

ONTARIO REGULATION 213/07

made under the

FIRE PROTECTION AND PREVENTION ACT, 1997

Made: May 24, 2007

Filed: May 25, 2007

Published on e-Laws: May 29, 2007

Printed in *The Ontario Gazette*: June 9, 2007

FIRE CODE

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DIVISION A COMPLIANCE, OBJECTIVES AND FUNCTIONAL STATEMENTS

PART 1 COMPLIANCE AND GENERAL

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SECTION 1.1 ORGANIZATION OF THIS CODE

Subsection 1.1.1. General

Scope of Division A

1.1.1.1. Division A contains the compliance and application provisions, **objectives** and **functional statements** of this Code.

Scope of Division B

1.1.1.2. Division B contains the **acceptable solutions** of this Code.

Scope of Division C

1.1.1.3. Division C contains the administrative provisions of this Code.

Internal cross-references

1.1.1.4. If a provision of this Code contains a reference to another provision of this Code but no Division is specified, both provisions are in the same Division of this Code.

SECTION 1.2 COMPLIANCE

Subsection 1.2.1. Compliance with this Code

Owner's responsibility

1.2.1.1. Unless otherwise specified, the **owner** is responsible for carrying out the provisions of this Code.

Compliance with Parts 2 and 3

1.2.1.2. Compliance with Parts 2 and 3 is required only as it relates to the use of **alternative solutions** as set out in Subsection 1.2.2.

Subsection 1.2.2. Compliance with Division B

1.2.2.1. (1) Compliance with Division B shall be achieved

(a) by complying with the **acceptable solutions** in Division B, or

(b) by using **alternative solutions** that

(i) will achieve the level of performance required by the applicable **acceptable solutions** in respect of the **objectives** and **functional statements** attributed to the applicable **acceptable solutions** in OFM Fire Code Supplement FCS-1, "Objectives and Functional Statements Attributed to Acceptable Solutions",

(ii) do not contravene any other provision in Division B, and

(iii) have been **approved** and implemented in conformance with Subsection 1.3.2. of Division C.

(2) For the purpose of Clause (1)(b), the level of performance in respect of a **functional statement** refers to the performance required by the **functional statement** as it relates to the **objective** with which it is associated in OFM Fire Code Supplement FCS-1, "Objectives and Functional Statements Attributed to Acceptable Solutions".

(3) The use of **alternative solutions** as described in Clause (1) (b) is not applicable in respect of any **acceptable solutions** to which **objectives** and **functional statements** have not been attributed in OFM Fire Code Supplement FCS-1, "Objectives and Functional Statements Attributed to Acceptable Solutions".

Subsection 1.2.3. Compliance with Other Applicable Law

1.2.3.1. Compliance with this Code does not relieve the **owner** from compliance with other applicable legislation and regulations, and, where the requirements of the applicable legislation and regulations conflict with the requirements in this Code, the more stringent requirements prevail.

SECTION 1.3 EXEMPTIONS

Subsection 1.3.1. Exemption for Farms

1.3.1.1. A **farm building** with an **occupant load** of not more than one person per 40 m² of floor area during normal use and other premises on a farm used for farming purposes are exempt from the requirements of this Code.

SECTION 1.4 TERMS AND ABBREVIATIONS

Subsection 1.4.1. Definitions of Words and Phrases

Non-defined terms

1.4.1.1. (1) Definitions of words and phrases used in this Code that are not included in the list of definitions in Article 1.4.1.2. have the meanings that are commonly assigned to them in the context in which they are used, taking into account the specialized use of terms with the various trades and professions to which the terminology applies.

(2) Despite Sentence (1), words and phrases may be assigned other meanings where specifically noted in another provision of this Code.

Defined terms

1.4.1.2. The words and terms used in this Code that are in bold face, and either in upper and lower case or in lower case, have the following meanings:

Acceptable solution means a requirement set out in Division B.

Access to exit means that part of a **means of egress** within a **floor area** that provides access to an **exit** serving the **floor area**.

Air-supported structure means a structure that consists of a pliable membrane that achieves and maintains its shape and support by internal air pressure.

Alarm signal means an audible signal transmitted throughout a zone or zones or throughout a **building** to advise occupants that a fire emergency exists.

Alert signal means an audible signal to advise designated persons of a fire emergency.

Alternative solution means a substitute for an **acceptable solution**.

Appliance means a device to convert fuel into energy, and includes all components, controls, wiring and piping required to be part of the device by the applicable standard referred to in this Code.

Approved means approved by the **Chief Fire Official**.

Architect means a member or licensee of the Ontario Association of Architects under the **Architects Act**.

Assembly occupancy means the **occupancy** or the use of a **building**, or part thereof, by a gathering of persons for civic, political, travel, religious, social, educational, recreational or like purposes or for the consumption of food or drink.

Atmospheric storage tank means a **storage tank** that is designed to operate at pressures from atmospheric to 3.5 kPa (gauge).

Attic space means the space between the roof and the ceiling of the top **storey** or between a dwarf wall and a sloping roof.

Basement means a **storey** or **storeys** of a **building** located below the **first storey**.

Boiler means an **appliance** intended to supply hot water or steam for **space heating**, processing or power purposes.

Building means any structure used or intended for supporting or sheltering any use or **occupancy**.

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**.

Building Code means any version of the **Ontario Building Code** that was in force at any time since it was made under **The Building Code Act, 1974**, the **Building Code Act** of the Revised Statutes of Ontario, 1980, the **Building Code Act** of the Revised Statutes of Ontario, 1990, the **Building Code Act, 1992** or a successor to the **Building Code Act, 1992**, and, where a specific version of the **Building Code** is referred to, that version of the **Building Code**.

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

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

Care and treatment occupancy means an **occupancy** in which persons receive special care and treatment.

Care occupancy means an **occupancy** in which persons receive special or supervisory care because of cognitive or physical limitations, but does not include a **dwelling unit**.

Care or detention occupancy means the **occupancy** or use of a **building** or part thereof by persons who

- (a) are dependent on others to release security devices to permit egress,
- (b) receive special care and treatment, or
- (c) receive supervisory care.

Check means visual observation to ensure the device or system is in place and is not obviously damaged or obstructed.

Chief Fire Official means the assistant to the Fire Marshal who is the Municipal Fire Chief or a member or members of the **fire department** appointed by the Municipal Fire Chief under Article 1.1.1.2. of Division C or a person appointed by the Fire Marshal under Article 1.1.1.1. of Division C.

Chimney means a primarily vertical shaft enclosing at least 1 **flue** for conducting **flue** gases to the outdoors.

Class A fire means a fire involving combustible materials such as wood, cloth and paper.

Class B fire means a fire involving a **flammable** or **combustible liquid**, fat or grease.

Class C fire means a fire involving energized electrical equipment.

Class D fire means a fire involving a combustible metal.

Closed container means a container so sealed by means of a lid or other device that neither liquid nor vapour will escape from it at ordinary temperatures.

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

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

Combustible dust means dust and particles ignitable and liable to explode when mixed with air.

Combustible fibres means finely divided combustible vegetable or animal fibres and thin sheets or flakes of such materials that in a loose, unbaled condition present a flash fire hazard, and includes cotton, wool, hemp, sisal, jute, kapok, paper and cloth.

Combustible liquid means any liquid having a **flash point** at or above 37.8°C and below 93.3°C.

Compressed gas means any contained mixture or material with either an absolute pressure exceeding 275.8 kPa at 21°C or an absolute pressure exceeding 717 kPa at 54°C, or both, or any liquid having an absolute **vapour pressure** exceeding 275.8 kPa at 37.8°C.

Contained use area means a supervised area containing one or more rooms in which occupant movement is restricted to a single room by security measures not under the control of the occupant.

Dangerous goods means those products or substances which are regulated by the **Transportation of Dangerous Goods Act (Canada)** and its Regulations.

Demolition means the doing of anything in the removal of a **building** or any material part thereof.

Detention occupancy means an **occupancy** in which persons are under restraint or are incapable of self preservation because of security measures not under their control.

Distilled beverage alcohol means a beverage that is produced by fermentation and contains more than 20 per cent by volume of water-miscible alcohol.

Distillery means a **process plant** where **distilled beverage alcohols** are produced, concentrated or otherwise processed, and includes facilities on the same site where the concentrated products may be blended, mixed, stored or packaged.

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

Exit means that part of a **means of egress**, including doorways, that leads from the **floor area** it serves to a separate **building**, an open public thoroughfare or an exterior open space protected from fire exposure from the **building** and having access to an open public thoroughfare.

Facility, for the purposes of Division A, means a property upon which a use regulated by this Code, including open air public assembly activities, open air industrial processing and outdoor storage, occurs, whether or not a **building** is located on the property.

Farm building means a **building** or part thereof associated with and located on land devoted to the practice of farming, and used primarily for the housing of equipment or livestock or the production, storage or processing of agricultural and horticultural produce or feeds, but is not used for **residential occupancy**.

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

Fire damper means a **closure** that consists of a damper installed in an air distribution system or in a wall or floor assembly that is normally held in the open position and that is designed to close automatically in the event of a fire in order to maintain the integrity of the **fire separation**.

Fire department means a group of firefighters authorized to provide fire protection services by a municipality, group of municipalities or by an agreement made under section 3 of the **Fire Protection and Prevention Act, 1997**.

Fire detector means a device which detects a fire condition and automatically initiates an electrical signal to actuate an **alert signal** or **alarm signal** and includes **heat detectors** and **smoke detectors**.

Fire-protection rating means the time in hours or fraction thereof that a **closure**, window assembly or glass block assembly will withstand the passage of flame when exposed to fire under specified conditions of **test** and performance criteria, or as otherwise prescribed in the **Building Code**.

Fire-resistance rating means the time in hours or fraction thereof 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 therefrom as prescribed in the **Building Code**.

Fire separation means a construction assembly that acts as a barrier against the spread of fire and may or may not have a **fire-resistance rating** or a **fire-protection rating**.

Fire stop means a draft-tight barrier within or between construction assemblies that acts to retard the passage of smoke and flame.

Fire-stop flap means a device intended for use in horizontal assemblies that are required to have a **fire-resistance rating** and incorporate protective ceiling membranes and that operates to close off a duct opening through the membrane in the event of a fire.

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

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

Flame-spread rating means an index or classification indicating the extent of spread of flame on the surface of a material or an assembly of materials as determined in the **Building Code**.

Flammable liquid means a liquid having a **flash point** below 37.8°C and having a **vapour pressure** not more than 275.8 kPa (absolute) at 37.8°C as determined by ASTM D 323, "Vapor Pressure of Petroleum Products (Reid Method)".

Flash point means the minimum temperature at which a liquid within a container gives off vapour in sufficient concentration to form an ignitable mixture with air near the surface of the liquid.

Floor area means the space on any **storey** of a **building** between exterior walls and required **firewalls** and includes the space occupied by interior walls and **partitions**, but does not include **exits** and **vertical service spaces** that pierce the **storey**.

Flue means an enclosed passageway for conveying exhaust gases.

Flue pipe means the pipe connecting the **flue** collar of an **appliance** to a **chimney**.

Fuel dispensing station means any premises or part of premises at which **flammable liquids** or **combustible liquids** are dispensed from fixed equipment into the fuel tank of a motor vehicle, watercraft or floatplane.

Functional statement means a function set out in Part 3.

Furnace means a **space-heating appliance** that uses warm air as the heating medium and that usually has provision for the attachment of ducts.

Grade means the average level of finished ground adjoining a **building** at all exterior walls.

Guest suite means a single room or a series of rooms of complementary use providing sleeping accommodation for the travelling public or for recreational purposes in a **hotel**.

Heat detector means a **fire detector** designed to operate at a predetermined temperature or rate of temperature rise.

Heavy timber construction means that type of **combustible construction** in which a degree of fire safety is attained by placing limitations on the sizes of wood structural members and on thickness and composition of wood floors and roofs, by avoidance of concealed spaces under floors and roofs and by use of **approved** fastenings, construction details and adhesives for structural members.

High hazard industrial occupancy means an **industrial occupancy** that contains sufficient quantities of highly combustible and flammable or explosive materials that, because of their inherent characteristics, constitute a special fire hazard.

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

Hotel establishment means a **building** containing a **hotel** and all subsidiary **occupancies** that are operated in connection with the **hotel** and includes all connected or adjacent **buildings** that are operated in connection with the **hotel**.

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

Individual storage area means the area occupied by piles, bin boxes, **racks** or shelves, including subsidiary aisles providing access to the stored products, which is separated from the adjacent storage by aisles not less than 2.4 m in width.

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

Inspection means physical examination to determine that the device or system will apparently perform in accordance with its intended function.

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

Low hazard industrial occupancy means an **industrial occupancy** in which the combustible content is not more than 50 kg/m² or 1200 MJ/m² of **floor area**.

Low pressure storage tank means a **storage tank** designed to operate at pressures greater than 3.5 kPa (gauge) to 100 kPa (gauge).

Lower explosive limit means the minimum concentration of vapour in air at which the propagation of flame occurs on contact with a source of ignition.

Major occupancy means the principal **occupancy** for which a **building** or part thereof is used or intended to be used, and includes the subsidiary **occupancies** that are an integral part of the principal **occupancy**.

Marine fuel dispensing station means a **fuel dispensing station** at which **flammable liquids** or **combustible liquids** are dispensed into the fuel tank of a watercraft or floatplane.

Means of egress means a continuous path of travel provided for the escape of persons from any point in a **building** or contained open space to a separate **building**, an open public thoroughfare or an exterior open space protected from fire exposure from the **building** and having access to an open public thoroughfare. **Means of egress** includes both **exits** and **access to exits**.

Medium hazard industrial occupancy means an **industrial occupancy** in which the combustible content is more than 50 kg/m² or 1200 MJ/m² of **floor area** and not classified as **high hazard industrial occupancy**.

Mercantile occupancy means the **occupancy** or use of a **building** or part thereof for the displaying or selling of retail goods, wares or merchandise.

Minimum explosible concentration (MEC) means the minimum concentration of **combustible dust** suspended in air, measured in mass per unit volume, that will support a deflagration as defined by the test procedure in ASTM E 1515, *Standard Test Method for Minimum Explosible Concentration of Combustible Dusts*.

Noncombustible construction means that type of construction in which a degree of fire safety is attained by the use of noncombustible materials for structural members and other **building** assemblies.

Objective means an objective set out in Part 2.

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

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

Order means an order made under subsection 21(1) of the **Fire Protection and Prevention Act, 1997**.

Owner means any person, firm or corporation having control over any portion of the **building** or property under consideration and includes the persons in the **building** or property.

Partition means an interior wall, one **storey** or part of a **storey** in height, that is not load-bearing.

Plenum means a chamber forming part of an air duct system.

Pressure vessel means a **storage tank** that is designed to operate at pressures greater than 100 kPa (gauge).

Process plant means an **industrial occupancy** where materials, including **flammable liquids**, **combustible liquids** or Class 2 gases, are produced or used in a process.

Professional Engineer means a member or licensee of the Association of Professional Engineers of the Province of Ontario under the **Professional Engineers Act**.

Public amusement area means an area where the public is ordinarily invited or permitted access, either expressly or by implication, whether or not a fee is charged for entry, and includes entertainment displays or structures used on a temporary, seasonal or permanent basis.

Public corridor means a corridor that provides **access to exit** from more than one **suite**.

Rack means any combination of vertical, horizontal or diagonal members that support stored materials on solid or open shelves, including both fixed and portable units.

Rapid transit station means a **building** or part thereof used for the purpose of loading and unloading passengers of a rapid transit system but does not include open-air shelters at street level.

Refinery means any **process plant** in which **flammable** or **combustible liquids** are produced from crude petroleum, including areas on the same site where the resulting products are blended, packaged or stored on a commercial scale.

Residential occupancy means the **occupancy** or use of a **building** or part thereof by persons for whom sleeping accommodation is provided but who are not harboured or detained to receive medical care or treatment or are not involuntarily detained.

Retrofit means the minimum performance requirements for life safety for existing **buildings**.

Self-service outlet means a **fuel dispensing station**, other than a marine **fuel dispensing station**, where the public handles the dispenser.

Service room means a room in a **building** used to contain equipment associated with **building** services.

Service space means space in a **building** used to facilitate or conceal the installation of **building** service facilities such as chutes, ducts, pipes, shafts or wires.

Smoke alarm means a combined **smoke detector** and audible alarm device that is designed to sound an alarm within the room or **suite** in which it is located when there is smoke within the room or **suite**.

Smoke detector means a **fire detector** designed to operate when the concentration of airborne combustion products exceeds a predetermined level.

Space heater means a **space-heating appliance** that heats the room or space within which it is located without the use of ducts.

Space-heating appliance means an **appliance** that supplies heat to a room or space directly or indirectly or to rooms or spaces of a **building** through a heating system.

Spraying area means the area that is within 6 m of a **spray booth** or spraying operation and that is not separated therefrom by a vapour-tight separation.

Spray booth means a power-ventilated structure that encloses or accommodates a spraying operation so that spray vapour and residue can be controlled and exhausted.

Spray room means a **spraying area** on a **floor area** or part thereof in which an open spraying operation is confined and that is separated from the remainder of the **building** in which it is located by a noncombustible vapour-tight separation.

Sprinklered (as applying to a **building** or part thereof) means that the **building** or part thereof is equipped with a system of automatic sprinklers.

Storage tank means a vessel for **flammable** or **combustible liquids** having a capacity of more than 230 L and designed to be installed in a fixed location.

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

Street means any highway, road, boulevard, square or other improved thoroughfare 9 m or more in width that has been dedicated or deeded for public use and is accessible to **fire department** vehicles and equipment.

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 or complementary rooms for **business and personal services occupancies**.

Supervisory staff means those occupants of a **building** who have some delegated responsibility for the fire safety of other occupants under the fire safety plan and may include the **fire department** where the **fire department** agrees to accept these responsibilities.

Tank vehicles means any vehicle, other than railroad tank cars and boats, with a cargo tank having a capacity of more than 450 L mounted or built as an integral part of the vehicle, used for the transportation of **flammable** or **combustible liquids**, and includes tank trucks, trailers and semi-trailers.

Tent means a shelter or structure with a covering that is made of pliable material.

Test means the operation of a device or system to ensure that it will perform in accordance with its intended operation or function.

Total area means the total area of all floors above and below **grade**, including mezzanines and penthouses, measured between the inside surfaces of exterior walls or between the inside surfaces of exterior walls and the inside surfaces of **firewalls**.

Travel distance means the distance from any point in a **floor area** to an exit measured along the path of **exit** travel, except that when **floor areas** are subdivided into rooms used singly or into **suites** of rooms and served by **public corridors** or exterior passageways, the distance is measured from the door of the rooms or **suites** to the nearest **exit**.

Unstable liquid means a liquid, including a **flammable** and **combustible liquid**, which is chemically reactive to the extent that it will vigorously react or decompose at or near normal temperature and pressure conditions or which is chemically unstable when subject to impact.

Vapour pressure means the pressure exerted by a liquid as determined by ASTM D 323, "Vapor Pressure of Petroleum Products (Reid Method)".

Vertical service space means a shaft oriented essentially vertically that is provided in a **building** to facilitate the installation of **building** services, including elevators, refuse chutes, linen chutes and mechanical, electrical and plumbing installations.

Viscosity means the resistance that a liquid offers to flow.

Subsection 1.4.2. Symbols and Other Abbreviations

1.4.2.1. The symbols and abbreviations in this Code have the following meanings:

cm	centimetre(s)
cm/s	centimetre(s) per second
cm ²	square centimetre(s)
°C	degree(s) Celsius
h	hour(s)
kg	kilogram(s)
kN	kilonewton(s)
kPa	kilopascal(s)
L	litre(s)
L/h	litre(s) per hour
L/min	litre(s) per minute
L/min/m ²	litre(s) per minute per square metre
lx	lux
m	metre(s)
m ²	square metre(s)
m ³	cubic metre(s)
m/s	metre(s) per second
m/min	metre(s) per minute
m ³ /h	cubic metre(s) per hour
m ³ /min	cubic metre(s) per minute
min	minute(s)
MJ	megajoule(s)
mL	millilitre(s)
mm	millimetre(s)
mm ² /s	square millimetre(s) per second
N	newton(s)
ppm	part(s) per million
s	second(s)
t	tonne(s)
%	per cent

SECTION 1.5 REFERENCED DOCUMENTS

Subsection 1.5.1. Referenced Documents

Application of referenced documents

1.5.1.1. The provisions of documents referenced in this Code apply only to the extent that they are related to fire safety matters.

Conflicting requirements

1.5.1.2. In the case of a conflict between the provisions of this Code and those of a referenced document, the provisions of this Code govern.

Secondary references

1.5.1.3. If a document in this Code refers to another document, only those portions of the second document that are specific to the subject matter are applicable.

PART 2 OBJECTIVES

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SECTION 2.1 APPLICATION

Subsection 2.1.1. Application

2.1.1.1. (1) The **objectives** set out in Table 2.2.1.1. apply only to the extent that they relate to an **alternative solution** as provided in Article 1.2.2.1.

(2) The **objectives** described in this Part apply only as they relate to fire safety.

SECTION 2.2 OBJECTIVES

Subsection 2.2.1. Objectives

2.2.1.1. The **objectives** of this Code are those listed in Table 2.2.1.1.

TABLE 2.2.1.1.

Objectives
Forming Part of Article 2.2.1.1.

Column 1 Category	Column 2 Objective number	Column 3 Objective
SAFETY	OS	An objective of this Code is to limit the probability that, as a result of specific circumstances related to the building or facility , a person in or adjacent to the building or facility will be exposed to an unacceptable risk of injury.
Fire Safety	OS1	An objective of this Code is to limit the probability that, as a result of (a) activities related to the construction, use or demolition of the building or facility , (b) the condition of specific elements of the building or facility , (c) the design and construction of specific elements of the facility related to certain hazards, or (d) inadequate built-in protection measures for the current or intended use of the building , a person in or adjacent to the building or facility will be exposed to an unacceptable risk of injury due to fire. The risks of injury due to fire addressed in this Code are those caused by:
	OS1.1	fire or explosion occurring
	OS1.2	fire or explosion impacting areas beyond its point of origin
	OS1.3	collapse of physical elements due to a fire or explosion
	OS1.4	fire safety systems failing to function as expected
	OS1.5	persons being delayed in or impeded from moving to a safe place during a fire emergency
Safety in Use	OS3	An objective of this Code is to limit the probability that, as a result of (a) activities related to the construction, use or demolition of the building or facility , (b) of specific elements of the building or facility , (c) the design and construction of specific elements of the facility related to certain hazards, or (d) inadequate built-in protection measures for the current or intended use of the building , a person in or adjacent to the building or facility will be exposed to an unacceptable risk of injury due to hazards.

		The risks of injury due to hazards addressed in this Code are those caused by:
	OS3.1	tripping, slipping, falling, contact, drowning or collision
	OS3.2	contact with hot surfaces or substances
	OS3.3	contact with energized equipment
	OS3.4	exposure to hazardous substances
	OS3.7	persons being delayed in or impeded from moving to a safe place during an emergency
HEALTH	OH	An objective of this Code is to limit the probability that, as a result of specific circumstances related to the building or facility , a person will be exposed to an unacceptable risk of illness.
Indoor Conditions	OH1	An objective of this Code is to limit the probability that, as a result of an installation required by this Code, a person in the building or facility will be exposed to an unacceptable risk of illness due to indoor conditions. The risks of illness due to indoor conditions addressed in this Code are those caused by:
	OH1.1	inadequate indoor air quality
Hazardous Substances Containment	OH5	An objective of this Code is to limit the probability that, as a result of
		(a) activities related to the construction, use or demolition of the building or facility , (b) the condition of specific elements of the building or facility , (c) the design and construction of specific elements of the facility related to certain hazards, or (d) inadequate built-in protection measures for the current or intended use of the building , the public will be exposed to an unacceptable risk of illness due to the release of hazardous substances from the building or facility .
Fire Protection of Buildings and Facilities	OP	An objective of this Code is to limit the probability that, as a result of specific circumstances related to the building or facility , the building or facility will be exposed to an unacceptable risk of damage due to fire.
Fire Protection of the Building or Facility	OP1	An objective of this Code is to limit the probability that, as a result of (a) activities related to the construction, use or demolition of the building or facility , (b) the condition of specific elements of the building or facility , (c) the design and construction of specific elements of the facility related to certain hazards, or (d) inadequate built-in protection measures for the current or intended use of the building , the building or facility will be exposed to an unacceptable risk of damage due to fire. The risks of damage due to fire addressed in this Code are those caused by:
	OP1.1	fire or explosion occurring
	OP1.2	fire or explosion impacting areas beyond its point of origin
	OP1.3	collapse of physical elements due to a fire or explosion
	OP1.4	fire safety systems failing to function as expected
Protection of Adjacent Buildings or Facilities from Fire	OP3	An objective of this Code is to limit the probability that, as a result of (a) activities related to the construction, use or demolition of the building or facility , (b) the condition of specific elements of the building or facility , (c) the design and construction of specific elements of the facility related to certain hazards, or (d) inadequate built-in protection measures for the current or intended use of the building , adjacent buildings or facilities will be exposed to an unacceptable risk of damage due to fire. The risks of damage due to fire addressed in this Code are those caused by:
	OP3.1	fire or explosion impacting areas beyond the building or facility of origin

PART 3 FUNCTIONAL STATEMENTS

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SECTION 3.1 APPLICATION

Subsection 3.1.1. Application

3.1.1.1. The **functional statements** set out in Table 3.2.1.1. apply only to the extent that they relate to an **alternative solution** as provided in Article 1.2.1.1.

SECTION 3.2 FUNCTIONAL STATEMENTS

Subsection 3.2.1. Functional Statements

3.2.1.1. The **functional statements** of this Code are those set out in Table 3.2.1.1.

TABLE 3.2.1.1.

Functional Statements
Forming Part of Article 3.2.1.1.

Column 1	Column 2
Function	Functional Statement
F01	To minimize the risk of accidental ignition.
F02	To limit the severity and effects of a fire or explosion.
F03	To retard the effects of fire on areas beyond its point of origin.
F04	To retard failure or collapse due to the effects of fire.
F05	To retard the effects of fire on emergency egress facilities .
F06	To retard the effects of fire on facilities for notification, suppression and emergency response.
F10	To facilitate the timely movement of persons to a safe place in an emergency.
F11	To notify persons, in a timely manner, of the need to take action in an emergency.
F12	To facilitate emergency response.
F13	To notify emergency responders, in a timely manner, of the need to take action in an emergency.
F20	To support and withstand expected loads and forces.
F21	To limit or accommodate dimensional change.
F22	To limit movement under expected loads and forces.
F30	To minimize the risk of injury to persons as a result of tripping, slipping, falling, contact, drowning or collision.
F32	To minimize the risk of injury to persons as a result of contact with energized equipment.
F34	To resist or discourage unwanted access or entry.
F36	To minimize the risk that persons will be trapped in confined spaces.
F43	To minimize the risk of release of hazardous substances.
F44	To limit the spread of hazardous substances beyond their point of release.
F51	To maintain appropriate air and surface temperatures.
F80	To resist deterioration resulting from expected service conditions.
F81	To minimize the risk of malfunction, interference, damage, tampering, lack of use or misuse.
F82	To minimize the risk of inadequate performance due to improper maintenance or lack of maintenance.

DIVISION B ACCEPTABLE SOLUTIONS

PART 1 GENERAL

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SECTION 1.1 GENERAL

Subsection 1.1.1. General

Notification

1.1.1.1. Where **tests**, repairs or alterations are made to fire protection installations, including sprinkler and standpipe systems, a procedure of notification shall be established, and the procedure shall include notifying the **fire department** and the **building** occupants where necessary for safety in the event of a fire emergency.

Check, inspect and test

1.1.1.2. (1) The **checking, inspection** and **testing** of fire safety devices shall be conducted in accordance with this Code.

(2) Where specific references to **checking, inspection** and **testing** of fire safety devices are not made in this Code, such devices shall be maintained to ensure they operate as per their design requirements.

(3) Any **appliance**, device or component of a device that does not operate or appear to operate as intended when **checked, inspected** or **tested** as required by this Code shall be repaired or replaced if the failure or malfunctioning of the **appliance**, device or component would adversely affect fire or life safety.

Subsection 1.1.2. Records of Tests and Inspections

Records

1.1.2.1. (1) If this Code requires **tests** and corrective measures or operational procedures to be carried out, records shall be made and the original or a copy shall be retained at the **building** premises for examination by the **Chief Fire Official**.

(2) Records of **tests** and corrective measures or operational procedures shall be retained so that at least the current and the immediately preceding reports are available.

(3) Despite Sentence (2), records shall be retained for a period of at least two years after being prepared.

(4) In addition to the requirements of Sentences (1), (2) and (3), in facilities regulated by or under the **Developmental Services Act**, written records shall be kept of **inspections** for two years after they are made, and the records shall be available upon request to the **Chief Fire Official**.

Verification report

1.1.2.2. (1) The initial verification or **test** reports for fire protection systems installed after November 21, 2007 shall be retained throughout the life of the systems.

(2) The requirements of Sentence (1) apply to systems installed in accordance with this Code or the **Building Code**.

SECTION 1.2 REFERENCED DOCUMENTS AND ORGANIZATIONS

Subsection 1.2.1. Referenced Documents

Applicable editions

1.2.1.1. (1) A reference in this Code to a document set out in Table 1.2.1.A. is to the edition designated in the table.

(2) The edition specified in Sentence (1) does not apply to,

(a) commercial cooking equipment in Sentence 2.6.1.12.(1),

(b) solid-fuel-burning **appliances** and equipment in Article 2.6.2.1.,

(c) outdoor incinerators in Sentence 2.6.3.1.(2),

(d) blower and exhaust systems in Article 3.2.1.2.,

(e) sprinkler systems in Sentences 3.3.3.6.(1), 4.12.8.4.(2) and 4.12.8.5.(3), Articles 5.4.2.3. and 5.4.5.1., Sentence 5.12.8.2.(1) and Article 5.13.6.1.,

(f) explosion venting in Subclause 5.6.2.4.(1)(d)(ii) and Sentence 5.18.3.3.(2),

(g) fire protection in Sentence 5.12.8.2.(2), and

(h) sprinkler systems and special fire suppression systems in Sentences 4.2.7.7.(1), 4.8.4.3.(4) and 4.9.3.2.(2) and (3)

for installations or construction that meet, on November 20, 2007, the requirements of **Ontario Regulation 388/97 (Fire Code)**, as it read on that day.

Effective date

1.2.1.2. A reference in this Code to a document set out in Table 1.2.1.A. includes all amendments up to and including June 1, 2007.

Previous editions

1.2.1.3. Despite Articles 1.2.1.1. and 1.2.1.2., the **Chief Fire Official** may permit compliance with an edition of a document previous to that referred to in this Code if the **Chief Fire Official** is satisfied that compliance with the edition referred to in this Code is impractical.

TABLE 1.2.1.A.

Forming Part of Article 1.2.1.1.

Issuing Agency	Document Number	Title of Document	Code Reference
ANSI/ASME		Boiler and Pressure Vessel Code 1992	4.3.1.3.(1) 4.4.10.5.(2) 4.4.10.6.(1)
ANSI/ASME ANSI/ASME	B16.5-1988 B31.3-1993	Pipe Flanges and Flanged Fittings Chemical Plant and Petroleum Refinery Piping	4.4.5.3.(1) 4.4.2.1.(5)
API	5L-1992	Line Pipe	4.4.2.1.(4)
API	12B-1990	Bolted Tanks for Storage of Production Liquids	4.3.1.2.(1)
API	12D-1982	Field Welded Tanks for Storage of Production Liquids	4.3.1.2.(1)
API	12F-1994	Shop Welded Tanks for Storage of Production Liquids	4.3.1.2.(1)
API	620-1990	Design and Construction of Large, Welded, Low-Pressure Storage Tanks	4.3.1.3.(1) 4.3.3.1.(1)
API	650-1993	Welded Steel Tanks for Oil Storage	4.3.1.2.(1) 4.3.3.1.(1)
API	1104-1994	Welding Pipelines and Related Facilities	4.4.5.2.(1)
API	RP 1107-1991	Recommended Pipeline Maintenance Welding Practices	4.4.5.2.(1) 4.4.11.7.(6)
API	2000-1992	Venting Atmospheric and Low-Pressure Storage Tanks	4.3.4.1.(1)
API	2200-1994	Repairs to Crude Oil, Liquefied Petroleum Gas and Products Pipelines	4.4.11.7.(6)
API	2201-1985	Welding or Hot Tapping on Equipment Containing Flammables	4.4.11.7.(6)
ASTM	A 53-93a	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless	4.4.2.1.(4)
ASTM	A 193/A 193M-94a	Alloy-Steel and Stainless Steel Bolting Materials for High Temperature Services	4.4.5.4.
ASTM	D 56-93	Flash Point by Tag Closed Tester	4.1.3.1.(1)
ASTM	D 93-90	Flash Point by Pensky-Martens Closed Tester	4.1.3.1.(2)
ASTM	D 323-90	Vapor Pressure of Petroleum Products (Reid Method)	1.4.1.2. of Division A (Vapour pressure)
ASTM	D 3278-89	Flash Point of Liquids by Setaflash Closed-Cup Apparatus	4.1.3.1.(4)
ASTM	D 3828-93	Flash Point by Small Scale Closed Tester	4.1.3.1.(3)
ASTM	E 1515 - 03a	Standard Test Method for Minimum Explosible Concentration of Combustible Dusts	1.4.1.2. of Division A (Minimum explosible concentration)
CGA	P-1-1991	Safe Handling of Compressed Gases in Containers	5.6.1.1. (3)
CGSB	CAN2-4.2-M77	Textile Test Methods, Test Method 27.1	2.3.2.1.(2)
CGSB	CAN/CGSB-24.3-M92	Identification of Piping Systems	4.3.1.7. 4.4.4.1.(3) 4.4.8.6.(1)
CPPI		Using the CPPI Colour-Symbol System to Mark Equipment and Vehicles for Product Identification (1990)	4.3.1.7. 4.4.4.1.(3) 4.4.8.6.(1)
CPPI	PACE Report No. 87-1	Impressed Current Method of Cathodic Protection of Underground Petroleum Storage Tanks	4.3.9.1.(2) 4.4.3.1.(2)
CSA	B51-94	Boiler, Pressure Vessel and Pressure Piping Code	4.3.1.3.(2)
CSA	B306-M1977	Portable Fuel Tanks for Marine Use	4.2.3.1.(1)
CSA	B346-M1980	Power-Operated Dispensing Devices for Flammable Liquids	4.5.3.1.
CSA	CAN/CSA-B365-01	Installation Code for Solid-Fuel-Burning Appliances and Equipment	2.6.2.1. 2.6.2.2.
CSA	B376-M1980	Portable Containers for Gasoline and Other Petroleum Fuels	4.2.3.1.(1)
CSA	B620-1987	Highway Tanks and Portable Tanks for the Transportation of Dangerous Goods	4.2.3.1.(1)
CSA	C22.2 No. 141-M1985	Unit Equipment for Emergency Lighting	9.9.5.5.(2)
CSA	C22.2 No.152-M1984 (including R2006 revisions)	Combustible Gas Detection Instruments	5.17.3.3.(1)

CSA	C282-05	Emergency Electrical Power Supply for Buildings	6.7.1.1.(1) 6.7.1.3. 9.9.5.5.(1), (2)
CSA CSA	CSA-W117.2-M87 CSA-Z32-04	Code for Safety in Welding and Cutting Electrical Safety and Essential Electrical Systems in Health Care Facilities	5.17.1.1. 6.7.1.1.(2)
CSA CSA	Z245.1-93 Z305.12-06	Steel Line Pipe Safe Storage, Handling, and Use of Portable Oxygen Systems in Residential Buildings and Health Care Facilities	4.4.2.1.(4) 2.15.1.2.
MAH	Supplementary Standard SB-4, June 2006	Measures for Fire Safety in High Buildings	7.3.1.3.(2)
NFPA NFPA	10-2002 11-2002	Portable Fire Extinguishers Standard for Low-, Medium-, and High-Expansion Foam	6.2.7.1. 4.3.2.5.(2) 6.8.1.1.(3)
NFPA NFPA NFPA NFPA	12-2000 12A-2004 12B-1990 13-2002	Standard on Carbon Dioxide Extinguishing Systems Standard on Halon 1301 Fire Extinguishing Systems Standard on Halon 1211 Fire Extinguishing Systems Standard for the Installation of Sprinkler Systems	6.8.1.1.(3) 6.8.1.1.(3) 6.8.1.1.(3) 3.3.1.8.(1) 3.3.1.9. 3.3.2.10.(3) 3.3.3.6.(1) 4.8.4.3.(4) 4.9.4.1.(2) 5.4.2.3. 5.4.5.1. 5.12.8.2.(1) 5.13.6.1. 6.5.1.1.(1) 9.2.5.2.(4) Table 9.2.5.A. 9.5.5.3.(2) 9.6.5.5.(2)
NFPA	13D-2002	Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes	9.8.5.1.
NFPA	13R-2002	Standard for the Installation of Sprinkler Systems in Residential Occupancies Up to and Including Four Stories in Height	9.5.5.3.(2)
NFPA	15-2001	Standard for Water Spray Fixed Systems for Fire Protection	4.3.2.5.(2) 6.8.1.1.(4)
NFPA	16-2003	Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems	6.8.1.1.(4)
NFPA NFPA NFPA NFPA	17-2002 17A-2002 18-1995 24-2002	Standard for Dry Chemical Extinguishing Systems Standard for Wet Chemical Extinguishing Systems Standard on Wetting Agents Standard for the Installation of Private Fire Service Mains and their Appurtenances	6.8.1.1.(3) 6.8.1.1.(3) 6.8.1.1.(5) 4.8.4.3.(4)
NFPA	25-2002	Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems	6.4.1.6. 6.5.1.1.(2) 6.6.1.5.(1) to (3)
NFPA	30-2003	Flammable and Combustible Liquids Code	4.2.7.7.(1) 4.2.10.5.(1)
NFPA NFPA	32-2003 33-2003	Standard for Drycleaning Plants Standard for Spray Application Using Flammable or Combustible Materials	3.6.1.1.(1) 5.12.3.5. 5.12.8.2.(2) 5.14.6.1.(3)
NFPA	37-1990	Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines	4.3.12.2.
NFPA	40-1994	Standard for the Storage and Handling of Cellulose Nitrate Motion Picture Film	5.4.4.2.
NFPA NFPA	40E-1993 51-1992	Code for the Storage of Pyroxylin Plastic Standard for the Oxygen-Fuel Gas Systems for Welding, Cutting and Allied Processes	5.4.3.3.(1) 5.17.2.1.
NFPA	55-1993	Standard for the Storage, Use and Handling of Compressed and Liquefied Gases in Portable	5.6.1.1.(3)

NFPA	68-1994	Cylinders Guide for Venting of Deflagrations	4.1.5.9.(4) 4.2.9.6.(1) and (2) 4.3.13.3. 4.8.3.1. 4.8.4.2.(1) 5.6.2.4.(1) 5.10.1.5.(2) 5.10.1.7.(2) 5.18.3.3.(2) and (3)
NFPA	69-1992	Standard on Explosion Prevention Systems	4.3.2.5.(2) 4.8.4.2.(1) 5.10.1.8.(2)
NFPA	71-1989	Standard for the Installation, Maintenance and Use of Signaling Systems for Central Station Service	6.3.1.2.(2)
NFPA	72-1990	Standard for the Installation, Maintenance, and Use of Protective Signaling Systems	6.3.1.2.(5)
NFPA	82-2004	Standard on Incinerators and Waste and Linen Handling Systems and Equipment	2.6.3.1.(2) 2.6.3.2.
NFPA	86-1995	Standard for Ovens and Furnaces	4.4.9.5.(2) 5.18.4.1.
NFPA	91-1999	Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids	3.2.1.2. 4.1.7.2.(5) 4.12.8.4.(1)
NFPA	96 - 2001	Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations	2.6.1.12.(1) 2.6.1.13.
NFPA	291-1995	Recommended Practice for Fire Flow Testing and Marking of Hydrants	6.6.6.1.
NFPA	505-1992	Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Maintenance, and Operation	3.4.1.1.
NFPA	705-2003	Recommended Practice for a Field Flame Test for Textiles and Films	2.3.2.2. 2.9.2.1.
NFPA	1142-2001	Standard on Water Supplies for Suburban and Rural Fire Fighting	3.5.3.11.(4)
NRC	User's Guide - NBC 1995	Fire Protection, Occupant Safety and Accessibility (Part 3)	7.3.1.2.
NRC	Eighth Edition 2005	National Fire Code of Canada 2005	4.1.1.2.(2) 4.2.1.1.(2) 4.2.2.3.(1) and (2) 4.2.7.9. 4.2.8.4.(1) and (2) 4.9.4.2. 7.3.1.2.
NRCan	March 2002, Draft Edition #2	Display Fireworks Manual	5.2.2.2.
NRCan	April 2003, Edition 2	Pyrotechnics Special Effects Manual	5.2.2.2.
OFM	Fire Code Supplement FCS-1, May 2007	Objectives and Functional Statements Attributed to the Acceptable Solutions	1.2.2.1.(1), (2) and (3) of Division A 4.1.1.4.(4) 1.3.2.2.(1) and (2) of Division C
TC	May 2001	Standards Respecting Pipeline Crossings Under Railways	4.4.7.4.(3)
UL	ANSI/UL 558-1998	Industrial Trucks, Internal Combustion Engine-Powered	3.4.2.1.(3)
UL	ULI 1275-1994	Flammable Liquid Storage Cabinets	4.2.10.5.
ULC	C842-M1984	Valves for Flammable and Combustible Liquids	4.4.8.1.(1)
ULC	C1275-1984	Storage Cabinets for Flammable Liquid Containers	4.2.10.5.
ULC	CAN/ULC-S109-03	Flame Tests of Flame-Resistant Fabrics and Films	2.3.2.1.(1)
ULC	CAN4-S111-M80	Standard Method of Fire Tests for Air Filter Units	5.12.2.3.
ULC	ULC-S505-1974	Standard for Fusible Links for Fire Protection Service	9.5.3.7.(3)
ULC	CAN/ULC-S508-02	Standard for the Rating and Testing of Fire Extinguishers	6.2.2.1.
ULC	CAN/ULC-S524-01	Standard for the Installation of Fire Alarm Systems	6.3.1.8. 9.9.4.12.(1)
ULC	ULC-S531-1978	Standard for Smoke Alarms	2.13.2.1.(6)

			9.5.4.5.(4) 9.6.4.10.(4) 9.8.4.2.(4) 9.9.4.13.(3) 2.13.2.1.(1) 9.5.4.5.(3) 9.6.4.10.(3) 9.8.4.2.(3) 9.9.4.13.(2)
ULC	CAN/ULC-S531-02	Standard for Smoke-Alarms	
ULC	CAN/ULC-S536-04	Inspection and Testing of Fire Alarm Systems	6.3.2.2.(1) to (3) 6.3.2.4.
ULC	CAN/ULC-S537-04	Verification of Fire Alarm Systems	9.9.4.12.(2)
ULC	CAN/ULC-S552-02	Standard for the Maintenance and Testing of Smoke-Alarms	6.3.2.6.(2)
ULC	CAN/ULC-S553-02	Standard for the Installation of Smoke-Alarms	9.5.4.5.(3) 9.6.4.10.(3) 9.8.4.2.(3) 9.9.4.13.(4)
ULC	CAN/ULC-S561-03	Installation and Services for Fire Signal Receiving Centres and Systems	6.3.1.2.(2)
ULC	ULC-S601-93	Shop Fabricated Steel Aboveground Horizontal Tanks for Flammable and Combustible Liquids	4.3.1.2.(1)
ULC	ULC-S601(A)-2001	Refurbishing of Steel Aboveground Horizontal Tanks for Flammable and Combustible Liquids	4.3.1.10.(2)
ULC	CAN/ULC-S602-M92	Aboveground Steel Tanks for Fuel Oil and Lubricating Oil	4.3.1.2.(1)
ULC	CAN/ULC-S603-M92	Steel Underground Tanks for Flammable and Combustible Liquids	4.3.1.2.(1) 4.3.15.4.(5)
ULC	ULC-S603(A)-2001	Refurbishing of Steel Underground Tanks for Flammable and Combustible Liquids	4.3.1.10.(3)
ULC	CAN/ULC-S603.1-03	External Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids	4.3.1.2.(1) 4.3.8.5.(1) 4.3.9.1.(1) 4.4.3.1.(2)
ULC	CAN/ULC-S612-M88	Hose for Flammable and Combustible Liquids	4.5.5.1.(1)
ULC	CAN4-S615-M83	Reinforced Plastic Underground Tanks for Petroleum Products	4.3.1.2.(1) 4.3.8.5.(2) 4.3.15.4.(5)
ULC	ULC-S615(A)-2002	Refurbishing of Reinforced Plastic Underground Tanks for Flammable and Combustible Liquids	4.3.1.10.(3)
ULC	CAN/ULC-S620-M90	Hose Nozzle Valves for Flammable and Combustible Liquids	4.4.8.1.(2) 4.5.5.2.(1)
ULC	ULC-S630-93	Shop Fabricated Steel Aboveground Vertical Tanks for Flammable and Combustible Liquids	4.3.1.2.(1) 4.3.3.2.(1)
ULC	ULC-S630(A)-2001	Refurbishing of Steel Aboveground Vertical Tanks for Flammable and Combustible Liquids	4.3.1.10.(2)
ULC	CAN/ULC-S633-M90	Flexible Underground Hose Connectors for Flammable and Combustible Liquids	4.4.7.13.(2)
ULC	CAN/ULC-S642-M87	Compounds and Tapes for Threaded Pipe Joints	4.4.5.1.
ULC	CAN/ULC-S643-M90	Shop Fabricated Steel Aboveground Utility Tanks for Flammable and Combustible Liquids	4.3.1.2.(1) 4.3.7.4.(2)
ULC	CAN/ULC-S644-M90	Emergency Breakaway Fittings for Flammable and Combustible Liquids	4.5.5.2.(4)
ULC	CAN/ULC-S651-M90	Emergency Valves for Flammable and Combustible Liquids	4.4.8.1.(3) 4.5.6.3.(1)
ULC	ULC-S652-93	Tank Assemblies for Collection of Used Oil	4.3.1.2.(1)
ULC	ULC-S653-94	Aboveground Steel Contained Tank Assemblies for Flammable and Combustible Liquids	4.3.1.2.(1)
ULC	ULC-S655-98	Aboveground Protected Tank Assemblies for Flammable and Combustible Liquids	4.3.1.2.(1) 4.3.2.1.(7)
ULC	ULC/ORD-C30-1995	Safety Containers	4.1.5.9.(2) 4.2.3.1.(1) 4.2.6.4.
ULC	ULC/ORD-C58.9-1997	Secondary Containment Liners for Underground and Aboveground Flammable and Combustible Liquid Tanks	4.3.7.2.(2)
ULC	ULC/ORD-C58.10-	Jacketed Steel Underground Tanks for Flammable and	4.3.1.2.(1)

ULC	1992 ULC/ORD-C58.12-1992	Combustible Liquids Leak Detection Devices (Volumetric Type) for Underground Flammable Liquid Storage Tanks	4.3.9.1.(2) 4.3.15.1.(3) 4.3.16.2.(1)
ULC	ULC/ORD-C58.14-1992	Nonvolumetric Leak Detection Devices for Underground Flammable Liquid Storage Tanks	4.3.15.1.(3) 4.3.16.2.(1)
ULC	ULC/ORD-C58.15-1992	Overfill Protection Devices for Flammable Liquid Storage Tanks	4.3.1.8.(1)
ULC	ULC/ORD-C107.4-1992	Ducted Flexible Underground Piping Systems for Flammable and Combustible Liquids	4.4.2.1.(3)
ULC	ULC/ORD-C107.7-1993	Glass Fibre Reinforced Plastic Pipe and Fittings for Flammable Liquids	4.4.2.1.(3)
ULC	ULC/ORD-C107.12-1992	Line Leak Detection Devices for Flammable Liquid Piping	4.4.6.7.
ULC	ULC/ORD-C107.21-1992	Under-Dispenser Sumps	4.5.3.2.
ULC	ULC/ORD-C142.5-1992	Concrete Encased Steel Aboveground Tank Assemblies for Flammable and Combustible Liquids	4.3.1.2.(1)
ULC	ULC/ORD-C142.23-1991	Aboveground Waste Oil Tanks	4.3.1.2.(1)
ULC	ULC/ORD-C410A-1994	Absorbents for Flammable and Combustible Liquids	4.1.6.3.(3)
ULC	ULC/ORD-C536-1998	Flexible Metallic Hose	4.4.7.13.(2)
ULC	ULC/ORD-C971-2005	Nonmetallic Underground Piping for Flammable and Combustible Liquids	4.4.7.13.(2)

Subsection 1.2.2. Organizations

Abbreviations of proper names

1.2.2.1. The abbreviations in this Code for the names of organizations shall have the meanings assigned to them as follows:

ANSI	American National Standards Institute
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
CAN	Standards Council of Canada designation identifying a national standard. The number or name following the CAN designation represents the agency under whose auspices the standard is issued. CAN1 designates CGA, CAN2 designates CGSB, CAN3 designates CSA, and CAN4 designates ULC.
CGA	Compressed Gas Association
CGSB	Canadian General Standards Board
CPPI	Canadian Petroleum Products Institute
CSA	Canadian Standards Association
MAH	Ontario Ministry of Municipal Affairs and Housing
NFPA	National Fire Protection Association
NRC	National Research Council of Canada
NRCan	Natural Resources Canada
OFM	Ontario Office of the Fire Marshal
TC	Transport Canada
UL	Underwriters Laboratories Inc.
ULC	Underwriters' Laboratories of Canada

PART 2 FIRE SAFETY

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SECTION 2.1 GENERAL

Subsection 2.1.1. Scope and Application

Scope

2.1.1.1. This Part provides measures for the safety of persons, the elimination or control of fire hazards in and around **buildings**, the maintenance of certain life safety systems in **buildings**, the establishing of a fire safety plan in those **buildings** where required and the installation of **smoke alarms** in **dwelling units**.

Application

2.1.1.2. Except as provided in Article 2.1.1.3., this Part applies to **buildings, tents, air-supported structures** and outdoor **public amusement areas**.

2.1.1.3. (1) This Part does not apply to individual **dwelling units**.

(2) Despite Sentence (1), Section 2.2 (Fire Separations), Subsection 2.4.7. (Vacant Buildings), Section 2.6 (Service Equipment), Section 2.11 (Insulation and Re-Insulation), Section 2.13 (Installation of Smoke Alarms) and Section 2.15 (Portable Oxygen Systems) apply to individual **dwelling units**.

(3) Despite Sentence (1), this Part applies to facilities regulated by or under the **Developmental Services Act**.

Subsection 2.1.2. Classification of Buildings or Parts of Buildings by Major Occupancy

Classification of buildings or parts thereof

2.1.2.1. For the purpose of applying this Code, a **building** or part thereof shall be classified according to its **major occupancy** by the **Chief Fire Official** in conformance with the **Building Code**.

Hazardous activities

2.1.2.2. Activities that create a hazard and that are not allowed for in the original design shall not be carried out in a **building** unless **approved** provisions are made to control the hazard.

Prohibited combinations of occupancies

2.1.2.3. No **major occupancy** consisting of **high hazard industrial occupancy** shall be contained within a **building** with any **occupancy** classified as **assembly occupancy, care or detention occupancy** or **residential occupancy**.

SECTION 2.2 FIRE SEPARATIONS

Subsection 2.2.1. Major Occupancies

Damaged fire separations

2.2.1.1. Where **fire separations** between **major occupancies** are damaged in a manner so as to affect the integrity of their **fire-resistance rating**, such damaged **fire separations** shall be repaired so that the integrity of the **fire separations** is maintained.

Subsection 2.2.2. Rooms and Spaces

Damaged fire separations

2.2.2.1. Where **fire separations** between rooms, corridors, shafts and other spaces are damaged so as to affect the integrity of their **fire-resistance rating**, the damaged **fire separations** shall be repaired so that the integrity of the **fire separations** is maintained.

Subsection 2.2.3. Closures

Damaged closures

2.2.3.1. Where **closures** are damaged so as to affect the integrity of their **fire-protection rating**, the damaged **closures** shall be repaired so that the integrity of the **closures** is maintained.

Maintenance of closures

2.2.3.2. (1) **Closures** in **fire separations** shall be maintained to ensure that they are operable at all times by

- (a) keeping fusible links and heat or smoke-actuated devices undamaged and free of paint and dirt,
- (b) keeping guides, bearings and stay rolls clean and lubricated,
- (c) making necessary adjustments and repairs to door hardware and accessories to ensure proper closing and latching, and
- (d) repairing or replacing inoperative parts of hold-open devices and automatic releasing devices.

Operation of closures

2.2.3.3. **Closures** in **fire separations** shall not be obstructed, blocked, wedged open, or altered in any way that would prevent the intended operation of the **closure**.

Inspection of doors in fire separations

2.2.3.4. Doors in **fire separations** shall be **inspected** monthly.

2.2.3.5. (1) Doors in **fire separations** in occupied **buildings** shall be **checked** as frequently as necessary to ensure that they remain closed.

(2) Sentence (1) does not apply to

- (a) doors designed to close automatically in the event of a fire, or
- (b) doors for which an **approved** fire safety plan contains provisions for closing in the event of a fire.

2.2.3.6. RESERVED

Inspection of fire dampers and fire-stop flaps

2.2.3.7. **Fire dampers** and **fire-stop flaps** shall be **inspected** annually, or on an **approved** time schedule.

2.2.3.8. Door openings and the surrounding areas shall be kept clear of everything that would be likely to obstruct or interfere with the free operation of the door.

SECTION 2.3 INTERIOR FINISHING, FURNISHING AND DECORATIVE MATERIALS

Subsection 2.3.1. General

2.3.1.1. (1) Where a **building** is refurbished or redecorated, interior finish materials used shall be in conformance with the **Building Code**.

(2) Despite Sentence (1), other interior finish materials may be **approved**.

Moveable partitions and screens

2.3.1.2. Moveable **partitions** or screens, including acoustical screens, shall have a **flame-spread rating** equal to that required for the interior finish of the area in which they are located as determined in the **Building Code**.

Subsection 2.3.2. Textile Flammability

Flame resistance of textiles

2.3.2.1. (1) Drapes, curtains, netting, and other similar or decorative materials, including textiles and films used in **buildings**, shall meet the requirements of CAN/ULC-S109, "Flame Tests of Flame-Resistant Fabrics and Films", when these materials are used in any

- (a) **care and treatment occupancy** and **detention occupancy**,
- (b) lobby or **exit**,
- (c) **access to exit** in **assembly occupancies**, and **assembly occupancies** with an **occupant load** of more than 100 persons, or
- (d) open **floor area** in a **business and personal services occupancy**, **mercantile occupancy** or **industrial occupancy** exceeding 1500 m², except when the **floor area** is divided into **fire compartments** not exceeding 1500 m² in area and separated from the remainder of the **floor area** by a **fire separation** having a 1 h **fire-resistance rating**.

(2) Existing drapes, curtains, netting, and other similar or decorative materials, including textiles and films used in **buildings** which meet the requirements for a high degree of flame resistance as described in NOTE 4 of Test Method 27.1 of CAN2-4.2, "Textile Test Methods" are deemed to be in compliance with Sentence (1).

(3) For the purposes of Sentence (2),

"existing" means in place on November 21, 2007.

Flameproofing treatments

2.3.2.2. Flame retardant treatments shall be renewed as often as required to ensure that the material will pass the match flame **test** in NFPA 705, "Recommended Practice for a Field Flame Test for Textiles and Films".

SECTION 2.4 FIRE HAZARDS

Subsection 2.4.1. Combustible Materials

Accumulation of combustible materials

2.4.1.1. (1) Combustible waste materials in and around **buildings** shall not be permitted to accumulate in quantities or locations that will constitute a fire hazard.

(2) Combustible materials, other than those for which the location, room or space is designed, shall not be permitted to accumulate in any part of an elevator shaft, ventilation shaft, **means of egress, service room or service space**.

(3) Horizontal concealed spaces, such as crawl spaces and ceiling spaces, shall not be used for the storage of combustible materials.

(4) Combustible materials shall not be stored on a roof or adjacent to any **building** so as to create a fire hazard to the **building** or its occupants.

(5) Abandoned optical fibre cables and electrical wires and cables, with combustible insulation, jackets, or sheaths, and nonmetallic raceways shall be removed from a **plenum** unless

- (a) they are permanently closed by the structure or finish of the **building**,
- (b) their removal would disturb the structure or finish of the **building**, or
- (c) their removal could affect the performance of cables in use.

(6) Outdoor storage receptacles, such as dumpsters, used for combustible materials shall be located so that they do not create a fire hazard to **buildings**.

Furniture in corridors serving guest suites

2.4.1.2. Despite Sentence 2.4.1.1.(2), corridors serving as **access to exits** for **guest suites** may contain solid wood or other **approved** furniture, provided the furniture does not create an obstruction to the egress route.

Waste receptacles

2.4.1.3. (1) Materials subject to spontaneous ignition, such as greasy or oily rags, shall be deposited in a receptacle conforming to Sentence (3) or be removed from the premises.

(2) Ashes shall be stored in receptacles that conform to Sentence (3) and combustible materials shall not be stored with ashes in the same receptacle.

(3) A receptacle required in Sentences (1) and (2) shall

- (a) be constructed of noncombustible materials,
- (b) have a close-fitting, self-closing metal cover,
- (c) if the flooring material upon which it is placed is combustible, have a flanged bottom or legs not less than 50 mm high, and

(d) not be placed closer than 1 m to combustible materials, except as permitted in Clause (c).

Waste containers in hotels

2.4.1.4. (1) Waste containers in public washrooms and in other public areas in a **hotel establishment** shall be

- (a) **approved**, or
- (b) constructed of noncombustible material and have self-closing covers.

Lint traps for laundry equipment

2.4.1.5. Lint traps in laundry equipment shall be cleaned to prevent the accumulation of lint that creates an undue fire hazard.

Flammable or combustible liquid spills

2.4.1.6. **Flammable liquid** or **combustible liquid** spills in a **building** shall be removed immediately with an absorbent material that will not increase the hazard and shall be disposed of in a safe manner.

Subsection 2.4.2. RESERVED

Subsection 2.4.3. Smoking

Smoking prohibited

2.4.3.1. (1) Where conditions are such as to make smoking a fire or explosion hazard, smoking shall be permitted only in specifically **approved** smoking areas.

(2) In facilities regulated by or under the **Developmental Services Act**, suitable noncombustible ashtrays shall be provided where smoking is permitted.

Signs

2.4.3.2. The areas where smoking is not permitted shall be identified by signs having black lettering 50 mm high with a 12.5 mm stroke on a yellow background, except that symbols of 150 mm by 150 mm may be used in lieu of lettering, or covered by instructions established under a fire safety plan and available to all persons.

Subsection 2.4.4. Open Flames

Open flames prohibited

2.4.4.1. (1) Open flames shall not be permitted in **buildings** used for public assemblies in such quantities and in such a manner as to create a fire hazard unless **approved**.

(2) Open flames shall not be permitted in dining areas in **care and treatment occupancies** and **care occupancies**.

(3) Despite Sentence (1), decorative and lighting devices with open flames shall not be used unless they are

(a) securely supported in noncombustible holders and located and protected so that combustible materials will not come into contact with or be ignited by the flame, or

(b) **approved**.

2.4.4.2. (1) Flaming meals or drinks shall not be served in **care and treatment occupancies** and **care occupancies**.

(2) In **assembly occupancies**, flaming meals or drinks shall be ignited only at the location of serving.

(3) In **assembly occupancies**, the refuelling of equipment used to flame meals or drinks, or to warm food, shall be carried out

(a) outside the serving area, and

(b) away from ignition sources.

(4) A portable extinguisher with a minimum rating of 5B:C shall be located on the serving cart or table at locations referred to in Sentences (2) and (3).

Devices having open flames

2.4.4.3. Devices having open flames shall be securely supported in noncombustible holders and located or protected so as to prevent accidental contact of the flame with combustible materials.

Subsection 2.4.5. Use of Hazardous Materials

2.4.5.1. **Flammable liquids** shall not be used for cleaning purposes except where the cleaning is an essential part of a process.

2.4.5.2. Flammable gases shall not be used to inflate balloons.

Subsection 2.4.6. Electrical Hazards

Electrical wiring

2.4.6.1. Temporary electrical wiring shall not be used where it presents a fire hazard.

Subsection 2.4.7. Vacant Buildings

2.4.7.1. Vacant **buildings** shall be secured against unauthorized entry.

SECTION 2.5 FIRE DEPARTMENT ACCESS TO BUILDINGS

Subsection 2.5.1. General

Application

2.5.1.1. (1) This Section applies to fire access routes

(a) required to be constructed under the **Building Code**,

(b) required by municipal by-law, or

(c) required by this Code.

Maintaining access free of obstructions

2.5.1.2. (1) Fire access routes and access panels or windows provided to facilitate access for fire fighting operations shall not be obstructed by vehicles, gates, fences, **building** materials, vegetation, signs or any other form of obstruction.

(2) **Fire department** sprinkler and standpipe connections shall be clearly identified and maintained free of obstructions for use at all times.

Maintenance

2.5.1.3. Fire access routes shall be maintained so as to be immediately ready for use at all times by **fire department** vehicles.

Signs

2.5.1.4. **Approved** signs shall be displayed to indicate fire access routes.

SECTION 2.6 SERVICE EQUIPMENT**Subsection 2.6.1. Heating, Ventilating and Air-Conditioning*****Defective equipment***

2.6.1.1. Defective **appliances** in a **building** shall be removed, repaired or replaced when the defective **appliances** create a hazardous condition.

Solid fuel bins

2.6.1.2. Bins containing solid fuel shall be located at least 1.2 m from any **appliance**.

Hoods, filters and ducts

2.6.1.3. Hoods, ducts and filters subject to accumulations of combustible deposits shall be **checked** at intervals not greater than seven days, and shall be cleaned if the accumulation of such deposits creates a fire hazard.

Chimneys, flues and flue pipes

2.6.1.4. (1) Every **chimney, flue and flue pipe** shall be **inspected** to identify any dangerous condition

- (a) at intervals not greater than 12 months,
- (b) at the time of addition of any **appliance**, and
- (c) after any **chimney** fire.

(2) A **chimney, flue, or flue pipe** shall be replaced or repaired to eliminate

- (a) any structural deficiency or decay, and
- (b) all abandoned or unused openings which are not effectively sealed in a manner that would prevent the passage of fire or smoke.

(3) **Chimneys, flues and flue pipes** that constitute a fire hazard shall be repaired or replaced in accordance with the **Building Code**.

2.6.1.5. **Chimneys, flues and flue pipes** shall be cleaned as often as necessary to keep them free from accumulations of combustible deposits.

2.6.1.6. RESERVED

Operation of systems

2.6.1.7. Heating, ventilating and air-conditioning systems, including **appliances, chimneys and flue pipes**, shall be operated and maintained so as not to create a hazardous condition.

Disconnect switches

2.6.1.8. Except for self-contained systems within **guest suites** and **dwelling units**, disconnect switches for mechanical air-conditioning and ventilating systems shall be operated at intervals not greater than 12 months to establish that the system can be shut down in an emergency.

Ventilation shafts

2.6.1.9. Ventilation shafts shall be used only for ventilating purposes.

Precautions during repairs or renovations

2.6.1.10. (1) Work on ducts involving the use of heat-producing devices for cutting, welding or soldering shall not be undertaken before

- (a) the system has been shut down,
- (b) the duct has been cleaned of any accumulations of combustible deposits, and
- (c) any combustible lining and covering material that could be ignited by such work has been removed.

2.6.1.11. Precautions shall be taken, where necessary, to ensure that there is no damage to fuel supply piping or equipment that would result in fuel leakage or a fire hazard during renovations or excavations.

Commercial cooking equipment

2.6.1.12. (1) Commercial cooking equipment shall be provided with exhaust and fire protection systems in conformance with NFPA 96, “Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations”.

- (2) Despite Sentence (1), existing exhaust or fire protection systems may be **approved**.

(3) In a **hotel establishment** regulated by Section 9.9, commercial cooking equipment that complies with Article 9.9.2.19. is deemed to be in compliance with Sentence (1).

2.6.1.13. Commercial cooking equipment exhaust and fire protection systems shall be maintained in conformance with NFPA 96, “Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations”.

2.6.1.14. (1) Instructions for manually operating the fire protection systems required under Article 2.6.1.12. shall be posted conspicuously in the kitchen.

- (2) The instructions required in Sentence (1) shall be included in the fire safety plan where such a plan is required.

Subsection 2.6.2 Solid-Fuel-Burning Appliances

Solid-fuel-burning appliances

2.6.2.1. The installation of solid-fuel-burning **appliances** and equipment shall be in accordance with CAN/CSA-B365, “Installation Code for Solid-Fuel-Burning Appliances and Equipment”.

2.6.2.2. Solid-fuel-burning **appliances** and equipment shall be maintained in accordance with CAN/CSA-B365, “Installation Code for Solid-Fuel-Burning Appliances and Equipment”.

Subsection 2.6.3. Incinerators

Design, construction, installation and alteration

2.6.3.1. (1) The design, construction, installation and alteration of indoor incinerators shall conform to the requirements of the **Building Code**.

(2) The design, construction, installation, alteration and maintenance of outdoor incinerators shall conform to NFPA 82, “Standard on Incinerators and Waste and Linen Handling Systems and Equipment”, except that the **flue** venting an incinerator shall not serve as the chute conveying waste material to the incinerator.

Maintenance

2.6.3.2. All indoor and outdoor incinerators shall be maintained in accordance with NFPA 82, “Standard on Incinerators and Waste and Linen Handling Systems and Equipment”.

Spark arresters

2.6.3.3. (1) Spark arresters installed in conformance with Article 2.6.3.1. shall be **inspected** and cleaned at intervals not greater than 12 months or more frequently where accumulations of debris will adversely affect operations.

- (2) Burnt-out spark arresters shall be repaired or replaced.

Open-air burning

2.6.3.4. (1) Open-air burning shall not be permitted unless **approved**, or unless such burning consists of a small, confined fire, supervised at all times, and used to cook food on a grill or a barbecue.

(2) Sentence (1) does not apply to an **appliance** that is in conformance with the **Technical Standards and Safety Act, 2000**, is for outdoor use and is installed in accordance with the manufacturer’s instructions.

Subsection 2.6.4. Electrical Equipment Vaults

- 2.6.4.1. Electrical equipment vaults shall not be used for storage purposes.

- 2.6.4.2. Electrical equipment vaults shall be kept locked so that unauthorized persons will not have access to them.

SECTION 2.7 SAFETY TO LIFE

Subsection 2.7.1. Means of Egress

Mercantile, business and personal services occupancies

2.7.1.1. Individual work areas in **business and personal services occupancies** and **mercantile occupancies** shall be located adjacent to aisles described in Articles 2.7.1.2. and 2.7.1.3.

2.7.1.2. Where two **exits** are required from **floor areas** in **buildings** of **business and personal services occupancy** and **mercantile occupancy** that are not subdivided into rooms or **suites** of rooms served by corridors giving **access to exits**, at least one aisle with access to the two **exits** and having a minimum clear width of 1100 mm shall be provided to serve the individual work areas where necessary.

2.7.1.3. Subsidiary aisles with a minimum clear width of 900 mm may branch off for a distance not exceeding 7.5 m from the aisles described in Article 2.7.1.2.

Occupant load

2.7.1.4. (1) The number of persons occupying a room or floor space in an **assembly occupancy** shall not exceed the **occupant load** for the intended use as determined in Sentence (2).

(2) The **occupant load** for any room or floor space shall be the lower of

(a) the **occupant load** as calculated in accordance with Sentences (3) to (7), or

(b) the **occupant load** for which **means of egress** are provided as determined by the **Building Code**.

(3) The **occupant load** of a **floor area** or part of a **floor area** in an **assembly occupancy** shall be based on

(a) the number of fixed seats, or

(b) the number of persons

(i) for which the area is designed, or

(ii) determined from Table 2.7.1.A. for **occupancies** other than those described in Clause (a).

(4) For the purposes of this Article, **mezzanines**, tiers and balconies shall be regarded as part of the **floor area**.

(5) Where fixed bench-type seats without arms are provided, the **occupant load** shall be based on a seat width of 450 mm per person.

(6) The **occupant load** of a room in which a dance floor is situated shall be based on that portion of the room that is not occupied by the dance floor except where the **occupant load** is determined using Subclause (3)(b)(i).

(7) At no time shall the maximum **occupant load** determined in Sentences (2) to (6) exceed the **occupant load** calculated on the basis of

(a) 0.60 m² of floor space per person in dining, alcoholic beverage and cafeteria space, and

(b) 0.40 m² of floor space per person for all other uses.

TABLE 2.7.1.A.

Type of Use of Building or Floor Area or Part Thereof	Area per Person m ²
Space with fixed seats	See Clause (3) (a)
Space with nonfixed seats	0.75
Stages for theatrical performances	0.75
Space with nonfixed seats and tables	0.95
Standing space	0.40
Stadia and grandstands	0.60
Bowling alleys, pool and billiard rooms	9.30
Classrooms	1.85
School shops and vocational rooms	9.30
Reading or writing rooms or lounges	1.85
Dining, alcoholic beverage and cafeteria space	1.10
Laboratories in schools	4.60
Exhibition halls other than those classified in mercantile occupancy	2.80

Posting occupant load

2.7.1.5. (1) When the **occupant load** as determined in Article 2.7.1.4. is more than 60 persons, the **occupant load** shall be posted in a conspicuous location.

(2) When the **occupant load** has been determined using Subclause 2.7.1.4.(3)(b)(i), a permanent sign indicating the **occupant load** shall be posted in a conspicuous location.

Nonfixed seating

2.7.1.6. (1) Nonfixed row seating in an **assembly occupancy** shall be arranged as described in Sentences (2) to (8).

(2) Aisles leading to **exits** shall be provided so that there are not more than seven seats between any seat and the nearest aisle.

(3) The minimum clear width of aisles shall be at least 1100 mm, except as permitted by Sentence (4).

(4) Aisles required in Sentence (3) may be reduced in width to 750 mm when serving 60 seats or less, or 900 mm when serving seats on one side only.

(5) Aisles shall terminate in a cross aisle, foyer or **exit** and the width of such cross aisle, foyer or **exit** shall be at least the required width of the widest aisle plus 50% of the total required width of the remaining aisles that it serves.

(6) The distance of travel to an **exit** door by an aisle shall not be greater than 30 m, except in a **sprinklered floor area** where the distance of travel shall not be greater than 45 m.

(7) Where the **occupant load** exceeds 200 persons in an **assembly occupancy** containing nonfixed seating, the seats shall be fastened in units of not less than 4 nor more than 12 seats, or each end seat abutting an aisle shall be securely fastened to the floor.

(8) Seats may be arranged in a manner that does not meet the requirements of Sentence (7) where the aisle widths are increased by 50% above the requirements set out in Sentences (2) to (6), and where the maximum **occupant load** of the space is based on not less than 1.2 m² of floor space per person.

Maintenance and lighting for exits

2.7.1.7. (1) **Means of egress** shall be maintained in good repair and free of obstructions.

(2) Lighting provided for illumination in **exits** and **access to exits**, including corridors used by the public, shall be maintained.

Fire escapes

2.7.1.8. (1) Exterior passageways, exterior stairways and fire escapes in occupied **buildings** shall be maintained in good repair and operational and kept free of snow and ice accumulations.

(2) Where equipment is provided to melt snow or ice on exterior passageways, exterior stairways and fire escapes in an occupied **building**, the equipment shall be maintained in working order or alternative measures shall be taken as specified in Sentence (1).

Turnstiles and checkout counters

2.7.1.9. (1) Except as provided in Sentences (2) and (3), turnstiles, checkout counters, railings or barriers shall not obstruct the **exits** or **access to exits** from any room, **floor area** or **storey**.

(2) Checkout counters or control posts in retail outlets may be used within **access to exits** if there is a clear width of at least 450 mm up to a height of 914 mm.

(3) If the checkout counters or control posts exceed 914 mm in height, there shall be a clear width of at least 550 mm.

(4) The clear width may be less than that required by Sentences (2) and (3) if an alternative **means of egress** is adjacent to and plainly visible from the restricted egress.

(5) Wheeled carts shall be stored after use so as not to obstruct **access to exits** in retail outlets where wheeled carts are used by customers.

(6) Despite Sentences (1) to (5), the aggregate width of **exits** and **access to exits** shall be provided.

Subsection 2.7.2. Door Hardware

Door release hardware

2.7.2.1. (1) Every **exit** door shall be designed and installed so that, when the latch is released, the door will open in the direction of **exit** travel under a force of not more than 90 N, applied at the knob or other latch releasing device.

(2) **Approved** hardware designed to release the latch and allow the door to open in the direction of **exit** travel when a force of not more than 90 N is applied to the hardware is required on

(a) every door in an **access to exit** from a room or **suite** of **assembly occupancy** having an **occupant load** of more than 100 persons,

- (b) every **exit** door from a **floor area** containing an **assembly occupancy** having an **occupant load** of more than 100 persons,
 - (c) every door leading to an **exit** lobby from an **exit** stair shaft in **buildings** having an **occupant load** of more than 100 persons,
 - (d) every exterior door leading from an **exit** stair shaft in **buildings** having an **occupant load** of more than 100 persons, and
 - (e) every **exit** door from a **floor area** containing a **high hazard industrial occupancy**.
- (3) Every door that opens into a corridor or other facility providing **access to exit** from a **suite** or room not located within a **suite** shall swing
- (a) on its vertical axis, and
 - (b) in the direction of **exit** travel where the room or **suite** is used or intended to be used for an **occupant load** of more than 60 persons or is designed for a **high hazard industrial occupancy**.
- (4) Sentences (1) and (3) do not apply if the existing door is **approved** and either does not endanger life safety or is modified to provide life safety.
- (5) Sentences (1), (2) and (3) do not apply in **rapid transit stations** which comply with the **Building Code**.

2.7.2.2. (1) Except as permitted in Sentences (2) and (3), locking, latching and other fastening devices on

- (a) every required **exit** door, and
- (b) every door that opens into or is located within
 - (i) a **public corridor**,
 - (ii) a facility that provides **access to exit** from a **suite**, or
 - (iii) a facility that provides **access to exit** from a room serving patients or residents in a **care or detention occupancy**

shall be such that the door can be readily opened to permit egress without requiring keys, special devices or specialized knowledge of the door opening mechanism.

(2) Except for a door in an elementary or secondary school or a door leading directly from a **high hazard industrial occupancy**, a door in an **access to exit** or an **exit** door may be equipped with an electromagnetic locking device that is **approved** or complies with the **Building Code**.

(3) An egress door that serves a **contained use area** or **impeded egress zone** may be equipped with a locking device that can be released either locally or remotely provided

- (a) local locking devices are operable by a key from both sides of the door,
 - (b) controls for the remote release of the door locking devices are located in an area readily available to security personnel, and
 - (c) electrical release devices are designed to operate on emergency power and are also manually operated by security personnel.
- (4) Sentence (1) does not apply in **rapid transit stations** that comply with the **Building Code**.

Subsection 2.7.3. Exit Lighting and Emergency Lighting

Exit signs

2.7.3.1. Required **exit** signs shall be clearly visible and maintained in a clean and legible condition.

2.7.3.2. **Exit** signs shall be illuminated, externally or internally, as appropriate for each sign's design, while the **building** is occupied.

Emergency lighting

2.7.3.3. (1) Pilot lights on emergency lighting unit equipment shall be **checked** monthly for operation.

(2) Emergency lighting unit equipment shall be **inspected** monthly to ensure that

- (a) the terminal connections are clean, free of corrosion and lubricated when necessary,
- (b) the terminal clamps are clean and tight as per manufacturer's specifications,
- (c) the electrolyte level and specific gravity are maintained as per manufacturer's specifications, and
- (d) the battery surface is kept clean and dry.

(3) Emergency lighting unit equipment shall be **tested**

(a) monthly to ensure that the emergency lights will function upon failure of the primary power supply, and

(b) annually to ensure that the unit will provide emergency lighting for a duration equal to the design criteria under simulated power failure conditions.

(4) After completion of the **test** required in Clause (3)(b), the charging conditions for voltage and current and the recovery period shall be **tested** to ensure that the charging system is in accordance with the manufacturer's specifications.

(5) Except as provided in Sentences (1) to (4), emergency lights shall be **inspected** at intervals not greater than 12 months to ensure that they are functional.

(6) Where emergency power for the lights referred to in Sentence (5) is provided from a system of batteries, the batteries shall be **inspected** and **tested** in accordance with the procedures set out in Sentences (2) to (4).

Subsection 2.7.4. Indoor Public Amusement Areas

Fire hazards

2.7.4.1. (1) **Public amusement areas** located in **buildings** shall be designed so that they do not create a fire hazard to the public using the facility.

(2) Hay, straw, shavings, textiles, films or similar combustible materials shall not be used in the design and construction or as decorative features in **public amusement areas** located in **buildings** unless **approved** provisions are made to control the hazard.

Emergency egress

2.7.4.2. (1) Indoor **public amusement areas** that involve enclosed, confined or otherwise confusing configurations shall be provided with emergency egress points that

(a) have appropriate width, height and capacity for the anticipated **occupant load**,

(b) are not more than 15 m travel from any point within the **public amusement area** except as **approved**,

(c) are clearly identified with signs, and

(d) are equipped with emergency lighting providing a minimum lighting level of 10 lx at floor or pathway level for a duration of at least 30 min, where natural lighting is not sufficient in the circumstances.

SECTION 2.8 EMERGENCY PLANNING

Subsection 2.8.1. General

Application

2.8.1.1. (1) The requirements of this Section shall apply to **buildings** containing

(a) **assembly occupancy** or **care or detention occupancy**,

(b) **residential occupancy** where the **occupant load** exceeds 10,

(c) **business and personal services occupancy** where the **occupant load** exceeds 300,

(d) **mercantile occupancy** where the **occupant load** exceeds 300,

(e) **high hazard industrial occupancy** where the **occupant load** exceeds 25,

(f) **medium hazard industrial occupancy** where the **occupant load** exceeds 100, or

(g) **low hazard industrial occupancy** where the **occupant load** exceeds 300.

(2) Despite Sentence (1), the requirements of this Section shall apply to **buildings** or premises

(a) containing 4 **storeys** or more, including **storeys** below **grade**,

(b) subject to the provisions of Subsection 3.5.3.,

(c) subject to the provisions of Article 4.1.5.6.,

(d) subject to the provisions of Article 4.12.4.1.,

(e) regulated by Section 9.3,

(f) subject to the provisions of Sentence 9.5.3.1.(3), or

(g) used as a convalescent home or children's custodial home providing sleeping accommodation for more than three persons.

(3) Despite Sentence (1), the requirements of this Section apply to recreational camps regulated by or under the **Health Protection and Promotion Act**.

(4) Despite Sentence (1), the requirements of this Section apply to facilities regulated by or under the **Developmental Services Act**.

Instructions in emergency procedures

2.8.1.2. (1) **Supervisory staff** shall be instructed in the fire emergency procedures as described in the fire safety plan before they are given any responsibility for fire safety.

(2) **Supervisory staff** shall be available on notification of a fire emergency to fulfil their obligation as described in the fire safety plan.

(3) It is not necessary that **supervisory staff** be in the **building** on a continual basis.

2.8.1.3. (1) Employees in a **hotel establishment** shall be instructed on

(a) the procedures outlined in Article 2.8.2.1., and

(b) the use of fire fighting equipment, including portable extinguishers and, where applicable, standpipe and hose systems.

Subsection 2.8.2. Fire Safety Plan

Measures in a fire safety plan

2.8.2.1. (1) A fire safety plan shall include

(a) the emergency procedures to be used in case of fire, including

(i) sounding the fire alarm,

(ii) notifying the **fire department**,

(iii) instructing occupants on procedures to be followed when the fire alarm sounds,

(iv) evacuating occupants, including special provisions for persons requiring assistance,

(v) the procedures for use of elevators, and

(vi) confining, controlling and extinguishing the fire,

(b) the appointment and organization of designated **supervisory staff** to carry out fire safety duties,

(c) the training of **supervisory staff** and instruction of other occupants in their responsibilities for fire safety,

(d) documents, including diagrams, showing the type, location and operation of the **building** fire emergency systems.

(e) the holding of fire drills,

(f) the control of fire hazards in the **building**,

(g) the maintenance of **building** facilities provided for the safety of occupants, and

(h) the provision of alternative measures for the safety of occupants during any shutdown of fire protection equipment and systems or part thereof.

(2) The fire safety plan shall be prepared, **approved** and implemented in **buildings** regulated by Article 2.8.1.1.

(3) The fire safety plan shall be kept in the **building** in an **approved** location.

(4) The fire safety plan shall be reviewed as often as necessary, but at intervals not greater than 12 months, to ensure that it takes account of changes in the use and other characteristics of the **building**.

(5) The **approval** specified in Sentence (2) does not apply to a **hotel establishment** with respect to which approval, as defined in Sentence 1.1.6.2.(5) of **Ontario Regulation 388/97 (Fire Code)** as it read on December 31, 2006, was granted for so long as such approval is valid.

Supervisory staff

2.8.2.2. (1) There shall be sufficient **supervisory staff** available in **care or detention occupancies** to carry out the duties as required in the fire safety plan.

(2) In **hotel establishments**

(a) there shall be sufficient **supervisory staff** available to carry out the duties as required in the fire safety plan, and

(b) in **buildings** greater than 3 **storeys** in **building height** or having a **total area** greater than 4000 m², **supervisory staff** shall be on duty whenever the **building** is occupied.

High buildings

2.8.2.3. (1) The fire safety plan in **buildings** within the scope of Subsection 3.2.6. of Division B of the **Building Code** shall, in addition to the requirements of Sentence 2.8.2.1.(1), include

- (a) the instruction of **supervisory staff** on the use of the voice communication system,
- (b) the action to be taken by **supervisory staff** in initiating any smoke control or other fire emergency systems installed in a **building** in the event of fire until the **fire department** arrives,
- (c) the procedures established to facilitate **fire department** access to the **building** and fire location within the **building**, and
- (d) the instructions for the **supervisory staff** and **fire department** for the operation of the fire emergency systems.

2.8.2.4. A copy of the fire emergency procedures and other duties for **supervisory staff** as laid down in the fire safety plan shall be given to all **supervisory staff**.

Posting fire emergency procedures

2.8.2.5. (1) At least one copy of the fire emergency procedures shall be prominently posted and maintained on each **floor area**.

(2) In addition to Sentence (1), in a **hotel establishment**

- (a) one copy of the **approved** fire safety plan shall be posted in the main reception area, and
- (b) a copy of the emergency procedures, location of **exits** and the fire safety rules shall be posted on the inside of the egress doors of each **guest suite**.

(3) Where a fire alarm system has been installed with no provisions to transmit a signal to the **fire department**, a legible notice, that is not easily removed, shall be affixed to the wall near each manual pull station with wording that the **fire department** is to be notified in the event of a fire emergency and including the emergency telephone number for the municipality or the telephone number of the **fire department**.

Subsection 2.8.3. Fire Drills

Procedures

2.8.3.1. (1) The procedure for conducting fire drills described in Clause 2.8.2.1.(1)(e) shall be included in the fire safety plan, taking into consideration

- (a) the **building occupancy** and its fire hazards,
- (b) the safety features provided in the **building**,
- (c) the desirable degree of participation of occupants other than **supervisory staff**,
- (d) the number and degree of experience of participating **supervisory staff**, and
- (e) the **testing** and operation of the emergency systems installed in **buildings** within the scope of Subsection 3.2.6. of Division B of the **Building Code**.

(2) The fire drill procedures required in Sentence (1) shall be prepared in consultation with the **Chief Fire Official**.

Frequency

2.8.3.2. (1) Fire drills as described in Sentence 2.8.3.1.(1) shall be held at least once during each 12-month period for the **supervisory staff**, except that

- (a) in day care centres, facilities regulated by or under the **Developmental Services Act** and **care or detention occupancies**, fire drills shall be held at least monthly,
- (b) in schools attended by children, total evacuation fire drills shall be held three times in each of the fall and spring school terms, and
- (c) in **buildings** within the scope of Subsection 3.2.6. of Division B of the **Building Code**, fire drills shall be held every three months.

(2) In addition to the requirements of Sentence (1), every employee in a **hotel establishment** shall take part in at least one fire drill during each 12-month period.

(3) Records of a fire drill required by this Article shall be kept for 12 months after the fire drill.

SECTION 2.9 TENTS AND AIR-SUPPORTED STRUCTURES

Subsection 2.9.1. General

2.9.1.1. **Tents and air-supported structures** shall be in conformance with the **Building Code**.

2.9.1.2. This Section does not apply to **tents** that have an area of 30 m² or less and that are used for camping, personal or other non-commercial uses.

Subsection 2.9.2. Materials

Flameproofing treatments

2.9.2.1. Flameproofing treatments shall be renewed as often as necessary to ensure that the material will pass the match flame **test** in NFPA 705, “Recommended Practice for a Field Flame Test for Textiles and Films”.

Subsection 2.9.3. Fire Hazards and Control

Combustible materials

2.9.3.1. Hay, straw, shavings or similar combustible materials other than that necessary for the daily feeding and care of animals shall not be permitted within a **tent** or **air-supported structure** used for an **assembly occupancy**, except that sawdust and shavings are permitted to be used if kept damp.

Smoking and open flames

2.9.3.2. Smoking and open flame devices shall not be permitted in a **tent** or **air-supported structure** unless provisions have been made for such activities under the fire safety plan.

Fire alarm system or firewatch

2.9.3.3. (1) Despite Article 2.9.1.1., if a **tent** or **air-supported structure** does not have a fire alarm system that conforms to the **Building Code**,

- (a) it may have an **approved** fire alarm system that does not conform to the **Building Code** where the reliability and performance of the system will provide an adequate early warning level, or
- (b) a person shall be employed for firewatch duty.

2.9.3.4. (1) A person employed for firewatch duty in accordance with Article 2.9.3.3. shall

- (a) be familiarized with all fire safety features, including the fire safety plan as provided in conformance with Section 2.8 and the condition of **exits**, and
- (b) patrol the area to ensure that the **means of egress** are kept clear and that regulations are enforced.

Communications systems

2.9.3.5. When the conditions of Article 2.9.3.3. apply, an **approved** communications system shall be provided.

SECTION 2.10 DAY CARE CENTRES

Subsection 2.10.1. Application

Application

2.10.1.1. (1) This Section applies to day care centres for children.

(2) Notwithstanding Sentence (1), this Section does not apply to “private-home day care” as described in the **Day Nurseries Act**.

Subsection 2.10.2. Combustible Materials

Artwork and teaching materials on walls

2.10.2.1. Combustible artwork and teaching materials that are attached to walls shall not exceed 20% of the area of the walls.

Waste receptacles

2.10.2.2. Waste receptacles shall be made of noncombustible materials.

Flammable and combustible liquids

2.10.2.3. **Flammable liquids** and **combustible liquids** shall be stored in conformance with Part 4 and in areas inaccessible to children.

Subsection 2.10.3. Staffing

2.10.3.1. Where children with disabilities are cared for, sufficient staff shall be present at all times during the period the children are in the centre to escort them to safety in the event of a fire emergency.

SECTION 2.11 INSULATION AND RE-INSULATION

Subsection 2.11.1. General

2.11.1.1. The installation of insulation, including the replacement of insulation, shall be carried out in accordance with the **Building Code**.

2.11.1.2. Unless otherwise **approved**, combustible insulation shall be protected as prescribed in the **Building Code**.

2.11.1.3. Insulation shall not be placed in **building** roof-ceiling or floor-ceiling assemblies, as described in Parts 3 and 9 of Division B of the **Building Code**, where the assemblies are required to have a **fire-resistance rating** unless the insulation does not reduce the **fire-resistance rating** of the assemblies.

SECTION 2.12 COVERED MALLS

Subsection 2.12.1. General

2.12.1.1. (1) Covered malls designed for ornamental and pedestrian uses only shall not be used for merchandising or public activities, except that such activities may be permitted on a temporary basis where they do not create a fire hazard.

(2) Where a covered mall described in Sentence (1) is used for merchandising or public activities, the fire safety plan described in Section 2.8 shall include additional provisions to offset any hazard that may be created by such activities.

2.12.1.2. Merchandising or public activities in a **sprinklered** covered mall described in Article 2.12.1.1. shall not be permitted where such activity will create a hazard exceeding the design criteria for which the sprinkler system was designed.

2.12.1.3. (1) When a covered mall having a width of 9 m or more has been provided for the purpose of considering each portion of the **building** separated by the mall as a separate **building**, no merchandising or public activities shall be carried on within the 9 m width.

(2) Despite Sentence (1), merchandising or public activities or both may be carried on within the 9 m width where they are **approved** and they do not endanger life safety or alternative measures are taken to provide life safety.

2.12.1.4. **Access to exits** within a covered mall shall be provided and maintained in conformance with Subsection 2.7.1.

2.12.1.5. Where a covered mall is used for merchandising or public activities, the activities shall be arranged so that access to fire protection equipment, including sprinkler control valves, fire hose stations, portable extinguishers and fire alarm stations, is not restricted.

2.12.1.6. Decorative materials used for merchandising or public activities in a covered mall shall conform to Subsection 2.3.2.

2.12.1.7. Where a covered mall is used for the display of fueled equipment, batteries shall be disconnected and caps for fuel tanks shall be locked or secured against tampering.

SECTION 2.13 INSTALLATION OF SMOKE ALARMS

Subsection 2.13.1. Scope

2.13.1.1. (1) Except as provided in Sentence (2), this Section applies to all **dwelling units**.

(2) This Section does not apply to **dwelling units** in **buildings** that are regulated under the scope of Part 9, including dwelling units regulated under Section 9.8.

(3) In Sentence (2), “dwelling unit”, in light face, means “dwelling unit” as defined in Sentence 9.8.1.1.(2).

Subsection 2.13.2. Installation

2.13.2.1. (1) **Smoke alarms** conforming to CAN/ULC-S531, “Standard for Smoke Alarms”, shall be installed in accordance with this Article.

(2) Except as provided in Sentence (7), **smoke alarms** shall be installed between each sleeping area and the remainder of the **dwelling unit**, and where the sleeping areas are served by hallways, the **smoke alarms** shall be installed in the hallways.

(3) In addition to the requirements in Sentence (2), at least one **smoke alarm** shall be installed on each **storey** that does not contain a sleeping area in a **dwelling unit**.

(4) **Smoke alarms** shall be installed by permanent connections to an electrical circuit and shall have no disconnect switch between the overcurrent device and the **smoke alarm**.

(5) Battery-operated **smoke alarms** are deemed to be in compliance with Sentence (3).

(6) Existing **smoke alarms** meeting the requirements of ULC-S531-1978, “Standard for Smoke Alarms”, are deemed to be in compliance with Sentence (1).

(7) Sentence (2) does not apply where **smoke alarms** are installed in each bedroom in accordance with Subsection 9.10.18. of Division B of the **Building Code**.

SECTION 2.14 OUTDOOR PUBLIC AMUSEMENT AREAS

Subsection 2.14.1. General

Application

2.14.1.1. This Section applies to **public amusement areas** located outdoors.

Fire hazards

2.14.1.2. (1) Outdoor **public amusement areas** shall be designed so that they do not create a fire hazard to the public using them.

(2) Hay, straw, shavings, textiles, films or similar combustible materials shall not be used in the design and construction or as decorative features in outdoor **public amusement areas** unless **approved** provisions are made to control the hazard.

Ignition sources

2.14.1.3. Smoking, open flames, temporary wiring, heat-producing equipment and similar ignition sources shall not be permitted where they constitute a fire hazard to the public except in specifically **approved** areas.

Emergency egress

2.14.1.4. (1) Outdoor **public amusement areas** that involve enclosed, confined or otherwise confusing configurations shall be provided with emergency egress points that

- (a) have appropriate width, height and capacity for the anticipated number of occupants,
- (b) are not more than 15 m travel from any point within the **public amusement area** except as **approved**,
- (c) are clearly identified with signs, and
- (d) are equipped with lighting providing a minimum lighting level of 10 lx at floor or pathway level for a duration of at least 30 min, where natural lighting is not sufficient in the circumstances.

Fire safety procedures

2.14.1.5. (1) The operator of the outdoor **public amusement area** shall develop and implement written fire safety procedures that include

- (a) a means of alerting the persons in the **public amusement area** of a fire emergency and notifying the **fire department**,
- (b) evacuation of endangered persons,
- (c) appointment and instruction of **supervisory staff** to carry out fire safety duties, and
- (d) fire prevention and control of fire hazards.

(2) The procedures described in Sentence (1) shall be made available to the **Chief Fire Official** upon request.

SECTION 2.15 PORTABLE OXYGEN SYSTEMS

Subsection 2.15.1. General

2.15.1.1. This Section applies to portable oxygen systems used for medical purposes in **residential occupancies** and health care facilities.

2.15.1.2. Storage, handling and use of portable oxygen systems shall be in conformance with CSA-Z305.12, "Safe Storage, Handling, and Use of Portable Oxygen Systems in Residential Buildings and Health Care Facilities".

**PART 3
FIRE SAFETY FOR INDUSTRIAL AND COMMERCIAL USES**

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SECTION 3.1 GENERAL

Subsection 3.1.1. Scope

Scope

3.1.1.1. This Part applies where the use, storage and handling of hazardous materials or the stockpiling of combustible materials create a potentially serious fire hazard.

SECTION 3.2 WOOD PRODUCTS

Subsection 3.2.1. Woodworking Plants

Lumber storage outdoors

3.2.1.1. The outdoor storage of lumber shall conform to Subsection 3.2.2.

Exhaust systems

3.2.1.2. Every machine that produces wood dust, particles or shavings shall be provided with a blower and exhaust system installed in conformance with NFPA 91, “Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids”.

3.2.1.3. Operations that generate sparks or combustible vapours shall not be served by woodworking exhaust systems.

Sawdust disposal

3.2.1.4. Loose shavings and sawdust shall be swept up at frequent intervals and deposited in receptacles described in Sentence 2.4.1.3.(3).

Portable extinguishers

3.2.1.5. A portable extinguisher conforming to Subsection 6.2.6. or a garden-type hose shall be provided within 7.5 m of any machine that produces wood dust, particles or shavings.

3.2.1.6. Spray finishing operations using **flammable liquids** or **combustible liquids** in woodworking plants shall conform to Part 5.

3.2.1.7. The storage and handling of **flammable liquids** and **combustible liquids** shall be in conformance with Part 4.

Subsection 3.2.2. Outdoor Storage of Lumber and Forest Products

Deviations from requirements

3.2.2.1. This Subsection does not apply where the existing situation is **approved** and does not endanger life safety, or **approved** alternative measures to the requirements set out in this Subsection are taken to provide life safety.

Surface of ground

3.2.2.2. (1) Except as permitted in Sentence (2) and Article 3.2.2.3., storage sites for lumber and other forest products shall consist of level and solid ground that is paved or surfaced with noncombustible material.

- (2) Soft storage beds may be used for logs where embedment of stones or cinders may cause damage to cutting knives.

Surface under piling

3.2.2.3. (1) Forest products shall not be piled on refuse-filled or sawdust-filled land except where the site is covered with a layer of compacted earth to a minimum depth of 150 mm.

- (2) Peat and humus are not acceptable materials for compacted earth cover in Sentence (1).

Clearance for yard storage areas

3.2.2.4. (1) Fire exposure to the yard areas from the mill operations and other structures shall be limited by providing clear space.

(2) The width of clear space shall be based upon the severity of exposure that will vary with the area, height, **occupancy**, construction and protection of the exposing structure and the type of piling and height of adjacent lumber piles.

- (3) To provide for fire fighting operations, the clear space permanently available shall not be less than 4.5 m.

Clearance for stickered lumber piles

3.2.2.5. (1) Stickered lumber piles in lumber storage yards shall be located at least 15 m from property lines and **buildings**.

- (2) Large size timbers and flat-piled stock may be stored or piled on the perimeter of the yard.

Clearance from vegetation

3.2.2.6. Storage yards shall be maintained free of combustible ground vegetation, including grass and weeds, for 4.5 m from the stored material and 30 m from brush and forested areas.

Wood waste disposal

- 3.2.2.7. Sawdust, chips and other waste material shall not be allowed to accumulate in piling areas in lumber yards.

Separation of treated lumber piles

3.2.2.8. Lumber and timber treated with **combustible liquids** shall be stored in piles that are separated from other stored material so that the distance between piles is at least twice the height of the treated pile, but not less than 4.5 m.

Storage beneath power lines

3.2.2.9. Stickered lumber piles, and piles of lumber and timber treated with **combustible liquids** shall not be stored beneath electrical power lines having a voltage in excess of 750 volts or that supply power to fire emergency systems.

Pile heights

- 3.2.2.10. Pile heights for stickered lumber piles shall not exceed 6 m.

3.2.2.11. Pile heights for randomly stacked or unranked piles shall not exceed 6 m unless special fire suppression equipment, such as portable turrets, deluge sets and monitor towers, is installed.

Fire department access

3.2.2.12. (1) Unless otherwise **approved**, each lumber yard shall be provided with at least two fire access routes in conformance with Sentence (2).

- (2) The fire access routes required in Sentence (1) shall

- (a) have a clear width of at least 6 m, unless it can be shown that lesser widths are satisfactory,
- (b) be designed to support the expected loads imposed by fire fighting equipment and be surfaced with concrete, asphalt or other material designed to permit accessibility under all climatic conditions,
- (c) be connected with a public thoroughfare, and
- (d) be located as remotely as is possible in the circumstances from each other.

3.2.2.13. (1) Where storage areas are fenced or otherwise enclosed, gateways having a clear width of at least 3.5 m shall be provided to permit entry of **fire department** vehicles.

- (2) Gateways shall be kept clear of obstructions so that gates may be opened fully at all times.

3.2.2.14. Groups of lumber piles shall be arranged with a maximum width of 15 m and a maximum length of 45 m, with **fire department** access routes surrounding each group of piles.

3.2.2.15. Vehicle parking and equipment storage is permitted on one side of a fire access route provided the clear width of the access route, as required under Clause 3.2.2.12.(2)(a), is maintained.

3.2.2.16. RESERVED

Burning of wood waste materials

3.2.2.17. Shavings, sawdust and refuse materials shall be burned only in **boilers** or **furnaces**, or in incinerators or refuse burners conforming to Subsection 2.6.3.

3.2.2.18. Refuse burners or incinerators referred to in Article 3.2.2.17. shall be located at least 15 m from **buildings**, property lines or piles of logs or lumber.

3.2.2.19. Where the size and design of the burner or spark-arresting screen, the prevailing winds or the location and arrangement of yard storage creates a fire hazard by conforming to Article 3.2.2.18., an **approved** increase in clear space referred to in Article 3.2.2.18. shall be provided to alleviate the fire hazard.

3.2.2.20. A refuse bin conforming to Sentence 2.4.1.3.(3) shall be provided at each **boiler, furnace**, incinerator and refuse burner referred to in Article 3.2.2.17.

3.2.2.21. Salamanders, braziers or other open flames shall not be used in storage yards.

Smoking prohibited

3.2.2.22. Smoking shall be prohibited in lumber yards, except as permitted in Subsection 2.4.3.

3.2.2.23. The telephone number of the **fire department** and location of the nearest telephones shall be posted conspicuously in working locations in the open yard and in each **building**.

Fire extinguishing provisions

3.2.2.24. (1) Outdoor lumber storage shall have fire protection provisions consisting of

(a) 200 L vessels with lids, having an opening of 457 mm least dimensions, located so that no person will have to travel more than 25 m from any part of the storage yard to reach a vessel, and

(b) three 12 L standard fire pails at each vessel.

(2) The water stored in the vessels and pump tanks shall be protected from freezing.

(3) The vessels, pails and pump tanks shall be painted red with the word "FIRE" in black painted thereon.

(4) Portable extinguishers having a 2A or higher rating conforming to the requirements of Section 6.2 may be provided in lieu of the requirements of Sentence (1).

3.2.2.25. Portable extinguishers shall be provided in conformance with Section 6.2 in each **building** located in a lumber yard.

Hydrant systems and water supply

3.2.2.26. The water supply available shall be adequate for hose streams and monitor towers, based on the provision of **approved** fire protection.

3.2.2.27. Where fire protection cannot be provided by municipal or private hydrants or mobile pumping equipment to confine and control a fire within a lumber yard, the hydrant system shall be extended into the yard area so that all parts of lumber yards can be reached by using not more than 60 m of hose.

Subsection 3.2.3. Outdoor Storage of Wood Chips

Deviations from requirements

3.2.3.1. This Subsection does not apply where the existing situation is **approved** and does not endanger life safety, or **approved** alternative measures to the requirements set out in this Subsection are taken to provide life safety.

Surface of ground

3.2.3.2. The storage site shall be well drained and be level, solid ground or paved with asphalt, concrete or other hard surface material.

3.2.3.3. The ground surface between piles shall be kept free of combustible materials.

Vegetation removal

3.2.3.4. (1) Weeds, grass and similar vegetation shall be removed from the yard.

(2) Portable open-flame weed burners shall not be used in chip storage yards.

Pile dimensions

3.2.3.5. Piles shall not exceed 18 m in height, 90 m in width and 150 m in length unless temporary water pipes with hose connections are laid on the top surface of the pile.

Fire department access

3.2.3.6. (1) Space shall be maintained between chip piles and exposing structures, yard equipment or stock equal to

- (a) twice the pile height for combustible stock or **buildings**, or
- (b) the pile height for noncombustible **buildings** and equipment.

(2) Despite Sentence (1), space between chip piles and exposing structures, yard equipment or stock shall not be less than 9 m.

3.2.3.7. Where storage areas are fenced or otherwise enclosed, gates at least 3.5 m in width shall be provided to permit entry of **fire department** vehicles.

3.2.3.8. (1) Permanently installed access walkways at least 1.8 m wide and constructed of noncombustible material shall be provided so that hose streams may be directed on any part of the piles.

(2) Despite Sentence (1), other **approved** means may be used to ensure adequate **fire department** access to the piles.

3.2.3.9. Piles exceeding 150 m in length shall be surrounded by **fire department** access routes at least 9 m wide.

Smoking prohibited

3.2.3.10. Smoking shall be prohibited in chip pile areas.

Fire extinguishing provisions

3.2.3.11. Portable extinguishers for **Class A fires** shall be provided on vehicles operating on chip piles in addition to the units for **Class B fires** normally required for the vehicles.

3.2.3.12. (1) Hose houses or cabinets shall be provided around the perimeter of chip piles at intervals not exceeding 120 m.

(2) One 75 m length of 65 mm hose and two portable extinguishers having a 2A or higher rating and conforming to Section 6.2 shall be installed in each hose house or cabinet.

(3) Each hose required in Sentence (2) shall be connected to a water supply capable of supplying 1140 L/min of water to it at a pressure that will allow the hose stream to reach the top of the chip pile.

3.2.3.13. Portable extinguishers in conformance with Section 6.2 shall be provided in transfer houses.

SECTION 3.3 STORAGE**Subsection 3.3.1. Indoor Tire Storage*****Application***

3.3.1.1. This Subsection applies to **buildings** used for the storage of tires in which the bulk volume of tires stored in one **fire compartment** exceeds 425 m³.

Tire pile dimensions

3.3.1.2. A single pile of tires in a tire storage location shall occupy an area not greater than 500 m² with a maximum length of 30 m.

3.3.1.3. (1) The maximum piling height of tires shall not exceed the height used for the design of the fixed extinguishing system installed as required in Article 3.3.1.8.

(2) The maximum piling height allowed in Sentence (1) shall be posted in conspicuous locations.

Pile clearance

3.3.1.4. A clearance of at least 914 mm shall be maintained between the tops of piles and sprinkler head deflectors.

3.3.1.5. Aisles between individual piles shall be at least 1.8 m wide.

3.3.1.6. A clearance of at least 600 mm shall be maintained between piles of tires and columns and enclosing walls.

3.3.1.7. A tire storage location shall be classified as a **medium hazard industrial occupancy**.

Warehouse fire extinguishing systems

3.3.1.8. (1) Where the **floor area** of a tire storage location exceeds 250 m², the **floor area** shall be provided with an **approved** automatic fire extinguishing system installed in conformance with NFPA 13, "Standard for the Installation of Sprinkler Systems".

(2) The design of the automatic fire extinguishing system required in Sentence (1) shall be based on the maximum piling height available.

3.3.1.9. A standpipe and hose system shall be installed in conformance with NFPA 13, “Standard for the Installation of Sprinkler Systems”.

Portable extinguishers

3.3.1.10. (1) In addition to the requirements of Section 6.2, multi-purpose dry chemical portable extinguishers having a rating of 4A:80B shall be installed

- (a) in every 500 m² of **floor area**, and
- (b) so that the distance travelled to any extinguisher does not exceed 25 m.

Subsection 3.3.2 Indoor General Storage

Application

3.3.2.1. (1) This Subsection applies to the indoor general storage of combustible or noncombustible solids with combustible packaging or storage aids to a height of 6.4 m, except that this Subsection does not apply to the bulk storage of unpackaged grain, coal or similar commodities, or special hazard commodities covered elsewhere in this Code.

(2) When **flammable liquids** or **combustible liquids** are stored with products covered by this Subsection, the liquids shall meet the requirements of the applicable provisions of Part 4.

Storage pile dimensions

- 3.3.2.2. (1) The area of individual storage piles shall not exceed 500 m² in **buildings** that are not **sprinklered**.
- (2) The area of individual storage piles shall not exceed 1000 m² in **sprinklered buildings**.
- (3) Heights of storage piles in **buildings** that are not **sprinklered** shall not exceed 4.5 m.
- (4) The maximum permitted height of storage of any **individual storage area** shall be determined according to
 - (a) the stability of the stored products as it relates to the base area and shape, and
 - (b) the height limitations otherwise set in this Subsection.

Pile clearance

3.3.2.3. (1) The clearance between sprinkler head deflectors and the tops of piles shall not be less than 457 mm.

(2) Where the storage piles are above the lower chords of floor or roof structural framing members, a horizontal clear space of at least 300 mm shall be maintained between the storage and the structural members.

Fire access aisles

3.3.2.4. At least one main aisle having a width equal to at least half the height of the highest adjacent pile and extending the length of the structure shall be provided but in no case shall the width of the aisle be less than 2.4 m.

3.3.2.5. Aisles separating piles described in Article 3.3.2.2. shall be at least 2.4 m wide.

3.3.2.6. (1) Adequate access for fire fighting purposes shall be provided and maintained to all portions of the premises, in conformance with Sentences (2) to (6).

(2) Access aisles not less than 1.0 m wide shall be provided to **exits**, to **fire department** access panels and to fire protection equipment.

(3) Aisles shall be maintained free of obstruction.

(4) Except as permitted by Sentence (5), at least one main access aisle shall extend the length of the **building** with a minimum width of

- (a) 2.4 m for storage heights not more than 6 m, and
- (b) 3.6 m for storage heights of more than 6 m.

(5) Narrower aisles may be **approved** where the **building** is **sprinklered** and the sprinkler design is based on aisle widths less than required by Sentence (4) but in no case shall the aisle width be less than the aisle width on which the sprinkler design is based.

(6) In storage areas that exceed 200 m², main access aisles referred to in Sentence (4) shall be accessible from at least two **fire department** access points, which shall be located such that, in the event one becomes unusable due to fire, the other will still allow emergency responders to access the **building**.

3.3.2.7. Wall clearances of at least 600 mm shall be maintained where stored commodities may swell or expand with the absorption of water.

Palletized storage arrangements

3.3.2.8. Palletized storage shall be arranged so that unobstructed horizontal channels formed by the top and bottom of pallets shall not exceed 15 m.

3.3.2.9. Except as permitted in Article 3.3.2.10., pallets and dunnage not in use shall be stored outdoors and be located so as to avoid an exposure hazard.

Pallet storage

3.3.2.10. (1) Except as permitted in Sentences (2) and (3), combustible pallets shall be stored outdoors in conformance with Section 2.4.

(2) Indoor storage of combustible pallets is permitted in a **building** that is not **sprinklered**, provided

- (a) the height of storage of combustible pallets is not more than 1.2 m,
- (b) the width of an **individual storage area** is not more than 7.5 m, and
- (c) the aggregate area of storage is not more than

- (i) 100 m² for wood or solid deck non-expanded polyethylene pallets, or
- (ii) 50 m² for plastic pallets not described in Subclause (i).

(3) In a **sprinklered building**, the storage of combustible pallets is permitted to exceed the values in Sentence (2) provided such storage conforms to NFPA 13, "Standard for the Installation of Sprinkler Systems".

3.3.2.11. Except as provided in Subsection 2.4.3., smoking shall not be permitted in an indoor storage area.

Subsection 3.3.3. Indoor Storage of Ammonium Nitrate

Application

3.3.3.1. This Subsection shall apply to the storage of ammonium nitrate in quantities exceeding 1000 kg in the form of crystals, flakes, grains or prills, including fertilizer grade or other mixtures containing 60% or more ammonium nitrate by weight, but does not apply to blasting agents or fertilizer storage on railways regulated by the Canadian Transport Commission.

Storage buildings

3.3.3.2. (1) A **building** used for the storage of ammonium nitrate shall not be more than 1 **storey** in **building height**.

(2) A **building** used for the storage of ammonium nitrate shall not

- (a) have **basements** or crawl spaces, or
- (b) contain open floor drains, tunnels, elevator pits or other pockets which might trap molten ammonium nitrate.

(3) A **building** used for the storage of ammonium nitrate shall have not less than 70 cm² in vent area for each square metre of storage area unless mechanical ventilation is provided.

(4) All flooring in storage areas shall be of noncombustible materials.

(5) A **building** used for the bulk storage of ammonium nitrate shall be designed to prevent contact with **building** material that

- (a) will cause the ammonium nitrate to become unstable,
- (b) may corrode or deteriorate by reason of contact with the ammonium nitrate, or
- (c) will become impregnated by ammonium nitrate.

(6) The distance between an ammonium nitrate storage facility and the property line of another property shall be not less than

- (a) 15 m where the other property contains a warehouse for **flammable liquids** storage or a facility for loading or unloading **flammable liquids**,
- (b) 15 m where the other property contains a **building** classified as **medium hazard industrial occupancy** or **low hazard industrial occupancy** provided the ammonium nitrate storage facility does not exceed 200 t of ammonium nitrate,
- (c) 30 m where the other property contains a **building** classified as **industrial occupancy** not covered in Clause (b), **flammable liquids storage tanks**, flammable gas **storage tanks** or other tanks containing a hazardous substance, or
- (d) 90 m for all other **occupancies**.

(7) The distance in Clause (6)(b) may be reduced to 7.5 m when a 2 h **firewall** is provided between the storage facility and the **building** it exposes.

(8) The distance in Clause (6)(c) may be reduced to 15 m for a **medium hazard industrial occupancy** or a **low hazard industrial occupancy** when a 2 h **firewall** is provided between the storage facility and the **building** it exposes.

(9) The use of **buildings** or structures that do not conform with the provisions of Sentences (6) to (8) may be **approved** where the **buildings** or structures do not constitute a hazard to life or property from fire or explosion.

(10) Except where other forms of exposure protection are **approved**, the walls of the exposed side of a storage **building** shall be noncombustible where such walls are within 15 m of a

- (a) combustible **building**,
- (b) forest, or
- (c) pile of combustible material.

Industrial trucks

3.3.3.3. (1) In addition to the requirements of Section 3.4, industrial trucks used or stored within the **building** shall be maintained so that fuels or hydraulic fluids do not contaminate the ammonium nitrate.

(2) Fuel-dispensing operations shall not be carried out in **buildings** where ammonium nitrate is stored.

(3) An internal combustion engine shall not be permitted to remain unattended in a **building** where ammonium nitrate is stored unless the engine is located in an area that will prevent the spread of a fire originating in the engine.

(4) Industrial trucks used for the transportation of ammonium nitrate shall be cleaned of remaining material following use.

Portable extinguishers

3.3.3.4. In addition to the requirements of Section 6.2, pressurized-water portable extinguishers having a rating of 2A or larger shall be installed.

Storage

3.3.3.5. (1) **Individual storage areas** of bagged ammonium nitrate shall not exceed 1500 m² in area and 9 m in height.

(2) Bags of ammonium nitrate shall not be stored closer than 400 mm from walls and **partitions** and not closer than 900 mm from a roof, overhead supporting beam or a sprinkler head deflector.

(3) Ammonium nitrate shall not be stored in an area where the ambient temperature is such that it can become unstable or susceptible to undesirable reactions.

(4) Ammonium nitrate storage shall be identified by signs of contrasting colours indicating the contents with letters 50 mm high.

(5) Bulk storage of ammonium nitrate shall be located indoors or in enclosed bin-type structures.

(6) Bins used for the storage of ammonium nitrate shall not contain galvanized iron, copper, lead or zinc, or other materials that may contaminate or be corroded by ammonium nitrate.

Automatic sprinklers

3.3.3.6. (1) Ammonium nitrate shall be stored only in **buildings** equipped with an automatic sprinkler system installed in conformance with NFPA 13, "Standard for the Installation of Sprinkler Systems".

(2) Sentence (1) does not apply where the existing situation is **approved** and does not endanger life safety or alternative measures to the requirements set out in Sentence (1) are taken to provide life safety.

Disposal

3.3.3.7. (1) Spilled ammonium nitrate material shall be disposed of in conformance with Sentences (2) to (5).

(2) Uncontaminated material may be rebagged in suitable slip-over bags and sealed to prevent spillage.

(3) Unsalvageable material shall be removed by sweeping and burial.

(4) After flushing and scrubbing contaminated areas very thoroughly to dissolve all material, the residue shall be washed away with hoses.

(5) Empty bags shall be disposed of by burning outdoors where permitted in a safe area, or by burial.

Explosives prohibited

3.3.3.8. Explosives shall not be used to break up caked ammonium nitrate.

Smoking and open flames prohibited

3.3.3.9. (1) Smoking and the use of open flames shall be prohibited in **buildings** used for the storage of ammonium nitrate.

(2) Signs with letters 50 mm high indicating that ammonium nitrate is being stored and that smoking is not permitted shall be prominently displayed near each entrance on the exterior of **buildings** identified in Sentence (1).

Heating equipment

3.3.3.10. Heating equipment shall be separated from any storage area in conformance with the requirements of the **Building Code**.

SECTION 3.4 INDUSTRIAL TRUCKS

Subsection 3.4.1. General

General

3.4.1.1. The designation, use, maintenance and operation of industrial trucks, including fork lifts, tractors, sweepers and motorized hand trucks, shall conform to NFPA 505, "Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Maintenance, and Operation".

Subsection 3.4.2. Industrial Trucks

Fuel-fired industrial trucks

3.4.2.1. (1) Fuel-fired industrial trucks shall be stored in

- (a) detached **buildings**,
- (b) areas separated from the remainder of the storage area by a **fire separation** having a **fire-resistance rating** of not less than 1 h, or
- (c) areas where the vehicles do not create a fire hazard to the storage area.

(2) Except as provided in Sentence (3), industrial trucks shall be refuelled only at designated locations outside **buildings**.

(3) Industrial trucks that are fuelled by replaceable propane cylinders are permitted to have their cylinders replaced indoors provided

- (a) cylinder replacement is done at a safe location that is at least 7.5 m from ignition sources, open pits and underground entrances,
- (b) the cylinder valves are closed, and
- (c) when an automatic quick-closing coupling that closes in both directions when uncoupled and **listed** to ANSI/UL 558, "Industrial Trucks, Internal Combustion Engine-Powered", is not provided, the engine is operated until the fuel in the system is consumed.

(4) Each fuel-fired industrial truck shall be equipped with at least one portable extinguisher having a minimum rating of 2A:30B:C.

(5) Propane cylinders shall be stored in conformance with Section 5.6.

Battery-powered industrial trucks

3.4.2.2. (1) Battery charging installations for battery-powered industrial trucks shall be located

- (a) at least 1.5 m from combustible materials,
- (b) when serving more than two trucks, in well ventilated areas,
- (c) in areas where flammable gases or vapours, **combustible dusts** or **combustible fibres** are not present in hazardous quantities, and
- (d) in areas where precautions are taken to prevent ignition sources, such as open flames, sparks or electric arcs.

(2) Battery charging installations for battery-powered industrial trucks shall be equipped with at least one portable extinguisher having a minimum rating of 2A:30B:C.

(3) Facilities shall be provided at battery charging installations for flushing and neutralizing spilled electrolyte and for protecting charging apparatus from mechanical damage.

Training

3.4.2.3. (1) Only trained and authorized personnel shall be permitted to

- (a) operate industrial trucks,
- (b) replace or refuel propane cylinders for fuel-fired industrial trucks,
- (c) refuel fuel-fired industrial trucks, or

(d) change or charge batteries for battery-powered industrial trucks.

SECTION 3.5 SALVAGE SHOPS AND SALVAGE YARDS

Subsection 3.5.1. General

Roof storage prohibited

3.5.1.1. The roof of a **building** located in a salvage yard shall not be used for storage purposes.

Fires prohibited

3.5.1.2. Fires shall not be permitted in a salvage yard except when used for heating purposes or for operating machinery or welding or cutting equipment.

3.5.1.3. Gas tanks on vehicles to be salvaged shall be drained and ventilated prior to salvage operations.

Fire access gates

3.5.1.4. Where storage areas are fenced or otherwise enclosed, gates having a clear width of 3.5 m shall be provided to permit the entry of **fire department** vehicles.

Fire extinguishing provisions

3.5.1.5. Except where all salvage and scrap material is noncombustible and free of combustibles, water barrels of 200 L capacity with three 12 L pails or portable extinguishers having a 2A or higher rating conforming to the requirements of Section 6.2 shall be provided, so that the maximum distance travelled from any part of the yard to a barrel or extinguisher is 25 m.

3.5.1.6. Portable extinguishers in conformance with Section 6.2 shall be provided in each **building** located in a salvage yard.

Hydrant systems and water supply

3.5.1.7. Except as required in Article 3.5.1.8., where a municipal hydrant system exists and is adjacent to the yard, the hydrant system shall be extended into the yard area so that all parts of the salvage yard can be reached by using not more than 60 m of hose.

3.5.1.8. Article 3.5.1.7. does not apply where the fire protection that is provided by the municipal hydrants and mobile pumping equipment is **approved** as being adequate in the circumstances.

Smoking prohibited

3.5.1.9. Smoking shall be prohibited in salvage yards, except as permitted in Subsection 2.4.3.

3.5.1.10. The telephone number of the **fire department** and location of the nearest telephones shall be posted conspicuously in working locations in the open yard and in each **building**.

Subsection 3.5.2. Piling

Pile clearance and dimensions

3.5.2.1. Piles that include combustible salvage shall be 3 m from property lines, and not more than 3 m in height and 100 m² in area.

3.5.2.2. Piles of salvage material shall be separated by a clear space of 3 m that is kept clear of grass and weeds.

Piles of tanks or drums

3.5.2.3. Tanks or drums shall be stored in piles separate from piles of other materials.

Combustible metals

3.5.2.4. (1) Piles or containers with metal shavings, turnings and dusts shall be stored in an area separate from other salvage materials and identified with warning signs.

(2) Warning signs required in Sentence (1) shall

(a) be visible from all directions of approach, and

(b) have the name of the metal and the words “COMBUSTIBLE METAL — DO NOT USE WATER” displayed in plain legible letters as described in Sentence (3).

(3) Lettering on warning signs shall be red or white letters 114 mm high with a 19 mm stroke on a contrasting background.

Subsection 3.5.3. Outdoor Tire Storage Yards

Application

3.5.3.1. (1) Despite Subsection 3.5.2., this Subsection applies with respect to the outdoor storage of tires or shredded tires where the bulk volume of stored product exceeds 300 m³.

(2) This Subsection does not apply where the stored tires or shredded tires are covered by a minimum depth of 150 mm of noncombustible material.

Prohibitions

3.5.3.2. (1) Open-air burning is prohibited in storage yards.

(2) Cutting, welding or heating devices shall not be operated in storage yards.

(3) Smoking is prohibited in storage yards except as provided in Subsection 2.4.3.

(4) Storage piles shall not be located beneath electrical power lines with a voltage in excess of 750 volts or that supply power to fire emergency systems.

Fire safety planning

3.5.3.3. (1) Except as provided in Sentences (2) to (4), storage yards shall comply with the requirements of Section 2.8.

(2) The fire safety plan shall include provisions respecting access for water tanker shuttle operations within the **fire department** access routes, if water tanker shuttle operations are required in the circumstances of the storage yard.

(3) At least one copy of the fire emergency procedures shall be prominently posted and maintained at the storage yard.

(4) The telephone number of the **fire department** and location of the nearest telephone shall be posted conspicuously in attended locations.

Pile dimensions

3.5.3.4. (1) Individual storage piles shall not be more than 3 m in height and 100 m² in area.

(2) Storage piles shall be separated by a clear space of at least 6 m from piles of other stored product.

Pile clearance

3.5.3.5. (1) Storage piles shall be located at least 15 m from property lines.

(2) Storage piles shall be located at least 15 m from **buildings**.

(3) Individual storage piles shall be separated from other piles of salvage by a clear space of at least 6 m.

Clearances from vegetation

3.5.3.6. (1) Storage yards shall be maintained free of combustible ground vegetation,

(a) over a distance of 4.5 m from the stored product to grass and weeds, and

(b) over a distance of 30 m from the stored product to brush and forested areas.

Fire breaks

3.5.3.7. (1) Where the bulk volume of stored product is more than 4800 m³, fire breaks shall be provided around the perimeter of each group of storage piles in accordance with Sentences (2) and (3).

(2) Individual storage piles shall be arranged so that there are not more than 16 individual storage piles per group.

(3) Fire breaks shall be at least 22 m wide.

Alternative measures

3.5.3.8. Despite Articles 3.5.3.4. to 3.5.3.7., other pile arrangements that will prevent the spread of fire and that are **approved** may be used.

Fire department access

3.5.3.9. (1) Each tire storage yard shall be provided with fire access routes.

(2) The fire access routes shall

(a) have a clear width of at least 6 m,

(b) be designed to support the loads imposed by fire fighting equipment,

(c) be surfaced with material designed to permit accessibility under all climatic conditions,

(d) be connected with a public thoroughfare in at least two places that are located as remotely as is possible in the circumstances from each other,

- (e) be located within all pile clearances identified in Sentence 3.5.3.5.(1) or (2) and within all fire breaks required in Article 3.5.3.7.,
- (f) be within 50 m of any point in the storage yard where storage piles are located,
- (g) be at least 6 m from any storage pile, and
- (h) be maintained accessible and unobstructed at all times.
- (3) Despite Sentences (1) and (2), alternate fire access routes may be provided if
 - (a) the routes permit fire fighting vehicles and equipment access and permit the use of fire suppression techniques appropriate in the circumstances, and
 - (b) the routes are **approved**.

Fencing

- 3.5.3.10. (1) Where the bulk volume of stored product is more than 600 m³, the storage yard shall be surrounded by a firmly anchored fence or other **approved** method of security that controls unauthorized access to the storage yard.
- (2) Where a fence is used, the fence shall be at least 1.8 m high and constructed to discourage entry.
 - (3) The fence shall have gateways with a clear width of at least 3.5 m.
 - (4) The gateways shall be high enough to permit the entry of **fire department** vehicles.
 - (5) The gateways shall be kept clear of obstructions so that the gates may be opened fully at all times.
 - (6) The gates shall be locked when the storage yard is not staffed.

Water supply

- 3.5.3.11. (1) A public or private water supply shall be provided such that any part of the storage yard can be reached by using not more than 150 m of hose.
- (2) When the quantity of stored product is between 300 m³ and 1200 m³, the water supply system shall be capable of supplying 1860 L/min for 3 h.
 - (3) Where the quantity of stored product is 1200 m³ or more, the water supply system shall be capable of supplying 3780 L/min for 3 h.
 - (4) Where on-site reservoirs or other established water supplies are used as a **fire department** draft source to meet the requirements of Sentences (1), (2) and (3), they shall be equipped with dry hydrants in accordance with Chapter 9 of NFPA 1142, “Standard on Water Supplies for Suburban and Rural Fire Fighting”.

Alternative measures

3.5.3.12. Despite Article 3.5.3.11., other water supply systems or other measures may be used if the systems or measures will provide sufficient fire suppression capability in the circumstances and if the systems or measures are **approved**.

Portable extinguishers

3.5.3.13. Each motorized vehicle operating in an outdoor storage area shall be equipped with at least one portable extinguisher having a minimum rating of 2A:30B:C.

SECTION 3.6 DRY CLEANING AND DYEING PLANTS

Subsection 3.6.1. Dry Cleaning and Dyeing Plants

Applicable standard

- 3.6.1.1. (1) Dry cleaning plants shall conform to NFPA 32, “Standard for Drycleaning Plants”.
- (2) Despite Sentence (1) and except as permitted by Sentence (3), **flammable liquids** shall not be used for any purpose in dry cleaning and dyeing plants.
 - (3) **Flammable liquids** may be used as a local application to remove spots and stains if the liquids
 - (a) are stored in containers not exceeding 1 L in capacity,
 - (b) do not exceed 25 L in aggregate quantity and are in containers conforming to Part 4, and
 - (c) are dispensed from plastic containers that do not exceed 0.5 L.
 - (4) Despite Sentence (1), electrical installations need not conform to NFPA 70, “National Electrical Code”, but shall conform to the **Electrical Safety Code** made under the **Electricity Act, 1998**.

(5) Despite Sentence (1), existing dry cleaning plants and dyeing plants may be **approved** if the **Chief Fire Official** is satisfied that the level of fire safety specified in Sentence (1) is provided.

SECTION 3.7 BOWLING ALLEYS

Subsection 3.7.1. Resurfacing

Notification

3.7.1.1. The **Chief Fire Official** shall be notified when bowling alleys are to be resurfaced.

Floor finishing

3.7.1.2. Floor finishing operations shall be in conformance with Subsection 5.14.8.

Subsection 3.7.2. Pin Refinishing

3.7.2.1. (1) Pin refinishing shall be carried out in a **building** provided for this purpose, or in a room at or above **grade** separated by walls, floor and ceiling assemblies all having a 1 h **fire-resistance rating**.

(2) Smoking shall not be permitted in a pin refinishing room.

(3) Signs in conformance with Article 2.4.3.2. shall be posted in pin refinishing rooms.

Subsection 3.7.3. Flammable Liquids and Combustible Liquids

3.7.3.1. The storage, handling and use of **flammable liquids** and **combustible liquids** shall be in conformance with Part 4.

3.7.3.2. (1) During the pin refinishing process, a receptacle conforming to Sentence 2.4.1.3.(3) shall be provided for waste rags and materials used in operations involving flammable finishes or solvents.

(2) The contents of the receptacles in Sentence (1) shall be removed daily and disposed of in a manner that is **approved**.

PART 4 FLAMMABLE LIQUIDS AND COMBUSTIBLE LIQUIDS

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SECTION 4.1 APPLICATION

Subsection 4.1.1. Scope and Application

Scope

4.1.1.1. (1) This Part provides for the storage, handling, processing and use of

- (a) **flammable liquids** or **combustible liquids**, and
- (b) liquids with **flash points** greater than 93.3°C, when processed, stored, handled or used at temperatures above their **flash points in buildings**, structures and open areas.

(2) For the purposes of this Part,

“existing” means in existence on November 21, 1997.

Application

4.1.1.2. (1) Areas in **process plants** need not conform to this Part where specific hazards are addressed by design and operational procedures that meet recognized standards and equivalent protection is provided.

(2) Except as specifically provided elsewhere in this Part, this Part does not apply to

- (a) the transportation of **flammable liquids** or **combustible liquids** to which the **Transportation of Dangerous Goods Act (Canada)** and its regulations, or the **Dangerous Goods Transportation Act** and its regulations apply,
- (b) the storage, handling, transportation and use of **flammable liquids** or **combustible liquids** to which the **Technical Standards and Safety Act, 2000** and its regulations apply,

- (c) the storage, handling and use of **flammable liquids** or **combustible liquids** at airports, piers and wharves regulated under federal law,
- (d) underground areas to which the **Occupational Health and Safety Act** and its regulations apply,
- (e) the storage of aerosol products that fall under the scope of Subsection 3.2.5. in Division B of NRC, “National Fire Code of Canada 2005”, and
- (f) the storage of **flammable liquids** or **combustible liquids** on farms for individual farm use.

Compliance

4.1.1.3. Existing conditions are acceptable with respect to Articles 4.3.2.1., 4.3.2.2., 4.3.2.3. and 4.3.8.2. and Sentence 4.3.8.1.(2) until replacement or relocation of a tank is carried out, at which time these requirements shall apply.

Compliance equivalency

4.1.1.4. (1) The composition, design, size and arrangement of any material, object, device or thing is deemed to be in compliance with this Part where

- (a) the material, object, device or thing provides a level of protection with respect to strength, health and safety that is equal to or greater than that prescribed in this Part,
- (b) the compliance equivalency in Clause (a) has been **approved**, and
- (c) the compliance equivalency has been implemented.

(2) A proposal for compliance equivalency described in Sentence (1) shall bear the signature and seal of a **Professional Engineer** or **Architect** or both.

(3) A copy of the **approved** compliance equivalency shall be kept on the premises to which it relates and made available to the **Chief Fire Official** upon request.

(4) The compliance equivalency described in this Article is not applicable in respect of any **acceptable solutions** to which **objectives** and **functional statements** have not been attributed in OFM Fire Code Supplement FCS-1, “Objectives and Functional Statements Attributed to Acceptable Solutions”.

Subsection 4.1.2. Classification

Classification

4.1.2.1. (1) For the purposes of this Part, **flammable liquids** and **combustible liquids** shall be classified in conformance with Sentences (2) and (3).

- (2) **Flammable liquids** shall be Class I liquids, and shall be subdivided into
 - (a) Class IA liquids, which are those having a **flash point** below 22.8°C and a boiling point below 37.8°C,
 - (b) Class IB liquids, which are those having a **flash point** below 22.8°C and a boiling point at or above 37.8°C, and
 - (c) Class IC liquids, which are those having a **flash point** at or above 22.8°C and below 37.8°C.
- (3) **Combustible liquids** shall be Class II or Class IIIA liquids, and shall be subdivided into
 - (a) Class II liquids, which are those having a **flash point** at or above 37.8°C and below 60°C, and
 - (b) Class IIIA liquids, which are those having a **flash point** at or above 60°C and below 93.3°C.

Heated liquids

4.1.2.2. When a liquid having a **flash point** at or above 37.8°C is being processed, stored, handled or used at a temperature at or above its **flash point**, it shall be treated as a Class I liquid.

Used lubricating oil

4.1.2.3. (1) Except as provided in Sentence (2), used lubricating oil drained from motor vehicles shall be classified as a Class IIIA liquid.

(2) When Class I or II liquids are added to the used oils described to in Sentence (1), the resulting mixture shall be classified

- (a) through **tests** conforming to Subsection 4.1.3., or
- (b) in the absence of **tests** referred to in Clause (a),
 - (i) as a Class IC liquid if Class I liquids are added, or
 - (ii) as a Class II liquid if only Class II liquids are added.

Subsection 4.1.3. Flash Point

Determination of flash point

4.1.3.1. (1) Except as provided in Sentences (3) and (4), the **flash point** of liquids having a **viscosity** less than 6 mm²/s at 37.8°C and a **flash point** below 93.3°C shall be determined in conformance with ASTM D 56, “Flash Point by Tag Closed Tester”.

(2) Except as provided in Sentences (3) and (4), the **flash point** of liquids having a **viscosity** of 6 mm²/s or more at 37.8°C or a **flash point** of 93.3°C or higher shall be determined in conformance with ASTM D 93, “Flash Point by Pensky-Martens Closed Tester”.

(3) The **flash point** of aviation turbine fuels may be determined in conformance with ASTM D 3828, “Flash Point by Small Scale Closed Tester”.

(4) The **flash point** for paints, enamels, lacquers, varnishes and related products and their components having **flash points** between 0°C and 110°C, and having a **viscosity** less than 15000 mm²/s at 25°C may be determined in conformance with ASTM D 3278, “Flash Point of Liquids by Setaflash Closed-Cup Apparatus”.

Subsection 4.1.4. Electrical Installations

Hazardous locations

4.1.4.1. (1) Electrical equipment in a location where **flammable liquids** or **combustible liquids** are present shall conform to the **Electrical Safety Code** made under the **Electricity Act, 1998**.

(2) Where refrigerators are used to keep Class I liquids, they shall be designed so that

(a) electrical equipment located within the storage compartment, within the outer shell, on the door and on the door frame of the refrigerator is in conformance with the **Electrical Safety Code** made under the **Electricity Act, 1998**, for Class I, Zone 0 or 1 hazardous locations based on the frequency of occurrence and duration of an explosive gaseous atmosphere, and

(b) electrical equipment mounted on the outside surface of the refrigerator is

(i) in conformance with the **Electrical Safety Code** made under the **Electricity Act, 1998**, for Class I, Zone 2 hazardous locations, or

(ii) located above the top of the storage compartment.

Subsection 4.1.5. Fire Prevention and Protection

Portable extinguishers

4.1.5.1. Portable extinguishers required in this Part shall be in accordance with Section 6.2.

4.1.5.2. RESERVED

Ignition sources

4.1.5.3. Unless controlled in a manner that will not create a fire or explosion hazard, a device, operation or activity that produces open flames, sparks or heat shall not be permitted in an area described in Article 4.1.1.1.

Smoking

4.1.5.4. Except for designated safe smoking areas conforming to Subsection 2.4.3., smoking shall not be permitted in areas described in Article 4.1.1.1.

Removal of combustibles

4.1.5.5. (1) Areas described in Article 4.1.1.1. shall be kept clean and free of ground vegetation and accumulations of combustible materials not essential to operations.

(2) Cleaning rags shall be stored in receptacles conforming to Sentence 2.4.1.3.(3).

Fire safety plan

4.1.5.6. The requirements of Section 2.8 shall apply to **buildings** and open areas where the quantities of **flammable liquids** and **combustible liquids** exceeds 500 L in total or exceeds 250 L of Class I liquids.

Access for fire fighting

4.1.5.7. Aisles and other access paths shall be maintained to permit the unobstructed movement of personnel and **fire department** apparatus so that fire fighting operations can be carried out in any part of an area used for the storage, use or handling of **flammable liquids** or **combustible liquids**.

Hot works

4.1.5.8. Hot works shall be performed in conformance with Section 5.17.

Basement storage

4.1.5.9. (1) Except as permitted in Sentences (2), (3) and (4), Class I liquids shall not be stored, handled or used in **basements** or pits.

(2) Class I liquids may be stored in **dwelling units** as described in Article 4.2.4.5. and **mercantile occupancies** as described in Sentence 4.2.5.2.(3).

(3) Up to 5 L of Class I liquids may be stored in **basements**, provided it is stored in safety containers conforming to ULC/ORD-C30, “Safety Containers”.

(4) Class I liquids not exceeding 250 L in quantity may be stored, handled or used in existing laboratories described in Subsection 4.12.1. where

- (a) continuous mechanical ventilation is provided to ensure that flammable vapour concentrations do not exceed 25% of the **lower explosive limit** in the **basement** or pit,
- (b) the continuous mechanical ventilation required in Clause (a) sounds an audible alarm in an attended area upon shutdown of the ventilation system,
- (c) the Class I liquids are located in a **fire compartment** separated from the rest of the **building** by a **fire separation** having a 1 h **fire-resistance rating**,
- (d) despite Article 4.1.5.6., the **building** has a fire safety plan in conformance with Section 2.8,
- (e) Class IA liquids are not stored in containers greater than 4 L in capacity,
- (f) except where all dispensing of Class I liquids is carried out in a power-ventilated enclosure in conformance with Articles 4.12.8.3. to 4.12.8.5. and where Class IA liquids are stored in storage cabinets in conformance with Article 4.2.10.5., the room is designed to prevent critical structural and mechanical damage from internal explosion in conformance with NFPA 68, “Guide for Venting of Deflagrations”, and
- (g) except where all sources of ignition within 0.9 m from the floor are eliminated, the room is provided with a flammable vapour detection system that will alarm in an attended location upon detection of vapour concentrations exceeding 10% of the **lower explosive limit**.

(5) Despite Clause (4)(c), existing **fire separations** consisting of lath and plaster or gypsum board are deemed to be in compliance with Clause (4)(c).

Routine maintenance

4.1.5.10. Maintenance of any equipment involved in the storage, handling, processing and use of **flammable liquids** or **combustible liquids**, whose failure would significantly increase the fire or explosion hazard and whose maintenance requirements are not addressed in another Part of this Code shall be maintained in accordance with its **listed** requirements and if not **listed**, be maintained in accordance with the manufacturer’s recommendations or good engineering practice.

Subsection 4.1.6. Spill Control and Drainage Systems

Spill control

4.1.6.1. (1) Except as permitted in Sentence (3), a spill of **flammable liquids** or **combustible liquids** shall be prevented from flowing outside the spill area and from reaching waterways, sewer systems and potable water sources by

- (a) constructing a noncombustible barrier capable of containing the spill, or
- (b) grading the site or sloping the floor to divert the spill to a drainage system conforming to Article 4.1.6.2.

(2) Where barriers required in Sentence (1) are provided to contain accidental spillage from aboveground **storage tanks**, they shall conform to the requirements for secondary containment in Subsection 4.3.7.

(3) Water-miscible effluent from spills and fire fighting operations is permitted to be directed into a sewer system provided it does not create a fire hazard or any risk to public health or safety.

(4) The fire safety plan required in Article 4.1.5.6. shall include measures to be taken to direct overflow of spilled liquids and fire fighting water away from

- (a) **buildings**,
- (b) adjoining properties,
- (c) **means of egress**,
- (d) air intakes or openings that could permit vapour entry into the **building**,
- (e) fire alarm control panels,

- (f) **fire department** access routes,
- (g) valves controlling the water supply for fire fighting, or fire protection systems,
- (h) **fire department** pumper connections or wall hydrants,
- (i) isolation valves controlling processes, and
- (j) valves controlling the flow of **flammable liquids** or **combustible liquids**.

Drainage systems

4.1.6.2. (1) A drainage system referred to in Clause 4.1.6.1.(1)(b) shall

- (a) terminate at a location where such a spill will not create a fire hazard or any risk to health or safety or the natural environment, and
 - (b) direct the spill away from the areas identified in Sentence 4.1.6.1.(4).
- (2) Closed drainage systems shall be equipped with a trap.

Spills and leaks

4.1.6.3. (1) Maintenance and operating procedures shall be established to prevent the escape of **flammable liquids** or **combustible liquids** to areas where they could create a fire or explosion hazard.

(2) Except as provided in Sentence (3), all reasonable steps shall be taken to recover escaped liquid and to remove or treat contaminated soil, surface water, ground water or aquatic sediments.

(3) Spilled or leaked **flammable liquids** or **combustible liquids** shall be

- (a) flushed to a location where they will not create a fire or explosion hazard, or any risk to public health or safety, or
- (b) neutralized or absorbed and cleaned up with the aid of a product that conforms to ULC/ORD-C410A, "Absorbents for Flammable and Combustible Liquids", or is compatible and non-reactive with the liquid being cleaned up, and
 - (i) deposited in a receptacle conforming to Sentence 2.4.1.3.(3), or
 - (ii) disposed of in a manner that does not create a fire or explosion hazard.

(4) Clean-up shall conform with Part X (Spills) of the **Environmental Protection Act**.

Spill procedure

4.1.6.4. (1) A spill control procedure shall be **approved** and implemented for any **occupancy** where **flammable liquids** or **combustible liquids** are stored, handled, processed or used.

(2) The spill control procedure referred to in Sentence (1) shall include

- (a) suitable operating procedures to prevent leaks and spills from piping, pumps, **storage tanks** or process vessels,
- (b) ventilation,
- (c) control of ignition sources,
- (d) spill containment and cleanup (such as dikes and spill control agents such as sand),
- (e) personal protective clothing or equipment that should be used (such as rubber gloves, rubber boots and self-contained breathing apparatus),
- (f) chain of command, including notification of affected agencies and management,
- (g) a preventive maintenance program, and
- (h) training for new staff within three months of their being hired and for experienced staff every six months.

(3) Spill control procedures shall be prominently posted and maintained where **flammable liquids** or **combustible liquids** are stored, handled, processed or used.

Subsection 4.1.7. Ventilation

Rooms or enclosed spaces

4.1.7.1. Where **flammable liquids** or **combustible liquids** are processed, handled, stored, dispensed or used within rooms or enclosed spaces, ventilation shall conform to this Part and the **Building Code**.

Ventilation measures

4.1.7.2. (1) Except as permitted in Sentence (2), a room or enclosed space referred to in Article 4.1.7.1. shall be provided with a ventilation system having

- (a) continuous mechanical ventilation where Class I liquids are processed, dispensed or used in a manner that releases flammable vapours into the room or enclosed space, or
- (b) either natural or continuous mechanical ventilation where
 - (i) Class I liquids are stored, processed, dispensed or used in a manner that does not release flammable vapours into the room or enclosed space, or
 - (ii) Class II liquids are processed, dispensed or used.
- (2) Ventilation referred to in Clause (1)(b) need not be provided for the storage of Class I liquids if
 - (a) storage consists of only **closed containers**, and
 - (b) no dispensing operations are performed.
- (3) Ventilation required in Sentence (1) shall be sufficient to ensure that flammable vapour concentrations outside the zone identified as Class I, Division I in conformance with Article 4.1.4.1. do not exceed 25% of the **lower explosive limit** of the flammable vapour.
- (4) Where a mechanical ventilation system is installed to meet the conditions of Sentence (3), it shall be capable of exhausting at least 18 m³/h per square metre of room area, but not less than 250 m³/h.
- (5) Where continuous mechanical ventilation is installed in order to meet the conditions of Sentence (1), it shall
 - (a) be provided with automatic interlocks so that the activity generating flammable vapours cannot be performed when the ventilation system is not in operation,
 - (b) sound an audible alarm in an attended area upon shutdown of the ventilation system, and
 - (c) conform to NFPA 91, “Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids”.
- (6) Despite Sentences (1) and (2), for those **occupancies** of facilities that are covered by **Ontario Regulation 851 of the Revised Regulations of Ontario, 1990 (Industrial Establishments)** made under the **Occupational Health and Safety Act** or **Ontario Regulation 67/93 (Health Care and Residential Facilities)** made under the **Occupational Health and Safety Act**, ventilation requirements for a room or enclosed space referred to in Article 4.1.7.1. shall be provided with
 - (a) continuous mechanical ventilation where Class I liquids are processed, dispensed or used in a manner that releases flammable vapours into the room or enclosed space, and
 - (b) continuous mechanical or natural ventilation to the outdoors by upper and lower vents where
 - (i) Class I liquids are stored, or
 - (ii) Class II liquids are processed, dispensed or used.

Location of air inlets and outlets

- 4.1.7.3. (1) Ventilation air inlets and outlets within a room or enclosed space referred to in Article 4.1.7.1. shall be arranged in conformance with Sentences (2) and (3).
- (2) Where the flammable vapour being removed is heavier than air,
 - (a) at least one air inlet shall be located near a wall, no higher than 300 mm from the floor, and
 - (b) at least one air outlet shall be located near the opposite wall, no higher than 300 mm from the floor.
 - (3) Where the flammable vapour being removed is lighter than air,
 - (a) at least one air inlet shall be located near a wall, no lower than 300 mm from the ceiling, and
 - (b) at least one air outlet shall be located near the opposite wall, no lower than 300 mm from the ceiling.

Location of mechanical ventilation exhaust air outlets

- 4.1.7.4. (1) Except as provided in Article 4.1.7.6., the exhaust air outlet from a mechanical ventilation system required in Article 4.1.7.2. shall be
- (a) located outdoors, not less than 3 m from any **building** opening, and
 - (b) arranged so that the exhaust air does not discharge toward any unprotected opening within 7.5 m of the discharge point.

Make-up air

- 4.1.7.5. (1) Where make-up air for a mechanical ventilation system is taken from within the **building**, the opening into the room or enclosed space shall be provided with a **fire damper**.

(2) Make-up air for a natural or mechanical ventilation system shall be taken from a point remote from any exhaust air discharge described in Article 4.1.7.4.

(3) Make-up air for a natural ventilation system shall be taken from a point outside the **building**.

Recirculating ventilation systems

4.1.7.6. (1) Where a mechanical ventilation system is installed in conformance with Article 4.1.7.2., and where exhaust air is recirculated, a fail-safe vapour detection and alarm system shall be provided

- (a) to continuously monitor the flammable vapour concentration in the exhaust air, and
- (b) if the vapour concentration in Clause (a) exceeds 25% of the **lower explosive limit** of the vapour, to
 - (i) sound an alarm in an attended area,
 - (ii) stop the recirculation of air, and
 - (iii) redirect the exhaust air to an outdoor location.

Exclusive use of ducts

4.1.7.7. Ducts used in a ventilation system as required in Article 4.1.7.2. shall not be used for any other ventilation or exhaust system.

Maintenance

4.1.7.8. All components of the ventilation system shall be kept free of obstructions that may interfere with its operation.

Subsection 4.1.8. Handling of Flammable and Combustible Liquids

Containers and storage tanks

4.1.8.1. (1) Except as provided in Sentence 4.1.8.4.(1), **flammable liquids** and **combustible liquids** shall be kept in containers conforming to Subsection 4.2.3. or in **storage tanks** conforming to Subsection 4.3.1.

(2) Containers and **storage tanks** for **flammable liquids** or **combustible liquids** shall be kept closed when not in use.

(3) Containers and **storage tanks** shall not be filled beyond their safe filling level.

Control of static electric charge

4.1.8.2. (1) When Class I liquids are dispensed into a container or **storage tank**,

- (a) if the container or **storage tank** is made of metallic or electrically-conducting material, such container or **storage tank** shall be electrically connected to the fill stem, or rest on a conductive floor that is electrically connected to the fill stem, or
- (b) if the container or **storage tank** is made of non-electrically-conducting material, measures shall be taken to minimize the potential for a static electric charge to develop.

(2) Except as provided in Sentence (3), when Class I liquids are transferred into a **storage tank** through the top of the tank, the fill pipe shall terminate within 150 mm of the bottom of the tank.

(3) Sentence (2) shall not apply when

- (a) the **storage tank** vapour space cannot exceed 25% of the **lower explosive limit** or is filled with an inert gas that prevents the ignition of the vapour mixture, or
 - (b) the liquid being transferred has a minimum conductivity that prevents the accumulation of static electricity.
- (4) Fill pipes referred to in Sentence (2) shall be installed in such a way as to minimize vibration of the pipe.

Transfer

4.1.8.3. (1) Class I liquids shall be drawn from or transferred into containers or **storage tanks** within a **building**

- (a) through a piping or transfer system conforming to Section 4.4,
- (b) by means of a pump designed in conformance with good engineering practice on top of the container or **storage tank**, or
- (c) by gravity through a self-closing valve designed in conformance with good engineering practice.

(2) Except as provided in Subsection 4.4.10., the transfer of **flammable liquids** or **combustible liquids** by means of pressure applied to a container or **storage tank** shall not be permitted.

Fuel tanks of vehicles

4.1.8.4. (1) It is permitted to use movable tanks for dispensing **flammable liquids** or **combustible liquids** into the fuel tanks of vehicles or other motorized equipment provided such movable tanks are used in conformance with the requirements of this Part for **storage tanks**.

(2) Only enclosed pumping equipment designed in conformance with good engineering practice shall be used to transfer Class I liquids to or from the fuel tanks of vehicles inside **buildings**.

SECTION 4.2 CONTAINER STORAGE AND HANDLING

Subsection 4.2.1. Scope

Application

4.2.1.1. (1) Except as provided in Sentence (2), this Section applies to the storage, handling and use of **flammable liquids** or **combustible liquids** in

- (a) containers conforming to Clauses 4.2.3.1.(1)(a) to (d) having a capacity of not more than 230 L,
- (b) portable tanks conforming to Clause 4.2.3.1.(1)(e) having an individual capacity of not more than 2500 L, or
- (c) intermodal bulk containers conforming to Clause 4.2.3.1.(1)(a) having an individual capacity of not more than 3000 L.

(2) Except as otherwise stated in this Part, this Section shall not apply to

- (a) bulk plants covered in Section 4.6, **refineries** covered in Section 4.8 and **distilleries** covered in Section 4.9,
- (b) liquids in the fuel tank of motors or engines,
- (c) **distilled beverage alcohol in closed containers** when stored in conformance with Part 3 in Division B of NRC, “National Fire Code of Canada 2005”,
- (d) food and pharmaceutical products when in **closed containers** having a capacity of not more than 5 L, or
- (e) products containing not more than 50% by volume of water-miscible **flammable liquids** or **combustible liquids** with the remainder of the solution being nonflammable, when in **closed containers** having a capacity of not more than 5 L.

(3) Portable tanks having a capacity greater than 2500 L shall be installed in conformance with Section 4.3.

(4) For the purpose of this Section, **unstable liquids** shall meet the requirements for Class IA liquids.

(5) Except as otherwise stated, requirements for containers in this Part shall also apply to portable tanks described in Sentence (1).

Subsection 4.2.2. General

Storage locations

4.2.2.1. (1) **Flammable liquids** or **combustible liquids** shall not be stored in or adjacent to **exits**, including outdoors, elevators or principal routes that provide **access to exits**.

(2) Where **flammable liquids** or **combustible liquids** are stored, storage shall be in conformance with Subsections 4.2.4. to 4.2.11.

Storage arrangement

4.2.2.2. In addition to the provisions of this Section, the method of storage of **flammable liquids** and **combustible liquids** shall be determined to ensure the physical and chemical stability of the stored products.

Separation from other dangerous goods

4.2.2.3. (1) Except as provided in Sentence (2), **flammable liquids** and **combustible liquids** shall be separated from other **dangerous goods** in conformance with Sections 3.2 and 3.3 in Division B of NRC, “National Fire Code of Canada 2005”.

(2) For the purposes of applying Table 3.2.7.6. in Division B of NRC, “National Fire Code of Canada 2005”, Class IIIA liquids shall be treated as Class 3 **dangerous goods**.

Subsection 4.2.3. Containers and Portable Tanks

Design and construction

4.2.3.1. (1) Except as permitted in Article 4.2.3.3., containers and portable tanks for **flammable liquids** or **combustible liquids** shall be built in conformance with

- (a) the **Transportation of Dangerous Goods Regulations (Canada)**,
- (b) CSA-B376, “Portable Containers for Gasoline and Other Petroleum Fuels”,
- (c) CSA-B306, “Portable Fuel Tanks for Marine Use”,

(d) ULC/ORD-C30, “Safety Containers”, or

(e) Section 6 of CSA-B620, “Highway Tanks and Portable Tanks for the Transportation of Dangerous Goods”.

Markings or labels

4.2.3.2. (1) Except as provided in Sentence (2) and Article 4.2.3.1., containers for **flammable liquids** or **combustible liquids** shall be distinctly marked or labelled in easily legible type which is in contrast to any other printed matter on the label with a warning to indicate that

- (a) the material in the container is flammable,
- (b) it should be kept away from heat, sparks and open flames, and
- (c) it should be kept closed when not in use.

(2) Markings referred to in Sentence (1) are not required when the container is labelled in conformance with

- (a) the **Transportation of Dangerous Goods Act (Canada)** and its regulations,
- (b) the **Hazardous Products Act (Canada)** and its regulations, and
- (c) the **Pest Control Products Act (Canada)** and its regulations.

Other types of containers

4.2.3.3. (1) The storage, handling and use of **flammable liquids** or **combustible liquids** in a container other than one of those set out in Article 4.2.3.1. shall be permitted only if

- (a) the required purity of the liquid would be affected by containers of the types set out in Article 4.2.3.1. or if the liquid would cause the excessive corrosion of those types of containers,
- (b) the container not conforming to Article 4.2.3.1. has a capacity of not more than 1 L if used for Class I liquids and not more than 5 L if used for Class II or IIIA liquids, or
- (c) the container not conforming to Article 4.2.3.1. is a sample container used for quality control purposes or for **testing** by regulatory officials.

Subsection 4.2.4. Assembly and Residential Occupancies

Application

4.2.4.1. (1) This Subsection applies to the storage and handling of **flammable liquids** and **combustible liquids** in **buildings** classified as **assembly** or **residential occupancies**, except that it shall not apply to nonresidential schools, universities or colleges covered in Subsection 4.2.6.

Maximum quantities

4.2.4.2. (1) Except as provided in Sentence (4) and in Articles 4.2.4.5. and 4.2.4.6., the maximum quantity of **flammable liquids** or **combustible liquids** stored in a **building** shall conform to Sentences (2) and (3).

(2) When a single class of liquid is stored in a **building**, the total quantity of liquid shall not exceed

- (a) 30 L of Class I liquids,
- (b) 150 L of Class II liquids, or
- (c) 600 L of Class IIIA liquids.

(3) When two or more classes of liquid are stored in the same **building**, the total quantity permitted for each class of liquid shall be calculated as follows:

$$qI/30 + qII/150 + qIIIA/600 \leq 1$$

where

qI = the actual quantity of Class I liquid present, in litres,

qII = the actual quantity of Class II liquid present, in litres, and

qIIIA = the actual quantity of Class IIIA liquid present, in litres.

(4) Quantities of **flammable liquids** or **combustible liquids** exceeding those permitted in Sentence (1) are permitted, provided they are kept

- (a) in storage cabinets conforming to Subsection 4.2.10., except that the total quantity of **flammable liquids** and **combustible liquids** stored in such cabinets shall not exceed the quantity permitted for one cabinet, or

- (b) in a storage room conforming to Subsection 4.2.9. and having no openings that communicate directly with the public portions of the **building**.

Storage cabinets and storage rooms

4.2.4.3. The storage cabinets and storage rooms referred to in Sentence 4.2.4.2.(4) shall not be located above or below the **first storey**.

Exterior balconies

4.2.4.4. **Flammable liquids** and **combustible liquids** shall not be stored on exterior balconies.

Dwelling units

4.2.4.5. Not more than 30 L of **flammable liquids** and **combustible liquids**, of which not more than 10 L shall be Class I liquids, are permitted to be stored in a **dwelling unit**.

Attached garages and sheds

4.2.4.6. Not more than 50 L of **flammable liquids** and **combustible liquids**, of which not more than 30 L shall be Class I liquids, are permitted to be stored in a garage or shed attached to a **dwelling unit**.

Subsection 4.2.5. Mercantile Occupancies

Maximum quantities

4.2.5.1. (1) Except as provided in Sentence (5), the quantities of **flammable liquids** and **combustible liquids** stored in **mercantile occupancies** shall not exceed those in Sentences (2) to (4).

(2) In **mercantile occupancies** that are not **sprinklered**, the maximum quantity of **flammable liquids** and **combustible liquids** permitted to be stored in a single **suite** shall be the lesser of

- (a) 8 L for every 1 m² of the area of the **suite**, provided that not more than 2 L per m² is Class I liquid, of which not more than 0.3 L per m² shall be Class IA, Class IB, or any combination of these two classes, or
- (b) 8000 L, provided that not more than 2000 L is Class I liquid, of which not more than 300 L shall be Class IA or Class IB or any combination of these two classes.

(3) In **sprinklered mercantile occupancies**, the maximum quantity of **flammable liquids** and **combustible liquids** permitted to be stored in a single **suite** shall be the lesser of

- (a) 24 L for every 1 m² of the area of the **suite**, provided that not more than 6 L per m² is Class I liquid, of which not more than 1 L per m² shall be Class IA or Class IB or any combination of these two classes, or
- (b) 24000 L, provided that not more than 6000 L is Class I liquid, of which not more than 1000 L shall be Class IA or Class IB or any combination of these two classes.

(4) For the purposes of calculating permissible quantities in Sentences (2) and (3), **mercantile occupancies** of less than 250 m² **floor area** shall be assumed to be 250 m² in area.

(5) Quantities of **flammable liquids** and **combustible liquids** in excess of those permitted in Sentences (2) to (4) shall be kept in a storage area conforming to Subsection 4.2.7.

Containers

4.2.5.2. (1) **Flammable liquids** and **combustible liquids** in **mercantile occupancies** shall be kept in **closed containers**.

(2) **Closed containers** of Class I and II liquids shall not be stacked more than 1.5 m high on floors, or 1 m high on individual fixed shelves.

(3) Class I liquids in **closed containers** are permitted to be stored in **basements** of **mercantile occupancies**.

Transfer

4.2.5.3. In **mercantile occupancies**, transfer of **flammable liquids** or **combustible liquids** from or into containers shall only be permitted in a storage room conforming to Subsection 4.2.9.

Subsection 4.2.6. Business and Personal Services, Educational and Care or Detention Occupancies

Application

4.2.6.1. (1) This Subsection applies to the storage, handling and use of **flammable liquids** and **combustible liquids** in **business and personal services occupancies** and **care or detention occupancies** and shall include nonresidential schools, universities and colleges.

Storage cabinets and storage rooms

4.2.6.2. (1) Except as permitted in Article 4.2.6.3., **flammable liquids** and **combustible liquids** shall be kept in **closed containers** and stored

- (a) in cabinets conforming to Subsection 4.2.10., except that the total quantity of **flammable liquids** and **combustible liquids** stored in such cabinets shall not exceed the quantity permitted for one cabinet, or
- (b) in a room having no openings communicating directly with the public portions of the **building** and conforming to Subsection 4.2.9.

Maximum quantities

4.2.6.3. (1) Except as provided in Sentence (2), the storage of **flammable liquids** and **combustible liquids** outside of a cabinet or room required in Article 4.2.6.2. is permitted, provided such storage does not exceed

- (a) 10 L, including not more than 5 L of Class I liquid, in a single room, or
- (b) 250 L, including not more than 60 L of Class II liquid, or 10 L of Class I liquid, in a single **fire compartment** having at least a 45 min **fire separation**.

(2) In automotive shop or industrial arts areas of an educational facility, storage of up to 75 L of **flammable liquids** and **combustible liquids**, including not more than 25 L of Class I liquid, shall be permitted outside of a cabinet or room as specified in Article 4.2.6.2.

Containers

4.2.6.4. Where individual containers with a capacity of more than 5 L are required for storage of **flammable liquids** or **combustible liquids** in a **building**, safety containers conforming to ULC/ORD-C30, "Safety Containers", and of not more than 25 L capacity, shall be used.

Separation of dangerous goods

4.2.6.5. **Flammable liquids** or **combustible liquids** stored in cabinets or rooms shall be separated from other **dangerous goods** in conformance with Article 4.2.2.3.

Subsection 4.2.7. Industrial Occupancies

Application

4.2.7.1. This Subsection applies to the storage, handling and use of **flammable liquids** and **combustible liquids** in **industrial occupancies**, where storage in **closed containers** is the principal activity.

Storage facilities

4.2.7.2. (1) In **industrial occupancies**, **flammable liquids** and **combustible liquids** shall be stored

- (a) in conformance with Subsection 4.2.8.,
- (b) in cabinets conforming to Subsection 4.2.10.,
- (c) in rooms conforming to Subsection 4.2.9., or
- (d) in storage areas conforming to Article 4.2.7.5.

Fire compartments

4.2.7.3. **Fire compartments** regulated by this Subsection shall be separated from the remainder of the **building** by a **fire separation** having a **fire-resistance rating** of at least 2 h.

Dispensing and transfer

4.2.7.4. (1) Except as permitted in Subsection 4.2.8. and in Sentence (2), the dispensing or transfer of Class I or II liquids shall be conducted in rooms conforming to Subsection 4.2.9.

- (2) It is permitted to dispense or transfer Class I or II liquids in a storage area conforming to Article 4.2.7.5. provided
 - (a) the storage area does not exceed 100 m², and
 - (b) the dispensing or transfer operations conform to the applicable requirements of Subsection 4.2.9.

Maximum quantities

4.2.7.5. (1) Except as provided in Sentence (2), the storage of **flammable liquids** and **combustible liquids** in storage areas specified in Clause 4.2.7.2.(1)(a) shall

- (a) conform to Table 4.2.7.A.
 - (i) where it consists of palletized or solid piled storage, or

- (ii) where stored in **racks** in **buildings** not protected in conformance with Article 4.2.7.7., or
- (b) conform to Table 4.2.7.B. where stored in **racks** in **buildings** protected in conformance with Article 4.2.7.7.
- (2) Where a **building** is designed for the storage of **flammable liquids** or **combustible liquids**, there is no limit on the total quantity of storage per **fire compartment** provided
- (a) the **building** is separated from adjacent **buildings** by
- a **firewall** having a **fire-resistance rating** of at least 4 h, or
 - spatial separation in conformance with the **Building Code**, and
- (b) in protected **rack** storage, the quantities in each **individual storage area** do not exceed those specified in Table 4.2.7.B.
- (3) Where containers for two or more liquids having different **flash points** are stored together in a single **individual storage area**, the maximum quantity permitted in the **individual storage area** shall equal that permitted for the liquid with the lowest **flash point**.
- (4) When two or more classes of liquids are stored in a single **fire compartment**, the maximum quantity permitted for each class of liquid shall be calculated as follows:

$$qIA/QIA + qIB/QIB + qIC/QIC + qII/QII + qIII/QIII \leq 1$$

where

qIA,IB or IC = the actual quantity of Class IA, IB or IC liquid present,

qII = the actual quantity of Class II liquid present,

qIII = the actual quantity of Class IIIA liquid present,

QIA,IB or IC = the maximum quantity of Class IA, IB or IC liquid permitted in Table 4.2.7.A. or 4.2.7.B. for the arrangement,

QII = the maximum quantity of Class II liquid permitted in Table 4.2.7.A. or 4.2.7.B. for the arrangement, and

QIII = the maximum quantity of Class IIIA liquid permitted in Table 4.2.7.A. or 4.2.7.B. for the arrangement.

TABLE 4.2.7.A.

Indoor Container Storage (Palletized or Solid Piled Storage and Unprotected **Rack** Storage)
Forming Part of Article 4.2.7.5.

Class of Liquid	Storage Level	Protected Storage ⁽¹⁾			Unprotected Storage		
		Maximum Quantity per I.S.A. ⁽²⁾ , L	Maximum Storage Height, m	Maximum Quantity per Fire Compartment , L	Maximum Quantity per I.S.A. ⁽²⁾ , L	Maximum Storage Height, m	Quantity per Fire Compartment , L
Class IA	First Storey	10000	1.5	50000	2500	1.5	2500
	Storeys above the first storey	7500	1.5	30000	2500	1.5	2500
	Basement	Not permitted	Not permitted	Not permitted	Not permitted	Not permitted	Not permitted
Class IB or IC	First Storey	20000	2.0	60000	10000	1.5	10000
	Storeys above the first storey	10000	2.0	50000	10000	1.5	10000
	Basement	Not permitted	Not permitted	Not permitted	Not permitted	Not permitted	Not permitted
Class II	First Storey and storeys above the first storey	40000	3.0	100000	15000	3.0	30000
	Basement	25000	1.5	25000	Not permitted	Not permitted	Not permitted
Class IIIA	First Storey and storeys above the first storey	60000	6.0	200000	50000	4.5	100000
	Basement	40000	3.0	100000	Not permitted	Not permitted	Not permitted

Notes to Table 4.2.7.A.:

⁽¹⁾ See Article 4.2.7.7.

(2) **Individual Storage Area**

TABLE 4.2.7.B.

Indoor Container Storage (Protected **Rack Storage**)⁽¹⁾ Forming Part of Article 4.2.7.5.

Class of Liquid	Storage Level	Maximum Height, m	Maximum Quantity per Fire Compartment, L
Class IA	First Storey	7.5	30000
	Storeys above the first storey	4.5	17000
	Basement	Not permitted	Not permitted
Class IB or IC	First Storey	7.5	60000
	Storeys above the first storey	4.5	35000
	Basement	Not permitted	Not permitted
Class II	First Storey	7.5	100000
	Storeys above the first storey	7.5	100000
	Basement	4.5	35000
Class IIIA	First Storey	12.0	200000
	Storeys above the first storey	6.0	200000
	Basement	6.0	100000

Notes to Table 4.2.7.B.:⁽¹⁾ See Article 4.2.7.7.**Spill control**

4.2.7.6. Measures to control spilled **flammable liquids** or **combustible liquids** shall be provided in conformance with Subsection 4.1.6.

Fire suppression systems

4.2.7.7. (1) Where protection is required by this Part, storage areas for **flammable liquids** and **combustible liquids** shall be

- (a) **sprinklered** in conformance with NFPA 30, “Flammable and Combustible Liquids Code”, or
- (b) protected by an automatic special fire suppression system in conformance with an applicable standard set out in Article 6.8.1.1.

Clearances

4.2.7.8. (1) The clearance between the top of storage and the lowest structural members, sprinkler head deflectors or other overhead fire protection system components shall be not less than 450 mm.

(2) A clearance of not less than 400 mm shall be maintained between stored **flammable liquids** and **combustible liquids** and walls, except that where the width of storage adjacent to the wall is not more than 1.5 m, such wall clearance is not required.

Aisles

4.2.7.9. Except as provided in Article 4.2.7.10., main aisles, access aisles and aisles defining **individual storage areas** shall be in conformance with Article 3.2.2.2. in Division B of NRC, “National Fire Code of Canada 2005”.

Separation from other dangerous goods

4.2.7.10. **Flammable liquids** and **combustible liquids** shall not be stored with other **dangerous goods** unless in conformance with Article 4.2.2.3.

Separation from combustible products

4.2.7.11. Combustible materials, other than those used for the packaging of **flammable liquids** or **combustible liquids**, shall not be stored in the same **individual storage area** with such liquids.

Absorbents

4.2.7.12. Absorbent materials shall be available in the storage area for use in clean-up of spilled **flammable liquids** or **combustible liquids** in conformance with Article 4.1.6.3.

Ventilation

4.2.7.13. Storage areas described in Article 4.2.7.1. shall be ventilated in conformance with Subsection 4.1.7.

Subsection 4.2.8. Incidental Use

Application

4.2.8.1. Except as otherwise noted in this Part, this Subsection applies to **industrial occupancies** where the use, storage and handling of **flammable liquids** or **combustible liquids** is secondary to the principal activity.

Maximum quantities

4.2.8.2. (1) Except as provided in Sentences (2) and (3) and in Article 4.2.8.4., the quantity of **flammable liquids** and **combustible liquids** permitted to be located outside of storage rooms conforming to Subsection 4.2.7., 4.2.9. or 4.3.13. or storage cabinets conforming to Subsection 4.2.10. in any one **fire compartment** of a **building** shall not be more than

- (a) 600 L of **flammable liquids** and **combustible liquids** in **closed containers**, of which not more than 100 L shall be Class IA liquids, and
- (b) 5000 L of Class IB, IC, II and IIIA liquids in **storage tanks** or portable tanks.

(2) Where required for normal plant activity, quantities of **flammable liquids** and **combustible liquids** are permitted to exceed those specified in Sentence (1), but shall not be greater than the supply for one day of normal operation.

(3) Where larger quantities than are permitted by Sentence (1) are required, such quantities shall be in **storage tanks** installed in conformance with Sentence 4.3.12.4.(2).

Handling

4.2.8.3. (1) Areas in which **flammable liquids** or **combustible liquids** are transferred from one container or **storage tank** to another, or are used in such a way as to release potentially explosive concentrations of flammable vapours, shall be

- (a) separated from possible sources of ignition by a spatial separation of not less than 6 m, or by a **fire separation**,
- (b) provided with a drainage system to control spills in conformance with Subsection 4.1.6.,
- (c) provided with absorbent materials to assist in clean-up of small liquid spills in conformance with Article 4.1.6.3.,
- (d) provided with either natural or mechanical ventilation in conformance with Subsection 4.1.7., and
- (e) separated from other **dangerous goods** in conformance with Article 4.2.2.3.

General storage areas

4.2.8.4. (1) In a general storage area covered in Subsection 3.2.3. in Division B of NRC, “National Fire Code of Canada 2005”, quantities of **flammable liquids** and **combustible liquids** are permitted to exceed those in Sentence 4.2.8.2.(1) provided the storage area is in conformance with Sentences (2) to (6).

(2) The storage area referred to in Sentence (1) shall be **sprinklered** in conformance with Article 3.2.3.3. in Division B of NRC, “National Fire Code of Canada 2005”, providing a level of protection not less than that required for Class IV commodities stored up to a height of 6 m.

(3) The height of storage of **flammable liquids** and **combustible liquids** shall be not more than those permitted for unprotected storage in Table 4.2.7.A.

(4) When a single class of liquid is stored, the total quantity in a single **fire compartment** shall be not more than

- (a) 2500 L of Class IB and IC liquid,
- (b) 5000 L of Class II liquid, or
- (c) 10000 L of Class IIIA liquid.

(5) When two or more classes of liquid are stored in the same **fire compartment**, the total quantity permitted for each class of liquid shall be calculated as follows:

$$qI/2500 + qII/5000 + qIIIA/10000 \leq 1$$

where

qI = the actual quantity of Class IB and IC liquid present,

qII = the actual quantity of Class II liquid present, and

qIIIA = the actual quantity of Class IIIA liquid present.

(6) When two or more classes of liquid are stored in the same **individual storage area**, the maximum quantity permitted in the **individual storage area** shall be that permitted for the liquid with the lowest limit set out in Sentence (4).

Subsection 4.2.9. Rooms for Container Storage and Dispensing

Maximum quantities

4.2.9.1. (1) Except as provided in Sentences (2) and (3), where **flammable liquids** and **combustible liquids** are stored in a room required in this Part, the storage densities averaged over the total room area and the total quantities of such liquids shall conform to Table 4.2.9.A.

(2) The maximum quantities and densities of **flammable liquids** and **combustible liquids** shown in Table 4.2.9.A. are permitted to be doubled provided the storage room is protected by an automatic fire suppression system conforming to Article 4.2.7.7.

(3) The maximum quantities of Class I liquids in an unprotected storage room with a **fire separation** having a **fire-resistance rating** of not less than 2 h shall

- (a) not exceed those specified for unprotected storage in Table 4.2.7.A., and
- (b) comply with Sentences 4.2.7.5.(3) and (4).

TABLE 4.2.9.A.

Rooms for Container Storage and Dispensing Forming Part of Article 4.2.9.1.

Maximum Quantity, L	Minimum Fire Separation Around Room, h	Maximum Density, L/m ²
1500	1	100
10000	2	200

Spill control

4.2.9.2. (1) Storage rooms referred to in Article 4.2.9.1. shall be equipped with

- (a) liquid-tight seals between interior walls and the floor and a liquid-tight ramped sill at any door opening in an interior wall, and
- (b) a drain connected to a dry sump or holding tank for those **occupancies** that are covered by **Regulation 851 of the Revised Regulations of Ontario, 1990 (Industrial Establishments)** made under the **Occupational Health and Safety Act** or **Ontario Regulation 67/93 (Health Care and Residential Facilities)** made under the **Occupational Health and Safety Act**.

(2) Storage rooms referred to in Sentence (1) shall be designed to accommodate possible spills of **flammable liquids** and **combustible liquids** in conformance with Subsection 4.1.6.

Ventilation

4.2.9.3. Storage rooms referred to in Article 4.2.9.1. shall be ventilated in conformance with Subsection 4.1.7.

Aisles

4.2.9.4. The contents of **flammable liquids** and **combustible liquids** storage rooms referred to in Article 4.2.9.1. shall be arranged to provide aisle widths of not less than 1 m.

Dispensing

4.2.9.5. Dispensing of **flammable liquids** or **combustible liquids** from containers having a capacity of more than 30 L shall be by pumps or through self-closing valves, designed in conformance with good engineering practice.

Explosion venting

4.2.9.6. (1) Except for the storage of **distilled beverage alcohol**, where Class IA or IB liquids are dispensed or stored in open containers within a storage room, the room shall be designed to prevent critical structural and mechanical damage from an internal explosion in conformance with NFPA 68, "Guide for Venting of Deflagrations".

(2) Despite Sentence (1), where Class IA liquids are stored in **closed containers** or Class I liquids are dispensed or stored in open containers for those **occupancies** or facilities that are covered by **Regulation 851 of the Revised Regulations of Ontario, 1990 (Industrial Establishments)** made under the **Occupational Health and Safety Act** or **Ontario Regulation 67/93 (Health Care and Residential Facilities)** made under the **Occupational Health and Safety Act**, the room shall be designed to prevent critical structural and mechanical damage from an internal explosion in conformance with NFPA 68, "Guide for Venting of Deflagrations".

Portable extinguishers

4.2.9.7. Portable extinguishers shall be provided for storage rooms described in Article 4.2.9.1. in conformance with Section 6.2.

Egress doors

4.2.9.8. (1) This Article applies to a dispensing room in **occupancies** covered by **Regulation 851 of the Revised Regulations of Ontario, 1990 (Industrial Establishments)** made under the **Occupational Health and Safety Act** or **Ontario Regulation 67/93 (Health Care and Residential Facilities)** made under the **Occupational Health and Safety Act** where the room

- (a) has an area greater than 15 m², or
- (b) has a distance of travel greater than 4.5 meters from any point in the room to an egress doorway.
- (2) A dispensing room shall be equipped with self-closing doors hinged to swing outward on their vertical axis.
- (3) A dispensing room shall be located in a **floor area** that has at least two **exits**.
- (4) A dispensing room shall have at least two egress doorways that are at least three-quarters of the maximum diagonal dimension of the room from each other.
- (5) At least one egress doorway shall be located within 23 m from any point in the dispensing room.

Subsection 4.2.10. Cabinets for Container Storage

Containers

4.2.10.1. **Flammable liquids** and **combustible liquids** stored in cabinets required in this Part shall be in **closed containers** conforming to Article 4.2.3.1.

Maximum quantity per cabinet

4.2.10.2. The maximum quantity of **flammable liquids** and **combustible liquids** stored in a cabinet shall be 500 L, of which not more than 250 L shall be Class I liquids.

Maximum quantity per fire compartment

4.2.10.3. (1) Except as provided in Sentences (2) and (3), the total quantity of **flammable liquids** and **combustible liquids** stored in cabinets in a single **fire compartment** shall not exceed the quantity permitted in Article 4.2.10.2. for three cabinets.

(2) In **industrial occupancies**, quantities of **flammable liquids** and **combustible liquids** greater than those specified in Sentence (1) are permitted in a single **fire compartment** where

- (a) the total quantity stored in a group of cabinets is not more than the quantity permitted for three cabinets, and
- (b) the distance between groups of cabinets described in Clause (a) is not less than 30 m.

(3) In **care or detention occupancies**, the total quantity of **flammable liquids** and **combustible liquids** stored in cabinets in a single **fire compartment** shall not exceed the quantity permitted for one cabinet.

Labelling

4.2.10.4. Cabinets for container storage shall be labelled in conspicuous lettering to indicate that the cabinet contains flammable materials and that open flames must be kept away.

Storage cabinets

4.2.10.5. (1) Storage cabinets required in this Part shall

- (a) conform to ULC-C1275, "Storage Cabinets for Flammable Liquid Containers",
- (b) conform to ULI 1275, "Flammable Liquid Storage Cabinets",
- (c) be "FM APPROVED" by FM Global, or
- (d) be **listed** as meeting NFPA 30, "Flammable and Combustible Liquids Code".

Ventilation

4.2.10.6. (1) When a storage cabinet required in this Part is provided with ventilation openings,

- (a) the ventilation openings shall be sealed with materials providing fire protection at least equivalent to that required for the construction of the cabinet, or
- (b) the cabinet shall be vented outdoors using vent piping providing fire protection at least equivalent to that required in Clause (a) for seals.

Subsection 4.2.11. Outdoor Container Storage

Quantities and clearances

4.2.11.1. (1) Except as provided in Sentence (2), the quantities and clearances for **flammable liquids** and **combustible liquids** stored in containers in outdoor storage areas shall conform to Table 4.2.11.A.

(2) The clearances required in Sentence (1) do not apply where not more than 5000 L of **flammable liquids** or **combustible liquids** are stored adjacent to a **building** on the same property, and

- (a) the **building** is 1 **storey** in **building height** and used primarily for the storage or handling of **flammable liquids** or **combustible liquids**, or
- (b) the exposed wall has a **fire-resistance rating** of at least 2 h and has no openings within 3 m of such outdoor storage.

TABLE 4.2.11.A.

Outdoor Container Storage Forming Part of Article 4.2.11.1.

Class of Liquid	Maximum Total Quantity per Pile, L	Minimum Distance Between Piles, m	Minimum Distance to a Property Line or to a Building on the Same Property, m
Class IA	5000	1.5	6
Class IB or IC	15000	1.5	6
Class II	35000	1.5	6
Class IIIA	85000	1.5	6

Mixed storage

4.2.11.2. Where two or more liquids with different **flash points** are stored outdoors in containers that form a single pile, the maximum total quantity permitted in the pile shall be equal to that permitted for the liquid with the lowest **flash point**.

Fire department access

4.2.11.3. An access route not less than 6 m wide, constructed in conformance with Subsection 3.2.5. in Division B of the **Building Code**, shall be provided in outdoor storage areas to permit the approach of **fire department** vehicles to within 60 m of any part of a pile.

Spill control

4.2.11.4. Outdoor storage areas for **flammable liquids** or **combustible liquids** shall be designed to accommodate possible spillage in conformance with Subsection 4.1.6.

Fencing

4.2.11.5. (1) An outdoor area used for the container storage of **flammable liquids** or **combustible liquids** shall be surrounded by a firmly anchored fence that is

- (a) substantially constructed to discourage climbing and unauthorized entry,
- (b) not less than 1.8 m high, and
- (c) provided with gates that shall be locked when the storage area is not staffed.

SECTION 4.3 TANK STORAGE

Subsection 4.3.1. Design, Construction and Use of Storage Tanks

Application

4.3.1.1. This Section applies to **storage tanks** for **flammable liquids** and **combustible liquids**.

Atmospheric storage tanks

4.3.1.2. (1) Except as required in Sentences (2), (4), (6) and (8) and permitted in Sentences (3), (5) and (7) and in Section 4.9, **atmospheric storage tanks** shall be built in conformance with

- (a) API 12B, "Bolted Tanks for Storage of Production Liquids",
- (b) API 12D, "Field Welded Tanks for Storage of Production Liquids",
- (c) API 12F, "Shop Welded Tanks for Storage of Production Liquids",
- (d) API 650, "Welded Steel Tanks for Oil Storage",
- (e) ULC-S601, "Shop Fabricated Steel Aboveground Horizontal Tanks for Flammable and Combustible Liquids",
- (f) CAN/ULC-S602, "Aboveground Steel Tanks for Fuel Oil and Lubricating Oil",
- (g) CAN/ULC-S603, "Steel Underground Tanks for Flammable and Combustible Liquids",

- (h) CAN/ULC-S603.1, “External Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids”,
 - (i) CAN4-S615, “Reinforced Plastic Underground Tanks for Petroleum Products”,
 - (j) ULC-S630, “Shop Fabricated Steel Aboveground Vertical Tanks for Flammable and Combustible Liquids”,
 - (k) CAN/ULC-S643, “Shop Fabricated Steel Aboveground Utility Tanks for Flammable and Combustible Liquids”,
 - (l) ULC-S652, “Tank Assemblies for Collection of Used Oil”,
 - (m) ULC-S653, “Aboveground Steel Contained Tank Assemblies for Flammable and Combustible Liquids”,
 - (n) ULC/ORD-C58.10, “Jacketed Steel Underground Tanks for Flammable and Combustible Liquids”,
 - (o) ULC/ORD-C142.5, “Concrete Encased Steel Aboveground Tank Assemblies for Flammable and Combustible Liquids”,
 - (p) ULC-S655, “Aboveground Protected Tank Assemblies for Flammable and Combustible Liquids”, or
 - (q) ULC/ORD-C142.23, “Aboveground Waste Oil Tanks”.
- (2) Tanks built in conformance with Clauses (1)(a), (b) and (c) shall be used only for the storage of crude petroleum at oil fields.

(3) When necessitated by possible contamination of the liquid to be stored or possible rapid corrosion of the tank, **storage tanks** need not conform to Sentence (1), provided that they are designed and built in conformance with good engineering practice for the material being used.

(4) **Atmospheric storage tanks** shall not be used for the storage of **flammable liquids** or **combustible liquids** at temperatures at or above their boiling points.

(5) Existing aboveground **atmospheric storage tanks** in service that do not comply with Sentence (1) are permitted to remain in service provided that the tank

- (a) is not leaking,
- (b) has no dents in the tank greater than 30 degrees or 35 mm in depth from the normal configuration,
- (c) has no pitting in excess of 3 mm, and
- (d) has metal thickness of at least 50% of the minimum permissible thickness specified in an applicable standard referenced in Sentence (1).

(6) Existing aboveground **atmospheric storage tanks** that do not comply with Sentence (1), (3), (5) or (9) shall be refurbished in conformance with Article 4.3.1.10. or be replaced.

(7) Existing underground **storage tanks** in service that do not comply with Sentence (1) are permitted to remain in service provided that the tanks are not leaking and steel **storage tanks** and associated piping are protected from external corrosion in conformance with Subsection 4.3.9.

(8) Existing underground **storage tanks** that do not comply with Sentence (1), (3) or (7) shall be refurbished in conformance with Article 4.3.1.10. or be replaced.

(9) Existing aboveground **atmospheric storage tanks** that comply to ULC/ORD-C142.16-1994, “Protected Aboveground Tank Assemblies for Flammable and Combustible Liquids” is deemed to comply with Clause (1)(p).

Low pressure storage tanks and pressure vessels

4.3.1.3. (1) **Low pressure storage tanks** shall be constructed in conformance with

- (a) API 620, “Design and Construction of Large, Welded, Low-Pressure Storage Tanks”, or
- (b) ANSI/ASME, “Boiler and Pressure Vessel Code”.

(2) **Pressure vessels** shall be constructed in conformance with CSA-B51, “Boiler, Pressure Vessel, and Pressure Piping Code”.

(3) **Low pressure storage tanks** and **pressure vessels** are permitted to be used as **atmospheric storage tanks**.

Operating pressure

4.3.1.4. The normal operating pressure of a **storage tank** shall not exceed its design pressure.

Corrosion protection

4.3.1.5. The exposed surface of every aboveground **storage tank** for **flammable liquids** or **combustible liquids** which is fabricated of any ferrous substance shall be thoroughly coated with rust-resisting material compatible with the tank.

Floating roofs

4.3.1.6. Except for perimeter sealing material, floating roof assemblies or internal floating covers installed in **storage tanks** shall be constructed of metal, or other materials and design conforming to one of the tank construction standards set out in this Subsection.

Identification

4.3.1.7. A **storage tank** and its filling and emptying connections shall be identified in conformance with CPPI, “Using the CPPI Colour-Symbol System to Mark Equipment and Vehicles for Product Identification” or to CAN/CGSB-24.3, “Identification of Piping Systems”.

Overfill protection

4.3.1.8. (1) A **storage tank** shall be prevented from being overfilled by providing

- (a) continuous supervision of the filling operations by personnel qualified to supervise such operations, or
- (b) an overfill protection device conforming to ULC/ORD-C58.15, “Overfill Protection Devices for Flammable Liquid Storage Tanks”.

Installation and use

4.3.1.9. Unless otherwise specified in this Code, a **storage tank** shall be installed and used in conformance with the applicable installation and use provisions of the design document to which the **storage tank** was built as required by this Section.

Reuse

4.3.1.10. (1) A **storage tank** that has been taken out of service shall not be reused for the storage of **flammable liquids** or **combustible liquids** unless it has been

- (a) refurbished so as to conform to one of the standards set out in Sentence 4.3.1.2.(1), or
- (b) refurbished in conformance with Sentence (2) or (3).

(2) A **storage tank** is permitted to be refurbished for aboveground use in conformance with one of the following standards:

- (a) ULC-S601(A), “Refurbishing of Steel Aboveground Horizontal Tanks for Flammable and Combustible Liquids”,
- (b) ULC-S630(A), “Refurbishing of Steel Aboveground Vertical Tanks for Flammable and Combustible Liquids”.

(3) A **storage tank** is permitted to be refurbished for underground use in conformance with one of the following standards:

- (a) ULC-S603(A), “Refurbishing of Steel Underground Tanks for Flammable and Combustible Liquids”,
- (b) ULC-S615(A), “Refurbishing of Reinforced Plastic Underground Tanks for Flammable and Combustible Liquids”.

- (4) A riveted **storage tank** shall not be relocated.

Subsection 4.3.2. Installation of Outside Aboveground Storage Tanks

Location

4.3.2.1. (1) Every outside aboveground **storage tank** for the storage of **flammable liquids** or **combustible liquids** shall be located in conformance with Sentences (2) to (5) with respect to the property line and any **building** on the same property.

(2) Except as provided in Sentences (6) and (7), every aboveground **storage tank** containing stable liquids and having a working pressure of not more than 17 kPa (gauge) shall be separated from a property line and any **building** on the same property by distances

- (a) half those in Table 4.3.2.A. where protection is provided against fire or explosion in the tank in conformance with Sentence 4.3.2.5.(2), or
- (b) equal to those in Table 4.3.2.A. where protection referred to in Clause (a) is not provided.

(3) Every aboveground **storage tank** containing **unstable liquids** and having a working pressure of not more than 17 kPa (gauge) shall be separated from a property line and any **building** on the same property by distances

- (a) equal to those in Table 4.3.2.A., but not less than 7.5 m, where protection is provided against fire or explosion in the tank in conformance with Sentence 4.3.2.5.(2), or
- (b) three times those in Table 4.3.2.A., but not less than 15 m, where protection referred to in Clause (a) is not provided.

(4) Every aboveground **storage tank** containing boil-over liquids shall be separated from a property line and any **building** on the same property by distances

- (a) 0.75 times those in Table 4.3.2.A. where protection is provided against fire or explosion in the tank in conformance with Sentence 4.3.2.5.(2), or
- (b) equal to those in Table 4.3.2.A. where protection referred to in Clause (a) is not provided.
- (5) Where a **storage tank** containing stable liquids or **unstable liquids** has a working pressure greater than 17 kPa (gauge), the distances from a property line and any **building** on the same property shall be those specified in Sentences (2) and (3) multiplied by 1.5, but shall be not less than 7.5 m.
- (6) The minimum distance required in Sentence (2) from a **storage tank** containing only Class II or IIIA liquids to a **building** on the same property is permitted to be reduced to
- (a) 1.5 m provided the tank capacity is not more than 50000 L, or
- (b) zero provided the tank capacity is not more than 2500 L.
- (7) The minimum distance required in Sentence (2) is permitted to be waived provided the **storage tank**
- (a) is in conformance with ULC-S655, “Aboveground Protected Tank Assemblies for Flammable and Combustible Liquids”, and
- (b) has a capacity of not more than 50000 L.
- (8) Where end failure of horizontal **storage tanks** may endanger adjacent property, the tanks shall be placed with the longitudinal axis parallel to such property.

TABLE 4.3.2.A.

Location of Aboveground Storage Tanks Forming Part of Article 4.3.2.1.

Maximum Tank Capacity, L	Minimum Distance to a Property Line or to a Building on the Same Property, m
250000	3
500000	4.5
2500000	9
5000000	12
over 5000000	15

Spacing between storage tanks

4.3.2.2. (1) Except as required in Sentences (2) and (3) and in Article 4.3.2.3., the minimum distance between every combination of two aboveground **storage tanks** shall be 0.25 times the sum of their diameters, but shall be not less than 1 m.

(2) The minimum distance between any two **storage tanks**, neither of which has a capacity of more than 250000 L, shall be 1 m.

(3) Where either of the two aboveground **storage tanks** contains **unstable liquids**, the distance required in Sentences (1) and (2) shall be doubled.

Clearances from liquefied petroleum gas cylinders and tanks

4.3.2.3. (1) The minimum separation between a **flammable liquid** or **combustible liquid storage tank** and a liquefied petroleum gas cylinder or tank shall be 6 m.

(2) Secondary containments for **flammable liquid** or **combustible liquid storage tanks** shall not contain any liquefied petroleum gas cylinder or tank, and the centre line of the secondary containment wall shall be not less than

- (a) 3 m away from a liquefied petroleum gas cylinder, and
- (b) 7 m away from a liquefied petroleum gas **storage tank**.

Fire department access

4.3.2.4. (1) Except as provided in Sentences (2) and (3), **storage tanks** for **flammable liquids** or **combustible liquids** shall be spaced so that each **storage tank** is accessible for fire fighting purposes.

(2) An access route constructed in conformance with Subsection 3.2.5. in Division B of the **Building Code** shall be provided in outdoor storage areas to permit the approach of **fire department** vehicles to within 60 m of any **storage tank**.

(3) Where fire fighting access to **storage tanks** containing Class I or II liquids is not provided, fire extinguishing measures conforming to Sentence 4.3.2.5.(2) shall be provided.

Fire protection systems

4.3.2.5. (1) Where the diameter of a **storage tank** exceeds 45 m, the **storage tank** shall be provided with protection against fire or explosion in conformance with Sentence (2).

(2) Protection against fire or explosion required for a **storage tank** shall consist of fixed protection systems designed in conformance with good engineering practice such as described in

- (a) NFPA 11, “Standard for Low-, Medium-, and High-Expansion Foam”,
- (b) NFPA 15, “Standard for Water Spray Fixed Systems for Fire Protection”, and
- (c) NFPA 69, “Standard on Explosion Prevention Systems”.

Leakage testing

4.3.2.6. At the time of installation, aboveground **storage tanks** and associated piping shall be **tested** for leakage in conformance with Subsections 4.3.15. and 4.4.6.

Subsection 4.3.3. Supports, Foundations and Anchorage for Aboveground Storage Tanks

Foundations and supports

4.3.3.1. (1) **Storage tanks** shall rest on the ground or on foundations, supports or piling made of concrete, masonry or steel in conformance with

- (a) Appendix B of API 650, “Welded Steel Tanks for Oil Storage”, and
- (b) Appendices C and D of API 620, “Design and Construction of Large, Welded, Low Pressure Storage Tanks”.

(2) Tank supports shall be installed on firm foundations designed to minimize uneven settling of the tank and to minimize corrosion of the part of the tank resting on the foundation.

(3) Except for steel saddles that are less than 300 mm high at their highest point, supports for **storage tanks** shall provide a **fire-resistance rating** of not less than 2 h.

(4) Every aboveground **storage tank** shall be supported in a manner that will prevent the allowable design stress of the tank from being exceeded.

Earthquake protection

4.3.3.2. (1) In areas subject to earthquake forces, **storage tanks**, supports and connections shall be designed to resist such forces in conformance with

- (a) Part 4 in Division B of the **Building Code**, and
- (b) Appendix A of ULC-S630, “Shop Fabricated Steel Aboveground Vertical Tanks for Flammable and Combustible Liquids”.

Protection against flooding

4.3.3.3. When aboveground **storage tanks** are located in an area that may be subject to flooding, the tanks shall be securely anchored to prevent floating.

Subsection 4.3.4. Normal and Emergency Venting for Aboveground Storage Tanks

Design and installation

4.3.4.1. (1) **Atmospheric** and **low pressure storage tanks** shall be provided with normal and emergency venting in conformance with

- (a) API 2000, “Venting Atmospheric and Low Pressure Storage Tanks”, or
- (b) the appropriate tank design standard set out in Sentence 4.3.1.2.(1).

Unstable liquids

4.3.4.2. When **unstable liquids** are stored, the effects of heat or gas resulting from polymerization, decomposition, condensation or self-reactivity shall be allowed for in the determination of the total venting capacity.

Subsection 4.3.5. Vent Piping for Aboveground Storage Tanks

Materials and construction

4.3.5.1. Except at **distilleries** covered in Section 4.9., vent piping materials and construction shall conform to Subsections 4.4.2., 4.4.3. and 4.4.5.

Location of vent pipe outlets

- 4.3.5.2. (1) Normal vent pipe outlets for **storage tanks** of Class I liquids

- (a) shall be located outside **buildings**, not less than
 - (i) 3.5 m above the adjacent ground level, and
 - (ii) 1.5 m from any **building** opening, and
- (b) shall discharge so that flammable vapours will not enter the **building** or be trapped near any part of the **building**.
- (2) Normal vent pipe outlets for **storage tanks** of Class II or IIIA liquids shall discharge outside **buildings**, not less than
 - (a) 2 m above the adjacent ground level, and
 - (b) 1.5 m from any **building** opening.
- (3) Emergency vent outlets for **storage tanks** shall discharge outside **buildings** not less than 1.5 m from any **building** opening and from any combustible component of a **building** exterior wall.

Interconnection of vent piping

4.3.5.3. (1) Except as provided in Sentence (2), two or more **storage tanks** are permitted to be connected to a common vent pipe for normal relief venting provided the vent pipe size is designed to vent the combined vapours produced in the connected tanks without exceeding the allowable stresses of the tanks.

(2) Vent piping for **storage tanks** for Class I liquids shall not be connected to vent piping for **storage tanks** for Class II or IIIA liquids unless an effective arrangement is provided to prevent the vapours from the Class I liquids from entering the other tanks.

Subsection 4.3.6. Openings Other than Vents in Aboveground Storage Tanks

Provision of valves

4.3.6.1. (1) Each connection to an aboveground **storage tank** through which liquid can normally flow shall be provided with an internal or external shut-off valve located as close as practical to the shell of the tank.

(2) Each connection that is located below the liquid level of the aboveground **storage tank** and through which liquid does not normally flow shall be provided with a liquid-tight closing device.

Materials

4.3.6.2. (1) Valves and their connections to a **storage tank** shall be made of steel, except that when the chemical characteristics of the liquid stored are incompatible with steel, materials other than steel are permitted to be used.

(2) Materials for valves and their connections to a **storage tank** shall be suitable for the pressures, stresses and temperatures that may be expected, including those of possible fire exposure.

Openings for liquid level measurements

4.3.6.3. Openings for measuring liquid levels in **storage tanks** for Class I liquids shall be equipped with caps or covers which shall be opened only when measuring the liquid level.

Connections for filling and emptying

4.3.6.4. (1) Except as provided in Sentence (3), connections used as part of normal operating conditions for filling or emptying **storage tanks** for **flammable liquids** and **combustible liquids** shall be located

- (a) outside **buildings**,
- (b) at a location free of sources of ignition, and
- (c) not less than 1.5 m from **building** openings.
- (2) Connections for filling or emptying **storage tanks** shall be kept closed to prevent leakage when not in use.
- (3) A filling connection described in Sentence (1) is permitted to be located inside a **building** where
 - (a) made necessary
 - (i) by a process or activity located indoors and to which the tank is directly associated, or
 - (ii) for the collection of used liquids, and
 - (b) the fill piping is provided with means to prevent flammable vapours from returning to the **building**.

Subsection 4.3.7. Secondary Containment for Aboveground Storage Tanks

General

4.3.7.1. (1) The area surrounding a **storage tank** or group of **storage tanks** shall be designed to accommodate accidental spillage in conformance with Subsection 4.1.6.

(2) Where barriers described in Sentence 4.1.6.1.(1) are provided to contain accidental spillage from above-ground **storage tanks**, they shall conform to the requirements for secondary containment in this Subsection.

(3) A **storage tank** conforming to Sentence 4.3.7.4.(2) shall be considered as conforming to this Subsection provided it is used and maintained in conformance with Articles 4.3.7.8. and 4.3.7.9.

Construction

4.3.7.2. (1) Except as provided in Sentence (2), the base and walls of a secondary containment shall be made of noncombustible materials, and shall be designed, constructed and maintained to

- (a) withstand full hydrostatic head, and
 - (b) provide a permeability of not more than 10^{-6} cm/s to the **flammable liquids** or **combustible liquids** contained in the **storage tanks**.
- (2) Where a membrane provides the level of impermeability required in Sentence (1), the membrane shall
- (a) conform to ULC/ORD-C58.9, "Secondary Containment Liners for Underground and Aboveground Flammable and Combustible Liquid Tanks", and
 - (b) if combustible, be covered with a noncombustible material of such nature and thickness that the membrane will not fail when the secondary containment is exposed to fire.
- (3) Except as provided in Sentence (4), openings shall not be permitted in a secondary containment.
- (4) Where piping passes through a secondary containment, such passages shall conform to Sentences (1) and (2).

Capacity

4.3.7.3. (1) Except as permitted in Sentence (3), a secondary containment for a single **storage tank** shall have a volumetric capacity of not less than 110% of the capacity of the tank.

(2) Except as permitted in Sentence (3), a secondary containment for more than one **storage tank** shall have a volumetric capacity of not less than the sum of

- (a) the capacity of the largest **storage tank** located in the contained space, and
- (b) 10% of the greater of
 - (i) the capacity specified in Clause (a), or
 - (ii) the aggregate capacity of all other **storage tanks** located in the contained space.

(3) When the secondary containment is designed to prevent the entry of precipitation and water used for fire fighting purposes into the contained space, it shall have a volumetric capacity of not less than the capacity of the largest **storage tank** located in the contained space.

Clearances

4.3.7.4. (1) Except as provided in Sentence (2), no part of a secondary containment wall shall be less than 1.5 m from a **storage tank** shell.

- (2) It is permitted to waive the distance required in Sentence (1) provided the **storage tank**
- (a) is constructed in accordance with
 - (i) Clause 4.3.1.2.(1)(l), (m), (o), (p) or (q), incorporating secondary containment, or
 - (ii) Clause 4.3.1.2.(1)(e), (j) or (k) for double-walled **storage tanks**,
 - (b) has a capacity of not more than 50000 L, and
 - (c) is protected by posts or guardrails when exposed to collision damage.

Access to storage tanks and ancillary equipment

4.3.7.5. (1) A secondary containment shall permit

- (a) access to **storage tanks**, valves and ancillary equipment,
- (b) egress from the contained space, and
- (c) access for fire fighting as specified in Article 4.3.2.4.

(2) Where a **storage tank** contains Class I liquids, provision shall be made for the normal operation of valves and for access to the **storage tank** roof without entering the contained space created by the secondary containment when

- (a) the average height of the secondary containment exceeds 3.5 m, measured from the ground level of the interior of the contained area, or
- (b) the distance between the tank shell and the top inside edge of the secondary containment wall is less than the height of this wall.

Emergency venting

4.3.7.6. Where the secondary containment is not open to the atmosphere, emergency venting shall be provided to relieve any buildup of internal pressure in the contained space when exposed to heat or fire.

Leak detection

4.3.7.7. Where the contained space created by the secondary containment is not accessible for visual examination, a monitoring device shall be provided to indicate the presence of liquid in, or the loss of integrity of, the secondary containment.

Drainage

4.3.7.8. (1) Liquids, debris and precipitation shall not be permitted to accumulate in the contained space created by the secondary containment.

- (2) Provisions shall be made for removing liquid from the secondary containment in conformance with Subsection 4.1.6.
- (3) Controls for the liquid removal system required in Sentence (2) shall be
 - (a) normally closed,
 - (b) accessible under fire exposure conditions, and
 - (c) located so they can be operated from outside the contained space.

Use of secondary containment

4.3.7.9. The contained space created by a secondary containment shall not be used for storage purposes.

Subsection 4.3.8. Installation of Underground Storage Tanks

Location

4.3.8.1. (1) Underground **storage tanks** shall be located so that

- (a) foundations of existing **buildings** will not be undermined during excavation, and
- (b) loads from **building** foundations and supports are not transmitted to the tank.
- (2) Underground **storage tanks** shall be separated by a horizontal distance of not less than
 - (a) 600 mm from adjacent underground tanks or structures,
 - (b) 1 m from a **building** foundation or a **street** line, and
 - (c) 1.5 m from other property lines.

Ground cover

4.3.8.2. (1) Except as required in Sentences (2) to (4), underground **storage tanks** shall be installed with not less than 600 mm of ground cover over the tank.

(2) Except as required in Sentence (3), **storage tanks** subject to vehicular traffic shall be installed not less than 1 m below finished ground level.

(3) Either a 150 mm reinforced concrete slab or a 200 mm unreinforced concrete slab over not less than 450 mm of sand is permitted in lieu of the protection described in Sentence (2) provided the slab extends at least 300 mm beyond the **storage tank**.

(4) Where subsurface conditions make it impractical to install a **storage tank** totally below adjacent ground level, an underground **storage tank** shall be installed so that at least

- (a) 75% of its mass is below adjacent ground level provided there is not less than 600 mm of ground cover over the portion of the tank above adjacent ground level, or
- (b) 50% of its mass is below adjacent ground level provided there is not less than 1 m of ground cover over the portion of the tank above adjacent ground level.

Damage repair

4.3.8.3. (1) Underground **storage tanks** that are in the process of being installed shall be **inspected**, and any damage to the tank shell, protective coating, fittings or anodes shall be repaired before they are lowered into the excavation.

- (2) Damage to **storage tank** shells shall not be repaired on site.

Damage prevention

4.3.8.4. (1) Underground **storage tanks** shall be lowered into the excavation by the use of lifting lugs and hooks and, where necessary, spreader bars to prevent damage to the tank shell, protective coating, fittings or anodes.

- (2) Any method of handling that may result in damage to the protective coating of the tank shall not be used.

Installation

4.3.8.5. (1) Underground steel **storage tanks** shall be installed in conformance with Appendix B of CAN/ULC-S603.1, “External Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids”.

(2) Underground reinforced plastic **storage tanks** shall be installed in conformance with Appendix A of CAN4-S615, “Reinforced Plastic Underground Tanks for Petroleum Products”.

(3) Underground **storage tanks** shall not be placed in direct contact with reinforced concrete slabs but shall be separated by not less than 150 mm of sand or other suitable material to distribute evenly the weight of the tank on the supporting base.

Leakage testing

4.3.8.6. (1) At the time of installation, underground **storage tanks** and associated piping shall be **tested** for leakage in conformance with Subsections 4.3.15. and 4.4.6.

Filling

4.3.8.7. (1) **Flammable liquids** or **combustible liquids** shall not be placed in an underground **storage tank** until

- (a) the fill pipe and vent line have been installed in the tank, and
- (b) all other openings have been sealed.

Spillage

4.3.8.8. If a spillage occurs, the escaped liquid and all soil contaminated by the spill shall be removed in conformance with Subsection 4.1.6.

Anchorage

4.3.8.9. (1) Underground **storage tanks** shall be protected against hydrostatic forces which can cause uplift of the tanks when they are empty.

- (2) Where anchors and ground straps are used to resist the uplift forces referred to in Sentence (1), they shall be
- (a) electrically isolated from the tank, and
 - (b) installed in such a manner that they do not damage the tank shell, protective coating, fittings or anodes.

Subsection 4.3.9. Corrosion Protection of Underground Steel Storage Tanks

Corrosion protection

4.3.9.1. (1) Except as provided in Sentence (2), underground steel **storage tanks** and associated piping and fittings subject to corrosion shall be protected in conformance with CAN/ULC-S603.1, “External Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids”.

- (2) A steel **storage tank** not conforming to Sentence (1) is permitted provided
- (a) it conforms to ULC/ORD-C58.10, “Jacketed Steel Underground Tanks for Flammable and Combustible Liquids”, or
 - (b) it has corrosion protection conforming to good engineering practice such as described in PACE Report No. 87-1, “Impressed Current Method of Cathodic Protection of Underground Petroleum Storage Tanks”, published by the Canadian Petroleum Products Institute.

Subsection 4.3.10. Vents for Underground Storage Tanks

Vent design

4.3.10.1. Underground **storage tanks** shall be provided with vent openings and piping of sufficient cross-sectional area designed to vent the tanks during the maximum filling or withdrawal rate without causing the allowable stress for the tank to be exceeded.

Materials and construction

4.3.10.2. Except at **distilleries** as provided in Section 4.9., vent piping materials and construction shall conform to Subsections 4.4.2., 4.4.3. and 4.4.5.

Installation

4.3.10.3. (1) Vent pipe outlets from underground **storage tanks** for Class I liquids shall

- (a) be located outside **buildings** higher than the fill pipe openings but not less than
 - (i) 3.5 m above the adjacent ground level,
 - (ii) 1.5 m from any **building** opening, and
 - (iii) 7.5 m from any dispenser, and

(b) discharge so that flammable vapours will not enter **building** openings or be trapped near any part of the **building**.

(2) Vent pipes from underground **storage tanks** for Class II or IIIA liquids shall be located outside **buildings** at a height that is above the fill pipe opening but not less than 2 m above finished ground level.

(3) Vent pipes from underground **storage tanks** for **flammable liquids** or **combustible liquids** shall not be obstructed by any device that may cause excessive back pressure, except that vent pipes from underground **storage tanks** for Class II or Class IIIA liquids are permitted to be fitted with return bends, coarse screens or other devices to minimize the entry of foreign material.

(4) Vent piping shall enter the **storage tank** through the top of the tank and shall not extend into the tank more than 25 mm except when the vent is equipped with a vent alarm.

(5) Vent piping shall be

- (a) installed so that any nominally horizontal run shall slope towards the **storage tank**,
- (b) constructed without traps,
- (c) adequately supported to prevent sagging, and
- (d) where necessary, protected against mechanical damage.

Interconnection of vent pipes

4.3.10.4. (1) Except as permitted in Sentence (2), where vent piping connects two or more **storage tanks**, pipe sizes shall be designed to vent the combined vapours produced in the connected underground **storage tanks** without exceeding the allowable stresses of the tanks when being filled simultaneously.

(2) Where it is not possible to fill the connected **storage tanks** referred to in Sentence (1) simultaneously, or where the connected vents have a vapour recovery system, the vent piping shall be sized to accommodate the maximum vapour flow possible in the system.

(3) Vent piping for an underground **storage tank** containing a Class I liquid shall not be connected to the vent piping for a **storage tank** containing a Class II or IIIA liquid unless an effective method is provided to prevent the vapours from the Class I liquid **storage tank** from entering the other tank.

Subsection 4.3.11. Openings Other than Vents in Underground Storage Tanks

Connections

4.3.11.1. Connections for all openings in underground **storage tanks** shall be liquid and vapour tight.

Openings for measuring liquid level

4.3.11.2. Openings for measuring liquid levels in underground **storage tanks** if independent of the fill pipe shall be equipped with a vapour-tight cap or cover which shall be opened only when measuring the liquid level.

Fill piping and discharge piping

4.3.11.3. (1) Fill piping and discharge piping shall enter underground **storage tanks** only through the top of the tank and discharge piping used in suction systems shall be sloped toward the **storage tanks**.

(2) Remote fill outlets from an underground **storage tank** shall not be located higher than other outlets from the tank.

(3) Except as provided in Sentence (5), connections used as part of normal operating conditions for filling or emptying **storage tanks** for **flammable liquids** and **combustible liquids** shall be located

- (a) outside **buildings**,
- (b) at a location free of sources of ignition, and
- (c) not less than 1.5 m away from **building** openings.

(4) Connections for filling or emptying **storage tanks** described in Sentence (3) shall be kept closed to prevent leakage when not in use.

(5) A filling connection described in Sentence (3) is permitted to be located inside a **building** where

(a) made necessary

(i) by a process or activity located indoors and to which the tank is directly associated, or

(ii) for the collection of used liquids, and

(b) the fill piping is provided with means to prevent flammable vapours from returning to the **building**.

Subsection 4.3.12. Installation of Storage Tanks Inside Buildings

Occupancy

4.3.12.1. Except as provided in Article 4.3.12.2., **storage tanks** shall not be permitted in other than **industrial occupancies**.

Stationary combustion engines

4.3.12.2. Installations using Class I liquids as fuel supplies for stationary engines inside **buildings** shall conform to NFPA 37, “Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines”.

Maximum static head

4.3.12.3. The static head imposed on a **storage tank** inside a **building** shall not exceed 70 kPa (gauge) at the bottom of the tank when the vent or fill pipe is filled with liquid unless the tank is designed for greater pressures.

Maximum quantities and location

4.3.12.4. (1) Except as provided in Subsection 4.2.8. and in Sentence (2), **storage tanks** for **flammable liquids** or **combustible liquids** shall be

(a) located in dedicated rooms conforming to Subsection 4.3.13., and

(b) located in conformance with Table 4.3.12.A.

(2) When quantities greater than are permitted for incidental use in Subsection 4.2.8. are required for special process operations, **storage tanks** for **flammable liquids** or **combustible liquids** are permitted to be located outside of a storage room referred to in Sentence (1), provided that

(a) total quantities per **fire compartment** are not more than one-half the quantities permitted in Table 4.3.12.A.,

(b) they are located on the **first storey**, and

(c) the installation conforms to Articles 4.3.12.7. to 4.3.12.10. and Article 4.3.13.4.

(3) Table 4.3.12.A. does not apply to the storage of **distilled beverage alcohol**.

TABLE 4.3.12.A.

Indoor Tank Storage Forming Part of Article 4.3.12.4.

Class of Liquid	Storage Level	Maximum Quantity per Storage Room ⁽¹⁾ , L, One or More Tanks	
		Protected ⁽²⁾	Unprotected Storage
Class I	First Storey	40000	25000
	Storeys above the first storey	7500	Not permitted
	Basement	Not permitted	Not permitted
Class II and IIIA	First Storey	200000	100000
	Storeys above the first storey	20000	Not permitted
	Basement	20000	Not permitted

Notes to Table 4.3.12.A.:

⁽¹⁾ See Subsection 4.3.13.

⁽²⁾ See Article 4.2.7.7.

Fire compartments

4.3.12.5. **Fire compartments** regulated by this Subsection shall be separated from the remainder of the **building** by a **fire separation** having a **fire-resistance rating** of not less than 2 h.

Mixed storage

4.3.12.6. (1) When two or more classes of liquids are stored in a single storage room referred to in Sentence 4.3.12.4.(1), the total quantity permitted for each class of liquid shall be calculated as follows:

$$qI/QI + qII+IIIA/QII+IIIA \leq 1$$

where

qI = the actual quantity of Class I liquid present,

qII+IIIA = the actual quantity of Class II and IIIA liquid present,

QI = the maximum quantity of Class I liquid permitted in Table 4.3.12.A., and

QII+IIIA = the maximum quantity of Class II and IIIA liquid permitted in Table 4.3.12.A.

Storage tanks outside storage rooms

4.3.12.7. (1) Where **storage tanks** for **flammable liquids** or **combustible liquids** are located outside of storage rooms conforming to Subsection 4.3.13.,

- (a) provision shall be made, in conformance with Subsection 4.1.6., to contain 100% of the volume of the largest **storage tank** or to drain away spilled **flammable liquids** or **combustible liquids**,
- (b) all electrical equipment and wiring in the vicinity of the **storage tank** and the exterior vent shall be installed in conformance with Subsection 4.1.4., and
- (c) the area in which the **storage tank** is located shall be ventilated in conformance with Subsection 4.1.7., where designated a Class 1, Zone 0, 1 or 2 hazardous location under the **Electrical Safety Code** made under the **Electricity Act, 1998**.

Vents

4.3.12.8. (1) Except as provided in Sentence (2), normal and emergency vents for **storage tanks** in **buildings** shall be provided in conformance with Subsections 4.3.4. and 4.3.5.

(2) The use of weak roof-to-side shell seams, designed to rupture before the allowable design stress of the **storage tank** is reached, shall not be permitted as a means of emergency venting of **storage tanks** inside **buildings**.

Supports, foundations and anchorage

4.3.12.9. (1) Except as provided in Sentence (2), where **storage tanks** for **flammable liquids** or **combustible liquids** are installed inside **buildings**, the supports, foundations and anchorage for such **storage tanks** shall be in conformance with Subsection 4.3.3.

(2) Where a **storage tank** is suspended, rather than supported on a foundation, supports shall be designed and installed in conformance with good engineering practice.

Bonding and grounding

4.3.12.10. (1) Where **storage tanks** for **flammable liquids** or **combustible liquids** are installed inside **buildings**, tanks, piping and discharge equipment shall be bonded and grounded.

Subsection 4.3.13. Rooms for Storage Tanks

Design and construction

4.3.13.1. (1) Rooms for **storage tanks** inside **buildings** shall be

- (a) separated from the rest of the **building** by a **fire separation** having a **fire-resistance rating** of at least 2 h,
- (b) designed to contain 100% of the volume of the largest **storage tank**, or to drain away spilled **flammable liquids** or **combustible liquids** in conformance with Subsection 4.1.6.,
- (c) made liquid-tight where the walls join the floor,
- (d) provided with natural or mechanical ventilation in conformance with Subsection 4.1.7., and
- (e) used for no other purposes than the storage and handling of **flammable liquids** or **combustible liquids**.

Clearances

4.3.13.2. A minimum clear space of 550 mm shall be maintained between the walls of a room described in Article 4.3.13.1. and the sides of any **storage tanks** within the room.

Explosion venting

4.3.13.3. Where Class IA or IB liquids are dispensed within a storage room, the room shall be designed to prevent critical structural and mechanical damage from an internal explosion in conformance with NFPA 68, "Guide for Venting of Deflagrations".

Hose stations and portable extinguishers

4.3.13.4. (1) In **buildings** not required to be equipped with a standpipe system by the **Building Code**, hose stations conforming to Articles 3.2.9.2. to 3.2.9.7. of the **Building Code**, as it read on August 21, 2000, shall be provided in the vicinity of the storage room, such that all parts of the room are within reach of a hose stream.

(2) Portable extinguishers for **Class B fires** shall be provided in conformance with Section 6.2.

Placards

4.3.13.5. (1) Placards conforming to the **Transportation of Dangerous Goods Regulations** made under the **Transportation of Dangerous Goods Act, 1992 (Canada)** shall be posted in a conspicuous location outside the room containing **storage tanks**.

(2) Placards required in Sentence (1) shall identify the

- (a) liquids stored as **flammable liquids** or **combustible liquids**, and
- (b) capacities of the **storage tanks**.

(3) Despite Clause (2)(a), where storage consists of a single product, placards that identify the liquid using the UN Product Identification Number (PIN) shall be acceptable.

(4) Despite Clause (2)(a), where storage consists of multiple products within the same class, placards that identify the class of liquids shall be acceptable.

(5) Despite Clause 2(a), where storage consists of more than one class of liquid, placards that indicate the danger symbol or individual placards for each class of liquid shall be acceptable.

(6) Rooms for **storage tanks** and the information described in Sentence (2) shall be identified in the fire safety plan required in Article 4.1.5.6.

Subsection 4.3.14. Openings Other than Vents in Storage Tanks in Buildings***Connections***

4.3.14.1. (1) Connections for all openings in **storage tanks** in **buildings** shall be liquid and vapour tight.

(2) Connections to **storage tanks** through which liquid can flow shall be provided with valves located as close as practical to the tank.

Openings for liquid level measurement

4.3.14.2. (1) Openings that are independent of the fill pipe and are used for measuring the liquid level in **storage tanks** containing Class I or II liquids shall be equipped with a vapour-tight cap which shall be opened only when measuring the liquid level.

(2) Openings referred to in Sentence (1) shall be protected against overflow and **vapour pressure** by means of a spring-loaded check valve.

Subsection 4.3.15. Leakage Testing of Storage Tanks***Leakage testing***

4.3.15.1. (1) Every **storage tank** shall be **tested** for leakage in conformance with Sentences (2) to (4)

- (a) whenever a leak is suspected, and
- (b) at the time of installation
 - (i) before backfilling in the case of an underground tank, or
 - (ii) before filling or putting into service in the case of an aboveground tank.

(2) When a leakage **test** is required by Sentence (1) on an aboveground **storage tank**, it is permitted to determine the source of leakage

- (a) by a visual examination of the tank shell, and
- (b) where the bottom is not amenable to such examination, by **testing** the bottom of the tank in conformance with Sentence (3).

(3) Except as provided in Articles 4.3.15.4. and 4.3.15.5., when a leakage **test** is required by Sentence (1) on an underground **storage tank**, it shall be done by qualified personnel using equipment conforming to

- (a) ULC/ORD-C58.12, “Leak Detection Devices or (Volumetric Type) for Underground Flammable Liquid Storage Tanks”, or
- (b) ULC/ORD-C58.14, “Nonvolumetric Leak Detection Devices for Underground Flammable Liquid Storage Tanks”.

(4) Where field **test** methods are included in the tank construction standards referred to in Articles 4.3.1.2. and 4.3.1.3., such **tests** shall be permitted for **storage tanks** conforming to those standards.

Retention of records

4.3.15.2. Records of **tests** referred to in Article 4.3.15.1. shall be retained for examination by the **Chief Fire Official**, in conformance with Article 1.1.2.1.

Remedial action

4.3.15.3. (1) When a leak is detected in a **storage tank** by a leakage **test** required in this Subsection or by a leakage detection measure required in Subsection 4.3.16.,

- (a) the **storage tank** shall
 - (i) be replaced, in the case of an underground tank, or
 - (ii) be repaired or replaced in the case of an aboveground tank, and
- (b) the escaped liquid shall be removed in conformance with Article 4.1.6.3.

(2) The **Chief Fire Official** shall be notified within 24 h of detection of a leak referred to in Sentence (1).

Pneumatic leakage tests

4.3.15.4. (1) Pneumatic leakage **tests** shall not be performed on field-erected aboveground **storage tanks**.

(2) Pneumatic leakage **tests** shall not be performed on **storage tanks** with **flammable liquids** or **combustible liquids** in the tanks.

(3) Where a pneumatic leakage **test** is performed on an underground **storage tank**, the tank shall be considered to be leaking when the **test** indicates a pressure drop within a 2 h period after steady temperature conditions have been established and the source of pressure has been removed.

(4) Pneumatic **test** pressures applied to underground **storage tanks** shall be measured by an instrument calibrated in increments of not more than 1 kPa.

(5) Where a pneumatic leakage **test** is conducted before an underground tank is backfilled in the case of a new tank, or after the tank is uncovered in the case of a previously installed tank, the **test** pressure shall be in conformance with the production **testing** requirements of

- (a) CAN/ULC-S603, “Steel Underground Tanks for Flammable and Combustible Liquids”, or
- (b) CAN4-S615, “Reinforced Plastic Underground Tanks for Petroleum Products”.

(6) Where a pneumatic leakage **test** is performed on a completely buried **storage tank**, the **test** pressure shall be not less than 35 and not more than 70 kPa (gauge).

(7) Measures shall be taken to guard against the hazards associated with pneumatic leakage **testing** where explosive mixtures of vapours from **flammable liquids** or **combustible liquids** and air may be present in the area of a tank that has been in use.

Liquid media leakage tests

4.3.15.5. (1) Where a leakage **test** incorporating a liquid **test** medium, including a **flammable liquid** or **combustible liquid**, is performed on an underground **storage tank**, the tank shall be considered to be leaking when, with compensation for volume differentials caused by effects of temperature and tank shell distortion, the **test** indicates a liquid loss.

(2) The pressure at the bottom of a **storage tank** shall not exceed 70 kPa (gauge) during the leakage **test** referred to in Sentence (1).

Subsection 4.3.16. Leakage Detection of Storage Tanks

Liquid level measurements

4.3.16.1. (1) Except as provided in Article 4.3.16.2., the liquid level in any **storage tank** shall be measured at intervals not greater than seven days in conformance with Sentences (2) to (4), except that at **fuel dispensing stations**, the measurements shall be taken each day the station is in operation.

(2) The level of water at the bottom of an underground **storage tank** shall be measured at intervals not greater than seven days, except that at **fuel dispensing stations**, the measurement shall be taken each day the station is in operation.

(3) A comparison of the measurements described in Sentences (1) and (2) with meter readings and a computation of any gain or loss of liquid shall be done each time a required measurement is taken.

(4) A record for each **storage tank** showing the measurements and computations described in Sentence (3) shall be retained for examination by the **Chief Fire Official**, in conformance with Article 1.1.2.1.

Continuous leakage detection

4.3.16.2. (1) The measurements described in Article 4.3.16.1. are not required for an underground **storage tank** when

- (a) it is provided with a continuous leakage detection device conforming to
 - (i) ULC/ORD-C58.12, "Leak Detection Devices (Volumetric Type) for Underground Flammable Liquid Storage Tanks", or
 - (ii) ULC/ORD-C58.14, "Nonvolumetric Leak Detection Devices for Underground Flammable Liquid Storage Tanks", and
- (b) its associated underground piping is provided with continuous leakage detection conforming to Article 4.4.6.7.

Corrective action

4.3.16.3. (1) Immediate corrective action shall be taken in conformance with Subsection 4.3.15. when

- (a) a loss of liquid or a gain of water is indicated by any of the leakage detection measures described in Articles 4.3.16.1. and 4.3.16.2., or
- (b) the level of water at the bottom of an underground **storage tank** exceeds 50 mm.

Subsection 4.3.17. Out of Service

Underground storage tanks

4.3.17.1. (1) When underground **storage tanks** will be out of service for a period not exceeding 180 days,

- (a) the liquid level in the **storage tank** shall be measured at intervals not greater than one month and a record of such measurements shall be retained for **inspection**,
- (b) fill pipe covers and covers over openings to measure liquid levels, dispensers and power controls shall be kept locked when not in use, and
- (c) vent piping shall be kept open.

(2) Except as provided in Sentence (3), when underground **storage tanks** will be out of service for a period exceeding 180 days,

- (a) the **storage tanks**, connected piping and dispensers shall be emptied of Class I liquid,
- (b) the **storage tanks**, piping and dispensers shall be refilled with a Class II or IIIA liquid, or not less than 1 kg of dry ice for each 500 L of tank capacity shall be added to the **storage tank**,
- (c) measurements of the liquid level of each **storage tank** containing a Class II or IIIA liquid shall be made at intervals not greater than one month, and a record of such measurements shall be retained for **inspection**, and
- (d) fill pipe covers and covers over openings to measure liquid levels, dispensers and power controls shall be locked.

(3) Where underground **storage tank** facilities are operated on a seasonal basis,

- (a) at the close of each season of operation,
 - (i) the liquid level of each **storage tank** shall be measured,
 - (ii) a record of such measurements shall be retained for **inspection**, and
 - (iii) all fill pipe covers and covers over openings for measuring liquid levels, dispensers and power controls shall be locked, and
- (b) prior to the start of an operating season,
 - (i) the liquid level in each **storage tank** shall be measured,
 - (ii) the measurements shall be compared with those recorded at the close of the previous season, and
 - (iii) when a loss of liquid or water intrusion is apparent, immediate action shall be taken to determine and correct the condition.

(4) Where a **storage tank** has been out of service for more than 12 months, the tank and piping shall be **tested** for leakage in conformance with Subsections 4.3.15. and 4.4.6.

Aboveground storage tanks

4.3.17.2. (1) When an aboveground **storage tank** will be out of service or unsupervised for a period not exceeding 180 days, the piping from the tank shall be capped or the valves necessary to achieve similar isolation of the tank shall be closed and securely locked.

(2) When a **storage tank** referred to in Sentence (1) contains **flammable liquids** or **combustible liquids**, the liquid level in the tank shall be measured and the readings compared at intervals not greater than one month.

(3) Where an aboveground **storage tank** will be out of service or unsupervised for a period exceeding 180 days,

(a) all liquid and vapours shall be removed from the **storage tank** and its connected piping, and

(b) the **storage tank** markings shall clearly indicate that the tank is empty.

Disposal

4.3.17.3. Where a **storage tank** is to be permanently disposed of, sufficient openings shall be cut in the tank to render it unfit for further use.

Removal

4.3.17.4. (1) When underground **storage tanks** have no further use or have been out of service for two years or longer, such tanks, together with connected piping and dispensers, shall

(a) have all **flammable liquids** and **combustible liquids** removed from them,

(b) be purged of vapours, and

(c) except as permitted in Article 4.3.17.5., be removed from the ground.

(2) If contaminated, soil surrounding the **storage tanks** described in Sentence (1) shall be replaced with clean fill.

Abandonment in place

4.3.17.5. (1) Where the **Chief Fire Official** determines that it is impractical to remove an underground **storage tank** described in Sentence 4.3.17.4.(1), such tank shall be filled with an inert material.

(2) Where the **Chief Fire Official** determines that it is impractical to remove underground piping described in Sentence 4.3.17.4.(1), such piping shall have the ends permanently sealed by capping or plugging.

Corrosion protection

4.3.17.6. Corrosion protection systems shall be maintained in operating condition when a **storage tank** is temporarily out of service and during seasonal shutdowns.

SECTION 4.4 PIPING AND TRANSFER SYSTEMS

Subsection 4.4.1. Scope

Application

4.4.1.1. (1) This Section applies to piping and transfer systems for **flammable liquids** and **combustible liquids**.

(2) Except where otherwise stated in this Part, this Section shall not apply to the following:

(a) tubing or casings and piping for oil or gas wells,

(b) transmission pipelines,

(c) piping for vehicles, aircraft, watercraft and portable or stationary engines,

(d) piping systems in **fuel dispensing stations** and **distilleries**, and

(e) piping within the scope of the applicable provincial **boiler** and **pressure vessel** codes.

Subsection 4.4.2. Materials for Piping, Valves and Fittings

Materials

4.4.2.1. (1) Materials for piping systems containing **flammable liquids** or **combustible liquids** shall be suitable for the maximum anticipated working pressures and operating temperatures and for the chemical properties of the contained liquid.

(2) Except as provided in Sentence (3), the use of

(a) materials that are subject to failure from internal stress or rupture by mechanical damage, or

(b) combustible or low-melting-point materials that are subject to failure in fires shall not be permitted for piping systems referred to in Sentence (1).

(3) Non-metallic piping systems are permitted to be used for underground installations provided they conform to

- (a) ULC/ORD-C107.7, “Glass Fibre Reinforced Plastic Pipe and Fittings for Flammable Liquids”, or
- (b) ULC/ORD-C107.4, “Ducted Flexible Underground Piping Systems for Flammable and Combustible Liquids”.

(4) Except as provided in Sentence (5), where steel piping is used, it shall conform to

- (a) API 5L, “Line Pipe”,
- (b) ASTM A 53, “Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless”, or
- (c) CSA Z245.1, “Steel Line Pipe”.

(5) Where service pressures exceeding 875 kPa (gauge) may occur, piping and fittings shall be designed in conformance with ANSI/ASME B31.3, “Chemical Plant and Petroleum Refinery Piping”.

(6) Underground piping systems shall include piping in tank sumps, transition sumps and dispenser sumps.

Special materials

4.4.2.2. Where problems of corrosion, contamination or sanitation or standards of purity require special materials, it is permitted to use non-metallic materials for piping, valves and fittings in conformance with Article 4.1.1.4.

Subsection 4.4.3. Corrosion Protection of Piping Systems

Corrosion protection

4.4.3.1. (1) Except as provided in Sentence (2), all exposed or underground piping, valves, couplings, flanges and bolts that are fabricated of any ferrous substance shall be thoroughly coated with a rust-resistant compatible material.

(2) Underground steel piping, valves and fittings that are in contact with the soil or groundwater shall be protected against corrosion in conformance with

- (a) CAN/ULC-S603.1, “External Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids”, or
- (b) good engineering practice such as described in PACE Report No. 87-1, “Impressed Current Method of Cathodic Protection of Underground Petroleum Storage Tanks”, published by the Canadian Petroleum Products Institute.

Subsection 4.4.4. Identification of Piping Systems

Identification

4.4.4.1. (1) Pipelines for **flammable liquids** or **combustible liquids** shall be marked with the contents of the line, and these markings shall be maintained in a clearly legible form.

(2) Piping for **flammable liquids** or **combustible liquids** shall not be painted red.

(3) Transfer points in piping systems for **flammable liquids** and **combustible liquids** shall be identified in conformance with CPPI, “Using the CPPI Colour-Symbol System to Mark Equipment and Vehicles for Product Identification”, or to CAN/CGSB-24.3, “Identification of Piping Systems”.

Documentation

4.4.4.2. (1) Documentation on piping systems for **flammable liquids** or **combustible liquids**, including tank and pumping arrangements, shall be made available to the **fire department** upon request.

(2) Documents referred to in Sentence (1) shall be kept at two separate locations so that one copy remains readily available in the event the other is inaccessible due to fire.

Subsection 4.4.5. Joints in Piping Systems

Threaded joints

4.4.5.1. Threaded joints in piping systems for **flammable liquids** or **combustible liquids** shall be made using joint compound or polytetrafluoroethylene tape conforming to CAN/ULC-S642, “Compounds and Tapes for Threaded Pipe Joints”.

Welded piping

4.4.5.2. (1) Welding of piping for **flammable liquids** or **combustible liquids** shall conform to Section 5.17 and to

- (a) API 1104, “Welding Pipelines and Related Facilities”, or

(b) API RP 1107, “Recommended Pipeline Maintenance Welding Practices”.

(2) Flanged joints for piping shall be provided in welded systems at intervals which will facilitate dismantling and avoid subsequent in-place cutting and welding operations.

Flanged joints

4.4.5.3. (1) Except as permitted in Sentence (2), flanged joints for piping shall be made with forged or cast steel flanges designed, constructed and installed in conformance with ANSI/ASME B16.5, “Pipe Flanges and Flanged Fittings”.

(2) Bronze flanges for 50 mm diameter or smaller size piping referred to in Article 4.4.5.2. are permitted to be used where copper and brass piping is permitted.

Bolting materials

4.4.5.4. Bolting materials for flanged connections in steel piping systems for **flammable liquids** or **combustible liquids** shall be of alloy steel equivalent to ASTM A 193/A 193M, “Alloy-Steel and Stainless Steel Bolting Materials for High Temperature Service”, Grade B-7.

Gaskets

4.4.5.5. Gaskets in flanged connections shall be of a material resistant to the liquid being carried and capable of withstanding temperatures of at least 650°C without damage that would impair its function.

Mechanical connections

4.4.5.6. (1) Where underground piping systems have no secondary containment, mechanical connections shall

- (a) be readily accessible for **inspection** and maintenance, and
- (b) not be in direct contact with the soil.

Subsection 4.4.6. Leakage Testing of Piping Systems

Leakage testing

4.4.6.1. (1) Piping systems including those at **fuel dispensing stations** shall be **tested** for leakage in conformance with Sentences (2) and (3)

- (a) whenever a leak is suspected, and
- (b) at the time of installation
 - (i) before backfilling in the case of underground piping, or
 - (ii) before putting into service in the case of exposed piping.

(2) Exposed piping systems in service are permitted to be visually **inspected** for leakage in conformance with Article 4.4.11.5.

- (3) When exposed piping systems are subjected to a pneumatic leakage **test**,
 - (a) it shall be in conformance with Article 4.4.6.4., and
 - (b) the piping, including the joints, shall be soaped to assist in the detection of leaks.

Retention of records

4.4.6.2. Records of the pressure **tests** on piping systems shall be retained for examination by the **Chief Fire Official**, in conformance with Article 1.1.2.1.

Remedial action

4.4.6.3. If a leak is detected in a piping system during the leakage **test**, the piping system shall be repaired or replaced and the escaped liquid shall be removed in conformance with Subsection 4.1.6.

Pneumatic leakage tests

4.4.6.4. (1) Piping systems referred to in Sentence 4.4.6.1.(3) shall be considered to be leaking when the **test** indicates a pressure drop or a volume loss within a 2 h period after steady temperature conditions have been established and the source of pressure had been removed.

(2) Pressure measurements referred to in Sentence (1) shall be obtained by using instruments calibrated in increments of not more than

- (a) 4 kPa for **test** pressures up to 700 kPa (gauge), and
- (b) 1% of the **test** pressure where it exceeds 700 kPa (gauge).

Test pressures

4.4.6.5. (1) Except as provided in Sentences (2) and (3) and Article 4.4.6.6., piping systems shall be pressure **tested** at pressures of not less than 350 kPa (gauge) or 1.5 times the maximum operating pressure, whichever is greater.

(2) **Test** pressures exceeding 700 kPa (gauge) shall not be permitted except when the piping system is designed for such pressures.

(3) Where **test** pressures exceed the design pressures for pumps or similar components included in the piping system being **tested**, such pumps or components shall be isolated from the remainder of the system.

Class I liquids as a test medium

4.4.6.6. Class I liquids shall not be used for pressure **testing** of piping systems, except that piping normally containing Class I liquids under pressure is permitted to be **tested** with such liquids at pressures not exceeding their maximum operating pressures.

Leakage detection

4.4.6.7. When an underground piping system is provided with continuous leakage detection, it shall be in conformance with ULC/ORD-C107.12, "Line Leak Detection Devices for Flammable Liquid Piping".

Subsection 4.4.7. Location and Arrangement of Piping***Location***

4.4.7.1. (1) Piping shall be installed outdoors whenever possible and located so it will not create a hazard to **buildings** or equipment.

(2) Where piping for **flammable liquids** or **combustible liquids** is installed within a **building**, the length of piping shall be as direct and as short as practicable.

(3) It is not permitted to use any portion of a piping system in a manner that could cause damage to the piping system.

(4) Piping systems shall be used only for the transfer of products.

Supports for aboveground outdoor piping

4.4.7.2. (1) Aboveground outdoor piping shall be supported and arranged to prevent excessive vibration and stress on equipment connected to it.

(2) When vehicular impact or physical damage is possible, protective guarding devices shall be provided for piping referred to in Sentence (1) and for fill pipes for **storage tanks**.

(3) Aboveground piping systems shall be supported such that they are not in direct contact with the surface of the ground.

Arrangement of aboveground outdoor piping

4.4.7.3. (1) Aboveground outdoor piping shall not be located

(a) on the exterior of walls except on those of **noncombustible construction**, or

(b) above windows and doors.

(2) Aboveground outdoor piping shall not be located above roofs except above roofs of impermeable and **noncombustible construction**, with provision for accidental spillage provided in conformance with Subsection 4.1.6.

(3) Where aboveground piping crosses roadways or railway sidings, ample overhead clearance and warning signs indicating the clearance height shall be provided.

(4) Piping passing through secondary containment walls shall be designed to prevent excessive stress resulting from settlement or fire exposure.

Underground piping

4.4.7.4. (1) Underground piping shall be located so it will not be damaged as a result of vibrations or settling of an adjacent **building** or structure.

(2) Underground piping shall be located not less than 300 mm away from the foundations of any **building** or structure, except where such piping enters the **building** as permitted in Article 4.4.7.7.

(3) Piping passing under railway tracks shall be installed in conformance with TC, "Standards Respecting Pipeline Crossings Under Railways".

(4) Piping adjacent to railway tracks shall be installed in conformance with **Flammable Liquids Bulk Storage Regulations** made under the **Canada Transportation Act**.

Installation of underground piping

4.4.7.5. (1) Underground piping shall be

- (a) supported on undisturbed or compacted soil, and
- (b) backfilled on the top and sides with not less than
 - (i) 300 mm of pea gravel or clean crushed stone, or
 - (ii) 300 mm of clean sand, free of cinders and stones and compacted in layers not more than 300 mm thick.

(2) Where it is not practicable to support piping as required in Sentence (1) on undisturbed soil, it shall be supported on not less than 150 mm of clean sand, pea gravel or washed, crushed stone.

Piping in service tunnels

4.4.7.6. Piping for **flammable liquids** or **combustible liquids** shall not be located in service tunnels that are used for pedestrian traffic other than for maintenance purposes.

Piping at entrances to buildings

4.4.7.7. (1) Piping for **flammable liquids** or **combustible liquids** shall be located aboveground where the piping enters a **building**.

(2) Piping referred to in Sentence (1) shall be provided with inside and outside shut-off valves.

(3) Where piping referred to in Sentence (1) passes through a wall which would restrict the expansion or contraction of the piping, pipe sleeves shall be provided at the wall penetration to facilitate such movement.

Indoor piping

4.4.7.8. (1) Indoor piping for **flammable liquids** or **combustible liquids** shall either be supported overhead or be located in trenches conforming to Article 4.4.7.9.

(2) Piping referred to in Sentence (1) shall not be installed under combustible flooring.

Piping in trenches

4.4.7.9. (1) Where indoor piping for **flammable liquids** or **combustible liquids** is installed in trenches, a trapped drainage system conforming to Subsection 4.1.6. shall be provided.

(2) When piping referred to in Sentence (1) contains Class I liquids, the trench shall be

- (a) provided with positive ventilation to the outdoors, or
- (b) designed to prevent the accumulation of flammable vapours.

Overhead piping

4.4.7.10. (1) Overhead piping for **flammable liquids** or **combustible liquids** shall be installed close to the ceiling or beams or along walls not less than 1.8 m above the floor to protect it against mechanical damage.

(2) Where practical, overhead piping referred to in Sentence (1) shall be supported from **building** framing members.

(3) In **buildings** of steel frame construction, piping referred to in Sentence (1) shall be fastened to steel beams or columns by pipe hangers attached to the flanges.

(4) Piping under concrete ceilings shall be suspended with the use of through bolts or expansion shields.

Supports for overhead piping

4.4.7.11. (1) Piping shall be supported on pipe hangers or other supports so that allowable stresses in the pipe are not exceeded.

(2) Anchors of the expansion shield type used to suspend piping shall not be used to suspend piping from unsound or lightweight concrete or from gypsum assemblies.

Protection of pipe risers

4.4.7.12. (1) Exposed pipe risers shall be protected against mechanical damage by

- (a) installing such risers
 - (i) adjacent to walls or pilasters,
 - (ii) between flanges of steel columns, or
 - (iii) within securely anchored larger perforated pipe, and
- (b) providing mechanical guards where the risers are exposed to mobile equipment.

Provision for expansion and contraction

4.4.7.13. (1) In the design of piping systems for **flammable liquids** or **combustible liquids**, provision shall be made for the expansion and contraction of the piping system and of the product it conveys.

- (2) To prevent excessive stresses resulting from vibration, settling or temperature changes
- (a) flexible non-metallic hose connectors conforming to CAN/ULC-S633, “Flexible Underground Hose Connectors for Flammable and Combustible Liquids”, are permitted to be used where necessary in underground piping systems carrying **flammable liquids** or **combustible liquids**,
- (b) flexible non-metallic pipe and fittings conforming to ULC/ORD-C971, “Nonmetallic Underground Piping for Flammable and Combustible Liquids”, are permitted to be used where necessary in underground piping systems carrying **flammable liquids** or **combustible liquids**, or
- (c) flexible metallic hose connectors conforming to ULC/ORD-C536, “Flexible Metallic Hose”, are permitted to be used where necessary in aboveground and underground piping systems carrying **flammable liquids** or **combustible liquids**.

Subsection 4.4.8. Valves in Piping Systems

Design

4.4.8.1. (1) Except as provided in Sentences (2), (3) and (4), valves in piping systems for **flammable liquids** or **combustible liquids** shall be designed to accommodate the temperatures and pressures of those systems and shall conform to ULC-C842, “Valves for Flammable and Combustible Liquids”.

(2) Every hose nozzle valve shall conform to CAN/ULC-S620, “Hose Nozzle Valves for Flammable and Combustible Liquids”.

(3) Every emergency valve shall conform to CAN/ULC-S651, “Emergency Valves for Flammable and Combustible Liquids”.

(4) Existing valves are deemed to comply with Sentences (1), (2) and (3), provided they are

- (a) not leaking, and
- (b) constructed of material that is in conformance with Article 4.4.2.1.

Shut-off valves

4.4.8.2. (1) Shut-off valves shall be provided in all **flammable liquid** or **combustible liquid** piping and pumping systems.

(2) Where practical, valves referred to in Sentence (1) shall be located outdoors or be immediately accessible from outdoors.

(3) Except as permitted in Sentence (4), steel shut-off valves shall be provided

- (a) at connections to all aboveground **storage tanks**,
- (b) on supply piping where it enters **buildings** or structures,
- (c) on branch lines from the main supply line,
- (d) on supply lines at dispensing locations,
- (e) to isolate one part of a piping system from another, and
- (f) to isolate meters and air eliminators.

(4) Stainless steel, monel metal or lined steel bodied valves are permitted to be used when special conditions warrant their use.

Diaphragm valves

4.4.8.3. Diaphragm valves shall have no direct connections between the liquid and air sections that might permit leakage of the liquid past the packing into the air lines.

Globe valves

4.4.8.4. Globe valves shall be arranged so that the packing is on the low pressure side.

Indicating valves

4.4.8.5. Rising stem or other indicating valves shall be used where necessary to determine whether the valves are open or shut.

Identification

4.4.8.6. (1) All valves shall be identified in conformance with CPPI, “Using the CPPI Colour-Symbol System to Mark Equipment and Vehicles for Product Identification”, or to CAN/CGSB-24.3-92, “Identification of Piping Systems”.

(2) Every identification tag shall be kept clean so that its colour and inscription are easily recognizable.

Subsection 4.4.9. Heating of Piping Systems**Design**

4.4.9.1. Heating equipment for piping systems containing **flammable liquids** or **combustible liquids** shall be designed not to overheat or create an ignition source for the liquids being heated.

Steam heating

4.4.9.2. (1) **Flammable liquids** and **combustible liquid** piping is permitted to be heated by steam lines provided the minimum steam temperature and pressure to make the liquid fluid are used and Sentences (2) and (3) are complied with.

(2) A pressure regulator shall be provided in the steam line with a relief valve on the downstream side of the regulator.

(3) Piping and steam lines shall be enclosed in insulation conforming to the **Building Code**.

Electrical heating cables

4.4.9.3. Electrical heating cables including electrical induction heating, shall conform to Subsection 4.1.4.

Thermal electrical conduction heating

4.4.9.4. (1) Thermal electrical conduction heating conforming to Sentence (2) is permitted to be used by passing a low-voltage alternating current through the pipe.

(2) Systems permitted in Sentence (1) shall be installed and **tested** as complete units and

(a) unheated sections of piping shall be isolated from heated sections by means of nonconductive fittings,

(b) thermostatic controls, high temperature limit controls and fuses shall have the lowest practical rating to ensure satisfactory operation,

(c) all parts of the piping and fittings shall be enclosed by insulated coverings of a type which will prevent accidental grounding of the systems, and

(d) switches, transformers, contactors and other spark-producing equipment shall be located in an area not subject to flammable vapours.

(3) Upon completion of the installation, systems permitted in Sentence (1) shall be **tested** to ensure that all components are functioning as intended.

Open flames

4.4.9.5. (1) Except as permitted in Sentence (2), the use of open flames as a heat source shall not be permitted for heating piping for **flammable liquids** or **combustible liquids**.

(2) Use of open flames shall be permitted for heating piping for **flammable liquids** or **combustible liquids**, when such operations are carried out in **furnaces** or ovens conforming to NFPA 86, “Standard for Ovens and Furnaces”.

Subsection 4.4.10. Methods of Transfer in Piping Systems**Location of outdoor pumps**

4.4.10.1. (1) Pumps for **flammable liquid** or **combustible liquid** piping systems installed aboveground and outside of **buildings** shall be located not less than

(a) 3 m from the property line, and

(b) 1.5 m from **building** openings.

Pump houses and pump rooms

4.4.10.2. (1) Pumps located indoors shall be in rooms built in conformance with Subsection 4.2.9.

(2) Pump houses and pump rooms shall not be used for any purpose other than to serve the pumping equipment.

Pits

4.4.10.3. (1) Pits for subsurface pumps for piping systems or for piping connected to submersible pumps shall be designed to withstand the forces to which they may be subjected without causing damage to the system.

(2) Pits provided in conformance with Sentence (1) shall not be larger than necessary for **inspection** and maintenance and shall be provided with a cover.

Control switches

4.4.10.4. Pumps for piping systems shall be provided with duplicate control switches to shut down the pumps in case of emergency, with one located in the operating area and the other at a remote location.

Hydraulic transfer systems

4.4.10.5. (1) Where **flammable liquids** or **combustible liquids** are transferred by water pressure as a result of displacement, such system shall not be used for liquids that are miscible in water.

(2) All **pressure vessels** for hydraulic transfer systems referred to in Sentence (1) shall be constructed, installed and **tested** in conformance with ANSI/ASME, “Boiler and Pressure Vessel Code”.

(3) Hydraulic transfer systems referred to in Sentence (1) shall be designed to prevent water pressure in excess of the design pressure of the tank or piping.

(4) Operating pressures shall be controlled by a constant-level float valve or a pressure-regulating valve on the water supply side of the hydraulic transfer system referred to in Sentence (1).

(5) Hydraulic transfer systems referred to in Sentence (1) shall be arranged so that there is no water pressure on the system except when liquid is being discharged.

(6) Check valves shall be provided for both water and **flammable liquid** or **combustible liquid** piping to prevent back-flow in hydraulic transfer systems referred to in Sentence (1).

Inert gas transfer systems

4.4.10.6. (1) Where **flammable liquids** or **combustible liquids** are transferred as a result of displacement by the expansion of nitrogen, carbon dioxide or other inert gases, all **pressure vessels** involved shall be constructed, installed and **tested** in conformance with ANSI/ASME, “Boiler and Pressure Vessel Code”.

(2) Pressure regulators for inert gas transfer systems referred to in Sentence (1) shall be provided in the gas line to control the pressure of the gas at the minimum pressure required to force the liquid through the piping system at the required rate.

(3) A relief valve with a slightly higher setting than the pressure required in Sentence (2) shall be provided on the downstream side of the regulator or on the tank.

(4) Means of automatically shutting off the gas supply and bleeding the gas pressure in the event of fire shall be provided on all inert gas transfer systems referred to in Sentence (1).

Non-inert gas transfer

4.4.10.7. (1) Except as permitted in Sentence (2), the transfer of **flammable liquids** or **combustible liquids** in a closed piping system by means of compressed air or other non-inert gas pressure shall not be permitted.

(2) A non-inert gas pressure is permitted to be used in a closed piping system referred to in Sentence (1) provided

- (a) it is the vapour or gas of the **flammable liquid** or **combustible liquid** being transferred, or
- (b) it is a vapour or gas that will not support combustion reaction and is non-reactive with the **flammable liquid** or **combustible liquid** being transferred.

Subsection 4.4.11. Operating Procedures for Piping Systems

Procedures

4.4.11.1. Standard procedures for normal operations and for emergencies shall be given in printed form to all employees engaged in the operation of equipment for the transfer of **flammable liquids** and **combustible liquids** and shall be posted or readily available for convenient reference.

Training

4.4.11.2. (1) All employees participating in transfer operations involving **flammable liquids** or **combustible liquids** shall be trained in

- (a) the procedures referred to in Article 4.4.11.1.,
- (b) the importance of constant attendance during all loading or unloading operations,
- (c) extinguishing procedures for fires involving **flammable liquids** and **combustible liquids**, and
- (d) the **flammable liquids** and **combustible liquid** colour-coding and identification system required in Article 4.4.8.6.

(2) Employees engaged in the operation of equipment for the transfer of **flammable liquids** or **combustible liquids** shall be trained in the location, function and operation of valves used for the operation of fire protection equipment and manual emergency shut-off valves.

Emergency valves

4.4.11.3. Signs indicating the location of valves used for the operation of fire protection equipment and manual emergency shut-off valves shall be posted in conspicuous locations.

Portable extinguishers

4.4.11.4. At least one portable extinguisher having a rating of 80B:C shall be provided in the vicinity of pumps and ancillary equipment used for the transfer of **flammable liquids** or **combustible liquids**.

Visual inspections

4.4.11.5. (1) A visual **inspection** routine for the prompt detection of obviously abnormal conditions shall be established and shall be performed at least once each shift.

(2) A visual **inspection** shall be made at least once during each day of operation of all aboveground piping systems, pumps and other ancillary equipment, to detect leakage, and any such leakage shall be repaired as quickly as practical.

(3) Where necessary, flammable vapour indicators shall be used to detect leakage.

(4) Open flames and spark-producing devices shall not be used for leakage detection referred to in Sentence (2).

Operational tests

4.4.11.6. To ensure proper operation, frequent **inspections** and **tests** shall be made of all safety shut-off valves and other fire safety devices, with particular attention directed to normally open, fusible-link operated valves, float valves and automatic controls.

Maintenance

4.4.11.7. (1) Except as provided in Sentence (6), maintenance shall not be carried out on piping systems while they are under pressure.

(2) If connections or piping are to be opened, the system shall be drained of **flammable liquids** and **combustible liquids**.

(3) Where equipment for handling **flammable liquids** or **combustible liquids** has to be repaired, it shall be removed and taken to maintenance areas when possible.

(4) Tags shall be attached to all valves on piping systems that are shut off for maintenance purposes to indicate that such valves are not to be opened.

(5) Piping that has been used for the transfer of **flammable liquids** or **combustible liquids** shall be removed or capped when it is no longer intended to be used.

(6) Connections to pressurized piping systems shall be made in conformance with good practice such as described in

(a) API RP 1107, "Recommended Pipeline Maintenance Welding Practices",

(b) API 2200, "Repairs to Crude Oil, Liquefied Petroleum Gas and Products Pipelines", or

(c) API 2201, "Welding or Hot Tapping on Equipment Containing Flammables".

SECTION 4.5 FUEL DISPENSING STATIONS

Subsection 4.5.1. Scope

Application

4.5.1.1. (1) This Section applies to the storage, handling and use of **flammable liquids** and **combustible liquids** at **fuel dispensing stations** except for any property or facility regulated by the **Gasoline Handling Act**.

(2) Except as provided in this Section, the storage and dispensing of Class 2.1 flammable gases at **fuel dispensing stations** shall conform to

(a) **Ontario Regulation 214/01 (Compressed Natural Gas)** made under the **Technical Standards and Safety Act, 2000**, and

(b) **Ontario Regulation 211/01 (Propane Storage and Handling)** made under the **Technical Standards and Safety Act, 2000**.

(3) Requirements of this Section that pertain to the location of dispensers, **storage tanks**, pumps, piping and their ancillary equipment inside **buildings** shall not apply to a canopy that is open on not less than 75% of its perimeter.

Subsection 4.5.2. Storage and Handling

Outside aboveground storage tanks

4.5.2.1. (1) Except as provided in Sentences (2) and (3), the installation of outside aboveground **storage tanks** at **fuel dispensing stations** shall be in conformance with Subsection 4.3.2.

(2) Outside aboveground **storage tanks** at **fuel dispensing stations** shall have an individual capacity of not more than 50000 L, and their aggregate capacity shall not exceed 150000 L.

(3) Outside aboveground **storage tanks** at **fuel dispensing stations** shall be provided with

- (a) physical protection against collision damage,
- (b) measures to prevent unauthorized access to the **storage tank** and its ancillary equipment, and
- (c) measures to contain accidental spillage in conformance with Subsection 4.3.7.

Dispensing of Class I liquids

4.5.2.2. (1) Facilities for the dispensing of Class I liquid fuels shall not be installed

- (a) above any space intended for **occupancy**, or
- (b) in any **building**.

Storage tanks in buildings

4.5.2.3. (1) Where Class IIIA liquids are stored and dispensed inside **buildings** from **storage tanks**, the individual tanks shall have a capacity of not more than 2500 L and the aggregate capacity of all the tanks shall not exceed 10000 L.

(2) All fill pipes, vent piping and valves associated with the **storage tanks** referred to in Sentence (1) shall

- (a) conform to Subsections 4.3.5. and 4.3.6., and
- (b) be permanently marked to indicate the liquid in each tank and the equipment controlled by the valves.

Piping

4.5.2.4. All piping for **flammable liquids** or **combustible liquids** at a **fuel dispensing station** shall be in conformance with Article 4.4.2.1.

Corrosion protection for piping

4.5.2.5. All piping, valves and fittings at a **fuel dispensing station** shall be protected against corrosion in conformance with Article 4.4.3.1.

Piping supports and guards

4.5.2.6. Piping shall be firmly supported and protected by means of guarding devices where necessary to prevent vehicle, watercraft or floatplane impact or other physical damage.

Pits

4.5.2.7. Pits for subsurface pumps or for piping connected to submersed pumps shall conform to Article 4.4.10.3.

Subsection 4.5.3. Dispensing Systems***Dispensers***

4.5.3.1. Fixed dispensers for **flammable liquids** or **combustible liquids** shall conform to CSA-B346, "Power-Operated Dispensing Devices for Flammable Liquids".

Sumps

4.5.3.2. Sumps shall be installed in conformance with ULC/ORD-C107.21, "Under-Dispenser Sumps".

Location

4.5.3.3. (1) Fixed dispensers for Class I liquids shall be installed outside **buildings** and not less than

- (a) 3 m from any right-of-way and any property line,
- (b) 3 m from any propane gas dispenser,
- (c) 1.5 m from any natural gas dispenser,
- (d) 6 m horizontally from any fixed source of ignition,
- (e) 6 m horizontally from any liquefied petroleum gas cylinder or tank, and

- (f) 3 m from any **building** opening, except those openings in **buildings** for the shelter of operating personnel in which electrical installations conform to Article 4.1.4.1.
- (2) Fixed dispensers for Class II or IIIA liquids are permitted to be installed inside a **building** where
 - (a) the **building** is not open to the public,
 - (b) the dispensers are located on the **first storey**,
 - (c) drainage is provided in conformance with Subsection 4.1.6., and
 - (d) ventilation is provided in conformance with Subsection 4.1.7. and with the requirements for storage garages in Part 6 in Division B of the **Building Code**.

Protection against collision damage

- 4.5.3.4. (1) Fixed dispensers shall be protected against collision damage by
- (a) a concrete island not less than 100 mm high, or
 - (b) posts or guardrails.

Marine fuel dispensing stations

4.5.3.5. Dispensers at **marine fuel dispensing stations** shall be in a location that will prevent watercraft or floatplane impact, or other physical damage.

Subsection 4.5.4. Shut-Off Devices

Location and identification

4.5.4.1. (1) A device to shut off power to all dispensers and pumps shall be provided at a remote location on the site of the **fuel dispensing station** and shielded from any fire that might occur in the dispensing area.

(2) The device required in Sentence (1) shall be clearly identified and readily accessible to attendants and emergency responders.

Self service outlets

4.5.4.2. (1) Except as provided in Sentence (2), and in addition to the device required by Sentence 4.5.4.1.(1), an emergency shut-off switch to simultaneously stop the flow of liquid at all dispensers at **self-service outlets** shall be located at the central control console described in Sentence 4.5.8.2.(2) so that it is readily accessible to the attendant.

(2) At card or key-activated **self-service outlets**, the emergency shut-off switch required in Sentence (1) shall be readily accessible to the customer.

Marine fuel dispensing stations

4.5.4.3. At **marine fuel dispensing stations**, a readily accessible valve shall be provided in each pipeline at or within 7.5 m of the pier to shut off the supply from shore.

Subsection 4.5.5. Delivery Hose and Nozzles

Delivery hose

4.5.5.1. (1) Delivery hose shall conform to CAN/ULC-S612, "Hose for Flammable and Combustible Liquids".

(2) Except as permitted in Sentences (3) and (4), hose through which **flammable liquids** or **combustible liquids** are dispensed at a **fuel dispensing station** shall be restricted to a maximum extended length of 4.5 m.

(3) Where a retracting mechanism is used, a maximum extended length of 6 m shall be permitted.

(4) At **marine fuel dispensing stations** or at card or key-activated dispensers, the length of extended hose is permitted to exceed the values in Sentences (2) and (3).

Hose nozzle valves

4.5.5.2. (1) Every hose nozzle valve through which a Class I or II liquid is dispensed by a motorized dispenser into a vehicle tank shall

- (a) be automatic closing as required in Sentence (2), and
- (b) conform to CAN/ULC-S620, "Hose Nozzle Valves for Flammable and Combustible Liquids".

(2) Except as provided in Sentences (3) to (5), a hose nozzle valve shall be constructed so that the valve

- (a) can be kept open only by the continuous application of manual pressure, or
- (b) is equipped with a hold-open device that is an integral part of the nozzle which will

- (i) allow automatic dispensing,
- (ii) automatically shut off when the vehicle tank is filled, and
- (iii) shut off if the nozzle is dropped or falls from the fill pipe.

(3) A hose nozzle valve at a **marine fuel dispensing station** shall be of the type without a hold-open device, in conformance with Clause (2)(a).

(4) When a hose nozzle valve with a hold-open device is used at an attended **self-service outlet**, a break-away coupling conforming to CAN/ULC-S644, “Emergency Breakaway Fittings for Flammable and Combustible Liquids”, shall be provided.

(5) When the flow of liquid can be stopped other than by the hose nozzle valve, a hose nozzle valve with a hold-open device is permitted to be used only if it is provided with a device that will automatically close the hose nozzle valve upon a drop of pressure in the dispensing hose.

Subsection 4.5.6. Remote Pumping Systems

Application

4.5.6.1. This Subsection applies to systems for dispensing **flammable liquids** or **combustible liquids** where such liquids are transferred from bulk storage to individual or multiple dispensers by pumps located elsewhere than at the dispensers.

Pumps and control equipment

4.5.6.2. (1) Pumps, including associated control equipment, shall be designed so that the system will not be subject to pressures above the design working pressure.

(2) Pumps shall be securely anchored and protected against damage from vehicles.

Emergency valves

4.5.6.3. (1) An emergency valve conforming to CAN/ULC-S651, “Emergency Valves for Flammable and Combustible Liquids”, shall be installed in the supply line so that the shear point of the valve is at a level not higher than the base of the dispenser nor more than 25 mm below it.

(2) The emergency valve required in Sentence (1) shall be maintained in operating condition and serviced at intervals not greater than 12 months.

Pump location

4.5.6.4. (1) Pumps installed aboveground and outside **buildings** shall be located not less than

- (a) 3 m from any property line, and
- (b) 1.5 m from any **building** opening.

(2) When an outside pump location is impractical, pumps are permitted to be installed inside **buildings** or in pits as provided elsewhere in this Part.

Leakage testing

4.5.6.5. After the completion of the installation, including paving, all underground piping connected to tanks shall be **tested** for leakage in conformance with Subsection 4.4.6.

Marine fuel dispensing stations

4.5.6.6. (1) Except as permitted in Sentence (2), tanks and pumps not integral with the dispenser at **marine fuel dispensing stations** shall be located on the shore or on a pier of the solid-fill type.

(2) Where shore locations would result in excessively long supply lines to the dispenser, **storage tanks** are permitted to be installed on a pier provided that

- (a) the applicable portions of Subsection 4.3.7. relating to spacing, secondary containment and piping are complied with, and
- (b) the quantity stored does not exceed 5000 L aggregate capacity.

(3) No **storage tank** at a **marine fuel dispensing station** shall be located closer than 4.5 m horizontally from the normal annual high-water mark.

(4) **Storage tanks** located on shore and supplying **marine fuel dispensing stations** are permitted to be located aboveground where rock or a high water table make underground tanks impractical.

(5) Where **storage tanks** at a **marine fuel dispensing station** are elevated above the dispenser, an automatically operated valve, that is designed to open only when the dispenser is being operated so as to prevent gravity draining of the tank in the

event of a rupture of the supply line to the dispenser, shall be provided at the **storage tank** outlet, positioned adjacent to and outside the valves specified in Sentence 4.3.6.1.(1).

(6) Piping between **storage tanks** located on shore and dispensers at a **marine fuel dispensing station** shall conform to Section 4.4, except that where dispensing is from a floating structure, it is permitted to use suitable lengths of flexible hose designed in conformance with good engineering practice between the piping on shore and the piping on the floating structure.

Subsection 4.5.7. Spill Control

Spill control

4.5.7.1. (1) Areas where **flammable liquids** or **combustible liquids** are dispensed shall be designed to

- (a) be able to handle accidental spillage in conformance with Subsection 4.1.6., and
- (b) control a spill of not less than 1000 L.

Subsection 4.5.8. Supervision and Dispensing Procedures

Attendants

4.5.8.1. (1) Except as provided in Sentence (2), every **fuel dispensing station** shall have at least one attendant referred to in Article 4.5.8.5. on duty when the station is open for business.

(2) **Fuel dispensing stations** which do not serve the general public do not require an attendant.

(3) Except as permitted at **self-service outlets**, a qualified attendant shall be in constant control of the dispensing of Class I and II liquids into the fuel tanks of motor vehicles, watercraft or floatplanes, or into containers.

(4) Duties of attendants and fuel dispensing procedures, as stated in Articles 4.5.8.5. and 4.5.8.6., shall be posted at every **fuel dispensing station**.

Self-service outlets

4.5.8.2. (1) Instructions for the operation of dispensers in **self-service outlets** shall be posted in a conspicuous location.

(2) A control console shall be provided at **self-service outlets** within 25 m of all dispensers so that the attendant has an unobstructed view of all units at the same time.

(3) The control console referred to in Sentence (2) shall be equipped to regulate the operation of each dispenser.

(4) A two-way communication system between the control console and each pump island shall be provided at **self-service outlets**.

(5) At **fuel dispensing stations** which provide both attended service and self-service, the attendant required in Sentence 4.5.8.1.(1) is permitted to dispense **flammable liquids** or **combustible liquids** at the attended service island, provided that

- (a) each island has an emergency shut-off switch as described in Article 4.5.4.2., and
- (b) the attendant is never more than 25 m from the self-service island or control console.

Special dispensers

4.5.8.3. Except as provided in Article 4.5.8.4. for card or key-activated equipment, special dispensers including coin-operated, card-operated and preset units, shall not be permitted at **self-service outlets** unless there is at least one qualified attendant on duty for each 12 hoses which can be operated simultaneously while the outlet is open to the public.

Card or key activated dispensers

4.5.8.4. (1) Card or key-activated dispensers are permitted at unattended **self-service outlets** and **fuel dispensing stations** that are not open to the general public, in conformance with Sentences (2) to (6).

(2) Except as provided in Sentences (3) to (6), installation of card or key-activated dispensers shall conform to the requirements for **self-service outlets** and **fuel dispensing stations** in this Section.

(3) Operation of card or key-activated dispensers shall be restricted to persons authorized by the supply agent to possess a card or key to operate the dispensers.

(4) Clearly legible operating instructions, visible at all times, shall be posted at every dispenser island.

(5) A telephone or other clearly identified means to notify the **fire department** shall be provided in a location readily accessible to the user.

(6) Emergency instructions, including the telephone number for the local **fire department**, shall be conspicuously posted to advise the user, in the event of a spill or accident,

- (a) to use the emergency shut-off switch required in Article 4.5.4.2., and

- (b) to call the **fire department**.

Duties of attendants

4.5.8.5. (1) Attendants on duty at **fuel dispensing stations** shall

- (a) supervise the dispensing of **flammable liquids** and **combustible liquids**,
- (b) activate the controls to permit the dispensing of fuel at an individual dispenser only after the customer at the unit is ready to activate the nozzle,
- (c) prevent the dispensing of **flammable liquids** and **combustible liquids** into containers that
 - (i) do not conform to Article 4.2.3.1., or
 - (ii) are in a vehicle,
- (d) take appropriate measures to prevent sources of ignition from creating a hazard at the dispensers,
- (e) take appropriate action in the event of a spill to reduce the risk of fire, and
- (f) shut off the power to all dispensers in the event of a spill or fire.

(2) In addition to the requirements in Sentence (1), attendants on duty at **marine fuel dispensing stations** shall

- (a) activate the controls to permit the dispensing of fuel at an individual dispenser only after all ports and hatches on the watercraft have been closed, and
- (b) ensure that containers for **flammable liquids** and **combustible liquids**
 - (i) are not filled beyond their safe filling level, and
 - (ii) are filled only after they have been removed from the watercraft or floatplane.

(3) Attendants shall be trained on how to conduct their duties.

Fuel dispensing procedures

4.5.8.6. (1) Except as provided in Sentence (2), **flammable liquids** and **combustible liquids** shall not be dispensed into the fuel tank of a motor vehicle, watercraft or floatplane while its engine is running.

(2) It is permitted to dispense a Class II or IIIA liquid into the fuel tank of a motor vehicle while its engine is running provided it is dispensed not less than 6 m away from any Class I liquid dispenser.

(3) Class I and II liquids shall not be dispensed at a **fuel dispensing station** into the fuel tank of a motor vehicle while any part of the motor vehicle or any vehicle attached to it is on a **street**.

(4) Every person dispensing **flammable liquids** and **combustible liquids** shall

- (a) take precautions to prevent overflow or spillage of the liquid being dispensed,
- (b) not knowingly overfill the fuel system,
- (c) except as otherwise stated in Article 4.5.8.5., in the event of spillage, immediately apply an absorbent material to soak up the spillage in conformance with Article 4.1.6.3.,
- (d) not dispense Class I or II liquids in proximity to open sources of ignition,
- (e) not use any object or device that is not an integral part of the hose nozzle valve assembly to maintain the flow of fuel, and
- (f) not dispense the liquids into containers that are in a vehicle, watercraft or floatplane.

Sources of ignition

4.5.8.7. Smoking or any other source of ignition shall not be permitted within 3 m of a dispenser at a **fuel dispensing station**.

Signs

4.5.8.8. (1) At least one weather-resistant sign conforming to Sentences (2) to (4) shall be provided for each dispenser in a location visible to every driver approaching the dispenser.

(2) The sign required in Sentence (1) shall indicate that smoking is not permitted in the vicinity of the dispenser and that the ignition must be turned off while the vehicle is being refueled.

(3) The sign required in Sentence (1) shall

- (a) have a minimum dimension of 200 mm, and

(b) except as permitted in Sentence (4), have letters not less than 25 mm high.

(4) The sign required in Sentence (1) is permitted to display the international “No Smoking — Ignition Off” symbol not less than 100 mm in diameter.

Subsection 4.5.9. Leakage Detection

Liquid level measurement

4.5.9.1. The liquid level in **storage tanks** at **fuel dispensing stations** shall be measured in conformance with Subsection 4.3.16.

Subsection 4.5.10. Fire Prevention and Protection

Portable extinguishers

4.5.10.1. At least two portable extinguishers, each having a rating of not less than 40B:C, shall be provided at every **fuel dispensing station**.

Absorbent materials

4.5.10.2. Absorbent material to soak up liquid spillage shall be provided for use by attendants at **fuel dispensing stations** in conformance with Article 4.1.6.3.

SECTION 4.6 BULK PLANTS

Subsection 4.6.1. Scope

Application

4.6.1.1. This Section applies to that portion of a property where **flammable liquids** or **combustible liquids** are received in bulk quantities and are stored or handled for the purpose of being distributed.

Subsection 4.6.2. Storage

Storage

4.6.2.1. (1) **Flammable liquids** and **combustible liquids** shall be stored in

- (a) **closed containers** in conformance with Article 4.6.2.4., or
- (b) **storage tanks** in conformance with Section 4.3.

Storage tanks

4.6.2.2. At bulk plant rail loading and unloading facilities, the minimum distance from a **storage tank** to a railway line shall be in conformance with **Flammable Liquids Bulk Storage Regulations** made under the **Canada Transportation Act**.

Hydraulic pressure shock

4.6.2.3. Bulk **storage tanks**, piping, pumps, valves and associated components shall be designed, installed and maintained to accommodate hydraulic pressure shock on the system.

Container storage

4.6.2.4. (1) Containers for **flammable liquids** or **combustible liquids** stored indoors shall be stored in conformance with Subsection 4.2.7.

(2) Containers for **flammable liquids** or **combustible liquids** stored outdoors shall be stored in conformance with Subsection 4.2.11., except that the distance between the piles and property lines and the distance between piles need not apply when the containers are stored in an area that does not present a hazard to neighbouring property.

Spill control

4.6.2.5. An outdoor storage area shall be designed to accommodate accidental spillage in conformance with Subsection 4.1.6.

Fencing

4.6.2.6. (1) An outdoor area used for aboveground **storage tanks**, container storage, ancillary equipment and unloading facilities for **flammable liquids** or **combustible liquids** shall be surrounded by a firmly anchored fence that is

- (a) substantially constructed to discourage climbing and unauthorized entry,
- (b) not less than 1.8 m high, and
- (c) provided with gates that shall be locked when the storage area is not staffed.

Subsection 4.6.3. Dispensing

Interconnection

4.6.3.1. Dispensing systems for Class I liquids shall not be interconnected with dispensing systems for Class II and IIIA liquids.

Dispensing into vehicles

4.6.3.2. (1) Dispensers serving the general public for dispensing **flammable liquids** or **combustible liquids** into fuel tanks of vehicles shall not be located at a bulk plant unless separated by a fence or equivalent barrier from the area in which the bulk storage operations are conducted.

(2) Where a dispenser referred to in Sentence (1) is supplied from an aboveground **storage tank**,

(a) an automatically operated valve, that is designed to open only when the dispenser is being operated, shall be provided at the tank outlet, and

(b) an emergency valve shall be provided for the dispenser in conformance with Sentence 4.5.6.3.(1).

Dispensing and transfer inside buildings

4.6.3.3. Class I liquids shall be dispensed or transferred inside **buildings** only in conformance with Subsections 4.1.7. and 4.1.8.

Dispensing into metal containers or tanks

4.6.3.4. Class I liquids shall not be dispensed into a metal container or **storage tank** unless it is electrically connected in conformance with Article 4.1.8.2.

Subsection 4.6.4. Loading and Unloading Facilities**Clearances**

4.6.4.1. (1) At a loading or unloading facility for **tank vehicles** or tank cars, the horizontal distance from the fill stem to an aboveground **storage tank**, a **building** or a property line shall be not less than

(a) 7.5 m for Class I liquids, and

(b) 4.5 m for Class II and IIIA liquids.

(2) At bulk plant rail loading and unloading facilities, the minimum distance from a loading structure to a railway line shall be in conformance with **Flammable Liquids Bulk Storage Regulations** made under the **Canada Transportation Act**.

(3) **Buildings** for the shelter of personnel or pumps shall be considered a part of the loading or unloading facility.

Multi-purpose facilities

4.6.4.2. When piping and pumping systems have been used for the transfer of either **flammable liquids** or **combustible liquids** at loading or unloading facilities, the system shall be cleaned of vapours before the other class of liquid is introduced.

Backflow preventers

4.6.4.3. (1) Systems through which tank cars or **tank vehicles** discharge into **storage tanks** by means of a pump shall be provided with backflow preventers located to prevent spills and inadvertent mixing of liquids.

(2) Systems referred to in Sentence (1) shall be designed, installed and maintained to prevent leakage or spillage.

Control valves

4.6.4.4. (1) Valves installed to control the filling of **tank vehicles** or tank cars shall be of the self-closing type.

(2) Control valves referred to in Sentence (1) shall be held open manually, except where automatic devices are provided for shutting off the flow in order to prevent the overfilling of **tank vehicle** or tank car compartments.

Bonding and grounding

4.6.4.5. (1) Bonding, grounding and isolation components for protection against static charges during the loading of **tank vehicles** or tank cars shall be provided when transferring **flammable liquids** or **combustible liquids**.

(2) Where **flammable liquids** or **combustible liquids** are transferred into railway tank cars, railway tracks shall be bonded throughout their length and permanently grounded in conformance with **Railway Prevention of Electric Sparks Regulations** made under the **Canada Transportation Act**.

(3) Bonding required in Sentence (1) shall consist of a metallic bond wire connected to the fill stem or to some part of the loading structure in electrical contact with the fill stem in conformance with Subsection 4.1.4.

(4) Bonding wires for **tank vehicles** shall be provided with a pull-off connector attached so as to be in electrical contact with the cargo tank of the **tank vehicle**.

(5) The bonding connection required in Sentence (1) shall be fixed to the **tank vehicle** or **storage tank** before dome covers are raised and shall remain in place until filling is completed and all dome covers have been closed and secured.

Downspouts

4.6.4.6. Except as provided in Sentence 4.1.8.2.(2), when **tank vehicles** or tank cars are filled with Class I or II liquids through the top of the tank, the fill pipe shall terminate within 150 mm of the bottom of the tank.

Subsection 4.6.5. Fire Protection

Portable extinguishers

4.6.5.1. At least two portable extinguishers, each having a rating of not less than 80B:C, shall be provided at hazardous locations in bulk storage plants for **flammable liquids** and **combustible liquids**.

Subsection 4.6.6. Spill Control

Spill control

4.6.6.1. Facilities to control possible spills of **flammable liquids** or **combustible liquids** shall be provided at loading and unloading points in conformance with Subsection 4.1.6.

SECTION 4.7 PIERS AND WHARVES

Subsection 4.7.1. Scope

Application

4.7.1.1. This Section applies to **flammable liquid** and **combustible liquid** installations on piers and wharves, but does not include **marine fuel dispensing stations**.

Subsection 4.7.2. General

Clearances

4.7.2.1. (1) Piers and wharves where cargos of **flammable liquids** or **combustible liquids** are transferred in bulk quantities to or from tanks of marine vessels shall be not less than 30 m from

- (a) any bridge over a navigable waterway, and
- (b) an entrance to a superstructure of any vehicular or railroad tunnel under a waterway.

(2) The termination of fixed piping for loading and unloading **flammable liquids** or **combustible liquids** shall be not less than 60 m from a bridge or from an entrance to a tunnel.

Construction

4.7.2.2. The substructure and deck of a pier or wharf shall be designed for its intended use and shall be of **heavy timber construction** or other material that will provide adequate flexibility, resistance to shock, durability, strength and fire resistance.

Subsection 4.7.3. Storage Tanks

Installation

4.7.3.1. (1) Except as permitted in Sentences (2) and (3), **storage tanks** shall be installed on shore in conformance with Subsections 4.3.2. to 4.3.7.

(2) **Storage tanks** are permitted to be located in **buildings** on piers and wharves of solid-fill or **noncombustible construction** provided they conform to Subsections 4.3.12. to 4.3.14.

(3) **Storage tanks** are permitted to be buried in piers and wharves of the solid-fill type provided they conform to Subsections 4.3.8. to 4.3.11.

Subsection 4.7.4. Piping, Valves and Fittings

Installation and materials

4.7.4.1. The method of installation and materials used for piping, valves and fittings shall conform to Section 4.4.

Pipe supports

4.7.4.2. (1) Piping shall be properly supported and arranged to prevent excessive vibration or strain on equipment connected to it.

- (2) Piping supports shall consist of
 - (a) wood having no dimension less than 150 mm,

- (b) steel, or
- (c) concrete.

(3) Where pipe is supported more than 1.2 m above the pier deck, piping supports shall have a minimum **fire-resistance rating** of 2 h.

Guards

4.7.4.3. In areas where general cargo is handled or where piping might be subject to physical damage from vehicles, watercraft or floatplanes, the piping shall be protected by means of guarding devices.

Flexible connections

4.7.4.4. Piping between the shore and piers or wharves shall be provided with swing joints or flexible connections designed in conformance with good engineering practice to permit the independent movement of the pier or wharf and shore piping without strain on the pipe.

Shut-off valves

4.7.4.5. A readily accessible valve to shut off the supply from shore shall be provided in each pipeline within 7.5 m of piers and wharves.

Access openings for inspection

4.7.4.6. (1) Access openings for **inspection** purposes below deck shall be provided for valves required in Article 4.7.4.5. and for connections to pipelines, and suitable signs shall be posted indicating their locations.

(2) No freight or materials shall be placed on piers and wharves in such a manner as to obstruct the access openings required in Sentence (1).

Identification

4.7.4.7. Identification tags or labels of metal or other material impervious to water and to the **flammable liquids** or **combustible liquids** being transferred shall be attached to and maintained on all pipelines and control valves to designate their use.

Leakage testing

4.7.4.8. (1) Piping systems shall be **tested** for leakage in conformance with Subsection 4.4.6. before being put into service and before reactivation when used on a seasonal basis.

(2) Underground piping systems referred to in Sentence (1) shall be **tested** at intervals not greater than 12 months.

Subsection 4.7.5. Bonding and Grounding

Bonding and grounding

4.7.5.1. (1) Railway tracks on piers and wharves shall be bonded throughout their length and permanently grounded in conformance with **Railway Prevention of Electric Sparks Regulations** made under the **Canada Transportation Act**.

(2) Insulating joints shall be placed in all rails where entering upon the pier or wharf.

Subsection 4.7.6. Fire Protection

Portable extinguishers

4.7.6.1. (1) Portable extinguishers having a rating of 40B:C shall be provided in the vicinity of Class I liquid pumps and fuel dispensers in conformance with Section 6.2.

(2) Portable extinguishers shall be kept in the pump house or other suitable location where they will be accessible in the event of an emergency, but not accessible to the public.

(3) Where marine vessels are loading or unloading **flammable liquids** or **combustible liquids** or are being refuelled, portable extinguishers with a rating of not less than 40B:C shall be placed on the pier or wharf in the vicinity of loading or unloading operations, so that they are accessible in the event of a fire emergency.

(4) Portable extinguishers provided in conformance with Sentence (3) shall be in addition to those provided on board the marine vessels.

Training

4.7.6.2. Operating personnel shall be trained in how to summon the nearest **fire department** in the event of fire.

Subsection 4.7.7. Bulk Transfer Stations

Location

4.7.7.1. (1) Except as permitted in Sentence (2), the bulk transfer of **flammable liquids** or **combustible liquids** shall be permitted only on piers and wharves used exclusively for that purpose.

(2) Where it is not practical to locate bulk transfer stations on separate piers and wharves, such stations are permitted to be located on general purpose piers and wharves provided that guards or fences are installed around valves or pumping equipment to prevent entry of unauthorized personnel.

Leakage and spill control

4.7.7.2. (1) Measures to accommodate possible leakage or spillage from hose couplings shall be provided in conformance with Subsection 4.1.6.

(2) Provision shall be made to prevent spillage resulting from the disconnection of hoses.

Hose connections

4.7.7.3. (1) Except as provided in Sentence (2), hose connections on piping shall be of the bolted flange type, and all such connections shall be provided with shut-off valves.

(2) The use of cam-locking connections up to 100 mm in size shall be permitted.

(3) Hose connections shall not project beyond the face of piers and wharves.

Subsection 4.7.8. Cargo Hose

Cargo hose

4.7.8.1. (1) The transfer of **flammable liquids** or **combustible liquids** between tanks of marine vessels and piers or wharves shall be through

- (a) flexible cargo hose designed in conformance with good engineering practice, or
- (b) jointed tubing or piping
 - (i) suitable for the cargo to be transferred, and
 - (ii) designed to withstand the maximum design working pressure.

Maintenance and testing

4.7.8.2. Cargo hose shall be maintained in satisfactory operating condition and be pressure **tested**, at intervals not greater than 12 months, to 1.5 times the maximum working pressure but not less than 350 kPa (gauge).

Supports

4.7.8.3. Cargo hose shall be supported where it is not run on a solid foundation.

Subsection 4.7.9. Cargo Pumps

Design and installation

4.7.9.1. Cargo pumps shall be designed and installed in conformance with Subsection 4.4.10.

Pressure relief

4.7.9.2. Cargo pumps capable of producing pressures in excess of the safe working pressure of the cargo hose shall be provided with pressure relief devices such as return lines or relief valves.

Location

4.7.9.3. (1) Except as permitted in Sentence (2), cargo pumps shall be located

- (a) on shore or on piers and wharves either of **noncombustible construction** or of the solid-fill type, and
- (b) not less than 3 m from other **buildings** or structures.

(2) Where it is not practicable to install cargo pumps as required in Sentence (1), they are permitted to be installed on piers and wharves of **combustible construction** if located in pump houses

- (a) conforming to Subsection 4.7.10., and
- (b) located not less than 3 m from other **buildings**.

Subsection 4.7.10. Pump Houses

Construction

4.7.10.1. Pump houses shall be of **noncombustible construction** with floors that are chemically resistant to the liquid being handled, liquid-tight and equipped with curbs or flashings around the base of the wall not less than 100 mm in height to contain any spilled liquid.

Ventilation

4.7.10.2. Ventilation shall be provided in pump houses in conformance with Subsection 4.1.7.

Subsection 4.7.11. Transfer Operations

Supervision

4.7.11.1. (1) Transfer operations shall be carried out only under the continuous supervision of a person qualified to supervise such operations.

(2) Cargo shall not be transferred to or from the tank of a marine vessel unless sufficient personnel are on board to control the operation.

(3) The person responsible for directing the operations shall

(a) prior to the transfer of cargo, ascertain that no unauthorized repair work is being carried out on the pier or wharf and that there are no open flames in the vicinity,

(b) during the transfer of cargo, monitor the progress of the loading and unloading to prevent overflow, and

(c) **inspect** the hose and connections for leakage and, if leakage occurs, stop the operations.

Bonding and grounding

4.7.11.2. (1) Tanks of marine vessels shall be electrically connected to the shore piping prior to the connection of cargo hose, except when cathodic protection facilities are operating.

(2) Electrical connections to tanks of marine vessels shall be maintained until the cargo hose has been disconnected and any spillage has been removed.

Equipment

4.7.11.3. (1) Cargo hose shall be of adequate length to allow for the movement of the marine vessel.

(2) Gaskets shall be used in all hose joints and pipe couplings to prevent leakage.

(3) Flanged joints shall be tightly bolted to prevent leakage.

(4) Drip pans shall be placed under hose connections on piers and wharves, except where a sump pit or settling basin is provided.

Spill control

4.7.11.4. (1) When transfer operations are completed,

(a) the valves on the hose connections shall be closed, and

(b) unless the cargo hose is equipped with a device that prevents liquid from draining from the hose, it shall be drained into appropriate containers that shall be emptied in such a fashion as to not create a fire or explosion hazard.

(2) Care shall be taken that no liquid is discharged on a pier or wharf or overboard during draining and emptying operations.

SECTION 4.8 PROCESS PLANTS

Subsection 4.8.1. Scope

Application

4.8.1.1. (1) Except as provided in Sentence (2), this Section applies to those **process plants**, including **refineries**, which contain industrial processes involving **flammable liquids** or **combustible liquids**.

(2) This Section does not apply to **distilleries** covered in Section 4.9.

Subsection 4.8.2. Outdoor Processing Equipment

Location

4.8.2.1. (1) The location of outdoor processing equipment in **process plants** shall be based on its **flammable liquid** and **combustible liquid** capacity as described in Sentences (2) to (4).

(2) Except as provided in Sentence (4), outdoor processing equipment having emergency relief venting and a working pressure of not more than 17 kPa (gauge) shall be separated from property lines and **buildings** on the same property by distances

- (a) equal to those in Table 4.3.2.A. for stable liquids, and
 - (b) 2.5 times those in Table 4.3.2.A. for **unstable liquids**.
- (3) Except as provided in Sentence (4), outdoor processing equipment having emergency relief venting and a working pressure more than 17 kPa (gauge) shall be separated from property lines and **buildings** on the same property by distances
- (a) 1.5 times those in Table 4.3.2.A. for stable liquids, and
 - (b) four times those in Table 4.3.2.A. for **unstable liquids**.
- (4) Where protection is not provided against fires or explosions in processing equipment, the distances in Sentences (2) and (3) shall be doubled.

Subsection 4.8.3. Processing Buildings

Explosion venting

4.8.3.1. Except as provided in Article 4.8.4.2., where Class IA liquids or **unstable liquids** are processed within a room or a **building**, the room or **building** shall be designed to prevent critical structural and mechanical damage from an internal explosion in conformance with NFPA 68, “Guide for Venting of Deflagrations”.

Fire separations

4.8.3.2. Areas where **unstable liquids** are handled or where small-scale unit chemical processes are carried out shall be separated from the remainder of the **building** by a **fire separation** having a **fire-resistance rating** of not less than 2 h.

Basements and pits

4.8.3.3. (1) Except as permitted in Article 4.1.5.9., Class I liquids shall not be handled or used in **basements**.

(2) Where Class I liquids are handled or used above **grade** within existing **buildings** that have **basements** or covered pits into which flammable vapours can travel and accumulate, such below **grade** areas shall be provided with mechanical ventilation designed to prevent the accumulation of flammable vapours.

(3) The mechanical ventilation required in Sentence (2) shall be capable of exhausting at least 18 m³/h per square metre of the room area.

Ventilation

4.8.3.4. (1) Enclosed processing **buildings** handling **flammable liquids** or **combustible liquids** shall be ventilated as specified in Subsection 4.1.7.

(2) Equipment used in a **building** and the ventilation of the **building** shall be designed so as to limit flammable vapour-air mixtures under normal operating conditions to the interior of equipment, and to not more than 1.5 m from such equipment.

Subsection 4.8.4. Fire Prevention and Protection

Spill and vapour control

4.8.4.1. (1) Processing equipment shall be designed and arranged to

- (a) prevent the unintentional escape of liquids and vapours, and
- (b) minimize the quantity escaping in the event of accidental release.

(2) Measures to control spilled **flammable liquids** and **combustible liquids** shall be provided in conformance with Subsection 4.1.6.

Explosion protection

4.8.4.2. (1) Processing equipment where an explosion hazard is present shall be

- (a) designed to withstand the explosion pressure without damage to the equipment,
- (b) provided with explosion venting in conformance with NFPA 68, “Guide for Venting of Deflagrations”, or
- (c) provided with an explosion prevention system in conformance with NFPA 69, “Standard on Explosion Prevention Systems”.

Fire prevention and protection

4.8.4.3. (1) An evaluation of the fire and explosion risks shall be undertaken to consider the material properties, quantities, operating conditions, storage arrangement, transportation, process design, operating and maintenance procedures.

(2) The evaluation in Sentence (1) shall result in the identification of measures that will minimize fires and explosions from occurring and mitigate the effects of a fire or explosion should it occur.

(3) Measures identified in Sentence (2) shall be implemented in conformance with good engineering practices to prevent fires and explosions from occurring.

(4) Measures identified in Sentence (2) may include but are not limited to

- (a) fire detection and alarm,
 - (b) special fire suppression systems conforming to the standards identified in Sentences 6.8.1.1.(3) and (4),
 - (c) sprinkler system conforming to NFPA 13, “Standard for Installation of Sprinkler Systems”,
 - (d) a reliable water supply with pressure and flow rates capable of meeting the fire demands,
 - (e) standpipe and hose systems connected to a reliable water supply located such that vessels, pumps and other equipment containing **flammable liquids** or **combustible liquids** can be reached with at least one hose stream,
 - (f) combination nozzles capable of discharging a straight steam, water spray or fog,
 - (g) hydrants or monitor nozzles installed in accordance with NFPA 24, “Standard for the Installation of Private Fire Service Mains and their Appurtenances”,
 - (h) fire-proofing to protect essential equipment and controls,
 - (i) methods to effect an emergency shutdown of systems, and
 - (j) methods to protect equipment and structures from fire exposure.
- (5) The evaluation and measures shall be put in writing and kept in the **building** for review by the **Chief Fire Official**.

SECTION 4.9 DISTILLERIES

Subsection 4.9.1. Scope

Application

4.9.1.1. (1) This Section applies to those areas or **buildings** in **distilleries** where **distilled beverage alcohols** are concentrated, blended, mixed, stored or packaged.

(2) The storage, handling and use of **flammable liquids** or **combustible liquids**, other than **distilled beverage alcohols**, in a **distillery** shall conform to this Part.

(3) Where there is a conflict between the requirements of this Section and other requirements in this Part, this Section shall apply.

(4) Where there are conflicts between this Part and the regulations made under the **Excise Act (Canada)** with regard to security of the product and measurement methods, the **Excise Act (Canada)** shall apply.

Subsection 4.9.2. General

Building classification

4.9.2.1. (1) Except as provided in Sentence (2), **buildings** or parts thereof in which **distilled beverage alcohol** is distilled, processed or stored in bulk shall be classified as **high hazard industrial occupancies**.

(2) **Buildings** or parts thereof used for storage of **closed containers** of **distilled beverage alcohols** shall be classified as **medium hazard industrial occupancies**.

Subsection 4.9.3. Storage Tanks and Containers

Design, fabrication and testing

4.9.3.1. **Storage tanks**, wooden vats, barrels, drums or containers used for the storage or processing of **distilled beverage alcohols** shall be designed, fabricated and **tested** for the anticipated maximum working pressure, operating temperature, internal corrosion conditions and structural stresses to which they could be subjected.

Supports, foundations and anchorage

4.9.3.2. (1) Supports, foundations and anchorage of **storage tanks** shall comply with Subsection 4.3.3., except that timber supports shall be permitted.

(2) **Storage tank** supports having less than a 2 h **fire-resistance rating** shall be protected by an automatic fire suppression system conforming to an applicable standard set out in Article 6.8.1.1.

(3) The area underneath any **storage tank** greater than 1.2 m in diameter shall be protected by an automatic special fire suppression system conforming to an applicable standard set out in Article 6.8.1.1.

Storage tank vents

4.9.3.3. Normal and emergency vents shall be provided on **storage tanks** in conformance with good engineering practice.

Subsection 4.9.4. Storage

Storage tanks, drums and barrels

4.9.4.1. (1) Where more than 25000 L of **distilled beverage alcohol** in **storage tanks**, drums or barrels are stored inside **buildings**, such **buildings** shall be **sprinklered**.

(2) For **storage tank buildings** protected by automatic sprinklers in conformance with NFPA 13, “Standard for the Installation of Sprinkler Systems”, storage capacities shall not be limited.

Closed containers and storage aids

4.9.4.2. Storage of **closed containers** of **distilled beverage alcohols**, packaging materials and empty bottles, drums, barrels and pallets shall be in conformance with Part 3 in Division B of NRC, “National Fire Code of Canada 2005”.

Subsection 4.9.5. Piping and Pumping Systems

Design and installation

4.9.5.1. The design, fabrication, assembly and **inspection** of piping and pumping systems containing **distilled beverage alcohols** shall be suitable for the anticipated maximum working pressures, operating temperatures, internal corrosion conditions and structural stresses to which they could be subjected.

Subsection 4.9.6. Ventilation

Ventilation

4.9.6.1. (1) Natural or mechanical ventilation shall be provided for all areas where alcohol vapours are released from **storage tanks** or process equipment under normal operating conditions, to prevent the concentration of vapours from exceeding 25% of the **lower explosive limit**, measured 1.5 m from any equipment or from any opening subject to vapour release.

(2) Explosion venting as outlined in Sentence 4.2.9.6.(1) is only required in the distillation areas of a **distillery**.

Subsection 4.9.7. Spill Control

Spill control

4.9.7.1. Emergency drainage systems shall be provided to direct any spilled or leaked **distilled beverage alcohol** to a safe location.

Subsection 4.9.8. Fire Protection

Portable extinguishers

4.9.8.1. (1) Except as provided in Sentences (2) to (4), portable extinguishers shall be provided in conformance with Section 6.2.

(2) Except as permitted in Sentence (3), in maturing warehouses, at least one 4A:30B:C rated portable extinguisher shall be located adjacent to each **exit**.

(3) Hose stations complying with Article 6.2.6.6. are permitted to be installed in lieu of portable extinguishers at locations required in Sentence (2), and spaced so that the distance travelled to the nearest hose is not greater than 25 m.

(4) At least one portable extinguisher having a rating of 30B:C shall be located on each industrial lift truck.

Standpipe and hose systems

4.9.8.2. (1) Except as provided in Sentence (2), standpipe and hose systems shall be provided and installed in **distilleries** in accordance with the **Building Code**.

(2) Where a **building** is **sprinklered** in conformance with the **Building Code**, small hose (38 mm) stations are permitted to be supplied from interior sprinkler piping.

SECTION 4.10 RESERVED

SECTION 4.11 TANK VEHICLES

Subsection 4.11.1. Scope

Application

4.11.1.1. This Section applies to **tank vehicles** when located on a property to which this Code applies.

Subsection 4.11.2. General

Portable extinguishers

- 4.11.2.1. (1) A **tank vehicle** shall be provided with at least one portable extinguisher having a minimum rating of 80B:C.
 (2) Portable extinguishers on a **tank vehicle** shall be readily accessible.

Hot works

- 4.11.2.2. Hot works performed on or in close proximity to a **tank vehicle** shall conform to Section 5.17.

Parking inside buildings

- 4.11.2.3. (1) A **tank vehicle** shall not be parked inside a **building** unless
- (a) the **building** is specifically designed for that purpose,
 - (b) there is sufficient space in the **tank vehicle** compartment to accommodate the thermal expansion of the **flammable liquid** or **combustible liquid**, and
 - (c) the **tank vehicle** has no leaks of **flammable liquid** or **combustible liquid**.

Parking outside buildings

4.11.2.4. (1) Except as provided in Sentence (2), a **tank vehicle** is permitted to be left unattended by the vehicle operator outside a **building** for not more than 1 h.

(2) A **tank vehicle** is permitted to be left unattended by the vehicle operator outside a **building** for more than 1 h, but only in a parking space

- (a) that is located not less than 15 m from a **building**, and
- (b) where the **tank vehicle** is not exposed to undue hazard from accident or collision.

Subsection 4.11.3. Loading, Unloading and Dispensing from Tank Vehicles

Loading and unloading

4.11.3.1. Unless otherwise stated in this Subsection, the loading and unloading of **tank vehicles** shall be conducted in conformance with the applicable provisions in Subsection 4.6.4.

Ignition sources

4.11.3.2. During loading and unloading operations, a **tank vehicle** and its delivery equipment shall be separated from ignition sources by distances conforming to the requirements for dispensers in Articles 4.5.3.3. and 4.5.8.7.

Static electric charges

4.11.3.3. During loading and unloading of a **tank vehicle**, measures shall be taken against static electric charges in conformance with Articles 4.1.8.2. and 4.6.4.5.

Supervision

4.11.3.4. During loading and unloading of a **tank vehicle**, trained personnel shall be in a position to shut off the flow of liquid in an emergency.

Multi-use compartments

4.11.3.5. When a compartment of a **tank vehicle** has been used to carry a Class I liquid, the compartment, piping and accessory delivery equipment shall be drained of liquid before a Class II or IIIA liquid is loaded.

Engine

4.11.3.6. When loading or unloading of Class I liquids is done without the use of the engine of the **tank vehicle**, the engine ignition shall be shut off during the transfer operations.

Unloading

- 4.11.3.7. (1) Before a **tank vehicle** is unloaded, the volume of liquid in the receiving tank shall be measured to ensure that the tank can accept the volume to be unloaded.
- (2) If the vents of the receiving or delivery tank are obstructed, the transfer of liquid shall be stopped.
 - (3) A **tank vehicle** shall not be parked on a **street**, shoulder or sidewalk while unloading at a **fuel dispensing station**.

Dispensing into vehicles

4.11.3.8. (1) Dispensing Class I liquids into the fuel tank of vehicles directly from a **tank vehicle** shall not be permitted.

(2) Dispensing Class II or IIIA liquids into the fuel tank of vehicles directly from a **tank vehicle** having a capacity greater than 3000 L shall be permitted only if

- (a) the vehicles are located outdoors on a property where they are
 - (i) not less than 6 m away from any **building**, and
 - (ii) not exposed to undue hazard from accident or collision,
- (b) at least two portable extinguishers having a minimum rating of 80B:C are provided on the **tank vehicle**,
- (c) the delivery hoses and automatic closing hose nozzle valves used for the fuel dispensing operations conform to Subsection 4.5.5.,
- (d) the **tank vehicle** operator is given training and equipment for controlling any spillage that may occur during fuel dispensing, and
- (e) in cases where fuel dispensing operations are carried out at a site not conforming to Subsection 4.1.6., measures are in place to control a spill of not less than 1000 L.

SECTION 4.12 LABORATORIES

Subsection 4.12.1. Scope

Application

4.12.1.1. This Subsection applies to laboratories where **flammable liquids** and **combustible liquids** are used or handled.

Subsection 4.12.2. Separation

Separation

4.12.2.1. (1) A laboratory shall be separated from other parts of the **building** by a **fire separation** having a **fire-resistance rating** of not less than 1 h.

(2) Despite Sentence (1), an existing laboratory that has **fire separations** consisting of membranes of lath and plaster or gypsum board is deemed to be in compliance with Sentence (1).

Subsection 4.12.3. Maximum Quantities

Maximum quantities

4.12.3.1. (1) Except as provided in Article 4.2.6.4., containers used for the storage of **flammable liquids** or **combustible liquids** in a laboratory shall be of not more than 5 L capacity and shall conform to Subsection 4.2.3.

(2) Except as permitted in Sentence (3), not more than 300 L of **flammable liquids** and **combustible liquids**, of which not more than 50 L shall be **flammable liquids**, shall be permitted in the open area of a laboratory.

(3) Quantities in excess of those permitted in Sentence (2) shall be stored in cabinets conforming to Subsection 4.2.10. or in a room conforming to Subsection 4.2.9.

(4) Containers of **flammable liquids** or **combustible liquids** shall be kept closed when not in use.

Subsection 4.12.4. Emergency Planning

Fire safety plan

4.12.4.1. (1) Except as provided in Sentences (2) to (4), a laboratory shall conform with the requirements of Section 2.8.

(2) Fire drills required in Subsection 2.8.3. shall be held at intervals not greater than six months in laboratories.

(3) Personnel working in laboratories shall be trained in the safe handling of **flammable liquids** and **combustible liquids**.

(4) Measures shall be taken to prevent access to laboratories by unauthorized persons.

Subsection 4.12.5. Spill Control

Spill control

4.12.5.1. A written spill procedure shall be provided for laboratories in conformance with Article 4.1.6.4.

Subsection 4.12.6. Electrical Equipment

Electrical equipment

4.12.6.1. Electrical equipment shall conform with Subsection 4.1.4.

Subsection 4.12.7. Inspection and Maintenance

Inspection and maintenance

4.12.7.1. (1) Electrical equipment, mechanical systems, piping, valves and automatic and manual control and safety devices shall be **inspected** annually and maintained in good operating condition at all times.

(2) The ventilation systems serving a laboratory shall be **inspected** and cleaned as required to prevent the accumulation of combustible or reactive deposits, and the intervals between **inspections** shall be not greater than

- (a) 12 months for the ventilation systems of the open laboratory areas, and
- (b) six months for the ventilation system of a power-ventilated enclosure required in Article 4.12.8.2.

Subsection 4.12.8. Ventilation

Scope and application

4.12.8.1. (1) Ventilation systems shall conform to Subsection 4.1.7. and Articles 4.12.8.2. to 4.12.8.5.

(2) Despite Sentence (1), existing ventilation systems need not conform with Articles 4.1.7.3., 4.1.7.4. and 4.12.8.2. to 4.12.8.5.

(3) Existing ventilation systems where make-up air is provided are deemed to be in compliance with Article 4.1.7.5.

(4) Existing ventilation systems that maintain a negative pressure within the ventilation system with respect to the surroundings are deemed to be in compliance with Article 4.1.7.7.

Ventilation

4.12.8.2. (1) A laboratory shall be provided with continuous mechanical ventilation designed and maintained to ensure that flammable vapours

- (a) do not accumulate in the laboratory,
- (b) are prevented from migrating to other parts of the **building**,
- (c) do not accumulate in the ventilation system,
- (d) are exhausted to the outdoors, and
- (e) are not returned to the **building**.

(2) A ventilation system required in Sentence (1) shall be provided with monitoring devices to

- (a) indicate that the ventilation system is in operation, and
- (b) sound an alarm if the ventilation system malfunctions.

Power-ventilated enclosure

4.12.8.3. (1) The use and handling of **flammable liquids** or **combustible liquids** in a laboratory shall be confined inside a power-ventilated enclosure conforming to Articles 4.12.8.4. and 4.12.8.5. when

- (a) their use releases flammable vapours which could be potentially explosive,
- (b) liquids are heated to a temperature equal to or greater than their **flash point**, or
- (c) **unstable liquids** are used.

Enclosure exhaust ventilation

4.12.8.4. (1) The ventilation system for a power-ventilated enclosure required in Article 4.12.8.3. shall

- (a) conform to NFPA 91, “Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids”,
- (b) provide continuous exhaust ventilation at an air velocity sufficient to prevent the accumulation of explosive vapours or of combustible or reactive deposits in the power-ventilated enclosure and its exhaust duct system,
- (c) confine flammable vapours to the area where they are generated and exhaust them to the outdoors,
- (d) not return the exhausted air to the **building**, and
- (e) be provided with well identified control switches that are
 - (i) located outside of the power-ventilated enclosure, and
 - (ii) readily accessible in case of an emergency.

(2) Where deposits referred to in Clause (1)(b) can accumulate in the power-ventilated exhaust duct system and create a fire or explosion hazard,

- (a) provisions shall be made to remove such deposits so they do not create a fire or explosion hazard, or
- (b) an automatic special fire suppression system shall be provided in conformance with an applicable standard set out in Article 6.8.1.1.

Enclosure construction

4.12.8.5. (1) The power-ventilated enclosure required in Article 4.12.8.3. and its exhaust system shall

- (a) except as provided in Sentences (2) and (3), be constructed of noncombustible materials compatible with and chemically resistant to vapours being exhausted,
- (b) be provided with access doors to permit **inspection** and maintenance of the fan assembly and exhaust ducts,
- (c) be provided with instructions for its use and the operation of the ventilation system, and
- (d) be provided with means to control accidental spillage in conformance with Subsection 4.1.6.

(2) Combustible materials are permitted in systems described in Clause (1)(a) where

- (a) such materials are required by the corrosive or reactive properties of chemicals or liquids being used, and
- (b) their **flame-spread rating** is not more than 25.

(3) The **flame-spread rating** required in Sentence (2) is permitted to be greater than 25 if an automatic special fire suppression system conforming to an applicable standard set out in Article 6.8.1.1. is provided inside the power-ventilated enclosure and its exhaust duct system.

Subsection 4.12.9. Refrigerated Storage

Refrigerated storage

4.12.9.1. (1) Refrigerators described in Sentence 4.1.4.1.(2) shall be identified as containing **flammable liquids** or **combustible liquids**.

- (2) Class I liquids stored in refrigerators shall be kept in **closed containers**.

**PART 5
HAZARDOUS MATERIALS, PROCESSES AND OPERATIONS**

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SECTION 5.1 GENERAL

Subsection 5.1.1. Application

Application

5.1.1.1. This Part applies to materials, processes and operations that involve a risk from explosion or high flammability, or otherwise create a hazard to life safety or health.

Subsection 5.1.2. Means of Egress

Means of egress

5.1.2.1. Hazardous materials, processes and operations shall be located and the premises maintained so that the **means of egress** will not be obstructed in any manner that would interfere with evacuation of the **floor area** in the event of a fire.

Subsection 5.1.3. Electrical Installations

Electrical installations

5.1.3.1. Electrical installations shall conform to the **Electrical Safety Code** made under the **Electricity Act, 1998**.

Subsection 5.1.4. Ventilation

Ventilation requirements

5.1.4.1. Ventilation shall be provided for hazardous locations and processes in conformance with the **Building Code** and the requirements of this Part.

SECTION 5.2 EXPLOSIVES, FIREWORKS AND PYROTECHNICS

Subsection 5.2.1. Explosives

Storage, handling and use

5.2.1.1. The storage, handling and use of explosives, blasting agents, detonators, propellant explosives, pyrotechnics and ammunition shall be in conformance with the **Explosives Act (Canada)** and the **Explosives Regulations** made under it.

Fire emergency procedures

5.2.1.2. (1) Any person using, storing or handling explosives shall establish fire emergency procedures in conformance with Section 2.8 and that shall specify

- (a) the location and identification of storage and use areas,
- (b) methods to control a fire emergency safely and efficiently, and
- (c) the names, addresses and telephone numbers of persons to be contacted in case of fire during nonoperating hours.

Subsection 5.2.2. Fireworks and Pyrotechnics

Manufacture, storage, transportation and sale

5.2.2.1. The manufacture, storage, transportation and sale of fireworks and pyrotechnics shall be in conformance with the **Explosives Act (Canada)** and the **Explosives Regulations** made under it.

Handling and discharge

5.2.2.2. The handling and discharge of fireworks and pyrotechnics shall conform with the NRCan, "Display Fireworks Manual" and NRCan, "Pyrotechnics Special Effects Manual".

SECTION 5.3 MATCHES

Subsection 5.3.1. Storage

Labelling and packing

5.3.1.1. Matches shall be classified, packaged and labelled by the manufacturer as Class 4 Division 1, Flammable Solids, in conformance with the **Transportation of Dangerous Goods Act (Canada)**.

Storage compartment

5.3.1.2. Where the aggregate volume of piles of stored matches exceeds 3 m³, storage compartments shall be constructed in conformance with the requirements of the **Building Code** for **high hazard industrial occupancies**.

Carton pile arrangements

5.3.1.3. In storage areas regulated by Article 5.3.1.2., shipping cartons containing matches shall be arranged in piles not exceeding 3 m in height or 40 m³ in volume, and separated by aisles 2.4 m wide.

Mixed storage

5.3.1.4. In mixed storage areas, matches shall be stored in a specific area separated from the remainder of the storage by a clear space of 2.4 m.

Storage restrictions

5.3.1.5. Matches shall not be stored within 3 m of any elevator shaft opening, stairway or other vertical opening.

SECTION 5.4 CELLULOSE NITRATE PLASTICS

Subsection 5.4.1. Displays

Advertising displays

5.4.1.1. Displays of cellulose nitrate plastic articles in stores that are not in showcases or show windows shall be displayed only when placed on tables or counters not more than 1 m wide and 3 m long, and the spaces underneath the tables or counters shall be kept free of combustible materials.

Lighting fixtures

5.4.1.2. Lighting fixtures shall not be located adjacent to any cellulose nitrate plastic material so as to create a possible ignition hazard.

Subsection 5.4.2. Manufacture

Storage of raw materials

5.4.2.1. Raw materials used in the manufacture of cellulose nitrate plastics shall be stored only in areas reserved for that purpose.

Storage in cabinets

5.4.2.2. Not more than 450 kg of raw material used for the manufacture of finished cellulose nitrate plastic goods shall be stored in cabinets in any one workroom, not more than 225 kg stored in any one cabinet and not more than 112 kg in any one compartment of the cabinet.

Storage in vented vaults

5.4.2.3. Raw material in excess of that permitted in Article 5.4.2.2. shall be kept in vented vaults not exceeding 40 m³ capacity and protected with an automatic sprinkler system installed in conformance with NFPA 13, "Standard for the Installation of Sprinkler Systems".

Accumulation of materials in workrooms

5.4.2.4. In factories manufacturing articles of cellulose nitrate plastics, **sprinklered** and vented cabinets, vaults or storage rooms shall be provided to prevent the accumulation of excessive quantities of such material in workrooms.

Stationing of operators

5.4.2.5. In the workrooms of factories where cellulose nitrate plastics are being processed, operators shall be stationed not closer than 1 m apart.

Storage in work areas

5.4.2.6. Material for the manufacture of cellulose nitrate plastic articles that is not kept in containers may be placed on tables, workbenches or at machines provided the quantity does not exceed one day's supply.

Storage limitations in workrooms

5.4.2.7. The total amount of cellulose nitrate plastic materials, including the material in containers and on tables, in any one workroom shall not exceed 70 kg.

Waste material storage

5.4.2.8. Waste cellulose nitrate plastic materials such as shavings, chips, turnings, sawdust edgings and trimmings shall be kept under water in metal receptacles until removed from the premises.

Subsection 5.4.3. Storage of Finished Products

Ventilation

5.4.3.1. Areas where cellulose nitrate plastic finished products are stored shall be ventilated so that any decomposition gases produced by the plastics will be vented outdoors to an area where they will not re-enter the **building**.

Heating appliance restrictions

5.4.3.2. (1) Cellulose nitrate plastics shall not be stored

- (a) in rooms containing fuel-burning **appliances** or electrical heating elements, or
- (b) within 600 mm of any steam pipe, radiator or **chimney**.

Storage vaults

5.4.3.3. (1) Where cellulose nitrate plastics in excess of 11 kg are stored in any **fire compartment** in a **building**, a vented cabinet or vault constructed in conformance with NFPA 40E, “Code for the Storage of Pyroxylin Plastic”, and Articles 5.4.3.4. and 5.4.3.5. shall be provided for its storage.

- (2) Not more than 9000 kg of cellulose nitrate plastics shall be stored in any vault.

Storage up to 3400 kg

5.4.3.4. (1) Where quantities do not exceed 3400 kg, cellulose nitrate plastics shall be stored in a vault that

- (a) has a **fire-resistance rating** of 1.5 h,
- (b) is designed to resist an internal pressure of 3.5 kPa,
- (c) is not greater than 40 m³ in volume,
- (d) has explosion venting of 0.1 m² of venting area to the exterior for every cubic metre of vault volume, and
- (e) is ventilated to the exterior to provide 200 cm² of ventilating area for each cubic metre of vault volume.

Storage in excess of 3400 kg

5.4.3.5. (1) Where quantities exceed 3400 kg but do not exceed 9000 kg, cellulose nitrate plastics shall be stored in a vault that

- (a) has a 4 h **fire-resistance rating**,
- (b) is designed to resist an internal pressure of 28 kPa,
- (c) has explosion venting of 650 cm² of venting area to the exterior for every cubic metre of vault volume, and
- (d) is ventilated to the exterior to provide 200 cm² of ventilating area for each cubic metre of vault volume.

Subsection 5.4.4. Cellulose Nitrate Motion Picture Film

Restricted use

5.4.4.1. Cellulose nitrate motion picture film shall not be used, stored or handled in a place of public assembly.

Storage and handling

5.4.4.2. Cellulose nitrate motion picture film shall be stored and handled in conformance with NFPA 40, “Standard for the Storage and Handling of Cellulose Nitrate Motion Picture Film”.

Storage when not in use

5.4.4.3. When not in use, cellulose nitrate motion picture film shall be kept in closed, single-roll containers.

Subsection 5.4.5. Fire Protection

Sprinkler systems

5.4.5.1. The manufacture and storage of articles of cellulose nitrate plastic in quantities exceeding 45 kg shall be only in **buildings** equipped with a system of automatic sprinklers installed in conformance with NFPA 13, “Standard for the Installation of Sprinkler Systems”.

SECTION 5.5 RESERVED

SECTION 5.6 COMPRESSED GAS CYLINDERS

Subsection 5.6.1. General

Alternative protection measures

5.6.1.1. (1) A requirement of this Section is deemed to be complied with if alternative protection measures are **approved** that, in the opinion of the **Chief Fire Official**, will provide protection for life safety and health similar to the protection provided by compliance with the requirement.

(2) A proposal for alternative protection measures referred to in Sentence (1) shall bear the signature and seal of a **Professional Engineer** or **Architect**, or both.

(3) This Section does not apply to facilities at which **compressed gases** are manufactured or cylinders are filled or distributed if the storage and handling of the **compressed gases** is in conformance with

- (a) CGA P-1, “Safe Handling of Compressed Gases in Containers”,
- (b) NFPA 55, “Standard for the Storage, Use and Handling of Compressed and Liquefied Gases in Portable Cylinders”, or
- (c) a procedure that bears the signature and seal of a **Professional Engineer**.
- (4) Articles 5.6.2.1. to 5.6.2.4. do not apply where the amount of **compressed gas** stored does not exceed
 - (a) 25 kg of flammable **compressed gas**, or
 - (b) 150 kg of non-flammable **compressed gas**.
- (5) Despite Sentence (4), Articles 5.6.2.1. to 5.6.2.4. apply to any amount of poisonous or corrosive **compressed gas**.

Protection against mechanical damage

- 5.6.1.2. (1) Cylinders containing **compressed gas** shall be protected against mechanical damage.
- (2) Cylinders containing **compressed gas** shall be stored to hold them securely in place
 - (a) on **racks**,
 - (b) by nesting, or
 - (c) by **approved** methods or devices.

Acetylene cylinders

- 5.6.1.3. Except when being transported, acetylene cylinders shall be kept in an upright position.

Valve damage

- 5.6.1.4. Cylinders containing **compressed gas** which are in storage shall be protected against valve damage.

Temperature limitations

- 5.6.1.5. Cylinders containing **compressed gas** shall be stored in areas where the ambient air temperature does not exceed 52°C.

Ventilation

- 5.6.1.6. (1) Where cylinders containing **compressed gas** are stored indoors, the storage areas or rooms shall be
 - (a) dry, and
 - (b) ventilated in accordance with Sentence 5.6.2.4.(4).

Oxygen cylinders

- 5.6.1.7. Oil or grease shall not be used for the lubrication of valves or fittings on oxygen cylinders.

Subsection 5.6.2. Storage

Outdoor storage of cylinders

- 5.6.2.1. (1) Cylinders containing **compressed gases** stored outdoors shall be
 - (a) supported on raised concrete or other noncombustible platforms,
 - (b) located in an enclosure used for the sole purpose of such storage, and
 - (c) surrounded by a fence in conformance with Sentence 5.6.2.2.(1).
- (2) Where a canopy is provided to protect outdoor storage in Sentence (1), the canopy shall be of **noncombustible construction**.

Fencing

- 5.6.2.2. (1) Fencing required in Article 5.6.2.1. shall be
 - (a) firmly anchored and substantially constructed,
 - (b) designed to discourage climbing,
 - (c) not less than 1.8 m high,
 - (d) provided with gates that shall be locked when the storage area is not staffed, and
 - (e) kept clear of obstructions so that gates may be fully opened at all times.
- (2) An outdoor storage area that exceeds 100 m² and is used for storage of cylinders containing **compressed gas** shall be arranged such that there is a clear space of not less than

- (a) 30 m between stored products and brush or forested areas, and
- (b) 6 m between stored products and uncontrolled grass or weeds.

Clearances from building openings

5.6.2.3. (1) Cylinders containing **compressed gas** and located outdoors shall be

- (a) at least 1.5 m from any **building** opening if the aggregate capacity of expanded gas is not more than 170 m³,
 - (b) at least 7.5 m from any **building** opening if the aggregate capacity of expanded gas is over 170 m³ but not more than 500 m³, or
 - (c) at least 15 m from any **building** opening if the aggregate capacity of expanded gas is over 500 m³.
- (2) Sentence (1) does not apply if the **building** opening is into a room that conforms to Sentence 5.6.2.4.(1).

Indoor storage of flammable compressed gases

5.6.2.4. (1) Except as provided in Sentences (2), (3) and (5), cylinders containing flammable **compressed gas** stored indoors shall be located in a room that

- (a) is separated from the remainder of the **building** by a gas-tight **fire separation** having a **fire-resistance rating** of at least 2 h,
- (b) is located on an exterior wall of the **building**,
- (c) can be entered from the exterior, and any **closures** into the interior of the **building** shall be
 - (i) equipped with self-closing devices in such a manner that the **closures** are kept closed when not in use, and
 - (ii) constructed so as to prevent migration of gases from the room into other parts of the **building**,
- (d) is constructed so that an exterior wall provides explosion venting
 - (i) in the ratio of 0.2 m² for each cubic metre of room volume, or
 - (ii) in the ratio computed in accordance with NFPA 68, "Guide for Venting of Deflagrations", except in no case less than 650 cm² of vent area for each cubic metre of room volume,
- (e) has ventilation conforming to Sentence (4),
- (f) does not contain fuel-fired equipment or high temperature heating elements, and
- (g) is used for no purpose other than the storage of **compressed gas**.

(2) Cylinders of flammable, lighter than air **compressed gas** are permitted to be stored outside of a room described in Sentence (1) provided that the aggregate capacity per **fire compartment** of expanded gas outside of the room is not more than,

- (a) 60 m³ in a **building** of **combustible construction** that is not **sprinklered**, and
- (b) 170 m³ in a **sprinklered building** or in a **building** of **noncombustible construction**.

(3) Cylinders of flammable **compressed gas** which are heavier than air may be stored in rooms other than those described in Sentence (1) if they are stored in a **fire compartment** having a **fire-resistance rating** of at least 45 min and

- (a) the aggregate capacity does not exceed 100 kg,
- (b) the number of cylinders does not exceed three,
- (c) the cylinders are not located in the **basement** or other areas below **grade**, and
- (d) the **fire compartment** has ventilation conforming to Sentence (4).

(4) The ventilation required by Clauses (1)(e) and (3)(d) shall be

- (a) mechanical ventilation to the outside that ensures at least one air change per hour, or
- (b) natural ventilation to the outside through non-closeable louvred openings with
 - (i) at least one opening no more than 0.3 m from the ceiling and one opening no more than 0.3 m from the floor,
 - (ii) all openings at ceiling level having an aggregate free opening area of at least 0.2 m² per 100 m² of the **floor area**,
 - (iii) all openings at floor level having an aggregate free opening area of at least 0.2 m² per 100 m² of the **floor area**, and
 - (iv) the openings located to ensure cross ventilation.

(5) “ Single trip” non-refillable cylinders with water capacities of more than 375 g and less than 1.13 kg located within **mercantile occupancies** shall conform to the provisions stipulated in **Ontario Regulation 211/01 (Propane Storage and Handling)** made under the **Technical Standards and Safety Act, 2000**.

5.6.2.5. RESERVED

Poisonous compressed gas

5.6.2.6. Cylinders containing poisonous **compressed gas** shall not be stored in a room containing combustible or flammable material.

Reactive gases

5.6.2.7. (1) Except as provided in Sentences (2) and (3), cylinders containing **compressed gases** that may react with one another shall be stored in separate **fire compartments** separated by a **fire separation** having a **fire-resistance rating** of at least 1 h.

(2) Cylinders containing **compressed gases** that are lighter than air and that may react with each other may be stored in the same **fire compartment** if they are separated

- (a) by a distance of at least 7.5 m, or
- (b) by a concrete or masonry wall having a height of at least 2.0 m and projecting at least 1.0 m beyond the cylinders.

(3) Cylinders containing **compressed gases** that may react with each other and are heavier than air may be stored in the same **fire compartment** if they are separated

- (a) by a distance of at least 15 m, or
- (b) by a concrete or masonry wall having a height of at least 1.5 m, and projecting such that the minimum distance that vapour can travel between two cylinders of gases that may react with each other is not less than 15 m, measured horizontally.

Signs

5.6.2.8. Storage rooms shall have exterior signs with minimum 50 mm high letters indicating the nature of the **compressed gases**.

SECTION 5.7 RESERVED

SECTION 5.8 RESERVED

SECTION 5.9 RESERVED

SECTION 5.10 COMBUSTIBLE DUST PRODUCING PROCESSES

Subsection 5.10.1. Dust Collection

Mechanical exhaust systems

5.10.1.1. (1) This Section shall apply to **buildings**, parts of **buildings**, or equipment where **combustible dusts** are produced in quantities or concentrations that create an explosion or fire hazard.

(2) Machinery that produces, agitates or conveys **combustible dusts** shall have or be connected to a mechanical exhaust system to the outside atmosphere and dust-tight casings or enclosures.

Accumulations of combustible dusts

5.10.1.2. (1) **Building** and machinery surfaces shall be kept clean of accumulations of **combustible dusts** using cleaning equipment that

- (a) is made of materials that will not create electrostatic charges or sparks,
- (b) is electrically conductive and bonded to ground, and
- (c) except as permitted in Sentence (3), removes the dust to a safe location by vacuum.

(2) When used in atmospheres containing **combustible dusts**, the cleaning equipment required in Sentence (1) shall be **listed** and labelled for use in atmospheres containing **combustible dusts**.

(3) Where it is not possible to effectively remove dust by vacuum, it is permitted to use compressed air or other means which cause dust to be suspended in air during removal if, in the dust removal area,

- (a) all sources of ignition are eliminated, and
- (b) all machinery and equipment is de-energized, unless such equipment is **listed** and labelled for use in atmospheres containing **combustible dusts**.

Dust-collecting equipment

5.10.1.3. Dust-collecting systems shall be provided to prevent the accumulation of dust and keep suspended dusts at a safe concentration inside a **building**.

Construction of dust-collecting equipment

5.10.1.4. (1) Dust-collecting systems shall be made of noncombustible material.

(2) Dust-collecting systems shall be of a design which will prevent sparks due to physical contact in the fan assembly.

Location

5.10.1.5. (1) Except as provided in Sentences (2) and (5), a dust collector shall be located outside of a **building**.

(2) A dust collector is permitted to be located inside a **building** if it is

(a) provided with explosion venting to the outdoors in conformance with NFPA 68, “Guide for Venting and Deflagrations”,

(b) equipped with an automatic explosion prevention system, or

(c) located in a room

(i) with **fire separations** having a minimum 1 h **fire-resistance rating**,

(ii) provided with explosion venting to the outdoors, and

(iii) used solely for the housing of dust-collecting equipment.

(3) Except for dust collectors described in Sentence (5), when air exhausted by a dust collector is returned to a **building**, the dust-collecting system shall be designed so that

(a) returned air will not create an explosion hazard inside the **building**, and

(b) the exhaust fan and ancillary equipment are automatically shut down in the event of a fire or an explosion inside the dust collector.

(4) Existing explosion venting to the outdoors providing not less than 0.1 m² of vent area for each cubic metre of dust collector enclosure volume is deemed to be in compliance with Clause (2)(a).

(5) Sentences (1) and (2) do not apply to dust collectors having a capacity of less than 0.47 m³/s and used on wood working operations, except for wood flour manufacturing.

Grounding

5.10.1.6. Electrically-conducting parts of duct systems, dust collectors and the machines they serve shall be grounded.

Explosion venting

5.10.1.7. (1) Except as provided in Article 5.10.1.8., an activity that creates an explosive atmosphere of **combustible dusts** shall be located only in a **building** provided with explosion venting to the outdoors.

(2) When explosion venting is required in this Section, it shall be designed to prevent critical structural and mechanical damage to the **building** in conformance with NFPA 68, “Guide for Venting of Deflagrations”.

Explosion prevention system

5.10.1.8. (1) In processes where an explosion hazard is present and conditions exist that prevent adequate explosion venting as required in this Section, an explosion prevention system shall be provided.

(2) When an explosion prevention system is required in this Section, it shall be designed in conformance with NFPA 69, “Standard on Explosion Prevention Systems”.

Interlocks

5.10.1.9. Equipment required to have a dust-collecting system shall be interlocked to prevent it from operating if the dust-collecting system is not in operation.

Air velocity

5.10.1.10. Dust-collecting systems shall be designed for an air velocity in the ducts of at least 1068 m/min.

Vent stacks

5.10.1.11. (1) Permanently open vent stacks may be used to ventilate storage containers where mechanical dust-collecting systems are not practical, provided that the vent stacks

(a) have a cross-sectional area not less than twice that of spouts discharging into the container,

- (b) are installed not more than 30 degrees from the vertical,
- (c) extend from the top of the container to a point not less than 1.2 m above the roof, and
- (d) are designed to prevent the entry of snow and rain.

Separators

5.10.1.12. Magnetic or pneumatic separators shall be installed to prevent the entrance of foreign materials that may cause sparks in equipment such as shellers, crackers, crushers, grinding machines, pulverizers or similar machines that produce **combustible dusts**.

Grounding

5.10.1.13. Machinery and metal parts of the equipment in Article 5.10.1.12. and related conveying systems shall be electrically grounded.

Ignition sources prohibited

5.10.1.14. Smoking, open flame and spark-producing equipment shall not be allowed in areas containing **combustible dust** producing operations.

SECTION 5.11 COMBUSTIBLE FIBRES

Subsection 5.11.1. Storage

Building sizes

5.11.1.1. **Buildings** used for the storage and handling of baled **combustible fibres** shall comply with the height and area limitations of the **Building Code** for **medium hazard industrial occupancies**.

Loose fibre storage

5.11.1.2. (1) Up to 3 m³ of loose **combustible fibres** are permitted to be kept in a **fire compartment** provided they are stored in metal-lined bins equipped with self-closing metal-lined covers.

(2) Quantities of loose **combustible fibres** exceeding 3 m³ but not exceeding 15 m³ shall be stored in rooms separated from the remainder of the **building** by a **fire separation** having a **fire-resistance rating** of not less than 1 h.

(3) Quantities of loose **combustible fibres** exceeding 15 m³ but not exceeding 30 m³ shall be stored in rooms separated from the remainder of the **building** by a **fire separation** having a **fire-resistance rating** of not less than 2 h.

(4) Quantities of loose **combustible fibres** that exceed 30 m³ shall be stored in an individual room that is

- (a) **sprinklered**, and
- (b) separated from the remainder of the **building** by a **fire separation** having a **fire-resistance rating** of not less than 2 h.
- (5) The **individual storage areas** for **combustible fibres** described in Sentence (4) shall not exceed 250 m².

Baled fibre storage

5.11.1.3. (1) Baled **combustible fibres** shall be stored so that

- (a) a single pile will not contain more than 700 m³,
- (b) the maximum height of any single pile will not exceed 4.5 m,
- (c) piles are separated by aisles not less than 1.5 m wide, and
- (d) the clearance between piles and **building** walls is not less than 1 m.

Baled storage piles

5.11.1.4. The sides of baled storage piles shall be inclined back from the base of the pile with a slope of not less than 1 m for each 10 m of height.

Clearance to sprinklers and structural framing

5.11.1.5. (1) The clearance between sprinkler head deflectors and the tops of piles shall not be less than 457 mm.

(2) Where the storage piles are above the lower chords of floor or roof structural framing members, a horizontal clear space of 300 mm shall be maintained between the storage and the structural members.

Heating equipment

5.11.1.6. (1) Unless controlled in a manner that will not create a fire or explosion hazard, fuel-fired **appliances** and electrical heating elements shall not be permitted in a storage area for **combustible fibres**.

(2) Shields shall be provided that will prevent stored material from coming within 300 mm of any part of a heating system heat distribution network.

Subsection 5.11.2. Fire Protection

Standpipe and hose system installations

5.11.2.1. **Combustible fibres** shall be stored only in warehouses which are protected by standpipe and hose systems installed in conformance with the **Building Code**.

Portable extinguishers

5.11.2.2. Portable extinguishers shall be provided in conformance with Section 6.2.

Smoke vents

5.11.2.3. Where **combustible fibres** are stored in **buildings**, automatic smoke venting hatches manually operable from remote locations and having a combined opening area of 64 cm² for each square metre of **floor area** shall be provided.

SECTION 5.12 SPRAY APPLICATIONS USING FLAMMABLE AND COMBUSTIBLE MATERIALS

Subsection 5.12.1. Location

Separation for spray operations

5.12.1.1. Spray operations shall be separated from the remainder of the **building** in conformance with the **Building Code**, where applicable.

Subsection 5.12.2. Construction

General

5.12.2.1. (1) A **spray booth** shall consist of a steel frame covered with sheet steel having a minimum thickness of 1.14 mm, or be of equivalent **noncombustible construction**.

(2) The interior surfaces of a **spray booth** shall be smooth and continuous.

(3) The floor of a **spray booth** and the operator's working area shall be of noncombustible materials.

Baffle plates

5.12.2.2. (1) **Spray booth** baffle plates shall be of noncombustible material and be removable or arranged to facilitate cleaning.

(2) **Spray booth** baffle plates shall not be located in exhaust ducts.

Overspray collection

5.12.2.3. (1) A **spray booth** shall be provided with overspray collection, such as filters or water wash, to prevent build-up of combustible deposits on the exhaust fan and ductwork.

(2) Where filters are used as for overspray collection, supports and holders for the filters shall be constructed of noncombustible materials.

(3) Overspray collection filters shall be readily removable or accessible for cleaning or replacement.

(4) Filters shall not be alternately used for different types of coating materials if the combination of materials might result in spontaneous heating or ignition.

(5) Maintenance procedures shall be established to ensure that overspray collection filters are replaced before excessive restriction to airflow occurs.

(6) Overspray collectors shall be inspected after each period of use and clogged filters shall be discarded and replaced.

(7) Water-wash collection shall be used when applying materials known to be highly susceptible to spontaneous heating or spontaneous ignition.

Fan blades and casings

5.12.2.4. Fan blades and casings in exhaust blowers for **spray booths** shall be non-ferrous, or the fan shall be constructed so that a movement of the wheel or shaft will not permit two ferrous parts of the fan to rub or strike together.

Subsection 5.12.3. Ventilation

Ventilation

5.12.3.1. (1) Ventilation shall be provided in all **spraying areas** to maintain

(a) the concentration of flammable vapours at or below 25% of their **lower explosive limit**, and

- (b) the concentration of **combustible dusts** at or below 50% of their **minimum explosible concentration** or 15g/m³ when the **minimum explosible concentration** cannot be established.

Exhaust for spray booths

5.12.3.2. Except as provided in Article 5.12.3.3., the exhaust air velocity at the face of the **spray booth** shall be at least 30 m/min.

Exhaust for electrostatic spraying

5.12.3.3. Electrostatic spraying shall have an exhaust air velocity of at least 18 m/min at the face of the **spray booth**.

Combined ducting

5.12.3.4. A separate exhaust duct shall be provided for each **spray booth**, except that a common duct may be used if it serves **spray booths** having a combined open frontal area of not more than 1.8 m².

Exhaust air

5.12.3.5. Air exhausted from spray operations shall not be recirculated, except where recirculation is acceptable, as described in NFPA 33, "Standard for Spray Application Using Flammable or Combustible Materials".

Monitoring air velocity

5.12.3.6. (1) Gauges or alarms that indicate when the air velocity is less than the air velocity required by Article 5.12.3.2. or 5.12.3.3. shall be installed for **spray booths**.

(2) When the gauge or alarm indicates that the air velocity is less than that required by Article 5.12.3.2. or 5.12.3.3., immediate corrective action shall be taken to remedy the condition that has resulted in the reduction of the ventilation.

Subsection 5.12.4. Exhaust Ducts

Duct support and construction

5.12.4.1. Exhaust ducts for **spray booths** shall be securely supported and constructed of sheet steel in conformance with Table 5.12.4.A.

TABLE 5.12.4.A.

Forming Part of Article 5.12.4.1.

Maximum Dimension of Duct	Minimum Thickness of Sheet Steel, mm
Up to 200 mm incl.	0.56
Over 200 mm to 450 mm incl.	0.69
Over 450 mm to 750 mm incl.	0.86
Over 750 mm	1.14

Clearances

5.12.4.2. Except as provided in Article 5.12.4.3., a clearance of 457 mm shall be maintained between ducts venting **spray booths** and unprotected combustible material.

Collars

5.12.4.3. (1) Where exhaust ducts pass through combustible roofs or **partitions**, metal collars shall provide not less than a 100 mm clearance between the duct and combustible material.

(2) The space between the duct and combustible material shall be sealed with noncombustible insulating material.

Access doors

5.12.4.4. Exhaust ducts for **spray booths** shall be provided with access doors for cleaning purposes.

Exhaust outlet locations

5.12.4.5. (1) Except for water-wash types, the exhaust outlet to atmosphere from **spray booths** shall

(a) be 1.8 m from any combustible exterior wall or roof, and

(b) be located so that the air does not discharge toward any combustible surface or unprotected opening within 7.5 m.

Subsection 5.12.5. Electrical Equipment

Electrical equipment

5.12.5.1. Electrical equipment within the **spraying area**, including lighting fixtures, shall conform to Part 1, Sections 18 and 20 of the **Electrical Safety Code** made under the **Electricity Act, 1998**.

Motors for exhaust fans

5.12.5.2. Electric motors for exhaust fans shall not be placed inside **spray booths** or ducts.

Grounding

5.12.5.3. Metal parts of **spray booths**, exhaust ducts and piping systems conveying **flammable liquids** or **combustible liquids** shall be electrically grounded.

Subsection 5.12.6. Flammable Liquids and Combustible Liquids

Storage and handling

5.12.6.1. **Flammable liquids** and **combustible liquids** for use in **spraying areas** shall be stored and handled in conformance with Part 4, and at no time shall the amount of **flammable liquids** and **combustible liquids** in the **spraying areas** exceed one day's supply.

Paint storage

5.12.6.2. **Flammable liquids** and **combustible liquids** shall be kept in **closed containers** when not in use.

Thinners and solvents

5.12.6.3. Thinners and solvents shall be dispensed only from **listed** and labelled safety cans.

Pump discharge relief valves

5.12.6.4. Where **flammable liquids** are supplied to spray nozzles by positive displacement pumps, the pump discharge line shall be provided with a suitable relief valve discharging to the pump suction or to a safe remote location.

Subsection 5.12.7. Control of Fire Hazards

Interlocks

5.12.7.1. The spraying equipment for a **spray booth** shall be interlocked to shut down in the event of failure of the ventilation system, failure of the circulating water pump of a water-wash system or failure of the filter roll-down mechanism of a dry **spray booth**.

Cleaning and residue disposal

5.12.7.2. (1) The inner surface of **spray booths** shall be cleaned of combustible residue as often as necessary to prevent a fire hazard.

(2) Combustible residue from cleaning operations shall, on the same day as the cleaning operations, be removed from the premises or placed in receptacles conforming to Sentence 2.4.1.3.(3).

Filter pads and rolls

5.12.7.3. Discarded filter pads and filter rolls shall be removed to a safe location or placed in a water-filled metal container and disposed of after each day's operation.

Filters prohibited

5.12.7.4. A water-wash **spray booth** shall be used when applying spray material that is susceptible to spontaneous heating.

Heating equipment

5.12.7.5. **Space-heating appliances**, steam pipes and other hot surfaces shall not be located in an area subject to accumulation of deposits of combustible residue from spray-coating operations.

Ignition sources

5.12.7.6. Open flame or spark producing devices shall not be used within a **spraying area**, unless separated therefrom by a vapour-tight **fire separation** having a 1 h **fire-resistance rating**.

Subsection 5.12.8. Fire Protection Equipment

Portable extinguishers

5.12.8.1. Portable extinguishers shall be installed near **spraying areas** in conformance with Section 6.2.

Sprinkler installations

5.12.8.2. (1) Except as permitted in Sentences (2) and (3), automatic sprinkler protection shall be provided in each **spraying area, spray booth and spray room** in conformance with NFPA 13, “Standard for the Installation of Sprinkler Systems”.

(2) Where spraying operations are confined within a **spray booth**, fire protection may be provided for the **spray booth** only, in conformance with NFPA 33, “Standard for Spray Application Using Flammable or Combustible Materials”.

(3) This Article does not apply where the existing situation is **approved** and does not endanger life safety, or **approved** alternative measures to the requirements set out in this Article are taken to provide life safety.

Sprinkler head protection

5.12.8.3. (1) Sprinkler heads in **spray booths** shall be protected with lightweight paper or thin polyethylene bags.

(2) Bags protecting sprinkler heads shall be replaced before they have accumulated excessive deposits.

Subsection 5.12.9. Drying Operations

Spray booths used for drying

5.12.9.1. Except as permitted in Article 5.12.9.4., **spray booths, spray rooms** or other enclosures used for spraying operations shall not be used for drying by any arrangement that could cause an increase in the surface temperatures of the **spray booths, spray rooms** or other enclosures.

Location of equipment

5.12.9.2. Except as provided in Articles 5.12.9.3. and 5.12.9.4., drying or curing equipment that utilizes components capable of producing ignition, such as an open flame, a spark, or a hot surface, shall not be installed in or near a **spraying area**.

Location near spraying area

5.12.9.3. (1) Equipment described in Article 5.12.9.2. may be installed in an area adjacent to the **spraying area** provided the adjacent area is equipped with a ventilating system arranged to

- (a) purge the drying space before the heating system can be started,
- (b) maintain the atmosphere at any source of ignition at or below 25% of the **lower explosive limit** of any combustible or flammable materials in use, and
- (c) automatically shut down the heating system in the event of failure of the ventilating system.

Spray booths used for drying

5.12.9.4. (1) **Spray booths** may be used for drying operations where

- (a) the **spray booth** conforms to the appropriate requirements for drying ovens in Section 5.18,
- (b) the interior of the enclosure is kept reasonably free of overspray deposits,
- (c) portable drying apparatus, if used, is of the infrared type, and such apparatus, wiring and connections are removed from the enclosure during spraying operations, and
- (d) interlocks are installed to
 - (i) prevent the use of spraying apparatus while the drying operation is taking place,
 - (ii) provide for the purging of the enclosure of spray vapours for a minimum of 3 min before the drying apparatus can be energized,
 - (iii) ensure that the ventilating system maintains the concentration of flammable vapours at or below 25% of the **lower explosive limit** within the enclosure during the drying process, and
 - (iv) ensure that the drying apparatus will automatically shut off in the event of failure of the ventilating system.

SECTION 5.13 DIP TANKS

Subsection 5.13.1. Location

Room design

5.13.1.1. Dip tank operations involving **flammable liquids** or **combustible liquids** where the quantity exceeds 45 L or the liquid surface area exceeds 0.42 m² shall be conducted in a room designed for that purpose and separated from the remainder of the **building** by a **fire separation** having a 2 h **fire-resistance rating**.

Prohibition for basements

5.13.1.2. Dip tanks shall not be located in **basements**.

Subsection 5.13.2. Construction

Floors

5.13.2.1. The floor of any room where dip tanks are located shall be made liquid-tight with material that is impervious to the liquid in the tank, have permanent curbs and be drained to a place of safe discharge.

Materials

5.13.2.2. (1) Dip tanks and drain boards shall be constructed of noncombustible material with steel, reinforced concrete or masonry supports.

(2) Drain boards shall be arranged to drain back to the dip tank.

Height above floor

5.13.2.3. The top of a dip tank shall not be less than 150 mm above the floor of the room in which it is located.

Cover construction

5.13.2.4. Dip tank covers as required in Articles 5.13.6.2. and 5.13.6.3. shall be of noncombustible materials.

Cover design

5.13.2.5. Dip tank covers shall overlap the sides of the tank by 25 mm and shall have a recess or flange extending down around the tank.

Cover maintenance

5.13.2.6. Dip tank covers shall be maintained in good operating condition.

Subsection 5.13.3. Overflow and Drain Pipes

Liquid levels

5.13.3.1. The liquid level in a dip tank shall be kept not less than 150 mm below the top of the tank.

Overflow pipes

5.13.3.2. Dip tanks having a capacity in excess of 550 L or having a liquid surface area in excess of 1 m² shall be equipped with a properly trapped overflow pipe that leads to a safe location outside the **building** or to a closed, vented salvage tank conforming to Subsection 5.13.4.

Location of overflow

5.13.3.3. The centre line of the overflow connection to a dip tank shall be 150 mm below the top of the tank.

Overflow size

5.13.3.4. Overflow pipe sizes for dip tanks shall conform to Table 5.13.3.A.

TABLE 5.13.3.A.

Forming Part of Article 5.13.3.4.

Size of Tank, L	Overflow Pipe Size Required, mm
0 - 46	50
47 - 160	65
161 - 350	75
351 - 700	100
701 - 1025	125
1026 - 1500	150
1501 and over	200

Overflow connection

5.13.3.5. Overflow pipes shall be connected to dip tanks by a flared outlet.

Piping connections

5.13.3.6. Piping connections for drains and overflow lines shall be designed so as to allow for easy access to their interiors for cleaning purposes.

Bottom drains

5.13.3.7. Dip tanks of over 2300 L liquid capacity shall be equipped with bottom drains capable of being operated both automatically and manually to drain the tank quickly in the event of fire.

Salvage tank

5.13.3.8. Bottom drains from dip tanks shall be trapped and shall discharge to a closed, vented salvage tank.

Drain size

5.13.3.9. Bottom drain sizes for dip tanks shall conform to Table 5.13.3.B.

TABLE 5.13.3.B.

Forming Part of Article 5.13.3.9.

Capacity of Dip Tank, L	Diameter of Bottom Drain Pipe, mm
2300 - 3425	75
3426 - 4550	100
4551 - 11500	125
11501 - 18250	150
18251 and over	200

Manual operation of bottom drains

5.13.3.10. Manual operation of bottom drains shall be from an accessible location not affected by a fire in or around the dip tank.

Automatic pumps

5.13.3.11. Where gravity flow is not practical, automatic pumps shall be installed on drain lines from dip tanks.

Pump for salvage tank

5.13.3.12. Where salvage tanks are used, pumping arrangements shall be provided for the transfer of their contents for disposal.

Subsection 5.13.4. Salvage Tanks

Use

5.13.4.1. Salvage tanks shall be used only for temporary storage purposes.

Capacity

5.13.4.2. The capacity of a salvage tank shall be 20% greater than the capacity of the dip tank or tanks to which it is connected.

Location

5.13.4.3. Salvage tanks shall be located underground outside the **building**, or inside a **building** in an enclosure separated from the remainder of the **building** by a **fire separation** having a **fire-resistance rating** of not less than 2 h.

Subsection 5.13.5. Control of Fire Hazards

Ventilation

5.13.5.1. Ventilation shall be provided to confine all flammable vapour concentrations exceeding 25% of the **lower explosive limit** to within 600 mm of the dip tank, drain board and freshly coated work.

Interlock for dipping conveyer

5.13.5.2. Ventilating systems shall be arranged so that the failure of any ventilation fan as sensed by air flow will automatically stop the dipping conveyer systems and sound an alarm.

Interlock for heating

5.13.5.3. The heating system used in drying operations shall be interlocked so that it cannot be started until the associated ventilation system is in operation.

Conveyer systems

5.13.5.4. Conveyer systems utilized in conjunction with dip tanks shall be designed to stop automatically with the actuation of an automatic fixed extinguishing system or a manual fire alarm.

Purging interlocks

5.13.5.5. Where there is a possible source of ignition in a drying operation, interlocks shall be installed to provide for purging before the heating system can be started and for automatic shutdown if the ventilation system should fail.

Electrical installations

5.13.5.6. Where **flammable liquids** and **combustible liquids** contained in dip tanks are heated or have a **flash point** below 43°C, the electrical installation shall conform to the **Electrical Safety Code** made under the **Electricity Act, 1998**.

Flammable and combustible liquids

5.13.5.7. (1) The storage and handling of **flammable liquids** and **combustible liquids** shall be in conformance with Part 4.

(2) The total number of containers for **flammable liquids** and **combustible liquids** in a dip tank area shall not exceed that required for one day's operations.

Ignition sources

5.13.5.8. Smoking, open flames, spark-producing devices and heated surfaces having a temperature sufficient to ignite vapours shall not be permitted in the vapour area of a dip tank.

Signs prohibiting smoking

5.13.5.9. Signs that prohibit smoking and that conform to Article 2.4.3.2. shall be posted conspicuously in the vicinity of dip tanks.

Subsection 5.13.6. Fire Protection

Automatic sprinklers

5.13.6.1. Dip tanks shall be located only in rooms protected by an automatic sprinkler system installed in conformance with NFPA 13, "Standard for the Installation of Sprinkler Systems".

Tank covers and extinguishing systems

5.13.6.2. (1) Dip tanks with over 550 L capacity or with over 1 m² liquid surface area shall be protected by

- (a) a cover actuated by a device that
 - (i) automatically closes the cover in the event of a fire, and
 - (ii) permits manual operation of the cover, or
- (b) an **approved** automatic extinguishing system of a water spray, foam, carbon dioxide or dry chemical type.

Flammable liquids or combustible liquids

5.13.6.3. Dip tanks containing either a **flammable liquid** or **combustible liquid** with a **flash point** less than 43°C or a heated **combustible liquid** giving off flammable vapours shall conform to Article 5.13.6.2. when the capacity exceeds 45 L or when the liquid surface area exceeds 0.4 m².

Portable extinguishers

5.13.6.4. Areas in the vicinity of dip tanks shall be provided with portable extinguishers in conformance with Section 6.2.

SECTION 5.14 SPECIAL PROCESSES INVOLVING FLAMMABLE AND COMBUSTIBLE MATERIALS

Subsection 5.14.1. Quench Tanks

Location

- 5.14.1.1. (1) Quench tanks shall be located as far as practical from annealing, hardening and tempering **furnaces**.
- (2) Quench tanks shall not be located on or near combustible floors.

Hoods and vents

5.14.1.2. Quench tanks shall be provided with a noncombustible hood and vent exhausting to the outside to prevent the accumulation and condensation of vapours from the process.

Vent design

5.14.1.3. Vents for quench tanks shall conform to the requirements for **flue pipes** in Section 2.6.

High temperature limit switches

5.14.1.4. (1) A high temperature limit switch shall be provided to sound an alarm, shut off heat and stop conveyors when a **flammable liquid** or **combustible liquid** reaches 28°C below its **flash point** in a quench tank.

(2) The temperature-sensing element for the high temperature limit switch in Sentence (1) shall be located close to the surface of the liquid and be protected from damage.

Electrical installations

5.14.1.5. Electrical installations conforming to the requirements for dip tanks in Article 5.13.5.6. shall be provided for quench tanks of over 1900 L capacity whose liquid surface area exceeds 2.5 m².

Air pressure

5.14.1.6. Air under pressure shall not be used to fill or agitate oil in quench tanks.

Working temperatures

5.14.1.7. A quench tank shall be designed so that the maximum workload is incapable of raising the working temperature of the cooling medium to within 28°C of its **flash point**.

Subsection 5.14.2. Flow-Coating Operations

Application of dip tank requirements

5.14.2.1. (1) The requirements in Section 5.13 for dip tanks shall also apply to flow-coating operations.

(2) The sump area and any area on which coating liquid flows shall be considered as the dip tank area and shall conform to the applicable provisions in Section 5.13.

Mechanical ventilation

5.14.2.2. Mechanical ventilation shall be provided at the rate of 63 m³ of fresh air per litre of solvent used.

Vapour concentration

5.14.2.3. Ventilation shall be arranged so that the flammable vapour concentration exceeding 25% of the **lower explosive limit** will be confined to within 600 mm of the paint stream and drain area, freshly coated work and the drip tunnel bottom.

Interlocks

5.14.2.4. The ventilation system required in Articles 5.14.2.2. and 5.14.2.3. shall be interlocked to shut off the coating liquid supply whenever ventilation fans are shut down.

Supply

5.14.2.5. (1) **Flammable liquids** or **combustible liquids** shall be supplied by

- (a) direct low pressure pumping arranged to shut down automatically by means of **listed** and labelled devices in the event of fire, or
- (b) a gravity tank not exceeding 45 L in capacity.

Subsection 5.14.3. Roll-Coating Processes

Application of dip tank requirements

5.14.3.1. Section 5.13 shall apply to coating operations where **flammable liquids** or **combustible liquids** are applied to products or materials by bringing them into contact with a roller that is coated with the coating liquid.

Grounding

5.14.3.2. (1) Rotating parts shall be grounded.

(2) Static collectors shall be installed where the material being coated leaves each rotating part.

Location

5.14.3.3. Operations involving materials that have been freshly coated with a liquid containing solvents having a **flash point** less than 43°C shall be located in **sprinklered** rooms that are separated from other **occupancies** by **fire separations** having a 2 h **fire-resistance rating**.

Subsection 5.14.4. Electrostatic Spraying and Detearing Equipment

Equipment location

5.14.4.1. (1) Electrical components, including transformers, power packs and control equipment for electrostatic spray applications or for the electrostatic removal of excess coating material (detearing), shall be located in an area where the vapour concentration of **flammable liquids** or **combustible liquids** cannot exceed 25% of the **lower explosive limit**.

(2) Sentence (1) does not apply to high voltage grids and their connections.

Interlocks

5.14.4.2. (1) Electrostatic spraying and detearing equipment shall be provided with automatic controls that will operate without a time delay to disconnect power to high voltage transformers and to signal the operator when

- (a) stoppage of the air supply, ventilating fan or conveyor system occurs,
- (b) there is a ground at any point on the high voltage system, or
- (c) clearances are reduced below those specified in Article 5.14.4.4.

Insulators

5.14.4.3. Insulators shall be kept clean and dry.

Clearances

5.14.4.4. (1) A space equivalent to twice the sparking distance shall be maintained between articles being painted or deteared and electrodes or conductors.

(2) A sign shall be conspicuously posted near an electrical assembly stating the maximum sparking distance.

Drip plates and screens

5.14.4.5. Drip plates and screens subject to paint deposits shall be removable for cleaning.

Insulating and grounding

5.14.4.6. High voltage components, including atomizing heads, shall be insulated and protected against mechanical damage and accidental contact or grounding.

Automatic grounding

5.14.4.7. An automatic means shall be provided for grounding the electrode system when it is de-energized.

Operating distances

5.14.4.8. Items being electrostatically sprayed shall not be held by hand nor suspended in such a manner as to reduce the proper operating distance from the atomizing heads.

Distance to processing areas

5.14.4.9. Electrostatic spraying equipment shall be located 1.5 m from processing equipment and isolated from other areas by grounded guards and fences of conducting material.

Surface temperatures

5.14.4.10. The surface temperature of equipment in a **spraying area** shall not exceed 66°C.

Precautions against shock

5.14.4.11. High voltage circuits shall be designed so that any discharge occurring will not ignite vapour-air mixtures or create a shock hazard.

Spray gun energy supply

5.14.4.12. The energy supply to hand spray guns shall be controlled by a switch that also controls the coating material supply.

Spray gun operation

5.14.4.13. Spray gun handles shall be grounded and have a metallic connection that is in direct contact with the operator's hand during spraying.

Grounding

5.14.4.14. All electrically conductive objects in the **spraying area** shall be grounded, and a sign shall be posted indicating the need for such grounding.

Paint accumulations

5.14.4.15. Hooks and other supports for sprayed items shall be kept clean and free of paint.

Warning signs

5.14.4.16. Signs designating the **spraying area** as dangerous shall be conspicuously posted.

Fixed extinguishing equipment

5.14.4.17. **Spraying areas** shall be located in rooms protected by **listed** and labelled automatic fixed extinguishing equipment.

Subsection 5.14.5. Automobile Undercoating

Spray operations

5.14.5.1. Automobile undercoating spray operations shall conform to the requirements of Section 5.12 or to the requirements in this Subsection.

Undercoating materials

5.14.5.2. (1) Automobile undercoating materials shall have a **flash point** of not less than 37.8°C.

(2) Where the **flash point** of an automobile undercoating is less than 60°C, it shall be applied in a work area where

- (a) there are no work pits,
- (b) there is a fan, that provides mechanical ventilation during the application, cleaning and drying cycles,
 - (i) with nonferrous blades, or so constructed that a movement of the wheel or shaft will not permit two ferrous parts of the fan to rub or strike, and
 - (ii) that ensures that the concentration of vapour does not exceed 25% of the **lower explosive limit**,
- (c) air movement from the air intake and exhaust system is along the length of the vehicle being undercoated, and
- (d) air is exhausted at a level approximately 1 m above the floor.

Ignition sources

5.14.5.3. (1) Work stations in Article 5.14.5.2. shall have no source of ignition located within 6 m horizontally of the work area or in the area above it.

(2) Signs prohibiting smoking that conform to Article 2.4.3.2. shall be posted at the outer limits of the work area.

Electrical installations

5.14.5.4. Except for overhead lighting that is totally enclosed and sealed with gaskets, electrical wiring and equipment within the area of hazard described in Article 5.14.5.3. shall conform to Article 5.1.3.1.

Storage and handling

5.14.5.5. The storage and handling of **flammable liquids** and **combustible liquids** shall be in conformance with Part 4.

Portable extinguishers

5.14.5.6. Portable extinguishers shall be located so that there is one portable extinguisher having a 20B:C rating immediately accessible to each work station described in Article 5.14.5.2.

Refuse disposal

5.14.5.7. All areas where automobile undercoating is used shall be kept clean of undercoating deposits and refuse, which shall be placed in covered metal receptacles.

Subsection 5.14.6. Dry Powder Finishing

Application and location

5.14.6.1. (1) This Subsection shall apply to coating operations involving the use of combustible dry powders applied by powder spray guns, electrostatic powder spray guns, fluidized beds or electrostatic fluidized beds.

(2) Coating operations referred to in Sentence (1) shall be performed in

- (a) ventilated, enclosed, powder-coating rooms of **noncombustible construction**, or
- (b) **spray booths** conforming to Article 5.12.2.1.

(3) Protective finishing systems designed, operated and maintained in conformance with NFPA 33, “Standard for Spray Application Using Flammable or Combustible Materials”, are deemed to be in compliance with this Subsection.

(4) Despite Sentence (3), electrical installations shall conform to the **Electrical Safety Code** made under the **Electricity Act, 1998**.

Location of electrical equipment

5.14.6.2. With the exception of charging electrodes and their connections, transformers, power packs, control apparatus and all other electrical components shall be located outside the powder-coating area.

Working temperatures

5.14.6.3. (1) Where a part to be coated is preheated prior to the application of the powder, the temperature of the part shall not exceed the ignition temperature of the powder being used.

(2) The surface temperature of electrostatic fluidized bed coating areas shall not exceed 66°C.

Grounding

5.14.6.4. (1) Powder transport, application and recovery equipment shall be grounded.

(2) Electrically conductive objects within the charging influence of the electrodes of electrostatic fluidized beds shall be grounded.

(3) A sign shall be posted indicating the necessity of grounding equipment and objects identified in Sentences (1) and (2).

Electrical discharges

5.14.6.5. High voltage circuits in electrostatic fluidized beds shall be designed so that any discharge produced when the charging electrodes of the bed are approached or contacted by a grounded object will not be of sufficient intensity to ignite any powder-air mixture likely to be encountered or result in any appreciable shock hazard.

Separators

5.14.6.6. Separators shall be used to prevent tramp iron or other spark-producing materials from being introduced into the powders being applied.

Recovery systems

5.14.6.7. All waste air-suspended powders shall be removed by exhaust ducts to a powder recovery system and shall not be released to the outside atmosphere.

Vacuum cleaning

5.14.6.8. Accumulations of waste dust from dry powder finishes shall be removed by vacuum cleaning equipment.

Contact points

5.14.6.9. Objects being coated shall be maintained in contact with the conveyor or other support.

Hangers

5.14.6.10. Hangers for objects being coated shall be kept clean and have sharp points or edges at areas of contact.

Smoking prohibited

5.14.6.11. (1) Smoking shall not be permitted at powder-coating areas and in powder storage rooms.

(2) Signs prohibiting smoking that conform to Article 2.4.3.2. shall be conspicuously posted at all powder-coating areas and powder storage rooms.

Subsection 5.14.7. Organic Peroxides and Dual Component Coatings

Location of spraying operations

5.14.7.1. Spraying operations involving the use of organic peroxides and other dual component coatings shall be conducted in **sprinklered spray booths** as described in Sentence 5.12.8.2.(1).

Initiator storage

5.14.7.2. Organic peroxide initiators shall be stored so that they will be kept away from contact with other stored materials.

Handling equipment

5.14.7.3. Handling equipment, including spray guns, which is specifically designed for use with organic peroxides shall be used to apply such coatings.

Containers

5.14.7.4. Separate containers shall be used exclusively for the storage of resin and organic peroxide.

Pressure tank inserts

5.14.7.5. Organic peroxide pressure tank inserts shall be constructed of stainless steel, polyethylene or a material that is equally inert to organic peroxide.

Elimination of foreign materials

5.14.7.6. Precautions shall be taken to prevent any mixing of foreign materials with dusts or overspray residues resulting from the sanding or spraying of finishing materials containing organic peroxides.

Subsection 5.14.8. Floor Finishing

Application

5.14.8.1. Floor finishing operations involving the use of **flammable liquids** or **combustible liquids** shall conform to Part 4 and this Subsection.

Operations below grade

5.14.8.2. Floor finishing operations involving the use of **flammable liquids** shall not be performed below **grade**.

Public access

5.14.8.3. Any part of a **building** where floor finishing operations are done shall not be open to the public.

Ventilation

5.14.8.4. (1) Ventilation shall be provided in areas where floor finishing operations are done to prevent the accumulation of flammable vapours.

(2) Ventilation required in Sentence (1) is permitted to be provided by mechanical systems if their use does not constitute a source of ignition.

Sources of ignition

5.14.8.5. All mechanical systems, electric motors, and other equipment which might be a source of ignition shall be shut down, and smoking and the use of open flames shall be prohibited, during the application of **flammable liquids** and for at least 1 h after such application.

Waste receptacles

5.14.8.6. A receptacle conforming to Sentence 2.4.1.3.(3) shall be provided for all waste rags and materials used in operations involving **flammable liquids** or **combustible liquids**, and the contents shall be removed daily and disposed of in a manner that will not create a fire hazard.

SECTION 5.15 RADIOACTIVE MATERIALS

Subsection 5.15.1. Application

Application

5.15.1.1. This Section applies to the storage and handling of radioactive material that emits ionizing radiation and that is present in quantities in excess of the scheduled quantity as defined in Schedule I of the **Atomic Energy Control Regulations** made under the **Atomic Energy Control Act (Canada)**.

Subsection 5.15.2. Storage

5.15.2.1. Radioactive materials and equipment shall be returned to storage after use.

Storage

5.15.2.2. Radioactive materials shall be stored in accordance with the licence requirements and regulations of the Canadian Nuclear Safety Commission.

Prohibited combination

5.15.2.3. Radioactive materials and equipment shall not be stored with flammable or corrosive materials.

Subsection 5.15.3. Emergency Procedures

Fire emergency procedures

5.15.3.1. (1) Persons using or storing radioactive materials shall establish fire emergency procedures in consultation with the **fire department**, including

- (a) the location and identification of storage and use areas,
- (b) methods to control a fire emergency and to recover radioactive materials and equipment containing radioactive materials safely and efficiently,
- (c) the names, addresses and telephone numbers of primary and alternative sources of expert radiation safety advice and assistance, and
- (d) the location of primary and alternative sources of radiation survey instruments.

SECTION 5.16 FUMIGATION AND THERMAL INSECTICIDAL FOGGING

Subsection 5.16.1. Application

Application

5.16.1.1. (1) This Section applies to the fumigation or thermal fogging of **buildings** where this activity creates a fire or explosion hazard, including the fumigation of equipment or commodities within structures, tanks or bins or under tarpaulins.

(2) Articles 5.16.2.1. and 5.16.2.2. do not apply to industries that conduct frequent fumigation operations on a routine basis where **approved** prior to the conducting of the operations.

Subsection 5.16.2. Safety Precautions

Notification of fire department

5.16.2.1. (1) Except as permitted in Sentence 5.16.1.1.(2), the **fire department** shall

- (a) be notified in writing at least 24 h before any **building** is to be closed for fumigation, and
- (b) be advised of the chemicals to be used, the proposed date and time of use, the types of respiratory protective devices required and the degree of flammability of the fumigant or fog being used.

Notification of adjacent premises

5.16.2.2. Except as permitted in Sentence 5.16.1.1.(2), prior notice shall be given to the occupants of any premises adjacent to that in which fumigation or thermal insecticidal fogging is to take place.

Ignition sources

5.16.2.3. Flames and other sources of ignition shall be eliminated in a **building** undergoing fumigation or thermal insecticidal fogging.

Power supply

5.16.2.4. Electric power supply shall be shut off to the premises undergoing fumigation or thermal insecticidal fogging.

Air temperature

5.16.2.5. The air temperature in a **building** undergoing fumigation or thermal insecticidal fogging shall be kept sufficiently low to prevent the actuation of any sprinkler system.

Breathing apparatus

5.16.2.6. Protective breathing apparatus shall be made available at the premises undergoing fumigation or thermal insecticidal fogging for all persons in case of emergency.

Restricted entrance

5.16.2.7. (1) No unauthorized person shall be permitted to enter a premises undergoing fumigation or thermal insecticidal fogging until the premises has been ventilated and is safe.

(2) Warning signs shall be posted in a conspicuous location near every entrance to the premises being fumigated.

(3) One person shall be on duty at each entrance to the premises undergoing fumigation or thermal insecticidal fogging to prevent any unauthorized person from entering until such premises have been ventilated.

SECTION 5.17 WELDING AND CUTTING

Subsection 5.17.1. General

Protection of persons and property

5.17.1.1. The protection of persons and property from injury or damage by fire or other causes arising from electric and gas welding and cutting equipment or its installation, operation and maintenance shall conform to CSA-W117.2, "Code for Safety in Welding and Cutting", and to the requirements in this Section.

Subsection 5.17.2. Use and Maintenance of Equipment

Fuel gases

5.17.2.1. The operation of acetylene generating systems and the storage and generation of welding fuel gases shall conform to NFPA 51, "Standard for the Oxygen-Fuel Gas Systems for Welding, Cutting and Allied Processes", Chapter 6.

Piping

5.17.2.2. Acetylene gas shall not be piped through copper or high copper content alloy, tubing, piping or fittings.

Cylinder storage

5.17.2.3. Cylinders stored inside **buildings** shall conform to the requirements in Section 5.6.

Cylinder caps and valves

5.17.2.4. Gas fuel cylinders, whether full or empty, whose valves are not in a recessed or protected location shall have their caps in place and their valves tightly closed when not in actual use.

Damaged equipment

5.17.2.5. Torches, regulators, hoses and other oxyacetylene welding and cutting equipment which have been damaged shall not be used.

Equipment inspection

5.17.2.6. (1) Welding equipment shall be **inspected** daily or prior to use for defects by personnel in charge of the equipment.

(2) Welding and cutting equipment shall be **tested** monthly for leaks with a leak **test** solution.

(3) Leaks or defects found in welding and cutting equipment shall be repaired prior to use.

Equipment not in use

5.17.2.7. Valves shall be closed and lines bled when equipment is not in actual use.

Lubrication

5.17.2.8. Oil or grease shall not be used for lubrication of welding and cutting equipment.

Subsection 5.17.3. Prevention of Fires

Location of operations

5.17.3.1. (1) Welding and cutting operations in **buildings** shall be carried out in areas that

(a) are free of combustible and flammable contents, and

(b) have walls, ceilings and floors of **noncombustible construction** or that are lined with noncombustible materials.

(2) When it is not practical to undertake welding and cutting operations in areas described in Sentence (1), combustible and flammable materials shall either be kept at least 11 m from the work area or otherwise protected against ignition by sheet metal, asbestos blankets or other noncombustible material.

(3) Any process or activity that produces flammable gases or vapours, **combustible dusts** or **combustible fibres** in quantities sufficient to create a fire or explosion hazard shall be interrupted and the hazardous conditions shall be removed before any hot work is carried out.

Work adjacent to piping

5.17.3.2. When welding or cutting is to be carried out near piping containing flammable gas, the section of the piping located within 1 m of the torch shall be covered with wet noncombustible insulating material 6 mm thick.

Work on containers

5.17.3.3. (1) Welding and cutting shall not be performed on containers, equipment, or piping containing **flammable liquids, combustible liquids** or flammable gases unless

(a) they have been cleaned and **tested** with a **listed** gas detector, such as one conforming to CSA C22.2 No. 152, "Combustible Gas Detection Instruments", to ascertain that they are free of explosive vapours, or

(b) safety measures are taken in conformance with good engineering practice.

(2) Welding or cutting operations shall not be undertaken on a totally enclosed container.

(3) At least one portable extinguisher conforming to Section 6.2 shall be provided in the cutting or welding area.

SECTION 5.18 INDUSTRIAL OVENS FOR BAKING AND DRYING PROCESSES

Subsection 5.18.1. Application

Application

5.18.1.1. This Section applies to industrial baking and drying ovens which during operation contain flammable vapours given off by the products being baked or dried.

Subsection 5.18.2. Location

Prohibited location

5.18.2.1. Ovens shall not be located in any **storey** below **grade**.

Subsection 5.18.3. Construction

Oven materials

5.18.3.1. Industrial ovens shall be constructed of noncombustible materials with smooth interior surfaces to permit cleaning.

Limiting temperature on combustible construction

5.18.3.2. The roof and floor of ovens and heaters and associated ductwork shall have sufficient clearance or be insulated where necessary to prevent the temperature from exceeding 90°C at any combustible part of the **building** assembly.

Explosion vents

5.18.3.3. (1) Explosion vents shall be provided for ovens where fuel or vapour hazards are present.

(2) Explosion vents shall be designed in conformance with NFPA 68, “Guide for Venting of Deflagrations”.

(3) Existing explosion vents that provide a vent ratio of 0.2 m² of vent area for each cubic metre of oven volume are deemed to satisfy the vent ratio for the purposes of NFPA 68 in Sentence (1).

(4) Openings or access doors equipped with explosion release hardware shall be acceptable as explosion vents.

Duct and stack restrictions

5.18.3.4. (1) Ducts, stacks and associated insulation in systems for the removal of flammable vapours shall

(a) be constructed of noncombustible materials,

(b) not pass through **firewalls**, and

(c) discharge outdoors not less than

(i) 1.5 m from unprotected **building** openings, and

(ii) 6 m from air intake openings.

Subsection 5.18.4. Ventilation

Oven ventilation

5.18.4.1. Ovens in which flammable vapours may be present or through which products of combustion are circulated shall be ventilated in accordance with NFPA 86, “Standard for Ovens and Furnaces”.

Fan interlocks

5.18.4.2. (1) In ovens where flammable vapours may be present, interlocks shall be provided to ensure that energy sources and ignition devices are de-activated when

(a) the ventilating fans stop, or

(b) the excess temperature controls are activated.

Continuous-process oven interlocks

5.18.4.3. (1) In continuous-process ovens where flammable vapours may be present, interlocks shall be provided to ensure

(a) that ventilating fans are operating before conveyors can be started, and

(b) that the conveyors are stopped when

(i) the ventilating fans stop, or

(ii) the excess temperature controls are activated.

Subsection 5.18.5. Maintenance

Cleaning of ovens and ductwork

5.18.5.1. (1) Ovens and associated ductwork shall be **inspected**, cleaned and maintained internally and externally at intervals sufficient to prevent the accumulation of combustible deposits.

(2) Access doors or panels shall be provided to permit **inspection**, cleaning and maintenance of ovens and associated ductwork.

(3) Fixed noncombustible ladders, steps or grab rails shall be provided to permit access to the doors or panels required in Sentence (2).

Subsection 5.18.6. Fire Protection

Portable extinguishers

5.18.6.1. Portable extinguishers shall be provided in conformance with Section 6.2.

Standpipe and hose systems

5.18.6.2. A standpipe and hose system shall be installed in conformance with the **Building Code** and equipped with spray nozzles so that all parts of an oven structure can be reached by a hose stream.

Fire access doors

5.18.6.3. Doors or other means of access shall be provided in ovens and associated ductwork so that portable extinguishers or hose streams may be used in all parts of the equipment.

Automatic fire protection

5.18.6.4. Ovens containing or processing sufficient combustible materials to sustain a fire shall be protected by an automatic sprinkler system or other fixed extinguishing systems.

**PART 6
FIRE PROTECTION EQUIPMENT**

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SECTION 6.1 GENERAL

Subsection 6.1.1. Scope

Scope

6.1.1.1. This Part applies to installation, **checking, inspection, testing**, maintenance and operation of fire protection equipment and life safety systems.

SECTION 6.2 PORTABLE EXTINGUISHERS

Subsection 6.2.1. General

6.2.1.1. **Listed** portable extinguishers shall be installed when replacing or adding new extinguishers.

Maintenance

6.2.1.2. Portable extinguishers shall be kept operable and fully charged.

Location

6.2.1.3. (1) Portable extinguishers shall be located so that they are easily seen and shall be accessible at all times, except as permitted in Sentences (2) and (3).

(2) A lockable, break-front glazed cabinet may be used for security purposes to store portable extinguishers and where portable extinguishers are located in a fire hose cabinet, an **approved** lockable, scored glass break-front cabinet may be used.

(3) In a **detention occupancy**, portable extinguishers are permitted to be located in secure areas, or in lockable cabinets provided

- (a) identical keys for all cabinets are located at all supervisory or security stations, or
- (b) electrical remote release devices that are designed to open upon power failure are provided for the cabinets.

6.2.1.4. Portable extinguishers shall be located in or adjacent to corridors or aisles that provide **access to exits**.

Signs

6.2.1.5. The location of portable extinguishers shall be prominently indicated by signs or markings in large **floor areas** and in locations where visual obstructions cannot be avoided.

Proximity to fire hazards

6.2.1.6. Portable extinguishers in proximity to a fire hazard shall be located so as to be accessible without exposing the operator to undue risk.

Corrosive atmosphere

6.2.1.7. Portable extinguishers that are subject to corrosion shall not be installed in a corrosive environment unless they are provided with appropriate corrosion protection.

Temperature range requirements

6.2.1.8. (1) Where a portable extinguisher is to be located in an area subject to temperatures outside the range 4°C to 49°C, it shall be

- (a) placed in an enclosure where the temperature is maintained within this range, or
- (b) of a type labelled for the temperatures to which it will be exposed.

Mounting brackets

6.2.1.9. When portable extinguishers are located on vehicles or in areas where they are subject to jarring or vibration, brackets designed to accommodate these effects shall be used.

Subsection 6.2.2. Classification

Rating of portable extinguishers

6.2.2.1. Portable extinguishers shall be rated and identified in conformance with CAN/ULC-S508, "Standard for the Rating and Fire Testing of Fire Extinguishers".

Subsection 6.2.3. Selection Requirements

Multiple ratings

6.2.3.1. Where portable extinguishers have been **tested** and are rated as being acceptable for fighting more than one class of fire, each class of fire for which they are acceptable shall be designated on each extinguisher.

Subsection 6.2.4. Installation Requirements

Where required

6.2.4.1. (1) Portable extinguishers shall be provided to protect every **building**, each hazardous **occupancy** inside the **building** and each hazardous process or operation located outside.

(2) Sentence (1) does not apply to **dwelling units**, including dwelling units regulated under Section 9.8.

(3) In Sentence (2),

“dwelling unit”, in light face, means “dwelling unit” as defined in Sentence 9.8.1.1.(2).

Distance above floor

6.2.4.2. Portable extinguishers with a gross weight greater than 18 kg shall be installed so that the top of the extinguisher is not more than 1.1 m above the floor when the extinguisher is not equipped with wheels.

6.2.4.3. Portable extinguishers having a gross weight of 18 kg or less shall be installed so that the top of the extinguisher is not more than 1.5 m above the floor.

Operating instructions

6.2.4.4. The operating instructions of portable extinguishers shall face outward when the extinguishers are located in cabinets, in wall recesses or on shelves.

Subsection 6.2.5. Grading of Hazards

Light hazard occupancy

6.2.5.1. Where the quantity of combustible material present is such that fires of small size may be expected, such as in offices, schoolrooms, churches, assembly halls and telephone exchanges, the **occupancy** shall be graded as light hazard.

Ordinary hazard occupancy

6.2.5.2. Where the quantity of combustible material present is such that fires of moderate size may be expected, such as in **mercantile occupancies**, display rooms, auto showrooms, parking garages, light manufacturing, warehouses not classified as extra hazard and school shop areas, the **occupancy** shall be graded as ordinary hazard.

Extra hazard occupancy

6.2.5.3. Where the quantity of combustible material present is such that fires of severe magnitude may be expected, such as in woodworking, auto repair, aircraft servicing, mercantile storage areas, warehouses with high-piled combustibles and processes incorporating **flammable liquids** or **combustible liquids**, the **occupancy** shall be graded as extra hazard.

Subsection 6.2.6. Distribution

6.2.6.1. (1) Portable extinguishers required in Article 6.2.4.1. shall be located in conformance with this Subsection.

(2) Despite Sentence (1), in an unoccupied warehouse equipped with a fixed fire protection system, provision shall be made for portable extinguishers to be available for use by responding personnel.

(3) The location and number of portable extinguishers required under Sentence (2) shall be **approved**.

Building protection

6.2.6.2. Portable extinguishers that are provided to protect a **building** shall be suitable for fighting **Class A fires** and be available for use at all times.

Occupancy protection

6.2.6.3. Portable extinguishers that are provided to protect a hazardous **occupancy** shall be those required in this Section for fighting **Class A fires**, **Class B fires**, **Class C fires** or **Class D fires**.

Extinguishers for Class A fires

6.2.6.4. Except as required in Article 6.2.6.5., portable extinguishers for **Class A fires** shall be provided in conformance with Table 6.2.6.A.

6.2.6.5. Where a **floor area** is less than that shown in Table 6.2.6.A., one portable extinguisher not less than the minimum size permitted shall be provided.

TABLE 6.2.6.A.

Forming part of Article 6.2.6.4.

Basic Minimum Extinguisher Rating for Area Specified	Maximum Travel Distance to Extinguisher, m	Maximum Area to be Protected per Extinguisher for Class A Fires , m ²		
		Light Hazard Occupancy	Ordinary Hazard Occupancy	Extra Hazard Occupancy
2A	25	600	300	Not Acceptable
3A	25	900	400	300
4A	25	1100	600	400
6A	25	1100	900	600
10A	25	1100	1100	900
20A	25	1100	1100	1100
40A	25	1100	1100	1100

Hose stations in lieu of extinguishers

6.2.6.6. Up to one half of the number of portable extinguishers required in Table 6.2.6.A. may be replaced by hose stations.

Extinguishers for Class B fires

6.2.6.7. Except as required by Article 6.2.6.9., portable extinguishers for **Class B fires** shall be provided as required in Table 6.2.6.B.

6.2.6.8. (1) Where up to three portable extinguishers rated for **Class B fires** are used to satisfy the extinguisher rating specified in Table 6.2.6.B., the sum of the basic extinguisher ratings shall satisfy the requirements in Table 6.2.6.B.

(2) No more than three portable extinguishers shall be used to satisfy the requirements of Table 6.2.6.B.

TABLE 6.2.6.B.

Forming part of Article 6.2.6.7.

Grade of Hazard	Basic Minimum Extinguisher Rating per Unit	Maximum Travel Distance to Extinguishers, m
Light	5B	9
	10B	15
Ordinary	10B	9
	20B	15
Extra	20B	9
	40B	15

Extinguishers for flammable and combustible liquids

6.2.6.9. (1) Portable extinguishers for **Class B fires** shall be provided for **flammable liquid** and **combustible liquid** hazards when **flammable liquids** or **combustible liquids** are stored in open containers to a depth greater than 6 mm.

(2) The portable extinguishers shall provide at least one numerical unit of extinguishing potential for **Class B fires** per 0.1 m² of surface area of the largest open container within the area, but in no case shall the extinguisher rating be less than that required by Table 6.2.6.B.

(3) The distance travelled to reach a portable extinguisher required by Sentence (1) shall not exceed 15 m.

6.2.6.10. (1) Where up to three foam-type portable extinguishers rated for **Class B fires** are used to satisfy the requirements of Article 6.2.6.9., the sum of the basic extinguisher ratings shall satisfy the requirements in Table 6.2.6.B.

(2) No more than three portable extinguishers shall be used to satisfy the requirements of Table 6.2.6.B.

Supplementary protection

6.2.6.11. Portable extinguishers shall supplement fixed fire protection in Part 5 in accordance with Article 6.2.6.9. where a **flammable liquid** or **combustible liquid** is stored in an open container and where the liquid surface area exceeds 0.4 m².

Extinguishers for commercial cooking equipment

6.2.6.12. Wet chemical or alkali-based dry chemical portable extinguishers shall be provided to protect commercial cooking equipment.

Extinguishers for Class C fires

6.2.6.13. Portable extinguishers suitable for **Class C fires** shall be provided in or near **service rooms** containing electrical equipment.

Distribution

6.2.6.14. Distribution of portable extinguishers for **Class C fires** shall conform to the applicable provisions for the distribution of extinguishers for **Class A fires** or **Class B fires** in the vicinity of the electrical equipment.

6.2.6.15. Reference shall be made to Parts 2, 3, 4 and 5 for requirements of portable extinguishers for **flammable liquids** and **combustible liquids**, hazardous materials, processes and operations.

Extinguishers for combustible metal fires

6.2.6.16. (1) For fires involving combustible metals, extinguishers or extinguishing agents with **Class D fire** ratings suitable for the combustible metal shall be provided.

(2) Extinguishing equipment shall be located not more than 25 m from the **Class D fire** hazard.

Subsection 6.2.7. Inspection, Testing and Maintenance

6.2.7.1. (1) Maintenance and **testing** of portable extinguishers shall be in conformance with NFPA 10, “Portable Fire Extinguishers”.

(2) Portable extinguishers that are **inspected** in conformance with NFPA 10, “Portable Fire Extinguishers”, are deemed to satisfy the **inspection** requirements of this Subsection.

Examination

6.2.7.2. Portable extinguishers shall be **inspected** monthly.

Defective extinguishers

6.2.7.3. Portable extinguishers having defects shall be repaired or recharged where necessary to ensure the extinguishers will operate effectively and safely.

Tags

6.2.7.4. (1) Each portable extinguisher shall have a tag securely attached to it showing the maintenance or recharge date, the servicing agency and the signature of the person who performed the service.

(2) Sentence (1) does not apply where other **approved** records are maintained that show the maintenance or recharge date, the servicing agency and the signature of the person who performed the service.

Maintenance records

6.2.7.5. A permanent record containing the maintenance date, the examiner’s name and a description of any maintenance work or hydrostatic **testing** carried out shall be prepared and maintained for each portable extinguisher.

Maintenance after use

6.2.7.6. Portable extinguishers shall be replaced and recharged after use in conformance with instructions given on the extinguisher nameplate.

6.2.7.7. Extinguisher shells, cartridges or cylinders that show leakage or permanent distortion in excess of specified limits or that rupture shall be removed from service.

6.2.7.8. Hydrostatic pressure **tests** shall be conducted at the original **test** pressure as stated on the nameplate.

Test labels

6.2.7.9. (1) Where a portable extinguisher is **tested**, a label shall be fixed to the extinguisher after **testing** that indicates the month and year the hydrostatic pressure **test** was performed, the **test** pressure used and the name of the person or agency performing the **test**.

(2) Sentence (1) does not apply where a permanent record of the **test** is kept and is available to the **fire department**.

SECTION 6.3 FIRE ALARM AND VOICE COMMUNICATION SYSTEMS FOR LIFE SAFETY

Subsection 6.3.1. General

Access

6.3.1.1. Access to fire alarm and voice communication system components requiring **inspection** or servicing shall be kept unobstructed.

Monitoring

6.3.1.2. (1) Where the **Building Code** or this Code require a fire alarm system to be monitored to transmit a signal to the **fire department**, the building **owner** shall ensure the continuation of the monitoring.

(2) Where the fire alarm system monitoring referred to in Sentence (1) is provided by a central station, the **building owner** shall obtain written documentation from the central station operator that the monitoring service complies with

- (a) NFPA 71, “Standard for the Installation, Maintenance, and Use of Signaling Systems for Central Station Service”, or
- (b) CAN/ULC-S561, “Installation and Services for Fire Signal Receiving Centres and Systems”.

(3) Where a fire alarm system is monitored by a central station to meet the requirements of the **Building Code** or this Code, the operator of the central station shall provide, upon request by the **owner** or **Chief Fire Official**, a document attesting that the monitoring service is in compliance with one of the standards identified in Sentence (2).

(4) Despite Article 1.2.1.1. of Division A, where the **Building Code** or this Code requires a fire alarm system to be monitored and the monitoring is provided by a central station, the operator of the central station shall be responsible for maintaining the monitoring service and associated monitoring equipment in accordance with one of the standards identified in Sentence (2).

(5) Where the fire alarm system is monitored by a proprietary signalling system, such system shall be maintained in accordance with Chapter 4 of NFPA 72, “Standard for the Installation, Maintenance, and Use of Protective Signaling Systems”.

6.3.1.3. When a fire alarm or voice communication system or any part thereof is shut down, the **supervisory staff** shall be notified in accordance with Section 2.8.

6.3.1.4. Fire alarm and voice communication systems shall be maintained in operating condition.

Signal silencing

6.3.1.5. (1) Once activated, a fire alarm system shall not be manually silenced unless it has been confirmed by **supervisory staff**, in accordance with **approved** procedures as detailed in the fire safety plan, that no fire emergency exists.

(2) Sentence (1) does not apply where a silencing switch is part of an **approved** integrated voice communication system and signal silencing takes place to allow fire emergency instructions to be heard.

Disconnect switches

6.3.1.6. Disconnect switches for power supplies which serve only fire alarm systems or interconnected **smoke alarms** shall be in a locked secure area or otherwise secured in an **approved** manner.

Relocating manual pull stations

6.3.1.7. (1) Where **approved**, manual pull stations for a fire alarm system in a **building** may be relocated if there is a high incidence of false alarms in the **building**.

(2) Where the manual pull stations are relocated, alternate **approved** measures shall be used to maintain the level of life safety.

Repairs and alterations to fire alarm systems

6.3.1.8. Repair, replacement and alterations of fire alarm system components shall be in accordance with CAN/ULC-S524, “Standard for the Installation of Fire Alarm Systems”.

Subsection 6.3.2. Check, Inspect and Test

6.3.2.1. (1) The **owner** shall ensure that any person performing the annual **tests** or annual **inspections** required by this Subsection and any person performing repair, replacement or alterations referred to in Article 6.3.1.8. is in compliance with the requirements of

- (a) Clause 1.2.1.2.(1)(a) of Division C, or
- (b) Sentence 1.2.1.2.(2) of Division C.

Fire alarm systems

6.3.2.2. (1) Except as provided in Sentence (2), a fire alarm system, with or without voice communication capability, shall be **inspected** and **tested** in conformance with CAN/ULC-S536, “Inspection and Testing of Fire Alarm Systems”.

(2) Despite Clause 5.7.4.1.6. of CAN/ULC-S536, “Inspection and Testing of Fire Alarm Systems”, a UL **listed smoke detector** sensitivity instrument may be used to conduct annual sensitivity **testing** of **smoke detectors**.

(3) A description of the fire alarm system as required in Clause 3.6 of CAN/ULC-S536, “Inspection and Testing of Fire Alarm Systems”, shall be kept current and maintained in the **building** at an **approved** location.

(4) A record of each device, component and circuit of the fire alarm system that is **inspected** and **tested** in accordance with Sentence (1) shall

- (a) indicate whether the device, component or circuit is in proper working order, and
- (b) be kept in accordance with Article 1.1.2.1.

(5) Where a fire alarm system is monitored to transmit a signal to the **fire department**, the **owner** shall record whether all signals from the **tests** conducted in Sentence (1), or other events, are received by the monitoring station, and records shall be kept in accordance with Article 1.1.2.1.

Central alarm and control facilities

6.3.2.3. The central alarm and control facility shall be **checked** daily for indication of trouble in the system.

Voice communication systems

6.3.2.4. Voice communication systems that are integrated with a fire alarm system shall be **tested** in conformance with CAN/ULC-S536, “Inspection and Testing of Fire Alarm Systems”.

6.3.2.5. (1) Voice communication systems that are not integrated with a fire alarm system shall be **tested** monthly in compliance with Sentences (2) and (3).

(2) Loudspeakers described in Sentence (1) shall be **tested** monthly as an all-call signal to ensure they function as intended.

(3) Communication from at least one remote firefighter emergency telephone location to the control unit shall be **tested** monthly on a rotational basis so that communication from all remote firefighter emergency telephone locations are **tested** at least once per year.

(4) Voice communication systems are not required to be **tested** in conformance with Sentences (1) and (2) where the systems are regularly used as part of a paging system.

Interconnected smoke alarms

6.3.2.6. (1) This Article applies to interconnected **smoke alarm** systems in all **residential occupancies** and **care occupancies**, except in individual **dwelling units** and in **buildings** regulated by Section 9.8.

(2) Interconnected **smoke alarms** shall be **tested** and maintained in operating condition in conformance with CAN/ULC-S552, “Standard for the Maintenance and Testing of Smoke Alarms”, and as required by this Article.

(3) The power supply shall be **checked** weekly.

(4) The operability of the interconnected system shall be confirmed monthly, by **testing** at least one **smoke alarm** using its **test** function, on a rotational basis.

(5) Where installed, each manual pull station shall be **tested** to ensure activation of the interconnected **smoke alarms** on an annual basis.

(6) Written records shall be kept of weekly **checks** of the power supply for at least six months after they are made, and be available upon request to the **Chief Fire Official**.

(7) Monthly and annual **tests** shall be recorded and kept in accordance with Article 1.1.2.1.

Subsection 6.3.3. Smoke Alarms — Testing and Maintenance

Application

6.3.3.1. (1) This Subsection applies to **smoke alarms**

- (a) in **dwelling units**,
- (b) in dwelling units regulated under Section 9.8,
- (c) in **guest suites**, and
- (d) in each sleeping room not within a **dwelling unit**.

(2) In Clause (1)(b),

“dwelling unit”, in light face, means “dwelling unit” as defined in Sentence 9.8.1.1.(2).

Owner’s responsibility

6.3.3.2. (1) **Smoke alarms** shall be maintained in operating condition by the **owner**.

(2) For the purposes of Sentence (1), in rental **dwelling units**, including rental dwelling units regulated under Section 9.8, the landlord is deemed to be the **owner**.

(3) In Sentence (2),

“dwelling unit”, in light face, means “dwelling unit” as defined in Sentence 9.8.1.1.(2).

Instructions for tenants

6.3.3.3. (1) The landlord shall provide a copy of the **smoke alarm** manufacturer’s maintenance instructions or **approved** alternative to the occupant in each rental **dwelling unit**, including the occupant in a dwelling unit regulated under Section 9.8.

(2) In Sentence (1),

“dwelling unit”, in light face, means “dwelling unit” as defined in Sentence 9.8.1.1.(2).

Disabling not permitted

6.3.3.4. No person shall intentionally disable a **smoke alarm** so as to make it inoperable.

Replacement

6.3.3.5. (1) When **smoke alarms** are being replaced, the installation shall not reduce the level of detection required by

(a) the **Building Code** in effect at the time of construction of the **dwelling unit**, or

(b) municipal by-laws in effect before this Subsection came into force, whichever is applicable.

SECTION 6.4 STANDPIPE AND HOSE SYSTEMS

Subsection 6.4.1. General

6.4.1.1. During alteration of a **building** required to have a standpipe and hose system, the system shall be installed or dismantled progressively so as to provide protection to all **floor areas**.

6.4.1.2. Standpipe and hose systems shall be maintained in operating condition.

Fire department connections

6.4.1.3. (1) Except when in use or being **inspected** in accordance with Sentence (2), **fire department** connections shall be equipped with plugs or caps that are secured wrench-tight.

(2) Plugs or caps shall be removed annually and the **fire department** connections **inspected** for wear, rust or obstruction and corrective action shall be taken as needed.

(3) If plugs or caps are missing, the **fire department** connections shall be examined for obstructions, back-flushed when conditions warrant and the plugs or caps replaced.

Out of service requirements

6.4.1.4. When the standpipe and hose system or any part thereof is shut down, the **supervisory staff** shall be notified in accordance with Section 2.8.

Hotels

6.4.1.5. In **buildings** containing a **hotel**, a standpipe and hose system shall not be shut down, disconnected or otherwise impaired without notifying the **Chief Fire Official** in accordance with a schedule identified in the **approved** fire safety plan.

Inspection, testing and maintenance

6.4.1.6. Compliance with the **inspection, testing** and maintenance provisions of NFPA 25, “Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems”, for standpipe and hose systems is deemed to satisfy the requirements of Articles 6.4.2.1. to 6.4.2.5. and Subsection 6.4.3.

Subsection 6.4.2. Maintenance and Inspection of Hose Stations and Equipment

Hose stations

6.4.2.1. Hose stations shall be **inspected** monthly to ensure that the hose is in proper position and that all of the equipment is in place and in operable condition.

6.4.2.2. Standpipe and hose system equipment shall be used for fire protection only.

6.4.2.3. Standpipe hose stations shall be conspicuously identified and unobstructed.

Hose valves

6.4.2.4. Hose valves shall be **inspected** annually to ensure that they are tight so that there is no water leakage into the hose.

Hose

6.4.2.5. (1) Standpipe hose shall be **inspected** and replaced on the **rack** annually and after use, and any worn hose or gaskets in the couplings at the hose valves and at the nozzle replaced.

(2) When hose is replaced on the **rack** as required in Sentence (1), it shall be done so that any folds will not occur at the same places.

Standpipe identification

6.4.2.6. (1) Except as required in Sentence (2), each hose connection in a standpipe system shall be provided with a legible sign reading: "FIRE HOSE FOR USE BY TRAINED PERSONS ONLY".

(2) Each hose connection in a dry standpipe system with no permanent water supply shall be provided with a legible weatherproof sign reading: "DRY STANDPIPE FOR FIRE DEPARTMENT USE ONLY".

Hose cabinets

6.4.2.7. (1) If a fire hose station is located in a cabinet, an **approved** lockable, scored glass break-front cabinet may be used.

(2) Hose stations in a **major occupancy** consisting of **detention occupancy** may be located in secure areas, or in lockable cabinets where

- (a) identical keys for all cabinets are located at all guard stations, or
- (b) electrical remote release devices are provided and are connected to an emergency power supply.

Subsection 6.4.3. Testing

Standpipe systems

6.4.3.1. (1) Standpipe systems that have been modified, extended or are being restored to service after a period of disuse exceeding one year shall be **tested** in conformance with Articles 6.4.3.2. to 6.4.3.5.

(2) Where standpipe connections are built in walls or **partitions**, the **tests** shall be made before the standpipes are concealed.

Hydrostatic test

6.4.3.2. Standpipe system piping shall be hydrostatically **tested** at a pressure of not less than 1400 kPa (gauge) for 2 h, or at 350 kPa (gauge) in excess of the normal hydrostatic pressure when the normal hydrostatic pressure is in excess of 1050 kPa (gauge).

Fire department connections

6.4.3.3. Piping between the **fire department** connection and the check valve in the inlet pipe to the standpipe shall be **tested** in the same manner as the remainder of the system.

Underground mains

6.4.3.4. (1) Underground mains and connections shall be **tested** for 2 h at a hydrostatic pressure of 350 kPa (gauge) in excess of the maximum hydrostatic pressure in service, but not less than 1400 kPa (gauge).

(2) Leakage during the **test** shall not exceed 2 L/h per 100 joints for pipe laid with rubber gasketed joints, and 30 mL/h per 25 mm of pipe diameter per joint for pipe laid with caulked lead or lead substitute joints.

Flow and pressure tests

6.4.3.5. Flow and pressure **tests** shall be conducted at the highest and most remote hose valve or hose connection to ensure that the water supply for standpipes is provided as originally designed.

Dry standpipes

6.4.3.6. Standpipe system piping which normally remains dry shall be **tested** in conformance with Article 6.4.3.2. at intervals of not more than five years.

Hotels

6.4.3.7. In **buildings** containing a **hotel**, flow and pressure **tests** shall be conducted annually at the highest and most remote hose valve or hose connection to verify that the water supply for the standpipe system is provided as originally designed.

SECTION 6.5 SPRINKLER SYSTEMS

Subsection 6.5.1. General

6.5.1.1. (1) Repair, replacement and alterations of sprinkler system components shall be in accordance with NFPA 13, “Standard for the Installation of Sprinkler Systems”.

(2) Compliance with the **inspection, testing** and maintenance provisions of NFPA 25, “Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems”, for sprinkler systems is deemed to satisfy the requirements of Subsections 6.5.4., to 6.5.6.

6.5.1.2. Sprinkler systems shall be maintained in operating condition.

Closing sprinkler control valves

6.5.1.3. (1) Sprinkler control valves shall not be closed in the event of a fire until the fire is

- (a) extinguished, or
- (b) considered by the **fire department**, or by an industrial fire brigade established by the **owner** in consultation with the **fire department**, to be under control by other means.

Changes in equipment or occupancy

6.5.1.4. Changes in equipment or **occupancy** that might result in temperatures at sprinklers being more than 38°C or less than 4°C with wet pipe systems shall not be made without previously making provisions to alter the sprinkler system to prevent premature operation or freezing.

Obstructions

6.5.1.5. (1) No obstructions shall be placed so as to interfere with the effectiveness of water discharge from sprinklers.

(2) Sprinkler systems shall not be used to support anything that will interfere with effective sprinkler system performance.

6.5.1.6. (1) Where alterations or repairs are made to feed mains, cross mains, or risers in sprinkler systems, the systems shall be **tested** in conformance with Sentences (2) to (8).

(2) Except as permitted in Sentence (4), the sprinkler system shall be subjected to a hydrostatic pressure **test** of a minimum of 1400 kPa (gauge), or 350 kPa (gauge) in excess of the maximum static pressure to which the system may be subjected, for a period of 2 h without loss of pressure.

(3) For dry-pipe systems, the clapper of the differential type dry-pipe valve shall be held off its seat, and the ball drip in the intermediate chamber shall be replaced by a plug during the **test**.

(4) The **tests** described in Sentence (2) shall be performed when hydrostatic pressure **testing** can be performed without danger of freezing, and when there is danger of freezing, the sprinkler system shall be pressure **tested** with air at 350 kPa (gauge) for 2 h without loss of pressure.

(5) Sprinkler system water supply pressure shall be **tested** with the main drain valve fully open to ensure that there are no obstructions in the water supply piping to the sprinkler system.

(6) Drainage facilities shall be **tested** to ensure that the drains are capable of taking the full flow from the main drain pipe without overflowing.

(7) Dry-pipe valves shall be **tested** to ensure that they are in operating condition.

(8) Mechanical and electrical alarms shall be **tested** to ensure that they are in operating condition.

Testing of underground mains

6.5.1.7. (1) When alterations or additions are made to underground mains and lead-in connections of a sprinkler system, the mains and lead-in connections shall be **tested** by

- (a) flushing for sufficient time to remove foreign material at a minimum water flow as specified in Table 6.5.1.A., and
- (b) a 2 h hydrostatic pressure **test** of 350 kPa (gauge) in excess of the maximum static pressure, but not less than 1400 kPa (gauge) and leakage shall not exceed 2 L/h per 100 joints for pipe laid with rubber gasketed joints, and 30 mL/h per 25 mm of pipe diameter per joint for pipe laid with caulked lead or lead substitute joints.

TABLE 6.5.1.A.

Forming part of Article 6.5.1.7.

Size of Pipe, mm	Minimum Flow, L/min
100	1500
150	3250
200	5800

250	9000
300	13000

(2) At seasons of the year that will not permit hydrostatic pressure **testing**, the procedure outlined in Sentence 6.5.1.6.(4) may be followed.

Records

6.5.1.8. (1) An **approved** record shall be kept of **inspections** of each system.

(2) The record required in Sentence (1) shall be available for examination by the **Chief Fire Official**.

Subsection 6.5.2. Sprinkler System Shutdowns

Notification

6.5.2.1. When any alterations, additions or repairs are to be made involving interruption to a sprinkler system or part thereof, the **Chief Fire Official** shall be notified.

Sprinkler control valves and water supplies

6.5.2.2. (1) Sprinkler control valves and sprinkler water supplies shall not be shut down, disconnected or otherwise impaired for more than 24 h without notifying the **Chief Fire Official**.

(2) In **buildings** containing a **hotel**, sprinkler control valves and sprinkler water supplies shall not be shut down, disconnected or otherwise impaired

(a) for 24 h or less without notifying the **Chief Fire Official** in accordance with a schedule identified in the **approved** fire safety plan, or

(b) for more than 24 h without notifying the **Chief Fire Official**.

Schedule of temporary shutdowns

6.5.2.3. Where it is required to temporarily shut down a sprinkler system or part thereof, the work shall be programmed by the contractor working on the system to enable the sprinkler system to be operational as quickly as possible in the circumstances.

Programmed repairs

6.5.2.4. When a sprinkler system or part thereof is shut down, the **supervisory staff** shall be notified in accordance with Section 2.8.

Additional protection during shutdowns

6.5.2.5. Full sprinkler protection shall be restored or the provisions of Article 6.5.2.6. maintained when work on the system is discontinued.

Identification of closed valves

6.5.2.6. Closed sprinkler control valves shall be tagged or identified in an **approved** manner.

Subsection 6.5.3. Checking

Sprinkler control valves

6.5.3.1. (1) Except as permitted in Sentences (2) and (3), valves controlling sprinkler water supplies or alarms shall be sealed in the open position and **inspected** weekly.

(2) Valves which are locked open or valves which are electrically supervised shall be **inspected** monthly.

(3) After any alterations or repairs, an **inspection** shall be made to ensure valves are returned to the fully open position and are sealed, locked or electrically supervised.

Pipe hangers

6.5.3.2. Exposed sprinkler piping hangers shall be **checked** yearly to ensure that they are kept in good repair.

Pressure maintenance

6.5.3.3. Water supply pressure and system air or water pressure shall be **checked** weekly by using gauges to ensure that the system is maintained at the required operating pressure.

Protection against freezing

6.5.3.4. Dry-pipe valve rooms or enclosures in unheated **buildings** shall be **checked** as often as necessary when the outside temperature falls below 0°C to ensure that the system does not freeze.

Sprinkler inspection

6.5.3.5. Sprinkler heads shall be **checked** at least once per year to ensure that they are free from damage, corrosion, grease, dust, paint or whitewash.

Subsection 6.5.4. Inspection

Winter damage

6.5.4.1. Auxiliary drains shall be **inspected** to prevent freezing.

Test flushing

6.5.4.2. Dry-pipe systems shall be **inspected** every 15 years for obstructions in the sprinkler piping and, if necessary, the entire system flushed of foreign material.

Priming water level

6.5.4.3. The priming water for dry-pipe systems shall be **inspected** at least every three months to ensure that the proper level above the dry-pipe valve is maintained.

Fire department connections

6.5.4.4. (1) Except when in use or being **inspected** in accordance with Sentence (2), **fire department** connections shall be equipped with plugs or caps that are secured wrench-tight.

(2) Plugs or caps shall be removed annually and the **fire department** connections **inspected** for wear, rust or obstruction and corrective action shall be taken as needed.

(3) If plugs or caps are missing, the **fire department** connections shall be examined for obstructions, back-flushed when conditions warrant and the plugs or caps replaced.

Subsection 6.5.5. Testing

Notification

6.5.5.1. Prior notification of water flow or other **tests** to be made to a sprinkler system shall be given to parties who could be affected by an alarm.

Alarm testing

6.5.5.2. (1) Except as provided in Article 6.5.5.7., the alarm on all sprinkler systems shall be **tested** monthly by flowing water through the **test** connection located at the sprinkler valve.

(2) An alarm line subject to freezing shall be cleared of all obstructions susceptible to freezing after the **test** specified in Sentence (1).

Water flow alarm tests

6.5.5.3. Water flow alarm **tests** using the most hydraulically remote **test** connection shall be performed annually on wet sprinkler systems.

Trip testing valves

6.5.5.4. (1) Dry-pipe valves shall be trip **tested** by means of the inspector's **test** valve in accordance with Sentences (2) and (3) to ensure that they operate satisfactorily and that the sprinkler alarms are in operating condition.

(2) Dry-pipe valves shall be trip **tested** annually.

(3) During the **test** referred to in Sentence (2), the control valve is not required to be in the fully open position.

(4) Dry-pipe valves shall be trip **tested** at least once every three years with the control valve fully open.

(5) The trip time for the **tests** described in Sentences (2) and (4) may exceed the acceptance trip time by not more than 10%.

Water supply

6.5.5.5. Sprinkler system water supply pressure shall be **tested** annually with the main drain valve fully open to ensure that there are no obstructions or deterioration of the main water supply.

6.5.5.6. The **test** prescribed in Article 6.5.5.5. shall be conducted after any sprinkler system control valve has been operated.

Electrical supervision signal testing

6.5.5.7. (1) Where an electrical supervisory signal service is provided for a sprinkler system, it shall be **tested** by operating the supervisory signal devices in conformance with Sentences (2) and (3).

(2) Transmitters and water-flow-actuated devices shall be **tested** every two months.

(3) Valve supervisory switches, tank water level devices, **building** and tank water temperature supervisory devices and other sprinkler system supervisory devices shall be **tested** at least every six months.

Subsection 6.5.6. Maintenance

Sprinkler guards

6.5.6.1. Sprinklers shall be protected by sprinkler guards where there is the possibility of mechanical damage.

Valve access

6.5.6.2. Sprinkler control valves shall be accessible and maintained in operable condition at all times.

Valve pits

6.5.6.3. Pits containing sprinkler control valves shall be kept free of water and protected against freezing.

Precautions against freezing

6.5.6.4. (1) Except as permitted in Sentence (2), sections of sprinkler systems subject to freezing shall be converted to a dry-pipe or antifreeze system with a separate control valve for that part of the system.

(2) Alternative methods to prevent freezing of sprinkler piping may be used where **approved**.

Spare sprinkler heads

6.5.6.5. (1) Where sprinkler systems are installed, a supply of spare sprinkler heads and equipment shall be maintained in conformance with Sentences (2) to (5).

(2) Spare sprinkler heads shall be kept in a cabinet where the temperature does not exceed 38°C.

(3) The minimum stock of spare sprinkler heads to be kept on hand shall be

- (a) 6 sprinkler heads for installations containing not more than 300 sprinklers,
- (b) 12 sprinkler heads for installations containing from 301 to 1000 sprinklers, and
- (c) 24 sprinkler heads for installations containing more than 1000 sprinklers.

(4) Spare sprinkler heads shall correspond to the types and temperature ratings of the sprinklers installed on the system.

(5) A wrench suitable for replacing sprinkler heads shall be kept in the cabinet where the spare sprinkler heads are stored.

Protection for combustible sprinkler piping

6.5.6.6. Materials installed to protect combustible sprinkler piping, as required by the **Building Code** current at the time of installation, shall be maintained in accordance with the provisions of the same edition of the **Building Code** used for their installation.

SECTION 6.6 WATER SUPPLIES FOR FIRE PROTECTION

Subsection 6.6.1. General

6.6.1.1. Private and public water supplies for fire protection installations shall be maintained to provide the required flow under fire conditions.

Valve inspections

6.6.1.2. (1) Except as permitted in Sentences (2) and (3), valves controlling water supplies used exclusively for fire protection systems shall be sealed in the open position and **inspected** weekly.

(2) Valves which are locked open or valves which are electrically supervised shall be **inspected** monthly.

(3) After any alterations or repairs, an **inspection** shall be made to ensure valves are returned to the fully open position and are sealed, locked or electrically supervised.

Ice accumulations

6.6.1.3. Water supply systems used for fire protection shall be kept free of ice accumulations that may interfere with flow.

Antifreeze pumping systems

6.6.1.4. Where antifreeze solutions are used to maintain pumping systems operable under freezing conditions, the specific gravity shall be such that the solution will remain unfrozen at a temperature of 8°C below the expected minimum temperature of the surrounding atmosphere.

Inspection, testing and maintenance

6.6.1.5. (1) Compliance with the **inspection, testing** and maintenance provisions of NFPA 25, “Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems”, for tanks is deemed to satisfy the requirements of Subsection 6.6.2.

(2) Compliance with the **inspection, testing** and maintenance provisions of NFPA 25, “Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems”, for fire pumps is deemed to satisfy the requirements of Subsection 6.6.3.

(3) Compliance with the **inspection, testing** and maintenance provisions of NFPA 25, “Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems”, for hydrants is deemed to satisfy the requirements of Subsection 6.6.5.

Subsection 6.6.2. Tanks

Tank inspections

6.6.2.1. An annual **inspection** shall be made of tanks for fire protection, tank supporting structures and water supply systems, including piping, control valves, check valves, heating systems, mercury gauges and expansion joints, to ensure that they are in operating condition.

Tank heating equipment

6.6.2.2. Tank heating equipment and accessories shall be **checked** daily during freezing weather to ensure that they are in operating condition and that heater valves are open.

Water temperature checks

6.6.2.3. A daily **check** of the temperature of the water contained in tanks shall be carried out during freezing weather to ensure that it does not fall below the freezing temperature.

Tank enclosure temperature checks

6.6.2.4. A daily **check** of the temperature of the tank enclosure for tanks in **buildings** shall be carried out during freezing weather to ensure that the temperature of the tank enclosure does not fall below 0°C.

Check for corrosion

6.6.2.5. Steel and iron work, including the inside and outside of steel tanks and hoops and grillages for wooden tanks, shall be **checked** for corrosion at intervals not exceeding two years and scraped and repainted as required.

Inspection for sediment

6.6.2.6. (1) Tanks, other than tanks supplied by a potable water supply, shall be **inspected** for accumulations of sediment at least every two years and cleaned as required.

(2) Tanks supplied by a potable water supply shall be **inspected** every five years and scraped and repainted as required.

Inspection of cathodic protection

6.6.2.7. Where cathodic protection equipment is installed to prevent corrosion of steel tanks, the equipment shall be **inspected** annually.

Water level in gravity tanks

6.6.2.8. The water level in gravity tanks shall be **inspected** monthly.

Gravity tanks

6.6.2.9. Gravity tanks shall be **inspected** annually to ensure that the tank roof is tight and in good repair, that hatches or doors are kept closed and properly secured and that the frost-proof casing of the tank riser makes a tight joint with the bottom of the tank.

6.6.2.10. The space between overflow pipes and the tops of gravity tanks, the valve pits at the bottoms of the risers and the entire area around the bases of the columns of tanks shall be kept free of rubbish and waste materials.

6.6.2.11. Gravity tank expansion joints shall be repacked and adjusted if binding or leaks develop.

Pressure tanks

6.6.2.12. (1) Pressure tanks shall be **checked** weekly during which the water level shall be observed and the air pressure shall be read.

(2) Corrective action shall be taken immediately if the observed water level or air pressure is outside the designed operating range for the tank.

6.6.2.13. Relief valves on the air and water supply lines of pressure tanks shall be **inspected** weekly.

Subsection 6.6.3. Fire Pumps and Reservoirs

Fire pump reservoirs

6.6.3.1. The water level in the fire pump reservoir shall be **checked** weekly.

Pump room temperature

6.6.3.2. The temperature of pump rooms shall be **checked** daily during freezing weather.

Inspection of fire pumps

6.6.3.3. (1) Fire pumps shall be operated at least once per week at rated speed.

(2) The fire pump discharge pressure, suction pressure, lubricating oil level, operative condition of relief valves, priming water level and general operating conditions shall be **inspected** during the weekly operation of fire pumps.

Internal combustion engine inspection

6.6.3.4. (1) Internal combustion engine fire pumps shall be operated once a week for a sufficient time to bring the engine up to normal operating temperature.

(2) The storage batteries, lubrication systems, oil and fuel supplies shall be **inspected** once a week.

Fire pump flow tests

6.6.3.5. Fire pumps shall be **tested** annually at full rated capacity to ensure that they are capable of delivering the rated flow.

Hotels

6.6.3.6. In **buildings** containing a **hotel**, the intervals referred to in Articles 6.6.3.3. and 6.6.3.4. are permitted to be once per month.

Subsection 6.6.4. Hydrants

Hydrants

6.6.4.1. Municipal and private hydrants shall be maintained in operating condition.

6.6.4.2. Hydrants shall be maintained free of snow and ice accumulations.

6.6.4.3. Hydrants shall be readily available and unobstructed for use at all times.

Subsection 6.6.5. Inspection of Hydrants

6.6.5.1. Hydrants shall be **inspected** annually and after each use in accordance with Articles 6.6.5.2. to 6.6.5.5.

6.6.5.2. (1) Except when in use or being **inspected** in accordance with Sentence (2), hydrants shall be equipped with port caps that are secured wrench-tight.

(2) The port caps shall be removed and the connections **inspected** for wear, rust or obstructions that in any way hamper easy removal and corrective action shall be taken as needed.

(3) If the caps are missing, the hydrant shall be examined for obstructions or accumulated refuse and flushed in accordance with Article 6.6.5.7. and the port caps shall be re-installed.

6.6.5.3. The hydrant barrel shall be **inspected** to ensure that no water has accumulated within the barrel when the main valve is in the closed position.

6.6.5.4. Where the hydrant barrel is found to contain water under Article 6.6.5.3., the drain valve shall be **inspected** for operation.

6.6.5.5. If the hydrant barrel is found to contain water because of poor drainage that is impractical to correct, **approved** measures shall be taken to prevent freezing during winter conditions.

Hydrant water flow

6.6.5.6. Hydrant water flow shall be **inspected** annually in accordance with Article 6.6.5.7.

6.6.5.7. The main valve of the hydrant shall be fully opened and the hydrant operated with one port open and the water flow **checked**.

6.6.5.8. A record of the hydrant operation as described in Article 6.6.5.7. shall be kept in conformance with Article 1.1.2.1.

Subsection 6.6.6. Uniform Marking of Hydrants

Hydrant marking

6.6.6.1. Hydrants shall be colour-coded in accordance with NFPA 291, “Recommended Practice for Fire Flow Testing and Marking of Hydrants”.

SECTION 6.7 EMERGENCY POWER SYSTEMS

Subsection 6.7.1. General

6.7.1.1. (1) Except as provided in Sentence (2), and Articles 6.7.1.2. to 6.7.1.5., emergency power systems shall be **inspected, tested** and maintained in conformance with CSA-C282, “Emergency Electrical Power Supply for Buildings”.

(2) An emergency electrical power supply system for emergency equipment in hospitals shall be **inspected, tested** and maintained in conformance with CSA-Z32, “Electrical Safety and Essential Electrical Systems in Health Care Facilities”.

(3) When an emergency power system or any part thereof is shut down, the **supervisory staff** shall be notified in accordance with Section 2.8.

Instructions for switching and starting

6.7.1.2. Where an emergency power system is installed, instructions shall be provided for switching on essential loads and for starting the generator when this is not done automatically.

Inspection and testing

6.7.1.3. Despite the requirements of Article 1.1.2.1., written records shall be maintained as required in CSA-C282, “Emergency Electrical Power Supply for Buildings”.

Fuel supply

6.7.1.4. The amount of fuel stored and connected to the emergency power system shall be sufficient to operate the engine for at least 2 h.

6.7.1.5. (1) Liquid fuel **storage tanks** shall be drained and refilled with fresh fuel at intervals not greater than 12 months.

(2) The requirements of Sentence (1) may be achieved by replenishment as the result of the normal **test** program required in Article 6.7.1.1.

SECTION 6.8 SPECIAL FIRE SUPPRESSION SYSTEMS

Subsection 6.8.1. Installation

6.8.1.1. (1) Where a special fire suppression system is installed after November 21, 2007 to comply with this Code, the system shall conform to one of the standards set out in Sentences (3) and (4).

(2) If a water-based fire suppression system is not compatible with fire suppression for specific types of hazards, a special fire suppression system conforming to one of the standards set out in Sentence (3) is permitted to be installed in lieu of a water-based system.

(3) The design and installation of a special fire suppression system that is not water-based shall conform to one of the following standards:

- (a) NFPA 11, “Standard for Low-, Medium-, and High-Expansion Foam”,
- (b) NFPA 12, “Standard on Carbon Dioxide Extinguishing Systems”,
- (c) NFPA 12A, “Standard on Halon 1301 Fire Extinguishing Systems”,
- (d) NFPA 12B, “Standard on Halon 1211 Fire Extinguishing Systems”,
- (e) NFPA 17, “Standard for Dry Chemical Extinguishing Systems”, or
- (f) NFPA 17A, “Standard for Wet Chemical Extinguishing Systems”.

(4) The design and installation of a water-based special fire suppression system shall conform to one of the following standards:

- (a) NFPA 15, “Standard for Water Spray Fixed Systems for Fire Protection”, or
- (b) NFPA 16, “Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems”.

(5) Wetting agents used in conjunction with water-based fire suppressions systems shall conform to NFPA 18, “Standard on Wetting Agents”.

(6) A hazard for which a fire suppression system has been designed is not permitted to be increased unless the level of fire protection is also commensurately increased.

(7) Operating and maintenance instructions for a special fire suppression system shall be posted in proximity to the equipment and, if manual controls are provided, shall also be posted near the manual controls.

(8) Valves and controls for a special fire suppression system shall be clearly marked to indicate their function and shall be accessible at all times.

Subsection 6.8.2. Inspection and Maintenance

6.8.2.1. (1) Except as otherwise provided in this Section, where special fire suppression systems have been installed, **inspection** and maintenance shall be provided in conformance with the appropriate standards set out in Sentences 6.8.1.1. (3), (4) and (5).

(2) Where a special fire suppression system of a type has been installed in accordance with a standard not referred to in Article 6.8.1.1., **inspection** and maintenance shall be provided in conformance with the specified standard and in the absence of a standard, to the manufacturer's recommended maintenance instructions.

(3) When a special fire suppression system or any part thereof is shut down, the **supervisory staff** shall be notified in accordance with Section 2.8.

Test records

6.8.2.2. Written records shall be kept of **inspections**, maintenance and **testing** in conformance with Article 1.1.2.1.

Container maintenance

6.8.2.3. Extinguishing agent containers provided for special fire suppression systems shall be fully charged with the proper quantity of extinguishing agent and the necessary operating pressure maintained.

Discharge outlets

6.8.2.4. Discharge outlets for special fire suppression systems shall be kept free of dirt and residue.

Piping

6.8.2.5. Piping and equipment shall be mechanically secure and accessible for cleaning and maintenance.

Replacement equipment

6.8.2.6. No replacement equipment and devices provided for special fire suppression systems shall be used unless suitable for the installation in which they are to be placed.

PART 7

INSPECTION, TESTING AND MAINTENANCE OF FIRE EMERGENCY SYSTEMS IN HIGH BUILDINGS

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SECTION 7.1 GENERAL

Subsection 7.1.1. General

Application

7.1.1.1. This Part provides for the **checking, inspection, testing** and maintenance of fire emergency systems installed in high **buildings** as described in Article 3.2.6.1. of Division B of the **Building Code**.

Testing fire emergency systems

7.1.1.2. Fire emergency systems required by the **Building Code** shall be **tested** in conformance with Sections 7.2 and 7.3.

Maintenance of fire emergency systems

7.1.1.3. (1) In addition to the requirements of Part 6, components of fire emergency systems shall be maintained in conformance with Sentences (2) to (6).

(2) The keys required to recall elevators and to permit independent operation of each elevator shall be kept in the location required by the **Building Code**.

(3) The required firefighters' elevator symbol shall be maintained in identifiable condition.

(4) Access to windows and panels required to vent **floor areas** and vents to vestibules permitted to be manually openable shall be kept free of obstructions.

(5) Windows and panels provided for venting **floor areas** shall be maintained so as to be openable without the use of keys.

(6) Vents to vestibules permitted to be manually openable shall be maintained in an operable condition.

SECTION 7.2 INSPECTION, TESTING AND MAINTENANCE

Subsection 7.2.1. Intervals Between Tests

7.2.1.1. Unless otherwise specifically prescribed in this Part, **tests** shall be carried out at intervals of not more than three months.

7.2.1.2. Firefighters' elevators required by Part 9 of this Division or by the **Building Code** shall be maintained in operable condition.

Subsection 7.2.2. Elevators

Testing

7.2.2.1. (1) Elevator door-opening devices operated by means of photo-electric cells shall be **tested** to ensure that the devices become inoperative after the door has been held open for more than 20 s with the photo-electric cell covered.

(2) Key-operated switches located outside an elevator shaft shall be **tested** to ensure that actuation of the switch will render the emergency stop switch in each car inoperative and bring all cars to the **street** floor or transfer lobby by cancelling all other calls after the car has stopped at the next floor at which it can make a normal stop.

(3) Key-operated switches in each elevator car shall be **tested** to ensure that actuation of the switch will

(a) enable the elevator to operate independently of other elevators,

(b) allow operation of the elevator without interference from floor call buttons,

(c) render door protective devices inoperative, and

(d) control the opening of power-operated doors only by continuous pressure on the door-opening buttons or switches, to ensure that if the "OPEN" button or switch is released while the door is opening, the doors will automatically close.

Subsection 7.2.3. Venting to Aid Fire Fighting

Inspection

7.2.3.1. (1) **Closures** in vent openings into smoke shafts from each **floor area** shall be **inspected** sequentially over a period not to exceed five years.

(2) Every **closure** in an opening to the outdoors at the top of a smoke shaft shall be **inspected** annually to ensure that it will open

(a) manually from outside the **building**,

(b) on a signal from the smoke or heat actuated device in the smoke shaft, and

(c) when a **closure** in an opening between a **floor area** and the smoke shaft opens.

(3) In addition to the procedures described in Sentences (1) and (2), elevators in an elevator shaft that is intended for use as a smoke shaft shall be **inspected** semi-annually to ensure that on activation of the fire alarm system they will return to the **street** floor and remain inoperative.

(4) Where an air-handling system is used for venting **floor areas** in the event of a fire to comply with the requirements of the **Building Code**, the system shall be **inspected** annually to ensure that air is exhausted to the outdoors.

Subsection 7.2.4. Central Alarm and Control Facilities and Voice Communication Systems for Life Safety

7.2.4.1. The **checking, inspecting** and **testing** of central alarm and control facilities and voice communication systems for life safety shall be carried out in accordance with the requirements of Section 6.3.

SECTION 7.3 INSPECTIONS AND TESTS FOR SMOKE CONTROL EQUIPMENT

Subsection 7.3.1. General

7.3.1.1. Smoke control equipment provided in **buildings** under the **Building Code** shall be maintained in a manner to ensure that they are fully operational.

7.3.1.2. Where smoke control measures contained in Commentary C of NRC, User's Guide –NBC 1995, "Fire Protection, Occupant Safety and Accessibility (Part 3)" are used, the **inspections** and **tests** shall be carried out as outlined in Section 7.3 in Division B of NRC, "National Fire Code of Canada 2005".

7.3.1.3. (1) Except as described in Sentences (2) to (5), where a smoke control system is designed to meet the requirements of the **Building Code**, the **inspections** and **tests** for equipment shall be carried out in accordance with procedures established by the designer of the system.

(2) Where procedures described in Sentence (1) are not available, smoke control systems shall be assessed to ensure satisfactory operation using techniques described in MAH Supplementary Standard SB-4, "Measures for Fire Safety in High Buildings".

(3) Upon completion of the assessment described in Sentence (2), written procedures for periodic **inspections** and **tests** shall be established.

(4) The procedures described in Sentence (2) and (3) shall bear the signature and seal of a **Professional Engineer** or **Architect**.

(5) The **inspections** and **tests** established under Sentence (3) shall be implemented.

(6) Despite Sentences (1) and (3), other **inspection** and **test** procedures may be **approved**.

PART 8 DEMOLITION

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SECTION 8.1 GENERAL

Subsection 8.1.1. Application

Application

8.1.1.1. This Part applies to the prevention or control of fire during any **demolition** and the protection from fire of adjacent occupied spaces and adjoining properties.

Subsection 8.1.2. Requirements

Building services

8.1.2.1. Existing **building** services that may be affected by **demolition** so as to cause a fire hazard shall be protected or be shut off and capped.

Firewatch

8.1.2.2. (1) During periods when **demolition** operations will create a fire hazard to neighbouring properties or partially occupied spaces, a firewatch shall be provided.

(2) Where a firewatch is required, the **demolition** site shall be toured at least once each hour.

(3) The firewatch personnel shall be provided with a means of communication with the **fire department**, and be equipped with portable illumination and protective equipment.

(4) Prior to commencement of **demolition**, a plan conforming to Sentence (5) shall be prepared and implemented for the **demolition** site.

(5) The plan required by Sentence (4) shall include

(a) the designation and organization of site personnel to carry out fire safety duties, including firewatch if applicable,

(b) the emergency procedures to be used in case of fire, including

(i) sounding the alarm throughout the **building**,

(ii) notifying the **fire department**, and

(iii) instructing site personnel on procedures to be followed when the fire alarm sounds,

- (c) the control of fire hazards in and around the **building**, and
- (d) the maintenance of fire fighting facilities.

Storage of combustible salvage

8.1.2.3. (1) Combustible salvage, combustible waste material and rubbish shall not be permitted to accumulate on site in such quantity or such location as to cause a fire hazard.

- (2) Where temporary chutes are installed on the exterior of a **building** they shall
 - (a) be of noncombustible material, or
 - (b) be installed a distance of at least 3 m from any opening in the **building** face.

Removal of combustible waste

8.1.2.4. Rubbish shall not be burned on the premises unless permitted in accordance with Article 2.6.3.4.

Welding and cutting

8.1.2.5. Electric or gas welding and cutting equipment and the installation, operation and maintenance of electric or gas welding and cutting equipment shall be carried out in conformance with the requirements of Section 5.17.

Standpipe systems

8.1.2.6. (1) Where a **building** being **demolished** floor by floor is equipped with a standpipe system, the system, together with **fire department** connections, valves, couplings and hose, shall be maintained in operable condition on all **storeys** below the one being demolished, except for the **storey** immediately below it.

(2) Where no **fire department** standpipe connections exist in **buildings** 4 **storeys** or more in **building height** in **buildings** under **demolition**, a temporary connection shall be provided.

(3) In **buildings** not equipped with a standpipe system and over 8 **storeys** in **building height**, a temporary standpipe shall be provided.

(4) Standpipe systems shall be kept in such condition that they may be connected near **street** level, to a **fire department** pump, so as to supply water to every outlet on each floor.

(5) In **buildings** over 84 m in height, primary water supplies serving standpipe systems, including fire pumps, shall be maintained in operating condition in **buildings** under **demolition**.

Access for fire fighting

8.1.2.7. (1) Fire fighting access routes shall be maintained in conformance with Section 2.5.

(2) Unobstructed access to fire hydrants, portable extinguishers and to **fire department** connections for standpipe and sprinkler systems shall be maintained.

(3) Where a **demolition** site is fenced so as to prevent general entry, provision shall be made for access by **fire department** equipment and personnel.

(4) Elevating devices shall be accessible for the use of firefighters for **buildings** more than 36 m in **building height**, measured between **grade** and the floor level of the top **storey**.

Portable extinguishers

8.1.2.8. (1) Portable extinguishers shall be provided in **buildings** under **demolition** in conformance with Subsection 6.2.6. as if the **building** were graded for ordinary hazard under Subsection 6.2.5.

(2) In addition to the other requirements of this Code, portable extinguishers shall be provided

- (a) adjacent to cutting or welding operations,
- (b) in areas where combustibles are stored,
- (c) near or on any internal combustion engines,
- (d) adjacent to areas where **flammable liquids** or gases are stored or handled,
- (e) adjacent to temporary oil-fired or gas-fired equipment, and
- (f) adjacent to bitumen heating equipment.

(3) The extinguishers required by Sentence (2) shall have a minimum rating of

- (a) 2A:10B:C on moveable equipment, and
- (b) 4A:40B:C in all other locations.

(4) Portable extinguishers required in Sentences (1), (2) and (3) shall be maintained in conformance with Section 6.2.

Smoking restrictions

8.1.2.9. Smoking shall be permitted only in conformance with Subsection 2.4.3.

Clearance to combustible materials

8.1.2.10. (1) Internal combustion engines shall be located so that the exhaust discharges not less than 500 mm from combustible materials.

(2) Where exhaust from internal combustion engines is piped outdoors, a clearance of not less than 150 mm shall be maintained between the exhaust pipe and any combustible material.

(3) The clearance between combustible materials and temporary heating equipment, including **flues**, shall be in conformance with the **Building Code** or in conformance with the minimum clearances shown on certified heating equipment.

Temporary enclosures

8.1.2.11. Fabrics and films used to temporarily enclose **buildings** shall be securely fastened to prevent them from being blown against heaters or other ignition sources.

Provisions for egress

8.1.2.12. Unless otherwise **approved**, at least two **exits** shall be accessible and usable at all times.

Fire warning

8.1.2.13. (1) A system shall be provided to alert site personnel of fire.

(2) The system required by Sentence (1) shall be capable of being heard throughout the **building**.

**PART 9
RETROFIT**

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SECTION 9.1 GENERAL

Subsection 9.1.1. General

Scope

9.1.1.1. This Part provides for the upgrading of existing **buildings** through **retrofit**.

Compliance

9.1.1.2. (1) The requirements of this Part shall be satisfied

(a) by implementing the requirements of the applicable Section except as provided in Subsection 9.1.3. and Sentence 9.5.3.7.(5), or

(b) by implementing an **approved** Life Safety Study in accordance with Subsection 9.1.4.

Approved alternatives

9.1.1.3. A requirement of this Part is deemed to be complied with if materials, equipment or systems are **approved** that, in the opinion of the **Chief Fire Official**, will provide protection for life safety similar to the protection provided by compliance with the requirement.

Subsection 9.1.2. Application

Application

9.1.2.1. (1) Except as provided in Sentence (2), the requirements for **buildings** that are covered by this Part shall be determined by their **occupancies** as regulated in the appropriate Sections herein.

(2) **Care occupancies** not regulated by Sentence 9.4.1.1.(1) are deemed to be **residential occupancies** for the purposes of this Part.

Exemptions

9.1.2.2. (1) Except for Section 9.9, this Part does not apply to **buildings** or parts thereof that satisfy the requirements of the **Building Code**.

(2) Section 9.9 does not apply to **buildings** or parts thereof that satisfy the requirements of the **Building Code** as it read on or after July 1, 1993.

(3) This Part does not apply to a **building** that contains not more than one **dwelling unit** and no other **major occupancy**.

(4) The requirements of Sections 9.2 to 9.8, except Article 9.5.3.7., do not apply to installations or construction that meet, on November 20, 2007, the requirements of **Ontario Regulation 388/97 (Fire Code)**, as it read on that day.

(5) Sections 9.2, 9.3, 9.4, 9.5, 9.6 and 9.8 do not apply to **buildings** with respect to which the **Chief Fire Official** has granted an exemption under a predecessor to the Regulation for so long as the exemption is valid.

Subsection 9.1.3. Schedule of Compliance

Compliance time for hotels

9.1.3.1. (1) Except as permitted in Sentences (2), (3) and (4) and Article 9.1.3.2., it is the responsibility of the **owner** to comply with the requirements of Section 9.9.

(2) In a **hotel establishment** constructed after August 31, 1971, or in an addition to a **hotel establishment** constructed after August 31, 1971, it is the responsibility of the **owner** to comply with the requirements of

- (a) Article 9.9.1.2., as of January 1, 2008,
- (b) Sentence 9.9.2.12.(5) and Article 9.9.4.13., as of July 1, 2008,
- (c) Sentences 9.9.2.8.(2), 9.9.2.14.(3) and (4) and 9.9.3.3.(2), (3) and (5), Clauses 9.9.4.2.(2)(b) and (c) and Sentence 9.9.4.2.(4), as of January 1, 2010, and
- (d) Article 9.9.2.9., Sentences 9.9.2.10.(7) and (8), Article 9.9.2.13., Sentences 9.9.2.15.(3) and 9.9.3.2.(3) and Articles 9.9.4.14., 9.9.5.1., 9.9.5.3. and 9.9.5.5, as of January 1, 2012.

(3) In a **hotel establishment** constructed after August 31, 1971, or in an addition to a **hotel establishment** constructed after August 31, 1971, it is the responsibility of the **owner** to comply with the requirements of Sentence 9.9.2.8.(1) with respect to self-closing devices on doors as of January 1, 2010.

(4) In a **hotel establishment** constructed prior to September 1, 1971, or in an addition to a **hotel establishment** constructed prior to September 1, 1971, it is the responsibility of the **owner** to comply with the requirements of

- (a) Article 9.9.1.2., as of January 1, 2008,
- (b) Sentence 9.9.2.12.(5) and Article 9.9.4.13., as of July 1, 2008,
- (c) Article 9.9.2.6., Sentences 9.9.2.8.(1) and (2), 9.9.2.14.(3) and (4) and 9.9.3.3.(2), (3), (5) and (6), Article 9.9.3.5., Sentences 9.9.3.6.(2) and 9.9.3.7.(1), Clauses 9.9.4.2.(2)(b) and (c) and Sentence 9.9.4.2.(4), as of January 1, 2010, and
- (d) Sentence 9.9.2.1.(6), Articles 9.9.2.2. to 9.9.2.5., 9.9.2.7. and 9.9.2.9., Sentences 9.9.2.10.(7) and (8), Article 9.9.2.13., Sentences 9.9.2.15.(3), 9.9.3.2.(2) and (3) and Articles 9.9.4.14., 9.9.5.1., 9.9.5.2., 9.9.5.3. and 9.9.5.5, as of January 1, 2012.

Extension of time

9.1.3.2. If compliance is not possible by the date required under Article 9.1.3.1. because of a strike, material shortage or other circumstances beyond an **owner's** control, the **Chief Fire Official** may grant an extension of the time for compliance.

Subsection 9.1.4. Life Safety Study

Life Safety Study

9.1.4.1. (1) A Life Safety Study is a proposal to the **Chief Fire Official** that consists of

- (a) a detailed assessment of the life safety performance requirements, clearly identifying items not meeting the requirements of this Part,
- (b) a detailed description of how an acceptable level of life safety can be achieved, and
- (c) a detailed time schedule to implement the provisions of Clause (b).

Contents

9.1.4.2. (1) A Life Safety Study shall deal with, but is not limited to

- (a) containment, including
 - (i) **fire separations**,
 - (ii) **firewalls**,
 - (iii) construction assemblies,
 - (iv) **occupancy separations**, and

- (v) interior finishes,
- (b) detection, including
 - (i) alarm and detection systems, and
 - (ii) voice communication systems,
- (c) suppression, including
 - (i) **fire department** access,
 - (ii) standpipe and hose systems,
 - (iii) sprinkler or special fire suppression systems, and
 - (iv) firefighters' elevators, and
- (d) egress, including
 - (i) the number, type, **access to**, direction to, lighting for and identification of **exits**,
 - (ii) fire escapes,
 - (iii) **occupant load**, and
 - (iv) emergency lighting.

Signature and seal

9.1.4.3. A Life Safety Study shall bear the signature and seal of a **Professional Engineer** or **Architect**, or both.

Time schedule

9.1.4.4. The time schedule referred to in Clause 9.1.4.1.(1)(c) may provide for a compliance date after the compliance date required by Article 9.1.3.1.

Extension of time

9.1.4.5. An **owner** or the **owner's** agent may apply to the **Chief Fire Official** for an extension of the compliance date to permit time for a Life Safety Study to be submitted.

Extension following Order

9.1.4.6. (1) Where an **owner** or the **owner's** agent has received an **Order** that requires compliance with this Part, the **owner** or the **owner's** agent may apply within five days of receipt of the **Order** to the **Chief Fire Official** to extend the time for compliance pending submission of a Life Safety Study.

(2) Upon receipt of the application referred to in Sentence (1), the **Chief Fire Official** shall, within 10 days, review the application and either grant or refuse an extension of the time for compliance to permit submission of a Life Safety Study.

(3) The **Chief Fire Official** shall notify the **owner** or the **owner's** agent of the **Chief Fire Official's** decision in writing.

(4) Notification shall be served either personally or by mail.

(5) Where notification is by mail, it is deemed to have been served on the fifth day after the date of mailing.

(6) An **owner** or the **owner's** agent, within five days of being notified of a refusal to grant an extension of the time to submit a Life Safety Study, may request the reasons for the refusal in writing.

(7) The **Chief Fire Official** shall comply with the request referred to in Sentence (6) within 10 days after receipt thereof.

(8) An **owner** or the **owner's** agent who feels aggrieved by a decision to refuse an extension of time to submit a Life Safety Study may, within 30 days of the refusal, appeal the refusal in the same manner as though it were an **Order**.

Review

9.1.4.7. (1) Despite any other **Order** that requires compliance with this Part, the **Chief Fire Official** shall, within 30 days after receiving a Life Safety Study, review the Life Safety Study for implementation.

(2) Where a Life Safety Study is **approved** for implementation, the **Chief Fire Official** shall notify the **owner** or the **owner's** agent of the decision in writing.

(3) Where a Life Safety Study is not **approved**, the **Chief Fire Official** shall advise the **owner** or the **owner's** agent of the decision and the reasons therefor in writing.

(4) Notification shall be served either personally or by mail.

(5) Where notification is by mail, it is deemed to have been served on the fifth day after the date of mailing.

(6) An **owner** or the **owner's** agent who feels aggrieved by a decision not to **approve** a Life Safety Study may, within 30 days of the refusal, appeal the decision in the same manner as though it were an **Order**.

(7) Despite any other provision of this Part, a Life Safety Study that has been **approved** and implemented is deemed to satisfy an **Order** requiring compliance with this Part and made with respect to the same premises before the Life Safety Study was accepted.

Record

9.1.4.8. A copy of an **approved** Life Safety Study shall be kept on the premises to which it relates and be made available to the **Chief Fire Official** upon request.

SECTION 9.2 ASSEMBLY OCCUPANCIES

Subsection 9.2.1. Application

Assembly occupancies

9.2.1.1. (1) This Section applies to

- (a) art galleries,
- (b) auditoria,
- (c) beverage establishments,
- (d) bingo halls,
- (e) clubs,
- (f) community halls,
- (g) dance halls,
- (h) enclosed arenas,
- (i) exhibition halls,
- (j) gymnasias,
- (k) halls in religious establishments (excluding areas of worship),
- (l) lecture halls,
- (m) lodge rooms,
- (n) movie theatres,
- (o) museums,
- (p) opera houses,
- (q) restaurants,
- (r) television studios, and
- (s) theatres.

(2) For the purposes of this Section,

“**1986 Building Code**” means Ontario Regulation 419/86, as it read on February 11, 1987;

“existing” means in existence on February 11, 1987.

Exemption for educational facilities

9.2.1.2. This Section does not apply to **assembly occupancies** in **buildings** that are regulated by or under the **Education Act** or the **Ministry of Colleges and Universities Act**.

Exemption for hotels

9.2.1.3. This Section does not apply to a **building** or part of a **building** regulated by Section 9.9.

Subsection 9.2.2. Containment

Fire separations between major occupancies

9.2.2.1. (1) **Fire separations** shall be provided between **assembly occupancies** described in Subsection 9.2.1. and other **major occupancies** in compliance with Article 3.1.3.2. of the **1986 Building Code**.

(2) Where a **building** is **sprinklered** and the sprinkler system complies with Article 9.2.5.2. or where a detection system is provided and connected to the **building** fire alarm system, and Sentence (1) requires

- (a) a 2 h **fire separation**, a 1 h **fire separation** is deemed to be in compliance, or
- (b) a 1 h **fire separation**, a 30 min **fire separation** is deemed to be in compliance.

Protection of openings in fire separations

9.2.2.2. (1) **Closures** that are in compliance with Sentences 3.1.6.4.(2) and 3.1.6.7.(1) of the **1986 Building Code** shall be provided in **fire separations**.

- (2) Where Sentence (1) requires
 - (a) a 1 h or a 45 min **fire-protection rating**, existing hollow metal or kalamein doors, with or without wired glass and equipped with self-closing devices, and existing hollow metal frames are deemed to be in compliance,
 - (b) a 1 h or a 45 min **fire-protection rating**, existing wired glass screens set in fixed steel frames are deemed to be in compliance, or
 - (c) a 20 min **fire-protection rating**, existing 45 mm solid core wood doors and existing solid wood frames are deemed to be in compliance.

(3) Despite the requirements referred to in Sentence (1), **fire dampers** or **fire-stop flaps** are not required to be installed in existing noncombustible ducts at penetrations of a **fire separation**.

Fire separations for hazardous areas

9.2.2.3. (1) In high **buildings** classified in the **1986 Building Code** under Subsection 3.2.6., **fire separations** that are in compliance with Subsection 3.5.2. of the **1986 Building Code** shall be provided between **service rooms** and **assembly occupancies**.

(2) In **buildings** not referred to in Sentence (1), **fire separations** that are in compliance with Subsection 3.5.2. of the **1986 Building Code** shall be provided between **service rooms** and **assembly occupancies**.

(3) A 30 min **fire separation** is deemed to be in compliance with Sentence (2) where

- (a) the **service room** is **sprinklered**, or
- (b) a detection system is provided and connected to the **building** fire alarm system.

(4) **Fire separations** shall be provided between theatrical stages and **assembly occupancies** in compliance with Sentences 3.3.2.14.(3) to (5) of the **1986 Building Code**.

(5) Despite Sentence (4), existing **fire separations** may be **approved**.

Interior finishes

9.2.2.4. (1) Interior finishes shall comply with the **flame-spread rating** requirements under Clauses 3.1.4.5.(3)(g) and (h) and Subsection 3.1.11. of the **1986 Building Code**.

(2) Where

- (a) the finish is not an exposed expanded plastic, the assembly area is **sprinklered** and the sprinkler system complies with Article 9.2.5.2., the existing interior finish is deemed to be in compliance with Sentence (1), or
- (b) the finish is treated with a fire retardant surface coating **listed** by a recognized **testing** laboratory and applied in accordance with the listing conditions, the finish is deemed to be in compliance with Sentence (1).

(3) Despite Sentence (1), existing interior finishes may be **approved**.

Subsection 9.2.3. Means of Egress

Occupant load determination

9.2.3.1. The **occupant load** for calculation of number and width of **exits** referred to in Articles 9.2.3.6. and 9.2.3.7. shall be in accordance with Article 2.7.1.4.

Access to exits; number and location

9.2.3.2. (1) Where the **occupant load** of a room exceeds 60 persons, at least two egress doorways shall be provided in such a manner that one doorway can provide egress if the other doorway becomes inaccessible to the occupants.

(2) An existing room with one doorway is deemed to be in compliance with Sentence (1) where

- (a) the **occupant load** does not exceed 100 persons,
- (b) the **floor area** is **sprinklered** and the sprinkler system complies with Article 9.2.5.2., and

- (c) the **travel distance** does not exceed 23 m.

Access to exits

- 9.2.3.3. (1) **Access to exits** shall comply with Article 3.3.2.7. of the **1986 Building Code**.
- (2) Existing **access to exits** through dead end corridors are deemed to be in compliance with Sentence (1) where
- (a) the **occupant load** does not exceed 20 persons, and
- (b) the travel distance does not exceed 6 m plus the width of the dead end corridor to a point where a choice of two directions of **exit** travel are available.

Minimum number of exits

- 9.2.3.4. (1) Each **floor area** shall be served by at least two **exits**.
- (2) Despite Sentence (1), **floor areas** in **buildings** not exceeding 2 **storeys** in **building height** may be served by one **exit** where
- (a) the **occupant load** for the **floor area** does not exceed 60 persons,
- (b) the **floor area** does not exceed 200 m², and
- (c) the **travel distance** from any point on the **floor area** does not exceed 15 m.

Door swing

9.2.3.5. Each door serving as an **access to exit** from a room serving more than 60 persons shall open in the direction of **exit** travel and shall swing on its vertical axis.

Number of exits

- 9.2.3.6. (1) The minimum number of **exits** from a **floor area** shall be,
- (a) for an **occupant load** of 61 up to and including 600 persons, not less than two **exits**,
- (b) for an **occupant load** of 601 up to and including 1000 persons, not less than three **exits**, or
- (c) for an **occupant load** of more than 1000 persons, not less than four **exits**.

Total width

9.2.3.7. (1) The aggregate required width of **exits** shall be determined by multiplying the **occupant load** of the area served by

- (a) 6.1 mm (1/4 in) per person for ramps with a gradient of not more than 1 in 8, doorways, corridors and passageways, or
- (b) 9.2 mm (3/8 in) per person for ramps with a gradient of more than 1 in 8 and stairs.

9.2.3.8. The width of an **exit** stair or of a corridor used as an **access to exit** or as an **exit** shall not be less than 900 mm.

9.2.3.9. Where the total number of **exits** and the total width of **exits** comply with Articles 9.2.3.6. and 9.2.3.7., existing corridor and stair widths are deemed to be in compliance with Article 9.2.3.8.

Fire escapes permitted

9.2.3.10. A fire escape may be erected on an existing **building** to provide one or more of the **exit** facilities described in Article 3.4.1.2. of the **1986 Building Code**, provided that the fire escape does not serve **floor areas** above the fifth floor.

Fire escape construction

- 9.2.3.11. (1) Each fire escape shall be constructed to comply with Article 3.4.7.13. of the **1986 Building Code**, except as permitted in Article 9.2.3.18.
- (2) Despite Sentence (1), an existing fire escape may be **approved**.

Emergency lighting

9.2.3.12. Emergency lighting shall comply with Article 3.2.7.3. of the **1986 Building Code**.

Exit signs

9.2.3.13. (1) Markings and signs for **exits** and **access to exits** shall comply with Subsection 3.4.5. of the **1986 Building Code**.

- (2) Despite Sentence (1), existing markings and signs may be **approved**.

9.2.3.14. In **buildings** over 2 **storeys** in **building height**, any part of an **exit** ramp or stair that continues past the **exit** door at ground level to a **basement** shall be clearly marked by a sign indicating that it does not lead to an **exit**.

Separation of exits

9.2.3.15. (1) Where an **exit** stairway, an escalator or a moving walkway serves as a required **exit**, it shall be separated from the remainder of the **building** in accordance with Sentence 3.4.4.1.(1) of the **1986 Building Code**.

(2) Doors in **fire separations** required in Sentence (1) shall be equipped with self-closing devices.

(3) An existing 45 min **fire separation** with a 45 min rated **closure** as described in Clause 9.2.2.2.(2)(a) is deemed to be in compliance with Sentence (1).

(4) Existing wired glass screens set in fixed steel frames are acceptable in **fire separations** required by this Article.

Exits through lobbies

9.2.3.16. (1) **Exits** through a lobby area shall comply with the requirements of Clauses 3.4.4.1.(7)(c) to (f) of the **1986 Building Code**.

(2) Despite Sentence (1), more than one **exit** may be permitted through a lobby area where there is at least one alternate **exit** capable of serving 50% of the total capacity and leading directly to the outside.

Ancillary rooms

9.2.3.17. (1) Existing storage rooms, garbage rooms and laundry rooms, opening directly into an **exit** stairway, shall be **sprinklered** and the rooms shall be separated from the **exit** stairway by a 45 min **fire separation**.

(2) Existing washrooms and toilet rooms opening directly into an **exit** stairway shall be separated from the **exit** stairway by a 45 min **fire separation**.

(3) Despite Sentences (1) and (2), existing ancillary rooms opening directly into an **exit** stairway may be **approved**.

9.2.3.18. (1) Openings adjacent to fire escapes shall comply with Sentence 3.4.7.13.(5) of the **1986 Building Code**.

(2) Existing openings are deemed to be in compliance with Sentence (1) where each opening is protected by sprinklers in conformance with Article 9.2.5.2.

(3) Despite Sentences (1) and (2), existing openings may be **approved**.

Subsection 9.2.4. Fire Alarm and Detection

Fire alarm systems

9.2.4.1. (1) Fire alarm and detection systems shall be installed in compliance with Subsection 3.2.4., excluding Article 3.2.4.7., of the **1986 Building Code**.

(2) Despite Sentence (1), existing fire alarm systems may be **approved** where the system reliability and performance will not increase the risk of life safety.

Subsection 9.2.5. Suppression

Access for fire fighting

9.2.5.1. (1) Access for fire fighting shall comply with Sentence 3.2.5.2.(1) of the **1986 Building Code**.

(2) Sentence (1) does not apply where the **building** is **sprinklered**.

(3) Access routes that do not comply with Sentence (1) may be **approved** where available **fire department** equipment has access to the **building** or alternative provisions are made under Subsection 2.8.2. for such access.

Sprinkler systems

9.2.5.2. (1) Except as permitted in Sentence (3), sprinkler systems shall comply with Article 3.2.5.5. of the **1986 Building Code**.

(2) An existing sprinkler system is deemed to be in compliance with Sentence (1) where the average sprinkler discharge density over the design area is at least equal to the minimum density corresponding to the area for the hazard classification as defined in Table 9.2.5.A.

(3) Where **buildings** with a ceiling height in excess of 9 m are required to be **sprinklered**, the design of the system shall be **approved** prior to installation.

(4) The water supply requirements for an existing sprinkler system shall be based on

(a) the hazard classification, as determined in Table 9.2.5.A., and

(b) the minimum sprinkler discharge density, area of application and sprinkler spacing, as determined in NFPA 13, "Standard for the Installation of Sprinkler Systems", that corresponds to the hazard classification determined under Clause (a).

(5) Clause (4)(b) does not apply to the water supply requirements for an existing sprinkler system in an arena or an exhibition hall.

(6) The water supply requirements for an existing sprinkler system in an arena or an exhibition hall shall be based on the lesser area of

- (a) 100% of the display area, or
- (b) 280 m².

TABLE 9.2.5.A.

Forming Part of Article 9.2.5.2.

Hazard Classification*	Occupancy
Light Hazard	Art galleries Beverage establishments Gymnasias Halls in religious establishments (excluding areas of worship) Lecture halls Museums
Ordinary Hazard Group 1	Auditoria (excluding stages) Bingo halls Clubs Community halls Dance halls Lodge rooms Motion picture theatres Opera houses (excluding stages) Restaurants Television studios Theatres (excluding stages)
Ordinary Hazard Group 3	Enclosed arenas Exhibition halls Stages excluded in Ordinary Hazard Group 1

*Hazard Classification is defined as per NFPA 13, “Standard for the Installation of Sprinkler Systems”.

SECTION 9.3 BOARDING, LODGING AND ROOMING HOUSES

Subsection 9.3.1. Application

Application

9.3.1.1. (1) This Section applies to boarding houses, lodging houses, rooming houses and private rest homes in which residents do not require care or treatment because of age, mental or physical limitations, where

- (a) the **building height** does not exceed 3 **storeys** and the **building area** does not exceed 600 m²,
- (b) lodging is provided for more than four persons in return for remuneration or the provision of services or both, and
- (c) lodging rooms do not have both bathrooms and kitchen facilities for the exclusive use of individual occupants.

(2) This Section applies to homes for special care within the meaning of the **Homes for Special Care Act**, where

- (a) the **building height** does not exceed 3 **storeys** and the **building area** does not exceed 600 m²,
- (b) sleeping accommodation is provided for more than three but not more than 10 residents, and
- (c) residents do not require nursing care.

(3) For the purposes of this Section,

“**1986 Building Code**” means Ontario Regulation 419/86, as it read on February 11, 1987;

“existing” means in existence on February 11, 1987.

Exemption for MCSS residences

9.3.1.2. Except as set out in Sentence 9.3.1.1.(2), this Section does not apply to **residential occupancies** that are regulated by or under the **Ministry of Community and Social Services Act**.

Exemption for hotels

9.3.1.3. This Section does not apply to a **building** or part of a **building** regulated by Section 9.9.

Subsection 9.3.2. Containment

9.3.2.1. **Fire separations** required by this Section to have a **fire-resistance rating** shall comply with Subsection 9.10.3. of the **1986 Building Code**.

Floor assemblies

9.3.2.2. (1) Floor assemblies shall

- (a) be constructed as **fire separations**, and
- (b) have a **fire-resistance rating** of not less than 30 min.

(2) Existing floor assemblies with ceilings consisting of lath and plaster, gypsum board or noncombustible materials are deemed to be in compliance with Sentence (1).

Basement fire separations

9.3.2.3. Where a **basement** does not contain a bedroom, recreation room, meeting room or hobby room, a **fire separation** having no **fire-resistance rating** between the **basement** and **first storey** is deemed to be in compliance with Clause 9.3.2.2.(1)(b).

Walls separating bedrooms

9.3.2.4. (1) Each guest room or **suite** of rooms shall have interior walls having a **fire-resistance rating** of not less than 30 min.

(2) Existing wall assemblies consisting of membranes of lath and plaster or gypsum wallboard are deemed to be in compliance with Sentence (1).

Furnace room separations

9.3.2.5. (1) In a **building** where the **building height** is greater than 2 **storeys** or the **building area** is greater than 400 m², a **furnace** room that is located on a **floor area** that contains a bedroom, recreation room, meeting room or hobby room shall be separated from the remainder of the **building** by a **fire separation** having a **fire-resistance rating** of not less than 45 min.

(2) Existing **fire separations** consisting of membranes of lath and plaster or gypsum board are deemed to be in compliance with Sentence (1).

(3) Where the required vertical **fire separation** in a **furnace** room is maintained and it is not practical in the circumstances to construct the ceiling as a **fire separation** having a **fire-resistance rating** of not less than 45 min, the **furnace** room area shall be **sprinklered** with a spacing that does not exceed 9.5 m² per sprinkler head.

(4) **Closures in fire separations** for a **furnace** room shall have a **fire-protection rating** of not less than 45 min.

(5) A hollow metal or kalamein door and frame are deemed to be in compliance with Sentence (4).

(6) **Closures** referred to in Sentences (4) and (5) shall be equipped with latches and self-closing devices.

(7) Despite Sentence (1), **fire dampers** or **fire-stop flaps** are not required in ducts at penetrations of a **fire separation**.

Combustion air

9.3.2.6. Where a **furnace** room is separated to comply with the requirements of Article 9.3.2.5., sufficient combustion air shall be brought directly from the exterior for the proper combustion and safe operation of the **appliance**.

Subsection 9.3.3. Means of Egress***Number of exits***

9.3.3.1. (1) Each **floor area** shall be served by at least two **exits**.

(2) Where sleeping accommodation is not provided for more than 10 persons, one **exit** from each of the first and second floor **floor areas** is deemed to be in compliance with Sentence (1).

(3) Where sleeping accommodation is not provided in the **basement**, one **exit** from the **basement** is deemed to be in compliance with Sentence (1).

Acceptable exits

9.3.3.2. (1) **Exits** required by Article 9.3.3.1. shall comply with the requirements of Articles 9.9.2.2. and 9.9.2.3. of the **1986 Building Code**.

(2) Despite Sentence 9.3.3.5.(1), not more than one required **exit** from the **basement** may lead through the first floor **floor area**.

(3) Where sleeping accommodation is not provided for more than 10 persons, corridors that are contiguous to a stairway may form part of the stairway enclosure.

(4) Only one stairway enclosure described in Sentence (3) shall be permitted as an **exit**.

(5) Where a fire escape of the type referred to in Article 9.3.3.4. is used as an **exit**, it is deemed to comply with the requirements of Articles 9.9.2.2. and 9.9.2.3. of the **1986 Building Code**.

9.3.3.3. Despite Articles 9.3.3.1. and 9.3.3.2., alternative measures may be **approved** where, in the opinion of the **Chief Fire Official**, they will provide protection for life safety similar to the protection provided by compliance with Articles 9.3.3.1. and 9.3.3.2.

Fire escapes

9.3.3.4. (1) Each fire escape used as an **exit** shall be constructed in compliance with Article 3.4.7.13., excluding Sentences (4) and (5), of the **1986 Building Code**.

(2) Despite Sentence (1), existing fire escapes may be **approved**.

(3) Access to fire escapes shall be from corridors.

Protection of exits

9.3.3.5. (1) Each **exit** other than a doorway opening directly onto a fire escape or to the outdoors at ground level shall be separated from the remainder of the **building** or from another **exit** by a **fire separation** having a **fire-resistance rating** of not less than 30 min.

(2) Existing **exit** stairways separated from the remainder of the **building** by walls consisting of lath and plaster or gypsum wallboard are deemed to be in compliance with Sentence (1).

(3) Despite Sentence (1), an existing separation of noncombustible material may be **approved**.

Interior stairways

9.3.3.6. (1) Floor separations shall be maintained at interior stairways that are not required **exits**.

(2) The floor separation shall be maintained at an **exit** permitted in Sentence 9.3.3.2.(2).

9.3.3.7. Floor separations required in Article 9.3.3.6. shall be rated in accordance with Articles 9.3.2.2. and 9.3.3.5.

Protection of openings in fire separations

9.3.3.8. (1) **Closures in fire separations** required in Articles 9.3.3.5. and 9.3.3.6. shall be constructed in accordance with Article 9.10.3.1. of the **1986 Building Code** with a minimum 20 min **fire-protection rating**.

(2) **Closures** located along contiguous corridors permitted in Sentence 9.3.3.2.(3) shall comply with Sentence (1).

(3) A 45 mm solid core wood, hollow metal or kalamein door, equipped with a self-closing device and a latching device, is deemed to be in compliance with Sentences (1) and (2).

(4) Despite Sentences (1) and (2), frames for doors described in Sentence (3) may be of wood, hollow metal or kalamein construction.

(5) Despite Sentences (1) and (2), **fire dampers** or **fire-stop flaps** are not required in ducts at penetrations of a **fire separation**.

9.3.3.9. Existing wired glass **closures** set in fixed steel frames in a **fire separation** are deemed to be in compliance with Article 9.3.3.8.

Exit signs

9.3.3.10. (1) **Exit** signs shall be located along a **means of egress** so that directions of **exit** travel are apparent to the occupants.

(2) **Exit** signs required by Sentence (1) shall have the word "EXIT" in block letters and such letters shall be

(a) internally or externally illuminated,

(b) coloured red on an opaque or contrasting field, and

(c) at least 115 mm high with a 19 mm stroke.

Interior finishes

9.3.3.11. The **flame-spread rating** of interior finishes on walls and ceilings within a **means of egress** shall not exceed 200.

Illumination of egress

9.3.3.12. Corridors and stairways shall be lighted to the intensity of 50 lx measured at the floor level, or 5 watts/m² of **floor area**.

Emergency lighting

9.3.3.13. Where sleeping accommodation is provided for more than 10 persons, emergency lighting shall be provided to corridors and stairways in accordance with Articles 9.9.11.4. and 9.9.11.5. of the **1986 Building Code**.

Subsection 9.3.4. Fire Alarm and Detection

Fire alarm requirements

9.3.4.1. (1) A **building** to which this Section applies that does not have floor assemblies having a minimum 45 min **fire-resistance rating** and **public corridors** or corridors serving sleeping rooms not within a **dwelling unit** that are not fire-separated from the remainder of the **building** by a minimum 30 min **fire-resistance rating** shall have a fire alarm system that complies with Articles 9.10.17.5. and 9.10.17.11. of the **1986 Building Code**, and shall have

- (a) **smoke alarms** that comply with Sentence (2) and that are installed and interconnected so that the activation of any **smoke alarm** will sound a similar signal in each of the interconnected devices, or
- (b) fire alarm system **smoke detectors** installed on the ceiling of each floor adjacent to each stairway, and on the ceiling in the **basement** adjacent to each stairway.
- (2) **Smoke alarms** referred to in Clause (1)(a) shall
 - (a) be installed on the ceiling in the corridor of each floor adjacent to each stairway and on the ceiling in the **basement** adjacent to each stairway,
 - (b) be on a separate circuit with no disconnect switch between the overcurrent device and the **smoke alarms**, and
 - (c) employ devices and an interconnected installation that are **listed**.

9.3.4.2. (1) A fire alarm system complying with Articles 9.10.17.4., 9.10.17.5., 9.10.17.11. and Subsection 9.10.18. of the **1986 Building Code** shall be installed where

- (a) sleeping accommodation is provided for more than 10 persons, and
- (b) the floor assemblies have a minimum 45 min **fire-resistance rating** and **public corridors** or corridors serving sleeping rooms not within a **dwelling unit** are fire-separated from the remainder of the **building** by a minimum 30 min **fire-resistance rating**.

9.3.4.3. Where a fire alarm system is required and sleeping accommodation is not provided for more than 14 persons, an interconnected **smoke alarm** system in accordance with Clause 9.3.4.1.(1)(a) is deemed to be in compliance with Article 9.3.4.2.

9.3.4.4. Despite Articles 9.3.4.1. and 9.3.4.2., existing fire alarm systems may be **approved** where the system reliability and performance will not increase the risk of life safety.

Subsection 9.3.5. Suppression

Portable extinguishers

9.3.5.1. (1) Despite the provisions of Subsection 6.2.6., at least one 2A rated portable extinguisher shall be provided on each floor.

- (2) At least one 5B:C rated portable extinguisher shall be installed in each kitchen where shared cooking facilities exist.

SECTION 9.4 HEALTH CARE FACILITIES

Subsection 9.4.1 Application

Application

9.4.1.1. (1) This Section applies to

- (a) Homes for Special Care, regulated under the **Homes for Special Care Act**, where sleeping accommodation is provided for more than 10 residents,
- (b) Homes for the Aged, regulated under the **Homes for the Aged and Rest Homes Act**,
- (c) Homes for the Aged, regulated under the **Charitable Institutions Act**,
- (d) Nursing Homes, regulated under the **Nursing Homes Act**,
- (e) Private Hospitals, regulated under the **Private Hospitals Act**, and

(f) Public Hospitals, regulated under the **Public Hospitals Act**.

(2) For the purposes of this Section,

“**1986 Building Code**” means Ontario Regulation 419/86, as it read on February 11, 1987;

“existing” means in existence on February 11, 1987.

Subsection 9.4.2. Containment

Construction

9.4.2.1. (1) Existing **buildings** shall comply with the applicable construction requirements of Articles 9.4.2.2. to 9.4.2.4.

(2) **Fire separations** required by this Section to have a **fire-resistance rating** shall comply with Subsection 3.1.5. and Articles 3.1.6.1., 3.1.6.2. and 3.1.6.3. of the **1986 Building Code**.

(3) Where a 45 min or less **fire-resistance rating** is required, existing wall assemblies, floor assemblies and their supporting assemblies consisting of membranes of lath and plaster or gypsum board are deemed to be in compliance with Sentences (1) and (2).

(4) Existing **buildings** with limited combustible components may be **approved as noncombustible construction**.

(5) **Heavy timber construction** conforming to Article 3.1.4.4. of the **1986 Building Code** is deemed to have a 45 min **fire-resistance rating**.

(6) Floor assemblies shall be **fire separations** with **fire-resistance ratings** as required in this Subsection.

Combustible construction up to 2 storeys

9.4.2.2. (1) **Buildings of combustible construction** shall comply with the provisions of Sentence (2) where the **building** is

(a) 1 **storey** in **building height** and not greater than 1000 m² in **building area**, or

(b) 2 **storeys** in **building height** and not greater than 500 m² in **building area**.

(2) Floor assemblies and walls, columns and arches supporting floor assemblies shall have a 45 min **fire-resistance rating**.

(3) Despite Sentence (2), where the **building** is **sprinklered**, a **fire-resistance rating** is not required for floor assemblies or for walls, columns and arches supporting floor assemblies.

Combustible construction up to 4 storeys

9.4.2.3. (1) **Buildings of combustible construction** shall comply with the provisions of Sentences (2) and (3) where the **building** is

(a) not more than 1 **storey** in **building height** and not greater than 2400 m² in **building area**,

(b) not more than 2 **storeys** in **building height** and not greater than 1600 m² in **building area**, or

(c) not more than 4 **storeys** in **building height** and not greater than 500 m² in **building area**.

(2) Floor assemblies and walls, columns and arches supporting floor assemblies shall have a 45 min **fire-resistance rating**.

(3) Despite Sentence 9.4.4.2.(2), **smoke detectors** shall be provided in bedrooms, corridors, lounges and sitting areas.

(4) A **building** that is **sprinklered** is deemed to be in compliance with Sentences (2) and (3).

All other buildings

9.4.2.4. (1) **Buildings** not described in Articles 9.4.2.2. and 9.4.2.3. shall

(a) have a 45 min **fire-resistance rating** for floor assemblies and walls, columns and arches supporting floor assemblies, and

(b) be **sprinklered**, where the **building** is of **combustible construction**.

(2) Where only the roof assembly is of **combustible construction**,

(a) sprinkling of the top **storey** and **attic space** is deemed to be in compliance with Clause (1)(b), or

(b) a ceiling membrane with a 45 min **fire-resistance rating** and **fire stopping** of the **attic space** in accordance with the requirements of Article 3.1.9.3. of the **1986 Building Code** is deemed to be in compliance with Clause (1)(b).

Fire separations between occupancies

9.4.2.5. (1) **Fire separations** having a 1 h **fire-resistance rating** shall be provided between **occupancies** regulated under this Section and other **major occupancies**.

(2) Where the **building** is **sprinklered** and the sprinkler system complies with Article 9.4.5.2. or where the other **major occupancy** is equipped with **heat detectors** and connecting corridors are equipped with **smoke detectors**, a 30 min **fire separation** is deemed to be in compliance with Sentence (1).

(3) Existing wall or floor assemblies consisting of masonry or membranes of lath and plaster or gypsum board are deemed to be in compliance with Sentence (1).

Fire separations between bedrooms and corridors

9.4.2.6. (1) Bedrooms or compartments containing related rooms shall be separated from adjacent rooms by **fire separations** having a 45 min **fire-resistance rating**.

(2) Corridors serving bedrooms shall be separated from adjacent rooms, except sitting areas, lounges, nurses stations and washrooms, by **fire separations** having a 45 min **fire-resistance rating**.

(3) Where the **floor area** is **sprinklered**, an existing **fire separation** is deemed to be in compliance with Sentences (1) and (2).

(4) Where **smoke detectors** are installed in bedrooms, sitting areas, lounges and corridors serving bedrooms on the **floor area** and where **heat detectors** are installed in other rooms opening onto corridors serving bedrooms, a 30 min **fire separation** is deemed to be in compliance with Sentences (1) and (2).

Safe areas of refuge

9.4.2.7. (1) **Floor areas** containing rooms or areas used by the residents shall be divided by 45 min **fire separations** separating the **floor area** into at least two zones.

(2) Each zone required in Sentence (1) shall

(a) contain at least one acceptable **exit**, and

(b) be able to accommodate, in addition to its own occupants, the occupants of the adjacent zone, based on the requirements of 0.5 m² of clear floor space per person, 1.6 m² per person in a wheelchair, and 2.4 m² for each bedridden patient as the **occupancy** requires.

(3) A **fire separation** is not required under Sentence (1) where

(a) the travel distance between **exits** does not exceed 9 m and the number of occupants on the **floor area** is not more than 10 persons, or

(b) the **floor area** is served by exterior **exit** doors leading directly to the outside.

Protection of openings in fire separations

9.4.2.8. (1) **Closures** in **fire separations** shall comply with the requirements of Sentences 3.1.6.4.(2), 3.1.6.7.(1) and 3.1.6.8.(1) and Article 3.1.6.9. of the **1986 Building Code**.

(2) Where a 30 min **fire separation** is permitted, **closures** shall have a 20 min **fire-protection rating**.

(3) Where Sentences (1) and (2) require

(a) a 1.5 h **fire-protection rating**, existing hollow metal doors, with or without wired glass panels not exceeding 645 cm², equipped with self-closing devices and existing hollow metal frames are deemed to be in compliance,

(b) a 45 min **fire-protection rating**, existing hollow metal or kalamein doors, with or without wired glass, equipped with self-closing devices and existing hollow metal frames are deemed to be in compliance,

(c) a 45 min **fire-protection rating**, existing wired glass screens set in fixed steel frames are deemed to be in compliance, or

(d) a 20 min **fire-protection rating**, existing 45 mm solid core wood doors and existing solid wood frames are deemed to be in compliance.

(4) Existing doors to bedrooms not conforming to Sentences (1) to (3) may be **approved**.

(5) Despite Sentence (1), and except as permitted in Article 9.4.2.9., door assemblies required to have a 20 min **fire-protection rating** shall be equipped with self-closing devices.

(6) Despite Sentences (1) and (2), **fire dampers** or **fire-stop flaps** are not required in ducts at penetrations of an existing **fire separation**.

Latches on bedroom doors

9.4.2.9. Where a door to a bedroom is not equipped with a self-closing device, a latch that can hold the door in the closed position shall be installed.

Fuel-fired appliance service rooms

9.4.2.10. (1) Fuel-fired **appliances** shall be enclosed in a **service room** separated from the remainder of the **building** by a **fire separation** having a 45 min **fire-resistance rating**.

(2) Sentence (1) does not apply to fireplaces.

(3) Despite Sentence (1), where the required vertical **fire separation** to a **service room** is provided and it is not practical in the circumstances to install a 45 min **fire separation** above the **service room**, the **service room** area shall be **sprinklered** with a spacing not exceeding 9.5 m² per sprinkler head.

Combustion air

9.4.2.11. Where a **furnace** room is separated to comply with the requirements of Article 9.4.2.10., sufficient combustion air shall be brought directly from the exterior for the proper combustion and safe operation of the **appliance**.

Transformer vaults

9.4.2.12. A transformer vault shall be separated from the remainder of the **building** by a **fire separation** having a 2 h **fire-resistance rating**.

Vertical service spaces

9.4.2.13. (1) **Vertical service spaces** shall be separated from the remainder of the **building** by a **fire separation** having a 45 min **fire-resistance rating**.

(2) Where openings in the **vertical service space**, including the top and bottom, are sealed with noncombustible materials having the same **fire-resistance rating** as the existing construction, the **vertical service space** is deemed to be in compliance with Sentence (1).

Refuse and linen chutes

9.4.2.14. (1) Automatic sprinklers shall be installed at the top and at alternate floor levels in each linen or refuse chute and in the room or bin into which the chute discharges.

(2) An existing linen chute installation is deemed to be in compliance with Sentence (1) where the room into which the linen chute discharges is **sprinklered** and at least one sprinkler head is installed at the top of the linen chute.

(3) Each room into which a linen or refuse chute discharges shall be separated from the remainder of the **building** by a **fire separation** having a 1 h **fire-resistance rating**.

Incinerator rooms

9.4.2.15. Incinerators shall be enclosed in a **service room** separated from the remainder of the **building** by a **fire separation** having a 2 h **fire-resistance rating**.

Subsection 9.4.3. Means of Egress

Access to exits

9.4.3.1. (1) Bedrooms or compartments containing related rooms on a **floor area** shall have a doorway leading to an interior corridor where it shall be possible to go in opposite directions to each of two separate **exits**.

(2) **Access to exits** through a dead end corridor is deemed to be in compliance with Sentence (1) where

(a) the number of persons served does not exceed 10 persons, and

(b) the travel distance does not exceed 6 m plus the width of the dead end corridor, to a point where a choice of two directions of **exit** travel is available.

(3) Where a bedroom or a compartment containing related rooms is served by an **exit** door leading directly to the outside or to an exterior passageway, a doorway leading to an interior corridor served by one **exit** is deemed to be in compliance with Sentences (1) and (2).

(4) Where a dead end corridor does not satisfy the travel distance as described in Sentence (2), the existing corridor is deemed to be in compliance where additional fire protection measures are provided that are **approved**.

Number of exits

9.4.3.2. Each **floor area** used by patients or residents shall be served by not fewer than two **exits**.

Stairway separations

9.4.3.3. (1) Each **exit** stairway shall be separated from the remainder of the **building** by a **fire separation** having a 45 min **fire-resistance rating**.

(2) **Closures** in stairway **fire separations** shall conform to Article 9.4.2.8.

Door swing

9.4.3.4. (1) Each **exit** door shall open in the direction of **exit** travel and swing on its vertical axis.

(2) Existing door swing arrangements not in conformance with Sentence (1) may be **approved**.

Exit signs

9.4.3.5. (1) Signs for **exits** and **access to exits** shall comply with the requirements of Article 3.4.5.1. of the **1986 Building Code**.

(2) Despite Sentence (1), existing signs may be **approved**.

Fire escapes

9.4.3.6. (1) A fire escape shall not be erected on an existing **building** unless it is not practical in the circumstances to provide one or more **exit** facilities, described under Article 3.4.1.2. of the **1986 Building Code**, and provided that the fire escape does not serve **floor areas** above the second floor.

(2) A fire escape permitted under Sentence (1) shall be constructed to comply with the requirements of Article 3.4.7.13. of the **1986 Building Code**, except that the fire escape shall not be less than 1100 mm in width when serving **floor areas** with non-ambulatory residents.

(3) Despite Sentences (1) and (2), an existing fire escape may be **approved**.

Emergency lighting

9.4.3.7. Emergency lighting shall be provided in accordance with the provisions of Article 3.2.7.3. of the **1986 Building Code**.

Subsection 9.4.4. Fire Alarm and Detection

Fire alarm requirements

9.4.4.1. A fire alarm and detection system shall be installed in each **building**.

9.4.4.2. (1) Fire alarm and detection systems shall comply with the requirements of Subsection 3.2.4. of the **1986 Building Code**.

(2) Despite Sentence (1), in **buildings** constructed prior to December 1, 1983, **heat detectors** may be installed in bedrooms, corridors and stair shafts to satisfy the **1986 Building Code**, except where other detection is required by Sentences 9.4.2.3.(3), 9.4.2.5.(2) or 9.4.2.6.(4).

(3) Despite Sentences (1) and (2), where the **Chief Fire Official** is satisfied that the performance and reliability of an existing fire alarm system will provide an adequate early warning level, the existing system may remain, be modified or be extended, provided compatibility of components is maintained.

Signals to fire department

9.4.4.3. (1) Each fire alarm system shall be connected to the **fire department** headquarters by

- (a) a direct connection, provided the **fire department** has the necessary facilities to accept such a connection, or
- (b) a central station or proprietary control station.

(2) Where the provisions required in Sentence (1) are not available, a procedure for notifying the **fire department** shall be **approved**.

Shutdown of air handling systems

9.4.4.4. (1) Recirculating air handling systems that serve more than 1 **storey** or more than one zone as described in Sentence 9.4.2.7.(1) shall be arranged to shut down upon actuation of the fire alarm system.

(2) In **buildings** greater than 6 **storeys** in **building height**, air handling systems serving more than 1 **storey** or more than one zone as described in Article 9.4.2.7. shall be arranged to shut down upon actuation of the fire alarm system, except where continued operation of the air handling system serves as part of a smoke control system.

Subsection 9.4.5. Suppression

Access for fire fighting

9.4.5.1. (1) Access routes for fire fighting shall be provided in accordance with the requirements of Article 3.2.5.2. of the **1986 Building Code**.

(2) Sentence (1) does not apply where the **building** is **sprinklered**.

(3) Access routes that do not comply with Sentence (1) may be **approved** where available **fire department** equipment has access to the **building** or alternative provisions are made under Subsection 2.8.2. for such access.

Sprinkler systems

9.4.5.2. (1) Sprinkler systems shall be designed in conformance with Article 3.2.5.5. of the **1986 Building Code**.

(2) Despite Sentence (1), water supply requirements for sprinkler systems required in this Section may be based on

(a) the operation of at least three sprinkler heads spaced not to exceed 14.4 m² per head, and

(b) a sprinkler discharge rate of not less than 100 L/min at any single operating sprinkler head for a duration of 30 min.

(3) Despite Sentences (1) and (2), existing sprinkler systems providing adequate protection may be **approved**.

Firefighters' elevators

9.4.5.3. (1) In **buildings** greater than 6 **storeys** in **building height**, at least one elevator shall be provided for use by firefighters.

(2) An elevator is deemed to be in compliance with Sentence (1) where

(a) the elevator is capable of providing transportation from the **street** floor to each floor normally served by the elevator system,

(b) the elevator is identified on the **street** floor as an elevator for use by firefighters,

(c) the elevator satisfies the requirements of Article 3.2.6.3. of the **1986 Building Code**, and

(d) other elevator cabs in the same shaft as the elevator for use by firefighters satisfy the requirements of Sentences 3.2.6.3.(1) and (2) of the **1986 Building Code**.

Voice communication systems

9.4.5.4. (1) In **buildings** greater than 6 **storeys** in **building height**, a voice communication system shall be provided in accordance with the requirements of Article 3.2.4.16. of the **1986 Building Code**.

(2) A public address system compatible with the fire safety plan required under Subsection 2.8.2. is deemed to be in compliance with Sentence (1).

SECTION 9.5 BUILDINGS UP TO AND INCLUDING 6 STOREYS IN BUILDING HEIGHT WITH RESIDENTIAL OCCUPANCIES

Subsection 9.5.1. Application

Application

9.5.1.1. (1) This Section applies to **buildings** up to and including 6 **storeys** in **building height** with **residential occupancies** and containing

(a) more than two **dwelling units** where

(i) at least two **dwelling units** share common **exit** facilities and have interior access to one another,

(ii) there is at least one **dwelling unit** located above another with interior access to one another, or

(iii) there is at least one **dwelling unit** located above another and the **dwelling units** share common **exit** facilities,

(b) sleeping accommodation for more than 10 persons, in one or more dormitories,

(c) boarding, lodging or rooming accommodation for more than four persons where Sections 9.3 and 9.4. do not apply, or

(d) one or two **dwelling units** in combination with boarding, lodging or rooming accommodation for two, three or four persons, excluding the operator's residence.

(2) Despite Sentence (1), if the **building** contains other **occupancies**, this Section does not apply to the fire safety systems, devices and structural elements of the other **occupancies** that do not affect the life safety of the **residential occupancy**.

(3) If a **building** contains areas that are governed by this Section and by another Section in this Part, the fire safety systems, devices and structural elements applicable to those areas shall comply with the requirements of this Section and the other Section that provide the greatest protection for life safety.

(4) For the purposes of this Section,

“**1990 Building Code**” means Ontario Regulation 413/90, as it read on October 9, 1992;

“existing” means in existence on October 9, 1992.

Exemption for convents and monasteries

9.5.1.2. Convents and monasteries are exempt from this Section.

Exemption for hotels

9.5.1.3. This Section does not apply to a **building** or part of a **building** regulated by Section 9.9.

Subsection 9.5.2. Containment***Construction***

9.5.2.1. (1) Existing **buildings** shall comply with the applicable construction requirements of Articles 9.5.2.2. to 9.5.2.5.

(2) **Fire separations** required by this Section to have a **fire-resistance rating** shall be in accordance with Subsection 3.1.7. and Articles 3.1.8.1., 3.1.8.2., 3.1.8.3. and 3.5.4.2. of the **1990 Building Code**.

(3) Where a 45 min or less **fire-resistance rating** is required, existing wall assemblies, floor assemblies, ceilings and their supporting assemblies, consisting of membranes of lath and plaster or gypsum board, are deemed to be in compliance with Sentence (2).

(4) **Heavy timber construction** conforming to Article 3.1.4.6. of the **1990 Building Code** is deemed to have a 45 min **fire-resistance rating**.

(5) **Buildings** with limited combustible components may be **approved** as **noncombustible construction**.

(6) Floor assemblies shall be **fire separations** with **fire-resistance ratings** as required by Articles 9.5.2.2. to 9.5.2.5.

(7) Sentence (6) does not apply to floor assemblies between different levels of the same multi-level **dwelling unit**.

Buildings up to 3 storeys

9.5.2.2. (1) **Buildings** shall comply with the requirements of Sentence (2) where the **building** is

(a) not more than 1 **storey** in **building height** and not greater than 1200 m² in **building area**,

(b) not more than 2 **storeys** in **building height** and not greater than 900 m² in **building area**, or

(c) not more than 3 **storeys** in **building height** and not greater than 600 m² in **building area**.

(2) Floor assemblies and walls, columns and arches supporting floor assemblies shall have a 30 min **fire-resistance rating**.

(3) Where sleeping accommodation, recreation rooms, meeting rooms or hobby rooms are not provided in the **basement**, an existing **fire separation** between the **first storey** and **basement** is deemed to be in compliance with Sentence (2) where

(a) the **basement** is **sprinklered**, or

(b) the **building** contains not more than four **dwelling units** and provides sleeping accommodation for not more than 10 persons, and

(i) interconnected **smoke alarms** are installed in accordance with Article 9.5.4.4.,

(ii) doors connecting the **basement** and **first storey** are in compliance with Sentence 9.5.2.8.(4), and

(iii) **fire stopping** of the wall space at the **basement** level is in accordance with Article 9.10.15.3. of the **1990 Building Code**.

(4) The water supply for the sprinklers referred to in Clause (3)(a) may be taken from the domestic supply where the supply provides sufficient density for the largest **fire compartment** and where the supply is **approved**.

Deemed compliance

9.5.2.3. (1) **Buildings** are deemed to be in compliance with Sentence 9.5.2.2.(2) where

(a) the **building** is **sprinklered**, or

(b) the **building** is 1 **storey** in **building height** and is not greater than 600 m² in **building area**.

Buildings up to 4 storeys

9.5.2.4. (1) **Buildings** to which Sentence 9.5.2.2.(1) does not apply and which are not more than 4 **storeys** in **building height** shall comply with Sentences (2) and (3).

(2) Floor assemblies and walls, columns and arches supporting floor assemblies shall have a 45 min **fire-resistance rating**.

(3) **Smoke detectors** shall be provided as **fire detectors** in **public corridors** serving **dwelling units** in **buildings** of **combustible construction**.

- (4) A **building** that is **sprinklered** is deemed to be in compliance with Sentences (2) and (3).

Buildings over 4 storeys

9.5.2.5. (1) **Buildings** that are more than 4 **storeys** in **building height** shall

- (a) have a 45 min **fire-resistance rating** for floor assemblies and walls, columns and arches supporting floor assemblies, and
- (b) be **sprinklered**, where the **building** is of **combustible construction**.

(2) Where only the roof assembly is of **combustible construction**, the **building** is deemed to be in compliance with Clause (1)(b) where

- (a) the ceiling membrane has a 45 min **fire-resistance rating** and the **attic space** is **fire stopped** in accordance with Article 3.1.11.5. of the **1990 Building Code**,
- (b) the roof assembly is of **heavy timber construction** in accordance with Article 3.1.4.6. of the **1990 Building Code**, or
- (c) the top **storey** and **attic space** are **sprinklered**.

(3) Where **smoke detectors** are provided in **public corridors**, a **building** of **heavy timber construction** conforming to Article 3.1.4.6. of the **1990 Building Code** is deemed to be in compliance with Sentence (1).

Fire separations between occupancies

9.5.2.6. (1) **Fire separations** having a 1 h **fire-resistance rating** shall be provided between **residential occupancies** and other **major occupancies**.

(2) Existing **fire separations** having a 30 min **fire-resistance rating** are deemed to be in compliance with Sentence (1) where

- (a) the **building** is **sprinklered** and the sprinkler system complies with Article 9.5.5.3., or
- (b) the part of the **building** containing the other **major occupancy** is equipped with **heat detectors** and connecting corridors are equipped with **smoke detectors** as part of the fire alarm system of the **building**.

(3) Existing **fire separations** consisting of membranes of lath and plaster or gypsum board are deemed to be in compliance with Sentence (1).

Fire separations between dwelling units and corridors

9.5.2.7. (1) Each **dwelling unit** and sleeping room not within a **dwelling unit** shall be separated from adjacent rooms and areas by **fire separations** having a 30 min **fire-resistance rating**.

(2) **Public corridors** shall be separated from adjacent rooms and areas by **fire separations** having a 30 min **fire-resistance rating**.

(3) Where the **floor area** is **sprinklered**, existing **fire separations** having less than a 30 min **fire-resistance rating** are deemed to be in compliance with Sentences (1) and (2).

Protection of openings in fire separations

9.5.2.8. (1) **Closures** in **fire separations** shall be in accordance with Sentences 3.1.8.4.(2), 3.1.8.10.(1) and 3.1.8.11.(1) and Article 3.1.8.13. of the **1990 Building Code**.

(2) Openings in a **fire separation** having a 30 min **fire-resistance rating** shall be protected with **closures** having a 20 min **fire-protection rating**.

(3) Where a 45 min **fire-protection rating** is required, existing **closures** consisting of

- (a) hollow metal or kalamein doors in hollow metal frames, with openings, if any, protected by wired glass, and equipped with self-closing devices, or
- (b) wired glass screens set in fixed steel frames

are deemed to be in compliance with Sentence (1).

(4) Where a 20 min **fire-protection rating** is required, existing **closures** consisting of 45 mm solid core wood doors installed in solid wood or hollow metal frames and equipped with self-closing devices are deemed to be in compliance with Sentences (1) and (2).

(5) Existing **closures** in **fire separations** to which Article 9.5.2.7. applies are deemed to be in compliance with Sentences (1) and (2) where

- (a) the **floor area** is **sprinklered**, or

(b) interconnected **smoke alarms** are installed in accordance with Article 9.5.4.4., the **building** has not more than four **dwelling units** and the **building** provides sleeping accommodation for not more than 10 persons.

(6) Despite Sentence (1), **closures in fire separations** to which Article 9.5.2.7. applies do not require self-closing devices, except as required in Sentences 9.5.3.1.(2) and 9.5.3.3.(3).

(7) Existing operable transoms and glass lights shall be fixed shut and shall meet the **fire-protection rating** requirements of Sentences (1) and (2).

(8) Despite Sentences (1) and (2), **fire dampers** or **fire-stop flaps** are not required in existing noncombustible ducts at penetrations of **fire separations**.

Storage rooms

9.5.2.9. (1) Storage rooms for the use of occupants, not contained within a **dwelling unit** or **suite**,

(a) shall be separated from the remainder of the **building** by a **fire separation** having a 45 min **fire-resistance rating**, and

(b) shall be

(i) **sprinklered**, or

(ii) subdivided into areas not exceeding 150 m² by **fire separations** having a 45 min **fire-resistance rating** and equipped with **fire detectors** connected to the fire alarm system.

(2) Existing storage rooms are deemed to be in compliance with Clause (1)(b) where the **building** contains not more than four **dwelling units** and provides sleeping accommodation for not more than 10 persons.

(3) Existing storage rooms are deemed to be in compliance with Sentence (1) where

(a) the **building** contains not more than four **dwelling units** and provides sleeping accommodation for not more than 10 persons, and

(b) sleeping rooms are not located on the same floor as storage rooms.

Fuel-fired appliance service rooms

9.5.2.10. (1) Fuel-fired **appliances** shall be enclosed in a **service room** separated from the remainder of the **building** by a **fire separation** having a 45 min **fire-resistance rating** where the **building height** is greater than 2 **storeys** or the **building area** is greater than 400 m².

(2) Sentence (1) does not apply to fireplaces within a **dwelling unit** or **suite**.

(3) Despite Sentence (1), the **fire-resistance rating** of the **fire separation** above the **service room** is not required where

(a) the required vertical **fire separation** to a **service room** is provided, and

(b) the **service room** area is **sprinklered**, with a spacing not exceeding 9.5 m² per sprinkler head, or providing a minimum average density of 6.5 L/min/m² over the room area.

Combustion air

9.5.2.11. Where a **service room** is separated in accordance with Article 9.5.2.10., sufficient combustion air shall be brought directly from the outside for the proper combustion and safe operation of the **appliances**.

Incinerator and refuse storage rooms

9.5.2.12. (1) Incinerator rooms and refuse storage rooms shall be separated from the remainder of the **building** by a **fire separation** having a 45 min **fire-resistance rating**.

(2) Refuse storage rooms shall be **sprinklered** with a spacing not exceeding 9.5 m² per sprinkler head or providing a minimum average density of 6.5 L/min/m² over the room area.

Vertical service spaces

9.5.2.13. (1) **Vertical service spaces** shall be separated from the remainder of the **building** by a **fire separation** having a **fire-resistance rating** equivalent to that required for the floor assemblies within the **building** in accordance with Articles 9.5.2.2. to 9.5.2.5.

(2) Where openings in the **vertical service space**, including the top and bottom, are sealed with noncombustible materials having the same **fire-resistance rating** as the existing construction, the **vertical service space** is deemed to be in compliance with Sentence (1).

Refuse and linen chutes

9.5.2.14. (1) Each room into which a linen or refuse chute discharges shall be separated from the remainder of the **building** by a **fire separation** having a 1 h **fire-resistance rating**.

(2) Automatic sprinklers shall be installed in each linen or refuse chute

- (a) at the top,
- (b) at alternate floor levels, and
- (c) in the room or bin into which the chute discharges.

(3) Where the room into which the chute discharges is **sprinklered** and at least one sprinkler head is installed at the top of the chute, an existing chute installation is deemed to be in compliance with Sentence (2).

(4) Despite Sentence 9.5.2.1.(2), a **closure** is not required at the opening between the chute and the room into which it discharges.

Storage garages

9.5.2.15. A storage garage shall be separated from the remainder of the **building** by a **fire separation** having a 45 min **fire-resistance rating**.

Subsection 9.5.3. Means of Egress

Access to exits

9.5.3.1. (1) Each **dwelling unit** or **suite** in a **floor area** shall have a doorway leading to

- (a) the outside at or near **grade**,
- (b) an outside passageway where it is possible to go in opposite directions to separate **exits**, or
- (c) a **public corridor** where it is possible to go in opposite directions to separate **exits**.

(2) **Access to exits** through a dead end **public corridor** is deemed to be in compliance with Clause (1)(c) where

- (a) the distance along the dead end does not exceed 6 m plus the width of the corridor, measured from any door along the corridor to a point where a choice of two directions of **exit** travel is available, and
- (b) self-closing devices are provided on **suite** entrance doors opening onto the dead end portion of the corridor.

(3) **Access to exits** through a dead end corridor in boarding, lodging or rooming accommodation is deemed to be in compliance with Clause (1)(c) where

- (a) the **building** is not more than 3 **storeys** in **building height**,
- (b) sleeping accommodation is provided for not more than 10 persons,
- (c) not more than two persons require assistance to evacuate the **building** in a fire emergency,
- (d) **smoke alarms** are installed in the **means of egress** in accordance with Sentence 9.5.4.1.(2), and
- (e) the building complies with the requirements of Section 2.8.

(4) Existing dead end **public corridors** are deemed to be in compliance with Clause (2)(a) where additional fire protection measures are **approved** that, in the opinion of the **Chief Fire Official**, will provide protection for life safety similar to the protection provided by compliance with Clause (2)(a).

(5) Despite Sentence (1), a doorway from a **dwelling unit** or **suite** may open onto

- (a) an **exit** stairway,
- (b) a fire escape,
- (c) a **public corridor** served by a single **exit**, or
- (d) an outside passageway served by a single **exit** stairway,

if the **dwelling unit** or **suite** has access to a second and separate **exit** or the **building** is in compliance with Sentence 9.5.3.2.(2) or (3).

Number of exits

9.5.3.2. (1) Each **floor area** shall be served by a minimum of two **exits**.

(2) A single **exit** from a **basement**, first or second floor is deemed to be in compliance with Sentence (1) where the **exit** does not serve more than four **dwelling units**, the **exit** does not serve more than 10 persons and the **building** is not more than 3 **storeys** in **building height** and is not greater than 600 m² in **building area**.

(3) Where a **building** is not more than 3 **storeys** in **building height** and not greater than 600 m² in **building area**, alternative measures to Sentence (1) may be used if they are **approved**, and in the opinion of the **Chief Fire Official**, will provide protection for life safety similar to the protection provided by compliance with Sentence (1).

Stairway separations

9.5.3.3. (1) Each **exit** stairway shall be separated from the remainder of the **building** by a **fire separation** having a 45 min **fire-resistance rating**.

(2) Where the **building** is not more than 3 **storeys** in **building height**, a **fire separation** having a 30 min **fire-resistance rating** is deemed to be in compliance with Sentence (1).

(3) **Closures** in stairway **fire separations** referred to in Sentences (1) and (2) shall be equipped with self-closing devices.

Door swing

9.5.3.4. Where the **occupant load** in a **building** exceeds 24 persons or there are more than 10 **dwelling units**, each **exit** door, except those serving a single **dwelling unit**, shall open in the direction of **exit** travel and swing on its vertical axis.

Exit signs

9.5.3.5. (1) Each **exit** door, except for the main entrance to a **building, dwelling unit** or **suite**, shall have an **exit** sign when the **exit** serves

- (a) a **building** exceeding 2 **storeys** in **building height**,
- (b) a **building** having an **occupant load** greater than 150 persons, or
- (c) a **floor area** other than a single **dwelling unit** with a fire escape as part of a **means of egress**.

(2) Where **exit** signs are not visible throughout the corridors and passageways, additional **exit** signs shall be installed in **approved** locations to indicate the direction of egress.

(3) **Exit** signs required in Sentences (1) and (2) shall have

- (a) the word “EXIT” or the words “EXIT/SORTIE” in red letters on a contrasting background or white letters on a red background,
- (b) letters with strokes at least 19 mm wide,
- (c) letters at least 150 mm high when the signs are externally illuminated, and
- (d) letters at least 114 mm high when the signs are internally illuminated.

Interior finishes

9.5.3.6. (1) **Flame-spread ratings** of interior wall and ceiling finishes within a **means of egress** shall not exceed 150.

(2) Despite Sentence (1), existing interior wall and ceiling finishes within an **access to exit** may be **approved** if, in the opinion of the **Chief Fire Official**, they will provide protection for life safety similar to the protection provided by compliance with Sentence (1).

Fire escapes

9.5.3.7. (1) Each fire escape used as an **exit** shall be in accordance with Articles 3.4.7.2., 3.4.7.3., 3.4.7.5. and 3.4.7.6. of the **1990 Building Code**.

(2) Where a fire escape serves any **storey** above the second floor,

- (a) doorway openings shall be protected with **closures** having a 20 min **fire-protection rating** and equipped with self-closing devices, and
- (b) window openings shall be protected by
 - (i) **closures** having a 20 min **fire-protection rating** and that are fixed shut,
 - (ii) wired glass screens set in fixed steel frames,
 - (iii) glass block, or
 - (iv) **listed** steel shutters arranged to close automatically upon the operation of a fusible link,

where such openings are located within 3 m horizontally of, 3 **storeys** or 10 m below, or 1.8 m above, any balcony, platform or stairway of the fire escape.

(3) The fusible link referred to in Clause (2)(b)(iii) shall be in conformance with ULC-S505, “Standard for Fusible Links for Fire Protection Service”.

(4) The wired glass screens and glass block referred to in Clause (2)(b) shall be installed in conformance with Article 3.1.8.14. of the **1990 Building Code**.

(5) Despite Sentence 9.1.1.2.(1), the **owner** need not comply with the requirements of Clause (2)(b) until November 21, 2008.

Lighting

9.5.3.8. **Public corridors** and stairways that form part of a **means of egress** shall be adequately illuminated to allow for the safe evacuation of occupants.

Emergency lighting

9.5.3.9. (1) Emergency lighting shall be provided in **exit** stairways, **public corridors** and other principal **access to exits** where the **occupant load** in a **building** exceeds 24 persons or there are more than 10 **dwelling units**.

(2) Emergency lighting required in Sentence (1) shall be

- (a) designed to provide illumination for a duration of at least 30 min,
- (b) supplied by a source of energy separate from the primary electrical supply for the **building**, and
- (c) designed to be automatically actuated when the power to the **building** is interrupted.

(3) Illumination from emergency lighting shall be an average of at least 10 lx at floor or tread level, or 1 watt/m² of floor space.

Subsection 9.5.4. Fire Alarm and Detection

Fire alarm requirements

9.5.4.1. (1) A fire alarm system shall be installed in accordance with Articles 3.2.4.2. to 3.2.4.6., 3.2.4.8., 3.2.4.9. and 3.2.4.17. and Sentences 3.2.7.8.(1) to (4) of the **1990 Building Code**, where

- (a) the **building** is greater than 3 **storeys** in **building height**, or
- (b) sleeping accommodation is provided for more than 10 persons.

(2) A **building** not greater than 3 **storeys** in **building height** that contains not more than 10 **dwelling units** and provides sleeping accommodation for not more than 24 persons is deemed to be in compliance with Sentence (1) where the **building** is equipped with

- (a) **smoke alarms** in accordance with Article 9.5.4.4., installed and interconnected so that the actuation of any **smoke alarm** will sound a similar signal in each of the interconnected devices, and
 - (b) a manual pull station at each exterior **exit** door for the actuation of the **smoke alarms** in Clause (a).
- (3) A **building** is deemed to be in compliance with Sentence (1) where
- (a) each **exit** and **public corridor** is shared by not more than four **dwelling units** or not more than 10 persons in boarding, lodging, rooming or dormitory accommodation, or
 - (b) each **dwelling unit** and **suite** has direct access to outdoors by a door near ground level.

Non-electric fire alarm systems

9.5.4.2. (1) Existing manually operated, non-electric alarm systems employing mechanical gongs are deemed to be in compliance with Sentence 9.5.4.1.(1), where

- (a) the **building** is not more than 2 **storeys** in **building height**,
- (b) not more than two manual fire alarm stations are required in the **building**, and
- (c) each gong is audible in every location in the **building**.

Automatic detection

9.5.4.3. (1) Automatic detection devices referred to in Sentences (2) and (3) shall be installed and connected to the fire alarm system required in Sentence 9.5.4.1.(1).

(2) **Fire detectors** shall be installed in storage rooms, locker rooms, **service rooms**, machinery rooms, heating rooms, incinerator rooms, linen and refuse chute intake compartments, janitors' closets and refuse storage rooms, at the tops of elevator shafts and in any room or area where hazardous or combustible materials may be used or stored.

(3) Rooms or areas that are **sprinklered** in accordance with Article 3.2.4.16. of the **1990 Building Code** are deemed to be in compliance with Sentence (2).

Interconnected smoke alarms

9.5.4.4. (1) Interconnected **smoke alarms** required in Sentence 9.5.4.1.(2), Subclause 9.5.2.2.(3)(b)(i) or Clause 9.5.2.8.(5)(b) shall be

- (a) installed on or near the ceiling in **public corridors** of each **floor area**, adjacent to each stairway serving the **public corridor** and on or near the ceiling in the **basement**, adjacent to each stairway,

- (b) audible throughout the **suites**,
- (c) connected to an electrical circuit with no disconnect switch between the overcurrent device and the **smoke alarms**, and
- (d) **listed** for use in an interconnected installation.

Smoke alarms

9.5.4.5. (1) **Smoke alarms** shall be installed in each **dwelling unit** and in each sleeping room not within a **dwelling unit** in accordance with Article 3.2.4.21. of the **1990 Building Code**.

(2) Battery-operated **smoke alarms** are deemed to be in compliance with Sentence 3.2.4.21.(4) of the **1990 Building Code**.

(3) **Smoke alarms** required in Sentence (1) shall be in accordance with CAN/ULC-S531, “Standard for Smoke Alarms”, and CAN/ULC-S553, “Standard for the Installation of Smoke Alarms”.

(4) Existing **smoke alarms** meeting the requirements of ULC-S531-1978, “Standard for Smoke Alarms”, are deemed to be in compliance with Sentence (3).

Existing fire alarm systems

9.5.4.6. Despite Articles 9.5.4.1. to 9.5.4.4., where the performance and reliability of an existing fire alarm system will provide an adequate early warning level, the existing system may remain, be modified or be extended, if compatibility of the components is maintained and the system is **approved**.

Subsection 9.5.5. Suppression

Access for fire fighting

9.5.5.1. (1) Access routes for fire fighting shall be provided in accordance with the requirements of Articles 3.2.5.5. to 3.2.5.7. of the **1990 Building Code**.

- (2) Sentence (1) does not apply where the **building** is **sprinklered**.

Standpipe systems

9.5.5.2. (1) A standpipe and hose system in accordance with Articles 3.2.9.1. to 3.2.9.7. of the **1990 Building Code** shall be installed in **buildings** more than 4 **storeys** in **building height** where the fifth or sixth **storey** is used for a **residential occupancy**.

- (2) A wet or dry standpipe system is deemed to be in compliance with Sentence (1) where it includes

- (a) a 50 mm riser and 50 mm extensions,
- (b) capped 38 mm hose valves located so that any point on the **floor area** may be reached by 30 m of hose plus 3 m of hose stream from at least one hose valve,
- (c) a **fire department** connection in accordance with Sentences 3.2.9.5.(2) to (9) of the **1990 Building Code**, and
- (d) a water supply in accordance with Sentences 3.2.9.3.(1) to (3) of the **1990 Building Code**.

(3) Despite Sentences (1) and (2), existing standpipe systems and water supplies may be used if the systems or measures will provide sufficient fire suppression capability in the circumstances and if the systems or measures are **approved**.

Sprinkler systems

9.5.5.3. (1) Where a **building** or portion thereof is required to be **sprinklered**, the sprinkler system shall be designed and constructed in accordance with Articles 3.2.5.13. to 3.2.5.16. of the **1990 Building Code**.

(2) Existing sprinkler systems are deemed to be in compliance with Sentence (1) if the average sprinkler discharge density over the design area is at least equal to the minimum density corresponding to the area for light hazard classification as defined in NFPA 13, “Standard for the Installation of Sprinkler Systems”, or NFPA 13R, “Standard for the Installation of Sprinkler Systems in Residential Occupancies Up to and Including Four Stories in Height”, whichever is applicable.

(3) Despite Sentences (1) and (2), existing sprinkler systems providing adequate protection that will control or extinguish fire and that are **approved** may be used.

SECTION 9.6 BUILDINGS HIGHER THAN 6 STOREYS IN BUILDING HEIGHT WITH RESIDENTIAL OCCUPANCIES

Subsection 9.6.1. Application

Application

9.6.1.1. (1) This Section applies to **buildings** higher than 6 **storeys** in **building height** with **residential occupancies** and containing

- (a) more than two **dwelling units**,
- (b) sleeping accommodation for more than 10 persons in one or more dormitories, or
- (c) boarding, lodging or rooming accommodation for more than 10 persons.

(2) Despite Sentence (1), if the **building** contains other **occupancies**, this Section does not apply to the fire safety systems, devices and structural elements of the other **occupancies** that do not affect the life safety of the **residential occupancy**.

(3) If a **building** contains areas that are governed by this Section and by another Section in this Part, the fire safety systems, devices and structural elements applicable to those areas shall comply with the requirements of this Section and the other Section that provide the greatest protection for life safety.

(4) For the purposes of this Section,

“**1990 Building Code**” means Ontario Regulation 413/90, as it read on October 9, 1992;

“existing” means in existence on October 9, 1992.

Exemption for convents and monasteries

9.6.1.2. Convents and monasteries are exempt from this Section.

Exemption for hotels

9.6.1.3. This Section does not apply to a **building** or part of a **building** regulated by Section 9.9.

Subsection 9.6.2. Containment

Construction

9.6.2.1. (1) Existing **buildings** shall comply with Articles 9.6.2.2. and 9.6.2.3.

(2) **Fire separations** required by this Section to have a **fire-resistance rating** shall be in accordance with Subsection 3.1.7. and Articles 3.1.8.1., 3.1.8.3. and 3.5.4.2. of the **1990 Building Code**.

(3) Where a 1 h or less **fire-resistance rating** is required, existing wall assemblies, floor assemblies and their supporting assemblies consisting of

- (a) reinforced concrete,
- (b) masonry, or
- (c) clay tile with plaster or gypsum board finish on both sides

are deemed to be in compliance with Sentence (2).

(4) Where a 45 min or less **fire-resistance rating** is required, existing wall assemblies, floor assemblies, ceilings and their supporting assemblies, consisting of membranes of lath and plaster or gypsum board are deemed to be in compliance with Sentence (2).

Floor assemblies

9.6.2.2. (1) Floor assemblies shall be **fire separations** having a 1 h **fire-resistance rating**.

(2) Walls, columns and arches supporting floor assemblies shall have a 1 h **fire-resistance rating**.

(3) Sentences (1) and (2) do not apply to floor assemblies between different levels of the same multi-level **dwelling unit**.

Combustible construction

9.6.2.3. (1) **Buildings** of **combustible construction** shall be **sprinklered**.

(2) Where only the roof assembly is of **combustible construction**, the **building** is deemed to be in compliance with Sentence (1) where

- (a) the ceiling membrane has a 45 min **fire-resistance rating** and the **attic space** is **fire stopped** in accordance with Article 3.1.11.5. of the **1990 Building Code**,
- (b) the roof assembly is of **heavy timber construction** in accordance with Article 3.1.4.6. of the **1990 Building Code**, or
- (c) the top **storey** and **attic space** are **sprinklered**.

Fire separations between occupancies

9.6.2.4. (1) **Fire separations** having a 1 h **fire-resistance rating** shall be provided between **residential occupancies** and other **major occupancies**.

(2) Existing **fire separations** having a 30 min **fire-resistance rating** are deemed to be in compliance with Sentence (1) where the other **major occupancy** is **sprinklered**.

Fire separations between dwelling units and corridors

9.6.2.5. (1) Each **dwelling unit** and sleeping room not within a **dwelling unit** shall be separated from adjacent rooms and areas by a **fire separation** having a 45 min **fire-resistance rating**.

(2) **Public corridors** shall be separated from adjacent rooms and areas by a **fire separation** having a 45 min **fire-resistance rating**.

(3) Existing **fire separations** having less than a 45 min **fire-resistance rating** are deemed to be in compliance with Sentences (1) and (2) where the **floor area** is **sprinklered**.

(4) Existing **fire separations** having a 30 min **fire-resistance rating** are deemed to be in compliance with Sentences (1) and (2) where **smoke detectors** are installed in **public corridors**.

Protection of openings in fire separations

9.6.2.6. (1) **Closures in fire separations** shall be in accordance with Sentences 3.1.8.4.(2), 3.1.8.10.(1) and 3.1.8.11.(1) and Articles 3.1.8.13. and 3.3.4.5. of the **1990 Building Code**.

(2) Openings in **fire separations** having a 30 min **fire-resistance rating** shall be protected with **closures** having a 20 min **fire-protection rating**.

(3) Where a 1.5 h **fire-protection rating** is required, existing **closures** consisting of hollow metal or kalamein doors in hollow metal frames, with openings, if any, protected by wired glass panels not exceeding 645 cm², and equipped with self-closing and latching devices are deemed to be in compliance with Sentence (1).

(4) Where a 1 h or 45 min **fire-protection rating** is required, existing **closures** are deemed to be in compliance with Sentence (1) where they consist of

- (a) hollow metal or kalamein doors in hollow metal frames, with openings, if any, protected by wired glass, and equipped with self-closing and latching devices, or
- (b) wired glass screens set in fixed steel frames.

(5) Where a 20 min **fire-protection rating** is required, or in a **fire separation** required under Article 9.6.2.5., existing **closures** consisting of 45 mm solid core wood doors installed in solid wood or hollow metal frames and equipped with self-closing and latching devices are deemed to be in compliance with Sentences (1) and (2).

(6) Where the **floor area** is **sprinklered**, existing **closures in fire separations** to which Article 9.6.2.5. applies are deemed to be in compliance with Sentence (2) and Sentences 3.1.8.4.(2) and 3.1.8.10.(1) of the **1990 Building Code**.

(7) Despite Sentence (1), garbage intake room doors that swing inward shall be acceptable without a latching device.

(8) Existing operable transoms and glass lights shall be fixed shut and shall meet the **fire-protection rating** requirements of Sentences (1) and (2).

(9) Despite Sentences (1) and (2), **fire dampers** or **fire-stop flaps** are not required in existing noncombustible ducts at penetrations of **fire separations**.

Storage rooms

9.6.2.7. (1) Storage rooms for the use of occupants, not contained within a **dwelling unit** or **suite**, shall be

- (a) separated from the remainder of the **building** by a **fire separation** having a 1 h **fire-resistance rating**, and
- (b) **sprinklered** in accordance with Article 9.6.5.5.

(2) Despite Clause (1)(b), existing sprinkler systems or alternate fire protection systems that will control or extinguish fire and that are **approved** may be used.

Fuel-fired appliance service rooms

9.6.2.8. (1) Fuel-fired **appliances** shall be enclosed in a **service room** separated from the remainder of the **building** by a **fire separation** having a 1 h **fire-resistance rating**.

(2) Sentence (1) does not apply to fireplaces within a **dwelling unit** or **suite**.

Incinerator rooms

9.6.2.9. (1) Incinerator rooms shall be separated from the remainder of the **building** by a **fire separation** having a 2 h **fire-resistance rating**.

(2) A **fire separation** having a 1 h **fire-resistance rating** is deemed to be in compliance with Sentence (1) where the incinerator room is **sprinklered**.

Combustion air

9.6.2.10. Where a **service room** is separated in accordance with Article 9.6.2.8., sufficient combustion air shall be brought directly from the outside for the proper combustion and safe operation of the **appliances**.

Refuse storage rooms

9.6.2.11. (1) Refuse storage rooms shall be

- (a) separated from the remainder of the **building** by a **fire separation** having a 1 h **fire-resistance rating**, and
- (b) **sprinklered** to provide a minimum average density of 6.5 L/min/m² over the room area.

Vertical service spaces

9.6.2.12. (1) **Vertical service spaces** shall be separated from the remainder of the **building** by a **fire separation** having a 45 min **fire-resistance rating**.

(2) Where openings in the **vertical service space**, including the top and bottom, are sealed with noncombustible materials having the same **fire-resistance rating** as the existing construction, the **vertical service space** is deemed to be in compliance with Sentence (1).

Refuse and linen chutes

9.6.2.13. (1) Each room into which a linen or refuse chute discharges shall be separated from the remainder of the **building** by a **fire separation** having a 1 h **fire-resistance rating**.

(2) Automatic sprinklers shall be installed in each linen or refuse chute

- (a) at the top,
- (b) at alternate floor levels, and
- (c) in the room or bin into which the chute discharges.

(3) An existing chute installation is deemed to be in compliance with Sentence (2) where

- (a) the chute outlet in the discharge room is protected by an automatic, self-latching **closure** held open by a fusible link,
- (b) the room into which the chute discharges is **sprinklered**, and
- (c) at least one sprinkler head with a minimum discharge rate of 66 L/min is located at the top of the chute.

Transformer vaults

9.6.2.14. Transformer vaults to which the **Electricity Act, 1998** applies shall be separated from the remainder of the **building** by a **fire separation** having a 2 h **fire-resistance rating** and shall be provided with **heat detectors** connected to the fire alarm system.

Storage garages

9.6.2.15. (1) A storage garage shall be separated from the remainder of the **building** by a **fire separation** having a 1.5 h **fire-resistance rating**.

(2) Underground storage garages shall be **sprinklered**.

(3) Where an underground storage garage is equipped with **heat detectors** connected to the fire alarm system and vestibules are located at points of access to the **residential occupancy**, the garage is deemed to be in compliance with Sentence (2).

Smoke control measures

9.6.2.16. (1) **Buildings** where the vertical distance between the floor of the top **storey** and **grade** exceeds 18 m shall have smoke control measures in accordance with Article 3.2.6.2. of the **1990 Building Code**.

(2) **Buildings** are deemed to be in compliance with Sentence (1) where

- (a) all **dwelling units** have access to an exterior balcony,
- (b) the length of **public corridors** does not exceed 30 m between **exits**,
- (c) **public corridors** on each **floor area** are equipped with **smoke detectors** connected to the fire alarm system,
- (d) **public corridors** on each **floor area** are subdivided in accordance with Sentence (3), or
- (e) the **building** is fully **sprinklered**.

(3) The **public corridor** subdivision referred to in Clause (2)(d) shall

- (a) separate the corridor into at least two compartments by a **fire separation**,

- (b) be located so that no more than one of the required **exit** stairs is located in any one compartment and the distance of travel from any **suite** entrance door to an **exit** or adjacent compartment does not exceed 25 m, and
- (c) include smoke-tight doors equipped with self-closing devices that act as **closures** in the **fire separation**.

Subsection 9.6.3. Means of Egress

Access to exits

9.6.3.1. (1) Each **dwelling unit** or **suite** in a **floor area** shall have a doorway leading to

- (a) the outside at or near **grade**,
- (b) an outside passageway where it is possible to go in opposite directions to separate **exits**, or
- (c) a **public corridor** where it is possible to go in opposite directions to separate **exits**.

(2) **Access to exits** through a dead end **public corridor** is deemed to be in compliance with Clause (1)(c) where the distance of travel, measured from any door along the corridor to a point where a choice of two directions of **exit** travel is available, does not exceed 6 m plus the width of the corridor.

(3) Existing dead end **public corridors** are deemed to be in compliance with Sentence (2) where additional fire protection measures are **approved** that, in the opinion of the **Chief Fire Official**, will provide protection for life safety similar to the protection provided by compliance with Sentence (2).

(4) Despite Sentence (1), a doorway from a **dwelling unit** or **suite** may open onto

- (a) an **exit** stairway,
- (b) a **public corridor** served by a single **exit**, or
- (c) an outside passageway served by a single **exit** stairway

if the **dwelling unit** or **suite** has access to a second and separate **exit**.

Number of exits

9.6.3.2. (1) Each **floor area** shall be served by a minimum of two **exits**.

(2) The minimum distance between **exits** shall be 9 m or half the maximum diagonal dimension of the **floor area**, whichever is less.

Travel distance

9.6.3.3. (1) The **travel distance** to at least one **exit** shall not exceed

- (a) 30 m in a **floor area** that is not **sprinklered**, or
- (b) 45 m in a **sprinklered floor area**.

Stairway separations

9.6.3.4. (1) Each **exit** stairway shall be separated from the remainder of the **building** by a **fire separation** having a 1 h **fire-resistance rating**.

(2) **Closures** in stairway **fire separations** shall be in accordance with Article 9.6.2.6.

Door swing

9.6.3.5. Each **exit** door, except those serving a single **dwelling unit**, shall open in the direction of **exit** travel and swing on its vertical axis.

Exit signs

9.6.3.6. (1) **Exit** signs shall be installed in accordance with Subsection 3.4.5. of the **1990 Building Code**.

(2) Each door opening into an **exit** stairway from a **public corridor** shall be identified on the stairway side with the number assigned to that floor in accordance with Article 3.4.6.17. of the **1990 Building Code**.

Interior finishes

9.6.3.7. (1) **Flame-spread ratings** of interior wall and ceiling finishes within a **means of egress** shall be in accordance with Article 3.1.13.7. of the **1990 Building Code**.

(2) Despite Sentence (1), existing interior wall and ceiling finishes within an **access to exit** may be **approved** if, in the opinion of the **Chief Fire Official**, they will provide protection for life safety similar to the protection provided by compliance with Sentence (1).

Lighting

9.6.3.8. **Public corridors** and stairways that form part of a **means of egress** shall be adequately illuminated to allow for the safe evacuation of occupants.

Emergency lighting

- 9.6.3.9. (1) Emergency lighting shall be provided in **exit** stairways, **public corridors** and other principal **access to exits**.
- (2) Emergency lighting required in Sentence (1) shall be
- (a) designed to provide illumination for a duration of at least
 - (i) 2 h in **buildings** whose highest floor level is more than 18 m above **grade**, and
 - (ii) 30 min in **buildings** whose highest floor level is not more than 18 m above **grade**,
 - (b) supplied by a source of energy separate from the primary electrical supply for the **building**, and
 - (c) designed to be automatically actuated when the power to the **building** is interrupted.
- (3) Illumination from emergency lighting shall be an average of at least 10 lx at floor or tread level, or 1 watt/m² of floor space.

Subsection 9.6.4. Fire Alarm and Detection

Fire alarm requirements

- 9.6.4.1. (1) A fire alarm and detection system shall be installed in each **building** in accordance with Articles 3.2.4.1. to 3.2.4.14., 3.2.4.16. to 3.2.4.20., 3.2.4.22. and 3.2.7.8. of the **1990 Building Code**.
- (2) An existing fire alarm system is deemed to be in compliance with Sentence (1) where the system
- (a) complies with Articles 9.6.4.2. to 9.6.4.9., and
 - (b) operates in accordance with Article 3.2.4.4. of the **1990 Building Code**.

Automatic detection

- 9.6.4.2. (1) Automatic detection devices referred to in Sentences (2) and (3) shall be installed and connected to the fire alarm system required in Sentence 9.6.4.1.(2).
- (2) **Fire detectors** shall be installed in storage rooms, locker rooms, **service rooms**, machinery rooms, heating rooms, incinerator rooms, linen and refuse chute intake compartments, janitors' closets and refuse storage rooms, at the tops of elevator shafts and **exit** stair shafts, and in any room or area where hazardous or combustible materials may be used or stored.
- (3) Rooms or areas that are **sprinklered** in accordance with Article 3.2.4.16. of the **1990 Building Code** are deemed to be in compliance with Sentence (2).

Manual pull stations

9.6.4.3. Manual pull stations shall be provided in accordance with Article 3.2.4.17. of the **1990 Building Code**.

Electrical supervision

- 9.6.4.4. (1) The fire alarm system shall be electrically supervised.
- (2) Despite Sentence (1), electrical supervision of the bell circuits is not required where bells operate on more than one circuit on each floor.

Annunciator panels

- 9.6.4.5. (1) An annunciator panel shall
- (a) be located at the main **street** entrance to the **building** or a location that is accessible to the **fire department** and that is **approved**, and
 - (b) indicate all floors with not more than one floor per zone indicated.
- (2) Despite Clause (1)(b), existing annunciator zone indication that is compatible with the fire safety plan required under Subsection 2.8.2. and that is **approved** may be used.

Signals to the fire department

9.6.4.6. Fire alarm systems in **buildings** where the vertical distance between the floor of the top **storey** and **grade** exceeds 18 m shall have provision for notifying the **fire department** in accordance with Sentences 3.2.4.7.(1) to (4) of the **1990 Building Code** that a fire **alarm signal** or **alert signal** has been initiated.

Voice communication systems

9.6.4.7. (1) A voice communication system shall be provided where the vertical distance between the floor of the top storey and grade exceeds 36 m.

(2) The voice communication system required by Sentence (1) shall

- (a) consist of loudspeakers operated from the central alarm and control facility or other location that is accessible to the fire department and supervisory staff required under Subsection 2.8.2. and that is approved,
- (b) provide a clear verbal signal throughout the building, except for within elevator cars, and
- (c) provide for automatic silencing of the fire alarm devices when the loudspeakers are in use.

(3) Approved existing public address systems compatible with the fire safety plan required under Subsection 2.8.2. and capable of communicating instructions to the building occupants are deemed to be in compliance with Sentences (1) and (2).

Emergency power

9.6.4.8. Fire alarm and voice communication systems shall be provided with an electrically supervised emergency power supply in accordance with Article 3.2.7.8. of the 1990 Building Code.

Shutdown of air handling systems

9.6.4.9. Recirculating air handling systems that serve more than one dwelling unit, suite or storey shall be equipped with a duct-type smoke detector that will automatically shut down the system upon actuation of the smoke detector.

Smoke alarms

9.6.4.10. (1) Smoke alarms shall be installed in each dwelling unit and in each sleeping room not within a dwelling unit in accordance with Article 3.2.4.21. of the 1990 Building Code.

(2) Battery-operated smoke alarms are deemed to be in compliance with Sentence 3.2.4.21.(4) of the 1990 Building Code.

(3) Smoke alarms required in Sentence (1) shall be in accordance with CAN/ULC-S531, "Standard for Smoke Alarms", and CAN/ULC-S553, "Standard for the Installation of Smoke Alarms".

(4) Existing smoke alarms meeting the requirements of ULC-S531-1978, "Standard for Smoke Alarms", are deemed to be in compliance with Sentence (3).

Subsection 9.6.5. Suppression

Access for fire fighting

9.6.5.1. (1) Access routes for fire fighting shall be provided in accordance with Articles 3.2.5.5. to 3.2.5.7. of the 1990 Building Code.

(2) Sentence (1) does not apply where the building is sprinklered.

Standpipe systems

9.6.5.2. (1) A standpipe and hose system in accordance with Subsection 3.2.9. of the 1990 Building Code shall be installed in each building.

(2) A wet or dry standpipe system is deemed to be in compliance with Sentence (1) where the system includes

- (a) a minimum 150 mm diameter riser located in each stairwell, with 38 mm and 65 mm capped fire hose valves at each storey,
- (b) capped 38 mm fire hose valves located in the public corridor so that any point on a floor area may be reached by 30 m of hose plus 3 m of hose stream from at least one hose valve,
- (c) flow rates as required by Clauses 3.2.9.3.(4)(b) and (c) of the 1990 Building Code for buildings less than 84 m in height, measured between grade and the ceiling level of the top storey,
- (d) flow rates as required by Clause 3.2.9.3.(5)(b) of the 1990 Building Code for buildings 84 m or more in height, measured between grade and the ceiling level of the top storey, and
- (e) a water supply in accordance with Sentences 3.2.9.3.(1) and (2) of the 1990 Building Code.

(3) An existing standpipe and hose system capable of delivering a minimum flow rate of 265 L/min for at least 30 min at a minimum discharge pressure of 345 kPa (gauge) at the two highest and most remote hose valves is deemed to be in compliance with Clauses (2) (a), (c), (d) and (e) if not less than 132 L/min can be supplied from each of the two outlets simultaneously.

(4) Emergency power shall be provided for a standpipe system that is designed with at least one pressure zone located above another, such that the water supply for the booster pump in the upper zone must be supplied from the pump in the zone below.

Fire department connections

9.6.5.3. (1) A **fire department** connection in accordance with Sentences 3.2.9.5.(2) to (9) of the **1990 Building Code** shall be provided.

(2) Despite Sentence (1), a **fire department** connection is not required where a booster pump equipped with emergency power is provided.

(3) Despite Sentence (1), existing **fire department** connections that are visible and accessible to the **fire department** and that are **approved** may be used.

Hydrants

9.6.5.4. (1) Hydrants shall be located within 90 m of the **building** face on which the principal entrance is located.

(2) A hydrant located within 45 m of a **fire department** connection, as required by Sentence 9.6.5.3.(1), is deemed to be in compliance with Sentence (1).

(3) Despite Sentence (1), existing hydrant locations that provide sufficient fire suppression capability in the circumstances and that are **approved** may be used.

Sprinkler systems

9.6.5.5. (1) Where a **building** or portion thereof is required to be **sprinklered**, the sprinkler system shall be designed and constructed in accordance with Articles 3.2.5.13. to 3.2.5.16. of the **1990 Building Code**.

(2) Existing sprinkler systems in which the average sprinkler discharge density over the design area is at least equal to the minimum density corresponding to the area for light hazard classification as defined in NFPA 13, "Standard for the Installation of Sprinkler Systems", are deemed to be in compliance with Sentence (1).

Firefighters' elevators

9.6.5.6. (1) At least one elevator shall be provided for use by firefighters in accordance with Articles 3.2.6.8. and 3.2.6.9. of the **1990 Building Code** in **buildings** where the vertical distance between the floor of the top **storey** and **grade** exceeds 18 m.

(2) An elevator is deemed to be in compliance with Sentence (1) where

- (a) the elevator is capable of providing transportation from the **street** floor to every floor served by the elevator system,
- (b) the elevator is identified on the **street** floor as an elevator provided for use by firefighters,
- (c) the elevator satisfies the requirements of Sentences 3.2.6.8.(1) to (4) of the **1990 Building Code**, and
- (d) other elevator cabs in the same shaft as the elevator for use by firefighters satisfy the requirements of Sentences 3.2.6.8.(1) and (2) of the **1990 Building Code**.

(3) An elevator system that requires transfer from one elevator to another to reach all floors above **grade** is deemed to be in compliance with Sentence (1) where

- (a) the elevators are identified on the **street** floor and the transfer floor as elevators provided for firefighters' use,
- (b) the elevators satisfy the requirements of Sentences 3.2.6.8.(1) to (4) of the **1990 Building Code**,
- (c) emergency power is provided capable of operating one elevator car at a time, in **buildings** where the vertical distance between the floor of the top **storey** and **grade** exceeds 36 m, and
- (d) other elevator cabs in the same shaft as the elevator for use by firefighters satisfy the requirements of Sentences 3.2.6.8.(1) and (2) of the **1990 Building Code**.

Emergency power supply

9.6.5.7. (1) Emergency electric power provided for

- (a) fire alarm and detection systems referred to in Sentence 9.6.4.1.(1) and Article 9.6.4.8.,
- (b) booster pumps serving standpipe systems referred to in Sentences 9.6.5.2.(4) and 9.6.5.3.(2), and
- (c) elevators referred to in Clause 9.6.5.6.(3)(c)

shall be installed in accordance with Articles 3.2.7.5. and 3.2.7.8. of the **1990 Building Code**.

(2) Despite Sentence (1), existing emergency electric power generators that will provide reliable and sufficient electric power and that are **approved** may be used.

SECTION 9.7 RESERVED**SECTION 9.8 TWO UNIT RESIDENTIAL OCCUPANCIES**

Subsection 9.8.1. Application

Application

9.8.1.1. (1) This Section applies to a detached house, semi-detached house or row house containing two existing dwelling units, where

- (a) the **building** is 3 **storeys** or less in **building height**,
 - (b) the **building area** does not exceed 600 m², and
 - (c) one dwelling unit or a portion of a dwelling unit is situated above another dwelling unit, or two dwelling units side by side share a common interior means of escape.
- (2) For the purposes of this Section,

“**1994 Building Code**” means Regulation 61 of the Revised Regulations of Ontario, 1990, as it read on July 14, 1994;

“dwelling unit”, in light face, means a room or **suite** of rooms operated as a housekeeping unit that is used as a domicile by one or more persons, and that contains cooking, eating, living, sleeping and sanitary facilities;

“existing” means in existence on July 14, 1994;

“row house” means a residential structure which

- (a) is one of a group of three or more horizontally attached residential structures, and
- (b) is separated vertically from one or two of the other structures by common walls which do not provide for internal access from the living space in one structure to another;

“semi-detached house” means a residential structure which

- (a) is one of two horizontally attached residential structures, and
- (b) is separated vertically from the other residential structure by a common wall which does not provide for internal access from the living space in one structure to the other.

Subsection 9.8.2. Containment

General requirements for fire separations

9.8.2.1. (1) **Fire separations** required to have a **fire-resistance rating** by this Section shall comply with Article 9.10.3.1. of the **1994 Building Code** or the corresponding compliance alternatives in Part 11 of the **1994 Building Code**.

(2) Except as permitted in Article 9.8.2.5., a wall or floor assembly required to be a **fire separation** shall be constructed as a continuous barrier against the spread of fire.

(3) Where a 30 min **fire-resistance rating** is required, existing wall assemblies and floor assemblies consisting of membranes of lath and plaster or gypsum board are deemed to be in compliance with Sentence (1).

(4) Where a 15 min **fire-resistance rating** is required, existing wall assemblies and floor assemblies consisting of membranes of plaster board with a plaster skim coat are deemed to be in compliance with Sentence (1).

Fire separations between dwelling units

9.8.2.2. (1) Except as permitted in Article 9.8.2.3., each dwelling unit shall be separated from other rooms and areas by a **fire separation** having a 30 min **fire-resistance rating** conforming to Article 9.8.2.1. or shall comply with Sentence (2) or (3) of this Article.

(2) Except as permitted in Article 9.8.2.3., each dwelling unit shall be separated from other rooms and areas by a **fire separation** having a 15 min **fire-resistance rating** conforming to Article 9.8.2.1. and be equipped with interconnected **smoke alarms** conforming to Article 9.8.4.1.

(3) Existing **fire separations** are deemed to be in compliance with Sentence (1) where the detached house, semi-detached house, or row house is **sprinklered** in accordance with Article 9.8.5.1.

Alternative protection for ceilings

9.8.2.3. The **fire-resistance rating** of the **fire separation** above a room containing a fuel-fired **appliance** is not required where the room is **sprinklered**, providing a minimum average density of 6.5 L/min/m² over the room area.

Combustion air

9.8.2.4. Where a room containing a fuel-fired **appliance** is enclosed to satisfy other provisions of this Section in a manner that restricts the supply of combustion air, sufficient combustion air shall be brought directly from the outside for the proper combustion and safe operation of the **appliance**.

Protection of openings in fire separations

9.8.2.5. (1) Openings in **fire separations** required by Sentences 9.8.2.2.(1) and (2) and 9.8.3.3.(1) shall be protected with **closures** conforming to Articles 9.10.13.2. and 9.10.13.10. of the **1994 Building Code**.

(2) Despite Sentence (1), existing 45 mm solid core wood, hollow metal or kalamein doors equipped with self-closing devices, installed in hollow metal or solid wood frames, are acceptable.

(3) Despite Sentence (1), **fire dampers** or **fire-stop flaps** are not required in ducts at penetrations of a **fire separation**.

Subsection 9.8.3. Means of Egress

Requirements for means of escape

9.8.3.1. Each dwelling unit shall be provided with a means of escape conforming to Article 9.8.3.2., 9.8.3.3., 9.8.3.4. or 9.8.3.5.

One means of escape

9.8.3.2. (1) Each dwelling unit shall be served by at least one means of escape consisting of a door that

- (a) serves only that dwelling unit,
- (b) opens directly to the exterior from that dwelling unit, and
- (c) has direct access to ground level.

9.8.3.3. (1) Each dwelling unit shall have direct access to at least one means of escape that may be shared if

- (a) the means of escape is separated from the remainder of the **building** by a **fire separation** having a 30 min **fire-resistance rating**,
- (b) the **flame-spread rating** of interior wall and ceiling finishes within the means of escape does not exceed 150, and
- (c) the means of escape does not involve entering another dwelling unit or other **occupancy** and leads directly to the exterior with direct access to ground level.

(2) Where a means of escape provided by Sentence (1) serves a dwelling unit situated entirely on the third **storey**, the detached house, semi-detached house or row house shall be equipped with interconnected **smoke alarms** conforming to Article 9.8.4.1.

Two means of escape

9.8.3.4. (1) Each dwelling unit shall be served by at least two means of escape arranged in such a manner that

- (a) one means of escape shall be through a door which may lead through another dwelling unit, and
- (b) the second means of escape shall be through a window if
 - (i) the window conforms to Sentence (2) or (3), and
 - (ii) the detached house, semi-detached house or row house is equipped with interconnected **smoke alarms** conforming to Article 9.8.4.1.

(2) A window may serve as a second means of escape if

- (a) the sill is not more than 1 m above or below the adjacent ground level,
- (b) the window can be opened from the inside without the use of tools,
- (c) the window has an individual, unobstructed open portion having a minimum area of 0.38 m² with no dimension less than 460 mm,
- (d) the sill height does not exceed 900 mm above the floor or fixed steps,
- (e) where the window has a window-well, a clearance of at least 1 m is provided in the window-well in front of the window, and
- (f) where the window has a window-well, the window opens into the dwelling unit and does not interfere with escape.

(3) A window may serve as a second means of escape if

- (a) the window is of a casement type,
- (b) the window is not less than 1060 mm high and 560 mm wide,
- (c) the sill of the window is not more than 900 mm above the inside floor, and
- (d) the sill of the window is not less than 1 m and not more than 5 m above the adjacent ground level.

Existing means of escape with sprinklers

9.8.3.5. An existing means of escape, not conforming to Article 9.8.3.2., 9.8.3.3. or 9.8.3.4., is acceptable if the detached house, semi-detached house or row house is **sprinklered** in accordance with Article 9.8.5.1.

Subsection 9.8.4. Fire Alarm and Detection

Interconnected smoke alarms

9.8.4.1. (1) Interconnected **smoke alarms** required in Sentences 9.8.2.2.(2) and 9.8.3.3.(2) and Clause 9.8.3.4.(1)(b) shall be installed on or near the ceiling in each

- (a) **storey** within a dwelling unit, including every **basement**, and
- (b) shared means of escape.
- (2) **Smoke alarms** referred to in Sentence (1) shall be
 - (a) electrically interconnected so that the activation of any **smoke alarm** will sound a similar signal in each of the interconnected devices,
 - (b) installed in accordance with the manufacturer's instructions, and on floor levels containing bedrooms or sleeping areas, the required **smoke alarms** shall be installed between such bedrooms and the remainder of the dwelling unit, such as in a hallway or corridor serving such rooms or areas,
 - (c) connected to an electrical circuit with no disconnect switch between the overcurrent device and the **smoke alarms**,
 - (d) **listed** for use in an interconnected installation, and
 - (e) audible in bedrooms when the intervening doors are closed.

Smoke alarms

9.8.4.2. (1) **Smoke alarms** shall be installed in each dwelling unit in accordance with Sentences 3.2.4.21.(1) to (4) of the **1994 Building Code**.

(2) Battery-operated **smoke alarms** are deemed to be in compliance with Sentence 3.2.4.21.(4) of the **1994 Building Code**.

(3) **Smoke alarms** required in Sentence 9.8.4.2.(1) shall be designed in conformance with CAN/ULC-S531, "Standard for Smoke Alarms", and installed in accordance with CAN/ULC-S553, "Standard for the Installation of Smoke Alarms".

(4) Existing **smoke alarms** meeting the requirements of ULC-S531-1978, "Standard for Smoke Alarms", are deemed to be in compliance with Sentence (3).

(5) When interconnected **smoke alarms** are installed in accordance with Article 9.8.4.1., the **smoke alarms** referred to in Sentence (1) of this Article are not required.

Subsection 9.8.5. Suppression

Sprinkler systems

9.8.5.1. Sprinkler protection required in this Section shall be designed and installed in conformance with NFPA 13D, "Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes".

Subsection 9.8.6. Electrical

Electrical inspections required

9.8.6.1. (1) Each detached house, semi-detached house and row house regulated by this Section shall be subjected to a general **inspection** by the Electrical Safety Authority, as defined in the **Electricity Act, 1998**, and **inspection** fees shall be paid by the **owner**.

(2) Electrical hazards identified during an **inspection** required by Sentence (1) shall be repaired in accordance with the **Electrical Safety Code** made under the **Electricity Act, 1998**.

(3) The letter of compliance from the Electrical Safety Authority, as defined in the **Electricity Act, 1998**, shall be made available to the **Chief Fire Official** upon request.

SECTION 9.9 HOTELS

Subsection 9.9.1. Application

Application

- 9.9.1.1. (1) Except as provided in Sentences (2), (3) and (4), this Section applies to every **hotel establishment**.

(2) Except as required in Sentence (5), this Section does not apply to a **hotel establishment** where every **building** that contains a **hotel**

- (a) is not more than 1 **storey** in **building height**, and
- (b) has a **building area** of 300 m² or less.

(3) Except as required in Sentences (5) and (6), this Section does not apply to a **building** or part of a **building** that was regulated by Section 9.2, 9.3, 9.5 or 9.6 on December 31, 2006 if the use of the **building** is unchanged since that date.

(4) Except as required in Sentence (6), if the **building** contains **major occupancies** that operate under independent control from the **hotel establishment**, this Section does not apply to fire safety systems, devices and structural elements of those **major occupancies** that do not affect the life safety of the **hotel** occupants.

- (5) Article 9.9.4.13. applies to a **building** or part of a **building** described in Sentence (2) or (3).
- (6) Articles 9.9.2.9. and 9.9.2.15. apply to a **building** or part of a **building** described in Sentence (3) or (4).
- (7) For the purposes of this Section,

“**1994 Building Code**” means Regulation 61 of the Revised Regulations of Ontario, 1990, as it read on June 23, 1994;

“existing” means in existence on January 1, 2007.

Building audit

9.9.1.2. (1) A **building** audit shall be prepared and retained by the **owner**.

(2) The **building** audit referred to in Sentence (1) shall identify and describe the existing **building** features in relation to the requirements of this Section, including

- (a) containment and control of a fire, including
 - (i) **fire separations**,
 - (ii) **firewalls**,
 - (iii) construction assemblies,
 - (iv) **occupancy separations**,
 - (v) interior finishes,
 - (vi) smoke control,
 - (vii) heating, ventilating and air-conditioning systems, and
 - (viii) commercial cooking equipment,
- (b) detection, including
 - (i) alarm and detection systems,
 - (ii) **smoke alarms**, and
 - (iii) voice communication systems,
- (c) suppression, including
 - (i) **fire department** access,
 - (ii) standpipe and hose systems,
 - (iii) sprinkler or special fire suppression systems, and
 - (iv) firefighters’ elevators, and
- (d) egress, including
 - (i) the number, type, **access to**, direction to, lighting for and identification of **exits**,
 - (ii) fire escapes,
 - (iii) **occupant load**, and
 - (iv) emergency lighting.

Subsection 9.9.2. Containment

Construction

9.9.2.1. (1) **Fire separations** required by this Section to have a **fire-resistance rating** shall be in conformance with Subsection 3.1.7. and Articles 3.1.8.1., 3.1.8.2., 3.1.8.3. and 3.5.4.2. of the **1994 Building Code**.

(2) Where a 2 hr or less **fire-resistance rating** is required, existing wall assemblies, floor assemblies and their supporting assemblies consisting of

- (a) reinforced concrete,
- (b) masonry, or
- (c) clay tile with plaster or gypsum board finish on both sides

are deemed to be in compliance with Sentence (1).

(3) Where a 1 hr or less **fire-resistance rating** is required, existing wall assemblies, floor assemblies, ceilings and their supporting assemblies that consist of membranes of lath and plaster or gypsum board are deemed to be in compliance with Sentence (1).

(4) **Heavy timber construction** conforming to Article 3.1.4.6. of the **1994 Building Code** is deemed to have a 45 min **fire-resistance rating**.

(5) **Buildings** with limited combustible components may be **approved** as **noncombustible construction**.

(6) Except as permitted in Sentences (7) and (8), floor assemblies shall be **fire separations**.

(7) Sentence (6) does not apply to floor assemblies between different levels of the same multi-level **guest suite**.

(8) A floor assembly immediately above a crawl space is not required to be constructed as a **fire separation** and is not required to have a **fire-resistance rating** provided the crawl space is not considered as a **basement** in Sentence 3.2.2.5.(1) of the **1994 Building Code**.

Buildings up to 3 storeys

9.9.2.2. (1) **Buildings** shall comply with the requirements of Sentence (2), where the **building** is

- (a) not more than 1 **storey** in **building height** and not greater than 1200 m² in **building area**,
- (b) not more than 2 **storeys** in **building height** and not greater than 900 m² in **building area**, or
- (c) not more than 3 **storeys** in **building height** and not greater than 600 m² in **building area**.

(2) Floor assemblies and walls, columns and arches supporting floor assemblies shall have a 30 min **fire-resistance rating**.

(3) Where sleeping accommodation or meeting rooms are not provided in the **basement**, an existing **fire separation** between the **first storey** and **basement** is deemed to be in compliance with Sentence (2) where

- (a) the **basement** is **sprinklered**,
- (b) the **building** contains not more than four **guest suites** and provides sleeping accommodation for not more than 10 persons, and
 - (i) interconnected **smoke alarms** are installed in conformance with Clause 9.9.4.1.(3)(c),
 - (ii) doors connecting the **basement** and **first storey** have a 20 min **fire-protection rating** and are equipped with self-closing and latching devices, and
 - (iii) **fire stopping** of the wall space at the **basement** level is in conformance with Article 9.10.15.3. of the **1994 Building Code**, or
- (c) the **building** is 1 **storey** in **building height**, not more than 600 m² in **building area**, and
 - (i) each **guest suite** has direct access to the outdoors by a door near ground level,
 - (ii) doors connecting the **basement** and **first storey** have a 20 min **fire-protection rating** and are equipped with self-closing and latching devices,
 - (iii) **fire stopping** of the wall space at the **basement** level is in accordance with Article 9.10.15.3. of the **1994 Building Code**, and
 - (iv) an **approved** early warning system is installed consisting of **fire detectors** in the **basement** interconnected with alarm signalling devices that are audible in all **guest suites**.

(4) The water supply for the sprinklers referred to in Clause (3)(a) may be taken from the domestic supply where the supply provides sufficient density for the largest **fire compartment** and where the supply is **approved**.

(5) A **building** that is **sprinklered** is deemed to be in compliance with Sentence (2).

Buildings up to 4 storeys

9.9.2.3. (1) **Buildings** to which Sentence 9.9.2.2.(1) does not apply and that are not more than 4 **storeys** in **building height** shall comply with Sentences (2) and (3).

(2) Floor assemblies and walls, columns and arches supporting floor assemblies shall have a 45 min **fire-resistance rating**.

(3) **Smoke detectors** shall be provided in corridors serving **guest suites** in **buildings** of **combustible construction**.

(4) A **building** that is **sprinklered** is deemed to be in compliance with Sentences (2) and (3).

Buildings over 4 storeys but not more than 6 storeys

9.9.2.4. (1) **Buildings** to which Articles 9.9.2.2. and 9.9.2.3. do not apply and that are not more than 6 **storeys** in **building height** shall

(a) have a 45 min **fire-resistance rating** for floor assemblies and walls, columns and arches supporting floor assemblies, and

(b) be **sprinklered**, where the **building** is of **combustible construction**.

(2) Where only the roof assembly is of **combustible construction**, the **building** is deemed to be in compliance with Clause (1)(b) where

(a) the ceiling membrane has a 45 min **fire-resistance rating** and the **attic space** is **fire stopped** in conformance with Article 3.1.11.5. of the **1994 Building Code**,

(b) the roof assembly is of **heavy timber construction** in conformance with Article 3.1.4.6. of the **1994 Building Code**, or

(c) the top **storey** and attic space are **sprinklered**.

(3) Where **smoke detectors** are provided in corridors serving **guest suites**, a **building** of **heavy timber construction** conforming to Article 3.1.4.6. of the **1994 Building Code** is deemed to be in compliance with Sentence (1).

Buildings over 6 storeys

9.9.2.5. (1) **Buildings** that are more than 6 **storeys** in **building height** shall

(a) have a 1 hr **fire-resistance rating** for floor assemblies and walls, columns and arches supporting floor assemblies, and

(b) be **sprinklered**, where the **building** is of **combustible construction**.

(2) Where only the roof assembly is of **combustible construction**, the **building** is deemed to be in compliance with Clause (1)(b) where

(a) the ceiling membrane has a 45 min **fire-resistance rating** and the **attic space** is **fire stopped** in conformance with Article 3.1.11.5. of the **1994 Building Code**,

(b) the roof assembly is of **heavy timber construction** in conformance with Article 3.1.4.6. of the **1994 Building Code**, or

(c) the top **storey** and attic space are **sprinklered**.

Adjacent buildings

9.9.2.6. (1) A **building** containing a **hotel** shall be separated from a directly connected adjacent **building** that does not contain a **hotel** by a noncombustible **fire separation** having a 2 h **fire-resistance rating**.

(2) An existing wall having a 2 h **fire-resistance rating** and constructed as a **fire separation** is deemed to be in compliance with Sentence (1).

(3) Where the connection consists of an aboveground or underground walkway in conformance with Articles 3.2.3.20. and 3.2.3.21. of the **1994 Building Code**, the **building** is deemed to be in compliance with Sentence (1).

Interconnected floor spaces

9.9.2.7. (1) Despite Sentence 9.9.2.1.(6), a floor assembly may be penetrated by an unprotected opening between 2 contiguous **storeys** up to the fifth **storey** where

(a) the **building** is of **noncombustible construction**,

(b) the interconnected floor space does not contain sleeping accommodation, and

(c) the required **fire-resistance rating** of the floor assembly is maintained.

(2) Despite Sentence 9.9.2.1.(6), in a **building** that is not more than 3 **storeys** in **building height** and not more than 600 m² in **building area**, a floor assembly is not required to be constructed as a **fire separation** between 2 contiguous **storeys** where

- (a) the interconnected floor space consists of the **first storey** and the **storey** next above or below, but not both,
- (b) the interconnected floor space is **sprinklered**, and
- (c) the sprinkler system is equipped with a water flow device and electrical supervision in conformance with Sentence 3.2.8.7.(2) of the **1994 Building Code**.

(3) Despite Sentence 9.9.2.1.(6), a floor assembly in a storage garage or an open-air parking garage is not required to be constructed as a **fire separation**.

(4) Interconnected floor spaces in conformance with Subsection 3.2.8. of the **1994 Building Code** are deemed to be in compliance with Sentence (1).

Fire separation of guest suites

9.9.2.8. (1) **Guest suites** shall be separated from adjacent rooms and areas on the same **floor area** by

- (a) a **fire separation** having a 30 min **fire-resistance rating** in **buildings** that are not more than 6 **storeys** in **building height**, and
- (b) a **fire separation** having a 45 min **fire-resistance rating** in **buildings** that are more than 6 **storeys** in **building height**.

Fire separation of corridors

(2) Corridors serving **guest suites** shall be separated from adjacent rooms and areas on the same **floor area** by

- (a) a **fire separation** having a 30 min **fire-resistance rating** in **buildings** that are not more than 6 **storeys** in **building height**, and
- (b) a **fire separation** having a 45 min **fire-resistance rating** in **buildings** that are more than 6 **storeys** in **building height**.

(3) Existing **fire separations** having less than a 45 min **fire-resistance rating** are deemed to be in compliance with Sentences (1) and (2) where the **floor area** is **sprinklered**.

Fire separations between major occupancies

9.9.2.9. (1) **Fire separations** having a 45 min **fire-resistance rating** shall be provided between **major occupancies**.

(2) Existing **fire separations** having a 30 min **fire-resistance rating** are deemed to be in compliance with Sentence (1) where

- (a) the **floor area** is **sprinklered**, or
- (b) the part of the **building** containing the **major occupancy** is equipped with **fire detectors** and connecting corridors are equipped with **smoke detectors** as part of the fire alarm system of the **building**.

Protection of openings in fire separations

9.9.2.10. (1) **Closures** in **fire separations** shall be in conformance with

- (a) Sentences 3.1.8.4.(2) and 3.1.8.10.(1) of the **1994 Building Code**, and
- (b) Articles 3.1.8.11. and 3.1.8.13. of the **1994 Building Code**.

(2) Despite Sentence (1), openings in **fire separations** to which Article 9.9.2.8. or 9.9.2.11. applies may be protected with **closures** having a 20 min **fire-protection rating**.

(3) Where a 1 h or less **fire-protection rating** is required, existing **closures** consisting of

- (a) hollow metal or kalamein doors in hollow metal frames, with openings, if any, protected by wired glass and equipped with self-closing and latching devices, or
- (b) wired glass screens set in fixed steel frames

are deemed to be in compliance with Sentence (1).

(4) Where a 20 min **fire-protection rating** is required, existing **closures** consisting of door assemblies of 45 mm solid core wood doors installed in solid wood or hollow metal frames and equipped with self-closing and latching devices are deemed to be in compliance with Sentences (1) and (2).

(5) Despite Sentence (1), existing **closures** in **fire separations** to which Articles 9.9.2.8. and 9.9.3.6. apply need not be equipped with latching devices in **buildings** that are not more than 6 **storeys** in **building height**.

(6) Where the **floor area** is **sprinklered**, existing **closures** in **fire separations** to which Article 9.9.2.8. applies are deemed to be in compliance with Clause (1)(a) and Sentence (2).

(7) **Fire dampers** shall be installed in **fire separations** in conformance with Article 3.1.8.7. of the **1994 Building Code**.

(8) Despite Sentence (7), **fire dampers** are not required in existing noncombustible ducts at penetrations of **fire separations**.

Laundry rooms, storage rooms and maintenance shops

9.9.2.11. Laundry rooms, storage rooms exceeding 0.6 m² in area and maintenance shops shall be separated from the remainder of the **building** by a **fire separation** having a 45 min **fire-resistance rating**.

Fuel-fired appliances

9.9.2.12. (1) Fuel-fired **appliances**, except for cooking **appliances**, shall be separated from the remainder of the **building** by a **fire separation** having a 1 h **fire-resistance rating**.

(2) Sentence (1) does not apply to a gas or oil-fired **appliance** installed on the roof of a **building** of **noncombustible construction**.

(3) Sentence (1) does not apply to fireplaces and **space heaters** provided the **appliance** is not located in an **exit** or in a corridor serving as an **access to exit** for **guest suites**.

(4) Despite Sentence (1), the **fire-resistance rating** of the **fire separation** above the room is not required where

(a) the required vertical **fire separation** to the room is provided, and

(b) the room area is fully **sprinklered**, with a spacing not exceeding 9.5 m² per sprinkler head, or providing a minimum average density of 6.5 L/min/m² over the room area.

(5) Where an **appliance** is separated in conformance with this Article, sufficient combustion air shall be brought directly from the outside for the safe operation of the **appliance**.

(6) Where it is impractical to provide combustion air directly from the outside as required in Sentence (5), alternative means for the safe operation of the **appliance** may be **approved**.

(7) Despite Sentence (1), a **fire separation** is not required for a fuel-fired **appliance** located within a **guest suite** and serving only that **guest suite**.

Vertical service spaces

9.9.2.13. (1) **Vertical service spaces** shall be separated from the remainder of the **building** by a **fire separation** having a 45 min **fire-resistance rating**.

(2) Where the existing **vertical service space**, including the top and bottom, is sealed with gypsum board, lath and plaster or other similar noncombustible material, the **vertical service space** is deemed to be in compliance with Sentence (1).

Refuse and linen chutes

9.9.2.14. (1) Unless otherwise **approved**, linen and refuse chutes shall be located in a shaft separated from the remainder of the **building** by a **fire separation** having a 1 h **fire-resistance rating**.

(2) Linen and refuse chutes shall terminate or discharge directly into rooms that are separated from the remainder of the **building** by a **fire separation** having a 1 h **fire-resistance rating**.

(3) In **buildings** more than 2 **storeys** in **building height**, automatic sprinklers shall be installed in each linen or refuse chute

(a) at the top,

(b) at alternate floor levels, and

(c) in the room or bin into which the chute discharges.

(4) An existing chute installation is deemed to be in compliance with Sentence (3) where

(a) the chute outlet in the discharge room is protected by an automatic, self-latching **closure** held open by a fusible link in **buildings** greater than 6 storeys in **building height**,

(b) the room into which the chute discharges is **sprinklered**, and

(c) at least one sprinkler head with a minimum discharge rate of 66 L/min is located at the top of the chute.

Smoke control

9.9.2.15. (1) **Buildings** containing a **hotel** where the vertical distance between the floor of the top **storey** and **grade** exceeds 18 m shall have smoke control measures in conformance with Sentences (2) and (3).

- (2) **Buildings** containing a **hotel** shall
 - (a) have smoke control measures that prevent smoke spread from **floor areas** containing other **occupancies** to upper **floor areas** that contain **guest suites**, or
 - (b) be **sprinklered** on all **floor areas** containing other **occupancies** that are located below floors that contain **guest suites**.
- (3) **Buildings** containing a **hotel** shall have smoke control measures in conformance with Article 3.2.6.2. of the **1994 Building Code**.
- (4) A **building** is deemed to be in compliance with Sentence (3) where
 - (a) all **guest suites** have access to an exterior balcony,
 - (b) the length of corridors serving **guest suites** does not exceed 30 m between **exits**,
 - (c) corridors serving **guest suites** are equipped with **smoke detectors** connected to the fire alarm system,
 - (d) corridors serving **guest suites** are subdivided in conformance with Sentence (5), or
 - (e) the **building** is **sprinklered**.
- (5) The corridor subdivision referred to in Clause (4)(d) shall
 - (a) separate the corridor into at least two compartments by a **fire separation** that does not require a **fire-resistance rating**,
 - (b) be located so that not more than one of the required **exit** stairs is located in any one compartment and the distance of travel from any **guest suite** entrance door to an **exit** or adjacent compartment does not exceed 25 m, and
 - (c) include smoke-tight doors equipped with self-closing devices that act as **closures** in the **fire separation**.

Pipes, ducts and plenums

9.9.2.16. (1) Pipes, ducts, **plenums** and other equipment in heating and air handling systems shall be constructed of steel, **approved** noncombustible material or other **approved** material.

(2) Insulating materials and adhesives for pipes, ducts, **plenums** and other components of heating and air handling systems shall be noncombustible or shall have a **flame-spread rating** of 25 or less or shall be of some other **approved** composition.

(3) Where an **attic space**, a crawl space, a corridor ceiling space or any other concealed space is used as a **plenum**, the concealed space shall be lined with noncombustible material, material having a **flame-spread rating** of 25 or less or other **approved** material.

9.9.2.17. (1) A **fire separation** that separates an **exit** stairway from the remainder of the **building** shall not be breached by a duct or other part of an air handling system.

(2) Despite Sentence (1), an **exit** through a lobby or other entrance area that is within a stairway separation may be breached, provided the stairway is separated from the entrance area by a **fire separation** having a 45 min **fire-resistance rating**.

9.9.2.18. No stairway enclosure or corridor shall be used as a **plenum** to exhaust air from other areas.

Commercial cooking equipment

9.9.2.19. (1) An existing commercial cooking equipment installation in conformance with Sentences (2) to (6) is deemed to be in compliance with Sentence 2.6.1.12.(1).

(2) Commercial cooking equipment shall have an existing exhaust system which, unless otherwise **approved**, shall be provided with

- (a) a hood or other primary collection device to collect and confine all cooking vapours and residues emanating from the cooking equipment,
- (b) a grease filter or other means of grease extraction,
- (c) a duct from the hood or other primary collection device which
 - (i) leads as directly as possible to the outside,
 - (ii) is independent and not connected to any other ventilation system, and
 - (iii) has adequate openings for **inspection** and cleaning purposes that are equipped with tight fitting doors,
- (d) a residue trap with provisions for cleanout at the base of each vertical riser, and
- (e) mechanically induced air flow of sufficient velocity to confine cooking vapours and residues to the hood or other primary collection means installed at the cooking equipment.

(3) Pipes, ducts, **plenums** and other components of the exhaust system shall be constructed of steel, **approved** noncombustible material or other **approved** material.

(4) Insulating material and adhesive used in the exhaust system shall be noncombustible or shall have a **flame-spread rating** of 25 or less or shall have some other **approved** composition.

(5) The commercial cooking equipment shall be

(a) located in a kitchen that is separated from the remainder of the **building** by a **fire separation** having a 45 min **fire-resistance rating**, or

(b) protected by a fixed fire protection system.

(6) The **fire separation** referred to in Sentence (5) may contain an unprotected pass-through opening into the adjoining dining area if **approved** measures are provided to limit fire spread.

Subsection 9.9.3. Means of Egress

Occupant load

9.9.3.1. (1) The **occupant load** for calculation of the number and width of **access to exits** and **exits** referred to in this Section shall be determined in accordance with Subsection 3.1.16. of the **1994 Building Code**.

(2) The **occupant load** of a **floor area** may vary if it is used for different **occupancies** at different times, but the **exits** from the **floor area** shall provide the aggregate **exit** width prescribed in Article 9.9.3.2. for the greatest **occupant load**.

Access to exit

9.9.3.2. (1) Each room, **guest suite**, podium, terrace, platform, contained open space or other area intended for **occupancy** shall have egress facilities leading directly to

(a) a public thoroughfare,

(b) an **approved** open space that has access to a public thoroughfare, or

(c) a corridor where it is possible to go in opposite directions to separate **exits**, except as otherwise permitted by this Article or Article 9.9.3.3.

Dead end corridors

(2) Dead end corridors shall not be longer than 6 m plus the width of the corridor, unless otherwise **approved**.

(3) Unless otherwise **approved**, no area may be served by a dead end corridor where

(a) the area contains an **assembly occupancy** and its **occupant load** is greater than 20 persons,

(b) the area is intended for storage and exceeds 200 m², or

(c) the area is intended for a use other than that described in Clauses (a) and (b) and exceeds 100 m² in area or has an **occupant load** greater than 24 persons.

(4) If a **guest suite** has access to a second **exit** or if a **guest suite** is in a **building** that is permitted to be served by a single **exit** in compliance with Article 9.9.3.3., a doorway from the **guest suite** may open onto

(a) an **exit** stairway,

(b) a fire escape,

(c) a corridor served by a single **exit**, or

(d) an exterior passageway served by a single **exit** stairway.

Egress facilities

(5) Each room, **guest suite**, podium, terrace, platform, contained open space or other area intended for **occupancy** shall have two egress doorways placed in such a manner that one doorway could provide egress from the room or area if the other doorway becomes inaccessible to the occupants due to a fire which might originate in the room or area where

(a) the space is intended for **assembly occupancy**, and

(i) the distance of travel to an egress door from any point in the space exceeds 15 m, or

(ii) the **occupant load** exceeds 60 persons,

(b) the space is intended for storage, and

(i) exceeds 200 m² in area, or

(ii) the distance of travel to an egress door from any point in the space exceeds 23 m, or

(c) the space is intended for a use other than that described in Clauses (a) and (b), and

- (i) exceeds 100 m² in area, or
- (ii) the **occupant load** exceeds 60 persons.

(6) Despite Sentence (5), every room containing an **assembly occupancy** shall be provided with at least

- (a) three independent well-separated egress doorways, where its **occupant load** is 600 persons or more, and
- (b) four independent well-separated egress doorways where its **occupant load** is 1000 persons or more.

(7) Where a room or **floor area** is divided into individual spaces for **assembly occupancy**, egress through an adjacent **assembly occupancy** is permitted provided each space has at least one independent egress doorway in accordance with Sentence (1) and dividing walls or **partitions** are not more than 1.35 m in height.

(8) Dividing walls or **partitions** in Sentence (7) may exceed 1.35 m in height if alternative provisions are **approved** to provide safe egress.

Egress widths

(9) The aggregate width of required **means of egress** from a **floor area** or portion of a **floor area** shall be determined by multiplying the **occupant load** of the area served by

- (a) 6.1 mm per person, for ramps with a gradient of not more than 1 in 8, doorways, corridors and passageways, or
- (b) 9.2 mm per person, for ramps with a gradient of more than 1 in 8 and stairs.

(10) Where two or more egress doorways are required from a **floor area** or portion of a **floor area**, a sufficient aggregate width shall be provided so that the egress capacity is not reduced by more than half if any one doorway or opening is inaccessible in an emergency.

(11) Despite Sentences (9) and (10), the minimum clear width of a **means of egress** shall be not less than

- (a) 1100 mm for corridors,
- (b) 900 mm for stairs, and
- (c) 750 mm for doorways, ramps and all other areas.

Number of exits

9.9.3.3. (1) Each **floor area** shall be served by a minimum of two **exits** where

- (a) the **floor area** is intended for **assembly occupancy**, and
 - (i) the distance of travel to an **exit** from any point in the space exceeds 15 m, or
 - (ii) the **occupant load** exceeds 60 persons,
- (b) the **floor area** is intended for storage, and
 - (i) exceeds 200 m² in area, or
 - (ii) the distance of travel to an **exit** from any point in the space exceeds 23 m,
- (c) the **floor area** is a **basement**, and
 - (i) exceeds 200 m² in area, or
 - (ii) contains areas that are accessible to the public, or
- (d) the **floor area** is intended for a use other than that described in Clauses (a), (b) and (c), and
 - (i) exceeds 100 m² in area, or
 - (ii) the **occupant load** exceeds 60 persons.

(2) Despite Sentence (1), each **floor area** shall be served by at least two **exits** in **buildings** that are more than 3 **storeys** in **building height**.

(3) Despite Sentence (1), where a **building** is 3 **storeys** in **building height**, the third **storey** shall be served by at least two **exits** unless **approved** alternative measures are used.

(4) Despite Sentence (3), a single **exit** is permitted from the third **storey** used as the residence of the **hotel owner** or manager.

(5) The minimum distance between **exits** referred to in Sentences (1), (2) and (3) shall be 9 m or half the maximum diagonal dimension of the **floor area**, whichever is less.

(6) **Exits** are deemed to be in compliance with Sentence (5) where the **floor area** is divided by a **fire separation** having a 45 min **fire-resistance rating** so that it is necessary to pass through the **fire separation** to travel from one **exit** to another **exit**.

Exit widths

9.9.3.4. Except as provided in Sentence 9.9.3.7.(2), the width of **exits** shall be in conformance with Article 9.9.3.2.

Travel distance

9.9.3.5. (1) The **travel distance** to at least one **exit** shall not exceed

- (a) 30 m in a **floor area** that is not **sprinklered**,
- (b) 45 m in a **sprinklered floor area**, or
- (c) 45 m in a **basement** that is not accessible to the public.

Stairway separations

9.9.3.6. (1) Each **exit** stairway shall be separated from the remainder of the **building** by a **fire separation** having a 45 min **fire-resistance rating**.

(2) Each **exit** stairway shall lead directly to a public thoroughfare or to an **approved** open space from inside the **fire separation** described in Sentence (1).

(3) Despite Sentence (2), one **exit** from a **floor area** is permitted to lead through a lobby provided

- (a) the path of travel through the lobby to the outdoors at ground level is not more than 15 m,
 - (b) a **fire separation**, constructed in accordance with Sentence (1), is provided between the lobby and any **exit** permitted by this Sentence to lead through a lobby,
 - (c) the lobby is not located within an interconnected floor space described in Article 9.9.2.7.,
 - (d) from the interior of the **exit** stair that leads through the lobby, there is an unobstructed path of travel not leading through the lobby to an alternate **exit** such that
 - (i) it is not necessary to travel up or down more than 1 **storey** to reach the alternate **exit** by means of a protected **access to exit**, or
 - (ii) the path of travel is entirely within the same **storey** as the lobby and is separated from the lobby by a **fire separation** having not less than a 45 min **fire-resistance rating**, and
 - (e) **approved** provisions are made to direct occupants to the alternate **exit** described in Clause (d) in the event of a fire condition in the lobby.
- (4) The lobby described in Sentence (3) is permitted to contain an **occupancy** provided the required egress width is maintained and clearly delineated.
- (5) Despite Sentence 9.9.2.12.(3), the lobby described in Sentence (3) is permitted to contain a fireplace or a **space heater**.
- (6) Despite Sentence (2), an **exit** through a lobby is permitted in conformance with Article 3.4.4.2. or 9.9.8.5. of the **1994 Building Code**, as applicable for the size and height of the **building**.

Exterior stairways and fire escapes

9.9.3.7. (1) Exterior **exit** stairways and fire escapes shall not serve **floor areas** above the sixth **storey**.

(2) Unless otherwise **approved**, each fire escape used as an **exit** and each exterior **exit** stairway shall be in conformance with Articles 3.4.7.2., 3.4.7.3., 3.4.7.5. and 3.4.7.6. of the **1994 Building Code**.

(3) Unless otherwise **approved**, exterior **exit** stairways, fire escapes and exterior **exit** passageways serving any **storey** above the second **storey** or any **basement** below the first **basement** shall be protected against fire exposure from the **building** by having

- (a) window openings, except **first storey** display windows, protected by wired glass in fixed steel frames, and
- (b) doorways and other openings protected by **closures** having a 45 min **fire-protection rating**

where such openings are located within 3 m horizontally, within 3 **storeys below**, within 10 m below or within 1.8 m above the exterior stairway, fire escape or passageway.

(4) Exterior **exit** stairways leading across roofs shall be provided with handrails on both sides of the walkway leading to the stairway at the edge of the roof, unless otherwise **approved**.

(5) Exterior **exit** stairways and fire escapes below **grade** shall be

- (a) enclosed by side walls and a roof, with a door to ground level at the upper landing,
- (b) provided with a roof projecting horizontally for a distance of at least 1.8 m beyond any step or landing, or
- (c) provided with some other **approved** construction or device to prevent snow from accumulating in the stairway or fire escape.
- (6) Sentence (3) does not apply to an exterior passageway if
 - (a) 50% or more of the exterior side is open to the outdoors,
 - (b) the exterior passageway floor assembly has a **fire-resistance rating** of not less than 45 min or is of **noncombustible construction**, and
 - (c) an **exit** stairway is provided at each end of the passageway.

Door swing and hardware

9.9.3.8. Each **exit** door and door providing an **access to exit** shall be in conformance with Subsection 2.7.2.

Emergency access to floor areas

9.9.3.9. Doors providing access between **floor areas** and **exit** stairs shall comply with Article 3.4.6.16. of the **1994 Building Code**.

Signs

9.9.3.10. (1) **Exit** signs shall be installed in accordance with Subsection 3.4.5. of the **1994 Building Code**.

(2) Each door opening into an **exit** stairway shall be identified with the number assigned to that floor in accordance with Article 3.4.6.17. of the **1994 Building Code**.

(3) Existing doors that have the floor level identified in plain legible block letters or numbers at least 114 mm high with a 19 mm stroke on both sides of the door are deemed to be in compliance with Sentence (2).

Interior finishes

9.9.3.11. (1) Interior finish materials on the walls and ceilings of **exits** and **access to exits** shall be in accordance with Subsection 3.1.13. of the **1994 Building Code**, except as provided in Sentence (2) or otherwise **approved**.

(2) Sentence (1) does not apply to

- (a) wood or other **approved** materials, treated with an **approved** fire retardant, used on the walls of lobbies, foyers, vestibules, entrance halls and other major entrance areas,
- (b) combustible interior finishes, including paint, wallpaper and other interior finishes not more than 1.5 mm thick used on the walls of corridors, and
- (c) combustible materials that have a **flame-spread rating** of 150 or less used on the walls and ceilings of **access to exits** if the **access to exits** are **sprinklered**.

9.9.3.12. The **flame-spread rating** of interior wall and ceiling finishes in rooms containing an **assembly occupancy** shall be not more than 150.

Lighting

9.9.3.13. Every **exit** and **access to exit** shall be equipped to provide illumination to an average level of at least 50 lx at floor level and at all points such as angles and intersections at changes of level where there are stairs and ramps.

Emergency lighting

9.9.3.14. (1) Emergency lighting shall be provided in

- (a) **exits** and **access to exits** in **buildings** required to have a fire alarm system, and
- (b) rooms containing an **assembly occupancy** with an **occupant load** of more than 60 persons.

(2) Emergency lighting required in Sentence (1) shall be

- (a) designed to provide illumination for a duration of at least
 - (i) 2 h in **buildings** where the vertical distance between the floor of the top **storey** and **grade** exceeds 18 m, and
 - (ii) 30 min in **buildings** where the vertical distance between the floor of the top **storey** and **grade** is not more than 18 m,
- (b) supplied by a source of energy separate from the primary electrical supply for the **building**, and
- (c) designed to be automatically actuated when the power to the **building** is interrupted.

(3) Illumination from emergency lighting referred to in Sentence (2) shall be an average of at least 10 lx at floor or tread level, or 1 watt/m² of floor space.

Subsection 9.9.4. Fire Alarm and Detection

Fire alarm requirements

9.9.4.1. (1) A fire alarm system with **listed** components shall be installed in each **building** in accordance with Articles 9.9.4.2. to 9.9.4.12. where

- (a) the **building area** is more than 600 m²,
- (b) the **building** is more than 1 **storey** in **building height**, or
- (c) each **guest suite** is not served by an exterior **exit** facility leading to ground level.

(2) A **building** is deemed to be in compliance with Sentence (1) where

- (a) the **building** is not more than 3 **storeys** in **building height**,
- (b) each **guest suite** is served by an exterior **exit** facility leading to ground level,
- (c) each **guest suite** is separated from adjacent rooms by a **fire separation** having a 45 min **fire-resistance rating**, and
- (d) each **guest suite** is equipped with a **smoke alarm**.

(3) A **building** is deemed to be in compliance with Sentence (1) where

- (a) the **building** is not more than 3 **storeys** in **building height**,
- (b) sleeping accommodation is provided for not more than 10 persons, and
- (c) the **building** is equipped with
 - (i) **smoke alarms** on or near the ceiling in corridors serving **guest suites** on each **floor area**, adjacent to each stairway serving the corridors, and on or near the ceiling in the **basement**, adjacent to each stairway, and
 - (ii) one manual pull station in each **floor area** in an **approved** location, installed and interconnected so that the actuation of any manual pull station or **smoke alarm** will cause all **smoke alarms** to operate and be audible throughout the **building**.

Automatic detection

9.9.4.2. (1) Automatic detection devices referred to in Sentences (2), (3) and (4) shall be installed and connected to the fire alarm system required in Sentence 9.9.4.1.(1).

(2) **Fire detectors** shall be installed

- (a) in every part of a **building** that requires a fire alarm system in Article 9.9.4.1., other than corridors, washrooms, closets in **guest suites**, saunas, refrigerated areas and swimming pools,
- (b) at the tops of elevator shafts, and
- (c) at the tops of **exit** stairs.

(3) Despite Sentence (2), **fire detectors** are not required in existing **guest suites** where **smoke detectors** are installed in every corridor serving the **guest suites**.

(4) Rooms or areas that are **sprinklered** in accordance with Article 3.2.4.16. of the **1994 Building Code** are deemed to be in compliance with Sentence (2).

Manual pull stations

9.9.4.3. (1) Unless otherwise **approved**, manual pull stations shall be installed at

- (a) the main reception area, and
 - (b) near every **exit**.
- (2) Despite Sentence (1), a manual pull station may serve two **exits** where
- (a) the **exits** are not more than 9 m apart,
 - (b) the **exits** are located on the same **storey**, and
 - (c) the manual pull station is readily accessible and visible from each **exit**.
- (3) A manual pull station shall be
- (a) red in colour,

- (b) readily accessible and unobstructed,
- (c) readily visible, and
- (d) unless otherwise **approved**, installed at a height not less than 1.2 m and not more than 1.5 m, measured vertically from the finished floor surface.

Alarm signalling devices

9.9.4.4. (1) Alarm signalling devices shall be

- (a) installed on all **storeys**, unless otherwise **approved**,
- (b) located so that the **alarm signal** and **alert signal** when sounded, may be heard throughout the **building** over all normal sounds at any time, and
- (c) be distinctive in sound.

Annunciator panels

9.9.4.5. (1) In a **building** that is 4 or more **storeys** in **building height** or has a **total area** of 4000 m² or more, an annunciator panel shall

- (a) be installed near the main entrance, in the main reception area or other **approved** location that is readily accessible to the **fire department**, and
- (b) indicate all floors with not more than one floor per zone indicated.

(2) **Fire detectors** required in Clauses 9.9.4.2.(2)(b) and (c) may be considered as part of the adjoining floor for the purposes of Clause (1)(b) of this Article.

Shutdown of air handling systems

9.9.4.6. Recirculating air handling systems that serve more than one **guest suite** or **storey** shall be arranged to shut down upon actuation of the fire alarm system, except where continued operation of the air handling system serves as part of a smoke control system.

Trouble signals

9.9.4.7. (1) A trouble signal sounding device and, where the trouble signal sounding device has a silencing switch, a trouble light shall be installed in

- (a) the main reception area, or
- (b) a continuously supervised area.

Operation

9.9.4.8. Fire alarm systems shall operate in conformance with Article 3.2.4.4. of the **1994 Building Code**, unless otherwise **approved**.

Continuity

9.9.4.9. Each **building** shall not have more than one fire alarm system, unless otherwise **approved**.

Electrical supervision

9.9.4.10. Fire alarm systems shall be electrically supervised.

Emergency power

9.9.4.11. (1) Fire alarm systems shall be provided with an emergency power supply in conformance with Article 3.2.7.8. of the **1994 Building Code**.

(2) An existing emergency power supply that is capable of providing supervisory power for not less than 24 h and emergency power under full load for not less than 5 min at the end of the 24 h period is deemed to be in compliance with Sentence (1).

Primary power

(3) Fire alarm system connections to the primary source of power shall be on a separate circuit equipped with separate circuit breakers or fuse switches that are located in a secure area.

(4) When a **building** is not supplied with primary power from a public utility, two **approved** independent sources of power shall be provided to the fire alarm system.

Installation

9.9.4.12. (1) Where a fire alarm system is required to be installed, extended or modified by this Section, the installation, extension or modification shall be in conformance with CAN/ULC-S524, “Standard for the Installation of Fire Alarm Systems”.

(2) Where a fire alarm system has been installed, extended or modified as required by this Section, the system or portion of the system shall be **tested** in conformance with CAN/ULC-S537, “Verification of Fire Alarm Systems”.

(3) Sentences (1) and (2) do not apply to existing fire alarm system components.

Smoke alarms

9.9.4.13. (1) **Smoke alarms** shall be installed in each **guest suite**.

(2) **Smoke alarms** required in Sentence (1) shall be in conformance with CAN/ULC-S531, “Standard for Smoke Alarms”.

(3) Existing **smoke alarms** meeting the requirements of ULC-S531-1978, “Standard for Smoke Alarms”, are deemed to be in compliance with Sentence (2).

(4) **Smoke alarms** required in Sentence (1) shall be installed in conformance with CAN/ULC-S553, “Standard for the Installation of Smoke Alarms”.

(5) **Smoke alarms** shall be installed with permanent connections to an electrical circuit and shall have no disconnect switches between the overcurrent device and the **smoke alarm**.

(6) Despite Sentence (5), battery-operated **smoke alarms** may be used.

(7) Unless otherwise **approved**, at least one **smoke alarm** shall be installed on each floor of a multi-level **guest suite** and the **smoke alarms** shall be interconnected so that the actuation of one **smoke alarm** will cause all **smoke alarms** within the **guest suite** to sound.

Voice communication systems

9.9.4.14. (1) A voice communication system shall be provided in each **building** where the vertical distance between the floor of the top **storey** and **grade** exceeds 36 m.

(2) The voice communication system required by Sentence (1) shall

(a) consist of loudspeakers operated from the central alarm and control facility or other location that is accessible to the **fire department** and **supervisory staff** appointed under Section 2.8 and that is **approved**,

(b) provide a clear verbal signal throughout the **building**, except for elevator cars, and

(c) provide for automatic silencing of the fire **alarm signals** or **alert signals** when the loudspeakers are in use.

(3) **Approved** existing public address systems compatible with the fire safety plan required under Section 2.8 and capable of communicating instructions to the **building** occupants are deemed to be in compliance with Sentences (1) and (2).

Subsection 9.9.5. Suppression

Access for fire fighting

9.9.5.1. (1) Access routes for fire fighting shall be provided in conformance with the requirements of Articles 3.2.5.5. to 3.2.5.7. of the **1994 Building Code**.

(2) Sentence (1) does not apply where the **building** is **sprinklered**.

(3) In **buildings** not greater than 6 **storeys** in **building height**, existing access routes

(a) having a clear width of at least 6 m,

(b) capable of supporting the expected loads imposed by fire fighting equipment and surfaced with concrete, asphalt or other material that provides accessibility under all climatic conditions,

(c) located not less than 3 m and not more than 15 m from the principal entrance, and

(d) connected with a public thoroughfare

are deemed to be in compliance with Sentence (1).

(4) Despite Sentence (1), alternative methods may be **approved** where, in the opinion of the **Chief Fire Official**, they provide protection for life safety similar to the protection provided by compliance with Sentence (1).

Standpipe systems

9.9.5.2. (1) In **buildings** that are greater than 3 **storeys** in **building height**, a standpipe and hose system shall be installed in conformance with Subsection 3.2.9. of the **1994 Building Code**.

- (2) A standpipe and hose system installed in conformance with Sentences (3) to (6) is deemed to be in compliance with Sentence (1).
- (3) Hose stations shall
- (a) be located so that all areas
 - (i) are protected by a hose station on the same **storey**, and
 - (ii) can be reached by a hose stream and are within 6 m of a hose nozzle when the hose is extended,
 - (b) be provided with a 38 mm hose valve, unless otherwise **approved**,
 - (c) be equipped with not more than 30 m of 38 mm hose on a hose **rack**, unless otherwise **approved**,
 - (d) have the hose attached, ready for use at all times and equipped with a shut-off combination fog and straight stream nozzle,
 - (e) be within easy reach of a person standing on the floor, with the hose valve connection located no more than 1.5 m from the floor, and
 - (f) be located
 - (i) in corridors where possible, and
 - (ii) in hose cabinets.
- (4) Despite Subclause (3)(a)(i), a penthouse may be protected by a hose station located in the **storey** below.
- (5) A standpipe and hose system shall
- (a) have an adequate water supply capable of producing a hose stream of at least 6 m from the hose nozzle at the highest fire hose outlet, and
 - (b) be served by at least one **fire department** connection located on the outside of the **building** adjacent to a **street**, readily accessible to the **fire department**.
- (6) Hose cabinets shall be
- (a) of sufficient size to accommodate a hose, hose **rack**, hose valve and portable extinguisher,
 - (b) conspicuously identified, by lettering at least 50 mm high or by the provision of a sufficiently large glass panel in the door to ensure that the equipment in the cabinet is readily visible,
 - (c) equipped with a door without locks, constructed to open easily, unless otherwise **approved**, and
 - (d) so located that the door, when open, will not obstruct any doorway.

Elevators for firefighters' use

9.9.5.3. (1) At least one elevator shall be provided for use by firefighters in conformance with Articles 3.2.6.8. and 3.2.6.9. of the **1994 Building Code** in **buildings** where the vertical distance between the floor of the top **storey** and **grade** exceeds 18 m.

- (2) An elevator is deemed to be in compliance with Sentence (1) where
- (a) the elevator is capable of providing transportation from the **street** floor to every floor served by the elevator system,
 - (b) the elevator is identified on the **street** floor as an elevator provided for use by firefighters,
 - (c) the elevator satisfies the requirements of Sentences 3.2.6.8.(1) to (4) of the **1994 Building Code**, and
 - (d) other elevator cabs in the same shaft as the elevator for use by firefighters satisfy the requirements of Sentences 3.2.6.8.(1) and (2) of the **1994 Building Code**.
- (3) An elevator system that requires transfer from one elevator to another to reach all floors above **grade** is deemed to be in compliance with Sentence (1) where
- (a) the elevators are identified on the **street** floor and the transfer floor as elevators provided for firefighters' use,
 - (b) the elevators satisfy the requirements of Sentences 3.2.6.8.(1) to (4) of the **1994 Building Code**,
 - (c) emergency power is provided that is capable of operating one elevator car at a time, in **buildings** where the vertical distance between the floor of the top **storey** and **grade** exceeds 36 m, and
 - (d) other elevator cabs in the same shaft as the elevator for use by firefighters satisfy the requirements of Sentences 3.2.6.8.(1) and (2) of the **1994 Building Code**.

Sprinkler systems

9.9.5.4. Unless otherwise **approved**, where a **building** or portion thereof is required to be **sprinklered**, the sprinkler system shall be designed and constructed in conformance with Articles 3.2.5.13. to 3.2.5.16. of the **1994 Building Code**.

Emergency power supply

9.9.5.5. (1) Unless otherwise **approved**, emergency electric power provided by generators for

(a) fire alarm and detection systems in Sentence 9.9.4.1.(1), and

(b) elevator cars in Clause 9.9.5.3.(3)(c)

shall be installed in conformance with CSA-C282, “Emergency Electrical Power Supply for Buildings”, as applicable.

(2) Unless otherwise **approved**, emergency electric power required for emergency lighting systems required in Sentence 9.9.3.14.(1) shall be installed in conformance with CSA-C282, “Emergency Electrical Power Supply for Buildings” or CSA-C22.2 No. 141, “Unit Equipment for Emergency Lighting”, as applicable.

**DIVISION C
ADMINISTRATIVE PROVISIONS**

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SECTION 1.1 GENERAL

Subsection 1.1.1. Chief Fire Official

Appointment by Fire Marshal

1.1.1.1. (1) The Fire Marshal may appoint persons who are assistants to the Fire Marshal to be **Chief Fire Officials** for the purposes and subject to the limitations and conditions as are set out in the appointment.

(2) An appointment made under Sentence (1) may grant to the person appointed the exclusive authority to exercise all or any of the powers and perform all or any of the duties of a **Chief Fire Official** with respect to any class or classes of **building** or **occupancy** or within the territorial area specified in the appointment and, in such case, no other **Chief Fire Official** shall exercise such powers or perform such duties.

Appointment by Fire Chief

1.1.1.2. The Municipal Fire Chief may appoint a member or members of the **fire department** who are assistants to the Fire Marshal to be **Chief Fire Officials** for the purposes and subject to the limitations and conditions as are set out in the appointment.

SECTION 1.2 QUALIFICATIONS

Subsection 1.2.1. Qualifications and Responsibilities of Persons Performing Work on Fire Alarm Systems

Application

1.2.1.1. This subsection applies to every person who performs annual **tests** or annual **inspections** of a fire alarm system required under Article 6.3.2.2. of Division B and every person who repairs, replaces or alters components of a fire alarm system.

Qualifications

- 1.2.1.2. (1) Any person who performs the work described in Article 1.2.1.1. on a fire alarm system shall
- (a) have successfully completed a program or course acceptable to the Fire Marshal,
 - (b) produce for inspection, upon request by the **owner** or the **Chief Fire Official**, a copy of a certificate or document attesting to the successful completion of a program or course referenced in Clause (a), and
 - (c) perform the **inspection, test**, repair, replacement or alteration in accordance with Article 6.3.1.8. and Subsection 6.3.2. of Division B.
- (2) Despite Sentence (1), a person who has not successfully completed the required program or course may perform the work described in Clause (1)(c) provided that
- (a) the work is done under the supervision of a person who has successfully completed a program or course required by Clause (1)(a),
 - (b) no more than two persons work under the supervision of the person referred to in Clause (a) at the same time, and
 - (c) the supervision is provided at the work site.
- (3) Any person supervising another as permitted in Sentence (2)
- (a) shall advise the **owner** in writing that the work has been completed in accordance with Article 6.3.1.8. and Subsection 6.3.2. of Division B, and
 - (b) is deemed to be the person referred to in Article 1.2.1.3.

Responsibility

1.2.1.3. Despite Article 1.2.1.1. of Division A, any person who performs the work described in Article 1.2.1.1. of this Division on a fire alarm system is responsible for complying with Article 1.2.1.2. of this Division.

Subsection 1.2.2. Qualifications and Responsibilities of Persons Performing Work on Interconnected Smoke Alarm Systems

Application

1.2.2.1. This subsection applies to every person who performs annual **tests** of an interconnected **smoke alarm** system required under Article 6.3.2.6. of Division B and any person who repairs, replaces or alters components of such an interconnected **smoke alarm** system.

Qualifications

- 1.2.2.2. (1) Any person who performs the work described in Article 1.2.2.1. on an interconnected **smoke alarm** system shall
- (a) have successfully completed a program or course acceptable to the Fire Marshal,
 - (b) produce for inspection, upon request by the **owner** or the **Chief Fire Official**, a copy of a certificate or document attesting to the successful completion of a program or course referenced in Clause (a), and
 - (c) perform the **test** and maintenance in accordance with Article 6.3.2.6. of Division B.
- (2) Despite Sentence (1), a person who has not successfully completed the required program or course may perform the work described in Sentence (1) provided that
- (a) the work is done under the supervision of a person who has successfully completed a program or course required in Clause (1)(a),
 - (b) no more than two persons work under the supervision of the person referred to in Clause (a) at the same time, and
 - (c) the supervision is provided at the work site.
- (3) Any person supervising another as permitted in Sentence (2)
- (a) shall advise the **owner** in writing that the work has been completed in accordance with Article 6.3.2.6. of Division B, and
 - (b) is deemed to be the person referred to in Article 1.2.2.2.

Responsibility

1.2.2.3. Despite Article 1.2.1.1. of Division A, any person who performs the work described in Article 1.2.2.1. of this Division on an interconnected **smoke alarm** system is responsible for complying with Article 1.2.2.2. of this Division.

SECTION 1.3 ADMINISTRATIVE PROVISIONS

Subsection 1.3.1. Required Testing

Tests by owner

1.3.1.1. Where a **building** or its contents must be **tested** for compliance with this Code, the **tests** shall be carried out by the **owner** or the **owner's** agent within such reasonable time as the **Chief Fire Official** may determine.

Tests by Chief Fire Official

1.3.1.2. (1) The **tests** referred to in Article 1.3.1.1. may also be carried out by the **Chief Fire Official**.

(2) The **Chief Fire Official** shall only take such samples as are necessary in the circumstances in order to carry out the **tests** referred to in Article 1.3.1.1.

Subsection 1.3.2. Alternative Solutions

Approval

1.3.2.1. An **alternative solution** shall be submitted to the **Chief Fire Official** for review and **approval**.

Documentation

1.3.2.2. (1) An **alternative solution** submitted to the **Chief Fire Official** under Article 1.3.2.1. shall be accompanied by supporting documentation that demonstrates that the **alternative solution** meets the **objectives** and satisfies the **functional statements** attributed to the **acceptable solution** it is proposed to replace, as set out in Division A and OFM Fire Code Supplement FCS-1, "Objectives and Functional Statements Attributed to Acceptable Solutions".

(2) The documentation referred to in Sentence (1) shall include

(a) an analysis outlining the analytical methodology and rationale used to determine that a proposed **alternative solution** will achieve at least the minimum level of performance intended by the applicable **acceptable solution** in Division B in respect of the **objectives** and **functional statements** attributed to the **acceptable solution** as identified in Division A and OFM Fire Code Supplement FCS-1, "Objectives and Functional Statements Attributed to Acceptable Solutions", and

(b) information concerning any additional **check, inspection, test**, maintenance or operational requirements, including any commissioning requirements, and schedules not otherwise specifically addressed in Division B.

(3) The analysis referred to in Clause (2)(a) shall identify the **acceptable solution** that the **alternative solution** is proposed to replace, the **objectives** and **functional statements** attributed to that **acceptable solution**, and any assumptions, limiting or restricting factors, engineering studies or **building** performance parameters in order to allow for an assessment of compliance with this Code by the **Chief Fire Official**.

(4) The information provided under Sentence (3) shall be in sufficient detail to convey the design intent and to support the validity, accuracy, relevance and precision of the analysis.

(5) An **alternative solution** shall bear the signature and seal of a **Professional Engineer** or **Architect**, or both.

Review

1.3.2.3. (1) The **Chief Fire Official** shall, within 45 days after the receipt of an **alternative solution** submitted under Article 1.3.2.2., review the **alternative solution** for compliance with this Code and notify the **owner** or the **owner's** agent of the decision in writing.

(2) Where an **alternative solution** is not **approved**, the **Chief Fire Official** shall include the reasons in the decision.

(3) Notification shall be served either personally or by mail.

(4) Where notification is by mail, it is deemed to have been served on the fifth day after the date of mailing.

(5) An **owner** or an **owner's** agent who feels aggrieved by a decision not to **approve** an **alternative solution** may, within 30 days after receipt of the refusal, appeal the decision in the same manner as though it were an **Order**.

Implementation

1.3.2.4. **Approved alternative solutions** referred to in this Subsection and the requirements referred to in Clause 1.3.2.5.(3)(b) shall be implemented.

Records

1.3.2.5. (1) Documentation for every

(a) **approved alternative solution** to this Code, and

(b) alternative solution, as defined in the **Building Code**, with respect to fire safety

shall be kept on the premises to which it relates and be made available to the **Chief Fire Official** upon request.

(2) The documentation referred to in Sentence (1) shall be retained for as long as necessary to demonstrate compliance with this Code and the **Building Code**, as applicable.

(3) The **check, inspection, test**, maintenance and operational requirements

(a) referred to in Clause 1.3.2.2.(2)(b), or

(b) forming part of an alternative solution, as defined in the **Building Code**, with respect to fire safety, where such requirements are not otherwise specifically addressed in Division B

shall be included in the fire safety plan where such a plan is required under Section 2.8 of Division B.

SECTION 2.1 REVOCATION AND COMMENCEMENT

Subsection 2.1.1. Revocation

Revocation

2.1.1.1. Ontario Regulation 388/97 is revoked.

Subsection 2.1.2. Commencement

Commencement

2.1.2.1. This Regulation comes into force on November 21, 2007.

Made by:

MONTE KWINTER
Minister of Community and Safety and Correctional Services

Date made: May 24, 2007.

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