Tentative Interim Amendment

NFPA 25

Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems

2011 Edition

Reference: 3.6.4.1.1 Premixed Antifreeze Solution (New), 5.3.4, and A.5.3.4
TIA 11-1
(SC 11-3-6/TIA Log #1014)

Pursuant to Section 5 of the NFPA Regulations Governing Committee Projects, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, 2011 edition. The TIA was processed by the Technical Committee on Inspection, Testing, and Maintenance of Water-Based Systems, and was issued by the Standards Council on March 1, 2011, with an effective date of March 21, 2011.

A Tentative Interim Amendment is tentative because it has not been processed through the entire standards-making procedures. It is interim because it is effective only between editions of the standard. A TIA automatically becomes a proposal of the proponent for the next edition of the standard; as such, it then is subject to all of the procedures of the standards-making process.

1. Add a new definition as 3.6.4.1.1 to read as follows:

3.6.4.1.1 Premixed Antifreeze Solution. A mixture of an antifreeze material with water that is prepared by the manufacturer at a factory with a quality control procedure in place that ensures that the antifreeze solution remains homogeneous.

2. Revise 5.3.4 to read as follows:

5.3.4* Antifreeze Systems. Annually, before the onset of freezing weather, the antifreeze solution shall be tested using the following procedure:

(1) Using installation records, maintenance records, information from the owner, chemical tests, or other reliable sources of information, the type of antifreeze in the system shall be determined.

   a) If the type of antifreeze is found to be a type that is no longer permitted, the system shall be drained completely and replaced with an acceptable solution.
   b) If the type of antifreeze cannot be reliably determined, then the system shall be drained completely and replaced with an acceptable solution.

(2) If the antifreeze is not replaced in accordance with step 1, test samples shall be taken at the top of each system and at the bottom of each system.

   a) If the most remote portion of the system is not near the top or the bottom of the system, an additional sample shall be taken at the most remote portion.
   b) If the connection to the water supply piping is not near the top or the bottom of the system, an additional sample shall be taken at the connection to the water supply.

(3) The specific gravity of each solution shall be checked using a hydrometer with a suitable scale or a refractometer having a scale calibrated for the antifreeze solution.

(4) If any of the samples exhibits a concentration in excess of what is permitted by NFPA 25, the system shall be emptied and refilled with a new acceptable solution. If a concentration greater than what is currently permitted by NFPA 25 was necessary to keep the fluid from freezing, alternate methods of preventing the pipe from freezing shall be employed.

(5) If any of the samples exhibits a concentration lower than what is necessary to keep the fluid from freezing, the system shall be emptied and refilled with a new acceptable solution.

5.3.4.1 The use of antifreeze solutions shall be in conformity with state and local health regulations.

5.3.4.1.1* Listed CPVC sprinkler pipe and fittings shall be protected from freezing with glycerin only. The use of diethylene, ethylene, or propylene glycols shall be specifically prohibited.

5.3.4.2* Antifreeze solutions shall comply with one of the following:

(1) The concentration of a glycerin solution measured in an existing system shall be limited to 50% by volume.

(2) Newly introduced solutions shall be factory premixed antifreeze solutions of glycerin (chemically pure or United States Pharmacopoeia 96.5%) at a maximum concentration of 48% by volume.

(3) The concentration of a propylene glycol solution measured in an existing system shall be limited to 40% by volume.

(4) Newly introduced solutions shall be factory premixed antifreeze solutions of propylene glycol (chemically pure or United States Pharmacopoeia 96.5%) at a maximum concentration of 38% by volume.

(5) Other solutions listed specifically for use in fire protection systems.

5.3.4.3 The antifreeze solution shall be tested at its most remote portion and where it interfaces with the wet pipe system.

5.3.4.4 Where antifreeze systems have a capacity larger than 150 gal (568 L), tests at one additional point for every 100 gal (379 L) shall be made.

5.3.4.4.1 If the results indicate an incorrect freeze point at any point in the system, the system shall be drained and refilled with new premixed antifreeze.

5.3.4.4.2 For premixed solutions, the manufacturer's instructions shall be permitted to be used with regard to the number of test points and refill procedure.

4. Remove Table 5.3.4.1(a) and 5.3.4.1(b) and add Table 5.3.4.1 as follows:

Table 5.3.4.1- Properties of Glycerin and Propylene Glycol

Material	Solution (% by volume)	Specific Gravity at 77ºF (25ºC)	Freezing Point	
			ºF	ºC
Glycerin (C.P. or U.S.P. grade)	0	1.000	32	0
	5	1.014	31	-0.5
	10	1.029	28	-2.2
	15	1.043	25	-3.9
	20	1.059	20	-6.7
	25	1.071	16	-8.9
	30	1.087	10	-12
	35	1.100	4	-15.5
	40	1.114	-2	-19
	45	1.130	-11	-24
	50	1.141	-19	-28

Propylene glycol	0	1.000	32	0
	5	1.004	26	-3
	10	1.008	25	-4
	15	1.012	22	-6
	20	1.016	19	-7
	25	1.020	15	-10
	30	1.024	11	-12
	35	1.028	2	-17
	40	1.032	-6	-21

5. Revise A.5.3.4 to read as follows:

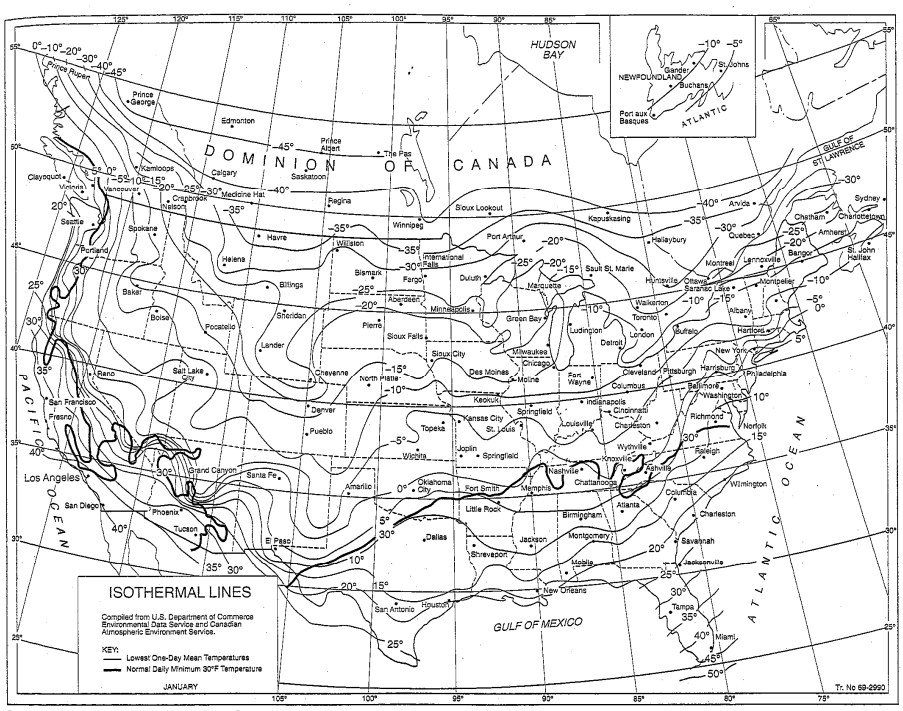
A.5.3.4 Sampling from the top and bottom of the system helps to determine if the solution has settled. Antifreeze solutions are heavier than water. If the antifreeze compound is separating from the water due to poor mixing, it will exhibit a higher concentration in the lower portion of the system than in the upper portion of the system. If the concentration is acceptable near the top, but too low near the water connection, it may mean that the system is becoming diluted near the water supply. If the concentration is either too high or too low in both the samples, it may mean that the wrong concentration was added to the system.

Two or three times during the freezing season, test samples can be drawn from test valve B as shown in Figure 7.6.2.1(1) of NFPA 13, especially if the water portion of the system has been drained for maintenance or repairs. A small hydrometer can be used so that a small sample is sufficient. Where water appears at valve B, or where the sample indicates that the solution has become weakened, the entire system should be emptied and refilled with acceptable solution as previously described.

See Figure A.5.3.4 for expected minimum air temperatures in 48 of the United States and parts of Canada where the lowest one-day mean temperature can be used as one method of determining the minimum reasonable air temperature. In situations where the piping containing the antifreeze solution is protected in some way from exposure to the outside air, higher minimum temperatures can be anticipated.

Where systems are drained in order to be refilled, it is not typically necessary to drain drops. Most systems with drops have insufficient volume to cause a problem, even if slightly higher concentration solutions collect in the drops. For drops in excess of 36 in., consideration should be given to draining drops if there is evidence that unacceptably high concentrations of antifreeze have collected in these long drops.

When emptying and refilling antifreeze solutions, every attempt should be made to recycle the old solution with the antifreeze manufacturer rather than discarding it.



Source: Compiled from United States Weather Bureau records.
For SI units, °C = ⅝ (°F −32); 1 mi = 1.609 km.

Figure A.5.3.4

6. Add a new A.5.3.4.2 to read as follows:

A.5.3.4.2 The use of factory premixed solutions is required because solutions that are not mixed properly have a possibility of separating from the water, allowing the pure concentrate (which is heavier than water) to drop out of solution and collect in drops or low points of the system. Such concentrations are combustible and could present problems during fires. The properties of glycerin are shown in Table A.5.3.4.2.

Table A.5.3.4.2 Properties of Glycerin and Propylene Glycol

Material	Solution (% by volume)	Specific Gravity at 60ºF (15.6ºC)	Freezing Point	
			ºF	ºC
Glycerin (C.P. or U.S.P. grade)	50 water	1.145	-20.9	-29.4
Hydrometer scale 1.000 to 1.200				
Propylene glycol	60 water	1.034	-6	-21.1
Hydrometer scale 1.000 to 1.200 (subdivisions 0.002)				

C.P.: chemically pure; U.S.P.: United States Pharmacopoeia 96.5%.

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(Note: For further information on NFPA Codes and Standards, please see www.nfpa.org/codelist**)**