

STORAGE TANK SYSTEMS INSIDE BUILDINGS

PURPOSE

The purpose of this interpretation is to clarify the application of the National Fire Code - 2019 Alberta Edition (NFC (AE)) for indoor above ground *storage tanks* and *storage tank systems* used to supply fuel to *appliances*, stationary combustion engines, internal combustion engines and oil burning equipment.

DISCUSSION

There have been inquiries from designers and installers regarding the *fire-resistance rating* requirements for rooms housing generators with *storage tanks* and *storage tank systems* providing power to non-life safety equipment.

Under the National Building Code – 2019 Alberta Edition (NBC(AE)) an emergency generator and its ancillary equipment are required to be separated from the remainder of the *building* by a fire separation having a 2 hour *fire-resistance rating*. Typically, this would be a separate room. The type of generators in question may be referred to as backup or standby generators and have been used to ensure continuity of data/data backup, but can be used for other purposes.

The conversation around the requirements for a *fire-resistance rating* of a minimum of 2 hours is that it is not an emergency generator. It has been proposed that because it is not an emergency generator, the *storage tank/storage tank system* and generator can be installed in a *service room*, which is separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 1 hour. These non-emergency generators fall under the definition of an *appliance*.

The installation of an *appliance* under the NFC(AE) can be installed to either the National Fire Protection Association (NFPA) 37 “Installation and Use of Stationary Combustion Engines and Gas Turbines” or CSA B139, “Installation Code for Oil-Burning Equipment.” Both of these documents have different criteria for the design of the room where the *storage tank/storage tank systems* are installed. In these types of installations, it is important to note that it is not the *appliance*, stationary combustion engine, internal combustion engine or oil burning equipment that determines the *fire separation* with a *fire-resistance rating*; it is the *storage tank/storage tank system* supplying the fuel that dictates the rating.

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

Issue 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.

The NFC(AE) requires *storage tanks* to be located in dedicated rooms that are separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* of at least 2 hours.

CODE REFERENCES

Article 1.4.1.2. of Division A states:

1.4.1.2. Defined Terms

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.

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

Fire-resistance rating means the time in minutes or hours that a material or assembly of materials will withstand the passage of flame and the transmission of heat when exposed to fire under specified conditions of test and performance criteria, or as determined by extension or interpretation of information derived therefrom as prescribed in the National Building Code – 2019 Alberta Edition. (See Note A-1.4.1.2(1).)

Fire separation means a construction assembly that acts as a barrier against the spread of fire. (See Note- A 1.4.1.2.)

Service room means a room provided in a *building* to contain equipment associated with *building services*. (See Note- A 1.4.1.2.(1).)

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

Storage tank system means a system for the storage and dispensing of *flammable liquids* and *combustible liquids* and is not limited to *storage tanks*, associated piping, vents, pumps, and dispensing equipment.

A-1.4.1.2.(1) Defined Terms.

Fire-resistance Rating

Since it is not practicable to measure the fire resistance of constructions in situ, they must be evaluated under some agreed test conditions. A specified fire-resistance rating is not necessarily the actual time that the assembly would endure in situ in a building fire, but is that which the particular construction must meet under the specified methods of test.

Fire Separation

A fire separation may or may not have a fire-resistance rating.

Service Room

Typical examples of service rooms include boiler rooms, furnace rooms, incinerator rooms, garbage handling rooms and rooms to accommodate air-conditioning or heating *appliances*, pumps, compressors and electrical equipment. Rooms such as elevator machine rooms and common laundry rooms are not considered to be service rooms.

NBC(AE) Article 3.6.2.8. states:

3.6.2.8. Emergency Power Installations

- 1) Where a generator intended to supply emergency power for lighting, fire safety and life safety systems is located in a *building*, except where such *building* is used solely for the purpose of housing the generator and its ancillary equipment, it shall be located in a room that
 - a) is separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than 2 h, and
 - b) contains only the generating set and equipment related to the emergency power supply system.

Sentences 4.3.13.1. and 4.3.13.2 states:

4.3.13. Installation of Storage Tanks inside Buildings

4.3.13.1. Occupancy

- 1) Except as provided in Article 4.3.13.2., *storage tanks* inside *buildings* shall
 - a) conform to Subsections 4.3.13. to 4.3.15.,
 - b) be permitted in *industrial occupancies*, and
 - c) be permitted in all *occupancies* where *combustible liquids* are stored and used as fuel for oil-burning equipment, emergency generators and fire pumps.

4.3.13.2. Stationary Combustion Engines

- 1) *Storage tank systems* using Class I liquids as fuel supplies for stationary engines inside *buildings* shall conform to this Part when they are used to supply *appliances* installed in conformance with NFPA 37, "Installation and Use of Stationary Combustion Engines and Gas Turbines."
- 2) *Storage tank systems* for Class II and IIIA liquids inside *buildings* shall conform to this Part when they are used to supply *appliances* installed in conformance with CSA B139, "Installation Code for Oil-Burning Equipment."

Sentences 4.3.13.2.(1) and 4.3.13.2.(2) state "*storage tanks systems*...shall conform to this Part when they are used to supply *appliances* in conformance with...". The inclusion of "Part" in these Sentences means Part 4, which means that the installation of *storage tank systems* shall be in conformance with Part 4 and not NFPA 37, "Install and Use of Stationary Combustion Engines and Gas Turbines" or CSA B139, "Installation Code for Oil-Burning Equipment".

Sentence 4.3.13.4.(1) states:

4.3.13.4. Maximum Quantities and Location

- 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 storage rooms conforming to Subsection 4.3.14., and
 - b) located in conformance with Tables 4.3.13.4.A. and 4.3.13.4.B. (see Note A-4.3.13.4.(1)(b)).

A-4.3.13.4.(1)(b) Table 4.3.13.4.-B deals with storage tanks that are outside the scope of CSA B139, "Installation Code for Oil-Burning Equipment" (which limits the capacity of individual storage tanks to 2 500 L and their aggregate capacity to 5 000 L) and harmonizes requirements for all occupancies using oil-burning equipment, emergency generators and fire pumps.

Sentence 4.3.14.1. states:

4.3.14. Rooms for Storage Tanks

4.3.14.1. Design and Construction

- 1) Rooms for *storage tanks* inside *buildings*, referred to in Sentence 4.3.13.4.(1), 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 a spill equal to at least 100% of the volume of the largest *storage tank*, or to drain away spilled *flammable liquids* or *combustible liquids*,
 - c) made liquid-tight where the walls join the floor, and
 - d) used for no other purposes than the storage and handling of *flammable liquids* or *combustible liquids*.

APPLICATION

This Interpretation applies to all indoor above ground *storage tanks/storage tank systems* used to supply fuel to *appliances*, stationary combustion engines, internal combustion engines and oil burning equipment

INTERPRETATION

The installation of *storage tanks* and *storage tanks systems* for *flammable liquids* and *combustible liquids* installed inside buildings and that supply fuel to *appliances*, stationary combustion engines, internal combustion engines and oil burning equipment shall comply with the requirements of Part 4 of the NFC(AE). This includes, but is not limited to, the requirement to be in a room separated from the rest of the building by a *fire separation* having a *fire-resistance rating* of at least 2 hours.

In addition to the requirements of NFC(AE) Part 4, there may also be specific permitting requirements by the *local authority having jurisdiction*.

Any existing *storage tanks* and *storage tank systems* are acceptable as per the conditions of the permit applied for.

This INTERPRETATION is applicable throughout the province of Alberta.