# Notes to Part 3

# Indoor and Outdoor Storage

**A-3.1.1.1.(1)** Part 3 applies to the short- or long-term storage of products, whether raw or waste materials, goods in process, or finished goods.

This Part does not deal with products or materials that are directly supplied to appliances, equipment or apparatus through piping, hose, ducts, etc. For example, the gas cylinders that are mounted on propane barbecues are not covered by Part 3: they are considered to be "in use" as opposed to "in storage" and are not intended to be regulated by the storage requirements stated in the BCFC.

**A-3.1.1.4.** Part 3 deals mainly with the storage of cylinders of dangerous goods classified as compressed gases. It is expected that gas installations that are not covered in the Code will conform to good engineering practice, such as that described in NFPA 55, "Compressed Gases and Cryogenic Fluids Code."

**A-3.1.1.4.(1)(a)** In the context of the exemption in Clause 3.1.1.4.(1)(a), a distributor is deemed to be a commercial enterprise regularly handling or storing more than 1 500 kg of dangerous goods classified as compressed gases for the purposes of resale. Such distributors are expected to follow the same good engineering practices as their suppliers. CGA P-1, "Safe Handling of Compressed Gases in Containers," represents good engineering practice for the handling of dangerous goods classified as compressed gases.

**A-3.1.2.3.(2)** The International Maritime Organization, the International Civil Aviation Organization, the United Nations and Transport Canada are examples of regulatory authorities that may establish standards for the design and construction of packages and containers for dangerous goods.

**A-3.1.2.5.(2)(a)** Methods of preventing valve damage include the use of valve caps, storage in crates (for small cylinders) and the provision of steel rings or protective handles. Certain high pressure cylinders are required by other legislation to be equipped with valve caps.

**A-3.1.2.6.** Reactive materials include various classes of unstable or reactive dangerous goods, such as flammable solids, pyrophoric materials, oxidizers, corrosives, water-reactive substances and organic peroxides.

In general, it is unsafe to store highly reactive oxidizers close to liquids with low flash points, combustible products or chemically incompatible products. Quantities of oxidizers or other dangerously reactive materials should therefore be limited and the storage area should be constructed of noncombustible materials, should be kept cool and ventilated, and should not impede egress.

In some cases, depending on the quantity and nature of the oxidizing agent, normal fire protection measures (e.g. sprinklers, fire hose and extinguishers) are ineffective due to the self-yielding of oxygen by the oxidizing agent.

When containers of highly reactive oxidizers become damaged or are exposed to excessive heat, humidity or contamination (e.g. sawdust, petroleum products, or other chemicals), a very violent fire or explosion can result.

The following oxidizing substances, among others, are known to supply oxygen: organic and inorganic peroxides; pool chemicals (e.g. calcium hypochlorite, sodium dichloroisocyanurate); oxides; permanganates; perrhenates; chlorates; perchlorates; persulfates; organic and inorganic nitrates; bromates; iodates; periodates; perselenates; chromates, dichromates; ozone; perborates.

When containers of dangerously reactive materials become damaged or are exposed to water or humidity, a flammable gas (such as hydrogen, ammonia or methane) or a toxic gas (such as hydrogen chloride, hydrogen bromide or phosphine) can be released.

The following dangerously reactive materials, among others, are known to release a flammable gas in reaction to contact with water or humidity: alkali metals (e.g. sodium, potassium, cesium); reactive metals (e.g. zinc, aluminum, magnesium); metallic hydride (e.g. sodium borohydride, germanium tetrahydride, calcium hydride).

The following dangerously reactive materials, among others, are known to release a toxic gas in reaction to contact with water or humidity: organic and inorganic chloride (e.g. phosphorus trichloride, phosphorus oxide trichloride, acetyl chloride); organic and inorganic bromide (e.g. phosphorus tribromide, aluminum tribromide, acetyl bromide).

**A-3.2.1.1.(1)** Section 3.2. applies to all parts of buildings, including warehousing or storage areas, manufacturing areas, shipping and receiving areas, and sales areas. It does not apply to the storage of unpackaged grain or coal. Additional requirements in Part 5 of this Code address the dust hazard associated with bulk grain or coal storage.

**A-3.2.1.1.(1)(a)** NFPA 13, "Installation of Sprinkler Systems," gives an extensive description with numerous examples of commodities for classification purposes and should be consulted. The following is a brief overview of the NFPA 13 classification of commodities:

A Class I commodity is defined as essentially noncombustible products in ordinary corrugated cartons or in ordinary paper wrappings, with or without combustible pallets.

A Class II commodity is defined as Class I products in slatted wooden crates, solid wooden boxes, multiple thickness paperboard cartons or equivalent combustible packaging material, with or without combustible pallets.

A Class III commodity is defined as wood, paper, natural fibre, cloth, or Group C plastics, with or without combustible pallets. Products may contain a limited amount of Group A or B plastics.

A Class IV commodity is defined as Class I, II, or III products in corrugated cartons, containing an appreciable amount of Group A plastics or with Group A plastics packaging, with or without combustible pallets. Group B plastics and free-flowing Group A plastics are also included in this class.

Group A plastics include, but are not limited to, ABS, acrylic, butyl rubber, fiberglass reinforced polyester, natural rubber (if expanded), nitrile rubber, polycarbonate, polyester elastomer, polyethylene, polypropylene, polystyrene, polyurethane, highly plasticized PVC, and SBR.

Group B plastics include, but are not limited to, cellulosics, fluoroplastics, natural rubber (not expanded), nylon, and silicone rubber.

Group C plastics include, but are not limited to, fluoroplastics, melamine, phenolic resins, rigid PVC, and urea formaldehyde.

**A-3.2.2.2.** The purpose of this Article is to provide adequate access to the interior of the storage area for firefighting and overhaul operations. Means of egress must also be provided in accordance with Section 2.7. of the BCFC. The use of dead-end aisles in storage areas should be minimized because of the potential hazard they create with respect to egress. Access aisles required in Sentence (2) include aisles to fire department access panels, or to fire protection equipment such as sprinkler control valves, fire hose stations, portable extinguishers and manual stations.

Sentences (4) to (8) prescribe requirements for main access aisles in the storage area. More than one main access aisle may be required depending on the storage configuration and alternate arrangements to a single main access aisle are permitted in Sentence (7). These requirements are in addition to the general requirement for 2.4 m aisles separating individual storage areas. The width of subsidiary aisles within individual storage areas is determined by material handling needs.

Fire department access to a storage area can be by means of doors or access panels on exterior walls, or through doors from another fire compartment in the building, provided that fire compartment in turn has adequate fire department access. The access points should be as remote from each other as possible. Where practicable, the preferred arrangement is for main aisles to terminate at exterior doors on opposite sides of the building.

Where stored products are liable to expand with the absorption of water, there exists a significant danger of collapse of the products into the aisles. It does not matter whether the products are in racks or not, nor whether the water comes from hose streams or sprinklers. Examples of such products include certain paper products and baled rags. Numerous firefighters have been killed through being crushed by falling products, or through being trapped after their escape routes have become blocked by fallen products. Special consideration should be given in these cases to rack design, aisle widths and layout to prevent such hazards or to minimize their effect.

**A-3.2.2.3.(2)** In unsprinklered buildings, a clear space is required above the storage to permit hose streams to be directed onto the top of storage.

**A-3.2.2.3.(5)** Clearance between stored products and heating equipment must also be maintained in conformance with Section 2.6. of the BCFC, which references Part 6 of Division B of the BCBC for installation requirements for heating systems. All stored combustible materials should be kept away from hot elements of heating equipment.

**A-3.2.2.4.(3)** NFPA 13, "Installation of Sprinkler Systems," gives sprinkler system design criteria for areas where combustible pallets are stored, based on the height, area and type of pallets.

**A-3.2.3.2.(2)** For self-contained, multi-tiered structural rack or shelf systems, the storage height should be determined as the height from the lowest floor level to the top of storage on the uppermost tier.

**A-3.2.3.3.(2)** NFPA 13, "Installation of Sprinkler Systems," does not provide sufficient information on the design of sprinkler systems in buildings used for the storage of closed containers of distilled beverage alcohol.

**A-3.2.4.2.(1)** The volume of tires in a storage area can be determined by measuring to the nearest 0.1 m the length, width and height of the piles or racks intended to contain the tires. In racks, the top shelf is assumed to be loaded to maximum possible height, while observing required clearances between structural elements and sprinklers.

**A-3.2.5.1.(1)** Aerosol products that are displayed in mercantile occupancies represent a lower hazard and do not require specific storage limits or additional fire protection provided they have been removed from their combustible cartons or cartons have been display-cut so that only the bottom and the lowest 50 mm of the side panels is retained. The storage of packaged aerosols in mercantile occupancies shall nevertheless conform to this Subsection.

**A-3.2.5.2.(1)** This Code has adopted the aerosol classification system developed by the National Fire Protection Association in NFPA 30B, "Manufacture and Storage of Aerosol Products."

Examples of Level 1 aerosol products include shaving cream, spray starch, window cleaners, alkaline oven cleaners, rug shampoos, some air fresheners and some insecticides. These aerosols are less hazardous than Level 2 or Level 3 aerosols, and represent a storage hazard comparable to Class III commodities.

Examples of Level 2 water-miscible flammable base aerosol products include most personal care products such as deodorants (except for oil-based antiperspirants), and hair sprays. They may also include antiseptics and anesthetics, some furniture polishes and windshield de-icers. Level 2 aerosols are less hazardous than Level 3 aerosols.

Examples of Level 3 aerosol products include some automotive products such as engine and carburetor cleaners, undercoats and lubricants; some wood polishes, paints and lacquers; some insecticides; and oil based antiperspirants.

In Canada, some aerosol products are required by HC SOR/2015-17, "Hazardous Products Regulations," HC SOR/2001-269, "Consumer Chemicals and Containers Regulations," and certain other legislation to bear flammability hazard symbols. The nature of the symbol on the can is determined on the basis of a flame projection test, which measures the susceptibility of the aerosol spray to ignite; this is most important for protecting consumers who, for example, might be smoking while using an aerosol product. A direct comparison between the flammability hazard symbols used in Canadian regulations and the NFPA Level 1, 2 or 3 classification system used in the BCFC is not reliable as the latter measures the overall contribution of flammable base product, combined with flammable gas propellant, to the rate of growth and severity of a fire involving a substantial number of aerosols.

**A-Table 3.2.7.1.** Categories and Subcategories of Controlled Products (WHMIS). The letters and numbers in Column B of Table 3.2.7.1. refer to the categories and subcategories of controlled products under the "Workplace Hazardous Materials Information System (WHMIS)" as classified in Part 7 of HC SOR/2015-17, "Hazardous Products Regulations."

**A:** compressed gases
**B1:** flammable gases
**B2:** flammable liquids
**B3:** combustible liquids
**B4:** flammable solids
**B5:** flammable aerosols
**B6:** reactive flammable materials
**C:** oxidizing materials
**D:** poisonous and infectious materials
**D1:** materials causing immediate and serious toxic effects
**D1A:** very toxic materials
**D1B:** toxic materials
**D2:** materials causing other toxic effects
**D2A:** very toxic materials
**D2B:** toxic materials
**D3:** biohazardous infectious materials
**E:** corrosive materials
**F:** dangerously reactive materials
**A+C:** controlled products of Class A combined with C
**A+D1, A+D2, A+E:** controlled products of Class A combined with D1, or A combined with D2, or A combined with E

**A-3.2.7.1.(3)(b)** Class of Controlled Product (WHMIS) Having Precedence. Where a dangerous good includes more than one class of controlled product, the class indicated in Table A-3.2.7.1.(3)(b) is considered as the primary class for segregation purposes only.

**Table A-3.2.7.1.(3)(b)**
**Precedence of Classes of Controlled Products under the WHMIS(1)**

| WHMIS Class Combinations | B6 | C | D1A | D1B | D2A or D2B | E |
|---|---|---|---|---|---|---|
| | Class of Controlled Product Having Precedence | | | | | |
| B2 | B6 | B2 | B2 | B2 | B2 | B2 |
| B3 | B6 | B3 | D1A | D1B | B3 | E |
| B4 | B6 | B4 | D1A | D1B | B4 | E |
| B6 | – | B6 | D1A | B6 | B6 | B6 |
| C | B6 | – | D1A | C | C | C |
| D1A | D1A | D1A | – | D1A | D1A | D1A |
| D1B | B6 | C | D1A | – | D1B | D1B |
| D2A or D2B | B6 | C | D1A | D1B | – | E |

**Notes to Table A-3.2.7.1.(3)(b):**

(1) This Table is an adaptation of the Table entitled "Precedence of Classes, Class and Packing Group" presented in Section 2.8 of the "Transportation of Dangerous Goods Regulations (TDGR)" for the classes of controlled products under the "Workplace Hazardous Materials Information System (WHMIS)."

## How to Use Table A-3.2.7.1.(3)(b)

If, for example, a substance meets the criteria for inclusion in Classes B2, E and D1A, compare two classes at a time to determine the primary class. First, consider the combination of Classes B2 and E. Find Class B2 in the left-hand column of the Table and follow the row across to the column on the right that refers to E. The Class at the intersection of the row and the column is the class having precedence, which, in this case, is B2; Class E is therefore set aside.

| WHMIS Class | B6 | C | D1A | D1B | D2A or D2B | E |
|---|---|---|---|---|---|---|
| B2 | B6 | B2 | B2 | B2 | B2 | B2 |

Now consider the combination of Classes B2 and D1A. In this case, Class B2 also takes precedence; Class D1A is set aside, leaving Class B2 as the primary class.

| WHMIS Class | B6 | C | D1A | D1B | D2A or D2B | E |
|---|---|---|---|---|---|---|
| B2 | B6 | B2 | B2 | B2 | B2 | B2 |

**A-3.2.7.1.(3)** Small Quantity Exemptions for Dangerous Goods. Figure A-3.2.7.1.(3) illustrates the steps involved in determining which Class of dangerous goods has precedence for the purpose of applying the maximum exempt amount allowed to be stored using Table 3.2.7.1.

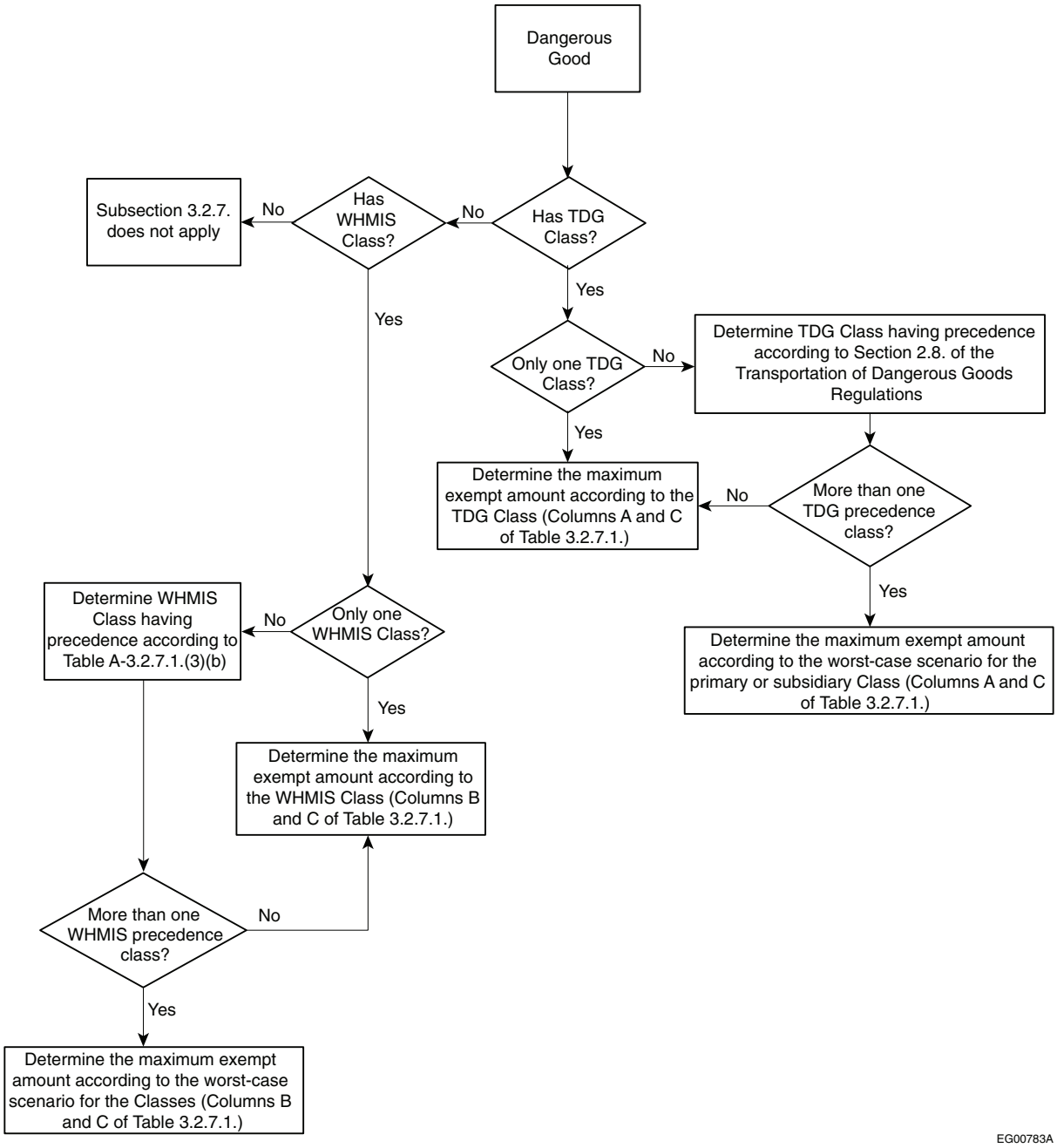


**Figure A-3.2.7.1.(3)**
**Decision flow chart for small quantity exemptions applicable to dangerous goods**

**A-3.2.7.3.(1)(b)** Part 4 of the BCFC specifies ventilation rates to prevent the buildup of dangerous concentrations of flammable vapours in rooms used for storing flammable and combustible liquids. The same principles should apply to dangerous goods capable of releasing toxic gases, or where the accidental mixing of incompatible substances could generate flammable vapours or toxic gases. Where no guidance is given, the design of the ventilation system should conform to good engineering practice. Recommendations in the NFPA standards or in ACGIH, "Industrial Ventilation: A Manual of Recommended Practice for Design," are considered examples of good engineering practice.

**A-3.2.7.5.(1)(c)** Clause 3.2.7.5.(1)(c) requires compliance with Table 3.2.3.2. so as to ensure that the fuel load of stored dangerous goods, including packaging materials, does not exceed individual storage area size limits for unsprinklered and sprinklered buildings.

**A-3.2.7.6.(2)** For oxidizing or reactive materials, Sentences 3.2.7.5.(6) and (7) require a 2 h fire-resistance rating. For compressed gases, Subsection 3.2.8. requires a 1 h or 2 h fire-resistance rating depending on the type of gases. For aerosols, Subsection 3.2.5. applies following the same reasoning.

### A-Table 3.2.7.6.

#### Combinations of dangerous goods indicated by "DS"

Where a combination of dangerous goods is indicated by "DS" in Table 3.2.7.6., refer to the Safety Data Sheet published by the products' manufacturer(s), or as needed, refer to a chemical database such as CAMEO Chemicals, which is an online library of more than 6,000 data sheets containing response-related information and recommendations for hazardous materials that are commonly transported, used, and/or stored. The CAMEO Chemicals database also contains the Chemical Reactivity Worksheet, which can be used to predict potential reactive hazards between chemicals of concern.

#### Corrosive acids and bases

The reaction between an acid (H+ releaser) and a base (OH- releaser) produces water ($H_2O$) through an exothermic (i.e. heat-producing) reaction. The reaction between an acid and a base of high power and concentration can produce extreme heat. The power of an acid or a base can be determined based on its pH level, which is a measure of the acidity or basicity of a liquid material on a scale of 0 to 14. Liquid materials with a pH less than 7 are acidic and those with a pH greater than 7 are basic or alkaline. Pure water is neutral with a pH close to 7.0 at 25°C.

An acid that is classified as a corrosive is powerful and its pH value is generally lower than 2. A base that is classified as a corrosive is also powerful and its pH value is generally higher than 11.5. Consequently, the reaction between a corrosive base and a corrosive acid would be strong, likely producing a large amount of heat that could ignite surrounding combustible materials. When the corrosive is also a flammable liquid, the liquid itself could ignite. The dangerous goods classification of a corrosive does not indicate if it is a base or an acid; this information is available in the Safety Data Sheet for the substance.

**A-3.2.7.6.(3)** It is assumed that Safety Data Sheets will in many cases be provided as part of the documentation for TC SOR/2008-34, "Transportation of Dangerous goods Regulations (TDGR)," or for the "Workplace Hazardous Materials Information System (WHMIS)" established in conformance with HC SOR/2015-17, "Hazardous Products Regulations."

The following are examples of basic principles that should apply to any storage situation involving dangerous goods:

- Chemicals should not be stored using an alphabetical sequence system but should be grouped according to compatibility.
- Organic materials should not be stored with either strong acids or oxidizers.
- Alkalis should not be stored with strong acids or chlorinated hydrocarbons.
- Strong acids should not be stored with oxidizers.
- Sulphites, bisulphites and sulphides should not be stored with acids.

Poisonous chemicals should not be stored together on the basis that they are poisons, but rather on the basis of compatibility. As with the storage of all chemicals, the primary consideration is what might happen in the event of a mishap causing them to be mixed. For instance, the following are all dangerous goods classified as toxic substances but will cause serious problems when mixed in the presence of water (such as water used for firefighting purposes):

- sodium azide + dimethyl sulphate = explosion;
- sodium cyanide + anhydrous chloral = highly toxic vapour cloud.

Dangerous goods classified as toxic substances should not be stored in the vicinity of chemicals that are designated as B.P., B.P.C., U.S.P., F.C.C. and N.F. grades. Many of these chemicals find their way into cosmetics, pharmaceutical drugs and foodstuffs. A spill of poisonous substance would not only cause contamination of the product itself, but also of the outside of the container and of the clean room in which they are processed.

**A-3.2.7.9.(1)** So many types, quantities, and concentrations of dangerous goods could be present in a building that setting maximum quantities allowed in unprotected buildings is very difficult. The hazard presented by the dangerous goods is not necessarily a function of their inherent flammability, but rather a function of their potential for hampering firefighting. If the area involved in dangerous goods storage is large enough, the owner must provide some degree of built-in automatic fire suppression for the building. Therefore, the point at which installation of an active fire suppression system becomes mandatory is based on the total area involved in dangerous goods storage, regardless of the product stored.

The active fire suppression system intended is a sprinkler system, installed throughout the building, not just in the area of dangerous goods storage. The objective is to control both a fire originating in a spot remote from the dangerous goods, so that it never threatens the dangerous goods, and a fire involving the dangerous goods themselves. Even if a fire originates in a dangerous good on which water should not be applied (stored pesticides for example), sprinklers may provide better control than alternative firefighting measures. A sprinkler system should control the fire, limit its spread, and minimize the number of containers that fail. The sprinkler alarm will notify responsible persons who can take corrective action while the fire is small. The amount of water applied to the pesticide by the sprinklers will be small in comparison to what will have to be applied by hose streams once the fire is established.

Sentence 2.1.3.1.(1) refers to the BCBC, which sets the basic criteria for sprinkler systems. These criteria may not be appropriate for specific dangerous goods. For example, water may not be the best extinguishing agent to use on a particular product. In such cases, special arrangements may be required, such as isolating that product in an unsprinklered room protected by a fixed fire suppression system conforming to Article 2.1.3.5.

It is assumed that the fire suppression system will be designed by persons experienced in such design, using good engineering practice to establish design criteria, such as type of suppressant to use, and rate of application.

**A-3.2.7.10.(1)** Venting of smoke and other products of combustion can be achieved by opening roof vents, breaking skylights, removing panels or opening windows. Smoke and hot gases should be vented directly to the outside.

**A-3.2.7.12.(2)** Access to at least 2 sides of a building used for the storage of dangerous goods is required so that, if necessary, firefighting operations can be set up on the upwind side of the building to minimize the adverse effects of toxic smoke.

**A-3.2.7.12.(3)** Protective clothing worn by firefighters in a fire involving dangerous goods is bulkier than the usual firefighting turnout gear. Therefore, Sentence 3.2.7.12.(3) requires access openings into buildings used for the storage of dangerous goods to be wider than otherwise required by the BCBC.

**A-3.2.7.13.(1)** Firefighters need to identify the substances they may encounter in a building during a fire. Labelling of products to comply with the "Workplace Hazardous Materials Information System (WHMIS)" or other provincial, territorial or federal regulations is deemed to satisfy this requirement.

**A-3.2.7.14.(1)** Some products are only classified under the "Workplace Hazardous Materials Information System (WHMIS)" and are not regulated by TC SOR/2008-34, "Transportation of Dangerous Goods Regulations (TDGR)." One or more placards should nonetheless be posted to identify the hazards associated with the product using its corresponding TDGR classification. For example, a TDGR placard for corrosives can be used to identify the hazard associated with a corrosive product that is only classified under the WHMIS.

One or more placards are required at the door into a room used for the storage of dangerous goods, or into a laboratory where dangerous goods are used, to inform firefighters, emergency responders and occupants that dangerous goods are contained within. In larger storage areas containing a variety of dangerous goods in different individual storage areas, each individual storage area should have placards.

It is understood that it is not reasonable to strictly enforce the use of placards conforming to the TDGR due to the limited space available on the exterior wall and/or door of laboratories in relation to the placard dimension requirement outlined in the TDGR. The intent of Sentence 3.2.7.14.(1) – as it applies to laboratories – is to ensure that the dangerous goods used within are either clearly identified by class or that their presence is signalled through the use of a "Danger" placard, either of which will help alert firefighters, emergency responders and occupants to the potential hazards associated with the presence of dangerous goods in the fire compartments containing laboratories.

**A-3.2.8.2.(1)(d)** When a flammable mixture of air and vapour/gas/dust is ignited and causes an explosion, the exothermic reaction results in the rapid expansion of heated gases and the corresponding pressure waves travel through the mixture at sonic or supersonic velocities. The pressures developed by an explosion very rapidly reach levels that most buildings and equipment cannot withstand unless specifically designed to do so. Explosion venting consists of devices designed to open at a predetermined pressure to relieve internal pressure build-up inside a room or enclosure, hence limiting the structural and mechanical damage.

The major parameters to be considered in designing an explosion venting system for a building are:

- the physical and chemical properties of the flammable air mixture, such as the particle size or the droplet diameter, the moisture content, the minimum ignition temperature and explosive concentration, the burning velocity or explosibility classification, the maximum explosion pressure and the rate of pressure rise,
- the concentration and dispersion of the flammable mixture in the room,
- the turbulence and physical obstructions in the room,
- the size and shape of the room, the type of construction and its ability to withstand internal pressures, and
- the type, size and location of relief panels, which should also be designed to reduce the possibility of injury to people in the immediate vicinity of the panels.

**A-3.2.8.2.(2)** Table A-3.2.8.2.(2) lists the specific volume ($m^3/kg$) of some common gases at normal temperature and pressure. This information is also available in the gas manufacturer's literature. Cylinder data for industrial gases can be found in FM Global Data Sheet 7-50, "Compressed Gases in Cylinders." All this information is needed to convert gas mass (kg) into gas expanded volume ($m^3$), and vice versa.

The volume, V, of gas in a compressed cylinder is a function of its pressure, P, in the cylinder. Applying the Ideal Gas Law – PV = nRT (where n is the number of moles, R is the gas constant, and T is the temperature) at constant temperature – provides the volume of gas in the cylinder at normal pressure and temperature. Since the temperature is kept constant, the following equation can then be derived:

$$P_1 \cdot V_1 = P_2 \cdot V_2$$

where

$P_1$ = pressure of the compressed gas in the cylinder,

$V_1$ = internal volume of the cylinder (commonly referred to as water volume) based on the manufacturer's cylinder specification,

$P_2$ = atmospheric pressure (101.325 kPa or 14.7 psig), and

$V_2$ = expanded volume of gas in the cylinder at atmospheric pressure ($V_2 = P_1V_1/P_2$).

Once $V_2$ is calculated, the specific volumes for common gases listed in Table A-3.2.8.2.(2) or in the gas manufacturer's literature can be converted into units of mass.

**Table A-3.2.8.2.(2)**
**Specific Volume of Common Gases**
Forming Part of Note A-3.2.8.2.(2)

| Gas | Specific Volume, $m^3/kg$ |
|---|---|
| Acetylene | 0.9 |
| Ammonia, anhydrous | 1.4 |
| Arsine | 0.3 |
| Butane | 0.4 |
| Carbon dioxide | 0.5 |
| Chlorine | 0.3 |
| Ethylene oxide | 0.5 |
| Fluorine | 0.6 |
| Hydrogen | 12.0 |
| Methane | 1.5 |
| Methyl acetylene | 0.6 |
| Methyl chloride | 0.5 |
| Nitrogen | 0.9 |
| Oxygen | 0.8 |
| Phosphine | 0.7 |
| Propane | 0.5 |
| Propylene | 0.6 |

**A-3.2.9.1.(1)** The chemical composition of ammonium nitrate is [$NH_4NO_3$], which makes it an inorganic nitrate. It comes in granular, prilled, flaked, crystalline or solid forms. Ammonium nitrate is manufactured in two densities used for different purposes and is treated with a wax or clay protective coating to prevent moisture absorption, which causes caking of the product.

High-density ammonium nitrate is a fertilizer used in the agricultural sector. Subsection 3.2.9. applies only to ammonium nitrate mixtures designated as Class 5.1 oxidizing substances, which may be composed of as little as 45% ammonium nitrate. Sentence 3.2.9.1.(1) increases the maximum exempt amount stated in Table 3.2.7.1. from 250 kg to 1 000 kg.

Low-density ammonium nitrate, when sensitized, is a blasting explosive used in the mining and construction sectors. When a carbonaceous or organic substance, such as fuel or diesel oil, nut hulls, or carbon black, is added and admixed with ammonium nitrate, the mixture may become a blasting explosive. This Code does not apply to ammonium-nitrate-based blasting explosives.

Blasting explosives are classified as Class 1 explosives; their storage is regulated under NRCan R.S.C., 1985, c. E-17, "Explosives Act," and its Regulations.

**A-3.2.9.2.(5)** The minimum spatial separation stated in Subsection 3.2.3. of Division B of the BCBC may be increased by the authority having jurisdiction with respect to the nearness of assembly, institutional, residential and mercantile occupancies regarding the proximity of these exposures and congested commercial or industrial areas with due consideration to the exposure of toxic vapours from fires involving ammonium nitrate.

**A-3.2.9.3.(1)** It is recommended that electric or LP-gas-powered industrial trucks be used rather than gasoline- or diesel-fuelled ones so as to reduce the potential for contamination of the ammonium nitrate.

**A-3.2.9.4.(1)** Dry chemical extinguishers are not permitted to be used to fight fires involving ammonium nitrate, but may be used to extinguish fires involving industrial trucks, conveyors, etc.

**A-3.3.1.1.(1)(d)** Hogged material can be described as mill waste consisting mainly of hogged bark but may include a mixture of bark, chips, dust, or other by-products from trees. This also includes material designated as hogged fuel.

**A-3.3.1.1.(1)(e)** Factory-assembled combustible structures, such as mobile or modular homes and office trailers, that are transportable in one or more sections, are designated as manufactured buildings in this Section.

**A-3.3.1.1.(2)(c)** An intermodal shipping container can be described as a standard sized reusable structure into which commodities are packed and designed to be used in more than one mode of transportation.

**A-3.3.1.1.(2)(g)** Treated forest products are those that have been coated or impregnated with flammable or combustible liquids. Ranked piles are typically piles of logs evenly arranged by conveyor, crane or other means.

**A-3.3.2.6.(2)** The width and location of gates in a fire department access route should take into account the connection with public thoroughfares, width of the roadway, radius of curves, and the type and size of fire department vehicles available in the municipality or area where the storage site is located. Padlocks that can be forced and replaced are preferred by fire departments for easy access to the storage site.

**A-3.3.3.2.(1)** Where the adjoining property is land that may be built upon or used for storage, it is intended that the required clearance be maintained between the stored products and the property line. If the adjoining property does not present a fire exposure hazard, such as a street, right of way, watercourse, or park land, the required clearance could be beyond the property line. In all cases, care should be taken that the storage close to the property line does not defeat the purpose of other safety measures prescribed in this Code.