

FIRE CODE INTERPRETATION

STANDATA

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USE OF CONTAINERS, PORTABLE TANKS AND TRANSPORTATION TANKS FOR THE ONGOING STORAGE AND DISPENSING OF FLAMMABLE LIQUIDS AND COMBUSTIBLE LIQUIDS

PURPOSE

This clarifies the requirements of the National Fire Code – 2019 Alberta Edition (NFC(AE)) for the ongoing use of containers, portable tanks and transportation tanks for storing and dispensing flammable liquids and combustible liquids.

DISCUSSION

The means of transporting flammable liquids and combustible liquids within Alberta is regulated by Transportation of Dangerous Goods Regulations-Canada & Alberta (TDGR). These units include compliant steel and plastic drums, portable tanks, intermodal bulk containers (IBC) and tank vehicles and trailers.

It has been reported to Municipal Affairs that some locations are using these units either indoors or outdoors, as refillable receptacles for the ongoing delivery, storage and dispensing of flammable liquids and combustible liquids. Except for the specific allowances to dispense Class II and IIIA liquids from tank vehicles into vehicle fuel tanks in Sentence 4.11.3.8.(2) of the NFC(AE), this type of activity **is not permitted**.

While these containers and transportation units may be compliant with TDGR, they do not meet the NFC(AE) requirements of Subsection 4.2.3. Containers and Portable Tanks for the on-site refilling and ongoing storage of flammable liquids and combustible liquids indoors or outdoors.

These containers and portable tanks are not designed, manufactured or installed to the standards outlined in Section 4.3., Containers and Portable Tanks of the NFC(AE). Also, they do not provide secondary containment and the manufacturers and distributors agree these units are not intended for installation and ongoing storage with on-site refilling.

Their intended purpose, and the intent of their inclusion in the NFC(AE) in Section 4.2. is only to transport a product to a site where the product is subsequently dispensed by the end user. When the container has been emptied at the end use site, it needs to be disposed of or transported back to the manufacturer or distributor for possible testing and refurbishment.

Due to this “one way” usage and portable nature these containers are NOT acceptable for continuous usage as part of a storage tank system. Nor are they acceptable for continuous use in a container dispensing system (e.g. drums).

Unless stated otherwise, all Code references in this STANDATA are to Division B of the National Fire Code - 2019 Alberta Edition.

Issuance of this STANDATA is authorized by
the Provincial Fire Administrator

[original signed]
Tina Parker

The logo for the province of Alberta, featuring the word "Alberta" in a stylized, cursive font with a small blue square at the end of the word.

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CODE REFERENCES

Sentence 1.4.1.2.(1) of Division A states:

Authority having jurisdiction means a safety codes officer in the fire discipline exercising authority pursuant to designation of powers and terms of employment in accordance with the Safety Codes Act. (See Note A-1.4.1.2.(1).)

A-1.4.1.2.(1) Defined Terms.

Authority Having Jurisdiction

The defined term “authority having jurisdiction” refers to a safety codes officer as the appointed individual responsible for decision-making in a number of areas. In most cases, this individual will be a member of an accredited municipal fire department. In municipalities that use accredited agencies for their inspection and enforcement, the fire department may not be involved. It is important that accredited municipalities employing accredited agencies properly designate the person(s) acting as the authority having jurisdiction.

In addition, municipalities using accredited agencies should ensure that the agency has a close working relationship with the fire department during the decision-making process.

Combustible liquid means a liquid having a *flash point* at or above 37.8°C and below 93.3°C. (See Subsection 4.1.2. of Division B.)

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).” (See Subsection 4.1.2. of Division B.)

High-hazard industrial occupancy (Group F, Division 1) means an *industrial occupancy* containing sufficient quantities of highly combustible and flammable or explosive materials which, because of their inherent characteristics, constitute a special fire hazard.

Medium-hazard industrial occupancy (Group F, Division 2) means an *industrial occupancy* in which the combustible content is more than 50 kg/m² or 1,200 MJ/m² of *floor area* and not classified as a *high-hazard industrial occupancy*.

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.

Secondary containment means containment that prevents any materials spilled or leaked from the primary *storage tank system* from reaching the land or water outside the containment area before cleanup occurs and includes double-walled *storage tank systems* and impermeable membranes or liners.

Article 4.1.8.3 of Division B states:

4.1.8.3. Transfer

- 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 4.5.,
 - 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. (See Note A-4.1.8.3.(1).)



A-4.1.8.3.(1) Products tested and listed by recognized agencies are considered to be designed in conformance with good engineering practice. Underwriters Laboratories Inc., ULC and FM Global are currently listing these products.

Sentences 4.2.1.1.(1), (3) and (5) state:

4.2.1.1. Application

- 1) Except as provided in Sentence (2), this Section shall apply to the storage, handling and use of *flammable liquids* or *combustible liquids* that are in
 - a) containers conforming to Clauses 4.2.3.1.(1)(a) to (d) having an individual 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 2,500 L, or
 - c) intermediate bulk containers conforming to Clause 4.2.3.1.(1)(a) having an individual capacity of not more than 3,000 L.
- 3) Portable tanks having a capacity greater than 2,500 L shall be installed in conformance with Section 4.3.
- 5) Except as otherwise stated, requirements for containers in this Part shall also apply to portable tanks described in Sentence (1).

NFC(AE) Subsection 4.2.3., Containers and Portable Tanks, Sentences (1) and (5) state:

4.2.3.1. Design and Construction

- 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 the following:
 - a) TC SOR/2016-95, "Transportation of Dangerous Goods Regulations (TDGR),"
 - b) CSA B376-M, "Portable Containers for Gasoline and Other Petroleum Fuels,"
 - c) CSA B306-M, "Portable Fuel Tanks for Marine Use,"
 - d) ULC/ORD-C30, "Safety Containers," or
 - e) CSA B620, "Highway Tanks and TC Portable Tanks for the Transportation of Dangerous Goods."
- 5) Nonmetallic aboveground *storage tanks*, up to 2,500 L, intended for the storage of *combustible liquids*, including heating oil, diesel fuel and new or used oils, shall comply with CAN/ULC-S670, "Aboveground Nonmetallic Tanks for Fuel Oil and Other Combustible Liquids."

Sentences 4.2.8.1.(1) and 4.2.8.2.(1) state:

4.2.8.1. Application

- 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. (See Note A-4.2.8.1.(1).)

4.2.8.2. Maximum Quantities

- 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 Subsections 4.2.7., 4.2.9. or 4.3.14., 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) 5 000 L of Class IB, IC, II and IIIA liquids in *storage tanks* or portable tanks.

Subsection 4.2.9., Rooms for Container Storage and Dispensing states:

4.2.9.1. Maximum Quantities

- 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 4.2.9.1.

Table 4.2.9.1
Rooms for Container Storage and Dispensing
Forming Part of Sentences 4.2.9.1.(1) and (2)

Maximum Quantity, L	Minimum Fire Separation Around Room, h	Maximum Density, L/m ²
10,000	2	200
1,500	1	100

- 2) The maximum quantities and densities of *flammable liquids* and *combustible liquids* shown in Table 4.2.9.1. are permitted to be doubled provided the storage room is protected by an automatic fire suppression system conforming to Article 4.2.7.6.
- 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 4.2.7.5.-A, and
 - b) comply with Sentences 4.2.7.5.(3) and (4).

4.2.9.2. Spill Control

- 1) Storage rooms referred to in Article 4.2.9.1. shall be liquid-tight where the walls join the floor.

4.2.9.3. Aisles

- 1) The contents of *flammable liquid* and *combustible liquid* storage rooms referred to in Article 4.2.9.1. shall be arranged to provide aisle widths of not less than 1 m.

4.2.9.4. Dispensing

- 1) 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. (See Note A-4.1.8.3.(1).)

4.2.9.5. Explosion Venting

- 1) Except for the storage of *distilled beverage alcohol*, where Class IA or IB liquids are used, dispensed or stored in open containers within a storage room, or where Class IA liquids are stored in containers exceeding 4 L in capacity, the room shall be designed to prevent critical structural and mechanical damage from an internal explosion in conformance with Sentence 3.3.6.4.(2) of Division B of the NBC(AE). (See Note A-3.2.8.2.(1)(d).)

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

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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.

Sentences 4.3.1.2.(1) and (5) state:

4.3.1.2. Atmospheric Storage Tanks

- 1) Except as permitted in Sentence (3) and in Section 4.10., *atmospheric storage tanks* shall be built in conformance with the following:
 - a) except as provided in Sentence (2), API 12B, “Bolted Tanks for Storage of Production Liquids,”
 - b) except as provided in Sentence (2), API 12D, “Field Welded Tanks for Storage of Production Liquids,”
 - c) except as provided in Sentence (2), API 12F, “Shop Welded Tanks for Storage of Production Liquids,”
 - d) API 650, “Welded Tanks for Oil Storage,”
 - e) CAN/ULC-S601, “Shop Fabricated Steel Aboveground 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) CAN/ULC-S615, “Fibre Reinforced Plastic Underground Tanks for Flammable and Combustible Liquids,”
 - j) CAN/ULC-S652, “Tank Assemblies for the Collection, Storage and Removal of Used Oil,”
 - k) CAN/ULC-S653, “Aboveground Steel Contained Tank Assemblies for Flammable and Combustible Liquids,”
 - l) ULC-S655, “Aboveground Protected Tank Assemblies for Flammable and Combustible Liquids,”
 - m) CAN/ULC-S677, “Fire Tested Aboveground Tank Assemblies for Flammable and Combustible Liquids,” or
 - n) ULC/ORD-C80.1, “Non-metallic Tank for Oil Burner Fuels and Other Combustible Liquids.”

- 5) Nonmetallic aboveground storage tanks, up to 2,500 L, intended for the storage of combustible liquids, including heating oil, diesel fuel and new or used oils, shall comply with CAN/ULC-S670, “Aboveground Nonmetallic Tanks for Fuel Oil and Other Combustible Liquids.”



Sentence 4.11.3.8.(2) states:

4.11.3.8. Dispensing into Vehicles

- 2) Dispensing Class II or IIIA liquids into the fuel tank of vehicles directly from a *tank vehicle* having a capacity greater than 3,000 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 2 portable extinguishers having a minimum rating of 80-B:C are provided on the *tank vehicle*,
 - c) the delivery hoses and automatically closing hose nozzle valves used for the fuel-dispensing operations conform to Subsection 4.6.5.,
 - d) the *tank vehicle* operator is given training and equipment for controlling any spillage that may occur during the fuel-dispensing operations, 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 1,000 L.

APPLICATION

This Interpretation applies to the storage of flammable liquids and combustible liquids after their delivery and use while in containers, portable tanks and transportation tanks including TDGR transportation containers or vehicle-mounted tanks.

This Interpretation does NOT apply to storage of liquids that are neither flammable nor combustible.

INTERPRETATION

On site refilling at the end user location and the ongoing usage of containers, portable tanks and transportation tanks, including TDGR transportation containers or vehicle-mounted tanks, is prohibited. This provides an assurance to owners that storage of flammable liquids and combustible liquids, such as, but not limited to, liquid fuels, solvents, windshield washer antifreeze, and engine additives are delivered and stored in a safe and consistent manner across Alberta.

Containers, portable tanks and transportation tanks are intended to be delivered to the point of end use and emptied in a compliant manner at that end use point. This will typically involve either:

- Transfer to a permanent storage tank compliant with Section 4.3. of the NFC(AE),
- Storage in a store room designed for this purpose under Subsection 4.2.9. of the NFC(AE) , often in rack storage, while awaiting withdrawal for the purpose of manufacturing, blending or operations,
- Storage in a store room designed for this purpose under Subsection 4.2.9. of the NFC(AE), often in rack storage, while awaiting further shipping or transfer,
- Connected to process equipment in a code compliant manner so the product may be directly introduced to that process, or
- Being placed outside a store room, subject to quantity limitations, in a manner acceptable to the authority having jurisdiction (AHJ) in conformance with Article 4.2.1.1, for usage as per Sub Section 4.2.8. Incidental Use of the NFC(AE) within a high hazard occupancy or a medium hazard occupancy where the product is



dispensed, with appropriate equipment rated for the product which meets the requirements of Sentence 4.2.9.4.(1) and A-4.1.8.3.(1), in a safe and compliant manner.

AHJs should note that flammable liquids and combustible liquids of any kind are not to be stored in containers that are certified to ULC-ORD-C142.1403, "Non metallic Bulk Containers for the Storage and Dispensing of Combustible and Non-combustible Liquids."

Where flammable liquids and combustible liquids, in quantities greater than the amounts noted in Sentence 4.2.1.1.(1), are offloaded and stored in storage tanks anywhere under the jurisdiction of the NFC(AE) these storage tanks must meet the requirements of Sentence 4.3.1.2.(1) or an approved variance. Variances are approved by the local AHJ or the Alberta Safety Codes Authority (ASCA).

In addition, installation of storage tanks for ongoing usage and refilling requires the owner to obtain a Storage Tank System Permit as per the Permit Regulation (AR 204/2007) adopted under the Safety Codes Act (ch. S-1 RSA 2000). Owners should contact either the authority having jurisdiction (AHJ) or ASCA for permit requirements and processes.

This INTERPRETATION replaces the following documents:

FCI-14-01RI, Use of Containers, Portable Tanks and Transportation Tanks for the Ongoing Storage and Dispensing of Flammable and Combustible Liquids

This INTERPRETATION is applicable throughout the province of Alberta.

Purchase codes and standards

To purchase a copy of the standards, contact the National Research Council (NRC) at 1-800-672-7990 or visit the [NRC](#) website.

