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January 10, 2017

**TO: BUILDING CODE USERS**

The enclosed replacement pages to the 2012 Building Code Compendium Edition[1] reflect recent revisions to Supplementary Standard SB-10 made by Minister's Ruling MR-16-S-27 as well as editorial changes.

In particular, Supplementary Standard SB-10 "Energy Efficiency Supplement" has been amended to include requirements that are intended to help industry meet the regulatory target set for 2017 which is a 13% improvement over the current energy efficiency requirements.

For this purpose, previously provided sample compliance paths in Division 3 of SB-10 have been revised and other compliance paths have been structured based on contemporary energy codes which include:

- Compliance path based on ANSI/ASHRAE/IES 90.1 2013 edition,
- Compliance path based on NECB 2015 edition, and
- Compliance path based on ANSI/ASHRAE/USGBC/IES 189.1 2014 edition.

Designers are permitted to continue to use the 1997 MNECB option with the 25% improvement approach in addition to a further 13% enhancement for a limited time. The deadline for permit application using the enhanced 1997 MNECB approach is December 31, 2017.

Changes to the Code are identified on the amendment pages by a unique symbol and a corresponding effective date. These pages should be inserted in your Code now. Replaced pages should be kept for future reference.

ServiceOntario Publications is the official publisher and vendor of the 2012 Building Code Compendium and the amendment pages. You may contact ServiceOntario Publications by phone at 416-326-5300, 1-800-668-9938 (toll-free), TTY 1-800-268-7095 or www.serviceontario.ca/publications.

For further information, please visit the Building Code website at www.ontario.ca/buildingcode.

Brenda Lewis
Director

Encl.

[1] The Compendium is not an official copy of the Act and Code. Official copies of the legislation can be accessed from www.e-laws.gov.on.ca.

# 2012 Building Code Compendium

# Volume 1

## January 1, 2017 update
## (Containing MR-16-S-27)

## COMMENCEMENT

Ontario Regulation 332/12 comes into force on the 1st day of January, 2014.

**r1** Amending Ontario Regulation 151/13 comes into force on the 1st day of January, 2014.
**r2** Amending Ontario Regulation 360/13 comes into force on the 1st day of January, 2014.
**r2.1** Amending Ontario Regulation 360/13 comes into force on the 1st day of January, 2015.
**r3** Amending Ontario Regulation 361/13 comes into force on the 1st day of January, 2014.
**r3.1** Amending Ontario Regulation 361/13 comes into force on the 1st day of January, 2015.
**r4** Amending Ontario Regulation 368/13 comes into force on the 1st day of January, 2015.
**r5** Amending Ontario Regulation 191/14 comes into force on the 1st day of January, 2015.

**m1** Ruling of the Minister of Municipal Affairs and Housing (Minister's Ruling) MR-13-S-24 comes into force on the 1st day of January 2014.
**m2** Ruling of the Minister of Municipal Affairs (Minister's Ruling) MR-16-S-25 comes into force on the 7th day of July 2016.
**m3** Ruling of the Minister of Municipal Affairs (Minister's Ruling) MR-16-S-26 comes into force on the 7th day of July 2016.
**m4** Ruling of the Minister of Municipal Affairs (Minister's Ruling) MR-16-S-27 comes into force on the 1st day of January 2017.

## EDITORIAL

**e1** Editorial correction issued for January 1st, 2014.
**e2** Editorial correction issued for January 1st, 2014.
**e2.1** Editorial correction issued for January 1st, 2015.
**e3** Editorial correction issued for January 1st, 2015.
**e4** Editorial correction issued for July 7th, 2016.
**e5** Editorial correction issued for January 1st, 2017.

## COVER PHOTO CREDITS

| | | | |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 |

1. Stephen Hawking Centre at the Perimeter Institute of Theoretical Physics; Teeple Architects Inc.; Scott Norsworthy Photography
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# Table of Contents

## Volume 2

# Code Amendment History

The first Ontario Building Code was issued in 1975. The 1975 and subsequent editions of the Building Code have been issued as follows:

| Building Code Edition | Date Filed | Effective Date |
|---|---|---|
| O. Reg. 925/75 (1975 Building Code) | November 24, 1975 | December 31, 1975 |
| O. Reg. 583/83 (1983 Building Code) | September 15, 1983 | November 30, 1983 |
| O. Reg. 419/86 (1986 Building Code) | July 18, 1986 | October 20, 1986 |
| O. Reg. 413/90 (1990 Building Code) | July 30, 1990 | October 1, 1990 |
| O. Reg. 403/97 (1997 Building Code) | November 3, 1997 | April 6, 1998 |
| O. Reg. 350/06 (2006 Building Code) | June 28, 2006 | December 31, 2006 |
| O. Reg. 332/12 (2012 Building Code) | November 2, 2012 | January 1, 2014 |

The following Table lists the amendments to the 2012 Building Code made since the filing of O. Reg. 332/12.

| Regulatory Amendments to the 2012 Building Code – Ontario Regulation 332/12 | | | |
|---|---|---|---|
| Amendment | Date Filed | Effective Date | Nature of Amendment |
| O. Reg. 151/13 | May 9, 2013 | January 1, 2014 | Sprinklering of retirement homes |
| O. Reg. 360/13 | December 20, 2013 | January 1, 2014 | Fees |
| | | January 1, 2015 | |
| O. Reg. 361/13 | December 20, 2013 | January 1, 2014 | Housekeeping changes, fireplace emission limits<br>Revise Supplementary Standard SA-1 |
| | | January 1, 2015 | EIFS |
| O. Reg. 368/13 | December 27, 2013 | January 1, 2015 | Accessibility |
| O. Reg. 191/14 | September 23, 2014 | January 1, 2015 | Midrise wood construction, accessibility, housekeeping changes<br>Revise Supplementary Standards SA-1, SB-1, SB-2, SB-3, SB-12 |

The following Table lists Minister's Rulings that have been made to adopt amendments to codes, formulae, standards, guidelines or procedures referenced in the 2012 Building Code.

| Minister's Rulings to adopt amendments to codes, formulae, standards, guidelines or procedures referenced in the 2012 Building Code | | | |
|---|---|---|---|
| Ruling Number | Date of Ruling | Effective Date | Nature of Amendment |
| MR-13-S-24 | September 1, 2013 | January 1, 2014 | Revise Table 1.3.1.2. of Division B<br>Revise Supplementary Standards SA-1, SB-5 and SB-12 |
| MR-16-S-25 | July 7, 2016 | July 7, 2016 | Revise Table 1.3.1.2. of Division B<br>Revise Supplementary Standard SB-5 |
| MR-16-S-26 | July 7, 2016 | July 7, 2016 | Revise Table 1.3.1.2. of Division B<br>Revise Supplementary Standard SB-12 |
| MR-16-S-27 | December 22, 2016 | January 1, 2017 | Revise Table 1.3.1.2. of Division B<br>Revise Supplementary Standard SB-10 |

*Horizontal branch* means that part of a *waste pipe* that is horizontal and installed to convey the discharge from more than one *fixture*.

*Horizontal exit* means an *exit* from one *building* to another by means of a doorway, vestibule, *walkway*, bridge or balcony.

*Horizontal service space* means a space such as an attic, duct, ceiling, roof or crawl space,
(a) that is oriented essentially in a horizontal plane,
(b) that is concealed and generally inaccessible, and
(c) through which *building* service facilities such as pipes, ducts and wiring may pass.

*Hotel* means *floor areas*, a *floor area* or part of a *floor area* that contains four or more *suites* and that provides sleeping accommodation for the travelling public or for recreational purposes.

*Hub drain* means a drain opening for indirect liquid wastes,
(a) that does not serve as a floor drain,
(b) that has the same pipe *size*, material and venting requirements as a floor drain,
(c) that has a *flood level rim* above the floor in which it is installed, and
(d) that receives wastes that are discharged directly into the drain opening.

*Impeded egress zone* means a supervised area in which occupants have free movement but require the release, by security personnel, of security doors at the boundary before being able to leave the area, but does not include a *contained use area*.

*Indirectly connected* means not *directly connected*.

*Indirect service water heater* means a *service water heater* that derives its heat from a heating medium such as warm air, steam or hot water.

*Individual vent* means a *vent pipe* that serves one *fixture*.

*Indoor pool* means a *public pool* where the pool and *pool deck* are totally or partially covered by a roof.

*Industrial occupancy* means the *occupancy* or use of a *building* or part of a *building* for the assembling, fabricating, manufacturing, processing, repairing or storing of goods or materials.

*Interceptor* means a receptacle that is designed and installed to prevent oil, grease, sand or other materials from passing into a *drainage system*.

*Interconnected floor space* means superimposed *floor areas* or parts of *floor areas* in which floor assemblies that are required to be *fire separations* are penetrated by openings that are not provided with *closures*.

*Lake Simcoe shoreline* has the same meaning as in the Lake Simcoe Protection Plan established under the *Lake Simcoe Protection Act, 2008* and dated July, 2009.

**e$_5$** *Lake Simcoe watershed* has the same meaning as in section 2 of the *Lake Simcoe Protection Act, 2008*.

*Leaching* means dispersal of liquid by downward or lateral drainage or both into permeable *soil*, as defined in Part 8 of Division B, or *leaching bed fill*.

*Leaching bed* means an absorption system constructed as *absorption trenches* or as a filter bed, located wholly in ground or raised or partly raised above ground, as required by local conditions, to which *effluent* from a *treatment unit* is applied for treatment and disposal and that is composed of,
(a) the *soil*, as defined in Part 8 of Division B, *leaching bed fill* or other filter media that is contained between the surface on which the *sanitary sewage* is applied and the bottom of the bed,
(b) the *distribution pipe* and the stone or gravel layer in which the *distribution pipe* is located, and
(c) the backfill above the *distribution pipe*, including the topsoil and sodding or other anti-erosion measure, and the side slopes of any portion elevated above the natural ground elevation.

*Leaching bed fill* means unconsolidated material suitable for the *construction* of a *leaching bed*, placed in the area of the *leaching bed* in order to obtain the required unsaturated zone below the *distribution pipes* and the required lateral extent such that the *effluent* is absorbed.

*Leader* means a pipe that is installed to carry storm water from a roof to a *storm building drain*, sewer or other place of disposal.

*Limiting distance* means the distance from an *exposing building face* to a property line, to the centre line of a *street*, lane or public thoroughfare or to an imaginary line between two *buildings* or *fire compartments* on the same property, measured at right angles to the *exposing building face*.

*Listed* means equipment or materials included in a list published by a certification organization accredited by the Standards Council of Canada.

*Liquid manure* means manure having a dry matter content of less than 18 percent or a slump of more than 150 millimetres using the Test Method for the Determination of Liquid Waste (slump test) set out in Schedule 9 to Regulation 347 of the Revised Regulations of Ontario, 1990 (General — Waste Management) made under the *Environmental Protection Act*.

*Live load* means a variable load due to the intended use and *occupancy* that is to be assumed in the design of the structural members of a *building* and includes loads due to cranes and the pressure of liquids in containers.

*Live/work unit* means a *dwelling unit* having an area of not more than 200 $m^2$ that contains a subsidiary *business and personal services occupancy* or a subsidiary *low hazard industrial occupancy*, and which is used and operated by one or more persons of a single household.

*Loadbearing* means, when applied to a *building* element, subjected to or designed to carry loads in addition to its own *dead load*, but does not include a wall element subject only to wind or earthquake loads in addition to its own *dead load*.

*Loading rate* means the volume in litres of *effluent* per square metre applied in a single day to *soil*, as defined in Part 8 of Division B, or *leaching bed fill*.

*Low hazard industrial occupancy* (Group F, Division 3) means an *industrial occupancy* in which the *combustible* content is not more than 50 kg/m² or 1 200 MJ/m² of *floor area*.

*Low human occupancy* means, when applied to a *farm building*, an *occupancy* in which the *occupant load* is not more than one person per 40 m² of *floor area* during normal use.

*Major occupancy* means the principal *occupancy* for which a *building* or part of a *building* is used or intended to be used, and is deemed to include the subsidiary *occupancies* that are an integral part of the principal *occupancy*. The *major occupancy* classifications used in this Code are as follows:

(a) Group A, Division 1 - *Assembly occupancies* intended for the production and viewing of the performing arts,
(b) Group A, Division 2 - *Assembly occupancies* not elsewhere classified in Group A,
(c) Group A, Division 3 - *Assembly occupancies* of the arena type,
(d) Group A, Division 4 - *Assembly occupancies* in which occupants are gathered in the open air,
(e) Group B, Division 1 - *Detention occupancies*,
(f) Group B, Division 2 - *Care and treatment occupancies*,
(g) Group B, Division 3 - *Care occupancies*,
(h) Group C - *Residential occupancies*,
(i) Group D - *Business and personal services occupancies*,
(j) Group E - *Mercantile occupancies*,
(k) Group F, Division 1 - *High hazard industrial occupancies*,
(l) Group F, Division 2 - *Medium hazard industrial occupancies*, and
(m) Group F, Division 3 - *Low hazard industrial occupancies*.

*Make-up water* means water added to a *public pool* from an external source.

*Marquee* means a *canopy* over an entrance to a *building*.

*Masonry or concrete chimney* means a *chimney* of brick, stone, concrete or masonry units constructed on site.

*Means of egress* includes *exits* and *access to exits* and means a continuous path of travel provided for the escape of persons from any point in a *building* or in a contained open space to,

(a) a separate *building*,
(b) an open public thoroughfare, or
(c) an exterior open space that is protected from fire exposure from the *building* and that has access to an open public thoroughfare.

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Table 1.3.1.2. (Cont'd)
Documents Referenced in the Building Code
Forming Part of Sentence 1.3.1.2.(1)

| Issuing Agency | Document Number | Title of Document(1) | Code Reference |
|---|---|---|---|
| MMAH | Supplementary Standard SB-1, September 2, 2014 | Climatic and Seismic Data | 1.1.2.1.(1)<br>1.1.2.1.(2)<br>3.2.6.2.(2)<br>3.3.1.7.(1)<br>5.2.1.1.(1)<br>5.2.1.1.(2)<br>6.2.1.1.(1)<br>6.2.1.7.(1)<br>7.4.10.4.(1)<br>9.4.1.1.(3)<br>9.4.2.2.(1)<br>Table 9.25.5.2.<br>Table 9.32.3.10.A.<br>9.33.3.2.(1) |
| MMAH | Supplementary Standard SB-2, September 2, 2014 | Fire Performance Ratings | 3.1.5.23.(1)<br>3.1.7.1.(2)<br>3.1.8.14.(2)<br>3.1.9.5.(1)<br>3.1.9.5.(2)<br>3.1.12.1.(3)<br>3.2.3.12.(1)<br>3.2.3.13.(4)<br>3.13.2.1.(8)<br>3.13.3.5.(1)<br>3.13.3.6.(2)<br>3.13.4.2.(7)<br>9.10.3.1.(1)<br>9.10.3.2.(1)<br>9.10.5.1.(4)<br>9.10.9.9.(1)<br>9.10.13.14.(1) |
| MMAH | Supplementary Standard SB-3, September 2, 2014 | Fire and Sound Resistance of Building Assemblies | 9.10.3.1.(1)<br>9.10.5.1.(4)<br>9.11.2.1.(1)<br>9.11.2.1.(2) |
| MMAH | Supplementary Standard SB-4, September 14, 2012 | Measures for Fire Safety in High Buildings | 3.2.6.2.(1)<br>3.2.6.2.(6)<br>3.2.6.5.(3)<br>3.2.6.9.(1)<br>3.2.6.10.(2)<br>3.2.6.14.(1)<br>Table 11.5.1.1.C.<br>Table 11.5.1.1.D/E.<br>Table 11.5.1.1.F. |
| MMAH | Supplementary Standard SB-5 | Reserved | |
| Column 1 | 2 | 3 | 4 |

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Table 1.3.1.2. (Cont'd)
Documents Referenced in the Building Code
Forming Part of Sentence 1.3.1.2.(1)

| Issuing Agency | Document Number | Title of Document(1) | Code Reference |
|---|---|---|---|
| MMAH | Supplementary Standard SB-6, September 14, 2012 | Percolation Times and Soil Descriptions | 8.2.1.2.(2) |
| MMAH | Supplementary Standard SB-7, September 14, 2012 | Guards for Housing and Small Buildings | 9.8.8.2.(5) |
| MMAH | Supplementary Standard SB-8, September 14, 2012 | Design, Construction and Installation of Anchorage Systems for Fixed Access Ladders | 3.6.1.5.(1) |
| MMAH | Supplementary Standard SB-9, September 14, 2012 | Requirements for Soil Gas Control | 9.13.4.1.(1)<br>9.13.4.2.(2) to (4) |
| $m_4$ MMA | Supplementary Standard SB-10, December 22, 2016 | Energy Efficiency Requirements | Table 9.7.3.3.<br>12.2.1.1.(2)<br>12.2.1.2.(2)<br>12.2.2.1.(1)<br>12.2.3.1.(1) |
| MMAH | Supplementary Standard SB-11, September 14, 2012 | Construction of Farm Buildings | 1.3.1.2.(4) of Division A |
| $m_3$ MMA | Supplementary Standard SB-12, July 7, 2016 | Energy Efficiency for Housing | Table 9.7.3.3.<br>Table 11.5.1.1.C.<br>12.2.1.1.(3)<br>12.2.1.2.(3) |
| MMAH | Supplementary Standard SB-13, September 14, 2012 | Glass in Guards | 3.1.20.1.(1) |
| MMAH | Supplementary Standard SC-1, September 14, 2012 | Code of Conduct for Registered Code Agencies | 3.7.4.1.(2) of Division C |
| MOE | PIBS 6879 2008 | Design Guidelines for Sewage Works | 7.1.5.5.(2) |
| MOE | PIBS 6881e 2008 | Design Guidelines for Drinking-Water Systems | 7.1.5.5.(1) |
| NFPA | 2014 Publication | National Fire Codes | 6.2.1.1.(1) |
| NFPA | 13-2013 | Installation of Sprinkler Systems | 3.1.9.1.(4); 3.2.4.9.(2)<br>3.2.4.17.(1); 3.2.5.13.(1)<br>3.2.8.4.(7); 3.3.2.12.(3)<br>3.15.1.1.(3); 3.15.1.1.(4)<br>3.15.1.5.(2); 3.15.1.6.(2)<br>3.15.2.1.(1); 3.15.2.2.(1)<br>3.15.3.1.(1); 9.10.9.6.(11) |
| NFPA | 13D-2010 | Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes | 3.2.5.13.(3) |
| NFPA | 13R-2010 | Installation of Sprinkler Systems in Residential Occupancies up to and including Four Stories in Height | 3.2.5.13.(2) |
| NFPA | 14-2010 | Installation of Standpipe and Hose Systems | 3.2.9.2.(1) |
| NFPA | 20-2010 | Installation of Stationary Pumps for Fire Protection | 3.2.4.10.(4)<br>3.2.5.19.(1) |
| Column 1 | 2 | 3 | 4 |

### 8.6.2.2. Other Treatment Units (See Appendix A.)

**(1)** Except as provided in Sentence (2), a *treatment unit*, other than a *septic tank*, shall be designed such that the *effluent* does not exceed, for the level of the *treatment unit* set out in Column 1 of Table 8.6.2.2., the maximum concentrations set out opposite it in Columns 2 and 3 of Table 8.6.2.2.

Table 8.6.2.2.
Other Treatment Unit Effluent Quality Criteria
Forming Part of Sentences 8.6.2.2.(1) and (2)

| Classification of Treatment Unit(1) | Suspended Solids(2) | $CBOD_5$(2) |
|---|---|---|
| Level II | 30 | 25 |
| Level III | 15 | 15 |
| Level IV | 10 | 10 |
| Column 1 | 2 | 3 |

Notes to Table 8.6.2.2.:
(1) The classifications of *treatment units* specified in Column 1 correspond to the levels of treatment described in CAN/BNQ 3680-600, "Onsite Residential Wastewater Treatment Technologies".
(2) Maximum concentration in mg/L based on a 30 day average.

**(2)** A *treatment unit* that is used in conjunction with a *leaching bed constructed* as a *shallow buried trench*, *Type A dispersal bed* or *Type B dispersal bed* shall be designed such that the *effluent* does not exceed the maximum concentrations set out opposite a Level IV *treatment unit* in Columns 2 and 3 of Table 8.6.2.2.

**(3)** All *treatment units* referred to in Sentences (1) and (2) that contain mechanical components shall be equipped with an audible and visual warning alarm so located to warn the occupants of the *building* served or the operator of the *treatment unit* of a malfunction in the operation of the *treatment unit*.

**(4)** All *treatment units* referred to in Sentences (1) and (2) shall permit the sampling of the *effluent*.

$e_5$ **(5)** A *treatment unit* is deemed to comply with Sentences (1) and (2) if it has been certified to CAN/BNQ 3680-600, "Onsite Residential Wastewater Treatment Technologies" using a temperature condition listed under option a) or b) of Clause 8.2.2. of that standard. (See Appendix A.)

**(6)** Every operator of a *treatment unit* shall obtain, from the manufacturer or distributor of the *treatment unit*, literature that describes the unit in detail and provides complete instructions regarding the operation, servicing, and maintenance requirements of the unit and its related components necessary to ensure the continued proper operation in accordance with the original design and specifications.

# Section 8.7. Leaching Beds

## 8.7.1. General Requirements

### 8.7.1.1. Scope

**(1)** This Section applies to the *construction* of *leaching beds*.

### 8.7.1.2. Limitation on Installation

**(1)** The design and installation of a *shallow buried trench*, *Type A dispersal bed* or *Type B dispersal bed* shall be carried out by a person competent in this field of work.

## 8.7.2. Design and Construction Requirements

### 8.7.2.1. General Requirements

**(1)** A *leaching bed* shall not be located,
(a) in an area that has an average slope that exceeds one unit vertically to four units horizontally,
(b) in *soil* or *leaching bed fill* having a *percolation time of,*
  (i) less than one minute, or greater than 125 minutes if *constructed* as a *shallow buried trench*, or
  (ii) less than one minute, or greater than 50 minutes for all other *leaching beds*, or
(c) in or on an area that is subject to flooding that may be expected to cause damage to the *leaching bed* or impair the operation of the *leaching bed*.

**(2)** A *leaching bed* shall not be covered with any material having a hydraulic conductivity less than 0.01 m/day.

**(3)** The surface of the *leaching bed* shall be shaped to shed water and together with the side slopes of any raised portion, shall be protected against erosion in such a manner as to not inhibit the evaporation and transpiration of waters from the *soil* or *leaching bed fill*, and to not cause plugging of the *distribution pipe*.

**(4)** No part of a *leaching bed* shall be sloped steeper than 1 unit vertically to 4 units horizontally.

**(5)** A *leaching bed* shall be designed to be protected from compaction or any stress or pressure that may result in,
(a) the impairment or destruction of any pipe in the *leaching bed*, or
(b) the smearing of the *soil* or *leaching bed fill*.

### 8.7.2.2. Distribution Pipes within Leaching Beds

**(1)** Sentence (2) applies to the design and *construction* of a *leaching bed* with *distribution pipes* used within the *leaching bed*.

**(2)** The *header line* and *distribution pipes* within a *leaching bed* shall be designed and *constructed* so that they can be detected by,
(a) magnetic means,
(b) means of a 14 gauge TW solid copper light coloured plastic coated tracer wire, or
(c) other means of subsurface detection.

## 8.7.3. Absorption Trench Construction

### 8.7.3.1. Length of Distribution Pipe

**(1)** The total length of *distribution pipe* shall,
(a) not be less than 30 m when *constructed* as a *shallow buried trench*, or
(b) not be less than 40 m for any other *absorption trench*.

(c) has a professional or financial interest in,
  (i) the *construction* of the *sewage system* to which the certificate relates,
  (ii) the *sewage system* to which the certificate relates, or
  (iii) the person responsible for the design of the *sewage system* to which the certificate relates, or
(d) is an elected official, officer or employee of a *principal authority*.

## 1.10.2. Mandatory Maintenance Inspection Program

### 1.10.2.1. Scope

**(1)** This Subsection establishes and governs, for the purposes of subsection 34(2.2) of the Act, a *maintenance inspection program* in respect of standards prescribed under clause 34(2)(b) of the Act in relation to *sewage systems*.

### 1.10.2.2. Administration of Maintenance Inspection Program

**(1)** The *principal authority* that has jurisdiction in an area affected by the *maintenance inspection program* established under Sentence 1.10.2.3.(1) shall administer the program for that area and shall conduct inspections under the program in accordance with this Subsection.

### 1.10.2.3. Maintenance Inspection Program

**(1)** Subject to Article 1.10.2.5., an *inspector* shall inspect all *sewage systems* located in whole or in part in the areas set out in Sentence (2) for compliance with the requirements of Section 8.9. of Division B.

**(2)** The areas referred to in Sentence (1) are:
(a) the strip of land that is located along the *Lake Simcoe shoreline* and that is 100 m wide measured horizontally and perpendicular to and upland from the *Lake Simcoe shoreline*, except for the portions of the strip of land that are described in Sentence (3),
**e5** (a.1) portions of the strip of land along the *Lake Simcoe shoreline* described in Sentence (3),
**e5** (a.2) the strip of land that is located along each of the following rivers, streams, lakes or ponds and that is 100 m wide measured horizontally and perpendicular to and upland from the river, stream, lake or pond,
  (i) any river or stream in the *Lake Simcoe watershed* that continually flows in an average year,
  (ii) any lake or pond in the *Lake Simcoe watershed* that is connected on the surface to a river or stream described in Subclause (i), and
  (iii) any other lake or pond in the *Lake Simcoe watershed* that has a surface area greater than 8 hectares, and
(b) areas within a *vulnerable area* that are located in a *source protection area* and that are identified in the most recent of the following documents as the areas where an activity described in Sentence (4) is or would be a *significant drinking water threat*:
  (i) the assessment report for the *source protection area*, as initially approved under the *Clean Water Act, 2006* or as most recently approved following any updating under that Act, or
  (ii) the *source protection plan* for the *source protection area*, as initially approved under the *Clean Water Act, 2006* or as most recently approved following any amendments or reviews under that Act.

**(3)** The excepted portions of the strip of land along the *Lake Simcoe shoreline* referred to in Clause (2)(a) are:
(a) that portion of the strip of land in the geographic Township of Oro, now in the municipal Township of Oro-Medonte, in the County of Simcoe, and in the geographic Townships of Innisfil and Vespra, now in the City of Barrie, being bounded on the north by the east limit of Lot 1, Concession 1 East Penetanguishene Road of the said geographic Township of Oro and its southerly prolongation and on the south by the east limit of Lot 14, Concession 13 of the said geographic Township of Innisfil and its northerly prolongation,
(b) that portion of the strip of land in the geographic Townships of North Gwillimbury and Georgina, now in the Town of Georgina, and in the geographic Township of East Gwillimbury, now in the Town of East Gwillimbury, all in The Regional Municipality of York, being bounded on the west by the west limit of Lot 6, Concession 1 of the said geographic Township of North Gwillimbury and its northerly prolongation and on the east by the east limit of Lot 3, Concession 8 of the said geographic Township of Georgina and its northerly prolongation, and

(c) that portion of the strip of land in the geographic Township of Mara, now in the municipal Township of Ramara, in the County of Simcoe, and in the geographic Township of Thorah, now in the municipal Township of Brock, in The Regional Municipality of Durham, being bounded on the north by the west limit of Lot 13, Concession C of the said geographic Township of Mara and its southerly prolongation and on the south by the west limit of Lot 14, Concession 6 of the said geographic Township of Thorah and its northerly prolongation.

**(4)** The activity referred to in Clause (2)(b) is an activity that is subject to the Act and that is described in paragraph 2 of subsection 1.1(1) of Ontario Regulation 287/07 (General) made under the *Clean Water Act, 2006*.

## 1.10.2.4. Time Periods for Maintenance Inspections

**(1)** An inspection required under Sentence 1.10.2.3.(1) shall be conducted in respect of a *sewage system* in an area described in Clause 1.10.2.3.(2)(a),

(a) initially, no later than,
  (i) January 1, 2016, in the case of a *sewage system constructed* before January 1, 2011, or
  (ii) five years after the *construction* of the *sewage system*, in the case of a *sewage system constructed* on or after January 1, 2011, and
(b) thereafter, every five years after the most recent inspection of the *sewage system* has been conducted.

$e_5$ **(1.1)** An inspection required under Sentence 1.10.2.3.(1) shall be conducted in respect of a *sewage system* in an area described in Clause 1.10.2.3.(2)(a.1) or (a.2),

(a) initially, no later than,
  (i) January 1, 2021, in the case of a *sewage system constructed* before January 1, 2016, or
  (ii) five years after the *construction* of the *sewage system*, in the case of a *sewage system constructed* on or after January 1, 2016, and
(b) thereafter, every five years after the most recent inspection of the *sewage system* has been conducted.

**(2)** An inspection required under Sentence 1.10.2.3.(1) shall be conducted in respect of a *sewage system* in an *area affected by a significant drinking water threat*,

(a) initially, no later than,
  (i) five years after the date on which notice of the approval of one of the following documents is published on the environmental registry under the *Clean Water Act, 2006*, in the case of a *sewage system constructed* before the date of publication,
    (A) the assessment report for the *source protection area*, if the *source protection plan* is one prepared under section 22 of the *Clean Water Act, 2006*, or
    (B) the *source protection plan* for the *source protection area*, if the *source protection plan* is one prepared under section 26 or 33 of the *Clean Water Act, 2006*, or
  (ii) five years after the *construction* of the *sewage system*, in the case of a *sewage system constructed* on or after the date of publication, and
(b) thereafter, every five years after the most recent inspection of the *sewage system* has been conducted.

**(3)** If additional *areas affected by a significant drinking water threat* are identified for a *source protection area* after the date of publication referred to in Clause (2)(a), an inspection required under Sentence 1.10.2.3.(1) shall be conducted in respect of a *sewage system* in those additional areas,

(a) initially, no later than,
  (i) five years after the following date of approval or publication, as applicable, in the case of a *sewage system constructed* before that date,
    (A) the date of approval under section 19 of the *Clean Water Act, 2006* of the updated assessment report in which the additional areas are identified, or
    (B) the date of publication on the environmental registry under the *Clean Water Act, 2006* of notice of the approval of the amended or updated *source protection plan* in which the additional areas are identified, or
  (ii) five years after the *construction* of the *sewage system*, in the case of a *sewage system constructed* on or after the date of approval or publication, as applicable, and
(b) thereafter, every five years after the most recent inspection of the *sewage system* has been conducted.

## 1.10.2.5. Certificate as Alternative to Maintenance Inspection

**(1)** The *principal authority* that administers the *maintenance inspection program* established under Sentence 1.10.2.3.(1), may, as an alternative to conducting an inspection of a *sewage system* required under Sentence 1.10.2.3.(1), accept a certificate described in Sentence (2) from the owner of the property on which the *sewage system* is located.

**(2)** The certificate required by Sentence (1) shall satisfy the requirements of Sentence 1.10.1.3.(2) and for these purposes Sentences 1.10.1.3.(3) to (5) apply with necessary modifications.

# Part 4

# e5 Transition, Amendments, Revocation and Commencement

# Part 4

# Transition, Amendments, Revocation and Commencement

## Section 4.1. Transition Rule

### 4.1.1. Transition, January 2014

#### 4.1.1.1. Transition Rule

r3 **(1)** Subject to Sentence (2), Ontario Regulation 350/06 (Building Code) made under the Act, as it read on December 31, 2013, is deemed to continue in force with respect to *construction* for which a permit has been applied for before January 1, 2014.

**(2)** Sentence (1) does not apply unless the *construction* is commenced within six months after the permit is issued.

### r3 4.1.2. Transition, January 2015

#### 4.1.2.1. Transition Rule

**(1)** Subject to Sentence (2), this Regulation, as it read on December 31, 2014, is deemed to continue in force with respect to *construction* for which a permit has been applied for before January 1, 2015.

**(2)** Sentence (1) does not apply unless the *construction* is commenced within six months after the permit is issued.

### r3 4.1.3. Transition, January 2017

#### 4.1.3.1. Transition Rule

r5 **(1)** Subject to Sentence (2), Item 337 (MMAH Supplementary Standard SB-5, "Approved Sewage Treatment Units") of Table 1.3.1.2. and Sentence 8.6.2.2.(5) of Division B of this Regulation, as they read on December 31, 2016, are deemed to continue in force with respect to *construction* for which a permit has been applied for before January 1, 2017.

**(2)** Sentence (1) does not apply unless the *construction* is commenced within six months after the permit is issued.

## $e_5$ Section 4.2. Omitted

(Provides for Amendments to this Regulation). O. Reg. 332/12, Section 4.2.

## $e_5$ Section 4.3. Omitted

(Revokes Other Regulations). O. Reg. 332/12, Section 4.3.

## $e_5$ Section 4.4. Omitted

(Provides for Coming into Force of Provisions of this Regulation). O. Reg. 332/12, Section 4.4.

# 2012 Building Code Compendium

# Volume 2

## January 1, 2017 update

**COMMENCEMENT**

Supplementary Standards SA-1, SB-1 to SB-13 and SC-1 come into force on the 1st day of January, 2014.

See "Code Amendment History" page in the Preface of Volume 1 for information concerning amendments to Supplementary Standards issued through Minister's Rulings.

**$a_1$** Amendment made to Appendix A or B issued for January 1st, 2014.
**$a_2$** Amendment made to Appendix A or B issued for January 1st, 2014.
**$a_{2.1}$** Amendment made to Appendix A or B issued for January 1st, 2015.
**$a_3$** Amendment made to Appendix A or B issued for January 1st, 2015.
**$a_4$** Amendment made to Appendix A or B issued for July 7th, 2016.

**EDITORIAL**

**$e_1$** Editorial correction issued for January 1st, 2014.
**$e_2$** Editorial correction issued for January 1st, 2014.
**$e_{2.1}$** Editorial correction issued for January 1st, 2015.
**$e_3$** Editorial correction issued for January 1st, 2015.
**$e_4$** Editorial correction issued for July 7th, 2016.
**$e_5$** Editorial correction issued for January 1st, 2017.

**COVER PHOTO CREDITS**

| | | | |
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# Table of Contents

## Volume 2

# MMAH Supplementary Standard SB-1

# Climatic and Seismic Data

## September 2, 2014 update

**Effective Date: January 1, 2017**

**Issued January 10, 2017**

**COMMENCEMENT**

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

**r**$_5$ SB-1 as amended by Ontario Regulation 191/14 comes into force on the 1st day of January, 2015.

**EDITORIAL**

**e**$_2$ Editorial correction issued for January 1st, 2014.
**e**$_5$ Editorial correction issued for January 1st, 2017.

Table 1.2 (Cont'd)
Design Data for Selected Locations in Ontario

| Location | Elevation, m | Design Temperature | | | | Degree Days Below 18°C | 15 Min Rainfall, mm | One Day Rainfall, 1/50, mm | Annual Rainfall, mm | Annual Total Precipitation, mm | Driving Rain Wind Pressures, Pa, 1/5 | Snow Load, kPa, 1/50 | | Hourly Wind Pressures, kPa | | Seismic Data | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | January | | July 2.5% | | | | | | | | $S_s$ | $S_r$ | 1/10 | 1/50 | $S_a(0.2)$ | $S_a$ (0.5) | $S_a(1.0)$ | $S_a(2.0)$ | PGA |
| | | 2.5%, °C | 1%, °C | Dry, °C | Wet, °C | | | | | | | | | | | | | | | |
| Ottawa (Metropolitan) | | | | | | | | | | | | | | | | | | | | |
| Ottawa (City Hall) | 70 | -25 | -27 | 30 | 23 | 4440 | 23 | 86 | 750 | 900 | 160 | 2.4 | 0.4 | 0.32 | 0.41 | 0.640 | 0.310 | 0.140 | 0.046 | 0.320 |
| Ottawa (Barrhaven) | 98 | -25 | -27 | 30 | 23 | 4500 | 25 | 92 | 750 | 900 | 160 | 2.4 | 0.4 | 0.32 | 0.41 | 0.630 | 0.300 | 0.140 | 0.045 | 0.320 |
| Ottawa (Kanata) | 98 | -25 | -27 | 30 | 23 | 4520 | 25 | 92 | 730 | 900 | 160 | 2.5 | 0.4 | 0.32 | 0.41 | 0.620 | 0.300 | 0.130 | 0.045 | 0.320 |
| Ottawa (MacDonald-Cartier Int'l Airport) | 125 | -25 | -27 | 30 | 23 | 4500 | 24 | 89 | 750 | 900 | 160 | 2.4 | 0.4 | 0.32 | 0.41 | 0.630 | 0.310 | 0.140 | 0.046 | 0.320 |
| Ottawa (Orleans) | 70 | -26 | -28 | 30 | 23 | 4500 | 23 | 91 | 750 | 900 | 160 | 2.4 | 0.4 | 0.32 | 0.41 | 0.630 | 0.310 | 0.140 | 0.046 | 0.320 |
| Owen Sound | 215 | -19 | -21 | 29 | 22 | 4030 | 28 | 113 | 760 | 1075 | 160 | 2.8 | 0.4 | 0.37 | 0.48 | 0.120 | 0.085 | 0.055 | 0.018 | 0.036 |
| Pagwa River | 185 | -35 | -37 | 28 | 21 | 6500 | 20 | 86 | 540 | 825 | 80 | 2.4 | 0.4 | 0.23 | 0.30 | 0.095 | 0.057 | 0.026 | 0.009 | 0.036 |
| Paris | 245 | -18 | -20 | 30 | 23 | 4000 | 23 | 96 | 790 | 925 | 160 | 1.4 | 0.4 | 0.33 | 0.42 | 0.180 | 0.100 | 0.060 | 0.019 | 0.084 |
| Parkhill | 205 | -16 | -18 | 31 | 23 | 3800 | 25 | 103 | 800 | 925 | 180 | 2.1 | 0.4 | 0.39 | 0.50 | 0.120 | 0.079 | 0.051 | 0.016 | 0.041 |
| Parry Sound | 215 | -24 | -26 | 28 | 22 | 4640 | 23 | 97 | 820 | 1050 | 160 | 2.8 | 0.4 | 0.30 | 0.39 | 0.160 | 0.110 | 0.065 | 0.022 | 0.050 |
| Pelham (Fonthill) | 230 | -15 | -17 | 30 | 23 | 3690 | 23 | 96 | 820 | 950 | 160 | 2.3 | 0.4 | 0.33 | 0.42 | 0.340 | 0.190 | 0.068 | 0.022 | 0.200 |
| Pembroke | 125 | -28 | -31 | 30 | 23 | 4980 | 23 | 105 | 640 | 825 | 100 | 2.5 | 0.4 | 0.27 | 0.35 | 0.630 | 0.300 | 0.130 | 0.044 | 0.320 |
| Penetanguishene | 220 | -24 | -26 | 29 | 23 | 4200 | 25 | 97 | 720 | 1050 | 160 | 2.8 | 0.4 | 0.30 | 0.39 | 0.140 | 0.110 | 0.064 | 0.022 | 0.041 |
| Perth | 130 | -25 | -27 | 30 | 23 | 4540 | 25 | 92 | 730 | 900 | 140 | 2.3 | 0.4 | 0.32 | 0.41 | 0.360 | 0.210 | 0.110 | 0.036 | 0.140 |
| Petawawa | 135 | -29 | -31 | 30 | 23 | 4980 | 23 | 92 | 640 | 825 | 100 | 2.6 | 0.4 | 0.27 | 0.35 | 0.630 | 0.300 | 0.130 | 0.043 | 0.320 |
| Peterborough | 200 | -23 | -25 | 30 | 23 | 4400 | 25 | 92 | 710 | 840 | 140 | 2.0 | 0.4 | 0.32 | 0.41 | 0.190 | 0.130 | 0.078 | 0.025 | 0.062 |
| Petrolia | 195 | -16 | -18 | 31 | 24 | 3640 | 25 | 108 | 810 | 920 | 180 | 1.3 | 0.4 | 0.36 | 0.47 | 0.130 | 0.079 | 0.049 | 0.015 | 0.048 |
| Pickering (Dumbarton) | 85 | -19 | -21 | 30 | 23 | 3800 | 23 | 92 | 730 | 825 | 140 | 1.0 | 0.4 | 0.37 | 0.48 | 0.180 | 0.120 | 0.069 | 0.022 | 0.078 |
| Picton | 95 | -21 | -23 | 29 | 23 | 3980 | 23 | 92 | 770 | 940 | 160 | 2.0 | 0.4 | 0.38 | 0.49 | 0.260 | 0.160 | 0.088 | 0.028 | 0.110 |
| Plattsville | 300 | -19 | -21 | 29 | 23 | 4150 | 28 | 103 | 820 | 950 | 140 | 1.9 | 0.4 | 0.33 | 0.42 | 0.150 | 0.096 | 0.058 | 0.018 | 0.069 |
| Column 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |

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$r_5$

Table 1.2 (Cont'd)
Design Data for Selected Locations in Ontario

| Location | Elevation, m | Design Temperature | | | | Degree Days Below 18°C | 15 Min Rainfall, mm | One Day Rainfall, 1/50, mm | Annual Rainfall, mm | Annual Total Precipitation, mm | Driving Rain Wind Pressures, Pa, 1/5 | Snow Load, kPa, 1/50 | | Hourly Wind Pressures, kPa | | Seismic Data | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | January | | July 2.5% | | | | | | | | | | | | | | | | |
| | | 2.5%, °C | 1%, °C | Dry, °C | Wet, °C | | | | | | | $S_s$ | $S_r$ | 1/10 | 1/50 | $S_a(0.2)$ | $S_a(0.5)$ | $S_a(1.0)$ | $S_a(2.0)$ | PGA |
| Point Alexander | 150 | -29 | -32 | 30 | 22 | 4960 | 23 | 92 | 650 | 850 | 100 | 2.5 | 0.4 | 0.27 | 0.35 | 0.630 | 0.300 | 0.130 | 0.043 | 0.320 |
| Port Burwell | 195 | -15 | -17 | 30 | 24 | 3800 | 25 | 92 | 930 | 1000 | 180 | 1.2 | 0.4 | 0.36 | 0.47 | 0.170 | 0.099 | 0.058 | 0.018 | 0.092 |
| Port Colborne | 180 | -15 | -17 | 30 | 24 | 3600 | 23 | 108 | 850 | 1000 | 160 | 2.3 | 0.4 | 0.36 | 0.46 | 0.330 | 0.180 | 0.066 | 0.022 | 0.190 |
| Port Elgin | 205 | -17 | -19 | 28 | 22 | 4100 | 25 | 92 | 790 | 850 | 180 | 2.8 | 0.4 | 0.43 | 0.55 | 0.110 | 0.078 | 0.051 | 0.017 | 0.036 |
| Port Hope | 100 | -21 | -23 | 29 | 23 | 3970 | 23 | 94 | 760 | 825 | 180 | 1.2 | 0.4 | 0.37 | 0.48 | 0.210 | 0.130 | 0.077 | 0.024 | 0.094 |
| Port Perry | 270 | -22 | -24 | 30 | 23 | 4260 | 25 | 97 | 720 | 850 | 140 | 2.4 | 0.4 | 0.34 | 0.44 | 0.170 | 0.120 | 0.070 | 0.023 | 0.053 |
| Port Stanley | 180 | -15 | -17 | 31 | 24 | 3850 | 25 | 92 | 940 | 975 | 180 | 1.2 | 0.4 | 0.36 | 0.47 | 0.170 | 0.099 | 0.055 | 0.017 | 0.090 |
| Prescott | 90 | -23 | -25 | 29 | 23 | 4120 | 25 | 103 | 770 | 975 | 180 | 2.2 | 0.4 | 0.34 | 0.44 | 0.420 | 0.240 | 0.120 | 0.038 | 0.018 |
| Princeton | 280 | -18 | -20 | 30 | 23 | 4000 | 25 | 97 | 810 | 925 | 160 | 1.5 | 0.4 | 0.33 | 0.42 | 0.160 | 0.100 | 0.059 | 0.018 | 0.082 |
| Raith | 475 | -34 | -37 | 28 | 22 | 5900 | 23 | 97 | 570 | 750 | 120 | 2.7 | 0.4 | 0.23 | 0.30 | 0.095 | 0.057 | 0.026 | 0.008 | 0.036 |
| Rayside-Balfour (Chelmsford) | 270 | -28 | -30 | 29 | 21 | 5200 | 25 | 92 | 650 | 850 | 180 | 2.5 | 0.4 | 0.35 | 0.45 | 0.140 | 0.097 | 0.057 | 0.020 | 0.045 |
| Red Lake | 360 | -35 | -37 | 28 | 21 | 6220 | 20 | 92 | 470 | 630 | 120 | 2.4 | 0.3 | 0.23 | 0.30 | 0.095 | 0.057 | 0.026 | 0.008 | 0.036 |
| Renfrew | 115 | -27 | -30 | 30 | 23 | 4900 | 23 | 97 | 620 | 810 | 140 | 2.5 | 0.4 | 0.27 | 0.35 | 0.580 | 0.290 | 0.130 | 0.043 | 0.300 |
| Richmond Hill | 230 | -21 | -23 | 31 | 24 | 4000 | 25 | 97 | 740 | 850 | 140 | 1.5 | 0.4 | 0.34 | 0.44 | 0.180 | 0.110 | 0.065 | 0.021 | 0.063 |
| Rockland | 50 | -26 | -28 | 30 | 23 | 4600 | 23 | 92 | 780 | 950 | 160 | 2.4 | 0.4 | 0.31 | 0.40 | 0.600 | 0.300 | 0.140 | 0.045 | 0.310 |
| Sarnia | 190 | -16 | -18 | 31 | 24 | 3750 | 25 | 100 | 750 | 825 | 180 | 1.1 | 0.4 | 0.36 | 0.47 | 0.120 | 0.073 | 0.048 | 0.015 | 0.037 |
| Sault Ste. Marie | 190 | -25 | -28 | 29 | 22 | 4960 | 23 | 97 | 660 | 950 | 200 | 3.1 | 0.4 | 0.34 | 0.44 | 0.095 | 0.057 | 0.032 | 0.012 | 0.036 |
| Schreiber | 310 | -34 | -36 | 27 | 21 | 5960 | 20 | 103 | 600 | 850 | 160 | 3.3 | 0.4 | 0.30 | 0.39 | 0.095 | 0.057 | 0.026 | 0.008 | 0.036 |
| Seaforth | 310 | -17 | -19 | 30 | 23 | 4100 | 25 | 108 | 810 | 1025 | 160 | 2.5 | 0.4 | 0.37 | 0.48 | 0.120 | 0.080 | 0.051 | 0.017 | 0.040 |
| Shelburne | 495 | -22 | -24 | 29 | 23 | 4700 | 28 | 108 | 740 | 900 | 150 | 3.1 | 0.4 | 0.31 | 0.40 | 0.140 | 0.094 | 0.059 | 0.020 | 0.046 |
| Simcoe | 210 | -17 | -19 | 30 | 24 | 3700 | 28 | 113 | 860 | 950 | 160 | 1.3 | 0.4 | 0.35 | 0.45 | 0.180 | 0.100 | 0.060 | 0.018 | 0.093 |
| Sioux Lookout | 375 | -34 | -36 | 28 | 22 | 5950 | 25 | 97 | 520 | 710 | 100 | 2.4 | 0.3 | 0.23 | 0.30 | 0.095 | 0.057 | 0.026 | 0.008 | 0.036 |
| Smiths Falls | 130 | -25 | -27 | 30 | 23 | 4540 | 25 | 92 | 730 | 850 | 140 | 2.3 | 0.4 | 0.32 | 0.41 | 0.390 | 0.220 | 0.120 | 0.037 | 0.170 |
| Smithville | 185 | -16 | -18 | 30 | 23 | 3650 | 23 | 108 | 800 | 900 | 160 | 1.5 | 0.4 | 0.33 | 0.42 | 0.340 | 0.180 | 0.068 | 0.022 | 0.200 |
| Column 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |

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# MMA Supplementary Standard SB-5

# Reserved

## July 1, 2017 update

# MMA Supplementary Standard SB-10

# Energy Efficiency Requirements

## December 22, 2016 update

**COMMENCEMENT**

MMAH Supplementary Standard SB-10 comes into force on the 1st day of January, 2014.

$m_4$ Ruling of the Minister of Municipal Affairs (Minister's Ruling) MR-16-S-27 takes effect on the 1st day of January, 2017.

**ACKNOWLEDGEMENT**

The Ministry wishes to thank ASHRAE for permission to reproduce material from ANSI/ASHRAE/USGBC/IES Standard 189.1-2009.

## NOMENCLATURE

This Supplementary Standard is organized into a hierarchy of Divisions, Chapters, Parts or Sections, Subsections, Articles, Sentences, Clauses and Subclauses.

## FOREWORD

This Supplementary Standard contains 5 Divisions as follows:

**Division 1** addresses general requirements. This updated Supplementary Standard includes new referenced standards and updated versions of previously referenced standards.

**Division 2** contains requirements for the design and construction of buildings which may continue to be used after December 31, 2016 subject to Clause 12.2.1.2.(2)(a) of Division B of the Building Code which requires an additional minimum 13% increase in energy efficiency levels. The energy efficiency design of buildings is required to meet one of the following four compliance paths plus a further minimum 13 percent increase in energy efficiency levels:

1. achieve the energy efficiency levels attained by conforming to ANSI/ASHRAE/IES Standard 90.1-2010, "Energy Standard for Buildings Except Low-Rise Residential Buildings" as modified by Chapter 2 of this Division,
2. exceed by not less than 5% the energy efficiency levels attained by conforming to ANSI/ASHRAE/IES 90.1-2010, "Energy Standard for Buildings Except Low-Rise Residential Buildings",
3. exceed by not less than 25% the energy efficiency levels attained by conforming to CCBFC NRCC 38730, "1997 Model National Energy Code for Buildings" (Note: The 1997 MNECB-based compliance path is revoked on January 1, 2018 and will no longer be a design option after December 31, 2017. See Minister's Ruling MR-16-S-27.), or
4. achieve the energy efficiency levels attained by conforming to CCBFC NRCC 54435, "2011 National Energy Code of Canada for Buildings" as modified by Chapter 3 of this Division.

**Division 2** outlines the modifications mentioned above. These modifications enhance the building envelope provisions of ANSI/ASHRAE/IES Standard 90.1-2010 and enables the use of Canadian testing procedures for HVAC and service water heating equipment. Editorial changes have also been introduced to Division 2 in this updated edition.

**Division 3** contains requirements for the design and construction of buildings for which a permit has been applied for after December 31, 2016. In this updated Supplementary Standard, Division 3 has been substantially revised. The existing sample compliance path has been replaced by new compliance paths. The compliance paths are based on contemporary energy codes and standards and contain additional requirements to achieve, on average, a 13 percent improvement over the efficiency level required by Sentence 12.2.1.1.(2) of Division B of the Building Code. Division 3 contains a transition provision and revised $CO_2e$ factors in Chapter 1 as well as the following three compliance paths based on:

1. ANSI/ASHRAE/IES Standard 90.1-2013, "Energy Standard for Buildings Except Low-Rise Residential Buildings", and additional requirements introduced through Chapter 2,
2. CCBFC NRCC 56191, "2015 National Energy Code of Canada for Buildings" and additional requirements introduced through Chapter 3, and
3. ANSI/ASHRAE/USGBC/IES Standard 189.1-2014, "Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings".

**Divisions 2 and 3** also describe limitations on peak electric demand and annual carbon dioxide emissions.

**Division 4** contains simplified energy efficiency requirements for the construction of certain non-residential buildings within the scope of Part 9 of Division B of the 2012 Building Code for which a permit has been applied for before January 1, 2017. No changes were introduced to Division 4 in this updated Supplementary Standard.

**Division 5** contains simplified energy efficiency requirements for the construction of certain non-residential buildings within the scope of Part 9 of Division B of the 2012 Building Code for which a permit has been applied for after December 31, 2016. Division 5 was revised consistent with changes made to Division 3 in this updated edition.
The application of the above documents to existing buildings is limited to the requirements of Part 10 and Part 11 of Division B of the Building Code.

# m4 SB-10 Energy Efficiency Requirements

# Division 1

# General

# Division 1

# General

## Section 1.1. General

### 1.1.1. Application of Supplementary Standard SB-10

#### 1.1.1.1. Application

**(1)** This Supplementary Standard applies to the energy efficiency design and *construction* of *buildings* required to comply with Sentences 12.2.1.1.(2) and 12.2.1.2.(2) and Subsections 12.2.2. and 12.2.3. of Division B of the *Building Code*.

**(2)** The energy efficiency of existing *buildings* shall comply with
(a) Part 10 of Division B of the *Building Code* with respect to change of use, or
(b) Part 11 of Division B of the *Building Code* for renovation.

#### 1.1.1.2. Energy Efficiency Design Before January 1, 2017

**(1)** Except as permitted in Sentence (2), the energy efficiency design and *construction* of *buildings* required to comply with Sentence 12.2.1.1.(2) of Division B of the *Building Code* shall comply with Division 2 of this Supplementary Standard.

**(2)** The energy efficiency of a *building* or part of a *building* may conform to the design requirements of Division 4 of this Supplementary Standard, if the *building* or part of the *building*,
(a) is within the scope of Part 9 of Division B of the *Building Code*,
(b) does not contain a *residential occupancy*,
(c) does not use *electric space heating*, and
(d) is intended for occupancy on a continuing basis during the winter months.

#### 1.1.1.3. Energy Efficiency Design After December 31, 2016

**(1)** Except as permitted in Sentence (2), the energy efficiency design and *construction* of *buildings* required to comply with Sentence 12.2.1.2.(2) of Division B of the *Building Code* shall comply with Division 3 of this Supplementary Standard.

**(2)** The energy efficiency of a *building* or part of a *building* may conform to the design requirements of Division 5 of this Supplementary Standard, if the *building* or part of the *building*,
(a) is within the scope of Part 9 of Division B of the *Building Code*,
(b) does not contain a *residential occupancy*,
(c) does not use *electric space heating*, and
(d) is intended for occupancy on a continuing basis during the winter months.

#### 1.1.1.4. Internal Cross-References

**(1)** If a provision of this Supplementary Standard contains a reference to another provision of this Supplementary Standard but no Division is specified, both provisions are in the same Division of this Supplementary Standard.

# Section 1.2. Terms and Abbreviations

## 1.2.1. Definitions of Words and Phrases

### 1.2.1.1. Non-Defined Terms

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

### 1.2.1.2. Defined Terms

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

**(2)** In this Supplementary Standard,

*Carbon dioxide equivalent* ($CO_2e$) means a measure used to compare the impact of various greenhouse gases based on their global warming potential.

## 1.2.2. Symbols and Other Abbreviations

### 1.2.2.1. Symbols and Other Abbreviations

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

**(2)** The abbreviations listed in Column 2 of Table 1.2.2.1. also apply to this Supplementary Standard and have the meaning listed opposite it in Column 3.

Table 1.2.2.1.
Symbols and Abbreviations
Forming Part of Sentence 1.2.2.1.(2)

| Item | Abbreviation | Meaning |
|---|---|---|
| 1 | $CO_2e$ | *carbon dioxide equivalent* |
| 2 | GJ | gigajoules |
| 3 | kWh | kilowatt-hours |
| 4 | LPG | liquified petroleum gas |
| Column 1 | 2 | 3 |

# Section 1.3. Referenced Documents and Organizations

## 1.3.1. Referenced Documents

### 1.3.1.1. Effective Date

**(1)** Except as provided in Table 1.3.1.2. of this Supplementary Standard, the documents referenced in this Supplementary Standard shall include all amendments, revisions and supplements effective to June 26, 2015.

### 1.3.1.2. Applicable Editions

**(1)** Unless otherwise specified in this Supplementary Standard, documents referenced in this Standard shall be the editions designated in Column 2 of Table 1.3.1.2. of Division B of the *Building Code*.

**(2)** Where ANSI/ASHRAE/IES Standard 90.1, "Energy Standard for Buildings Except Low-Rise Residential Buildings" is referenced in this Supplementary Standard, it shall be the edition designated in Table 1.3.1.2.

**(3)** Where CCBFC NRCC 38730, "Model National Energy Code of Canada for Buildings" or CCBFC NRCC 54435 or 56191 , "National Energy Code of Canada for Buildings" is referenced in this Supplementary Standard, it shall be the edition designated in Table 1.3.1.2. (Note: The reference to CCBFC NRCC 38730, "Model National Energy Code of Canada for Buildings" is revoked on January 1, 2018. See Minister's Ruling MR-16-S-27.)

Table 1.3.1.2.
Referenced Documents
Forming Part of Sentences 1.3.1.2.(1) to (3)

| Issuing Agency | Document Number | Title of Document | Supplementary Standard Reference |
|---|---|---|---|
| ANSI/ASHRAE/IES | 90.1-2010 (excluding amendments issued) | Energy Standard for Buildings Except Low-Rise Residential Buildings | Division 1<br>Chapters 1 and 2 of Division 2 |
| ANSI/ASHRAE/IES | 90.1-2013 (including amendments issued to June 26, 2015) | Energy Standard for Buildings Except Low-Rise Residential Buildings | Division 3<br>Chapters 1 and 2 of Division 3 |
| ANSI/ASHRAE/ USGBC/IES | 189.1-2014 | Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings | Division 3<br>Chapter 1 of Division 3 |
| CSA | CAN/CSA-A440.2-14 | Fenestration Energy Performance | 1.1.1.3.(5) of Chapter 1 of Divisions 2, and 1.1.1.4.(5) of Chapter 1 and 1.1.1.6 (8) of Chapter 3 of Division 3 |
| CSA | C390-2010 | Test Methods, Marking Requirements, and Energy Efficiency Levels for Three-Phase Induction Motors | 1.1.1.7.(5) of Chapter 1 of Divisions 2 and 3 |
| CCBFC | NRCC 38730 -1997 | Model National Energy Code of Canada for Buildings (Note: This row is revoked on January 1, 2018. See Minister's Ruling MR-16-S-27.) | Division 1<br>Chapter 1 in Division 2 |
| CCBFC | NRCC 54435 -2011 | National Energy Code of Canada for Buildings | Division 1<br>Chapters 1 and 3 of Division 2 |
| CCBFC | NRCC 56191 -2015 | National Energy Code of Canada for Buildings | Division 1<br>Chapters 1 and 3 of Division 3 |
| NFRC | NFRC 100-2014 | Procedure for Determining Fenestration Product U-factors | 1.1.1.4.(5) of Chapter 1 and 1.1.1.6.(8) of Chapter 3 of Division 3 |
| NFRC | NFRC 200-2014 | Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence | 1.1.1.4.(5) of Chapter 1 and 1.1.1.6.(8) of Chapter 3 of Division 3 |
| Column 1 | 2 | 3 | 4 |

## 1.3.2. Abbreviations

### 1.3.2.1. Abbreviations of Proper Names

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

**(2)** For the purpose of this Supplementary Standard,

(a) 2010 ANSI/ASHRAE/IES 90.1, means ANSI/ASHRAE/IES Standard 90.1-2010, "Energy Standard for Buildings Except Low-Rise Residential Buildings",

(b) 2013 ANSI/ASHRAE/IES 90.1, means ANSI/ASHRAE/IES Standard 90.1-2013, "Energy Standard for Buildings Except Low-Rise Residential Buildings",

(c) 2014 ANSI/ASHRAE/USGBC/IES Standard 189.1 means ANSI/ASHRAE/USGBC/IES Standard 189.1-2014, "Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings",

(d) 1997 MNECB means CCBFC NRCC 38730-1997, "Model National Energy Code of Canada for Buildings", (Note: Clause (d) is revoked on January 1, 2018. See Minister's Ruling MR-16-S-27.)

(e) 2011 NECB means CCBFC NRCC 54435-2011, "National Energy Code of Canada for Buildings", and

(f) 2015 NECB means CCBFC NRCC 56191-2015, "National Energy Code of Canada for Buildings".

# Division 2

# Energy Efficiency Design Before January 1, 2017

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

## FOREWORD

This Division contains requirements for the design and construction of buildings which may continue to be used after December 31, 2016 subject to Clause 12.2.1.2.(2)(a) of Division B of the Building Code which requires an additional minimum 13% increase in energy efficiency levels. The energy efficiency design of buildings is required to meet one of the following four compliance paths plus a further minimum 13 percent increase in energy efficiency levels:

1. achieve the energy efficiency levels attained by conforming to ANSI/ASHRAE/IES Standard 90.1-2010, "Energy Standard for Buildings Except Low-Rise Residential Buildings" as modified by Chapter 2 of this Division,
2. exceed by not less than 5% the energy efficiency levels attained by conforming to ANSI/ASHRAE/IES 90.1-2010, "Energy Standard for Buildings Except Low-Rise Residential Buildings",
3. exceed by not less than 25% the energy efficiency levels attained by conforming to CCBFC NRCC 38730, "1997 Model National Energy Code for Buildings" (Note: The 1997 MNECB-based compliance path is revoked on January 1, 2018 and will no longer be a design option after December 31, 2017. See Minister's Ruling MR-16-S-27.), or
4. achieve the energy efficiency levels attained by conforming to CCBFC NRCC 54435, "2011 National Energy Code of Canada for Buildings" as modified by Chapter 3 of this Division.

This Division outlines the modifications mentioned above. These modifications enhance the building envelope provisions of ANSI/ASHRAE/IES Standard 90.1-2010, "Energy Standard for Buildings Except Low-Rise Residential Buildings" and enables the use of Canadian testing procedures for HVAC and service water heating equipment.

Certain buildings and parts of buildings are exempted from the energy efficiency provisions in this Division.

Compliance with this Division does not necessarily ensure that the actual annual energy cost of a building is less than or equal to the theoretical values arrived at using the building energy cost budget method of ANSI/ASHRAE/IES Standard 90.1-2010, "Energy Standard for Buildings Except Low-Rise Residential Buildings" or building energy performance compliance of CCBFC NRCC 38730, "1997 Model National Energy Code for Buildings" or CCBFC NRCC 54435, "2011 National Energy Code of Canada for Buildings". (Note: The reference to the 1997 MNECB is revoked on January 1, 2018. See Minister's Ruling MR-16-S-27.) Factors such as weather, workmanship, depreciation of the thermal resistance of building materials, occupant/user lifestyle, building operation and maintenance impact on the actual energy consumption of a building.

Recommended Resource Material: ANSI/ASHRAE/IES Standard 90.1-2010 User's Manual

# Division 2

# Chapter 1

# General

## Section 1.1. General

### 1.1.1. Scope

#### 1.1.1.1. Scope

**(1)** Except as provided in Clause 12.2.1.2.(2)(a) of Division B of the *Building Code*, this Division applies to *construction* for which a permit has been applied for before January 1, 2017.

### 1.1.2. Energy Efficiency Design, Carbon Dioxide Equivalents and Peak Electric Demand

#### 1.1.2.1. Energy Efficiency Design

**(1)** Except as provided in Sentence (2) and Article 1.2.1.1. and except as permitted in Sentence (3), the energy efficiency of all *buildings* shall be designed to

(a) exceed by not less than 25% the energy efficiency levels attained by conforming to the 1997 MNECB, (Note: Clause (a) is revoked on January 1, 2018. See Minister's Ruling MR-16-S-27.), (See Appendix A.)
(b) exceed by not less than 5% the energy efficiency levels attained by conforming to 2010 ANSI/ASHRAE/IES 90.1,
(c) achieve the energy efficiency levels attained by conforming to 2010 ANSI/ASHRAE/IES 90.1 and Chapter 2, or
(d) achieve the energy efficiency levels attained by conforming to the 2011 NECB and Chapter 3.

(See Appendix A.)

**(2)** The requirements of Clause (1)(b) do not apply to a *building* in which *electric space heating* is used.

**(3)** The requirements of Clause (1)(b) may be met by conforming to the corresponding requirements of Chapter 2.

**(4)** Where compliance with energy efficiency requirements is achieved in accordance with Clause 1.1.2.1.(1)(a), lighting and ventilation controls and strategies recognized by this Division may be accounted as energy credits.

**(5)** Energy efficiency requirements do not apply to *buildings* or parts of *buildings* described in Article 1.2.1.1.

## 1.1.2.2. Carbon Dioxide Equivalents

**(1)** The annual $CO_2e$ emission level from a *building* shall be determined in accordance with good engineering practice using the $CO_2e$ emission factors listed in Table 1.1.2.2.

Table 1.1.2.2.
$CO_2e$ Emission Factors
Forming Part of Sentence 1.1.2.2.(1)

| *Building* Energy Sources | $CO_2e$, (kg/kWh) |
|---|---|
| Grid Delivered Electricity (marginal based on natural gas) | 0.400 |
| LPG or Propane | 0.274 |
| Fuel Oil | 0.312 |
| Gasoline | 0.309 |
| Natural Gas | 0.191 |
| Column 1 | 2 |

**(2)** Except as provided in Sentences (3) to (5), the annual $CO_2e$ emission level from a *building* required to comply with Article 1.1.2.1., shall not exceed the level established by
(a) Sections 5 to 10 of 2010 ANSI/ASHRAE/IES 90.1 and Chapter 2, or
(b) Parts 1 to 7 of the 2011 NECB and Chapter 3.

**(3)** Where the energy efficiency of a *building* is determined by Clause 1.1.2.1.(1)(b), the annual $CO_2e$ emission level from a *building* shall be reduced by at least 5 percent from the level established by 2010 ANSI/ASHRAE/IES 90.1.

**(4)** Where the energy efficiency of a *building* is determined by Clause 1.1.2.1.(1)(a), the annual $CO_2e$ emission level from a *building* shall be reduced by at least 25 percent from the level established by the 1997 MNECB. (Note: Sentence (4) is revoked on January 1, 2018. See Minister's Ruling MR-16-S-27.)

**(5)** The annual $CO_2e$ emission level from a *building* is deemed to comply with Sentence (3) or (4) if the level complies with the level established by Sentence (2). (Note: The reference to "or (4)" is struck out on January 1, 2018. See Minister's Ruling MR-16-S-27.)

## 1.1.2.3. Peak Electric Demand

**(1)** Except as provided in Sentence (2), the peak electric demand of a *building* required to comply with Article 1.1.2.1. shall not exceed the level established by
(a) Sections 5 to 10 of 2010 ANSI/ASHRAE/IES 90.1 and Chapter 2, or
(b) Parts 1 to 7 of the 2011 NECB and Chapter 3.

**(2)** The peak electric demand of a *building* is deemed to comply with Sentence (1), if the *building* design meets the prescriptive requirements set in 2010 ANSI/ASHRAE/IES 90.1 and Chapter 2 or in the 2011 NECB and Chapter 3 for the energy efficiency of the cooling equipment, fan power limitations for cooling and ventilation systems, and interior lighting power density.

### 1.1.3. Chapter 2 and Chapter 3

#### 1.1.3.1. Chapter 2

**(1)** Chapter 2 contains additional requirements and changes to 2010 ANSI/ASHRAE/IES 90.1 and applies where compliance with energy efficiency requirements is achieved in accordance with Clause 1.1.2.1.(1)(c).

**(2)** Where compliance with energy efficiency requirements is achieved in accordance with Clause 1.1.2.1.(1)(b), energy efficiency of the *building* or part of the *building* is permitted to conform to the respective requirements of Chapter 2 in lieu of the corresponding requirements in 2010 ANSI/ASHRAE/IES 90.1. (See Appendix A.)

#### 1.1.3.2. Chapter 3

**(1)** Chapter 3 contains additional requirements and changes to the 2011 NECB and applies where compliance with energy efficiency requirements is achieved in accordance with Clause 1.1.2.1.(1)(d).

## Section 1.2. Application

### 1.2.1. Application of 2010 ANSI/ASHRAE/IES 90.1, 1997 MNECB and 2011 NECB (Note: The reference to the 1997 MNECB is revoked on January 1, 2018. See Minister's Ruling MR-16-S-27.)

#### 1.2.1.1. Exceptions

**(1)** The requirements of Articles 1.1.2.1 to 1.1.2.3. of this Chapter do not apply to
(a) a *building* or part of a *building* of *residential occupancy* that is within the scope of Part 9 of Division B of the *Building Code*,
(b) a *heritage building*,
(c) structures such as construction trailers, tents and *air-supported structures*,
(d) a *building* or part of a *building* where the environmental condition within the *building* is governed by the process, operation of the *building* or permanent openings to the outdoors or to unconditioned environments,
(e) a *building* or part of a *building* where it can be shown that meeting the requirements of Article 1.1.2.1. does not conserve any energy,
(f) equipment or processes that use energy for manufacturing, industrial and commercial purposes, and
(g) *occupancies* listed in Table 1.2.1.1.

**(2)** The following *buildings* or parts of *buildings* need not to comply with envelope requirements:
(a) any *building* space which uses energy for space conditioning at a rate less than 12 W/m² under peak conditions,
(b) warehouses and storage rooms where the design indoor temperature does not exceed 10°C,
(c) except conditioned spaces of *buildings* exposed to unheated *storage garages* and unheated storage rooms, unheated *storage garages* and unheated storage rooms, and
(d) where a part of a single enclosed space is heated.

**(3)** Where specifically noted in this Supplementary Standard or documents referenced in Sentence 12.2.1.1.(2), certain other *buildings* or elements of *buildings* shall be exempt.

**(4)** This Supplementary Standard or the requirements of Sentences 12.2.1.1.(1) and 12.2.1.1.(2) shall not be used to circumvent any safety and health requirements.

**(5)** The *occupancies* listed in Table 1.2.1.1. are exempt from compliance with 2010 ANSI/ASHRAE/IES 90.1, 1997 MNECB and 2011 NECB. (Note: The reference to the 1997 MNECB is revoked on January 1, 2018. See Minister's Ruling MR-16-S-27.)

Table 1.2.1.1.
Occupancies Exempt from Compliance with 2010 ANSI/ASHRAE/IES 90.1, 1997 MNECB and 2011 NECB(2)
(Note: The reference to the 1997 MNECB is revoked on January 1, 2018. See Minister's Ruling MR-16-S-27.)
Forming Part of Sentences 1.2.1.1.(1) and 1.2.1.1.(5)

| GROUP A, DIVISION 4 | GROUP F, DIVISION 1 | GROUP F, DIVISION 2 | GROUP F, DIVISION 3 |
|---|---|---|---|
| Amusement Park Structures (not elsewhere classified)<br>Bleachers<br>Grandstands<br>Reviewing Stands<br>Stadia | Bulk Plants for Flammable Liquids<br>Bulk Storage Warehouses for Hazardous Substances<br>Cereal Mills<br>Chemical Manufacturing or Processing Plants<br>Distilleries<br>Dry Cleaning Plants<br>Feed Mills<br>Flour Mills<br>Grain Elevators<br>Lacquer Factories<br>Paint, Varnish and Pyroxylin Product Factories<br>Rubber Processing Plants<br>Spray Painting Operations<br>Waste Paper Processing Plants | Dry Cleaning Establishments not using flammable or explosive solvents or cleaners<br>Electrical Substations<br>Helicopter Landing Areas on Roofs<br>Laundries, except self-service<br>Planing Mills<br>Printing Plants<br>Repair Garages<br>Woodworking Factories | Creameries<br>Power Plants<br>Open-air Parking Garages<br>Pumping Stations |
| GROUP C<br><br>Part 9 Buildings(1)<br>Camps for Housing Workers (Part 3 and 9 Buildings)<br>Recreational Camps | | | |
| Column 1 | 2 | 3 | 4 |

Notes to Table 1.2.1.1.:
(1) Part 9 *buildings* are exempt from compliance with 2010 ANSI/ASHRAE/IES 90.1, 1997 MNECB or 2011 NECB where the energy efficiency design conforms to Division 4 of this Supplementary Standard. (Note: The reference to the 1997 MNECB is revoked on January 1, 2018. See Minister's Ruling MR-16-S-27.)
(2) The list is not intended to be exhaustive and other exemptions may be made in accordance with Article 1.2.1.1.

# Section 1.3. Climatic Zones

## 1.3.1. Climatic Zone Numbers

### 1.3.1.1. Determination of Climatic Zone Numbers

**(1)** Except as permitted in Sentence (2), the climatic zone number of a location shall be determined in accordance with Table 1.3.1.1. based on the corresponding heating degree-days (HDD) for locations found in Table 1.2 of MMAH Supplementary Standard SB-1, "Climatic and Seismic Data".

**(2)** For locations not listed in Table 1.2 of MMAH Supplementary Standard SB-1, "Climatic and Seismic Data", the heating degree-days and climatic data of the climatologically closest location is permitted to be used.

Table 1.3.1.1.
Climatic Zone Numbers for Ontario
Forming Part of Sentence 1.3.1.1.(1)
(This Table is to be used in conjunction with Tables SB 5.5-5 to SB 5.5-7)

| Climatic Zone Number | Thermal Criteria |
|---|---|
| Zone 5 | HDD18 < 4000°C |
| Zone 6 | 4000°C ≤ HDD18 < 5000°C |
| Zone 7 | HDD18 ≥ 5000°C |
| Column 1 | 2 |

# Chapter 2

# Additional Requirements to 2010 ANSI/ASHRAE/IES 90.1

## Section 1.1. Changes and Additional Requirements

### 1.1.1. Changes and Additional Requirements to 2010 ANSI/ASHRAE/IES 90.1

#### 1.1.1.1. Application of Chapter 2

**(1)** Where compliance with energy efficiency requirements is achieved in accordance with Clause 1.1.2.1.(1)(c) of Chapter 1, energy efficiency of the *building* is required to conform to Chapter 2 of this Division.

**(2)** Where compliance with energy efficiency requirements is achieved in accordance with Clause 1.1.2.1.(1)(b) of Chapter 1, energy efficiency of the *building* is permitted to conform to Chapter 2 or parts of Chapter 2 of this Division in lieu of corresponding requirements in 2010 ANSI/ASHRAE/IES 90.1.

#### 1.1.1.2. Section 4 "Administration and Compliance" of 2010 ANSI/ASHRAE/IES 90.1

**(1)** Sections 4.2.1.1 to 4.2.1.3 of 2010 ANSI/ASHRAE/IES 90.1 are replaced with the following:

**4.2.1.1 New Buildings.** New buildings and additions to existing buildings shall comply with provisions of either Sections 5 to 10 or Section 11.

**4.2.1.2** Reserved.

**4.2.1.3 Existing Buildings.** Change of use of existing buildings shall conform to Part 10 of Division B of the Building Code and renovation of existing buildings shall conform to Part 11 of Division B of the Building Code.

#### 1.1.1.3. Climatic Zones

**(1)** Climatic zone numbers shall be determined in accordance with Section 1.3. of Chapter 1.

## 1.1.1.4. Section 5 "Building Envelope" of 2010 ANSI/ASHRAE/IES 90.1

**(1)** Section 5.4.3.1.A shall be added to Section 5.4.3 "Air Leakage" of 2010 ANSI/ASHRAE/IES 90.1.

**5.4.3.1.A Air Barrier Materials, Assemblies and Systems**

(1) The air barrier materials, assemblies and systems that are in conformance with Part 5 of Division B of the Building Code shall be deemed to be in compliance with Section 5.4.3.1.3 and Section 5.4.3.2.

**(2)** Sections 5.5.1 and 5.5.2 shall be replaced with Sections 5.5.1.(1) through 5.5.1.(7) and Sections 5.5.3.5.1, 5.5.3.5.2, 5.5.3.7, and 5.5.3.8 shall be added to Section 5.5 of 2010 ANSI/ASHRAE/IES 90.1.

**5.5.1 Exterior Building Envelope**

(1) Where electric space heating is used, the building envelope shall comply with the requirements of Table SB 5.5-7 of this Supplementary Standard, regardless of its climatic location.

(2) For the purpose of Sentence (1), any reference to Tables 5.5-5 through 5.5-7 of 2010 ANSI/ASHRAE/IES 90.1 shall be deemed to be a reference to Tables SB 5.5-5 to SB 5.5-7 of this Supplementary Standard.

(3) Tables SB 5.5-5 to SB 5.5-7 shall supersede the requirements of Tables 5.5-5 to 5.5-7 of 2010 ANSI/ASHRAE/IES 90.1.

(4) Tables 5.5-1 to 5.5-8 of 2010 ANSI/ASHRAE/IES 90.1 shall not be used.

(5) For a conditioned space, the exterior building envelope shall comply with either the "nonresidential" or "residential" requirements in Tables SB 5.5-5 through SB 5.5-7 of this Supplementary Standard for the appropriate climate.

(6) If a building contains any semiheated space or unconditioned space, then the semi-exterior building envelope shall comply with the requirements for semiheated space in Tables SB 5.5-5 through SB 5.5-7 of this Supplementary Standard for the appropriate climate.

(7) Notwithstanding the requirements of Tables SB 5.5-5 to SB 5.5-7, exposed frame floors need not be insulated to more than
   (a) RSI of 6.69 (R38) where the framing depth is more than 254 mm (10 in.), and
   (b) RSI of 5.28 (R30) where the framing depth is 254 mm (10 in.) or less.

**5.5.2 Reserved**

**5.5.3.5.1 Slabs.** Insulation continuity shall be maintained in the design of slab edge insulation systems. Continuity shall be maintained from the wall insulation through the slab/wall/footing intersection to the body of the slab edge insulation. Several representative configurations are illustrated in Figure 5-1.

**5.5.3.5.2** Where insulative continuity is impossible because of structural constraints, a minimum overlapping of insulation is acceptable. The insulation must overlap by a distance equal to (or greater than) four times the minimum insulation separation, as shown in Figure 5-2.

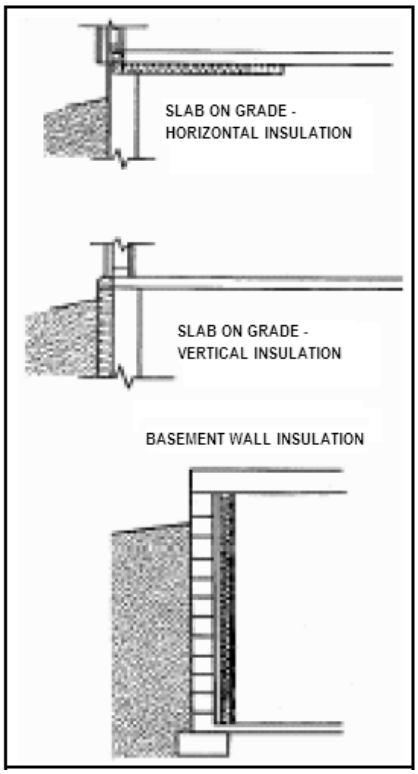


Figure 5-1
Continuity of Insulation on or Below Grade

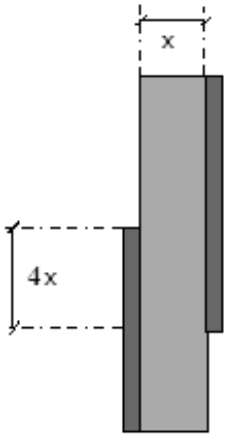


Figure 5-2
Minimum Permissible Insulation Overlap

**5.5.3.7** For the purposes of Section 5, the effects of thermal bridging are waived for:

(a) intermediate structural connections of continuous steel shelf angles (or similar structural element) used to support the building facade provided there is a thermal break between the remaining contact surface of the supporting element and the building structure. This provision is intended to substantially reduce thermal bridging effects caused by the continuous bearing between structural elements supporting building facade and the building frame (ie. steel shelf angle attached to perimeter floor slab to support brick veneer), or

(b) structural connections of load bearing elements where a thermal break cannot be achieved.

**5.5.3.8** In addition to the exceptions permitted above, the effects of thermal bridging are also waived for:

(a) exposed structural projections of buildings where the total cross-sectional area of the exposed element does not exceed 2% of the exterior building envelope area and the cross-sectional area of the exposed structural element is measured where it penetrates the insulation component of the building envelope. (For example, if the total cross-sectional area of cantilevered concrete balconies and other projections penetrating the insulation component of the building envelope does not exceed 2% of the exterior building envelope area, their thermal bridging effects need not be taken into account)

(b) ties in masonry construction,

(c) flashing, and

(d) top exposed portion of foundation walls provided the exposure does not exceed 200 mm measured from the top of the foundation wall to the top of exterior wall insulation which meets the minimum insulation RSI-Value for wall below grade stipulated in the appropriate Tables. (See Figure 5-3)

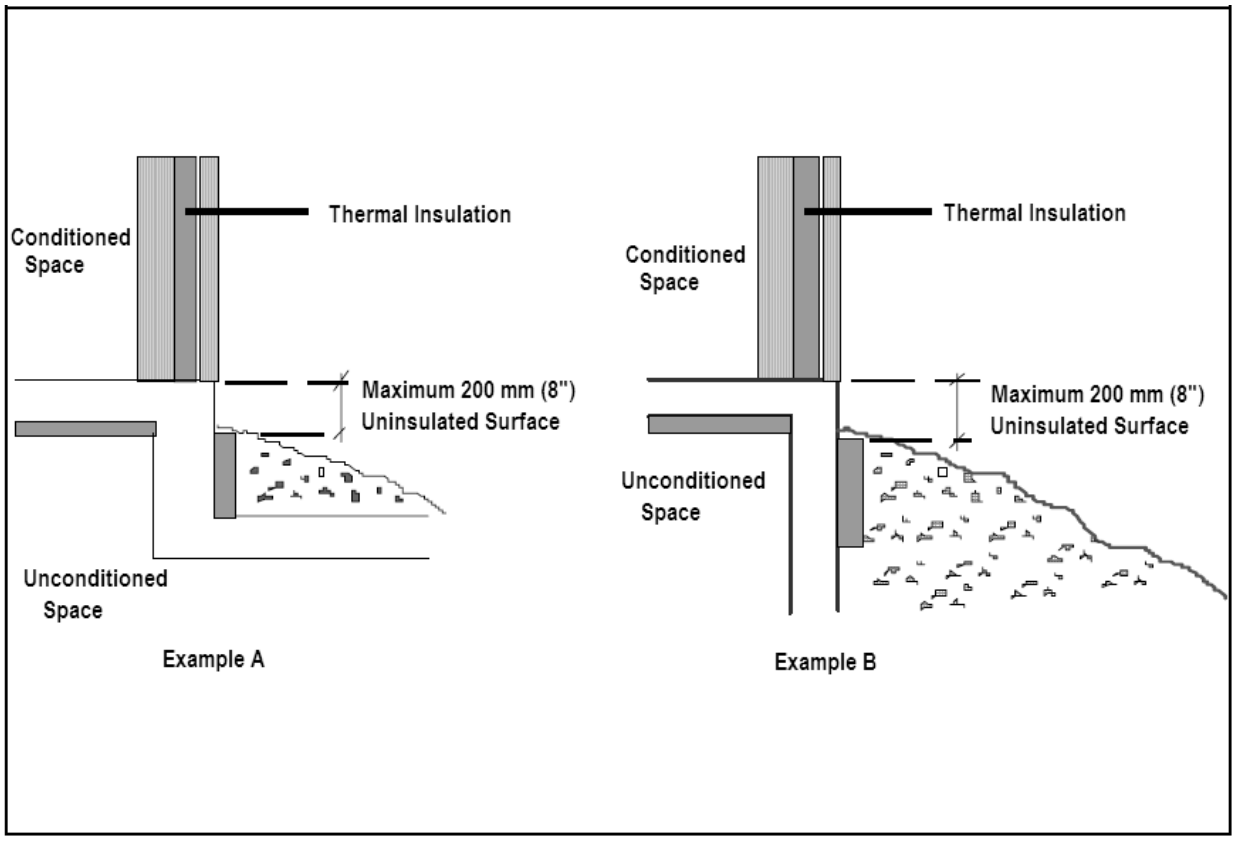


Figure 5-3
Maximum Uninsulated Surface of Foundation Wall

**(3)** Section 5.5.4.5 shall only be applicable where the main entrance is located on the south orientation and the south oriented wall area is larger than west oriented wall area, and where the south oriented wall area is larger than east oriented wall area. (See Appendix A.)

**(4)** The *building* envelope trade-off option in Section 5.6 of 2010 ANSI/ASHRAE/IES 90.1 shall not apply unless the procedure incorporates the modifications made to 2010 ANSI/ASHRAE/IES 90.1 through this Chapter.

**(5)** Section 5.8.2.4.A shall be added to Section 5.4.3 "Air Leakage" of 2010 ANSI/ASHRAE/IES 90.1.

**5.8.2.4.A Alternative Standards to determine U-factor**

(1) U-factors are permitted to be determined in accordance with CAN/CSA-A440.2,"Fenestration Energy Performance."

TABLE SB 5.5-5 (See Appendix A.)
(Supersedes Table 5.5-5 in 2010 ANSI/ASHRAE/IES 90.1)
Building Envelope Requirements for Climate Zone 5 (A, B, C) (SI)

| Opaque Elements | Nonresidential | | Residential | | Semiheated | |
|---|---|---|---|---|---|---|
| | Assembly | Insulation [d] | Assembly | Insulation [d] | Assembly | Insulation [d] |
| | Max. U | Min. RSI-Value | Max. U | Min. RSI-Value | Max. U | Min. RSI-Value |
| Roofs | | | | | | |
| Insulation Entirely above Deck | U-0.22 | 4.4 ci | U-0.22 | 4.4 ci | U-0.53 | 1.8 ci |
| Metal Building | U-0.20 | 3.3 + 1.9 Ls | U-0.20 | 3.3 + 1.9 Ls | U-0.39 | 2.3 + 3.3 |
| Attic and Other | U-0.12 | 8.6 | U-0.12 | 8.6 | U-0.19 | 5.3 |
| Walls, Above Grade | | | | | | |
| Mass | U-0.45 | 2.3 ci | U-0.40 | 2.7 ci | U-0.70 | 1.3 ci |
| Metal Building | U-0.30 | 2.3 + 2.3 ci | U-0.30 | 2.3 + 2.3 ci | U-0.45 | 2.3 + 1.1 ci |
| Steel Framed | U-0.31 | 2.3 + 1.8 ci | U-0.31 | 2.3 + 1.8 ci | U-0.48 | 2.3 + 0.7 ci |
| Wood Framed and Other | U-0.29 | 2.3 + 1.3 ci | U-0.26 | 2.3 + 1.8 ci | U-0.36 | 2.3 + 0.7 ci |
| Wall, Below Grade | | | | | | |
| Below Grade Wall | C-0.52 | 1.8 ci | C-0.52 | 1.8 ci | C-0.68 | 1.3 ci |
| Floors | | | | | | |
| Mass | U-0.36 | 2.2 ci | U-0.32 | 2.6 ci | U-0.61 | 1.1 ci |
| Steel Joist [c] | U-0.18 | 6.7 | U-0.18 | 6.7 | U-0.21 | 5.3 |
| Wood Framed and Other [c] | U-0.15 | 5.3 + 1.3 ci | U-0.15 | 5.3 + 1.3 ci | U-0.19 | 5.3 |
| Slab-On-Grade Floors | | | | | | |
| Unheated | F-0.93 | 1.8 for 600 mm | F-0.90 | 2.6 for 600 mm | F-0.93 | 1.8 for 600 mm |
| Heated | F-0.76 | 2.6 for 900 mm + 0.9 ci below | F-0.76 | 2.6 for 900 mm + 0.9 ci below | F-1.56 | 1.8 for 600 mm |
| Opaque Doors | | | | | | |
| Swinging | U-2.27 | | U-2.27 | | U-3.41 | |
| Non-Swinging | U-2.27 | | U-2.27 | | U-2.84 | |
| Fenestration | Assembly | Assembly | Assembly | Assembly | Assembly | Assembly |
| | Max. U | Max. SHGC | Max. U | Max. SHGC | Max. U | Max. SHGC |
| Vertical Fenestration, 0% - 40% of Wall | | | | | | |
| Nonmetal framing: all [a] | U-1.42 | 0.35 | U-1.42 | 0.40 | U-3.12 | NR |
| Metal framing: curtainwall / storefront [b] | U-1.99 | | U-1.99 | | U-3.41 | |
| Metal framing: entrance door [b] | U-3.97 | | U-3.97 | | U-4.54 | |
| Metal framing: all other [b] | U-2.56 | | U-2.56 | | U-3.69 | |
| Skylight with Curb, Glass, % of Roof | | | | | | |
| 0% - 5.0% | U-3.80 | 0.36 | U-3.80 | 0.36 | U-11.24 | NR |
| Skylight with Curb, Plastic, % of Roof | | | | | | |
| 0% - 5.0% | U-3.92 | 0.34 | U-3.92 | 0.34 | U-10.79 | NR |
| Skylight without Curb, All, % of Roof | | | | | | |
| 0% - 5.0% | U-2.56 | 0.36 | U-2.56 | 0.36 | U-7.72 | NR |

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The following definitions apply: ci = continuous insulation, Ls = liner system, NR = no (insulation) requirement.

a Nonmetal framing includes framing materials other than metal with or without metal reinforcing or cladding.

b Metal framing includes metal framing with or without thermal break. The all other subcategory includes operable windows, fixed windows, and non-entrance doors.

c See Section 5.5.1.(7) under Sentence 1.1.1.3.(2) of Chapter 2 of this Division.

d Alternative combinations of insulation RSI-values are permitted provided the combinations are designed in accordance with “Normative Appendix A” of 2010 ANSI/ASHRAE/IES 90.1.

TABLE SB 5.5-6 (See Appendix A.)
(Supersedes Table 5.5-6 in 2010 ANSI/ASHRAE/IES 90.1)
Building Envelope Requirements for Climate Zone 6 (A, B) (SI)

| Opaque Elements | Nonresidential | | Residential | | Semiheated | |
|---|---|---|---|---|---|---|
| | Assembly | Insulation [d] | Assembly | Insulation [d] | Assembly | Insulation [d] |
| | Max. U | Min. RSI-Value | Max. U | Min. RSI-Value | Max. U | Min. RSI-Value |
| Roofs | | | | | | |
| Insulation Entirely above Deck | U-0.18 | 5.3 ci | U-0.18 | 5.3 ci | U-0.36 | 2.6 ci |
| Metal Building | U-0.18 | 4.4 + 1.9 Ls | U-0.18 | 4.4 + 1.9 Ls | U-0.39 | 2.3 + 3.3 |
| Attic and Other | U-0.12 | 8.6 | U-0.12 | 8.6 | U-0.15 | 6.7 |
| Walls, Above Grade | | | | | | |
| Mass | U-0.40 | 2.7 ci | U-0.34 | 3.5 ci | U-0.59 | 1.7 ci |
| Metal Building | U-0.30 | 2.3 + 2.3 ci | U-0.30 | 2.3 + 2.3 ci | U-0.45 | 2.3 + 1.1 ci |
| Steel Framed | U-0.31 | 2.3 + 1.8 ci | U-0.31 | 2.3 + 1.8 ci | U-0.48 | 2.3 + 0.7 ci |
| Wood Framed and Other | U-0.26 | 2.3 + 1.8 ci | U-0.26 | 2.3 + 1.8 ci | U-0.36 | 2.3 + 0.7 ci |
| Wall, Below Grade | | | | | | |
| Below Grade Wall | C-0.52 | 1.8 ci | C-0.52 | 1.8 ci | C-0.68 | 1.3 ci |
| Floors | | | | | | |
| Mass | U-0.32 | 2.6 ci | U-0.29 | 2.9 ci | U-0.61 | 1.1 ci |
| Steel Joist [c] | U-0.18 | 6.7 | U-0.13 | 6.7 + 2.2 ci | U-0.21 | 5.3 |
| Wood Framed and Other [c] | U-0.15 | 5.3 + 1.3 ci | U-0.15 | 5.3 + 1.3 ci | U-0.19 | 5.3 |
| Slab-On-Grade Floors | | | | | | |
| Unheated | F-0.90 | 2.6 for 600 mm | F-0.88 | 3.5 for 600 mm | F-0.93 | 1.8 for 600 mm |
| Heated | F-0.76 | 2.6 for 900 mm + 0.9 ci below | F-0.76 | 2.6 for 900 mm + 0.9 ci below | F-1.56 | 1.8 for 600 mm |
| Opaque Doors | | | | | | |
| Swinging | U-2.27 | | U-2.27 | | U-3.41 | |
| Non-Swinging | U-2.27 | | U-2.27 | | U-2.84 | |
| Fenestration | Assembly | Assembly | Assembly | Assembly | Assembly | Assembly |
| | Max. U | Max. SHGC | Max. U | Max. SHGC | Max. U | Max. SHGC |
| Vertical Fenestration, 0% - 40% of Wall | | | | | | |
| Nonmetal framing: all [a] | U-1.42 | 0.40 | U-1.42 | 0.40 | U-2.56 | NR |
| Metal framing: curtainwall / storefront [b] | U-1.99 | | U-1.99 | | U-2.84 | |
| Metal framing: entrance door [b] | U-3.97 | | U-3.97 | | U-4.54 | |
| Metal framing: all other [b] | U-2.56 | | U-2.56 | | U-3.12 | |
| Skylight with Curb, Glass, % of Roof | | | | | | |
| 0% - 5.0% | U-3.80 | 0.46 | U-3.80 | 0.46 | U-11.24 | NR |
| Skylight with Curb, Plastic, % of Roof | | | | | | |
| 0% - 5.0% | U-3.92 | 0.49 | U-3.92 | 0.49 | U-10.79 | NR |
| Skylight without Curb, All, % of Roof | | | | | | |
| 0% - 5.0% | U-2.56 | 0.46 | U-2.56 | 0.39 | U-7.72 | NR |

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The following definitions apply: ci = continuous insulation, Ls = liner system, NR = no (insulation) requirement.

a Nonmetal framing includes framing materials other than metal with or without metal reinforcing or cladding.

b Metal framing includes metal framing with or without thermal break. The all other subcategory includes operable windows, fixed windows, and non-entrance doors.

c See Section 5.5.1.(7) under Sentence 1.1.1.3.(2) of Chapter 2 of this Division.

d Alternative combinations of insulation RSI-values are permitted provided the combinations are designed in accordance with "Normative Appendix A" of 2010 ANSI/ASHRAE/IES 90.1.

TABLE SB 5.5-7 (See Appendix A.)
(Supersedes Table 5.5-7 in 2010 ANSI/ASHRAE/IES 90.1)
Building Envelope Requirements for Climate Zone 7 (SI)

| Opaque Elements | Nonresidential | | Residential | | Semiheated | |
|---|---|---|---|---|---|---|
| | Assembly | Insulation [d] | Assembly | Insulation [d] | Assembly | Insulation [d] |
| | Max. U | Min. RSI-Value | Max. U | Min. RSI-Value | Max. U | Min. RSI-Value |
| Roofs | | | | | | |
| Insulation Entirely above Deck | U-0.16 | 6.2 ci | U-0.16 | 6.2 ci | U-0.36 | 2.6 ci |
| Metal Building | U-0.16 | 5.3 + 1.9 Ls | U-0.16 | 5.3 + 1.9 Ls | U-0.39 | 2.3 + 3.3 |
| Attic and Other | U-0.10 | 10.6 | U-0.10 | 10.6 | U-0.15 | 6.7 |
| Walls, Above Grade | | | | | | |
| Mass | U-0.34 | 3.5 ci | U-0.34 | 3.5 ci | U-0.51 | 2.0 ci |
| Metal Building | U-0.30 | 2.3 + 2.3 ci | U-0.22 | 2.3 + 3.4 ci | U-0.45 | 2.3 + 1.1 ci |
| Steel Framed | U-0.31 | 2.3 + 1.8 ci | U-0.21 | 2.3 + 3.3 ci | U-0.48 | 2.3 + 0.7 ci |
| Wood Framed and Other | U-0.26 | 2.3 + 1.8 ci | U-0.26 | 2.3 + 1.8 ci | U-0.36 | 2.3 + 0.7 ci |
| Wall, Below Grade | | | | | | |
| Below Grade Wall | C-0.52 | 1.8 ci | C-0.42 | 2.2 ci | C-0.68 | 1.3 ci |
| Floors | | | | | | |
| Mass | U-0.25 | 3.5 ci | U-0.25 | 3.5 ci | U-0.50 | 1.5 ci |
| Steel Joist [c] | U-0.18 | 6.7 | U-0.13 | 6.7 + 2.2 ci | U-0.21 | 5.3 |
| Wood Framed and Other [c] | U-0.15 | 5.3 + 1.3 ci | U-0.15 | 5.3 + 1.3 ci | U-0.19 | 5.3 |
| Slab-On-Grade Floors | | | | | | |
| Unheated | F-0.52 | 2.6 for 600 mm + 0.9 ci below | F-0.52 | 2.6 for 600 mm + 0.9 ci below | F-0.93 | 1.8 for 600 mm |
| Heated | F-0.65 | 3.5 for 900 mm + 0.9 ci below | F-0.65 | 3.5 for 900 mm + 0.9 ci below | F-1.19 | 3.5 for 1200 mm |
| Opaque Doors | | | | | | |
| Swinging | U-2.27 | | U-2.27 | | U-3.41 | |
| Non-Swinging | U-2.27 | | U-2.27 | | U-2.84 | |
| Fenestration | Assembly | Assembly | Assembly | Assembly | Assembly | Assembly |
| | Max. U | Max. SHGC | Max. U | Max. SHGC | Max. U | Max. SHGC |
| Vertical Fenestration, 0% - 40% of Wall | | | | | | |
| Nonmetal framing: all [a] | U-1.42 | 0.45 | U-1.42 | NR | U-2.56 | NR |
| Metal framing: curtainwall / storefront [b] | U-1.70 | | U-1.70 | | U-2.84 | |
| Metal framing: entrance door [b] | U-3.97 | | U-3.97 | | U-4.54 | |
| Metal framing: all other [b] | U-1.99 | | U-1.99 | | U-3.12 | |
| Skylight with Curb, Glass, % of Roof | | | | | | |
| 0% - 5.0% | U-3.80 | 0.46 | U-3.80 | 0.46 | U-11.24 | NR |
| Skylight with Curb, Plastic, % of Roof | | | | | | |
| 0% - 5.0% | U-3.92 | 0.50 | U-3.92 | 0.50 | U-10.79 | NR |
| Skylight without Curb, All, % of Roof | | | | | | |
| 0% - 5.0% | U-2.56 | 0.46 | U-2.56 | 0.46 | U-7.72 | NR |

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The following definitions apply: ci = continuous insulation, Ls = liner system, NR = no (insulation) requirement.

a Nonmetal framing includes framing materials other than metal with or without metal reinforcing or cladding.

b Metal framing includes metal framing with or without thermal break. The all other subcategory includes operable windows, fixed windows, and non-entrance doors.

c See Section 5.5.1.(7) under Sentence 1.1.1.3.(2) of Chapter 2 of this Division.

d Alternative combinations of insulation RSI-values are permitted provided the combinations are designed in accordance with “Normative Appendix A” of 2010 ANSI/ASHRAE/IES 90.1.

TABLE SB 5.5-5 (See Appendix A.)
(Supersedes Table 5.5-5 in 2010 ANSI/ASHRAE/IES 90.1)
Building Envelope Requirements for Climate Zone 5 (A, B, C) (I-P)

| Opaque Elements | Nonresidential | | Residential | | Semiheated | |
|---|---|---|---|---|---|---|
| | Assembly | Insulation [d] | Assembly | Insulation [d] | Assembly | Insulation [d] |
| | Max. U | Min. R-Value | Max. U | Min. R-Value | Max. U | Min. R-Value |
| Roofs | | | | | | |
| Insulation Entirely above Deck | U-0.039 | R-25 ci | U-0.039 | R-25 ci | U-0.093 | R-10 ci |
| Metal Building | U-0.035 | R-19 + R-11 Ls | U-0.035 | R-19 + R-11 Ls | U-0.068 | R-13 + R- 19 |
| Attic and Other | U-0.021 | R-49 | U-0.021 | R-49 | U-0.034 | R-30 |
| Walls, Above Grade | | | | | | |
| Mass | U-0.080 | R-13.3 ci | U-0.071 | R-15.2 ci | U-0.123 | R-7.6 ci |
| Metal Building | U-0.052 | R-13 + R-13 ci | U-0.052 | R-13 + R-13 ci | U-0.079 | R-13 + R-6.5 ci |
| Steel Framed | U-0.055 | R-13 + R-10 ci | U-0.055 | R-13 + R-10 ci | U-0.084 | R-13 + R-3.8 ci |
| Wood Framed and Other | U-0.051 | R-13 + R-7.5 ci | U-0.045 | R-13 + R-10 ci | U-0.064 | R-13 + R-3.8 ci |
| Wall, Below Grade | | | | | | |
| Below Grade Wall | C-0.092 | R-10 ci | C-0.092 | R-10 ci | C-0.119 | R-7.5 ci |
| Floors | | | | | | |
| Mass | U-0.064 | R-12.5 ci | U-0.057 | R-14.6 ci | U-0.107 | R-6.3 ci |
| Steel Joist [c] | U-0.032 | R-38 | U-0.032 | R-38 | U-0.038 | R-30 |
| Wood Framed and Other [c] | U-0.026 | R-30 + R-7.5 ci | U-0.026 | R-30 + R-7.5 ci | U-0.033 | R-30 |
| Slab-On-Grade Floors | | | | | | |
| Unheated | F-0.540 | R-10 for 24 in. | F-0.520 | R-15 for 24 in. | F-0.540 | R-10 for 24 in. |
| Heated | F-0.440 | R-15 for 36 in. + R-5 ci below | F-0.440 | R-15 for 36 in. + R-5 ci below | F-0.900 | R-10 for 24 in. |
| Opaque Doors | | | | | | |
| Swinging | U-0.400 | | U-0.400 | | U-0.600 | |
| Non-Swinging | U-0.400 | | U-0.400 | | U-0.500 | |
| Fenestration | Assembly | Assembly | Assembly | Assembly | Assembly | Assembly |
| | Max. U | Max. SHGC | Max. U | Max. SHGC | Max. U | Max. SHGC |
| Vertical Fenestration, 0% - 40% of Wall | | | | | | |
| Nonmetal framing: all [a] | U-0.25 | 0.35 | U-0.25 | 0.40 | U-0.55 | NR |
| Metal framing: curtainwall / storefront [b] | U-0.35 | | U-0.35 | | U-0.60 | |
| Metal framing: entrance door [b] | U-0.70 | | U-0.70 | | U-0.80 | |
| Metal framing: all other [b] | U-0.45 | | U-0.45 | | U-0.65 | |
| Skylight with Curb, Glass, % of Roof | | | | | | |
| 0% - 5.0% | U-0.67 | 0.36 | U-0.67 | 0.36 | U-1.98 | NR |
| Skylight with Curb, Plastic, % of Roof | | | | | | |
| 0% - 5.0% | U-0.69 | 0.34 | U-0.69 | 0.34 | U-1.90 | NR |
| Skylight without Curb, All, % of Roof | | | | | | |
| 0% - 5.0% | U-0.45 | 0.36 | U-0.45 | 0.36 | U-1.36 | NR |

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The following definitions apply: ci = continuous insulation, Ls = liner system, NR = no (insulation) requirement.

a Nonmetal framing includes framing materials other than metal with or without metal reinforcing or cladding.

b Metal framing includes metal framing with or without thermal break. The all other subcategory includes operable windows, fixed windows, and non-entrance doors.

c See Section 5.5.1.(7) under Sentence 1.1.1.3.(2) of Chapter 2 of this Division.

d Alternative combinations of insulation R-values are permitted provided the combinations are designed in accordance with “Normative Appendix A” of 2010 ANSI/ASHRAE/IES 90.1.

TABLE SB 5.5-6 (See Appendix A.)
(Supersedes Table 5.5-6 in 2010 ANSI/ASHRAE/IES 90.1)
Building Envelope Requirements for Climate Zone 6 (A, B) (I-P)

| Opaque Elements | Nonresidential | | Residential | | Semiheated | |
|---|---|---|---|---|---|---|
| | Assembly | Insulation [d] | Assembly | Insulation [d] | Assembly | Insulation [d] |
| | Max. U | Min. R-Value | Max. U | Min. R-Value | Max. U | Min. R-Value |
| Roofs | | | | | | |
| Insulation Entirely above Deck | U-0.032 | R-30 ci | U-0.032 | R-30 ci | U-0.063 | R-15 ci |
| Metal Building | U-0.031 | R-25 + R-11 Ls | U-0.031 | R-25 + R-11 Ls | U-0.068 | R-13 + R-19 |
| Attic and Other | U-0.021 | R-49 | U-0.021 | R-49 | U-0.027 | R-38 |
| Walls, Above Grade | | | | | | |
| Mass | U-0.071 | R-15.2 ci | U-0.060 | R-20 ci | U-0.104 | R-9.5 ci |
| Metal Building | U-0.052 | R-13 + R-13 ci | U-0.052 | R-13 + R-13 ci | U-0.079 | R-13 + R-6.5 ci |
| Steel Framed | U-0.055 | R-13 + R-10 ci | U-0.055 | R-13 + R-10 ci | U-0.084 | R-13 + R-3.8 ci |
| Wood Framed and Other | U-0.045 | R-13 + R-10 ci | U-0.045 | R-13 + R-10 ci | U-0.064 | R-13 + R-3.8 ci |
| Wall, Below Grade | | | | | | |
| Below Grade Wall | C-0.092 | R-10 ci | C-0.092 | R-10 ci | C-0.119 | R-7.5 ci |
| Floors | | | | | | |
| Mass | U-0.057 | R-14.6 ci | U-0.051 | R-16.7 ci | U-0.107 | R-6.3 ci |
| Steel Joist [c] | U-0.032 | R-38 | U-0.023 | R-38 + R-12.5 ci | U-0.038 | R-30 |
| Wood Framed and Other [c] | U-0.026 | R-30 + R-7.5 ci | U-0.026 | R-30 + R-7.5 ci | U-0.033 | R-30 |
| Slab-On-Grade Floors | | | | | | |
| Unheated | F-0.520 | R-15 for 24 in. | F-0.510 | R-20 for 24 in. | F-0.540 | R-10 for 24 in. |
| Heated | F-0.440 | R-15 for 36 in. + R-5 ci below | F-0.440 | R-15 for 36 in. + R-5 ci below | F-0.900 | R-10 for 24 in. |
| Opaque Doors | | | | | | |
| Swinging | U-0.400 | | U-0.400 | | U-0.600 | |
| Non-Swinging | U-0.400 | | U-0.400 | | U-0.500 | |
| Fenestration | Assembly | Assembly | Assembly | Assembly | Assembly | Assembly |
| | Max. U | Max. SHGC | Max. U | Max. SHGC | Max. U | Max. SHGC |
| Vertical Fenestration, 0% - 40% of Wall | | | | | | |
| Nonmetal framing: all [a] | U-0.25 | 0.40 | U-0.25 | 0.40 | U-0.45 | NR |
| Metal framing: curtainwall / storefront [b] | U-0.35 | | U-0.35 | | U-0.50 | |
| Metal framing: entrance door [b] | U-0.70 | | U-0.70 | | U-0.80 | |
| Metal framing: all other [b] | U-0.45 | | U-0.45 | | U-0.55 | |
| Skylight with Curb, Glass, % of Roof | | | | | | |
| 0% - 5.0% | U-0.67 | 0.46 | U-0.67 | 0.46 | U-1.98 | NR |
| Skylight with Curb, Plastic, % of Roof | | | | | | |
| 0% - 5.0% | U-0.69 | 0.49 | U-0.69 | 0.49 | U-1.90 | NR |
| Skylight without Curb, All, % of Roof | | | | | | |
| 0% - 5.0% | U-0.45 | 0.46 | U-0.45 | 0.39 | U-1.36 | NR |

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a Nonmetal framing includes framing materials other than metal with or without metal reinforcing or cladding.

b Metal framing includes metal framing with or without thermal break. The all other subcategory includes operable windows, fixed windows, and non-entrance doors.

c See Section 5.5.1.(7) under Sentence 1.1.1.3.(2) of Chapter 2 of this Division.

d Alternative combinations of insulation R-values are permitted provided the combinations are designed in accordance with “Normative Appendix A” of 2010 ANSI/ASHRAE/IES 90.1.

TABLE SB 5.5-7 (See Appendix A.)
(Supersedes Table 5.5-7 in 2010 ANSI/ASHRAE/IES 90.1)
Building Envelope Requirements for Climate Zone 7 (I-P)

| Opaque Elements | Nonresidential | | Residential | | Semiheated | |
|---|---|---|---|---|---|---|
| | Assembly | Insulation [d] | Assembly | Insulation [d] | Assembly | Insulation [d] |
| | Max. U | Min. R-Value | Max. U | Min. R-Value | Max. U | Min. R-Value |
| Roofs | | | | | | |
| Insulation Entirely above Deck | U-0.028 | R-35 ci | U-0.028 | R-35 ci | U-0.063 | R-15 ci |
| Metal Building | U-0.029 | R-30 + R-11 Ls | U-0.029 | R-30 + R-11 Ls | U-0.068 | R-13 + R-19 |
| Attic and Other | U-0.017 | R-60 | U-0.017 | R-60 | U-0.027 | R-38 |
| Walls, Above Grade | | | | | | |
| Mass | U-0.060 | R-20 ci | U-0.060 | R-20 ci | U-0.090 | R-11.4 ci |
| Metal Building | U-0.052 | R-13 + R-13 ci | U-0.039 | R-13 + R-19.5 ci | U-0.079 | R-13 + R-6.5 ci |
| Steel Framed | U-0.055 | R-13 + R-10 ci | U-0.037 | R-13 + R-18.8 ci | U-0.084 | R-13 + R-3.8 ci |
| Wood Framed and Other | U-0.045 | R-13 + R-10 ci | U-0.045 | R-13 + R-10 ci | U-0.064 | R-13 + R-3.8 ci |
| Wall, Below Grade | | | | | | |
| Below Grade Wall | C-0.092 | R-10 ci | C-0.075 | R-12.5 ci | C-0.119 | R-7.5 ci |
| Floors | | | | | | |
| Mass | U-0.043 | R-20 ci | U-0.043 | R-20 ci | U-0.087 | R-8.3 ci |
| Steel Joist [c] | U-0.032 | R-38 | U-0.023 | R-38 + R-12.5 ci | U-0.038 | R-30 |
| Wood Framed and Other [c] | U-0.026 | R-30 + R-7.5 ci | U-0.026 | R-30 + R-7.5 ci | U-0.033 | R-30 |
| Slab-On-Grade Floors | | | | | | |
| Unheated | F-0.300 | R-15 for 24 in. + R-5 ci below | F-0.300 | R-15 for 24 in. + R-5 ci below | F-0.540 | R-10 for 24 in. |
| Heated | F-0.373 | R-20 for 36 in. + R-5 ci below | F-0.373 | R-20 for 36 in. + R-5 ci below | F-0.688 | R-20 for 48 in. |
| Opaque Doors | | | | | | |
| Swinging | U-0.400 | | U-0.400 | | U-0.600 | |
| Non-Swinging | U-0.400 | | U-0.400 | | U-0.500 | |
| Fenestration | Assembly | Assembly | Assembly | Assembly | Assembly | Assembly |
| | Max. U | Max. SHGC | Max. U | Max. SHGC | Max. U | Max. SHGC |
| Vertical Fenestration, 0% - 40% of Wall | | | | | | |
| Nonmetal framing: all [a] | U-0.25 | 0.45 | U-0.25 | NR | U-0.45 | NR |
| Metal framing: curtainwall / storefront [b] | U-0.30 | | U-0.30 | | U-0.50 | |
| Metal framing: entrance door [b] | U-0.70 | | U-0.70 | | U-0.80 | |
| Metal framing: all other [b] | U-0.35 | | U-0.35 | | U-0.55 | |
| Skylight with Curb, Glass, % of Roof | | | | | | |
| 0% - 5.0% | U-0.67 | 0.46 | U-0.67 | 0.46 | U-1.98 | NR |
| Skylight with Curb, Plastic, % of Roof | | | | | | |
| 0% - 5.0% | U-0.69 | 0.5 | U-0.69 | 0.5 | U-1.90 | NR |
| Skylight without Curb, All, % of Roof | | | | | | |
| 0% - 5.0% | U-0.45 | 0.46 | U-0.45 | 0.46 | U-1.36 | NR |

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The following definitions apply: ci = continuous insulation, Ls = liner system, NR = no (insulation) requirement.

a Nonmetal framing includes framing materials other than metal with or without metal reinforcing or cladding.

b Metal framing includes metal framing with or without thermal break. The all other subcategory includes operable windows, fixed windows, and non-entrance doors.

c See Section 5.5.1.(7) under Sentence 1.1.1.3.(2) of Chapter 2 of this Division.

d Alternative combinations of insulation R-values are permitted provided the combinations are designed in accordance with “Normative Appendix A” of 2010 ANSI/ASHRAE/IES 90.1.

## 1.1.1.5. Heating Ventilation and Air-Conditioning Equipment - Test Procedures

**(1)** Where *electric space heating* is used, the *building* envelope shall comply with the requirements of Table SB 5.5-7 of this Supplementary Standard, regardless of its climatic zone.

**(2)** Section 6.4.1.A shall be added to Section 6 "Heating Ventilation and Air Conditioning Equipment" of 2010 ANSI/ASHRAE/IES 90.1.

**6.4.1.A Testing Procedures for Minimum Equipment Efficiency**

(1) Equipment efficiencies that are tested in accordance with the test procedures listed in the 2011 NECB or in an applicable Ontario Regulation, shall be deemed to be in compliance with the test procedures given in Tables 6.8.1A to 6.8.1K.

## 1.1.1.6. Service Water Heating Equipment - Test Procedures

**(1)** Section 7.4.2.A shall be added to Section 7 "Service Water Heating Equipment" of 2010 ANSI/ASHRAE/IES 90.1.

**7.4.2.A Testing Procedures for Minimum Equipment Efficiency**

(1) Equipment efficiencies that are tested in accordance with the test procedures listed in the 2011 NECB or in an applicable Ontario Regulation, shall be deemed to be in compliance with the test procedures given in Table 7.8.

**(2)** Section 7.4.5.2 of Section 7 "Service Water Heating Equipment" of 2010 ANSI/ASHRAE/IES 90.1 shall be substituted with the following Article:

**7.4.5.2 Pool Covers.** Heated exterior public pools and public spas shall be equipped with pool covers.

**Exception.** Pools deriving over 60% of their energy for heating (computed over an annual operating season) from site-recovered or site-solar energy.

## 1.1.1.7. Power, Lighting and Other Equipment

**(1)** Automatic receptacle controls required in Section 8.4.2 of 2010 ANSI/ASHRAE/IES 90.1 shall not apply to private and open offices.

**(2)** Section 9.4.1.3.(b) of 2010 ANSI/ASHRAE/IES 90.1 shall be substituted with the following:

9.4.1.3.(b) Lighting shall be controlled by one or more devices that automatically reduce lighting power by a minimum of 30% when there is no activity detected within a lighting zone for no more than 30 minutes. Lighting zone for this requirement shall be no larger than 334 $m^2$ (3600 $ft^2$).

**(3)** The additional controls required in Section 9.4.1.6.(g) of 2010 ANSI/ASHRAE/IES 90.1 shall not apply to lighting installed to provide minimum illumination level required by Section 3.2.7. of Division B of the *Building Code*.

**(4)** Uncovered parking areas are exempt from the requirements of Section 9.4.1.7.(c) of 2010 ANSI/ASHRAE/IES 90.1.

**(5)** Section 10.4.1.A shall be added to Section 10 "Other Equipment" of 2010 ANSI/ASHRAE/IES 90.1.

**10.4.1.A Standards for Electric Motors**

(1) Where the minimum efficiency of an electric motor that is within the scope of 2010 ANSI/ASHRAE/IES 90.1 is regulated by an Ontario Regulation, compliance with the requirements of Ontario Regulation shall be deemed to be compliance with the requirements of Section 10.4.1 and Tables 10.8a through 10.8c.

(2) Where the minimum efficiency of an electric motor that is within the scope of 2010 ANSI/ASHRAE/IES 90.1 is regulated by an Ontario Regulation, the efficiency level shall be based on CSA C390, "Test Methods, Marking Requirements, and Energy Efficiency Levels for Three-Phase Induction Motors".

(3) Electric motors shall comply with the appropriate minimum nominal efficiency requirements of Table 10.4.1.A.(a) or Table 10.4.1.A.(b).

Table 10.4.1.A.(a)
Minimum Nominal Efficiency for Motors (Premium Efficiency 60 Hz Motors)

| Rated Power | Open Motors | | | Enclosed Motors | | |
|---|---|---|---|---|---|---|
| | Number of Poles | | | Number of Poles | | |
| hp (kW) | 2 | 4 | 6 | 2 | 4 | 6 |
| | Minimum Energy Efficiency, % | | | Minimum Energy Efficiency, % | | |
| 1 (0.75) | 77.0 | 85.5 | 82.5 | 77.0 | 85.5 | 82.5 |
| 1.5 (1.1) | 84.0 | 86.5 | 86.5 | 84.0 | 86.5 | 87.5 |
| 2 (1.5) | 85.5 | 86.5 | 87.5 | 85.5 | 86.5 | 88.5 |
| 3 (2.2) | 85.5 | 89.5 | 88.5 | 86.5 | 89.5 | 89.5 |
| 5 (3.7) | 86.5 | 89.5 | 89.5 | 88.5 | 89.5 | 89.5 |
| 7.5 (5.5) | 88.5 | 91.0 | 91.0 | 89.5 | 91.7 | 91.0 |
| 10 (7.5) | 89.5 | 91.7 | 91.7 | 90.2 | 91.7 | 91.0 |
| 15 (11) | 90.2 | 93.0 | 91.7 | 91.0 | 92.4 | 91.7 |
| 20 (15) | 91.0 | 93.0 | 92.4 | 91.0 | 93.0 | 91.7 |
| 25 (18.5) | 91.7 | 93.6 | 93.0 | 91.7 | 93.6 | 93.0 |
| 30 (22) | 91.7 | 94.1 | 93.6 | 91.7 | 93.6 | 93.0 |
| 40 (30) | 92.4 | 94.1 | 94.1 | 92.4 | 94.1 | 94.1 |
| 50 (37) | 93.0 | 94.5 | 94.1 | 93.0 | 94.5 | 94.1 |
| 60 (45) | 93.6 | 95.0 | 94.5 | 93.6 | 95.0 | 94.5 |
| 75 (55) | 93.6 | 95.0 | 94.5 | 93.6 | 95.4 | 94.5 |
| 100 (75) | 93.6 | 95.4 | 95.0 | 94.1 | 95.4 | 95.0 |
| 125 (90) | 94.1 | 95.4 | 95.0 | 95.0 | 95.4 | 95.0 |
| 150 (110) | 94.1 | 95.8 | 95.4 | 95.0 | 95.8 | 95.8 |
| 200 (150) | 95.0 | 95.8 | 95.4 | 95.4 | 96.2 | 95.8 |
| 250 (185) | 95.0 | 95.8 | 95.4 | 95.8 | 96.2 | 95.8 |
| 300 (225) | 95.4 | 95.8 | 95.4 | 95.8 | 96.2 | 95.8 |
| 350 (260) | 95.4 | 95.8 | 95.4 | 95.8 | 96.2 | 95.8 |
| 400 (300) | 95.8 | 95.8 | 95.8 | 95.8 | 96.2 | 95.8 |
| 450 (340) | 95.8 | 96.2 | 96.2 | 95.8 | 96.2 | 95.8 |
| 500 (375) | 95.8 | 96.2 | 96.2 | 95.8 | 96.2 | 95.8 |
| Column 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Table 10.4.1.A.(b)
Minimum Nominal Efficiency for Motors (Energy Efficient 60 Hz Motors)

| Rated Power | Open Motors | | | | Enclosed Motors | | | |
|---|---|---|---|---|---|---|---|---|
| | Number of Poles | | | | Number of Poles | | | |
| hp (kW) | 2 | 4 | 6 | 8 | 2 | 4 | 6 | 8 |
| | Minimum Energy Efficiency, % | | | | Minimum Energy Efficiency, % | | | |
| 1 (0.75) | 75.5 | 82.5 | 80.0 | 74.0 | 75.5 | 82.5 | 80.0 | 74.0 |
| 1.5 (1.1) | 82.5 | 84.0 | 84.0 | 75.5 | 82.5 | 84.0 | 85.5 | 77.0 |
| 2 (1.5) | 84.0 | 84.0 | 85.5 | 85.5 | 84.0 | 84.0 | 86.5 | 82.5 |
| 3 (2.2) | 84.0 | 86.5 | 86.5 | 86.5 | 85.5 | 87.5 | 87.5 | 84.0 |
| 4 (3) | 84.0 | 86.5 | 86.5 | 86.5 | 85.5 | 87.5 | 87.5 | 84.0 |
| 5 (3.7) | 85.5 | 87.5 | 87.5 | 87.5 | 87.5 | 87.5 | 87.5 | 85.5 |
| 5.5 (4) | 85.5 | 87.5 | 87.5 | 87.5 | 87.5 | 87.5 | 87.5 | 85.5 |
| 7.5 (5.5) | 87.5 | 88.5 | 88.5 | 88.5 | 88.5 | 87.5 | 89.5 | 85.5 |
| 10 (7.5) | 88.5 | 89.5 | 90.2 | 89.5 | 89.5 | 89.5 | 89.5 | 88.5 |
| 15 (11) | 89.5 | 91.0 | 90.2 | 89.5 | 90.2 | 89.5 | 90.2 | 88.5 |
| 20 (15) | 90.2 | 91.0 | 91.0 | 90.2 | 90.2 | 91.0 | 90.2 | 89.5 |
| 25 (18.5) | 91.0 | 91.7 | 91.7 | 90.2 | 91.0 | 91.0 | 91.7 | 89.5 |
| 30 (22) | 91.0 | 92.4 | 92.4 | 91.0 | 91.0 | 92.4 | 91.7 | 91.0 |
| 40 (30) | 91.7 | 93.0 | 93.0 | 91.0 | 91.7 | 92.4 | 93.0 | 91.0 |
| 50 (37) | 92.4 | 93.0 | 93.0 | 91.7 | 92.4 | 93.0 | 93.0 | 91.7 |
| 60 (45) | 93.0 | 93.6 | 93.6 | 92.4 | 93.0 | 93.0 | 93.6 | 91.7 |
| 75 (55) | 93.0 | 94.1 | 93.6 | 93.6 | 93.0 | 93.6 | 93.6 | 93.0 |
| 100 (75) | 93.0 | 94.1 | 94.1 | 93.6 | 93.6 | 94.1 | 94.1 | 93.0 |
| 125 (90) | 93.6 | 94.5 | 94.1 | 93.6 | 94.5 | 94.5 | 94.1 | 93.6 |
| 150 (110) | 93.6 | 95.0 | 94.5 | 93.6 | 94.5 | 94.5 | 95.0 | 93.6 |
| 175 (132) | 94.5 | 95.0 | 94.5 | 93.6 | 95.0 | 95.0 | 95.0 | 94.1 |
| 200 (150) | 94.5 | 95.0 | 94.5 | 93.6 | 95.0 | 95.0 | 95.0 | 94.1 |
| 250 (185) | 94.5 | 95.4 | 95.4 | 94.5 | 95.4 | 95.4 | 95.0 | 94.5 |
| 300 (225) | 95.0 | 95.4 | 95.4 | | 95.4 | 95.4 | 95.0 | |
| 350 (260) | 95.0 | 95.4 | 95.4 | | 95.4 | 95.4 | 95.0 | |
| 400 (300) | 95.4 | 95.4 | | | 95.4 | 95.4 | | |
| 450 (340) | 95.8 | 95.8 | | | 95.4 | 95.4 | | |
| 500 (375) | 95.8 | 95.8 | | | 95.4 | 95.8 | | |
| Column 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

## 1.1.1.8. Energy Cost Method

**(1)** Where the compliance is achieved in accordance with Sentence 1.1.2.1.(1)(b), the *building* shall be designed to reduce its annual energy use that is calculated in terms of energy units such as GJ, kWh by 5% than the level attained by conforming to 2010 ANSI/ASHRAE/IES 90.1.

**(2)** Section 11.2.1.1.(a.) of 2010 ANSI/ASHRAE/IES 90.1 shall be substituted with the following:

a. hour by hour and a minimum of 8760 hours per year.

**(3)** Section 11.3.2.(d.) of 2010 ANSI/ASHRAE/IES 90.1 shall be substituted with the following:

d. For the purpose of annual energy use simulation, except as provided in (d1.), the peak outdoor air ventilation rates for the proposed and reference building shall be set to the minimum rates required by the applicable ventilation standard based on the proposed building design.

d1. Except where it may be required by Section 6 of 2010 ANSI/ASHRAE/IES 90.1, demand controlled and dedicated ventilation strategies need not be modeled in the reference building.

**(4)** Notwithstanding Section 11.3.2.(h.), the reference building fan power may be modeled in accordance with the requirements of G3.1.2.10 of Appendix G, 2010 ANSI/ASHRAE/IES 90.1.

**(5)** Notwithstanding footnotes “e” and “f” of Table 11.2.3.A, the reference building water pumps may be modeled in accordance with the requirements of G3.1.3.5 and G3.1.3.10 of Appendix G, 2010 ANSI/ASHRAE/IES 90.1.

**(6)** For automatic lighting controls in addition to those required in Section 9.4.1 credit may be taken for automatically controlled systems by reducing the connected lighting power by the applicable percentages listed in Table G3.2. of Appendix G, 2010 ANSI/ASHRAE/IES 90.1.

**(7)** Section 11.2.3.A.(1) shall be added to Section 11.2 ”Simulation General Requirements” of 2010 ANSI/ASHRAE/IES 90.1.

**11.2.3.A. Rates for Energy Supplied Back to the Grid System.**

(1) Where energy generated by an on-site renewable energy source is supplied back to the grid system, for the purpose of Section 11, Energy Cost Budget Method, the rates for the energy supplied back to the grid system shall be assumed to be equal to the rates paid for the same type of purchased energy from the grid system.

# Chapter 3

# Additional Requirements to the 2011 NECB

## Section 1.1. Changes and Additional Requirements

### 1.1.1. Changes and Additional Requirements to the 2011 NECB

#### 1.1.1.1. Application of Chapter 3

**(1)** Where compliance with energy efficiency requirements is achieved in accordance with Clause 1.1.2.1.(1)(d) of Chapter 1, energy efficiency of the *building* is required to conform to Chapter 3 of this Division.

**(2)** Notwithstanding Sentence 1.1.1.3.(1) of the 2011 NECB, where the requirements of the *Building Code* or the requirements of this Division are in conflict with the requirements of the 2011 NECB, the requirements of the *Building Code* and the requirements of this Division shall govern.

**(3)** In the 2011 NECB, references made to the CCBFC NRCC 53301, "National Building Code of Canada" or CCBFC NRCC 53302, "National Plumbing Code of Canada" are deemed to be references to corresponding provisions of the *Building Code*.

#### 1.1.1.2. Division A, Part 1 "Compliance" of the 2011 NECB

**(1)** Notwithstanding the provisions of Part 1 of Division A of the 2011 NECB, except as provided in Division 1 and Chapter 1 of Division 3 of this Supplementary Standard and except for *residential occupancies* that are within the scope of Part 9 of Division B of the *Building Code*, the 2011 NECB shall apply to all *buildings*.

#### 1.1.1.3. Division A, Part 2 "Objectives" and Part 3 "Functional Statements" of the 2011 NECB

**(1)** In addition to objectives and functional statements set out in Parts 2 and 3 of Division A of the 2011 NECB, the objectives and functional statements set out in the *Building Code* and attributed to Sentence 12.2.1.2.(2) of Division B of the *Building Code* shall also be the objectives and functional statements of the 2011 NECB.

#### 1.1.1.4. Division B, "Acceptable Solutions" of the 2011 NECB

**(1)** Except as provided in this Chapter, the energy efficiency of a *building* shall conform to all requirements of Division B "Acceptable Solutions" of the 2011 NECB and this Chapter.

## 1.1.1.5. Division C, "Administrative Provisions" of the 2011 NECB

**(1)** Division C "Administrative Provisions" of the 2011 NECB shall be substituted with the administrative provisions of the *Building Code Act, 1992* and the administrative provisions of Division C of the *Building Code*.

## 1.1.1.6. Enhancements to Division B, Part 3 "Building Envelope" of the 2011 NECB

**(1)** Where *electric space heating* is used in a *building* located in Zone 5, 6, 7A, or 7B, the *building* envelope requirements of Zone 7B of the 2011 NECB shall apply regardless of climatic zone.

**(2)** Sentence (4) shall be added to Article 3.2.2.3. of Division B of the 2011 NECB.

**3.2.2.3. Thermal Characteristics of Fenestration**

(4) The solar heat gain coefficient of fenestration shall comply with Table 3.2.2.3.A.

Table 3.2.2.3.A.
Solar Heat Gain Coefficients
Forming Part of Sentence 3.2.2.3.(4)

| Climatic Zone | Zone 5 | | Zone 6 | | Zone 7A and 7B | | Zone 8 | |
|---|---|---|---|---|---|---|---|---|
| Occupancy | Residential | Others | Residential | Others | Residential | Others | Residential | Others |
| Vertical Fenestration, SHGC | 0.40 | 0.35 | 0.40 | 0.40 | NR | 0.45 | NR | NR |
| Skylights, SHGC | 0.36 | 0.36 | 0.46 | 0.46 | 0.46 | 0.46 | NR | NR |
| Column 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Notes to Table 3.2.2.3.A.:
NR = No requirement

# Division 3

# Energy Efficiency Design After December 31, 2016

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

## FOREWORD

**Division 3** of this Supplementary Standard contains requirements for the design and construction of buildings for which a permit has been applied for after December 31, 2016. In this updated Supplementary Standard, the existing sample compliance paths in this Division have been replaced by new compliance paths. The compliance paths are based on contemporary energy codes and standards and contain additional requirements to achieve, on average, a 13 percent improvement over the efficiency level required by Sentence 12.2.1.1.(2) of Division B of the Building Code. Division 3 contains a transition provision and revised $CO_2e$ factors in Chapter 1 as well as the following three compliance paths based on:

1. ANSI/ASHRAE/IES Standard 90.1-2013, "Energy Standard for Buildings Except Low-Rise Residential Buildings", and additional requirements introduced through Chapter 2,
2. ANSI/ASHRAE/USGBC/IES Standard 189.1-2014, "Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings", and
3. CCBFC NRCC 56191, "2015 National Energy Code of Canada for Buildings" and additional requirements introduced through Chapter 3.

Division 3 also describes limitations on peak electric demand and annual carbon dioxide emissions.

Division 3 outlines the modifications made to these documents which are generally enhancements to the building envelope, mechanical equipment, lighting and heat recovery provisions of 2013 ANSI/ASHRAE/IES 90.1 and the 2015 NECB. These modifications can be found in Chapters 2 and 3, respectively. Certain buildings and parts of buildings are exempted from the energy efficiency provisions in this Division.

Compliance with this Division does not necessarily ensure that the actual annual energy consumption or actual annual energy cost of a building is less than or equal to the theoretical values arrived at using the building energy cost budget method of 2013 ANSI/ASHRAE/IES 90.1 or performance method of the 2015 NECB. Factors such as weather, workmanship, depreciation of the thermal resistance of building materials, occupant/user lifestyle, building operation and maintenance impact on the actual energy consumption of a building, while simulation assumption and software used may affect the theoretical calculations.

### Summary of the Contents of Division 3

**Chapter 1: General**

This Chapter contains the application, energy efficiency design requirements and exemptions to SB-10. It also contains climatic zones applicable to Ontario locations.

**Chapter 2: Additional Requirements to 2013 ANSI/ASHRAE/IES 90.1.** This Chapter contains additions and/or substitutions to 2013 ANSI/ASHRAE/IES 90.1.

**Chapter 3: Additional Requirements to the 2015 NECB**. This Chapter contains additions and/or substitutions to the 2015 NECB.

Recommended Resource Material: ANSI/ASHRAE/IES Standard 90.1-2013 User's Manual.

# Division 3

# Chapter 1

# General

## Section 1.1. General

### 1.1.1. Scope

#### 1.1.1.1. Scope

**(1)** Except as provided in Sentence (2), this Division applies to *construction* for which a permit has been applied for after December 31, 2016.

**(2)** *Construction* for which a permit is applied for on or before December 31, 2017 is permitted to conform to Division 3 as it read on December 31, 2016. (See Appendix A.)

### 1.1.2. Energy Efficiency Design, Carbon Dioxide Equivalents and Peak Electric Demand

#### 1.1.2.1. Energy Efficiency Design

**(1)** Except as provided in Sentence (2) and Article 1.2.1.1., the energy efficiency of all *buildings* shall be designed to achieve the energy efficiency levels attained by conforming to

(a) 2013 ANSI/ASHRAE/IES 90.1 and Chapter 2,
(b) 2015 NECB and Chapter 3, or
(c) Section 7 "Energy Efficiency" of 2014 ANSI/ASHRAE/USGBC/IES 189.1, excluding Sections 7.2.b, 7.4.7.3, 7.4.8 and 7.5.

**(2)** Energy efficiency requirements do not apply to *buildings* or parts of *buildings* described in Article 1.2.1.1.

#### 1.1.2.2. Carbon Dioxide Equivalents

**(1)** The annual $CO_2e$ emission level from a *building* shall be determined in accordance with good engineering practice using the $CO_2e$ emission factors listed in Table 1.1.2.2.

**(2)** The annual $CO_2e$ emission level from a *building* required to comply with Clause 1.1.2.1.(1) (a), shall not exceed the level achieved by complying with Sections 5 to 10 of 2013 ANSI/ASHRAE/IES 90.1 and Chapter 2.

**(3)** The annual $CO_2e$ emission level from a *building* required to comply with Clause 1.1.2.1.(1) (b), shall not exceed the level achieved by complying with Sections 1 to 7 of the 2015 NECB and Chapter 3.

**(4)** The annual $CO_2e$ emission level from a *building* required to comply with Clause 1.1.2.1.(1) (c), shall not exceed the level achieved by complying with Sections 7.1, 7.2.a, 7.3 and 7.4 of 2014 ANSI/ASHRAE/USGBC/IES Standard 189.1.

**(5)** Where the energy efficiency compliance of a *building* is achieved using the Energy Cost Budget Method of 2013 ANSI/ASHRAE/IES 90.1 and Chapter 2, or Building Energy Performance Compliance Path of the 2015 NECB and Chapter 3:

(a) the annual design $CO_2e$ emission level from the *building* shall be calculated, and

(b) the annual design $CO_2e$ emission level of the proposed building shall not exceed the annual $CO_2e$ emission level of the corresponding baseline or reference building using the $CO_2e$ emission factors listed in Table 1.1.2.2.

Table 1.1.2.2.
$CO_2e$ Emission Factors
Forming Part of Sentences 1.1.2.2.(1) and (5)

| Building Energy Source | Emission Factor |
|---|---|
| Stationary Sources | |
| Electricity (average for 2014) | 0.050 $kgCO_2e$ / kWh |
| Natural Gas | 1.899 $kgCO_2e$ / $m^3$ |
| Propane | 1.548 $kgCO_2e$ / L |
| Heating Oil | 2.755 $kgCO_2e$ / L |
| Column 1 | 2 |

Notes to Table 1.1.2.2.:

1. Factors are expressed in units of $CO_2$ equivalent ($CO_2e$) so as to encompass the global warming effects of all relevant greenhouse gases ($CO_2$, $CH_4$, and $N_2O$).
2. Non-$CO_2$ emission components are technology dependent and vary by application; the above factors assume the most common and likely applications.
3. Electricity emission factor is an average consumption intensity factor for the year 2014; electricity factors are subject to change on an annual basis depending on the mix of generation in a particular year. Use the latest available published data.
4. Factors are expressed in their native units (e.g. kWh, $m^3$, or litre) and conversion to other common units (e.g. $kgCO_2e$ / GJ) is possible through calculation; a suggested list of unit conversions is available from the National Energy Board.
5. The table is not comprehensive or exhaustive and not necessarily representative of every energy source that may be encountered in a project; other factors may be used on a case-by-case basis with appropriate methodological justification.
6. Emission factors are sourced from Environment and Climate Change Canada's 2016 National Inventory Report (NIR) unless otherwise noted and values have been rounded; further information on emission factors can be found in Annex 6 of Part 2 of the 2016 NIR which can be downloaded.

### 1.1.2.3. Peak Electric Demand

**(1)** The peak electric demand of a *building* required to comply with Clause 1.1.2.1.(1) (a), shall not exceed the level achieved by complying with Sections 5 to 10 of 2013 ANSI/ASHRAE/IES 90.1 and Chapter 2.

**(2)** The peak electric demand of a *building* required to comply with Clause 1.1.2.1.(1) (b), shall not exceed the level achieved by complying with Sections 1 to 7 of the 2015 NECB and Chapter 3.

**(3)** The peak electric demand of a *building* required to comply with Clause 1.1.2.1.(1) (c), shall not exceed the level achieved by complying with Sections 7.1 to 7.4.7.5 of 2014 ANSI/ASHRAE/USGBC/IES Standard 189.1.

**(4)** Except as provided in Sentence (5), where the energy efficiency compliance of a *building* is achieved by using the Energy Cost Budget Method of 2013 ANSI/ASHRAE/IES 90.1 and Chapter 2, or the Building Energy Performance Compliance Path of the 2015 NECB and Chapter 3:
(a) the peak electric demand of a *building* shall be calculated, and
(b) the peak electric demand of the proposed building shall not exceed the peak electric demand of the corresponding budget or reference building.

**(5)** A *building* is deemed to comply with Sentences (1) to (4), if the *building* design meets the applicable prescriptive requirements set in Article 1.1.2.1. for the energy efficiency of
(a) the cooling equipment, fan power limitations for cooling and ventilation systems, and interior lighting power density, if the *building's* peak electric demand occurs in summer, or
(b) the space and water heating equipment, fans, pumps and interior lighting power density, if the *building's* peak electric demand occurs in winter.

## 1.1.3. Chapter 2

### 1.1.3.1. Chapter 2

**(1)** Chapter 2 contains additional requirements and changes to 2013 ANSI/ASHRAE/IES 90.1 and applies where compliance with energy efficiency requirements is achieved in accordance with Clause 1.1.2.1.(1)(a).

## 1.1.4. Chapter 3

### 1.1.4.1. Chapter 3

**(1)** Chapter 3 contains additional requirements and changes to the 2015 NECB and applies where compliance with energy efficiency requirements is achieved in accordance with Clause 1.1.2.1.(1)(b).

# Section 1.2. Application

## 1.2.1. Application of Articles 1.1.2.1. to 1.1.2.3.

### 1.2.1.1. Exceptions

**(1)** The requirements of Articles 1.1.2.1. to 1.1.2.3. of this Chapter do not apply to
(a) a *building* or part of a *building* of *residential occupancy* that is within the scope of Part 9 of Division B of the *Building Code*,
(b) construction trailers, tents and *air-supported structures*,
(c) a *building* or part of a *building* where the environmental condition within the *building* is governed by the process, operation of the *building* or permanent openings to the outdoors or to unconditioned environments,
(d) a *building* or part of a *building* where it can be shown that meeting the requirements of Article 1.1.2.1. does not conserve any energy,
(e) equipment or processes that use energy for manufacturing, industrial and commercial purposes, and
(f) *occupancies* listed in Table 1.2.1.1.

Table 1.2.1.1.
Occupancies Exempt from Compliance with Articles 1.1.2.1 to 1.1.2.3.
Forming Part of Sentence 1.2.1.1.(1)

| GROUP A, DIVISION 4 | GROUP F, DIVISION 1 | GROUP F, DIVISION 2 | GROUP F, DIVISION 3 |
|---|---|---|---|
| Amusement Park Structures (not elsewhere classified)<br>Bleachers<br>Grandstands<br>Reviewing Stands<br>Stadia | Bulk Plants for Flammable Liquids<br>Bulk Storage Warehouses for Hazardous Substances<br>Cereal Mills<br>Chemical Manufacturing or Processing Plants<br>Distilleries<br>Dry Cleaning Plants<br>Feed Mills<br>Flour Mills<br>Grain Elevators<br>Lacquer Factories<br>Paint, Varnish and Pyroxylin Product Factories<br>Rubber Processing Plants<br>Spray Painting Operations<br>Waste Paper Processing Plants | Dry Cleaning Establishments not using flammable or explosive solvents or cleaners<br>Electrical Substations<br>Helicopter Landing Areas on Roofs<br>Laundries, except self-service<br>Planing Mills<br>Printing Plants<br>Repair Garages<br>Woodworking Factories | Creameries<br>Power Plants<br>Open-air Parking Garages<br>Pumping Stations |
| GROUP C<br><br>Part 9 Buildings(1)<br>Camps for Housing Workers (Part 3 and 9 Buildings)<br>Recreational Camps | | | |
| Column 1 | 2 | 3 | 4 |

Notes to Table 1.2.1.1.:
(1) Part 9 *buildings* are exempt from compliance with Articles 1.1.2.1. to 1.1.2.3. where the energy efficiency design conforms to Division 5 of this Supplementary Standard.
(2) The list is not intended to be exhaustive and other exemptions may be made in accordance with Article 1.2.1.1.

**(2)** The following *buildings* or parts of *buildings* need not to comply with *building* envelope requirements:
(a) any *building* space which uses energy for space conditioning at a rate less than 12 W/m² under peak conditions,
(b) warehouses and storage rooms where the design indoor temperature does not exceed 10°C,
(c) except conditioned spaces of *buildings* exposed to unheated *storage garages* and unheated storage rooms, unheated *storage garages* and unheated storage rooms, and
(d) where part of a single enclosed space is heated.

**(3)** Where specifically noted in this Supplementary Standard or documents referenced in Sentence 12.2.1.1.(2) of Division B of the *Building Code*, certain other *buildings* or elements of *buildings* shall be exempt.

# Section 1.3. Climatic Zones

## 1.3.1. Climatic Zone Numbers

### 1.3.1.1. Determination of Climatic Zone Numbers

**(1)** Except as permitted in Sentence (2), the climatic zone number of a location shall be determined in accordance with Table 1.3.1.1. based on the corresponding heating degree-days (HDD) for locations found in Table 1.2 of MMAH Supplementary Standard SB-1, "Climatic and Seismic Data".

**(2)** For locations not listed in Table 1.2 of MMAH Supplementary Standard SB-1, "Climatic and Seismic Data", the heating degree-days and climatic data of the climatologically closest location is permitted to be used.

Table 1.3.1.1.
Climatic Zone Numbers for Ontario
Forming Part of Sentence 1.3.1.1.(1)
(This Table is to be used in conjunction with Tables SB 5.5-5 to SB 5.5-7)

| Climatic Zone Number | Thermal Criteria |
|---|---|
| Zone 5 | HDD18 < 4000°C |
| Zone 6 | 4000°C ≤ HDD18 < 5000°C |
| Zone 7 | HDD18 ≥ 5000°C |
| Column 1 | 2 |

# Chapter 2

# Additional Requirements to 2013 ANSI/ASHRAE/IES 90.1

## Section 1.1. Changes and Additional Requirements

### 1.1.1. Changes and Additional Requirements

#### 1.1.1.1. Application of Chapter 2

**(1)** Where compliance with energy efficiency requirements is achieved in accordance with Clause 1.1.2.1.(1)(a) of Chapter 1, energy efficiency of the *building* is required to conform to this Chapter.

#### 1.1.1.2. Section 4 "Administration and Compliance" of 2013 ANSI/ASHRAE/IES 90.1

**(1)** Sections 4.2.1.1 to 4.2.1.3 of 2013 ANSI/ASHRAE/IES 90.1 are replaced with the following:

**4.2.1.1 New Buildings**. New buildings and additions to existing buildings shall comply with provisions of either Sections 5 to 10 or Section 11.

**4.2.1.2** Reserved.

**4.2.1.3 Existing Buildings.** Change of use of existing buildings shall conform to Part 10 of Division B of the Building Code and renovation of existing buildings shall conform to Part 11 of Division B of the Building Code.

#### 1.1.1.3. Climatic Zones

**(1)** Climatic zone numbers shall be determined in accordance with Section 1.3. of Chapter 1.

#### 1.1.1.4. Section 5 "Building Envelope" of 2013 ANSI/ASHRAE/IES 90.1

**(1)** Section 5.4.3.1.A shall be added to Section 5.4.3 "Air Leakage" of 2013 ANSI/ASHRAE/IES 90.1.

**5.4.3.1.A Air Barrier Materials, Assemblies and Systems**

(1) The air barrier materials, assemblies and systems that are in conformance with Part 5 of Division B of the Building Code shall be deemed to be in compliance with Section 5.4.3.1.3 and Section 5.4.3.2.

**(2)** Sections 5.5.1 and 5.5.2 shall be replaced with Sections 5.5.1.(1) through 5.5.1.(7) and Sections 5.5.3.5.1, 5.5.3.5.2, 5.5.3.7, and 5.5.3.8 shall be added to Section 5.5 of 2013 ANSI/ASHRAE/IES 90.1.

**5.5.1 Exterior Building Envelope**

(1) Where electric space heating is used, the building envelope shall comply with the requirements of Table SB 5.5-7 of this Supplementary Standard, regardless of its climatic location.

(2) For the purpose of Sentence (1), any reference to Tables 5.5-5 through 5.5-7 of 2013 ANSI/ASHRAE/IES 90.1 shall be deemed to be a reference to Tables SB 5.5-5–2017 to SB 5.5-7–2017 of this Supplementary Standard.

(3) Tables SB 5.5-5–2017 to SB 5.5-7–2017 shall supersede the requirements of Tables 5.5-5 to 5.5-7 of 2013 ANSI/ASHRAE/IES 90.1

(4) Tables 5.5-1 to 5.5-8 of 2013 ANSI/ASHRAE/IES 90.1 shall not be used.

(5) For a conditioned space, the exterior building envelope shall comply with either the “nonresidential” or “residential” requirements in Tables SB 5.5-5–2017 through SB 5.5-7–2017 of this Supplementary Standard for the appropriate climate.

(6) If a building contains any semiheated space or unconditioned space, then the semi-exterior building envelope shall comply with the requirements for semiheated space in Tables SB 5.5-5–2017 through SB 5.5-7–2017 of this Supplementary Standard for the appropriate climate.

(7) Notwithstanding the requirements of Tables SB 5.5-5–2017 to SB 5.5-7–2017, exposed frame floors, between the framing members, need not be insulated to more than
   (a) RSI of 6.69 (R38) where the framing depth is more than 254 mm (10 in.), and
   (b) RSI of 5.28 (R30) where the framing depth is 254 mm (10 in.) or less, and

**5.5.2. Reserved**

**5.5.3.5.1 Slabs.** Insulation continuity shall be maintained in the design of slab edge insulation systems. Continuity shall be maintained from the wall insulation through the slab/wall/footing intersection to the body of the slab edge insulation. Several representative configurations are illustrated in Figure 5-1.

**5.5.3.5.2** Where insulative continuity is impossible because of structural constraints, a minimum overlapping of insulation is acceptable. The insulation must overlap by a distance equal to (or greater than) four times the minimum insulation separation, as shown in Figure 5-2.

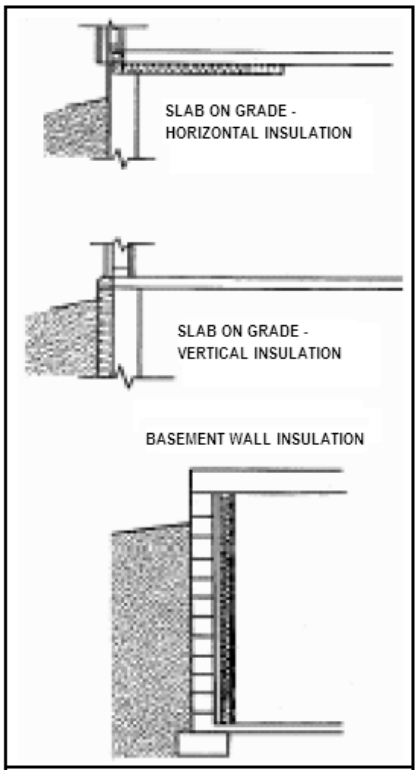


Figure 5-1
Continuity of Insulation on or Below Grade

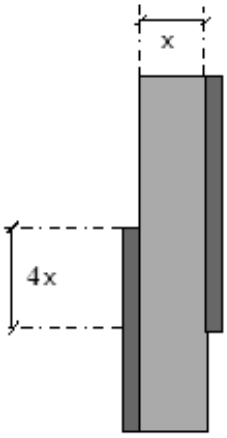


Figure 5-2
Minimum Permissible Insulation Overlap

**5.5.3.7** For the purposes of Section 5, the effects of thermal bridging are waived for:

(a) intermediate structural connections of continuous steel shelf angles (or similar structural element) used to support the building facade provided there is a thermal break between the remaining contact surface of the supporting element and the building structure. This provision is intended to substantially reduce thermal bridging effects caused by the continuous bearing between structural elements supporting building facade and the building frame (ie. steel shelf angle attached to perimeter floor slab to support brick veneer), or

(b) structural connections of load bearing elements where a thermal break cannot be achieved.

**5.5.3.8** In addition to the exceptions permitted above, the effects of thermal bridging are also waived for:

(a) exposed structural projections of buildings where the total cross-sectional area of the exposed element does not exceed 2% of the exterior building envelope area and the cross-sectional area of the exposed structural element is measured where it penetrates the insulation component of the building envelope, (For example, if the total cross-sectional area of cantilevered concrete balconies and other projections penetrating the insulation component of the building envelope does not exceed 2% of the exterior building envelope area, their thermal bridging effects need not be taken into account)

(b) ties in masonry construction,

(c) flashing, and

(d) top exposed portion of foundation walls provided the exposure does not exceed 200 mm measured from the top of the foundation wall to the top of exterior wall insulation which meets the minimum insulation RSI-Value for wall below grade stipulated in the appropriate Tables. (See Figure 5-3)

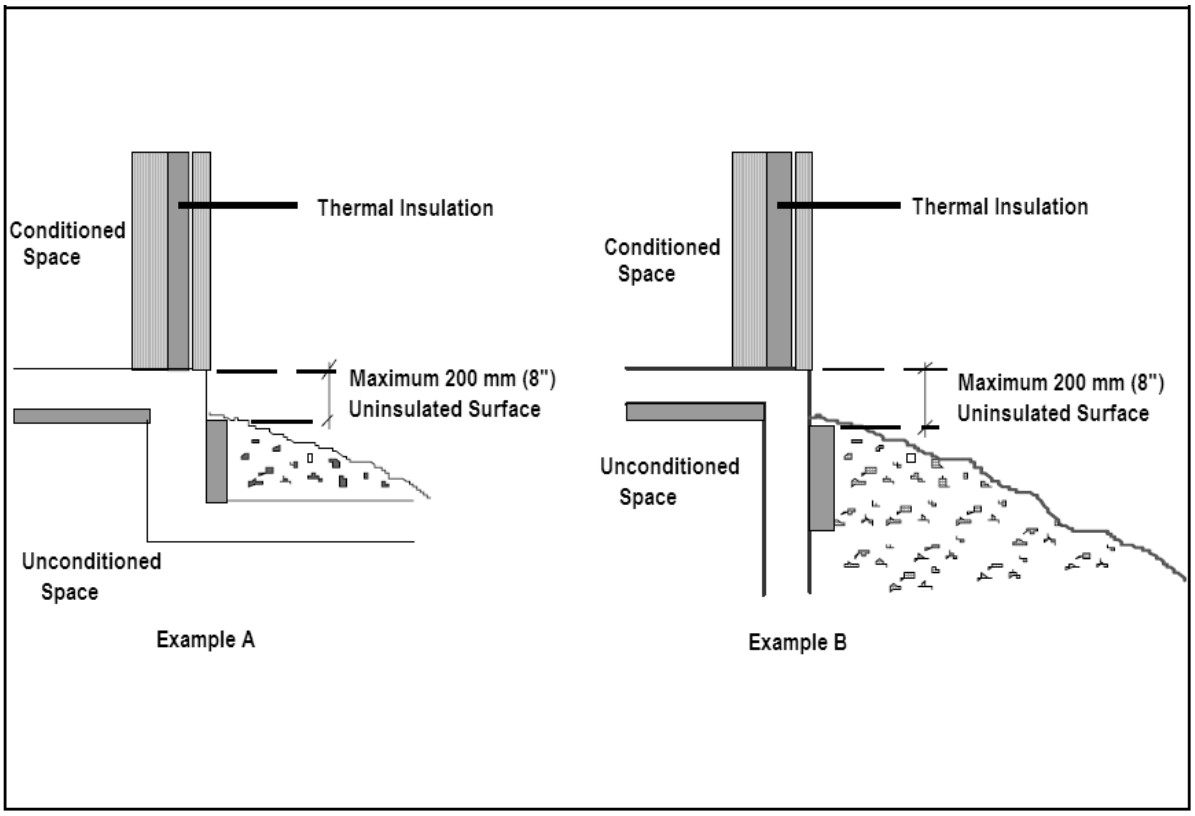


Figure 5-3
Maximum Uninsulated Surface of Foundation Wall

**(3)** Section 5.5.4.5 of 2013 ANSI/ASHRAE/IES 90.1 shall only be applicable where the main entrance is located on the south orientation and the south oriented wall area is larger than west oriented wall area, and where the south oriented wall area is larger than east oriented wall area. (See Appendix A.)

**(4)** The *building* envelope trade-off option in Section 5.6 of 2013 ANSI/ASHRAE/IES 90.1 shall not apply unless the procedure incorporates the modifications made to 2013 ANSI/ASHRAE/IES 90.1 through this Chapter.

**(5)** Section 5.8.2.4.A shall be added to Section 5.8.2.4 "Air Leakage" of 2013 ANSI/ASHRAE/IES 90.1.

**5.8.2.4.A Alternative Standards to determine Thermal Characteristics of Fenestrations**

(1) Notwithstanding Sections 5.8.2.3 and 5.8.2.4, thermal characteristics of fenestrations are permitted to be determined in conformance with;

(a) CAN/CSA-A440.2, "Fenestration Energy Performance", or

(b) NFRC 100, "Procedure for Determining Fenestration Product U-factors" and NFRC 200, "Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence".

TABLE SB 5.5-5–2017 (See Appendix A.)
(Supersedes Table 5.5-5 in 2013 ANSI/ASHRAE/IES 90.1)
Building Envelope Requirements for Climate Zone 5 (A, B, C) (SI)

| Opaque Elements | Nonresidential | | Residential | | Semiheated | |
|---|---|---|---|---|---|---|
| | Assembly | Insulation | Assembly | Insulation | Assembly | Insulation |
| | Max. U-Value | Min. RSI-Value | Max. U-Value | Min. RSI-Value | Max. U-Value | Min. RSI-Value |
| Roofs | | | | | | |
| Insulation Entirely Above Deck | U-0.164 | 6.2 ci | U-0.164 | 6.2 ci | U-0.322 | 3.0 ci |
| Metal Building [a] | U-0.189 | 4.4 + 1.9 Ls | U-0.189 | 4.4 + 1.9 Ls | U-0.419 | 1.8 + 3.3 |
| Attic and Other | U-0.107 | 10.6 | U-0.107 | 10.6 | U-0.174 | 6.7 |
| Walls, Above Grade | | | | | | |
| Mass | U-0.307 | 3.0 ci | U-0.273 | 3.3 ci | U-0.514 | 1.8 ci |
| Metal Building | U-0.256 | 2.3 + 3.3 ci | U-0.256 | 2.3 + 3.3 ci | U-0.480 | 2.3 + 1.1 ci |
| Steel Framed | U-0.281 | 2.3 + 2.1 ci | U-0.281 | 2.3 + 2.1 ci | U-0.429 | 2.3 + 1.1 ci |
| Wood Framed and Other | U-0.261 | 2.3 + 1.8 ci | U-0.261 | 2.3 + 1.8 ci | U-0.455 | 2.3 + 0.2 ci |
| Wall, Below Grade | | | | | | |
| Below Grade Wall | C-0.380 | 2.6 ci | C-0.380 | 2.6 ci | C-0.676 | 1.3 ci |
| Floors | | | | | | |
| Mass | U-0.291 | 2.9 ci | U-0.261 | 3.3 ci | U-0.547 | 1.3 ci |
| Steel Joist | U-0.194 | 6.7 | U-0.194 | 6.7 | U-0.266 | 4.4 |
| Wood Framed and Other | U-0.169 | 6.7 | U-0.169 | 6.7 | U-0.261 | 3.7 |
| Slab-On-Grade Floors | | | | | | |
| Unheated | F-0.810 | 2.6 for 1200 mm | F-0.794 | 2.6 for 1200 mm | F-1.263 | NR |
| Heated | F-1.072 | 1.8 full slab | F-1.072 | 1.8 full slab | F-1.402 | 1.8 for 1200 mm |
| Opaque Doors | | | | | | |
| Swinging | U-2.56 | | U-2.56 | | U-3.58 | |
| Nonswinging | U-2.56 | | U-2.56 | | U-7.41 | |

| Fenestration | Assembly | Assembly | | Assembly | Assembly | | Assembly | Assembly | |
|---|---|---|---|---|---|---|---|---|---|
| | Max. U-Value | Max. SHGC | Min. VT/SHGC | Max. U-Value | Max. SHGC | Min. VT/SHGC | Max. U-Value | Max. SHGC | Min. VT/SHGC |
| Vertical Fenestration, 0% - 40% of Wall | | | | | | | | | |
| Nonmetal framing: all | U-1.64 | 0.40 | 1.10 | U-1.64 | 0.40 | 1.10 | U-2.30 | NR | NR |
| Metal framing: fixed | U-2.15 | | | U-2.15 | | | U-3.17 | | |
| Metal framing: operable | U-2.56 | | | U-2.56 | | | U-3.58 | | |
| Metal framing: entrance door | U-3.94 | | | U-3.48 | | | U-3.94 | | |
| Skylight, 0% - 3% of Roof | | | | | | | | | |
| All types | U-2.56 | 0.40 | NR | U-2.56 | 0.40 | NR | U-5.01 | NR | NR |

The following definitions apply: ci = continuous insulation, Ls = liner system, NR = no (insulation) requirement.
[a] When using the RSI-value compliance method for metal building roofs, a thermal spacer block is required.

TABLE SB 5.5-6–2017 (See Appendix A.)
(Supersedes Table 5.5-6 in 2013 ANSI/ASHRAE/IES 90.1)
Building Envelope Requirements for Climate Zone 6 (A, B) (SI)

| Opaque Elements | Nonresidential | | Residential | | Semiheated | |
|---|---|---|---|---|---|---|
| | Assembly | Insulation | Assembly | Insulation | Assembly | Insulation |
| | Max. U-Value | Min. RSI-Value | Max. U-Value | Min. RSI-Value | Max. U-Value | Min. RSI-Value |
| Roofs | | | | | | |
| Insulation Entirely Above Deck | U-0.164 | 6.2 ci | U-0.164 | 6.2 ci | U-0.322 | 3.0 ci |
| Metal Building [a] | U-0.158 | 4.4 + 1.9 + 1.9 Ls | U-0.148 | 4.4 + 1.9 + 1.9 Ls | U-0.307 | 3.3 + 1.9 Ls |
| Attic and Other | U-0.107 | 10.6 | U-0.107 | 10.6 | U-0.174 | 6.7 |
| Walls, Above Grade | | | | | | |
| Mass | U-0.273 | 3.3 ci | U-0.261 | 3.5 ci | U-0.514 | 1.8 ci |
| Metal Building | U-0.256 | 2.3 + 3.3 ci | U-0.256 | 2.3 + 3.3 ci | U-0.480 | 2.3 + 1.1 ci |
| Steel Framed | U-0.250 | 2.3 + 2.6 ci | U-0.250 | 2.3 + 2.6 ci | U-0.429 | 2.3 + 1.1 ci |
| Wood Framed and Other | U-0.261 | 2.3 + 1.8 ci | U-0.261 | 2.3 + 1.8 ci | U-0.455 | 2.3 + 0.2 ci |
| Wall, Below Grade | | | | | | |
| Below Grade Wall | C-0.284 | 3.5 ci | C-0.284 | 3.5 ci | C-0.676 | 1.3 ci |
| Floors | | | | | | |
| Mass | U-0.261 | 3.3 ci | U-0.261 | 3.3 ci | U-0.445 | 1.7 ci |
| Steel Joist | U-0.164 | 6.7 + 0.7 ci | U-0.164 | 6.7 + 0.7 ci | U-0.266 | 4.4 |
| Wood Framed and Other | U-0.138 | 6.7 + 0.5 ci | U-0.138 | 6.7 + 0.5 ci | U-0.261 | 3.7 |
| Slab-On-Grade Floors | | | | | | |
| Unheated | F-0.794 | 2.6 for 1200 mm | F-0.676 | 1.8 full slab | F-1.263 | NR |
| Heated | F-1.072 | 1.8 full slab | F-1.045 | 1.8 full slab | F-1.340 | 2.6 for 1200 mm |
| Opaque Doors | | | | | | |
| Swinging | U-2.56 | | U-2.56 | | U-3.58 | |
| Nonswinging | U-2.56 | | U-2.56 | | U-2.56 | |

| Fenestration | Assembly | Assembly | | Assembly | Assembly | | Assembly | Assembly | |
|---|---|---|---|---|---|---|---|---|---|
| | Max. U-Value | Max. SHGC | Min. VT/SHGC | Max. U-Value | Max. SHGC | Min. VT/SHGC | Max. U-Value | Max. SHGC | Min. VT/SHGC |
| Vertical Fenestration, 0% - 40% of Wall | | | | | | | | | |
| Nonmetal framing: all | U-1.64 | .40 | 1.10 | U-1.64 | 0.40 | 1.10 | U-2.30 | NR | NR |
| Metal framing: fixed | U-2.15 | | | U-2.15 | | | U-2.61 | | |
| Metal framing: operable | U-2.56 | | | U-2.56 | | | U-3.02 | | |
| Metal framing: entrance door | U-3.94 | | | U-3.48 | | | U-3.94 | | |
| Skylight, 0% - 3% of Roof | | | | | | | | | |
| All types | U-2.56 | 0.40 | NR | U-2.56 | 0.40 | NR | U-4.34 | NR | NR |

The following definitions apply: ci = continuous insulation, Ls = liner system, NR = no (insulation) requirement.
[a] When using the RSI-value compliance method for metal building roofs, a thermal spacer block is required.

TABLE SB 5.5-7–2017 (See Appendix A.)
(Supersedes Table 5.5-7 in 2013 ANSI/ASHRAE/IES 90.1)
Building Envelope Requirements for Climate Zone 7 (SI)

| Opaque Elements | Nonresidential | | Residential | | Semiheated | |
|---|---|---|---|---|---|---|
| | Assembly | Insulation | Assembly | Insulation | Assembly | Insulation |
| | Max. U-Value | Min. RSI-Value | Max. U-Value | Min. RSI-Value | Max. U-Value | Min. RSI-Value |
| Roofs | | | | | | |
| Insulation Entirely Above Deck | U-0.143 | 7.0 ci | U-0.143 | 7.0 ci | U-0.199 | 4.9 ci |
| Metal Building [a] | U-0.148 | 4.4 + 1.9 + 1.9 Ls | U-0.148 | 4.4 + 1.9 + 1.9 Ls | U-0.189 | 4.4 + 1.9 Ls |
| Attic and Other | U-0.087 | 12.5 | U-0.087 | 12.5 | U-0.138 | 8.6 |
| Walls, Above Grade | | | | | | |
| Mass | U-0.261 | 3.5 ci | U-0.261 | 3.5 ci | U-0.419 | 2.1 ci |
| Metal Building | U-0.225 | 2.3 + 3.3 ci | U-0.225 | 2.3 + 3.3 ci | U-0.368 | 2.3 + 1.7 ci |
| Steel Framed | U-0.250 | 2.3 + 2.6 ci | U-0.215 | 2.3 + 3.5 ci | U-0.327 | 2.3 + 1.8 ci |
| Wood Framed and Other | U-0.261 | 2.3 + 1.8 ci | U-0.261 | 2.3 + 1.8 ci | U-0.327 | 2.3 + 1.1 ci |
| Wall, Below Grade | | | | | | |
| Below Grade Wall | C-0.284 | 3.5 ci | C-0.284 | 3.5 ci | C-0.676 | 1.3 ci |
| Floors | | | | | | |
| Mass | U-0.215 | 4.1 ci | U-0.215 | 4.1 ci | U-0.378 | 2.1 ci |
| Steel Joist | U-0.164 | 6.7 + 0.7 ci | U-0.164 | 6.7 + 0.7 ci | U-0.266 | 4.4 |
| Wood Framed and Other | U-0.138 | 6.7 + 0.5 ci | U-0.138 | 6.7 + 0.5 ci | U-0.261 | 3.7 |
| Slab-On-Grade Floors | | | | | | |
| Unheated | F-0.794 | 2.6 for 1200 mm | F-0.676 | 1.8 full slab | F-1.263 | NR |
| Heated | F-1.045 | 1.8 full slab | F-1.045 | 1.8 full slab | F-1.340 | 2.6 for 1200 mm |
| Opaque Doors | | | | | | |
| Swinging | U-2.56 | | U-2.56 | | U-3.58 | |
| Nonswinging | U-2.56 | | U-2.56 | | U-2.56 | |

| Fenestration | Assembly | Assembly | | Assembly | Assembly | | Assembly | Assembly | |
|---|---|---|---|---|---|---|---|---|---|
| | Max. U-Value | Max. SHGC | Min. VT/SHGC | Max. U-Value | Max. SHGC | Min. VT/SHGC | Max. U-Value | Max. SHGC | Min. VT/SHGC |
| Vertical Fenestration, 0% - 40% of Wall | | | | | | | | | |
| Nonmetal framing: all | U-1.64 | 0.45 | 1.10 | U-1.64 | 0.45 | 1.10 | U-1.64 | NR | NR |
| Metal framing: fixed | U-1.94 | | | U-1.94 | | | U-1.94 | | |
| Metal framing: operable | U-2.04 | | | U-2.04 | | | U-2.25 | | |
| Metal framing: entrance door | U-3.94 | | | U-3.48 | | | U-3.94 | | |
| Skylight, 0% - 3% of Roof | | | | | | | | | |
| All types | U-2.56 | NR | NR | U-2.56 | NR | NR | U-4.34 | NR | NR |

The following definitions apply: ci = continuous insulation, Ls = liner system, NR = no (insulation) requirement.
[a] When using the RSI-value compliance method for metal building roofs, a thermal spacer block is required.

TABLE SB 5.5-5–2017 (See Appendix A.)
(Supersedes Table 5.5-5 in 2013 ANSI/ASHRAE/IES 90.1)
Building Envelope Requirements for Climate Zone 5 (A, B, C) (I-P)

| Opaque Elements | Nonresidential | | Residential | | Semiheated | |
|---|---|---|---|---|---|---|
| | Assembly | Insulation | Assembly | Insulation | Assembly | Insulation |
| | Max. U-Value | Min. R-Value | Max. U-Value | Min. R-Value | Max. U-Value | Min. R-Value |
| Roofs | | | | | | |
| Insulation Entirely Above Deck | U-0.029 | R-35 ci | U-0.029 | R-35 ci | U-0.057 | R-17 ci |
| Metal Building [a] | U-0.033 | R-25 + R-11 Ls | U-0.033 | R-25 + R-11 Ls | U-0.074 | R-10 + R-19 |
| Attic and Other | U-0.019 | R-60 | U-0.019 | R-60 | U-0.031 | R-38 |
| Walls, Above Grade | | | | | | |
| Mass | U-0.054 | R-17 ci | U-0.048 | R-19 ci | U-0.091 | R-10 ci |
| Metal Building | U-0.045 | R-13 + R-19 ci | U-0.045 | R-13 + R-19 ci | U-0.085 | R-13 + R-6.3 ci |
| Steel Framed | U-0.050 | R-13 + R-12 ci | U-0.050 | R-13 + R-12 ci | U-0.076 | R-13 + R-6.3 ci |
| Wood Framed and Other | U-0.046 | R-13 + R-10 ci | U-0.046 | R-13 + R-10 ci | U-0.080 | R-13 + R-1 ci |
| Wall, Below Grade | | | | | | |
| Below Grade Wall | C-0.067 | R-15 ci | C-0.067 | R-15 ci | C-0.119 | R-7.4 ci |
| Floors | | | | | | |
| Mass | U-0.051 | R-16.4 ci | U-0.046 | R-18.7 ci | U-0.096 | R-7.4 ci |
| Steel Joist | U-0.034 | R-38 | U-0.034 | R-38 | U-0.047 | R-25 |
| Wood Framed and Other | U-0.030 | R-38 | U-0.030 | R-38 | U-0.046 | R-21 |
| Slab-On-Grade Floors | | | | | | |
| Unheated | F-0.468 | R-15 for 48 in. | F-0.459 | R-15 for 48 in. | F-0.730 | NR |
| Heated | F-0.619 | R-10 full slab | F-0.619 | R-10 full slab | F-0.810 | R-10 for 48 in. |
| Opaque Doors | | | | | | |
| Swinging | U-0.45 | | U-0.45 | | U-0.63 | |
| Nonswinging | U-0.45 | | U-0.45 | | U-1.31 | |

| Fenestration | Assembly | Assembly | | Assembly | Assembly | | Assembly | Assembly | |
|---|---|---|---|---|---|---|---|---|---|
| | Max. U-Value | Max. SHGC | Min. VT/SHGC | Max. U-Value | Max. SHGC | Min. VT/SHGC | Max. U-Value | Max. SHGC | Min. VT/SHGC |
| Vertical Fenestration, 0% - 40% of Wall | | | | | | | | | |
| Nonmetal framing: all | U-0.29 | 0.40 | 1.10 | U-0.29 | 0.40 | 1.10 | U-0.41 | NR | NR |
| Metal framing: fixed | U-0.38 | | | U-0.38 | | | U-0.56 | | |
| Metal framing: operable | U-0.45 | | | U-0.45 | | | U-0.63 | | |
| Metal framing: entrance door | U-0.69 | | | U-0.61 | | | U-0.69 | | |
| Skylight, 0% - 3% of Roof | | | | | | | | | |
| All types | U-0.45 | 0.40 | NR | U-0.45 | 0.40 | NR | U-0.88 | NR | NR |

The following definitions apply: ci = continuous insulation, Ls = liner system, NR = no (insulation) requirement.
[a] When using the R-value compliance method for metal building roofs, a thermal spacer block is required.

TABLE SB 5.5-6–2017 (See Appendix A.)
(Supersedes Table 5.5-6 in 2013 ANSI/ASHRAE/IES 90.1)
Building Envelope Requirements for Climate Zone 6 (A, B) (I-P)

| Opaque Elements | Nonresidential | | Residential | | Semiheated | |
|---|---|---|---|---|---|---|
| | Assembly | Insulation | Assembly | Insulation | Assembly | Insulation |
| | Max. U-Value | Min. R-Value | Max. U-Value | Min. R-Value | Max. U-Value | Min. R-Value |
| Roofs | | | | | | |
| Insulation Entirely Above Deck | U-0.029 | R-35 ci | U-0.029 | R-35 ci | U-0.057 | R-17 ci |
| Metal Building [a] | U-0.028 | R-25 + R-11 + R-11 Ls | U-0.026 | R-25 + R-11 + R-11 Ls | U-0.054 | R-19 + R-11 Ls |
| Attic and Other | U-0.019 | R-60 | U-0.019 | R-60 | U-0.031 | R-38 |
| Walls, Above Grade | | | | | | |
| Mass | U-0.048 | R-19 ci | U-0.046 | R-20 ci | U-0.091 | R-10 ci |
| Metal Building | U-0.045 | R-13 + R-19 ci | U-0.045 | R-13 + R-19 ci | U-0.085 | R-13 + R-6.5 ci |
| Steel Framed | U-0.044 | R-13 + R-15 ci | U-0.044 | R-13 + R-15 ci | U-0.076 | R-13 + R-6 ci |
| Wood Framed and Other | U-0.046 | R-13 + R-10 ci | U-0.046 | R-13 + R-10 ci | U-0.080 | R-13 + R-1 ci |
| Wall, Below Grade | | | | | | |
| Below Grade Wall | C-0.050 | R-20 ci | C-0.050 | R-20 ci | C-0.119 | R-7.5 ci |
| Floors | | | | | | |
| Mass | U-0.046 | R-18.7 ci | U-0.046 | R-18.7 ci | U-0.078 | R-9.7 ci |
| Steel Joist | U-0.029 | R-38 + R-4 ci | U-0.029 | R-38 + R-4 ci | U-0.047 | R-25 |
| Wood Framed and Other | U-0.024 | R-38 + R-3 ci | U-0.024 | R-38 + R-3 ci | U-0.046 | R-21 |
| Slab-On-Grade Floors | | | | | | |
| Unheated | F-0.459 | R-15 for 48 in. | F-0.391 | R-10 full slab | F-0.730 | NR |
| Heated | F-0.619 | R-10 full slab | F-0.604 | R-10 full slab | F-0.774 | R-15 for 48 in. |
| Opaque Doors | | | | | | |
| Swinging | U-0.45 | | U-0.45 | | U-0.63 | |
| Nonswinging | U-0.45 | | U-0.45 | | U-0.45 | |

| Fenestration | Assembly | Assembly | | Assembly | Assembly | | Assembly | Assembly | |
|---|---|---|---|---|---|---|---|---|---|
| | Max. U-Value | Max. SHGC | Min. VT/SHGC | Max. U-Value | Max. SHGC | Min. VT/SHGC | Max. U-Value | Max. SHGC | Min. VT/SHGC |
| Vertical Fenestration, 0% - 40% of Wall | | | | | | | | | |
| Nonmetal framing: all | U-0.29 | 0.40 | 1.10 | U-0.29 | 0.40 | 1.10 | U-0.41 | NR | NR |
| Metal framing: fixed | U-0.38 | | | U-0.38 | | | U-0.46 | | |
| Metal framing: operable | U-0.45 | | | U-0.45 | | | U-0.53 | | |
| Metal framing: entrance door | U-0.69 | | | U-0.61 | | | U-0.69 | | |
| Skylight, 0% - 3% of Roof | | | | | | | | | |
| All types | U-0.45 | 0.40 | NR | U-0.45 | 0.40 | NR | U-0.77 | NR | NR |

The following definitions apply: ci = continuous insulation, Ls = liner system, NR = no (insulation) requirement.
[a] When using the R-value compliance method for metal building roofs, a thermal spacer block is required.

TABLE SB 5.5-7–2017 (See Appendix A.)
(Supersedes Table 5.5-7 in 2013 ANSI/ASHRAE/IES 90.1)
Building Envelope Requirements for Climate Zone 7 (I-P)

| Opaque Elements | Nonresidential | | Residential | | Semiheated | |
|---|---|---|---|---|---|---|
| | Assembly | Insulation | Assembly | Insulation | Assembly | Insulation |
| | Max. U-Value | Min. R-Value | Max. U-Value | Min. R-Value | Max. U-Value | Min. R-Value |
| Roofs | | | | | | |
| Insulation Entirely Above Deck | U-0.025 | R-40 ci | U-0.025 | R-40 ci | U-0.035 | R-28 ci |
| Metal Building [a] | U-0.026 | R-25 + R-11 + R-11 Ls | U-0.026 | R-25 + R-11 + R-11 Ls | U-0.033 | R-25 + R-11 Ls |
| Attic and Other | U-0.015 | R-71 | U-0.015 | R-71 | U-0.024 | R-49 |
| Walls, Above Grade | | | | | | |
| Mass | U-0.046 | R-20 ci | U-0.046 | R-20 ci | U-0.074 | R-12 ci |
| Metal Building | U-0.040 | R-13 + R-19 ci | U-0.040 | R-13 + R-19 ci | U-0.065 | R-13 + R-9.8 ci |
| Steel Framed | U-0.044 | R-13 + R-15 ci | U-0.038 | R-13 + R-20 ci | U-0.058 | R-13 + R-10 ci |
| Wood Framed and Other | U-0.046 | R-13 + R-10 ci | U-0.046 | R-13 + R-10 ci | U-0.058 | R-13 + R-6 ci |
| Wall, Below Grade | | | | | | |
| Below Grade Wall | C-0.050 | R-20 ci | C-0.050 | R-20.0 ci | C-0.119 | R-7.5 ci |
| Floors | | | | | | |
| Mass | U-0.038 | R-23.4 ci | U-0.038 | R-23.4 ci | U-0.067 | R-12 ci |
| Steel Joist | U-0.029 | R-38 + R-4 ci | U-0.029 | R-38 + R-4 ci | U-0.047 | R-25 |
| Wood Framed and Other | U-0.024 | R-38 + R-3 ci | U-0.024 | R-38 + R-3 ci | U-0.046 | R-21 |
| Slab-On-Grade Floors | | | | | | |
| Unheated | F-0.459 | R-15 for 48 in. | F-0.391 | R-10 full slab | F-0.730 | NR |
| Heated | F-0.604 | R-10 full slab | F-0.604 | R-10 full slab | F-0.774 | R-15 for 48 in. |
| Opaque Doors | | | | | | |
| Swinging | U-0.45 | | U-0.45 | | U-0.63 | |
| Nonswinging | U-0.45 | | U-0.45 | | U-0.45 | |

| Fenestration | Assembly | Assembly | | Assembly | Assembly | | Assembly | Assembly | |
|---|---|---|---|---|---|---|---|---|---|
| | Max. U-Value | Max. SHGC | Min. VT/SHGC | Max. U-Value | Max. SHGC | Min. VT/SHGC | Max. U-Value | Max. SHGC | Min. VT/SHGC |
| Vertical Fenestration, 0% - 40% of Wall | | | | | | | | | |
| Nonmetal framing: all | U-0.29 | 0.45 | 1.10 | U-0.29 | 0.45 | 1.10 | U-0.29 | NR | NR |
| Metal framing: fixed | U-0.34 | | | U-0.34 | | | U-0.34 | | |
| Metal framing: operable | U-0.36 | | | U-0.36 | | | U-0.40 | | |
| Metal framing: entrance door | U-0.69 | | | U-0.61 | | | U-0.69 | | |
| Skylight, 0% - 3% of Roof | | | | | | | | | |
| All types | U-0.45 | NR | NR | U-0.45 | NR | NR | U-0.77 | NR | NR |

The following definitions apply: ci = continuous insulation, Ls = liner system, NR = no (insulation) requirement.
[a] When using the R-value compliance method for metal building roofs, a thermal spacer block is required.

## 1.1.1.5. Heating Ventilation and Air-Conditioning

**(1)** Where *electric space heating* is used, the *building* envelope shall comply with the requirements of Table SB 5.5-7–2017 of this Supplementary Standard, regardless of its climatic zone.

**(2)** Section 6.4.1.A shall be added to Section 6 "Heating Ventilation and Air Conditioning Equipment" of 2013 ANSI/ASHRAE/IES 90.1.

**6.4.1.A. Testing Procedures for Minimum Equipment Efficiency**

(1) Equipment efficiencies that are tested in accordance with the test procedures listed in the 2015 NECB or in an applicable Ontario Regulation, shall be deemed to be in compliance with the test procedures given in Tables 6.8.1-1 to 6.8.1-13.

**(3)** Fan systems shall have fan power limitations 10% below limitations specified in Table 6.5.3.1-1 of 2013 ANSI/ASHRAE/IES-90.1.

**(4)** Energy recovery systems required in 6.5.6.1 of 2013 ANSI/ASHRAE/IES-90.1 shall have at least 55% energy recovery effectiveness.

## 1.1.1.6. HVAC and Service Water Heating Equipment – Minimum Equipment Efficiency

**(1)** The minimum equipment efficiency of a gas-fired boiler shall comply with the value required in Table SB 6.8.1–2017.

**(2)** The minimum equipment efficiency of a gas-fired storage water heater shall comply with the value required in Table SB 6.8.1–2017.

Table SB 6.8.1–2017
Minimum Equipment Efficiency for Gas Boilers and Gas Water Heaters
Forming Part of Sentences 1.1.1.6.(1) and (2)

| Equipment | Size Category, kW (Btu/h) | Performance Required |
|---|---|---|
| Gas boilers, hot water | < 88 (< 300,000) | 90% AFUE |
| | ≥ 88 and < 733 (≥ 300,000 and < 2,500,000) | 90% $E_t$ |
| Gas water heaters | ≤ 22 (≤ 75,000) | 0.7 - 0.0005V (V in litres) EF (0.7 - 0.00189V, V in U.S. gal) |
| Column 1 | 2 | 3 |

## 1.1.1.7. Service Water Heating Equipment

**(1)** Section 7.4.2.A shall be added to Section 7 "Service Water Heating Equipment " of 2013 ANSI/ASHRAE/IES 90.1.

**7.4.2.A Testing Procedures for Minimum Equipment Efficiency**

(1) Equipment efficiencies that are tested in accordance with the test procedures listed in the 2015 NECB or in an applicable Ontario Regulation, shall be deemed to be in compliance with the test procedures given in Table 7.8.

**(2)** Section 7.4.5.2 of Section 7 "Service Water Heating Equipment" of 2013 ANSI/ASHRAE/IES 90.1 shall be substituted with the following Article:

**7.4.5.2 Pool Covers.** Heated exterior public pools and public spas shall be equipped with pool covers.

**Exception.** Pools deriving over 60% of their energy for heating (computed over an annual operating season) from site-recovered or site-solar energy.

## 1.1.1.8. Power, Lighting and Other Equipment

**(1)** Automatic receptacle controls required in Section 8.4.2 of 2013 ANSI/ASHRAE/IES 90.1 shall not apply to private and open offices.

**(2)** Section 8.4.3.3 shall be added to Section 8.4.3. "Electric Energy monitoring" of 2013 ANSI/ASHRAE/IES 90.1.

**8.4.3.3** The building shall be deemed to comply with Sections 8.4.3.1 and 8.4.3.2 if the building is designed and constructed to facilitate future installation of means to measure and monitor energy use of the building parts and systems described in Section 8.4.3.1. (See Appendix A.)

**(3)** Section 9.4.1.2.(b) of 2013 ANSI/ASHRAE/IES 90.1 shall be substituted with the following:

**9.4.1.2.(b)** Lighting shall be controlled by one or more devices that automatically reduce lighting power by a minimum of 30% when there is no activity detected within a lighting zone for no more than 20 minutes. Lighting zone for this requirement shall be no larger than 334 $m^2$ (3600 $ft^2$).

**(4)** Uncovered parking areas are exempt from the requirements of Section 9.4.1.4.(c) of 2013 ANSI/ASHRAE/IES 90.1.

## 1.1.1.9. Lighting Power Allowance and Controls

**(1)** The calculation of interior lighting power allowance shall be based on the lighting power densities given in Table SB 9.5.1–2017 or Table SB 9.6.1–2017 of this Chapter.

**(2)** Except as provided in Sentence (4), for the purpose of Sentence (1), any reference to Table 9.5.1 and the lighting power densities contained in Table 9.6.1 of 2013 ANSI/ASHRAE/IES-90.1 shall be deemed to be a reference to Table SB 9.5.1–2017 and the lighting power densities listed in Table SB 9.6.1–2017 of this Chapter respectively.

**(3)** Lighting power densities listed in Table SB 9.5.1–2017 and Table SB 9.6.1–2017 of this Chapter shall supersede the lighting power densities listed in Table 9.5.1 and Table 9.6.1 of 2013 ANSI/ASHRAE/IES-90.1 respectively.

**(4)** Minimum lighting control requirements in Table 9.6.1 of 2013 ANSI/ASHRAE/IES-90.1 shall apply.

Table SB 9.5.1–2017
Lighting Power Densities Using the Building Area Method(1)
Forming Part of Sentences 1.1.1.9.(1) to (3)

| Building Area Type | Lighting Power Density, W/m² (W/ft²) |
|---|---|
| Automotive Facility | 7.6 (0.71) |
| Convention Centre | 8.2 (0.76) |
| Courthouse | 9.7 (0.90) |
| Dining | |
| Bar Lounge / Leisure | 9.7 (0.90) |
| Cafeteria / Fast Food | 8.5 (0.79) |
| Family | 8.4 (0.78) |
| Dormitory | 6.6 (0.61) |
| Exercise Centre | 7.0 (0.65) |
| Fire Station | 5.7 (0.53) |
| Gymnasium | 7.3 (0.68) |
| Health-Care Clinic | 8.8 (0.82) |
| Hospital | 11.3 (1.05) |
| Hotel | 8.1 (0.75) |
| Library | 8.4 (0.78) |
| Manufacturing Facility | 9.7 (0.90) |
| Motel | 8.1 (0.75) |
| Motion Picture Theatre | 8.9 (0.83) |
| Multi-Unit Residential Building | 7.3 (0.68) |
| Museum | 11.4 (1.06) |
| Office | 8.5 (0.79) |
| Storage Garage | 1.6 (0.15) |
| Penitentiary | 8.1 (0.75) |
| Performing Arts Theatre | 12.7 (1.18) |
| Police Station | 8.6 (0.80) |
| Post Office | 7.2 (0.67) |
| Religious Building | 10.1 (0.94) |
| Retail | 11.4 (1.06) |
| School / University | 8.7 (0.81) |
| Sports Arena | 9.4 (0.87) |
| Town Hall | 8.6 (0.80) |
| Transportation | 6.6 (0.61) |
| Warehouse | 5.2 (0.48) |
| Workshop | 9.7 (0.90) |
| Column 1 | 2 |

Notes to Table SB 9.5.1–2017:
(1) Terms shall have the same meanings as they have in 2013 ANSI/ASHRAE/IES-90.1.

Table SB 9.6.1–2017
Lighting Power Densities Using the Space-by-Space Method(1)
Forming Part of Sentences 1.1.1.9.(1) to (3)

| Common Space Types | Lighting Power Density, W/m² (W/ft²) |
|---|---|
| Atrium | |
| < 6 m in height | 1.06 per m in height (0.03 per ft in height) |
| ≥ 6 m and ≤ 12 m in height | 1.06 per m in height (0.03 per ft in height) |
| > 12 m in height | 4.31 + 0.71 per m in height (0.40 + 0.02 per ft in height) |
| Audience / Seating Area-Permanent | |
| For Auditorium | 6.8 (0.63) |
| For Convention Centre | 8.8 (0.82) |
| For Gymnasium | 7.0 (0.65) |
| For Motion Picture Theatre | 12.3 (1.14) |
| For Penitentiary | 3.0 (0.28) |
| For Performing Arts Theatre | 21.8 (2.03) |
| For Religious Buildings | 16.5 (1.53) |
| For Sports Arena | 4.6 (0.43) |
| Other | 4.6 (0.43) |
| Banking Activity Area and Offices | 9.3 (0.86) |
| Classroom / Lecture / Training | |
| For Penitentiary | 14.4 (1.34) |
| Other | 10.3 (0.96) |
| Computer / Server Room | 14.3 (1.33) |
| Conference / Meeting / Multi-Purpose | 11.5 (1.07) |
| Confinement Cell | 8.7 (0.81) |
| Copy / Print Room | 6.0 (0.56) |
| Corridor / Transition Area | |
| For space designed to ANSI/IES RP- 28(2) (and used primarily by residents) | 9.9 (0.92) |
| For Hospital | 9.9 (0.92) |
| For Manufacturing Facility | 3.1 (0.29) |
| Other | 7.1 (0.66) |
| Courtroom | 15.0 (1.39) |
| Dining Area | |
| For Bar Lounge / Leisure Dining | 10.0 (0.93) |
| For Cafeteria / Fast Food Dining | 6.8 (0.63) |
| For Family Dining | 7.6 (0.71) |
| For space designed to ANSI/IES RP-28(2) (and used primarily by residents) | 21.5 (2.00) |
| For Penitentiary | 10.3 (0.96) |
| Other | 6.8 (0.63) |
| Column 1 | 2 |

Table SB 9.6.1–2017 (Cont'd)
Lighting Power Densities Using the Space-by-Space Method
Forming Part of Sentences 1.1.1.9.(1) to (3)

| Building-Specific Space Types | Lighting Power Density, W/m² (W/ft²) |
|---|---|
| Dressing / Fitting Room For Performing Arts Theatre | 6.6 (0.61) |
| Electrical / Mechanical Room | 4.6 (0.43) |
| Emergency Vehicle Garage | 4.4 (0.41) |
| Food Preparation Area | 11.4 (1.06) |
| Guest Room | 8.3 (0.77) |
| Laboratory | |
| For Classrooms | 12.9 (1.20) |
| Other | 15.6 (1.45) |
| Laundry / Washing Area | 4.6 (0.43) |
| Loading Dock, Interior | 6.2 (0.58) |
| Lobby | |
| For space designed to ANSI/IES RP-28(2) (and used primarily by residents) | 21.8 (2.03) |
| For Elevator | 7.3 (0.68) |
| For Hotel | 11.4 (1.06) |
| For Motion Picture Theatre | 4.8 (0.45) |
| For Performing Arts Theatre | 18.3 (1.70) |
| Other | 10.8 (1.00) |
| Locker Room | 5.2 (0.48) |
| Lounge / Break Room | |
| For Healthcare Facility | 8.4 (0.78) |
| Other | 6.7 (0.62) |
| Office | |
| Enclosed | 10.0 (0.93) |
| Open Plan | 8.7 (0.81) |
| Storage Garage, Interior | 1.5 (0.14) |
| Pharmacy Area | 14.4 (1.34) |
| Sales Area | 13.1 (1.22) |
| Seating Area, General | 4.6 (0.43) |
| Stairway | 6.2 (0.58) |
| Storage Room ≥ 5 m² and < 100 m² | 6.8 (0.63) |
| Storage Room < 5 m² | 10.4 (0.97) |
| Vehicular Maintenance Area | 6.0 (0.56) |
| Washroom | |
| For care occupancy designed to ANSI/IES RP-28(2) (and used primarily by residents) | 13.1 (1.22) |
| Other | 9.1 (0.85) |
| Workshop | 12.3 (1.14) |
| Column 1 | 2 |

Table SB 9.6.1–2017 (Cont'd)
Lighting Power Densities Using the Space-by-Space Method
Forming Part of Sentences 1.1.1.9.(1) to (3)

| Building-Specific Space Types | Lighting Power Density, $W/m^2$ ($W/ft^2$) |
|---|---|
| Care occupancy designed to ANSI/IES RP-28(2) | |
| For Chapel (used primarily by residents) 23.811.4 | 11.4 (1.06) |
| For Recreation Room (used primarily by residents) | 19.4 (1.80) |
| Convention Centre | |
| Exhibit Space | 9.5 (0.88) |
| Dormitory | |
| Living Quarters | 5.8 (0.54) |
| Fire Station | |
| Sleeping Quarters | 2.2 (0.20) |
| Gymnasium / Fitness Centre | |
| Exercise Area | 5.4 (0.50) |
| Playing Area | 8.8 (0.82) |
| Healthcare Facility | |
| Exam / Treatment Room | 18.1 (1.68) |
| Medical Supply Room | 5.8 (0.54) |
| Nursery | 10.8 (1.00) |
| Nurses' Station | 8.7 (0.81) |
| Operating Room | 23.4 (2.17) |
| Patient Room | 6.7 (0.62) |
| Physical Therapy | 9.0 (0.84) |
| Imaging Room | 11.4 (1.06) |
| Recovery | 11.1 (1.03) |
| Library | |
| Reading Area | 8.8 (0.82) |
| Stacks | 12.9 (1.20) |
| Manufacturing Facility | |
| Detailed Manufacturing Area | 10.0 (0.93) |
| Equipment Room | 7.0 (0.65) |
| Extra High Bay (> 15 m floor to ceiling height) | 11.3 (1.05) |
| High Bay (7.5 m to 15 m floor to ceiling height) | 8.1 (0.75) |
| Low Bay (< 7.5 m floor to ceiling height) | 10.3 (0.96) |
| Column 1 | 2 |

Table SB 9.6.1–2017 (Cont'd)
Lighting Power Densities Using the Space-by-Space Method
Forming Part of Sentences 1.1.1.9.(1) to (3)

| Building-Specific Space Types | Lighting Power Density, W/m² (W/ft²) |
|---|---|
| Museum | |
| General Exhibition | 11.3 (1.05) |
| Restoration | 9.2 (0.85) |
| Post Office | 7.3 (0.68) |
| Sorting Area | |
| Religious Building | |
| Fellowship Hall | 5.9 (0.55) |
| Worship / Pulpit / Choir | 16.5 (1.53) |
| Retail Facilities | |
| Dressing / Fitting Room | 5.4 (0.50) |
| Mall Concourse | 9.7 (0.90) |
| Sports Arena – Playing Area | |
| Class IV Facility | 12.2 (1.13) |
| Class III Facility | 18.3 (1.70) |
| Class II Facility | 21.1 (1.96) |
| Class I Facility | 26.6 (2.47) |
| Transportation Facility | |
| Baggage / Carousel Area | 4.8 (0.45) |
| Airport Concourse | 3.3 (0.31) |
| Terminal Ticket Counter | 6.7 (0.62) |
| Warehouse | |
| Small, Hand-Carried Items | 7.4 (0.69) |
| Medium To Bulky, Palletized Items | 3.8 (0.35) |
| Column 1 | 2 |

Notes to Table SB 9.6.1–2017:
(1) Terms shall have the same meanings as they have in 2013 ANSI/ASHRAE/IES-90.1.
(2) BSR/IES RP-28-16, "Lighting and the Visual Environment for Seniors and the Low Vision Population".

**(5)** The calculation of exterior lighting power allowance shall be based on Table SB 9.4.2-2–2017 of this Chapter.

**(6)** Lighting power allowances listed in Table SB 9.4.2-2–2017 of this Chapter shall supersede the lighting power allowances listed in Table 9.4.2-2 of 2013 ANSI/ASHRAE/IES 90.1.

TABLE SB 9.4.2-2–2017
(Supersedes Table 9.4.2-2 in 2013 ANSI/ASHRAE/IES 90.1)
Individual Lighting Power Allowances for Building Exteriors
Forming Part of Sentences 1.1.1.9.(5) and (6)

| | Zone 0 | Zone 1 | Zone 2 | Zone 3 | Zone 4 |
|---|---|---|---|---|---|
| Base Site Allowance (base allowance may be used in tradable or non-tradable surfaces) | | | | | |
| | No allowance | 350 W | 400 W | 500 W | 900 W |
| Tradable Surfaces<br>(LPDs for uncovered parking areas, building grounds, building entrances, exits and loading docks, canopies and overhangs, and outdoor sales areas may be traded.) | | | | | |
| Uncovered Parking Areas | | | | | |
| Parking areas and drives | No allowance | 0.32 W/m$^2$ (0.03 W/ft$^2$) | 0.43 W/m$^2$ (0.04 W/ft$^2$) | 0.65 W/m$^2$ (0.06 W/ft$^2$) | 0.86 W/m$^2$ (0.08 W/ft$^2$) |
| Building Grounds | | | | | |
| Walkways less than 3 m (10 ft) wide | No allowance | 1.6 W/m (0.50 W/ft) | 1.6 W/m (0.50 W/ft) | 2.0 W/m (0.60 W/ft) | 2.3 W/m (0.70 W/ft) |
| Walkways 3 m (10 ft) wide or greater | No allowance | 1.1 W/m$^2$ (0.10 W/ft$^2$) | 1.1 W/m$^2$ (0.10 W/ft$^2$) | 1.2 W/m$^2$ (0.11 W/ft$^2$) | 1.5 W/m$^2$ (0.14 W/ft$^2$) |
| Plaza areas | No allowance | 1.1 W/m$^2$ (0.10 W/ft$^2$) | 1.1 W/m$^2$ (0.10 W/ft$^2$) | 1.2 W/m$^2$ (0.11 W/ft$^2$) | 1.5 W/m$^2$ (0.14 W/ft$^2$) |
| Stairways | No allowance | 6.5 W/m$^2$ (0.60 W/ft$^2$) | 7.5 W/m$^2$ (0.70 W/ft$^2$) | 7.5 W/m$^2$ (0.70 W/ft$^2$) | 7.5 W/m$^2$ (0.70 W/ft$^2$) |
| Pedestrian Tunnels | No allowance | 1.3 W/m$^2$ (0.12 W/ft$^2$) | 1.3 W/m$^2$ (0.12 W/ft$^2$) | 1.5 W/m$^2$ (0.14 W/ft$^2$) | 2.3 W/m$^2$ (0.21 W/ft$^2$) |
| Landscaping | No allowance | 0.32 W/m$^2$ (0.03 W/ft$^2$) | 0.43 W/m$^2$ (0.04 W/ft$^2$) | 0.43 W/m$^2$ (0.04 W/ft$^2$) | 0.43 W/m$^2$ (0.04 W/ft$^2$) |
| Building Entrances, Exits, and Loading Docks | | | | | |
| Pedestrian and vehicular entrances and exits | No allowance | 46 W/m (14 W/ft) of door width | 46 W/m (14 W/ft) of door width | 69 W/m (21 W/ft) of door width | 69 W/m (21 W/ft) of door width |
| Entry canopies | No allowance | 2.1 W/m$^2$ (0.20 W/ft$^2$) | 2.7 W/m$^2$ (0.25 W/ft$^2$) | 4.3 W/m$^2$ (0.40 W/ft$^2$) | 4.3 W/m$^2$ (0.40 W/ft$^2$) |
| Loading docks | No allowance | 5.4 W/m$^2$ (0.50 W/ft$^2$) | 5.4 W/m$^2$ (0.50 W/ft$^2$) | 5.4 W/m$^2$ (0.50 W/ft$^2$) | 5.4 W/m$^2$ (0.50 W/ft$^2$) |
| Sales Canopies | | | | | |
| Free standing and attached | No allowance | 4.3 W/m$^2$ (0.40 W/ft$^2$) | 4.3 W/m$^2$ (0.4 W/ft$^2$) | 6.5 W/m$^2$ (0.60 W/ft$^2$) | 7.5 W/m$^2$ (0.70 W/ft$^2$) |
| Outdoor Sales | | | | | |
| Open areas (including vehicle sales lots) | No allowance | 6.5 W/m$^2$ (0.60 W/ft$^2$) | 6.5 W/m$^2$ (0.60 W/ft$^2$) | 6.5 W/m$^2$ (0.60 W/ft$^2$) | 6.5 W/m$^2$ (0.60 W/ft$^2$) |
| Street frontage for vehicle sales lots in addition to “open area” allowance | No allowance | No allowance | 23 W/m (7 W/ft) | 23 W/m (7 W/ft) | 69 W/m (21 W/ft) |
| Column 1 | 2 | 3 | 4 | 5 | 6 |

TABLE SB 9.4.2-2–2017 (Cont'd)
(Supersedes Table 9.4.2-2 in 2013 ANSI/ASHRAE/IES 90.1)
Individual Lighting Power Allowances for Building Exteriors
Forming Part of Sentences 1.1.1.9.(5) and (6)

| | Zone 0 | Zone 1 | Zone 2 | Zone 3 | Zone 4 |
|---|---|---|---|---|---|
| Base Site Allowance (base allowance may be used in tradable or non-tradable surfaces) | | | | | |
| | No allowance | 350 W | 400 W | 500 W | 900 W |
| Nontradable Surfaces<br>(LPD calculations for the following applications can be used only for the specific application and cannot be traded between surfaces or with other exterior lighting. The following allowances are in addition to any allowance otherwise permitted in the "Tradable Surfaces" section of this table.) | | | | | |
| Building façades (façade lighting) | No allowance | No allowance | 1.1 W/m$^2$ (0.10 W/ft$^2$) for each illuminated wall or surface or 8.2 W/m (2.5 W/ft) for each illuminated wall or surface length | 1.6 W/m$^2$ (0.15 W/ft$^2$) for each illuminated wall or surface or 12.3 W/m (3.75 W/ft) for each illuminated wall or surface length | 2.2 W/m$^2$ (0.20 W/ft$^2$) for each illuminated wall or surface or 16.4 W/m (5.0 W/ft) for each illuminated wall or surface length |
| Automated teller machines (ATM) and night depositories | No allowance | 135 W per location plus 45 W per additional ATM per location | 135 W per location plus 45 W per additional ATM per location | 135 W per location plus 45 W per additional ATM per location | 135 W per location plus 45 W per additional ATM per location |
| Entrances and gatehouse inspection stations at guarded facilities | No allowance | 5.4 W/m$^2$ (0.50 W/ft$^2$) of covered and uncovered area | 5.4 W/m$^2$ (0.50 W/ft$^2$) of covered and uncovered area | 5.4 W/m$^2$ (0.50 W/ft$^2$) of covered and uncovered area | 5.4 W/m$^2$ (0.50 W/ft$^2$) of covered and uncovered area |
| Loading areas for law enforcement, fire, ambulance, and other emergency service vehicles | No allowance | 3.8 W/m$^2$ (0.35 W/ft$^2$) of covered and uncovered area | 3.8 W/m$^2$ (0.35 W/ft$^2$) of covered and uncovered area | 3.8 W/m$^2$ (0.35 W/ft$^2$) of covered and uncovered area | 3.8 W/m$^2$ (0.35 W/ft$^2$) of covered and uncovered area |
| Drive-through windows/doors | No allowance | 200 W per drive-through | 200 W per drive-through | 200 W per drive-through | 200 W per drive-through |
| Parking near 24-hour retail entrances | No allowance | 400 W per drive-through | 400 W per drive-through | 400 W per drive-through | 400 W per drive-through |
| Roadway/parking entry, trail head, and toilet facility, or other locations approved by the authority having jurisdiction. | A single luminaire of 60 W or less may be installed for each roadway/parking entry, trail head, and toilet facility, or other locations approved by the authority having jurisdiction | No allowance | No allowance | No allowance | No allowance |
| Column 1 | 2 | 3 | 4 | 5 | 6 |

## 1.1.1.10. Other Equipment

**(1)** Section 10.4.1.A shall be added to Section 10 "Other Equipment" of 2013 ANSI/ASHRAE/IES 90.1.

**10.4.1.A Electric Motors**

(1) Notwithstanding Section 10.4.1, where the minimum efficiency requirements of an electric motor is covered under an applicable Ontario Energy Efficiency Regulation, it shall meet the requirements of the Ontario Regulation and shall be deemed to be in compliance with Section 10.4.1.

**(2)** Section 10.4.5.3 shall be added to Section 10.4.5 "Whole Building Energy Monitoring" of 2013 ANSI/ASHRAE/IES 90.1.

**10.4.5.3** The building shall be deemed to comply with Sections 10.4.5.1 and 10.4.5.2, if the building is designed and constructed to facilitate future installation of means to measure and monitor energy use by each energy type described in Section 10.4.5.1. (See Appendix A.)

## 1.1.1.11. Energy Cost Method

**(1)** Section 11.4.1.1.(a.) of 2013 ANSI/ASHRAE/IES 90.1 shall be substituted with the following:

a. hour by hour and a minimum of 8760 hours per year.

**(2)** Section 11.5.2.(d.) of 2013 ANSI/ASHRAE/IES 90.1 shall be substituted with the following:

d. For the purpose of annual energy use simulation, except as provided in (d1.), the peak outdoor air ventilation rates for the proposed and budget building shall be the same and set to the minimum rates required by the applicable ventilation standard based on the proposed building design. Heat recovery shall be modelled for the budget building design in accordance with Section 6.5.6.1.

d1. Except where it may be required by Section 6 of 2013 ANSI/ASHRAE/IES 90.1, demand controlled and dedicated ventilation strategies need not be modeled in the budget building.

**(3)** Notwithstanding Section 11.5.2.(h.), the budget building fan power may be modeled in accordance with the requirements of G3.1.2.10 of Appendix G, 2013 ANSI/ASHRAE/IES 90.1.

**(4)** Notwithstanding footnotes "e" and "f" of Table 11.5.3.A, the budget building water pumps may be modeled in accordance with the requirements of G3.1.3.5 and G3.1.3.10 of Appendix G, 2013 ANSI/ASHRAE/IES 90.1.

**(5)** Energy saving credits may be taken for automatic lighting controls that are provided in addition to those required in Section 9.4.1 of 2013 ANSI/ASHRAE/IES 90.1.

**(6)** Section 11.4.3.2.A.(1) below shall be added to Section 11.4.3 " Renewable, Recovered and Purchased Energy Rates" of 2013 ANSI/ASHRAE/IES 90.1.

**11.4.3.2.A Rates for Energy Supplied Back to the Grid System.**

(1) Where energy generated by an on-site renewable energy source is supplied back to the grid system, for the purpose of Section 11, Energy Cost Budget Method, the rates for the energy supplied back to the grid system shall be assumed to be equal to the rates paid for the same type of purchased energy from the grid system.

# Chapter 3

# Additional Requirements to the 2015 NECB

## Section 1.1. Changes and Additional Requirements

### 1.1.1. Changes and Additional Requirements to the 2015 NECB

#### 1.1.1.1. Application of Chapter 3

**(1)** Where compliance with energy efficiency requirements is achieved in accordance with Clause 1.1.2.1.(1)(b) of Chapter 1, energy efficiency of the *building* is required to conform to the 2015 NECB and this Chapter.

**(2)** Notwithstanding Sentence 1.1.1.3.(1) of the 2015 NECB, where the requirements of the *Building Code* or the requirements of this Division are in conflict with the requirements of the 2015 NECB, the requirements of the *Building Code* and the requirements of this Division shall govern.

**(3)** In the 2015 NECB, references made to the CCBFC NRCC 53301, "National Building Code of Canada" or CCBFC NRCC 53302, "National Plumbing Code of Canada" are deemed to be references to corresponding provisions of the *Building Code*.

#### 1.1.1.2. Division A, Part 1 "Compliance" of the 2015 NECB

**(1)** Notwithstanding the provisions Sentence 1.1.1.1.(1) of Part 1 of Division A of the 2015 NECB and except as provided in Division 1 and Chapter 1 of Division 3 of this Supplementary Standard, except for *residential occupancies* that are within the scope of Part 9 of Division B of the *Building Code*, and except for farm buildings, the 2015 NECB shall apply to all *buildings*.

#### 1.1.1.3. Division A, Part 2 "Objectives" and Part 3 "Functional Statements" of the 2015 NECB

**(1)** In addition to objectives and functional statements set out in Parts 2 and 3 of Division A of the 2015 NECB, the objectives and functional statements set out in the *Building Code* and attributed to Sentence 12.2.1.2.(2) of Division B of the *Building Code* shall also be the objectives and functional statements of the 2015 NECB.

#### 1.1.1.4. Division B, "Acceptable Solutions" of the 2015 NECB

**(1)** Except as provided in this Chapter, the energy efficiency of a *building* shall conform to all requirements of Division B "Acceptable Solutions" of the 2015 NECB and this Chapter.

#### 1.1.1.5. Division C, "Administrative Provisions" of the 2015 NECB

**(1)** Division C "Administrative Provisions" of the 2015 NECB shall be substituted with the administrative provisions of the *Building Code Act, 1992* and the administrative provisions of Division C of the *Building Code*.

## 1.1.1.6. Enhancements to Division B, Part 3 "Building Envelope" of the 2015 NECB

**(1)** Where *electric space heating* is used in a *building* located in Zone 5, 6, 7A, or 7B, the *building* envelope requirements of Zone 7B of the 2015 NECB shall apply regardless of climatic zone.

**(2)** Table 3.2.2.2. in Division B of the 2015 NECB shall be substituted with the following:

Table SB 3.2.2.2.
(Supersedes Table 3.2.2.2. in the 2015 NECB)
Overall Thermal Transmittance of Above-Ground Opaque Building Assemblies
Forming Part of Sentences 3.2.2.2.(1) and (2)

| Above-Ground *Opaque Building Assembly* | Heating Degree-Days of *Building* Location,(1) in Celsius Degree-Days | | | |
|---|---|---|---|---|
| | Zone 5(2) 3000 to 3999 | Zone 6(2) 4000 to 4999 | Zone 7A and 7B(2) 5000 to 6999 | Zone 8(2) ≥ 7000 |
| | Maximum *Overall Thermal Transmittance*, in W/(m²·K) | | | |
| Walls | 0.278 | 0.247 | 0.210 | 0.183 |
| Roofs | 0.156 | 0.156 | 0.138 | 0.121 |
| Floors | 0.183 | 0.183 | 0.162 | 0.142 |

Notes to Table SB 3.2.2.2.:
(1) See Sentence 1.1.4.1.(1).
(2) See Appendix A.

**(3)** Table 3.2.2.3. in Division B of the 2015 NECB shall be substituted with the following:

Table SB 3.2.2.3.
(Supersedes Table 3.2.2.3. in the 2015 NECB)
Overall Thermal Transmittance of Fenestration
Forming Part of Sentences 3.2.2.3.(2) to (4)

| Component | Heating Degree-Days of *Building* Location,(1) in Celsius Degree-Days | | | |
|---|---|---|---|---|
| | Zone 5(2) 3000 to 3999 | Zone 6(2) 4000 to 4999 | Zone 7A and 7B(2) 5000 to 6999 | Zone 8(2) ≥ 7000 |
| | Maximum *Overall Thermal Transmittance*, in W/(m²·K) | | | |
| All Fenestration | 1.9 | 1.9 | 1.9 | 1.4 |

Notes to Table SB 3.2.2.3.:
(1) See Sentence 1.1.4.1.(1).
(2) See A-Table 3.2.2.2. in Appendix A.

**(4)** Sentence (5) shall be added to Article 3.2.2.3. of Division B of the 2015 NECB.

**3.2.2.3. Thermal Characteristics of Fenestration**

(5) The maximum solar heat gain coefficient of fenestration shall comply with Table 3.2.2.3.A.

Table 3.2.2.3.A.
Maximum Solar Heat Gain Coefficients
Forming Part of Sentence 3.2.2.3.(4)

| Climatic Zone | Zone 5 | | Zone 6 | | Zone 7A and 7B | | Zone 8 | |
|---|---|---|---|---|---|---|---|---|
| Occupancy | Residential | Others | Residential | Others | Residential | Others | Residential | Others |
| Vertical Fenestration, SHGC | 0.40 | 0.40 | 0.40 | 0.40 | 0.45 | 0.45 | NR | NR |
| Skylights, SHGC | 0.40 | 0.40 | 0.40 | 0.40 | NR | NR | NR | NR |
| Column 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Notes to Table 3.2.2.3.A.:
NR = No requirement

**(5)** Table 3.2.2.4. in Division B of the 2015 NECB shall be substituted with the following:

Table SB 3.2.2.4.
(Supersedes Table 3.2.2.4. in the 2015 NECB)
Overall Thermal Transmittance of Doors
Forming Part of Sentences 3.2.2.4.(1) and (2)

| Component | Heating Degree-Days of *Building* Location,(1) in Celsius Degree-Days | | | |
|---|---|---|---|---|
| | Zone 5(2) 3000 to 3999 | Zone 6(2) 4000 to 4999 | Zone 7A and 7B(2) 5000 to 6999 | Zone 8(2) ≥ 7000 |
| | Maximum *Overall Thermal Transmittance*, in W/(m²·K) | | | |
| All Doors | 1.9 | 1.9 | 1.9 | 1.4 |

Notes to Table SB 3.2.2.4.:
(1) See Sentence 1.1.4.1.(1).
(2) See A-Table 3.2.2.2. in Appendix A.

**(6)** Notwithstanding Sentence 3.3.1.2.(2) of Division B of the 2015 NECB, where Section 3.3. Trade-Off Path of the 2015 NECB is used and where the vertical total fenestration and door area to gross wall area ratio (FDWR) of the proposed building is less than the maximum FDWR permitted in Sentence 3.2.1.4.(1) of Division B of the 2015 NECB, the FDWR of the reference building shall be equal to the proposed building.

**(7)** Notwithstanding of Sentence 3.3.1.2.(2) of Division B of the 2015 NECB, where Section 3.3. Trade-Off Path of the 2015 NECB is used and where the total skylight area to gross roof area ratio of the proposed building is less than the maximum ratio permitted in Sentence 3.2.1.4.(2) of Division B of the 2015 NECB, the total skylight area to gross roof area ratio of the reference building shall be equal to the proposed building.

**(8)** Thermal characteristics of fenestration are permitted to be determined in conformance with;
(a) CAN/CSA-A440.2, “Fenestration Energy Performance”, or
(b) NFRC 100, “Procedure for Determining Fenestration Product U-factors” and NFRC 200, “Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence”.

## 1.1.1.7. Enhancements to Division B, Part 4 "Lighting" of the 2015 NECB

**(1)** The calculation of interior lighting power allowance shall be based on the lighting power densities given in Table SB 4.2.1.5. –2017 or Table SB 4.2.1.6.–2017 of this Chapter.

**(2)** Except as provided in Sentence (4), for the purpose of Sentence (1), any reference to Table 4.2.1.5. and the lighting power densities contained in Table 4.2.1.6. of Division B of the 2015 NECB, shall be deemed to be a reference to Table SB 4.2.1.5.–2017 and lighting power densities in Table SB 4.2.1.6.–2017 of this Chapter.

**(3)** Lighting power densities listed in Table SB 4.2.1.5.–2017 and Table SB 4.2.1.6.–2017 of this Chapter shall supersede the lighting power densities listed in Table 4.2.1.5. and Table 4.2.1.6. of Division B of the 2015 NECB.

**(4)** Minimum lighting control requirements in Table 4.2.1.6. of the 2015 NECB shall apply.

Table SB 4.2.1.5.–2017
Lighting Power Density by Building Type for Use with the Building Area Method
Forming Part of Sentences 4.2.1.5.(1), (4) and (5)

| Building Area Type | Lighting Power Density, W/m² (W/ft²) |
|---|---|
| Automotive Facility | 7.6 (0.71) |
| Convention Centre | 8.2 (0.76) |
| Courthouse | 9.7 (0.90) |
| Dining | |
| Bar Lounge / Leisure | 9.7 (0.90) |
| Cafeteria / Fast Food | 8.5 (0.79) |
| Family | 8.4 (0.78) |
| Dormitory | 6.6 (0.61) |
| Exercise Centre | 7.0 (0.65) |
| Fire Station | 5.7 (0.53) |
| Gymnasium | 7.3 (0.68) |
| Health-Care Clinic | 8.8 (0.82) |
| Hospital | 11.3 (1.05) |
| Hotel | 8.1 (0.75) |
| Library | 8.4 (0.78) |
| Manufacturing Facility | 9.7 (0.90) |
| Motel | 8.1 (0.75) |
| Motion Picture Theatre | 8.9 (0.83) |
| Multi-Unit Residential Building | 7.3 (0.68) |
| Museum | 11.4 (1.06) |
| Office | 8.5 (0.79) |
| Storage Garage | 1.6 (0.15) |
| Penitentiary | 8.1 (0.75) |
| Performing Arts Theatre | 12.7 (1.18) |
| Police Station | 8.6 (0.80) |
| Post Office | 7.2 (0.67) |
| Religious Building | 10.1 (0.94) |
| Retail | 11.4 (1.06) |
| School / University | 8.7 (0.81) |
| Sports Arena | 9.4 (0.87) |
| Town Hall | 8.6 (0.80) |
| Transportation | 6.6 (0.61) |
| Warehouse | 5.2 (0.48) |
| Workshop | 9.7 (0.90) |
| Column 1 | 2 |

Table SB 4.2.1.6.–2017[1]
Lighting Power Density Using the Space-by-Space Method
Forming Part of Sentence 4.2.1.6.(1)

| Common Space Types | Lighting Power Density, $W/m^2$ ($W/ft^2$) |
|---|---|
| Atrium | |
| < 6 m in height | 1.06 per m in height (0.03 per ft in height) |
| ≥ 6 m and ≤ 12 m in height | 1.06 per m in height (0.03 per ft in height) |
| > 12 m in height | 4.31 + 0.71 per m in height (0.40 + 0.02 per ft in height) |
| Audience / Seating Area-Permanent | |
| For Auditorium | 6.8 (0.63) |
| For Convention Centre | 8.8 (0.82) |
| For Gymnasium | 7.0 (0.65) |
| For Motion Picture Theatre | 12.3 (1.14) |
| For Penitentiary | 3.0 (0.28) |
| For Performing Arts Theatre | 21.8 (2.03) |
| For Religious Buildings | 16.5 (1.53) |
| For Sports Arena | 4.6 (0.43) |
| Other | 4.6 (0.43) |
| Banking Activity Area and Offices | 9.3 (0.86) |
| Classroom / Lecture / Training | |
| For Penitentiary | 14.4 (1.34) |
| Other | 10.3 (0.96) |
| Computer / Server Room | 14.3 (1.33) |
| Conference / Meeting/Multi-Purpose | 11.5 (1.07) |
| Confinement Cell | 8.7 (0.81) |
| Copy / Print Room | 6.0 (0.56) |
| Corridor / Transition Area | |
| For space designed to ANSI/IES RP- 28[2] (and used primarily by residents) | 9.9 (0.92) |
| For Hospital | 9.9 (0.92) |
| For Manufacturing Facility | 3.1 (0.29) |
| Other | 7.1 (0.66) |
| Courtroom | 15.0 (1.39) |
| Dining Area | |
| For Bar Lounge / Leisure Dining | 10.0 (0.93) |
| For Cafeteria / Fast Food Dining | 6.8 (0.63) |
| For Family Dining | 7.6 (0.71) |
| For space designed to ANSI/IES RP-28[2] (and used primarily by residents) | 21.5 (2.00) |
| For Penitentiary | 10.3 (0.96) |
| Other | 6.8 (0.63) |
| Column 1 | 2 |

Table SB 4.2.1.6.–2017 (Cont'd)
Lighting Power Density Using the Space-by-Space Method
Forming Part of Sentence 4.2.1.6.(1)

| Building-Specific Space Types | Lighting Power Density, $W/m^2$ ($W/ft^2$) |
|---|---|
| Dressing / Fitting Room For Performing Arts Theatre | 6.6 (0.61) |
| Electrical / Mechanical Room | 4.6 (0.43) |
| Emergency Vehicle Garage | 4.4 (0.41) |
| Food Preparation Area | 11.4 (1.06) |
| Guest Room | 8.3 (0.77) |
| Laboratory | |
| For Classrooms | 12.9 (1.20) |
| Other | 15.6 (1.45) |
| Laundry / Washing Area | 4.6 (0.43) |
| Loading Dock, Interior | 6.2 (0.58) |
| Lobby | |
| For space designed to ANSI/IES RP-28(2) (and used primarily by residents) | 21.8 (2.03) |
| For Elevator | 7.3 (0.68) |
| For Hotel | 11.4 (1.06) |
| For Motion Picture Theatre | 4.8 (0.45) |
| For Performing Arts Theatre | 18.3 (1.70) |
| Other | 10.8 (1.00) |
| Locker Room | 5.2 (0.48) |
| Lounge / Break Room | |
| For Healthcare Facility | 8.4 (0.78) |
| Other | 6.7 (0.62) |
| Office | |
| Enclosed | 10.0 (0.93) |
| Open Plan | 8.7 (0.81) |
| Storage Garage, Interior | 1.5 (0.14) |
| Pharmacy Area | 14.4 (1.34) |
| Sales Area | 13.1 (1.22) |
| Seating Area, General | 4.6 (0.43) |
| Stairway | 6.2 (0.58) |
| Storage Room ≥ 5 $m^2$ and < 100 $m^2$ | 6.8 (0.63) |
| Storage Room < 5 $m^2$ | 10.4 (0.97) |
| Vehicular Maintenance Area | 6.0 (0.56) |
| Washroom | |
| For care occupancy designed to ANSI/IES RP-28(2) (and used primarily by residents) | 13.1 (1.22) |
| Other | 9.1 (0.85) |
| Workshop | 12.3 (1.14) |
| Column 1 | 2 |

Table SB 4.2.1.6.–2017 (Cont'd)
Lighting Power Density Using the Space-by-Space Method
Forming Part of Sentence 4.2.1.6.(1)

| Building-Specific Space Types | Lighting Power Density, $W/m^2$ ($W/ft^2$) |
|---|---|
| Care occupancy designed to ANSI/IES RP-28(2) | |
| For Chapel (used primarily by residents) 23.811.4 | 11.4 (1.06) |
| For Recreation Room (used primarily by residents) | 19.4 (1.80) |
| Convention Centre | |
| Exhibit Space | 9.5 (0.88) |
| Dormitory | |
| Living Quarters | 5.8 (0.54) |
| Fire Station | |
| Sleeping Quarters | 2.2 (0.20) |
| Gymnasium / Fitness Centre | |
| Exercise Area | 5.4 (0.50) |
| Playing Area | 8.8 (0.82) |
| Healthcare Facility | |
| Exam / Treatment Room | 18.1 (1.68) |
| Medical Supply Room | 5.8 (0.54) |
| Nursery | 10.8 (1.00) |
| Nurses' Station | 8.7 (0.81) |
| Operating Room | 23.4 (2.17) |
| Patient Room | 6.7 (0.62) |
| Physical Therapy | 9.0 (0.84) |
| Imaging Room | 11.4 (1.06) |
| Recovery | 11.1 (1.03) |
| Library | |
| Reading Area | 8.8 (0.82) |
| Stacks | 12.9 (1.20) |
| Manufacturing Facility | |
| Detailed Manufacturing Area | 10.0 (0.93) |
| Equipment Room | 7.0 (0.65) |
| Extra High Bay (> 15 m floor to ceiling height) | 11.3 (1.05) |
| High Bay (7.5 m to 15 m floor to ceiling height) | 8.1 (0.75) |
| Low Bay (< 7.5 m floor to ceiling height) | 10.3 (0.96) |
| Column 1 | 2 |

Table SB 4.2.1.6.–2017 (Cont'd)
Lighting Power Density Using the Space-by-Space Method
Forming Part of Sentence 4.2.1.6.(1)

| Building-Specific Space Types | Lighting Power Density, W/m² (W/ft²) |
|---|---|
| Museum | |
| General Exhibition | 11.3 (1.05) |
| Restoration | 9.2 (0.85) |
| Post Office | 7.3 (0.68) |
| Sorting Area | |
| Religious Building | |
| Fellowship Hall | 5.9 (0.55) |
| Worship / Pulpit / Choir | 16.5 (1.53) |
| Retail Facilities | |
| Dressing / Fitting Room | 5.4 (0.50) |
| Mall Concourse | 9.7 (0.90) |
| Sports Arena – Playing Area | |
| Class IV Facility | 12.2 (1.13) |
| Class III Facility | 18.3 (1.70) |
| Class II Facility | 21.1 (1.96) |
| Class I Facility | 26.6 (2.47) |
| Transportation Facility | |
| Baggage / Carousel Area | 4.8 (0.45) |
| Airport Concourse | 3.3 (0.31) |
| Terminal Ticket Counter | 6.7 (0.62) |
| Warehouse | |
| Small, Hand-Carried Items | 7.4 (0.69) |
| Medium To Bulky, Palletized Items | 3.8 (0.35) |
| Column 1 | 2 |

Notes to Table SB 4.2.1.6.–2017:
(1) Terms shall have the same meanings as they have in 2015 NECB or Chapter (2).
(2) BSR/IES RP-28-16, "Lighting and the Visual Environment for Seniors and the Low Vision Population".

**(5)** The calculation of exterior lighting power allowance shall be based on Table SB 4.2.3.1.-B–2017, Table SB 4.2.3.1.-C–2017 and Table SB 4.2.3.1.-D–2017 of this Chapter.

**(6)** Lighting power allowances listed in Table SB 4.2.3.1.-B–2017, Table SB 4.2.3.1.-C–2017 and Table SB 4.2.3.1.-D–2017 of this Chapter shall supersede the lighting power allowances listed in Table 4.2.3.1.-B, Table 4.2.3.1.-C and Table 4.2.3.1.-D of the 2015 NECB, respectively.

TABLE SB 4.2.3.1.-B–2017
(Supersedes Table 4.2.3.1.-B in the 2015 NECB)
Basic Site Allowances for Exterior Lighting
Forming Part of Sentences 4.2.3.1.(2) and (3)

| Basic Site Allowance According to Lighting Zone | | | | |
|---|---|---|---|---|
| Zone 0 | Zone 1 | Zone 2 | Zone 3 | Zone 4 |
| No allowance | 350 W | 400 W | 500 W | 900 W |
| Column 1 | 2 | 3 | 4 | 5 |

TABLE SB 4.2.3.1.-C–2017
(Supersedes Table 4.2.3.1.-C in the 2015 NECB)
Lighting Power Allowances for Specific Building Exterior Applications
Forming Part of Sentences 4.2.3.1.(3) and (4)

| Exterior Application | Zone 0 | Zone 1 | Zone 2 | Zone 3 | Zone 4 |
|---|---|---|---|---|---|
| Building façades (façade lighting) | No allowance | No allowance | 1.1 W/m$^2$ (0.10 W/ft$^2$) for each illuminated wall or surface or 8.2 W/m (2.5 W/ft) for each illuminated wall or surface length | 1.6 W/m$^2$ (0.15 W/ft$^2$) for each illuminated wall or surface or 12.3 W/m (3.75 W/ft) for each illuminated wall or surface length | 2.2 W/m$^2$ (0.20 W/ft$^2$) for each illuminated wall or surface or 16.4 W/m (5.0 W/ft) for each illuminated wall or surface length |
| Automated teller machines (ATM) and night depositories | No allowance | 135 W per location plus 45 W per additional ATM per location | 135 W per location plus 45 W per additional ATM per location | 135 W per location plus 45 W per additional ATM per location | 135 W per location plus 45 W per additional ATM per location |
| Entrances and gatehouse inspection stations at guarded facilities | No allowance | 5.4 W/m$^2$ (0.50 W/ft$^2$) of covered and uncovered area | 5.4 W/m$^2$ (0.50 W/ft$^2$) of covered and uncovered area | 5.4 W/m$^2$ (0.50 W/ft$^2$) of covered and uncovered area | 5.4 W/m$^2$ (0.50 W/ft$^2$) of covered and uncovered area |
| Loading areas for law enforcement, fire, ambulance, and other emergency service vehicles | No allowance | 3.8 W/m$^2$ (0.35 W/ft$^2$) of covered and uncovered area | 3.8 W/m$^2$ (0.35 W/ft$^2$) of covered and uncovered area | 3.8 W/m$^2$ (0.35 W/ft$^2$) of covered and uncovered area | 3.8 W/m$^2$ (0.35 W/ft$^2$) of covered and uncovered area |
| Drive-up windows/doors | No allowance | 200 W per drive-through | 200 W per drive-through | 200 W per drive-through | 200 W per drive-through |
| Parking near 24-hour retail entrances | No allowance | 400 W per drive-through | 400 W per drive-through | 400 W per drive-through | 400 W per drive-through |
| Roadway/parking entry, trail head, and toilet facility, or other locations approved by the authority having jurisdiction. | A single luminaire of 60 W or less may be installed for each roadway/parking entry, trail head, and toilet facility, or other locations approved by the authority having jurisdiction | No allowance | No allowance | No allowance | No allowance |
| Column 1 | 2 | 3 | 4 | 5 | 6 |

TABLE SB 4.2.3.1.-D–2017
(Supersedes Table 4.2.3.1.-D in the 2015 NECB)
Lighting Power Allowances for General Building Exterior Applications
Forming Part of Sentence 4.2.3.1.(4)

| Exterior Application | Lighting Power Allowances According to Lighting Zone | | | | |
|---|---|---|---|---|---|
| | Zone 0 | Zone 1 | Zone 2 | Zone 3 | Zone 4 |
| Uncovered Parking Areas | | | | | |
| Parking areas and drives | No allowance | 0.32 W/m$^2$ (0.03 W/ft$^2$) | 0.43 W/m$^2$ (0.04 W/ft$^2$) | 0.65 W/m$^2$ (0.06 W/ft$^2$) | 0.86 W/m$^2$ (0.08 W/ft$^2$) |
| Building Grounds | | | | | |
| Walkways less than 3 m (10 ft) wide | No allowance | 1.6 W/m (0.50 W/ft) | 1.6 W/m (0.50 W/ft) | 2.0 W/m (0.60 W/ft) | 2.3 W/m (0.70 W/ft) |
| Walkways 3 m (10 ft) wide or greater | No allowance | 1.1 W/m$^2$ (0.10 W/ft$^2$) | 1.1 W/m$^2$ (0.10 W/ft$^2$) | 1.2 W/m$^2$ (0.11 W/ft$^2$) | 1.5 W/m$^2$ (0.14 W/ft$^2$) |
| Plaza areas | No allowance | 1.1 W/m$^2$ (0.10 W/ft$^2$) | 1.1 W/m$^2$ (0.10 W/ft$^2$) | 1.2 W/m$^2$ (0.11 W/ft$^2$) | 1.5 W/m$^2$ (0.14 W/ft$^2$) |
| Stairways | No allowance | 6.5 W/m$^2$ (0.60 W/ft$^2$) | 7.5 W/m$^2$ (0.70 W/ft$^2$) | 7.5 W/m$^2$ (0.70 W/ft$^2$) | 7.5 W/m$^2$ (0.70 W/ft$^2$) |
| Pedestrian Tunnels | No allowance | 1.3 W/m$^2$ (0.12 W/ft$^2$) | 1.3 W/m$^2$ (0.12 W/ft$^2$) | 1.5 W/m$^2$ (0.14 W/ft$^2$) | 2.3 W/m$^2$ (0.21 W/ft$^2$) |
| Landscaping | No allowance | 0.32 W/m$^2$ (0.03 W/ft$^2$) | 0.43 W/m$^2$ (0.04 W/ft$^2$) | 0.43 W/m$^2$ (0.04 W/ft$^2$) | 0.43 W/m$^2$ (0.04 W/ft$^2$) |
| Building Entrances, Exits, and Loading Docks | | | | | |
| Pedestrian and vehicular entrances and exits | No allowance | 46 W/m (14 W/ft) of door width | 46 W/m (14 W/ft) of door width | 69 W/m (21 W/ft) of door width | 69 W/m (21 W/ft) of door width |
| Entry canopies | No allowance | 2.1 W/m$^2$ (0.20 W/ft$^2$) | 2.7 W/m$^2$ (0.25 W/ft$^2$) | 4.3 W/m$^2$ (0.40 W/ft$^2$) | 4.3 W/m$^2$ (0.40 W/ft$^2$) |
| Loading docks | No allowance | 5.4 W/m$^2$ (0.50 W/ft$^2$) | 5.4 W/m$^2$ (0.50 W/ft$^2$) | 5.4 W/m$^2$ (0.50 W/ft$^2$) | 5.4 W/m$^2$ (0.50 W/ft$^2$) |
| Sales Canopies | | | | | |
| Free standing and attached | No allowance | 4.3 W/m$^2$ (0.40 W/ft$^2$) | 4.3 W/m$^2$ (0.4 W/ft$^2$) | 6.5 W/m$^2$ (0.60 W/ft$^2$) | 7.5 W/m$^2$ (0.70 W/ft$^2$) |
| Outdoor Sales | | | | | |
| Open areas (including vehicle sales lots) | No allowance | 6.5 W/m$^2$ (0.60 W/ft$^2$) | 6.5 W/m$^2$ (0.60 W/ft$^2$) | 6.5 W/m$^2$ (0.60 W/ft$^2$) | 6.5 W/m$^2$ (0.60 W/ft$^2$) |
| Street frontage for vehicle sales lots in addition to “open area” allowance | No allowance | No allowance | 23 W/m (7 W/ft) | 23 W/m (7 W/ft) | 69 W/m (21 W/ft) |
| Column 1 | 2 | 3 | 4 | 5 | 6 |

## 1.1.1.8. Enhancements to Division B, Part 5 "Heating, Ventilating and Air-Conditioning Systems" of the 2015 NECB

**(1)** Article 5.2.10.1. in Division B of the 2015 NECB shall be replaced with the following:

**5.2.10.1. Heat-Recovery Systems**

(1) Except as provided in Sentences (3) and (4), each exhaust air system shall have an energy recovery system when the system's supply airflow rate exceeds the value listed in Tables SB 5.2.10.1.A–2017 and SB 5.2.10.1.B–2017, based on the operation, climate zone and percentage of outdoor airflow rate at design conditions.

(2) Heat recovered in accordance with Sentence (1) shall be used in *building* systems.

(3) The systems need not comply with Sentence (1), where the system
(a) is a specialized exhaust system, such as one that is used to exhaust smoke, grease-laden vapours, or toxic, flammable, paint, or corrosive fumes or dust,
(b) serves spaces that are not cooled and are heated to less than 16ºC,
(c) is designed in such a way that the largest source of air exhausted at a single location at the building exterior is less than 75% of the design outdoor airflow rate.

(4) Dwelling units shall be equipped with heat recovery systems in accordance with Article 5.2.10.4. of the 2015 NECB.

Table SB 5.2.10.1.A–2017
Exhaust Air Energy Recovery Requirements for Ventilation Systems Operating Less than 8000 Hours per Year
Forming Part of Sentence 5.2.10.1.(1)

| Climate Zone | Percent of Outdoor Air at Full Design Airflow Rate | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | ≥ 10% and < 20% | ≥ 20% and < 30% | ≥ 30% and < 40% | ≥ 40% and < 50% | ≥ 50% and < 60% | ≥ 60% and < 70% | ≥ 70% and < 80% | ≥ 80% |
| | Design Supply Fan Airflow Rate (L/s) | | | | | | | |
| 5 | ≥ 12271 | ≥ 7551 | ≥ 2596 | ≥ 2124 | ≥ 1652 | ≥ 944 | ≥ 472 | ≥ 0 |
| 6 | ≥ 12271 | ≥ 7551 | ≥ 2596 | ≥ 2124 | ≥ 1652 | ≥ 944 | ≥ 472 | ≥ 0 |
| 7A & 7B | ≥ 2124 | ≥ 1888 | ≥ 1180 | ≥ 472 | ≥ 0 | ≥ 0 | ≥ 0 | ≥ 0 |
| 8 | ≥ 2124 | ≥ 1888 | ≥ 1180 | ≥ 472 | ≥ 0 | ≥ 0 | ≥ 0 | ≥ 0 |
| Col. 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Table SB 5.2.10.1.B–2017
Exhaust Air Energy Recovery Requirements for Ventilation Systems Operating Greater than or Equal to 8000 Hours per Year
Forming Part of Sentence 5.2.10.1.(1)

| Climate Zone | Percent of Outdoor Air at Full Design Airflow Rate | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | ≥ 10% and < 20% | ≥ 20% and < 30% | ≥ 30% and < 40% | ≥ 40% and < 50% | ≥ 50% and < 60% | ≥ 60% and < 70% | ≥ 70% and < 80% | ≥ 80% |
| | Design Supply Fan Airflow Rate (L/s) | | | | | | | |
| All Zones | > 0 | > 0 | > 0 | > 0 | > 0 | > 0 | > 0 | > 0 |
| Col. 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

(5) Energy recovery systems required by Sentence (1) shall have at least 55% energy recovery effectiveness determined as a change in enthalpy of the outdoor air supply equal to 55% of the difference between the outdoor air and return air enthalpies at design conditions.

(6) At airflow rates not less than the system design capacity, the energy recovery effectiveness of an energy recovery apparatus referred to in Sentence (1) shall be determined in conformance with
(a) the test method described in ANSI/AHRI 1060-2009, "Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation",
(b) the test method described in CSA C439-09 "Standard Laboratory Methods of Test for Rating the performance of Heat/Energy-Recovery Ventilators", or
(c) the test method described in ASHRAE 84-2008, "Method of Testing Air-to-Air Heat/Energy Exchangers".

(7) Provisions shall be made to bypass or control the energy recovery system to permit air economizer operation as required by Article 5.2.2.8.

**(2)** Sentence 5.2.11.5.(3) and its reference in Sentence 5.2.11.5.(1) in Division B of the 2015 NECB shall be deleted.

**(3)** In addition to Table 5.2.12.1. in the 2015 NECB, the minimum equipment efficiency of a gas-fired boiler shall comply with the value required in Table SB 5.2.12.1.A–2017.

Table SB 5.2.12.1.A–2017
Minimum Equipment Efficiency for Gas Boilers
Forming Part of Sentence 5.2.12.1.(1)

| Equipment | Heating Capacity, kW (Btu/h) | Performance Required |
|---|---|---|
| Gas boilers, hot water | < 88 (< 300,000) | 90% AFUE |
| | ≥ 88 and < 733 (≥ 300,000 and < 2,500,000) | 90% $E_t$ |
| Column 1 | 2 | 3 |

## 1.1.1.9. Enhancements to Division B, Part 6 "Service Water Systems" of the 2015 NECB

**(1)** In addition to Table 6.2.2.1. in the 2015 NECB, a gas-fired storage water heater with an input capacity of 22 kW or less shall comply with Table SB 6.2.2.1.A–2017.

**(2)** Except where 25% of the annual service water heating requirement is provided by site-recovered energy and except for water heaters installed in individual *dwelling units*, where a service hot water system has a total installed gas water heating input capacity of 293 kW or greater, the gas service water heating equipment shall have a minimum thermal efficiency ($E_t$) of 90%.

Table SB 6.2.2.1.A –2017
Minimum Equipment Efficiency for Gas Water Heaters
Forming Part of Sentence 6.2.2.1.(1)

| Component | Input, kW (Btu/h) | Performance Requirement |
|---|---|---|
| Gas water heaters | ≤ 22 (≤ 75,000) | 0.7-0.00189V (V in U.S.gallons) EF<br>0.7-0.0005V (V in litres) EF |
| Column 1 | 2 | 3 |

## 1.1.1.10. Enhancements to Division B, Part 7 "Electrical Power Systems and Motors" of the 2015 NECB (See Appendix A.)

**(1)** Article 7.2.1.1. of Division B of the 2015 NECB shall be replaced with the following:

**7.2.1.1. Facilitation of Monitoring**

(1) Except as provided in Sentence (3), the building shall be designed and constructed to facilitate future installation of means to measure and monitor the electrical consumption of each of the following separately:
(a) total electrical energy,
(b) HVAC systems,
(c) interior lighting,
(d) exterior lighting, and
(e) receptacle circuits.

(2) Except as provided in Sentence (3), the electrical distribution systems of buildings with tenants or dwelling units shall be designed and constructed to facilitate future installation of means to measure and monitor the electrical consumption of the total building and of each individual tenant or dwelling unit, excluding shared systems.

(3) The following buildings and electrical energy end-uses need not meet the requirements of Sentence (1):
(a) buildings with a floor area of less than 2320 $m^2$,
(b) individual tenant spaces with floor areas of less than 930 $m^2$,
(c) residential building with less than 930 $m^2$ of common area, and
(d) critical circuit and Equipment branches in health care facilities.

**(2)** Sentence (2) shall be added to Article 7.2.4.1. of Division B of the 2015 NECB.

**7.2.4.1. Efficiency**

(2) Notwithstanding Sentence (1), where the minimum efficiency requirements of an electric motor is covered under an applicable Ontario Energy Efficiency Regulation, it shall meet the requirements of the Ontario Regulation and shall be deemed to be in compliance with the requirements of Sentence (1).

## 1.1.1.11. Whole Building Energy Monitoring (See Appendix A.)

**(1)** The *building* shall be designed and constructed to facilitate future installation of means to measure and monitor energy consumption of the following types of energy supplied by an energy provider or a plant that is not within the *building*:
(a) natural gas,
(b) fuel oil,
(c) propane,
(d) steam,
(e) chilled water, and
(f) hot water.

## 1.1.1.12. Enhancements to Division B, Part 8 "Building Energy Performance Compliance Path" of the 2015 NECB

**(1)** Sentences (9) and (10) shall be added to Article 8.4.4.3. of Division B of the 2015 NECB.

**8.4.4.3. Building Envelope Components**

(9) Where the vertical total fenestration and door area to gross wall area ratio (FDWR) of the proposed building is less than the maximum FDWR permitted in Sentence 3.2.1.4.(1), the FDWR of the reference building shall be equal to the proposed building.

(10) Where the total skylight area to gross roof area ratio of the proposed building is less than the maximum ratio permitted in Sentence 3.2.1.4.(2), the total skylight area to gross roof area ratio of the reference building shall be equal to the proposed building.

# Division 4

# Buildings of Non-Residential Occupancy Within the Scope of Part 9

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

# Division 4

# Buildings of Non-Residential Occupancy Within the Scope of Part 9

## Section 1.1. Buildings of Non-Residential Occupancy

### 1.1.1. Buildings of Non-Residential Occupancy

#### 1.1.1.1. Application

**(1)** Except as provided in Sentences 2 and (3), this Division applies to the energy efficiency of *buildings* or parts of *buildings* where the *building*
(a) is within the scope of Part 9 of Division B of the *Building Code*,
(b) does not contain a *residential occupancy*,
(c) does not use *electric space heating*, and
(d) is intended for occupancy on a continuing basis during the winter months.

**(2)** Where the ratio of the gross area of fenestration to the gross area of exterior wall measured from grade to the top of the most upper ceiling exceeds 40%, or the ratio of the gross skylight areas to gross ceiling area exceeds 5%, the *building* envelope shall comply with Article 1.1.2.1. of Chapter 1 of Division 2.

**(3)** *Buildings* are exempt from compliance with this Division where they meet the exemptions described in Article 1.2.1.1. of Chapter 1 of Division 2.

#### 1.1.1.2. Building Envelope Requirements

**(1)** Except as permitted in Sentence (2), the exterior *building* envelope shall comply with the requirements of Table 1.1.1.2.

**(2)** Except for doors, the opaque surfaces shall comply with
(a) minimum RSI value of the added insulation in framing cavities and continuous insulation required in Table 1.1.1.2., or
(b) maximum overall thermal transmittance U-value for the entire assembly required in Table 1.1.1.2., where U-value is provided.

**(3)** Where the top of a *foundation* wall is less than 1 200 mm above the adjoining ground level, those portions of the *foundation* wall that are above ground may be insulated to the level required for the below grade portion of the *foundation* wall.

**(4)** Except for swinging glass doors, the minimum thermal resistance of doors that separate heated space from unheated space shall be not less than RSI 0.7 (R-4).

Table 1.1.1.2.
Building Envelope Requirements Based on Degree-Day Zones(1) (SI)
Forming Part of Sentences 1.1.1.2.(1) and (2)

| Opaque Elements | Zone 1 Less Than 5000 Degree-Days | | Zone 2 5000 or More Degree-Days | |
|---|---|---|---|---|
| | Assembly Max. U-Value(1) | Insulation Min. RSI-Value | Assembly Max. U-Value(1) | Insulation Min. RSI-Value |
| Roofs | | | | |
| Without Attic Space-Insulation Above Deck | U-0.181 | 5.28 ci | U-0.158 | 6.16 ci |
| With Attic Space and Other | U-0.119 | 8.8 | U-0.096 | 10.56 |
| Walls, Above Grade | | | | |
| Above Grade Walls | U-0.312 | 2.28 + 1.76 ci | U-0.312 | 2.28 + 1.76 ci |
| Wall, Below Grade | | | | |
| Below Grade Wall | C-0.522(2) | 1.76 ci | C-0.522(2) | 1.76 ci |
| Exposed Floors | | | | |
| Lightweight Framing | U-0.181 | 6.69(3) | U-0.181 | 6.69(3) |
| Mass | U-0.323 | 2.57 ci | U-0.244 | 3.52 ci |
| Slab-On-Grade Floors (perimeter + below slab) | | | | |
| Unheated | | 2.64 for 600 mm | | 2.64 for 600 mm + 0.88 ci below |
| Heated | | 2.64 for 900 mm + 0.88 ci below | | 3.52 for 900 mm + 0.88 ci below |
| Fenestration | Assembly Max. U-Value(1) | Assembly Max. SHGC | Assembly Max. U-Value(1) | Assembly Max. SHGC |
| Vertical Fenestration, 0% - 40% of Wall | | | | |
| Windows | U-1.99 | 0.40 | U-1.70 | 0.45 |
| Skylight with Curb, % of Roof | | | | |
| 0% - 5.0% | U-3.92 | 0.49 | U-3.92 | 0.50 |
| Skylight without curb, % of Roof | | | | |
| 0% - 5.0% | U-2.56 | 0.46 | U-2.56 | 0.46 |
| Column 1 | 2 | 3 | 4 | 5 |

Notes to Table 1.1.1.2.:
The following definitions apply: ci = continuous insulation
(1) The overall thermal transmittance value of the entire assembly, includes air films.
(2) C-Value is overall thermal conductance of the assembly but it does not include soil or air films.
(3) Where the floor framing depth is 254 mm or less, the insulation is permitted to meet a minimum RSI-Value of 5.28.

Table 1.1.1.2.
Building Envelope Requirements Based on Degree-Day Zones(1) (I-P)
Forming Part of Sentences 1.1.1.2.(1) and (2)

| Opaque Elements | Zone 1 Less Than 5000 Degree-Days | | Zone 2 5000 or More Degree-Days | |
|---|---|---|---|---|
| | Assembly Max. U-Value(1) | Insulation Min. R-Value | Assembly Max. U-Value(1) | Insulation Min. R-Value |
| Roofs | | | | |
| Without Attic Space-Insulation Above Deck | U-0.032 | R-30 ci | U-0.028 | R-35 ci |
| With Attic Space and Other | U-0.021 | R-50 | U-0.017 | R-60 |
| Walls, Above Grade | | | | |
| Above Grade Walls | U-0.055 | R-13 + R-10 ci | U-0.055 | R-13 + R-10 ci |
| Wall, Below Grade | | | | |
| Below Grade Wall | C-0.092(2) | R-10 ci | C-0.092(2) | R-10 ci |
| Exposed Floors | | | | |
| Lightweight Framing | U-0.032 | R-38(3) | U-0.032 | R-38(3) |
| Mass | U-0.057 | R-14.6 ci | U-0.043 | R-20 ci |
| Slab-On-Grade Floors (perimeter + below slab) | | | | |
| Unheated | | R-15 for 24 in. | | R-15 for 24 in. + R-5 ci below |
| Heated | | R-15 for 36 in. + R-5 ci below | | R-20 for 36 in. + R-5 ci below |
| Fenestration | Assembly Max. U-Value(1) | Assembly Max. SHGC | Assembly Max. U-Value(1) | Assembly Max. SHGC |
| Vertical Fenestration, 0% - 40% of Wall | | | | |
| Windows | U-0.35 | 0.40 | U-0.30 | 0.45 |
| Skylight with Curb, % of Roof | | | | |
| 0% - 5.0% | U-0.69 | 0.49 | U-0.69 | 0.50 |
| Skylight without curb, % of Roof | | | | |
| 0% - 5.0% | U-0.45 | 0.46 | U-0.45 | 0.46 |
| Column 1 | 2 | 3 | 4 | 5 |

Notes to Table 1.1.1.2.:
The following definitions apply: ci = continuous insulation
(1) The overall thermal transmittance value of the entire assembly, includes air films.
(2) C-Value is overall thermal conductance of the assembly but it does not include soil or air films.
(3) Where the floor framing depth is 10 inches or less, the insulation is permitted to meet a minimum R-Value of R-30.

### 1.1.1.3. Air Infiltration

**(1)** Where a *building* component or assembly separates interior conditioned space from exterior space, interior space from ground or environmentally dissimilar interior spaces, the component or assembly shall contain an *air barrier system* conforming to the applicable requirements of Part 5 or Section 9.25. of Division B of the *Building Code*.

### 1.1.1.4. Heating, Ventilating and Air-Conditioning

**(1)** A heating, ventilating and *air-conditioning* system that serves more than one heating, ventilating and *air-conditioning* zone shall conform to Article 1.1.2.1. of Chapter 1 of Division 2 of this Supplementary Standard.

**(2)** Sentences (3) to (11) and Article 1.1.1.5. apply to a heating, ventilating and *air-conditioning* system that serves a single heating, ventilating and *air-conditioning* zone.

**(3)** Heating, ventilating and *air-conditioning* equipment shall conform to the minimum effective values required by Clause 1.1.2.1.(1)(c) of Chapter 1 of Division 2 of this Supplementary Standard.

**(4)** An *air-conditioning* system with a cooling capacity of 40 kW or more shall have an economizer,
(a) controlled by appropriate high limit shut-off control, and
(b) equipped with either barometric or powered relief sized to prevent excess pressurization of the *building*.

**(5)** Outdoor air dampers for economizer use shall be provided with blade and jamb seals.

**(6)** A heat recovery ventilator with a recovery effectiveness of 50% or more at the outside winter design temperature shall be provided where the quantity of the outdoor air supplied to the air duct distribution system is,
(a) more than 1400 L/s, and
(b) more than 70% of the supply air quantity of the system.

**(7)** Where a heat recovery ventilator is installed, the system shall have provisions to bypass or control the heat recovery ventilator to permit operation of the air economizer.

**(8)** A heating, ventilating and *air-conditioning* system shall be controlled by a manual changeover or dual setpoint thermostat.

**(9)** Except for a system requiring continuous operation, a heating, ventilating and *air-conditioning* system that has a cooling or heating capacity greater than 4.4 kW and a supply fan motor rated for more than 0.5 kW shall be provided with a time clock that,
(a) is capable of starting and stopping the system under different schedules for seven different day-types per week,
(b) is capable of retaining programming and time setting during a loss of power for a period of 10 hours or more,
(c) includes an accessible manual override that allows temporary operation of the system for up to two hours,
(d) is capable of temperature setback down to 13°C during off-hours, and
(e) is capable of temperature setup to 32°C during off-hours.

**(10)** Where separate heating and cooling equipment serves the same temperature zone, thermostats shall be interlocked to prevent simultaneous heating and cooling.

**(11)** A heating, ventilating and *air-conditioning* system with a design supply air capacity greater than 5000 L/s shall have optimum start controls.

## 1.1.1.5. Ducts, Plenums and Piping

**(1)** A duct or a plenum that is not protected by an insulated exterior wall or that is exposed to an unheated space shall be
(a) sealed in accordance with SMACNA, "HVAC Duct Construction Standards - Metal and Flexible", to minimize air leakage, and
(b) insulated to provide a thermal resistance of not less than RSI 1.4.

**(2)** A supply or *exhaust duct* or *plenum* that is located in a *conditioned space* shall be sealed in accordance with SMACNA, "HVAC Duct Construction Standards - Metal and Flexible", to minimize air leakage.

**(3)** Except for piping within prefabricated equipment, piping used for steam, hot water heating or cooling shall be insulated in accordance with Table 1.1.1.5.

Table 1.1.1.5.
Minimum Thickness of Pipe Insulation(1)
Forming Part of Sentences 1.1.1.5.(3) and 1.1.1.6.(2)

| Use of Pipe | Nominal Pipe Size Not More than 40 mm | Nominal Pipe Size More than 40 mm |
|---|---|---|
| | Minimum Pipe Insulation Thickness, mm | Minimum Pipe Insulation Thickness, mm |
| Steam | 40 | 65 |
| Hot water heating | 40 | 50 |
| Domestic hot water | 25 | 50 |
| Cooling | 12 | 25 |
| Column 1 | 2 | 3 |

Notes to Table 1.1.1.5.:
(1) Insulation material shall have a thermal conductivity of not more than 0.042 W/(m•°C).

**(4)** Insulation exposed to weather shall be protected by a covering such as aluminum, sheet metal, painted canvas or plastic.

**(5)** An *exhaust duct* with a design capacity of more than 140 L/s on a heating, ventilating and *air-conditioning* system that does not operate continuously shall be equipped with a gravity or motorized damper that will automatically shut when the system is not in operation.

**(6)** An air duct distribution system shall be balanced in the following sequence:
1. Minimize throttling losses.
2. If the fan is rated for more than 0.75 kW, adjust the fan speed to meet design flow conditions.

**(7)** A hydronic system shall be proportionately balanced to minimize throttling losses.

## 1.1.1.6. Service Water Heating

**(1)** Water heating equipment used solely for heating *potable* water and hot water storage tanks shall meet the minimum efficiency values required by Clause 1.1.2.1.(1)(c) of Chapter 1 of Division 2 of this Supplementary Standard.

**(2)** Domestic hot water heating piping shall be insulated in accordance with Table 1.1.1.5. if it is,
(a) recirculating system piping,
(b) located within the first 2.5 m of outlet piping in a constant temperature non-recirculating storage system,
(c) an inlet pipe located between the storage tank and a heat trap in a non-recirculating storage system, or
(d) a pipe that is externally heated by methods such as a heat trace or impedance heating.

**(3)** A hot water storage tank shall be provided with a temperature control to permit adjustment of the water storage temperature.

**(4)** An automatic time switch or other control that can be set to switch off the usage temperature maintenance system during extended periods when hot water is not required shall be installed in a domestic hot water system that is designed to maintain usage temperatures in hot water pipes such as recirculating hot water systems or heat trace.

**(5)** If a recirculating pump is used to maintain storage tank water temperature, the pump shall be equipped with a control to limit its operation to a period from the start of the heating cycle to a maximum of five minutes after the end of the heating cycle.

**(6)** In a washroom located in a public facility, a device shall be provided to control the maximum temperature of water delivered from a lavatory faucets to not more than 43°C.

**(7)** A vertical pipe riser that serves a storage water heater or a storage tank shall have heat traps on both the inlet and outlet piping as close as practical to the tank if,
(a) the riser is in a non-recirculating system, and
(b) the storage water heater or the storage tank does not have integral heat traps.

**(8)** A system that provides both space heating and domestic water heating shall conform to the minimum efficiency values required by Clause 1.1.2.1.(1)(c) of Chapter 1 of Division 2 of this Supplementary Standard.

## 1.1.1.7. Lighting

**(1)** Except as provided in Sentence (2), Articles 1.1.1.8. to 1.1.1.11. apply to,
(a) interior spaces of a *building*,
(b) exterior *building* features, including facades, illuminated roofs, architectural features, entrances, *exits*, loading docks and illuminated canopies, and
(c) exterior *building* ground lighting provided through the *building's* electrical service.

**(2)** Articles 1.1.1.8. to 1.1.1.11. do not apply to emergency lighting that is automatically turned off during the normal use of the *building*.

**(3)** Except as provided in Sentence (4), luminaires designed for use with one or three linear fluorescent lamps greater than 30 W each shall use two-lamp tandem-wired ballasts in place of single-lamp ballasts when two or more luminaires are in the same space and on the same control device.

**(4)** The tandem wiring required by Sentence (3) is not required for,
(a) recessed luminaires located more than 3 m apart, measured centre to centre,
(b) surface mounted or pendant luminaires that are not continuous,
(c) luminaires that use single-lamp high-frequency electronic ballasts,
(d) luminaires that use three-lamp high-frequency electronic or three-lamp electromagnetic ballasts, and
(e) luminaires on emergency circuits.

## 1.1.1.8. Interior Lighting

**(1)** The interior lighting power allowance for a *building* is the sum of the lighting power allowances, in watts, of all building area types and shall include all permanently installed general, task and furniture lighting systems and luminaires.

**(2)** The interior lighting power allowance shall be determined by multiplying the lighting power density given in Table 1.1.1.8. by the gross lighted areas of the building area type.

Table 1.1.1.8.
Interior Lighting Power Densities
Forming Part of Sentence 1.1.1.8.(2)

| Building Area Type | Lighting Power Density, W/m$^2$ |
|---|---|
| Automotive Facility | 8.8 |
| Fast Food | 10.0 |
| Dormitory | 6.6 |
| Health Care Clinic | 9.4 |
| Manufacturing Facility | 12.0 |
| Office | 10.0 |
| Parking Garage | 3.0 |
| Police Station without detention quarters / Fire Station | 10.0 |
| Post Office | 9.4 |
| Retail | 15.0 |
| Transportation | 8.3 |
| Warehouse | 7.0 |
| Workshop | 13.0 |
| Column 1 | 2 |

**(3)** The installed interior lighting power shall not exceed the interior lighting power allowance.

**(4)** Except as provided in Sentence (5), the installed interior lighting power shall include all power used by luminaires, including lamps, ballasts, current regulators and control devices.

**(5)** The following lighting equipment and applications shall not be considered when determining the installed interior lighting power or the interior lighting power allowance:
(a) lighting that is integral to equipment or instrumentation and is installed by its manufacturer,
(b) lighting specifically designed for use only during medical or dental procedures and lighting integral to medical equipment,
(c) lighting that is integral to both open and glass-enclosed refrigerator and freezer cases,
(d) lighting that is integral to food warming and food preparation equipment,
(e) lighting for plant growth or maintenance,
(f) lighting in spaces specifically designed for use by persons with low or no vision,
(g) lighting in retail display windows if the display area is enclosed by ceiling-height partitions,
(h) lighting in interior spaces that have been specifically designated as a *heritage building*,
(i) lighting that is an integral part of advertising or directional signage,
(j) *exit* signs,
(k) lighting that is displayed for sale, and
(l) educational lighting demonstration systems.

**(6)** Trade-offs among building area types are permitted provided that the total installed interior lighting power does not exceed the interior lighting power allowance.

## 1.1.1.9. Interior Lighting Controls

**(1)** Except as provided by Sentence (2), interior lighting in a *building* that exceeds 500 $m^2$ in *building area* shall be controlled with an automatic control device to shut off *building* lighting in all spaces.

**(2)** Sentence (1) does not apply to,
(a) lighting intended for 24-hour operation,
(b) emergency lighting, or
(c) lighting for spaces where an automatic shut-off would endanger safety or security.

**(3)** The automatic control device required in Sentence (1) shall operate on,
(a) a scheduled basis using a time-of-day operated control device that turns lighting off at specific programmed times,
(b) an occupant sensor that shall turn lighting off within 30 minutes of an occupant leaving a space, or
(c) a signal from another control or alarm system that indicates the area is unoccupied.

**(4)** Where the automatic control device conforms to Clause (3)(a), an independent program schedule shall be provided for each floor.

**(5)** Each space enclosed by *partitions* that extend to the ceiling shall have at least one control device to independently control the general lighting within the space.

**(6)** Each manual operated control device shall be readily accessible and located so the occupants can see the controlled lighting.

**(7)** Except as required by Sentences (8) and (9) and except for reasons of safety or security, an individual control device shall,
(a) be capable of being activated,
  (i) either manually, or
  (ii) automatically by sensing an occupant,
(b) control a floor area having an area not more than 240 $m^2$, and
(c) be capable of overriding at any time of-day scheduled shutoff control for not more than 4 h.

**(8)** Except in spaces with multi-scene control, a control device that automatically turns lighting off within 30 minutes of all occupants leaving a space shall be provided in,
(a) conference rooms,
(b) meeting rooms, and
(c) employee lunch and break rooms.

**(9)** A separate control device shall control,
(a) display lighting,
(b) accent lighting,
(c) case lighting,
(d) task lighting,
(e) non-visual lighting, and
(f) demonstration lighting.

## 1.1.1.10. Exterior Lighting

**(1)** Except as provided in Sentence (2), this Article applies to exterior areas conforming to Sentence 1.1.1.7.(1).

**(2)** If the lighting is equipped with a control device independent of the control of other lighting, Sentence (1) does not apply to,
(a) specialized signal, directional, and marker lighting associated with transportation,
(b) advertising signage or directional signage,
(c) lighting integral to equipment or instrumentation and installed by its manufacturer,
(d) temporary lighting,
(e) lighting for industrial production, material handling, transportation sites, and associated storage areas, and
(f) lighting used to highlight features of public monuments and *heritage buildings*.

**(3)** The exterior lighting power allowance for the exterior areas appurtenant to a *building* shall be determined by multiplying the lighting power density given in Table 1.1.1.10. by the areas or lengths of lighted exterior spaces.

Table 1.1.1.10.
Exterior Lighting Power Densities
Forming Part of Sentence 1.1.1.10.(3)

| Exterior Area | Lighting Power Density |
|---|---|
| Uncovered parking lots and drives | 1.0 W/m$^2$ |
| Walkways less than 3 m wide | 2.6 W/linear m |
| Walkways 3 m or greater, plaza areas, special feature areas | 1.7 W/m$^2$ |
| Stairways | 10.8 W/m$^2$ |
| Building main entries | 98 W/linear m of door width |
| Other doors | 66 W/linear m of door width |
| Canopies (free standing and attached and overhangs) | 8.6 W/m$^2$ |
| Outdoor sales open areas (including vehicle sale lots) | 5.4 W/m$^2$ |
| Street frontage for vehicle sales lots in addition to “open area” allowance | 33 W/linear m |
| Building facades | 1.6 W/m$^2$ for each illuminated wall or surface or<br>12.3 W/linear m for each illuminated wall or surface length |
| Automated teller machines and night depositories | 270 W per location plus 90 W per additional ATM per location |
| Entrances and gatehouse inspection stations at guarded facilities | 8.0 W/m$^2$ of uncovered area |
| Loading areas for law enforcement and emergency service vehicles | 5.4 W/m$^2$ of uncovered area |
| Drive-up windows | 400 W per drive-through |
| Parking near 24-hour retail entrances | 800 W per main entry |
| Column 1 | 2 |

**(4)** The total exterior lighting power allowance for the exterior areas appurtenant to a *building* is the sum of the individual power allowances determined from Sentence (3) plus an additional unrestricted allowance of 5% of that sum.

**(5)** The installed exterior lighting power shall not exceed the exterior lighting power allowance.

**(6)** All exterior building grounds luminaires that operate at greater than 100 watts shall contain lamps having a minimum efficacy of 60 lm/W unless the luminaire is controlled by a motion sensor.

## 1.1.1.11. Exterior Lighting Controls

**(1)** Except as provided in Sentence (2), lighting for exterior applications shall have automatic controls capable of turning off exterior lighting when,
(a) sufficient daylight is available, or
(b) the lighting is not required during night time hours.

**(2)** Sentence (1) does not apply to,
(a) lighting for covered vehicle entrances or exits from a *building*,
(b) parking structures, and
(c) where required for safety, security, or eye adaptation.

**(3)** Lighting designated for dusk-to-dawn operation shall be controlled by a time switch or photosensor.

**(4)** Lighting not designated for dusk-to-dawn operation shall be controlled by a time switch.

## 1.1.1.12. Electric Motors

**(1)** Electric motor shall conform to the efficiency levels required in Chapter 2 of Division 2.

# Division 5

# Buildings of Non-Residential Occupancy Within the Scope of Part 9

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

# Division 5

# Buildings of Non-Residential Occupancy Within the Scope of Part 9

## Section 1.1. Buildings of Non-Residential Occupancy

### 1.1.1. Buildings of Non-Residential Occupancy

#### 1.1.1.1. Application

**(1)** Except as provided in Sentence (2), this Division applies to construction for which a permit has been applied for after December 31, 2016.

**(2)** Construction for which a permit is applied for on or before December 31, 2017 is permitted to conform to Division 5 as it read on December 31, 2016. (See Appendix A.)

**(3)** Except as provided in Sentences (2) and (3), this Division applies to the energy efficiency of *buildings* or parts of *buildings* where the *building* or part of the *building*
(a) is within the scope of Part 9 of Division B of the *Building Code*,
(b) does not contain a *residential occupancy*,
(c) does not use *electric space heating*, and
(d) is intended for occupancy on a continuing basis during the winter months.

**(4)** Where the ratio of the gross area of fenestration to the gross area of exterior wall measured from grade to the top of the most upper ceiling exceeds 40%, or the ratio of the gross skylight areas to gross ceiling area exceeds 3%, the *building* envelope shall comply with Article 1.1.2.1. of Chapter 1 of Division 3.

**(5)** *Buildings* are exempt from compliance with this Division where they meet the exemptions described in Article 1.2.1.1. of Chapter 1 of Division 3.

#### 1.1.1.2. Building Envelope Requirements

**(1)** Except as permitted in Sentence (2), the exterior *building* envelope shall comply with the requirements of Table 1.1.1.2.

**(2)** Except for doors, the opaque surfaces shall comply with
(a) minimum RSI value of the added insulation in framing cavities and continuous insulation required in Table 1.1.1.2., or
(b) maximum overall thermal transmittance U-value for the entire assembly required in Table 1.1.1.2., where U-value is provided.

**(3)** Where the top of a *foundation* wall is less than 1 200 mm above the adjoining ground level, those portions of the *foundation* wall that are above ground may be insulated to the level required for the below grade portion of the *foundation* wall.

**(4)** The ratio of visible transmittance to solar heat gain coefficient (VT/SHGC) for vertical fenestration assemblies shall be 1.10 or greater.

Table 1.1.1.2.
Building Envelope Requirements Based on Degree-Day Zones(1) (SI)
Forming Part of Sentences 1.1.1.2.(1) and (2)

| Opaque Elements | Zone 1 Less Than 5000 Degree-Days | | Zone 2 5000 or More Degree-Days | |
|---|---|---|---|---|
| | Assembly Max. U-Value(1) | Insulation Min. RSI-Value | Assembly Max. U-Value(1) | Insulation Min. RSI-Value |
| Roofs | | | | |
| Without Attic Space - Insulation Above Deck | U-0.164 | 6.2 ci | U-0.143 | 7.0 ci |
| With Attic Space and Other | U-0.107 | 10.6 | U-0.087 | 12.5 |
| Walls, Above Grade | | | | |
| All Types | U-0.250 | 2.3 + 2.6 ci | U-0.250 | 2.3 + 2.6 ci |
| Wall, Below Grade | | | | |
| All Types | C-0.284(2) | 3.5 ci | C-0.284(2) | 3.5 ci |
| Exposed Floors | | | | |
| Mass | U-0.261 | 3.3 ci | U-0.215 | 4.1 ci |
| Lightweight Framing | U-0.164 | 6.7(3) + 0.7 ci | U-0.164 | 6.7(3) + 0.7 ci |
| Slab-On-Grade Floors | | | | |
| Unheated | | 2.6 for 1200 mm | | 2.6 for 1200 mm |
| Heated | | 1.8 full slab | | 1.8 full slab |
| Opaque Doors | U-2.56 | | U-2.56 | |
| Fenestration | Assembly Max. U-Value(1) | Assembly Max. SHGC | Assembly Max. U-Value(1) | Assembly Max. SHGC |
| Vertical Fenestration, 0% - 40% of Wall | | | | |
| All Types Except Entrance Doors | U-2.15 | SHGC-0.40 | U-1.94 | SHGC-0.45 |
| Entrance Doors | U-3.94 | SHGC-0.40 | U-3.94 | SHGC-0.45 |
| Skylight, 0% - 3% of Roof | | | | |
| All Types | U-2.56 | SHGC-0.40 | U-2.56 | NR |
| Column 1 | 2 | 3 | 4 | 5 |

Notes to Table 1.1.1.2.:
The following definitions apply: ci = continuous insulation
(1) The overall thermal transmittance value of the entire assembly, includes air films.
(2) C-Value is overall thermal conductance of the assembly but it does not include soil or air films.
(3) Where the floor framing depth is 254 mm or less, the insulation between the framing members is permitted to meet a minimum RSI-Value of 5.28.

Table 1.1.1.2.
Building Envelope Requirements Based on Degree-Day Zones(1) (I-P)
Forming Part of Sentences 1.1.1.2.(1) and (2)

| Opaque Elements | Zone 1 Less Than 5000 Degree-Days | | Zone 2 5000 or More Degree-Days | |
|---|---|---|---|---|
| | Assembly Max. U-Value(1) | Insulation Min. R-Value | Assembly Max. U-Value(1) | Insulation Min. R-Value |
| Roofs | | | | |
| Without Attic Space - Insulation Above Deck | U-0.029 | R-35 ci | U-0.025 | R-40 ci |
| With Attic Space and Other | U-0.019 | R-60 | U-0.015 | R-71 |
| Walls, Above Grade | | | | |
| All Types | U-0.044 | R-13 + R-15 ci | U-0.044 | R-13 + R-15 ci |
| Wall, Below Grade | | | | |
| All Types | C-0.050(2) | R-20 ci | C-0.050(2) | R-20 ci |
| Exposed Floors | | | | |
| Mass | U-0.046 | R-18.7 ci | U-0.038 | R-23.4 ci |
| Lightweight Framing | U-0.029 | R-38(3) + R-4 ci | U-0.029 | R-38(3) + R-4 ci |
| Slab-On-Grade Floors | | | | |
| Unheated | | R-15 for 48 in. | | R-15 for 48 in. |
| Heated | | R-10 full slab | | R-10 full slab |
| Opaque Doors | U-0.45 | | U-0.45 | |
| Fenestration | Assembly Max. U-Value(1) | Assembly Max. SHGC | Assembly Max. U-Value(1) | Assembly Max. SHGC |
| Vertical Fenestration, 0% - 40% of Wall | | | | |
| All Types Except Entrance Doors | U-0.38 | SHGC-0.40 | U-0.34 | SHGC-0.45 |
| Entrance Doors | U-0.69 | SHGC-0.40 | U-0.69 | SHGC-0.45 |
| Skylight, 0% - 3% of Roof | | | | |
| All Types | U-0.45 | SHGC-0.40 | U-0.45 | NR |
| Column 1 | 2 | 3 | 4 | 5 |

Notes to Table 1.1.1.2.:

The following definitions apply: ci = continuous insulation

(1) The overall thermal transmittance value of the entire assembly, includes air films.

(2) C-Value is overall thermal conductance of the assembly but it does not include soil or air films.

(3) Where the floor framing depth is 10 inches or less, the insulation between the framing members is permitted to meet a minimum R-Value of R-30.

## 1.1.1.3. Air Infiltration

**(1)** Where a *building* component or assembly separates interior conditioned space from exterior space, interior space from ground or environmentally dissimilar interior spaces, the component or assembly shall contain an air *barrier system* conforming to the applicable requirements of Part 5 or Section 9.25. of Division B of the *Building Code*.

## 1.1.1.4. Heating, Ventilating and Air-Conditioning

**(1)** A heating, ventilating and *air-conditioning* system that serves more than one heating, ventilating and *air-conditioning* zone shall conform to Article 1.1.2.1. of Chapter 1 of Division 3 of this Supplementary Standard.

**(2)** Sentences (3) to (11) and Article 1.1.1.5. apply to a heating, ventilating and *air-conditioning* system that serves a single heating, ventilating and *air-conditioning* zone.

**(3)** The minimum efficiency of heating, ventilating and *air-conditioning* equipment shall conform to the requirements of Sentence 1.1.2.1.(1) of Chapter 1 of Division 3 of this Supplementary Standard.

**(4)** An *air-conditioning* system with a cooling capacity of 15.8 kW (54,000 Btu/h) or more shall have an economizer,
(a) controlled by appropriate high limit shut-off control, and
(b) equipped with either barometric or powered relief sized to prevent excess pressurization of the *building*.

**(5)** Outdoor air dampers for economizer use shall be provided with blade and jamb seals.

**(6)** Except where the largest exhaust at a single point is less than 75% of the outdoor air, a heat recovery ventilator with a recovery effectiveness of 55% or more at the outside winter design temperature shall be provided where the quantity of the outdoor air supplied to the air duct distribution system
(a) is more than 1400 L/s (3000 cfm), or
(b) operates 8000 hours per year or more.

**(7)** Where a heat recovery ventilator is installed, the system shall have provisions to bypass or control the heat recovery ventilator to permit operation of the air economizer.

**(8)** A heating, ventilating and *air-conditioning* system shall be controlled by a manual changeover or dual setpoint thermostat.

**(9)** Except for a system requiring continuous operation, a heating, ventilating and *air-conditioning* system that has a cooling or heating capacity greater than 4.4 kW (15,000 Btu/h) and a supply fan motor rated for more than 0.5 kW shall be provided with a time clock that,
(a) is capable of starting and stopping the system under different schedules for seven different day-types per week,
(b) is capable of retaining programming and time setting during a loss of power for a period of 10 hours or more,
(c) includes an accessible manual override that allows temporary operation of the system for up to two hours,
(d) is capable of temperature setback down to 13°C (55°F) during off-hours, and
(e) is capable of temperature setup to 32°C (90°F) during off-hours.

**(10)** Where separate heating and cooling equipment serves the same temperature zone, thermostats shall be interlocked to prevent simultaneous heating and cooling.

**(11)** A heating, ventilating and *air-conditioning* system with a design supply air capacity greater than 5000 L/s (10,600 cfm) shall have optimum start controls.

## 1.1.1.5. Ducts, Plenums and Piping

**(1)** A duct or a plenum that is not protected by an insulated exterior wall or that is exposed to an unheated space shall be
(a) sealed in accordance with SMACNA, "HVAC Duct Construction Standards - Metal and Flexible", to minimize air leakage, and
(b) insulated to provide a thermal resistance of not less than RSI 1.4 (R8).

**(2)** A supply or *exhaust duct* or *plenum* that is located in a *conditioned space* shall be sealed in accordance with SMACNA, "HVAC Duct Construction Standards - Metal and Flexible", to minimize air leakage.

**(3)** Except for piping within prefabricated equipment, piping used for steam, hot water heating or cooling shall be insulated in accordance with Table 1.1.1.5.

**(4)** Insulation exposed to weather shall be protected by a covering such as aluminum, sheet metal, painted canvas or plastic.

**(5)** An *exhaust duct* with a design capacity of more than 140 L/s (300 cfm) on a heating, ventilating and *air-conditioning* system that does not operate continuously shall be equipped with a gravity or motorized damper that will automatically shut when the system is not in operation.

**(6)** An air duct distribution system shall be balanced in the following sequence:
1. Minimize throttling losses.
2. If the fan is rated for more than 0.75 kW, adjust the fan speed to meet design flow conditions.

**(7)** A hydronic system shall be proportionately balanced to minimize throttling losses.

Table 1.1.1.5.
Minimum Thickness of Pipe Insulation(1)
Forming Part of Sentences 1.1.1.5.(3) and 1.1.1.6.(2)

| Use of Pipe | | Nominal Pipe Size Not More than 40 mm | Nominal Pipe Size More than 40 mm |
|---|---|---|---|
| | | Minimum Pipe Insulation Thickness, mm | Minimum Pipe Insulation Thickness, mm |
| Steam | | 64 | 76 |
| Hot water heating | | 38 | 51 |
| Domestic hot water | 40ºC to 60ºC | 25 | 38 |
| | 61ºC and higher | 38 | 51 |
| Cooling | | 13 | 25 |
| Column 1 | | 2 | 3 |

Notes to Table 1.1.1.5.:
(1) Insulation material shall have a thermal conductivity of not more than 0.042 W/(m•°C).

## 1.1.1.6. Service Water Heating

**(1)** The minimum efficiency of water heating equipment used solely for heating *potable* water and hot water storage tanks shall conform to the requirements of Sentence 1.1.2.1.(1) of Chapter 1 of Division 3 of this Supplementary Standard.

**(2)** Domestic hot water heating piping shall be insulated in accordance with Table 1.1.1.5. if it is,
(a) recirculating system piping,
(b) located within the first 2.5 m (8 ft) of outlet piping in a constant temperature non-recirculating storage system,
(c) an inlet pipe located between the storage tank and a heat trap in a non-recirculating storage system, or
(d) a pipe that is externally heated by methods such as a heat trace or impedance heating.

**(3)** A hot water storage tank shall be provided with a temperature control to permit adjustment of the water storage temperature.

**(4)** An automatic time switch or other control that can be set to switch off the usage temperature maintenance system during extended periods when hot water is not required shall be installed in a domestic hot water system that is designed to maintain usage temperatures in hot water pipes such as recirculating hot water systems or heat trace.

**(5)** If a recirculating pump is used to maintain storage tank water temperature, the pump shall be equipped with a control to limit its operation to a period from the start of the heating cycle to a maximum of five minutes after the end of the heating cycle.

**(6)** In a washroom located in a public facility, a device shall be provided to control the maximum temperature of water delivered from a lavatory faucets to not more than 43°C (110°F).

**(7)** A vertical pipe riser that serves a storage water heater or a storage tank shall have heat traps on both the inlet and outlet piping as close as practical to the tank if,
(a) the riser is in a non-recirculating system, and
(b) the storage water heater or the storage tank does not have integral heat traps.

**(8)** A system that provides both space heating and domestic water heating shall conform to the minimum efficiency values required by Clause 1.1.2.1.(1)(c) of Chapter 1 of Division 3 of this Supplementary Standard.

## 1.1.1.7. Lighting

**(1)** Except as provided in Sentence (2), Articles 1.1.1.8. to 1.1.1.11. apply to,
(a) interior spaces of a *building*,
(b) exterior *building* features, including facades, illuminated roofs, architectural features, entrances, *exits*, loading docks and illuminated canopies, and
(c) exterior *building* ground lighting provided through the *building's* electrical service.

**(2)** Articles 1.1.1.8. to 1.1.1.11. do not apply to emergency lighting that is automatically turned off during the normal use of the *building*.

**(3)** Except as provided in Sentence (4), luminaires designed for use with one or three linear fluorescent lamps greater than 30 W each shall use two-lamp tandem-wired ballasts in place of single-lamp ballasts when two or more luminaires are in the same space and on the same control device.

**(4)** The tandem wiring required by Sentence (3) is not required for,
(a) recessed luminaires located more than 3 m apart, measured centre to centre,
(b) surface mounted or pendant luminaires that are not continuous,
(c) luminaires that use single-lamp high-frequency electronic ballasts,
(d) luminaires that use three-lamp high-frequency electronic or three-lamp electromagnetic ballasts, and
(e) luminaires on emergency circuits.

## 1.1.1.8. Interior Lighting

**(1)** The interior lighting power allowance for a *building* is the sum of the lighting power allowances, in watts, of all *building* area types and shall include all permanently installed general, task and furniture lighting systems and luminaires.

**(2)** The interior lighting power allowance shall be determined by multiplying the lighting power density given in Table 1.1.1.8. by the gross lighted areas of the *building* area type.

**(3)** The installed interior lighting power shall not exceed the interior lighting power allowance.

**(4)** Except as provided in Sentence (5), the installed interior lighting power shall include all power used by luminaires, including lamps, ballasts, current regulators and control devices.

**(5)** The following lighting equipment and applications shall not be considered when determining the installed interior lighting power or the interior lighting power allowance:
(a) lighting that is integral to equipment or instrumentation and is installed by its manufacturer,
(b) lighting specifically designed for use only during medical or dental procedures and lighting integral to medical equipment,
(c) lighting that is integral to both open and glass-enclosed refrigerator and freezer cases,
(d) lighting that is integral to food warming and food preparation equipment,
(e) lighting for plant growth or maintenance,
(f) lighting in spaces specifically designed for use by persons with low or no vision,
(g) lighting in retail display windows if the display area is enclosed by ceiling-height partitions,
(h) lighting in interior spaces that have been specifically designated as a *heritage building*,
(i) lighting that is an integral part of advertising or directional signage,
(j) *exit* signs,
(k) lighting that is displayed for sale, and
(l) educational lighting demonstration systems.

**(6)** Trade-offs among *building* area types are permitted provided that the total installed interior lighting power does not exceed the interior lighting power allowance.

Table 1.1.1.8.
Interior Lighting Power Densities
Forming Part of Sentence 1.1.1.8.(2)

| Building Area Type | Lighting Power Density, $W/m^2$ ($W/ft^2$) |
|---|---|
| Automotive Facility | 7.6 (0.71) |
| Fast Food | 8.5 (0.79) |
| Fire Station | 5.7 (0.53) |
| Health Care Offices - Clinic | 8.8 (0.82) |
| Manufacturing Facility | 9.7 (0.90) |
| Office | 8.5 (0.79) |
| Police Station (without detention quarters) | 8.6 (0.80) |
| Post Office | 7.2 (0.67) |
| Retail | 11.4 (1.06) |
| Storage Garage | 1.6 (0.15) |
| Warehouse | 5.2 (0.48) |
| Workshop | 9.7 (0.90) |
| Column 1 | 2 |

## 1.1.1.9. Interior Lighting Controls

**(1)** Except as provided in Sentence (2), there shall be one or more manual lighting controls in each space that controls all of the lighting in the space.

**(2)** Sentence (1) does not apply to,
(a) lighting intended for 24-hour operation,
(b) emergency lighting, or
(c) lighting for spaces where an automatic shut-off would endanger safety or security.

**(3)** Each control device required in Sentence (1) shall be readily accessible and located so that the occupants can see the controlled lighting when operating the control device.

**(4)** For the purpose of Sentence (1), remote location of the control device shall be permitted for reasons of safety or security when the control device is clearly labelled to identify the controlled lighting.

**(5)** Each space excluding corridors, storage rooms, restrooms, and parking garages shall have a manual control device that allows the occupant to reduce lighting power by a minimum of 50% and to turn the lighting off.

**(6)** A total lighting load not exceeding 0.2 $W/m^2$ multiplied by the gross lighted area of the *building* shall be permitted to operate at all times.

**(7)** Except as provided by Sentences (2) and (6), all lighting shall be automatically controlled to turn off when the *building* is either unoccupied or scheduled to be unoccupied.

**(8)** The automatic control device required in Sentence (7) shall operate on,
(a) a scheduled basis using a time-of-day operated control device that turns lighting off at specific programmed times, or
(b) a signal from another control or alarm system that indicates the area is unoccupied.

**(9)** Where the automatic control device conforms to Clause (8), an independent program schedule shall be provided for each floor, and the program shall account for weekends and holiday.

**(10)** Automatic daylight sensing controls shall be used to control general lighting where the total lighting input power is 150 W or greater and where skylights or roof monitors are installed, in the following spaces:
(a) dining areas in fast food *buildings*,
(b) apparatus rooms in fire station buildings,
(c) retail spaces, and
(d) office spaces

**(11)** Except in retail spaces, automatic daylight sensing controls shall be used to control general lighting in a space where the total lighting input power is 150 W or greater and the total area of exterior vertical fenestration in the space is 11 $m^2$ or greater.

**(12)** The automatic daylight sensing controls required in Sentences (10) and (11) shall reduce lighting in response to available daylight using continuous dimming or with at least two intermediate control points between fully on and fully off.

**(13)** Lighting in corridors, post office sorting areas, warehouse storage areas, and parking garages shall be controlled by occupancy sensors that reduce the lighting power by a minimum of 50% when no activity is detected for not longer than 20 minutes.

**(14)** The control device required in Sentence (13) shall not control an area more than 330 $m^2$.

**(15)** Lighting in the following spaces shall be controlled by occupancy sensors that automatically turn off the lighting when no activity is detected for not longer than 20 minutes:
(a) enclosed office areas less than 23 $m^2$ (250 $ft^2$),
(b) classrooms,
(c) training rooms,
(d) conference rooms,
(e) meeting rooms,
(f) breakrooms,
(g) non-warehouse storage areas,
(h) dressing / fitting rooms, and
(i) restrooms

**(16)** Control devices separate from those used for general lighting shall control the following:
(a) display lighting,
(b) accent lighting,
(c) case lighting,
(d) task lighting,
(e) non-visual lighting, and
(f) demonstration lighting.

## 1.1.1.10. Exterior Lighting

**(1)** Except as provided in Sentence (2), this Article applies to exterior areas conforming to Sentence 1.1.1.7.(1).

**(2)** If the lighting is equipped with a control device independent of the control of other lighting, Sentence (1) does not apply to,
(a) specialized signal, directional, and marker lighting associated with transportation,
(b) advertising signage or directional signage,
(c) lighting integral to equipment or instrumentation and installed by its manufacturer,
(d) temporary lighting,
(e) lighting for industrial production, material handling, transportation sites, and associated storage areas, and
(f) lighting used to highlight features of public monuments and *heritage buildings*.

**(3)** The exterior lighting power allowance for the exterior areas appurtenant to a *building* shall be determined by multiplying the lighting power density given in Table 1.1.1.10. by the areas or lengths of lighted exterior spaces.

**(4)** The total exterior lighting power allowance for the exterior areas appurtenant to a *building* is the sum of the individual power allowances including the base allowance determined from Sentence (3).

**(5)** The installed exterior lighting power excluding façade lighting shall not exceed the exterior lighting power allowance calculated in Sentence (4).

**(6)** The installed exterior lighting power of façade lighting shall not exceed 1.1 $W/m^2$ multiplied by the façade area.

**(7)** All exterior *building* grounds luminaires that operate at greater than 100 watts shall contain lamps having a minimum efficacy of 60 lm/W unless the luminaire is controlled by a motion sensor.

Table 1.1.1.10.
Exterior Lighting Power Densities
Forming Part of Sentence 1.1.1.10.(3)

| Exterior Area | Maximum Exterior Lighting Power Allowance |
|---|---|
| Base Allowance | 400 W |
| Special Feature Areas, Walkways, Plazas | 1.1 W/m$^2$ (0.10 W/ft$^2$) |
| Landscape | 0.43 W/m$^2$ (0.04 W/ft$^2$) |
| Pedestrian and Vehicular Entrances and Exits | 46 W/linear m of door width (14 W/linear ft of door width) |
| Stairs and Ramps | 7.5 W/m$^2$ (0.70 W/ft$^2$) |
| Parking Lots and Drives | 0.43 W/m$^2$ (0.04 W/ft$^2$) |
| All Other Areas not Listed | 2.2 W/m$^2$ (0.20 W/ft$^2$) |
| Column 1 | 2 |

## 1.1.1.11. Exterior Lighting Controls

**(1)** Except as provided in Sentence (2), control devices shall be installed that:
(a) automatically turn off the exterior lighting when sufficient daylight is available,
(b) automatically turn off *building* façade and landscape lighting during non-business hours, and
(c) automatically reduce the connected lighting power for exterior lighting excluding *building* façade and landscape lighting, by at least 30% during non-business hours or alternatively, during any period when no activity is detected for not longer than 15 minutes.

**(2)** Sentence (1) does not apply to,
(a) lighting for covered vehicle entrances or *exits* from a *building*, or
(b) parking structures where required for safety, security, or eye adaptation.

## 1.1.1.12. Electric Motors

**(1)** Electric motors shall conform to the efficiency levels required in Chapter 2 of Division 3.

# Appendix A

## Division 2

### Chapter 1

#### A-1.1.2.1.(1)(a) Revocation of 1997 MNECB.

Designers are permitted to continue to use the 1997 MNECB option with the 25% improvement approach in addition to a further 13% enhancement for a limited time. The deadline for permit application using the enhanced 1997 MNECB approach is December 31, 2017.

#### A-1.1.2.1.(1) Energy Efficiency Design.

The performance levels required in Clauses (a) and (b) are set based on the given percentage of reduction in annual energy use (kWh, GJ, etc) from the level that would occur if the building was merely designed in accordance with the referenced standard. Clauses (c) and (d) contain prescriptive, trade-off and performance methods. In the case of performance method, the performance level is set in accordance with Section 11 of 2010 ANSI/ASHRAE/IES 90.1 and Chapter 2, or Part 8 of the 2011 NECB and Chapter 3 respectively.

#### A-1.1.3.1.(2) Alternatives to Compliance With 2010 ANSI/ASHRAE/IES 90.1 in Chapter 2.

Where the energy efficiency of a building is designed in conformance with Clause 1.1.2.1.(1)(b), the designer is permitted to comply with any provision in Chapter 2 in lieu of the corresponding requirement in ANSI/ASHRAE/IES 90.1. For example, equipment tested to Canadian testing procedures listed in the 2011 NECB are permitted to be used in conjunction with Clause 1.1.2.1.(1)(b).

### Chapter 2

#### A-Tables SB 5.5-5 to SB 5.5-7 Building Envelope.

Building envelope Tables SB 5.5-5 to SB 5.5-7 in this Chapter are based on building envelope Tables A-5 to A-7 in ANSI/ASHRAE/USGBC/IES Standard 189.1-2009 which supersede building envelope Tables 5.5-5 to 5.5-7 in 2010 ANSI/ASHRAE/IES 90.1.

Envelope assemblies are required to meet either the maximum U-factor or the contain insulation that meets the minimum R-Values specified in the Tables. Where R-Values or combination of R-Values are specified, alternative R-Value combinations are permitted to address variations in R-Value of insulation products.

#### A-1.1.1.4.(3) Orientation of Walls.

South (or East or West) oriented wall area includes wall area that is oriented less than or equal to 45 degree of true South (or East or West).

# Division 3

## Chapter 1

### A-1.1.1.1.(2) Continuance of Division 3 of MMAH Supplementary Standard SB-10, September 14, 2012 until December 31, 2017.

Division 3 of MMAH Supplementary Standard SB-10, September 14, 2012 contained requirements that would have come into effect on January 1, 2017. These requirements have been updated in this edition; however, Division 3 of MMAH Supplementary Standard SB-10, September 14, 2012, as it read on December 31, 2016 can continue to be used for construction for which a permit is applied for on or before December 31, 2017.

## Chapter 2

### A-1.1.1.8.(2) and A-1.1.1.10.(2) Metering and Energy Use Monitoring Devices.

The mandating of meters and/or monitoring devices in buildings is governed by the Green Energy Act. For the purposes of complying with the Building Code, buildings are required to be designed in a manner that facilitates the future installation of these devices, to measure energy consumption of building systems and the building as described in this Supplementary Standard. Metering and monitoring devices must be installed in buildings where required by the Green Energy Act.

## Chapter 3

### A-1.1.1.10. and A-1.1.1.11. Metering and Energy Use Monitoring Devices.

The mandating of meters and/or monitoring devices in buildings is governed by the Green Energy Act. For the purposes of complying with the Building Code, buildings are required to be designed in a manner that facilitates the future installation of these devices, to measure energy consumption of building systems and the building as described in this Supplementary Standard. Metering and monitoring devices must be installed in buildings where required by the Green Energy Act.

# Division 5

### A-1.1.1.1.(2) Continuance of Division 5 of MMAH Supplementary Standard SB-10, September 14, 2012 until December 31, 2017.

Division 5 of MMAH Supplementary Standard SB-10, September 14, 2012 contained requirements that would have come into effect on January 1, 2017. These requirements have been updated in this edition; however, Division 5 of MMAH Supplementary Standard SB-10, September 14, 2012, as it read on December 31, 2016 can continue to be used for construction for which a permit is applied for on or before December 31, 2017.