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9.4.1.1.	(See Note A-9.4.1.1.)	**9.4.1.1**	(See Note A-9.4.1.1. and Article 2.2.7.6. of Division C.)
9.4.2.1	**Application**	**9.4.2.1.**	**Application** (See Note A-9.4.2.1. and 9.4.2.2.)
	γ = specific weight of snow, kN/m3.		
	1) Except as provided in Sentences (2) and (3), specified snow loads shall be not less than those calculated using the following formula:		γ = specific weight of snow taken as 4.0 kN/m^3 or 0.43Ss +2.2 kN/m^3, whichever is lesser.
	Ends at **3)**		**4)** Where the height of a roof step at the intersection of an upper-level roof and a lower level roof is greater than 2 m, and the upper level roof has a slope less than 1 in 6 and an area greater than 600 m^2, the specified snow load on the lower level roof shall be a) for distances from the roof step that are less than or equal to the drift length, xd, calculated in accordance with Sentence (5), not less than 1.5 times the specified snow load, S, calculated using the formula in Sentence (1) with Cb equal to 0.55, and b) for distances from the roof step that are greater than the drift length, xd, calculated in accordance with Sentence (5), as specified in Sentence (1). **5)** For the purposes of Sentence (4), the drift length, xd,inm, shall be calculated as follows: where h = height of the roof step, in m, and γ = specific weight of snow as specified in Clause 9.4.2.1.(1)(f).
9.6.1.2.	f) CAN/CGSB-12.10-M, “Glass, Light and Heat Reflecting,”	**9.6.1.2.**	f) CAN/CGSB-12.9, “Spandrel glass,”
9.6.1.4.	a) safety glass of the tempered or laminated type conforming to CAN/CGSB-12.1-M, “Tempered or Laminated Safety Glass,” or	**9.6.1.4.**	a) safety glazing of the tempered or laminated type conforming to CAN/CGSB-12.1, “Safety Glazing,” or
	2) Except as provided in Sentence (4), glass in entrance doors to dwelling units and in public areas, other than the entrance doors described in Sentence (1), shall be safety glass or wired glass of the type described in Sentence (1) where the glass area exceeds 0.5 m2 and extends to less than 900 mm from the bottom of the door.		**2)** Except as provided in Sentence (4), glass in entrance doors to *dwelling units* and in public areas, other than the entrance doors described in Sentence (1), shall be safety glazing or wired glass of the type described in Sentence (1) where the glass area exceeds 0.5 m^2 and extends to less than 900 mm from the bottom of the door.
	6) Glass other than safety glass shall not be used for a shower or bathtub enclosure.		**6)** Glazing used for a shower or bathtub enclosure shall conform to Class A of CAN/CGSB-12.1, “Safety Glazing.”
9.7.6.1.	b) protection from precipitation for walls incorporating windows or doors and for roofs incorporating skylights, and the interfaces of these walls with windows or doors and of roofs with skylights, shall conform to Section 9.27.	**9.7.6.1.**	b) protection from precipitation for walls incorporating windows or doors and for roofs incorporating skylights, and the interfaces of these walls with windows or doors and of roofs with skylights, shall also conform to Section 9.27.
9.8.4.9.	**New Section in 2020 →**	**9.8.4.9.**	**Open Risers** 1) Except as provided in Sentence (2), stairs shall have no open risers. 2) Open risers are permitted in a) interior and exterior stairs that serve a single dwelling unit or a house with a secondary suite,

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			b) fire escape stairs, c) stairs that are principally used for maintenance, d) stairs that serve service rooms, and e) stairs that serve industrial occupancies other than storage garages.
9.8.6.2.	2) Where a door at the top of a stair within a dwelling unit swings away from the stair, no landing is required between the doorway and the stair.	**9.8.6.2.**	2) Where a door at the top of a stair within a *dwelling unit* swings away from the stair, no landing is required between the doorway and the stair. (See Note A-9.8.6.2.(2).)
9.8.8.1.	1) Except as provided in Sentence (2), every surface to which access is provided, including but not limited to flights of steps and ramps, exterior landings, porches, balconies, mezzanines, galleries and raised walkways, shall be protected by a guard on each side that is not protected by a wall for the length where a) there is a difference in elevation of more than 600 mm between the walking surface and the adjacent surface, or b) the adjacent surface within 1.2 m of the walking surface has a slope of more than 1 in 2.	**9.8.8.1.**	1) Except as provided in Sentence (2) and except at the leading edge at the top of a flight, every surface to which access is provided, including but not limited to flights of steps and ramps, exterior landings, porches, balconies, mezzanines, galleries and raised walkways, shall be protected by a guard on each side that is not protected by a wall for the length where the difference in elevation is more than 600 mm between the walking surface and the adjacent surface within 1.2 m.
	4) b) a mechanism capable of controlling the free swinging or sliding of the openable part of the window so as to limit any clear unobstructed opening to not more than 100 mm measured either vertically or horizontally where the other dimension is greater than 380 mm. (See Note A-9.8.8.1.(4).)		4) b) a mechanism that can only be released with the use of tools or special knowledge to control the free swinging or sliding operation of the openable part of the window so as to limit any clear unobstructed opening to not more than 100 mm measured either vertically or horizontally. (See Note A-9.8.8.1.(4).)
	5) Windows need not be protected in accordance with Sentence (4), where a) the window serves a dwelling unit that is not located above another suite, b) the window serves a house with a secondary suite, c) the only opening greater than 100 mm by 380 mm is a horizontal opening at the top of the window, d) the window sill is located more than 450 mm above the finished floor on one side of the window, or e) the window is located in a room or space with the finished floor described in Clause (d) located less than 1 800 mm above the floor or ground on the other side of the window. (See Note A-9.8.8.1.(4).)		5) Windows need not be protected in accordance with Sentence (4), where the bottom edge of the openable portion of the window is located a) more than 900 mm above the finished floor, or b) less than 1 800 mm above the floor or ground on the other side of the window. (See Note A-9.8.8.1.(4).)
9.8.8.2.	1) Except as provided in Sentences (2) and (4), guards shall be designed to resist the specified loads prescribed in Table 9.8.8.2.	**9.8.8.2.**	1) Except as provided in Sentences (2), (3) and (5), guards shall be designed to resist the specified loads prescribed in Table 9.8.8.2
	2) For guards within dwelling units and within houses with a secondary suite including their common spaces and for exterior guards serving not more than 2 dwelling units, where the width and spacing of balusters are such that 3 balusters can be engaged by a load imposed over a 300 mm width, the load shall be imposed so as to engage 3 balusters.		2) The size of the opening between any two adjacent vertical elements within a guard shall not exceed the limits required by Sentence 9.8.8.5.(1) when each of these elements is subjected to a specified live load of 0.1 kN applied in opposite directions in the in-plane direction of the guard so as to produce the most critical effect.
9.8.8.3.	1) Except as provided in Sentences (2) to (4), all guards shall be not less than 1 070 mm high.	**9.8.8.3.**	1) Except as provided in Sentences (2) and (3), all guards shall be not less than 1 070 mm high.
9.8.8.5.	2) Except where they serve storage garages, guards in industrial occupancies are permitted to consist of a) a top railing, and b) one or more horizontal intermediate rails spaced such that the size of the openings through the guard prevents the passage of a spherical object having a diameter of 535 mm. (See Note A-9.8.8.5.(1) and (2).)	**9.8.8.5.**	2) Except for guards that serve industrial occupancies, the triangular openings formed by stair risers, stair treads and the bottom element of a required guard shall be of a size that prevents the passage of a 150 mm diam sphere.

<table>
<tr><th>2015 NBC</th><th></th><th>2020 NBC</th><th><u>CHANGES MADE</u></th></tr>
<tr><td>Code Ref.</td><td>Code - Part 9</td><td>Code Ref.</td><td>Code - Part 9</td></tr>
<tr><td>9.8.8.7.</td><td>1) Glass in guards shall be a) safety glass of the laminated or tempered type conforming to CAN/CGSB-12.1-M, “Tempered or Laminated Safety Glass,” or b) wired glass conforming to CAN/CGSB-12.11-M, “Wired Safety Glass.”</td><td>9.8.8.7.</td><td>1) Glass in guards shall be
a) safety glazing of the laminated or tempered type conforming to CAN/CGSB-12.1, “Safety Glazing,” or
b) wired glass conforming to CAN/CGSB-12.11-M, “Wired Safety Glass.”</td></tr>
<tr><td>9.8.9.5.</td><td>1) Stair treads of lumber, plywood or O-2 grade OSB within dwelling units shall be not less than 25 mm actual thickness, except that if open risers are used and the distance between stringers exceeds 750 mm, the treads shall be not less than 38 mm actual thickness.</td><td>9.8.9.5.</td><td>1) Stair treads of lumber, plywood or OSB within dwelling units shall be not less than 25 mm actual thickness, except that, where open risers are permitted and the distance between stringers exceeds 750 mm, the treads shall be not less than 38 mm actual thickness.</td></tr>
<tr><td>9.9.6.4.</td><td>5) Exit doors need not conform to Sentences (1) or (2), where
a) the doors serve accessory buildings where life safety is not adversely affected,
b) the doors serve storage garages or other accessory buildings serving not more than one dwelling unit, or
c) the doors
i) serve storage suites of not more than 20 m2 in gross area that are in warehousing buildings of not more than one storey, and
ii) open directly to the exterior at ground level.</td><td>9.9.6.4.</td><td>5) Exit doors need not conform to Sentence (1) or (2), where
a) the doors serve accessory buildings where life safety is not adversely affected,
b) the doors serve storage garages or other accessory buildings serving not more than one dwelling unit, or
c) the doors
i) serve storage suites of not more than 28 m2 in gross area that are in warehousing buildings of not more than one storey, and
ii) open directly to the exterior at ground level.</td></tr>
<tr><td>9.9.6.7.</td><td>3) Door release hardware on doors in a means of egress shall be installed not more than 1 200 mm above the finished floor.</td><td>9.9.6.7.</td><td>3) Door release hardware on doors in a means of egress shall be installed 900 mm to 1 100 mm above the finished floor</td></tr>
<tr><td>9.9.6.8.(1)</td><td></td><td>9.9.6.8.(1) Building Regulation Change</td><td>Is amended by adding the words “lock or” before the word “latch”/</td></tr>
<tr><td>9.10.2.1</td><td>1) Except as provided in Article 9.10.2.2., every building or part thereof shall be classified according to its major occupancy as belonging to one of the groups or divisions described in Table 9.10.2.1.
Table 9.10.2.1.
Occupancy Classifications
Forming Part of Sentence 9.10.2.1.(1)<table><tr><th>Group</th><th>Division</th><th>Description of Major Occupancies(1)</th></tr><tr><td>C</td><td>—</td><td>Residential occupancies</td></tr><tr><td>D</td><td>—</td><td>Business and personal services occupancies</td></tr><tr><td>E</td><td>—</td><td>Mercantile occupancies</td></tr><tr><td>F</td><td>2</td><td>Medium-hazard industrial occupancies</td></tr><tr><td>F</td><td>3</td><td>Low-hazard industrial occupancies (Does not include storage garages serving individual dwelling units)</td></tr></table></td><td>9.10.2.1. Building Regulation Change (Table replaced)</td><td>1) Except as provided in Article 9.10.2.2., every building or part thereof shall be classified according to its major occupancy as belonging to one of the groups or divisions described in Table 9.10.2.1.
Table 9.10.2.1. Occupancy Classifications Forming Part of Sentence 9.10.2.1.(1)
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9.10.2.2.	**Custodial and Convalescent Homes** **1)** Children's custodial homes and convalescent homes for ambulatory occupants living as a single housekeeping unit in a dwelling unit with sleeping accommodation for not more than 10 persons are permitted to be classified as residential occupancies (Group C).	**9.10.2.2.** Building Regulation Change **9.10.2.2 of division B is Repealed and the following substituted:**	**Alternative Family Care Homes** 1) *Alternative family care homes* are permitted to be classified as *residential occupancies* (Group C) provided the home conforms to Article 3.1.2.5 "Article 9.10.2.2. Alternative *family care homes* are permitted to be classified as *residential* occupancies (Group C) provided the home conforms to Article 3.1.2.5 Notes A-9-10.2.2. of Division B, Building Design and Staff on Duty is repealed. Sentence 9.10.15.1(1) of Division B is repealed and the following substituted: **"1) This Subsection applies to** a) *Buildings* that contain only *dwelling units* and have not more than one *dwelling unit* above another *dwelling unit;* and b) Houses with a secondary *suite* including their common spaces. (See Note A-9-10.15.1(1)
	2) A wall or ceiling membrane forming part of an assembly required to have a fire-resistance rating is permitted to be pierced by openings for electrical and similar service outlet boxes provided such outlet boxes are tightly fitted.	**9.10.5.1.**	2) A wall or ceiling membrane forming part of an assembly required to have a fire-resistance rating is permitted to be pierced by openings for electrical and similar service outlet boxes, provided such outlet boxes and the penetrations conform to Article 9.10.9.8.
9.10.9.2.	**Continuous Barrier** 2) Except as permitted in Article 9.10.9.3., a wall or floor assembly required to be a smoke-tight barrier shall be constructed as a continuous barrier against the spread of smoke. 3) The continuity of a fire separation or smoke-tight barrier shall be maintained where it abuts another fire separation or smoke-tight barrier, a floor, a ceiling, a roof, or an exterior wall assembly. (See Notes A-9.10.9.2.(3) and A-3.1.8.3.(4).) 4) All gypsum board joints in the assemblies described in Sentences (1) and (2) shall conform to CSA A82.31-M, "Gypsum Board Application," and penetrations in these assemblies shall be sealed using flexible sealant or tape to maintain the integrity of the smoke-tight barrier over the entire surface.	**9.10.9.2.**	**Continuous Barrier** 2) Except as permitted in Article 9.10.9.3., a wall or floor assembly required to be a smoke-tight barrier shall be constructed as a continuous barrier against the spread of smoke. (See Note A-9.10.9.2.(2) and (3).) 3) Except as provided in Sentence (6), the continuity of a fire separation where it abuts another fire separation or smoke-tight barrier, a floor, a ceiling, or a roof shall be maintained by a firestop that, when subjected to the fire test method in CAN/ULC-S115, "Standard Method of Fire Tests of Firestop Systems," has an FT rating not less than the fire-resistance rating for the abutting fire separation. (See Note A-9.10.9.2.(2) and (3).) (See also Note A-3.1.8.3.(2).) 4) Except as provided in Sentence (6), joints located in a horizontal plane between a floor and an exterior wall shall be sealed by a firestop that, when subjected to the fire test method in ASTM E2307, "Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-storey Test Apparatus," has an F rating not less than the fire-resistance rating for the horizontal fire separation. 5) Except as provided in Sentence (6), all gypsum board joints in the assemblies described in Sentences (1) and (2) shall conform to CSA A82.31-M, "Gypsum Board Application," to maintain the integrity of the smoke-tight barrier over the entire surface.

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			6) Joints between ceilings and walls, between floors and walls, and between walls at corners need not comply with Sentences (3) to (5) where such joints consist of gypsum board that is attached to framing members and arranged so as to restrict the passage of flame and smoke through the joints. (See Note A-3.1.8.3.(5).
9.10.9.3.	**Openings to be Protected with Closures** 1) Except as permitted in Articles 9.10.9.5., 9.10.9.6. and 9.10.9.7., openings in required fire separations shall be protected with closures conforming to Subsection 9.10.13	**9.10.9.3.**	**Openings to be Protected with Closures** 1) Except as permitted in Articles 9.10.9.5. to 9.10.9.8., openings in required fire separations shall be protected with closures conforming to Subsection 9.10.13.
9.10.9.6.	**Penetrations of Fire Separations** (See Note A-3.1.9.) 1) Piping, tubing, ducts, chimneys, wiring, conduit, electrical outlet boxes and other similar service equipment that penetrate a required fire separation shall be tightly fitted or fire stopped to maintain the integrity of the separation. (See Note A-9.10.9.6.(1).)	**9.10.9.6.**	**General Requirements for Penetrations of Fire Separations** (See Note A-3.1.9.) 1) Except as required by Sentence (2) and Articles 9.10.9.7. and 9.10.9.8. and as permitted by Article 9.10.9.9., penetrations of a required fire separation or a membrane forming part of an assembly required to be a fire separation shall be a) sealed by a firestop that, when subjected to the fire test method in CAN/ULC-S115, “Standard Method of Fire Tests of Firestop Systems,” has an F rating not less than the required fire-resistance rating for the fire separation, b) tightly fitted or cast in place, provided the penetrating item is made of steel, ferrous, copper, concrete or masonry, or c) sealed to maintain the integrity of the fire separation. (See Note A-9.10.9.6.(1).)
9.10.9.7.	**Piping Penetrations** (See Note A-3.1.9.) 1) Except as permitted in Sentences (2) to (6), combustible piping shall not be used in any part of a drain, waste and vent piping system where any part of that system partly or wholly penetrates a fire separation required to have a fire-resistance rating or penetrates a membrane that contributes to the required fire-resistance rating of an assembly. 2) Combustible drain, waste and vent piping not located in a vertical shaft is permitted to penetrate a fire separation required to have a fire-resistance rating or a membrane that forms part of an assembly required to have a fire-resistance rating provided the piping is sealed at the penetration by a fire stop that has an F rating not less than the fire-resistance rating required for the fire separation. 3) The rating referred to in Sentence (2) shall be based on CAN/ULC-S115, “Fire Tests of Firestop Systems,” with a pressure differential of 50 Pa between the exposed and unexposed sides, with the higher pressure on the exposed side. 4) Combustible drain piping is permitted to penetrate a horizontal fire separation or a membrane that contributes to the required fire-resistance rating of a horizontal fire separation, provided it leads directly from a non-combustible watercloset through a concrete floor slab.	**9.10.9.7.**	**Piping Penetrations** (See Note A-3.1.9.) 1) Except as provided in Sentences (2) and (5), piping for drain, waste, vent and central vacuum systems that is not located in a vertical shaft is permitted to penetrate a fire separation required to have a fire-resistance rating or a membrane that forms part of an assembly required to have a fire-resistance rating, provided the penetration is protected in accordance with Clause 9.10.9.6.(1)(a) or (b). 2) Drain piping leading directly from a water closet through a concrete floor slab is permitted to penetrate a horizontal fire separation or a membrane that contributes to the required fire-resistance rating of a horizontal fire separation, provided a) the piping is noncombustible and the penetration is protected in accordance with Sentence 9.10.9.6.(1), or b) the piping is combustible and the penetration is sealed by a firestop conforming to Clause 9.10.9.6.(1)(a). 3) Combustible drain, waste and vent piping is permitted on one side of a vertical fire separation, provided it is not located in a vertical shaft. 4) In buildings containing two dwelling units only, combustible drain, waste and vent piping is permitted on one side of a horizontal fire separation. 5) Water distribution piping is permitted to partly or wholly penetrate a fire separation required to have a fire-resistance rating, provided a) the piping is noncombustible, and the penetration is protected in accordance with Sentence 9.10.9.6.(1), or b) the piping is combustible and is not located in a vertical shaft, and the penetration is sealed by a firestop conforming to Clause 9.10.9.6. (1)(a).

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	5) Combustible drain, waste and vent piping is permitted on one side of a vertical fire separation provided it is not located in a vertical shaft. 6) In buildings containing 2 dwelling units only, combustible drain, waste and vent piping is permitted on one side of a horizontal fire separation.		
9.10.9.8.	**Collapse of Combustible Construction** 1) Combustible construction that abuts on or is supported by a non-combustible fire separation shall be constructed so that its collapse under fire conditions will not cause collapse of the fire separation.	**9.10.9.8.**	**Penetrations by Outlet Boxes or Service Equipment in Concealed Spaces** 1) Except as provided in Sentences (2) to (5), outlet boxes are permitted to penetrate the membrane of an assembly required to have a fire-resistance rating, provided they are sealed at the penetration by a firestop that, when subjected to the fire test method in CAN/ULC-S115, “Standard Method of Fire Tests of Firestop Systems,” has an FT rating not less than the fire-resistance rating of the fire separation. (See Note A-9.10.9.8.(1).) 2) Except as provided in Sentence 9.10.9.6.(2), noncombustible outlet boxes that penetrate a fire separation or a membrane forming part of an assembly required to have a fire-resistance rating need not conform to Sentence (1), provided a) they do not exceed i) 0.016 m2 in area, and ii) an aggregate area of 0.065 m2 in any 9.3 m2 of surface area, and b) the annular space between the membrane and the noncombustible outlet boxes does not exceed 3 mm. 3) Except as provided in Sentence 9.10.9.6.(2), combustible outlet boxes that penetrate a fire separation or a membrane forming part of an assembly required to have a fire-resistance rating need not conform to Sentence (1), provided a) the outlet boxes are i) separated from the remainder of the space within the assembly by an enclosure of not more than 0.3 m2 in area made of fire block material conforming to Article 9.10.16.3. (see Note A-9.10.9.8.(3)(a)(i)), or ii) located in a space within the assembly that is filled with preformed fibre insulation processed from rock or slag conforming to CAN/ULC-S702.1, “Standard for Mineral Fibre Thermal Insulation for Buildings, Part 1: Material Specification,” and having a mass per unit area of not less than 1.22 kg/m2 of wall surface such that the exposed sides and back of the outlet box are encapsulated by the noncombustible insulation, and b) the outlet boxes do not exceed an aggregate area of 0.016 m2 in any individual enclosure as described in Subclause (a)(i) or any individual insulated space as described in Subclause (a)(ii). 4) Noncombustible outlet boxes conforming to Sentence (2) are permitted to be located on opposite sides of a vertical fire separation having a fire-resistance rating and need not conform to Sentence (1), provided they are a) separated from each other by a horizontal distance of not less than 600 mm b) separated from each other and the remainder of the wall space by an enclosure conforming to Subclause (3)(a)(i), or

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			c) located in an insulated wall space in accordance with Subclause (3)(a)(ii). 5) Combustible outlet boxes conforming to Sentence (3) are permitted to be located on opposite sides of a vertical fire separation having a fire-resistance rating and need not conform to Sentence (1). 6) Service equipment is permitted to penetrate a horizontal fire separation conforming to Sentence 9.10.9.12.(2), provided the penetration is sealed by a) a firestop that, when subjected to the fire test method in CAN/ULC-S115, "Standard Method of Fire Tests of Firestop Systems," has an FT rating not less than the required fire-resistance rating for the fire separation, b) a firestop conforming to Clause 9.10.9.6.(1)(a), where the service equipment is located entirely within the cavity of a wall assembly above and below the horizontal fire separation having a required fire-resistance rating, or c) a firestop conforming to Clause 9.10.9.6.(1)(a), where the penetration is i) contained within the concealed space of a floor or ceiling assembly having a fire-resistance rating, ii) located above a ceiling membrane providing a horizontal fire separation, or iii) contained within a horizontal service space conforming to Sentence 9.10.9.12.(2) that is directly above or below a floor or ceiling.
9.10.9.9.	**Reduction in Thickness of Fire Separation by Beams and Joists** 1) Where pockets for the support of beams or joists are formed in a masonry or concrete fire separation, the remaining total thickness of masonry and/or grout and/or concrete shall be not less than the required equivalent thickness shown for Type S monolithic concrete in Table D-2.1.1. in Appendix D for the required fire-resistance rating.	**9.10.9.9.**	**Penetrations by Raceways, Sprinklers and Fire Dampers** 1.) Combustible totally enclosed raceways that are embedded in a concrete floor slab are permitted in an assembly required to have a fire-resistance rating, provided the concrete cover between the raceway and the bottom of the slab is not less than 50 mm. 2.) Totally enclosed raceways are permitted to penetrate a fire separation, provided they are sealed at the penetration by a firestop conforming to Clause 9.10.9.6.(1)(a). 3.) Sprinkler piping is permitted to penetrate a fire separation, provided the fire compartments on each side of the fire separation are sprinklered. 4.) Sprinklers are permitted to penetrate a fire separation or a membrane forming part of an assembly required to have a fire-resistance rating without having to meet the firestop requirements of Article 9.10.9.6. and Clause 9.10.9.8.(6)(a), provided the annular space created by the penetration of a fire sprinkler is covered by a metal escutcheon plate in accordance with NFPA 13, "Standard for the Installation of Sprinkler Systems." 5.) Fire dampers are permitted to penetrate a fire separation or a membrane forming part of an assembly required to have a fire-resistance rating without having to meet the firestop requirements of Sentence 9.10.9.6.(1), provided the fire damper is a) installed in conformance with NFPA 80, "Standard for Fire Doors and Other Opening Protectives," b) specifically designed with a firestop, or c) provided in conformance with Sentence 9.10.5.1.(3). (See also Note A-3.1.9.2.(1).)
9.10.9.17	**Separation of Repair Garages** 1) Except as provided in Sentences (2) and (3), a repair garage shall be separated from other occupancies by a fire separation having a fire-resistance rating of not less than 2 h.	**9.10.9.17**	**Separation of Public Corridors** 1) Except as otherwise required by this Part and as provided in Sentences (2) to (5), public corridors shall be separated from the remainder of the building by a fire separation having not less than a 45 min fire-resistance rating

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	5) Where membrane materials are used to provide the required airtightness in the air barrier system, all joints shall be sealed and structurally supported.		5) No fire separation is required in a sprinklered floor area between a public corridor and a space containing plumbing fixtures required by Article 3.7.2.2. and Section 9.31., provided a) the space and the public corridor are separated from the remainder of the storey by a fire separation having a fire-resistance rating not less than that required between the public corridor and the remainder of the storey, and b) the plumbing fixtures are not located within a dwelling unit or suite.
9.10.10.6.	**Storage Rooms** 1) Rooms for the temporary storage of combustible refuse in all occupancies or for public storage in residential occupancies shall be separated from the remainder of the building by a fire separation having not less than a 1 h fire-resistance rating, except that a 45 min fire separation is permitted where the fire-resistance rating of the floor assembly is not required to exceed 45 min, or where such rooms are sprinklered.	**9.10.10.6.**	**Storage Rooms** 1) Rooms for the temporary storage of combustible refuse and materials for recycling in all occupancies or for public storage in residential occupancies shall be separated from the remainder of the building by a fire separation having not less than a 1 h fire-resistance rating, except that a fire separation with a fire-resistance rating of not less than 45 min is permitted where a) the fire-resistance rating of the floor assembly is not required to exceed 45 min, or b) the room is sprinklered.
9.10.13.13.	**Fire Dampers** 1) Except as permitted by Sentences (2) to (5) and Sentence 9.10.5.1.(4), a duct that penetrates an assembly required to be a fire separation with a fire-resistance rating shall be equipped with a fire damper in conformance with Articles 3.1.8.4. and 3.1.8.10.	**9.10.13.13.**	**Fire Dampers** 1) Except as permitted by Sentences (2) to (5), 9.10.5.1.(3) and 9.10.9.9.(5), a duct that penetrates an assembly required to be a fire separation with a fire-resistance rating shall be equipped with a fire damper in conformance with Articles 3.1.8.4. and 3.1.8.10.
9.10.14.1.	1) This Subsection applies to buildings other than those to which Subsection 9.10.15. applies.	**9.10.14.1.**	1) This Subsection applies to buildings other than those to which Subsection 9.10.15. applies. 2) This Subsection does not apply to detached carports conforming to Section 9.35. that serve not more than one dwelling unit or a house with a secondary suite.
9.10.14.5.	4c) need not conform to the type of cladding required by Table 9.10.14.5.-A, regardless of the limiting distance. **11)** The face of a roof soffit is permitted to project to the property line, where it faces a street, lane, or public thoroughfare. (See Note A-9.10.14.5.(11) and 9.10.15.5.(10).) **12)** Added →	**9.10.14.5.**	4c) need not conform to the type of cladding and type of construction required by Table 9.10.14.5.-A, regardless of the limiting distance. **11)** The face of a roof soffit is permitted to project to the property line, where it faces a public way. (See Note A-9.10.14.5.(11) and 9.10.15.5.(10).) 12) Where roof soffits project to less than 1.2 m from the property line, the centre line of a public way, or an imaginary line between two buildings or fire compartments on the same property, they shall **12)** Where roof soffits project to less than 1.2 m from the property line, the centre line of a public way, or an imaginary line between two buildings or fire compartments on the same property, they shall

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9.10.15.1(1)		Building Regulation Change **9.10.15.1.(1) Repealed and the following substituted:**	1) This Subsection applies to a) *Buildings* that contain only *dwelling units* and have not more than one *dwelling unit* above another *dwelling unit*; and b) houses with a secondary *suite* including their common spaces. (See Note A-9.10.15.1(1).
		Building Regulation Change **A-9.10.15.1.(1) Repealed and the following substituted:**	The buildings to which Subsection 9.10.15 applies include: - Traditional individual detached houses with or without a secondary suite, - Semi detached houses (doubles) where each house may contain a secondary suite, - Row houses, where any house may contain a secondary suite (see Sentence 9.10.11.2(1), and - Stacked dwelling unites where one of them is a secondary suite. Subsection 9.10.15 does not apply to stacked row houses or multiple unit residential buildings containing more than 4 total unites included duplex units or secondary suites.
9.10.15.2.	iii) except as provided in Sentence (2), where Table 9.10.15.4. is used to determine the maximum aggregate area of glazed openings, the area of any number of individual vertical portions of the wall measured from the finished ground level to the uppermost ceiling. (See Note A-9.10.15.4.(2).)	**9.10.15.2.**	iii) except as provided in Sentence (2), where Table 9.10.15.4. is used to determine the maximum aggregate area of glazed openings, the area of any number of individual portions of the exposing building face. (See Note A-9.10.15.4.(2).)
9.10.15.4.	**Glazed Openings in Exposing Building Face** **1)** Except as provided in Sentence (6), the maximum aggregate area of glazed openings in an exposing building face shall a) conform to Table 9.10.15.4., b) conform to Subsection 3.2.3., or c) where the limiting distance is not less than 1.2 m, be equal to or less than the limiting distance squared. **2)** Where the limits on the area of glazed openings are determined for individual portions of the exterior wall, as described in Subclause 9.10.15.2.(1)(b)(iii), the maximum aggregate area of glazed openings for any portion shall conform to the values in the row of Table 9.10.15.4. corresponding to the maximum total area of exposing building face (see column 1 of the Table) that is equal to the sum of all portions of the exposing building face. (See Note A-9.10.15.4.(2).) **7)** Added →	**9.10.15.4.**	**Glazed Openings in Exposing Building Face** **1)** Except as provided in Sentences (6) and (7), the maximum aggregate area of glazed openings in an exposing building face shall a) conform to Table 9.10.15.4., b) conform to Subsection 3.2.3., or c) where the limiting distance is not less than 1.2 m, be equal to or less than the limiting distance squared. **2)** Where the limits on the area of glazed openings are determined for individual portions of the exposing building face, as described in Subclause 9.10.15.2.(1)(b)(iii), the maximum aggregate area of glazed openings for any portion shall be determined using the values in Table 9.10.15.4. corresponding to a) the maximum total area of exposing building face, which is equal to the sum of all portions of the exposing building face, and b) the limiting distance of each portion. (See Note A-9.10.15.4.(2).) **7)** The maximum aggregate area of glazed openings in an exposing building face is permitted to be up to twice the area determined in accordance with Sentence (1), where a) the glazed openings consist of glass blocks, as described in Article 9.10.13.7., or b) the building is sprinklered, provided all rooms, including closets, bathrooms and attached garages, that are adjacent to the exposing building face and

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			that have glazed openings are sprinklered, notwithstanding any exemptions in the sprinkler standards referenced in Article 3.2.5.12.
9.10.15.5.	**10)** The face of a roof soffit is permitted to project to the property line, where it faces a street, lane or public thoroughfare. (See Note A-9.10.14.5.(11) and 9.10.15.5.(10).) **11)** Where roof soffits project to less than 1.2 m from the property line, the centre line of a lane or public thoroughfare, or an imaginary line between two buildings or fire compartments on the same property, they shall a) have no openings, and b) be protected by i) not less than 0.38 mm thick sheet steel, ii) unvented aluminum conforming to CAN/CGSB-93.2-M, "Prefinished Aluminum Siding, Soffits, and Fascia, for Residential Use," iii) not less than 12.7 mm thick gypsum soffit board or gypsum ceiling board installed according to CSA A82.31-M, "Gypsum Board Application," iv) not less than 11 mm thick plywood, v) not less than 12.5 mm thick OSB or waferboard, or vi) not less than 11 mm thick lumber. (See Note A-3.2.3.6.(2).)	**9.10.15.5.**	**10)** The face of a roof soffit is permitted to project to the property line, where it faces a public way. (See Note A-9.10.14.5.(11) and 9.10.15.5.(10).) **11)** Where roof soffits project to less than 1.2 m from the property line, the center line of a public way, or an imaginary line between two buildings or fire compartments on the same property, they shall a) have no openings, and b) be protected by i) not less than 0.38 mm thick sheet steel, ii) unvented aluminum conforming to CAN/CGSB-93.2-M, "Prefinished Aluminum Siding, Soffits, and Fascia, for Residential Use," iii) not less than 12.7 mm thick gypsum soffit board or gypsum ceiling board installed according to CSA A82.31-M, "Gypsum Board Application," iv) not less than 11 mm thick plywood, v) not less than 12.5 mm thick OSB or waferboard, or vi) not less than 11 mm thick lumber. (See Note A-3.2.3.6.(2).)
9.10.16.4.	**Penetration of Fire Blocks** **1)** Where fire blocks are pierced by pipes, ducts or other elements, the effectiveness of the fire blocks shall be maintained around such elements.	**9.10.16.4.**	**Penetration of Fire Blocks** **1)** Where fire blocks are pierced by pipes, ducts or other elements, the effectiveness of the fire blocks shall be maintained around such elements. (See also Note A-3.1.11.7.(7).)
9.10.19.4.	**Power Supply** **3)** Suites of residential occupancy are permitted to be equipped with smoke detectors in lieu of smoke alarms, provided the smoke detectors a) are capable of independently sounding audible signals within the individual suites, b) except as permitted in Sentence (4), are installed in conformance with CAN/ULC-S524, "Installation of Fire Alarm Systems," and c) form part of the fire alarm system. (See Note A-3.2.4.20.(8).)	**9.10.19.4.**	**Power Supply** **3)** Suites of residential occupancy are permitted to be equipped with smoke detectors in lieu of smoke alarms, provided the smoke detectors a) are capable of independently sounding audible signals with a sound pressure level between 75 dBA and 110 dBA within the individual suites (see also Note A-3.2.4.18.(4)),

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		Notes to a-9.10.19 is repealed and the following substituted:	"For the purposes of applying Subsection 9.10.19 of Division B to *child care homes, a child care home* shall be considered a dwelling unit".
9.10.19.5.	**Interconnection of Smoke Alarms** **1)** Where more than one smoke alarm is required in a dwelling unit, the smoke alarms shall be wired so that the activation of one alarm will cause all alarms within the dwelling unit to sound.	**9.10.19.5.**	**Interconnection of Smoke Alarms** **1)** Where more than one smoke alarm is required in a dwelling unit, the smoke alarms shall be interconnected so that the activation of any one alarm causes all alarms within the dwelling unit to sound.
9.10.22.3.	**Protection around Cooktops** **1)** Except as provided in Sentences (2) and (3), combustible wall framing, finishes or cabinets within 450 mm of the area where the cooktop is to be located shall be protected above the level of the heating elements or burners by material providing fire resistance at least equivalent to that provided by a 9.5 mm thickness of gypsum board.	**9.10.22.3.**	**Protection around Cooktops** **1)** Except as provided in Sentences (2) and (3), combustible wall framing, finishes or cabinets within 450 mm of the area where the cooktop is to be located shall be protected above the level of the heating elements or burners by a) gypsum board not less than 9.5 mm thick, or b) any material providing a fire-resistance rating of not less than 10 min and a flame-spread rating of not more than 25.
9.15.3.4.	**Basic Footing Widths and Areas** **2)** Where the supported joist span exceeds 4.9 m in buildings with light wood-frame walls, floors and roofs, footing widths shall be determined according to a) Section 4.2., or b) the following formula $W = w \bullet [\Sigma sjs/(storeys \bullet 4.9)]$ where W = minimum footing width, w = minimum width of footings supporting joists not exceeding 4.9 m, as defined by Table 9.15.3.4., Σ sjs = sum of the supported joist spans on each storey whose load is transferred to the footing, and storeys = number of storeys supported by the footing. (See Note A-9.15.3.4.(2).)	**9.15.3.4.**	**Basic Footing Widths and Areas** **2)** Where the supported joist span exceeds 4.9 m in buildings with light wood-frame walls, floors and roofs, strip footing widths shall be determined according to a) Section 4.2., or b) the following formula $W = w \times [\Sigma sjs/(storeys \times 4.9)]$ where W = minimum footing width, w = minimum width of footings supporting joists not exceeding 4.9 m, as defined by Table 9.15.3.4., Σ sjs = sum of the supported joist spans on each storey bearing on an exterior wall whose load is transferred to the footing or sum of half of the supported joist spans on each storey bearing on both sides of an interior wall whose load is transferred to the footing, and storeys = number of storeys supported by the footing. (See Note A-9.15.3.4.(2).
9.15.4.1.	**Permanent Form Material** 1) Insulating concrete form units shall be manufactured of polystyrene conforming to the performance requirements of CAN/ULC-S701.1, "Thermal Insulation, Polystyrene Boards," for Type 2, 3 or 4 polystyrene.	**9.15.4.1.**	**Flat Wall Insulating Concrete Form Units** **1)** Flat wall insulating concrete form units shall conform to CAN/ULC-S717.1, "Standard for Flat Wall Insulating Concrete Form (ICF) Units – Material Properties."
9.15.4.2.	**Foundation Wall Thickness and Required Lateral Support** **1)** Except as required in Sentence (2), the thickness of foundation walls made of unreinforced concrete block or solid concrete and subject to lateral earth pressure shall conform to Table 9.15.4.2.-A for walls not exceeding 3.0 m in unsupported height. **2)** The thickness of concrete in flat insulating concrete form foundation walls shall be not less than the greater of a) 140 mm, or b) the thickness of the concrete in the wall above.	**9.15.4.2.**	**Foundation Wall Thickness and Required Lateral Support** **1)** Except as required in Sentence (2), the thickness of foundation walls made of unreinforced concrete block, concrete core in flat wall insulating concrete forms or solid concrete and subject to lateral earth pressure shall conform to Table 9.15.4.2.-A for walls not exceeding 3.0 m in unsupported height. **2)** The concrete core in flat insulating concrete form foundation walls shall be not less than the greater of a) 150 mm, or b) the thickness of the concrete in the wall above.

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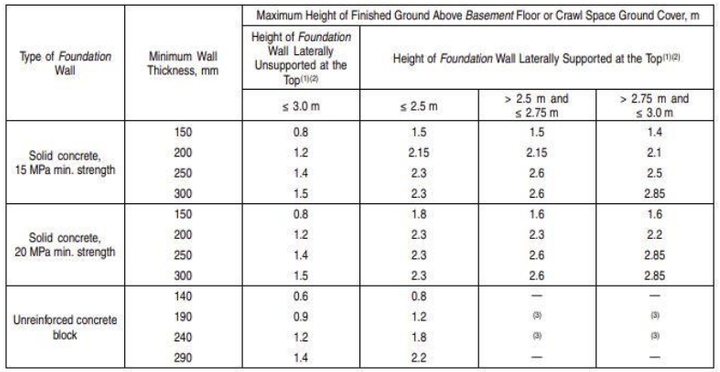
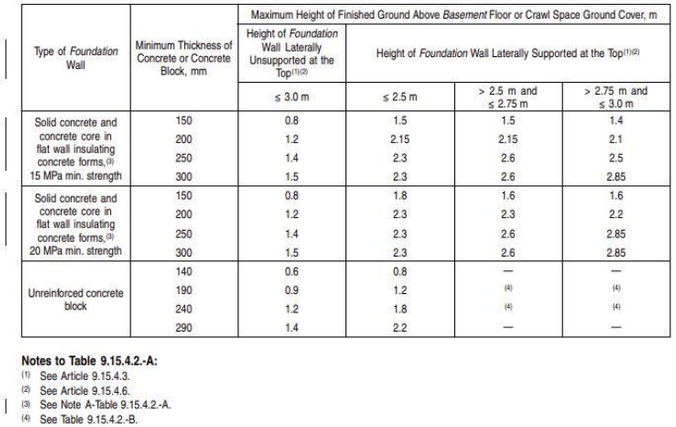
	3) Foundation walls made of flat insulating concrete form units shall be laterally supported at the top and at the bottom.		
9.15.4.2.	**Table 9.15.4.2.-A** **Thickness of Solid Concrete and Unreinforced Concrete Block Foundation Walls** Forming Part of Sentence 9.15.4.2.(1)  **Notes to Table 9.15.4.2.-A:** (1) See Article 9.15.4.3. (2) See Article 9.15.4.6. (3) See Table 9.15.4.2.-B.	**9.15.4.2.**	**Table 9.15.4.2.-A** **Thickness of Solid Concrete, Concrete Core in Flat Wall Insulating Concrete Form and Unreinforced Concrete Block Foundation Walls** Forming Part of Sentence 9.15.4.2.(1)  **Notes to Table 9.15.4.2.-A:** (1) See Article 9.15.4.3. (2) See Article 9.15.4.6. (3) See Note A-Table 9.15.4.2.-A. (4) See Table 9.15.4.2.-B.
9.15.4.3.	**Foundation Walls Considered to be Laterally Supported at the Top** 2) Foundation walls shall be considered to be laterally supported at the top if a) such walls support a solid masonry superstructure, b) the floor joists are embedded in the top of the foundation walls, or c) the floor system is anchored to the top of the foundation walls with anchor bolts, in which case the joists may run either parallel or perpendicular to the foundation walls.	**9.15.4.3.**	**Foundation Walls Considered to be Laterally Supported at the Top** **2)** Foundation walls shall be considered to be laterally supported at the top if a) such walls support a solid masonry superstructure or flat insulating concrete form wall, b) the floor joists are embedded in the top of the foundation walls, c) the floor system is anchored to the top of the foundation walls with anchor bolts, in which case the joists may run either parallel or perpendicular to the foundation walls, or d) they extend from the footing to no more than 300 mm above the finished ground level and are backfilled on both sides such that the difference in elevation between the finished ground levels on either side of the wall is no more than 150 mm.
9.15.4.4.	**Foundation Walls Considered to be Laterally Supported at the Bottom** **1)** Flat insulating concrete form foundation walls shall be considered to be laterally supported at the bottom where the foundation wall c) is doweled to the footing with not less than 15M bars spaced not more than 1.2 m o.c.	**9.15.4.4.**	**Foundation Walls Considered to be Laterally Supported at the Bottom** **1)** Flat insulating concrete form foundation walls shall be considered to be laterally supported at the bottom where the foundation wall c) is doweled to the footing with not less than i) 15M bars spaced not more than 1.2 m o.c., or ii) 10M bars spaced not more than 600 mm o.c.
9.15.4.5.	**Reinforcement for Flat Insulating Concrete Form Foundation Walls** **2)** Vertical reinforcement in flat insulating concrete form foundation walls shall be a) provided in accordance with i) Table 9.15.4.5.-A for 140 mm walls, ii) Table 9.15.4.5.-B for 190 mm walls, and iii) Table 9.15.4.5.-C for 240 mm walls,	**9.15.4.5.**	**Reinforcement for Flat Insulating Concrete Form Foundation Walls** **2)** Vertical reinforcement in flat insulating concrete form foundation walls shall be a) provided in accordance with i) Table 9.15.4.5.-A for 150 mm walls, ii) Table 9.15.4.5.-B for 190 mm walls, and iii) Table 9.15.4.5.-C for 240 mm walls,

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<table>
<tr><td></td><td>b) located in the inside half of the wall section with a minimum cover of 30 mm from the inside face of the concrete wall, and
c) where interrupted by wall openings, placed not more than 600 mm from each side of the openings.</td><td></td><td></td></tr>
<tr><td>9.15.4.5.</td><td>Table 9.15.4.5.-A
Vertical Reinforcement for 140 mm Flat Insulating Concrete Form Foundation Walls
Forming Part of Sentence 9.15.4.5.(2)
<table><tr><th rowspan="3">Max. Height of Finished Ground Above Finished Basement Floor, m</th><th colspan="3">Minimum Vertical Reinforcement</th></tr><tr><th colspan="3">Maximum Unsupported Basement Wall Height</th></tr><tr><th>2.44 m</th><th>2.75 m</th><th>3.0 m</th></tr><tr><td>1.35</td><td>10M at 400 mm o.c.</td><td>10M at 400 mm o.c.</td><td>10M at 400 mm o.c.</td></tr><tr><td>1.6</td><td>10M at 400 mm o.c.</td><td>10M at 380 mm o.c.</td><td>10M at 380 mm o.c.</td></tr><tr><td>2</td><td>10M at 380 mm o.c.</td><td>10M at 380 mm o.c.</td><td>10M at 380 mm o.c.</td></tr><tr><td>2.2</td><td>10M at 250 mm o.c.</td><td>10M at 250 mm o.c.</td><td>10M at 250 mm o.c.</td></tr><tr><td>2.35</td><td>n/a</td><td>10M at 250 mm o.c.</td><td>10M at 250 mm o.c.</td></tr><tr><td>2.6</td><td>n/a</td><td>10M at 250 mm o.c.</td><td>10M at 250 mm o.c.</td></tr><tr><td>3</td><td>n/a</td><td>n/a</td><td>15M at 250 mm o.c.</td></tr></table></td><td>9.15.4.5.</td><td>Table 9.15.4.5.-A
Vertical Reinforcement for 150 mm Flat Insulating Concrete Form Foundation Walls
Forming Part of Sentence 9.15.4.5.(2)
<table><tr><th rowspan="3">Max. Height of Finished Ground Above Finished Basement Floor, m</th><th colspan="3">Minimum Vertical Reinforcement</th></tr><tr><th colspan="3">Maximum Unsupported Basement Wall Height</th></tr><tr><th>2.44 m</th><th>2.75 m</th><th>3.0 m</th></tr><tr><td>1.35</td><td>10M at 400 mm o.c.</td><td>10M at 400 mm o.c.</td><td>10M at 400 mm o.c.</td></tr><tr><td>1.6</td><td>10M at 400 mm o.c.</td><td>10M at 380 mm o.c.</td><td>10M at 380 mm o.c.</td></tr><tr><td>2</td><td>10M at 380 mm o.c.</td><td>10M at 380 mm o.c.</td><td>10M at 380 mm o.c.</td></tr><tr><td>2.2</td><td>10M at 250 mm o.c.</td><td>10M at 250 mm o.c.</td><td>10M at 250 mm o.c.</td></tr><tr><td>2.35</td><td>n/a</td><td>10M at 250 mm o.c.</td><td>10M at 250 mm o.c.</td></tr><tr><td>2.6</td><td>n/a</td><td>10M at 250 mm o.c.</td><td>10M at 250 mm o.c.</td></tr><tr><td>3</td><td>n/a</td><td>n/a</td><td>15M at 250 mm o.c.</td></tr></table></td></tr>
<tr><td>9.20.9.5.</td><td>Ties for Masonry Veneer
1) Masonry veneer 75 mm or more in thickness and resting on a bearing support shall be tied to masonry backing or to wood framing members with straps that are
a) corrosion-resistant,
b) not less than 0.76 mm thick,
c) not less than 22 mm wide,
d) shaped to provide a key with the mortar, and
e) spaced in accordance with Table 9.20.9.5.
2) Straps described in Sentence (1) that are fastened to wood framing members shall be a) bent at a right angle within 6 mm from the fastener, and b) fastened with corrosion-resistant 3.18 mm diam screws or spiral nails having a wood penetration of not less than 63 mm.
3) Masonry veneer individually supported by masonry or wood-frame backing shall be secured to the backing in conformance with Subsection 4.3.2.</td><td>9.20.9.5.</td><td>Ties for Masonry Veneer
1) Masonry veneer 75 mm or more in thickness and resting on a bearing support shall be tied to masonry backing or to wood framing members with straps that are
a) corrosion-resistant,
b) not less than 0.76 mm thick,
c) not less than 22 mm wide,
d) shaped to provide a key with the mortar,
e) pre-bent during manufacture to a right angle within 6 mm of the fastener hole,
f) fastened with i) corrosion-resistant wood screws conforming to Sentence 9.23.3.1.(3) that have a minimum diameter of 4.16 mm (No. 8) and a wood penetration of not less than 38 mm, or ii) corrosion-resistant common spiral nails conforming to Sentence 9.23.3.1.(1) that are not less than 76 mm long and have a wood penetration of not less than 63 mm, and
g) spaced in accordance with Table 9.20.9.5.
2) Where hot-dipped, zinc-coated straps are used to meet the requirements of Sentence (1), they shall be pre-bent and pre-drilled or pre-punched prior to hot-dip, zinc-coated galvanizing.
3) Masonry veneer individually supported by masonry or wood-frame backing shall be secured to the backing in conformance with Subsection 4.3.2.</td></tr>
</table>

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9.20.16.1.	**Corrosion Resistance of Connectors** **Table 9.20.16.1.** **Minimum Requirements for Galvanizing** Forming Part of Sentence 9.20.16.1.(1) Connector Material / ASTM Standard / Coating Class or Thickness Wire ties and continuous reinforcing (hot-dipped galvanizing) / ASTM A 153/A 153M / Class B2 or 458 g/m² Hardware and bolts / ASTM A 153/A 153M / See ASTM A 153/A 153M Strip, plate, bars and rolled sections (not less than 3.18 mm thick) / ASTM A 123/A 123M / 610 g/m² Sheet (less than 3.18 mm thick) / ASTM A 123/A 123M / 305 g/m² on material 0.76 mm thick(1) **Notes to Table 9.20.16.1.:** (1) ASTM A 123/A 123M does not apply to metal less than 3.18 mm thick. Galvanizing coatings may be interpolated for thicknesses between 3.18 mm and 0.76 mm.	**9.20.16.1.**	**Corrosion Resistance of Connectors** **Table 9.20.16.1.** **Minimum Requirements for Galvanizing** Forming Part of Sentence 9.20.16.1.(1) Connector Material / ASTM Standard / Coating Class or Thickness Wire ties and continuous reinforcing (hot-dipped galvanizing) / ASTM A153/A153M / Class B2 or 458 g/m² Hardware and bolts / ASTM A153/A153M / See ASTM A153/A153M Strip, plate, bars and rolled sections (not less than 3.18 mm thick) / ASTM A123/A123M / 610 g/m² Sheet (less than 3.18 mm thick) / ASTM A123/A123M / 460 g/m² on material 0.76 mm thick(1) **Notes to Table 9.20.16.1.:** (1) ASTM A123/A123M does not apply to metal less than 0.76 mm thick. Galvanizing coatings may be interpolated for thicknesses between 3.18 mm and 0.76 mm.
9.23.2.4.	**Lumber** **1)** Lumber shall conform to Subsection 9.3.2.	**9.23.2.4.**	**Connections to Preservative-Treated Wood** **1)** Except as provided in Sentence (3), connectors in contact with preservative-treated wood shall be made of a) hot-dipped, zinc-coated galvanized steel with a coating weight not less than Z550 conforming to ASTM A653/A653M, “Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process,” b) a material that provides an equivalent level of corrosion protection to that provided by the material described in Clause (a), or c) stainless steel. **2)** Fasteners used to attach the connectors referred to in Sentence (1) shall be made of a) galvanized steel coated with zinc in accordance with ASTM A153/A153M, “Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware,” or b) a material that provides an equivalent level of performance and is compatible with the connector. **3)** Connectors and fasteners that are in contact with wood that has been treated with a disodium octaborate tetrahydrate (SBX (DOT)) or zinc borate preservative and is installed in a dry interior environment are permitted to be made of uncoated carbon steel. (See Note A-9.23.2.4.(3).)
9.23.3.1.	**Fasteners**	**9.23.3.1.**	**Fasteners and Connectors**

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9.23.3.4.

Table 9.23.3.4. (Continued)

Construction Detail	Minimum Length of Nails, mm	Minimum Number or Maximum Spacing of Nails
Rafter to joist (with ridge supported)	76	3
Rafter to joist (with ridge unsupported)	76	see Table 9.23.14.8.
Gusset plate to each rafter at peak	57	4
Rafter to ridge board – toe nail – end nail	82	3
Collar tie to rafter – each end	76	3
Collar tie lateral support to each collar tie	57	2
Jack rafter to hip or valley rafter	82	2
Roof strut to rafter	76	3
Roof strut to *loadbearing* wall – toe nail	82	2
38 mm x 140 mm or less plank decking to support	82	2
Plank decking wider than 38 mm x 140 mm to support	82	3
38 mm edge laid plank decking to support (toe nail)	76	1
38 mm edge laid plank to each other	76	450 mm o.c.

Notes to Table 9.23.3.4.:
(1) See Article 9.23.11.4. for requirements on the nailing of top plates in *braced wall bands*.
(2) See Sentence 9.23.3.4.(2).
(3) See Sentence 9.23.3.4.(3).

9.23.3.4.

Table 9.23.3.4. (Continued)

Construction Detail	Minimum Length of Nails, mm	Minimum Number or Maximum Spacing of Nails
Ledger strip to wood beam	82	2 per joist
Joist to joist splice (see also Table 9.23.14.8.)	76	2 at each end
Tail joist to adjacent header joist	82	5
(end nailed) around openings	101	3
Each header joist to adjacent trimmer joist	82	5
(end nailed) around openings	101	3
Stud to wall plate (each end) toe nail	63	4
or end nail	82	2
Doubled studs at openings, or studs at walls or wall intersections and corners	76	750 mm o.c.
Doubled top wall plates(1)	76	600 mm o.c.
Bottom wall plate or sole plate to floor joists, *rim joists* or blocking (exterior walls)(2)	82	400 mm o.c.
Bottom wall plate or sole plate – in required *braced wall panels* – to floor joists, *rim joists* or blocking (exterior walls)(2)	82	150 mm o.c.
Interior walls to framing or subflooring	82	600 mm o.c.
Required *braced wall panels* – in interior walls – to framing above and below	82	150 mm o.c.
Horizontal member over openings in non-*loadbearing* walls – each end	82	2
Lintels to studs	82	2 at each end
Ceiling joist to plate – toe nail each end	82	2
Roof rafter, roof truss or roof joist to plate – toe nail(3)	82	3
Rafter plate to each ceiling joist	101	2
Rafter to joist (with ridge supported)	76	3
Rafter to joist (with ridge unsupported)	76	see Table 9.23.14.8.
Gusset plate to each rafter at peak	57	4
Rafter to ridge board – toe nail – end nail	82	3
Collar tie to rafter – each end	76	3
Collar tie lateral support to each collar tie	57	2
Jack rafter to hip or valley rafter	82	2
Roof strut to rafter	76	3
Roof strut to *loadbearing* wall – toe nail	82	2
38 mm x 140 mm or less plank decking to support	82	2
Plank decking wider than 38 mm x 140 mm to support	82	3
38 mm edge laid plank decking to support (toe nail)	76	1
38 mm edge laid plank to each other	76	450 mm o.c.
End-joist or end-rafter to built-up wall stud(4)	76	5 or 8(5)

Notes to Table 9.23.3.4.:
(1) See Article 9.23.11.4. for requirements on the nailing of top plates in *braced wall bands*.
(2) See Sentence 9.23.3.4.(2).
(3) See Sentence 9.23.3.4.(3).
(4) See Sentence 9.23.13.5.(3).
(5) Where heavyweight construction is used in the roof of the space, at least 8 nails are required (see Note A-9.23.13.2.(1)(a)(i)).

9.23.6.1. **Anchorage of Building Frames**

9.23.6.1. **Anchorage of Building Frames**

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	1) Except as required by Sentence 9.23.6.3.(1), building frames shall be anchored to the foundation unless a structural analysis of wind and earthquake pressures shows anchorage is not required.		**1)** Except as required by Sentence 9.23.6.3.(1), building frames shall be anchored to the foundation unless a structural analysis that considers wind and earthquake loads and lateral earth pressures shows that anchorage is not required
9.23.13.5.	**Braced Wall Panels in Braced Wall Bands** **3)** Portions of the perimeter of a single open or enclosed space need not comply with Sentence (1), where a) the roof of the space projects not more than i) 3.5 m from the face of the framing of the nearest parallel braced wall band, and ii) half the perpendicular plan dimension, b) that portion of the perimeter structure does not support a floor, and c) the roof of the space is i) integral with the roof of the rest of the building with framing members not more than 400 mm o.c., or ii) constructed with roof framing not more than 400 mm o.c. fastened to the wall framing (see Table 9.23.3.4. and Article 9.23.9.1. for balloon framing). (See Note A-9.23.13.5.(3).)	**9.23.13.5.**	**Braced Wall Panels in Braced Wall Bands** **3)** c) the roof of the space is i) integral with the roof of the rest of the building with framing members not more than 400 mm o.c. where roof sheathing edges are not supported on blocking and not more than 600 mm o.c. where roof sheathing edges are supported on blocking securely fastened between framing members, or ii) constructed with roof framing not more than 400 mm o.c. where roof sheathing edges are not supported on blocking and not more than 600 mm o.c. where roof sheathing edges are supported on blocking securely fastened between framing members, and fastened to the wall framing (see Table 9.23.3.4. and Article 9.23.9.1. for balloon framing), and d) the end-joists or end-rafters for the roof of the space are fastened to a 3-ply, 38 mm × 140 mm built-up column or a 5-ply, 38 mm × 89 mm built-up column that is integral with the wall framing. (See Note A-9.23.13.5.(3).)
9.23.14.8.	**Ridge Support** **4)** When the roof slope is 1 in 3 or more, ridge support need not be provided when the lower ends of the rafters are adequately tied to prevent outward movement. **Table 9.23.14.8.** **Rafter-to-Joist Nailing (Unsupported Ridge)** Forming Part of Sentences 9.23.14.8.(5) and (6)	**9.23.14.8.**	**Ridge Support** **4)** Where the roof slope is 1 in 3 or steeper, ridge support need not be provided when the lower ends of the rafters are adequately tied to prevent outward movement. **Table 9.23.14.8.** **Rafter-to-Joist Nailing (Unsupported Ridge)** Forming Part of Sentences 9.23.14.8.(5) and (8)

Roof Slope	Rafter Spacing, mm	Minimum Number of Nails not less than 76 mm Long											
		Rafter Tied to every Joist						Rafter Tied to Joist every 1.2 m					
		Building Width up to 8 m			*Building* Width up to 9.8 m			*Building* Width up to 8 m			*Building* Width up to 9.8 m		
		Roof Snow Load, kPa			Roof Snow Load, kPa			Roof Snow Load, kPa			Roof Snow Load, kPa		
		1.0 or less	1.5	2.0 or more	1.0 or less	1.5	2.0 or more	1.0 or less	1.5	2.0 or more	1.0 or less	1.5	2.0 or more
1 in 3	400	4	5	6	5	7	8	11	—	—	—	—	—
	600	6	8	9	8	—	—	11	—	—	—	—	—
1 in 2.4	400	4	4	5	5	6	7	7	10	—	9	—	—
	600	5	7	8	7	9	11	7	10	—	—	—	—
1 in 2	400	4	4	4	4	4	5	6	8	9	8	—	—
	600	4	5	6	5	7	8	6	8	9	8	—	—
1 in 1.71	400	4	4	4	4	4	4	5	7	8	7	9	11
	600	4	4	5	5	6	7	5	7	8	7	9	11
1 in 1.33	400	4	4	4	4	4	4	4	5	6	5	6	7
	600	4	4	4	4	4	5	4	5	6	5	6	7
1 in 1	400	4	4	4	4	4	4	4	4	4	4	4	5
	600	4	4	4	4	4	4	4	4	4	4	4	5

Table 9.23.14.8.
Rafter-to-Joist Nailing (Unsupported Ridge)
Forming Part of Sentences 9.23.14.8.(5) and (8)

Roof Slope	Rafter Spacing, mm	Minimum Number of Nails Not Less Than 76 mm Long and 3.66 mm in Diameter[1][2][3][4]											
		Building Width up to 4 m			*Building* Width up to 6 m			*Building* Width up to 8 m			*Building* Width up to 10 m		
		Specified Roof Snow Load, kPa			Specified Roof Snow Load, kPa			Specified Roof Snow Load, kPa			Specified Roof Snow Load, kPa		
		1.0	1.5	2.0	1.0	1.5	2.0	1.0	1.5	2.0	1.0	1.5	2.0
1 in 3	300	3	4	5	5	6	7	6	8	10	7	10	[5]
	400	4	5	7	6	8	10	8	10	[5]	10	[5]	[5]
	600	6	8	10	9	[5]	[5]	[5]	[5]	[5]	[5]	[5]	[5]
1 in 2.4	300	3	3	4	4	5	6	5	6	8	6	8	10
	400	3	4	5	5	6	8	6	8	10	8	10	[5]
	600	5	6	8	7	9	[5]	9	[5]	[5]	[5]	[5]	[5]
1 in 2	300	2	3	4	3	4	5	4	5	7	5	7	8
	400	3	4	5	4	5	7	5	7	9	7	9	[5]
	600	4	5	7	6	8	10	8	10	[5]	10	[5]	[5]

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9.23.14.11.

Roof Trusses

1) Roof trusses which are not designed in accordance with Part 4 shall

9.23.14.11.

Table 9.23.14.8. (Continued)

Roof Slope	Rafter Spacing, mm	Minimum Number of Nails Not Less Than 76 mm Long and 3.66 mm in Diameter[1][2][3][4]											
		Building Width up to 4 m			*Building* Width up to 6 m			*Building* Width up to 8 m			*Building* Width up to 10 m		
		Specified Roof Snow Load, kPa			Specified Roof Snow Load, kPa			Specified Roof Snow Load, kPa			Specified Roof Snow Load, kPa		
		1.0	1.5	2.0	1.0	1.5	2.0	1.0	1.5	2.0	1.0	1.5	2.0
1 in 1.71	300	2	3	3	3	4	4	4	5	6	4	6	7
	400	3	3	4	4	5	6	5	6	8	6	7	9
	600	4	5	6	5	7	8	7	9	[5]	8	[5]	[5]
1 in 1.5	300	2	2	3	3	3	4	3	4	5	4	5	6
	400	2	3	4	3	4	5	4	5	7	5	7	8
	600	3	4	5	5	6	7	6	8	10	7	10	[5]
1 in 1.33	300	2	2	3	2	3	4	3	4	5	4	5	6
	400	2	3	3	3	4	5	4	5	6	5	6	7
	600	3	4	5	4	5	7	5	7	9	7	9	[5]
1 in 1.2	300	2	2	2	2	3	3	3	3	4	3	4	5
	400	2	2	3	3	3	4	3	4	5	4	5	7
	600	3	3	4	4	5	6	5	6	8	6	8	10
1 in 1	300	2	2	2	2	2	3	2	3	4	3	4	4
	400	2	2	3	2	3	4	3	4	5	4	5	6
	600	2	3	4	3	4	5	4	5	7	5	7	8

Notes to Table 9.23.14.8.:

(1) Nails with a diameter less than 3.66 mm are permitted to be used, provided the minimum number of nails stated in the Table is modified as follows:
- For a nail diameter greater than or equal to 2.86 mm and less than 3.25 mm, add 3 nails to the minimum number of nails, up to a maximum of 10 nails.
- For a nail diameter greater than or equal to 3.25 mm and less than 3.66 mm, add 2 nails to the minimum number of nails, up to a maximum of 10 nails.

Where more than 10 nails are required, the connections between the rafters and the ceiling joists shall be designed in accordance with Clause 9.4.1.1.(1)(b) or (c).

(2) The minimum number of nails stated in the Table is applicable to Spruce-Pine-Fir, Douglas Fir-Larch and Hem-Fir members. For Northern Species members, add 2 nails to the minimum number of nails, up to a maximum of 10 nails. Where more than 10 nails are required, the connections between the rafters and the ceiling joists shall be designed in accordance with Clause 9.4.1.1.(1)(b) or (c).

(3) To accommodate nail spacing, not less than 38 mm x 140 mm joists shall be used where 6 or more nails are required, and not less than 38 mm x 184 mm joists shall be used where 8 or more nails are required.

(4) The minimum number of nails in the Table is applicable for a maximum roof *dead load* of 0.5 kPa.

(5) The connections between the rafters and the ceiling joists shall be designed in accordance with Clause 9.4.1.1.(1)(b) or (c).

6) Except as permitted in Sentence (7), ceiling joists referred to in Sentence (5) shall be tied to the base of every rafter.

7) Where ceiling joists referred to in Sentence (5) are raised above the base of the rafters, the connections between the rafters and the ceiling joists shall be designed in accordance with Clause 9.4.1.1.(1)(b) or (c).

8) Ceiling joists referred to in Sentence (5) that are spliced to make a continuous joist shall be fastened together at each splice with at least one more nail than required for the rafter-to-joist connection shown in Table 9.23.14.8.

9) Members referred to in Sentences (6) and (8) are permitted to be fastened together either directly or through a gusset plate.

Roof Trusses

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	a) be capable of supporting a total ceiling load (dead load plus live load) of 0.35 kPa plus two and two-thirds times the specified live roof load for 24 h, and b) not exceed the deflections shown in Table 9.23.14.11. when loaded with the ceiling load plus one and one-third times the specified roof snow load for 1 h. **Table 9.23.14.11.** **Maximum Roof Truss Deflections** Forming Part of Sentence 9.23.14.11.(1) Truss Span / Type of Ceiling / Maximum Deflection 4.3 m or less / Plaster or gypsum board / 1/360 of the span 4.3 m or less / Other than plaster or gypsum board / 1/180 of the span Over 4.3 m / Plaster or gypsum board / 1/360 of the span Over 4.3 m / Other than plaster or gypsum board / 1/240 of the span **2)** The joint connections used in trusses described in Sentence (1) shall be designed in conformance with the requirements in Subsection 4.3.1. (See Note A-9.23.14.11.(2).) **3)** Where the length of compression web members in roof trusses described in Sentence (1) exceeds 1.83 m, such web members shall be provided with continuous bracing to prevent buckling.		**1)** Wood roof trusses shall be designed in accordance with good engineering practice such as that described in TPIC 2019, "Truss Design Procedures and Specifications for Light Metal Plate Connected Wood Trusses." **2)** The joint connections used in trusses described in Sentence (1) shall be designed in conformance with the requirements in Subsection 4.3.1. (See Note A-9.23.14.11.(2).) 3) All member bracing shall be installed as per the truss design drawings, and continuous lateral bracing shall be adequately anchored to the roof and ceiling diaphragms at intervals no greater than 6.10 m o.c. **3)** All member bracing shall be installed as per the truss design drawings, and continuous lateral bracing shall be adequately anchored to the roof and ceiling diaphragms at intervals no greater than 6.10 m o.c.
9.25.1.1.	**Scope and Application** **2)** b) constructed in such a way that the properties and relative position of all materials conform to Subsection 9.25.5.	**9.25.1.1.**	**Scope and Application** **2)** b) constructed in such a way that the properties and relative position of all materials conform to Subsection 9.25.5. (See Note A-9.25.1.1.(2).)
9.25.2.3.	**Installation of Thermal Insulation** **4)** Insulation on the interior of foundation walls enclosing a crawl space shall be applied so that there is not less than 50 mm clearance above the crawl space floor, if the insulation is of a type that may be damaged by water.	**9.25.2.3.**	**Installation of Thermal Insulation** **4)** Insulation shall be installed over the full height of foundation walls enclosing a basement or heated crawl space. (See also Note A-9.36.2.5.(5).)

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9.25.4.2.	**Vapour Barrier Materials** **1)** Vapour barriers shall have a permeance not greater than 60 ng/(Pa·s·m2) measured in accordance with ASTM E 96/E 96M, "Water Vapor Transmission of Materials," using the desiccant method (dry cup). **2)** Where the intended use of the interior space will result in high moisture generation, the assembly shall be designed according to Part 5. (See Note A-9.25.4.2.(2).) **6)** Where foamed plastic insulation functions as the vapour barrier, it shall be sufficiently thick so as to meet the requirement of Sentence (1). **7)** Added → **8)** Added →	**9.25.4.2.**	**Vapour Barrier Materials** **1)** Except as provided in Sentence (2), vapour barriers shall have a permeance not greater than 60 ng/(Pa×s×m2) measured in accordance with ASTM E96/E96M, "Standard Test Methods for Water Vapor Transmission of Materials," using the desiccant method (dry cup). **2)** Thermally insulated foundation wall assemblies are permitted to be constructed with variable-permeance vapour barriers having a permeance not greater than 60 ng/(Pa×s×m2) using the desiccant method (dry cup) and greater than 300 ng/(Pa×s×m2) using the water method (wet cup) measured in accordance with ASTM E96/E96M, "Standard Test Methods for Water Vapor Transmission of Materials."(See Note A-9.25.4.2.(2).) **6)** Membrane-type vapour barriers other than polyethylene that are susceptible to deterioration under prolonged exposure to direct ultraviolet radiation shall a) be covered, or b) only be installed in locations that are not exposed to direct ultraviolet radiation after the completion of construction. (See Note A-9.25.4.2.(6).) **7)** Where a coating is applied to gypsum board to function as the vapour barrier, the permeance of the coating shall be determined in accordance with CAN/CGSB-1.501-M, "Method for Permeance of Coated Wallboard." **8)** Where foamed plastic insulation functions as the vapour barrier, it shall be sufficiently thick so as to meet the requirement of Sentence (1).
9.26.1.3.	**Alternative Installation Methods** **1)** Methods described in CAN3-A123.51-M, "Asphalt Shingle Application on Roof Slopes 1:3 and Steeper," or in CAN3-A123.52-M, "Asphalt Shingle Application on Roof Slopes 1:6 to Less Than 1:3," are permitted to be used for asphalt shingle applications not described in this Section.	**9.26.1.3.**	**Alternative Installation Methods** **1)** Methods described in CSA A123.51, "Asphalt shingle application on roof slopes 1:6 and steeper," are permitted to be used for the installation of asphalt shingles in lieu of the methods described in this Section.
9.26.1.1.	**General** **1)** Where lumber, wood shingles, shakes, fibre-cement shingles, planks and sheets, plywood, OSB, waferboard, hardboard, vinyl, aluminum, or steel, including trim and soffits, are installed as cladding on wood-frame walls exposed to precipitation, the cladding assembly shall comply with a) Subsections 9.27.2. to 9.27.12., or b) Part 5. **2)** Where stucco is installed as cladding on wood-frame or masonry walls exposed to precipitation, the cladding assembly shall comply with a) Subsections 9.27.2. to 9.27.5., and Section 9.28., or b) Part 5. **3)** Where masonry serves as cladding on wood-frame or masonry walls exposed to precipitation, the cladding assembly shall comply with a) Subsections 9.27.2. to 9.27.4., and Section 9.20., or b) Part 5. **5)** Where an exterior insulation finish system is installed as cladding on wood-frame, masonry, cold-formed steel stud or cast-in-place concrete walls exposed to precipitation, the cladding assembly shall comply with a) Subsections 9.25.5., 9.27.2. to 9.27.4., and 9.27.13., or b) Part 5. (See Note A-9.27.1.1.(5).)	**9.26.1.1.**	**General** **1)** Where lumber, wood shingles, shakes, fibre-cement shingles, planks and sheets, plywood, OSB, waferboard, hardboard, vinyl, insulated vinyl, polypropylene, aluminum, or steel, including trim and soffits, are installed as cladding on wood-frame walls or above-ground flat insulating concrete form walls exposed to precipitation, the cladding assembly shall comply with a) Subsections 9.27.2. to 9.27.13., or b) Part 5. **2)** Where stucco is installed as cladding on wood-frame walls, above-ground flat insulating concrete form walls or masonry walls exposed to precipitation, the cladding assembly shall comply with a) Subsections 9.27.2. to 9.27.5., and Section 9.28., or b) Part 5. **3)** Where masonry serves as cladding on wood-frame walls, above-ground flat insulating concrete form walls or masonry walls exposed to precipitation, the cladding assembly shall comply with a) Subsections 9.27.2. to 9.27.4., and Section 9.20., except for masonry veneer, which shall be attached to above-ground flat insulating concrete form walls in accordance with Sentence 9.27.5.4.(2), or b) Part 5 **5)** Where an exterior insulation finish system is installed as cladding on wood-frame, masonry, cold-formed steel stud, above-ground flat insulating concrete form or cast-in-place concrete walls exposed to precipitation, the cladding assembly shall comply with a) Subsections 9.25.5., 9.27.2. to 9.27.4., and 9.27.14., or b) Part 5. (See Note A-9.27.1.1.(5).

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9.27.2.2.	**Minimum Protection from Precipitation Ingress** (See Note A-9.27.2.2.) **1)** Except as provided in Sentence (2), a cladding assembly is deemed to have a capillary break between the cladding and the backing assembly, where a) there is a drained and vented air space not less than 10 mm deep behind the cladding, over the full height and width of the wall (see also Article 9.27.5.3.),	**9.27.2.2.**	**Minimum Protection from Precipitation Ingress** (See Note A-9.27.2.2.) **1)** Except as provided in Sentence (2), a cladding assembly is deemed to have a capillary break between the cladding and the backing assembly, where a) there is a drained and vented air space not less than 9.5 mm deep behind the cladding, over the full height and width of the wall (see also Article 9.27.5.3.),
9.27.5.1.	**Attachment of Cladding – Attachment** **1)** Except as permitted by Sentences (2) to (4), cladding shall be fastened to the framing members or furring members, or to blocking between the framing members. 2) Vertical lumber and stucco lath or reinforcing are permitted to be attached to sheathing only where the sheathing consists of not less than a) 14.3 mm lumber, b) 12.5 mm plywood, or c) 12.5 mm OSB or waferboard. **5)** Added →	**9.27.5.1.**	**Attachment of Cladding – Attachment** **1)** Except as permitted by Sentences (2) to (5), cladding shall be fastened to the framing members or furring members, or to blocking between the framing members. **2)** Vertical lumber, stucco lath or reinforcing, vertically applied vinyl siding, vertically applied insulated vinyl siding, and polypropylene siding are permitted to be attached to sheathing only where the sheathing consists of not less than a) 14.3 mm lumber, b) 12.5 mm plywood or waferboard, or c) 11 mm OSB. **5)** Cladding, trim and furring members are permitted to be attached to the web fastening strips of flat wall insulating concrete form units using screws in accordance with Sentence 9.27.5.4.(2)
9.27.5.4.	**Size and Spacing of Fasteners** **1)** Nail or staple size and spacing for the attachment of cladding and trim shall conform to Table 9.27.5.4.	**9.27.5.4.**	**Size and Spacing of Fasteners** 1) Nail or staple size and spacing for the attachment of cladding and trim to wood framing, furring members or blocking shall conform to Table 9.27.5.4.-A.

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Table 9.27.5.4.-A
Attachment of Cladding to Wood Framing, Furring Members or Blocking
Forming Part of Sentence 9.27.5.4.(1)

Type of Cladding	Minimum Nail or Staple Length, mm[1]	Minimum Number of Nails or Staples	Maximum Nail or Staple Spacing, mm o.c.
Wood trim	51	—	600
Lumber siding or horizontal siding made from sheet material	51	—	600
Metal cladding	38	—	600 (nailed to framing) 400 (nailed to sheathing only)
Wood shakes			
up to 200 mm in width	51	2	—
over 200 mm in width	51	3	—
Wood shingles			
up to 200 mm in width	32	2	—
over 200 mm in width	32	3	—
Vinyl and insulated vinyl siding			
horizontally applied	38	—	400[2]
vertically applied	38	—	300
Polypropylene siding	38	—	400[2]
Panel- or sheet-type cladding			
up to 7 mm thick	38	—	150 (along edges)
over 7 mm thick	51	—	300 (along intermediate supports)

Notes to Table 9.27.5.4.-A:
(1) The minimum fastener length need not exceed the minimum fastener penetration depth required by Article 9.27.5.7.
(2) The maximum spacing of 400 mm o.c. applies to nails and staples used to attach horizontally applied vinyl, insulated vinyl and polypropylene siding, unless a greater spacing is permitted in an evaluation report prepared by an accredited certification organization.

2) Screw size and spacing for the attachment of cladding, trim, and furring members to the web fastening strips of flat wall insulating concrete form (ICF) units shall conform to Table 9.27.5.4.-B where the 1-in-50 hourly wind pressure (HWP) is less than or equal to 0.60 kPa. (See Note A-9.27.5.4.(2).)

Table 9.27.5.4.
Attachment of Cladding
Forming Part of Sentence 9.27.5.4.(1)

Type of Cladding	Minimum Nail or Staple Length, mm	Minimum Number of Nails or Staples	Maximum Nail or Staple Spacing, mm o.c.
Wood trim	51	—	600
Lumber siding or horizontal siding made from sheet material	51	—	600
Metal cladding	38	—	600 (nailed to framing) 400 (nailed to sheathing only)
Wood shakes			
up to 200 mm in width	51	2	—
over 200 mm in width	51	3	—
Wood shingles			
up to 200 mm in width	32	2	—
over 200 mm in width	32	3	—
Panel or sheet type cladding			
up to 7 mm thick	38	—	150 (along edges)
more than 7 mm thick	51	—	300 (along intermediate supports)

Table 9.27.5.4.-A
Attachment of Cladding to Wood Framing, Furring Members or Blocking
Forming Part of Sentence 9.27.5.4.(1)

Type of Cladding	Minimum Nail or Staple Length, mm[1]	Minimum Number of Nails or Staples	Maximum Nail or Staple Spacing, mm o.c.
Wood trim	51	—	600
Lumber siding or horizontal siding made from sheet material	51	—	600
Metal cladding	38	—	600 (nailed to framing) 400 (nailed to sheathing only)
Wood shakes			
up to 200 mm in width	51	2	—
over 200 mm in width	51	3	—
Wood shingles			
up to 200 mm in width	32	2	—
over 200 mm in width	32	3	—
Vinyl and insulated vinyl siding			
horizontally applied	38	—	400[2]
vertically applied	38	—	300
Polypropylene siding	38	—	400[2]
Panel- or sheet-type cladding			
up to 7 mm thick	38	—	150 (along edges)
over 7 mm thick	51	—	300 (along intermediate supports)

Notes to Table 9.27.5.4.-A:
(1) The minimum fastener length need not exceed the minimum fastener penetration depth required by Article 9.27.5.7.
(2) The maximum spacing of 400 mm o.c. applies to nails and staples used to attach horizontally applied vinyl, insulated vinyl and polypropylene siding, unless a greater spacing is permitted in an evaluation report prepared by an accredited certification organization.

2) Screw size and spacing for the attachment of cladding, trim and furring members to the web fastening strips of flat wall insulating concrete form (ICF) units shall conform to Table 9.27.5.4.-B where the 1-in-50 hourly wind pressure (HWP) is less than or equal to 0.60 kPa. (See Note A-9.27.5.4.(2).)

Table 9.27.5.4.-B
Attachment of Cladding to Flat Wall ICF Units where the 1-in-50 HWP ≤ 0.60 kPa
Forming Part of Sentence 9.27.5.4.(2)

Type of Cladding[1]	Minimum Screw Length	Minimum Screw Diameter, mm	Maximum Horizontal Spacing of Screws, mm o.c.[2]
Wood trim	[3]	3.5	400 or 450 (screwed to web fastening strip)
Lumber siding or horizontal siding made from sheet material	[3]	4.2	400 or 450 (screwed to web fastening strip)
Metal cladding	[3]	4.2	400 or 450 (screwed to web fastening strip)
Vinyl cladding	[3]	3.5	400 or 450 (screwed to web fastening strip)
Masonry veneer[4]	[3]	4.2	400 or 450 (masonry tie screwed to web fastening strip)
Panel- or sheet-type cladding			
up to 7 mm thick	[3]	3.5	150 or 200 (along edges)
over 7 mm thick	[3]	4.2	300 or 400 (along intermediate supports)

Notes to Table 9.27.5.4.-B:

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			(1) Wood shakes and wood shingles are permitted to be attached to horizontal wood furring members in accordance with Table 9.27.5.4.-A. The wood furring members shall be attached to the web fastening strips of flat wall ICF units with screws not less than 4.2 mm in diameter spaced horizontally not more than 400 or 450 mm o.c. (two horizontal spacing options are given to accommodate the 150 and 200 mm o.c. horizontal spacing options for web fastening strips). (2) Two horizontal spacing options are given to accommodate the 150 mm o.c. and 200 mm o.c. horizontal spacing options for web fastening strips. The maximum vertical spacing of screws or masonry ties, as applicable, shall be 400 mm. (3) Screws must be long enough to penetrate through the web fastening strips by a minimum of 6 mm. (4) See also Subsection 9.20.5. for requirements on the support of masonry veneer.
9.27.5.6.	**Expansion and Contraction** **1)** Fasteners for metal or vinyl cladding shall be positioned to permit expansion and contraction of the cladding.	**9.27.5.6.**	**Expansion and Contraction** **1)** Fasteners for metal cladding shall be positioned to permit expansion and contraction of the cladding. **2)** Fasteners for vinyl siding, insulated vinyl siding and polypropylene siding shall be installed in the centre of the slots of the nail hem.
9.27.5.7.	**Penetration of Fasteners** **1)** Fasteners for shakes and shingles shall penetrate through the nail-holding base or not less than 19 mm into the framing. **2)** Fasteners for cladding other than that described in Sentence (1) shall penetrate through the nail-holding base or not less than 25 mm into the framing.	**9.27.5.7.**	**Penetration of Fasteners** (See Note A-9.27.5.7.) **1)** Fasteners for shakes and shingles shall penetrate through the nail-holding base or not less than 19 mm into the framing. **2)** Fasteners for vinyl cladding, insulated vinyl cladding, and polypropylene cladding shall penetrate through the nail-holding base or not less than 32 mm into the framing. **3)** Fasteners for cladding other than that described in Sentences (1) and (2) shall penetrate through the nail-holding base or not less than 25 mm into the framing.
9.27.9.1.	**Material Standards** **1)** Factory-finished hardboard cladding shall conform to CAN/CGSB-11.5-M, “Hardboard, Precoated, Factory Finished, for Exterior Cladding.” **2)** Hardboard cladding that is not factory finished shall conform to Types 1, 2 or 5 in CAN/CGSB-11.3-M, “Hardboard.”	**9.27.9.1.**	**Material Standards** 1) Hardboard cladding shall conform to ANSI A135.6, “Engineered Wood Siding.”
9.27.9.2.	**Thickness** 1) Type 1 or 2 hardboard cladding shall be not less than a) 6 mm thick when applied over sheathing that provides continuous support, and b) 7.5 mm thick when applied over furring or framing members not more than 400 mm o.c.	**9.27.9.2.**	**Thickness** **1)** Hardboard cladding shall be not less than a) 9.5 mm thick when applied over sheathing that provides continuous support or over furring or framing members not more than 400 mm o.c., or b) 11.1 mm thick when applied over furring or framing members not more than 600 mm o.c.
9.27.11.1.	**Metal** **Material Standards** 1) Horizontal and vertical strip steel siding, including flashing and trim accessories, shall conform to CAN/CGSB-93.4, “Galvanized Steel and Aluminum-Zinc Alloy Coated Steel Siding, Soffits and Fascia, Prefinished, Residential.”	**9.27.11.1.**	**Metal** **Material Standards** **1)** Steel sheet cladding, including horizontal and vertical strip steel siding, flashing and trim accessories, shall a) have a minimum thickness of 0.33 mm, and b) conform to CSSBI 23M, “Standard for Residential Steel Cladding.” (See Note A-9.27.11.1.(1).)
9.27.12.1.	**Vinyl Siding, Insulated Vinyl Siding and Vinyl Soffits** **Material Standards**	**9.27.12.1.**	**Vinyl Siding, Insulated Vinyl Siding and Vinyl Soffits** **Material Standards**

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	1) Vinyl siding, including flashing and trim accessories, shall conform to CAN/CGSB-41.24, "Rigid Vinyl Siding, Soffits and Fascia."		**1)** Vinyl siding shall conform to ASTM D3679, "Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Siding." **2)** Insulated vinyl siding shall conform to ASTM D7793, "Standard Specification for Insulated Vinyl Siding." **3)** Rigid vinyl soffits shall conform to ASTM D4477, "Standard Specification for Rigid (Unplasticized) Poly (Vinyl Chloride) (PVC) Soffit." **4)** Where vinyl siding, insulated vinyl siding or rigid vinyl soffits are required to have a flame-spread rating, the rating shall be determined in accordance with CAN/ULC-S102.2, "Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies."
9.27.12.2.	**Attachment** **1)** The attachment of vinyl siding shall conform to the requirements in Subsection 9.27.5. for metal siding	**9.27.12.2.**	**Attachment** **1)** The attachment of vinyl siding and insulated vinyl siding shall conform to the requirements in Subsection 9.27.5
9.27.13.1.	**Application** **1)** Except as provided in Sentence (2), this Subsection applies to exterior insulation finish systems (EIFS) that a) are covered in the scope of CAN/ULC-S716.1, "Exterior Insulation and Finish Systems (EIFS) - Materials and Systems," and b) have a geometrically defined drainage cavity with a minimum cavity depth of 10 mm and an open area equal to not less than 13% of the area of a full-size EIFS panel. (See Note A-9.27.13.1.(1).) **2)** EIFS that are not covered by Sentence (1) shall comply with Part 5.	**9.27.13.1.**	**Polypropylene Siding** **Material Standard** **1)** Polypropylene siding shall conform to ASTM D7254, "Standard Specification for Polypropylene (PP) Siding." **2)** Where polypropylene siding is required to have a flame-spread rating, the rating shall be determined in accordance with CAN/ULC-S102.2, "Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies."
9.27.13.2.	**Materials** **1)** The materials used in EIFS shall conform to CAN/ULC-S716.1, "Exterior Insulation and Finish Systems (EIFS) - Materials and Systems." **2)** The substrate on which the EIFS is installed shall a) be compatible with that particular system (see Note A-9.27.13.2.(2)(a)), and b) comply with the structural requirements for sheathing materials stated in Section 9.23.	**9.27.13.2.**	**Attachment** **1)** The attachment of polypropylene siding shall conform to the requirements in Subsection 9.27.5.
9.29.5.2.	**Materials** **1)** Gypsum products shall conform to a) ASTM C 1178/C 1178M, "Coated Glass Mat Water-Resistant Gypsum Backing Panel," or b) ASTM C 1396/C 1396M, "Gypsum Board," except that the flame-spread rating of gypsum board shall be determined in accordance with CAN/ULC-S102, "Test for Surface Burning Characteristics of Building Materials and Assemblies."	**9.29.5.2.**	**Gypsum Board Finish (Taped Joints)** **Application** **2)** Except as provided in Sentence (3), gypsum board applications not described in this Subsection shall conform to CSA A82.31-M, "Gypsum Board Application." **3)** The application of gypsum board to flat insulating concrete form (ICF) walls shall conform to ASTM C840, "Standard Specification for Application and Finishing of Gypsum Board." (See Note A-9.29.5.1.(3).)

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9.32.3.9		Building Regulation Change **9.32.3.9 Repealed and the following substituted:**	**"9.32.3.9". Carbon Monoxide Alarms (See Note A-9.32.3.9.)** 1) This article applies to every building that contains a *residential occupancy, a care occupancy* with individual *suites, a care company* containing sleeping rooms not within a *suite,* an *alternative family care home,* or a *child care home,* and that also contains a) a fuel-burning appliance or b) a storage garage. 2) Carbon Monoxide (CO) alarms required by this Article shall a) conform to CAN/CSA 6.19 'Residential Carbon Monoxide Alarming Devices,' b) be equipped with an integral alarm that satisfies the audibility requirements of CAN/CSA 6.19 'Residential Carbon Monoxide Alarming Devices,' c) have no disconnect switch between the overcurrent and the CO alarm, where the CO alarm is powered by the dwelling unit's electrical system, and d) be mechanically fixed at a height recommended by the manufacturer. 3) Where a room contains a solid-fuel-burning appliance, a CO alarm conforming to CAN/CSA 6.19 'Residential Carbon Monoxide Alarming Devices' shall be mechanically fixed a) At the manufacturer's recommended height where these instructions specifically mention solid-fuel-burning appliances or b) In the absence of specific instructions related to solid-fuel burning appliances, on or near the ceiling. 4) Where a fuel-burning *appliance* is installed in a *suite* of *residential occupancy,* a suite of *care occupancy,* an *alternative family care home,* or a *child care home,* a CO alarm shall be installed a) Inside each bedroom or b) Outside each bedroom, within 5 m of each bedroom door, measured following corridors and doorways. 5) Where a fuel-burning *appliance* is installed in a *service room* that is not in a *suite of residential occupancy, a suite of care occupancy* or an *alternative family care home,* or a *child care home,* a CO alarm shall be installed a) either inside each bedroom, or if outside, within 5 m of each bedroom door, measured following corridors and doorways, in every *suite* of *residential occupancy* or *suite of care occupancy* that shares a wall or floor/ceiling with the *service room, and*

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			b) in the *service room.* 6) For each *suite* of *residential occupancy,* a *suite* of *care occupancy,* an *alternative family care home* or a *child care home* that shares a wall or floor/ceiling assembly with a *storage garage* or that is adjacent to an *attic* or crawl space to which the *storage garage* is also adjacent, a CO alarm shall be installed a) Inside each bedroom or b) Outside each bedroom, within 5 m of each bedroom door, measured following corridors and doorways. 7) Where CO alarms are installed in a house with a *secondary suite,* including their common spaces, the CO alarms shall be wired so that the activation of any one CO alarm causes all CO alarms within the house with a *secondary suite,* including their common spaces, to sound.
9.32.3.13.	**Outdoor Intake and Exhaust Openings** **3)** The distance separating air intakes from building envelope penetrations that are potential sources of contaminants, such as gas vents or oil fill pipes, shall be not less than 900 mm. **4)** Air intakes shall be clearly labeled as such for identification from locations outside the dwelling unit. **5)** The distance from the bottom of an exhaust outlet to finished ground or to any nearer and lower permanent horizontal surface shall be not less than 100 mm. **6)** Where air intake and exhaust openings are in exposed locations, provision shall be made to protect them from the entry of precipitation by the use of louvres, weather cowls or other suitable protection.	**9.32.3.13.**	**Outdoor Intake and Exhaust Openings** **3)** The distance separating air intakes for mechanical ventilation from exhaust outlets that are potential sources of contaminants, such as gas vents or oil fill pipes, shall be not less than 1 800 mm. **4)** Except as provided in Sentences (5) and (6), exhaust outlets that discharge air containing moisture, such as bathroom ventilation and clothes dryer exhaust outlets, shall be located at least 1 800 mm from air intakes and vented soffits. **5)** Where an exhaust outlet referred to in Sentence (4) is located within a soffit, the soffit shall either be unvented, or if vented, the full depth of the soffit shall be blocked for a distance of 1 800 mm on each side of the exhaust outlet. **6)** Where an exhaust outlet referred to in Sentence (4) is located in a side wall less than 1 800 mm from a soffit, a section of the soffit above the exhaust outlet shall be unvented, or if vented, the full depth of the soffit shall be blocked in accordance with the widths stipulated in Table 9.32.3.13.-A, centred over the location of the outlet. **Table 9.32.3.13.-A** **Widths of Unvented or Blocked Soffits Where Exhaust Outlets Are Less Than 1 800 mm from a Soffit** Forming Part of Sentence 9.32.3.13.(6) Distance Between Exhaust Outlet and Soffit, mm / Total Width of Unvented or Blocked Soffit Centred Over Location of Exhaust Outlet, mm 1 to 300 — 3 600 301 to 600 — 3 400 601 to 900 — 3 100 901 to 1 200 — 2 700 1 201 to 1 500 — 2 000 1 501 to 1 799 — 1 000

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9.33.8.1.	**Piping for Heating and Cooling Systems** **Piping Materials and Installation** 1) Piping shall be made from materials designed to withstand the effects of temperatures and pressures that may occur in the system. (See Articles 3.1.5.19., 3.1.9.1. and 9.10.9.6. for fire safety requirements.) 2) Every pipe used in a heating or air-conditioning system shall be installed to allow for expansion and contraction due to temperature changes. 3) Supports and anchors for piping in a heating or air-conditioning system shall be designed and installed to ensure that undue stress is not placed on the supporting structure	**9.33.8.1.**	**Piping for Heating and Cooling Systems** **Piping Materials and Installation** 1) Piping shall be made from materials designed to withstand the effects of temperatures and pressures that may occur in the system. (See Articles 3.1.5.19., 3.1.9.1. and 9.10.9.7., and Sentence 9.10.9.9.(3) for fire safety requirements.)
9.36.1.2.	**Energy Efficiency** **Definitions** **5)** Not existent in 2015. Added in 2020 → **6)** Not existent in 2015. Added in 2020 → **8)** Not existent in 2015. Added in 2020 →	**9.36.1.2.**	**Energy Efficiency** **Definitions** **5)** For the purpose of this Section, the term "annual energy consumption" shall mean the annual sum of service water heating and space-conditioning energy consumption of the proposed house design, calculated in accordance with Article 9.36.5.4. or 9.36.7.3., as applicable. (See Note A-9.36.1.2.(5) and (6).) **6)** For the purpose of this Section, the term "house energy target" shall mean the annual energy consumption of the reference house, calculated in accordance with Article 9.36.5.4. or 9.36.7.3., as applicable. (See Note A-9.36.1.2.(5) and (6).) **8)** For the purpose of this Section, the term "volume of conditioned space" shall refer to the volume measured at the interior surfaces of exterior walls, ceilings, and floors of a building.
9.36.1.3.	**Compliance and Application** (See Note A-9.36.1.3.) **1)** Except as provided in Sentences (2) to (5), buildings shall comply with a) the prescriptive or trade-off requirements in Subsections 9.36.2. to 9.36.4., b) the performance requirements in Subsection 9.36.5., or c) the NECB. **3)** Subsection 9.36.5. applies only to a) houses with or without a secondary suite, and b) buildings containing only dwelling units and common spaces whose total floor area does not exceed 20% of the total floor area of the building. (See Note A-9.36.1.3.(3).) **4)** Buildings containing non-residential occupancies whose combined total floor area exceeds 300 m2 or medium-hazard industrial occupancies shall comply with the NECB.	**Building regulation change and 9.36.1.3. is repealed and the following substituted:**	**Compliance and Application** (See Note A-9.36.1.3.) **1)** Except as provided in Sentences (2) to (5), buildings shall comply with (a) The tiered performance requirements in Subsection 9.36.7. as follows i) The Tier 2 requirements for climate zone 7A effective January 1, 2024, and ii) The Tier 3 requirements for climate zone 7A effective January 1, 2025, or (b) The tiered prescriptive requirements in Subsection 9.36.8 as follows i) The Tier 2 requirements for climate zone 7A effective January 1, 2024, and ii) The Tier 3 requirements for climate zone 7A effective January 1, 2025. **2)** Subsection 9.36.7. applies only to a) Houses with or without a *secondary suite*, and b) Buildings containing only *dwelling units* and common spaces whose total *floor area does not* exceed 20% of the total *floor area* of the building. (See Note A-9.36.1.3.(3).) **3)** Subsection 9.36.8. applies only to *buildings* of *residential occupancy* to which Part 9 applies. **4)** *Buildings* containing *non-residential occupancies* shall comply with the NECB. **5)** *Buildings* or portions of *buildings* that are not required to be *conditioned spaces* are exempted from the requirements of this Section. (See Note A-9.36.1.3.(6).).

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“Table A-9.36.1.3. Energy Effiency Compliance Options for Part 9 Buildings Forming Part of Note A-9.36.1.3.

Building Types and Sizes	Energy Efficiency Compliance Options – 2020 NBC, DIV. B, Part 9 Buildings				
	NBC 9.36.2 to 9.36.4. (Prescriptive)	NBC 9.36.5. (Performance)	NBC 9.36.7. (Tiered Performance)	NBC 9.36.1. (Tiered Prescriptive)	NECB (Part 10)
• Houses with or withour a secondary unit • Buildings containing only dwelling units with common spaces ≤ 20% of buildings total floor area	✗	✗	✓	✓	✓
• Group C occupancies (Part 9 applicable)	✗	✗	✗	✓	✓
• Buildings containing Group D, E or F3 occupancies whose combined floor area ≤ 300 m2/ (excluding parking garages that serve residential occupancies) • Buildings with a mix of Group C and Group D, E or f3 occupancies where non-residential	✗	✗	✗	✗	✓

<table>
<tr><th>2015 NBC</th><th></th><th>2020 NBC</th><th><u>CHANGES MADE</u></th></tr>
<tr><td>Code Ref.</td><td>Code - Part 9</td><td>Code Ref.</td><td>Code - Part 9</td></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td>portions combined total floor area ≤ 300 m2/ (excluding parking garages that serve residential occupancies)</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>• Buildings containing Group D, E or F3 occupancies whose combined floor area > 300 m2
• Buildings containing group F2 occupancies of any size</td><td>✗</td><td>✗</td><td>✗</td><td>✗</td><td>✓</td></tr>
</table>
Notes to table A-9.36.1.3.:
The walls that enclose a common space are excluded from the calculations of floor area of that common space”</td></tr>
<tr><td></td><td>Continuity of Insulation
6) Where mechanical, plumbing or electrical system components, such as pipes, ducts, conduits, cabinets, chases, panels or recessed heaters, are placed within and parallel to a wall assembly required to be insulated, the effective thermal resistance of that wall at the projected area of the system component shall be not less than that required by Tables 9.36.2.6.-A, 9.36.2.6.-B, 9.36.2.8.-A and 9.36.2.8.-B (See Note A-9.36.2.5.(6).)
7) Except as permitted by Article 9.36.2.11., where mechanical ducts, plumbing pipes, conduits for electrical services or communication cables are placed within the insulated portion of a floor or ceiling assembly, the effective thermal resistance of the assembly at the projected area of the ducts, pipes, conduits or cables shall be not less than 2.78 (m2·K)/W</td><td>9.36.2.5.</td><td>Continuity of Insulation
6) Except as provided in Sentence (7) and Article 9.36.2.11., where mechanical, plumbing or electrical system components, such as pipes, ducts, conduits, cabinets, chases, panels or recessed heaters, are placed within and parallel to a wall assembly required to be insulated, the effective thermal resistance of that wall at the projected area of the system component shall be not less than that required by Tables 9.36.2.6.-A, 9.36.2.6.-B, 9.36.2.8.-A and 9.36.2.8.-B (See Note A-9.36.2.5.(6).)
7) The effective thermal resistance of a wall at the projected areas of plumbing and electrical system components, such as plumbing vent pipes, conduits, and electrical outlet and switch boxes, need not comply with Sentence (6), provided
a) the effective thermal resistance at the projected area of the system component is not less than 60% of that required in Articles 9.36.2.6. and 9.36.2.8., and
b) the insulation is continuous on the cold side behind the system component.</td></tr>
</table>

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9.36.2.10.	**Construction of Air Barrier Details** **7)** Penetrations by electrical wiring, outlets, switches or recessed light fixtures through the plane of airtightness shall be constructed airtight a) where the component is designed to provide a seal against air leakage, by sealing the component to the air barrier material (see Note A-9.36.2.10.(7)(a)), or b) where the component is not designed to provide a seal against air leakage, by covering the component with an air barrier material and sealing it to the adjacent air barrier material.	**9.36.2.10.**	**Construction of Air Barrier Details** 7) Except as provided in Sentence 9.36.8.8.(1), buildings to which this Subsection applies shall be constructed airtight in accordance with Sentences (8) to (18).
9.36.2.11.	**Trade-off Options for Above-ground Building Envelope Components and Assemblies** 5) The effective thermal resistance of windows shall be determined using one of the following equations, as applicable: a) RSI = 1/U, where the U-value is known, or b) RSI = 20/(57-ER), where the energy rating is known.	**9.36.2.11.**	**Trade-off Options for Above-ground Building Envelope Components and Assemblies** **5)** The effective thermal resistance of windows shall be determined as RSI = 1/U-value.

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9.36.3.10. **Equipment Efficiency**

Table 9.36.3.10.
HVAC Equipment Performance Requirements
Forming Part of Sentences 9.36.3.9.(2) and 9.36.3.10.(1)

Component or Equipment	Heating or Cooling Capacity, kW	Standard	Minimum Performance[1]
Air-Cooled Unitary Air Conditioners and Heat Pumps – Electrically Operated			
Split system	≤ 19	CSA C656	SEER = 14.5 EER = 11.5 HSPF = 7.1 (region 5 in standard)
Single-package system	≤ 19	CSA C656 (including General Instruction No. 2)	SEER = 14 EER = 11 HSPF = 7.0 (region 5 in standard)
All systems	> 19	CAN/CSA-C746	See Level 2 in standard
Water-Cooled Unitary Air Conditioners and Heat Pumps – Electrically Operated			
Ground-source and water-source heat pumps open loop closed loop	< 40	CAN/CSA-C13256-1	 $COP_c \geq 4.75$, $COP_h \geq 3.6$ $COP_c \geq 3.93$, $COP_h \geq 3.1$
Water-to-water heat pumps open loop closed loop	< 40	CAN/CSA-C13256-2	 $COP_c \geq 5.60$, $COP_h \geq 3.4$ $COP_c \geq 4.21$, $COP_h \geq 2.8$
Internal water-loop heat pumps	< 5 ≥ 5 and ≤ 40	CAN/CSA-C13256-1	$COP_c \geq 3.28$, $COP_h \geq 4.2$ $COP_c \geq 3.52$, $COP_h \geq 4.2$
Water-cooled air conditioners – all types	< 19	ANSI/AHRI 210/240 or CTI STD-201RS	COP = 3.54, ICOP = 3.60
Direct-Expansion Ground-Source Heat Pumps – Electrically Operated			
Direct-expansion ground-source heat pumps	≤ 21	CSA C748	EER = 13.0 $COP_h = 3.1$

9.36.3.10. **Equipment Efficiency**

Table 9.36.3.10.
HVAC Equipment Performance Requirements
Forming Part of Sentences 9.36.3.9.(2) and 9.36.3.10.(1)

Type of Equipment	Heating or Cooling Capacity, kW	Performance Testing Standard	Minimum Performance[1]
Air-Cooled Unitary Air Conditioners and Heat Pumps – Electrically Operated			
Split system	< 19	CSA C656	SEER = 14.5 EER = 11.5 HSPF V = 7.1
Single-package system	< 19	CSA C656	SEER = 14 EER = 11 HSPF V = 7.0
Heat pumps, split and single-package	≥ 19	See Tables 5.2.12.1.-A to -P of Division B of the NECB	
Air conditioners, all electrical phases, split and single-package	≥ 19	See Tables 5.2.12.1.-A to -P of Division B of the NECB	
Single-Package Vertical Air Conditioners (SPVAC) and Heat Pumps (SPVHP)			
SPVAC and SPVHP in cooling mode	< 19	CAN/CSA-C746	EER = 11
SPVAC and SPVHP in heating mode	< 19		$COP_h \geq 3.3$
SPVAC and SPVHP	≥ 19	See Tables 5.2.12.1.-A to -P of Division B of the NECB	
Water-Cooled Unitary Air Conditioners and Heat Pumps – Electrically Operated			
Ground-source and water-source heat pumps open loop closed loop	≤ 40	CAN/CSA-C13256-1	 $COP_c \geq 4.75$, $COP_h \geq 3.6$ $COP_c \geq 3.93$, $COP_h \geq 3.1$
Water-to-water heat pumps open loop closed loop	≤ 40	CAN/CSA-C13256-2	 $COP_c \geq 5.60$, $COP_h \geq 3.4$ $COP_c \geq 4.21$, $COP_h \geq 2.8$
Internal water-loop heat pumps	< 5 ≥ 5 and ≤ 40	CAN/CSA-C13256-1	$COP_c \geq 3.28$, $COP_h \geq 4.2$ $COP_c \geq 3.52$, $COP_h \geq 4.2$
Water-cooled air conditioners – all types	< 19	ANSI/AHRI 210/240	COP = 3.54, ICOP = 3.60
	≥ 19	See Tables 5.2.12.1.-A to -P of Division B of the NECB	

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Table 9.36.3.10. (Continued)

Component or Equipment	Heating or Cooling Capacity, kW	Standard	Minimum Performance[1]
Room Air Conditioners and Room Air Conditioner Heat Pumps			
Room air conditioners with reverse cycle			
with louvered sides	< 10.55	ANSI/AHAM RAC-1	EER = 8.5
without louvered sides			EER = 8.0
Room air conditioners without reverse cycle and with louvered sides	< 1.8	CSA C368.1	EER = 10.7
	≥ 1.8 and < 2.3		EER = 10.7
	≥ 2.3 and < 4.1		EER = 10.8
	≥ 4.1 and < 5.9		EER = 10.7
	≥ 5.9		EER = 9.4
Room air conditioner heat pumps with louvered sides	< 5.9		EER = 9.9
	≥ 5.9		EER = 9.5
Room air conditioners without louvered sides and without reverse cycle	< 1.8		EER = 9.9
	≥ 1.8 and < 2.3		EER = 9.9
	≥ 2.3 and < 4.1		EER = 9.4
	≥ 4.1 and < 5.9		EER = 9.4
	≥ 5.9		EER = 9.4
Room air conditioner heat pumps without louvered sides	< 4.1		EER = 9.2
	≥ 4.1		EER = 8.8
Room air conditioner, casement only	All capacities		EER = 9.5
Room air conditioner, casement slider	All capacities		EER = 9.5
Boilers			
Electric *boilers*	≤ 88	—	Must be equipped with automatic water temperature control[2]
Gas-fired *boilers*[3]	≤ 88	CAN/CSA-P.2	AFUE ≥ 90%
	> 88 and ≤ 117.23	AHRI BTS	E_t ≥ 83%
Oil-fired *boilers*	≤ 88	CSA B212 or ANSI/ASHRAE 103	AFUE ≥ 85%
Warm-Air Furnaces, Combination Warm-Air Furnace/Air-conditioning Units, Duct Furnaces and Unit Heaters			
Gas-fired warm-air *furnaces*[3]	≤ 65.9	CAN/CSA-P.2	AFUE ≥ 92%
	> 65.9 and ≤ 117.23	CAN/CSA-P.8	E_t ≥ 78.5%
Gas-fired duct *furnaces*[3]	≤ 117.23	ANSI Z83.8/CSA 2.6	E_t ≥ 81%
Gas-fired *unit heaters*[3]	≤ 117.23	CAN/CSA-P.11	E_t ≥ 82%
Oil-fired warm-air *furnaces*	≤ 66	CSA B212	AFUE ≥ 85%
Oil-fired duct *furnaces* and *unit heaters*	—	UL 731	E_c ≥ 80%
Combined space- and water-heating systems (combos)	≤ 87.9 if *boiler*-based	CAN/CSA-P.9[4]	TPF = 0.65
	≤ 73.2 if based on *service water heater*		
Integrated mechanical systems	—	CSA P.10	OTPF = 0.78
Other			
Gas-fired fireplaces and *stoves*[3]	—	—	[5]
Solid-fuel-burning space-heating equipment	—	EPA 40 CFR, Part 60, Subpart AAA or CSA B415.1[6]	See standard[7]
Dehumidifiers	≤ 87.5 L/day	CAN/CSA-C749	See standard[7]

Table 9.36.3.10. (Continued)

Type of Equipment	Heating or Cooling Capacity, kW	Performance Testing Standard	Minimum Performance[1]
Direct-Expansion Ground-Source Heat Pumps – Electrically Operated			
Direct-expansion ground-source heat pumps	≤ 21	CSA C748	EER = 13.0
			COP_h = 3.1
Packaged Terminal Air Conditioners (PTAC) and Heat Pumps (PTHP)			
PTAC – all types and modes	All capacities	See Tables 5.2.12.1.-A to -P of Division B of the NECB	
PTHP – all types and modes			
Room Air Conditioners and Room Air Conditioner Heat Pumps			
Louvered, without reverse cycle	< 2.3	CSA C368.1	CEER ≥ 11.0
	≥ 2.3 and < 4.1		CEER ≥ 10.9
	≥ 4.1 and < 5.9		CEER ≥ 10.7
	≥ 5.9 and < 8.2		CEER ≥ 9.4
	≥ 8.2 and < 10.6		CEER ≥ 9.0
Non-louvered, without reverse cycle	< 2.3		CEER ≥ 10.0
	≥ 2.3 and < 3.2		CEER ≥ 9.6
	≥ 3.2 and < 4.1		CEER ≥ 9.5
	≥ 4.1 and < 5.9		CEER ≥ 9.3
	≥ 5.9 and < 10.6		CEER ≥ 9.4
Louvered, with reverse cycle	< 5.9		CEER ≥ 9.8
	≥ 5.9 and < 10.6		CEER ≥ 9.3
Non-louvered, with reverse cycle	< 4.1		CEER ≥ 9.3
	≥ 4.1 and < 10.6		CEER ≥ 8.7
Room air conditioner, casement only	All capacities		CEER ≥ 9.5
Room air conditioner, casement slider	All capacities		CEER ≥ 10.4
Boilers			
Electric *boilers*	< 88	—	Must be equipped with automatic water temperature control[2]
Gas-fired *boilers*[3]	< 88	CAN/CSA-P.2	AFUE ≥ 90%
	≥ 88 and < 733	ANSI/AHRI 1500 or DOE 10 CFR, Part 431, Subpart E, Appendix A	E_t ≥ 83%
Oil-fired *boilers*	< 88	CAN/CSA-P.2	AFUE ≥ 86%
	≥ 88 and ≤ 733	ANSI/AHRI 1500 or DOE 10 CFR, Part 431, Subpart E, Appendix A	E_t ≥ 83%
Warm-Air Furnaces, Combination Warm-Air Furnace/Air-conditioning Units, Duct Furnaces and Unit Heaters			
Gas-fired warm-air *furnaces*[3]	≤ 66 using single-phase electric current	CAN/CSA-P.2	AFUE ≥ 95% and must be equipped with a high-efficiency constant torque or constant airflow fan motor
	≤ 66, through-the- wall *furnace*		E_t ≥ 78.5% AFUE ≥ 90%
	≤ 66 using three-phase electric current	ANSI Z21.47/CSA 2.3	AFUE ≥ 78% or E_t ≥ 80%
	> 66 and ≤ 117.23		E_t ≥ 80%

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Notes to Table 9.36.3.10.:
(1) The symbols and abbreviations that appear in this column have the following meanings:
AFUE = annual fuel utilization efficiency
COP = coefficient of performance, in W/W (COPc = in cooling mode and COPh = in heating mode)
Ec = combustion efficiency, in %
EER = energy efficiency ratio, in (Btu/h)/W (no metric equivalent)
Et = thermal efficiency
FE = fireplace efficiency
HSPF = heating season performance factor, in watt-hours
ICOP = integrated coefficient of performance, in W/W
OTPF = overall thermal performance factor
SEER = seasonal energy efficiency ratio, in (Btu/h)/W (no metric equivalent)
TPF = thermal performance factor
(2) No standard addresses the performance efficiency of electric boilers; however, their efficiency typically approaches 100%.
(3) Includes propane.
(4) See the exception stated in Sentence (3).
(5) See Sentence (2).
(6) CSA B415.1 does not apply to stoves with an oven whose volume is greater than 0.028 m3 and automatically fuelled appliances.
(7) Minimum performance values are omitted from the Table in cases where the referenced standard itself contains such requirement

Table 9.36.3.10. (Continued)

Type of Equipment	Heating or Cooling Capacity, kW	Performance Testing Standard	Minimum Performance[1]
Commercial gas-fired outdoor packaged *furnaces* (rooftop units)[3]	> 66 and ≤ 117.23	CAN/CSA-P.8	E_t ≥ 80%
Gas-fired duct *furnaces*[3]	≤ 117.23	ANSI Z83.8/CSA 2.6	E_t ≥ 81%
Gas-fired *unit heaters*[3]	≤ 117.23	CAN/CSA-P.11	E_t ≥ 82%
Oil-fired warm-air *furnaces*	≤ 66	CAN/CSA-P.2	AFUE ≥ 85%
Oil-fired duct *furnaces* and *unit heaters*	—	CSA B140.4	E_t ≥ 81%
Combined space- and water-heating systems (combos)	≤ 87.9 if boiler-based ≤ 73.2 if based on *service water heater*	CAN/CSA-P.9[4]	TPF = 0.80
Integrated mechanical systems	All capacities	CSA P.10	OTPF = 0.85
Electric *furnaces*	≤ 66	No energy performance test required	Must be equipped with a high-efficiency constant torque or constant airflow fan motor
Other			
Gas-fired fireplaces and *stoves*[3] heating decorative[5][6]	—	CAN/CSA-P.4.1	FE ≥ 50%, see Sentence (2) See Sentence (2)
Solid-fuel-burning space-heating equipment[7]	< 500 kW output capacity	EPA 40 CFR, Part 60, Subpart AAA and Subpart QQQQ, CSA B415.1, or EN 303-5	[8]
Dehumidifiers	≤ 16.6 L/day	CAN/CSA-C749	EF ≥ 1.35
	> 16.6 and ≤ 21.3 L/day		EF ≥ 1.50
	> 21.3 and ≤ 25.5 L/day		EF ≥ 1.60
	> 25.5 and ≤ 35.5 L/day		EF ≥ 1.70
	> 35.5 and ≤ 87.5 L/day		EF ≥ 2.50
Unitary electric resistance space heaters[9]	All capacities	No energy performance test required	—

Notes to Table 9.36.3.10.:
(1) The symbols and abbreviations that appear in this column have the following meanings:
AFUE = annual fuel utilization efficiency
CEER = combined energy-efficiency ratio, in (Btu/h)/W
COPc = coefficient of performance in cooling mode, in W/W
COPh = coefficient of performance in heating mode, in W/W
EER = energy-efficiency ratio, in (Btu/h)/W
EF = energy factor, in %/h Et = thermal efficiency
FE = fireplace efficiency
HSPF V = heating seasonal performance factor for region V (see map in CSA C656), in (Btu/h)/W
ICOP = integrated coefficient of performance, in W/W
OTPF = overall thermal performance factor
SEER = seasonal energy-efficiency ratio, in (Btu/h)/W
TPF = thermal performance factor
(2) An automatic water temperature control device adjusts the temperature of the water in the boiler so that the heat supplied corresponds more closely to the heat demanded under varying outdoor temperatures.

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			(3) Includes propane. **(4)** See Sentence (3). **(5)** Decorative gas-fired fireplaces and stoves are vented decorative gas appliances that are marked as such on their rating plate and that comply with ANSI Z21.50/CSA 2.22, “Vented decorative gas appliances.” **(6)** Decorative gas-fired fireplaces and stoves shall not be used to satisfy heating requirements or as part of the heating system required by Section 9.33. **(7)** Does not include stoves with an oven whose volume is greater than 0.028 m3. (8) Minimum performance values are omitted from the Table in cases where the referenced standard itself contains such requirements. Equipment tested to the referenced standards provides an acceptable level of energy performance. (9) See Sentence 9.36.3.6.(3).

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Table 9.36.4.2.
Service Water Heating Equipment Performance Requirements
Forming Part of Sentences 9.36.4.2.(1) and (2)

Type of Equipment	Input[1]	Performance Testing Standard	Performance Requirement[2]
Storage-Type Service Water Heaters			
Electric	≤ 12 kW (V_r > 50 L but ≤ 270 L)	CAN/CSA-C191	SL ≤ 35 + (0.20 V_r) (top inlet)
			SL ≤ 40 + (0.20 V_r) (bottom inlet)
	≤ 12 kW (V_r > 270 L but ≤ 454 L)		SL ≤ (0.472 V_r) – 38.5 (top inlet)
			SL ≤ (0.472 V_r) – 33.5 (bottom inlet)
	>12 kW	ANSI Z21.10.3/CSA 4.3 or DOE 10 CFR, Part 431, Subpart G, Appendix B	SL ≤ 0.30 +(102.2 V_a)
Heat pump water heaters	≤ 24 A and ≤ 250 V	CAN/CSA-C745	EF ≥ 2.1
Gas-fired[3]	≤ 22 kW and first-hour rating < 68 L	CAN/CSA-P.3	UEF ≥ 0.3456 – (0.00053 V_a)[4]
	≤ 22 kW and first-hour rating ≥ 68 L but < 193 L		UEF ≥ 0.5982 – (0.00050 V_a)[4]
	≤ 22 kW and first-hour rating ≥ 193 L but < 284 L		UEF ≥ 0.6483 – (0.00045 V_a)[4]
	≤22 kW and first-hour rating ≥284 L		UEF ≥ 0.6920 – (0.00034 V_a)[4]
	> 22 kW but ≤ 30.5 kW and V_r ≤ 454 L		UEF ≥ 0.8107 – (0.00021 V_a)[4]
	> 22 kW	DOE 10 CFR, Part 431, Subpart G, Appendix A	E_t ≥ 90% and SL ≤ 0.84 [(1.25 Q) ÷ (16.57 $\sqrt{V_a}$)]
Oil-fired	≤ 30.5 kW and first-hour rating < 68 L	CAN/CSA-B211 for EF or CAN/CSA-P.3 for UEF	EF ≥ 0.68 – (0.0005 V_r) or UEF ≥ 0.2509 – (0.00032 V_a)
	≤ 30.5 kW and first-hour rating ≥ 68 L but < 193 L		EF ≥ 0.68 – (0.0005 V_r) or UEF ≥ 0.5330 – (0.00042 V_a)
	≤ 30.5 kW and first-hour rating ≥ 193 L but < 284 L		EF ≥ 0.68 – (0.0005 V_r) or UEF ≥ 0.6078 – (0.00042 V_a)
	≤ 30.5 kW and first-hour rating ≥ 284 L		EF ≥ 0.68 – (0.0005 V_r) or UEF ≥ 0.6815 – (0.00037 V_a)
	> 30.5 kW but ≤ 40.99 kW and V_r ≤ 454 L		UEF ≥ 0.6740 – (0.00035 V_a)
	> 40.99 kW	DOE 10 CFR, Part 431, Subpart G, Appendix A	E_t ≥ 80% and SL ≤ (1.25 Q) + (16.57 $\sqrt{V_a}$)
Tankless Service Water Heaters			
Gas-fired	< 58.56 kW, V_r ≤ 7.6 L and max. flow rate < 6.4 L/min	CAN/CSA-P.3	UEF ≥ 0.86
	< 58.56 kW, V_r ≤ 7.6 L and max. flow rate ≥ 6.4 L/min		UEF ≥ 0.87
	≥ 58.56 kW, V_r ≤ 37.85 L and input rate to V_r ratio ≥ 309 W/L	DOE 10 CFR, Part 431, Subpart G, Appendix C	E_t ≥ 94%
Oil-fired	≤ 61.5 kW[5]	DOE 10 CFR, Part 430, Subpart B, Appendix E	EF ≥ 0.59 – (0.0005 V_r)
	Other	ANSI Z21.10.3/CSA 4.3 and DOE 10 CFR, Part 431, Subpart G	E_t ≥ 80%
Electric	—	—	[6]
Combined space- and water-heating systems (combos)	≤ 87.9 kW if *boiler*-based ≤ 73.2 kW if based on *service water heater*	CAN/CSA-P.9	TPF = 0.80

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Table 9.36.4.2. (Continued)

Type of Equipment	Input[1]	Performance Testing Standard	Performance Requirement[2]
Integrated mechanical systems	—	CSA P.10	OTPF = 0.85
Pool Heaters			
Gas-fired[3]	< 117.2 kW	ANSI Z21.56/CSA 4.7 or CSA P.6	$E_t \geq 82\%$
Oil-fired	—	CSA B140.12	$E_t \geq 78\%$

Notes to Table 9.36.4.2.:

(1) 1 kW = 3412 Btu/h

(2) The symbols and abbreviations used in this column have the following meanings:

EF = energy factor
E_t = thermal efficiency with a 38.9°C (70°F) water temperature difference
OTPF = overall thermal performance factor
Q = nameplate input rate, in kW
SL = standby loss, in W
TPF = thermal performance factor
UEF = uniform energy factor
V_r = rated nominal storage volume, in L
Vs = measured storage volume, in L

(3) Includes propane.

(4) Industry and regulators are transitioning from using EF to UEF as the metric to evaluate *service water heater* performance. While this Code sets out performance requirements for gas-fired *storage-type service water heaters* within the scope of CAN/CSA-P.3 in terms of UEF, the "Energy Efficiency Regulations" set out performance standards for such *service water heaters* in terms of both EF and UEF.

(5) Consistent with the U.S. Congress "National Appliance Energy Conservation Act of 1987."

(6) No standard addresses the performance efficiency of electric tankless *service water heaters*; however, their efficiency typically approaches 100%.

3) Except for components that are required to be installed outdoors, service water heating equipment shall be installed in a *conditioned space*. (See Note A-9.36.4.2.(3).)

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9.36.5.2.	**Energy Performance Compliance** **Definitions** (See Note A-9.36.5.2.) 2) For the purpose of this Subsection, the term “annual energy consumption” shall mean the annual sum of service water heating and space-conditioning energy consumption of the proposed house design, as calculated in accordance with this Subsection.	**9.36.5.2.**	**Energy Performance Compliance** **Definitions** (See Note A-9.36.5.2.) **2)** For the purpose of this Subsection, the term “proposed house” shall mean a modeled replica of the actual house under consideration, in which some elements covered in Subsections 9.36.2. to 9.36.4. are specific to the actual house, while other elements not covered in those Subsections, but that are necessary for the calculation of the annual energy consumption, are assigned default values.
9.36.5.3.	**1)** The performance compliance calculations shall determine a) the annual energy consumption of the proposed house, and b) the house energy target of a reference house	**9.36.5.3.**	**Compliance** (See Note A-9.36.5.3.) **1)** The performance compliance calculations shall determine the annual energy consumption of the proposed house and the house energy target of a reference house in accordance with a) this Subsection, or b) the EnerGuide Rating System, version 15, and Sentence (2). (See Note A-9.36.5.3.(1).)
9.36.5.4.	**Calculation Methods** 1) Except as provided in Sentence (2), the energy model calculations shall account for the annual energy consumption of systems and equipment required for a) space heating, b) ventilation, c) service water heating, and d) where installed, space cooling. (See Note A-9.36.5.4.(1).) **Table 9.36.5.4.** **Default Schedule for Internal Heat Gain Loads**(1) Forming Part of Sentence 9.36.5.4.(4)	**9.36.5.4.**	**Calculation Methods** **4)** The energy model calculations shall account for the loads due to heat gains from occupants, lighting, and miscellaneous equipment, which shall be fixed for every day of the year, by a) following the schedule provided in Table 9.36.5.4., and b) increasing the loads for each hour by 3.58 W per square metre of floor area in common spaces, if applicable. **Table 9.36.5.4.** **Default Schedule for Internal Heat Gain Loads**(1) Forming Part of Sentence 9.36.5.4.(4)

Average Load, in W, Before Noon											
12 a.m.	1 a.m.	2 a.m.	3 a.m.	4 a.m.	5 a.m.	6 a.m.	7 a.m.	8 a.m.	9 a.m.	10 a.m.	11 a.m.
786	552	549	523	521	547	634	726	847	880	906	986
Average Load, in W, After Noon											
12 p.m.	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.	7 p.m.	8 p.m.	9 p.m.	10 p.m.	11 p.m.
992	934	898	911	924	1 089	1 410	1 588	1 568	1 483	1 194	952

Notes to Table 9.36.5.4.:

(1) The schedule indicates at what time of day the heat gains from internal loads and hot water draws are present; it does not account for heat gains from exterior lighting and from lighting of unconditioned spaces.

Houses without a *Secondary Suite*(2)											
Average Load, in W, Before Noon											
12 a.m.	1 a.m.	2 a.m.	3 a.m.	4 a.m.	5 a.m.	6 a.m.	7 a.m.	8 a.m.	9 a.m.	10 a.m.	11 a.m.
646	454	452	431	429	450	522	597	696	724	745	811
Average Load, in W, After Noon											
12 p.m.	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.	7 p.m.	8 p.m.	9 p.m.	10 p.m.	11 p.m.
815	768	738	749	760	895	1159	1305	1288	1218	981	783
Each *Dwelling Unit* in Residential *Buildings* with Two or More *Dwelling Units*(2)											
Average Load, in W, Before Noon											
12 a.m.	1 a.m.	2 a.m.	3 a.m.	4 a.m.	5 a.m.	6 a.m.	7 a.m.	8 a.m.	9 a.m.	10 a.m.	11 a.m.
397	284	283	270	269	282	324	368	426	442	455	493
Average Load, in W, After Noon											
12 p.m.	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.	7 p.m.	8 p.m.	9 p.m.	10 p.m.	11 p.m.
496	468	451	457	463	543	697	783	773	732	593	477

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<table>
<tr>
<td></td>
<td>5) The energy model calculations shall account for the following space-heating temperature set-points:
a) 21°C in all living spaces above the basement,
b) 19°C in basements and common spaces, and
c) 15°C in crawl spaces intended to be conditioned spaces</td>
<td></td>
<td>
Table 9.36.5.4. (Continued)
Notes to Table 9.36.5.4.:
(1) The schedule indicates at what time of day the heat gains from the metabolic activity of the occupants and occupant-dependent appliance, lighting and receptacle electrical loads are present; it does not account for heat gains from exterior lighting, lighting of unconditioned spaces, service water heating systems and HVAC equipment.
(2) See Note A-Table 9.36.5.4.

5) The energy model calculations shall account for the following space-heating temperature set-points:
a) 20°C in all living spaces above the basement,
b) 19°C in basements and common spaces, and
c) 15°C in crawl spaces intended to be conditioned spaces.
</td>
</tr>
<tr>
<td>9.36.5.8.</td>
<td>5) The energy model calculations shall use a service water delivery temperature of 55˚C. (See Note A-9.36.5.8.(5).)
6) The energy model calculations shall take into account the service water heating use schedule presented in Table 9.36.5.8. using a load of a) 225 L/ day for houses with or without a secondary suite, or b) 140 L/day per dwelling unit for other types of residential buildings.

Table 9.36.5.8.
Default Schedule of Service Water Heating Use
Forming Part of Sentence 9.36.5.8.(6)
<table>
<tr><th>Type of Small Residential Building</th><th colspan="12">Distribution of Hourly Draws on Service Water Heating, L/h</th></tr>
<tr><td rowspan="4">Houses with or without a secondary suite (225 L/day/house)</td><td>12 a.m.</td><td>1 a.m.</td><td>2 a.m.</td><td>3 a.m.</td><td>4 a.m.</td><td>5 a.m.</td><td>6 a.m.</td><td>7 a.m.</td><td>8 a.m.</td><td>9 a.m.</td><td>10 a.m.</td><td>11 a.m.</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>5</td><td>20</td><td>30</td><td>55</td><td>27.5</td></tr>
<tr><td>12 p.m.</td><td>1 p.m.</td><td>2 p.m.</td><td>3 p.m.</td><td>4 p.m.</td><td>5 p.m.</td><td>6 p.m.</td><td>7 p.m.</td><td>8 p.m.</td><td>9 p.m.</td><td>10 p.m.</td><td>11 p.m.</td></tr>
<tr><td>7.5</td><td>2.5</td><td>5</td><td>12.5</td><td>22.5</td><td>15</td><td>15</td><td>5</td><td>2.5</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td rowspan="4">Dwelling units in other types of residential buildings (140 L/day/dwelling unit)</td><td>12 a.m.</td><td>1 a.m.</td><td>2 a.m.</td><td>3 a.m.</td><td>4 a.m.</td><td>5 a.m.</td><td>6 a.m.</td><td>7 a.m.</td><td>8 a.m.</td><td>9 a.m.</td><td>10 a.m.</td><td>11 a.m.</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>3.1</td><td>12.4</td><td>18.7</td><td>34.2</td><td>17.1</td></tr>
<tr><td>12 p.m.</td><td>1 p.m.</td><td>2 p.m.</td><td>3 p.m.</td><td>4 p.m.</td><td>5 p.m.</td><td>6 p.m.</td><td>7 p.m.</td><td>8 p.m.</td><td>9 p.m.</td><td>10 p.m.</td><td>11 p.m.</td></tr>
<tr><td>4.7</td><td>1.6</td><td>3.1</td><td>7.8</td><td>14</td><td>9.3</td><td>9.3</td><td>3.1</td><td>1.6</td><td>0</td><td>0</td><td>0</td></tr>
</table>
</td>
<td>9.36.5.8.</td>
<td>
Service Water Heating System Calculations
5) Except as provided in Sentence (8), the energy model calculations shall use a service water delivery temperature of 55˚C. (See Note A-9.36.5.8.(5).)
6) For hot service water usage other than for showering, the energy model calculations shall take into account the service water heating use schedule presented in Table 9.36.5.8. using a load of a) 97 L/ day for houses without a secondary suite, or b) 65 L/day for each dwelling unit in residential buildings with two or more dwelling units.

Table 9.36.5.8.
Default Schedule of Service Water Heating Use
Forming Part of Sentence 9.36.5.8.(6)
<table>
<tr><th>Type of Small Residential Building</th><th colspan="12">Distribution of Hourly Draws on Service Water Heating, L/h</th></tr>
<tr><td rowspan="4">Houses without a secondary suite (97 L/day/house)</td><td>12 a.m.</td><td>1 a.m.</td><td>2 a.m.</td><td>3 a.m.</td><td>4 a.m.</td><td>5 a.m.</td><td>6 a.m.</td><td>7 a.m.</td><td>8 a.m.</td><td>9 a.m.</td><td>10 a.m.</td><td>11 a.m.</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>2.2</td><td>8.6</td><td>12.9</td><td>23.7</td><td>11.9</td></tr>
<tr><td>12 p.m.</td><td>1 p.m.</td><td>2 p.m.</td><td>3 p.m.</td><td>4 p.m.</td><td>5 p.m.</td><td>6 p.m.</td><td>7 p.m.</td><td>8 p.m.</td><td>9 p.m.</td><td>10 p.m.</td><td>11 p.m.</td></tr>
<tr><td>3.2</td><td>1.1</td><td>2.2</td><td>5.4</td><td>9.7</td><td>6.5</td><td>6.5</td><td>2.2</td><td>1.1</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td rowspan="4">Each dwelling unit in residential buildings with two or more dwelling units (65 L/day/dwelling unit)</td><td>12 a.m.</td><td>1 a.m.</td><td>2 a.m.</td><td>3 a.m.</td><td>4 a.m.</td><td>5 a.m.</td><td>6 a.m.</td><td>7 a.m.</td><td>8 a.m.</td><td>9 a.m.</td><td>10 a.m.</td><td>11 a.m.</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1.4</td><td>5.7</td><td>8.6</td><td>15.8</td><td>7.9</td></tr>
<tr><td>12 p.m.</td><td>1 p.m.</td><td>2 p.m.</td><td>3 p.m.</td><td>4 p.m.</td><td>5 p.m.</td><td>6 p.m.</td><td>7 p.m.</td><td>8 p.m.</td><td>9 p.m.</td><td>10 p.m.</td><td>11 p.m.</td></tr>
<tr><td>2.2</td><td>0.7</td><td>1.4</td><td>3.6</td><td>6.5</td><td>4.3</td><td>4.3</td><td>1.4</td><td>0.7</td><td>0</td><td>0</td><td>0</td></tr>
</table>

7) The energy model calculations shall take into account daily hot service water usage for showering
a) at 7 a.m. for 15 mins for houses without a secondary suite, or
b) at 7 a.m. for 10 mins for each dwelling unit in residential buildings with two or more dwelling units.
8) The energy model shall set the service water delivery temperature for showering to 41°C at the shower head, with a flow rate of 7.6 L/min.
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</table>

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9.36.5.10.	**Modeling Building Envelope of Proposed House** **9)** The airtightness used in the energy model calculations for the proposed house shall be a) 3.2 air changes per hour at 50 Pa pressure differential with a pressure exponent of 0.67, where the construction complies with Section 9.25., b) 2.5 air changes per hour at 50 Pa pressure differential with a pressure exponent of 0.67, where it can be shown that the air barrier system is constructed in accordance with Subsection 9.25.3. and Articles 9.36.2.9. and 9.36.2.10., or c) the airtightness determined in accordance with Sentence 9.36.6.3.(1) expressed as i) the number of air changes per hour at 50 Pa pressure differential with a pressure exponent determined through a multi-point test, and ii) the equivalent leakage area. **10)** For compliance with Clause (9)(c), a design airtightness value shall be assigned for use in the energy model until the actual airtightness has been measured.	**9.36.5.10.**	**Modeling Building Envelope of Proposed House** **9)** The airtightness used in the energy model calculations for the proposed house shall be a) 3.2 air changes per hour at 50 Pa pressure differential with a pressure exponent of 0.67, where the construction complies with Section 9.25., b) 2.5 air changes per hour at 50 Pa pressure differential with a pressure exponent of 0.67, where it can be shown that the air barrier system is constructed in accordance with Subsection 9.25.3. and Articles 9.36.2.9. and 9.36.2.10., or c) the airtightness determined in accordance with Sentence 9.36.6.3.(1) expressed as i) the number of air changes per hour at 50 Pa pressure differential with a pressure exponent determined through a multi-point test, and ii) the equivalent leakage area. **10)** For compliance with Clause (9)(c), a design airtightness value shall be assigned for use in the energy model until the actual airtightness has been measured.
9.36.5.12.	**Modeling Service Water Heating System of Proposed House** **2)** The energy model calculations may include a) piping losses, and b) drain-water heat recovery, provided i) the calculation of the heat recovered is based on the performance of the drain-water heat-recovery unit specified, as determined in accordance with CSA B55.1, “Test method for measuring efficiency and pressure loss of drain water heat recovery units,” using a drain-water inlet temperature of 35°C, and ii) where there are one or two above-ground showers, all of them are served by the drain-water heat-recovery unit, and where there are more than two above-ground showers, at least two of them are served by the drain-water heat-recovery unit. (See Note A-9.36.5.12.(2).)	**9.36.5.12.**	**Modeling Service Water Heating System of Proposed House** **2)** The energy model calculations may include a) piping losses, and b) drain-water heat recovery, provided i) the calculation of the heat recovered is based on the performance of the drain-water heat-recovery unit specified, as determined in accordance with CSA B55.1, “Test method for measuring efficiency and pressure loss of drain water heat recovery units,” using a drain-water inlet temperature of 35°C, and ii) where there are one or two above-ground showers, all of them are served by the drain-water heat-recovery unit, and where there are more than two above-ground showers, at least two of them are served by the drain-water heat-recovery unit. (See Note A-9.36.5.12.(2).)
9.36.5.14.	**Modeling Building Envelope of Reference House** **2)** The energy model calculations for the reference house shall use the following values: a) 0.060 MJ/(m2×°C) for thermal mass, b) a solar absorptance of 0.4 for the exterior walls, roofs and exposed floors, c) 0.26 for the solar heat gain coefficient of fenestration, d) an airtightness of i) 3.0 air changes per hour at 50 Pa pressure differential for attached zones, where the airtightness used for the proposed house is determined in accordance with Sentence 9.36.6.3.(1) using the unguarded method, and ii) 2.5 air changes per hour at 50 Pa pressure differential otherwise, and e) the pressure exponent used for the proposed house where this value is less than 0.67, otherwise, 0.67.	**9.36.5.14.**	**Modeling Building Envelope of Reference House** 2) The energy model calculations for the reference house shall use the following values: a) 0.060 MJ/(m2×°C) for thermal mass, b) a solar absorptance of 0.4 for the exterior walls, roofs and exposed floors, c) 0.26 for the solar heat gain coefficient of fenestration, d) an airtightness of i) 3.0 air changes per hour at 50 Pa pressure differential for attached zones, where the airtightness used for the proposed house is determined in accordance with Sentence 9.36.6.3.(1) using the unguarded method, and ii) 2.5 air changes per hour at 50 Pa pressure differential otherwise, and e) the pressure exponent used for the proposed house where this value is less than 0.67, otherwise, 0.67.

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9.36.6.1.	**Added Section to 2020 →**	**9.36.6.1.**	**Airtightness of Building Envelope** **Scope and Application** **1)** This Subsection is concerned with a) determining the airtightness of buildings and dwelling units and parts thereof i) for use in the energy model calculations described in Subsection 9.36.5., or ii) for use in determining the Airtightness Level for the purposes of Clause (b), and b) determining the Airtightness Level for a building or dwelling unit to demonstrate compliance with Article 9.36.8.8.
9.36.6.2.	**Added Section to 2020 →**	**9.36.6.2.**	**Definitions** 1) For the purposes of this Subsection, the following terms shall have the meanings stated herein: a) "zone" means a conditioned space or part thereof having a sufficiently large opening onto the location where the airtightness testing equipment is installed to provide enough airflow such that the entire zone is at the same pressure (see Note A-9.36.6.2.(1)(a)), b) "attached zone" means a zone whose boundary area is fully or partially in contact with an adjacent zone or zones (see Note A-9.36.6.2.(1)(b)), c) "ACH50" refers to the air changes per hour at a reference pressure of 50 Pa, d) "NLA10" refers to the normalized leakage area at a reference pressure of 10 Pa, and e) "NLR50" refers to the normalized leakage rate at a reference pressure of 50 Pa.
9.36.6.3.	**Added Section to 2020 →**	**9.36.6.3.**	**Determination of Airtightness** **1)** Where airtightness is to be used as input to the energy model calculations, it shall be determined through a multi-point depressurization test carried out in accordance with CAN/CGSB-149.10, "Determination of the airtightness of building envelopes by the fan depressurization method," using the following parameters described therein: a) as-operated, and b) guarded or unguarded. **2)** Except as provided in Sentence (3), where airtightness is to be used to demonstrate compliance with an Airtightness Level listed in Table 9.36.6.4.-A or 9.36.6.4.-B, it shall be determined through a single-point, two-point or multi-point depressurization test carried out in accordance with CAN/CGSB-149.10, "Determination of the airtightness of building envelopes by the fan depressurization method," using the following parameters described therein: a) as-operated, and b) guarded or unguarded, as applicable. **3)** Determining NLA10 using a single-point test is not permitted. 9.36.6.4.

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9.36.7.3.	**Added Section to 2020 →**	**9.36.7.3.**	**Energy Performance Improvement Compliance Calculations** **1)** Except where otherwise stated in this Article, the proposed and reference houses shall be modeled in accordance with Subsection 9.36.5. to determine a) the annual energy consumption of the proposed house and the house energy target of the reference house, b) the annual gross space heat loss of the proposed and reference houses calculated in accordance with Sentence (5), and c) the peak cooling load of the proposed and reference houses (see Sentence (4)). (See Note A-9.36.7.3.(1).) **2)** The peak cooling load for the proposed house shall not be greater than the peak cooling load for the reference house. (See Sentence (4).) **3)** Except for energy performance tier 1, where space heating is provided by a heat pump in the proposed house, the reference house shall be modeled using a) equipment of the same type as the secondary or back-up system in the proposed house, but made to comply with the energy efficiency requirements of Article 9.36.3.10., or b) electric resistance heaters, where no back-up is provided in the proposed house. **4)** Where cooling systems are not installed in the proposed house, both the proposed and reference houses shall have additional models using appropriately sized space-cooling equipment serving all conditioned spaces to determine the peak cooling load. (See Note A-9.36.7.3.(4).) **5)** The annual gross space heat loss shall be calculated as the sum of the cumulative heat loss from a) conduction across opaque and transparent elements of the building envelope, b) air infiltration and exfiltration, and c) mechanical ventilation. (See Note A-9.36.7.3.(5).) **6)** The percent heat loss reduction shall be calculated by subtracting the annual gross space heat loss of the proposed house from the annual gross space heat loss of the reference house and dividing the result by the annual gross space heat loss of the reference house. **7)** The percent improvement shall be calculated by subtracting the annual energy consumption of the proposed house from the house energy target of the reference house and dividing the result by the house energy target of the reference house. **8)** The percent house energy target shall be calculated by dividing the annual energy consumption of the proposed house by the house energy target of the reference house. **9)** The airtightness value used in the energy model for the proposed house shall be a) the airtightness value set out in Clause 9.36.5.10.(9)(a), or b) where an airtightness test is to be conducted, a design airtightness, until the airtightness has been measured in accordance with Sentence 9.36.6.3.(1) and the appropriate airtightness value set out in Sentence 9.36.5.10.(9) can be selected. (See Note A-9.36.7.3.(9).)
9.36.8.1.	**Added Section to 2020 →**	**9.36.8.1.**	**Tiered Energy Performance Compliance: Prescriptive Path** **Scope** **1)** This Subsection is concerned with the energy performance improvement of the building through the implementation of energy conservation measures.

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9.36.8.2.	**Added Section to 2020 →**	**9.36.8.2.**	**Compliance** **1)** Compliance with this Subsection shall be achieved by a) designing and constructing buildings to which this Subsection applies in accordance with one or more of the energy conservation measures prescribed in Articles 9.36.8.4. to 9.36.8.10. to accumulate the minimum sum of energy conservation points required to attain Energy Performance Tier 2, 3, 4 or 5 as specified in Table 9.36.8.2., and b) complying with Subsections 9.36.2. to 9.36.4., except where these requirements are specifically permitted by this Subsection to be waived (see Note A-9.36.8.2.(1)(b)). **Table 9.36.8.2.** **Energy Performance Tiers** Forming Part of Clause 9.36.8.2.(1)(a) Energy Performance Tier / Minimum Sum of Energy Conservation Points 1 / (1) 2 / 10 3 / Reserved 4 / Reserved 5 / Reserved **Notes to Table 9.36.8.2.:** (1) Tier 1 represents compliance with the baseline energy efficiency requirements stated in Subsections 9.36.2. to 9.36.4.; therefore, this Tier has no energy conservation points associated with it.
9.36.8.3.	**Added Section to 2020 →**	**9.36.8.3.**	**Definitions** **1)** Reserved
9.36.8.4.	**Added Section to 2020 →**	**9.36.8.4.**	**Building Envelope – General** **1)** The building envelope shall be designed and constructed in accordance with Articles 9.36.2.1. to 9.36.2.5. and this Subsection.

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9.36.8.5.	**Added Section to 2020 →**	**9.36.8.5.**	**Energy Conservation Measures for Above-Ground Opaque Building Assemblies** **1)** Except as permitted by Articles 9.36.2.5. and 9.36.2.11., and Sentence 9.36.2.6.(3), the effective thermal resistance of above-ground opaque building assemblies or portions thereof shall be not less than that shown for the applicable heating degree-days of the building location in Table 9.36.2.6.-B. **2)** Above-ground walls that comply with one of the energy conservation measures prescribed in Table 9.36.8.5. shall be credited with the corresponding energy conservation points stipulated therein. **3)** The effective thermal resistance of rim joists shall be not less than that of the above-ground walls. **4)** Where the top of a section of foundation wall is on average greater than or equal to 600 mm above the adjoining ground level, the effective thermal resistance of the above-ground portion of that section of wall shall be not less than that of the above-ground walls. **5)** Except for tubular daylighting devices, the effective thermal resistance of skylight shafts shall be not less than that of the above-ground walls. **6)** Except as provided in Sentence (7), where above-ground walls are constructed using two or more wall assemblies with different calculated effective thermal resistance values, the above-ground wall assembly with the lowest effective thermal resistance value shall be used to determine the applicable energy conservation points from Table 9.36.8.5. **7)** The effective thermal resistance of one or more of the above-ground wall assemblies referred to in Sentence (6) is permitted to be less than that required to meet an energy conservation measure target listed in Table 9.36.8.5. for the wall or walls to be credited with the energy conservation points listed for that target, provided a) the effective thermal resistance of one or more of the other above-ground wall assemblies is increased to more than the energy conservation measure target listed in Table 9.36.8.5. to account for the wall assemblies that do not meet the target, and b) the sum of the results of each individual above-ground wall assembly area divided by its respective effective thermal resistance is less than or equal to the total area of all above-ground wall assemblies divided by the effective thermal resistance target listed in Table 9.36.8.5. that is to be credited. (See also Note A-9.36.2.11.(2).)

Table 9.36.8.5.
Energy Conservation Measures and Points for Above-Ground Walls(1)
Forming Part of Sentences 9.36.8.5.(2), (6) and (7)

Energy Conservation Measures for Above-Ground Walls – Minimum Effective RSI Values, ($m^2 \times K$)/W	Heating Degree-Days of *Building* Location, in Celsius Degree-Days					
	Zone 4 < 3000	Zone 5 3000 to 3999	Zone 6 4000 to 4999	Zone 7A 5000 to 5999	Zone 7B 6000 to 6999	Zone 8 ≥ 7000
	Energy Conservation Points					
2.97	2.0	–	–	–	–	–
3.08	3.2	1.4	1.6	2.1	–	–
3.69	7.4	5.4	6.2	6.7	5.4	5.2
3.85	8.2	6.0	6.9	7.4	6.2	6.0
3.96	8.9	6.8	7.7	8.2	7.0	6.8
4.29	10.2	8.1	9.2	9.7	8.6	8.4
4.40	10.8	8.7	9.9	10.3	9.3	9.1
4.57	11.4	9.3	10.6	11.1	10.1	9.9
4.73	11.9	9.7	11.1	11.5	10.6	10.4

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9.36.8.6.	**Added Section to 2020 →**	**9.36.8.6.**	**Energy Conservation Measures for Fenestration and Doors** **1)** Except as provided in Sentences (2) to (4), fenestration and doors that comply with one of the energy conservation measures prescribed in Table 9.36.8.6. shall be credited with the corresponding energy conservation points stipulated therein, provided all fenestration and doors comply with that energy conservation measure. **2)** Where the individual doors or windows have more than one overall thermal transmittance value (U-value), an average U-value is permitted to be used to determine the applicable energy conservation points from Table 9.36.8.6., provided the requirements of Sentence (3) are met. **3)** The U-value of one or more doors or fenestration is permitted to be greater than that required in Table 9.36.8.6., provided a) the traded doors and fenestration are located in the same orientation, b) the U-value of one or more of the other doors and fenestration is decreased to less than the energy conservation measure target in Table 9.36.8.6. to account for the doors and windows that do not meet the target, and c) the sum of each individual door or fenestration area multiplied by its respective U-value is less than or equal to the total area of all fenestration and doors multiplied by the U-value target in Table 9.36.8.6. that is to be credited. (See also Note A-9.36.2.11.(3).) **4)** Where the fenestration and doors make up not more than 17% of the total above-ground wall area, including openings, in a given orientation, the fenestration and doors in that orientation need not comply with Sentence (1) and are not subject to the provisions of Sentences (2) and (3), provided they meet or exceed the minimum Energy Rating stated in Table 9.36.8.6. that is to be credited. (See Note A-9.36.8.6.(4).)

Table 9.36.8.6.
Energy Conservation Measures and Points for Fenestration and Doors
Forming Part of Article 9.36.8.6.

Energy Conservation Measures for Fenestration and Doors(1)		Heating Degree-Days of *Building* Location, in Celsius Degree-Days					
Maximum U-values, W/(m²×K)	Minimum Energy Ratings(2)	Zone 4 < 3000	Zone 5 3000 to 3999	Zone 6 4000 to 4999	Zone 7A 5000 to 5999	Zone 7B 6000 to 6999	Zone 8 ≥ 7000
		Energy Conservation Points					
1.61	25	1.9	1.8	–	–	–	–
1.44	29	3.8	3.6	1.6	1.8	–	–
1.22	34	6.9	7.0	4.6	5.5	3.2	3.4

Notes to Table 9.36.8.6.:
(1) Except skylights and glass block assemblies.
(2) See Sentence (4). Energy Ratings shall be determined in accordance with CSA A440.2, "Fenestration energy performance."

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9.36.8.7.	**Added Section to 2020 →**	**9.36.8.7.**	**Energy Conservation Measures for Opaque Building Assemblies Below-Grade or in Contact with the Ground** **1)** Opaque building assemblies below-grade or in contact with the ground shall be designed and constructed in accordance with Sentences 9.36.2.8.(2) to (10) and this Article. **2)** Except as permitted by Article 9.36.2.5., the effective thermal resistance of foundation walls shall be not less than that shown for the applicable heating degree-days of the building location in Table 9.36.2.8.-B. **3)** Foundation walls that comply with one of the energy conservation measures prescribed in Table 9.36.8.7. shall be credited with the corresponding energy conservation points stipulated therein. **4)** Where foundation walls are constructed with more than one effective thermal resistance (RSI) value, the lowest effective RSI value of any of these walls shall be used to determine the applicable energy conservation points from Table 9.36.8.7. **Table 9.36.8.7.** **Energy Conservation Measures and Points for Opaque Building Assemblies Below-Grade or In Contact with Ground** Forming Part of Sentences 9.36.8.7.(3) and (4) Energy Conservation Measures for *Foundation* Walls – Minimum Effective RSI Values, $(m^2 \times K)/W$ / Heating Degree-Days of *Building* Location, in Celsius Degree-Days Zone 4 < 3000 / Zone 5 3000 to 3999 / Zone 6 4000 to 4999 / Zone 7A 5000 to 5999 / Zone 7B 6000 to 6999 / Zone 8 ≥ 7000 Energy Conservation Points 2.98: 1.7 – – – – – 3.09: 1.8 0.2 0.2 0.2 0.2 – 3.46: 2.2 0.6 0.8 0.6 0.7 – 3.90: 2.6 1.2 1.4 1.1 1.3 –
9.36.8.8.	**Added Section to 2020 →**	**9.36.8.8.**	**Energy Conservation Measures Relating to Airtightness** 1) Buildings to which this Subsection applies shall be designed and constructed in accordance with a) Articles 9.36.2.9. and 9.36.2.10., or b) Article 9.36.2.9. and Sentences 9.36.2.10.(1) to (7) and shall, where airtightness testing is carried out in accordance with Subsection 9.36.6., comply with an Airtightness Level listed in Table 9.36.6.4.-A or 9.36.6.4.-B. 2) Buildings that comply with an Airtightness Level determined in accordance with Clause (1)(b) shall be credited with the corresponding energy conservation points stipulated in Table 9.36.8.8.

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Table 9.36.8.8.
Energy Conservation Measures and Points for Airtightness
Forming Part of Sentence 9.36.8.8.(2)

Energy Conservation Measures for Airtightness – Airtightness Levels[1]	Heating Degree-Days of *Building* Location, in Celsius Degree-Days					
	Zone 4 < 3000	Zone 5 3000 to 3999	Zone 6 4000 to 4999	Zone 7A 5000 to 5999	Zone 7B 6000 to 6999	Zone 8 ≥ 7000
	Energy Conservation Points					
Airtightness Levels from Table 9.36.6.4.-A						
AL-1A	–	–	–	–	–	–
AL-2A	2.0	3.4	3.5	4.6	6.1	6.1

Table 9.36.8.8. (Continued)

Energy Conservation Measures for Airtightness – Airtightness Levels[1]	Heating Degree-Days of *Building* Location, in Celsius Degree-Days					
	Zone 4 < 3000	Zone 5 3000 to 3999	Zone 6 4000 to 4999	Zone 7A 5000 to 5999	Zone 7B 6000 to 6999	Zone 8 ≥ 7000
	Energy Conservation Points					
AL-3A	4.0	6.7	7.0	9.3	12.1	12.11
AL-4A	5.9	10.1	10.5	13.9	18.0	18.0
AL-5A	7.6	13.0	13.4	17.8	22.7	22.7
Airtightness Levels from Table 9.36.6.4.-B						
AL-1B	–	–	–	–	–	–
AL-2B	–	–	–	–	–	–
AL-3B	2.2	3.0	3.5	4.6	4.1	4.6
AL-4B	4.0	6.0	6.9	9.1	8.2	9.3
AL-5B	6.0	9.1	10.4	13.6	12.3	14.2
AL-6B	7.7	11.6	13.3	17.4	15.6	18.2

Notes to Table 9.36.8.8.:

(1) All *dwelling units* and common spaces in a *building*, or the whole *building*, must meet the Airtightness Level for which energy conservation points are being credited.

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8.36.8.9.	**Added Section to 2020 →**	**8.36.8.9.**	**Energy Conservation Measures for HVAC Systems** **1)** HVAC systems, equipment and installations shall be designed and constructed in accordance with Articles 9.36.3.2. to 9.36.3.8. and this Article. **2)** Where HVAC systems, equipment, or techniques other than those described in Articles 9.36.3.2. to 9.36.3.8. and this Article are used, the building shall be designed and constructed in accordance with the NECB. **3)** Ventilation systems serving buildings to which this Subsection applies shall be equipped with a heat-recovery ventilator conforming to Article 9.36.3.9. **4)** Heat-recovery ventilators that comply with one of the energy conservation measures prescribed in Table 9.36.8.9. shall be credited with the corresponding energy conservation points stipulated therein. **Table 9.36.8.9.** **Energy Conservation Measures and Points for Ventilation Systems** Forming Part of Sentence 9.36.8.9.(4) Energy Conservation Measures for Ventilation Systems – Sensible Heat-Recovery Efficiency, SRE(1) — Heating Degree-Days of *Building* Location, in Celsius Degree-Days Zone 4 < 3000 | Zone 5 3000 to 3999 | Zone 6 4000 to 4999 | Zone 7A 5000 to 5999 | Zone 7B 6000 to 6999 | Zone 8 ≥ 7000 Energy Conservation Points 60% ≤ SRE < 65%: 0.7 | 0.7 | 0.7 | 0.6 | 0.8 | 0.4 65% ≤ SRE < 75%: 2.1 | 2.1 | 2.2 | 1.7 | 2.3 | 1.2 75% ≤ SRE < 84%: 3.4 | 3.2 | 3.5 | 2.7 | 3.7 | 1.8 **Notes to Table 9.36.8.9.:** (1) SRE = sensible recovery efficiency measured at an outside air test temperature of 0°C
9.36.8.10.	**Added Section to 2020 →**	**9.36.8.10.**	**Energy Conservation Measures for Service Water Heating Equipment** **1)** Service water heating equipment and components shall be designed and constructed in accordance with Subsection 9.36.4. and this Article. **2)** Where service water heating equipment or techniques other than those described in Subsection 9.36.4. and this Article are used, the building shall be designed and constructed in accordance with the NECB. **3)** Service water heating equipment that complies with one of the energy conservation measures prescribed in Table 9.36.8.10. shall be credited with the corresponding energy conservation points stipulated therein.

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			Table 9.36.8.10. **Energy Conservation Measures and Points for Service Water Heating Equipment** Forming Part of Sentence 9.36.8.10.(3)

Type of Equipment	Energy Conservation Measures for Service Water Heating Equipment – Energy Efficiency, EF or UEF(1)(2)	Performance Testing Standard	Heating Degree-Days of *Building* Location, in Celsius Degree-Days					
			Zone 4 < 3000	Zone 5 3000 to 3999	Zone 6 4000 to 4999	Zone 7A 5000 to 5999	Zone 7B 6000 to 6999	Zone 8 ≥ 7000
			Energy Conservation Points					
Gas- or oil-fired tankless condensing water heater	EF ≥ 0.95 or UEF ≥ 0.92	CAN/CSA-P.3	8.9	5.4	4.9	3.1	3.1	3.1
Gas- or oil-fired residential *storage-type service water heater*	EF ≥ 0.80 or UEF ≥ 0.83		8.9	5.4	4.9	3.1	3.1	3.1
Gas- or oil-fired residential-duty commercial *storage-type service water heater*	UEF ≥ 0.79		4.6	2.7	2.4	1.5	1.5	1.5
	UEF ≥ 0.85		6.0	3.6	3.2	2.0	2.0	2.0
Heat pump water heater	EF ≥ 2.35	CAN/CSA-C745	6.4	3.9	3.8	3.0	3.0	3.0

Notes to Table 9.36.8.10.:

(1) EF = energy factor
UEF = uniform energy factor

(2) Applies to *storage-type service water heaters* that heat potable water, including *storage-type service water heaters* used to generate heat in combined space- and water-heating systems.

9.36.8.11.	**Added Section to 2020 →**	**9.36.8.11.**	**Energy Conservation Points for Building Volume** **1)** Buildings to which this Subsection applies that contain more than one dwelling unit, each of which contains not more than 230 m3 of conditioned space measured at the interior surfaces of the walls, ceilings and floors enclosing the suite, are permitted to be credited with ten energy conservation points. **2)** Buildings to which this Subsection applies that contain not more than 390 m3 of conditioned space, measured at the interior surfaces of exterior walls, ceilings and floors, are permitted to be credited with energy conservation points determined in accordance with Table 9.36.8.11.

2015 NBC		2020 NBC	CHANGES MADE
Code Ref.	Code - Part 9	Code Ref.	Code - Part 9

Table 9.36.8.11.
Energy Conservation Points for Building Volume
Forming Part of Sentence 9.36.8.11.(2)

Building Volume (V), m^3	Energy Conservation Points
$380 < V \leq 390$	1
$370 < V \leq 380$	2
$360 < V \leq 370$	3
$350 < V \leq 360$	4
$340 < V \leq 350$	5
$330 < V \leq 340$	6
$320 < V \leq 330$	7
$310 < V \leq 320$	8
$300 < V \leq 310$	9
$V \leq 300$	10