FIRE/BUILDING CODE VARIANCE

STANDATA

January 2019

Sprinkler Systems with Antifreeze Solutions

PURPOSE

This variance sets out the conditions to accept the use of antifreeze solution to limit the probability of freezing in sprinkler systems that are located in -20°C or colder climates within the Province of Alberta

DISCUSSION

The Alberta Building Code 2014 (ABC 2014) references NFPA 13D-2010, Installation of Sprinkler systems in One-and Two-Family Dwellings and Manufactured Homes", NFPA 13R-2010, "Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height", and both the ABC 2014 and the Alberta Fire Code 2014 (AFC 2014) reference NFPA 13-2013, "Installation of Sprinkler Systems".

NFPA 13, 13D and 13R prohibit the use of antifreeze solutions unless the antifreeze solution has been listed and the listing indicates the inability for the solution to be ignited. NFPA's acceptable concentration of antifreeze solution would now only allow for freeze protection to approximately -20°C. In Alberta, this -20°C point is not acceptable due to our climatic conditions. To alter the concentrations of the solution in existing systems would very likely cause these systems to fail and/or be damaged in a typical Alberta winter climate.

The AFC 2014 states that all water-based fire protection systems shall be inspected, tested and maintained in conformance with NFPA 25-2011, "Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems".

CODE REFERENCES

NFPA 13-2013 "Installation of Sprinkler Systems" states:

3.4.1 Antifreeze Sprinkler System. A wet pipe system using automatic sprinklers that contains a liquid solution to prevent freezing of the system, intended to discharge the solution upon sprinkler operation, followed immediately by water from a water supply.

3.4.1.1 ***Premixed Antifreeze Solution.*** A mixture of an antifreeze material with water that is prepared and factory-mixed by the manufacturer with a quality control procedure in place that ensures that the antifreeze solution remains homogeneous and that the concentration is as specified.

Unless stated otherwise, all Code references in this STANDATA are to Division B of the Alberta Fire Code 2014.

Issue of this STANDATA is authorized by
the Provincial Fire and Building Administrators

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ABC 2014 Article 3.2.5.12. states:

3.2.5.12. Automatic Sprinkler Systems

1) Except as permitted by Sentences (2), (3) and (4), an automatic sprinkler system shall be designed, constructed, installed and tested in conformance with NFPA 13, "Installation of Sprinkler Systems." (See Appendix A.)

2) Except as provided in Sentences (10) and (11), NFPA 13R, "Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height," is permitted to be used for the design, construction and installation of an automatic sprinkler system installed

a) in a *building* of *residential occupancy* throughout that
   i) is not more than 4 *storeys* in *building height* and conforms to one of Articles 3.2.2.47. to 3.2.2.54., or
   ii) is not more than 3 *storeys* in *building height* and conforms to Article 9.10.1.3., or
b) in a *building* of *care occupancy* with not more than 10 occupants that is not more than 3 *storeys* in *building height* and conforms to one of Articles 3.2.2.42. to 3.2.2.46.

3) Instead of the requirements of Sentence (1), NFPA 13D, "Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes," is permitted to be used for the design, construction and installation of an automatic sprinkler system installed

a) in a *building* of *residential occupancy* throughout that contains not more than 2 *dwelling units*, or
b) in a *building* of *care occupancy*, provided
   i) it contains not more than 2 *suites* of *care occupancy*,
   ii) it has not more than 5 residents throughout, and
   iii) a 30-minute water supply demand can be met.

AFC 2014 Section 6.4 and Appendix states:

Section 6.4. Water-Based Fire Protection Systems

6.4.1. General

6.4.1.1. Inspection, Testing and Maintenance

1) Water-based fire protection systems shall be inspected, tested and maintained in conformance with NFPA 25, "Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems." (See Appendix A.)

A-6.4.1.1.(1) Water-based fire protection systems include sprinkler systems, standpipes, private and municipal hydrants, hose systems, water spray fixed systems, foam-water sprinkler systems, foam-water spray systems, and fire pumps.

APPLICATION

This variance applies to any building that requires the installation of a sprinkler system, as per the ABC 2014, NFPA 13-2013, NFPA 13D-2010 and NFPA 13R-2010.

VARIANCE

This variance provides approximately equivalent or greater safety performance with respect to persons and property as that provided for by the Safety Codes Act.

1. In existing sprinkler systems, contractors and owners are permitted to maintain the freeze protection levels for which the sprinkler systems were already designed. Antifreeze concentrations in the systems must not be reduced unless alternative freeze protection measures are in place. (For examples of Alternative Solutions, see sentence 2

2. New sprinkler systems must be designed to include freeze protection levels for a typical Alberta climate or use alternative measures. Some alternatives may include, but are not limited to:
   - Tenting insulation over the piping such that the system is not subject to freezing conditions,
   - Climate appropriate insulation and/or bulk-heading of sprinkler pipes subject to freezing conditions,
   - Listed electrical heat tracing along sprinkler pipes subject to freezing conditions (Note: heat tracing shall be connected to the fire alarm system for monitoring),
   - The use of dry pipe systems and pre-action systems.

This VARIANCE is applicable throughout the province of Alberta.