

# **NOVA SCOTIA BUILDING CODE REGULATIONS**

Made Under Section 4

of the

## **BUILDING CODE ACT**

R.S.N.S., 1989, c. 46

2009



Labour and  
Workforce Development

## Division B

### Part 10

### Resource Conservation

#### 10.1. General

##### 10.1.1. Application

###### 10.1.1.1. Scope

(1) The scope of this Part shall be as described in Article 1.3.1.2. of Division A NBCC.

###### 10.1.1.2. Application

(1) This Part applies to resource conservation in the design and construction of *buildings*.

(2) This Part shall come into effect on and after December 31, 2009.

#### 10.2. Energy Efficiency

##### 10.2.1. General

###### 10.2.1.1. Energy Efficiency Design

(1) Sentences (2) to (4) apply to construction for which a permit has been applied for after December 31, 2009.

(2) The energy efficiency of a *building* or part of a *building* of residential occupancy that is within the scope of Part 9 and is intended for occupancy on a continuing basis during the winter months shall,

(a) conform to the thermal insulation requirements of Subsection 10.3.2.,

(b) conform to the thermal design requirements of Subsection 10.3.3. for Residential buildings or 10.3.4. for Non-residential buildings, or,

(c) be designed in accordance with a performance protocol acceptable to the authority having jurisdiction that will achieve at least the minimum equivalent level of energy conservation performance required by Part 10.

(See Appendix A-10.2.1.1.(2) NSBCR and Appendix A, Division B, Volume 2, A-9.1.1.1. NBC)

(3) The energy efficiency of a *building* or part of a *building* shall conform to the design requirements of Subsection 10.3.4. if the *building* or part of the *building*,

(a) is within the scope of Part 9, and

(b) does not contain a residential occupancy.

## Prescription

Prescription of the Nova Scotia Building Code Regulations made under Section 4 of the Building Code Act, R.S.N.S., 1989, c. 46.

I, Marilyn More, MLA, Minister of Labour and Workforce Development for the Province of Nova Scotia do hereby prescribe the attached regulations pursuant to Section 4 of the Building Code Act, R.S.N.S. 1989, c.46. These regulations, shall come into effect on and after December 31, 2009.

Dated at Halifax Regional Municipality, Province of Nova Scotia this xx<sup>th</sup> day of xxxxxxxxxx, 2009.

original signed by  
Honourable Marilyn More, Minister  
Nova Scotia Labour and Workforce Development

## Acknowledgements

The Department of Labour and Workforce Development gratefully acknowledges the contributions of the many individual volunteers who participate in the code development process. In particular, the Department recognizes the following volunteers for the continuing support.

### **Nova Scotia Building Advisory Committee**

David Bateman	Robert McLaren
Heather Corrigan	Tim Nobes
Bill Crawford	Gary Ruitenberg
Peter Greer ( <i>Chair</i> )	Roy Strickland
Richard Lind ( <i>Vice Chair</i> )	Kevin White
Duart MacAulay ( <i>to July 2009</i> )	Mannie Withrow
Kevin Marchand	Robert Martin

### **Ad Hoc Committee on Energy Conservation**

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 Richard Miller  
 Kevin Marchand  
 David Bateman  
 Robert McLaren  
 Brian Hayes  
 David Stewart

### **Ad Hoc Committee on Sprinklers**

Robert McLaren (*Chair*)  
 Roy Strickland  
 Gerard Donahoe  
 Gary Ruitenberg

The Department acknowledges the support of the Permits and Inspections Manager and Building Officials of the Halifax Regional Municipality in the preparation of this edition.



## Building Code Website Information

The general building code information website address is:  
<http://www.gov.ns.ca/lwd/buildingcode/>

This site also includes:

- Rules of Procedure for a Hearing
- Application forms for a Hearing
- Links to the
  - Building Code Act
  - Building Code Regulations
  - List of municipal building inspectors
  - Canadian Code Centre
  - Standards Organizations
  - other Provinces and Territories

**Building Officials** The Administration and Enforcement of these Regulations and The Building Code Act is the responsibility of the municipalities. Contact names and addresses are available on the internet: The address is:  
<http://www.gov.ns.ca/snsmr/muns/contact/grouped/BuildingInspectors.asp>

**Permits** Some municipalities now have applications available on the internet: To find a list and contact them the address is:  
<http://www.gov.ns.ca/snsmr/muns/contact/>

**Building Code Act** A copy of the Building Code Act is available at:  
<http://www.gov.ns.ca/legislature/legc/index.htm>

**Building Code Regulation** A copy of the Building Code Act is available at:  
<http://www.gov.ns.ca/just/regulations/regs/bcregs.htm>

## Building Code Regulation Information

The symbol **r** is used to designate changes from the 2006 edition of the regulation.



## Attention

Please take a few moments to fill out this form and return it so we can keep you updated on any amendments or errata to these Regulations. As well you will be added to our mailing list for any advisory notices that are issued by the Department on the Nova Scotia Building Code Regulations.

Any personal information collected on this form will only be used for this stated purpose. Personal information collected here is subject to the privacy provisions of the *NS Freedom of Information & Access to Privacy Act*.

The completed form may be mailed to:

Building Code Regulations  
Nova Scotia Labour and Workforce Development  
PO Box 697  
Halifax NS  
B3J 2T8

fax to: 1-902-424-3239  
e-mail to: [rosstg@gov.ns.ca](mailto:rosstg@gov.ns.ca)

## please print

name: \_\_\_\_\_

mailing address: \_\_\_\_\_

city/town

province

postal code

street address(if different): \_\_\_\_\_

city/town

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phone

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e-mail



## Code Change Form

(only one proposed change on any one submission - duplicate as necessary - print single sided)

(Attach additional pages as necessary or use any other format as long as all the information indicated below is included.)

**Mail to:** Secretary  
Nova Scotia Building Advisory Committee  
PO Box 697  
Halifax NS  
B3J 2T8

fax to: 1-902-424-3239

e-mail to: rosstg@gov.ns.ca

**please print**

name:

mailing address:

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**Code Reference it is proposed to change** (Article, Sentence, etc.)

**Problem** - Why should the existing provision be changed or, if proposing an addition to the Code, what is missing?:

**Proposed Change/Addition** - What wording for the change/addition do you think should be used in the Code?:

**Justification/Explanation** - How does proposed change/addition address the problem?:

**Cost Implications** - Will the change/addition entail any added costs? Will it provide benefits measurable in monetary terms?:

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**Enforcement Implications** - Can the proposed change/addition be enforced by the infrastructure available to enforce this Code? Will its enforcement require an increase in resources?:

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**Other Comments:**

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**Attached Supporting Material:** [Please attach supporting documentation or additional pages if required]

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**Has this submission previously been made to the Canadian Code Centre for a change to the National Code?** Yes ☐ No ☐ **If your answer is yes what was the outcome of that submission?** [Note: If a submission has been made to the Canadian Code Centre the NSBAC will review the outcome of that submission.]

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Please note that the NS Building Advisory Committee may decide to forward a code change suggestion to the Canadian Commission on Building and Fire Codes for national review. Personal information collected on this form is used only for the purpose of consultation regarding code change suggestions. This personal information may be shared with other public bodies for the purpose of consultation. Any personal information collected is subject to the privacy provisions of the *NS Freedom of Information & Protection of Privacy Act*, and the federal *Access to Information Act*.

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## PART 1

# Repeals, Interpretation, Scope, Definitions and Administration

## 1.1. Repeals, Adoption and Interpretation

### 1.1.1. Title, Repeals, and Effective Date

**1.1.1.1. Title.** These *regulations* may be cited as the *Nova Scotia Building Code Regulations*.

### 1.1.1.2. Repeals and Effective Date of *Regulations*.

- (1) The *Nova Scotia Building Code Regulations* (N.S. Reg. 143/2006) made by the Minister of Environment and Labour on July 13, 2006, 2006 as amended by N.S. Reg. 241/2008 (March 31, 2008, effective April 30, 2008), are hereby repealed on and after December 31, 2009.
- (2) These *Nova Scotia Building Code Regulations* made by the Minister of Labour and Workforce Development shall come into effect on and after December 31, 2009.

### 1.1.2. Adoption

#### 1.1.2.1. *Nova Scotia Building Code*

- (1) These *Nova Scotia Building Code Regulations* made by the Minister of Labour and Workforce Development shall come into effect on and after December 31, 2009.
- (2) These regulations adopt the National Building Code of Canada, 2005 and the 1<sup>st</sup> Revisions and Errata dated December 1, 2007, and the 2<sup>nd</sup> Revisions and Errata dated June 20, 2008, which together with the regulations shall be known as the "Nova Scotia Building Code" and may be referred to as the "Code".

### 1.1.3. Interpretation

#### 1.1.3.1. Numbering System

(1) These *regulations* have been prepared following the same decimal numbering system as used in the *Code*.

(2) The first number indicates the Part of the *regulations*; the second, the Section in the Part; the third, the Subsection and the fourth, the Article in the Subsection. An Article may be further broken down into Sentences (indicated by numbers in brackets), and the Sentence further divided into Clauses and Subclauses. They are illustrated as follows:

A	Division
A-3	Part
A-3.5	Section
A-3.5.2.	Subsection
A-3.5.2.1.	Article
A-3.5.2.1.(2)	Sentence
A-3.5.2.1.(2)(a)	Clause
A-3.5.2.1.(2)(a)(i)	Subclause

1.1.3.2. **Schedules** The Schedules "A" through "A-9" inclusive, "B", "C" and "D" form part of these *regulations*.

### 1.1.4. Nova Scotia Building Advisory Committee

#### 1.1.4.1. Appointment of Nova Scotia Building Advisory Committee

(1) The Minister may appoint to the Committee such number of members as the Minister determines, for such terms as may be specified in the appointments.

(2) The Committee shall include

- (a) a representative of municipal government appointed from among persons nominated by the Executive of the Union of Nova Scotia Municipalities;
- (b) a representative of the Fire Marshal for the Province;
- (c) a representative appointed from among persons nominated by the Disabled Persons Commission;
- (d) a representative appointed from among persons nominated by the Executive of the Association of Professional Engineers of Nova Scotia;
- (e) a representative appointed from among persons nominated by the Executive of the Nova Scotia Association of Architects;
- (f) a representative appointed from among persons nominated by the Executive of the Nova Scotia Home Designers Association;
- (g) a representative appointed from among persons nominated by the Executive of Association of Interior Designers of Nova Scotia;

**3.1.1.19. Article 9.10.1.2. Amended Article 9.10.1.2. Items under Part 3 Jurisdiction** is amended by adding

9.10.1.2.(10)(a) Except as provided in Sentence 1.1.1.1.(3) (Part 1, Division A, Volume 1), and as provided in Clause 9.10.1.2.(10)(b) and (c), Articles 3.2.2.18. and 3.2.2.44 to 3.2.2.48. inclusive (Part 3, Division B, Volume 1) apply to all *buildings* used for major occupancies classified as Group C, residential occupancies exceeding 300 m<sup>2</sup> in *building area* or are greater than 3 storeys in *building height*. (Appendix A -1.3.3.2.(2) NSBCR)

9.10.1.2.(10)(b) Single detached dwelling units are exempt.

9.10.1.2.(10)(c) A residential *building* containing two dwelling units with a *building area* of less than 600 m<sup>2</sup> and not more than 3 storeys *building height* is exempt.

**3.1.1.20. Sentence 3.2.4.20.(5) (Part 3, Division B, Volume 1) Smoke Alarms Deleted and Replaced** Sentence 3.2.4.20.(5) [Part 3, Division B, Volume 1] of the National Building Code of Canada 2005 is deleted and replaced with

(5) Smoke alarms referred in Sentence (1) shall

(a) be installed

- (i) by permanent connections to an electrical circuit, (See Appendix A, Division B, Volume 2 A-3.2.4.20.(5) NBC)
- (ii) have no disconnect switch between the overcurrent device and the smoke alarm, and
- (iii) in case the regular power supply to the *smoke alarm* is interrupted, be provided with a battery as an alternate power source that can continue to provide power to the *smoke alarm* for a period of no less than 24 hours in the normal condition, followed by five minutes of alarm.

**3.1.1.21. Sentence 9.10.19.3.(1) (Part 9, Division B, Volume 1) Power Supply Deleted and Replaced** Sentence 9.10.19.3.(1) (Part 9, Division B, Volume 1) of the National Building Code of Canada 2005 is deleted and replaced with

9.10.19.3.(1) Smoke alarms referred in Article 9.10.19.1. shall

(a) be installed

- (i) by permanent connections to an electrical circuit,
- (ii) have no disconnect switch between the overcurrent device and the smoke alarm, and
- (iii) in case the regular power supply to the *smoke alarm* is interrupted, be provided with a battery as an alternate power source that can continue to provide power to the *smoke alarm* for a period of no less than 24 hours in the normal condition, followed by five minutes of alarm,

or

- (b) in a single dwelling unit be installed
  - (i) as a component of a household fire warning system which includes a certified control unit that meets the applicable requirements of ULC-S545 "Standard for Residential Fire Warning System Control Units" and,
  - (ii) in case the regular power supply to the control unit is interrupted, be provided with a battery as an alternate power source that can continue to provide power to the control unit for a period of no less than 24 hours in the normal condition, followed by five minutes of alarm.

**3.1.1.22. Appendix Notes** The Appendix Notes to the National Building Code of Canada 2005 edition apply as appendix notes to the *Code* and where amendments made by this regulation unless specifically replaced or amended herein.

**3.1.1.23. Schedule E, Part 10 Energy Efficiency Measures** The National Building Code of Canada 2005 (Division B, Volume 1) is amended by adding the energy efficiency measures contained in Schedule "E" of these regulations.

**3.1.1.24. Division A NBC and NPC 2.2 Objectives** add the following objective to Division A Sentence 2..2.1.1.(1) (See Appendix Note NSBCR A-3.1.1.24.)

#### **OR Resource Conservation**

An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a natural resource will be exposed to an unacceptable risk of depletion or the capacity of the infrastructure supporting the use of the resource will be exposed to an unacceptable risk of being exceeded.

#### **OR1 Water Conservation**

An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, water resources will be exposed to an unacceptable risk of depletion or the capacity of the water supply, treatment and disposal infrastructure will be exposed to an unacceptable risk of being exceeded, caused by the consumption of water.

#### **OR2 Energy Conservation**

An *objective* of this Code is to limit the probability that, as a result of the design or *construction* of a *building*, a natural resource will be exposed to an unacceptable risk of depletion or the capacity of the infrastructure supporting the use of the resource will be exposed to an unacceptable risk of being exceeded, caused by the consumption of energy.

**3.1.1.25. Division A NBC and NPC 3.2 Functional Statements** add the following functional statement to Division A Sentence 3.2.1.1.(1)

- F 130 To limit excessive water consumption.
- F 131 To limit excessive energy consumption.

**3.1.1.26 Division B Table 1.3.1.2. amended** Table 1.3.1.2. is amended to add additional standards and/or code references to which the standards apply. See Schedule E, Energy Efficiency Measures, Division B, Part 1, Acceptable Solutions NSBCR.

**3.1.1.27. Table 1.3.1.2. amended** Table 1.3.1.2. is amended by adding

Issuing Agency	Document #	Title of Document	code reference
ULC	Can/ULC-S545	Standard for Residential Fire Warning System Control Units	9.10.19.3.(1)

r

**3.1.1.28. Article 2.4.9.1. No Reduction in Size is replaced** In the National Plumbing Code of Canada Division B replace the existing sentence (1) and add sentences (2) and (3)

#### **2.4.9.1. No Reduction in Size**

(1) Except as permitted in Sentence (3), no drainage pipe that is of minimum *size* required by this Part for the purpose for which it is installed shall be so connected as to drain to other drainage pipe of lesser *size*.

(2) Where a *building drain* connects to a stack through a wall or floor, the drain shall retain its full *size* through the wall or floor.

(3) A sanitary drainage pipe may be connected to a pre-engineered waste water heat recovery system that incorporates piping of a lesser *size* than required by Sentence (1) provided that it does not convey *sewage*,  
 (a) from a *sanitary unit*, or  
 (b) that contains solids.



**3.1.1.29. Article 2.6.1.8. Solar Domestic Hot Water Systems** In the National Plumbing Code of Canada Division B is replaced with

**2.6.1.8. Solar Domestic Hot Water Systems**

(1) Except as provided in Sentence (2), a system for solar heating of *potable* water shall be installed in accordance with good engineering practice.

(2) Systems for solar heating of *potable* water in *residential occupancies* shall be installed in conformance with CAN/CSA-F383, "Installation Code for Solar Domestic Hot Water Systems".

**3.1.1.30. Article 2.6.4. Water Efficiency** is added In the National Plumbing Code of Canada Division B.

**2.6.4. Water Efficiency**

**2.6.4.1. Water Supply Fittings**

(1) The flow rates of fittings that supply water to a fixture shall not exceed the maximum flow rates at the test pressures listed for that fitting in Table 2.6.4.1.

(2) Sentence (1) does not apply to a fixture located in a heritage *building*.

**Table 2.6.4.1.  
Maximum Flow Rates for Water Supply Fittings  
Forming Part of Sentence 2.6.4.1.(1)**

Fitting	Maximum Flow, L/min	Test Pressure, kPa
Lavatory Faucet	8.35	413
Kitchen Faucet	8.35	413
Shower Heads	9.5	550
Column 1	2	3

**2.6.4.2. Plumbing Fixtures**

(1) Water closets and urinals shall be certified to CAN/CSA-B45.0, "General Requirements for Plumbing Fixtures".



- (2) The flush cycle for each fixture that is a water closet or urinal and that is installed as a replacement for a fixture in a *building* that existed before the 1st day of January 2010 shall not exceed the maximum flush cycle listed for that fixture in Table 2.6.4.2.A.

**Table 2.6.4.2.A.**  
**Maximum Flush Cycles for Sanitary Fixtures**  
**Forming Part of Sentences 2.6.4.2.(2)**

Fixture	litres
Water Closet (Tank Type)	13.25
Water Closet (Direct Flush)	13.25
Urinal (Tank Type)	5.68(1)
Urinal (Direct Flush)	5.68(1)
Column 1	2

Notes to Table 2.6.4.2.A.

- (1) Urinals equipped with automatic flushing devices shall be controlled to prevent unnecessary flush cycles during *building* down time.

- (3) Except as provided in Sentence (2) the flush cycle for each fixture that is a water closet or urinal shall not exceed the maximum flush cycle listed for that fixture in Table 2.6.4.2.B.

- (4) Urinals which utilize water free technology and conform to CSA B 45 Plumbing Fixtures Series may be substituted under 2.6.4.2.(1).

- (5) Sentences (2) and (3) do not apply to a fixture located in a heritage *building*, care or detention occupancy or passenger station.

**Table 2.6.4.2.B.**  
**Maximum Flush Cycles for Sanitary Fixtures**  
**Forming Part of Sentence 2.6.4.2.(3)**

Fixture	litres
Water Closet (Tank Type)	6
Water Closet (Direct Flush)	6
Urinal (Tank Type)	3.8(1)
Urinal (Direct Flush)	3.8(1)
Column 1	2

Notes to Table 2.6.4.2.B.

- (1) Urinals equipped with automatic flushing devices shall be controlled to prevent unnecessary flush cycles during *building* down time.

**3.1.1.31. Article 3.7.2.1. Plumbing and Drainage Systems** Amend the National Building Code of Canada Division B Sentence 3.7.2.1.(1) by replacing the existing sentences 3.7.2.1.(1) and 3.7.2.2. (5)

**3.7.2.1. Plumbing and Drainage Systems**

1) Except under clause 3.7.2.2.(5)(b), if the installation of a sanitary drainage system is not possible because of the absence of a water supply, sanitary privies, chemical closets or other means for the disposal of human waste shall be provided.

**3.7.2.2. (5)**

(a) Urinals are permitted to be substituted for two thirds of the number of water closets required by this Article for males, except that if only 2 water closets are required for males, one urinal is permitted to be substituted for one of the water closets.

(b) Where urinals are permitted they may be of a type that utilizes water free technology and shall conform to CSA B 45 "Plumbing Fixtures Series."

**3.1.1.32. Sentence 9.7.2.1.(2) Part 9 Division B Window Standards** is deleted.

**3.1.1.33. Replace Article 9.25.1.1. Application** as follows

1) This Section applies to thermal insulation and measures to control heat transfer, air leakage and condensation.

2) Insulation and sealing of heating and ventilating ducts shall conform to Sections 9.32. and 9.33.

3) Thermal Insulation shall meet the requirements of Part 10 NSBCR.

**3.1.1.34. Replace Article 9.25.3.2. Air Barrier System Properties** (See Appendix A, Division B, Volume 2 A-9.25.3.2. NBC) as follows

1) Sheet and panel type materials intended to provide the principal resistance to air leakage shall have an air leakage characteristic not greater than  $0.02 \text{ L/(s.m}^2\text{)}$  measured at a differential of 75 Pa.

2) Where polyethylene sheet is used to provide airtightness in the air barrier system, it shall conform to CAN/CGSB-51.34-M, "Vapour Barrier, Polyethylene Sheet for Use in Building Construction."

- (4) Sentence (1) does not apply to,
- (a) *farm buildings*,
  - (b) *buildings* intended primarily for manufacturing or commercial or industrial processing,
  - (c) non heating season, or intermittently occupied *buildings*,
  - (See Appendix A, Division B, Volume 2, A-9.1.1.1.(1) NBC)
  - (d) heritage *buildings*
- (See Appendix Note A-10.3.4.1. NSBCR)

## 10.2.2. Motion Sensors

### 10.2.2.1. Motion Sensors

- (1) Lighting installed to provide the minimum illumination levels required by this Code may be controlled by motion sensors except where the lighting
- (a) is installed in an exit ,
  - (b) is installed in a corridor serving patients or residents in a Group B, Division 2 occupancy
- (2) Where motion sensors are used to control minimum lighting in a public corridor or corridor providing access to exit for the public, the motion sensors shall be installed with switch controllers equipped for fail-safe operation and illumination timers set for a minimum 15-minute duration.
- (3) A motion sensor shall not be used to control emergency lighting.

## 10.3. Energy Efficiency for *Buildings* Within the Scope of Part 9

### 10.3.1. General

#### 10.3.1.1. Application

~~(1) Except as provided in Sentence (2),~~ this Section applies to the energy efficiency of *buildings* within the scope of Part 9 intended for occupancy on a continuing basis during the winter months.

- ~~(2) This Section does not apply to,~~
- (a) *farm buildings*,
  - (b) *buildings* intended primarily for manufacturing or commercial or industrial processing,
  - (c) non heating season, or intermittently occupied *buildings*,
  - (d) heritage *buildings*
- (See Appendix Note A-10.3.4.1. NSBCR)

### 10.3.1.2. Equipment Efficiency for *Buildings of Residential Occupancy*

(1) The minimum annual fuel utilization efficiency of a *space-heating* and domestic hot water *appliances* serving a *building* of residential occupancy shall conform to Table 10.3.1.2.

**Table 10.3.1.2.**  
***Space-heating* and domestic hot water *appliances* Minimum Annual Fuel**  
**Utilization Efficiency**  
**Forming Part of Sentence 10.3.1.2.(1)**

Column 1	Column 2
<i>Space-heating</i> and domestic hot water <i>appliances</i> Fuel Source	Minimum Annual Fuel Utilization Efficiency
Natural gas	90%
Propane	90%
Oil - Hot Air Oil - Hot Water	85% 85%

### 10.3.1.3. Residential Windows and Sliding Glass Doors

(1) The energy rating and the overall coefficient of heat transfer required for windows and sliding glass doors in a residential occupancy shall be determined in conformance with CAN/CSA-A440.2, "Energy Performance Evaluation of Windows and Sliding Glass Doors". (See Appendix A, Division B, Volume 2, A-9.7.2.1.(2) NBC)

### 10.3.2. Thermal Insulation for *Buildings of Residential Occupancy*

#### 10.3.2.1. Required Insulation

(1) All walls, ceilings, floors, windows and doors that separate heated space from unheated space, the exterior air or the exterior soil shall have thermal resistance ratings conforming to this Subsection.

(2) Insulation shall be provided between heated and unheated spaces and between heated spaces and the exterior, and around the perimeter of concrete slabs-on-ground.

(3) Reflective surfaces of insulating materials shall not be considered in calculating the thermal resistance of *building* assemblies.

(4) Except as permitted in Articles 10.3.2.3., 10.3.2.4., 10.3.2.6., 10.3.2.7. and 10.3.2.9., the minimum thermal resistance of insulation shall conform to Table 10.3.2.1.

**Minimum Thermal Resistance of Insulation to be Installed  
Forming Part of Sentence 10.3.2.1.(4)**

	Building Element Exposed to the Exterior or to Unheated Space	Minimum RSI [R] Values Required <sub>3</sub>
1	Ceiling below attic or roof space	7.00 [40]
2	Roof assembly without attic or roof space	5.46 [31]
3	Wall other than foundation wall [including walls between heated and unheated spaces]	4.23 [24]
4	ICF wall above grade <sub>1</sub>	3.75 [21.3]
5	ICF wall below grade enclosing heated space [full height insulation] <sub>1</sub>	3.75 [21.3]
6	Foundation walls enclosing heated space [full height insulation]	3.52 [20]
7	Floors over unheated spaces including Overhanging [cantilevered] Floors	5.46 [31]
8	Floor joist header space	4.23 [24]
9	Frost Wall (with slab-on-ground) <sub>2</sub>	1.76 [10]
10	Slab-on-ground perimeter insulation (see Sentence 10.3.3.8.(1)) <sub>2</sub>	1.76 [10]
11	Under Slab-on-ground containing heating pipes, tubes, ducts or cables <sub>2</sub>	1.76 [10]
12	Under Slab-on-ground not containing heating pipes, tubes, ducts or cables <sub>2</sub>	1.76 [10]
13	Basement floor slabs located not more than 1 m below grade <sub>2</sub>	1.76 [10]
14	Basement floor slabs located more than 1 m below grade	nil

1. ICF walls provide an effective insulating value of not less than R 21.3. Walls of this construction have inherently effective air barriers and minimal thermal bridging characteristics.
2. This value may be reduced to R 4 at the thermal break between the slab and wall.
3. "Insulation values" shown are for the insulation only.

#### 10.3.2.2. Elements Acting as a Thermal Bridge

(1) Except for a foundation wall, the insulated portion of a wall that incorporates wood stud framing elements that have a thermal resistance of less than RSI 0.90 shall be insulated to restrict heat flow through the studs by a material providing a thermal resistance at least equal to 25 per cent of the thermal resistance required for the insulated portion of the assembly in Sentence 10.3.2.1.(4).

(2) Except as provided in Sentence (3), the thermal resistance of the insulated portion of a *building* assembly in Sentence 10.3.2.1.(4) that incorporates metal framing elements, such as steel studs and steel joists, that act as thermal bridges to facilitate heat flow through the assembly, shall be 20 per cent greater than the values shown in Table 10.3.2.1., unless it can be shown that the heat flow is not greater than the heat flow through a wood frame assembly of the same thickness.

(3) Sentence (2) does not apply to *building* assemblies incorporating thermal bridges where the thermal bridges are insulated to restrict heat flow through the thermal bridges by a material providing a thermal resistance at least equal to 25 per cent of the thermal resistance required for the insulated portion of the assembly in Sentence 10.3.2.1.(4).

#### 10.3.2.3. Thermal Resistance Values for Roof and Ceiling Assemblies

(1) The thermal resistance values in Table 10.3.2.1. for exposed roofs or ceilings may be reduced near eaves to the extent made necessary by the roof slope and required ventilation clearances.

#### 10.3.2.4. Insulation of Foundation Walls

(1) Foundation walls enclosing heated space shall be insulated from the underside of the subfloor to the finished floor slab.

(2) The insulation required by Sentence (1) may be provided by a system installed,

- (a) on the interior of the foundation wall,
- (b) on the exterior face of the foundation wall, or
- (c) partially on the interior and partially on the exterior, provided the thermal performance of the system is equivalent to that permitted in Clause (a) or (b).

(3) Insulation around concrete slabs-on-ground shall extend not less than 1m below exterior ground level.



(4) If a foundation wall is constructed of hollow masonry units, one or more of the following shall be used to control convection currents in the core spaces,

- (a) filling the core spaces,
- (b) at least one row of semi-solid blocks at or below grade , or
- (c) other similar methods.

(5) Masonry walls of hollow units that penetrate the ceiling shall be sealed at or near the ceiling adjacent to the roof space to prevent air within the voids from entering the attic or roof space by,

- (a) capping with masonry units without voids, or
- (b) installation of flashing material extending across the full width of the masonry.

#### **10.3.2.5. Enclosed Unheated Space**

(1) Where an enclosed unheated space is separated from a heated space by glazing, the unheated enclosure may be considered to provide a thermal resistance of RSI 0.16.

#### **10.3.2.6. Thermal Resistance of Windows**

(1) Except as permitted in Sentence (2), where a storm window is not provided, all windows that separate heated space from unheated space shall have,

- (a) an overall coefficient of heat transfer of not more than  $1.8 \text{ W/ m}^2\text{°C}$ , or
- (b) an energy rating of not less than,
  - (i) 25 for operable windows, and
  - (ii) 35 for fixed windows.

(2) A basement window that incorporates a loadbearing structural frame shall be double glazed with a low-E coating.

#### **10.3.2.7. Minimum Thermal Resistance of Doors**

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

(2) All sliding glass doors that separate heated space from unheated space shall have

- (a) an overall coefficient of heat transfer of not more than  $1.8 \text{ W/ m}^2\text{°C}$ , and
- (b) an energy rating of not less than 25.

#### **10.3.2.8. Minimum Thermal Resistance of Skylights**

(1) All skylights that separate heated space from unheated space shall have

- (a) an overall coefficient of heat transfer of not more than  $2.6 \text{ W/ m}^2\text{°C}$ , or
- (b) a U value of not more than 2.7.

### 10.3.2.9. Log Wall Construction and Post, Beam and Plank Construction

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

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

- (a) the thermal resistance of insulation for the exposed roof or ceiling required in Table 10.3.2.1. is increased by an amount equivalent to the reduction permitted in this Sentence, and
- (b) for log walls, the logs have tongue-and-groove or splined joints.

(3) Where milled log walls are installed, the thermal resistance value in Sentence (1) for the total wall assembly does not apply if,

- (a) the mean thickness of each log is not less than 150 mm,
- (b) the thermal resistance of insulation for the exposed roof or ceiling required in Table 10.3.2.1. is increased by RSI 0.53, and
- (c) the logs have tongue-and-groove or splined joints.

## 10.3.3. Thermal Design for *Buildings* of Residential Occupancy Within the Scope of Part 9

### 10.3.3.1. Application

(1) This Subsection applies to the thermal design of *buildings* to which Clause 10.2.1.1.(2)(b) applies.

### 10.3.3.2. General Requirements

(1) The materials for, and the installation of, thermal insulation, air barrier and vapour barrier protection shall conform to Section 9.25

(2) Foamed plastic thermal insulation shall be protected as described in Article 9.10.17.10.

(3) Crawl spaces shall conform to Section 9.18.

(4) Roof spaces shall conform to Section 9.19.

(5) Ventilation requirements shall conform to Section 9.32.

(6) Heating and air-conditioning requirements shall conform to Section 9.33.



### 10.3.3.3. Thermal Resistance

(1) Except as provided in Articles 10.3.3.4. to 10.3.3.8., and except for doors, windows, skylights and other closures, the thermal resistance of each *building* assembly through any portion that does not include framing or furring shall conform to Table 10.3.3.3.

**Table 10.3.3.3.**  
**Minimum Thermal Resistance of *Building Assemblies***  
**Forming Part of Sentence 10.3.3.3.(1)**

	Building Element Exposed to the Exterior or to Unheated Space	Minimum RSI [R]
1	Ceiling below attic or roof space	7.00 [40]
2	Roof assembly without attic or roof space	5.46 [31]
3	Wall other than foundation wall [including walls between heated and unheated spaces]	4.23 [24]
4	ICF wall above grade <sub>1</sub>	3.75 [21.3]
5	ICF wall below grade enclosing heated space [full height insulation] <sub>1</sub>	3.75 [21.3]
6	Foundation walls enclosing heated space [full height insulation]	3.52 [20]
7	Floors over unheated spaces including Overhanging [cantilevered] Floors	5.46 [31]
8	Floor joist header space	4.23 [24]
9	Frost Wall (with slab-on-ground) <sub>2</sub>	1.76 [10]
10	Slab-on-ground perimeter insulation (see Sentence 10.3.3.8.(1)) <sub>2</sub>	1.76 [10]
11	Under Slab-on-ground containing heating pipes, tubes, ducts or cables <sub>2</sub>	1.76 [10]
12	Under Slab-on-ground not containing heating pipes, tubes, ducts or cables <sub>2</sub>	1.76 [10]
13	Basement floor slabs located not more than 1 m. below grade <sub>2</sub>	1.76 [10]
14	Basement floor slabs located more than 1 m below grade	nil

1. ICF walls provide an effective insulating value of not less than R 21.3. Walls of this construction have inherently effective air barriers and minimal thermal bridging characteristics.
2. This value may be reduced to R 4 at the thermal break between the slab and wall.
3. "Insulation values" shown are for the insulation only.

#### 10.3.3.4. Metal Framing Elements Acting as Thermal Bridge

(1) Except as provided in Article 10.3.3.5., the thermal resistance of the insulated portion of a *building* assembly that incorporates metal framing elements, such as steel studs and steel joists, that act as thermal bridges to facilitate heat flow through the assembly, shall be 20 per cent greater than the values shown in Table 10.3.3.3., unless it can be shown that the heat flow is not greater than the heat flow through a wood frame assembly of the same thickness.

#### 10.3.3.5. Insulated Thermal Bridges

(1) Article 10.3.3.4. does not apply for *building* assemblies incorporating thermal bridges where the thermal bridges are insulated to restrict heat flow through the thermal bridges by a material providing a thermal resistance at least equal to 25 per cent of the thermal resistance required for the insulated portion of the assembly in Article 10.3.3.3.

#### 10.3.3.6. Reduction of Thermal Resistance

(1) The thermal resistance of a *building* assembly may be reduced by not more than 20 per cent from that required in Articles 10.3.3.3. and 10.3.3.4., and the amount of glazing may be increased to more than permitted in Sentence 10.3.3.11.(2), where it can be shown that the total calculated heat loss from the *building* enclosure does not exceed the heat loss that would result if the enclosure were constructed in conformance with the minimum thermal resistance requirements in Articles 10.3.3.3. and 10.3.3.4. and with the maximum amount of glazing permitted in Sentence 10.3.3.10.(2), provided no allowance is made for solar heat gains or for the orientation of the glazing as described in Sentence 10.3.3.10.(4).

#### 10.3.3.7. Thermal Resistance Values for Roof and Ceiling Assemblies

(1) The thermal resistance values in Articles 10.3.3.3. and 10.3.3.4. for roof or ceiling assemblies that separate heated space from unheated space or the exterior may be reduced near the eaves to the extent made necessary by the roof slope and required ventilation clearances, except that the thermal resistance at the location directly above the inner surface of the exterior wall shall be at least  $2.1 \text{ m}^2\text{°C/W}$ .

#### 10.3.3.8. Foundation Wall Insulation

(1) Insulation applied to the exterior of a slab-on-ground floor shall extend down at least 600 mm below the adjacent exterior ground level or shall extend down and outward from the floor or wall for a total distance of at least 600 mm. (See Appendix Note A-10.3.3.8. NSBCR)

#### 10.3.3.9. Enclosed Unheated Space

(1) Where an enclosed unheated space, such as a sun porch, enclosed verandah or vestibule, is separated from a heated space by glazing, the unheated enclosure may be considered to provide thermal resistance of  $0.16 \text{ m}^2\text{°C/W}$ , or the equivalent of one layer of glazing.

#### 10.3.3.10. Windows and Glazing

(1) Except as provided in Sentences (2) and (3), windows and all glazing that separates heated space from unheated space or the exterior shall conform to Article 10.3.2.6.

(2) Except as provided in Sentences (3) and (4), the total area of glazing, including glazing for doors and skylights, that separates heated space from unheated space or the exterior shall not exceed 20 per cent of the *floor area* of the storey served by the glazed areas and shall not exceed 40 per cent of the total area of the walls of that storey that separates heated space from unheated space or the exterior. (In the case of a sloping wall, the area of the opaque portion of the wall is calculated as its projected area on a vertical plane.)

(3) Where the thermal resistance of glazing is different from that required in Sentence (1) and Article 10.3.3.9., the area of such glazing for the purpose of applying Sentence (2) may be assumed as being equal to the actual area multiplied by the ratio of the required thermal resistance divided by the actual thermal resistance of the glazing.

(4) Except as provided in Sentence (5), the area of glazing that contains clear glass or that has a shading coefficient of more than 0.70 that is unshaded in the winter and faces a direction within  $45^\circ$  of due South may be assumed to be 50 per cent of its unshaded area in calculating the maximum area of glazing in Sentences (2) and (3) provided the *building* is designed with a system that is capable of distributing the solar heat gain from such glazed areas throughout the *building*. For the purpose of determining whether or not the glazing is shaded in the winter, the shading shall be calculated using the noon sun angles of December 21.

(5) Sentence (4) shall not apply where the *building* is designed to be cooled unless the glazing described in Sentence (4) is shaded in the summer with exterior devices. For the purpose of determining whether or not the glazing is shaded in the summer, the shading shall be calculated using the noon sun angles of June 21.

### 10.3.3.11. Doors

(1) Air curtains shall not be used in place of exterior doors. (See Appendix A, A-10.3.3.11(1) NSBCR)

(2) Except for doors used primarily to facilitate the movement of vehicles or handling of material, infiltration around doors shall conform to the appropriate requirements in Article 10.3.3.12.

(3) Except for doors on enclosed unheated vestibules, all doors that separate heated space from the outside shall conform to Articles 10.3.2.7.

### 10.3.3.12. Air Infiltration

(1) Windows that separate heated space from unheated space or the exterior shall be designed to limit the rate of air infiltration to not more than 0.775 L/s for each metre of sash crack when tested at pressure differential of 75 Pa in conformance with ASTM E283, "Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen".

(2) Manually operated exterior sliding glass door assemblies that separate heated space from unheated space or the exterior shall be designed to limit air infiltration to not more than 2.5 L/s for each square metre of door area when tested in conformance with Sentence (1).

(3) Except where the door is weather-stripped on all edges and protected with a storm door or by an enclosed unheated space, exterior swing type door assemblies for dwelling units, individually rented hotel rooms and suites shall be designed to limit the rate of air infiltration to not more than 6.35 L/s for each square metre of door area when tested in conformance with Sentence (1).

(4) Door assemblies other than those described in Sentences (2) and (3), that separate heated space from unheated space or the exterior shall be designed to limit the rate of air infiltration to not more than 17.0 L/s for each metre of door crack when tested in conformance with Sentence (1).

(5) Caulking material to reduce air infiltration shall conform to the requirements in Subsection 9.27.4.

(6) The junction between the sill plate and the foundation, joints between exterior wall panels and any other location where there is a possibility of air leakage into heated spaces in a *building* through the exterior walls, such as at utility service entrances, shall be caulked, gasketed or sealed to restrict such air leakage.

(7) Air leakage between heated space and adjacent roof or attic space caused by the penetration of services shall be restricted in conformance with the requirements of Subsection 9.25.3.

### 10.3.4. *Buildings* of Non-residential Occupancy

#### 10.3.4.1. Application

(1) Except where exempted by 10.2.1.1.(4), this Subsection applies to the energy efficiency of *buildings* or parts of *buildings* described in Sentence 10.2.1.1.(3). (See Appendix Note A-10.3.4.1.(1) NSBCR)

#### 10.3.4.2. Thermal Resistance of the *Building Envelope*

(1) Except as permitted in Sentences (2) and (3), the minimum thermal resistance of all walls, ceilings and floors that separate heated space from unheated space, the exterior air or the exterior soil shall conform to Table 10.3.4.2.A.

(2) 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.

**Table 10.3.4.2.A.**  
**Minimum Thermal Resistance of *Building Assemblies***  
**Forming Part of Sentence 10.3.4.2.(1)**

<i>Building Assembly</i>	minimum RSI [R] Value Required
Opaque wall assembly	2.63 [15]
Wall assembly adjacent to unconditioned space	1.61 [9]
Below grade wall	2.11 [12]
Roof assembly	3.91 [22]
Floor assembly over unconditioned space	4.52 [26]
Column 1	Column 2

Notes to Table 10.3.4.2.A.

1 The thermal resistance determined for the *building assembly* shall take into account the thermal bridging in the assembly.

2. "Insulation values" shown are for insulation only.
3. For the purposes of this Table 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.
4. 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, the total cross-sectional area of cantilevered concrete balconies and other projections penetrating the insulation component of the building envelope cannot exceed 2% of the exterior building envelope area,
  - (b) ties in masonry construction,
  - (c) insulation clips in masonry construction,
  - (d) flashing, and
  - (e) 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 Alternate Component Package Tables. (See Appendix Notes Table 10.3.3.3. Figure 1 NSBCR)

(3) The minimum thermal resistance of a slab-on-ground shall conform to Table 10.3.4.2.B.

**Table 10.3.4.2.B.**  
**Minimum Thermal Resistance for Slab-On-Ground Insulation**  
**Forming Part of Sentence 10.3.4.2.(3)**

Type of Slab-On-Ground	Position of Insulation	Length of Insulation, mm	Minimum RSI Value(1)
Unheated	Horizontal	600	3.17
		1200	1.94
	Vertical	600	1.41
		1200	0.7
Heated	Horizontal	600	3.52
		1200	2.29
	Vertical	600	1.76
		1200	1.06
Column 1	2	3	4

Notes to Table 10.3.4.2.B.

(1) "RSI value" shown is for insulation only.

(4) The maximum overall coefficient of heat transfer for windows that separate heated space from unheated space shall conform to Table 10.3.4.2.C.



**Table 10.3.4.2.C.**  
**Maximum Overall Coefficient of Heat Transfer for Windows**  
**Forming Part of Sentence 10.3.4.2.(4)**

Window-to-Wall Ratio	Maximum Overall Coefficient of Heat Transfer Required, W/ m <sup>2</sup> ·°C
less than 0.2	3.01
0.2 to 0.4	2.28
more than 0.4	1.7
Column 1	Column 2

(5) 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.

#### 10.3.4.3. 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 Subsection 9.25.3.

#### 10.3.4.4. 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 ANSI/ASHRAE/IESNA 90.1 "Energy Standard for *Buildings* Except Low-Rise Residential *Buildings*". (See Appendix Note Tables 10.3.4.4(1) to Table 10.3.4.4(7) NSBCR)

(2) Sentences (3) to (11) and Article 10.3.4.5. apply to a heating, ventilating and air-conditioning system that serves a single heating, ventilating and air-conditioning zone.

(3) The energy efficiency of equipment in a heating, ventilating and air-conditioning system that serves a single heating, ventilating and air-conditioning zone shall conform to

- (a) CAN/CSA-C656-05 Performance Standard for Split-System and Single Package Central Air Conditioners and Heat Pumps
- (b) CAN/CSA-C743-02 Performance Standard for Rating Packaged Water Chillers
- (c) ARI 310/380-2004 /CAN/CSA-C744-04 / Standard for Packaged Terminal Air Conditioners and Heat Pumps
- (d) CAN/CSA-C746-98 Performance Standard for Rating Large Air Conditioners and Heat Pumps
- (e) CAN/CSA-C13256-1-01 Water-Source Heat Pumps —Testing and Rating for Performance Part 1 Water-to-Air Heat and Brine-to-Air Heat Pumps (Adopted ISO 13256-11998, first edition, 1998-08-15, with Canadian deviations)

(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 1 400 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 set point 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

#### **10.3.4.5. Ducts, Plenums and Piping**

(1) A duct or a plenum that is not protected by an insulated exterior envelope or that is exposed to an unheated space shall be,

- (a) sealed to a Class A seal level in accordance with the 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 to a Class C seal level in accordance with the 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 10.3.4.5.

**Table 10.3.4.5.**  
**Minimum Thickness of Pipe Insulation (1)**  
**Forming Part of Sentences 10.3.4.5.(3) and 10.3.4.6.(2)**

Use of pipe	Nominal pipe size not more than 40 mm	Nominal pipe size more than 40 mm
Steam	40	50
Hot water heating	25	40
Domestic hot water	12	25
Cooling	12	25
Column 1	Column 2	Column 3

Notes to Table 10.3.4.5.

(1) Insulation material shall have a thermal conductivity of not more than 0.42 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

(a) Minimize throttling losses.

(b) 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.

#### **10.3.4.6. Service Water Heating**

(See Appendix Note A-Table 10.3.4.6.(1))

(1) Water heating equipment, hot water supply boilers used solely for heating potable water and hot water storage tanks shall meet the minimum efficiency values in

(a) CSA C745-03 Energy Efficiency of Electric Storage Tank Water Heaters and Heat Pump Water Heaters

(b) CAN/CSA-P.3-2004 Testing Method for Measuring Energy Consumption and Determining Efficiencies of Gas-Fired Water Heaters

(c) ANSI Z21.10.3-2004 / CSA 4.3-2004 Gas Water Heaters - Volume III, Storage Water Heaters With Input Ratings Above 75,000 Btu Per Hour, Circulating and Instantaneous

(d) CAN/CSA-B211-00 Energy Efficiency of Oil-Fired Storage Tank Water Heaters

(2) Domestic hot water heating piping shall be insulated in accordance with Table 10.3.4.5. 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 space heating and domestic water heating shall conform to Clause 10.2.1.1.(2)(a) or (b).

#### 10.3.4.7. Lighting

(1) Except as provided in Sentence (2), Articles 10.3.4.7. to 10.3.4.11. 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 10.3.4.7. to 10.3.4.11. do not apply to emergency lighting that is automatically turned off during the normal use of the *building*.

(3) Fluorescent light ballasts shall meet or exceed the minimum ballast efficacy factors. (See Appendix Note A-10.3.4.7.(3) NSBCR)

(4) Except as provided in Sentence (5), 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.

(5) The tandem wiring required by Sentence (4) 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.

#### 10.3.4.8. 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 10.3.4.8. by the gross lighted areas of the *building area type*.

**Table 10.3.4.8.**  
**Interior Lighting Power Densities**  
**Forming Part of Sentence 10.3.4.8.(2)**

<i>Building Area Type</i>	<i>Lighting Power Density, W/m<sup>2</sup></i>
Automotive Facility	10
Fast Food	15
Dormitory	11
Health Care Clinic	11
Manufacturing Facility	14
Office	11
Parking Garage	3
Police Station without detention quarters/Fire Station	11
Post Office	12
Retail	16
Transportation	11
Warehouse	9
Workshop	15
Column 1	Column 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 visually impaired persons,
- (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.

#### 10.3.4.9. Interior Lighting Controls

(1) Except as provided by Sentence (2), interior lighting in a *building* that exceeds 500 m<sup>2</sup> 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 10.3.4.9.(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<sup>2</sup>, and

(c) be capable of overriding at any time of-day scheduled shut-off 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.

#### **10.3.4.10. Exterior Lighting**

(1) Except as provided in Sentence (2), this Article applies to exterior areas conforming to Sentence 10.3.4.7.(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 10.3.4.10. by the areas or lengths of lighted exterior spaces.

**Table 10.3.4.10.**  
**Exterior Lighting Power Densities**  
**Forming Part of Sentence 10.3.4.10.(3)**

Uncovered parking lots and drives	1.6 W/m <sup>2</sup>
Walkways less than 3 m wide	3.3 W/linear m
Walkways 3 m or greater, plaza areas, special feature areas	2.2 W/m <sup>2</sup>
Stairways	10.8 W/m <sup>2</sup>
<i>Building</i> 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)	13.5 W/m <sup>2</sup>
Outdoor sales open areas (including vehicle sale lots)	5.4 W/m <sup>2</sup>
Column 1	Column 2



<b>Table 10.3.4.10. continued</b> <b>Exterior Lighting Power Densities</b> <b>Forming Part of Sentence 10.3.4.10.(3)</b>	
Street frontage for vehicle sales lots in addition to "open area" allowance	66 W/linear m
<i>Building facades</i>	2.2 W/m <sup>2</sup> for each illuminated wall or surface or 16.4 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	13.5 W/m <sup>2</sup> of uncovered area
Loading areas for law enforcement and emergency service vehicles	5.4 W/m <sup>2</sup> of uncovered area
Drive-up windows	400 W per drive-through
Parking near 24-hour retail entrances	800 W per main entry
Column 1	Column 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.

#### 10.3.4.11. 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.

#### **10.3.4.12. Electric Motors**

(1) Electric motors shall conform to the Nova Scotia Energy Efficient Appliance Act, based on CSA-C390-M. (See Appendix Note A-10.3.4.12. NSBCR)

### **10.4. Objectives and Functional Statements**

#### **3.9.1. Objectives and Functional Statements**

##### **3.9.1.1. Attribution to Acceptable Solutions**

For the purposes of compliance with this Code as required in Clause 1.2.1.1.(1)(b) of Division A NBC, the objectives and functional statements attributed to the acceptable solutions in this Part shall be the objectives and functional statements listed in Table 3.9.1.1. as amended by NSBCR 3.1.1.24. and 3.1.1.25..

Table 3.9.1.1.

Objectives and Functional Statements Attributed to the Acceptable Solutions in Part 3 Forming part of Sentence 3.9.1.1.(1)

Acceptable Solutions	Objectives and Functional Statements
Part 10	F131-OR2

## Appendix A

### Explanatory Material for the Nova Scotia *Building Code Regulations* 2009

This Appendix is included for explanatory purposes only and does not form part of the requirements. The bold-face reference numbers that introduce each item refer to the requirement in the Code.

Appendix notes which are contained in these regulations are noted as (See Appendix Note A-3.8.3.9. NSBCR).

Throughout the regulation Appendix notes which are contained in the NBC 2005 are noted as (See Appendix A, Division B, Volume 2 NBC A-3.8.3.8.).

Appendix notes contained in the NBC 2005 edition apply to the Nova Scotia *Building Code Regulation* unless specifically deleted or replaced by this regulation.

### **A-1.2.1.2.(1)(i) and (j) Modular and Manufactured Homes**

#### **Compliance with Nova Scotia Regulations**

The CSA A277 label or the Z240 label and the Specification Name Plate, are evidence that a product is manufactured to the requirements of the Nova Scotia Building Code.

The A277 and Z240 labels provide the date of manufacture. Where the date of manufacture is after December 31, 2009, the manufactured unit complies with all of the Nova Scotia requirements including energy efficiency measures. The Specification Name Plate for Z240 products must indicate Nova Scotia as the Province of Destination or, for units manufactured after December 31, 2009 specify that the unit complies with the energy requirements of the Nova Scotia Building Code.

The requirement for energy efficiency is not retro-active. All existing product bearing a CSA label produced prior to January 1, 2010 remain acceptable in Nova Scotia provided they have not been structurally altered. Foundations must comply with the Code in force on the date when an application for a building permit is made.

#### **Exceptions**

Exemptions from requirements of the Building Code Regulation do not extend to on-site preparations (foundations, basements, anchorage), interconnection of modules, connection to services or installation of appliances which shall meet the requirements of CSA Z240 MH Series or the National Building Code.

### **A-1.3.3.2.(2) Group C Residential Occupancies that exceed 300 m<sup>2</sup> 3229**

This article requires that, for any building containing Group C Residential Occupancies and exceeding 300 m<sup>2</sup> in building area, including those buildings which otherwise are considered to be Part 9 buildings, the fire protection requirements be determined on the basis of the provisions for Group C occupancies under Subsection 3.2.2.

For Part 9 buildings, which typically are 3 storeys in height and have access from only 1 street, this means that when the building area exceeds 300 m<sup>2</sup>, sprinklers are required. In other cases, depending on the building height, fire resistance and number of streets faced, some Part 9 and many Part 3 buildings with a building area greater than 300 m<sup>2</sup> may still be constructed without sprinkler protection. To determine when sprinkler protection is mandated, the provisions of Articles 3.2.2.42 to 3.2.2.48 apply.

Compliance with Articles 3.2.2.18. and 3.2.2.44. to 32.2.48. does not necessitate compliance with other provisions of Part 3 unless additional requirements of Part 9 specifically apply.

The *building* is required to conform to design requirements in Part 9 unless specifically directed by Part 9 requirements to other sections of the Code.

For example, unless a fire alarm system were required under provisions of sentence 9.10.18. Fire Alarm System Required, the installation of a sprinkler system under these provisions would not automatically require conformance to sentence 3.2.4.1. (1) Determination of Requirement for a Fire Alarm System.

#### **A-2.1.1.11.(1) and (2) Notification for Inspection and Certification of Field Review of Construction**

The *owner* of a *building* being *constructed* under the scope of Part 9 of the Code is required to inform the *authority having jurisdiction* to inspect for compliance with the *Code* at each of the seven stages listed. This includes all site constructed, modular, and manufactured buildings. However, the municipality may conduct more or fewer inspections as a particular project may require.

For example, inspections made under clauses 2.1.1.11. (1) (a) footings in place, (b) subfloor plumbing and (c) subfloor and foundation insulation, could be combined into one inspection for a single dwelling where there is no insulation required under a floor slab, and the home is on a large lot, not near a property line.

In other instances, such as a multi suite building, several inspections may be required as various stages of work are completed. In this scenario, some suites might be finished and occupied while others are still under construction.

#### **A-2.1.1.11.(3) Notification for Inspection and Certification of Field Review of Construction**

The *owner* of a *building* being *constructed* outside the scope of Part 9 of the Code is required to request the *authority having jurisdiction* to inspect for compliance with the *Code* at times agreed to by the *authority having jurisdiction*. The timing of these inspections should be established to assure review of construction for compliance to the Code.

#### **A-1.4.1.12. Temporary Building or Occupancy**

This article allows the erection of a temporary *building*, or a temporary change of occupancy classification for a short term use of an existing *building* which may not fully comply to all requirements of the *building* code. However, any matter of life safety must be adequately addressed.

### **A-3.1.1.13. Referenced Standards Designated under the following Acts and Regulations of the Province of Nova Scotia**

Standards are sometimes adopted under more than one Act or Regulation. To provide consistency in the adoption of standards the Nova Scotia *Building Code* recognizes the editions as adopted by those Acts and Regulations.

Where the Nova Scotia *Building Code* provides specific requirements that may be differ from those in a standard the *Building Code* prevails as per National *Building Code of Canada*

#### **2.7.2.1. Priority of the National *Building Code***

- (1) In the case of conflict between the provisions of this Code and those of a referenced document, the provisions of this Code shall govern.

Code users are advised that they should confirm which edition of a standard are in place under the following provincial acts and or regulations

Elevators and Lifts Act and Regulations

CSA CAN/CSA-B44 Safety Code for Elevators

CSA B355 Lifts for Persons with Physical Disabilities

Fuel Safety Regulations

CGA CAN/CGA-B149.1 Natural Gas Installation Code

CGA CAN/CGA-B149.2 Propane Installation Code

CSA CAN/CSA-B139 Installation Code for Oil Burning Equipment

Electrical Installation and Inspection Act and Regulations

CSA C22.1 Canadian Electrical Code, Part 1

Boilers and Pressure Vessels Act and Regulations

CSA B51 Boiler, Pressure Vessel and Pressure Piping Code

### **A-3.1.1.24. Division A NBC and NPC 2.2 Objectives**

The National Building and Plumbing codes are amended to add the Objective, Sub-objectives and Functional Statements in their respective Tables.

#### **A-3.8.1. Barrier-Free Design General**

Barrier free requirements, with few exceptions, apply to all *buildings*. The revised version, for example, continues to exempt a few occupancies such as houses and small residential *buildings*, not more than 3 units as it has in the past.

**A-3.8.1.1.(1)(f) Emergency Facilities Exempt** The exemption is intended to include sleeping quarters and associated kitchen and washroom facilities, but does not extend to assembly occupancies, administration or call-centre type operations within fire, rescue, or emergency response facilities.

**A-3.8.1.1.(6) Residential Suites required to be barrier free.** Where there are more than 3 residential suites in a *building*, 1 suite for every 20 suites, or part thereof, must conform to the requirements of 3.8.3.18. Suites of Residential Occupancies required to be Barrier Free.

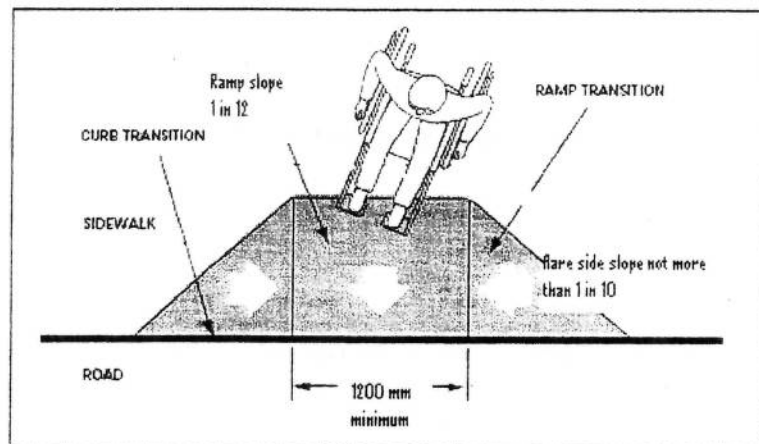
**A-3.8.2.1. Barrier free Path of Travel** In the previous versions 3.8.2.1. Barrier Free Path of Travel included an extensive list where the path was required, however it was not all inclusive, and lead to inconsistent application of the requirement. The intent of the Code is now emphasized to require the barrier free path of travel everywhere, with some few exceptions which are listed. For general guidance readers may refer to the NBC but are cautioned that Nova Scotia applies these concepts for employees as well as the general public. For example, the NBC comments that small raised office areas are not required to be barrier free in retail and industrial premises. In Nova Scotia the view is this would only be allowed if there were a fully accessible office as well as a raised office to serve the same function.

**A-3.8.2.1.(1)(c) Passenger-elevating Device** A passenger-elevating device must conform to those devices as defined in the CSA Standard B355, "Lifts for Persons with Physical Disabilities"

**A-3.8.2.3. Washrooms Required to be Barrier Free** A universal toilet room may be substituted for a barrier free water closet stall in new construction as well as where alterations are being made to an existing building. There should be no fewer water closets in total in a building, as a result of the substitution except as permitted by Article 3.7.2.2. Water Closet in the NBC.

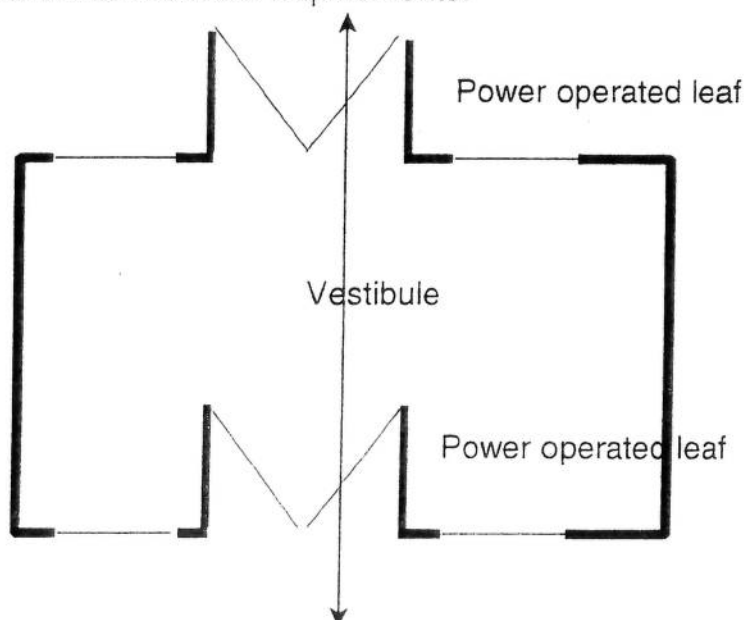


**A-3.8.3.2. Curb Ramp** Curb ramps commonly referred to as curb cut. Curb ramps are required where there are curbs in the path of travel, typically from a passenger loading zone or designated parking area to a *building*.



Curb ramps shall have a minimum width of not less 1200 mm in areas measured across the ramp. The sides of the curb ramp shall be flared. The gradients of the curb ramp shall be 1 in 12 and the flared sides shall be not more than 1 in 10. Curb ramps should have a surface that is slip-resistant and colour- and texture contrasted with the adjacent surfaces.

**A-3.8.3.3.(14) Power Door Operators in Vestibules** Where a power door operator is required at least one leaf in each set of doors in the barrier free path of travel through a vestibule shall meet the requirements.





**A-3.8.3.15.(5)(d)** Provision of TTY Phones Cell phones with text messaging capabilities satisfies this requirement.

**A-No. 35 Schedule "D" ALTERNATE COMPLIANCE METHODS FOR EXISTING Buildings** The code requires 50 per cent of all public entrances to have barrier free access. Typically small *buildings* may only have 1 or 2 entrances. Public way means a sidewalk, street, highway, square, or other open space to which the public has access, as of right or by invitation, expressed or implied. Street means any highway, road, boulevard, square or other improved thoroughfare 9 m or more in width, which has been dedicated or deeded for public use, and is accessible to fire department vehicles and equipment. The intent is to allow the use of a stair conforming to the alternate requirement for an existing *building* where no ramped or lift access is possible either at the front door or another door into the *building*. This would occur most frequently where a *building* sits on the lot line at the sidewalk, and there is no other door accessible from the public way.

The acceptance of an alternative barrier free path of travel to the entrance does not relieve any other barrier free requirement provisions of the Code. It is anticipated that even if the only access is by a stair, in compliance with the alternate compliance measure, the balance of the premises shall comply.

#### **A-10.2.1.1. (2) Energy Efficient Design**

There are three potential paths to follow to achieve compliance with the energy conservation requirements of Part 10.

These are

- (a) a pure prescriptive solution, which is achieved by meeting the prescriptive solutions found in 10.3.2.;
- (b) performance solutions, which are achieved by submitting such design drawings, methodology and calculations as required by the authority having jurisdiction to demonstrate conformance to the thermal design requirements found in 10.3.3. or 10.3.4.; or
- (c) performance paths, which are achieved by conforming to existing protocols and supported by such documentation as required by the authority having jurisdiction, such as
  - (i) NRCan "EnerGuide for New Houses Administrative and Technical Procedures" (2008), and achieve a design rating of not less than 80
  - (ii) NRCan "R-2000 Standard" (2005), or
  - (iii) other performance paths which conform to "Specifications for Calculation Procedures for Demonstrating Compliance to the Model Energy Code for Houses Using Trade-offs," published by the Canadian Commission on Building and Fire Codes that will achieve at least the minimum level of performance required by Part 10.

**A-10.3.3.11. (1) Doors**

An air curtain is a wall of air generated by specialized fans to separate areas of pressure or temperature differential.

**A-10.3.4.1.(1) Exceptions to the Application of Requirements**

(1) The requirements of 10.3.4. 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.
- (b) a heritage *building*,
- (c) any *building* space which uses energy at a rate less than 12 W/m<sup>2</sup> under peak conditions,
- (d) temporary structures such as construction trailers, tents, air-supported structures and portable classrooms,
- (e) warehouses and storage rooms where the design indoor temperature does not exceed 10°C, and
- (f) unheated storage garages and unheated storage rooms except as required in Sentence (2).

(2) Conditioned spaces of *buildings* exposed to unheated storage garages and unheated storage rooms shall meet the *building* envelope requirements 10.3.4..

(3) Energy consumption of systems and equipment located in a storage garage but which do not serve the storage garage need not be considered as energy used in the storage garage but shall be included as energy used for the rest of the *building*.

(4) The exceptions listed in Sentence 10.2.1.1.(4) exempts *buildings* or parts of *buildings* from compliance with energy efficient design requirements where

- (a) the areas are intended primarily for manufacturing processing, commercial processing or industrial processing, and
- (b) the environmental condition within the *buildings* or parts of *buildings* are governed by the operation or process within the *building*.

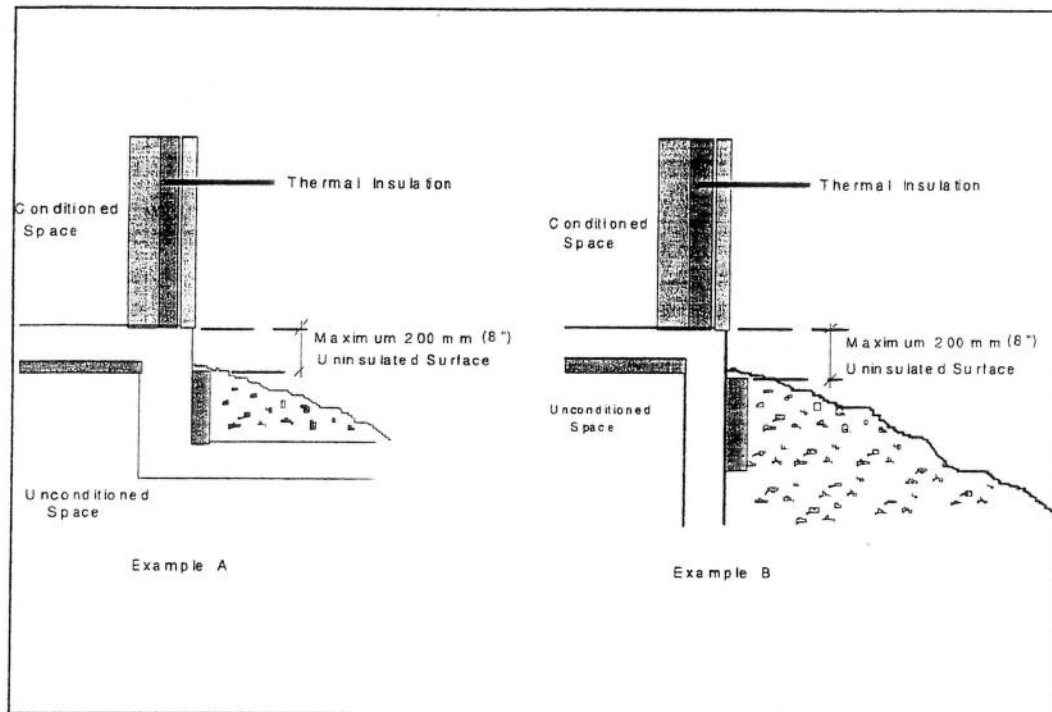
(5) A-Table 10.3.4.1.(1) contains some examples of occupancies which can be exempted from compliance with 10.3.4. The list is not intended to be exhaustive and other exemptions may be made.

**A-Table 10.3.4.1.(1)****Examples of Occupancies Exempt from Compliance**

GROUP A, DIVISION 4	GROUP F, DIVISION 1	GROUP F, DIVISION 2	GROUP F, DIVISION 3
Amusement Park Structures (not elsewhere classified)	Bulk Plants for Flammable Liquids	Dry Cleaning Establishments not using flammable or explosive solvents or cleaners	Creameries
Bleachers	Bulk Storage Warehouses for Hazardous Substances	Electrical Substations	Power Plants
Grandstands	Cereal Mills	Helicopter Landing Areas on Roofs	Open-air Parking Garages
Reviewing Stands	Chemical Manufacturing or Processing Plants	Laundries, except self-service	Pumping Stations
Stadia	Distilleries	Planing Mills	
	Dry Cleaning Plants	Printing Plants	
	Feed Mills	Repair Garages	
GROUP C must comply with Subsection 10.3.2. or 10.3.3. except for seasonally occupied buildings. (See Appendix A, Division B, Volume 2 NBC A-9.1.1.1.) Application of Part 9 to Seasonally and Intermittently Occupied Buildings )	Flour Mills	Woodworking Factories	
	Grain Elevators		
	Lacquer Factories		
	Paint, Varnish and Pyroxylin Product Factories		
	Rubber Processing Plants		
	Spray Painting Operations		
	Waste Paper Processing Plants		
Column 1	2	3	4

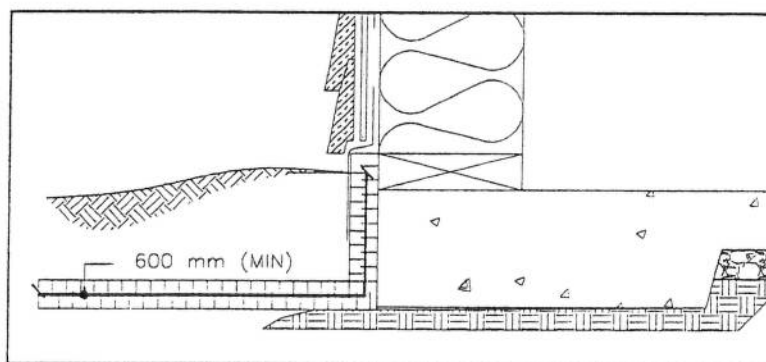
## A-10.3.4.2.

## Appendix Note 10.3.4.2.A.



Maximum Uninsulated Surface of Foundation Wall

## A-10.3.3.8. Foundation Wall Insulation

Configuration for Thermal Insulation Installed Down and Outward  
from the Floor or Wall

**A-10.3.4.4. Heating, Ventilating and Air-Conditioning** See the following Tables 10.3.4.4.(1) to 10.3.4.4.(7).

**A-Table 10.3.4.4.(1)**

**Unitary Air Conditioners and Condensing Units, Electrically Operated,  
Minimum Efficiency Requirements**

Equipment Type	Size Category	Sub-Category or Rating Condition	Minimum Efficiency <sup>(1)</sup>	Test Procedure
Air Conditioners, Air Cooled	< 19 kW (< 65,000 Btu/h)	Split System and Single Package	13.0 SEER <sub>(2)</sub>	CAN/CSA-C656 ARI 210/240
	≥ 19 kW and < 40 kW (≥ 65,000 Btu/h and < 135,000 Btu/h)	Split System and Single Package	10.3 EER <sub>(2)</sub> 10.6 IPLV <sub>(2)</sub>	CAN/CSA-C746 ARI 340/360
	≥ 40 kW and < 70 kW (≥ 135,000 Btu/h and < 240,000 Btu/h)	Split System and Single Package	9.7 EER <sub>(2)</sub> 9.9 IPLV <sub>(2)</sub>	CAN/CSA-C746 ARI 340/360
	≥ 70 kW and < 223 kW (≥ 240,000 Btu/h and < 760,000 Btu/h)	Split System and Single Package	9.5 EER <sub>(2)</sub> 9.7 IPLV <sub>(2)</sub>	ARI 340/360
	≥ 223 kW (≥ 760,000 Btu/h)	Split System and Single Package	9.2 EER <sub>(2)</sub> 9.4 IPLV <sub>(2)</sub>	ARI 340/360
Through-the-Wall, Air Cooled	≤ 8.8 kW (≤ 30,000 Btu/h)	Split System and Single Package	10.9 SEER <sub>(2)</sub> (before 1/23/2010) 12.0 SEER <sub>(2)</sub> (as of 1/23/2010)	CAN/CSA-C656 ARI 210/240
Small-Duct High- Velocity, Air Cooled	< 19 kW (< 65,000 Btu/h)	Split System	11.0 SEER <sub>(2)</sub>	CAN/CSA-C656 ARI 210/240
Air Conditioners, Water and Evaporatively Cooled	< 19 kW (< 65,000 Btu/h)	Split System and Single Package	12.1 EER <sub>(2)</sub>	ARI 210/240
	≥ 19 kW and < 40 kW (≥ 65,000 Btu/h and < 135,000 Btu/h)	Split System and Single Package	11.5 EER <sub>(2)</sub>	CAN/CSA-C746 ARI 340/360
	≥ 40 kW and < 70 kW (≥ 135,000 Btu/h and < 240,000 Btu/h)	Split System and Single Package	11.0 EER <sub>(2)</sub>	CAN/CSA-C746 ARI 340/360
	≥ 70 kW (≥ 240,000 Btu/h)	Split System and Single Package	11.0 EER <sub>(2)</sub> 10.3 IPLV <sub>(2)</sub>	ARI 340/360
Condensing Units, Air Cooled	≥ 40 kW (≥ 135,000 Btu/h)		10.1 EER <sub>(2)</sub> 11.2 IPLV <sub>(2)</sub>	CAN/CSA-C746 ARI 365
Condensing Units, Water or Evaporatively Cooled	≥ 40 kW (≥ 135,000 Btu/h)		13.1 EER <sub>(2)</sub> 13.1 IPLV <sub>(2)</sub>	CSA C746 ARI 365

Notes to A-Table 10.3.4.4.(1)

- (1) IPLV's are only applicable to equipment with capacity modulation. For units with other than electric resistance heat deduct 0.2 EER and 0.2 IPLV.
- (2) Minimum efficiency regulated by Nova Scotia Energy Efficiency Act.
- (3) Minimum efficiency specified in ANSI/ASHRAE/IESNA Standard 90.1.

**A-Table 10.3.4.4.(2)**  
**Unitary and Applied Heat Pumps, Electrically Operated,**  
**Minimum Efficiency Requirements**

Equipment Type	Size Category	Sub-Category or Rating Condition	Minimum Efficiency(1)	Test Procedure
Air Cooled, (Cooling Mode)	< 19 kW ( < 65,000 Btu/h)	Split System and Single Package	13.0 SEER(2)	CAN/CSA-C656 ARI 210/240
	≥ 19 kW and < 40 kW ( ≥ 65,000 Btu/h and < 135,000 Btu/h)	Split System and Single Package	10.1 EER(2) 10.4 IPLV(2)	CAN/CSA-C746 ARI 340/360
	≥ 40 kW and < 70 kW ( ≥ 135,000 Btu/h and < 240,000 Btu/h)	Split System and Single Package	9.3 EER(2) 9.5 IPLV(2)	CAN/CSA-C746 ARI 340/360
	≥ 70 kW ( ≥ 240,000 Btu/h)	Split System and Single Package	9.0 EER(3) 9.2 IPLV(3)	ARI 340/360
Through-the-Wall (Air Cooled, Cooling Mode)	≤ 8.8 kW ( ≤ 30,000 Btu/h)	Split System and Single Package	10.9 SEER(2) (before 1/23/2010) 12.0 SEER(2) (as of 1/23/2010)	CAN/CSA-C656 ARI 210/240
Small-Duct High-Velocity (Air Cooled, Cooling Mode)	< 19 kW ( < 65,000 Btu/h)	Split System	11.0 SEER(2)	CAN/CSA-C656 ARI 210/240
Water-Source (Cooling Mode)	< 5 kW ( < 17,000 Btu/h)	30°C (86°F) Entering Water	3.28 COPc(2)	CAN/CSA-C13256-1
	≥ 5 kW and < 19 kW ( ≥ 17,000 Btu/h and < 65,000 Btu/h)	30°C (86°F) Entering Water	3.52 COPc(2)	CAN/CSA-C13256-1
	≥ 19 kW and < 40 kW ( ≥ 65,000 Btu/h and < 135,000 Btu/h)	30°C (86°F) Entering Water	3.52 COPc(2)	CAN/CSA-C13256-1
Groundwater Source (Cooling Mode)	< 40 kW ( < 135,000 Btu/h)	15°C (59°F) Entering Water	4.75 COPc(2)	CAN/CSA-C13256-1
Ground Source (Cooling Mode)	< 40 kW ( < 135,000 Btu/h)	25°C (77°F) Entering Water	3.93 COPc(2)	CAN/CSA-C13256-1
Air Cooled, (Heating Mode)	< 19 kW ( < 65,000 Btu/h) Cooling Capacity	Split System and Single Package	6.7 HSPF V(2)	CAN/CSA-C656 ARI 210/240
	≥ 19 kW and < 40 kW ( ≥ 65,000 Btu/h and < 135,000 Btu/h) Cooling Capacity	8.3°C db / 6.1°C wb (47°F db / 43°F wb) Outdoor Air	3.2 COP(2)	CAN/CSA-C746 ARI 340/360
		-8.3°C db / -9.4°C wb (17°F db / 15°F wb) Outdoor Air	2.2 COP(2)	
	≥ 40 kW ( ≥ 135,000 Btu/h) Cooling Capacity	8.3°C db / 6.1°C wb (47°F db / 43°F wb) Outdoor Air	3.1 COP(2)	CAN/CSA-C746 ARI 340/360
		-8.3°C db / -9.4°C wb (17°F db / 15°F wb) Outdoor Air	2.0 COP(2)	

**A-Table 10.3.4.4.(2) Continued**  
**Unitary Air Conditioners and Condensing Units, Electrically Operated, Minimum Efficiency Requirements**

Equipment Type	Size Category	Sub-Category or Rating Condition	Minimum Efficiency(1)	Test Procedure
Through-the-Wall (Air Cooled, Heating Mode)	$\leq 8.8$ kW ( $\leq 30,000$ Btu/h) Cooling Capacity	Split System and Single Package	6.2 HSPF V(2) (before 1/23/2010) 6.4 HSPF V(2) (as of 1/23/2010)	CAN/CSA-C656 ARI 210/240
Small-Duct High-Velocity (Air Cooled, Heating Mode)	$< 19$ kW ( $< 65,000$ Btu/h) Cooling Capacity	Split System	5.9 HSPF V(2)	CAN/CSA-C656 ARI 210/240
Water-Source (Heating Mode)	$< 40$ kW ( $< 135,000$ Btu/h) Cooling Capacity	20°C (68°F) Entering Water	4.2 COP(2)	CAN/CSA-C13256-1
Groundwater Source (Heating Mode)	$< 40$ kW ( $< 135,000$ Btu/h) Cooling Capacity	10°C (50°F) Entering Water	3.6 COP(2)	CAN/CSA-C13256-1
Ground Source (Heating Mode)	$< 40$ kW ( $< 135,000$ Btu/h) Cooling Capacity	0°C (32°F) Entering Water	3.1 COP(2)	CAN/CSA-C13256-1

**Notes to A-Table 10.3.4.4.(2)**

- (1) IPLV's are only applicable to equipment with capacity modulation.
- (2) Minimum efficiency regulated by Nova Scotia Energy Efficiency Act.
- (3) Minimum efficiency specified in ANSI/ASHRAE/IESNA Standard 90.1.



**A-Table 10.3.4.4.(3)**  
**Water Chilling Packages, Minimum Efficiency Requirements**

Equipment Type	Size Category	Nova Scotia Energy Efficiency Act Minimum Efficiency	Test Procedure
Air Cooled, With Condenser, Electrically Operated	< 528 kW (< 150 tons)	2.80 COP 3.05 IPLV	CAN/CSA-C743 ARI 550, ARI 590
	≥ 528 kW (≥ 150 tons)	2.80 COP 3.05 IPLV	CAN/CSA-C743 ARI 550, ARI 590
Air Cooled, Without Condenser, Electrically Operated	All Capacities	3.10 COP 3.45 IPLV	CAN/CSA-C743 ARI 550, ARI 590
Water Cooled, Electrically Operated, Positive Displacement (Reciprocating)	All Capacities	4.20 COP 5.05 IPLV	CAN/CSA-C743 ARI 590
Water Cooled, Electrically Operated, Positive Displacement (Rotary Screw and Scroll)	< 528 kW (< 150 tons)	4.45 COP 5.20 IPLV	CAN/CSA-C743 ARI 550
	≥ 528 kW and < 1055 kW (≥ 150 tons and < 300 tons)	4.90 COP 5.60 IPLV	CAN/CSA-C743 ARI 550
	≥ 1055 kW (≥ 300 tons)	5.50 COP 6.15 IPLV	CAN/CSA-C743 ARI 550
Water Cooled, Electrically Operated, (Centrifugal)	< 528 kW (< 150 tons)	5.00 COP 5.25 IPLV	CAN/CSA-C743 ARI 550
	≥ 528 kW and < 1055 kW (≥ 150 tons and < 300 tons)	5.55 COP 5.90 IPLV	CAN/CSA-C743 ARI 550
	≥ 1055 kW (≥ 300 tons)	6.10 COP 6.40 IPLV	CAN/CSA-C743 ARI 550
Single Effect Absorption Air Cooled	All Capacities	0.60 COP	CAN/CSA-C743 ARI 560
Single Effect Absorption Water Cooled	All Capacities	0.70 COP	CAN/CSA-C743 ARI 560
Double Effect Absorption Indirect-Fired	All Capacities	1.00 COP 1.05 IPLV	CAN/CSA -C743 ARI 560
Double Effect Absorption Direct-Fired	All Capacities	1.00 COP 1.00 IPLV	CAN/CSA-C743 ARI 560





**A-Table 10.3.4.4.(4)**

**Packaged Terminal Air Conditioners, Packaged Terminal Heat Pumps, Single-Package Vertical Air Conditioners, Single-Package Vertical Heat Pumps, Room Air Conditioners and Room Air Conditioner Heat Pumps, Electrically Operated, Minimum Efficiency Requirements**

Equipment Type	Size Category (input)	Sub-Category or Rating Condition	Minimum Efficiency	Test Procedure
PTAC (Cooling Mode) New Construction	All Capacities	35°C (95°F) db Outdoor Air	12.5 - (0.213 x Cap/293.1) EER(1) 12.5 - (0.213 x Capo/1000) EER(1)	CAN/CSA C744 ARI 310/380
PTAC (Cooling Mode) Replacements b	All Capacities	35°C (95°F) db Outdoor Air	10.9 - (0.213 x Cap/293.1) EER(1) 10.9 - (0.213 x Capo/1000) EER(1)	CAN/CSA-C744 ARI 310/380
PTHP (Cooling Mode) New Construction	All Capacities	35°C (95°F) db Outdoor Air	12.3 - (0.213 x Cap/293.1) EER(1) 12.3 - (0.213 x Capo/1000) EER(1)	CAN/CSA-C744 ARI 310/380
PTHP (Cooling Mode) Replacements b	All Capacities	35°C (95°F) db Outdoor Air	10.8 - (0.213 x Cap/293.1) EER(1) 10.8 - (0.213 x Capo/1000) EER(1)	CAN/CSA-C744 ARI 310/380
PTHP (Heating Mode) New Construction	All Capacities		3.2 - (0.026 x Cap/293.1) COP(1) 3.2 - (0.026 x Capo/1000) COP(1)	CAN/CSA-C744 ARI 310/380
PTHP (Heating Mode) Replacements b	All Capacities		2.9 - (0.026 x Cap/293.1) COP(1) 2.9 - (0.026 x Capo/1000) COP(1)	CAN/CSA-C744 ARI 310/380
SPVAC (Cooling Mode)	All Capacities	35°C db / 23.9°C wb (95°F db/ 75°F wb) Outdoor Air	8.6 EER(1)	CAN/CSA-C746 ARI 390
SPVHP (Cooling Mode)	All Capacities	35°C db / 23.9°C wb (95°F db/ 75°F wb) Outdoor Air	8.6 EER(1)	CAN/CSA-C746 ARI 390
SPVHP (Heating Mode)	All Capacities	8.3°C db / 6.1°C wb (47°F db / 43°F wb) Outdoor Air	2.7 COP(1)	CAN/CSA-C746 ARI 390

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A-Table 10.3.4.4.(4) continued

**Packaged Terminal Air Conditioners, Packaged Terminal Heat Pumps, Single-Package Vertical Air Conditioners, Single-Package Vertical Heat Pumps, Room Air Conditioners and Room Air Conditioner Heat Pumps, Electrically Operated, Minimum Efficiency Requirements**

Equipment Type	Size Category (input)	Sub-Category or Rating Condition	Minimum Efficiency	Test Procedure
Room Air Conditioners, With Louvered Sides	< 1.8 kW (< 6,000 Btu/h)		9.7 EER	CSA C368.1-M C368.1 only applies to equipment < 10.55kW (< 36,000 Btu/h) ANSI/AHAM RAC-1
	≥ 1.8 kW and < 2.3 kW (≥ 6,000 Btu/h and < 8,000 Btu/h)		9.7 EER <sub>(1)</sub>	
	≥ 2.3 kW and < 4.1 kW (≥ 8,000 Btu/h and < 14,000 Btu/h)		9.8 EER <sub>(1)</sub>	
	≥ 4.1 kW and < 5.9 kW (≥ 14,000 Btu/h and < 20,000 Btu/h)		9.7 EER <sub>(1)</sub>	
	≥ 5.9 kW (≥ 20,000 Btu/h)		8.5 EER <sub>(1)</sub>	
Room Air Conditioners, Without Louvered Sides	< 2.3 kW (< 8,000 Btu/h)		9.0 EER <sub>(1)</sub>	CSA C368.1-M ANSI/AHAM RAC-1
	≥ 2.3 kW and < 5.9 kW (≥ 8,000 Btu/h and < 20,000 Btu/h)		8.5 EER <sub>(1)</sub>	
	≥ 5.9 kW (≥ 20,000 Btu/h)		8.5 EER <sub>(1)</sub>	
Room Air Conditioner Heat	< 5.9 kW (< 20,000 Btu/h)		9.0 EER <sub>(1)</sub>	CSA C368.1-M ANSI/AHAM RAC-1
Pumps With Louvered Sides	≥ 5.9 kW (≥ 20,000 Btu/h)		8.5 EER <sub>(1)</sub>	
Room Air Conditioner Heat	< 4.1 kW (< 14,000 Btu/h)		8.5 EER <sub>(1)</sub>	CSA C368.1-M ANSI/AHAM RAC-1
Pumps Without Louvered Sides	≥ 4.1 kW (≥ 14,000 Btu/h)		8.0 EER <sub>(1)</sub>	
Room Air Conditioner, Casement Only	All Capacities		8.7 EER <sub>(2)</sub>	ANSI/AHAM RAC-1
Room Air Conditioner, Casement-Slider	All Capacities		9.5 EER <sub>(2)</sub>	ANSI/AHAM RAC-1

Notes to A-Table 10.3.4.4.(4)

- (1) Minimum efficiency regulated by Nova Scotia Energy Efficiency Act.
- (2) Minimum efficiency specified in ANSI/ASHRAE/IESNA Standard 90.1.
- (3) Cap is the rated cooling capacity in W. Capo is the rated cooling capacity in Btu/h. If unit capacity is less than 2,030 W (7,000 Btu/h), use 2,030 W (7,000 Btu/h) in calculation. If greater than 4,390 W (15,000 Btu/h), use 4,390 W (15,000 Btu/h) in calculation.
- (4) Replacements must be factory labeled as follows "MANUFACTURED FOR REPLACEMENT APPLICATIONS ONLY; NOT TO BE INSTALLED IN NEW CONSTRUCTION PROJECTS." Replacement efficiencies apply only to units with existing wall sleeves/less than 0.41 m (16 in.) high and less than 1.07 m (42 in.) wide.

**A-Table 10.3.4.4.(5)**

**Warm Air Furnaces and Combination Warm Air Furnaces/Air-Conditioning Units, Warm Air Duct Furnaces and Units Heaters Minimum Efficiency Requirements**

Equipment Type	Size Category (input)	Sub-Category or Rating Condition	Nova Scotia Energy Efficiency Act Minimum Efficiency	Test Procedure
Warm Air Furnace, Gas-Fired	< 66 kW (< 225,000 Btu/h)	Single-phase	78% AFUE	CGA-P.2 DOE 10 CFR Part 430 or ANSI Z21.47
		Three-phase	78% AFUE or 80% Et	
	≥ 66 kW and < 117 kW (≥ 225,000 Btu/h and < 400,000 Btu/h)	Maximum Capacity*	80% Et	CSA 2.3 ANSI Z21.47
	≥ 117 kW (≥ 400,000 Btu/h)	Maximum Capacity*	80% Et	CGA P.8 ANSI Z21.47
Warm Air Furnace, Oil-Fired	< 66 kW (< 225,000 Btu/h)		78% SEUE	CSA B212 DOE 10 CFR Part 430 or UL 727
	≥ 66 kW (≥ 225,000 Btu/h)	Maximum Capacity*	81% Et	UL 727
Warm Air Duct Furnaces, Gas-Fired	All Capacities	Maximum Capacity*	80% Et	ANSI Z83.9
Warm Air Unit Heaters, Gas-Fired	All Capacities	Maximum Capacity*	80% Ec	CSA 2.6 ANSI Z83.8
Unit Heaters, Oil-Fired	All Capacities	Maximum Capacity*	80% Ec	UL 731
Et is thermal efficiency and Ec is combustion efficiency. Ec = 100% less flue losses *Maximum capacity as provided for and allowed by unit controls.				

**A-Table 10.3.4.4.(6)**  
**Gas-Fired and Oil-Fired Boilers, Minimum Efficiency Requirements**

Equipment Type	Size Category (input)	Sub-Category or Rating Condition	Minimum Efficiency	Test Procedure
Boilers, Gas-Fired	< 88 kW (< 300,000 Btu/h)	Hot Water	80% AFUE <sup>(1)</sup>	CGA P.2
		Steam	75% AFUE <sup>(1)</sup>	DOE 10 CFR Part 430
	≥ 88 kW and ≤ 733 kW (≥ 300,000 Btu/h and ≤ 2,500,000 Btu/h)	Maximum Capacity*	75% <sup>(2)</sup> E <sub>t</sub>	Hydronics Institute BTS
	> 733 kW (> 2,500,000 Btu/h)	Hot Water	80% <sup>(2)</sup> E <sub>c</sub>	Hydronics Institute BTS
		Steam	80% <sup>(2)</sup> E <sub>c</sub>	
Boilers, Oil-Fired	< 88 kW (< 300,000 Btu/h)		80% SEUE <sup>(1)</sup>	CSA B212 DOE 10 CFR Part 430
	≥ 88 kW and ≤ 733 kW (≥ 300,000 Btu/h and ≤ 2,500,000 Btu/h)	Maximum Capacity*	78% <sup>(2)</sup> E <sub>t</sub>	(Hydronics Institute)
	> 733 kW (> 2,500,000 Btu/h)	Hot Water	83% <sup>(2)</sup> E <sub>c</sub>	Hydronics Institute BTS
		Steam	83% <sup>(2)</sup> E <sub>c</sub>	
Boilers, Oil-Fired (Residual)	≥ 88 kW and ≤ 733 kW (≥ 300,000 Btu/h and ≤ 2,500,000 Btu/h)	Maximum Capacity*	78% <sup>(2)</sup> E <sub>t</sub>	Hydronics Institute BTS
	> 733 kW (> 2,500,000 Btu/h)	Hot Water	83% <sup>(2)</sup> E <sub>c</sub>	Hydronics Institute BTS
		Steam	83% <sup>(2)</sup> E <sub>c</sub>	

E<sub>t</sub> is thermal efficiency and E<sub>c</sub> is combustion efficiency. E<sub>c</sub> = 100% less flue losses.

\*Maximum capacity as provided for and allowed by the unit's controls.

Notes to A-Table 10.3.4.4.(6)

- (1) Minimum efficiency regulated by Nova Scotia Energy Efficiency Act.
- (2) Minimum efficiency specified in ANSI/ASHRAE/IESNA Standard 90.1.

**A-Table 10.3.4.4.(7)**  
**Cooling Tower Performance Requirements**

Equipment Type	Size Category	Sub-Category or Rating Condition	ASHRAE 90.1-2004 Performance Required	Test Procedure
Propeller or Axial Fans	All Capacities	35°C (95°F) Entering Water 29°C (85°F) Leaving Water 24°C (75°F) wb Outdoor Air	$\geq 3.23 \text{ L/s} \cdot \text{kW}$ ( $\geq 38.2 \text{ gpm/hp}$ )	CTI ATC-105
Centrifugal Fans	All Capacities	35°C (95°F) Entering Water 29°C (85°F) Leaving Water 24°C (75°F) wb Outdoor Air	$\geq 1.7 \text{ L/s} \cdot \text{kW}$ ( $\geq 20.0 \text{ gpm/hp}$ )	CTI ATC-105
Air-cooled Condensers	All Capacities	52°C (125°F) Condensing Temperature R-22 Test Fluid 88°C (190°F) Entering Gas Temperature 35°C (95°F) Entering db 8°C (15°F) Subcooling	$\geq 69 \text{ COP}$ ( $\geq 176,000 \text{ Btu/h} \cdot \text{hp}$ )	ARI 460

For purpose of this Table, cooling tower performance is maximum flow rating divided by fan nameplate rated motor power.

Air-cooled condenser performance is defined as heat rejected from the refrigerant divided by the fan nameplate rated motor power.

**A-Table 10.3.4.6.(1)**  
**Water Heating Equipment, Performance Requirements**

Equipment Type	Size Category	Sub-Category or Rating Condition	Minimum Efficiency	Test Procedure
Electric Storage Water Heaters	All Capacities	Resistance ≥ 50 L and ≤ 284 L (≥ 13.2 gal and ≤ 75 gal)	0.97 - 0.000349V EF(4) (0.97 - 0.00132 Vo EF)(4) 35 + 0.20V SL(1) (119.4 + 2.583Vo SLo)(1) 40 + 0.20V SL(2) (136.5 + 2.583Vo SLo)(2)	CSA C745 CAN/CSA - C191
	All Capacities	Resistance > 284 L and ≤ 454 L (> 75 gal and < 120 gal)	0.97 - 0.000349V EF(4) (0.97 - 0.00132 Vo EF)(4) 0.472V - 38.5 SL(1) (6.095Vo - 131.4 SLo)(1) 0.472V - 33.5 SL(2) (6.095Vo - 114.3 SLo)(2)	CSA C745 CAN/CSA - C191
	≤ 24 Amps and ≤ 250 volts	Heat Pump	0.93 - 0.000349 V EF(4) (0.93 - 0.00132 Vo EF)(4)	CSA C745 DOE 10 CFR Part 430
Gas Storage Water Heaters	≤ 21.98 kW (≤ 75,000 Btu/h)	≥ 75.7L and < 378.5 L (≥ 20 gal and < 100 gal)	0.67 - 0.0005V EF(4) (0.67 - 0.00189 Vo EF)(4)	CSA P.3 DOE 10 CFR Part 430
	> 21.98 kW (> 75,000 Btu/h)	< 309.75 W/L (< 4,000 Btu/h/gal)	80% Et(3),(5) $Q / 800 + 16.57\sqrt{V} SL$ $Q_T / 800 + 110\sqrt{V_o} SL_o$	CSA P.3 ANSI Z21.10.3
Gas Instantaneous Water Heaters	> 14.66 kW and < 58.62 kW (> 50,000 Btu/h and < 200,000 Btu/h)	≥ 309.75 W/L and < 7.57 L (≥ 4,000 Btu/h/gal and < 2 gal)	0.62 - 0.0005V EF(4) (0.62 - 0.00189 Vo EF)	CSA 4.3 DOE 10 CFR Part 430
	≥ 58.62 kW (≥ 200,000 Btu/h)	≥ 309.75 W/L and < 37.85 L (≥ 4,000 Btu/h/gal and < 10 gal)	80% Et(3),(4)	CSA 4.3 ANSI Z21.10.3
	≥ 58.62 kW (≥ 200,000 Btu/h)	≥ 309.75 W/L and ≥ 37.85 L (≥ 4,000 Btu/h/gal and ≥ 10 gal)	80% Et(3),(5) $Q / 800 + 16.57\sqrt{V} SL$ $Q_T / 800 + 110\sqrt{V_o} SL_o$	CSA 4.3 ANSI Z21.10.3



A-Table 10.3.4.6.(1) (continued)

## Water Heating Equipment, Performance Requirements

Equipment Type	Size Category	Sub-Category or Rating Condition	Minimum Efficiency	Test Procedure
Oil Storage Water Heaters	$\leq 30.78 \text{ kW}$ ( $\leq 105,000 \text{ Btu/h}$ )	$\geq 75.7 \text{ L}$ ( $\geq 20 \text{ gal}$ )	0.59 - 0.0005V EF(4) (0.59 - 0.00189 Vo EF)	CAN/CSA-B211 DOE 10 CFR Part 430
	$> 30.78 \text{ kW}$ ( $> 105,000 \text{ Btu/h}$ )	$< 309.75 \text{ W/L}$ ( $< 4,000 \text{ Btu/h/gal}$ )	78% Et(3),(5) $Q / 800 + 16.57\sqrt{V} \text{ SL}$ $Q_r / 800 + 110\sqrt{V_o} \text{ SL}_o$	ANSI Z21.10.3
Oil Instantaneous Water Heaters	$\leq 61.55 \text{ kW}$ ( $\leq 210,000 \text{ Btu/h}$ )	$\geq 309.75 \text{ W/L and } < 7.57 \text{ L}$ ( $\geq 4,000 \text{ Btu/h/gal and } < 2 \text{ gal}$ )	0.59 - 0.0005V EF (5) (0.59 - 0.0019Vo EF)(5)	DOE 10 CFR Part 430
	$> 61.55 \text{ kW}$ ( $> 210,000 \text{ Btu/h}$ )	$\geq 309.75 \text{ W/L and } < 37.85 \text{ L}$ ( $\geq 4,000 \text{ Btu/h/gal and } < 10 \text{ gal}$ )	80% Et(3),(5)	ANSI Z21.10.3
	$> 61.55 \text{ kW}$ ( $> 210,000 \text{ Btu/h}$ )	$\geq 309.75 \text{ W/L and } \geq 37.85 \text{ L}$ ( $\geq 4,000 \text{ Btu/h/gal and } \geq 10 \text{ gal}$ )	78% Et(3),(5) $Q / 800 + 16.57\sqrt{V} \text{ SL}$ $Q_r / 800 + 110\sqrt{V_o} \text{ SL}_o$	ANSI Z21.10.3
Hot Water Supply Boilers Gas and Oil	$\geq 87.93 \text{ kW and } < 3663.8 \text{ kW}$ ( $\geq 300,000 \text{ Btu/h and } < 12,500,000 \text{ Btu/h}$ )	$\geq 309.75 \text{ W/L and } < 37.85 \text{ L}$ ( $\geq 4,000 \text{ Btu/h/gal and } < 10 \text{ gal}$ )	80% Et(3),(5)	ANSI Z21.10.3
Hot Water Supply Boilers Gas		$\geq 309.75 \text{ W/L and } \geq 37.85 \text{ L}$ ( $\geq 4,000 \text{ Btu/h/gal and } \geq 10 \text{ gal}$ )	80% Et(3),(5) $Q / 800 + 16.57\sqrt{V} \text{ SL}$ $Q_r / 800 + 110\sqrt{V_o} \text{ SL}_o$	ANSI Z21.10.3
Hot Water Supply Boilers Oil		$\geq 309.75 \text{ W/L and } \geq 37.85 \text{ L}$ ( $\geq 4,000 \text{ Btu/h/gal and } \geq 10 \text{ gal}$ )	78% Et(3),(5) $Q / 800 + 16.57\sqrt{V} \text{ SL}$ $Q_r / 800 + 110\sqrt{V_o} \text{ SL}_o$	ANSI Z21.10.3
Pool Heaters, Gas	All		78% Et(3),(4)	CGA P.6 ASHRAE 146
Pool Heaters, Oil	All		78% Et(3),(4)	ASHRAE 146
Heat Pump Pool Heaters	All		4.0 COP(5)	ASHRAE 146
Unfired Storage Tanks	All		RSI-2.2 (R-12.5)(5)	NONE

Notes to Table 10.3.4.4.(8)

- (1) Without bottom inlet SL is the standby loss in W/V is the storage capacity in litres
- (2) With bottom inlet SLo is the standby loss in Btu/hVo is the storage capacity in gallons
- (3) Et is the thermal efficiency.
- (4) Minimum efficiency regulated by Nova Scotia Energy Efficiency Act.
- (5) Minimum efficiency specified in ANSI/ASHRAE/IESNA Standard 90.1.

**A-10.3.4.7.(3) Fluorescent Lamp Ballasts**

1. The ballast efficacy factor (BEF) of fluorescent lamp ballasts shall conform to A-Table 10.3.4.7. where

- (a) the ballast operates at nominal input voltages of 120, 277 or 347 volts;
- (b) the input frequency is 60 Hz;
- (c) the maximum lamp operating current is less than 1, 000 milliamperes;
- (d) the ballast is used to operate one of the following lamp types
  - 1. one or two 4-ft, nominal 40 W, rapid-start lamps,
  - 2. two 8-ft, nominal 75 W, slimline lamps,
- 3. two 8-ft, nominal 110 W, high-output rapid-start lamps;
- (e) the ballast is not specifically designed for starting at temperatures below 4.5°C (40°F); and
- (f) the ballast is not specifically designed for use with dimming controls.

2. The ballast efficacy factor (BEF) shall be calculated in accordance with Equation 9-1

$$\text{BEF} = \frac{\text{BF}}{\text{Power input}}$$

where BF = ballast factor, expressed as a percent, such as 95;  
power input = total wattage of combined lamps and ballasts.

Equation 9-1

3. Tests for BF and power input shall be in accordance with CAN/CSA-C654, "Fluorescent Lamp Ballast Efficacy Measurements".

4. Other Fluorescent Lamp Ballasts. Ballasts that do not have all the characteristics listed in Sentence 1 are not required to meet the BEF in A-Table 10.3.4.7. and may be used as required.

5. One-lamp or three-lamp fluorescent luminaires recess-mounted within 3 m (10 ft) center to center of each other or pendant mounted or surface mounted within 0.3 m (1 ft) of each other, and within the same room, shall be tandem wired to eliminate unnecessary use of single-lamp ballasts.

**Exception Three-lamp ballasts may be used.**

6. All ballasts shall have a power factor of 90% or greater.

### Exceptions

- (a) ballasts for circline and compact fluorescent lamps and low-wattage high-intensity discharge lamps of 100 W or less;
- (b) dimming ballasts.

**A-Table 10.3.4.7.**

### Fluorescent Lamp Ballast Efficacy Factors(1)

Application for Operation of	Ballast Input Voltage	Total Nominal Lamp Watts	Nova Scotia Energy Efficiency Act Ballast Efficacy Factor
One F40T12 Lamp(2)	120 V	40	2.29
	277 V	40	2.29
	347 V	40	2.22
Two F40T12 Lamps(2)	120 V	80	1.17
	277 V	80	1.17
	347 V	80	1.12
Two F96T12 Lamps(3)	120 V	150	0.63
	277 V	150	0.63
	347 V	150	0.62
Two 110W/F96T12HO Lamps(4)	120 V	220	0.39
	277 V	220	0.39
	347 V	220	0.38
Two F32T8 Lamps	120 V	64	1.25
	277 V	64	1.23
	347 V	64	1.2
Column 1	2	3	4

Notes to A-Table 10.3.4.7.

- (1) All fluorescent lamp ballasts must have a minimum power factor of at least 0.9 at indicated voltage.
- (2) Also for use on 34 W/48T12/RS and 40 W/48T10/RS lamps
- (3) Also for use on 60 W/96T12/IS lamps.
- (4) Also for use on 95 W/96T12/HO lamps.

**A-10.3.4.12.** Electric motors are regulated under the Nova Scotia Energy Efficient Appliance Act, based on CSA-C390-M. The following values may be found in the Energy Regulation. In case of conflict between the provisions of this Code and those of the Energy Regulation, the provisions of the Regulation shall govern.

**A- Table 10.3.4.12.**  
**Minimum Nominal Efficiency for Motors**  
**forming part of Sentence 10.3.4.12.(2)**

Motor		Open Motors				Enclosed Motors			
		Speed (RPM)				Speed (RPM)			
		3600	1800	1200	900	3600	1800	1200	900
		Number of Poles				Number of Poles			
kW	(hp)	2	4	6	8	2	4	6	8
0.8	-1	75.5	82.5	80.0	84.0	75.5	82.5	80.0	74.0
1.1	-1.5	82.5	84	84	75.5	82.5	84	85.5	77
1.5	-2	84	84	85.5	85.5	84	84	86.5	82.5
2.2	-3	84	86.5	86.5	86.5	85.5	87.5	87.5	84
3.7	-5	85.5	87.5	87.5	87.5	87.5	87.5	87.5	85.5
5.6	-7.5	87.5	88.5	88.5	88.5	88.5	89.5	89.5	85.5
7.5	-10	88.5	89.5	90.2	89.5	89.5	89.5	89.5	88.5
11.1	-15	89.5	91	90.2	89.5	90.2	91	90.2	88.5
14.9	-20	90.2	91	91	90.2	90.2	91	90.2	89.5
18.7	-25	91	91.7	91.7	90.2	91	92.4	91.7	89.5
22.4	-30	91	92.4	92.4	91	91	92.4	91.7	91
29.8	-40	91.7	93	93	91.7	91.7	93	93	91
37.3	-50	92.4	93	93	91.7	92.4	93	93	91.7
44.8	-60	93	93.6	93.6	92.4	93	93.6	93.6	91.7
56	-75	93	94.1	93.6	93.6	93	94.1	93.6	93
74.6	-100	93	94.1	94.1	93.6	93.6	94.5	94.1	93
93.3	-125	93.6	94.5	94.1	93.6	94.5	94.5	94.1	93.6
111.9	-150	93.6	95	94.5	93.6	94.5	95	95	93.6
130.6	-175	94.5	95	94.5	93.6	95	95	95	94.1
149.2	-200	94.5	95	94.5	93.6	95	95	95	94.1
Column 1		2	3	4	5	6	7	8	9

### Additional Conversion Factors

To Convert	To	Multiply by	Notes
$^{\circ}\text{C}$	$^{\circ}\text{F}$	1.8 and add 32	
$\text{m}^2\cdot\text{C}/\text{W}$ (RSI)	$\text{h}\cdot\text{ft}^2\cdot^{\circ}\text{F}/\text{Btu}$ (R)	5.678	
W	Btu/h	3.413	
$\text{W}/\text{m}^2$	$\text{Btu}/\text{h}\cdot\text{ft}^2$	0.317	
$\text{W}/\text{m}^2$	$\text{Btu}/\text{h}\cdot\text{ft}^2\cdot^{\circ}\text{F}$	0.17612	U value
$\text{W}/\text{m}\cdot^{\circ}\text{C}$	$\text{Btu}\cdot\text{ft}/\text{h}\cdot\text{ft}^2\cdot^{\circ}\text{F}$ or	0.5777	Conductivity (per foot)
	$\text{Btu}\cdot\text{in}/\text{h}\cdot\text{ft}^2\cdot^{\circ}\text{F}$	6.9444	Conductivity (per inch)
W/L	$\text{Btu}/\text{h}\cdot\text{US gal}$	12.916	



