

## BASIC RULES FROM THE CODE

### DEFINED WORDS, TERMS AND PHRASES

Words, terms and phrases with special meaning are defined in Division A, Part 1, Sentence 1.4.1.2.(1) of the Code.

The definition always applies unless the word, term or phrase has a special purpose definition listed elsewhere.

For consistency with the Code, defined terms are shown in *italics*. The definition for each defined term used in a module is repeated at the beginning of each module.

### NON-DEFINED WORDS, TERMS AND PHRASES

Consult Division A, Part 1, Sentence 1.4.1.1.(1) of the Code. It provides direction for dealing with non-defined terms. Note any question, comment or concern in the space provided.

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### ABBREVIATIONS AND SYMBOLS

The Code makes use of symbols and abbreviated nouns, terms and proper names. Division B, Part 1, Article 1.3.2.1. of the Code will reveal a number of abbreviations for proper names, along with contact information.

The meanings assigned to other 'Symbols and Abbreviations' used in the Code are found in Division A, Part 1, Sentence 1.4.2.1.(1). As examples, the letter 'h' means 'hour' in Div. B, Clause 3.2.2.23.(2)(c) and 'hours' in Div. B, Clause 3.2.2.23.(2)(b); the expression '1 in 2' means a slope of 1 vertical unit to 2 horizontal units.

### BASIC RULES FOR READING THE CODE - SCOPE AND APPLICATION OF CODE REQUIREMENTS

Individual requirements within the Code do not apply to every building. Guidance in the application of each of the 12 Parts of Division B of the Code to a particular building is found in Division A, Part 1, Subsection 1.1.2., "Application of Division B".

The third exception in Sentence 3.2.5.13.(4) states:

If a building contains fewer than 9 sprinklers, the water supply for these sprinklers is permitted to be supplied from the domestic water system for the building provided the required flow for the sprinklers can be met by the domestic system.

### **VERY IMPORTANT**

**When the Code spells out a general rule and exceptions thereto, conformity with the Code is obtained by complying with EITHER the general rule OR the exception thereto.**

### **TABLES, TEXT AND FOOTNOTES**

Whenever you are called upon to use a Table, you have to **consider the text** associated with **the Table AND the footnotes**. For example, Division B, Table 3.1.3.1 forms part of Sentence 3.1.3.1.(1). One of the Notes to Table 3.1.3.1., Note (2) directs us to Sentence 3.1.3.2.(1), which tells us that any building with any Group A, B or C occupancy, cannot contain a major occupancy of Group F, Division 1.

### **SUPPLEMENTARY STANDARDS AND REFERENCED DOCUMENTS**

By virtue of Paragraph 34.-(1) 9 of the Building Code Act, the "Supplementary Standards to the 2012 Building Code", SA-1, SB-1 to SB-13 and SC-1, and the Referenced Documents listed in Division B, Part 1, Section 1.3 of the Code form an integral part of the Building Code.

### **APPENDICES AND ILLUSTRATED GUIDES**

On the other hand, Appendix A "Explanatory Material for Division B", Appendix B Imperial Conversions of Metric Values" have been prepared for convenience only, and as such, are explanations that do **not** form part of the Building Code and are **not** intended to limit the ways by which compliance with Code requirements can be achieved.

### **DIVISION A, PART 2 - OBJECTIVES**

Objectives for all the requirements in the Code are broken down into the following categories and subcategories. Category "Safety" identified by the prefix OS, "Fire Safety" identified by the prefix OS1, "Structural Safety" identified by the prefix OS2, "Safety in Use" identified by the prefix OS3 and "Resistance to Unwanted Entry"

- provide an understanding of the requirements of the Code relating to flame spread ratings of materials
- outline the implications of occupant load and to be able to calculate occupant load
- reference applicable standards.

## 2.1 OVERVIEW (SECTION 3.1)

### DEFINITIONS

The definitions below relate to the content in this module and are from Division A, Part 1 of the Code. Definitions form an integral part of a requirement when the requirement includes a defined term. Defined terms are found in the Code and are identified in italics text. Defined terms will not be shown in italics in this module, other than in this section.

#### **Building area**

*Building area* means the greatest horizontal area of a building above grade within the outside surface of exterior walls or within the outside surface of exterior walls and the centre line of firewalls.

#### **Closure**

*Closure* means a device or assembly for closing an opening through a fire separation or an exterior wall, such as a door, a shutter, wired glass or glass block, and includes all components such as hardware, closing devices, frames and anchors.

#### **Combustible**

*Combustible* means that a material fails to meet the acceptance criteria of CAN/ULC0-S114, "Standard Method of Test for Determination of Non-combustibility in Building Materials".

#### **Combustible construction**

*Combustible construction* means that type of construction that does not meet the requirements for noncombustible construction.

#### **Fire compartment**

*Fire compartment* means an enclosed space in a building that is separated from all other parts of the building by enclosing construction providing a fire separation that may be required to have a fire-resistance rating.

**TABLE 2-1**  
**Minimum Fire-Resistance Ratings Between Major Occupancies**

Major Occupancy	Adjoining Major Occupancy	Minimum Fire-Resistance Rating of Fire Separation
A1	E	2 h
A1	F3	1 h
A2	C	1 h plus 3.1.3.1.(3)
A2	D	1 h plus 3.1.3.1.(4)
B2	B3	1 h
B3	C	2 h
C	D	1 h
C	E	2 h plus 3.1.3.1.(2)
D	C	1 h
D	E	not required
E	A1	2 h plus 3.1.3.2.(1)
E	A2	2 h plus 3.1.3.2.(1)
E	F1	3 h
E	F3	not required

**Note:** Not all major occupancy combinations are shown.

### **NONCOMBUSTIBLE CONSTRUCTION (3.1.5.)**

Buildings are classified in accordance with Subsection 3.2.2. in order to prevent fire spread and collapse caused by the effects of fire. The requirement to have the building constructed of noncombustible materials is determined from this Subsection. The principal factors involved in classification are building height, building area and occupancy. The occupancy of the building has a direct relationship with the probable fire loads that can be expected, under normal use, in the building. The building height and building area are measures used to determine the building exiting and firefighting potential.

Noncombustible construction means that, except for combustible items specifically permitted, all components of the building regulated by the Code must be of noncombustible construction. Many of the finish materials and other items not directly involved in the load carrying system may be of combustible materials if specifically listed in Subsection 3.1.5.

**TABLE 2-3**

<b>Combustible Material</b>	<b>Applicable Code Reference for Noncombustible Construction</b>
Vinyl faced gypsum wallboard	3.1.5.10.(1)
Paper faced gypsum wallboard	3.1.5.11.
Polypropylene drain waste and vent pipe	3.1.5.16.(3)
Electrical wire (14-2 romex)	3.1.5.18.
Vermiculite insulation	3.1.5.12.
Glass fibre insulation	3.1.5.12.
Wood strip flooring	3.1.5.8.(3), (4)
Wood frame partitions	3.1.5.13.
Heavy timber construction	3.1.5.1.(1), 3.2.2.16.
Vinyl window sashes and frames	3.1.5.4.(5)
Silicone caulking	3.1.5.2.(1)(b)
Tar and gravel roof	3.1.5.3.(1)
ABS or PVC drain waste and vent pipe	3.1.5.16.(1)
Fire retardant plywood as wall finish	3.1.5.10.(2)
Gypsum board	3.1.5.11.
Styrofoam insulation	3.1.5.12.
Aluminum siding failing CAN/ULC-S114 test	3.1.5.5.
Flame resistant fabric canopy	3.1.16.1.(1)



**STOP**

**COMBUSTIBLE INSULATION (3.1.5.12.)**

Insulation is not an interior finish material. For combustible insulation materials and foamed plastic insulations, the standard flame-spread test does not provide a true measure of the relative hazard constituted by insulating materials in an actual fire. Foamed plastic insulation materials represent particular hazards: when exposed to fire, they produce dense smoke and release products of combustion that are both flammable and harmful.

**EXERCISE #2-5**

Read the appropriate Articles of the Code. You have about 15 minutes to answer the questions. In each case, provide the Code reference.

1. State the two general rules that dictate when a fire damper must be installed in a duct.

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2. Where a fire damper acts as a closure, explain how the required fire protection rating is determined.

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3. The Code tells us that fire dampers tested in the vertical or horizontal position must be installed in the manner in which they were tested. Additionally, they are to be installed in the plane of the fire separation, so as to stay in place should the duct be dislodged during a fire. To which standard are they tested?

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4. Consider a noncombustible branch duct with a melting point above 7601C that penetrates a required fire separation. Would a fire damper be required if the duct served only a heating unit?

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5. There are a number of situations in which a duct either connects two fire compartments or penetrates an assembly required to have a fire-resistance rating, but does not require a fire damper to ensure the continuity of the fire separation.
- a) Serving air-conditioning units or combined air-conditioning and heating units.

Four conditions apply. State them.

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- b) Fire dampers can be omitted from branch ducts that are connected to exhaust duct risers. State the conditions that must be adhered to.

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## STOP

### TEMPERATURE RISE ON FIRE DOORS (3.1.8.15., 3.1.8.17.)

Some fire doors are required to meet temperature rise criteria. The term temperature rise refers to the temperature developed on the unexposed face of the door at the end of 30 or 60 minutes of a fire endurance test, in conformance with CAN/ULC-S104, "Fire Tests of Door Assemblies". Those labels that do not show temperature rise are for doors that develop temperature rises in excess of 250°C during the first 30 minutes of fire exposure.

- not in F1 occupancies [3.1.8.18.(2)(c)]
- not in any part of an exit serving:
  - floor area subject to 3.2.6. [3.1.8.18.(2)(d)(i)]
  - A care occupancy [3.1.8.18.(2)(d)(ii)]
  - care and treatment occupancy [3.1.8.18.(2)(d)(iii)]
  - A detention occupancy [3.1.8.18.(2)(d)(iv)]
  - residential occupancy [3.1.8.18.(2)(d)(v)].

When a sprinkler protected window assembly is installed in an exit enclosure, the building shall be:

- sprinklered, and
- protected exits cannot comprise more than 50% of the required exits from any floor area [3.1.8.18.(3)].

Sprinkler protected window assemblies include:

- framing
- specified glazing
- special sprinkler heads on both sides of glazing, and specified water flow requirements
- no horizontal mullions
- size limitations (see listings)
- sprinkler protected window assemblies are listed by accredited certification organizations and bear labels on components (like fire doors, fire dampers).

## STOP

### FIRESTOPPING (3.1.9.1.)

Firestops are elements of building assemblies that are installed at strategic locations to resist the passage of fire from one space to another. Although the term 'firestop' is not defined, there are two applications related to the concept of compartmentation.

One is to maintain the integrity of a fire separation, as directed by Article 3.1.8.1. We saw that openings in a required fire separation are usually protected with closures to ensure the continuity of fire separations. We will now learn the rules of the Building Code for building services that penetrate a membrane forming part of an assembly required to have a fire-resistance rating (FRR) or a fire separation. The function of a service penetration firestop is to maintain the integrity of the fire separation by addressing any

- their level of performance is equivalent to masonry or concrete under:
  - fire conditions
  - mechanical damage resistance, and
  - moisture resistance.
- they are not used to separate Group B1 or B2 major occupancies, and
- they are used to separate sprinklered buildings regulated by 3.2.6. (high buildings) from other sprinklered buildings.
- The firewall does not separate a building within the scope of Article 3.2.2.43A or 3.2.2.50A from another building unless the buildings on both sides of the firewall are sprinklered.

**STOP**

**EXERCISE #2-9**

Figure 2-5 illustrates various types of firewalls in one storey buildings. Take about 5 minutes to review them. Then read Article 3.1.10.1. Answer the questions, supporting your answer with a Code reference.

1. Illustrations A and B in Figure 2-5 reveal that the connected roof assemblies adjoining the firewall do not have a verifiable fire-resistance rating. Specify the Code requirement for the design of the firewall-roof connection.

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2. Explain the circumstances that would allow a firewall to be supported by the structural frame of a building.

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- 1 Sentences 3.1.13.2.(4) & (5): 10% of total wall area, not counting combustible doors and glazing in non-A1 occupancies, FSR  $\leq$  150.
- 2 Maximum cross-sectional FSR for combustible interior wall finishes.
- 3 Sentences 3.1.13.2.(4) & (5): 10% of total ceiling area, not counting skylights, light diffusers and lenses in non-A1 occupancies, FSR  $\leq$  150.
- 4 Maximum cross-sectional FSR for combustible interior ceiling finishes.
- 5 Article 3.1.13.10.: up to 10% of total wall/ceiling area FSR  $\leq$  150.
- 6 Sentences 3.1.13.2.(4) & (5): 25% of total wall area, not counting combustible doors and glazing in non-A1 occupancies, FSR  $\leq$  150.
- 7 Sentence 3.1.13.2.(3): no limit on FSR where door is in a dwelling unit.
- 8 Clause 3.1.13.6.(1)(b), or upper half of wall FSR  $\leq$  25 and lower half of wall FSR  $\leq$  150, Clause 3.1.13.6.(2).
- 9 Articles 3.2.2.36.  $\rightarrow$  3.2.2.41. require B occupancies to be sprinklered.
- 10 Clause 3.1.5.16.(1)(b) requires SDC  $\leq$  50 if high building

<b>Vertical service spaces</b>	walls	25 <sup>1</sup>	as above
	ceiling	25 <sup>2</sup>	as above
<b>Doors</b> , except A1 occupancies		200 <sup>5</sup>	Sentences 3.1.13.2.(2), (3)
<b>Doors</b> , within residential suites		no limit	Sentence 3.1.13.2.(3)
<b>Bathrooms</b> within Group C occupancies	walls	200	as above ☞ Article 3.1.13.3.
	ceiling	200	as above ☞ Article 3.1.13.3.
<b>Corridors</b> , public and other types not within suites or rooms	walls	75 <sup>6</sup>	as above ☞ Clause 3.1.13.6.(1)(a)
	ceiling	25	as above ☞ Sentence 3.1.13.6.(2)
<b>Plenums</b> , all surfaces	SDC: 50	25	Clause 3.6.4.3.(1)(a)
Other areas	walls	150	Sentence 3.1.13.2.(1)
	ceiling	150	Sentence 3.1.13.2.(1)

- 1 3.1.13.2.(4) & (5): 10% of total wall area, not counting combustible doors and glazing in non-A1, FSR ≤ 150.
- 2 3.1.13.2.(4) & (5): 10% of total ceiling area, not counting skylights, light diffusers and lenses in non-A1, FSR ≤ 150.
- 3 Article 3.1.13.10.: up to 10% of total wall/ceiling area FSR ≤ 150.
- 4 3.1.13.2.(4) & (5): 25% of total wall area, not counting combustible doors and glazing in non-A1, FSR ≤ 150.
- 5 Sentence 3.1.13.2.(3): no limit on FSR where door is in a dwelling unit.
- 6 Clause 3.1.13.6.(1)(b), or upper half of wall FSR ≤ 25 and lower half of wall FSR ≤ 150, Clause 3.1.13.6.(2).
- 7 Articles 3.2.2.36. ☞ 3.2.2.41. Require sprinklers.

**TABLE 2-9**

**Combustible Construction, Sprinklered**

<b>Occupancy, Location or Element</b>	<b>Maximum FSR</b>	<b>Code Reference(s)</b>
	<b>(Surface Flame Spread)</b>	<b>Sentences 3.1.13.2.(1); Table 3.1.13.2.</b>
<b>A1 occupancies</b> , including doors, skylights, glazing, light diffusers & lenses	walls	as above, in header
	ceiling	as above

### **Building height**

*Building height* means the number of storeys contained between the roof and the floor of the first storey.

### **Business and personal services occupancy**

*Business and personal services occupancy* means the occupancy or use of a building or part of a building for the transaction of business or the rendering or receiving of professional or personal services.

### **Combustible**

*Combustible* means that a material fails to meet the acceptance criteria of ULC/CAN4-S114, "Standard Method of Testing for Determination of Non-Combustibility in Building Materials".

### **Combustible construction**

*Combustible construction* means that type of construction that does not meet the requirements for noncombustible construction.

### **Fire-resistance rating**

*Fire-resistance rating* means the time in minutes or hours that a material or assembly of materials will withstand the passage of flame and the transmission of heat when exposed to fire under specified conditions of test and performance criteria, or as determined by extension or interpretation of information derived from that test and performance as prescribed in this Code.

### **Fire separation**

*Fire separation* means a construction assembly that acts as a barrier against the spread of fire.

### **Firewall**

*Firewall* means a type of fire separation of noncombustible construction which subdivides a building or separates adjoining buildings to resist the spread of fire and which has a fire-resistance rating as prescribed in this Code and the structural stability to remain intact under fire conditions for the required fire-rated time.

### **First storey**

*First storey* means the storey with its floor closest to grade and having its ceiling more than 1.8 m above grade.

**TABLE 4-2**

<b>ARTICLES 3.2.2.2. THROUGH 3.2.2.19</b>		
<b>Article</b>	<b>Title</b>	<b>Description</b>
3.2.2.2.	Special and Unusual Structures	Addresses buildings which cannot be categorized in a building classification within Articles 3.2.2.20. to 3.2.2.83.
3.2.2.3.	Exceptions to Structural Fire Protection	Identifies structural members which are exempted from requiring fire protection.
3.2.2.4.	Buildings with Multiple Major Occupancies	States that building height and area are applied in determining construction requirements. If multiple major occupancies are present, this Article mandates the application of Articles 3.2.2.5. through 3.2.2.8.
3.2.2.5.	Applicable Building Height and Area	For a building containing multiple major occupancies, the building height and building area of the entire building must be applied.
3.2.2.6.	Multiple Major Occupancies	Except for "superimposed" major occupancies, special provisions in 3.2.2.43A.(5) and 3.2.2.50A.(4) for Group C and D combustible buildings up to 6 storeys (and those waived in Article 3.2.2.8.,) the most conservative construction classification requirements must be applied when a building contains multiple major occupancies.
3.2.2.7.	Superimposed Major Occupancies	<p>The construction classification of each major occupancy must be assessed as though the entire building were of that occupancy (except those waived in Article 3.2.2.8. and special provisions in Sentences 3.2.2.43A.(5) and 3.2.2.50A.(4))</p> <p>The fire-resistance rating required for the floor separating superimposed major occupancies is based on the ratings required for the lower major occupancy.</p>



<b>ARTICLES 3.2.2.2. THROUGH 3.2.2.19</b>		
3.2.2.17.	Sprinklers in Lieu of Roof Rating	Permits the waiver of roof rating requirements of Articles 3.2.2.20. through 3.2.2.83. provided the criteria of Sentence 3.2.2.17.(1) are met (except for buildings classified under Articles 3.2.2.43A. and 3.2.2.50A.
3.2.2.18.	Automatic Sprinkler System Required	Sprinkler systems required by Articles 3.2.2.20. though 3.2.2.83. must meet the requirements of Articles 3.2.4.7. through 3.2.4.9. and Article 3.2.5.13.
3.2.2.19.	Buildings Containing Impeded Egress Zones	Permits the waiver of Articles 3.2.2.36 and 3.2.2.37 for buildings containing impeded egress zones under specific conditions.

The following Table 4-3 provides summary information on the general organization of the construction classification requirements.

**TABLE 4-3**

<b>FORMAT OF ARTICLES 3.2.2.20. THROUGH 3.2.2.83.</b>			
<b>Size</b>	<b>Building Type</b>	<b>Reference</b>	<b>Size Limits</b>
Large ↓ Smaller	Group A, Division 1	3.2.2.20. 3.2.2.21. 3.2.2.22.	Any height, any area, sprinklered 1 storey, limited area 1 storey
Large ↓ Smaller	Group A, Division 2	3.2.2.23. 3.2.2.24.  3.2.2.25. 3.2.2.26.  3.2.2.27. 3.2.2.28.	Any height, any area, sprinklered up to 6 storeys, any area, sprinklered Up to 2 storeys up to 2 storeys, increased area, sprinklered up to 2 storeys, sprinklered 1 storey

Large  Smaller	Group A, Division 3  Group A, Division 4	3.2.2.29.  3.2.2.30. 3.2.2.31. 3.2.2.32. 3.2.2.33. 3.2.2.34. 3.2.2.35.	Any height, any area (if under Subsection 3.2.6., sprinklered)  Up to 2 storeys Up to 2 storeys, sprinklered 1 storey, increased area 1 storey, sprinklered 1 storey 1 storey - all buildings, sprinklered in all spaces below seats used for occupancy
Large  Smaller	Group B, Division 1  Group B, Division 2  Group B, Division 3	3.2.2.36. 3.2.2.37.  3.2.2.38. 3.2.2.39. 3.2.2.40. 3.2.2.41.	Any height, any area, sprinklered Up to 3 storeys, sprinklered  Any height, any area, sprinklered Up to 3 storeys, sprinklered Up to 2 storeys, sprinklered One storey, sprinklered
Large  Smaller	Group C	3.2.2.42. 3.2.2.43. 3.2.2.43A  3.2.2.44.  3.2.2.45. 3.2.2.46. 3.2.2.47. 3.2.2.48.	Any height, any area, sprinklered Up to 6 storeys, sprinklered Up to 6 storeys, sprinklered, combustible plus special provisions  Up to 4 storeys, noncombustible construction  Up to 4 storeys, sprinklered Up to 3 storeys, increased area Up to 3 storeys Up to 3 storeys, sprinklered
Large  Smaller	Group D	3.2.2.49.  3.2.2.50. 3.2.2.50A.  3.2.2.51. 3.2.2.52. 3.2.2.53. 3.2.2.54. 3.2.2.55. 3.2.2.56.	Any height, any area (if under Subsection 3.2.6., sprinklered)  Up to 6 storeys Up to 6 storeys, sprinklered combustible construction with special provisions.  Up to 6 storeys, sprinklered Up to 4 storeys, sprinklered Up to 3 storeys Up to 3 storeys, sprinklered Up to 2 storeys Up to 2 storeys, sprinklered

5. A sprinklered building having fire compartments of Group D and Group F Division 1 occupancies has an exposing building face with the following characteristics.

Group D occupancy has 30% allowable unprotected openings Group F, Division 1 occupancy - 40% allowable unprotected openings.

Describe the construction of the exposing building faces.

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**STOP**

### **FIRE EXPOSURE BETWEEN FIRE COMPARTMENTS**

The intent of Articles 3.2.3.13. and 3.2.3.14. is to reduce the probability of the spread of fire from one fire compartment to an adjacent fire compartment in the same building through unprotected openings in the exterior wall of the fire compartment of origin.

Where two exposing building faces form an angle of 135° or less (in the case of parallel EBF, the angle of intersection is 0°), there is a potential danger of fire spreading from one fire compartment to the other, if the walls contain openings or do not have sufficient fire-resistance. To reduce this risk, each exterior wall must be constructed with limits on the amount of unprotected openings and with a fire-resistance rating not less than that of the fire separation between the fire compartments and the rest of the building.

This requirement is waived for all fire compartments in sprinklered buildings, except for exit facilities, unprotected openings on opposite sides of firewalls, and exposure from openings in a fire compartment that does not have an automatic sprinkler system [Article 3.2.3.13. and Sentence 3.2.3.14.(3)].

### **STOP**

## MID-RISE COMBUSTIBLE BUILDINGS

As of January 1, 2015 the Building Code made provisions to permit mid-rise buildings up to 6 storeys of combustible construction for Group C and Group D occupancies where they comply with specified provisions and restrictions. Prior to January 1, 2015, combustible construction was limited to buildings up to 4 storeys in accordance with the classification Articles 3.2.2.20 to 3.2.2.83. To accommodate combustible construction for mid-rise buildings up to 6 storeys in height two new Articles were included in the code.

Division B, Article 3.2.2.43A., Group C, up to 6 Storeys, Sprinklered, Combustible Construction

and

Division B, Article 3.2.2.50A., Group D, up to 6 Storeys, Sprinklered, Combustible Construction

Both Articles:

- have limitations on building height and building area
- require exits to be noncombustible fire separations
- require the roof to be noncombustible beyond a stipulated height
- allow assembly, mercantile and storage garage below the third storey.

Mid-rise combustible Group C and Group D buildings up to 6 storeys in height warrant special considerations to prevent the spread of fire and as a result there are exceptions to several Articles throughout Part 3.

Division B, Article 3.1.3.1 Separation of Major Occupancies, requires that a minimum 2 h fire-resistance rating be provided between Group C and Group A, Division 2 major occupancies in mid-rise combustible buildings and between Group D and Group A, Division 2 major occupancies in mid-rise combustible buildings.

In addition, Article 3.1.3.2., Prohibition of Occupancy Combinations, in mid-rise combustible Group C and Group D buildings prohibit:

- Group A, Division 1 or 3, Group B, Group F, Division 1 or 2 major occupancies

- Group A, Division 2 or Group E major occupancies above the second story
- Group F, Division 3 major occupancy, except for a storage garage which is permitted below the third storey.

Division B, Article 3.1.4.8. requires that cladding must be noncombustible when the building height exceeds 4 storeys.

Division B, Article 3.1.4.9. permits combustible piping, tubing and associated adhesives in mid-rise combustible buildings as long as they have a flame spread rating of not more than 25 except for items noted in this Article.

Division B, Sentence 3.1.7.5.(3) permits combustible construction to support noncombustible roofs when required in mid-rise combustible buildings.

Division B, Clause 3.1.10.2.(4)(e) requires firewalls that separate mid-rise combustible buildings from unsprinklered buildings be of masonry or concrete construction.

Division B, Article 3.1.11.5. requires fire blocks within concealed spaces of mid-rise combustible buildings in addition to sprinkler requirements of NFPA 13 or, the concealed spaces may instead be filled with noncombustible insulation.

Division B, Sentence 3.1.15.2.(2) requires that a combustible roof coverings on a mid-rise combustible building must have a Class A classification.

Multiple major occupancies described in Article 3.2.2.6. and rules on superimposed major occupancies in Article 3.2.2.7. are further restricted by Sentences 3.2.2.43A.(5) and 3.2.2.50A.(4) by restricting A2, E and storage garage occupancies below the third storey in a mid-rise combustible building.

Division B, Sentence 3.2.2.10.(3) requires that a minimum of 10 % of the building perimeter must be located within 15 metres of a street or streets.

Division B, Sentence 3.2.2.17.(2) requires that the roof rating for any mid-rise combustible building, even though the building has a supervised sprinkler system, may not be waived.

Division B, Article 3.2.3.7. was amended to include new requirements for mid-rise combustible buildings for cladding. Where the unprotected openings are permitted to be greater than 10% and the building height exceeds 4 storeys, the cladding must be non-combustible or the wall assembly must comply with CAN/ULC-S134, and where fire retardant treated wood is used, it must conform to accelerated weathering conditioning before subjecting the wall assembly to CAN/ULC-S314 tests.

Division B, Sentence 3.2.5.6.(2) restricts the location of the fire access route serving the mid-rise combustible building to be not more than 20 metres below the uppermost floor level of the uppermost storey (including mezzanines) that are included in the building height.

Division B, Sentence 3.2.5.13.(7) requires that Balconies and decks which project more than 610 mm from Mid-rise combustible buildings must be sprinklered, except that decks on the uppermost roof of the building are exempt from the sprinklering requirements.

Division B, Sentences 3.2.7.4.(1) and 3.2.7.8.(3) require that emergency lighting be provided for a minimum 1 hour and 1 hour emergency power be provided for fire alarm systems in mid-rise combustible buildings.

Division B, Sentence 3.4.4.1.(3) requires fire separations for exit stairs have a minimum 1.5 hours fire resistance rating.

Additional requirements specific structural design, additional requirements for buildings more than 5 years old and undergoing renovations and expansion to Group C and Group D mid-rise combustible buildings are found in other parts of the code and are not dealt with in this course.

## **STOP**

**EXERCISE 5-6**

1. What is the maximum building area permitted for a 6 storey apartment building of combustible construction ?

If sprinklered:

---

If unsprinklered:

---

## **FIRE DEPARTMENT NOTIFICATION**

Article 3.2.4.8., "Signals to Fire Department", identifies conditions where specific signals from the fire alarm system are required to be transmitted to the fire department directly, or to a proprietary monitoring station.

The following conditions require the transmission of fire alarm signals to the fire department:

- a) Group A (assembly) occupancy with an occupant load exceeding 300 persons,
- b) All Group B (detention, care, and care and treatment) occupancies,
- c) Group F, Division 1 (high hazard) occupancy,
- d) Buildings regulated under Subsection 3.2.6. (high buildings),  
OR
- e) Buildings that contain interconnected floor space that is required to comply with Articles 3.2.8.3. to 3.2.8.11. (atriums),
- f) Retirement homes regulated under the Retirement Homes Act, 2010 that is a Group C occupancy.

Fire alarm systems that include waterflow indicating devices must notify the fire department that an alarm has been initiated [3.2.4.8.(2)].

In a two-stage fire alarm system, the system shall be designed to notify the fire department that an alert signal has been initiated [3.2.4.8.(3)].

Where a single stage alarm is installed in an unsprinklered building, a legible notice shall be affixed to the wall near each pull station stating:

- a) fire department is to be notified,
- b) emergency telephone numbers for either the municipality or the fire department.

It should also be noted that the requirement for automatic fire alarm transmission to the fire department may also originate from Article 3.2.2.17. where a sprinkler system is provided in lieu of a roof fire rating.

- Sentences (2) through (7) apply to hotels or dwelling units.
- Sentence (8) applies to impeded egress zones and contained use areas in Group B, Divisions 1 and 2 occupancies.

Due to barrier-free requirements in Article 3.8.1.5., fire alarm pull stations are required to be located between 900 mm and 1,200 mm above the finished floor.

Pull stations are required to be provided by Clause 3.4.6.16.(4)(f) for the installation of electromagnetic locks.

### **VOICE COMMUNICATION**

Article 3.2.4.23., "Voice Communication Systems", applies primarily to high buildings, with one exception:

- A voice communication system is required for an assembly occupancy with fixed seats, if the aisles are designed to comply with Sentence 3.3.2.4.(14). Clause 3.3.2.4.(14)(f) requires a voice communication system that complies with Article 3.2.4.23.

Clause 3.2.4.23.(1)(a) requires that a two-way communication system for each floor area be provided with connections to the central alarm and control facility (CACF) and to the mechanical control centre.

The requirements in Article 3.2.4.23. are summarized as:

- Sentence (3) B Silencing the alarm signal in single stage system to allow transmission of voice messages is permitted after 30 s.
- Sentence (4) B Silencing the alert and alarm signals in a two-stage system to allow transmission of voice messages is permitted after the alert signal has transmitted for not less than 10 s in hospitals with 24 h supervision or 30 s for all other occupancies.
- Sentence (5) B Loudspeaker system required in Clause 3.2.4.23.(1)(b) be designed for selectivity to any zone or zones.
- Sentence (6) B The emergency telephones for the two-way communication system required in Clause 3.2.4.23.(1)(a) are required to be located on each floor area near each exit stair shaft.

For high buildings subject to requirements of Subsection 3.2.6., "Additional Requirements for High Buildings", the CACF is a separate

## WATER SUPPLY

Article 3.2.5.7., "Water Supply", requires an "adequate water supply for firefighting" to be provided for every building. Sentence 3.2.5.7.(1) refers to A-3.2.5.7 in the Appendix for guidance in determining adequate water supply for firefighting purposes.

Sentence (2) requires that fire hydrants be located within 90 m, measured horizontally from the exterior wall, of any portion of the building perimeter that is required to face a street. For example, 50% of a building perimeter faces a street or streets, and is considered to face two streets; that 50% of the building perimeter is required to be within 90 m of a fire hydrant, measured horizontally from the building face.

## SPRINKLER SYSTEMS

This section of the module identifies sprinkler requirements not only in Subsection 3.2.5. but from other areas in Part 3 of the Code.

Article 3.2.5.13., "Automatic Sprinkler Systems", Article 3.2.5.14., Combustible Sprinkler Piping, and Article 3.2.5.15., "Sprinklered Service Space", provide design and installation requirements for sprinkler systems.

In general, the above three Articles amend the corresponding requirements of NFPA 13, "Installation of Sprinkler Systems".

The seven Sentences under Article 3.2.5.13, "Automatic Sprinkler Systems", are summarized as:

1. Except as permitted in Sentences (2), (3) and (4), sprinkler systems are required to comply with the design, construction, installation and testing requirements of NFPA 13.
2. NFPA 13R, "Installation of Sprinkler Systems in Residential Occupancies Up To and Including Four Stories in Height", is permitted to be used in a building of residential occupancy that is not more than four storeys in building height, or in a Group B, Division 3 occupancy with not more than 10 persons and not more than six of those persons require assistance with evacuation.

3. NFPA 13D, "Installation of Sprinkler Systems in One and Two Family Dwellings and Manufactured Homes", is permitted to be used in a building of residential occupancy that contains not more than two dwelling units except that when the sprinkler system is installed in a retirement home, it must have a 20 minute water supply.
4. Where fewer than nine sprinkler heads serve a building, the water supply is permitted to be supplied from the domestic water supply provided that the required flow for the sprinklers can be met by the domestic system.
5. Separate water control valves are required for sprinkler systems and other equipment that is served by the same water supply.
6. Regardless of the requirements of NFPA 13 and NFPA 13R, sprinklers are required in any room or closet in the storey immediately below a roof assembly with the fire-resistance waived as a result of application of Article 3.2.2.17 for sprinklered buildings that are electrically supervised and alarm signals are transmitted to the fire department.
7. Balconies and decks more than 610 mm in depth in mid-rise combustible buildings not more than 4 storeys in building height within the scope of 3.2.2.43A or 3.2.2.50A shall be sprinklered, but sprinklers are not required on decks on the uppermost roof of such building.
8. Sprinklers in elevator machine rooms are required to have a minimum intermediate temperature rating and be protected against physical damage.
9. If the Building described in point 4 above is a retirement home regulated under the Retirement Home Act 2010, the sprinkler system shall be provided with a water supply for minimum 20 minutes.

### **COMBUSTIBLE SPRINKLER PIPING**

Sentence 3.2.5.14.(1) limits the use of combustible sprinkler piping to wet systems in residential occupancies and other light hazard occupancies. An example of a light hazard occupancy is Group D, "Business and Personal Services".

The remaining four Sentences identify additional installation requirements necessary to permit combustible sprinkler piping.

Sentence 3.2.7.8.(3) requires the emergency power source for the fire alarm system to be capable of providing supervisory power for a minimum duration of 24 h, plus

- 2 h under full load for a fire alarm system for buildings within the scope of Subsection 3.2.6. (high buildings), or
- 1 h under full load for a Group B building that is not within the scope of Subsection 3.2.6., or
- 1 h for a building Group C or Group D mid-rise combustible building within the scope of Articles 3.2.2.43A. or 3.2.2.50A., or
- 5 min under full load for a building that is not required to be equipped with an annunciator [refer to Sentences 3.2.4.9.(3) to (5)], or
- 30 min under full load for all other buildings.

### **EMERGENCY POWER FOR BUILDING SERVICES**

Article 3.2.7.9., “Emergency Power for Building Services”, addresses emergency power provisions for specific building services that include:

- elevators,
- water supply for firefighting, and
- fans and electrical equipment used for smoke control.

Emergency power for elevators and other equipment that is required to provide smoke control are high building requirements and are not within the scope of the Large Buildings 2012 course. These requirements are addressed in the Complex Buildings 2012 course.

### **PROTECTION OF ELECTRICAL CONDUCTORS**

Electrical conductors that are used in conjunction with fire alarm systems, and with emergency equipment described in Articles 3.2.6.2. to 3.2.6.8. and 3.2.7.3. and Sentences 3.3.3.6.(1) and 3.3.3.7.(4), shall be protected as per Sentences 3.2.7.10.(2) to (9).

### **EMERGENCY POWER FOR WATER SUPPLY FOR FIREFIGHTING**

Clause 3.2.7.9.(1)(b) and Sentences 3.2.7.9.(4) and (5) address emergency power requirements for the water supply for firefighting purposes.

A-3.2.5.7 in the Appendix provides guidance in determining adequate water supply for firefighting purposes. With respect to

Clause 3.2.7.9(1)(b), for high buildings, water supply refers to the water supply that is required for the sprinkler or standpipe system and that is dependent on electrical power supplied to the building (i.e. if a fire pump is required to provide the required water flow (volume and/or pressure) for the sprinkler or standpipe system).

Emergency power by an emergency generator is required for a water supply that is dependent on electrical power supplied to the building, for the duration of not less than:

- 2 h under full load for buildings within the scope of Subsection 3.2.6. (high buildings) [Clause 3.2.7.9.(1)(b)].
- 30 min under full load for buildings not within the scope of Subsection 3.2.6. This requirement does not apply to a standpipe system [Sentences 3.2.7.9.(4) and (5)]. It applies to sprinkler systems.

### **EMERGENCY POWER FOR ELECTRICAL EQUIPMENT FOR SMOKE CONTROL**

Emergency power for required smoke control systems are high building requirements and are not within the scope of the Large Buildings 2012 course. These requirements are addressed in the Complex Buildings 2012 course.

### **EXERCISE #6-7**

(Circle the correct answer and cite the Code reference)

1. Based on Subsection 3.2.7., what is the minimum required duration for emergency power for lighting in a hospital that is not within the scope of Subsection 3.2.6.?
  - a) 1 h
  - b) 2 h
  - c) 30 min

---

[ \_\_\_\_\_ ]

Sentence 3.2.8.1.(2) does not allow the exemptions in Sentence (1) to apply to the fire separation requirements for exits and vertical service spaces in Sections 3.4, "Exits", 3.5, "Vertical Transportation", and 3.6, "Service Facilities".

As such, exits and vertical service spaces are required to be fire separated as required in other parts of the Code.

Sentence 3.2.8.1.(3) does not permit sleeping rooms in a building of Group B, Division 2 or 3 major occupancy to be part of an interconnected floor space.

Sentences 3.2.8.1.(4) and (5) apply to an interconnected floor space within an elementary or secondary school as follows:

- The only type of interconnected floor space permitted is between the first storey and one adjacent storey.
- The interconnected floor space is sprinklered.
- The upper floor of the interconnected floor space is required to be fire separated from the interconnected floor space. A corridor on the upper floor of the interconnected floor space is required to be separated from the interconnected floor space by a fire separation with a minimum 30 min fire-resistance rating. Rooms and occupied spaces on the upper floor of the interconnected floor space are required to be separated from the interconnected floor space by a nonrated fire separation.
- A portion of a floor area that is not located within the interconnected floor space is not permitted to provide access to exit through the interconnected floor space.

### **ARTICLE 3.2.8.2., "EXCEPTIONS TO SPECIAL PROTECTION"**

This Article is more commonly used since it applies to 'open' and 'enclosed' mezzanines, openings between floor levels of storage garages, openings for manufacturing processes, openings for stairs, escalators and walks, industrial platforms and walkways, and two storey Article 3.2.8.2. exempts mezzanines and interconnected floor conditions that comply with Article 3.2.8.2., from complying with the special protection requirements of Articles 3.2.8.3. through 3.2.8.11.

Sentence 3.2.8.2.(1) covers exemptions for five mezzanine conditions. The following mezzanines are not required to terminate at a vertical fire separation or be protected in compliance with Articles 3.2.8.3.

Moveable partitions may be used as egress doors in business and personal service occupancies and in mercantile occupancies, provided they are not the only means of egress from the room or suite and no fire separation is required for the public corridor [Sentence 3.3.1.11.(3)].

### **Door Size and Hardware**

A door that provides access to exit from a room or suite into a public corridor or is located within a public corridor shall have a minimum clear opening width of 800 mm. (Read Article 3.3.1.12. for all criteria.) Doors in a barrier-free path of travel require a minimum clear width of 860 mm [Sentence 3.8.3.3.(1)].

B1 and B2 occupancies have different minimum door widths of 1100 mm or 1050 mm, as per Sentences 3.3.3.3.(4) and 3.3.3.4.(1).

A door in an access to exit must be readily openable in the direction of egress without requiring keys or special devices, or specialized knowledge of the door opening mechanism. Electromagnetic locking devices where permitted elsewhere in the Code are deemed to comply with this requirement [Sentences 3.3.1.12.(2) and 3.3.1.12.(10)].

Except for dwelling units or other suites of residential occupancy (e.g. hotel/motel) the door release hardware shall be operable by one hand and the door shall be openable with not more than one releasing operation [Sentence 3.3.1.12.(3)].

The door release hardware shall be located not more than 1200 mm above the floor surface [Sentence 3.3.1.12.(5)].

### **GLAZING IN DOORS AND SIDELIGHTS**

The Code recognizes that there is a potential hazard created by glazing in doors, sidelights and partitions where occupants are not aware of the glazing or can mistake a glazed sidelight or partition as a doorway opening. Glass doors shall be laminated or tempered safety glass or wired safety glass [Sentence 3.3.1.18.(1)].

### EXERCISE #7-4

Review Subsections 3.3.2. and 3.3.3., and Section 3.8.

1. A classroom in a secondary school has a total occupant load of 60 persons. The room has a single egress door. The door may swing into the classroom. True or False?

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[ \_\_\_\_\_ ]

2. A classroom in a school is located in a dead-end corridor. The occupant load in the classroom is not more than 60 persons. Under what conditions is this egress arrangement permissible?

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[ \_\_\_\_\_ ]

3. What is the minimum clear opening width of a doorway serving a meeting room in a school that is required to comply with the barrier-free design requirements of the Code? The room has a single means of egress and can accommodate up to 30 persons.

---

[ \_\_\_\_\_ ]

4. An owner wishes to install an electromagnetic locking device (EMLD) on a door to a computer room in an office building. The room is permitted to have a single egress door and will have an occupant load of 15 persons. The EMLD will be installed in accordance with Sentence 3.4.6.16.(4) and may be unlocked by the activation of a pull station located on the room side of the door. Is this locking device permitted, or does it contravene Sentences 3.3.1.12.(2) and (3)?

---

[ \_\_\_\_\_ ]

the vestibules and the vestibules shall be vented naturally or mechanically.

Basements in industrial occupancies cannot be used for the storage, manufacture or handling of volatile solids, liquids or gases that generate explosive air/vapour mixtures or for processes that involve explosive dusts [3.3.5.3.(1)].

Where such processes occur above grade, entrances and exits to basements and rooms containing building services shall be fire separated from the remainder of the building and the separations shall be vapour-tight [3.3.5.2.(3)].

## STOP

### EXERCISE #7-5

1. What is the minimum size of a balcony in a 3 bedroom dwelling unit for compliance as an area of refuge under Article 3.3.1.7. for protection of floor areas in a barrier-free path of travel?

\_\_\_\_\_ [ \_\_\_\_\_ ]

\_\_\_\_\_ [ \_\_\_\_\_ ]

2. What is the minimum height of a guard in the front of seats in the balcony of a theatre?

\_\_\_\_\_ [ \_\_\_\_\_ ]

3. What is the maximum length of a dead-end aisle in a classroom with fixed seats if the classroom is not separated from adjacent classrooms or the corridor used by the public?

\_\_\_\_\_ [ \_\_\_\_\_ ]

4. What fire separation is required between a kitchen and a servery in a sprinklered secondary school cafeteria with seating for 250 students?

\_\_\_\_\_ [ \_\_\_\_\_ ]

The following is an example of the steps that may generally be used to determine the amount of water closets and lavatories required in a typical building.

1. Calculate occupant load in accordance with Subsection 3.1.17.
2. Use the applicable article in Subsection 3.7.4. to determine the required number of water closets for each sex.
3. Calculate number of lavatories from Article 3.7.4.2 (5).
4. Water closets shall be provided for each sex assuming that the occupant load is equally divided between males and females [3.7.4.2.(2)]

However, both sexes are permitted to be served by a single water closet if the occupant load is not more than 10 persons in assembly occupancy except for:

- Elementary and secondary schools,
  - Child care facilities,
  - Place of worship,
  - Undertaking premises,
  - Dining rooms, restaurants, cafeterias and alcoholic beverage establishments [3.7.4.2.(8)].
5. The water closet and lavatory provided in a universal toilet room may be counted as part of the plumbing fixtures required for males and females if:
    - More than one water closet is required for males, and
    - More than one water closet is required for females [3.7.4.2.(7)].
  6. Lavatories, except for dwelling units, are required to be equipped with faucets that operate automatically, or have lever type handles that do not close under spring action [3.7.4.2.(11)].

## STOP

## 10.7 HEALTH CARE FACILITY SYSTEMS (SUBSECTION 3.7.5.)

Health care facility systems are regulated by Subsection 3.7.5.

In anaesthetizing locations, electrical systems shall be designed, constructed, installed and tested in conformance with CSA Z32, "Essential Electrical Systems in Health Care Facilities" [3.7.5.1.(1)].

All medical gas piping systems shall be designed, constructed, installed and tested in conformance with CSA Z7396.1, "Medical Gas Piping Systems – Part 1: Pipelines for Medical Gases and Vacuum" [3.7.5.2.(1)].

Every installation of an x-ray machine or x-ray equipment in a building shall be shielded to protect any person who could be exposed to radiation inside or outside the building [3.7.5.3.(1)].

Take 5 minutes to read Subsection 3.7.5.

Notes:

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**STOP**

## 11.2 OVERVIEW

### DEFINITIONS

The following definitions are taken from Division A, Part 1. While italicized in this section, they will not be italicized in the remainder of this module.

#### **Adaptable seating**

*Adaptable seating* means a fixed seat or seats designed to facilitate a side transfer from a wheelchair.

#### **Dwelling unit**

*Dwelling unit* means a suite operated as a housekeeping unit, used or intended to be used as a domicile by 1 or more persons and usually containing cooking, eating, living, sleeping and sanitary facilities.

#### **Guard**

*Guard* means a protective barrier, with or without openings through it, that is around openings in floors or at the open sides of stairs, landings, balconies, mezzanines, galleries, raised walkways or other locations to prevent accidental falls from one level to another.

#### **Occupancy**

*Occupancy* means the use or intended use of a building or part of a building for the shelter or support of persons, animals or property.

#### **Occupant load**

*Occupant load* means the number of persons for which a building or part of a building is designed.

#### **Storey**

*Storey* means that portion of a building which is situated between the top of any floor and the top of the floor next above it, and if there is no floor above it, that portion between the top of such floor and the ceiling above it.

#### **Suite**

*Suite* means a single room or series of rooms of complementary use, operated under a single tenancy, and includes dwelling units, individual guest rooms in motels, hotels, boarding houses, rooming houses and dormitories as well as individual stores and individual

## OCCUPANCY REQUIREMENTS

Generally a barrier-free path of travel is required throughout the entrance storey, and within every floor area served by an elevator or other passenger elevator device in all buildings, except to those occupancies and floor areas which are exempt from accessibility requirements listed in Sentence 3.8.1.1.(1) and in Sentences 3.8.2.1.(2) and (3).

Occupancies that are exempt from accessibility requirements are as follows:

- a) houses, including semi-detached houses, duplexes, triplexes, townhouses, row houses and boarding or rooming houses with fewer than 8 boarders or roomers,
- b) Group F, Division 1 major occupancies
- c) buildings which are not intended to be occupied on a daily or full time basis, including automatic telephone exchanges, pumphouses and substations, and
- d) camps for housing of workers [3.8.1.1.(1)].

A barrier-free path of travel is not required to extend to:

- a) floor areas containing Group B, Division 1 and 2 occupancies that are not required by Article 3.5.2.1. to be connected by a ramp or served by an elevator,
- b) Group C or Group D occupancies that are in floor areas in a building that is three or fewer storeys in building height and has a building area not exceeding 600 m<sup>2</sup>,
- c) Group F, Division 2 or 3 occupancies that are not required by Sentence 3.8.2.2.(1) to be served by an elevator,
- d) portions of restaurants and licensed beverage establishments where the same amenities and uses are found on other floors that have a barrier-free path of travel, or
- e) portions of child care facilities that have all entrance doors at floor levels that do not have a barrier-free path of travel.

In buildings that contain Group C major occupancies, not less than 15% of all residential suites are required to be provided with a barrier-free accessible path of travel from the suite entrance to the doorway leading to at least one bedroom, to the doorway to at least one bathroom that is located on the suite entrance floor level, to a kitchen or kitchen space, and to a living room or space.

[3.8.2.1.(5).] The accessible bathroom shall contain a lavatory, water closet, a bathtub or a shower, have wall reinforcement installed in conformance with 3.3.4.9.(1) to support grab bars, and be designed to permit a wheelchair to turn in an open space not less than 1500 mm in diameter. [3.8.2.1.(6)]

The number of accessible suites described in Sentence 3.8.2.1.(5) having 1, 2 or 3 or more bedrooms shall be in proportion to the number of suites of residential occupancy having 1, 2 or 3 or more bedrooms in the remainder of the building [3.8.2.1.(7)], and they shall be distributed among storeys that are required by Article 3.8.2.1. to have a barrier-free path of travel, having regard for the height of the suite above grade. In other words, the accessible suites must be evenly distributed to all floors served by an elevator that are required to have a barrier-free path of travel and are not to be restricted all to the ground floor [3.8.2.1.(8)].

5. Consider a strip mall with individual mercantile suites. Which mercantile suites do not require a barrier-free washroom?

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[ ]

6. A 3 storey building of medium hazard industrial occupancy that is not required to be served by an elevator shall have washrooms designed to have at least one ambulatory water closet.

True or False?

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[ ]

**STOP**

## 11.5 DESIGN STANDARDS

Specific criteria is prescribed by the Code for the design of facilities provided in a barrier-free path of travel to serve persons requiring assistance. Major design components of Subsection 3.8.3. are identified for discussion purposes.

### Doors and Doorways

All doorways in a barrier-free path of travel are required to provide a clear width of 860 mm [3.8.3.3.(1)]. Standard wheelchairs range from 584 mm to 685 mm in width.

Clear width is defined as the width of the doorway measured with the door in the open position. As such, the minimum width of a door in a barrier-free path of travel should be approximately 925 mm to ensure the minimum clear width of 860 mm (note that door widths may have to be increased to allow for any projecting exit hardware).

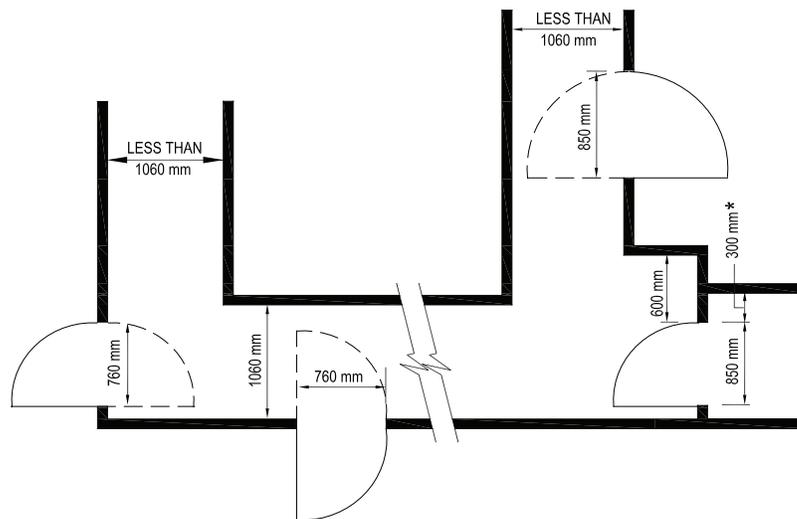
Sufficient clearance on the latch side of the door is required to permit a person in a wheelchair to approach and open a door where a door is equipped with a closer. Unless a door is equipped with a power door opener, where a door swings away from the approach side, a 300 mm clearance to the latch side of the door is required. Where a door swings toward the approach side, a 600 mm clearance to the latch side of the door is required and where there is a sliding door, a 300 mm clearance shall be provided beyond both sides of the sliding door [3.8.3.3.(10)].

See Figure 11-3.

Where residential suites are located on a barrier-free storey, doorways serving bedrooms and washrooms are regulated although the remainder of the suite is not [3.8.3.3.(2)].

Corridor Width	Clear Doorway Width
less than 1060 m	810 mm
minimum 1060 m	760 mm

See Figure 11-4.



\* Note: Does not apply to residential suits not regulated by Sentence 3.8.2.1.(5)

FIGURE 11-3

## Power Door Operators

Every door that provides a barrier-free path of travel through a barrier-free entrance (and every door in a vestibule that forms part of the barrier-free entrance) as required by Article 3.8.1.2. shall be equipped with a power door operator if the entrance serves a building containing a Group A, Group B, Division 2 or 3, Group C, Group D or Group E occupancy. [3.8.3.3.(4) & (5)]. In addition, a power door operator is required where the door serves a washroom for public use required to be barrier-free or a Group A occupancy within a Group C major occupancy apartment building [3.8.3.3. (6)]. Only the active leaf in a multiple leaf door in a barrier-free path of travel need conform have a power door operator [3.8.3.3.(12)].

Vestibules in a barrier-free path of travel are required to provide sufficient length between two doors in series. The minimum length between doors is 1500 mm plus the width of the door that swings into the vestibule and where the doors are not aligned, a turning diameter of 1500 mm within the vestibule, clear of any door swing is required [3.8.3.3.(11)].

A normally occupied floor area that is not required by Article 3.8.2.1. to have a barrier-free path of travel must still comply with the following barrier-free requirements:

- all doorways in public corridors in a normally occupied floor area must have a clear width of 860 mm when open
- door opening devices that are the only means of opening the door must be operable using a closed fist and be mounted between 900 mm and 1100 mm above the finished floor
- where a vision panel is provided the panel must be at least 75 mm in width and located so that the bottom of the panel is not more than 900 mm above the floor and the edge of the panel closest to the latch is not more than 250 mm from the latch side of the door,
- doors consisting of sheets of glass shall be marked with a continuous opaque strip conforming to 3.8.2.1.(15)., and
- where a power door operator is installed it shall be installed on the latch side so as to allow the person to activate the opening of the door from either side and where a proximity scanning device is installed the control for a power door operator shall comply with the requirements of 3.8.2.1.(17). [3.8.2.1.(19).]

### **Ramps [3.8.3.4.]**

Ramps can be difficult to negotiate if the slope is too great or the length too long. Ramps in a barrier-free path of travel are not permitted to exceed a 1 in 12 slope. Ramps are permitted to extend a maximum of 9 m horizontally between level areas [3.8.3.4.(1)].

Level areas that divide ramps into intervals of not more than 9 m and where there is a change of 90 degrees or more in direction, are required to be at least 1670 mm long and at least the same width as the ramp. The top and bottom of ramps are required to have level areas that are at least 1670 mm long and 1670 mm wide. Ramps are required to have a minimum width of 900 mm between handrails.

See Figure 11-5.

### **Seating Areas [3.8.3.6.]**

Assembly areas with fixed seating are required to provide designated seating for wheelchair use and a minimum number of fixed seat designated for adaptable seating [3.8.2.1.(4)]. The floor slope required for a barrier-free path of travel is only intended to apply to the actual designated seating and aisles leading to the seating area. It is not intended to apply to aisles and floor areas serving fixed seating [3.8.3.6.(1)]. The requirements for the location and configuration of wheelchair spaces, companion seats and adaptable seating are detailed in Sentences 3.8.3.6.(1) and (2). Storage of wheelchairs and mobility assistive devices, such as walkers, must also be accommodated in an assembly occupancy with fixed seats in accordance with Sentence 3.8.3.6.(3).

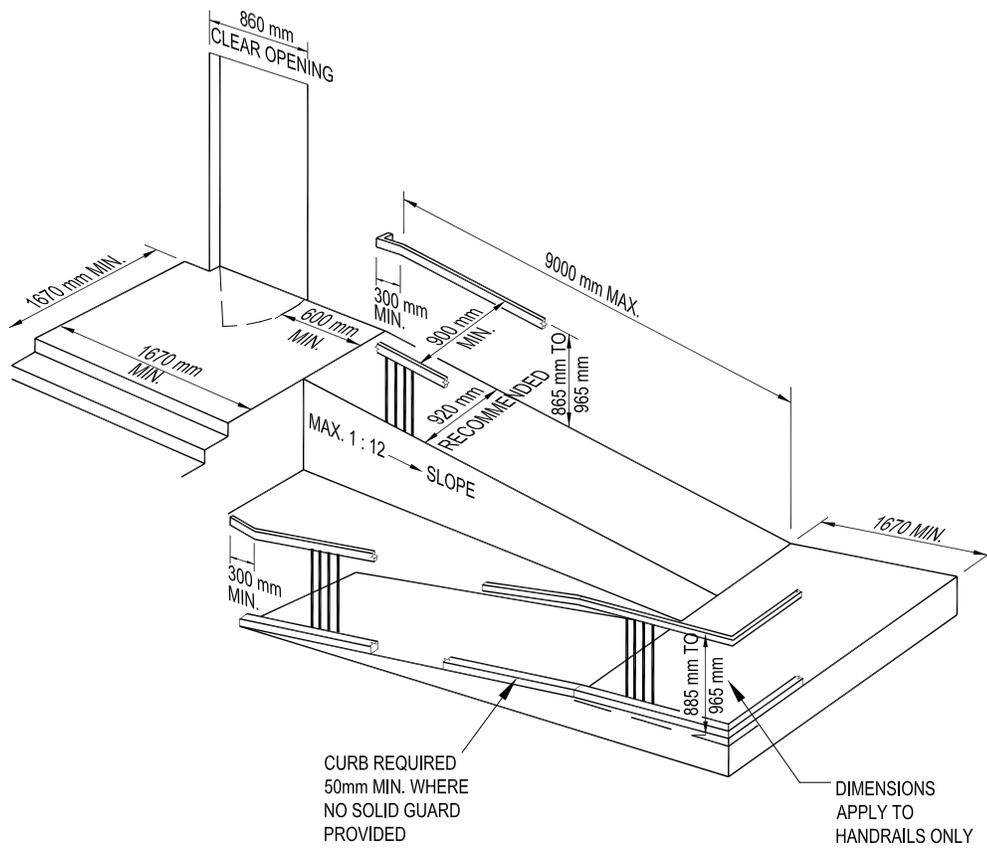


FIGURE 11-5

**Assistive Listening Devices [3.8.3.7.]**

Assembly occupancies greater than 100 m<sup>2</sup> and with an occupant load of more than 75 people are required to be equipped with assistive listening systems [3.8.3.7.(1)].

**Washrooms**

Where barrier-free washrooms are required in accordance with Article 3.8.2.3., at least one water closet is required to meet the dimensional requirements outlined in Articles 3.8.3.8. and 3.8.3.9., urinals must meet the requirements of Article 3.8.3.10. and lavatories are required to meet the requirements of Article 3.8.3.11. [3.8.3.8. and 3.8.3.11.]. Ambulatory water closet stalls are required in a washroom on a floor area where a barrier-free path of travel is not required. Design criteria for ambulatory washrooms are outlined in Sentence 3.8.3.8.(10).

**Universal Toilet Rooms**

Special washrooms are usually provided as unisex washrooms as an alternative to providing barrier-free washroom stalls in individual washrooms used by the general public. The number of universal washrooms required in a building is listed in Table 3.8.2.3.A. The dimensional requirements are outlined in Article 3.8.3.12.

**Showers and Bathtubs**

In other than residential occupancies, if showers or bathtubs are provided in a group, the number of barrier-free shower stalls and/or bathtubs conforming to the dimensional requirements outlined in Article 3.8.3.13., must be provided. Individual showers and individual bathtubs that are provided for patients' or residents' use in a Group B, Division 2 or 3 occupancy shall have barrier-free design features conforming to this Article including installation of grab bars, slip-resistant flooring, threshold limitations, seats in showers, etc.

**Shelves or Counters for Public Telephones**

Public telephones provided with built-in shelves or counters are required to meet the dimensional requirements outlined in Article 3.8.3.15.

**Drinking Fountains**

Drinking fountains are required to meet the dimensional requirements outlined in Article 3.8.3.16.

**STOP**

5. There are four designated spaces in a seating area serving 250 people. Each designated space is accessible at the same floor level as the points of entry into the assembly space. Does this seating arrangement comply with the barrier-free requirements of the code? Are the number of spaces designated for wheelchairs adequate? If not how many are required? What is the minimum number of fixed seats designated for adaptable seating?

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[ \_\_\_\_\_ ]

See Figure 11-6.

## EGRESS

Corridors are not required to be constructed as a public corridor where the travel distance measured from inside the rental space to the nearest exit is not more than 15 m, and provided the corridor walls are noncombustible construction, have no openings other than doors and the doors are solid construction and the walls are continuous from the floor to the underside of the floor above, the ceiling or the roof above [3.10.2.4.(2)].

Egress doors from the rental space are not required to swing in the direction of exit travel or swing on a vertical axis provided the area of the rental space is not more than 50 m<sup>2</sup> and the travel distance in the space is not more than 10 m [3.10.2.4.(4)].

Dead end corridors are not permitted [3.10.2.4.(7)].

The clear width of an exit stair in a self-service storage building shall not be less than 1100 mm [3.10.2.5.(2)].

## FIRE SEPARATION

Not more than two dwelling units are permitted within one of the buildings on the property. Dwelling units are required to be separated from the remainder of the building by a fire separation having a fire-resistance rating of not less than 2 hours [3.10.2.4.(9) and (10)], except that a fire separation is not required between a dwelling unit and an office that is not more than 50m<sup>2</sup> in area [3.10.2.4.(11)].

Fire separations between individual rental storage spaces are not required [3.10.2.4.(12)].

A fuel-fired appliance shall be located within a service room separated from the remainder of the building by a fire separation having a fire-resistance rating of not less than 1 h [3.10.2.6.(2)].

Except as permitted in Sentences 3.7.4.1. (2) and (3), two washrooms with a water closet and lavatory shall be provided within one of the buildings on the property [3.10.2.7.(2)].

## 13.6 PUBLIC POOLS WITH DIVING BOARDS AND PLATFORMS (SUBSECTION 3.11.4.)

Public pool diving boards or platforms and pool areas adjacent to these shall meet the provisions of Article 3.11.4.1.

For example:

- No diving board or platform shall be installed in a modified or wave action pool [3.11.4.1.(2)].
- Non slip surface [3.11.4.1.(3)].
- Handrail required > 600 mm above water [3.11.4.1.(4)].
- Pool depth in diving areas [3.11.4.1.(6), (7), (8) and (17)].
- Slope of bottom of pool [3.11.4.1.(8)].
- Horizontal distance between diving board and vertical projections [3.11.4.1.(10) and (11)].
- Diving board height [3.11.4.1.(12), (13), and (14)].
- Diving board projection dimensions [3.11.4.1.(15)].
- Diving boards higher than 3 m require a gate, barrier or other device to prevent access [3.11.4.1.(16)].

## 13.7 RAMPS IN PUBLIC POOLS (SUBSECTION 3.11.5.)

Ramps are permitted in public pools for the use of Group B,

Division 2 or 3 major occupancies provided the water depth does not exceed 1500 mm and the water surface area does not exceed 100 m<sup>2</sup>, to permit a bather with or without a wheelchair to enter the water [3.11.5.2.].

Ramps shall have [3.11.5.1.(2)]:

- Handrails between 865 - 965 mm in height along each side of ramp.
- A width of at least 1100 mm.
- A curb or other means to prevent a wheelchair from falling off the sides of the ramp.

- Surface finishes capable of being kept clean, sanitary and free from slipperiness.
- A landing at the bottom at least 1500 mm in length and the same width as the ramp.

Design criteria differs for a ramp that is not submerged from a ramp that is submerged into a pool in accordance with Sentences 3.11.5.(3) and (4) including differences in slope.

**STOP**

**EXERCISE #13-2**

Take 10 minutes to read Subsections 3.11.4. and 3.11.5. and answer the following questions.

1. What must a diving board in a public pool that is more than 600 mm above the water surface be equipped with?

\_\_\_\_\_ [ \_\_\_\_\_ ]

2. What is the horizontal distance between the centre line of the diving platform and the closest vertical projection of a ledge where the platform is 500 mm above the water surface?

\_\_\_\_\_ [ \_\_\_\_\_ ]

3. What is the minimum height of a handrail used on a ramp in a Group B Division 2 pool?

\_\_\_\_\_ [ \_\_\_\_\_ ]

4. What is the maximum slope of a submerged ramp adjacent to a pool wall and used for access to the water?

\_\_\_\_\_ [ \_\_\_\_\_ ]

**STOP**

**13.8 MODIFIED POOLS/WAVE ACTION POOLS  
(SUBSECTIONS 3.11.6. & 3.11.7.)**

Modified pools shall be designed to conform with Sentences 3.11.6.1.(3) to (9), [3.11.6.1.(2)]

Every circulation system in a spa shall be served by a minimum of two suction or gravity outlets except for a factory built spa with multiple openings that connect to a full size manifold [3.12.4.1.(4)].

A spa equipped with hydro-massage jet fittings shall be provided with a timing device. The water circulation system for a spa shall be capable of both completely and partially draining and refilling the spa water [3.12.4.1.(16) and (18)].

### **13.15 EMERGENCY PROVISIONS FOR PUBLIC SPAS (SUBSECTION 3.12.5.)**

In a public spa an emergency telephone directly connected to an emergency service or to the local telephone utility shall be installed within 30 m of the spa [3.12.5.1.(2)].

All public spas shall have an emergency stop button that is clearly labeled and located within 15 m of the spa [3.12.5.1.(3)].

### **13.16 SERVICE ROOMS AND STORAGE FOR PUBLIC SPAS (SUBSECTION 3.12.6.)**

Service rooms and storage facilities for all public spas shall comply with the requirements of Article 3.11.11.1. [3.12.6.1.(1)].

#### **EXERCISE #13-6**

1. A water circulation system for a public spa with 5 m<sup>3</sup> of water volume shall be capable of disinfecting and filtering the water contained therein with a turnover period of how many minutes?

\_\_\_\_\_ [\_\_\_\_\_]

2. What is the maximum water velocity in a copper pressure pipe?

\_\_\_\_\_ [\_\_\_\_\_]

- The use of a building is changed and the previous major occupancy cannot be determined.
- A Group A, Division 2 or a Group A, Division 4 major occupancy is converted to a gaming premise.
- A building or part thereof is changed to a post-disaster building.
- A building or part of a building is changed to a retirement home regulated under the *Retirement Homes Act, 2010*.
- The use of a building or part of a building is changed and the previous major occupancy cannot be determined.
- In respect of an existing building of combustible construction, will extend the building by adding a storey or storeys such that the extended building will be more than four storeys in building height [3.17.1.1.(1)].

The requirements of this section are in addition to the requirements of other Parts of the Code as they apply to the proposed construction [3.17.1.1.(3)].

## 16.4 CHANGE OF USE AND COMPENSATING CONSTRUCTION

Where the proposed construction will result in a change of the use described in clauses 3.17.1.1.(1) (a) and (b) additional construction shall be required in order that the building or part of the building subject to the change of use conforms to the requirements of Subsections 3.2.6. and Sections 3.7, 3.11. and 3.12 [3.17.2.1.(1)].

## 16.5 PERFORMANCE LEVEL AND COMPENSATING CONSTRUCTION

The performance level of a building after construction shall not be less than the performance level of the building prior to construction [3.17.2.2.(1)]. Existing buildings shall be classified as to their construction and occupancy as provided for in Sentence 11.2.1.1.(1).

Articles 11.4.2.1., 11.4.2.3., 11.4.2.5. and 11.4.2.6. determine reductions in performance levels [3.17.2.2.(2)].

If performance levels are reduced, compensating construction must be provided as required by Articles 11.4.3.1., 11.4.3.2., 11.4.3.4., 11.4.3.6. and 11.4.3.7.

Compliance alternatives may be used subject to all the requirements and conditions found in Section 11.5 for areas described in Sentences 11.4.3.4.(1), (3) and (4) [3.17.2.2.(4)].

## **STOP**

### **EXERCISE #16-1**

Take 15 minutes to read Subsections 3.17.1. and 3.17.2. and answer the following questions.

1. From the information in Table 1.3.1.4., Part 1, Division C, is a permit required if the major occupancy of a building is changed from a residential occupancy to a mercantile occupancy?

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[ \_\_\_\_\_ ]

2. If a farm building is changed to an industrial occupancy, is a building permit required?

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[ \_\_\_\_\_ ]

3. Consider a residential building which is being converted into an office building. Do the requirements in the Code for a Group D occupancy apply to the washroom facilities in the renovated building?

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[ \_\_\_\_\_ ]

A vapour barrier must have a sufficiently low permeance and be positioned in a building component or assembly so as to:

- a) minimize moisture transfer to surfaces within the assembly that would be cold enough to cause condensation at the design temperature and humidity conditions [5.5.1.2.(1)(a)], or
- b) reduce moisture transfer to limit the accumulation of moisture within the assembly to minimize deterioration of the assembly [5.5.1.2.(1)(b)].

Section 5.10 includes a list of Standards for materials installed to provide the required resistance to vapour diffusion.

Sentences 5.5.1.2.(2) and (3) include a list of standards related to coatings applied to gypsum wallboards and other materials to provide required resistance to vapour diffusion.

## **STOP**

### **EXERCISE #17-4**

1. Where is a vapour barrier required in a building component or assembly?

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[ \_\_\_\_\_ ]

2. For what purpose is the Standard ASTM E96/E96M used?

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[ \_\_\_\_\_ ]

## **STOP**

### **PROTECTION FROM PRECIPITATION [SECTION 5.6]**

Subsections 5.6.1. and 5.6.2. address protection from precipitation.

Building components or assemblies exposed to precipitation must:

- a) minimize entry of precipitation into the component or assembly, and
- b) prevent entry of precipitation into interior space [5.6.1.1.(1)].

- Understand and apply the provisions of the Code related to doors to bathrooms, glass in doors and sidelights, minimum window and glass areas for rooms in buildings of residential occupancy, the design and construction of interior and exterior stairs, steps, ramps, railings and guards, and lighting outlets.
- Provide an understanding of the requirements of the Code relating to resource conservation in the design and construction of buildings, including energy efficiency design, and energy efficiency design requirements for which a building permit has been applied for after December 31, 2011, motion sensors, and water efficiency.
- Reference applicable standards.

## 18.2 STRUCTURAL DESIGN (SUBSECTION 4.1.5.)

In addition to the requirements for loads on handrails which are covered in Division B, Sentence 3.4.6.5.(12), Article 4.1.5.14. prescribes the design requirements for guards based on their minimum specified horizontal load, applied either inward or outward at the top of every required guard for:

- a) means of egress in grandstands, stadiums, bleachers and arenas,
- b) equipment platforms contiguous stairs and other areas where the gathering of people is improbable, and
- c) for all other locations of guards.

Individual elements within the guard such as solid panels and pickets must be designed to withstand a load of 0.5 kN applied over an area of 100 x 100 mm. The point located must be selected to produce the most critical effect on the guard [4.1.5.14.(2)].

The loads required for individual elements do not need to be considered to act simultaneously with the loads provided in Sentences (1) and (4) of Article 4.1.5.14. [4.1.5.14.(3)].

The minimum specified load applied vertically at the top of every required guard shall be 1.5 kN/m and does not need to be considered to act simultaneously with the load in Sentence (1) of Article 4.1.5.14. [4.1.5.14.(4)].

workers or other buildings that are not dwelling units. Medical gas piping systems is also covered under Section 9.31. by reference to Subsection 3.7.5.

Article 7.1.4.2., Floor Drains, indicates:

1. Where gravity drainage is possible, a floor drain shall be installed in a basement forming part of the dwelling unit.
2. Where gravity drainage is not possible, the floor drain may be connected to a storm drainage system, dry well or drainage ditch provided it is located where it can receive only clear waste or storm sewage.
3. Floor drains shall be provided in public laundry rooms, garbage rooms, incinerator rooms, and boiler or heating rooms not within a dwelling unit.

### **LOCATION OF FIXTURES**

According to Sentence 7.1.6.1.(1), plumbing fixtures are not to be installed in a room that is not lighted and ventilated in accordance with requirements of Part 9 and Part 3. Every fixture, plumbing appliance, interceptor, cleanout, valve, device or piece of equipment shall be located such that it is readily accessible for use, cleaning and maintenance [7.1.6.2.(1)].

### **WATER TEMPERATURE CONTROL FOR POTABLE WATER SYSTEMS**

The maximum temperature of water supplied by fixtures in a residential occupancy shall not exceed 49°C. This requirement does not apply to hot water supplied to dish washers or clothes washers [7.6.5.1.(1) and (2)].

The requirements for valves supplying fixed location shower heads, as well as deck mounted or hand-held spray attachments, are located in Article 7.6.5.2.

For Group B, Division 2 or 3 occupancies, or for residents of a group home, home for special care, or residents for adults with developmental disabilities, are required to have one or more temperature gauges and control devices that are:

of all buildings shall be designed to good engineering practices described in:

- a) Division 1 and 2 or 4 of MMAH Supplementary Standard SB-10, "Energy Efficiency Requirements", **OR**
- b) For buildings of residential occupancy within the scope of Part 9:
  - i) Meet the performance level equal to a rating of 80 or more when evaluated in accordance with NRCan "EnerGuide for New Homes: Administrative and Technical Procedures", or
  - ii) Conform to Chapters 1 and 2 of MMAH Supplementary Standard SB-12, Energy Efficiency for Housing."

Energy efficiency design does not apply to farm buildings and buildings intended primarily for manufacturing or commercial or industrial processing [12.2.1.1.(4)].

#### **Energy Efficiency Design After December 31, 2016**

After December 31, 2016, the energy efficiency of all buildings shall be designed to exceed:

- a) by not less than 15% for residential buildings under the scope of Part 9 and
- b) by not less than 13% for all other buildings

the energy efficiency levels attained by the methods noted before January 1, 2017. [12.2.1.2.(2) and (3)]

These requirements do not apply to farm buildings and buildings intended primarily for manufacturing or commercial or industrial processing [12.2.1.2.(4)].

#### **Motion Sensors (Subsection 12.2.4.)**

The requirements for motion sensors are found in Article 12.2.4.1. According to Sentence (1), lighting installed to provide the minimum illumination levels required by the Code may be controlled by motion sensors except for the following locations:

- a) where lighting is installed in an exit,
- b) where lighting is installed in a corridor serving patients or residents in a Group B, Division 2 or 3 occupancy, **OR**
- c) where lighting is required to conform to Sentence 3.2.7.1.(6).

Sentence (2) indicates, where motion sensors are used to control minimum lighting in a public corridor, or corridor providing access