Section 10.2. Energy Efficiency

10.2.1. Energy Design Building Classification

10.2.1.1. Application

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

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

3) To meet the energy efficiency requirements of Articles 10.2.1.2. to 10.2.1.5., the design requirements of Subsection 10.2.2. shall form an integral part of this Subsection. Rev. 12692

4) For the purposes of Part 10 and the classification of applicable energy design requirements of a *building*, the application of these requirements are to be applied to a *building* or that portion of a *building*, which for the purposes of energy and emissions performance, is designed to function as an independent entity. (See Note A-10.2.1.1.(4).)

5) Except as permitted by Sentence (6), a balcony, including those that are enclosed, shall be designed and constructed as unconditioned ambient space, exterior to the *building* envelope, without the provision of heating, cooling, or gas connection.

6) A *building* with not more than 2 principle *dwelling units* may be provided with a gas connection serving a balcony that is not enclosed.

10.2.1.2. Buildings Without Residential or Commercial Components

1) All *buildings*, except those included in 10.2.1.3 through 10.2.1.5., Rev. 12692

a) shall be designed in compliance with (See Note A-10.2.1.2.(1)(a).)
   i) 10.2.2.2. or 10.2.2.3., or
   ii) 10.2.2.2. in a *building* required to be designed to Part 9 by Division A, 1.3.3.3.,
b) **[UTV Deleted],** Rev. 12692
c) **[UTV Deleted],**
d) **[UTV Deleted],**
e) shall be provided with vestibules in compliance with Article 10.2.2.8.,
f) shall be provided with metering equipment in compliance with Article 10.2.2.9,
g) shall be provided with lighting in conformance with Article 10.2.2.10.,
h) **[UTV Deleted],** Rev. 12692
i) shall comply with Article 10.2.2.15. where gas-fired fire places are provided, and
j) may provide exterior heated spaces in compliance with Article 10.2.2.22.

10.2.1.3. Residential Buildings of 4 Storeys or More, and Commercial Buildings (Including Hotels and Motels)

Rev. 12692

1) All *buildings* containing Group C, D, or E *Major Occupancies*, except those included in Articles 10.2.1.4. through 10.2.1.6.,

a) shall be designed in compliance with energy and emissions performance per Article 10.2.2.5,
b) **[UTV Deleted],** Rev. 12692
c) **[UTV Deleted],**
d) **[UTV Deleted],**
e) shall be provided with vestibules in compliance with Article 10.2.2.8.,
f) shall be provided with metering equipment in compliance with Article 10.2.2.9,
g) shall be provided with lighting in compliance with Article 10.2.2.10.,
h) **[UTV Deleted],** Rev. 12692
i) shall comply with Article 10.2.2.15., where domestic gas-fired fireplaces are provided,
j) shall provide airtightness testing in compliance with Article 10.2.2.21, and
k) may provide exterior heated spaces in compliance with Article 10.2.2.22.

10.2.1.4. [UTV Deleted]

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10.2.1.5. Residential Buildings of 1 to 3 Storeys and Houses (excluding Hotels/Motels)

Rev. 12692

1) A *building* shall comply with the requirements of Sentence (2), where it

a) is entirely of Group C *major occupancy* except subsidiary *occupancies*,

i) less than 4 *storeys* in *building height*, or

ii) containing not more than 2 principal *dwelling units* and their subsidiary structures with conditioned space, and

b) does not include a Hotel or Motel use.

(See Note A-10.2.1.5.(1)(a)(ii))

2) A *building* conforming with the criteria of Sentence (1),

a) shall be designed in compliance with

i) the energy and emissions performance of Article 10.2.2.5. and Sentences 10.2.2.15.(1) through (4) where domestic gas-fired fireplaces are provided, or

ii) Article 10.2.2.15. where domestic gas-fired fireplaces are provided.

b) shall be designed with thermal performance in compliance with Article 10.2.2.6.,

c) shall be designed with exterior closures and fenestration with thermal performance in compliance with Article 10.2.2.7.,

d) except for residential *buildings* with not more than 2 principal *dwelling units*, shall be provided with vestibules in compliance with Article 10.2.2.8.,

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

f) shall be provided with lighting in compliance with Article 10.2.2.10.,

g) shall comply with Articles 10.2.2.11. through 10.2.2.13. where domestic boilers generate space heating or hot water,

h) shall comply with Article 10.2.2.14. where domestic heat pumps, furnaces, or make-up air units are provided,

i) shall comply with Article 10.2.2.16. where domestic wood fireplaces are provided,

j) shall be provided with heat recovery ventilators in compliance with Article 10.2.2.17.,

k) **[UTV Deleted]**,

l) shall provide documentation in compliance with Article 10.2.2.20.,

m) shall provide airtightness testing in compliance with Article 10.2.2.21.,

n) except for residential *buildings* with not more than 2 principal *dwelling units*, may provide exterior heated spaces in compliance with Article 10.2.2.22.".

10.2.1.6. [UTV Deleted]

Rev. 12692

10.2.2. Design Measures for Energy Efficiency

10.2.2.1. Application

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

10.2.2.2. ANSI/ASHRAE/IESNA 90.1

1) A *building* designed in accordance with this Article shall, be designed and constructed in accordance with ANSI/ASHRAE/IESNA 90.1, "Energy Standard for Buildings, except Low-Rise Residential Buildings", and

2) A *building* is designed in accordance with Sentence (1), shall be designed, as applicable, with

Rev. 12692

a) a climate zone of 4,

b) no requirement to comply with the Fenestration Orientation provisions of ASHRAE 90.1, Article 5.5.4.5.,

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c) ventilation in compliance with ASHRAE 62-2001 (except addendum n), or if applicable, Clause 6.3.1.1.(3)(b) of the Building By-law,

d) no requirement to comply with Automatic Receptacle Control, per ASHRAE 90.1, Article 8.4.2.,

e) lighting alterations in conformance with the following provisions, which replace Lighting Alterations, per ASHRAE 90.1, Article 9.1.2:

9.1.2 Lighting Alterations.

For the *alteration* of any *lighting system* in an interior *space* or exterior area, that *space* or area shall comply with the entirety of Chapter 9, as applicable to that *space* or area.

Exceptions to 9.1.2

1. Interior lighting *alterations* where the total new wattage of all replaced *luminaires* on a project is 2,000 watts or less, the total wattage of *replaced luminaires* of a *lighting system* within a *space* shall be at least 50% below the total wattage of all *removed luminaires* of that *lighting system*, unless the *space* is at or below the LPD allowance of Table 9.6.1 or Section 9.6.2 as applicable.
Controls shall comply with the requirement of either Section 9.4.1.1(h) or Section 9.4.1.1(i).

2. Exterior lighting *alterations* where the total number of *replaced luminaires* on a project is 10 or less, the total wattage of *replaced luminaires* shall be at least 50% below the total wattage of all *removed luminaires*, unless each altered area is at or below the LPD allowances of Table 9.4.2-2.
Controls shall comply with the requirement of Section 9.4.1.4(a).

3. The replacement of a failed lamp or *ballast/driver* in an individual *luminaire* or the replacement of any failed lighting control.

4. The removal or relocation of interior or exterior *luminaires* as part of, or independent of, exceptions 1, 2, or 3.,

f) the 5% in Table 11.5.1.5. Building Envelope, Exception a., being replaced by 2%, if designed in compliance with ASHRAE 90.1, Section 11, and

g) the 5% in Table G3.1.5.a. Building Envelope, Exception 1., being replaced by 2%, if designed in compliance with ASHRAE 90.1, Appendix G.

10.2.2.3. National Energy Code of Canada for Buildings

Rev. 12692

1) A *building*, other than a Part 9 *building*, designed in accordance with this Article shall be designed and constructed in accordance with the National Energy Code of Canada for Buildings (NECB), except that the provisions of this By-law shall apply where the NECB refers to the National Building Code of Canada (NBCC), and shall be designed as applicable with

a) a climate zone of 4,

b) ventilation in conformance with ASHRAE 62-2001 (except addendum n), Rev. 12683

c) no requirement to comply with vestibules provision of NECB Article 3.2.2.1.,

d) window-to-wall and skylight-to-roof area ratios of the reference *building* identical to area ratios of the proposed *building*, to a maximum of 40% for windows and to a maximum of 5% for skylights, identical to area ratios of the proposed *building*,

e) a vertical glazing Solar Heat Gain Coefficient which does not exceed an assembly maximum of 0.36, and Rev. 12692

f) a skylight Solar Heat Gain Coefficient for all types, which does not exceed an assembly maximum of 0.40, where the ratio of the aggregate skylight area to roof area is less than or equal to 3.0%.

10.2.2.4. [UTV Deleted]

Rev. 12692

10.2.2.5. Building Energy and Emissions Performance

Rev. 12512

1) Except as permitted by Sentence (4), for a building required to conform with this Article, energy modelling shall conform to: Rev. 12692

a) the applicable requirements of Part 8 of the NECB, and Rev. 12512; 12997

b) the City of Vancouver Energy Modelling Guidelines.

2) Except as permitted in Sentence (3) and (4), a *building* designed with this Article shall demonstrate the performance values of the proposed *building* comply with the limits in Table 10.2.2.5.A1. Rev. 12692

3) Compliance with the GHGI limits in Table 10.2.2.5.A1 is not required where a *building* can demonstrate the performance values of the proposed *building* comply with the TEUI and TEDI limits in Table 10.2.2.5.B. Rev. 12692

4) Buildings and major occupancies designed and constructed to conform to the certification criteria for the Passive House Standard, are deemed to comply with this Article provided the design's energy model is Rev. 12692

a) version 9 or newer of the Passive House Planning Package, and

b) prepared by a Certified Passive House Designer, or Certified Passive House Consultant.

(See Note A-10.2.2.5.(4).)

5) Compliance with the TEUI and TEDI limits in Table 10.2.2.5.A1 is not required where a building is connected to a Low Carbon Energy System, and can demonstrate the performance values of the proposed building comply with the limits in Table 10.2.2.5.C. Rev. 12512; 12692

Table 10.2.2.5.A1
Maximum Energy Use and Emissions Intensities
Forming part of Sentence 10.2.2.5.(2) Rev. 12692

Occupancy Classification (1)	Total Energy Use Intensity (kWh/m²a)	Thermal Energy Demand Intensity (kWh/m²a)	Greenhouse Gas Intensity ($kgCO_{2e}/m^2a$)
Group C *occupancies* complying with 10.2.1.5.(2)(a)(i)	See Table 10.2.2.5.A2	20	3
Group C *occupancies* in *buildings* up to 6 *Storeys*	110	25	5.5
Group C *occupancies* in *buildings* over 6 *Storeys*, except Hotel and Motel	120	30	6
Hotel and Motel *occupancies*	140	20	8
Group D and E *occupancies*, except Office	120	20	3
Office *occupancies*	100	20	3

Rev. 12692; 12997

Rev. 12512

Notes to Table 10.2.2.5.A1.:

(1) For *buildings* containing multiple *occupancies*, refer to the procedures on mixed-use *buildings* in Section 5 of the CoV Energy Modelling Guidelines. Rev. 12692; 12997

Table 10.2.2.5.A2
Mechanical Energy Use Intensity in Buildings under 4 Storeys for Group C Major Occupancies except Hotel and Motel
Forming part of Sentence 10.2.2.5.(2) Rev. 12692

Conditioned Floor Area	Mechanical Energy Use Intensity (MEUI) (kWh/m²a)
≤50 m²	125
≤75 m²	108
≤120 m²	78
≤165 m²	58
≤210 m²	48
>210 m²	45

Table 10.2.2.5.B
Maximum Energy Use and Emissions Intensities
Forming part of Sentence 10.2.2.5.(3)

Occupancy Classification	Total Energy Use Intensity (kWh/m2a)	Thermal Energy Demand Intensity (kWh/m2a)	Greenhouse Gas Intensity (kgCO2e/m2a)
Group C *occupancies*	100	15	NA

Table 10.2.2.5.C
Maximum Energy Use and Emissions Intensities
For Buildings Connected to a *Low Carbon Energy System*
Forming part of Sentence 10.2.2.5.(4)

Occupancy Classification	Total Energy Use Intensity (kWh/m2a)	Thermal Energy Demand Intensity (kWh/m2a)	Greenhouse Gas Intensity (kgCO2e/m2a)
Group C *occupancies* in buildings up to 6 Storeys, except Hotel and Motel	110	25	5.5
Group C *occupancies* in buildings over 6 Storeys, except Hotel and Motel	130	40	6
Hotel and Motel *occupancies*	170	30	8
Office *occupancies*	130	30	3
Business and Personal Services or Mercantile *Occupancies*, except Office	170	30	3

Rev. 12512; 12692 12997

10.2.2.6. Building Envelope Opaque Elements

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

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

Table 10.2.2.6.
Minimum Effective Thermal Resistance of Assemblies in Buildings of Group C Major Occupancy
Forming part of Sentences 10.2.2.6.(1)

Building Assembly	Assembly Minimum RSI Value (m^2K/W)	
	Complying with Article 10.2.2.5.	Not subject to Article 10.2.2.5.
Roof Assemblies - Houses[1] Only		
Houses with total conditioned space <110 m^2 [2]	4.3	5.28
Houses with total conditioned space ≥110 m^2 [2]	4.3	7.0
Roof Assemblies - Other		
All projects	5.28	7.0
All Buildings		
Attic Space[3]	8.5	
Walls (including frame crawl space walls)[4]	3.85	
Foundation Walls	3.85	
Box and Rim Joists	3.85	
Concrete or Masonry Walls (other than foundation walls)	3.85	
Suspended Floors (framed)	4.2	
Suspended Floors (concrete slab)	4.2	

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Concrete Slabs on Ground at, above, or below grade (insulation under all slab area and around edge of slab)	2.5
Radiant Heating Suspended Floor Assembly Over Heated Area (insulation between heated floor and heated area below)(3)	2.5
Concrete Balconies, Eyebrows, and Exposed Slab Edge (wrapped or using manufacturer thermal break in structure)	0.42

Notes to Table 10.2.2.6.:

(1) The term "Houses" shall represent buildings containing not more than 2 principal dwelling units.

(2) The conditioned area of 110 m² pertains to the entire building and not only the suite.

(3) The thermal resistance rating of attic space insulation may be reduced to value required for frame walls for a distance of 1200 mm from the exterior wall. A minimum nominal RSI of 3.52 m²K/W is required above the top plate in the attic space

(4) Headers and lintels: cavities between structural members are to be fully insulated, except where a framing plan provided by the builder, architect, designer, or engineer indicates that full-depth solid headers are structurally required. Rev. 12997

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

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

3) The effective total "R" value of the opaque envelope area, the non-opaque envelope area, and the overall envelope area, calculated by a design professional, shall be submitted as part of an application for a *permit.* (See Note A-10.2.2.6.)

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

1) Except as otherwise required in this Subsection and as permitted by Sentence (2), a *building* required to comply with this Article shall comply with the performance values in Table 10.2.2.7.(1).

Table 10.2.2.7.(1)
Maximum Thermal Transmittance of Exterior Closures and Fenestration
Forming part of Sentence 10.2.2.7.(1)

	Assembly Maximum USI Value (W/(m²K))	
Conditions	**Complying with Article 10.2.2.5.**	**Not Subject to Article 10.2.2.5.**
Windows and sliding doors or folding doors with glazing		
Window-to-wall ratio is ≥ 30%, and One family dwelling with conditioned space ≥ 325 m²	1.4	Average of 1.0 or lower and no individual window can be above U1.2
All other	1.4	1.2
Curtainwall and window wall assemblies		
Window-to-wall ratio is ≥ 30%, and One family dwelling with conditioned space ≥ 325 m²	1.4	Average of 1.0 or lower and no individual window can be above U1.2
All other	1.4	1.2
Other Types of Closures		
Storefront curtainwall, window, and door assemblies	2.27	
Doors with or without glazing(1)	1.8	
Doors with a required fire resistance rating	Exempt	
Roof access hatches	2.9	

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Skylights (not larger than 1220 mm in both directions), roof windows and sloped glazing systems	2.4
Skylights larger than 1220 mm in both directions	2.95
Tubular daylight devices	2.6

Notes to Table 10.2.2.7.(1):

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

(2) See note A-10.2.2.7.(3).

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2) A maximum of one entry door assembly consisting of one or two leafs installed in the principle entrance of a *building*, together with attached transoms and sidelites all within a single rough opening, need not comply with Table 10.2.2.7.(1), where constructed of thermally broken metal or wood with multiple panes of glass, which may be argon filled, or coated with a low-e coating.

3) The thermal transmittance of factory glazed products within the scope of existing certification programs shall be indicated by labels applied to the products at the manufacturing location. The thermal transmittance of fenestration products that are site-assembled, imported, or otherwise outside the scope of existing certification programs shall be suitably documented.
(See Note A-10.2.2.7.(3).)

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10.2.2.8. Building Envelope Vestibules

(See Note A-10.2.2.8.)

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

a) all doors opening into and out of the vestibule shall be equipped with self-closing devices,

b) the interior and exterior doors of the vestibule shall be separated by no less than 2.1 m when closed, and the floor area of each vestibule shall not exceed 4.65 m^2 or 2% of the gross conditioned floor areas for that level of the *building*,

c) for spaces having a gross conditioned floor area for that level of the *building* of 3,716.1m^2 and greater, and when the doors opening into and out of the vestibule are equipped with automatic, electrically driven, self-closing devices, the interior and exterior doors shall be separated by no less than 4.87m.

d) the exterior envelope of a conditioned vestibule shall comply with the design requirements for a conditioned space, and

e) the interior and exterior envelope of an unconditioned vestibule shall comply with the design requirements for a semi heated space.

2) An enclosed vestibule is not required for

a) a *building* entrance with revolving doors,

b) a door not intended to be used as the *building* entrance,

c) a door opening directly to the exterior from a *dwelling unit*,

d) a *building* entrance, in a *building* less than 278.7 m^2 in gross floor area,

e) a door that opens directly to the exterior from a space that is less than 278.7 m^2 and is separate from the *building* entrance,

f) semi-heated spaces,

g) an enclosed elevator lobby for *building* entrances directly from parking garages, and

h) a *building* pursuing certification with the Passive House (PHI) standard.

10.2.2.9. Building Services Submetering

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

2) Submetering required by this Article shall include the following

a) hot water generated by a central hot water generation system

b) natural gas used for air handling systems in common areas, and

c) natural gas used for domestic hot water in amenity spaces, pools and spas.

10.2.2.10. Lighting in Residential Buildings

(See Note A-10.2.2.10.)

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

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

b) a switch near the principal entrance of each residential *suite* that

i) controls all lighting fixtures within the *suite*, except lights serving corridors, stairs, washrooms, and rooms with no exterior window.

ii) with an override on each floor, serving that floor, of a multilevel suite

2) Except as permitted by Sentence (3), permanent ancillary exterior lighting of a *building* of *residential* occupancy or the *residential* portion of a multi-use *building,* or those parts of a *building* facing a *lane*, that is required to conform to this Article shall

a) be provided with fixtures that are appropriately shielded that

i) utilize full cut-off optics or are fully shielded fore luminaires that emit over 600 lumens, or any luminaire installed along the side or back yard, and

ii) are partially shielded and utilize a diffusing cover for luminaires that emit 600 lumens or less.

b) be mounted no higher than 4 m above grade or the balcony surface it illuminates along the side yard, back yard, and similar outward facing courtyards or setbacks of the *building*,

c) be provided with dimmer and timer controls,

d) minimize lighting of adjacent exterior properties and properties across a *street*, *lane*, or *public way*,

3) Where exterior lighting is required by this By-law or other regulator enactments to provide illumination along paths of pedestrian or vehicular travel, fire department access, or equipment signage or lighting, it need not comply with the requirements of Sentence (2).

10.2.2.11. Hot Water Tank Piping

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

10.2.2.12. Domestic Hot Water Heaters

Rev. 12692

1) In a building required to comply with this Article, water heating appliances shall comply with the following and be electrically operated except as permitted by Sentence (2).

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

b) CAN/CSA-C745 "Energy Efficiency of Electric Storage Tank Water Heaters and Heat Pump Water Heaters, or

c) CAN/CSA-P.9 Combined space- and water-heating systems.

2) Buildings that are complying with Article 10.2.2.5 may provide gas-fired appliances providing domestic hot water, and shall have a uniform energy factor of not less than 0.92 or alternatively a thermal efficiency of not less than 90% as determined by the following:

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

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

c) CAN/CSA-P.9 Combined space- and water-heating systems,

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

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

10.2.2.13. Domestic Boilers

1) Except as permitted by Sentence (2), in a building required to comply with this Article, domestic boilers

providing heat, or heat and domestic hot water, shall be electric and be tested using CAN/CSA-C22.2 No 165, "Testing Method for Electric Boilers",

2) Buildings that are complying with Article 10.2.2.5 may provide gas-fired appliances have an Annual Fuel Utilization Efficiency (AFUE) rating of not less than 92%, and be tested using CSA P.2-07, "Testing Method for Measuring the Annual Fuel Utilization Efficiency of Residential gas fired Furnaces and Boilers".

10.2.2.14. Domestic Heat Pumps, Furnaces or Make Up Air Units

1) In a building required to comply with this Article, except as permitted by Sentence (5), domestic heat pumps, furnaces or make up air units shall be electrically-operated and have been tested using CAN/CSA-C22.2 No. 236 "Heating and Cooling Equipment",

2) Heat pumps equipped with supplementary heaters shall incorporate controls to prevent supplementary heater operation when the heating load can be met by the heat pump alone, except during defrost cycles,

3) Heat pumps with a programmable thermostat shall be equipped with setback controls that will temporarily suppress electrical back-up or adaptive anticipation of the recovery point, in order to prevent the activation of supplementary heat during the heat pump's recovery, and

4) Heat pumps shall conform to the performance requirements of Table 10.2.2.14.

Table 10.2.2.14.
Heat Pump Equipment Performance Requirements
Forming Part of Sentence 10.2.2.14.(4)

Component or Equipment	Heating or Cooling Capacity kW	Standard	Minimum Performance (no units)
Air Cooled Unitary Air Conditioners and Heat Pumps - Electrically Operated			
Split Systems	≤19	CSA-C656	SEER = 14.5 EER = 11.5 HSPF = 7.1
Single Package System	≤19	CSA-C656 (Including General Instruction No.2)	SEER = 14 EER = 11 HSPF = 7.0
All systems	>19	CAN/CSA-C746	See Level 2 in standard
Water Cooled Unitary Air Conditioners and Heat Pumps - Electrically Operated			
Ground Source Closed Loop			COP_h≥3.91
Water loop heat pumps		CSA-C13256-1	COP_h≥3.91
Direct Expansion Ground Source Heat Pumps - Electrically Operated			
Direct Expansion Ground Source Heat Pumps	≥21	CSA-C748	COP_h≥3.1

Notes to Table 10.2.2.14.:

The symbols and abbreviations that appear in this column have the following meanings:

COP = coefficient of performance, in W/W (COPc = in cooling mode and COPh = in heating mode)

EER = energy efficiency ratio, in (Btu/h)/W (no metric equivalent)

HSPF = heating season performance factor, in watt-hours

SEER = seasonal energy efficiency ratio, in (Btu/h)/W (no metric equivalent)

5) Buildings that are complying with Article 10.2.2.5 may provide domestic gas-fired furnaces or make up air units that shall have an Annual Fuel Utilization Efficiency (AFUE) rating of not less than 92%, as tested using CSA 2.6/ANSI Z83.8, "Gas unit heaters, gas packaged heaters, gas utility heaters and gas-fired duct furnaces".

10.2.2.15. Domestic Gas-Fired Fireplaces

(See Note A-10.2.2.15.)

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

a) intermittent pilot ignition (IPI) systems,

b) on-demand ignition systems that automatically shut off within

i) 7 days of appliance non-use in a one or two family dwelling *building*, or

ii) 6 hours of appliance non-use in a multifamily dwelling, or

c) match ignition.

2) In a *building* required to comply with this Article, domestic gas-fired fireplaces shall be direct vented (Naturally Aspirating Fuel-Fired Appliances (NAFFVA) are not permitted).

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

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

5) In a building required to comply with this Article, the total rated input of all gas fireplaces installed shall not exceed 17.59 kW (60,000 Btu per hour). Rev. 12692

10.2.2.16. Domestic Wood Burning Heating Appliances

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

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

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

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

10.2.2.17. Domestic Heat Recovery Ventilators

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

a) each dwelling *unit*, or

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

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

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

a) be sized to run at its rated speed for continuous operation while achieving the performance requirements of Table 10.2.2.17. as designed and tested in conformance with CAN/CSA-C439, Rev. 12692; 12997

Table 10.2.2.17.
Heat Recovery Ventilator Performance Requirements
Forming a part of Sentence 10.2.2.17.(3)

Building's Conditioned Space (m2)	Sensible Heat Recovery Efficiency (SRE) at 0°C
≤110 m^2	65%
>110 m^2	75%

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

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

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

e) be designed to run continuously to comply with the minimum ventilation rates of Table 9.32.3.5. of Division B, Rev. 12997

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

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

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

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

j) be located in a fully serviceable space that can be readily accessed for replacement or maintenance, and

i) designed and installed to operate with an acceptable level of weather and freeze protection if not within a *conditioned space*, and

ii) in a *building* containing not more than two primary *dwelling units* and their contained *ancillary residential units*, be within a *conditioned space* and provided with direct access from at least one of the *dwelling units* that it serves.

4) In a *building* required to comply with this Article, the HRV system contractor or installer shall provide a completed Mechanical Ventilation Checklist to the *Chief Building Official*. Rev. 12997

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

10.2.2.18. [UTV Deleted] Rev. 12692

10.2.2.19. [UTV Deleted]

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

1) In a *building* required to comply with this Article, at the time of *permit* application, and at the time of final inspection, the owner shall provide to the *Chief Building Official* *acceptable* documentation, in the form of Rev. 12997

a) a PHPP file from a Certified Passive House Consultant or Designer,

b) an EnerGuide Rating System Audit,

c) equivalent energy modelling documentation, *acceptable* to the *Chief Building Official*.

2) In a *building* required to comply with this article, at the time of mid-construction inspection, the owner shall provide to the *Chief Building Official* *acceptable* documentation, in the form of

a) a mid-construction checklist, and

b) a blower door test result that achieves an *acceptable* level of performance

3) In a *building* required to comply with this Article, that contains more than 325 m^2 of conditioned space, and does not contain more than one principal *dwelling unit*, the owner shall provide a calculation utilizing the EnerGuide rating system to demonstrate that the proposed home has a greenhouse gas (GHG) footprint that is no more than two (2) metric tonnes annually (see Note A-10.2.2.20.(3)). Rev. 12692; 12997

10.2.2.21. Building and Dwelling Unit Airtightness Testing

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

a) ASTM E 779, Standard Test Method for Determining Air Leakage Rate by Fan Pressurization,

b) USACE Version 3, Air Leakage Test Protocol for Building Envelopes, or

c) airtightness protocol recognized by Natural Resources Canada for use in homes and buildings labeled under the EnerGuide for New Homes program.

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

Table 10.2.2.21.
Maximum Tested Air Leakage Rates
Forming part of Sentence 10.2.2.21.(2)

Building Classification	Maximum Tested Air Leakage Rate
Buildings, excluding buildings containing not more than two principal dwelling units and ground-oriented *dwelling units*	2.0 L/s/m² at 75 Pa
Ground-oriented *dwelling units*	2.5 air changes per hour at 50 Pa
Ground-oriented *dwelling units* alternative measure	Normalized leakage area of 1.7 cm^3/m^2 at 10 Pa
Suites in *multi-family* buildings	1.23 L/s/m² at 50 Pa

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10.2.2.22. System Requirements for Heating within Exterior Spaces

(See Note A-10.2.2.22.)

1) Any space heating or occupant heating within an exterior space associated with a *building* shall comply with the requirements of this Article.

2) The design and/or installation of space heating or occupant heating systems within exterior spaces shall be limited to spaces directly served by licensed beverage establishments or licensed food establishments.

3) Any exterior space designed with a heating system and directly served by a licensed beverage establishment or a licensed food establishment, shall prioritize the heating system design in the following order:

a) In-slab or in-floor radiant heat, using non fossil fuel or low-carbon system,

b) Electric fixed infrared radiant heat with metal-sheath element,

c) Heated seating, using non fossil fuel or low-carbon system,

d) Non-electric radiant heat using non fossil fuel system.

4) In spaces required to comply with Sentence (3), the design of exterior space heating or occupant heating systems shall comply with Table 10.2.2.22., as applicable.

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Table 10.2.2.22.
Exterior Space or Occupant Heating System Design Requirements
Forming a part of 10.2.2.22.

System Type	Maximum output	Control type	Management Requirements
In-slab or in-floor radiant heat	15 W/ft²	Zone-based controls interconnected with centralized automatic control system	Independent zone management
Electric radiant heat	18 W/ft²	Unit-based or Zone-based controls interconnected with centralized automatic control system	Independent unit or zone management
Heated seating	20 W per seat	Zone-based controls interconnected with i) individual seat shutoff, or ii) centralized automatic control system	Individual seat heater shutoff and independent zone management
Non-electric and non-fossil fuel radiant heat	18 W/ft²	Unit-based controls interconnected with centralized automatic control system	Independent zone management

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5) Heating systems designed to sentence (3) shall include

a) an automatic shut-off (ambient temperature sensor – lockout),

b) an automatic shut-off (space temperature sensors – integral/ zone), and

c) an automatic shut-off using programmable timeclock.

6) Heated zones within a zone-based design shall not exceed 4.8 kW per zone.

7) Heating systems designed with overhead radiant systems within a space containing a ceiling or roof of adequate height, shall be designed with circulation fans interconnected to heating mode operations, with an override for independent fan operation.

8) In a space required to comply with sentence (2), any exterior space designed with a combination of systems contained in sentence (3) shall

a) comply with the specific requirements pertaining to each system, without duplication of requirements, and

b) not contain an area where the combined heating exceeds the performance requirement of the least restrictive system.