of the upper most ceiling is not more than 17%, the *building* shall comply with a compliance package selected from Tables 3.1.1.2.A to 3.1.1.2.C and Tables 3.1.1.3.A to 3.1.1.3.C, and Table 3.1.1.11. (See Appendix A.)

- (8) Except as permitted in Sentences 3.1.1.11.(3), where the ratio of the gross area of windows, sidelights, skylights, glazing in doors and sliding glass doors to the gross area of peripheral walls measured from grade to the top of the upper most ceiling is more than 17% but not more than 22%, the *building* shall comply with a compliance package selected from Tables 3.1.1.2.A to 3.1.1.2.C, Tables 3.1.1.3.A to 3.1.1.3.C and Table 3.1.1.11 and the *overall coefficient of heat transfer* of the *fenestration* shall be upgraded to
- (a) 1.6 where 1.8 is required by the selected compliance package or permitted by Article 3.1.1.4.,
 - (b) 1.4 where 1.6 is required by the selected compliance package or permitted by Article 3.1.1.4.,
 - (c) 1.2 where 1.4 is required by the selected compliance package or permitted by Article 3.1.1.4., and
 - (d) 1.0 where 1.2 is required by the selected compliance package or permitted by Article 3.1.1.4..
- (See Appendix A.)
- (9) Where the ratio of gross area of windows, sidelights, skylights, glazing in doors and sliding glass doors to the gross area of peripheral walls measured from grade to the top of the upper most ceiling is more than 22%, the *building* shall comply with Subsection 3.1.2. (See Appendix A.)
- (10) Where a *dwelling unit* has a walkout *basement*, the thermal performance level of the exterior *basement* wall shall be not less than that required for the above grade wall for
- (a) the *basement* wall containing the door opening, and
 - (b) any *basement* wall that has an exposed wall area above the ground level exceeding 50% of that *basement* wall area.
- (11) For a *conditioned space*, the exterior *building* envelope or envelope that separates *conditioned space* from unconditioned space shall conform to the applicable values specified in Articles 3.1.1.2. and 3.1.1.3.
- (12) Where an enclosed unheated space is separated from a heated space by glazing, the unheated enclosure may be considered to provide a thermal resistance of RSI 0.16.
- (13) Where a compliance package in Tables 3.1.1.2.A to 3.1.1.2.C, Tables 3.1.1.3.A to 3.1.1.3.C, or Table 3.1.1.11 specifies a nominal RSI value, *effective RSI value* and U-Value for a component specified in Column 1 of the Table and the component conforms to one of the thermal values, the component need not conform to the other thermal values specified for the component.
- (14) Insulation in the rim joist or header area where the floor assembly and wall assembly intersect shall have a thermal value not less than the thermal value of the insulation in the walls above grade.
- (15) Where a compliance package in Tables 3.1.1.2.A to 3.1.1.2.C, Tables 3.1.1.3.A to 3.1.1.3.C, or Table 3.1.1.11 specifies an *overall coefficient of heat transfer* and an energy rating value for a *fenestration* component specified in Column 1 of the Table and the component conforms to one of the thermal values, the component need not conform to the other thermal value specified for the component.
- (16) Ventilation systems serving *dwelling units* shall have a heat or energy recovery ventilator. (See Appendix A)
- (17) Except as provided in Sentence (18), a *building* is permitted to be designed in conformance with any of the compliance packages available for the climate zone that the *building* is located in, if the primary space heating of the *building* is supplied by
- (a) a wood burning *appliance*,
 - (b) an earth energy system, or
 - (c) an air or water source heat pump that does not use electric resistance as a back-up heat source.
- (18) For the purpose of Sentence (17), the requirements in the compliance packages for space heating equipment do not apply.
- (19) Heat or energy recovery ventilators specified in compliance packages in Tables 3.1.1.2.A to 3.1.1.2.C and Tables 3.1.1.3.A to 3.1.1.3.C, shall meet
- (a) the requirements of Article 9.32.3.11. of Division B of the *Building Code*, and
 - (b) the minimum SRE required in this Chapter based on a test temperature of 0°C at an air flow rate equal to the principle exhaust flow but need not exceed 30 L/s.

(20) *Building* envelope components that enclose a *common space* and are exposed to exterior or unconditioned space shall conform to this Subsection.

(21) Heating, ventilating, *air-conditioning* and lighting systems serving *common spaces* need not comply with this Subsection but shall comply with the other parts of the *Building Code*.

(22) Drain water heat recovery units shall be installed in accordance with Article 3.1.1.12.

3.1.1.2. Energy Efficiency for Buildings Located in Zone 1

(1) Except as provided in Sentences (2) to (5) and (7), the minimum thermal performance of *building* envelope assemblies and equipment shall conform to Table 3.1.1.2.A.

(2) Except for solid fuel-burning space heating equipment and except as provided in Sentence (5), where the space heating equipment efficiency is 84% or more but less than 92%, the minimum thermal performance of the *building* envelope assemblies and equipment shall conform to Table 3.1.1.2.B.

(3) Where *electric space heating* is used, the minimum thermal performance of the *building* envelope assemblies and equipment shall conform to Table 3.1.1.2.C.

(4) Except as provided in Sentence 3.1.1.1.(17), where the space heating equipment efficiency cannot meet the requirements of the applicable compliance packages, energy efficiency compliance shall be achieved in accordance with Subsection 3.1.2. of this Supplementary Standard.

(5) Where an ICF wall assembly is installed as an above and below grade wall assembly that has minimum RSI 1.76 (R10) insulation on the interior surface of the concrete and minimum RSI 1.76 (R10) insulation on the exterior surface, the ICF wall is deemed to comply with the thermal values set out for walls in the compliance packages in Table 3.1.1.2.A (See Appendix A).

(6) An ICF wall assembly described in Sentence (5) is permitted to be used in lieu of *basement* walls that require insulation value of RSI 3.52 ci (R20) or less. (See Appendix A).

(7) *Building* designs that utilize combined space heating and domestic water heating systems are permitted to use compliance package A4, provided that

(a) the water heating equipment has a minimum of 0.80 EF, 90% AFUE, or is a condensing type, or,

(b) the combination of equipment has a minimum of 0.85 TPF determined in accordance with CAN/CSA-P.9 “Test Method for Determining the Performance of Combined Space and Water Heating Systems (Combos).”

Table 3.1.1.2.A (SI)
ZONE 1 - Compliance Packages for Space Heating Equipment with AFUE ≥ 92%
 Forming Part of Sentence 3.1.1.2.(1)

Component	Thermal Values ⁽⁸⁾	Compliance Package					
		A 1	A 2	A 3	A 4	A 5	A 6
Ceiling with Attic Space	Min. Nominal RSI ⁽¹⁾	10.56	10.56	8.80	10.56	8.80	10.56
	Max. U ⁽²⁾	0.096	0.096	0.115	0.096	0.115	0.096
	Min. Effective RSI ⁽²⁾	10.43	10.43	8.67	10.43	8.67	10.43
Ceiling Without Attic Space	Min. Nominal RSI ⁽¹⁾	5.46	5.46	5.46	5.46	5.46	5.46
	Max. U ⁽²⁾	0.205	0.205	0.205	0.205	0.205	0.205
	Min. Effective RSI ⁽²⁾	4.87	4.87	4.87	4.87	4.87	4.87
Exposed Floor	Min. Nominal RSI ⁽¹⁾	5.46	5.46	6.16	5.46	6.16	5.46
	Max. U ⁽³⁾	0.190	0.190	0.177	0.190	0.177	0.190
	Min. Effective RSI ⁽³⁾	5.25	5.25	5.64	5.25	5.64	5.25
Walls Above Grade	Min. Nominal RSI ⁽¹⁾	3.87	3.34 + 0.88 ci	2.46 + 1.32 ci	3.87 + 0.88 ci	3.34 + 0.88 ci	3.87 + 0.88 ci
	Max. U ⁽³⁾	0.333	0.280	0.305	0.265	0.280	0.265
	Min. Effective RSI ⁽³⁾	3.00	3.58	3.28	3.77	3.58	3.77
Basement Walls ⁽⁶⁾	Min. Nominal RSI ⁽¹⁾	3.52 ci	2.11 + 1.76 ci	3.52 ci	3.52 ci	2.11 + 0.88 ci	3.52 ci
	Max. U ⁽⁴⁾	0.269	0.272	0.269	0.269	0.355	0.269
	Min. Effective RSI ⁽⁴⁾	3.72	3.67	3.72	3.72	2.81	3.72
Below Grade Slab Entire Surface > 600 mm Below Grade	Min. Nominal RSI ⁽¹⁾	-	-	-	-	-	-
	Max. U ⁽⁴⁾	-	-	-	-	-	-
	Min. Effective RSI ⁽⁴⁾	-	-	-	-	-	-
Heated Slab or Slab ≤ 600 mm Below Grade	Min. Nominal RSI ⁽¹⁾	1.76	1.76	1.76	1.76	1.76	1.76
	Max. U ⁽⁴⁾	0.510	0.510	0.510	0.510	0.510	0.510
	Min. Effective RSI ⁽⁴⁾	1.96	1.96	1.96	1.96	1.96	1.96
Edge of Below Grade Slab ≤ 600 mm Below Grade	Min. Nominal RSI ⁽¹⁾	1.76	1.76	1.76	1.76	1.76	1.76
Windows and Sliding Glass Doors	Max. U ⁽⁵⁾	1.6	1.6	1.4	1.6	1.6	1.6
	Energy Rating	25	25	29	25	25	25
Skylights	Max. U ⁽⁵⁾	2.8	2.8	2.8	2.8	2.8	2.8
Space Heating Equipment	Min. AFUE	96%	96%	94%	96%	94%	92%
HRV	Min. SRE	75%	75%	81%	75%	70%	65%
Domestic Water Heater ⁽⁷⁾	Min. EF	0.8	0.7	0.67	0.67	0.8	0.8
Column 1	2	3	4	5	6	7	8

Notes to Table 3.1.1.2.A (SI):

- (1) The values listed are minimum Nominal RSI-Values for the thermal insulation component only.
- (2) U-Value and *effective RSI value* shall include entire ceiling assembly components, from interior air film to vented space air film above insulation.
- (3) U-Value and *effective RSI value* shall include entire exposed floor or above grade wall assembly components, from interior air film to exterior air film.
- (4) U-Value and *effective RSI value* shall include entire basement wall or slab assembly components and interior air film.
- (5) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in $W/(m^2 \cdot K)$.
- (6) In the case of *basement wall assemblies*, where RSI 3.52 ci is required RSI 2.11 + 1.76 ci is permitted to be used or vice versa; or where RSI 2.11 + 0.88 ci is required, RSI 2.64 ci is permitted to be used or vice versa.
- (7) If an EF of a water tank is not indicated in a compliance package, there is no EF requirement for water tank for that specific compliance package.
- (8) Nominal and *effective RSI values* are expressed in $(m^2 \cdot K)/W$. U-Values are expressed in $W/(m^2 \cdot K)$.

Table 3.1.1.2.A (IP)
ZONE 1 - Compliance Packages for Space Heating Equipment with AFUE ≥ 92%
 Forming Part of Sentence 3.1.1.2.(1)

Component	Thermal Values ⁽⁸⁾	Compliance Package					
		A 1	A 2	A 3	A 4	A 5	A 6
Ceiling with Attic Space	Min. Nominal R ⁽¹⁾	60	60	50	60	50	60
	Max. U ⁽²⁾	0.017	0.017	0.020	0.017	0.020	0.017
	Min. Effective R ⁽²⁾	59.22	59.22	49.23	59.22	49.23	59.22
Ceiling Without Attic Space	Min. Nominal R ⁽¹⁾	31	31	31	31	31	31
	Max. U ⁽²⁾	0.036	0.036	0.036	0.036	0.036	0.036
	Min. Effective R ⁽²⁾	27.65	27.65	27.65	27.65	27.65	27.65
Exposed Floor	Min. Nominal R ⁽¹⁾	31	31	35	31	35	31
	Max. U ⁽³⁾	0.034	0.034	0.031	0.034	0.031	0.034
	Min. Effective R ⁽³⁾	29.80	29.80	32.02	29.80	32.02	29.80
Walls Above Grade	Min. Nominal R ⁽¹⁾	22	19 + 5 ci	14 + 7.5 ci	22 + 5 ci	19 + 5 ci	22 + 5 ci
	Max. U ⁽³⁾	0.059	0.049	0.054	0.047	0.049	0.047
	Min. Effective R ⁽³⁾	17.03	20.32	18.62	21.40	20.32	21.40
Basement Walls ⁽⁶⁾	Min. Nominal R ⁽¹⁾	20 ci	12 + 10 ci	20 ci	20 ci	12 + 5 ci	20 ci
	Max. U ⁽⁴⁾	0.047	0.048	0.047	0.047	0.063	0.047
	Min. Effective R ⁽⁴⁾	21.12	20.84	21.12	21.12	15.96	21.12
Below Grade Slab Entire Surface > 600 mm Below Grade	Min. Nominal R ⁽¹⁾	-	-	-	-	-	-
	Max. U ⁽⁴⁾	-	-	-	-	-	-
	Min. Effective R ⁽⁴⁾	-	-	-	-	-	-
Heated Slab or Slab ≤ 600 mm Below Grade	Min. Nominal R ⁽¹⁾	10	10	10	10	10	10
	Max. U ⁽⁴⁾	0.090	0.090	0.090	0.090	0.090	0.090
	Min. Effective R ⁽⁴⁾	11.13	11.13	11.13	11.13	11.13	11.13
Edge of Below Grade Slab ≤ 600 mm Below Grade	Min. Nominal R ⁽¹⁾	10	10	10	10	10	10
Windows and Sliding Glass Doors	Max. U ⁽⁵⁾	0.28	0.28	0.25	0.28	0.28	0.28
	Energy Rating	25	25	29	25	25	25
Skylights	Max. U ⁽⁵⁾	0.49	0.49	0.49	0.49	0.49	0.49
Space Heating Equipment	Min. AFUE	96%	96%	94%	96%	94%	92%
HRV	Min. SRE	75%	75%	81%	75%	70%	65%
Domestic Water Heater ⁽⁷⁾	Min. EF	0.8	0.7	0.67	0.67	0.8	0.8
Column 1	2	3	4	5	6	7	8

Notes to Table 3.1.1.2.A (IP):

- (1) The values listed are minimum Nominal R-Values for the thermal insulation component only.
- (2) U-Value and effective R value shall include entire ceiling assembly components, from interior air film to vented space air film above insulation.
- (3) U-Value and effective R value shall include entire exposed floor or above grade wall assembly components, from interior air film to exterior air film.
- (4) U-Value and effective R value shall include entire basement wall or slab assembly components and interior air film.
- (5) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in Btu/(h·ft²·F).
- (6) In the case of *basement* wall assemblies, where R20 ci is required R12 + 10 ci is permitted to be used or vice versa; or where R12 + 5 ci is required, R15 ci is permitted to be used or vice versa.
- (7) If an EF of a water tank is not indicated in a compliance package, there is no EF requirement for water tank for that specific compliance package.
- (8) Nominal and effective R values are expressed in (h·ft²·F)/Btu. U-Values are expressed in Btu/(h·ft²·F).

Table 3.1.1.2.B (SI)
ZONE 1 - Compliance Packages for Space Heating Equipment with $84\% \leq AFUE < 92\%$
 Forming Part of Sentence 3.1.1.2.(2)

Component	Thermal Values ⁽⁶⁾	Compliance Package					
		B 1	B 2	B 3	B 4	B 5	B 6
Ceiling with Attic Space	Min. Nominal RSI ⁽¹⁾	8.80	8.80	8.80	10.56 + HH	8.80	10.56
	Max. U ⁽²⁾	0.115	0.115	0.115	0.095	0.115	0.096
	Min. Effective RSI ⁽²⁾	8.67	8.67	8.67	10.55	8.67	10.43
Ceiling Without Attic Space	Min. Nominal RSI ⁽¹⁾	5.46	5.46	5.46	5.46	5.46	5.46
	Max. U ⁽²⁾	0.205	0.205	0.205	0.205	0.205	0.205
	Min. Effective RSI ⁽²⁾	4.87	4.87	4.87	4.87	4.87	4.87
Exposed Floor	Min. Nominal RSI ⁽¹⁾	6.16	6.16	6.16	5.46	6.16	5.46
	Max. U ⁽³⁾	0.177	0.177	0.177	0.190	0.177	0.190
	Min. Effective RSI ⁽³⁾	5.64	5.64	5.64	5.25	5.64	5.25
Walls Above Grade	Min. Nominal RSI ⁽¹⁾	3.87 + 0.88 ci	3.87 + 0.88 ci	3.87 + 1.32 ci	3.87 + 1.32 ci	3.34 + 1.76 ci	3.34 + 1.76 ci
	Max. U ⁽³⁾	0.265	0.265	0.238	0.238	0.224	0.224
	Min. Effective RSI ⁽³⁾	3.77	3.77	4.21	4.21	4.46	4.46
Basement Walls ⁽⁶⁾	Min. Nominal RSI ⁽¹⁾	3.52 ci	2.11 + 1.76 ci	3.52 ci	2.11 + 1.76 ci	3.52 ci	3.52 ci
	Max. U ⁽⁴⁾	0.269	0.272	0.269	0.272	0.269	0.269
	Min. Effective RSI ⁽⁴⁾	3.72	3.67	3.72	3.67	3.72	3.72
Below Grade Slab Entire Surface > 600 mm Below Grade	Min. Nominal RSI ⁽¹⁾	-	-	-	-	-	1.76
	Max. U ⁽⁴⁾	-	-	-	-	-	0.51
	Min. Effective RSI ⁽⁴⁾	-	-	-	-	-	1.96
Heated Slab or Slab ≤ 600 mm Below Grade	Min. Nominal RSI ⁽¹⁾	1.76	1.76	1.76	1.76	1.76	1.76
	Max. U ⁽⁴⁾	0.51	0.51	0.51	0.51	0.51	0.51
	Min. Effective RSI ⁽⁴⁾	1.96	1.96	1.96	1.96	1.96	1.96
Edge of Below Grade Slab ≤ 600 mm Below Grade	Min. Nominal RSI ⁽¹⁾	1.76	1.76	1.76	1.76	1.76	1.76
Windows and Sliding Glass Doors	Max. U ⁽⁵⁾	1.6	1.4	1.4	1.2	1.4	1.2
	Energy Rating	25	29	29	34	29	34
Skylights	Max. U ⁽⁵⁾	2.8	2.8	2.8	2.8	2.8	2.8
Space Heating Equipment	Min. AFUE	90%	90%	87%	87%	84%	84%
HRV	Min. SRE	75%	70%	70%	75%	75%	81%
Domestic Water Heater ⁽⁷⁾	Min. EF	0.66	0.62	0.66	-	0.66	-
Column 1	2	3	4	5	6	7	8

Notes to Table 3.1.1.2.B (SI):

The following definition applies:

HH = 250 mm high heel

- (1) The values listed are minimum Nominal RSI-values for the thermal insulation component only.
- (2) U-Value and *effective RSI value* shall include entire ceiling assembly components, from interior air film to vented space air film above insulation.
- (3) U-Value and *effective RSI value* shall include entire exposed floor or above grade wall assembly components, from interior air film to exterior air film.
- (4) U-Value and *effective RSI value* shall include entire basement wall or slab assembly components and interior air film.
- (5) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in $W/(m^2 \cdot K)$.
- (6) In the case of *basement wall assemblies*, where RSI 3.52 ci is required RSI 2.11 + 1.76 ci is permitted to be used or vice versa; or where RSI 2.11 + 0.88 ci is required, RSI 2.64 ci is permitted to be used or vice versa.
- (7) If an EF of a water tank is not indicated in a compliance package, there is no EF requirement for water tank for that specific compliance package.
- (8) Nominal and *effective RSI values* are expressed in $(m^2 \cdot K)/W$. U-Values are expressed in $W/(m^2 \cdot K)$.

Table 3.1.1.2.B (IP)
ZONE 1 - Compliance Packages for Space Heating Equipment with 84% ≤ AFUE < 92%
 Forming Part of Sentence 3.1.1.2.(2)

Component	Thermal Values ⁽⁶⁾	Compliance Package					
		B 1	B 2	B 3	B 4	B 5	B 6
Ceiling with Attic Space	Min. Nominal R ⁽¹⁾	50	50	50	60 + HH	50	60
	Max. U ⁽²⁾	0.020	0.020	0.020	0.016	0.020	0.017
	Min. Effective R ⁽²⁾	49.23	49.23	49.23	59.90	49.23	59.22
Ceiling Without Attic Space	Min. Nominal R ⁽¹⁾	31	31	31	31	31	31
	Max. U ⁽²⁾	0.036	0.036	0.036	0.036	0.036	0.036
	Min. Effective R ⁽²⁾	27.65	27.65	27.65	27.65	27.65	27.65
Exposed Floor	Min. Nominal R ⁽¹⁾	35	35	35	31	35	31
	Max. U ⁽³⁾	0.031	0.031	0.031	0.034	0.031	0.034
	Min. Effective R ⁽³⁾	32.02	32.02	32.02	29.80	32.02	29.80
Walls Above Grade	Min. Nominal R ⁽¹⁾	22 + 5 ci	22 + 5 ci	22 + 7.5 ci	22 + 7.5 ci	19 + 10 ci	19 + 10 ci
	Max. U ⁽³⁾	0.047	0.047	0.042	0.042	0.040	0.040
	Min. Effective R ⁽³⁾	21.40	21.40	23.90	23.90	25.32	25.32
Basement Walls ⁽⁶⁾	Min. Nominal R ⁽¹⁾	20 ci	12 + 10 ci	20 ci	12 + 10 ci	20 ci	20 ci
	Max. U ⁽⁴⁾	0.047	0.048	0.047	0.048	0.047	0.047
	Min. Effective R ⁽⁴⁾	21.12	20.84	21.12	20.84	21.12	21.12
Below Grade Slab Entire Surface > 600 mm Below Grade	Min. Nominal R ⁽¹⁾	-	-	-	-	-	10
	Max. U ⁽⁴⁾	-	-	-	-	-	0.090
	Min. Effective R ⁽⁴⁾	-	-	-	-	-	11.13
Heated Slab or Slab ≤ 600 mm Below Grade	Min. Nominal R ⁽¹⁾	10	10	10	10	10	10
	Max. U ⁽⁴⁾	0.090	0.090	0.090	0.090	0.090	0.090
	Min. Effective R ⁽⁴⁾	11.13	11.13	11.13	11.13	11.13	11.13
Edge of Below Grade Slab ≤ 600 mm Below Grade	Min. Nominal R ⁽¹⁾	10	10	10	10	10	10
Windows and Sliding Glass	Max. U ⁽⁵⁾	0.28	0.25	0.25	0.21	0.25	0.21
	Energy Rating	25	29	29	34	29	34
Skylights	Max. U ⁽⁵⁾	0.49	0.49	0.49	0.49	0.49	0.49
Space Heating Equipment	Min. AFUE	90%	90%	87%	87%	84%	84%
HRV	SRE	75%	70%	70%	75%	75%	81%
Domestic Water Heater ⁽⁷⁾	Min. EF	0.66	0.62	0.66	-	0.66	-
Column 1	2	3	4	5	6	7	8

Notes to Table 3.1.1.2.B (IP):

The following definitions apply:

HH = 10 inch high heel

Nominal and effective R values are expressed in (h·ft²·F)/Btu. U-Values are expressed in Btu/(h·ft²·F).

(1) The values listed are minimum Nominal RSI-values for the thermal insulation component only.

(2) U-Value and effective R value shall include entire ceiling assembly components, from interior air film to vented space air film above insulation.

(3) U-Value and effective R value shall include entire exposed floor or above grade wall assembly components, from interior air film to exterior air film.

(4) U-Value and effective R value shall include entire basement wall or slab assembly components and interior air film.

(5) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in Btu/(h·ft²·F).

(6) In the case of *basement* wall assemblies, where R20 ci is required R12 + 10 ci is permitted to be used or vice versa; or where R12 + 5 ci is required, R15 ci is permitted to be used or vice versa.

(7) If an EF of a water tank is not indicated in a compliance package, there is no EF requirement for water tank for that specific compliance package.

(8) Nominal and effective R values are expressed in (h·ft²·F)/Btu. U-Values are expressed in Btu/(h·ft²·F).

Table 3.1.1.2.C (SI)
 ZONE 1 - Compliance Packages for Electric Space Heating
 Forming Part of Sentence 3.1.1.2.(3)

Component	Thermal Values ⁽⁸⁾	Compliance Package			
		C 1	C 2	C 3	C 4
Ceiling with Attic Space	Min. Nominal RSI ⁽¹⁾	10.56 + HH	10.56 + HH	8.80	8.80
	Max. U ⁽²⁾	0.095	0.095	0.115	0.115
	Min. Effective RSI ⁽²⁾	10.55	10.55	8.67	8.67
Ceiling Without Attic Space	Min. Nominal RSI ⁽¹⁾	5.46	5.46	5.46	5.46
	Max. U ⁽²⁾	0.205	0.205	0.205	0.205
	Min. Effective RSI ⁽²⁾	4.87	4.87	4.87	4.87
Exposed Floor	Min. Nominal RSI ⁽¹⁾	5.46	5.46	6.16	6.16
	Max. U ⁽³⁾	0.190	0.190	0.177	0.177
	Min. Effective RSI ⁽³⁾	5.25	5.25	5.64	5.64
Walls Above Grade	Min. Nominal RSI ⁽¹⁾	3.34 + 1.76 ci	3.87 + 1.76 ci	3.87 + 1.76 ci	3.87 + 1.32 ci
	Max. U ⁽³⁾	0.224	0.215	0.215	0.238
	Min. Effective RSI ⁽³⁾	4.46	4.65	4.65	4.21
Basement Walls ⁽⁶⁾	Min. Nominal RSI ⁽¹⁾	3.52 + 1.40 ci	3.52 ci	3.52 ci	3.52 ci
	Max. U ⁽⁴⁾	0.250	0.269	0.269	0.269
	Min. Effective RSI ⁽⁴⁾	4.00	3.72	3.72	3.72
Below Grade Slab Entire Surface > 600 mm Below Grade	Min. Nominal RSI ⁽¹⁾	1.32	-	-	-
	Max. U ⁽⁴⁾	0.658	-	-	-
	Min. Effective RSI ⁽⁴⁾	1.52	-	-	-
Heated Slab or Slab ≤ 600 mm Below Grade	Min. Nominal RSI ⁽¹⁾	1.76	1.76	1.76	1.76
	Max. U ⁽⁴⁾	0.510	0.510	0.510	0.510
	Min. Effective RSI ⁽⁴⁾	1.96	1.96	1.96	1.96
Edge of Below Grade Slab ≤ 600 mm Below Grade	Min. Nominal RSI ⁽¹⁾	1.76	1.76	1.76	1.76
Windows and Sliding Glass Doors	Max. U ⁽⁵⁾	1.4	1.2	1.2	1.6
	Energy Rating	29	34	34	25
Skylights	Max. U ⁽⁵⁾	2.8	2.8	2.8	2.8
Space Heating Equipment	Min.	-	-	-	ASHP: 7.1 HSPF
HRV	Min. SRE	81%	75%	81%	55%
Domestic Water Heater ⁽⁷⁾	Min. EF	-	-	-	-
Column 1	2	3	4	5	6

Notes to Table 3.1.1.2.C (SI):

The following definitions apply:

HH = 250 mm high heel

- (1) The values listed are minimum Nominal RSI-values for the thermal insulation component only.
- (2) U-Value and *effective RSI value* shall include entire ceiling assembly components, from interior air film to vented space air film above insulation.
- (3) U-Value and *effective RSI value* shall include entire exposed floor or above grade wall assembly components, from interior air film to exterior air film.
- (4) U-Value and *effective RSI value* shall include entire basement wall or slab assembly components and interior air film.
- (5) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in $W/(m^2 \cdot K)$.
- (6) In the case of *basement wall assemblies*, where RSI 3.52 ci is required RSI 2.11 + 1.76 ci is permitted to be used or vice versa; or where RSI 2.11 + 0.88 ci is required, RSI 2.64 ci is permitted to be used or vice versa.
- (7) If an EF of a water tank is not indicated in a compliance package, there is no EF requirement for water tank for that specific compliance package.
- (8) Nominal and *effective RSI values* are expressed in $(m^2 \cdot K)/W$. U-Values are expressed in $W/(m^2 \cdot K)$.

Table 3.1.1.2.C (IP)
ZONE 1 - Compliance Packages for Electric Space Heating
 Forming Part of Sentence 3.1.1.2.(3)

Component	Thermal Values ⁽⁸⁾	Compliance Package			
		C 1	C 2	C 3	C 4
Ceiling with Attic Space	Min. Nominal R ⁽¹⁾	60 + HH	60 + HH	50	60 + HH
	Max. U ⁽²⁾	0.016	0.016	0.020	0.016
	Min. Effective R ⁽²⁾	59.90	59.90	49.23	49.23
Ceiling Without Attic Space	Min. Nominal R ⁽¹⁾	31	31	31	31
	Max. U ⁽²⁾	0.036	0.036	0.036	0.036
	Min. Effective R ⁽²⁾	27.65	27.65	27.65	27.65
Exposed Floor	Min. Nominal R ⁽¹⁾	31	31	35	31
	Max. U ⁽³⁾	0.034	0.034	0.031	0.034
	Min. Effective R ⁽³⁾	29.80	29.80	32.02	29.80
Walls Above Grade	Min. Nominal R ⁽¹⁾	19 + 10 ci	22 + 10 ci	22 + 10 ci	22 + 7.5 ci
	Max. U ⁽³⁾	0.040	0.038	0.038	0.042
	Min. Effective R ⁽³⁾	25.32	26.40	26.40	23.90
Basement Walls ⁽⁶⁾	Min. Nominal R ⁽¹⁾	20 + 8 ci	20 ci	20 ci	20 ci
	Max. U ⁽⁴⁾	0.044	0.047	0.047	0.047
	Min. Effective R ⁽⁴⁾	22.71	21.12	21.12	21.12
Below Grade Slab Entire Surface > 600 mm Below Grade	Min. Nominal R ⁽¹⁾	7.5	-	-	-
	Max. U ⁽⁴⁾	0.116	-	-	-
	Min. Effective R ⁽⁴⁾	8.63	-	-	-
Heated Slab or Slab ≤ 600 mm Below Grade	Min. Nominal R ⁽¹⁾	10	10	10	10
	Max. U ⁽⁴⁾	0.090	0.090	0.090	0.090
	Min. Effective R ⁽⁴⁾	11.13	11.13	11.13	11.13
Edge of Below Grade Slab ≤ 600 mm Below Grade	Min. Nominal R ⁽¹⁾	10	10	10	10
Windows and Sliding Glass Doors	Max. U ⁽⁵⁾	0.25	0.21	0.21	0.28
	Energy Rating	29	34	34	25
Skylights	Max. U ⁽⁵⁾	0.49	0.49	0.49	0.49
Space Heating Equipment	Min.	-	-	-	ASHP: 7.1 HSPF
HRV	Min. SRE	81%	75%	81%	55%
Domestic Water Heater ⁽⁷⁾	Min. EF	-	-	-	-
Column 1	2	3	4	5	6

Notes to Table 3.1.1.2.C (IP):

The following definitions applies:

HH = 10 inch high heel

(1) The values listed are minimum Nominal R values for the thermal insulation component only.

(2) U-Value and effective R value shall include entire ceiling assembly components, from interior air film to vented space air film above insulation.

(3) U-Value and effective R value shall include entire exposed floor or above grade wall assembly components, from interior air film to exterior air film.

(4) U-Value and effective R value shall include entire basement wall or slab assembly components and interior air film.

(5) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in Btu/(h·ft²·F).

(6) In the case of *basement* wall assemblies, where R20 ci is required R12 + 10 ci is permitted to be used or vice versa; or where R12 + 5 ci is required, R15 ci is permitted to be used or vice versa.

(7) If an EF of a water tank is not indicated in a compliance package, there is no EF requirement for water tank for that specific compliance package.

(8) Nominal and effective R values are expressed in (h·ft²·F)/Btu. U-Values are expressed in Btu/(h·ft²·F).

3.1.1.3. Energy Efficiency for Buildings Located in Zone 2

- (1) Except as provided in Sentences (2) to (5) and (7), the minimum thermal performance of *building* envelope and equipment shall conform to Table 3.1.1.3.A.
- (2) Except for solid fuel-burning space heating equipment and except as permitted in Sentence (5), where the space heating equipment efficiency is 84% or more but less than 92%, the minimum thermal performance of the *building* envelope and equipment shall conform to Table 3.1.1.3.B.
- (3) Where *electric space heating* is used, the minimum thermal performance of the *building* envelope and equipment shall conform to Table 3.1.1.3.C.
- (4) Except as permitted in Sentence (5), where the space heating equipment efficiency cannot meet the requirements of the applicable compliance packages, energy efficiency compliance shall be achieved in accordance with Subsection 3.1.2. of this Supplementary Standard.
- (5) Where an ICF wall assembly is installed as an above and below grade wall assembly that has minimum RSI 1.76 (R10) insulation on the interior surface of the concrete and minimum RSI 1.76 (R10) insulation on the exterior surface, the ICF wall is deemed to comply with the thermal values set out for walls in compliance packages A1 and A3 in Table 3.1.1.3.A. (See Appendix A).
- (6) An ICF wall assembly described in Sentence (5) is permitted to be used in lieu of *basement* walls that require insulation value of RSI 3.52 ci (R20) or less. (See Appendix A).
- (7) *Building* designs that utilize combined space heating and domestic water heating systems are permitted to use compliance package A4 or A5, provided that
 - (a) the water heating equipment has a minimum of 0.80 EF, 90% AFUE, or is a condensing type, or,
 - (b) the combination of equipment has a minimum of 0.85 TPF determined in accordance with CAN/CSA-P.9 “Test Method for Determining the Performance of Combined Space and Water Heating Systems (Combos).”

Table 3.1.1.3.A (SI)
ZONE 2 - Compliance Packages for Space Heating Equipment with AFUE ≥ 92%
 Forming Part of Sentence 3.1.1.3.(1)

Component	Thermal Values ⁽⁸⁾	Compliance Package					
		A 1	A 2	A 3	A 4	A 5	A 6
Ceiling with Attic Space	Min. Nominal RSI ⁽¹⁾	10.56	8.80	10.56 + HH	10.56	10.56	8.80
	Max. U ⁽²⁾	0.096	0.115	0.095	0.096	0.096	0.115
	Min. Effective RSI ⁽²⁾	10.43	8.67	10.55	10.43	10.43	8.67
Ceiling Without Attic Space	Min. Nominal RSI ⁽¹⁾	5.46	5.46	5.46	5.46	5.46	5.46
	Max. U ⁽²⁾	0.205	0.205	0.205	0.205	0.205	0.205
	Min. Effective RSI ⁽²⁾	4.87	4.87	4.87	4.87	4.87	4.87
Exposed Floor	Min. Nominal RSI ⁽¹⁾	5.46	6.16	5.46	5.46	5.46	6.16
	Max. U ⁽³⁾	0.190	0.177	0.190	0.190	0.190	0.177
	Min. Effective RSI ⁽³⁾	5.25	5.64	5.25	5.25	5.25	5.64
Walls Above Grade	Min. Nominal RSI ⁽¹⁾	3.34 + 0.88 ci	3.34 + 1.76 ci	3.87+ 0.88 ci	3.87 + 1.32 ci	3.34 + 1.76 ci	3.87 + 1.32 ci
	Max. U ⁽³⁾	0.280	0.224	0.265	0.238	0.224	0.238
	Min. Effective RSI ⁽³⁾	3.58	4.46	3.77	4.21	4.46	4.21
Basement Walls ⁽⁶⁾	Min. Nominal RSI ⁽¹⁾	3.52 ci	3.52 ci	3.52 ci	3.52 ci	3.52 ci	3.52 ci
	Max. U ⁽⁴⁾	0.269	0.269	0.269	0.269	0.269	0.269
	Min. Effective RSI ⁽⁴⁾	3.72	3.72	3.72	3.72	3.72	3.72
Below Grade Slab Entire Surface > 600 mm Below Grade	Min. Nominal RSI ⁽¹⁾	-	-	0.88	-	1.76	1.32
	Max. U ⁽⁴⁾	-	-	0.926	-	0.51	0.658
	Min. Effective RSI ⁽⁴⁾	-	-	1.08	-	1.96	1.52
Heated Slab or Slab ≤ 600 mm Below Grade	Min. Nominal RSI ⁽¹⁾	1.76	1.76	1.76	1.76	1.76	1.76
	Max. U ⁽⁴⁾	0.510	0.510	0.510	0.510	0.510	0.510
	Min. Effective RSI ⁽⁴⁾	1.96	1.96	1.96	1.96	1.96	1.96
Edge of Below Grade Slab ≤ 600 mm Below Grade	Min. Nominal RSI ⁽¹⁾	1.76	1.76	1.76	1.76	1.76	1.76
Windows and Sliding Glass Doors	Max. U ⁽⁵⁾	1.2	1.6	1.6	1.2	1.4	1.4
	Energy Rating	34	25	25	34	29	29
Skylights	Max. U ⁽⁵⁾	2.8	2.8	2.8	2.8	2.8	2.8
Space Heating Equipment	Min. AFUE	96%	96%	98%	96%	94%	92%
HRV	Min. SRE	81%	70%	65%	65%	65%	75%
Domestic Water Heater ⁽⁷⁾	Min. EF	0.7	0.8	0.8	0.67	0.67	0.7
Column 1	2	3	4	5	6	7	8

Notes to Table 3.1.1.3.A:

The following definition applies:

HH = 250 mm high heel

- (1) The values listed are minimum Nominal RSI-values for the thermal insulation component only.
- (2) U-Value and *effective RSI value* shall include entire ceiling assembly components, from interior air film to vented space air film above insulation.
- (3) U-Value and *effective RSI value* shall include entire exposed floor or above grade wall assembly components, from interior air film to exterior air film.
- (4) U-Value and *effective RSI value* shall include entire basement wall or slab assembly components and interior air film.
- (5) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in W/(m² • K).
- (6) In the case of *basement wall assemblies*, where RSI 3.52 ci is required RSI 2.11+1.76 ci is permitted to be used or vice versa; or where RSI 2.11+0.88 ci is required, RSI 2.64 ci is permitted to be used or vice versa.
- (7) If an EF of a water tank is not indicated in a compliance package, there is no EF requirement for water tank for that specific compliance package.
- (8) Nominal and *effective RSI values* are expressed in (m² • K)/W. U-Values are expressed in W/(m² • K).

Table 3.1.1.3.A (IP)
ZONE 2 - Compliance Packages for Space Heating Equipment with AFUE ≥ 92%
 Forming Part of Sentence 3.1.1.3.(1)

Component	Thermal Values ⁽⁶⁾	Compliance Package					
		A 1	A 2	A 3	A 4	A 5	A 6
Ceiling with Attic Space	Min. Nominal R ⁽¹⁾	60	50	60+HH	60	60	50
	Max. U ⁽²⁾	0.017	0.020	0.016	0.017	0.017	0.020
	Min. Effective R ⁽²⁾	59.22	49.23	59.22	59.22	59.22	49.23
Ceiling Without Attic Space	Min. Nominal R ⁽¹⁾	31	31	31	31	31	31
	Max. U ⁽²⁾	0.036	0.036	0.036	0.036	0.036	0.036
	Min. Effective R ⁽²⁾	27.65	27.65	27.65	27.65	27.65	27.65
Exposed Floor	Min. Nominal R ⁽¹⁾	31	35	31	31	31	35
	Max. U ⁽³⁾	0.034	0.031	0.034	0.034	0.034	0.031
	Min. Effective R ⁽³⁾	29.80	32.02	29.80	29.80	29.80	32.02
Walls Above Grade	Min. Nominal R ⁽¹⁾	19+5ci	19+10ci	22+5ci	22+7.5ci	19+10ci	22+7.5ci
	Max. U ⁽³⁾	0.049	0.040	0.047	0.042	0.040	0.042
	Min. Effective R ⁽³⁾	20.32	25.32	21.40	23.90	25.32	23.90
Basement Walls ⁽⁶⁾	Min. Nominal R ⁽¹⁾	20ci	20ci	20ci	20ci	20ci	20ci
	Max. U ⁽⁴⁾	0.047	0.047	0.047	0.047	0.047	0.047
	Min. Effective R ⁽⁴⁾	21.12	21.12	21.12	21.12	21.12	21.12
Below Grade Slab Entire Surface > 600 mm Below Grade	Min. Nominal R ⁽¹⁾	-	-	5	-	10	7.5
	Max. U ⁽⁴⁾	-	-	0.163	-	0.090	0.116
	Min. Effective R ⁽⁴⁾	-	-	6.13	-	11.13	8.63
Heated Slab or Slab ≤ 600 mm Below Grade	Min. Nominal R ⁽¹⁾	10	10	10	10	10	10
	Max. U ⁽⁴⁾	0.090	0.090	0.090	0.090	0.090	0.090
	Min. Effective R ⁽⁴⁾	11.13	11.13	11.13	11.13	11.13	11.13
Edge of Below Grade Slab ≤ 600 mm Below Grade	Min. Nominal R ⁽¹⁾	10	10	10	10	10	10
Windows and Sliding Glass Doors	Max. U ⁽⁵⁾	0.21	0.28	0.28	0.21	0.25	0.25
	Energy Rating	34	25	25	34	29	29
Skylights	Max. U ⁽⁵⁾	0.49	0.49	0.49	0.49	0.49	0.49
Space Heating Equipment	Min. AFUE	96%	96%	98%	96%	94%	92%
HRV	Min. SRE	81%	70%	65%	65%	65%	75%
Domestic Water Heater ⁽⁷⁾	Min. EF	0.7	0.8	0.8	0.67	0.67	0.7
Column 1	2	3	4	5	6	7	8

Notes to Table 3.1.1.3.A:

The following definition applies:

HH = 10 inch high heel

- (1) The values listed are minimum Nominal RSI-values for the thermal insulation component only.
- (2) U-Value and effective R value shall include entire ceiling assembly components, from interior air film to vented space air film above insulation.
- (3) U-Value and effective R value shall include entire exposed floor or above grade wall assembly components, from interior air film to exterior air film.
- (4) U-Value and effective R value shall include entire *basement* wall or slab assembly components and interior air film.
- (5) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in Btu/(h·ft²·F).
- (6) In the case of *basement* wall assemblies, where R20ci is required R12+10ci is permitted to be used or vice versa; or where R12+5ci is required, R15ci is permitted to be used or vice versa.
- (7) If an EF of a water tank is not indicated in a compliance package, there is no EF requirement for water tank for that specific compliance package.
- (8) Nominal and effective R values are expressed in (h·ft²·F)/Btu. U-Values are expressed in Btu/(h·ft²·F).

Table 3.1.1.3.B (SI)
ZONE 2 - Compliance Packages for Space Heating Equipment with $84\% \leq AFUE < 92\%$
 Forming Part of Sentence 3.1.1.3.(2)

Component	Thermal Values ⁽⁸⁾	Compliance Package					
		B 1	B 2	B 3	B 4	B 5	B 6
Ceiling with Attic Space	Min. Nominal RSI ⁽¹⁾	8.80	10.56	10.56 + HH	10.56 + HH	8.80	10.56
	Max. U ⁽²⁾	0.115	0.096	0.095	0.095	0.115	0.096
	Min. Effective RSI ⁽²⁾	8.67	10.43	10.55	10.55	8.67	10.43
Ceiling Without Attic Space	Min. Nominal RSI ⁽¹⁾	5.46	5.46	5.46	5.46	5.46	5.46
	Max. U ⁽²⁾	0.205	0.205	0.205	0.205	0.205	0.205
	Min. Effective RSI ⁽²⁾	4.87	4.87	4.87	4.87	4.87	4.87
Exposed Floor	Min. Nominal RSI ⁽¹⁾	6.16	5.46	5.46+1.76ci	5.46	6.16	5.46
	Max. U ⁽³⁾	0.177	0.190	0.143	0.190	0.177	0.190
	Min. Effective RSI ⁽³⁾	5.64	5.25	7.01	5.25	5.64	5.25
Walls Above Grade	Min. Nominal RSI ⁽¹⁾	3.87 + 1.32 ci	3.87 + 1.32 ci	3.87 + 1.76 ci	3.87 + 1.76 ci	3.87 + 1.76 ci	3.87 + 1.76 ci
	Max. U ⁽³⁾	0.238	0.238	0.215	0.215	0.215	0.215
	Min. Effective RSI ⁽³⁾	4.21	4.21	4.65	4.65	4.65	4.65
Basement Walls ⁽⁶⁾	Min. Nominal RSI ⁽¹⁾	3.52 ci	2.11 + 1.76 ci	3.52 + 1.76 ci	3.52 + 1.76 ci	3.52 + 2.11 ci	3.52 + 2.11 ci
	Max. U ⁽⁴⁾	0.269	0.272	0.226	0.226	0.213	0.213
	Min. Effective RSI ⁽⁴⁾	3.72	3.67	4.43	4.43	4.7	4.7
Below Grade Slab Entire Surface > 600 mm Below Grade	Min. Nominal RSI ⁽¹⁾	-	0.88	1.76	1.76	0.88	0.88
	Max. U ⁽⁴⁾	-	0.926	0.510	0.510	0.926	0.926
	Min. Effective RSI ⁽⁴⁾	-	1.08	1.96	1.96	1.08	1.08
Heated Slab or Slab ≤ 600 mm Below Grade	Min. Nominal RSI ⁽¹⁾	1.76	1.76	1.76	1.76	1.76	1.76
	Max. U ⁽⁴⁾	0.510	0.510	0.510	0.510	0.510	0.510
	Min. Effective RSI ⁽⁴⁾	1.96	1.96	1.96	1.96	1.96	1.96
Edge of Below Grade Slab ≤ 600 mm Below Grade	Min. Nominal RSI ⁽¹⁾	1.76	1.76	1.76	1.76	1.76	1.76
Windows and Sliding Glass Doors	Max. U ⁽⁵⁾	1.2	1.6	1.4	1.4	1.4	1.2
	Energy Rating	34	25	29	29	29	34
Skylights	Max. U ⁽⁵⁾	2.8	2.8	2.8	2.8	2.8	2.8
Space Heating Equipment	Min. AFUE	90%	90%	87%	87%	84%	84%
HRV	Min. SRE	75%	81%	70%	75%	81%	81%
Domestic Water Heater ⁽⁷⁾	Min. EF	0.66	0.66	0.66	0.62	0.66	-
Column 1	2	3	4	5	6	7	8

Notes to Table 3.1.1.3.B:

The following definition applies:

HH = 250 mm high heel

- (1) The values listed are minimum Nominal RSI-values for the thermal insulation component only.
- (2) U-Value and *effective RSI value* shall include entire ceiling assembly components, from interior air film to vented space air film above insulation.
- (3) U-Value and *effective RSI value* shall include entire exposed floor or above grade wall assembly components, from interior air film to exterior air film.
- (4) U-Value and *effective RSI value* shall include entire *basement* wall or slab assembly components and interior air film.
- (5) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in $W/(m^2 \cdot K)$.
- (6) In the case of *basement* wall assemblies, where RSI 3.52 ci is required RSI 2.11+1.76 ci is permitted to be used or vice versa; or where RSI 2.11+0.88 ci is required, RSI 2.64 ci is permitted to be used or vice versa.
- (7) If an EF of a water tank is not indicated in a compliance package, there is no EF requirement for water tank for that specific compliance package.
- (8) Nominal and *effective RSI values* are expressed in $(m^2 \cdot K)/W$. U-Values are expressed in $W/(m^2 \cdot K)$.

Table 3.1.1.3.B (IP)
ZONE 2 - Compliance Packages for Space Heating Equipment with $84\% \leq \text{AFUE} < 92\%$
 Forming Part of Sentence 3.1.1.3.(2)

Component	Thermal Values ⁽⁸⁾	Compliance Package					
		B 1	B 2	B 3	B 4	B 5	B 6
Ceiling with Attic Space	Min. Nominal R ⁽¹⁾	50	60	60 + HH	60 + HH	50	60
	Max. U ⁽²⁾	0.020	0.017	0.016	0.016	0.020	0.017
	Min. Effective R ⁽²⁾	49.23	59.22	59.90	59.90	49.23	59.22
Ceiling Without Attic Space	Min. Nominal R ⁽¹⁾	31	31	31	31	31	31
	Max. U ⁽²⁾	0.036	0.036	0.036	0.036	0.036	0.036
	Min. Effective R ⁽²⁾	27.65	27.65	27.65	27.65	27.65	27.65
Exposed Floor	Min. Nominal R ⁽¹⁾	35	31	31 + 10ci	31	35	31
	Max. U ⁽³⁾	0.031	0.034	0.025	0.034	0.031	0.034
	Min. Effective R ⁽³⁾	32.02	29.80	39.80	29.80	32.02	29.80
Walls Above Grade	Min. Nominal R ⁽¹⁾	22 + 7.5 ci	22 + 7.5 ci	22 + 10 ci	22 + 10 ci	19 + 10 ci	19 + 10 ci
	Max. U ⁽³⁾	0.042	0.042	0.038	0.038	0.038	0.038
	Min. Effective R ⁽³⁾	23.90	23.90	26.40	26.40	26.40	26.40
Basement Walls ⁽⁶⁾	Min. Nominal R ⁽¹⁾	20 ci	12 + 10 ci	20 + 10 ci	20 + 10 ci	20 + 12 ci	20 + 12 ci
	Max. U ⁽⁴⁾	0.047	0.048	0.040	0.040	0.037	0.037
	Min. Effective R ⁽⁴⁾	21.12	20.84	25.15	25.15	26.69	26.69
Below Grade Slab Entire Surface > 600 mm Below Grade	Min. Nominal R ⁽¹⁾	-	5	10	10	5	5
	Max. U ⁽⁴⁾	-	0.163	0.090	0.090	0.163	0.163
	Min. Effective R ⁽⁴⁾	-	6.13	11.13	11.13	6.13	6.13
Heated Slab or Slab ≤ 600 mm Below Grade	Min. Nominal R ⁽¹⁾	10	10	10	10	10	10
	Max. U ⁽⁴⁾	0.090	0.090	0.090	0.090	0.090	0.090
	Min. Effective R ⁽⁴⁾	11.13	11.13	11.13	11.13	11.13	11.13
Edge of Below Grade Slab ≤ 600 mm Below Grade	Min. Nominal R ⁽¹⁾	10	10	10	10	10	10
Windows and Sliding Glass Doors	Max. U ⁽⁵⁾	0.21	0.28	0.25	0.25	0.25	0.21
	Energy Rating	34	25	29	29	29	34
Skylights	Max. U ⁽⁵⁾	0.49	0.49	0.49	0.49	0.49	0.49
Space Heating Equipment	Min. AFUE	90%	90%	87%	87%	84%	84%
HRV	Min. SRE	75%	81%	70%	75%	81%	81%
Domestic Water Heater ⁽⁷⁾	Min. EF	0.66	0.66	0.66	0.62	0.66	-
Column 1	2	3	4	5	6	7	8

Notes to Table 3.1.1.3.B:

The following definition applies:

HH = 10 inch high heel

(1) The values listed are minimum Nominal R values for the thermal insulation component only.

(2) U-Value and effective R value shall include entire ceiling assembly components, from interior air film to vented space air film above insulation.

(3) U-Value and effective R value shall include entire exposed floor or above grade wall assembly components, from interior air film to exterior air film.

(4) U-Value and effective R value shall include entire *basement* wall or slab assembly components and interior air film.

(5) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in Btu/(h·ft²·F).

(6) In the case of *basement* wall assemblies, where R20 ci is required R12 + 10 ci is permitted to be used or vice versa; or where R12 + 5 ci is required, R15 ci is permitted to be used or vice versa.

(7) If an EF of a water tank is not indicated in a compliance package, there is no EF requirement for water tank for that specific compliance package.

(8) Nominal and effective R values are expressed in (h·ft²·F)/Btu. U-Values are expressed in Btu/(h·ft²·F).

Table 3.1.1.3.C (SI)
 ZONE 2 - Compliance Packages for Electric Space Heating
 Forming Part of Sentence 3.1.1.3.(3)

Component	Thermal Values ⁽⁸⁾	Compliance Package	
		C 1	C 2
Ceiling with Attic Space	Min. Nominal RSI ⁽¹⁾	10.56 + HH	8.80
	Max. U ⁽²⁾	0.095	0.115
	Min. Effective RSI ⁽²⁾	10.55	8.67
Ceiling Without Attic Space	Min. Nominal RSI ⁽¹⁾	5.46	5.46
	Max. U ⁽²⁾	0.205	0.205
	Min. Effective RSI ⁽²⁾	4.87	4.87
Exposed Floor	Min. Nominal RSI ⁽¹⁾	5.46 + 1.76 ci	6.16
	Max. U ⁽³⁾	0.143	0.177
	Min. Effective RSI ⁽³⁾	7.01	5.64
Walls Above Grade	Min. Nominal RSI ⁽¹⁾	4.22 + 1.76 ci	3.87 + 1.32 ci
	Max. U ⁽³⁾	0.210	0.238
	Min. Effective RSI ⁽³⁾	4.76	4.21
Basement Walls ⁽⁴⁾	Min. Nominal RSI ⁽¹⁾	3.52 + 2.11 ci	3.52 ci
	Max. U ⁽⁴⁾	0.213	0.269
	Min. Effective RSI ⁽⁴⁾	4.7	3.72
Below Grade Slab Entire Surface > 600 mm Below Grade	Min. Nominal RSI ⁽¹⁾	1.76	-
	Max. U ⁽⁴⁾	0.51	-
	Min. Effective RSI ⁽⁴⁾	1.96	-
Heated Slab or Slab ≤ 600 mm Below Grade	Min. Nominal RSI ⁽¹⁾	1.76	1.76
	Max. U ⁽⁴⁾	0.510	0.510
	Min. Effective RSI ⁽⁴⁾	1.96	1.96
Edge of Below Grade Slab ≤ 600 mm Below Grade	Min. Nominal RSI ⁽¹⁾	1.76	1.76
Windows and Sliding Glass Doors	Max. U ⁽⁵⁾	1.2	1.6
	Energy Rating	34	25
Skylights	Max. U ⁽⁵⁾	2.8	2.8
Space Heating Equipment	Min,	-	ASHP: 7.1 HSPF
HRV	Min. SRE	81%	70%
Domestic Water Heater ⁽⁷⁾	Min. EF	-	-
Column 1	2	3	4

Notes to Table 3.1.1.2.C:

The following definition applies: HH = 250 mm high heel

- (1) The values listed are minimum Nominal RSI-values for the thermal insulation component only.
- (2) U-Value and *effective RSI value* shall include entire ceiling assembly components, from interior air film to vented space air film above insulation.
- (3) U-Value and *effective RSI value* shall include entire exposed floor or above grade wall assembly components, from interior air film to exterior air film.
- (4) U-Value and *effective RSI value* shall include entire *basement* wall or slab assembly components and interior air film.
- (5) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in $W/(m^2 \cdot K)$.
- (6) In the case of *basement* wall assemblies, where RSI 3.52 ci is required RSI 2.11 + 1.76 ci is permitted to be used or vice versa; or where RSI 2.11 + 0.88 ci is required, RSI 2.64 ci is permitted to be used or vice versa.
- (7) If an EF of a water tank is not indicated in a compliance package, there is no EF requirement for water tank for that specific compliance package.
- (8) Nominal and *effective RSI values* are expressed in $(m^2 \cdot K)/W$. U-Values are expressed in $W/(m^2 \cdot K)$.

Table 3.1.1.3.C (IP)
 ZONE 2 - Compliance Packages for Electric Space Heating
 Forming Part of Sentence 3.1.1.3.(3)

Component	Thermal Values ⁽⁸⁾	Compliance Package	
		C 1	C 2
Ceiling with Attic Space	Min. Nominal R ⁽¹⁾	60 + HH	50
	Max. U ⁽²⁾	0.016	0.020
	Min. Effective R ⁽²⁾	59.90	49.23
Ceiling Without Attic Space	Min. Nominal R ⁽¹⁾	31	31
	Max. U ⁽²⁾	0.036	0.036
	Min. Effective R ⁽²⁾	27.65	27.65
Exposed Floor	Min. Nominal R ⁽¹⁾	31 + 10ci	35
	Max. U ⁽³⁾	0.025	0.031
	Min. Effective R ⁽³⁾	39.80	32.02
Walls Above Grade	Min. Nominal R ⁽¹⁾	24 + 10 ci	22 + 7.5 ci
	Max. U ⁽³⁾	0.037	0.042
	Min. Effective R ⁽³⁾	27.02	23.90
Basement Walls ⁽⁶⁾	Min. Nominal R ⁽¹⁾	20 + 12 ci	20 ci
	Max. U ⁽⁴⁾	0.037	0.047
	Min. Effective R ⁽⁴⁾	26.69	21.12
Below Grade Slab Entire Surface > 600 mm Below Grade	Min. Nominal R ⁽¹⁾	10.0	-
	Max. U ⁽⁴⁾	0.090	-
	Min. Effective R ⁽⁴⁾	11.13	-
Heated Slab or Slab ≤ 600 mm Below Grade	Min. Nominal R ⁽¹⁾	10	10
	Max. U ⁽⁴⁾	0.090	0.090
	Min. Effective R ⁽⁴⁾	11.13	11.13
Edge of Below Grade Slab ≤ 600 mm Below Grade	Min. Nominal R ⁽¹⁾	10	10
Windows and Sliding Glass Doors	Max. U ⁽⁵⁾	0.21	0.28
	Energy Rating	34	25
Skylights	Max. U ⁽⁵⁾	0.49	0.49
Space Heating Equipment	Min.	-	ASHP: 7.1 HSPF
HRV	Min. SRE	81%	70%
Domestic Water Heater ⁽⁷⁾	Min. EF	-	-
Column 1	2	3	4

Notes to Table 3.1.1.3.C

The following definition applies: HH = 10 inch high heel

- (1) The values listed are minimum Nominal R values for the thermal insulation component only.
- (2) U-Value and effective R value shall include entire ceiling assembly components, from interior air film to vented space air film above insulation.
- (3) U-Value and effective R value shall include entire exposed floor or above grade wall assembly components, from interior air film to exterior air film.
- (4) U-Value and effective R value shall include entire *basement* wall or slab assembly components and interior air film.
- (5) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in Btu/(h·ft²·F).
- (6) In the case of *basement* wall assemblies, where R20 ci is required R12 + 10 ci is permitted to be used or vice versa; or where R12 + 5 ci is required, R15 ci is permitted to be used or vice versa
- (7) If an EF of a water tank is not indicated in a compliance package, there is no EF requirement for water tank for that specific compliance package.
- (8) Nominal and effective R values are expressed in (h·ft²·F)/Btu. U-Values are expressed in Btu/(h·ft²·F).

3.1.1.4. Airtightness (See Appendix A)

(1) Where a *dwelling unit* is designed and *constructed* to be sufficiently airtight such that the air leakage of the whole *dwelling unit* is less than or equal to one of the applicable airtightness targets specified in the same row of Table 3.1.1.4.A, the requirements of Tables 3.1.1.2.A to 3.1.1.2.C, Tables 3.1.1.3.A to 3.1.1.3.C, and Table 3.1.1.11. are permitted to be substituted in accordance with Table 3.1.1.4.B or Table 3.1.1.4.C.

(2) Airtightness targets described in Sentence (1) shall be measured under as operated conditions in accordance with CAN/CGSB 149.10 “Determination of the Airtightness of *Building* Envelopes by the Fan Depressurization Method” or NRCAN, “EnerGuide Rating System Technical Procedures Version 15.1”.

(3) For purposes of substitutions described in Sentence (1),

(a) a maximum of one substitution per *dwelling unit* may be made if substitutions are made in accordance with Table 3.1.1.4.B, or

(b) a maximum of two substitutions per *dwelling unit* may be made if substitutions are made in accordance with Table 3.1.1.4.C.

Table 3.1.1.4.A
Airtightness Targets
Forming Part of Sentence 3.1.1.4.(1) and Subsection 3.1.2.

Building Type	Airtightness Targets				
	ACH @50Pa	NLA @10 Pa		NLR @50 Pa	
		cm ² /m ²	in ² /100 ft ²	L/s/m ²	cfm50/ft ²
Detached	2.5	1.26	1.81	0.93	0.18
Attached	3.0	2.12	3.06	1.32	0.26
Column 1	2	3	4	5	6

Table 3.1.1.4.B (SI)
Permitted Substitutions for Airtight Dwelling Units⁽²⁾
Forming Part of Sentences 3.1.1.4.(1) and (3)

Required Compliance	Permitted Substitution Airtightness Complies with Table 3.1.1.4.A ⁽¹⁾
<i>Maximum One Substitution per Dwelling Unit</i>	
RSI 3.87 + 1.32 ci	RSI 3.34 + 0.88 ci
RSI 3.87 + 1.76 ci	RSI 3.34 + 1.32 ci
RSI 4.22 + 1.76 ci	RSI 3.87 + 1.32 ci
HRV with 81% SRE	HRV with 70% SRE
HRV with 75% SRE	HRV with 65% SRE
Furnace with 98%, 96% or 94% AFUE	Reduce furnace efficiency by 4% AFUE
<i>Fenestration</i> U-Value = 1.6, 1.4 or 1.2	Increase U-Value by 0.2
Column 1	2

Notes to Table 3.1.1.4.B:

(1) Where nominal RSI values are given, the use of corresponding U-Value or *effective RSI values* are permitted.

(2) Use only Table 3.1.1.4.B or Table 3.1.1.4.C, not both.

Table 3.1.1.4.B (IP)
Permitted Substitutions for Airtight Dwelling Units⁽²⁾
 Forming Part of Sentence 3.1.1.4.(1)

Required Compliance	Permitted Substitution(s) Airtightness Complies with Table 3.1.1.4.A ⁽¹⁾
Maximum One Substitution per <i>Dwelling Unit</i>	
R22 + 7.5 ci	R19 + 5 ci
R22 + 10 ci	R19 + 7.5 ci
R24 + 10 ci	R22 + 7.5 ci
HRV with 81% SRE	HRV with 70% SRE
HRV with 75% SRE	HRV with 65% SRE
Furnace with 98%, 96% or 94% AFUE	Reduce furnace efficiency by 4% AFUE
<i>Fenestration</i> U-Value = 0.28, 0.25 or 0.21	Increase U-Value by 0.04 (downgrade one level)
Column 1	2

Notes to Table 3.1.1.4.B:

- (1) Where nominal R values are given, the use of corresponding "U" or "effective R" values are permitted.
 (2) Use only Table 3.1.1.4.B or Table 3.1.1.4.C, not both.

Table 3.1.1.4.C (SI)
Permitted Substitutions for Airtight Dwelling Units⁽³⁾
 Forming Part of Sentences 3.1.1.4.(1) and (3)

Required Compliance	Permitted Substitutions Airtightness Complies with Table 3.1.1.4.A ⁽¹⁾
Maximum Two Substitutions per <i>Dwelling Unit</i> ⁽²⁾	
Above grade continuous wall insulation RSI 1.32ci and RSI 1.76ci	Above grade continuous wall insulation RSI 0.88ci and RSI 1.32 ci respectively
RSI 3.87 and RSI 4.22 insulation between studs in above grade walls with continuous insulation	RSI 3.34 and RSI 3.87 insulation respectively between studs in above grade walls with continuous insulation
<i>Basement</i> wall RSI 3.52 + 2.11 ci, RSI 3.52 + 1.76 ci or RSI 3.52 ci	<i>Basement</i> wall RSI 2.64 ci or RSI 2.11 + 0.88ci
Slab located more than 600mm below grade and entire under slab insulation is RSI 1.76 or RSI 0.88	RSI 0, if slab is unheated RSI 0.88, if slab is heated
RSI 10.56 ceiling insulation with or without 250 mm high heel	RSI 8.80 ceiling insulation
Column 1	2

Notes to Table 3.1.1.4.C:

- (1) Where nominal RSI values are given, the use of corresponding U-Value or *effective RSI values* are permitted.
 (2) Where the required airtightness is achieved, simultaneous substitution of two components listed in this Table is permitted.
 (3) Use only Table 3.1.1.4.B or Table 3.1.1.4.C, not both.

Table 3.1.1.4.C (IP)
Permitted Substitutions for Airtight Dwelling Units⁽³⁾
 Forming Part of Sentences 3.1.1.4.(1) and (3)

Required Compliance	Permitted Substitutions Airtightness Complies with Table 3.1.1.4.A ⁽¹⁾
Maximum Two Substitutions per <i>Dwelling Unit</i> ⁽²⁾	
Above grade continuous wall insulation R7.5 ci and R10 ci	Above grade continuous wall insulation R5 ci and R7.5 ci respectively
R22 and R24 insulation between studs in above grade walls with continuous insulation	R19 and R22 insulation respectively between studs in above grade walls with continuous insulation
<i>Basement</i> wall R20 + 12 ci, R20 +10 ci or R20 ci	<i>Basement</i> wall R15 ci or R12 + 5 ci
Slab located more than 24 inches below grade and entire under slab insulation is R10 or R5	R0 , if the slab is unheated R5 min, if heated
R60 ceiling insulation with or without 250 mm high heel	R50 ceiling insulation
Column 1	2

Notes to Table 3.1.1.4.C:

- (1) Where nominal R values are given, the use of corresponding "U" or "effective R" values are permitted.
 (2) Where the required airtightness is achieved, simultaneous substitution of two components listed in this Table is permitted.
 (3) Use only Table 3.1.1.4.B or Table 3.1.1.4.C, not both.

3.1.1.5. Elements Acting as a Thermal Bridge

(1) Except for a *foundation* wall, the insulated portion of a wall that incorporates wood stud framing elements that have a thermal resistance of less than RSI 0.90 shall be insulated to restrict heat flow through the studs by a material providing a thermal resistance at least equal to 25% of the thermal resistance required for the insulated portion of the assembly in Articles 3.1.1.2., 3.1.1.3. and 3.1.1.11.

(2) Except as provided in Sentence (3), the thermal resistance of the insulated portion of a *building* assembly in Articles 3.1.1.2. and 3.1.1.3. that incorporates metal framing elements, such as steel studs and steel joists, that act as thermal bridges to facilitate heat flow through the assembly, shall be 20% greater than the values shown in Tables 3.1.1.2.A, to 3.1.1.2. C and Tables 3.1.1.3.A to 3.1.1.3.C and Table 3.1.1.11., unless it can be shown that the heat flow is not greater than the heat flow through a wood frame assembly of the same thickness.

(3) Sentence (2) does not apply to *building* assemblies incorporating thermal bridges where the thermal bridges are insulated to restrict heat flow through the thermal bridges by a material providing a thermal resistance at least equal to 25% of the thermal resistance required for the insulated portion of the assembly in Articles 3.1.1.2., 3.1.1.3. and 3.1.1.11.

3.1.1.6. Log Wall Construction and Post, Beam and Plank Construction

(1) Except as provided in Sentences (2) and (3), log wall construction and post, beam and plank construction shall have a minimum thermal resistance of RSI 2.1 for the total assembly.

- (2) The thermal resistance value in Sentence (1) for the total wall assembly may be reduced to not less than RSI 1.61 if,
 (a) the thermal resistance of insulation for the exposed roof or ceiling required in selected compliance package is increased by an amount equivalent to the reduction permitted in this Sentence, and
 (b) for log walls, the logs have tongue-and-groove or splined joints.

- (3) Where milled log walls are installed, the thermal resistance value in Sentence (1) for the total wall assembly does not apply if,
 - (a) the mean thickness of each log is not less than 150 mm,
 - (b) the thermal resistance of insulation for the exposed roof or ceiling required in selected compliance package is increased by RSI 0.53, and
 - (c) the logs have tongue-and-groove or splined joints.
- (4) Where a log wall is constructed in accordance with Sentences (1) to (3), the log wall shall be deemed to comply with the requirements in Subsection 9.25.3. of Division B of the *Building Code*.

3.1.1.7. Insulation of Foundation Walls

- (1) *Foundation* walls enclosing heated space shall be insulated from the underside of the subfloor to not more than 200 mm above the finished floor level of the *basement*. (See Appendix A.)
- (2) The insulation required by Sentence (1) may be provided by a system installed,
 - (a) on the interior of the *foundation* wall,
 - (b) on the exterior face of the *foundation* wall, or
 - (c) partially on the interior and partially on the exterior, provided the thermal performance of the system is equivalent to that permitted in Clauses (a) or (b).
- (3) If a *foundation* wall is constructed of hollow masonry units, one or more of the following shall be used to control convection currents in the core spaces,
 - (a) filling the core spaces,
 - (b) at least one row of semi-solid blocks at or below *grade*, or
 - (c) other similar methods.
- (4) Masonry walls of hollow units that penetrate the ceiling shall be sealed at or near the ceiling adjacent to the roof space to prevent air within the voids from entering the *attic or roof space* by,
 - (a) capping with masonry units without voids, or
 - (b) installation of flashing material extending across the full width of the masonry.
- (5) Except as provided in Sentences (6) and (7), where a portion of a *basement* slab or a portion of a *basement* slab edge is the only part of the slab that is at the exterior ground level such as a walk-out *basement*, or within 600 mm of the exterior ground level, those portions shall have perimeter insulation extend not less than 600 mm below the slab level. (See Appendix A.)
- (6) Where the entire concrete slab is within 600 mm of the exterior ground level, the entire surface of the slab shall be insulated. (See Appendix A.)
- (7) Where a slab contains heating ducts, pipes, tubes or cables, the entire heated surface of the slab that is in contact with the ground shall be insulated.

3.1.1.8. Thermal Resistance Values for Roof Access Hatches and Eaves

- (1) Except as provided in Sentence (2), the thermal resistance values for insulation required by Articles 3.1.1.2., 3.1.1.3. and 3.1.1.11. for exposed ceilings with attic spaces are permitted to be reduced
 - (a) directly above access hatches, and
 - (b) near eaves to the extent made necessary by the roof slope and required ventilation clearances,except that the thermal insulation value at the location directly above access hatches and inner surfaces of exterior walls shall be not less than RSI 3.52.
- (2) Where 250 mm high heel is required near the eaves, the available space on the inner surface of the wall below the roof venting space shall be fully insulated.

3.1.1.9. Thermal Performance of Windows, Skylights and Sliding Glass Doors

- (1) Except as provided in Sentences (3) to (5), windows, skylights and sliding glass doors shall meet
- the required *overall coefficient of heat transfer* in Tables 3.1.1.2.A 3.1.1.2.B and 3.1.1.2.C and Tables 3.1.1.3.A, 3.1.1.3.B and 3.1.1.3. C and Table 3.1.1.11., or
 - the corresponding energy rating in Table 3.1.1.9.
- (2) The energy rating and the *overall coefficient of heat transfer* required for windows and sliding glass doors in a *residential occupancy* shall be determined in conformance with
- CAN/CSA-A440.2, “Fenestration Energy Performance”, or
 - NFRC 100, “Procedure for Determining Fenestration Product U-factors” and NFRC 200, “Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence”.
- (3) A *basement* window that incorporates a *loadbearing* structural frame need not meet Sentence (1) provided that it has the following
- double glazed with a low-E coating,
 - inert gas-filled,
 - have an insulated spacer, and
 - if the frame is made from metal, the frame shall be thermally broken.
- (4) Glass blocks and decorative windows, including side lights, integrated glazing in doors, half-circle windows, leaded windows, transoms and other specialty glazing products, need not comply with Sentence (1) provided that the total area of such decorative glazing in the *building* does not exceed 1.85 m².
- (5) Windows and sliding glass doors need not meet the *overall coefficient of heat transfer* required by Sentence (1) where the window or sliding glass door necessitates a low solar heat gain coefficient due to its orientation and results in a U-Value greater than that permitted by Sentence (1), provided the overall thermal performance of all windows and sliding glass doors is maintained by improving the performance of other windows or sliding glass doors.

Table 3.1.1.9.
Maximum U-Values and Minimum Energy Ratings (ER) for Windows, Skylights and Sliding Glass Doors
Forming Part of Sentence 3.1.1.9.(1)

Component	Maximum U-Values	Minimum Energy Ratings, (ER)
	U-Value, W/m ² ·K (Btu/h·ft ² ·°F)	ER
Skylights	2.8 (0.50)	—
Windows and Sliding Glass Doors	2.0 (0.35)	17
	1.8 (0.32)	21
	1.6 (0.28)	25
	1.4 (0.25)	29
	1.2 (0.21)	34
	1.0 (0.18)	38
Column 1	2	3

3.1.1.10. Minimum Thermal Resistance of Doors

- (1) Except as provided in Sentence (2) and except for doors in enclosed unheated vestibules and cold cellars, and except for glazed portions of doors, all doors that separate heated space from unheated space shall have a thermal resistance of not less than RSI 0.7 where a storm door is not provided.
- (2) One exterior door system, with a single or multiple leaf door, that does not comply with Sentence (1) is permitted for each *dwelling unit*.
- (3) All doors that separate heated space from unheated enclosed spaces shall have an insulated core and be installed with weatherstripping.

3.1.1.11. Additions to Existing Buildings

- (1) Except as provided in Sentences (2) and (3), an addition to an existing *building* shall comply with
 - (a) one of the applicable compliance packages in Article 3.1.1.2. or 3.1.1.3. in accordance with this Subsection, or
 - (b) Sentences 3.1.1.1.(7) to (9), except that the Tables referenced in Sentences 3.1.1.1.(7) and (8) are permitted to be substituted with Table 3.1.1.11.
(See Appendix A.)
- (2) For the purpose of Sentences 3.1.1.1.(7) to (9) and Subsection 3.1.2., the addition may be considered independently or in combination with the existing *building*, regardless of the thermal characteristics of the existing *building* envelope.
(See Appendix A.)
- (3) A one-storey sunroom addition to an existing *building* shall be deemed to be in compliance with Articles 3.1.1.2. and 3.1.1.3. and Subsection 3.1.2., provided that the *overall coefficient of heat transfer* of
 - (a) doors, windows and walls has a maximum U-Value of
 - (i) 1.4 if the *building* does not use *electric space heating*, and
 - (ii) 1.2 if the *building* uses *electric space heating*, and
 - (b) roofs and skylights has a maximum U-Value of 2.6.
(See Appendix A.)

Table 3.1.1.11. (SI)
Thermal Performance Requirements for Additions to Existing Buildings⁽³⁾
Forming Part of Sentence 3.1.1.11.(2)

Component	Thermal Values ⁽⁷⁾	Compliance Package		
		Zone 1	Zone 2	Electric Space Heating
		Less than 5000 Degree Days	5000 or more Degree Days	Zones 1 and 2
Ceiling with Attic Space	Min. Nominal RSI ⁽¹⁾	10.56	10.56	10.56
	Max. U ⁽²⁾	0.096	0.096	0.095
	Min. Effective RSI ⁽²⁾	10.43	10.43	10.55
Ceiling Without Attic Space	Min. Nominal RSI ⁽¹⁾	5.46	5.46	5.46
	Max. U ⁽²⁾	0.205	0.205	0.205
	Min. Effective RSI ⁽²⁾	4.87	4.87	4.87
Exposed Floor	Min. Nominal RSI ⁽¹⁾	5.46	5.46	5.46
	Max. U ⁽³⁾	0.190	0.190	0.190
	Min. Effective RSI ⁽³⁾	5.25	5.25	5.25
Walls Above Grade	Min. Nominal RSI ⁽¹⁾	3.34 + 0.88 ci	3.87 + 1.32 ci	3.87 + 1.76 ci
	Max. U ⁽³⁾	0.280	0.238	0.215
	Min. Effective RSI ⁽³⁾	3.58	4.21	4.65
Basement Walls ⁽⁶⁾	Min. Nominal RSI ⁽¹⁾	3.52 ci	3.52 ci	3.52 ci
	Max. U ⁽⁴⁾	0.269	0.269	0.269
	Min. Effective RSI ⁽⁴⁾	3.72	3.72	3.72
Heated Slab or Slab ≤ 600 mm Below Grade	Min. Nominal RSI ⁽¹⁾	1.76	1.76	1.76
	Max. U ⁽⁴⁾	0.510	0.510	0.510
	Min. Effective RSI ⁽⁴⁾	1.96	1.96	1.96
Edge of Below Grade Slab ≤ 600 mm Below Grade	Min. Nominal RSI ⁽¹⁾	1.76	1.76	1.76
Windows and Sliding Glass Doors	Max. U ⁽⁵⁾	1.6	1.4	1.4
	Energy Rating	25	29	29
Column 1	2	3	4	5

Notes to Table 3.1.1.11:

- (1) The values listed are minimum Nominal RSI-Values for the thermal insulation component only.
- (2) U-Value and *effective RSI value* shall include entire ceiling assembly components, from interior air film to vented space air film above insulation.
- (3) U-Value and *effective RSI value* shall include entire exposed floor or above grade wall assembly components, from interior air film to exterior air film.
- (4) U-Value and *effective RSI value* shall include entire *basement* wall or slab assembly components and interior air film.
- (5) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in $W/(m^2 \cdot K)$.
- (6) In the case of *basement* wall assemblies, where RSI 3.52 ci is required RSI 2.11+1.76 ci is permitted to be used or vice versa; or where RSI 2.11+ 0.88 ci is required, RSI 2.64 ci is permitted to be used or vice versa.
- (7) Nominal and *effective RSI values* are expressed in $(m^2 \cdot K)/W$. U-Values are expressed in $W/(m^2 \cdot K)$.

Table 3.1.1.11. (IP)
Thermal Performance Requirements for Additions to Existing Buildings⁽³⁾
Forming Part of Sentence 3.1.1.11.(2)

Component	Thermal Values ⁽⁷⁾	Compliance Package		
		Zone 1	Zone 2	Electric Space Heating
		Less than 5000 Degree Days	5000 or more Degree Days	Zones 1 and 2
Ceiling with Attic Space	Min. Nominal R ⁽¹⁾	60	60	60
	Max. U ⁽²⁾	0.017	0.017	0.017
	Min. Effective R ⁽²⁾	59.22	59.22	59.22
Ceiling Without Attic Space	Min. Nominal R ⁽¹⁾	31	31	31
	Max. U ⁽²⁾	0.036	0.036	0.036
	Min. Effective R ⁽²⁾	27.65	27.65	27.65
Exposed Floor	Min. Nominal R ⁽¹⁾	31	31	31
	Max. U ⁽³⁾	0.034	0.034	0.034
	Min. Effective R ⁽³⁾	29.80	29.80	29.80
Walls Above Grade	Min. Nominal R ⁽¹⁾	19 + 5 ci	22 + 7.5 ci	22 + 10 ci
	Max. U ⁽³⁾	0.049	0.042	0.038
	Min. Effective R ⁽³⁾	20.32	23.90	26.40
Basement Walls ⁽⁶⁾	Min. Nominal R ⁽¹⁾	20 ci	20 ci	20 ci
	Max. U ⁽⁴⁾	0.047	0.047	0.047
	Min. Effective R ⁽⁴⁾	21.12	21.12	21.12
Heated Slab or Slab ≤ 600 mm Below Grade	Min. Nominal R ⁽¹⁾	10	10	10
	Max. U ⁽⁴⁾	0.090	0.090	0.090
	Min. Effective R ⁽⁴⁾	11.13	11.13	11.13
Edge of Below Grade Slab ≤ 600 mm Below Grade	Min. Nominal R ⁽¹⁾	10	10	10
Windows and Sliding Glass Doors	Max. U ⁽⁵⁾	0.28	0.25	0.25
	Energy Rating	25	29	29
Column 1	2	3	4	5

Notes to Table 3.1.1.11:

- (1) The values listed are minimum Nominal R values for the thermal insulation component only.
- (2) U-Value and effective R value shall include entire ceiling assembly components, from interior air film to vented space air film above insulation.
- (3) U-Value and effective R value shall include entire exposed floor or above grade wall assembly components, from interior air film to exterior air film.
- (4) U-Value and effective R value shall include entire *basement* wall or slab assembly components and interior air film.
- (5) U-Value is the *overall coefficient of heat transfer* for a window assembly, sliding glass door assembly or skylight assembly expressed in Btu/(h·ft²·F).
- (6) In the case of *basement* wall assemblies, where R20 ci is required R12 + 10 ci is permitted to be used or vice versa; or where R1 2+ 5 ci is required, R15 ci is permitted to be used or vice versa.
- (7) Nominal and effective R values are expressed in (h·ft²·F)/Btu. U-Values are expressed in Btu/(h·ft²·F).

3.1.1.12. Drain Water Heat Recovery

- (1) Except as provided in Sentence (2), a drain water heat recovery unit shall be installed in each *dwelling unit* to receive drain water from all showers or from at least two showers where there are two or more showers in the *dwelling unit*. (See Appendix A.)
- (2) Sentence (1) does not apply to *dwelling units* in which:
 - (a) there are no showers; or
 - (b) there are no storeys or crawl spaces beneath any of the showers in the *dwelling unit*.
- (3) Drain water heat recovery units shall conform to CSA B55.2, “Drain Water Heat Recovery Units”.
- (4) The minimum efficiency of a drain water heat recovery unit shall be determined in conformance with CSA B55.1, “Test Method for Measuring Efficiency and Pressure Loss of Drain Water Heat Recovery Units”.
- (5) The efficiency of a drain water heat recovery unit, when tested in accordance with Sentence (4), shall be not less than 42%.
- (6) A drain water heat recovery unit shall be installed
 - (a) in an upright position that does not diverge more than 5 degrees from the vertical,
 - (b) in a position such that the cold water inlet connection is at the bottom of the unit,
 - (c) downstream of a water softener where a water softener is installed, and
 - (d) in a *conditioned space* or on the warm side of the dewpoint of the wall assembly.

3.1.2. Performance Compliance

3.1.2.1. Required Performance Level (See Appendix A.)

- (1) The performance level shall be measured based on the simulated annual energy use of the *building*.
- (2) For the purpose of this Subsection, reference *building* means a *building* that is identical to the proposed *building*, except that it is designed to meet the requirements and performance level of an applicable compliance package in Subsection 3.1.1. on the basis of
 - (a) zone location,
 - (b) energy source, and
 - (c) equipment efficiency.
- (3) The simulated annual energy use of the proposed *building* shall not be greater than the simulated annual energy use of the reference *building*.
- (4) The simulated annual energy use of the proposed *building* and the reference *building* shall be calculated in accordance with Table 3.1.2.1.
- (5) For the purpose of calculations required in Sentence (4),
 - (a) the simulation software used shall be a recognized annual energy use simulation software,
 - (b) the climatic data used shall be the local climatic data,
 - (c) the equivalent domestic water loads, appliance loads and other plug-in loads shall be assumed for both the proposed *building* and the reference *building*, and
 - (d) the same software and climatic conditions shall be used for both the proposed *building* and the reference *buildings*.
- (6) Where the overall thermal performance of the proposed *building* envelope is less than the envelope performance of the compliance package that is compared against it, the reduction in the performance level of the *building* envelope shall not be more than 25%.
- (7) The annual energy use simulation of the reference *building* shall be in accordance with Subsection 3.1.1. of this Supplementary Standard, Part 12 and other applicable parts of the *Building Code*.

Table 3.1.2.1.
Specification for the Reference and Proposed Building Design
 Forming Part of Sentence 3.1.2.1.(4)

Building Component	Reference Building Design	Proposed Building Design
<i>Building Envelope</i>	<p>Dimensions and orientation: same as proposed design.</p> <p><i>Fenestration</i> to wall ratio: same as proposed up to 22%, (where $17% < \text{ratio} \leq 22%$, U-Value is required to be upgraded as per 3.1.1.1. (8)) where the proposed <i>fenestration</i> to wall ratio exceeds 22%, the <i>fenestration</i> area of the reference <i>building</i> shall be reduced proportionally along each exposure until the 22% is met.</p> <p>RSI Values or U-Values and ER values: as per applicable compliance package required in section 3.1.1.</p>	As proposed (See Sentences 3.1.2.1.(5) to (8)).
Construction Type	<p>Above Grade:</p> <p>Wood Frame spacing: 406 mm o.c. for wall studs, 406 mm o.c. for exposed floors joists, roof joists, and roof rafters, and 610 mm o.c. for roof trusses.</p> <p>Below grade: Concrete with interior insulation.</p>	As proposed.
Air Leakage Rate	<p>Detached dwelling: 3.0 ach, NLA 2.12cm²/m², or NLR 1.32 l/s/m²</p> <p>Attached dwellings: 3.5 ach, NLA 2.27 cm²/m², or NLR 1.44 L/s/m²</p> <p>(See Appendix A).</p>	Same as reference, or tested air leakage rate, that is measured in accordance with Sentence 3.1.1.4.(2).
On-site Renewable Energy	None. ⁽¹⁾	As proposed.
Ventilation	HRV operating continuously at principle exhaust flow rate and with SRE as per applicable compliance package required in Section 3.1.1.	As proposed.
Drain Water Heat Recovery	Drain water heat recovery units as per Article 3.1.1.12.	As proposed.
Heating System and Service Water Heating	<p>Fuel or energy type: Same as proposed⁽²⁾</p> <p>Equipment: Furnace and water tank.</p> <p>Efficiency: As per applicable compliance package required in Section 3.1.1. Where it is not specified, as per applicable provincial regulations.</p>	As proposed.
Plumbing	Complies with Part 7 of the <i>Building Code</i> .	As proposed but must comply with Part 7 of the <i>Building Code</i> or exceed.
Cooling System, if proposed ⁽³⁾	<p>Energy type: Electric.</p> <p>Equipment: Same as proposed.</p> <p>Efficiency: As per applicable provincial regulations.</p>	As proposed.

Building Component	Reference Building Design	Proposed Building Design
Operating Conditions / Default Values	Except as indicated in this Subsection and the <i>Building Code</i> , for the purpose of annual energy use simulations, the same operating conditions and default values shall be used for the reference <i>building</i> and the proposed <i>building</i> . ⁽⁴⁾	
All Components, Inputs for assemblies, workmanship, etc.	For both the reference <i>building</i> and the proposed <i>building</i> , input methodologies shall be the same and consistent with each other, e.g. use <ul style="list-style-type: none"> • Either user defined or build-up inputs for <i>building</i> envelope assemblies, • The same insulation installation quality; and • The same air tightness for the ductwork. 	
Internal gains, electrical loads, other components and characteristics that are not described in this Subsection and Subsection 3.1.1.	The same values or systems shall be used for both the reference <i>building</i> and the proposed <i>building</i> .	
Column 1	2	

Notes to Table 3.1.2.1.:

- (1) Except where principle heating fuel is wood or wood products.
- (2) For the purpose of annual energy use simulations, where an air or water source heat pump, or an earth energy system is proposed, the fuel or energy source of the reference *building* system is permitted to be the same as the supplementary (back up) energy source of the proposed heat pump system.
- (3) Where cooling is proposed, annual energy use simulations shall include cooling system.
- (4) Operating conditions consistent with Section 4.6 of NRCan's EnerGuide Rating System Version 15.2 may be used.

3.1.3. Other Acceptable Compliance Methods

3.1.3.1. Other Acceptable Compliance Methods (See Appendix A.)

- (1) A *building* shall be deemed to be in compliance with the requirements of Subsection 3.1.1.
 - (a) Provided that the same performance level is achieved through the technical requirements of NRCan, "Energy Star for New Homes Standard Version 12.6. or,
 - (b) The *building* meets the NRCan, "2012 R2000 Standard."

Appendix A

Explanatory Material for SB-12

Chapter 1: General

1.3.2.1.(2) Defined Terms

Effective RSI Value and U-Value Calculations

Effective RSI values and U values are to be calculated in accordance with good practice. Some sample effective R value *calculations* are provided below. *Overall thermal transmittance* (U values) can be calculated by taking the inverse of the effective R value ($U=1/(\text{effective RSI value})$)

Information on the calculation of effective thermal resistance of opaque assemblies can also be found at the following NRCAN website <http://www.nrcan.gc.ca/energy/efficiency/housing/new-homes/energy-star/14176> . The combined values for the stud and cavity insulation components used below are taken from the same website. Further details can be found under "Tables for Calculating Effective Thermal Resistance of Opaque Assemblies."

Sample effective RSI values:

Ceiling with Attic Space - RSI Nominal 8.80	
Details	Effective RSI
Roof sheathing (above vented air space, therefore excluded from calculation)	0
Vented air space	0.03
RSI 6.69 (R38) nominal of blown in cellulose	6.69
Roof truss bottom chord dimensional lumber - 38 mm x 89 mm (2"x4"), 610 mm (24") on-centre, RSI 2.11 (R12) nominal cavity fill between bottom chords	1.76
Poly vapour retarder (negligible contribution to effective thermal resistance)	0
12.7 mm gypsum board	0.08
Air film interior, ceiling	0.11
Total	8.67

Above Grade Wall - RSI Nominal 3.87 + 0.88 ci (vinyl)	
Details	Effective RSI
Air film exterior	0.03
Exterior Finish* - Siding - vinyl, hollow-backed	0.11
R5 (RSI 0.88) XPS sheathing	0.88
Stud dimensional lumber – 38 mm x 140 mm (2"x6") 406 mm (16") on-centre RSI 3.87 (R22) nominal cavity fill between studs	2.55
Poly vapour retarder (negligible contribution to effective thermal resistance)	0
12.7 mm gypsum board	0.08
Air film interior	0.12
Total	3.77

* Where exterior finish is brick, brick and air gap values are permitted to be substituted for siding.

Basement Wall* - RSI Nominal 3.52 ci	
Details	Effective RSI
Concrete foundation wall, 200 mm	0.08
R3.52 (R20) blanket	3.52
Air film interior	0.12
Total	3.72

* Where the basement is finished or drywall installed, drywall and other components that contribute to *effective RSI value* will be added.

Below Grade Slab - RSI Nominal 1.76	
Details	Effective RSI
Air film interior	0.16
Concrete slab, 100 mm	0.04
R1.76 (R10) XPS	1.76
Total	1.96

Exposed Floor - RSI Nominal 5.46 (carpet)	
Details	Effective RSI
Air film exterior	0.03
12.7 mm gypsum board	0.08
Dimensional lumber joist - 38 mm x 235 mm (2"x 10"), 406 mm (16") on-centre, RSI 5.46 (R31) nominal cavity fill	4.46
Poly vapour retarder (negligible contribution to effective thermal resistance)	0
5/8 OSB	0.16
Carpet and underpad	0.36
Air film interior	0.16
Total	5.25

Continuous Insulation (ci)

Continuous insulation (ci) is intended to minimize the thermal bridges in an assembly. It is generally uninterrupted across all structural members. Exceptions to this include fasteners and service openings. Insulation may generally be installed on the interior or the exterior, or may be integral to any opaque surface of the *building* envelope. It may generally be made of various material such as board, blanket, sprayed or other types of insulation. Compressions such as blanket fasteners are permitted.

A-Table 1.4.1.2. National Fenestration Rating Council.

Name	Address	Contact
NFRC	National Fenestration Rating Council 6305 Ivy Lane, Suite 140 Greenbelt, MD 20770, USA	ph: 301-589-1776 fax: 301-589-3884 web site: www.nfrc.org
Column 1	2	3

Chapter 2: Acceptable Solutions for Achieving Energy Efficiency Compliance Before January 1, 2017.

A-2.1.1. Compliance Packages.

Individual components of compliance packages found in Tables 2.1.1.2.A, 2.1.1.2.B and 2.1.1.2.C and Tables 2.1.1.3.A, 2.1.1.3.B and 2.1.1.3.C are not permitted to be mixed with similar components of other compliance packages either found within the same Table or similar components of compliance packages found in other Tables.

A-2.1.1.1.(3) Mechanical Equipment.

Compliance package tables referred to in this Sentence contain energy efficiency requirements for some or all mechanical equipment. Where a compliance package includes an energy efficiency level for space heating equipment, domestic water heater or heat or energy recovery ventilator, conformance with the package can only be achieved if the *building* is equipped with the mechanical equipment specified in the compliance package.

A-2.1.1.1.(7), (8) and (10) Fenestration to Wall Ratio.

When the *fenestration* to wall ratio is calculated, all *fenestration* areas and the entire peripheral wall above grade is included. The peripheral wall area includes floor rim board areas and all above grade wall areas. It is essentially the sum of the above grade walls that separate conditioned spaces from unconditioned spaces, and adjacent units. In the case of an attached

garage, the walls that are common with the house and the garage are also included in the wall area calculations. For attached homes, the above grade portions of the walls that are common to other conditioned units are also included in the wall area. The *fenestration* area is based on the rough structural opening provided for windows, skylights, sliding glass doors, and for glazed portions in doors. For A-frame structures with steeply inclined roofs that also act as walls, the roof portion that serves as the interior wall area can be considered as the wall area in calculating the *fenestration* to wall ratio.

A-2.1.1.2.(6)(a), (8)(a), and (9)(a) RSI Reduction of Above Grade Walls in Conjunction with Upgrading U-Value of Glazing Zone 1.

Where the above grade wall insulation is permitted to be reduced to RSI 3.52, one of the required compensating measures is to upgrade the window U-Value in accordance with Clauses 2.1.1.1.(8)(a) to (c). This upgrade is independent of the glazing upgrade that may be required due to a *fenestration* ratio that is higher than 17%. In cases where the above grade insulation is reduced to RSI 3.52 and compensated for with a *fenestration* upgrade, and the *building* has more than 17% *fenestration*, the glazing would be required to be upgraded a second time.

A-2.1.1.3.(6)(a) and (7)(a) RSI Reduction of Above Grade Walls in Conjunction with Upgrading U-Value of Glazing - Zone 2.

Where the above grade wall insulation is permitted to be reduced to RSI 3.52, one of the required compensating measures is to upgrade the window U-Value in accordance with Clauses 2.1.1.1.(8)(a) to (c). This upgrade is independent of the glazing upgrade that may be required due to a *fenestration* ratio that is higher than 17%. In cases where the above grade insulation is reduced to RSI 3.52 and compensated for with a *fenestration* upgrade, and the *building* has more than 17% *fenestration*, the glazing would be required to be upgraded a second time.

A-2.1.1.6.(1) Permitted Basement Insulation Gap.

The provision refers to the gap between basement insulation and the floor level that might be left at the bottom of a foundation wall. Insulation can be extended from the underside of the subfloor to the floor level of the basement, or a gap may be left provided that the gap is not more than 200 mm when measured from floor level to where the insulation is terminated.

A-2.1.1.6.(5) and (6) Slab Insulation.

Except heated slabs and except where specifically required in a compliance package, the entire surface of the slab is only required to be insulated when the entire concrete slab is located completely within 600 mm of the exterior ground level. A typical example would be a slab on ground construction without a basement. If a slab is located partially at the exterior ground level (i.e. a walkout basement) or partially within 600 mm of the exterior surface, then only those sections are required to be insulated with perimeter insulation. The perimeter insulation could be horizontal or vertical. If the entire surface of the slab is insulated, or the perimeter insulation is horizontal, in both cases vertical insulation would not be mandatory.

Where a slab of a house is completely or partially within 600 mm of the exterior ground level, either the entire surface of the slab or the perimeter of the slab is required to be insulated but not at both locations.

A-2.1.1.10.(1) Additions to Existing Houses.

In Clause 2.1.1.10.(1)(a), the design and *construction* of an addition to an existing house can conform to the minimum *building* envelope and mechanical equipment requirements where an applicable compliance package is selected from Article 2.1.1.2. or 2.1.1.3.

Alternatively, Clause 2.1.1.10.(1)(b) provides a simpler approach and permits an addition to an existing *building* to comply with the appropriate column in Table 2.1.1.10. since the design and *construction* of an existing *building* is unlikely to be determined and matched against an applicable compliance package from Article 2.1.1.2. or 2.1.1.3. However, the addition is required to comply with Sentences 2.1.1.1.(7) to (10). Glazing upgrade of the addition is required if it falls within the scope of Sentence 2.1.1.1.(8). Table 2.1.1.10. further exempts both an addition and an existing *building* from conforming to minimum efficiency requirements for HRV's, domestic water heaters and space heating equipment required in Article 2.1.1.2. or 2.1.1.3. This would permit existing mechanical equipment to serve the entire *building* provided that it has the necessary capacity.

A-2.1.1.10.(2) Treatment of Additions.

Where the *fenestration* to wall ratio of an addition is calculated or the annual energy use of an addition is modeled for the purpose of demonstrating compliance, calculations can be done for only the addition or the for entire house including the existing part of the house. Regardless, the thermal characteristics of the existing *building*, existing window and wall areas can be used in the *fenestration* ratio calculations. Similarly, in the case of modeling, existing *building* components that have not been altered can be used as they are for the reference house and for the proposed design.

A-2.1.1.10.(3) Sunroom Additions to Existing Houses.

A sunroom addition to an existing house referred in this Sentence applies to a one-storey structure built substantially with wall/roof *fenestration* and glass doors but which sometimes contain unglazed low wall panels that support wall glazing above it. Since the glazing percentage of sunrooms exceeds the limits permitted for compliance packages in Articles 2.1.1.2. and 2.1.1.3. and performance compliance methods may not be possible, these sunrooms are exempt from compliance package requirements, provided that the thermal performance of the glazing is enhanced further than what is required for non-sunroom additions.

The maximum U-Values for doors, sliding glass doors, wall glazing and supporting wall panels for sunroom additions in Clause 2.1.1.10.(3)(a) have been derived from the maximum U-Values for window and sliding glass doors in additions to existing *buildings* in Table 2.1.1.10. and then upgraded in accordance with Sentence 2.1.1.1.(8).

The maximum U-Value of 2.6 for roofs and skylights for sunroom additions in Clause 2.1.1.10.(3)(b) has been derived from upgrading the maximum U-Value of 2.8 for skylights in additions to existing *buildings* in Table 2.1.1.10. consistent with the methodology used in Sentence 2.1.1.1.(8).

A-2.1.1.11.(4)(a) Drain Water Heat Recovery Units for Showers.

For the purpose of the prescriptive trade off provisions in Subsection 2.1.1., the term “all showers” includes the case where there is only one shower in a dwelling unit. If there is only one shower, that shower is required to be connected to a drain water heat recovery unit. Where there are two or more showers, drain water from at least two showers are required to be connected to a single drain water heat recovery unit or to two individual drain water heat recovery units.

A-2.1.2.1. Application of Performance Compliance Path.

This Article requires two annual energy use simulations. These simulations compare the simulated annual energy use of the proposed *building* with the simulated annual energy use of an applicable compliance package. The simulated annual energy use of the proposed *building* cannot exceed the simulated annual energy use of an applicable compliance package.

Where a performance compliance path is selected, it is the intent of Sentence 2.1.2.1.(2) that the performance level of the compliance package takes into account the requirements listed in Subsection 2.1.1. that are applicable to that compliance package. Similarly, the annual energy use calculation for a compliance package referenced in Clause 2.1.2.1.(3)(b) shall take into account the requirements listed in Subsection 2.1.1. that are applicable to that compliance package.

For the purpose of calculating the annual energy use of a proposed design and a design based on a selected compliance package, the following software may be used:

- HOT2000 version 9.34c or later versions
- Other software referenced by the EnerGuide Rating System
- Passive house software such as
 - WUFI Passive
 - Passive House Planning Package
- RESNET accredited Home Energy Rating System (HERS) software, such as:
 - OptiMiser
 - EnergyGauge
 - EnergyInsights
 - REM/Rate

A-2.1.3.1. Other Acceptable Compliance Methods.

Compliance with the technical requirements of the Energy Star Program may be achieved using either the prescriptive path or the performance path required by NRCan, “Energy Star for New Homes: Technical Specifications – Ontario”.

Clause 2.1.1.1 of NRCan, “Energy Star for New Homes: Technical Specifications – Ontario” allows the designer to use an NRCan-approved compliance option described in NRCan, “Energy Star for New Homes: Compliance Options” (Ontario).

Only the technical provisions contained in NRCan, “Energy Star for New Homes: Technical Specifications – Ontario” and other Energy Star documents it references are mandatory under this Supplementary Standard. However, in addition to the technical requirements, the administrative requirements of the Energy Star documents may be used to demonstrate compliance with Sentence 2.1.3.1.(1) by obtaining an Energy Star label for the *building*.

Chapter 3: Acceptable Solutions for Achieving Energy Efficiency Compliance After December 31, 2016.

A-3.1.1. Compliance Packages.

Individual components of compliance packages found in Tables 3.1.1.2.A to 3.1.1.2.C and Tables 3.1.1.3.A to 3.1.1.3.C are not permitted to be mixed with similar components of other compliance packages either found within the same Table or similar components of compliance packages found in other Tables.

A-3.1.1.1.(3) Mechanical Equipment.

Compliance package tables referred to in this Sentence contain energy efficiency requirements for some or all mechanical equipment. Where a compliance package includes an energy efficiency level for space heating equipment, domestic water heater or heat or energy recovery ventilator, conformance with the package can only be achieved if the *building* is equipped with the mechanical equipment specified in the compliance package.

A-3.1.1.1.(7), (8) and (9) Fenestration to Wall Ratio.

When the *fenestration* to wall ratio is calculated, all *fenestration* areas and the entire peripheral wall above grade is included. The peripheral wall area includes floor rim board areas and all above grade wall areas. It is essentially the sum of the above grade walls that separate conditioned spaces from unconditioned spaces, and adjacent units. In the case of an attached garage, the walls that are common with the house and the garage are also included in the wall area calculations. For attached homes, the above grade portions of the walls that are common to other conditioned units are also included in the wall area. The *fenestration* area is based on the rough structural opening provided for windows, skylights, sliding glass doors, and for glazed portions in doors. For A-frame structures with steeply inclined roofs that also act as walls, the roof portion that serves as the interior wall area can be considered as the wall area in calculating the *fenestration* to wall ratio.

Where the window performance needs to be upgraded in accordance with Sentence 3.1.1.1.(8), upgrading can be done based on ER values in conjunction with Table 3.1.1.9.

A-3.1.1.1. (16) Heat or Energy Recovery Ventilators

Heat or energy recovery ventilators are required regardless of the type of heating system and not restricted to forced air heating systems only.

A-3.1.1.2. (5) and (6) ICF Walls

The use of ICF walls are not limited to the packages identified in these Sentences. Where U value or *effective RSI value* of a ICF wall assembly is the same or better than the U value or *effective RSI value* required for a wall assembly in any of the Tables, the ICF wall can be used in lieu of that assembly.

A-3.1.1.3. (5) and (6) ICF Walls

The use of ICF walls are not limited to the packages identified in these Sentences. Where U value or *effective RSI value* of a ICF wall assembly is the same or better than the U value or *effective RSI value* required for a wall assembly in any of the Tables, the ICF wall can be used in lieu of that assembly.

A-3.1.1.4. Airtightness

This provision is a voluntary provision. It only applies if credit for airtightness is claimed. Credit for air tightness allows the designer to substitute the requirements of compliance packages as set out in Table 3.1.1.4.B or 3.1.1.4.C. Neither the air leakage test nor compliance with airtightness targets given in Table 3.1.1.4.A are required, unless credit for airtightness is claimed. Table 3.1.1.4.A provides airtightness targets in three different metrics; ACH, NLA, NLR. Where credit for substitution is claimed, any one of these metrics can be used; the *building* need not meet all targets in different metrics.

A-3.1.1.7.(1) Permitted Basement Insulation Gap.

The provision refers to the gap between basement insulation and the floor level that might be left at the bottom of a foundation wall. Insulation can be extended from the underside of the subfloor to the floor level of the basement, or a gap may be left provided that the gap is not more than 200 mm when measured from floor level to where the insulation is terminated.

A-3.1.1.7.(5) and (6) Slab Insulation.

Except heated slabs and except where specifically required in a compliance package, the entire surface of the slab is only required to be insulated when the entire concrete slab is located completely within 600 mm of the exterior ground level. A typical example would be a slab on ground construction without a basement. If a slab is located partially at the exterior ground level (i.e. a walkout basement) or partially within 600 mm of the exterior surface, then only those sections are required to be insulated with perimeter insulation. The perimeter insulation could be horizontal or vertical. If the entire surface of the slab is insulated, or the perimeter insulation is horizontal, in both cases vertical insulation would not be mandatory.

A-3.1.1.11.(1) Additions to Existing Houses.

In Clause 3.1.1.11.(1)(a), the design and *construction* of an addition to an existing house can conform to the minimum *building* envelope and mechanical equipment requirements where an applicable compliance package is selected from Article 3.1.1.2. or 3.1.1.3.

Alternatively, Clause 3.1.1.11.(1)(b) provides a simpler approach and permits an addition to an existing *building* to comply with the appropriate column in Table 3.1.1.11. since the design and *construction* of an existing *building* is unlikely to be determined and matched against an applicable compliance package from Article 3.1.1.2. or 3.1.1.3. However, the addition is required to comply with Sentences 3.1.1.1.(7) to (10). Glazing upgrade of the addition is required if it falls within the scope of Sentence 3.1.1.1.(8). Table 3.1.1.11. further exempts both an addition and an existing *building* from conforming to minimum efficiency requirements for HRV's, domestic water heaters and space heating equipment required in Article 3.1.1.2. or 3.1.1.3. This would permit existing mechanical equipment to serve the entire *building* provided that it has the necessary capacity.

A-3.1.1.11.(2) Treatment of Additions.

Where the *fenestration* to wall ratio of an addition is calculated or the annual energy use of an addition is modeled for the purpose of demonstrating compliance, calculations can be done for only the addition or the for entire house including the existing part of the house. Regardless, the thermal characteristics of the existing *building*, existing window and wall areas can be used in the *fenestration* ratio calculations. Similarly, in the case of modeling, existing *building* components that have not been altered can be used as they are for the reference house and for the proposed design.

A-3.1.1.11.(3) Sunroom Additions to Existing Houses.

A sunroom addition to an existing house referred in this Sentence applies to a one-storey structure built substantially with wall/roof *fenestration* and glass doors but which sometimes contain unglazed low wall panels that support wall glazing above it. Since the glazing percentage of sunrooms exceeds the limits permitted for compliance packages in Articles 3.1.1.2. and 3.1.1.3. and performance compliance methods may not be possible, these sunrooms are exempt from compliance package requirements, provided that the thermal performance of the glazing is enhanced further than what is required for non-sunroom additions.

The maximum U-Values for doors, sliding glass doors, wall glazing and supporting wall panels for sunroom additions in Clause 3.1.1.11.(3)(a) have been derived from the maximum U-Values for window and sliding glass doors in additions to existing *buildings* in Table 3.1.1.11. and then upgraded in accordance with Sentence 3.1.1.1.(8).

The maximum U-Value of 2.6 for roofs and skylights for sunroom additions in Clause 3.1.1.11.(3)(b) has been derived from upgrading the maximum U-Value of 2.8 for skylights in additions to existing *buildings* in Table 3.1.1.11. consistent with the methodology used in Sentence 3.1.1.1.(8).

A-3.1.1.12.(1) Shower Drainage Installation.

The term “all showers” includes the case where there is only one shower in a dwelling unit. If there is only one shower, that shower is required to be connected to a drain water heat recovery unit. Where there are two or more showers, drain water from at least two showers are required to be connected to a single drain water heat recovery unit or to two individual drain water heat recovery units.

A-3.1.2.1. Application of Performance Compliance Path.

This Article requires two annual energy use simulations. These simulations compare the simulated annual energy use of the proposed *building* with the simulated annual energy use of an applicable compliance package. The simulated annual energy use of the proposed *building* cannot exceed the simulated annual energy use of an applicable compliance package.

Where a performance compliance path is selected, it is the intent of Sentence 3.1.2.1.(2) that the performance level of the compliance package takes into account the requirements listed in Subsection 3.1.1. that are applicable to that compliance package. Similarly, the annual energy use calculation for a compliance package referenced in Sentence 3.1.2.1.(3) shall take into account the requirements listed in Subsection 3.1.1. that are applicable to that compliance package. In addition to Subsection 3.1.2, the proposed *building* is still required to meet Part 12 and other applicable parts of the code.

The air leakage rates in Table 3.1.2.1. are not requirements. The Table is not intended to require or suggest that the *building* meet those airtightness targets. They are provided only as default or reference values for the purpose of annual energy simulations, should the builder/owner decide to perform such simulations. They are given in three different metrics; ACH, NLA, NLR. Any of them can be used. They can be used as a default values for both a reference and proposed *building* or, where an air leakage test is conducted and credit for airtightness is claimed, the airtightness values in Table 3.1.2.1. can be used for the reference *building* and the actual leakage rates obtained from the air leakage test can be used as inputs for the proposed *building*.

Annual Energy Use Software: For the purpose of calculating the annual energy use of a proposed design and a design based on a selected compliance package, the following software may be used:

- HOT2000 version 10.51 or later versions
- other software referenced by the EnerGuide Rating System
- Passive house software such as
 - WUFI Passive
 - Passive House Planning Package
- RESNET accredited Home Energy Rating System (HERS) software, such as:
 - ICF International Beacon Residential Version 2-80-3
 - Ekotrope, HERS Module v2.0
 - EnergyGauge® USA Version 5.0
 - REM/Rate v14.6.2

Operating Conditions:

The following operation conditions may be used:

(Courtesy of NRCan- Section 4.6 of NRCan's EnerGuide Rating System Version 15.2)

4.6. Operating conditions

4.6.1. General

The EnerGuide Rating System applies two sets of operating conditions to provide EnerGuide Rating System services: standard operating conditions and household operating conditions.

Standard operating conditions are used as the basis for the calculation of the EnerGuide rating in order to provide an estimate of the home's energy performance independent of occupant behaviour. Houses that reach a zero rating have access to reduced operating conditions for their rating calculations.

Optionally provided by homeowners, household operating conditions are intended to provide customized operating conditions in order to generate an estimated annual energy use based on actual occupancy.

The rated annual energy consumption of a house is based on a number of standard assumptions as specified in **section 4.6.3**.

4.6.2. Standard operating conditions

4.6.2.1. Number of occupants

The EnerGuide rating is calculated assuming an occupant load of two adults and one child at home 50% of the time.

4.6.2.2. Temperature set points for space heating and cooling

The EnerGuide rating is calculated assuming standard thermostat settings (set points) for space heating and cooling as per **Table 2**.

Table 2 - Temperature set points

Area of house	Type of set point	Temperature
Main and upper floors	heating daytime (16 hours)	21 °C (70 °F)
	heating nighttime (8 hours)	18 °C (64 °F)
	cooling	25 °C (77 °F) if air conditioning present
Basement / walkout	heating	19 °C (66 °F)
	cooling	25 °C (77 °F) if air conditioning ducted to basement
Heated crawl space	heating	15 °C (59 °F)

NOTES:

- 1) A constant weighted average of 20 degrees Celsius is used to simulate the effect of the heating setback temperature.
- 2) Air conditioning can include heat pump space cooling systems.
- 3) If air conditioning is not ducted to the basement, the approved compliance software will allow the basement temperature to vary.

4.6.2.3. Hot water load

The EnerGuide rating is calculated assuming that the occupants collectively use approximately 190 litres (50 U.S. gal.) of hot water per day (for showers, clothes washing, dishwashing and faucets) and that the water is heated to 55 °C (131°F). Shower temperature is held constant at 41 °C (106 °F) leading to some variability in the shower hot water load due to variations in regional cold water inlet temperatures. The shower hot water load ranges from 89 L/day (24 U.S. gal./day) in the warmest region to 100 L/day (26 U.S. gal./day) in the coldest. The 97 L/day (26 U.S. gal./day) of hot water usage applied to activities other than showering is constant across all weather locations. In total, the hot water usage will range from 178 L/day (47 U.S. gal./day) to 199 L/day (53 U.S. gal./day).

4.6.2.4. Electrical base loads

The EnerGuide rating is calculated assuming that a standard amount of electricity (electrical base loads) is used as defined in **Table 3** and **Table 4**.

It is always assumed that the house has an electric range and electric clothes dryer. It is also assumed that the clothes dryer exhausts to the outside and operates at a flow rate of 38 L/s (158 cfm), 45 minutes a day, 365 days per year.

Table 3 - Standard electrical base loads

Electrical load	Standard value (kWh/day)
Interior lighting	2.6
Appliances (refer to Table 4)	6.3
Other electrical	9.7
Exterior use (exterior lighting and miscellaneous outdoor use)	0.9
Daily total	19.5
Annual total	25.6 GJ/year
Electrical load	Standard value (kWh/day)

Table 4 - Standard appliance loads

Appliance	Standard value (kWh/yr)
Refrigerator	639
Electric range	565
Clothes washer	148
Dishwasher	260
Clothes dryer	687
Annual total for above 5 appliances	2299
Daily total for above 5 appliances	6.3 kWh/day

1) Standard appliance ratings assume four occupants while the EnerGuide Rating System for homes assumes three occupants. Therefore, the loads for clothes washers and clothes dryers have been reduced by 25% to remain consistent with the rating system standard operating conditions.

2) Freezer and microwave electrical consumptions are included in the "Other electrical" category.

4.6.2.5. Reduced operating conditions for zero-rated homes

For homes with superior energy performance, there is provision for reducing some of the standard operating conditions. These reduced operating conditions are considered to be a variation of the standard operating conditions. To be eligible for these reductions, the builder or homeowner must provide the energy advisor with proof that the required conditions, as specified below, are met and the EnerGuide rating for the house must be zero when modelled with the reduced values.

a) Allowable hot water reductions

Zero-rated homes may reduce their hot water load by the specified amount for each of the conditions they meet in **Table 5**. The four categories may be applied on an individual basis.

Table 5 - Allowable hot water reductions for zero-rated homes

Category	Specification	Approximate reduction L/day (U.S. gal/day)
Low-flow showerheads	7.6 L/min (2.0 US gpm) or less	19 (5.0)
Low-flow bathroom faucets	5.7 L/min (1.5 US gpm) or less	10 (2.6)
Clothes washer	ENERGY STAR certified	18 (4.8)
Dishwasher	ENERGY STAR certified	3 (0.8)
Approximate total potential reduction		50 (13.2)

NOTE: Showerhead water reductions are calculated by the approved compliance software based on incoming water temperature, flow rate and a shower length of seven minutes. Therefore, the 19 L/day (5.0 U.S. gal/day) for showerheads and the total potential reduction are approximate numbers.

b) Allowable electrical base loads reductions

Zero-rated homes may reduce their electrical base loads for interior lighting and appliances as detailed in **Table 6**. The “Other electrical” and “Exterior use” categories may not be reduced.

Table 6 - Allowable electrical base loads for zero-rated homes

Category	Conditions	Allowable reduced base load
Interior Lighting	25% to 75% of fixtures with compact fluorescent light bulbs or light emitting diodes	1.6 kWh/day
	> 75% of fixtures with compact fluorescent light bulbs or light emitting diodes	0.6 kWh/day
Appliances	<p>The actual EnerGuide appliance rating must be lower than the following standard values:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Refrigerator: 639 kWh/yr <input type="checkbox"/> Electric range: 565 kWh/yr <input type="checkbox"/> Dishwasher: 260 kWh/yr <input type="checkbox"/> Clothes washer: 197 kWh/yr <input type="checkbox"/> Clothes dryer: 916 kWh/yr 	<p>Use the actual EnerGuide appliance rating</p> <p>If an appliance is not present, default values must be used</p>

NOTE: Gas appliances will not be considered as a reduction to electrical base loads.

A-3.1.3.1. Other Acceptable Compliance Methods.

Compliance with this Supplementary Standard may be achieved using either the prescriptive path or the performance path required by NRCan, “Energy Star for New Homes Standard Version 12.6”, provided that the same performance level is achieved through its technical requirements. Compliance with the technical requirements of NRCan, “2012 R-2000 Standard” also achieves compliance with this Supplementary Standard.

Only the technical provisions contained in NRCan, “2012 R-2000 Standard” or NRCan, “Energy Star for New Homes Standard Version 12.6” and other Energy Star documents it references are mandatory under this Supplementary Standard. However, in addition to the technical requirements, the administrative requirements of the Energy Star or R-2000 documents may be used to demonstrate compliance with Sentence 3.1.3.1.(1) by obtaining an Energy Star or R-2000 label for the *building*.