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					
		A1	A2	A3	A4	A5	A6
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	0.80	0.70	0.67	0.67	0.80	0.80
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/(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 3.1.1.2.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					
		A1	A2	A3	A4	A5	A6
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	0.80	0.70	0.67	0.67	0.80	0.80
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% ≤ AFUE < 92%
Forming Part of Sentence 3.1.1.2.(2)

Component	Thermal Values[8]	Compliance Package					
		B1	B2	B3	B4	B5	B6
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/(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 3.1.1.2.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[8]	Compliance Package					
		B1	B2	B3	B4	B5	B6
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[5]	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			
		C1	C2	C3	C4
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/(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).

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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			
		C1	C2	C3	C4
Ceiling with Attic Space	Min. Nominal R[1]	60 + HH	60 + HH	50	50
	Max. U[2]	0.016	0.016	0.020	0.020
	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	35
	Max. U[3]	0.034	0.034	0.031	0.031
	Min. Effective R[3]	29.80	29.80	32.02	32.02
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					
		A1	A2	A3	A4	A5	A6
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	0.70	0.80	0.80	0.67	0.67	0.70
Column 1	2	3	4	5	6	7	8

Notes to Table 3.1.1.3.A (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/(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[8]	Compliance Package					
		A1	A2	A3	A4	A5	A6
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	59.90	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 + 5 ci	19 + 10 ci	22 + 5 ci	22 + 7.5 ci	19 + 10 ci	22 + 7.5 ci
	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]	20 ci	20 ci	20 ci	20 ci	20 ci	20 ci
	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	0.70	0.80	0.80	0.67	0.67	0.70
Column 1	2	3	4	5	6	7	8

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Notes to Table 3.1.1.3.A (IP):

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

Component	Thermal Values[8]	Compliance Package					
		B1	B2	B3	B4	B5	B6
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 + 1.76 ci	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[5]	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 (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/(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.B (IP)
ZONE 2 - Compliance Packages for Space Heating Equipment with 84% ≤ AFUE < 92%
Forming Part of Sentence 3.1.1.3.(2)

Component	Thermal Values[8]	Compliance Package					
		B1	B2	B3	B4	B5	B6
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 + 10 ci	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	22 + 10 ci	22 + 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

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Notes to Table 3.1.1.3.B (IP):

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	
		C1	C2
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[5]	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 (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/(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.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	
		C1	C2
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 + 10 ci	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 (IP):

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.

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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	$in^2/100\ ft^2$	$L/s/m^2$	cfm/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)
Maximum One Substitution per *Dwelling Unit*	
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
Fenestration 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 (SI):
(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.

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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 Airtightness Complies with Table 3.1.1.4.A(1)
Maximum One Substitution per *Dwelling Unit*	
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
Fenestration 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 (IP):
(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.

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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 *Dwelling Unit*(2)	
Above grade continuous wall insulation RSI 1.32 ci or RSI 1.76 ci	Above grade continuous wall insulation RSI 0.88 ci or RSI 1.32 ci respectively
RSI 3.87 or RSI 4.22 insulation between studs in above grade walls with continuous insulation	RSI 3.34 or RSI 3.87 insulation respectively between studs in above grade walls with continuous insulation
Basement wall RSI 3.52 + 2.11 ci, RSI 3.52 +1.76 ci or RSI 3.52 ci	*Basement* wall RSI 2.64 ci or RSI 2.11 + 0.88 ci
Slab located more than 600 mm below grade and entire under slab insultation 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 (SI):
(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.

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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 *Dwelling Unit*(2)	
Above grade continuous wall insulation R7.5 ci or R10 ci	Above grade continuous wall insulation R5 ci or R7.5 ci respectively
R22 or R24 insulation between studs in above grade walls with continuous insulation	R19 or R22 insulation respectively between studs in above grade walls with continuous insulation
Basement wall R20 + 12 ci, R20 +10 ci or R20 ci	*Basement* wall R15 ci or R12 + 5 ci
Slab located more than 24 inches below grade and entire under slab insultation is R10 or R5	R0 , if the slab is unheated R5 min, if heated
R60 ceiling insulation with or without 10 inch high heel	R50 ceiling insulation
Column 1	2

Notes to Table 3.1.1.4.C (IP):
(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.

RSI 2.1 × 5.678 = 11.9 / R12
RSI 2.1 ÷ .1761 = 11.9 / R12

(2) The thermal resistance value in Sentence (1) for the total wall assembly may be reduced to not less than RSI 1.61 if, R9
(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.

ie R60 → R63

(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, 6"
(b) the thermal resistance of insulation for the exposed roof or ceiling required in selected compliance package is increased by RSI 0.53, and (R3)
(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.*

4 Air Barrier Systems

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
(a) 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
(b) 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
(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 need not meet Sentence (1) provided that it has the following
(a) double glazed with a low-E coating,
(b) inert gas-filled,
(c) have an insulated spacer, and
(d) 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 m^2.

(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, $W/m^2 \cdot K$ (Btu/h·ft²·°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 ER-29 Energy Rating
  (ii) 1.2 if the *building* uses *electric space heating*, and ER-34 Energy Rating
(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 R60	10.56	10.56
	Max. U[2]	0.096	0.096	0.096
provide insulat	Min. Effective RSI[2]	10.43	10.43	10.43
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. (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/(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) Nominal and *effective RSI values* are expressed in (m²•K)/W. U-Values are expressed in W/(m²•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 (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) 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 to 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*.

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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
Building Envelope	Dimensions and orientation: same as proposed design. *Fenestration* to wall ratio: same as proposed up to 22%, (where 17% < ratio ≤ 22%, U-Value is required to be upgraded as per 3.1.1.1.(8)) where the proposed *fenestration* to wall ratio exceeds 22%, the *fenestration* area of the reference *building* shall be reduced proportionally along each exposure until the 22% is met. RSI Values or U-Values and ER values: as per applicable compliance package required in Subsection 3.1.1.	As proposed (See Sentences 3.1.2.1.(5) to (8)).
Construction Type	Above Grade: 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. Below Grade: Concrete with interior insulation.	As proposed.
Air Leakage Rate	Detached dwelling: 3.0 ACH, NLA 2.12 cm^2/m^2, or NLR 1.32 $L/s/m^2$ Attached dwellings: 3.5 ACH, NLA 2.27 cm^2/m^2, or NLR 1.44 $L/s/m^2$ (See Appendix A).	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 Subsection 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	Fuel or energy type: Same as proposed(2) Equipment: Furnace and water tank. Efficiency: As per applicable compliance package required in Subsection 3.1.1. Where it is not specified, as per applicable provincial regulations.	As proposed.
Plumbing	Complies with Part 7 of the *Building Code*.	As proposed but must comply with Part 7 of the *Building Code* or exceed.
Cooling System, if proposed(3)	Energy type: Electric. Equipment: Same as proposed. Efficiency: As per applicable provincial regulations.	As proposed.
Column 1	2	3

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Table 3.1.2.1. (Cont'd)
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
Operating Conditions / Default Values	Except as indicated in this Subsection and the *Building Code*, for the purpose of annual energy use simulations, the same operating conditions and default values shall be used for the reference *building* and the proposed *building*.(4)	
All Components, Inputs for assemblies, workmanship, etc.	For both the reference *building* and the proposed *building*, input methodologies shall be the same and consistent with each other, e.g. use • Either user defined or build-up inputs for *building* 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 *building* and the proposed *building*.	
Column 1	2	3

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.

e4 (4) Operating conditions consistent with Section 4.6 of NRCan's EnerGuide Rating System Version 15.1 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/(*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:

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Ceiling with Attic Space - RSI Nominal 8.80	
Details	Effective RSI
Roof sheathing (above vented air space, therefore excluded from calculation)	0
Vented roof 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" x 4"), 610 mm (24") on-centre, RSI 2.11 (R12) nominal cavity fill between bottom chords	1.76
Polyethylene vapour retarder (negligible contribution to effective thermal resistance)	0
12.7 mm (1/2") gypsum board	0.08
Air film interior, ceiling	0.11
Total	8.67

e_4

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
RSI 0.88 (R5) XPS sheathing	0.88
Stud dimensional lumber – 38 mm x 140 mm (2" x 6") 406 mm (16") on-centre RSI 3.87 (R22) nominal cavity fill between studs	2.55
Polyethylene vapour retarder (negligible contribution to effective thermal resistance)	0
12.7 mm (1/2") 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.

e_4

Basement Wall* - RSI Nominal 3.52 ci	
Details	Effective RSI
Concrete foundation wall, 200 mm (8")	0.08
RSI 3.52 (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.

e_4

Below Grade Slab - RSI Nominal 1.76	
Details	Effective RSI
Air film interior	0.16
Concrete slab, 100 mm (4")	0.04
RSI 1.76 (R10) XPS sheathing	1.76
Total	1.96

e_4

Exposed Floor - RSI Nominal 5.46 (carpet)	
Details	Effective RSI
Air film exterior	0.03
12.7 mm (1/2") 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
Polyethylene vapour retarder (negligible contribution to effective thermal resistance)	0
15.5 mm (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 to Table 2:
(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**

Notes to Table 4:

(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 U.S. gpm) or less	19 (5.0)
Low-flow bathroom faucets	5.7 L/min (1.5 U.S. 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)**

Notes to Table 5:

(1) 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	The actual EnerGuide appliance rating must be lower than the following standard values: • Refrigerator: 639 kWh/yr • Electric range: 565 kWh/yr • Dishwasher: 260 kWh/yr • Clothes washer: 197 kWh/yr • Clothes dryer: 916 kWh/yr	Use the actual EnerGuide appliance rating If an appliance is not present, default values must be used

Notes to Table 6:

(1) 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*.