



Date:

Construction Industry, Designers, Contractors and Suppliers providing services in Yukon

RE: Advisory #8 - Adequate Water Supply for Firefighting

The National Building Code of Canada 2015, (NBC) which is adopted in Yukon, under the Yukon Building Standards Act, contains provisions that requires that every building be provided with an adequate supply for firefighting for those buildings described in Sentence 1.3.3.2. of Division "A" of the NBC.

Although the Territory adopts the National Building Code (NBC), within Whitehorse, it is administered by the City of Whitehorse, Building Officials and in all other parts of Yukon, by the Building Officials for the Yukon Government. The objective of this Advisory #8 is to explain our interpretation and the Intent of Sentence 3.2.5.7.(1) of Division "B" of the NBC.

We hope that this advisory will help eliminate confusion regarding the Intent of what is required and how an adequate supply for firefighting is to be provided for those buildings regulated by Part 3 of the NBC. This will assist in ensuring a uniform application of the National Building Code requirements throughout Yukon. Please feel free to make copies of this advisory available to your customers as you see fit. Your assistance in achieving these goals will be greatly appreciated.

Warren Badley
A/Chief Building/Plumbing Inspector
Building & Safety Standards Branch
Yukon Government
(867) 667-5094

Matthew Wilkinson
Senior Building Official/Supervisor
Planning & Building Services
City of Whitehorse
(867) 668-8343

James Paterson
Director and Fire Marshal,
Community Services
Yukon Government
(867) 332-1903

Jason Everitt
Fire Chief
Fire Department
City of Whitehorse
(867) 668-8383

Building Standards - Advisory #8

Date:

Adequate Water for Firefighting

1 of 6

Compliance with *The Building Standards Act* and Regulations are addressed in this advisory. NBC 2015 means the National Building Code of Canada 2015 as adopted by *The Building Standards Act*. Words in italics, other than *The Building Standards Act* title, are defined in the NBC 2015.

Note: **This advisory applies to the requirements of the NBC 2015 regarding the Intent of what is required and how an adequate water supply for firefighting is to be provided for those buildings described in Sentence 1.3.3.2. of Division "A" of the NBC.**

Article 3.2.5.7. Water Supply

1) Every building shall be provided with an adequate water supply for firefighting. (See Note A-3.2.5.7.(1).)

This Article applies to those buildings described in Sentence 1.3.3.2. of Division "A" of the NBC.

The Intent of this Article is:

To limit the probability that firefighting operations will be ineffective, which could lead to a fire not being suppressed or controlled, which could lead to the spread of fire, which could lead to harm to persons.

A Functional Statement of this Article:

The objectives of the NBC are achieved by measures, such as those described in the acceptable solutions in Division B, that are intended to allow the building or its elements to perform the following functions.

F02 To limit the severity and effects of fire or explosions.

An Objective of this Article:

OS1 Fire Safety: An objective of this Code is to limit the probability that, as a result of the design or construction of the building, a person in or adjacent to the building will be exposed to an unacceptable risk of injury due to fire.

Firefighting Assumptions in the NBC:

The requirements of this Part are based on the assumption that firefighting capabilities are available in the event of a fire emergency. These firefighting capabilities may take the form of a paid or volunteer public fire department or in some cases a private fire brigade. If these firefighting capabilities are not available, **additional fire safety measures may be required.**

Although it is reasonable to consider that some level of municipal firefighting capability was assumed in developing the fire safety provisions in Part 3, this was not done on a consistent or defined basis. The requirements in the Code, while developed in the light of commonly prevailing municipal fire protection levels, do not attempt to relate the size of building to the level of municipal protection. The responsibility for controlling the maximum size of building to be permitted in Yukon in relation to local firefighting capability rests with the Yukon Government in consultation with the applicable municipality.

If a proposed building is too large, either in terms of floor area or building height, to receive reasonable protection from the municipal fire department, or volunteer public fire department or in some cases a private fire brigade, fire protection requirements in addition to those prescribed in the NBC, **may be necessary to compensate for this deficiency. Automatic sprinkler protection may be one option to be considered.**

In the case of a building that is sprinklered throughout, the automatic sprinkler system should control the fire to an extent that radiation to neighbouring buildings should be minimal. Although there will be some radiation effect on a sprinklered building from a fire in a neighbouring building, the internal sprinkler system should control any fires that might be ignited in the building and thereby minimize the possibility of the fire spreading into the exposed building. **NFPA 80A, "Protection of Buildings from Exterior Fire Exposures," provides additional information on the possibility of fire spread at building exteriors.**

Building Standards - Advisory #8

Date:

Adequate Water for Firefighting

2 of 6

The water supply requirements for fire protection installations depend on the requirements of any automatic sprinkler or standpipe installations and also on the number of fire streams that may be needed at any fire, having regard to the length of time the streams will have to be used. Both these factors are largely influenced by the conditions at the building to be equipped, and the quantity and pressure of water needed for the protection of both the interior and exterior of the building must be ascertained before the water supply is decided upon. Acceptable water supplies may be a public waterworks system that has adequate pressure and discharge capacity, automatic fire pumps, pressure tanks, manually controlled fire pumps in combination with pressure tanks, gravity tanks, and manually controlled fire pumps operated by remote control devices at each hose station.

Appendix Note for A-3.2.5.7.(1) Water Supply:

The intent of Sentence 3.2.5.7.(1) is that an adequate water supply for firefighting be readily available and of sufficient volume and pressure to enable emergency response personnel to control fire growth so as to **enable the safe evacuation of occupants and the conduct of search and rescue operations**, prevent the fire from spreading to adjacent buildings, and provide a limited measure of property protection.

The water supply requirements for buildings containing internal fire suppression systems, including sprinkler and standpipe systems, are contained in specific standards referenced in the Code. Compliance with the referenced standard, including any variations made by the NBC, is deemed to satisfy the intent of Sentence 3.2.5.7.(1). However, it will be necessary to verify that an adequate source of water is available on or at the building site to meet the required quantities and pressures.

For a building with no internal fire suppression system, the determination of the minimum requirements applicable to the water supply for firefighting is relevant mainly to building sites not serviced by municipal water supply systems. For building sites serviced by municipal water supply systems, where the water supply duration is not a concern, water supply flow rates at minimum pressures is the main focus of this provision. **However, where municipal water supply capacities are limited, or where building sites are not serviced by a municipal water supply system, it may be necessary for buildings to have supplemental water supplies to be readily available on site.**

The sources of water supply for firefighting purposes may be natural or developed. Natural sources may include ponds, lakes, rivers, streams, bays, creeks, and springs. Developed sources may include aboveground tanks, elevated gravity tanks, cisterns, swimming pools, wells, reservoirs, aqueducts, artesian wells, on-site tankers, hydrants served by a public or private water system, dry hydrants, or wall hydrants that are connected to onsite water storage tanks that serve a sprinkler or standpipe system and canals. Consideration should be given to ensuring that water sources will be accessible to fire department equipment under all climatic conditions, in winter or summer.

While fire department controlled water shuttle operations achieved through mutual or automatic aid agreements may exist for the site being assessed, it cannot be guaranteed and thus shall not be considered as a reasonable and reliable alternative for a dedicated supply of firefighting water readily available on site.

The volume of on-site water supply is dependent on the building size, construction, occupancy, exposure and environmental impact potential, and should be sufficient to allow at least 30 minutes of fire department hose stream use.

Building Standards - Advisory #8

Date:

Adequate Water for Firefighting

3 of 6

REGULATIONS O.I.C. 1985/147

Respecting Mobile and Manufactured Homes and Relocatable Industrial Accommodation:

Requires that every relocatable industrial accommodation containing sleeping accommodation for more than 30 persons shall be provided with a standpipe and hose system:

- (a) having a firefighting water supply storage volume not less than 13638 litres.
- (b) capable of supplying 568 litres per minute at a gauge pressure not less than 689 kPa, and
- (c) installed in conformance with NFPA 14-"Standard for the Installation of Standpipe and Hose Systems."

NBC Article 9.10.21.9. Hose Stations

- 1) Every construction camp *building* providing sleeping accommodation for more than 30 persons shall be provided with a hose station that is protected from freezing and is equipped with a hose of sufficient length so that every portion of the *building* is within reach of a hose stream.
- 2) Hose stations required in Sentence (1) shall be located near an exit.
- 3) Hoses referred to in Sentence (1) shall be not less than 19 mm inside diam. and shall be connected to a central water supply or to a storage tank having a capacity of not less than 4 500 L with a pumping system capable of supplying a flow of not less than 5 Lis at a gauge pressure of 300 kPa.

The requirements of the NBC regarding the Intent of Sentence 3.2.5.7.(1) of Division "B" of what is required and how an adequate water supply for firefighting is to be provided for those buildings described in Sentence 1.3.3.2. of Division "A" of the NBC regulated by Part 3 of Division "B" of the NBC by the Authority Having Jurisdiction are as follows:

- 1) Every *building* shall be provided with an adequate water supply for firefighting.
- 2) Buildings that are sprinklered throughout with a sprinkler system conforming to Article 3.2.5.12. or have a standpipe system conforming to Article 3.2.5.8. to 3.2.5.11. and **where there is no municipal water supply system, and has an exterior wall hydrant installed in compliance with NFPA 22 - "Water Tanks for Private Fire Protection", that are connected to the water storage tank(s)**, are deemed to comply with Sentence (1)
- 3) **Where there is a municipal water supply system** a hydrant shall be located within 90 m horizontally of any portion of a *building* perimeter that is required to face a street in Subsection 3.2.2.
- 4) Except as provided in Sentences (6) to (9), A *building* shall have water available for firefighting purposes that is provided by:
 - a) a piped municipal water supply capable of being delivered at a
 - i) rate of not less than 3 800 L/min, and
 - ii) residual pressure of not less than 140 kPa, or
 - b) an onsite private water supply that is not less than the quantity derived from the following formula:

$$Q=V \times O \times S$$

Where:

Q = minimum water supply (litres),

V =total building volume (cubic metres),

O =water supply coefficient (from Water Supply Coefficient Table), S =spatial coefficient whose value is 1.5 for a building that has a limiting distance less than 7.5 m, otherwise whose value is 1.0.

Building Standards - Advisory #8

Date:

Adequate Water for Firefighting

4 of 6

Water Supply Coefficient Table					
Type of Construction	Classification by Group and Division in Accordance with Table 3.1.2.1.				
	A-1, A-3, F-3	A-2, B-1, B-2, B-3, C, D	A-4	E, F-2	F-1
	Applicable Water Supply Coefficient				
A building of noncombustible construction with all loadbearing walls, columns and arches, having a fire-resistance rating at least equivalent to that required for the supported assembly, but not less than 45 min.	11	10	14	17	23
A building of noncombustible construction in accordance with Article 3.1.5.1.	17	15	20	25	34
A building having all structural members of noncombustible material, or if of combustible material, a fire-resistance rating of at least 45 min, or of heavy timber construction	22	19	27	34	45
A building of combustible construction.	34	27	40	50	67

5) The private water supply referred to in clause (4)(b) shall be:

- a) capable of being delivered at a rate of not less than
 - i) 2700 L/min for a building required to have a quantity less than 75,000 L, and
 - ii) 3800 L/min for a building requiring a quantity of 75,000 L and greater, and
- b) provided with a
 - i) dry hydrant conforming to Chapter 8 of NFPA 1142, "Water Supplies for Suburban and Rural Fire Fighting", or
 - ii) pressurized hydrant conforming to the requirements of NFPA 23, "Installation of Private Fire Service Mains and their Appurtenances".

6) Requirements under sentence (4) do not apply to a building that is:

- a) not more than 3 storeys in building height.
- b) not more than 600 m² in total building area of the building,
- c) no portion of the access route shall be more than 9 m below the uppermost floor level,
- d) the building does not contain a school, or a Group "B" Occupancy,
- e) the limiting distance from the property line is at least 15 m if the building contains a high hazard industrial occupancy and,
- f) the building constitutes no significant environmental contamination potential due to fire.

Building Standards - Advisory #8

Date:

Adequate Water for Firefighting

5 of 6

- 7) Capacity requirements under Sentence (4) do not apply to a *building* having a standpipe system conforming to the requirements of NFPA 14, "Installation of Standpipe and Hose Systems" and **where there is no municipal water supply system a building (shall) have an exterior wall hydrant installed in compliance with NFPA 22, "Water Tanks for Private Fire Protection", that is connected to the water storage.**
- 8) Capacity requirements under Sentence (4) do not apply to a *building* that is *sprinklered* in conformance with:
- a) NFPA 13, "Installation of Sprinkler Systems," or
 - b) NFPA 13R, "Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height" and,
- 9) Sentence (4) does not apply to a *building* classified as a Group 'D' (Business and Personal Services Occupancies), provided:
- a) any business and personal services contained within the *building* occupies not more than 10% of the *building* area, or
 - b) the occupancy is permitted to exceed 10% of the *building* area and the "primary open space" is permitted to be less than 90% of the floor area if these subdivided rooms or spaces are fire-separated with a non-combustible construction, 2-hour fire resistance rated wall and at least one exterior exit door is required from each of these rooms or spaces.
- 10) Sentence (4) does not apply to a *building* classified as a Group 'F2" (Medium-Hazard Industrial Occupancy) or Group 'F3' (Low-Hazard Industrial Occupancy, provided:
- a) the *building* is unoccupied of persons, of non-combustible construction and does not pose a risk to occupied *Buildings*
 - b) the *building* is occupied of persons, and
 - i) not more than 1 storey in *building* height,
 - ii) not more than 900 m2 in total *building* area for a medium-hazard occupancy building,
 - iii) not more than 1200 m2 in total *building* area for a low-hazard industrial occupancy building
 - iv) of noncombustible construction, and
 - v) not intended for the manufacture or storage of combustible materials and does not contain a mercantile occupancy,
 - c) a single stage fire alarm system is installed in the *building* in accordance with Subsection 3.2.4., and additionally,
 - i) the fire alarm system is provided with an alarm bell on the exterior of the *building*, and
 - ii) the fire alarm system is designed to notify the fire department, in conformance with Sentence 3.2.4.7.(4), that an alarm signal has been initiated, or
 - iii) in a remote area (i.e. mining camp, oil camp, gas camp, etc.) the fire alarm system is designed to notify the onsite fire brigade, that an alarm signal has been initiated, and
 - iv) the owner provides evidence of compliance to the above notification requirements to the authority having jurisdiction,
 - d) the floor area of the *building* is "primarily an open space" with minimal subdivision into smaller rooms or spaces, Definition: primarily open space; is when the percentage of open space is not less than 90% of the floor area.
 - e) the travel distance to an exit does not exceed 25 m,

Building Standards - Advisory #8

Date:

Adequate Water for Firefighting

6 of 6

- f) portable fire extinguishers are installed in accordance with NFPA 10, "Portable Fire Extinguishers,"
 - i) the permitted area for each extinguisher is one half that permitted in the standard,
 - ii) the capacity of each extinguisher is double that required by the standard, or
 - iii) an equivalent combination of Subclauses (f)(i) and (f)(ii) is used, and

- g) the highest point of the *building* is not more than 10 m above grade.

11) The volume of on-site water supply is dependent on the *building* size, construction, occupancy, exposure and environmental impact potential, and should be sufficient to allow at least 30 minutes of fire department hose stream use.

12) For the purposes of calculating adequate water supply requirements for firefighting, the following documents may also be useful:

- a) Insurance Services Office (ISO), "Needed Fire Flow Guide",
- b) NFPA 1142, "Standard on Water Supplies for Suburban and Rural Fire Fighting",
- c) American Water Works Association, "Distribution Requirements for Fire Protection", or
- d) Fire Underwriters Survey, "Water Supply for Public Fire Protection- 1999 Edition"

Below is a list of Standards Referenced in this Advisory #8

- NFPA 10, "Portable Fire Extinguishers,"
- NFPA 14, "Standard for the Installation of Standpipe and Hose Systems"
- NFPA 22, "Water Tanks for Private Fire Protection"
- NFPA 24, "Installation Private Fire Service Mains and their Appurtenances."
- NFPA 80A, "Protection of Buildings from Exterior Fire Exposures"
- NFPA 1142, "Water Supplies for Suburban and Rural Fire Fighting"