Second Revision No. 24-NFPA 25-2021 [Global Comment]

Change “qualified persons” and “a qualified person” to “qualified personnel” throughout the document.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 16:38:47 EDT 2021

Committee Statement

Committee Statement: Personnel can be both singular and plural. It better aligns with how the term is used throughout the standard.

Response Message: SR-24-NFPA 25-2021

Public Comment No. 129-NFPA 25-2021 [Section No. 4.1.1.3]

Public Comment No. 132-NFPA 25-2021 [Section No. 8.3.2.10.4]

Public Comment No. 134-NFPA 25-2021 [Section No. 13.7.3]

Public Comment No. 130-NFPA 25-2021 [Section No. 4.1.5.2]

Public Comment No. 131-NFPA 25-2021 [Section No. 4.6.6.14]

Public Comment No. 133-NFPA 25-2021 [Section No. 8.3.7.1.2]

Second Revision No. 70-NFPA 25-2021 [Global Comment]

Change “recognized” to “approved” in reference to testing laboratories throughout the document.

Submitter Information Verification

Committee: INM-AAA
Submittal Date: Fri Sep 10 11:37:14 EDT 2021

Committee Statement

Committee Statement: Approved is the appropriate defined term in NFPA standards.
Response Message: SR-70-NFPA 25-2021

Second Revision No. 87-NFPA 25-2021 [Global Comment]

Annex H Hazards of Legacy Antifreeze Solutions

H.1

Subsequent to the research conducted in the 2010–2012 time frame, UL conducted additional research on the legacy glycerine and propylene glycol antifreeze solutions to assist in the development of requirements included in UL 2901, *Antifreeze Solutions for Use in Fire Sprinkler Systems*. This research is described in the UL LLC report entitled *Comparative Fire Performance Tests Using Water and Antifreeze Solutions Discharged from Standard Spray Sprinklers*, dated September 16, 2020. This report includes test data and information on the 30 percent propylene glycol and 38 percent glycerine antifreeze solutions, as well as additional test data on the 50 percent glycerine solution. This report includes test data related to the following:

(1) Fire exposure tests to investigate the potential for ignition of the 30 percent propylene glycol and 38 percent glycerine antifreeze solutions

(2) Firefighting effectiveness of 30 percent propylene glycol and 38 percent glycerine antifreeze solutions discharged onto light and ordinary hazard type fires as compared to water

(3) Firefighting effectiveness of a 50 percent glycerine antifreeze solution discharged onto a light hazard type fire as compared to water

A summary of the tests results for these solutions as compared to the requirements for listing are described in Tables 3 through 8 of the UL test report.

H.2

The following is a list of research reports that have been issued by the Fire Protection Research Foundation (FPRF) related to the use of propylene glycol and glycerine antifreeze solutions in sprinkler systems:

(1) "Antifreeze Systems in Home Fire Sprinkler Systems — Literature Review and Research Plan"

(2) "Antifreeze Systems in Home Fire Sprinkler Systems — Phase II Final Report"

(3) "Antifreeze Solutions Supplied through Spray Sprinklers — Interim Report"

See Table H.2 for a summary of testing by the FPRF

Table H.2 FPRF Testing Summary

Topic	Information

Topic	Information
Scope of sprinklers tested	The following sprinklers were used during the residential sprinkler research program described in "Antifreeze Systems in Home Fire Sprinkler Systems — Phase II Final Report": (1) Residential pendent style having nominal K-factors of 3.1, 4.9, and 7.4 gpm/psi$^{1/2}$ (2) Residential concealed pendent style having a nominal K-factor of 4.9 gpm/psi$^{1/2}$ (3) Residential sidewall style having nominal K-factors of 4.2 and 5.5 gpm/psi$^{1/2}$ The following sprinklers were used during the spray sprinkler research program described in "Antifreeze Solutions Supplied through Spray Sprinklers — Interim Report": (1) Residential pendent style having a nominal K-factor of 3.1 gpm/psi$^{1/2}$ (2) Standard spray pendent style having nominal K-factors of 2.8, 4.2, 5.6, and 8.0 gpm/psi$^{1/2}$ (3) Standard spray concealed pendent style having a nominal K-factor of 5.6 gpm/psi$^{1/2}$ (4) Standard spray upright style having a nominal K-factor of 5.6 gpm/psi$^{1/2}$ (5) Standard spray extended coverage pendent style having a nominal K-factor of 5.6 gpm/psi$^{1/2}$
Antifreeze solution concentration	Less than 50 percent glycerine and 40 percent propylene glycol antifreeze solutions : Solutions were not tested. 50 percent glycerine and 40 percent propylene glycol antifreeze solutions: Large-scale ignition of the sprinkler spray did not occur in tests with sprinkler discharge onto a fire having a nominal HRR of 1.4 MW. Large-scale ignition of the sprinkler spray occurred in multiple tests with sprinkler discharge onto a fire having a nominal HRR of 3.0 MW. 55 percent glycerine and 45 percent propylene glycol antifreeze solutions: Large-scale ignition of the sprinkler spray occurred in tests with sprinkler discharge onto a fire having a nominal HRR of 1.4 MW.

Topic	Information
	Greater than 55 percent glycerine and greater than 45 percent propylene glycol antifreeze solutions: Large-scale ignition of the sprinkler spray occurred in tests with sprinkler discharge onto a fire having an HRR of less than 500 kW. 70 percent glycerine and 60 percent propylene glycol antifreeze solutions — maximum antifreeze solution concentrations tested.
Sprinkler inlet pressure	Large-scale ignition of the sprinkler discharge spray was not observed when the sprinkler inlet pressure was 50 psi or less for tests using 50 percent glycerine or 40 percent propylene glycol.
Ceiling height	When discharging 50 percent glycerine and 40 percent propylene glycol antifreeze solutions onto fires having an HRR of 1.4 MW, no large-scale ignition of the sprinkler spray was observed with ceiling heights up to 20 ft. When discharging 50 percent glycerine and 40 percent propylene glycol antifreeze solutions onto fires having an HRR of 3.0 MW, large-scale ignition of the sprinkler spray was observed at a ceiling height of 20 ft.
Fire control	The test results described in "Antifreeze Systems in Home Fire Sprinkler Systems — Phase II Final Report" and "Antifreeze Solutions Supplied through Spray Sprinklers — Interim Report" indicated that discharging glycerine and propylene glycol antifreeze solutions onto a fire can temporarily increase the fire size until water is discharged. As a part of the residential sprinkler research described in "Antifreeze Systems in Home Fire Sprinkler Systems — Phase II Final Report," tests were conducted to evaluate the effectiveness of residential sprinklers to control fires involving furniture and simulated furniture. The results of these tests indicated that 50 percent glycerine and 40 percent propylene glycol antifreeze solutions demonstrated the ability to control the furniture-type fires in a manner similar to water. For standard spray–type sprinklers, no tests were conducted to investigate the ability of these sprinklers to control the types and sizes of fires that these sprinklers are intended to protect.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Tue Sep 28 12:44:19 EDT 2021

Committee Statement

Committee Statement:	Annex H provides guidance related to legacy antifreeze and the hazards associated with it.
Response Message:	SR-87-NFPA 25-2021

Second Revision No. 2-NFPA 25-2021 [Detail]

NEW 5.2.1.1.1

5.2.1.1.1

A representative sample of concealed sprinklers consisting of not less than four concealed sprinklers or 1 percent of the number of concealed sprinklers per individual sprinkler sample area, whichever is greater, shall have their cover plates removed and the sprinklers inspected every 5 years.

5.2.1.1.1.1

Where one sprinkler within a representative sample fails to meet the inspection requirements of 5.2.1.1.2, the owner and the AHJ shall be consulted to determine a reinspection plan for the remaining sprinklers within the sample area.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 11:27:15 EDT 2021

Committee Statement

Committee Statement: Inspecting sprinklers behind cover plates periodically will help ensure that sprinklers will operate as intended and to help prevent premature discharge of sprinklers due to the conditions described. The five-year frequency is intended to coincide with other five-year requirements when ladders and lift equipment will be needed. Existing sections 5.2.1.1.1 and following are to be renumbered.

Response Message: SR-2-NFPA 25-2021

Public Comment No. 154-NFPA 25-2021 [New Section after 5.2.1]

Second Revision No. 6-NFPA 25-2021 [Detail]

5.3.1.1*

Where required by ~~this~~ ~~section~~Section 5.3, sample sprinklers shall be submitted to an~~recognized~~approved testing laboratory ~~acceptable to the authority having jurisdiction~~ for field service testing.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 12:40:18 EDT 2021

Committee Statement

Committee Statement: Referencing an approved lab reinforces this requirement for field testing of sprinklers. Approved is a defined term whereas the term “recognized” is not.

Response Message: SR-6-NFPA 25-2021

Public Comment No. 51-NFPA 25-2021 [Section No. 5.3.1.1 [Excluding any Sub-Sections]]

Second Revision No. 7-NFPA 25-2021 [Detail]

A.5.3.1.1

ISO/IEC 17025, *General Requirements for the Competence of Testing and Calibration Laboratories*, is an example of a standard that provides general requirements for the competence of testing and calibration laboratories.

Sprinklers should be first given a visual inspection in accordance with 5.2.1.1.2 to determine if replacement is required. Sprinklers that have passed the visual inspection should then be laboratory tested for sensitivity and functionality. The waterway should clear when sensitivity and functionality is tested at 7 psi (0.5 bar) or the minimum listed operating pressure for dry sprinklers.

The thermal sensitivity should be such that the RTI does not exceed 350 (meters-seconds)$^{1/2}$ for standard-response sprinklers, 65 (meters-seconds)$^{1/2}$ for quick-response and residential sprinklers, and 50 (meters-seconds)$^{1/2}$ for ESFR sprinklers.

Sprinklers that have been installed for years should not be expected to have the performance qualities of a new sprinkler. However, if there is any question about their continued satisfactory performance, the sprinklers should be replaced.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 12:44:49 EDT 2021

Committee Statement

Committee Statement: It's important that guidance be provided to ensure uniform testing procedures. This reference is better placed in the annex as there may be other accreditations that would be acceptable.

Response Message: SR-7-NFPA 25-2021

Public Comment No. 8-NFPA 25-2021 [Section No. 5.3.1.1 [Excluding any Sub-Sections]]

Second Revision No. 76-NFPA 25-2021 [Detail]

14.3.1(14) Leakage caused by internal corrosion

Delete 14.3.1(16)

Supplemental Information

File Name	Description	Approved
PC_19_14_3_1_Final_1_.docx	For staff use	

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Fri Sep 10 12:20:46 EDT 2021

Committee Statement

Committee Statement: Wording clarifies that external corrosion would not necessitate an internal investigation. Normal deterioration from aging at couplings or fittings at the end of pipe may not be sufficient to trigger an obstruction investigation.

Response Message: SR-76-NFPA 25-2021

Public Comment No. 19-NFPA 25-2021 [Section No. 14.3.1]

Second Revision No. 77-NFPA 25-2021 [Detail]

14.3.1

(16) *Failure to maintain a nitrogen supply, except in instances of preplanned impairments, installed in accordance with NFPA 13 when a Hazen-Williams *C* value of 120 is used for dry and preaction systems.

A.14.3.1(16)

Where nitrogen is used to allow for an increased *C* value in accordance with NFPA 13, the nitrogen supply should be from a listed nitrogen generator permanently installed, should be capable of supplying and maintaining at least 98 percent nitrogen concentration throughout the system at a minimum leakage rate of 1.5 psi (0.1 bar) per hour, should be provided with a means of verifying nitrogen concentration provided for each system where an increased *C* value is used, should be installed per the manufacturer's instruction, and should be maintained in accordance with this standard.

Nitrogen systems are equipped with an air compressor capable of restoring system air pressure within 30 or 60 minutes. It is not the intent of this section

Supplemental Information

File Name	Description	Approved
SR_77_14_3_1_16_.docx	SR 77 14_3_1 (16) For Staff Use	

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Fri Sep 10 13:25:55 EDT 2021

Committee Statement

Committee Statement: The internal condition of the piping in a dry or preaction system when a C-factor of 120 is used for the hydraulic calculations is dependent on the nitrogen supply being installed and in-service at all times. If the nitrogen supply is removed or is out of service, the build up of corrosive materials in the piping will be accelerated resulting in potential blockages in the system. These potential blockages necessitate an obstruction investigation.

This provision does not account for the purging period that may be required to meet 98 percent concentration of nitrogen.

Response Message: SR-77-NFPA 25-2021

Second Revision No. 82-NFPA 25-2021 [Detail]

A.5.3.1.2

Within an environment, similar sidewall, upright, and pendent sprinklers produced by the same manufacturer can be considered part of the same sample, but additional sprinklers would be included within the sample area if produced by a different manufacturer.

The sample ~~area~~set can represent any group of sprinklers that is practical, keeping in mind that if one sprinkler from the sample ~~area~~set fails, then all sprinklers ~~in the sample area~~represented by that sample set are to be replaced. The owner or their designated representative should determine the sprinklers to be represented in each sample ~~area~~set in consultation with the contractor performing the work.

The following is an example of ~~sample~~groups of sprinklers chosen for testing that make up one or more sample sets.

A warehouse has five overhead systems with 300 sprinklers per system, and an office area with 200 sprinklers. The warehouse sprinklers are all subject to the same ambient environment, and all of the office area sprinklers are subjected to the same ambient environment.

Sprinkler Sample ~~Area~~Sets— Option #1: All warehouse sprinklers ~~as~~represent one sample ~~area~~set (1 percent of 1500 = 15 sprinklers).

All office sprinklers ~~as~~are a separate sample ~~area~~set (1 percent of 200 = 2, but a minimum of 4 sprinklers must be tested).

Total of 19 sprinklers tested.

SprinklerSample ~~Area~~ Sets — Option #2: Each warehouse system is a separate sample ~~area~~set (1 percent of 300 = 3, but a minimum of 4 sprinklers must be tested; 4 × 5 = 20 sprinklers).

All office sprinklers ~~as~~are one sample set (1 percent of 200 = 2, but a minimum of 4 sprinklers must be tested).

Total of 24 sprinklers tested.

As shown, the number of sprinklers to be tested would be different depending on the ~~sample area~~sprinklers chosen to be represented by each sample set.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Mon Sep 13 11:07:32 EDT 2021

Committee Statement

Committee Statement: Revised text helps clarify that a sample set of sprinklers for testing and can be selected to best represent the conditions of sprinklers in an entire system, or in a select group of sprinklers.

Response Message: SR-82-NFPA 25-2021

Public Comment No. 151-NFPA 25-2021 [Section No. A.5.3.1.2]

Second Revision No. 19-NFPA 25-2021 [Section No. 1.1.3.1]

1.1.3.1*

This standard does not require the inspector to verify the adequacy of the design or installation of the system.

A.1.1.3.1

The requirement to evaluate the adequacy or accuracy of the design or installation of the system or the capability of the fire protection system to protect the building or its contents is not a part of the periodic inspection, testing, and maintenance requirements of this standard. Examples of items not covered by this standard include the evaluation of unsprinklered areas and the spacing of sprinklers. However, such evaluation is the responsibility of the property owner or designated representative as indicated in ~~4.1.6~~ 4.1.7 and ~~4.1.7~~ 4.1.8 ~~using the~~ . An example of a hazard evaluation form can be found in Annex E.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 15:41:53 EDT 2021

Committee Statement

Committee Statement: The reference to accuracy was deleted in that it is ambiguous and information is not provided for comparative basis. Also, it was noted that Chapter 5 does include an inspection for orientation which is an evaluation as to whether the installation was accurate.

The Committee did not agree with the deletion of the reference to Annex E but did revise the language to refer to Annex E as an example.

Response Message: SR-19-NFPA 25-2021

Public Comment No. 144-NFPA 25-2021 [Section No. 1.1.3.1]

Public Comment No. 102-NFPA 25-2021 [Section No. A.1.1.3.1]

Second Revision No. 85-NFPA 25-2021 [Chapter 2]

Chapter 2 Referenced Publications

2.1 General.

The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 11, *Standard for Low-, Medium-, and High-Expansion Foam,* 2021 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems,* 2022 edition.

NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes,* 2022 edition.

NFPA 13R, *Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies,* 2022 edition.

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems,* 2019 edition.

NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection,* 2022 edition.

~~NFPA 16, *Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems,* 2019 edition.~~

NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection,* 2022 edition.

NFPA 22, *Standard for Water Tanks for Private Fire Protection,* 2018 edition.

NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances,* 2022 edition.

NFPA *70E*®, *Standard for Electrical Safety in the Workplace*®, 2021 edition.

NFPA 72®, *National Fire Alarm and Signaling Code*®, 2022 edition.

NFPA *101*®, *Life Safety Code*®, 2021 edition.

NFPA 110, *Standard for Emergency and Standby Power Systems,* 2022 edition.

NFPA 307, *Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves,* 2021 edition.

NFPA 750, *Standard on Water Mist Fire Protection Systems,* ~~2019~~ 2023 edition.

NFPA 1142, *Standard on Water Supplies for Suburban and Rural ~~Fire Fighting~~ Firefighting ,* 2022 edition.

NFPA 1901, *Standard for Automotive Fire Apparatus,* 2016 edition.

NFPA 1962, *Standard for the Care, Use, Inspection, Service Testing, and Replacement of Fire Hose, Couplings, Nozzles, and Fire Hose Appliances,* 2018 edition.

2.3 Other Publications.

2.3.1 ASTM Publications.

ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM D975, *Standard Specification for Diesel Fuel*, 2020c.

ASTM D3359, *Standard Test Methods for Rating Adhesion by Tape Test*, 2017.

ASTM D6751, *Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels*, 2020a.

2.3.2 CGA Publications.

Compressed Gas Association, 14501 George Carter Way, Suite 103, Chantilly, VA 20151.

CGA C-6, *Standard for Visual Inspection of Steel Compressed Gas Cylinders,* 2019.

2.3.3 HI Publications.

Hydraulic Institute, 300 Interpace Parkway, Building A, 3rd floor, Parsippany, NJ 07054.

HI 3.6, *Rotary Pump Tests*, 2016.

2.3.4 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

2.4 References for Extracts in Mandatory Sections.

NFPA 11, *Standard for Low-, Medium-, and High-Expansion Foam,* ~~2016~~ 2021 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems,* 2022 edition.

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems,* 2019 edition.

NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection,* 2022 edition.

~~NFPA 16, *Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems,* 2019 edition.~~

NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection,* 2022 edition.

NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances,* 2022 edition.

~~NFPA 96, *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations,* 2021 edition.~~

NFPA 110, *Standard for Emergency and Standby Power Systems,* 2022 edition.

NFPA 750, *Standard on Water Mist Fire Protection Systems,* 2019 edition.

NFPA 820, *Standard for Fire Protection in Wastewater Treatment and Collection Facilities,* 2020 edition.

NFPA 1141, *Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas,* 2017 edition.

NFPA 1142, *Standard on Water Supplies for Suburban and Rural ~~Fire Fighting~~ Firefighting ,* 2022 edition.

NFPA 1911, *Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles,* 2017 edition.

Supplemental Information

File Name	Description	Approved
25-2020_Chapter_2.docx	For staff use	

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 16 11:14:47 EDT 2021

Committee Statement

Committee Statement: Updated references to reflect proposed changes.

Response Message: SR-85-NFPA 25-2021

Second Revision No. 21-NFPA 25-2021 [Section No. 3.3.15]

~~**3.3.15***~~ ~~Floor Level.~~

~~The surface in a building or structure that is constructed to be walked on under normal conditions without the use of any special safety devices or measures.~~

~~**A.3.3.15**~~ ~~Floor Level.~~

~~A normal walking surface, such as a mezzanine, should be used to get as close as is practical to the components being inspected without the use of special safety gear or apparatus, such as a safety harness. This definition is not intended to apply to flooring put down in an unoccupied attic. It is also not intended to apply to ladders, scaffolding, or lift equipment when inspecting sprinklers, water mist nozzles, pipe, tubing, fittings, hangers, braces, and supports.~~

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 16:08:50 EDT 2021

Committee Statement

Committee Statement: A definition for floor level is not required. The definition of floor level was too restrictive because some safety gear may be necessary depending on the type and location of the walking surface.

Response Message: SR-21-NFPA 25-2021

Public Comment No. 95-NFPA 25-2021 [Section No. A.3.3.15]

Public Comment No. 94-NFPA 25-2021 [Section No. 3.3.15]

Second Revision No. 22-NFPA 25-2021 [Section No. 3.3.27]

Global SR-24

3.3.26* Inspection, Testing, and Maintenance Service.

A service provided by ~~a~~ qualified ~~person(s)~~personnel through which ~~all components unique to a property's systems~~specific system components are inspected and tested at required ~~times~~frequencies and are maintained as necessary.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 16:15:58 EDT 2021

Committee Statement

Committee Statement: Revised "times" to "frequencies" since that is the term used in the standard. Components are subject to an inspection or test as required by this Standard and it may not require all components. Editorial clarifications to existing text. Revise title to annex text as well.

Response Message: SR-22-NFPA 25-2021

Public Comment No. 92-NFPA 25-2021 [Section No. 3.3.27]

Second Revision No. 23-NFPA 25-2021 [Section No. 3.3.34]

~~**3.3.34** Pressure Proportioning Head.~~

~~An assembly of components that forms an integral part of a pressure proportioning tank and creates a differential pressure in the water line, causing foam concentrate to be metered by an orifice into the water stream.~~

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 16:26:10 EDT 2021

Committee Statement

Committee Statement: The term is not used in the body of the standard.

Response Message: SR-23-NFPA 25-2021

Public Comment No. 69-NFPA 25-2021 [Section No. 3.3.34]

Second Revision No. 25-NFPA 25-2021 [Section No. 3.3.37]

3.3.35* Qualified ~~Person~~ Personnel .

~~A competent~~ Competent and capable ~~person who has~~ individual(s) having met the requirements and training for a given field acceptable to the AHJ.

A.3.3.35 Qualified ~~Person~~ Personnel .

See 4.1.1.3.1 for more information on ~~a~~ qualified ~~person~~ personnel .

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 16:43:40 EDT 2021

Committee Statement

Committee Statement: The Standard refers to an individual (person) and the definition should then be "qualified personnel."

Response Message: SR-25-NFPA 25-2021

Public Comment No. 127-NFPA 25-2021 [Section No. 3.3.37]

Second Revision No. 26-NFPA 25-2021 [Section No. 3.3.43]

~~**3.3.43** Rupture Disk.~~

~~A device used in a subsurface foam injection line to prevent backflow of hydrocarbon liquids to pressure foam makers (i.e., high back pressure or forcing type) and designed to burst when foam pressure builds at the foam maker discharge.~~

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 17:04:16 EDT 2021

Committee Statement

Committee Statement: The term is not used in the body of the standard.

Response Message: SR-26-NFPA 25-2021

Public Comment No. 73-NFPA 25-2021 [Section No. 3.3.43]

Second Revision No. 27-NFPA 25-2021 [Section No. 3.3.50]

3.3.47* Testing.

A procedure used to determine the operational status of a component or system by conducting periodic physical ~~checks~~ tasks .

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 17:18:05 EDT 2021

Committee Statement

Committee Statement: Committee did not want to use “test” in the definition of “testing.”

Response Message: SR-27-NFPA 25-2021

Public Comment No. 14-NFPA 25-2021 [Section No. 3.3.50]

Second Revision No. 29-NFPA 25-2021 [Section No. 3.3.58]

~~**3.3.58** Wide-Range or Variable-Range Proportioner.~~

~~A foam proportioner for use in closed head foam-water sprinkler systems where an accurate foam injection rate (i.e., percent concentration) must be held over a wide range of anticipated flow rates.~~

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 17:19:43 EDT 2021

Committee Statement

Committee Statement: The term is not used in the body of the standard.

Response Message: SR-29-NFPA 25-2021

Public Comment No. 75-NFPA 25-2021 [Section No. 3.3.58]

Second Revision No. 46-NFPA 25-2021 [Section No. 3.5.9]

3.5.9* Water Control Valve.

A valve that activates to allow water flow to a water-based fire protection system. [**13,** 2022]

A.3.5.9 Water Control Valve.

Dry valves, preaction valves, and deluge valves are examples of water control valves.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 13:30:37 EDT 2021

Committee Statement

Committee Statement: Clarification provided to differentiate between a control valve and a water control valve.

Response Message: SR-46-NFPA 25-2021

Public Comment No. 76-NFPA 25-2021 [Global Input]

Public Comment No. 93-NFPA 25-2021 [New Section after 3.5.9]

Second Revision No. 49-NFPA 25-2021 [Section No. 4.1.1.3.1]

4.1.1.3.1*

~~A qualified~~ Qualified ~~person(s)~~ personnel shall meet at least one of the following qualifications:

(1) Meets the requirements and training for a given field acceptable to the authority having jurisdiction

(2) Is certified by a nationally recognized fire protection certification organization acceptable to the authority having jurisdiction

(3) Is registered, licensed, or certified by a state or local authority to perform inspection, testing, and maintenance of water-based fire protection systems

A.4.1.1.3.1

Many required ITM frequencies, such as daily, weekly, and monthly inspections to verify proper valve position or required air and water pressure maintenance, can be performed by building maintenance personnel, while other required functions should be performed by personnel with specialized knowledge and training. Examples of ITMs that would typically require more qualified personnel include but are not limited to conducting and evaluating annual fire pump tests, trip testing valves, and foam systems tests. Many locations might not have municipal AHJ interaction/oversight (or contact with insurance company risk consultants acting as AHJs, etc.). In these cases, ITM tasks that could adversely affect system performance should be completed by qualified personnel with specialized knowledge and training that is acceptable to the AHJ. This could include personnel that are registered, licensed, or certified by a nationally recognized fire protection certification organization, state, or local authority. Such qualified personnel typically have the competency to not only complete the ITM task but also understand the intended system performance criteria and potential impact of the work being completed.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 13:56:13 EDT 2021

Committee Statement

Committee Statement: The Annex note clarifies that a different level of qualification is appropriate for the different tasks required by the standard

Response Message: SR-49-NFPA 25-2021

Public Comment No. 71-NFPA 25-2021 [Section No. 4.1.1.3.1]

Second Revision No. 4-NFPA 25-2021 [New Section after 4.1.2.5.2]

4.1.3* Nonmetallic Sprinkler Piping.

Nonmetallic sprinkler piping shall not be subjected to incompatible components or materials in contact with the pipe.

A.4.1.3

CPVC is a plastic material, and consideration is necessary when other materials or chemicals come in contact with CPVC that can cause degradation of performance of the pipe due to interaction of materials. Other construction materials include but are not limited to materials used in fabrication of the sprinkler system, additives to water supplies, cable and wiring, and certain insecticides and fungicides. Compliance with the requirements of NFPA 13 combined with following the manufacturer's guidance on installation and compatible materials will help prevent premature performance degradation of nonmetallic piping.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 12:24:29 EDT 2021

Committee Statement

Committee Statement: The subsection is addressing the owners responsibility for non-metallic pipe and incompatibility to address other building features that may be in contact with the pipe, intentionally or unintentionally.

Response Message: SR-4-NFPA 25-2021

Second Revision No. 51-NFPA 25-2021 [New Section after 4.1.5.2]

4.1.5.3*

Where a nitrogen supply is used as part of the dry pipe or preaction system design in accordance with NFPA 13 , it shall be maintained, repaired, or replaced with a nitrogen supply capable of maintaining design concentrations.

A.4.1.5.3

NFPA 13 permits systems designed with nitrogen to benefit from a higher *C* value.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 15:14:27 EDT 2021

Committee Statement

Committee Statement: Where used, a nitrogen system needs to be maintained. The Annex note indicates why it is important to maintain the nitrogen supply.

Response Message: SR-51-NFPA 25-2021

Public Comment No. 140-NFPA 25-2021 [New Section after 4.1.5.2]

Second Revision No. 52-NFPA 25-2021 [Section No. 4.1.9.1]

4.1.10.1

A permanently marked metal or rigid plastic information sign shall be placed at each system ~~control~~ riser.

Submitter Information Verification

Committee: INM-AAA
Submittal Date: Thu Sep 09 15:26:24 EDT 2021

Committee Statement

Committee Statement: Removing the term "control" for clarification.
Response Message: SR-52-NFPA 25-2021

Public Comment No. 15-NFPA 25-2021 [Section No. 4.1.9.1]

Public Comment No. 106-NFPA 25-2021 [Section No. 4.1.9.1]

Second Revision No. 53-NFPA 25-2021 [Section No. 4.1.10]

4.1.11* Antifreeze Information Sign.

An antifreeze information sign shall be placed on the antifreeze system ~~main~~ control valve indicating the manufacture type and brand of the antifreeze solution, the concentration by volume of the antifreeze solution used, and the volume of the antifreeze solution used in the system.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 15:31:43 EDT 2021

Committee Statement

Committee Statement: Control valve is the defined term in the standard.

Response Message: SR-53-NFPA 25-2021

Public Comment No. 107-NFPA 25-2021 [Section No. 4.1.10]

Second Revision No. 54-NFPA 25-2021 [Section No. 4.3.5]

4.3.5

Inspection, ~~test~~ testing , and maintenance records shall be retained for a minimum period of 1 year after the next inspection, test, or maintenance of that type required by the standard.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 16:00:31 EDT 2021

Committee Statement

Committee Statement: Editorial correction to align with the title of the standard.

The word “minimum” was added, because it can always be beneficial to have more than one previous report on file. Having a series of main drain tests or pump flow tests can be very useful to recognize trends or cycles.

Response Message: SR-54-NFPA 25-2021

Public Comment No. 101-NFPA 25-2021 [Section No. 4.3.5]

Second Revision No. 79-NFPA 25-2021 [Section No. 4.6.6.14]

Global SR-24

4.6.6.14

~~Automated~~The results of automated inspections and testing shall be ~~observed and results~~ analyzed by ~~a~~ qualified ~~person(s)~~personnel.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Fri Sep 10 14:27:43 EDT 2021

Committee Statement

Committee Statement: The inspection or test is not observed, it is the results that are analyzed.

Response Message: SR-79-NFPA 25-2021

Public Comment No. 25-NFPA 25-2021 [Section No. 4.6.6.14]

Second Revision No. 55-NFPA 25-2021 [Section No. 4.9.7]

4.9.7 Accessibility.

4.9.7.1

Inspection of equipment installed in areas that are inaccessible for safety considerations due to process operations shall be inspected during each scheduled shutdown.

4.9.7.2

Where approved by the authority having jurisdiction, testing of equipment installed in areas that are inaccessible for safety considerations due to process operations shall be ~~inspected~~ conducted during each scheduled shutdown.

4.9.7.3*

Where a risk assessment demonstrates that a temporary condition will result in personnel safety being compromised, inspection and testing activities shall be delayed when approved by the authority having jurisdiction.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 16:25:25 EDT 2021

Committee Statement

Committee Statement: Current language is appropriate. Maintenance can be addressed by the Fire Code. If needed, this might be better addressed as an Annex note.

Editorial correction to change “inspected” to “conducted” for clarity.

Response Message: SR-55-NFPA 25-2021

Public Comment No. 108-NFPA 25-2021 [Section No. 4.9.7]

Public Comment No. 123-NFPA 25-2021 [Section No. 4.9.7.2]

Second Revision No. 13-NFPA 25-2021 [Section No. 5.1.1.2]

5.1.1.2

Table 5.1.1.2 shall be used to determine the minimum required frequencies for inspection, testing, and maintenance.

Table 5.1.1.2 Summary of Sprinkler System Inspection, Testing, and Maintenance

Item	Frequency	Reference
Inspection		
Assessment of the internal piping condition	—	Chapter 14
Automatic air vents	Annually	Chapter 13
Control valves	—	Chapter 13
Electrically operated sprinklers	Annually	5.2.1.5
Fire department connections	—	Chapter 13
Gauges (wet and deluge systems)	—	Chapter 13
Gauges (dry and preaction systems)	—	Chapter 13
Hangers/braces/supports	Annually	5.2.3
Heat tracing	~~Per manufacturer's requirements~~ —	5.2.6
Hydraulic design information sign	Annually	5.2.5
Information signs	Annually	5.2.7, 5.2.8, and 5.2.9
Pipe and fittings	Annually	5.2.2
Sprinklers	Annually	5.2.1
Sprinklers (concealed)	Every 5 years	5.2.1.1.1
Sprinklers clearance to storage	Annually	5.2.1.2
Sprinklers (spare)	Annually	5.2.1.4
Sprinkler guards	Annually	~~5.2.1.1.7.1~~ 5.2.1.1.8
Supervisory signal devices (except valve supervisory switches)	—	5.2.4 and Chapter 13
System valves	—	Chapter 13
Valve supervisory signal devices	—	5.2.4 and Chapter 13
Waterflow alarm devices	~~Quarterly~~ —	5.2.4 and Chapter 13
Test		
Antifreeze solution	Annually	5.3.4
Control valves	—	Chapter 13
Electrically operated sprinklers	—	5.3.2
Gauges	—	Chapter 13
Main drain	—	Chapter 13
Sprinklers (all)	At 50 years and every 10 years thereafter	5.3.1~~.1.1, 5.3.1.1.1.1, and 5.3.1.1.1.2~~
Sprinklers (all)	At 75 years and every 5 years thereafter	5.3.1~~.1.1.5~~
Sprinklers (dry)	At ~~15~~ 20 years and every 10 years thereafter	5.3.1~~.1.1.6~~
Sprinklers (extra-high or greater temperature solder type)	Every 5 years	5.3.1~~.1.1.4~~

Item	Frequency	Reference
Sprinklers (fast-response, except ESFR and CMSA)	At ~~20~~ 25 years and every 10 years thereafter	5.3.1.~~1.1.3~~
Sprinklers (ESFR and CMSA with fast-response elements)	At 20 years and every 10 years thereafter	5.3.1
Sprinklers (harsh environments)	Every 5 years	5.3.1.~~1.2~~
Supervisory signal devices (except valve supervisory switches)	—	Chapter 13
System valves	—	Chapter 13
Valve supervisory signal devices	—	Chapter 13
Waterflow alarm devices ~~(mechanical)~~	~~Quarterly~~ —	5.3.3.~~1~~ and Chapter 13
~~Waterflow alarm devices (vane and pressure switch type)~~	~~Semiannually~~	~~5.3.3.2~~
Maintenance		
Low-point drains (dry pipe and preaction systems)	—	Chapter 13
Sprinklers and automatic spray nozzles protecting commercial cooking equipment and ventilation systems	Annually	~~5.4.1.7~~ 5.4.1.8
Replacement of sprinklers manufactured prior to 1920	—	5.4.1.1
Replacement of sprinklers showing signs in 5.2.1.1.2	—	5.4.1.1
Replacement of sprinklers with unsatisfactory performance	—	5.4.1.1
Replacement of sprinklers affected by a fire	—	5.4.1.1
Replacement of threaded sprinklers removed from fitting for any reason (except dry type)	— ~~Removed for any reason~~	~~5.4.1.1~~ 5.4.1.2
Replacement of damaged sprinkler guards	— ~~Damaged~~	~~5.2.1.1.7.2~~ 5.2.1.1.8.2
Valves (all types)	—	Chapter 13
Investigation		
Obstruction	—	Chapter 14

Supplemental Information

File Name	Description	Approved
PC_78_Table_5_1_1_2_Final.docx	PC 78 Table_5_1_1_2 Final. For staff use	

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 15:04:19 EDT 2021

Committee Statement

Committee Statement: Changes were made to the table to incorporate first and second revisions.

Response Message: SR-13-NFPA 25-2021

Public Comment No. 78-NFPA 25-2021 [Section No. 5.1.1.2]

Public Comment No. 150-NFPA 25-2021 [Section No. 5.1.1.2]

Second Revision No. 1-NFPA 25-2021 [Sections 5.2.1.2.2, 5.2.1.2.3]

5.2.1.2.2*

Clearance between the deflector and the top of storage shall be 36 in. (914 mm) or greater for ESFR and CMSA sprinklers.

A.5.2.1.2.2

CMSA sprinklers also include large drop sprinklers.

5.2.1.2.3

Where standards other than NFPA 13 specify greater clearance to storage minimums, they shall be followed.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 11:17:12 EDT 2021

Committee Statement

Committee Statement: The change will make the requirements flow in a more logical order.

Response Message: SR-1-NFPA 25-2021

Public Comment No. 110-NFPA 25-2021 [Sections 5.2.1.2.2, 5.2.1.2.3]

Public Comment No. 111-NFPA 25-2021 [Section No. A.5.2.1.2.3]

Second Revision No. 81-NFPA 25-2021 [Section No. 5.2.1.5]

5.2.1.5

Electrically operated sprinklers shall be inspected from the floor level annually in accordance with 5.2.1.1 and the manufacturer's requirements.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Fri Sep 10 14:43:05 EDT 2021

Committee Statement

Committee Statement: The requirements in 5.2.1.1 are important to be included when inspecting electronically operated sprinklers.

Response Message: SR-81-NFPA 25-2021

Second Revision No. 3-NFPA 25-2021 [Section No. 5.2.2.2]

5.2.2.2

Sprinkler piping shall not be ~~subjected to external loads by materials either resting on the pipe or hung from the pipe~~ used to support nonsystem components .

5.2.2.2.1

Nonmetallic sprinkler pipe shall not be subjected to incompatible components or materials in contact with the pipe.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 12:18:51 EDT 2021

Committee Statement

Committee Statement: The reference to hangers is inappropriate in this section and opposed to what NFPA 13 allows. The subsection is addressing non-metallic pipe and incompatibility was added to address other building features that may be in contact with the pipe, intentionally or unintentionally.

Response Message: SR-3-NFPA 25-2021

Public Comment No. 39-NFPA 25-2021 [Sections 5.2.2.2, 5.2.2.3]

Second Revision No. 5-NFPA 25-2021 [Section No. 5.2.10]

13.11 Automatic Air Vents.

Automatic air vents ~~installed in accordance with NFPA 13 to remove air from wet pipe sprinkler systems~~ shall be inspected annually from the floor level to verify they are free of physical damage and show no signs of leakage.

13.11.1

Strainers, filters, and screens shall be removed and inspected every 5 years for damaged or corroded parts.

13.11.2

When removed for inspection, strainers, filters, and screens shall be flushed until clear or replaced.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 12:27:32 EDT 2021

Committee Statement

Committee Statement: The requirements are more appropriately located in Chapter 13.

Response Message: SR-5-NFPA 25-2021

Public Comment No. 49-NFPA 25-2021 [Section No. 5.2.10]

Public Comment No. 50-NFPA 25-2021 [New Section after 13.10]

Second Revision No. 8-NFPA 25-2021 [Section No. 5.3.1]

5.3.1* Sprinklers.

Detail SR-6

Global SR-70

5.3.1.1*

Where required by ~~this section~~ Section 5.3 , sample sprinklers shall be submitted to an ~~recognized~~ approved testing laboratory ~~acceptable to the authority having jurisdiction~~ for field service testing.

5.3.1.1.1

Where sprinklers have been installed for 50 years, one of the following shall occur:

(1) The sprinklers shall be replaced.

(2) Representative samples ~~from one or more sample areas~~ of the sprinklers shall be tested and then retested every 10 years .

~~5.3.1.1.1.1~~

~~Test procedures shall be repeated every 10 years.~~

~~5.3.1.1.1.2~~

~~Sprinklers manufactured prior to 1920 shall be replaced.~~

5.3.1.1.1.1*

Where sprinklers manufactured using fast-response elements, except for ESFR and CMSA, have been installed for 25 years , one of the following shall occur~~, except as permitted in 5.3.1.1.1.4~~ :

(1) The sprinklers shall be replaced.

(2) Representative samples ~~from~~of the sprinklers shall be tested and then retested every 10 years.

5.3.1.1.1.2

Where ESFR and CMSA sprinklers using fast-response elements have been installed for 20 years, one of the following shall occur:

(1) The sprinklers shall be replaced.

(2) Representative samples ~~from~~of the sprinklers shall be tested and then retested every 10 years.

5.3.1.1.1.3*

~~Representative samples of~~Where solder-type sprinklers with a temperature classification of extra high [325°F (163°C) or greater] ~~that~~ are installed and exposed to semi-continuous to continuous maximum allowable ambient temperature conditions ~~shall be tested at~~for 5-years, ~~intervals~~one of the following shall occur: ~~.~~

(1) The sprinklers shall be replaced.

(2) Representative samples of the sprinklers shall be tested and then retested every 5 years.

5.3.1.1.1.4*

Where sprinklers have been manufactured in 1920 and later and have been installed for 75 years, one of the following shall occur: ~~they shall be replaced or representative samples from one or more sample areas shall be submitted to a recognized testing laboratory acceptable to the authority having jurisdiction for field service testing and repeated at 5-year intervals.~~

(1) The sprinklers shall be replaced.

(2) Representative samples of the sprinklers shall be tested and then retested every 5 years.

A.5.3.1.1.1.4

For sprinklers manufactured prior to 1920, see 5.4.1.1.

5.3.1.1.1.5

~~Dry~~Where dry sprinklers ~~that~~ have been installed for 20 years, one of the following shall occur: ~~shall be replaced or representative samples shall be tested and then retested at 10-year intervals. *(See 3.3.44.4.)*~~

(1) The sprinklers shall be replaced.

(2) Representative samples of the sprinklers shall be tested and then retested every 10 years. *(See 3.3.41.4, Dry Sprinkler.)*

5.3.1.1.2*

Where sprinklers ~~are~~ exposed to harsh environments, including corrosive atmospheres, have been installed for 5 years, one of the following shall occur:

(1) The sprinklers shall be replaced.

(2) Representative samples ~~from~~of the sprinklers shall be tested and then retested every 5 years.

5.3.1.1.3

Listed corrosion-resistant sprinklers installed in harsh environments shall be permitted to be tested every 10 years and then retested every 5 years.

5.3.1.1.4

Where historical data indicate, longer intervals between testing shall be permitted.

5.3.1.2*

A representative sample of sprinklers for testing in accordance with 5.3.1.1 shall consist of either a minimum of four sprinklers or 1 percent of the number of sprinklers per sample area, whichever is greater.

5.3.1.2.1*

Each sprinkler type and manufacturer in the sample area shall be represented in the sample.

5.3.1.2.2

Sprinklers tested shall not include any sprinklers that were replaced at prior testing intervals.

5.3.1.3

Where one sprinkler within a representative sample fails to meet the test requirement, all sprinklers within the area represented by that sample shall be replaced.

Supplemental Information

File Name	Description	Approved
SR_8_For_Staff_Use_Only.docx	For Staff Use	

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 12:47:57 EDT 2021

Committee Statement

Committee Statement: Changes made to provide consistency in the testing requirements. Most changes were editorial with the exception of new 5.3.1.3.2 which is needed to clarify that sprinklers that are being retested must not be the ones previously replaced.

Response Message: SR-8-NFPA 25-2021

Public Comment No. 120-NFPA 25-2021 [Section No. 5.3.1.1.1.2]

Public Comment No. 60-NFPA 25-2021 [Section No. 5.3.1.1]

Public Comment No. 146-NFPA 25-2021 [Section No. 5.3.1]

Public Comment No. 56-NFPA 25-2021 [Section No. 5.3.1.1.1.2]

Public Comment No. 119-NFPA 25-2021 [Sections 5.3.1.1.1.5, 5.3.1.1.1.6, 5.3.1.1.1.7]

Public Comment No. 53-NFPA 25-2021 [Section No. 5.3.1.1.1.3]

Second Revision No. 10-NFPA 25-2021 [Section No. 5.3.3]

5.3.3 Waterflow Alarm and Supervisory Signal Initiating Devices.

Waterflow alarm and supervisory signal initiating devices shall be tested in accordance with Chapter 13.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 13:27:15 EDT 2021

Committee Statement

Committee Statement: Provides consistency with 5.2.4.

Response Message: SR-10-NFPA 25-2021

Public Comment No. 112-NFPA 25-2021 [Section No. 5.3.3]

Second Revision No. 11-NFPA 25-2021 [Section No. 5.3.4.4]

5.3.4.4

Except as permitted by 5.3.4.4.2~~through~~ and 5.3.4.4.3, all antifreeze systems shall utilize listed antifreeze solutions.

5.3.4.4.1*

Where used to replace ~~non-listed~~ nonlisted antifreeze solutions, listed antifreeze solutions shall be permitted to be used outside their listing limitations, provided the temperature range limitations are not exceeded.

A.5.3.4.4.1

The specific gravity and viscosity characteristics of listed antifreeze solutions can vary significantly between solutions and at different temperatures. These characteristics can be substantially different from the antifreeze solution that is to be replaced. When selecting the antifreeze solution to be used as a replacement, the specific gravity and viscosity characteristics of the new antifreeze solution should be considered as to their potential impact on the system hydraulic calculations.

Listed antifreeze solutions are investigated in accordance with UL 2901, *Antifreeze Solutions for Use in Fire Sprinkler Systems*. From a fire testing standpoint, UL 2901 tests the ability of antifreeze solutions to resist ignition and substantial HRR contribution to a fire and to effectively attack a fire. Listed antifreeze solutions are not as effective as water in attacking challenging fires that might occur in light and ordinary hazard occupancies or storage facilities. Since currently listed antifreeze solutions are not as effective as water in attacking such fires, end-use limitations are specified as a part of the listing. These listing limitations include a maximum volume of antifreeze permitted to be used in a system and/or special requirements related to the hydraulic design of a sprinkler system.

Some existing systems have antifreeze volumes and hydraulic design characteristics that are not in accordance with these listing limitations. The requirement in 5.3.4.4.1 is intended to permit listed antifreeze solutions as a replacement for legacy propylene glycol and glycerine solutions in existing installations that do not comply with the volume and special requirements for the sprinkler system hydraulic design criteria where the required freeze protection is within the listing limit. The use of a listed antifreeze solution under these circumstances will improve the resistance to ignition and firefighting characteristics of the antifreeze as compared to 40 percent propylene glycol and 50 percent glycerine . The Fire Protection Research Foundation report on antifreeze supplied to spray sprinklers indicated that a 50 percent glycerine solution discharged onto a steady state flammable liquid fire ignited and increased the HRR of the test fire by more than 230 percent under certain test conditions. For an antifreeze solution to be listed, the HRR is not permitted to increase by more than 40 percent when it is discharged onto a steady state fire. See Annex H for additional information.

5.3.4.4.2*

An existing antifreeze solution shall be permitted to remain ~~or be refilled~~ in a system, provided the ~~following conditions exist:~~ concentration of the factory premixed antifreeze solution ~~shall be~~ is limited to 30 percent propylene glycol by volume or 38 percent glycerine by volume.

~~The concentration of the factory premixed antifreeze solution shall be limited to 30 percent propylene glycol by volume or 38 percent glycerine by volume.~~

~~* Where a system requires freeze protection below the minimum use temperature of any listed solution, factory premixed glycerine antifreeze solutions with concentrations of less than 50 percent by volume shall be permitted based upon an approved deterministic risk assessment prepared by a qualified person and approved by the authority having jurisdiction.~~

~~A.5.3.4.4.2(2)~~ –

~~Antifreeze solutions with a maximum concentration of 38 percent glycerine or 30 percent propylene glycol do not require a deterministic hazard analysis. The risk assessment should be prepared by an individual(s) who can demonstrate an ability to prepare a risk assessment with education and experience and who can demonstrate an understanding of the issues associated with antifreeze sprinkler systems, including the available related fire tests. For additional information regarding the risk assessment process, documentation to be submitted, and the AHJ's role, refer to NFPA 551 and the SFPE *Engineering Guide: Fire Risk Assessment* .~~

~~Propylene glycol and glycerine antifreeze solutions discharged from sprinklers have the potential to ignite under certain conditions. Research and testing has indicated that several variables might influence the potential for large-scale ignition of antifreeze solution discharged from a sprinkler. These variables include, but are not limited to, the concentration of antifreeze solution, sprinkler discharge characteristics, inlet pressure at the sprinkler, ceiling height, and size of the fire at the time of sprinkler discharge. All relevant data and information should be carefully reviewed and considered in the deterministic risk assessment. As appropriate, the risk assessment should consider factors such as the following:~~

- ~~Occupancy use group in accordance with NFPA 13~~
- ~~Ceiling height~~
- ~~Antifreeze solution concentration and type~~
- ~~Maximum system pressure (i.e., normal static pressures)~~
- ~~Sprinkler type, including K-factor~~
- ~~Potential and actual fuel load (e.g., Christmas trees)~~
- ~~Type of structure (i.e., construction types)~~
- ~~Size of structure~~
- ~~Ability of the sprinkler system to control the fire~~
- ~~Occupied spaces versus unoccupied spaces such as trash enclosures and dust collectors as follows:~~
    - ~~Adjacent occupancies (i.e., spaces adjacent to the area protected by antifreeze systems)~~
    - ~~Separation between areas protected with an antifreeze system and other areas~~
    - ~~Ventilation of areas protected with an antifreeze system to prevent damage to adjacent areas~~
    - ~~Duration of antifreeze discharge~~

~~Tests summarized in Table A.5.3.4.4.2(2) show that large-scale ignition of the sprinkler spray did not occur in tests with 50 percent glycerine and 40 percent propylene glycol antifreeze solutions discharging onto a fire having a nominal HRR of 1.4 MW. A deterministic risk assessment that demonstrates that the HRR for reasonably credible fire scenarios will be less than 1.4 MW at the time of sprinkler activation should be acceptable. The risk assessment should also address issues associated with management of change, such as change in occupancy and temporary fuel loads. A natural Christmas tree can result in an HRR well above 1.4 MW at the time of sprinkler activation. In addition to the previously identified variables, the deterministic risk assessment should include occupancy, quantity of solution, impact on life safety, and potential increase in HRR.~~

~~Subsequent to research conducted from 2010 to 2012, UL conducted additional~~

~~research on legacy glycerine and propylene glycol antifreeze solutions to assist in the development of requirements included in UL 2901, Antifreeze Solutions for Use in Fire Sprinkler Systems. This research is described in UL's report, Comparative Fire Performance Tests Using Water and Antifreeze Solutions Discharged from Standard Spray Sprinklers. This report includes test data and information on 30 percent propylene glycol and 38 percent glycerine antifreeze solutions, as well as additional test data on the 50 percent glycerine solution. This also report includes test data related to the following:~~

- ~~Fire exposure tests to investigate the ignition potential of 30 percent propylene glycol and 38 percent glycerine antifreeze solutions~~
- ~~Firefighting effectiveness of 30 percent propylene glycol and 38 percent glycerine antifreeze solutions discharged onto light and ordinary hazard type fires as compared to water~~
- ~~Firefighting effectiveness of 50 percent glycerine antifreeze solution discharged onto light hazard type fires as compared to water.~~

~~A summary of the tests results for these solutions as compared to the requirements for listing are described in Table 3 through Table 8 of the UL report.~~

~~The following is a list of research reports that have been issued by the Fire Protection Research Foundation (FPRF) related to the use of antifreeze in sprinkler systems that should be considered in the development of the deterministic risk assessment:~~

- ~~"Antifreeze Systems in Home Fire Sprinkler Systems — Literature Review and Research Plan,"~~
- ~~"Antifreeze Systems in Home Fire Sprinkler Systems — Phase II Final Report,"~~
- ~~"Antifreeze Solutions Supplied through Spray Sprinklers — Interim Report,"~~

~~Table A.5.3.4.4.2(2) provides an overview of the testing conducted by the FPRF.~~

~~Table A.5.3.4.4.2(2) FPRF Testing Summary~~

~~Topic~~	~~Information~~
~~Scope of sprinklers tested~~	~~The following sprinklers were used during the residential sprinkler research program described in "Antifreeze Systems in Home Fire Sprinkler Systems — Phase II Final Report":~~
-	~~(1) Residential pendent style having nominal K-factors of 3.1, 4.9, and 7.4 gpm/psi $^{1/2}$~~
-	~~(2) Residential concealed pendent style having a nominal K-factor of 4.9 gpm/psi $^{1/2}$~~
-	~~(3) Residential sidewall style having nominal K-factors of 4.2 and 5.5 gpm/psi $^{1/2}$~~
-	~~The following sprinklers were used during the spray sprinkler research program described in "Antifreeze Solutions Supplied through Spray Sprinklers — Interim Report":~~
-	~~(1) Residential pendent style having a nominal K-factor of 3.1 gpm/psi $^{1/2}$~~
-	~~(2) Standard spray pendent style having nominal K-factors of 2.8, 4.2, 5.6, and 8.0 gpm/psi $^{1/2}$~~
-	~~(3) Standard spray concealed pendent style having a nominal K-factor of 5.6 gpm/psi $^{1/2}$~~

Topic	Information
-	(4) Standard spray upright style having a nominal K-factor of 5.6 gpm/psi 1/2
-	(5) Standard spray extended coverage pendent style having a nominal K-factor of 5.6 gpm/psi 1/2
Antifreeze solution concentration	<50% glycerine and <40% propylene glycol antifreeze solutions — solutions were not tested.
-	50% glycerine and 40% propylene glycol antifreeze solutions — large-scale ignition of the sprinkler spray did not occur in tests with sprinkler discharge onto a fire having a nominal HRR of 1.4 MW. Large-scale ignition of the sprinkler spray occurred in multiple tests with sprinkler discharge onto a fire having a nominal HRR of 3.0 MW.
-	55% glycerine and 45% propylene glycol antifreeze solutions — large-scale ignition of the sprinkler spray occurred in tests with sprinkler discharge onto a fire having a nominal HRR of 1.4 MW.
-	>55% glycerine and >45% propylene glycol antifreeze solutions — large-scale ignition of the sprinkler spray occurred in tests with sprinkler discharge onto a fire having an HRR of less than 500 kW.
-	70% glycerine and 60% propylene glycol antifreeze solutions — maximum antifreeze solution concentrations tested.
Sprinkler inlet pressure	Large-scale ignition of the sprinkler discharge spray was not observed when the sprinkler inlet pressure was 50 psi or less for tests using 50% glycerine or 40% propylene glycol.
Ceiling height	When discharging 50% glycerine and 40% propylene glycol antifreeze solutions onto fires having an HRR of 1.4 MW, no large-scale ignition of the sprinkler spray was observed with ceiling heights up to 20 ft.
-	When discharging 50% glycerine and 40% propylene glycol antifreeze solutions onto fires having an HRR of 3.0 MW, large-scale ignition of the sprinkler spray was observed at a ceiling height of 20 ft.
Fire control	The test results described in “Antifreeze Systems in Home Fire Sprinkler Systems — Phase II Final Report” and “Antifreeze Solutions Supplied through Spray Sprinklers — Interim Report” indicated that discharging glycerine and propylene glycol antifreeze solutions onto a fire can temporarily increase the fire size until water is discharged.
-	As a part of the residential sprinkler research described in “Antifreeze Systems in Home Fire Sprinkler Systems — Phase II Final Report,” tests were conducted to evaluate the effectiveness of residential sprinklers to control fires involving furniture and simulated furniture. The results of these tests indicated that 50% glycerine and 40% propylene glycol antifreeze solutions demonstrated the ability to control the furniture-type fires in a manner similar to water.
-	For standard spray–type sprinklers, no tests were conducted to investigate the ability of these sprinklers to control the types and sizes of fires that these sprinklers are intended to protect.

A.5.3.4.4.2

Except as indicated in 5.3.4.4.3, the reference to refilling systems using antifreeze solutions having a concentration ~~of~~ higher than 30 percent by volume of propylene glycol and 38 percent by volume of glycerine was removed from the 2023 edition of NFPA 25.

Factory premixed solutions ~~are~~ were required because the pure concentrate (which is heavier than water) in improperly mixed solutions could separate from the water, drop out of the solution, and collect in drops or low points in the system. Such concentrations are combustible and could present problems during fires. ~~the~~ The properties of glycerine and propylene glycol are shown in Table A.5.3.4.4.2.

Table A.5.3.4.4.2 Properties of Glycerine and Propylene Glycol

Material	Solution (% by Volume)	Specific Gravity at 77°F (25°C)	Freezing Point °F	Freezing Point °C
Glycerine (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

Propylene glycol and glycerine antifreeze solutions discharged from sprinklers have the potential to ignite under certain conditions. Research and testing has indicated that several variables might influence the potential for large-scale ignition of antifreeze solution discharged from a sprinkler. These variables include, but are not limited to, the concentration of antifreeze solution, sprinkler discharge characteristics, inlet pressure at the sprinkler, ceiling height, and size of the fire at the time of sprinkler discharge. See Annex H for additional information.

~~**5.3.4.4.3**~~

~~Newly introduced solutions shall be factory premixed antifreeze solutions (i.e., chemically pure or USP 96.5 percent).~~

5.3.4.4.3

Premixed antifreeze solutions of propylene glycol exceeding 30 percent concentration by volume shall be permitted for use with ESFR sprinklers, provided the ESFR sprinklers are listed for such use in a specific application.

Supplemental Information

File Name	Description	Approved
PC_141_5_3_4_4_w_PCs_142_143_Final.docx	For Staff Use	

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 13:52:37 EDT 2021

Committee Statement

Committee Statement: The lower concentration levels of 38% glycerine and 30% propylene glycol can remain in existing systems as long as they provide the needed freeze protection. The risks associated with higher concentration levels of the legacy solutions warrant replacement with a listed antifreeze solution. All allowances to replace existing glycerine and propylene glycol solutions with new glycerine and propylene glycol solutions have been removed. The allowance to perform a deterministic risk assessment to allow legacy solutions to be used as a replacement solution has been removed. Annex text has been updated and a new annex section is created to provide data related to the FPRF testing of the legacy solutions.

Response Message: SR-11-NFPA 25-2021

Public Comment No. 142-NFPA 25-2021 [Section No. A.5.3.4.4.2(1)]

Public Comment No. 141-NFPA 25-2021 [Section No. 5.3.4.4]

Public Comment No. 143-NFPA 25-2021 [Section No. A.5.3.4.4.2(2)]

Second Revision No. 12-NFPA 25-2021 [Section No. 5.4.1.1]

5.4.1.1 Replacement Sprinklers ~~Replaced After Fire~~ .

~~All sprinklers affected by a fire shall be replaced.~~ Sprinklers with any of the following qualifications shall be replaced:

(1) Sprinklers manufactured prior to 1920.

(2) Sprinklers showing signs described in 5.2.1.1.2 .

(3) Sprinklers with unsatisfactory performance when tested in accordance with 5.3.1 .

(4)* Sprinklers affected by a fire as determined by the AHJ.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 14:16:37 EDT 2021

Committee Statement

Committee Statement: This consolidates all of the instances when sprinklers must be replaced into one section. In addition, the requirement to replaced sprinklers manufactured before 1920 was moved to this section because it's a maintenance activity. The AHJ needs to be consulted to determine which sprinklers need to be replaced after a fire.

Response Message: SR-12-NFPA 25-2021

Public Comment No. 148-NFPA 25-2021 [New Section after 5.4.1.1]

Public Comment No. 98-NFPA 25-2021 [Section No. 5.4.1]

Public Comment No. 121-NFPA 25-2021 [New Section after 5.4.1]

Public Comment No. 55-NFPA 25-2021 [Section No. 5.4.1.1]

Second Revision No. 80-NFPA 25-2021 [New Section after 5.4.1.2.2]

5.4.1.2.3

Sprinklers listed for use with a specifically listed fitting shall be permitted to be reinstalled in accordance with the manufacturer's installation and maintenance instructions.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Fri Sep 10 14:39:32 EDT 2021

Committee Statement

Committee Statement: There are listed sprinklers that allow the removal of the threaded sprinkler from the threaded fitting and be reinstalled in accordance with the manufacturer's technical data. This new text will allow for the reinstallation of these sprinklers and other sprinklers that may be listed with this allowance in the future.

Response Message: SR-80-NFPA 25-2021

Second Revision No. 14-NFPA 25-2021 [Section No. 6.1.1.2]

6.1.1.2

Table 6.1.1.2 shall be used to determine the minimum required frequencies for inspection, testing, and maintenance.

Table 6.1.1.2 Summary of Standpipe and Hose Systems Inspection, Testing, and Maintenance

Item	Frequency	Reference
Inspection		
Cabinet	Annually	6.2.8
Control valves	—	Chapter 13
Gauges	—	Chapter 13
Hose	Annually	6.2.5
Hose connection	Annually	6.2.3
Hose nozzle	Annually and after each use	6.2.6
Hose storage device	Annually	6.2.7
Hydraulic design information sign	Annually	6.2.2
Hose valves	—	Chapter 13
Piping	Annually	6.2.4
Pressure-regulating devices	—	Chapter 13
Supervisory devices (except valve supervisory devices)	—	Chapter 13
Valve supervisory devices	—	Chapter 13
Test		
Control valves	—	Chapter 13
System valves	—	Chapter 13
Flow test	5 years	6.3.1
Hose	—	NFPA 1962
Hose connection pressure regulating devices	—	Chapter 13
Hose valves	—	Chapter 13
Hydrostatic test (manual and semiautomatic dry standpipes)	5 years	6.3.2
Main drain test	—	Chapter 13
Pressure control valve	—	Chapter 13
Pressure-reducing valve	—	Chapter 13
Supervisory signal devices (except valve supervisory switches)	—	Chapter 13
Valve status test	—	Chapter 13
Valve supervisory devices	—	Chapter 13
Waterflow alarm devices	—	Chapter 13
Maintenance		
Hose valves	—	Chapter 13
Pressure gauges	—	Chapter 13
Valves (all types)	Annually/as needed	Chapter 13

Supplemental Information

File Name	Description	Approved
PC_72_Table_6_1_1_2_Final.docx	For staff use	

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 15:31:37 EDT 2021

Committee Statement

Committee Statement: Changes to the table were accepted with a modification to change the hydrostatic test for manual standpipes from applying to only manual dry standpipes to applying to all manual standpipes. There is an exception for manual wet standpipes when sprinkler systems are fed from them, but the user will see that when they review the actual text of the requirement.

Response Message: SR-14-NFPA 25-2021

Public Comment No. 72-NFPA 25-2021 [Section No. 6.1.1.2]

Second Revision No. 15-NFPA 25-2021 [Section No. 6.3.2.2.1]

6.3.2.2.1*

The ~~inside~~ standpipe piping shall show no visible signs of leakage.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 15:34:27 EDT 2021

Committee Statement

Committee Statement: Visible leakage could occur in part of the standpipe system that isn't inside the building and should be corrected.

Response Message: SR-15-NFPA 25-2021

Public Comment No. 113-NFPA 25-2021 [Section No. 6.3.2.2.1]

Second Revision No. 16-NFPA 25-2021 [Section No. 7.1.1.2]

7.1.1.2

Table 7.1.1.2 shall be used to determine the minimum required frequencies for inspection, testing, and maintenance.

Table 7.1.1.2 Summary of Private Fire Service Main Inspection, Testing, and Maintenance

Item	Frequency	Reference
Inspection		
Backflow preventer	—	Chapter 13
Check valve	—	Chapter 13
Control valve	—	Chapter 13
Fire department connection	—	Chapter 13
Hose houses	Quarterly	7.2.2.8
Hydrants (dry barrel and wall)	Annually and after each operation	7.2.2.4
Hydrants (wet barrel)	Annually and after each operation	7.2.2.5
Hydrants (dry)	Quarterly, annually	7.2.2.6, 7.2.2.6.3
Mainline strainers	Annually and after each significant flow	7.2.2.3
Monitor nozzles	Semiannually	7.2.2.7
Pipe and fittings (exposed)	Annually	7.2.2.1
Valve supervisory devices	—	Chapter 13
Test		
Backflow preventer	—	Chapter 13
Control valve	—	Chapter 13
Hydrants (flow test)	~~Flow, annually~~ Annually	7.3.2, 7.2.2.6.5
Monitor nozzles (flow test, range, operation)	~~Flow, annually (range and operation)~~ Annually	7.3.3
Piping (exposed and underground) (flow test)	5 years	7.3.1
Valve status test	—	Chapter 13
Valve supervisory devices	—	Chapter 13
Maintenance		
Backflow preventer	—	Chapter 13
Check valve	—	Chapter 13
Control valve	—	Chapter 13
Dry hydrant (water supply, clearance)	Quarterly	7.2.2.6.1, 7.2.2.6.2
Hydrants	Annually	7.4.2
Mainline strainers	Annually and after each operation	7.2.2.3
Monitor nozzles	Annually	7.4.3

Supplemental Information

File Name	Description	Approved
PC_122_Table_7_1_1_2_Final.docx	For staff use	

Submitter Information Verification

Committee: INM-AAA
Submittal Date: Wed Sep 08 15:35:16 EDT 2021

Committee Statement

Committee Statement: Changes made during the first revision were incorporated into Table 7.1.1.2.
Response Message: SR-16-NFPA 25-2021

Public Comment No. 122-NFPA 25-2021 [Section No. 7.1.1.2]

Second Revision No. 17-NFPA 25-2021 [Section No. 7.3.1.1]

7.3.1.1

Any flow test results that indicate deterioration of available water flow ~~and~~ or pressure shall be investigated to the complete satisfaction of the authority having jurisdiction to ensure that the required flow and pressure are available for fire protection.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 15:38:24 EDT 2021

Committee Statement

Committee Statement: If flow or pressure are not capable of supplying the fire protection system an investigation is needed.

Response Message: SR-17-NFPA 25-2021

Public Comment No. 84-NFPA 25-2021 [Section No. 7.3.1.1]

Second Revision No. 71-NFPA 25-2021 [Section No. 8.1.1.2 [Excluding any Sub-Sections]]

The minimum frequency of inspection, testing, and maintenance shall be in accordance with the manufacturer's recommendations and Table 8.1.1.2.

Table 8.1.1.2 Summary of Fire Pump Inspection, Testing, and Maintenance

Item	Frequency	Reference
Inspection		
Alignment	Annually	8.3.6.4
Cable/wire insulation	Annually	8.1.1.2.5
Diesel engine system	Weekly	8.2.2(4)
Electric system	Weekly	8.2.2(3)
Engine crankcase breather	Quarterly	8.1.1.2.12
Exhaust system, drain condensate trap, and silencers	Annually	8.1.1.2.13
Flexible hoses and connections	Annually	8.1.1.2.11
Fuel tank vents and overflow	Annually	8.1.1.2.10
Plumbing parts — inside and outside of panels	Annually	8.1.1.2.6
Printed circuit board (PCB) corrosion	Annually	8.1.1.2.4
Pump	Weekly	8.2.2(2)
Pump house/room	Weekly	8.2.2(1)
Shaft movement or endplay while running	Annually	8.1.1.2.1
Steam pump system	Weekly	8.2.2(5)
Suction screens	Annually	~~8.3.3.15~~ 8.3.3.16
Test		
~~Automatic transfer switch~~	~~Annually~~	~~8.3.3.12~~
Automatic transfer switch and emergency/standby generators	Per NFPA 110	~~8.3.6.1,~~ 8.3.6.2
Diesel engine–driven fire pump (no flow)	Weekly	8.3.1.1
Diesel fuel testing	Annually	8.3.4.1
Electric motor–driven fire pump (no flow)	Weekly/monthly	8.3.1.2
Electronic control module (ECM)	Annually	~~8.3.3.16~~ 8.3.3.17
Fire pump alarm signals	Annually	~~8.3.3.13~~ 8.3.3.14
Flow meters	Annually	8.3.3.5.3
Fuel tank, float switch, and supervisory signal for interstitial space	Quarterly	8.1.1.2.7
Gauges, transducers, and other devices used for testing	Annually	8.3.3.5.2
Main pressure relief valve	Annually	~~8.3.3.11~~ 8.3.3.12 , 13.5.6.2.3
Pump house/room environmental conditions	—	8.3.6.3
Pump operation (no flow)	Weekly/monthly	8.3.2, 8.3.5
Pump performance (flow)	Annually	8.3.3, 8.3.5
Supervisory signal for high cooling water temperature	Annually	8.1.1.2.8
Maintenance		
Batteries	Annually	8.1.1.2.15
Circulating water filter	Annually	~~8.1.1.2.21~~ 8.1.1.2.22
Control and power wiring connections	Annually	8.1.1.2 16

Item	Frequency	Reference
Controller and all other components of the pump assembly	Per manufacturer	8.5
Diesel active fuel maintenance system	Annually or per manufacturer	8.3.4.3
Diesel engine system	Per manufacturer	8.5
Electric motor and power system	Per manufacturer	8.5
Electrical connections	Annually	8.1.1.2.2
Engine lubricating oil	50 operating hours or annually	8.1.1.2.17
Engine oil filter	50 operating hours or annually	8.1.1.2.18
Fuel filter	50 operating hours or annually	8.1.1.2.19
Fuel tank — check for water and foreign materials	Annually	8.1.1.2.9
Measure back pressure on engine turbo	Annually	8.1.1.2.14
Power transmission components with elastomeric materials (including torsional couplings)	5 years or per manufacturer	~~8.1.1.2.23~~ 8.1.1.2.24
Pressure gauges and sensors	Annually	~~8.1.1.2.22~~ 8.1.1.2.23
Pump and motor bearings and coupling	Annually or as required	8.1.1.2.3
Sacrificial anode	Annually	~~8.1.1.2.20~~ 8.1.1.2.21

Supplemental Information

File Name	Description	Approved
PC_11_Table_8_1_1_2_Final.docx	PC 11 Table 8_1_1_2 Final For Staff Use Only.	

Submitter Information Verification

Committee: INM-AAA
Submittal Date: Fri Sep 10 11:42:51 EDT 2021

Committee Statement

Committee Statement: The table references have been updated to align with the requirements.
Response Message: SR-71-NFPA 25-2021

Public Comment No. 11-NFPA 25-2021 [Section No. 8.1.1.2 [Excluding any Sub-Sections]]

Second Revision No. 57-NFPA 25-2021 [Section No. 8.1.1.2.19]

8.1.1.2.19

Fuel filters shall be ~~changed at least annually and more frequently where necessary~~ changed annually .

8.1.1.2.20

When necessary, fuel filters shall be changed more frequently in accordance with the manufacturer's recommendations.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 17:11:29 EDT 2021

Committee Statement

Committee Statement: The number was changed to comply with the manual of style. Editorial changes were made to clarify that the fuel filter must be changed once per year and only changed more frequently if recommended by the manufacturer.

Response Message: SR-57-NFPA 25-2021

Public Comment No. 89-NFPA 25-2021 [Section No. 8.1.1.2.19]

Second Revision No. 58-NFPA 25-2021 [Section No. 8.3.2.10.4]

Global SR-24

8.3.2.10.4

~~A qualified~~ Qualified ~~person(s)~~ personnel shall be able to respond to the pump location upon abnormal condition within ~~8~~4 hours.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 17:32:32 EDT 2021

Committee Statement

Committee Statement: Allowing an 8 hour response time for an abnormal fire pump condition is too long as this could lead to an impaired fire protection system. Lowering to 4 hours will raise the priority and is ample time for a response.

Response Message: SR-58-NFPA 25-2021

Public Comment No. 23-NFPA 25-2021 [Section No. 8.3.2.10.4]

Public Comment No. 17-NFPA 25-2021 [Section No. 8.3.2.10.4]

Public Comment No. 91-NFPA 25-2021 [Section No. 8.3.2.10.4]

Public Comment No. 114-NFPA 25-2021 [Section No. 8.3.2.10.4]

Second Revision No. 60-NFPA 25-2021 [New Section after 8.3.5.7]

8.3.5.8 Annual Activation Test for Water Mist Positive Displacement Pumping Units.

8.3.5.8.1

Annually, an automatic activation test for systems with automatic nozzles shall be conducted using a test connection that simulates the smallest system nozzle in the hydraulically most remote area discharged at system maintenance pressure/standby pressure.

8.3.5.8.2

The pumping unit shall achieve the system design discharge pressure within the time specified in the listing but not greater than 60 seconds after the start of flow from the smallest nozzle.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Fri Sep 10 10:37:27 EDT 2021

Committee Statement

Committee Statement: These testing requirements are consistent with those developed by NFPA 750 and NFPA 20 Technical Committees and reflect the best practices for ensuring proper operation of positive displacement pump units. The 60 second requirement follows NFPA 20 and the frequency needs to be specified in the standard.

Response Message: SR-60-NFPA 25-2021

Public Comment No. 43-NFPA 25-2021 [New Section after 8.3.5.7]

Public Comment No. 124-NFPA 25-2021 [New Section after 8.3.5.7]

Second Revision No. 61-NFPA 25-2021 [Section No. 8.3.7.1.1.1]

8.3.7.1.1.1

The interpretation of the gross flow test performance relative to acceptably meeting the demands of all connected fire protection systems shall be the basis for determining acceptable performance of the pump assembly and connected water supply .

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Fri Sep 10 10:38:56 EDT 2021

Committee Statement

Committee Statement: The gross flow test performance is an indicator of the pump and connected water supply.

Response Message: SR-61-NFPA 25-2021

Public Comment No. 86-NFPA 25-2021 [Section No. 8.3.7.1.1.1]

Second Revision No. 73-NFPA 25-2021 [Section No. 10.1.1.2]

10.1.1.2

Table 10.1.1.2 shall be used to determine the minimum required frequencies for inspection, testing, and maintenance.

Table 10.1.1.2 Summary of Water Spray Fixed System Inspection, Testing, and Maintenance

Item	Frequency	Reference
Inspection		
Backflow preventer	—	Chapter 13
Check valves	—	Chapter 13
Control valves	—	Chapter 13
Deluge valve	—	Chapter 13
Detection systems and components	—	*NFPA 72*
Detector check valves	—	Chapter 13
Drainage	Quarterly	10.2.7
Fire pump system	—	Chapter 8
Fittings	Annually	10.2.3, 10.2.3.1
Fittings (rubber-gasketed)	Annually and after each system activation	10.2.3.1
Gravity tanks	—	Chapter 9
Hangers, braces, and supports	Annually and after each system activation	10.2.3.2
Heat (deluge valve house)	—	Chapter 13
Nozzles	Annually and after each system activation	10.2.4
Piping	Annually and after each system activation	10.2.3.1
Pressure tank	—	Chapter 9
Strainers	Mainline — annually and after each system activation	—
~~Strainers~~	Others — per manufacturer's instruction	10.2.6
Suction tanks	—	Chapter 9
Water supply piping	—	10.2.5.2
UHSWSS — controllers	Start of each shift	10.4.3
UHSWSS — detectors	Monthly	10.4.2
UHSWSS — valves	Start of each shift	10.4.4
Operational Test		
Backflow preventer	—	Chapter 13
Check valves	—	Chapter 13
Control valves	—	Chapter 13
Deluge valve	—	Chapter 13
Detection systems	—	*NFPA 72*
Detector check valve	—	Chapter 13
Fire pump system	—	Chapter 8
Gravity tanks	—	Chapter 9
Main drain test	—	Chapter 13

Item	Frequency	Reference
Manual release	Annually	10.3.5
Nozzles	Annually	~~Section~~ 10.3
Pressure tank	—	Chapter 9
Strainers	Annually	10.2.6
Suction tanks	—	Chapter 9
Waterflow alarm	—	~~Chapter 5~~ Chapter 13
Water spray system test	—	Chapter 13
Water supply flow test	—	Chapter 7
UHSWSS	Annually	~~Section~~ 10.4
Valve status test	—	Chapter 13
Maintenance		
Backflow preventer	—	Chapter 13
Check valves	—	Chapter 13
Control valves	—	Chapter 13
Deluge valve	—	Chapter 13
Deluge valve enclosures	—	Chapter 4
Detection systems	—	*NFPA 72*
Detector check valve	—	Chapter 13
Fire pump system	—	Chapter 8
Gravity tanks	—	10.2.9, Chapter 9
Pressure tank	—	10.2.9, Chapter 9
Strainers	Annually	10.2.1.4, 10.2.1.6, 10.2.6
Strainers (baskets/screen)	5 years	10.2.1.4, 10.2.1.7, A.10.2.6
Suction tanks	—	Chapter 9
Water spray nozzles	Annually	10.2.4

Supplemental Information

File Name	Description	Approved
Table_10_1_1_2_Final.docx	For staff use	

Submitter Information Verification

Committee: INM-AAA
Submittal Date: Fri Sep 10 11:55:34 EDT 2021

Committee Statement

Committee Statement: The table references have been updated to align with the requirements.
Response Message: SR-73-NFPA 25-2021

Second Revision No. 62-NFPA 25-2021 [Section No. 11.1.1.1]

11.1.1.1*

This chapter shall provide the minimum requirements for the routine inspection, testing, and maintenance of foam systems installed in accordance with NFPA 11 ~~and NFPA 16~~ or other approved installation standards .

A.11.1.1.1

A contract for the equipment service tests and operation at regular intervals is recommended. Other approved installation standards can include NFPA 16 .

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Fri Sep 10 10:58:58 EDT 2021

Committee Statement

Committee Statement: NFPA 16 has been withdrawn and is now included in NFPA 11. Annex text has been added to address legacy systems installed under NFPA 16.

Response Message: SR-62-NFPA 25-2021

Public Comment No. 152-NFPA 25-2021 [Section No. 11.1.1.1]

Second Revision No. 72-NFPA 25-2021 [Section No. 11.1.1.2]

11.1.1.2

Table 11.1.1.2 shall be used to determine the minimum required frequencies for inspection, testing, and maintenance.

Table 11.1.1.2 Summary of Low-, Medium-, and High-Expansion Foam and Foam-Water Sprinkler System Inspection, Testing, and Maintenance

System/Component	Frequency	Reference
Inspection		
Control valve(s)	—	Chapter 13
Deluge/preaction valve(s)	—	Chapter 13
Discharge device location (spray nozzle)	Monthly	~~11.2.2.1.1~~ 11.2.4.1.1
Discharge device location (sprinkler)	Annually	~~11.2.2.1.1~~ 11.2.4.1.1
Discharge device position (spray nozzle)	Monthly	~~11.2.2.1.1~~ 11.2.4.1.3
Discharge device position (sprinkler)	Annually	~~11.2.2.1.1~~ 11.2.4.1.3
Drainage in system area	Quarterly	~~11.2.5~~ 11.2.7
Fire pump(s)	—	Chapter 8
Foam concentrate pump(s)	—	Chapter 8
Fittings corrosion	Annually	~~11.2.9~~ 11.2.11
Fittings damage	Annually	~~11.2.9~~ 11.2.11
Foam concentrate storage	Annually	~~11.2.7~~ 11.2.9
Gauges	—	Chapter 13
Hangers/braces/supports	Annually	~~11.2.9~~ 11.2.12
Pipe corrosion	Annually	~~11.2.9~~ 11.2.11
Pipe damage	Annually	~~11.2.9~~ 11.2.11
Proportioning system(s) — all	Monthly	~~11.2.6~~ 11.2.8
Standard pressure proportioning pickup tube	10 years	~~11.2.6.5.2~~ 11.2.8.5.2
Line proportioner pickup tubes	Annually	~~11.2.6.6.3~~ 11.2.8.6.3
Foam tank inspection	Annually	~~11.2.7~~ 11.2.9
Proportioning head	Annually	~~11.2.6.5.2~~ 11.2.8.5.2
Water-powered proportioner pump leakage	Monthly	~~11.2.6.6.7~~ 11.2.8.6.8
Water-powered proportioner pump valve position	Monthly	~~11.2.6.6.7~~ 11.2.8.6.8
Water-powered proportioner pump oil level	6 months	~~11.2.6.6.7~~ 11.2.8.6.8
Water-powered proportioner pump shock absorbers	6 months	~~11.2.6.6.7~~ 11.2.8.6.8
Strainer(s) — mainline	Annually	Chapter 7
Strainer(s) — discharge device	Annually	~~11.2.4.1~~ 11.2.6.1
Foam concentrate strainers	Annually	~~11.2.4.4~~ 11.2.6.4
Water supply piping	—	Chapter 7
Water supply tank(s)	—	Chapter 9
Waterflow devices	—	Chapter 13
Supplementary hoses	Annually	~~11.2.2.4~~ 11.2.4.4
Auxiliary drain signage	Annually	Chapter 13
Supplementary hose stream nozzles	Annually and after each use	Chapter 6
Supplementary hose stream storage	Annually	Chapter 6

System/Component	Frequency	Reference
Fixed foam discharge outlet	Annually	~~11.2.2.2~~ 11.2.4.2
Vapor seals	Annually	~~11.2.2.2.4~~ 11.2.4.2.4
Fire department hose connections	Annually	Chapter 6
Hydraulic design information sign	Annually	Chapter 5
Underground piping	10 years	~~11.2.9~~ 11.2.11
Foam dam	—	~~11.2.12~~ 11.2.15
Pressure foam maker	Annual	~~11.2.2.2.5~~ 11.2.4.2.5
Rupture disk	Annual	~~11.2.2.2.5.5~~ 11.2.4.2.5.5
Alarm devices	—	11.1.3
Operating instructions and training	Annually	~~11.2.14~~ 11.2.17
~~System information documents~~	~~Annually~~	~~11.2.14~~
High pressure cylinders	Annually	~~11.2.11~~ 11.2.14
Foam in surrounding space of bladder	Annually	~~11.2.7.8~~ 11.2.9.8
Test		
Backflow preventer(s)	Annually	Chapter 13
Complete foam-water sprinkler system(s) (operational test)	Annually	~~11.3.8~~ 11.3.10.2
Control valve(s)	—	Chapter 13
Deluge/preaction valve(s)	—	Chapter 13
Detection system	—	11.1.3
Discharge device location	Annually	~~11.3.9.2.7~~ 11.3.10.2.7
Discharge device obstruction	Annually	~~11.3.9.2.7~~ 11.3.10.2.7
Discharge device position	Annually	~~11.3.9.2.7~~ 11.3.10.2.7
Fixed foam discharge outlet water flow	Annually	~~11.3.10~~ 11.3.11
Pressure foam maker water flow	Annually	~~11.3.10.6~~ 11.3.11.6
Fire pump(s)	—	Chapter 8
Foam concentrate pump(s)	—	Chapter 8
Manual actuation device(s)	Annually	~~11.3.9.4~~ 11.3.10.4
Proportioning system(s) — all	Annually	11.3.2
Valve status test	—	Chapter 13
Water supply flow test	5 years	Chapter 7
Water supply tank(s)	—	Chapter 9
Waterflow alarm devices	—	Chapter 13
Supplementary hose streams	5 years	Chapter 6
Supplementary hose stream nozzles	—	Chapter 5 of NFPA 1962
Foam concentrate	Annually	11.3.1.1
Monitors	Annually	~~11.3.6~~ 11.3.7
Oscillating monitor’s range of motion	Annually	11.3.7.2
Oscillating monitor full flow	5 years	11.3.7.3
Water-powered foam proportioning pump operation	2 months	11.3.4
Water-powered powered foam proportioning pump filters	6 months	11.3.4

System/Component	Frequency	Reference
Water-powered foam proportioning pump operation at specified rate of flow	Annually	11.3.4
Water-powered foam proportioning pump screwed connections	6 months	11.3.4
Water-powered foam proportioning pump valves	6 months	11.3.4
Bladder tank hydrostatic test	10 years	11.3.5.1
Foam concentrate tank hydrostatic test	10 years	11.3.5.1
High pressure cylinder	—	~~11.3.5.2~~ 11.3.5.4
Maintenance		
Backflow preventer(s)	—	Chapter 13
Bladder sight glass cleaning	10 years	~~11.4.3.5.1~~ 11.4.3.2
Check valve(s)	—	Chapter 13
Control valve(s)	—	Chapter 13
Deluge/preaction valves	—	Chapter 13
Detection system	—	*NFPA 72*
Detector check valve(s)	—	Chapter 13
Fire pump(s)	—	Chapter 8
Foam concentrate strainer(s)	Annually	Chapter 8
Metallic atmospheric and pressure vessel storage tanks drain/flush	10 years	~~11.4.3~~ 11.4.3.1
Foam concentrate pump(s)	5 years	Chapter 8
In-line balanced pressure type	—	—
Balancing valve diaphragm	5 year	~~11.4.4.3~~ 11.4.4.3.3
Line type	—	—
Pressure vacuum vents	5 years	11.4.4.6
Proportioning system(s) standard pressure type	—	—
Ball drip (automatic-type) drain valves	5 years	~~11.4.4.3~~ 11.4.4.1
Standard balanced pressure type	—	—
Balancing valve diaphragm	5 years	~~11.4.4.3~~ 11.4.4.2.3
Strainer(s) — mainline	—	~~11.4.4.10~~ Chapter 7
Water supply	—	11.4.2
Water supply tank(s)	—	Chapter 9
Hose valves	—	Chapter 13
Pressure gauges	—	Chapter 13
Fixed foam discharge outlet	—	11.4.4.8
Pressure foam maker	—	11.4.4.9
Monitors	—	11.4.4.7
Monitor nozzles	—	11.4.4.7
Supplementary hoses	—	11.4.4.11
Supplementary hose nozzles	—	11.4.4.12
Rupture disks	—	11.4.4.9.1
Water-powered foam concentrate proportioning pump shaft lubrication	6 months	~~11.4.4.6~~ 11.4.4.5

System/Component	Frequency	Reference
Water-powered foam concentrate proportioning pump oil change	5 years	~~11.4.4.6~~ 11.4.4.5
Water-powered foam concentrate proportioning ~~pump oil change~~ vane replacement	Manufacturer's recommendation	~~11.4.4.6~~ 11.4.4.5
Auxiliary drains	—	Chapter 13

Supplemental Information

File Name	Description	Approved
Table_11_1_1_2_Final.docx	Table 11_1_1_2 Final For Staff Use Only.	

Submitter Information Verification

Committee: INM-AAA
Submittal Date: Fri Sep 10 11:49:13 EDT 2021

Committee Statement

Committee Statement: The table references have been updated to align with the requirements.
Response Message: SR-72-NFPA 25-2021

Public Comment No. 155-NFPA 25-2021 [Section No. 11.2.1]

Second Revision No. 63-NFPA 25-2021 [Section No. 11.1.1.3]

~~11.1.1.3*~~

~~An inspection, testing, and maintenance service program shall be implemented.~~

~~A.11.1.1.3~~

~~The goal of the inspection, testing, and maintenance service should be to ensure that the system is in full operating condition and that it remains in such condition until the next inspection. See A.3.3.27 for more information.~~

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Fri Sep 10 11:05:49 EDT 2021

Committee Statement

Committee Statement: This language was included as part of ITM requirements from NFPA 11 and is not necessary in NFPA 25. It should remain in NFPA 11.

Response Message: SR-63-NFPA 25-2021

Public Comment No. 158-NFPA 25-2021 [Section No. 11.1.1.3]

Public Comment No. 159-NFPA 25-2021 [Section No. A.11.1.1.3]

Second Revision No. 64-NFPA 25-2021 [Section No. 11.1.1.4]

11.1.1.3*

~~Systems shall be so arranged that tests and inspections checking the operation of all mechanical and electrical system components can be made without discharging foam solution to~~ All inspection and testing shall be conducted without inadvertent discharging of foam solution into the system piping.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Fri Sep 10 11:09:01 EDT 2021

Committee Statement

Committee Statement: Removes a design requirement that is more appropriately located in NFPA 11.

Response Message: SR-64-NFPA 25-2021

Public Comment No. 157-NFPA 25-2021 [Section No. 11.1.1.4]

Second Revision No. 65-NFPA 25-2021 [Section No. 11.1.7]

11.1.7* System Changes.

If it is determined during routine inspection and testing that the system has been altered or replaced such that the foam concentrate and systems components are not compatible with each other , the system shall be considered impaired.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Fri Sep 10 11:10:53 EDT 2021

Committee Statement

Committee Statement: Clarifies that foam concentrate and system components need to be compatible.

Response Message: SR-65-NFPA 25-2021

Public Comment No. 153-NFPA 25-2021 [Section No. 11.1.7]

Second Revision No. 66-NFPA 25-2021 [Section No. 11.2.2]

11.2.2

Where any of the ~~testing~~ inspection requirements in this section are found to be deficient, the results shall be documented~~,~~ and corrected~~, and retested~~ in accordance with 11.1.5.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Fri Sep 10 11:13:19 EDT 2021

Committee Statement

Committee Statement: This section addresses inspection not testing.

Response Message: SR-66-NFPA 25-2021

Public Comment No. 160-NFPA 25-2021 [Section No. 11.2.2]

Second Revision No. 67-NFPA 25-2021 [Section No. 11.2.11.2.2]

11.2.11.2.2

Pressure tests in accordance with NFPA 11 of normally dry piping shall be conducted when ~~visual inspection indicates questionable strength due to corrosion~~ evidence of external corrosion detrimental to system performance or mechanical damage is present .

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Fri Sep 10 11:23:57 EDT 2021

Committee Statement

Committee Statement: The previous language was difficult to enforce. NFPA 11 provides the pressure testing requirements. Language changed to remain consistent with other sections of NFPA 25.

Response Message: SR-67-NFPA 25-2021

Public Comment No. 162-NFPA 25-2021 [Section No. 11.2.11.2.2]

Second Revision No. 68-NFPA 25-2021 [Section No. 11.2.11.7]

11.2.11.7

Aboveground foam system piping shall be examined to determine its condition and to verify proper drainage ~~pitch~~ is maintained.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Fri Sep 10 11:29:34 EDT 2021

Committee Statement

Committee Statement: NFPA 25 does not require evaluation of pitching of pipe.

Response Message: SR-68-NFPA 25-2021

Public Comment No. 156-NFPA 25-2021 [Section No. 11.2.11.7]

Second Revision No. 69-NFPA 25-2021 [Section No. 11.3.1.2]

11.3.1.2

Samples of foam concentrates shall be sent to the manufacturer or ~~a qualified~~ an approved testing laboratory for quality condition testing.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Fri Sep 10 11:34:47 EDT 2021

Committee Statement

Committee Statement: Approved is a defined term in NFPA standards.

Response Message: SR-69-NFPA 25-2021

Public Comment No. 128-NFPA 25-2021 [Section No. 11.3.1.2]

Second Revision No. 74-NFPA 25-2021 [Section No. 13.1.1.2]

13.1.1.2

Table 13.1.1.2 shall be used to determine the minimum required frequencies for inspection, testing, and maintenance.

Table 13.1.1.2 Summary of Valves, Valve Components, and Trim Inspection, Testing, and Maintenance

Item	Frequency	Reference
Inspection		
Alarm valves		
Exterior	Quarterly	13.4.1.1
Interior	5 years	13.4.1.2
Strainers, filters, orifices	5 years	13.4.1.2
Backflow prevention assemblies		
Reduced pressure	Weekly	13.7.1
Reduced-pressure detectors	Weekly	13.7.1
Interior	5 years	13.7.1.3
Check valves		
Interior	5 years	13.4.2.1
Control valves		
All valves except locked or supervised	Weekly	13.3.2.1
Locked or supervised	Monthly	13.3.2.1.1
Electrically supervised	Quarterly	13.3.2.1.2
Dry pipe valves/ quick-opening devices		
Enclosure (during cold weather)	—	Chapter 4
Exterior	Monthly	13.4.5.1.2
Interior	Annually	13.4.5.1.3
Strainers, filters, orifices	5 years	13.4.5.1.4
Low temperature alarm	Annually	Chapter 4
Deluge valves		
Enclosure (during cold weather)	Daily/weekly	Chapter 4
Exterior	Monthly	13.4.4.1.1
Interior	Annually/5 years	13.4.4.1.2
Strainers, filters, orifices	5 years	13.4.4.1.3
Fire department connections	Quarterly	13.8.1
Gauges	Monthly/quarterly	~~13.2.5~~ 13.2.4
Hose valves	Quarterly	13.6.1
Preaction valves		
Enclosure (during cold weather)	—	Chapter 4
Exterior	Monthly	13.4.3.1.1
Interior	Annually/5 years	13.4.3.1.2
Strainers, filters, orifices	5 years	13.4.3.1.3

Item	Frequency	Reference
Pressure-regulating and relief valves		
Master pressure regulating	Weekly	13.5.4.1
Sprinkler system pressure reducing	Quarterly	13.5.1.1
Hose connection pressure regulating	Annually	13.5.2.1
Hose rack pressure regulating	Annually	13.5.3.1
Fire pump circulation relief	With no flow test	~~13.5.6.1~~ 13.5.6.1
Fire pump main pressure-relief	With fire pump test	~~13.5.6.2.1~~ 13.5.6.2
Valve supervisory signal initiating device	Quarterly	13.3.2.1.3
Supervisory signal devices (except valve supervisory switches)	Quarterly	~~13.2.6.1~~ 13.2.5.1
Air compressors and nitrogen generators	Monthly	13.10.2
Waterflow alarms	Quarterly	13.2.3
Testing		
Backflow prevention assemblies	Annually	13.7.2
Control valves		
Operation and position	Annually	13.3.3.1
Valve status test	After the control valve closed and reopened	13.3.3.4
Supervisory	Semiannually	13.3.3.5
Deluge valves		
Trip test	Annually/3 years	13.4.4.2.3
Dry pipe valves/ quick-opening devices		
Air leakage	3 years	13.4.5.2.9
Priming water	Quarterly	13.4.5.2.1
Low air pressure alarm	Annually	13.4.5.2.6
Quick-opening devices	Quarterly	13.4.5.2.4
Trip test	Annually	13.4.5.2.2
Full-flow trip test	3 years	13.4.5.2.2.2
Gauges	5 years	~~13.2.5.2~~ 13.2.4.2
Main drains	Annually/quarterly	~~13.2.3~~ 13.2.2
Preaction valves		
Priming water	Quarterly	13.4.3.2.1
Low air pressure alarms	Quarterly	13.4.3.2.11
Trip test	Annually/3 years	13.4.3.2.2 and 13.4.3.2.3
Air leakage	3 years	13.4.3.2.6
Low temperature alarm	Annually	13.4.3.2.12

Item	Frequency	Reference
Pressure-regulating and relief valves		
Master pressure regulating	Quarterly/annually	13.5.4.2 and 13.5.4.3
Sprinkler systems pressure reducing	Annually/5 years	13.5.1.3 and 13.5.1.2
Hose connection pressure regulating	Annually/5 years	13.5.2.3 and 13.5.2.2
Hose rack pressure regulating	Annually/5 years	13.5.3.3 and 13.5.3.2
Fire pump circulation relief	With churn test	13.5.6.1.2
Fire pump pressure relief valves	With fire pump test	~~13.5.6.2.2~~ 13.5.6.2.3
Air compressors and nitrogen generators	Annually	13.10.3
Hose valves	Annually/3 years	13.6.2
Waterflow alarms	~~Quarterly/semiannually~~ Semiannually	~~13.2.4~~ 13.2.3
Supervisory signal devices (except valve supervisory switches)	Annually	~~13.2.6.2~~ 13.2.5.2
Maintenance		
Alarm valves	Per manufacturer	13.4.1.3
Backflow prevention assemblies	Per manufacturer	13.7.3
Check valves	Per manufacturer	13.4.2.2
Control valves (outside screw and yoke)	Annually	13.3.4
Deluge valves	Annually/5 years	13.4.4.3
Dry pipe valves/ quick-opening devices	Annually	13.4.5.3
Hose valves	As needed	13.6.3
Preaction valves	Annually/5 years	13.4.3.3
Air compressors and nitrogen generators	Per manufacturer	13.10.4

Supplemental Information

File Name	Description	Approved
PC_2_Table_13_1_1_2_Final.docx	For staff use	

Submitter Information Verification

Committee: INM-AAA
Submittal Date: Fri Sep 10 12:01:46 EDT 2021

Committee Statement

Committee Statement: Table references updated.
Response Message: SR-74-NFPA 25-2021

Public Comment No. 2-NFPA 25-2021 [Section No. 13.1.1.2]

Second Revision No. 32-NFPA 25-2021 [New Section after 13.2.3.6]

13.2.3.7 Waterflow Alarm Device Status.

13.2.3.7.1

During testing and maintenance, vane-type waterflow alarm devices shall remain in service unless impairment procedures are followed in accordance with *NFPA 72* or the adopted fire code.

13.2.3.7.1.1*

Disabling vane-type waterflow alarm devices by preventing movement of the vane or stem shall be prohibited.

A.13.2.3.7.1.1

Using screwdrivers or other means to jam paddle-type waterflow alarm devices into position can damage the device and should be avoided. Tools and devices being used in this manner often get left behind, rendering the waterflow alarm out of service until they are discovered.

13.2.3.7.1.2*

Interruption of the signal sent by the vane-type waterflow alarm device is permitted in accordance with 13.2.3.7.1.3 and 13.2.3.7.1.4 .

A.13.2.3.7.1.2

Whenever the signal between the waterflow alarm device and the fire alarm control panel or bell is interrupted, there should be an indication either at the fire alarm control panel or the device, or both. Without some sort of indication, the signal can be left interrupted after the test to maintenance, essentially impairing the device itself. There are many ways to indicate signal interruption, including but not limited to initiation of audible and visual trouble condition or a light near the waterflow alarm device.

13.2.3.7.1.3

Interruption of the waterflow alarm circuit shall be accomplished using a device listed for the purpose.

13.2.3.7.1.4

Interruption of the waterflow alarm circuit shall result in an audible and visual trouble signal in accordance with *NFPA 72* or the adopted fire code, or other approved indication at the switch signal in accordance with *NFPA 72* or the adopted fire alarm code, or other approved indication at the switch.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 10:58:30 EDT 2021

Committee Statement

Committee Statement: Language added due to discussion of repeated poor field practices in disabling flow switches.

Response Message: SR-32-NFPA 25-2021

Public Comment No. 139-NFPA 25-2021 [New Section after A.13.2.2]

Public Comment No. 138-NFPA 25-2021 [New Section after 13.2.3.5.1]

Second Revision No. 33-NFPA 25-2021 [Section No. 13.3.3.4.1]

~~13.3.3.4.1~~

~~The test shall be conducted every time the valve is closed.~~

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 11:09:47 EDT 2021

Committee Statement

Committee Statement: Removed as the intent of the section is covered by 13.3.3.4.

Response Message: SR-33-NFPA 25-2021

Public Comment No. 24-NFPA 25-2021 [Section No. 13.3.3.4.1]

Public Comment No. 64-NFPA 25-2021 [Section No. 13.3.3.4.1]

Second Revision No. 34-NFPA 25-2021 [Section No. 13.4.1.1]

13.4.1.1*

Alarm valves and system riser check valves shall be externally inspected quarterly and shall verify the following:

(1) The gauges indicate normal supply water pressure is being maintained.

(2) The valves and trim are free of physical damage.

(3) All valves are in the appropriate open or closed position.

(4) The retarding chamber or alarm drains are not leaking.

(5) Where applicable, the valve in the connection to the pressure-type contacts or water motor–operated alarm devices are either sealed, locked, or electrically supervised in the open position.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 11:13:46 EDT 2021

Committee Statement

Committee Statement: Language added to correlate with first draft dry valve ITM requirements for valves and trim. Contractors corrected to contacts.

Response Message: SR-34-NFPA 25-2021

Public Comment No. 116-NFPA 25-2021 [Section No. 13.4.1.1]

Second Revision No. 35-NFPA 25-2021 [Section No. 13.4.3.1.1]

13.4.3.1.1

The preaction valve shall be externally inspected monthly to verify the following:

(1) The valve is free from physical damage.

(2) All trim valves are in the appropriate open or closed position.

(3) The valve seat is not leaking.

(4) Electrical components are in service.

(5) Where applicable, the valve in the connection to the pressure-type contacts or water motor–operated alarm devices are either sealed, locked, or electrically supervised in the open position.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 11:16:37 EDT 2021

Committee Statement

Committee Statement: Language added to correlate with first draft dry valve ITM requirements for valves and trim. Contractors corrected to contacts.

Response Message: SR-35-NFPA 25-2021

Public Comment No. 117-NFPA 25-2021 [Section No. 13.4.3.1.1]

Second Revision No. 36-NFPA 25-2021 [Section No. 13.4.3.1.3]

13.4.3.1.3

Strainers, filters, and restricted orifices~~, and diaphragm chambers~~ shall be inspected internally every 5 years unless tests indicate a greater frequency is necessary.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 11:18:10 EDT 2021

Committee Statement

Committee Statement: This is an integral part of the valve, so it is automatically included in the inspections for preaction valves.

Response Message: SR-36-NFPA 25-2021

Public Comment No. 9-NFPA 25-2021 [Section No. 13.4.3.1.3]

Second Revision No. 37-NFPA 25-2021 [New Section after 13.4.3.2.13]

13.4.3.2.14*

In preaction systems where nitrogen is used to allow for an increased *C* value in accordance with NFPA 13, the nitrogen supply shall be tested semiannually to verify the nitrogen concentration is at 98 percent or greater.

A.13.4.3.2.14

Nitrogen maintained at 98 percent is the requirement for corrosion control while not overtaxing generators. Higher concentrations only provide marginal increases in corrosion protection but increase wear and tear on generators and their compressors. Less than 98 percent the corrosion protection drops significantly. NFPA 13 allows for the use of higher C-factor pipe if using a nitrogen generator. If the system was designed and installed utilizing nitrogen, then nitrogen should be maintained for the life of the system or the water deliver times can be affected due to increased corrosion in combination with higher C-factor piping.

13.4.3.2.14.1

Where the nitrogen concentration is monitored at a constantly attended location, the concentration shall be verified annually.

13.4.3.2.14.2

If nitrogen concentration is found to be below 98 percent, the cause of the low concentration shall be identified and corrected.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 11:20:02 EDT 2021

Committee Statement

Committee Statement: These ITM requirements are necessary to maintain system design integrity in accordance with new NFPA 13 allowances for increased C values in dry and preaction systems using nitrogen.

Response Message: SR-37-NFPA 25-2021

Public Comment No. 136-NFPA 25-2021 [New Section after 13.4.3.2.13]

Second Revision No. 38-NFPA 25-2021 [Section No. 13.4.3.3.3]

13.4.3.3.3*

Auxiliary drains in preaction systems shall be operated after each system operation, toward the beginning of the heating season prior to the onset of freezing conditions where applicable , and thereafter as needed.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 11:22:34 EDT 2021

Committee Statement

Committee Statement: Change clarifies that all three are needed, as in cases such as where systems are protecting freezers. Annex material clarifies this requirement.

Response Message: SR-38-NFPA 25-2021

Public Comment No. 18-NFPA 25-2021 [Section No. 13.4.3.3.3]

Second Revision No. 39-NFPA 25-2021 [Section No. 13.4.4.1.1]

13.4.4.1.1

The deluge valve shall be externally inspected monthly to verify the following:

(1) The valve is free from physical damage.

(2) All trim valves are in the appropriate open or closed position.

(3) The valve seat is not leaking.

(4) Electrical components are in service.

(5) Where applicable, the valve in the connection to the pressure-type contacts or water motor–operated alarm devices are either sealed, locked, or electrically supervised in the open position.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 11:25:02 EDT 2021

Committee Statement

Committee Statement: Language added to correlate with first draft dry valve ITM requirements for valves and trim. Contractors corrected to contacts.

Response Message: SR-39-NFPA 25-2021

Public Comment No. 118-NFPA 25-2021 [Section No. 13.4.4.1.1]

Second Revision No. 40-NFPA 25-2021 [New Section after 13.4.5.2.9]

13.4.5.2.10*

In dry pipe systems where nitrogen is used to allow for an increased *C* value in accordance with NFPA 13, the nitrogen supply shall be tested semiannually to verify the nitrogen concentration is at 98 percent or greater.

A.13.4.5.2.10

Nitrogen maintained at 98 percent is the requirement for corrosion control while not overtaxing generators. Higher concentrations only provide marginal increases in corrosion protection but increase wear and tear on generators and their compressors. Less than 98 percent the corrosion protection drops significantly. NFPA 13 allows for the use of higher C-factor pipe if using a nitrogen generator. If the system was designed and installed utilizing nitrogen, then nitrogen should be maintained for the life of the system or the water deliver times can be affected due to increased corrosion in combination with higher C-factor piping.

13.4.5.2.10.1

Where the nitrogen concentration is monitored at a constantly attended location, the concentration shall be verified annually.

13.4.5.2.10.2

If nitrogen concentration is found to be below 98 percent, the cause of the low concentration shall be identified and corrected.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 11:54:02 EDT 2021

Committee Statement

Committee Statement: These ITM requirements are necessary to maintain system design integrity in accordance with new NFPA 13 allowances for increased C values in dry and preaction systems using nitrogen.

Response Message: SR-40-NFPA 25-2021

Public Comment No. 137-NFPA 25-2021 [New Section after 13.4.5.2.9]

Public Comment No. 88-NFPA 25-2021 [Global Input]

Second Revision No. 41-NFPA 25-2021 [New Section after 13.5.2.2.1]

13.5.2.2.2

A tag shall be attached to the valve indicating the date of the test, the flow, the inlet pressure, and the outlet pressure recorded during the test.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 11:57:36 EDT 2021

Committee Statement

Committee Statement: Important information that needs to be available at the valve for fire fighter use and should be at both valves and hose stations. Correlates with requirements being added in NFPA 1 and NFPA 14.

Response Message: SR-41-NFPA 25-2021

Public Comment No. 36-NFPA 25-2021 [New Section after 13.5.1.2.1]

Second Revision No. 42-NFPA 25-2021 [New Section after 13.5.3.2.1]

13.5.3.2.2

A tag shall be attached to the valve indicating the date of the test, the flow, the inlet pressure, and the outlet pressure recorded during the test.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 11:59:02 EDT 2021

Committee Statement

Committee Statement: Important information that needs to be available at the valve for fire fighter use and should be at both valves and hose stations. Correlates with requirements being added in NFPA 1 and NFPA 14.

Response Message: SR-42-NFPA 25-2021

Second Revision No. 44-NFPA 25-2021 [Section No. 13.11.1]

13.12.1

Whenever a valve, valve component, and/or valve trim is adjusted, repaired, reconditioned, or replaced, the action required in Table 13.12.1 shall be performed.

Table 13.12.1 Summary of Component Action Requirements

Component	Adjust	Repair/Recondition	Replace	Inspection, Test, and Maintenance Procedures
Water delivery components				
Post indicator and wall indicator valves	X	X	X	(1) Inspect for leaks at system pressure (2) Perform full operational test conforming to 13.3.3.1 (3) Perform spring torsion inspection conforming to 13.3.3.2 (4) Verify target visibility at shut and full open position (5) Test supervisory device (6) Valve status test
Control valves other than post indicator and wall indicator valves	X	X	X	(1) Inspect for leaks at system pressure (2) Perform full operational test conforming to 13.3.3.1 (3) Valves to be backed one-quarter turn from fully open to prevent jamming in accordance with 13.3.3.3 (4) Verify supervisory device (5) Valve status test
Alarm check valve	X	X	X	(1) Inspect for leaks at system pressure per 13.4.1 (2) Test all alarms and supervisory signals affected by the alarm valve (3) Valve status test
Dry pipe valve	X	X	X	(1) Inspect for leaks at system pressure (2) Trip test per 13.4.5.2 (3) Inspect condition of valve seat (4) Test all dry pipe system alarms and supervisory signals (5) Valve status test
Deluge/preaction valve	X	X	X	(1) Inspect for leaks at system pressure per 13.4.4/13.4.3 (2) Trip test (3) Inspect condition of valve seat

Component	Adjust	Repair/Recondition	Replace	Inspection, Test, and Maintenance Procedures
				(4) Test all deluge/preaction system alarms and supervisory signals (5) Valve status test
Quick-opening device	X	X	X	(1) Inspect for leaks at system pressure per 13.4.5.2.9 (2) Trip test (3) Valve status test
Pressure-regulating device — hose valves	X	X	X	(1) Inspect for leaks at system pressure per 13.5.2 (2) Full flow test (3) Valve status test
Pressure-regulating devices — other than hose valves	X	X	X	(1) Inspect for leaks at system pressure per Section 13.5 (2) Test pressure setting with full flow and without flow (3) Test supervisory device and alarm (4) Valve status test
Hose valve	X	X	X	(1) Inspect for leaks at system pressure per Section 13.6 (2) Valve status test
Backflow prevention device	X	X	X	(1) Inspect for leaks at system pressure per Section 13.7 (2) Forward flow test per 13.7.2.1 (3) Test supervisory device and alarm (4) Valve status test
Check valves	X	X	X	(1) Inspect for leaks at system pressure per 13.4.2 (2) Inspect for leaking through check valve (3) Valve status test
Fire department connection	X	X		(1) Inspect for leaks at system pressure per Section 13.8 (2) Valve status test
Fire department connection — sprinkler system(s)			X	(1) Isolate and hydrostatic test for 2 hours at 150 psi (10 bar) (2) Valve status test

Component	Adjust	Repair/Recondition	Replace	Inspection, Test, and Maintenance Procedures
Fire department connection — other than sprinkler system(s)			X	(1) Isolate and hydrostatic test for 2 hours at 50 psi (3.5 bar) above the normal working pressure [200 psi (14 bar) minimum] (2) Valve status test
Strainers	X	X	X	Inspect and clean in accordance with manufacturer's instructions
Main drain valves	X	X	X	Main drain test per ~~13.2.3~~ 13.2.2
Gauges			X	Calibrate per ~~13.2.5~~ 13.2.4
Alarm and supervisory components				
Alarm device	X	X	X	Test for conformance with NFPA 13 and/or *NFPA 72*
Supervisory device	X	X	X	Test for conformance with NFPA 13 and/or *NFPA 72*
System protection components				
Pressure relief valve — fire pump installation	X	X	X	See 8.3.3.11 and 13.5.6
Pressure relief valve — other than fire pump installation			X	Verify relief valve is listed or approved for the application and set to the correct pressure
Informational components				
Identification signs	X	X	X	Inspect for compliance with NFPA 13 and 13.3.1

Supplemental Information

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Submitter Information Verification

Committee: INM-AAA

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Committee Statement

Committee Statement: Action corrects references.

Response Message: SR-44-NFPA 25-2021

Public Comment No. 12-NFPA 25-2021 [Section No. 13.11.1]

Second Revision No. 78-NFPA 25-2021 [Section No. 14.3.1]

Detail SR-76

Detail SR-77

14.3.1*

An obstruction investigation shall be conducted for system or yard main piping wherever any of the following conditions exist:

(1) Defective intake for fire pumps taking suction from open bodies of water

(2) Discharge of obstructive material during routine water tests

(3) Foreign materials in fire pumps, dry pipe valves, or check valves

(4) Foreign material in water during drain tests or plugging of inspector's test connection(s)

(5) Unknown materials ~~are~~ heard in the system piping during draining, refilling, or otherwise flowing water through the system

(6) Plugged sprinklers

(7) Foreign organic or inorganic material with the potential to obstruct pipe or sprinklers ~~is~~ found in the pipe

(8) Failure to flush yard piping or surrounding public mains following new installations or repairs

(9) Record of broken public mains in the vicinity

(10) Abnormally frequent false tripping of a dry pipe valve(s)

(11) System ~~is~~ returned to service after an extended shutdown (i.e., greater than 1 year)

(12) Reason to believe that the sprinkler system contains sodium silicate or highly corrosive fluxes in copper systems

(13) System ~~has been~~ supplied with raw water via the fire department connection

(14) ~~Pinholes or other leaks~~Leakage caused by internal corrosion

(15)* ~~Fifty percent increase in the time it takes water to travel to the inspector's test connection from the time the valve trips during a full flow trip test of a dry pipe sprinkler system~~A 25 percent increase or a 5-second increase for portions of systems protecting dwelling units in the total water delivery time for dry pipe systems and double interlock preaction systems, with normal air pressure on the system and starting at the time of fully opened inspection test connection, when compared to the original system acceptance test

A.14.3.1(15)

When the original system acceptance test results are not available, the following water delivery times should be used to determine when an obstruction investigation is warranted:

(1) Portions of systems protecting dwelling units: 20 seconds or greater

(2) Ordinary hazard: 63 seconds or greater with a test manifold simulating two open sprinklers

(3) Extra hazard: 56 seconds or greater with a test manifold simulating four open sprinklers

(4) High-piled storage: 50 seconds or greater with a test manifold simulating four open sprinklers

(5) All other hazards with a test connection equal to a single sprinkler: 75 seconds or greater

~~Deterioration of the end of steel piping at grooved couplings or threaded fittings~~

(16)* Failure to maintain a nitrogen supply, except in instances of preplanned impairments, installed in accordance with NFPA 13 when a Hazen-Williams *C* value of 120 is used

for dry and preaction systems.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Fri Sep 10 13:36:48 EDT 2021

Committee Statement

Committee Statement: The 50% rule was created in the 2002 edition to initiate an obstruction investigation if there was an increase in the time it takes water getting to the inspector's test. The original text used the term "significant" but the committee decided this was too subjective and settled on a 50% increase in time for water delivery. The 50% was not supported by obstruction investigation or failure data.

The committee has not revisited the 50% since 2002. The proposed reduction to a 25% increase or a five second increase for portions of systems protecting dwelling units is to better correlate with reduced water delivery times added in the 2002 edition of NFPA 13 for residential (dwelling units) and calculated water delivery times.

Modified total water delivery time to correlate with acceptance requirements in NFPA 13.

Added double-interlock preaction systems to the requirement.

Response Message: SR-78-NFPA 25-2021

Public Comment No. 20-NFPA 25-2021 [Section No. 14.3.1]

Second Revision No. 45-NFPA 25-2021 [Section No. 14.3.2.2]

14.3.2.2*

Internal examination shall be performed at the following minimum ~~four~~ five points:

(1) System valve or water control valve, where provided

~~Riser~~

(2) Cross main – most remote end of remote cross main

(3) Branch line near the most remote line at connection to cross main

(4) Branch line near the most remote line at end of branch line

(5) Branch line piping directly connected to the most remote low point drain

Supplemental Information

File Name	Description	Approved
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Submitter Information Verification

Committee: INM-AAA

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Committee Statement

Committee Statement: Wording clarifies added system points that are most susceptible to internal corrosion and obstructions.

Response Message: SR-45-NFPA 25-2021

Public Comment No. 29-NFPA 25-2021 [Section No. 14.3.2.2]

Second Revision No. 84-NFPA 25-2021 [Section No. A.3.3.8]

A.3.3.8 Deficiency.

This standard classifies abnormal conditions as either noncritical or critical deficiencies and impairments. The use of the phrase "*fire protection system or unit*" is a broad reference to those terms used in the titles of Chapter 5 through 12. Some fire protection features are referenced to as systems in the installation standards (e.g., sprinkler, standpipe, water-spray, foam-water, water mist), or referred to as units (e.g., fire pumps), and others use neither term (e.g., private fire service mains, water tanks). For the purpose of this standard, the word "*unit*" refers to a fire pump and its connections required by NFPA 20, a water storage tank and its connections required by NFPA 22, or a private fire service fire main and its connections required by NFPA 24. The use of the word "*unit*" in the definitions of impairment, deficiency, critical deficiency, and noncritical deficiency is not referring to an individual component such as a sprinkler, valve, fitting, switch, or piece of pipe.

While conducting inspections and tests, various abnormal conditions might be encountered. Abnormalities or conditions requiring correction are classified as an impairment, critical deficiency, or noncritical deficiency. The classification is intended to provide guidance in responding to these conditions.

For example, an impairment should be addressed promptly by either immediately correcting the condition or implementing the impairment procedures found in Chapter 15. Critical and noncritical deficiencies should be corrected as soon as practical after considering the nature and severity of the risk. It should be noted that many jurisdictions have requirements for the timely correction of impairments and/or deficiencies.

Table A.3.3.8 provides examples for classifying conditions needing repair or correction that are identified during inspections and tests of water-based suppression systems or units (e.g., fire pump, water storage tank, private fire service main). It is not the intent of Table A.3.3.8 to specify a required classification. Table A.3.3.8 does not consider every variation of conditions needing repair or correction. The nature of the hazard or the life safety exposure of the occupancy should be considered when using Table A.3.3.8 to assign a classification. For example, several painted sprinklers in a large warehouse might be classified as noncritical, whereas a single painted sprinkler in a hospital patient sleeping room might be classified as critical.

Some conditions are more easily classified. A shut water control valve supplying a system, a portion of a system, or a unit is considered an impairment, whereas a missing water control valve sign is noncritical in nature. However, most classifications require a careful level of judgment, and in some cases further investigation might be needed. For example, where a main drain test on a sprinkler system shows a drop of more than 10 percent in full flow pressure, the classification is dependent on such issues as the full flow pressure in relation to the system demand. The classification could be noncritical, critical, or an impairment, depending on the impact to the performance or operation of the system.

Where Table A.3.3.8 shows more than one classification, the intent is to demonstrate that the proper classification should consider the context in which the condition exists. It is important to note that many conditions will require the system to be impaired to correct and the impairment procedures found in Chapter 15 apply.

Table A.3.3.8 should be used with careful judgment and the understanding that assigning a classification might require input from the authority having jurisdiction.

Table A.3.3.8 Water-Based Fire Protection System Inspection and Testing Findings

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
Chapter 5: Sprinkler Systems — Inspection					
All sprinklers	Leaking — spraying or running water	~~5.2.1.1.1~~ 5.2.1.1.2		X	
All sprinklers	Leaking — slowly dripping water	~~5.2.1.1.1~~ 5.2.1.1.2			X

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
All sprinklers	Foreign material attached or suspended from sprinkler	~~5.2.1.1.1~~ 5.2.1.1.2		X	X
All sprinklers	Heavily loaded, corroded, or painted; improper orientation; glass bulb has lost fluid; damaged	~~5.2.1.1.1~~ 5.2.1.1.2		X	
All sprinklers	Lightly or moderately loaded, corroded, or painted	~~5.2.1.1.1~~ 5.2.1.1.2			X
Concealed sprinkler coverplates	Caulked or glued to ceiling	~~5.2.1.1.1~~ 5.2.1.1.2	X		
Escutcheons and coverplates	Missing recessed or flush escutcheons; concealed coverplate with deflector and operating element in correct position	~~5.2.1.1.5~~ 5.2.1.1.6			X
Escutcheons and coverplates	Missing recessed or flush escutcheons; concealed coverplate with deflector and operating element not in correct position	~~5.2.1.1.5~~ 5.2.1.1.6		X	
All sprinklers	Minimum clearance to storage not maintained	5.2.1.2		X	
Spare sprinkler cabinet	Cabinet missing; temperature above maximum permitted; not proper number and type; missing wrench for each type	5.2.1.4			X
Pipe and fittings	Leaking — slowly dripping and/or moisture on surface	5.2.2.1			X
Pipe and fittings	Leaking — spraying or running water	5.2.2.1		X	
Pipe and fittings	Mechanical damage	5.2.2.1		X	X
Hangers and seismic braces	Loose	5.2.3.2			X

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
Hangers and seismic braces	Damaged or unattached	5.2.3.2		X	X
Hydraulic design information sign	Not attached properly; illegible; missing	5.2.5			X
Heat tracing	Not in accordance with manufacturer's instructions	5.2.6		X	
Information sign	Not attached; illegible; missing	5.2.7			X
General information sign	Not attached; illegible; missing	5.2.8			X
Antifreeze information sign	Not attached; illegible; missing	5.2.9			X
Chapter 5: Sprinkler Systems — Testing					
Antifreeze systems	Solution does not meet requirements of 5.3.4(4)	5.3.4		X	
Antifreeze systems	Solution is inadequate to prevent freezing	~~Table A.~~ 5.3.4.4.1(1), ~~5.3.4.2.1, and Figure A.5.3.4~~	X		
Sprinkler	Sprinkler(s) fails laboratory testing	5.3.1	X	X	
Chapter 6: Standpipe and Hose Systems — Inspection					
Hydraulic design information sign	Missing	6.2.2			X
Pipe and fittings	Leaking — slowly dripping and/or moisture on surface	6.2.4			X
Pipe and fittings	Leaking — spraying or running water	6.2.4		X	
Pipe and fittings	Mechanical damage	6.2.4		X	X
Hangers and supports	Damaged; missing	6.2.4		X	X
Hose	Cuts; couplings not of compatible threads	6.2.5 and NFPA 1962	X	X	
Hose	Deterioration; no gasket or damaged gaskets	6.2.5 and NFPA 1962		X	

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
Hose	Mildew present; corrosion present; hose not connected	6.2.5 and NFPA 1962		X	X
Hose nozzle	Missing; broken parts; thread gasket damaged	6.2.6 and NFPA 1962	X	X	
Hose storage	Hose not properly racked or rolled; nozzle clip missing; nozzle not contained; damaged; obstructed; failure to rotate	6.2.7 and NFPA 1962	X	X	
Cabinet	Corroded or damaged parts; not easy to open; not identified; door glazing in poor condition; lock not functioning in break glass type; physically obstructed; valve, hose nozzle, fire extinguisher, and so on not readily accessible	6.2.8 and NFPA 1962		X	
Chapter 6: Standpipe and Hose Systems — Testing					
Hose storage device	Rack will not swing out of cabinet at least 90 degrees	6.2.7 and NFPA 1962			X
Standpipe system	Test results did not provide design pressure at required flow	6.3.1	X	X	
Hydrostatic test of manual and semiautomatic dry standpipe systems	Leakage in ~~inside~~ piping	6.3.2.1			X
Chapter 7: Private Fire Service Mains — Inspection					
Exposed piping	Leaking — slowly dripping and/or moisture on surface	7.2.2.1.2			X
Exposed piping	Leaking — spraying or running water	7.2.2.1.2		X	
Exposed piping	Mechanical damage; corroded; not properly restrained	7.2.2.1.2		X	X

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
Mainline strainers	Plugged or fouled	7.2.2.3.2	X		
Mainline strainers	Corroded	7.2.2.3.2		X	
Dry barrel, wet barrel, and wall hydrant	Inaccessible; barrel contains ice; cracks in barrel	7.2.2.4 and 7.2.2.5	X		
Dry barrel, wet barrel, and wall hydrant	Barrel contains water; improper drainage from barrel; leaks at outlets or top of hydrant	7.2.2.4 and 7.2.2.5		X	
Dry barrel, wet barrel, and wall hydrant	Unusable outlets, nozzle threads, or operating nut	7.2.2.4 and 7.2.2.5	X		
Dry barrel, wet barrel, and wall hydrant	Worn but usable outlets, nozzle threads, or operating nut; missing wrench	7.2.2.4 and 7.2.2.5			X
Monitor nozzles	Missing; damaged	7.2.2.7	X		
Monitor nozzles	Corroded; leaking	7.2.2.7		X	
Hose/hydrant houses	Inaccessible	7.2.2.8	X		
Hose/hydrant houses	Damaged	7.2.2.8		X	
Hose/hydrant houses	Not fully equipped	7.2.2.8			X
Chapter 7: Private Fire Service Mains — Testing					
Underground and exposed piping	Test results show deterioration in water supply when compared to previous results	7.3.1.1	X	X	X
Dry barrel and wall hydrant	Hydrant did not flow clear or did not drain within 60 minutes	7.3.2.1 and 7.3.2.4			X
Monitor nozzles	Did not flow acceptable amount of water	7.3.3	X		
Monitor nozzles	Nozzle patterns not adequate/adjustable	7.3.3			X
Monitor nozzles	Failure of oscillating mechanism	7.3.3.2	X		

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
Monitor nozzles	Did not operate throughout their full range	7.3.3.2		X	
Chapter 8: Fire Pumps — Inspection					
Pump house/room	Ventilating louvers not free to operate	8.2.2(1)(c)		X	
Pump house/room	Heat not adequate, temperature less than 40°F (4°C)	8.2.2(1)(a)	X	X	
Pump house/room	Heat not adequate, temperature less than 70°F (21°C) for diesel pumps without engine heaters	8.2.2(1)(b)	X	X	
Pump house/room	Excessive water on floor	8.2.2(1)(d)		X	
Pump house/room	Coupling guard not in place	8.2.2(1)(e)		X	
Pump system	Suction or discharge not fully open	8.2.2(2)(a)	X		
Pump system	Bypass valves not fully open	8.2.2(2)(a)		X	
Pump system	Pipe leaking	8.2.2(2)(b)		X	
Pump system	Suction line and system line pressure not normal	8.2.2(2)(c) and 8.2.2(2)(d)	X	X	X
Pump system suction	Reservoir empty	8.2.2(2)(e)	X		
Pump system	Suction reservoir does not have required water level; wet pit suction screens missing	8.2.2(2)(e)		X	
Pump system	Wet pit suction screens obstructed	8.2.2(2)(f)	X		
Pump system	Waterflow test valves open; hose connection valve open; test line contains water	8.2.2(2)(g)		X	X
Electrical power to pump system	No electrical power provided — controller pilot light not illuminated; transfer switch pilot light not illuminated; isolating switch not closed; reverse phase alarm pilot	8.2.2(3)	X		

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
	light on; normal phase light is off				
Electrical power to pump system	Electrical power provided — controller pilot light not illuminated; transfer switch pilot light not illuminated; normal phase light is not illuminated	8.2.2(3)			X
Electric pump system	Oil level in vertical motor sight glass not normal	8.2.2(3)(e)		X	
Pressure maintenance (jockey) pump	No power	8.2.2(3)(f)			X
Diesel engine system	Fuel tank less than two-thirds full	8.2.2(4)(a)		X	
Diesel engine system	Fuel tank empty	8.2.2(4)(a)	X		
Diesel engine system	Controller selector switch not in auto position	8.2.2(4)(b)	X		
Diesel engine system	Battery voltage readings not normal	8.2.2(4)(c)	X	X	
Diesel engine system	Battery charging current not normal	8.2.2(4)(d)		X	
Diesel engine system	Battery failure pilot lights on	8.2.2(4)(e)	X		
Diesel engine system	Battery pilot lights off	8.2.2(4)(e)		X	
Diesel engine system	Alarm pilot lights are on	8.2.2(4)(f)		X	
Diesel engine system	Engine running time meter not reading	8.2.2(4)(g)			X
Diesel engine system	Oil level in right angle gear drive not normal (i.e., not at level mark, but visible in sight glass)	8.2.2(4)(h)			X
Diesel engine system	Oil level in right angle gear drive below low level (i.e., not visible in sight glass or below one finger knuckle from inspection hole)	8.2.2(4)(h)		X	
Diesel engine system	Crankcase oil level not normal	8.2.2(4)(i)			X
Diesel engine system	Crankcase oil level below low level	8.2.2(4)(i)	X		

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
Diesel engine system	Cooling water level not normal	8.2.2(4)(j)			X
Diesel engine system	Cooling water level not visible	8.2.2(4)(j)		X	
Diesel engine system	Electrolyte level in batteries below top of battery plates	8.2.2(4)(k)		X	
Diesel engine system	Battery terminals corroded	8.2.2(4)(l)		X	
Diesel engine system	Water-jacket heater not operating	8.2.2(4)(m)		X	
Steam system	Steam pressure gauge reading not normal	8.2.2(5)		X	
Chapter 8: Fire Pumps — Testing					
Fire pump test	Pump did not start automatically	8.3.2.2	X		
Fire pump test	Pump failed to run for 10 minutes	8.3.2.3	X		
Fire pump test	Pump failed to run for 30 minutes	8.3.2.4	X		
Fire pump test — pump system	System suction and discharge gauge reading, or pump starting pressure, outside the acceptable range	8.3.2.9(1)		X	
Fire pump test — pump system	Pump packing gland discharge not acceptable; unusual noise or vibration; packing boxes, bearings, or pump casing overheating	8.3.2.9(1)		X	
Fire pump test — electrical-motor-driven system	Time for motor to accelerate to full speed, time controller is on first step, or time pump runs after starting not acceptable	8.3.2.9(2)	X		
Fire pump test — diesel-engine-driven system	Time for engine to crank and time for engine to reach running speed not acceptable (engine is required to reach rated speed within 20 seconds in accordance with 11.2.4.1.4 of NFPA 20)	8.3.2.9(3)		X	

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
Fire pump test — diesel-engine-driven system	Low rpm and does not meet system demand	8.3.2.9(3)	X		
Fire pump test — diesel-engine-driven system	Low rpm and meets system demand	8.3.2.9(3)			X
Fire pump test — diesel-engine-driven system	Low oil pressure; high temperature; high cooling water pressure	8.3.2.9(3)		X	
Fire pump test — steam system	Gauge reading and time for turbine to reach running speed not acceptable	8.3.2.9(4)		X	
Fire pump annual test	Circulation relief valve and/or pressure relief valve did not work properly at churn condition	8.3.3.10(1)	X	X	
Fire pump annual test	Pressure relief valve did not work properly at each flow condition	~~8.3.3.11~~ 8.3.3.12	X	X	
Fire pump annual test (with transfer switch)	Overcurrent protective devices opened when simulating a power failure condition at peak load; power not transferred to alternate source; pump did not continue to perform at peak load; pump did not reconnect to normal power after removing power failure condition	~~8.3.3.12~~ 8.3.3.13	X		
Fire pump annual test	Alarms did not properly operate	~~8.3.3.13~~ 8.3.3.14		X	
Fire pump annual test	Parallel or angular alignment not correct	8.3.6.4		X	
Fire pump annual test	Flow test does not meet most demanding system flow and pressure requirements	8.3.7.2.3(1)	X	X	

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
Fire pump annual test	Flow test results not within 5 percent of acceptance test or nameplate	8.3.7.2.3(3)			X
Fire pump annual test	Voltage readings at motor not within 5 percent below or 10 percent above rated (nameplate)	8.3.7.2.9		X	
Diesel fuel annual test	Diesel fuel tested for degradation and failed	8.3.4	X		
Chapter 9: Water Storage Tanks — Inspection					
Water level	Water level and/or condition not correct	9.2.1		X	
Water level	Tank is below the designed water level	9.2.1	X		
Water temperature	Heating system not operational, water temperature below 40°F (4°C)	9.2.3		X	
Water temperature	Water temperature at or below 32°F (0°C)	9.2.3	X		
Exterior	Tank exterior, supporting structure, vents, foundation, catwalks, or ladders (where provided) damaged	9.2.4.1			X
Exterior	Area around tank has fire exposure hazard in form of combustible storage, trash, debris, brush, or material	9.2.4.2			X
Exterior	Accumulation of material on or near parts that could result in accelerated corrosion or rot	9.2.4.2			X
Exterior	Ice buildup on tank and support	9.2.4.2		X	
Exterior	Erosion exists on exterior sides or top of embankments supporting coated fabric tanks	9.2.4.2		X	X

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
Exterior	Expansion joints leaking or cracking	9.2.4.3		X	
Exterior	Hoops and grilles of wooden tanks in poor condition	9.2.4.4			X
Exterior	Exterior painted, coated, or insulated surfaces of tanks or supporting structure degraded	9.2.4.5			X
Interior	Pitting, corrosion, spalling, rot, or other forms of deterioration; waste materials exist; aquatic growth; local or general failure of interior coating	9.2.5.3			X
Interior	Voids beneath floor, with sand in middle of tanks on ring-type foundations	9.2.5.5			X
Interior	Heating system components or piping in poor condition but working	9.2.5.6			X
Interior	Heating system components or piping in poor condition and not working	9.2.5.6	X	X	
Interior	Blockage of antivortex plate	9.2.5.7	X		
Interior	Deterioration of antivortex plate	9.2.5.7		X	
Chapter 9: Water Storage Tanks — Testing					
Interior testing	Tank coating did not pass adhesion, coating thickness, or wet sponge test	9.2.6			X
Interior testing	Tank walls and bottoms did not pass ultrasonic test	9.2.6			X
Interior testing	Tank bottom seams did not pass vacuum-box test	9.2.6			X
Level indicator	Lacked freedom of movement, or not accurate	9.3.1		X	X

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
Heating system	Not in working order	9.3.2	X	X	
Low-temperature alarm	Low-water-temperature alarm did not pass test	9.3.3		X	
High-temperature alarm	High-water-temperature limit switch did not pass test	9.3.4			X
Water level alarms	High- and low-water-level alarms did not pass test	9.3.5		X	
Chapter 10: Water Spray Fixed Systems — Inspection					
Pipe and fittings	Mechanical damage; missing or damaged paint or coating; rusted or corroded; not properly aligned or trapped sections; low-point drains not functioning; improper location of rubber-gasketed fittings	10.2.3.1		X	X
Hangers and seismic braces	Damaged or missing; not securely attached to structural or piping; missing or damaged paint or coating; rusted or corroded	10.2.3.2		X	X
Water spray nozzles	Discharge devices missing	10.2.4.1	X		
Water spray nozzles	Discharge devices not properly positioned or pointed in design direction; loaded or corroded	10.2.4.1		X	
Water spray nozzles	Caps or plugs (if required) not free to operate as intended	~~10.2.4.2~~ 10.2.4.1.1	X		
Water spray nozzles	Missing caps or plugs (if required)	~~10.2.4.2~~ 10.2.4.1.1		X	
Strainers	Plugged or fouled	10.2.6	X		
Strainers	Damaged or corroded	10.2.6		X	
Drainage	Trap sumps and drainage trenches blocked; retention embankments or	10.2.7			X

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
	dikes in disrepair				
Ultra-high-speed	Detectors have physical damage or deposits on lenses of optical detectors	10.4.2		X	
Ultra-high-speed	Controllers found to have faults	10.4.3		X	
Chapter 10: Water Spray Fixed Systems — Testing					
Operational test	Heat detection system did not operate within 40 seconds; flammable gas detection system did not operate within 20 seconds	10.3.3.1	X		
Operational test	Nozzles plugged	10.3.3.3.1	X		
Operational test	Nozzles not correctly positioned	10.3.3.3.1		X	
Operational test	Pressure readings not comparable to original design requirements	10.3.3.4		X	
Operational test	Manual actuation devices did not work properly	10.3.5	X		
Ultra-high-speed operational test	Response time was more than 100 milliseconds	10.4.5.2	X		
Chapter 11: Foam-Water Sprinkler Systems — Inspection					
Foam-water discharge devices	Missing	~~11.2.2.1.1~~ 11.2.4.11	X		
Foam-water discharge devices	Not properly positioned or pointed in design direction; loaded or corroded	~~11.2.4.1.1~~ 11.2.4.1.1		X	
Foam-water discharge devices	Caps or plugs (if required) not free to operate as intended	~~11.2.2.1.2~~ 11.2.4.1.2	X		
Foam-water discharge devices	Missing caps or plugs (if required)	~~11.2.2.1.2~~ 11.2.4.1.2		X	
Foam-water discharge devices	Incorrect foam concentrate for application and devices	~~11.2.2.1.4~~ 11.2.4.1.4		X	

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
Fixed foam discharge outlet	Corrosion	~~11.2.2.2.2~~ 11.2.4.2.2			X
Fixed foam discharge outlet	Damaged; painted; orifice plate or jet orifice missing; clogged	~~11.2.2.2.2~~ 11.2.4.2.2	X		
Fixed foam discharge outlet	Vapor seal not present	~~11.2.2.2.4.1~~ 11.2.4.2.4		X	
Pressure foam maker	Orifice clogged	~~11.2.2.2.5~~ 11.2.4.2.5	X		
Pressure foam maker	Check valve not operating freely	~~11.2.2.2.5.1~~ 11.2.4.2.5.1	X		
Pressure foam maker	Rupture disc burst	~~11.2.2.2.5.5~~ 11.2.4.2.5.5		X	
Pressure foam maker	Liquid level below injection line	~~11.2.2.2.5.7~~ 11.2.4.2.5.7		X	
Pressure foam maker	Damaged or corroded	~~11.2.2.2.5.8~~ 11.2.4.2.5.8			X
Pressure foam maker	Air intake damaged, clogged, or missing	~~11.2.2.2.5.9~~ 11.2.4.2.5.9	X		
Foam concentrate strainers	Blowdown valve open or not plugged	~~11.2.4.4~~ 11.2.6.4		X	
Drainage	Trap sumps and drainage trenches blocked; retention embankments or dikes in disrepair	~~11.2.5~~ 11.2.7			X
Proportioning systems (all)	Valves not in correct open/closed position in accordance with specified operating conditions	~~11.2.6.3~~ 11.2.8.3	X		
Standard pressure proportioner	Automatic drains (ball drip valves) not free or open, external	~~11.2.6.5.2~~ 11.2.8.5.2			X
Bladder tank proportioner	Water control valve to foam concentrate in “closed” position	~~11.2.6.6.2~~ 11.2.8.6.2	X		
Line proportioner	Strainer damaged or corroded; pressure vacuum vent not operating freely	~~11.2.6.6.3~~ 11.2.8.6.3		X	
Line proportioner	Strainer plugged or fouled	~~11.2.6.6.3~~ 11.2.8.6.3	X		

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
Standard balanced pressure proportioner	Sensing line valves not open; no power to foam liquid pump	~~11.2.6.6.4~~ 11.2.8.6.4	X		
Standard balanced pressure proportioner	Strainer plugged or fouled	~~11.2.6.6.4~~ 11.2.8.6.4	X		
Standard balanced pressure proportioner	Strainer damaged or corroded; pressure vacuum vent not operating freely; gauges damaged or not showing proper pressures	~~11.2.6.6.4~~ 11.2.8.6.4		X	
In-line balanced pressure proportioner	Sensing line valves at pump unit or individual proportioner stations not open; no power to foam liquid pump	~~11.2.6.6.5~~ 11.2.8.6.5	X		
In-line balanced pressure proportioner	Strainer damaged or corroded; pressure vacuum vent not operating freely; gauges damaged or not showing proper pressures	~~11.2.6.6.5~~ 11.2.8.6.5		X	
In-line balanced pressure proportioner	Strainer plugged or fouled	~~11.2.6.6.5~~ 11.2.8.6.5	X		
Orifice plate proportioner	No power to foam liquid pump	~~11.2.6.6.6~~ 11.2.8.6.6	X		
Orifice plate proportioner	Strainer damaged or corroded; pressure vacuum vent not operating freely; gauges damaged or not showing proper pressures	~~11.2.6.6.6~~ 11.2.8.6.6		X	
Orifice plate proportioner	Strainer plugged or fouled	~~11.2.6.6.6~~ 11.2.8.6.6	X		
Wide-range proportioner	Reference marks not aligned	~~11.2.6.6.7~~ 11.2.8.6.7		X	
Wide-range proportioner	Proportioner installed backwards	~~11.2.6.6.7~~ 11.2.8.6.7	X		
Proportioning systems (all)	Foam concentrate in tank below the design	~~11.2.7.1~~ 11.2.9.1	X		

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
	requirements				
Proportioning systems (all)	Corrosion on foam concentrate tanks	~~11.2.7.2~~ 11.2.9.2			X
Bladder tank proportioner	Foam in water surrounding bladder	~~11.2.7.9~~ 11.2.9.8	X		
Pipe and fittings	Mechanical damage; rusted or corroded; not properly aligned or trapped sections; low-point drains not functioning; improper location or poor condition of rubber-gasketed fittings	~~11.2.9.2.1~~ 11.2.11.2 , ~~11.2.9.2.3~~ 11.2.11.4 , ~~11.2.9.2.5~~ 11.2.11.5 , and ~~11.2.9.2.6~~ 11.2.11.6		X	X
Hangers and seismic braces	Damaged or missing; not securely attached to structure or piping; missing or damaged paint or coating; rusted or corroded	~~11.2.10.2~~ 11.2.12		X	X
Foam contamination	Foam types mixed or water intrusion	~~11.2.11.1.2~~ 11.2.13.1.2		X	
Foam dam	Damaged or clogged drains within dam	~~11.2.13~~ 11.2.15	X		
Chapter 11: Foam-Water Sprinkler Systems — Testing					
Foam concentrate	Fails quality testing	11.3.1.3		X	
Operational test	Foam sample failed concentration test	11.3.2.2	X		
Hydro test	Tank fails test	11.3.5.1	X		
Operational test	Fire detection system did not operate within requirements of *NFPA 72*	11.3.10.2.5		X	
Operational test	Nozzles plugged	11.3.10.2.7.1	X		
Operational test	Nozzles not correctly positioned	11.3.10.2.7.1		X	
Operational test	Pressure readings not comparable to original design requirements	11.3.10.2.8		X	
Operational test	Manual actuation devices not working properly	11.3.10.4	X		

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
Fixed foam discharge outlet	Orifice plugged	11.3.11.1	X		
Foam dam	Failed to retain water	11.3.11.5.1	X		
Pressure foam maker	Plugged	11.3.11.6.2	X		
Chapter 13: Common Components and Valves — Inspection					
Alarm devices	Physical damage	~~13.2.4.3~~ 13.2.3.1 and ~~13.2.4.4~~ 13.2.3.2		X	X
Gauges	Not operating or damaged	~~13.2.5.1.1~~ 13.2.4.1.1			X
Gauges	Not showing normal water/air pressure	~~13.2.5.1.2~~ 13.2.4.1.2 and ~~13.2.5.1.3~~ 13.2.4.1.3	X	X	X
Gauges	Freezer — system pressure lower than compressor	~~13.2.5.1.4~~ 13.2.4.1.4	X		
Control valve	Improper closed position	13.3.2.2	X		
Control valve	Improper open position	13.3.2.2		X	
Control valve	Not accessible; no appropriate wrench (if required); no identification	13.3.2.2			X
Control valve	Not sealed, locked, or supervised	13.3.2.2		X	
Alarm valve	External physical damage; trim valves not in appropriate open or closed position; retard chamber or alarm drain leaking	13.4.1.1		X	
Valve enclosure	Upon visual observation, enclosure not maintaining minimum 40°F (4°C) temperature	4.1.2.5	X	X	
Valve enclosure	Low-temperature alarms (if installed) are physically damaged	4.1.2.5.1 and 4.1.2.5.2		X	
Preaction valve and deluge valve	External physical damage; trim valves not in appropriate open or closed position; valve seat leaking	13.4.3.1.1 and 13.4.4.1.1		X	

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
Preaction valve and deluge valve	Electrical components not in service	13.4.3.1.1 and 13.4.4.1.1	X		
Dry pipe valve/quick-opening device	External physical damage; trim valves not in appropriate open or closed position; intermediate chamber leaking	13.4.5.1.2		X	
Sprinkler pressure-reducing control valves	Not in open position	13.5.1.1	X		
Sprinkler pressure-reducing control valves	Not maintaining downstream pressures in accordance with design criteria	13.5.1.1	X	X	X
Sprinkler pressure-reducing control valves	Leaking; damaged; hand wheel missing or broken	13.5.1.1		X	
Hose connection pressure-reducing valves	Hand wheel missing; hose threads damaged and not usable; reducer missing	13.5.2.1	X		
Hose connection pressure-reducing valves	Hand wheel broken;hose threads damaged but usable; leaking	13.5.2.1		X	
Hose connection pressure-reducing valves	Cap missing	13.5.2.1			X
Hose rack assembly pressure-reducing valve	Hand wheel broken or missing; leaking	13.5.3.1		X	
Hose valves	Leaking; visible obstructions; caps, hose threads, valve handle, or cap gasket damaged or in poor condition; no restricting device	13.6.1		X	
Backflow prevention assemblies	Reduced-pressure assemblies; differential-sensing valve relief port	13.7.1.1		X	

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
	continuously discharging				
Fire department connection	Not accessible; damaged couplings and not usable	13.8.1	X		
Fire department connection	Damaged couplings but usable; clapper not operating properly or missing	13.8.1		X	
Fire department connection	Check valve leaking; automatic drain not operating properly or missing	13.8.1			X
Fire department connection	Missing identification sign	13.8.1			X
Chapter 13: Common Components and Valves — Testing					
Main drain	More than 10 percent drop in full flow pressure	~~13.2.3.3~~ 13.2.2.3	X	X	X
Alarm devices	Water motor and gong not functioning without an additional electrically supervised waterflow device	~~13.2.4.3.2~~ 13.2.3.1.2		X	
Alarm devices	Water motor and gong not functioning with an additional electrically supervised waterflow device	~~13.2.4.3.2~~ 13.2.3.1.2			X
Alarm devices	Pressure switch or vane-type switch not functioning; no alarm	~~13.2.4.4.2~~ 13.2.3.2.2		X	
Gauges	Not replaced or calibrated in 5 years; not accurate within 3 percent of scale	~~13.2.5.2~~ 13.2.4.2 and ~~13.2.5.3~~ 13.2.4.3			X
Control valve	Valve not operating through its full range	13.3.3.1	X		
Control valve	No spring or torsion felt in rod when opening post indicator valve	13.3.3.2	X		

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
Supervisory switches	No signal from two revolutions of hand-wheel from normal position or when stem has moved one-fifth of distance from normal position	13.3.3.5.2			X
Supervisory switches	Signal restored in position other than normal	~~13.3.3.5.2~~ 13.3.3.5.3		X	
Preaction valve	Priming water level not correct	13.4.3.2.1		X	
Preaction valve	Three-year air leakage test failed	13.4.3.2.6		X	X
Preaction valve	Low air pressure switch did not send signal; no alarm	13.4.3.2.11		X	
Preaction and deluge valve	Low-temperature switch did not send signal; no alarm	13.4.3.2.12 and 13.4.4.2.14		X	
Preaction valve	Automatic air maintenance device did not pass test	13.4.3.2.13			X
Deluge valve	Annual full flow trip test revealed plugged nozzles; manual actuation devices did not operate properly	13.4.4.2.4	X		
Deluge valve	Pressure reading at hydraulically most remote nozzle and/or at valve not compatible with original design values	13.4.4.2.7		X	
Dry pipe valve	Priming water level not correct	13.4.5.2.1		X	
Dry pipe valve	Does not trip during test	13.4.5.2.2	X		
Quick-opening device	Quick-opening device did not pass test	13.4.5.2.4		X	
Dry pipe valve	Low air pressure switch did not send signal; no alarm	13.4.5.2.6		X	
Dry pipe valve	Low-temperature switch did not send signal; no alarm	13.4.5.2.7		X	
Dry pipe valve	Automatic air maintenance device did not pass test	13.4.5.2.8		X	

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
Dry pipe system	Three-year leakage test failed	13.4.5.2.9		X	X
Sprinkler pressure-reducing control valves	Test results not comparable to previous results	13.5.1.2	X	X	X
Hose connection pressure-regulating valves	Test results not comparable to previous results	13.5.2.2	X	X	X
Hose rack assembly pressure-regulating valve	Test results not comparable to previous results	13.5.3.2	X	X	X
Hose valves (Class I and Class III standpipe systems)	Annual test revealed valve leaking or difficult to operate	13.6.2.1.1		X	
Hose valves (Class II standpipe systems)	Test revealed valve leaking or difficult to operate	13.6.2.2.1		X	
Backflow prevention assemblies	Did not pass minimum flow requirement for forward flow test	13.7.2.1	X	X	
Air compressors and nitrogen generators	Unit does not start at required air pressure; unit does not restore normal supervisory air pressure in required time frame; unit overheats while operating	13.10.3		X	X
Chapter 14: Internal Piping Condition and Obstruction Investigation — Testing					
Assessment of internal condition	Assessment revealed presence of MIC, zebra mussels, rust, or scale	14.2.1		X	

Supplemental Information

File Name	Description	Approved
25_Table_A.3.3.8_Updates.doc.docx	See Attached Word Doc For Changes. For staff use	

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Tue Sep 14 14:56:11 EDT 2021

Committee Statement

Committee Statement: Reference corrections were made to the table to incorporate first and second revisions.

Response Message: SR-84-NFPA 25-2021

Second Revision No. 20-NFPA 25-2021 [Section No. A.3.3.12]

A.3.3.12 Exercise.

Examples of exercising components include operating control valves through their full range of motion, operating system components, or moving a ~~valve~~ backflow preventer from its seat.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 16:05:10 EDT 2021

Committee Statement

Committee Statement: Control valves need to be operated through their full range of motion.

Response Message: SR-20-NFPA 25-2021

Public Comment No. 67-NFPA 25-2021 [Section No. A.3.3.12]

Second Revision No. 48-NFPA 25-2021 [Section No. A.4.1.1]

A.4.1.1

Any portion of or all inspection, testing, and maintenance is permitted to be contracted out to an inspection, testing, and maintenance service company. ~~When such a service company agrees to perform inspections, tests, and maintenance at a specific frequency required by this standard, it should perform all required inspections, tests, and maintenance more frequently than specified. For example, aservice company agrees to perform required inspections, tests, and maintenance on an annual basis. The inspections, tests, and maintenance required on a daily, weekly, quarterly, and semiannual frequency should also be performed annually.~~

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 13:45:34 EDT 2021

Committee Statement

Committee Statement: While the concept of incorporating daily, weekly, monthly, etc. inspections and tests into an annual ITM program makes some sense, that concept cannot be expanded to include ITM beyond the one-year mark. For example, if a service company is hired to conduct the 5-year water flow test for a standpipe system, it should not obligate the service provider to conduct all ITM requirements for frequencies of annual or less. Neither should it oblige the service provider to conduct a 5-year check valve maintenance, a 5-year internal inspection or a 5-year hydrostatic test. All that would be beyond the scope of the requirement to conduct a flow test.

As noted in 4.1.1, the owner is responsible for ITM, so this annex text should not obligate a service provider for any specific tasks. However, the first sentence was retained to clarify that the owner has the ability to contract out to a service company. The scope of the work needs to be laid out in the contractual agreement.

Response Message: SR-48-NFPA 25-2021

Public Comment No. 96-NFPA 25-2021 [Section No. A.4.1.1]

Second Revision No. 50-NFPA 25-2021 [Section No. A.4.1.5.1.1]

A.4.1.6.1.1

~~For an example~~ For examples of a reference sources containing ~~a~~ lists of links to manufacturers' information regarding components that are recalled or part of a replacement program, see ~~www.nfsa.org~~ the manufacturers' websites or other applicable websites .

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 15:04:02 EDT 2021

Committee Statement

Committee Statement: Removed website and added manufacturer's website since the link only includes those that have voluntarily reported the recall to maintainer of the site.

Response Message: SR-50-NFPA 25-2021

Public Comment No. 48-NFPA 25-2021 [Section No. A.4.1.5.1.1]

Second Revision No. 18-NFPA 25-2021 [Section No. A.5.2.1.1]

A.5.2.1.1

The ~~coverplates~~ cover plates of concealed sprinklers do not need to be removed for the annual inspection. Where the inspection of ~~coverplates~~ cover plates for concealed sprinklers reveals possible signs of leakage, damage, corrosion, or other adverse conditions, those ~~coverplates~~ cover plates should be removed to facilitate a closer inspection of the concealed sprinkler.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Wed Sep 08 15:39:11 EDT 2021

Committee Statement

Committee Statement: Clarification needed to differentiate the annual inspection from the new five-year requirement to inspect sprinklers behind concealed cover plates.

Response Message: SR-18-NFPA 25-2021

Second Revision No. 75-NFPA 25-2021 [Section No. A.5.4.1.1]

A.5.4.1.1(4)

In the event of a fire, all sprinklers within the fire area should be inspected after the incident. In situations where the fire was quickly controlled or extinguished by one or two sprinklers, it might be necessary only to replace the activated sprinklers. Replacement sprinklers should be of the same make and model or have compatible performance characteristics *(see ~~5.4.1.2~~ 5.4.1.3)*. Soot-covered sprinklers should be replaced because deposits can result in the corrosion of operating parts. In the event of a substantial fire, special consideration should be given to also replacing the first ring of sprinklers surrounding the activated sprinklers due to the potential for excessive thermal exposure, which could weaken the response mechanisms.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Fri Sep 10 12:05:59 EDT 2021

Committee Statement

Committee Statement: This ties this annex text to the correct section number.

Response Message: SR-75-NFPA 25-2021

Public Comment No. 99-NFPA 25-2021 [Section No. A.5.4.1.1]

Second Revision No. 56-NFPA 25-2021 [Section No. A.8.1.1.2.1]

~~**A.8.1.1.2.1**~~

~~Shaft movement should be less than 1/8 in. (3 mm).~~

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 17:09:11 EDT 2021

Committee Statement

Committee Statement: This annex note implies that a measurement should be taken. The requirement of section 8.1.1.2.1 is to inspect which just includes a visual observation.

Response Message: SR-56-NFPA 25-2021

Public Comment No. 147-NFPA 25-2021 [Section No. A.8.1.1.2.1]

Second Revision No. 59-NFPA 25-2021 [Section No. A.8.3.3.5]

~~A.8.3.3.5~~

~~For vertical turbine fire pumps installed in a well shaft, see 7.3.5.3 and A.7.3.5.2 of NFPA 20 for requirements on determining net pump pressures.~~

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Fri Sep 10 10:10:39 EDT 2021

Committee Statement

Committee Statement: There is an apparent typo in the proposed new text of A.8.3.3.5. The reference to "see 7.3.5.3 and A.7.3.5.2 of NFPA 20 for requirements on determining net pump pressures" is not applicable. Section 7.3.5.3 contains the requirements for water level detection and there is no A.7.3.5.2. There is no discussion of net pump pressure in either section.

Response Message: SR-59-NFPA 25-2021

Public Comment No. 115-NFPA 25-2021 [Section No. A.8.3.3.5]

Second Revision No. 31-NFPA 25-2021 [Section No. A.12.3.1.1]

A.12.3.1.1

Water mist nozzles should be first given a visual inspection for signs of mechanical damage, cleaning, painting, leakage in service, or severe loading or corrosion, all of which are causes for immediate replacement.

Automatic nozzles that have passed the visual inspection should be laboratory tested for sensitivity (RTI), functionality, and K-factor. Thermal sensitivity should be not less than that permitted in post-corrosion testing of new automatic water mist nozzles of the same type. Automatic water mist nozzles should be tested for functionality at their minimum operating pressure specified by the manufacturer. Automatic water mist nozzles should have a K-factor within ~~±5~~ ±10 percent of the value published by the manufacturer.

Some example testing standards include EN 12259-1, *Fixed firefighting systems — Components for sprinkler and water spray systems — Part 1: Sprinklers*; UL 2167, *Water Mist Nozzles for Fire Protection Service*; and FM Approvals Standard 5560, *Water Mist Systems*.

Water mist nozzles that have been in service for a number of years should not be expected to have all of the performance measurements of a new water mist nozzle. However, if there is any question about their continued satisfactory performance, the water mist nozzles should be replaced.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 10:14:48 EDT 2021

Committee Statement

Committee Statement: The current tolerance is considered too restrictive. Increasing the tolerance to ±10 percent allows for a limited change in the K-factor and provides consistency with the post corrosion requirements currently included in UL 2167 (Water Mist Nozzles).

Response Message: SR-31-NFPA 25-2021

Public Comment No. 41-NFPA 25-2021 [Section No. A.12.3.1.1]

Public Comment No. 42-NFPA 25-2021 [Section No. A.12.3.1.1]

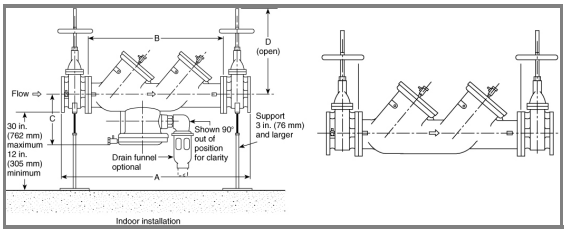
Second Revision No. 47-NFPA 25-2021 [Section No. A.13.1]

A.13.1

Alarm Valves. Alarm valves are installed in water-based fire protection systems to sound a fire alarm when a flow of water from the system equals or exceeds the flow of a single discharge device. A retarding chamber, which minimizes false alarms due to surges and fluctuating water supply pressure, can be supplied with the alarm valve.

Backflow Prevention Devices. Backflow prevention devices are used to prevent water in a fire protection system from entering the public water supply due to a reverse flow of water, thermal expansion, hydraulic shock, back pressure, or back siphonage. *[See Figure A.13.1(a).]*

Figure A.13.1(a) Reduced-Pressure Backflow Preventers (left) and Double Check Valve Assemblies (right).



Ball Valves. Ball valves are manually operated through their full range of open to closed positions with a one-quarter turn.

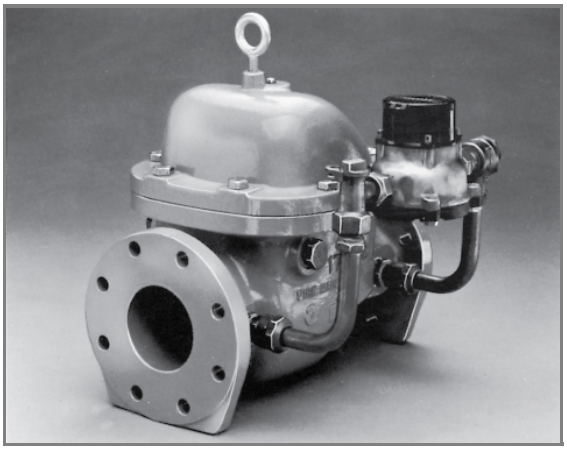
Butterfly Valves. Butterfly valves are water supply control valves with gear operators to assist in opening and closing. Butterfly valves can be of the wafer or grooved-end type. *[See Figure A.13.1(b).]*

Figure A.13.1(b) Butterfly Post Indicator Valve. *(Courtesy of Henry Pratt Co.)*



Check Valves. Check valves allow waterflow in one direction only. *[See Figure A.13.1(c).]*

Figure A.13.1(c) Detector Check Valve.

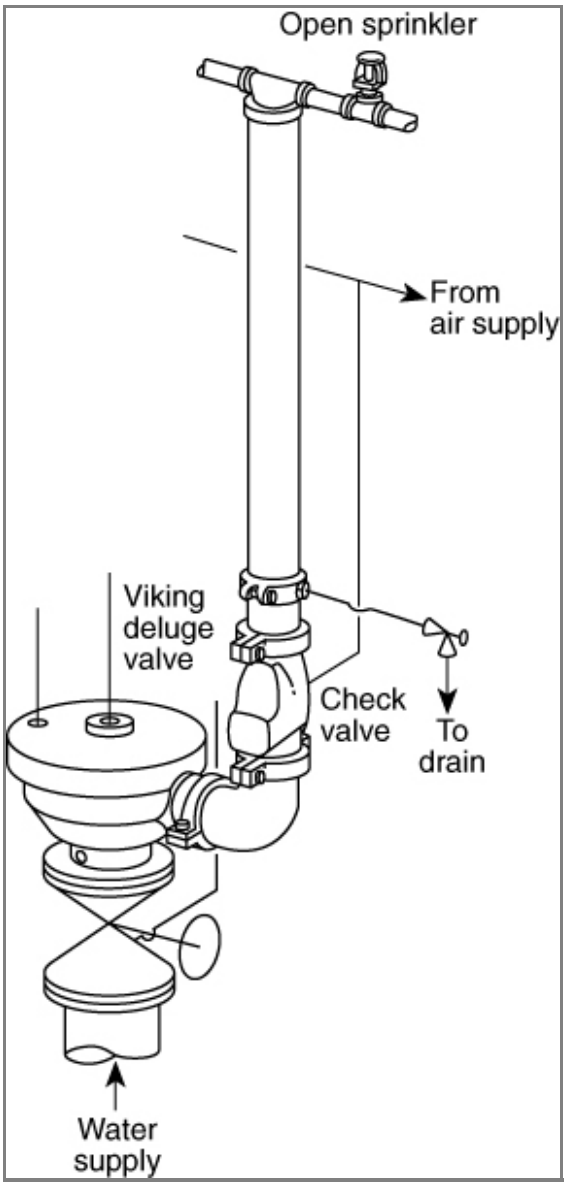


DCA. A double check assembly (DCA) consists of two independently operating spring-loaded check valves. The assembly includes two resilient-seated isolation valves and four test cocks required for testing.

DCDA. A double check detector assembly (DCDA) is hydraulically balanced to include a metered bypass assembly to detect system leakage. The main valve assembly and bypass assembly afford equal levels of backflow prevention and are each equipped with two resilient-seated isolation valves and four test cocks required for testing.

Deluge Valves. Deluge valves hold water at the valve until actuated by the operation of a detection system or manual release. *[See Figure A.13.1(d).]*

Figure A.13.1(d) Deluge Valve.



Drip Valves. Drip valves automatically drain condensation or small amounts of water that have leaked into system piping or valves. Drip valves close when exposed to system pressure.

Dry Pipe Valves. Dry pipe valves control the flow of water to areas that could be exposed to freezing conditions. Water is held at the valve by air pressure in the system piping. When the air pressure is reduced, the valve operates and floods the system. *[See Figure A.13.1(e) and Figure A.13.1(f).]*

Figure A.13.1(e) Dry Pipe Valve.

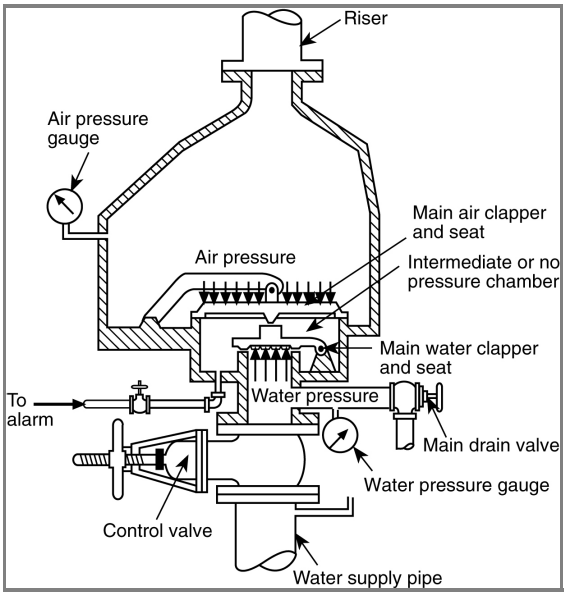
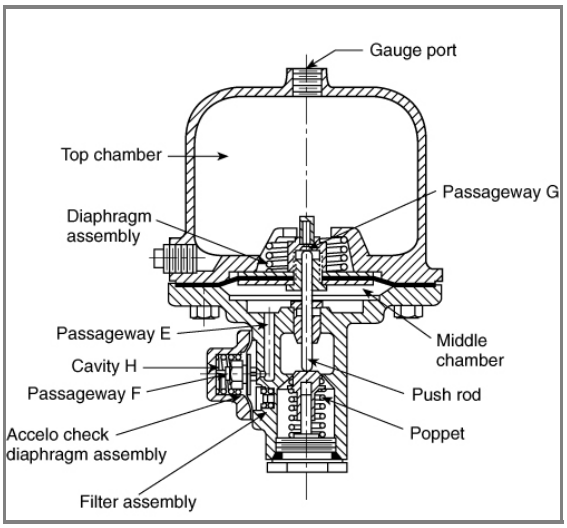


Figure A.13.1(f) Dry Pipe System Accelerator. ***(Courtesy of The Reliable Automatic Sprinkler Co., Inc.)***

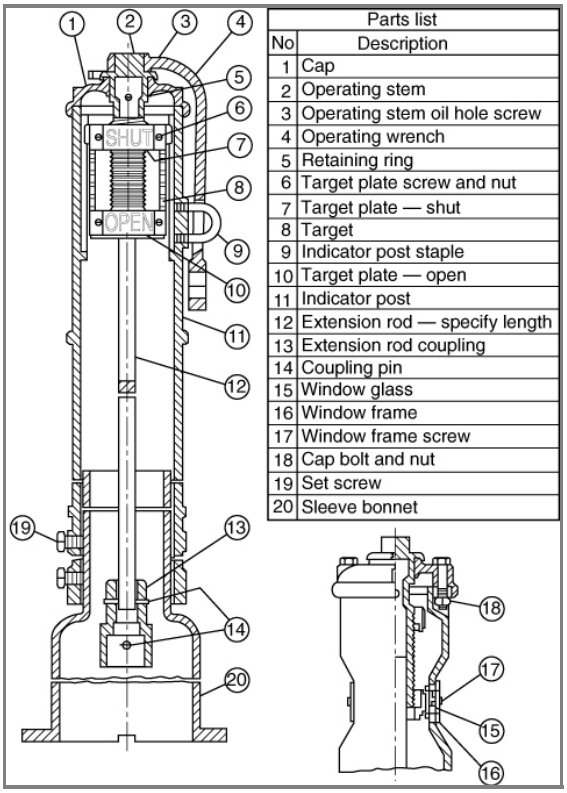


Indicating Valves. Indicating valves provide a dependable, visible indication of the open

position, even at a distance.

Indicator Posts. Indicator posts include wall and underground types and are intended for use in operating inside screwed pattern gate valves and for indicating the position of the gates in the valves. *[See Figure A.13.1(g).]*

Figure A.13.1(g) Vertical Indicator Post.



Parts list	
No	Description
1	Cap
2	Operating stem
3	Operating stem oil hole screw
4	Operating wrench
5	Retaining ring
6	Target plate screw and nut
7	Target plate — shut
8	Target
9	Indicator post staple
10	Target plate — open
11	Indicator post
12	Extension rod — specify length
13	Extension rod coupling
14	Coupling pin
15	Window glass
16	Window frame
17	Window frame screw
18	Cap bolt and nut
19	Set screw
20	Sleeve bonnet

NRS Gate Valves, OS&Y Gate Valves. Nonrising stem (NRS) gate valves are used underground with indicator posts attached or as roadway box valves (curb-box installation). Outside screw and yoke (OS&Y) gate valves are used indoors and in pits outdoors. The valve stem moves out when the valve is open and moves in when it is closed. The stem indicates the position of the valve. *[See Figure A.13.1(h) and Figure A.13.1(i).]*

Figure A.13.1(h) OS&Y Gate Valve.

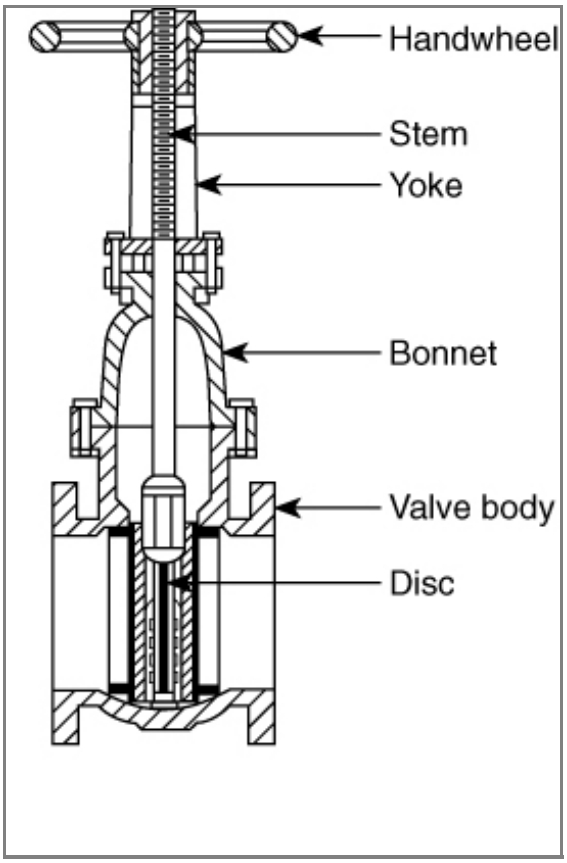
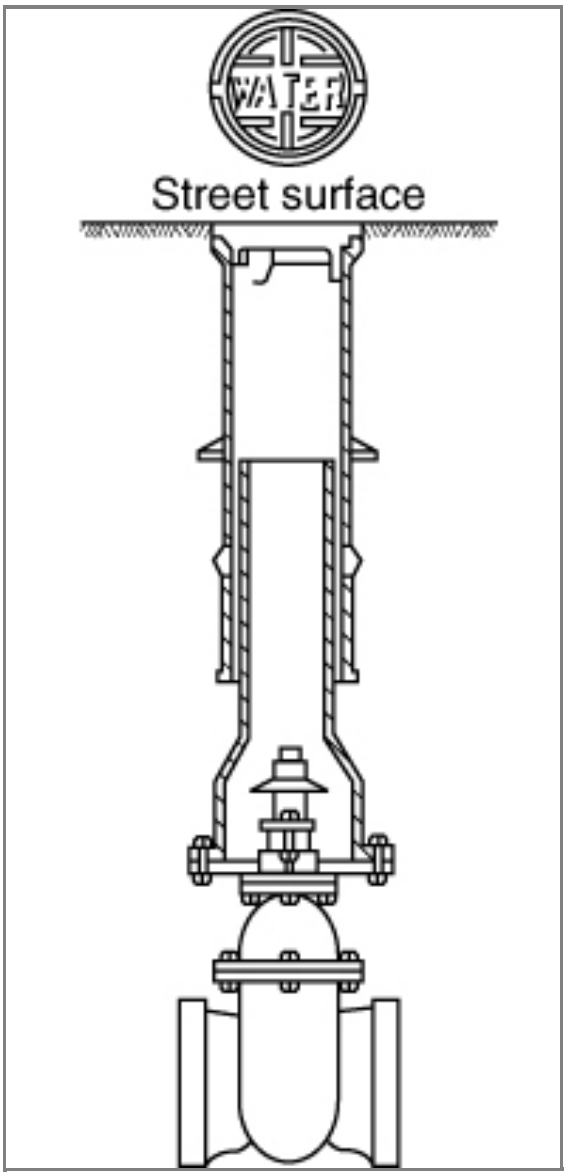


Figure A.13.1(i) Nonindicating-Type Gate Valve.



RPA. A reduced-pressure zone principle assembly (RPA) consists of two independently spring-loaded check valves separated by a differential-sensing valve. The differential-sensing valve includes a relief port to atmosphere that discharges excess water resulting from supply system fluctuations. The assembly includes two resilient-seated isolation valves and four test cocks required for testing.

RPDA. A reduced-pressure detector assembly (RPDA) is hydraulically balanced to include a metered bypass assembly to detect system leakage. The main valve assembly and bypass assembly afford equal levels of backflow prevention, and each assembly is equipped with two resilient-seated isolation valves and four test cocks required for testing.

Strainers. Strainers are used for protection against clogging of water discharge openings.

Waterflow Detector Check Valves. Detector-type check valves allow flow in one direction only and have provisions for the connection of a bypass meter around the check valve. *[See Figure A.13.1(c).]*

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 13:33:05 EDT 2021

Committee Statement

Committee Statement: Provides clarification between a water control valve and a control valve.

Response Message: SR-47-NFPA 25-2021

Second Revision No. 43-NFPA 25-2021 [Section No. A.13.7.2.1]

A.13.7.2.1

The full flow test of the backflow prevention valve can be performed with a test header or other connections downstream of the valve. A bypass around the check valve in the fire department connection line with a control valve in the normally closed position is an acceptable arrangement. When flow to a visible drain cannot be accomplished, closed loop flow is acceptable if a flowmeter or sight glass is incorporated into the system to ensure flow. Minimum rate of flow can be determined by using sensing or measuring devices such as a pitot or other capable devices. It can be difficult to measure flow properly from ~~2 in. (50 mm) and smaller orifices~~ main drain and inspector's test connections . If connections do not permit accurate measurement of the minimum flow rate, tests should be flowed at the maximum flow rate possible in accordance with 13.7.2.3.

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 09 12:04:52 EDT 2021

Committee Statement

Committee Statement: Contractor can use any size orifice that can provide system demand. It can be difficult to measure flow properly from main drain and inspector’s test connections.

Response Message: SR-43-NFPA 25-2021

Public Comment No. 105-NFPA 25-2021 [Section No. A.13.7.2.1]

Second Revision No. 86-NFPA 25-2021 [Chapter H]

Annex I Informational References

I.1 Referenced Publications.

The documents or portions thereof listed in this annex are referenced within the informational sections of this standard and are not part of the requirements of this document unless also listed in Chapter 2 for other reasons.

I.1.1 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 11, *Standard for Low-, Medium-, and High-Expansion Foam*, 2021 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 2022 edition.

NFPA 13R, *Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies*, 2022 edition.

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*, 2019 edition.

NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*, 2022 edition.

NFPA 16, *Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems*, 2019 edition. (withdrawn)

NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection*, 2022 edition.

NFPA 22, *Standard for Water Tanks for Private Fire Protection*, 2018 edition.

NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*, 2022 edition.

NFPA *70E*®, *Standard for Electrical Safety in the Workplace*®, 2021 edition.

NFPA 72®, *National Fire Alarm and Signaling Code*®, ~~2021~~ 2022 edition.

NFPA 110, *Standard for Emergency and Standby Power Systems*, 2022 edition.

NFPA 291, *Recommended Practice for Water Flow Testing and Marking of Hydrants*, 2022 edition.

NFPA 551, *Guide for the Evaluation of Fire Risk Assessments*, ~~2019~~ 2022 edition.

NFPA 750, *Standard on Water Mist Fire Protection Systems*, ~~2019~~ 2023 edition.

NFPA 780, *Standard for the Installation of Lightning Protection Systems*, ~~2020~~ 2023 edition.

NFPA 1962, *Standard for the Care, Use, Inspection, Service Testing, and Replacement of Fire Hose, Couplings, Nozzles, and Fire Hose Appliances*, 2018 edition.

“Antifreeze Systems in Home Fire Sprinkler Systems — Literature Review and Research Plan,” Fire Protection Research Foundation, June 2010.

“Antifreeze Systems in Home Fire Sprinkler Systems — Phase II Final Report,” Fire Protection Research Foundation, December 2010.

“Antifreeze Solutions Supplied through Spray Sprinklers — Interim Report,” Fire Protection Research Foundation, February 2012.

“Fire Pump Field Data Collection and Analysis Report,” available for download at www.nfpa.org/foundation, 2011.

NFPA’s Future in Performance Based Codes and Standards, July 1995.

NFPA Performance Based Codes and Standards Primer, December 1999.

I.1.2 Other Publications.

I.1.2.1 ASTM Publications.

ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

IEEE/ASTM SI 10, *American National Standard for Metric Practice,* 2016.

I.1.2.2 AWWA Publications.

American Water Works Association, 6666 West Quincy Avenue, Denver, CO 80235.

Manual of Water Supply Practices — M42 Steel Water-Storage Tanks, 2013.

I.1.2.3 BSI Publications.

British Standards Institution, 389 Chiswick High Road, London, W4 4AL, United Kingdom.

EN 12259-1, *Fixed firefighting systems — Components for sprinkler and water spray systems — Part 1: Sprinklers*, 1999 edition.

I.1.2.4 CGA Publications.

Compressed Gas Association, 14501 George Carter Way, Suite 103, Chantilly, VA 20151.

CGA C-6, *Standard for Visual Inspection of Steel Compressed Gas Cylinders*, 2019.

I.1.2.5 FM Publications.

FM Approvals LLC, 1151 Boston-Providence Turnpike, P.O. Box 9102, Norwood, MA 02062.

FM Approvals Standard 5560, *Water Mist Systems*, 2012 edition.

I.1.2.6 FSSA Publications.

Fire Suppression Systems Association, 3601 E. Joppa Road, Baltimore, MD 21234.

FSSA *Cylinder Service Guide* .

I.1.2.7 Hydraulic Institute Publications.

Hydraulic Institute, 300 Interpace Parkway, Building A, 3rd floor, Parsippany, NJ 07054.

Hydraulic Institute Standards for Centrifugal, Rotary and Reciprocating Pumps, 1983.

I.1.2.8 IMO Publications.

International Maritime Organization, 4 Albert Embankment, London SE1 7SR, United Kingdom.

MSC.1/Circular 1432, *Guidelines for the Maintenance and Inspection of Fire Protection Systems and Appliances*, 2012.

I.1.2.9 ISO Publications.

International Organization for Standardization, ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland.

ISO/IEC 17025, *General Requirements for the Competence of Testing and Calibration Laboratories* , 2017.

I.1.2.10 SFPE Publications.

Society of Fire Protection Engineers, 9711 Washingtonian Blvd, Suite 380, Gaithersburg, MD 20878.

Engineering Guide: Fire Risk Assessment, 2006.

Engineering Guide to Performance-Based Fire Protection, 2007.

SFPE Handbook of Fire Protection Engineering, 2016.

I.1.2.11 UL Publications.

Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

UL 2167, *Water Mist Nozzles for Fire Protection Service*, 2017.

UL 2901, *Antifreeze Solutions for Use in Fire Sprinkler Systems*, 2019.

Comparative Fire Performance Tests Using Water and Antifreeze Solutions Discharged from Standard Spray Sprinklers.

I.1.2.12 U.S. Government Publications.

U.S. Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401-0001.

Title 49, Code of Federal Regulations, "Transportation."

Title 49, Code of Federal Regulations, Part 180.205, "General Requirements for Requalification of Specification Cylinders."

Title 49, Code of Federal Regulations, Part 180.209, "Requirements for Requalification of Specification Cylinders."

I.1.2.13 Other Publications.

Budnick, E. K., P.E., "Automatic Sprinkler System Reliability," *Fire Protection Engineering*, Society of Fire Protection Engineers, 2001.

Fire Protection Equipment Surveillance Optimization and Maintenance Guide, Electric Power Research Institute, July 2003.

Dungan, K. W., P.E., "Performance-Based Inspection, Testing, and Maintenance," *Fire Protection Engineering*, Society of Fire Protection Engineers, 2016.

Koffel, W. E., P.E., *Reliability of Automatic Sprinkler Systems*, Alliance for Fire Safety, 2005.

I.2 Informational References.

The following documents or portions thereof are listed here as informational resources only. They are not a part of the requirements of this document.

I.2.1 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1, *Fire Code*, ~~2018~~ 2021 edition.

NFPA 25 Handbook, *ITM of Water-Based Fire Protection Systems*, 2020 edition.

I.2.2 Other Publications.

I.2.2.1 AWWA Publications.

American Water Works Association, 6666 West Quincy Avenue, Denver, CO 80235.

AWWA D101, *Inspecting and Repairing Steel Water Tanks, Standpipes, Reservoirs, and Elevated Tanks, for Water Storage,* 1986.

I.2.2.2 SSPC Publications.

Society for Protective Coatings, 800 Trumbull Drive, Pittsburgh, PA 15205.

SSPC Chapter 3, "Special Pre-Paint Treatments," 1993.

SSPCPA 1, *Shop, Field, and Maintenance Coating of Metals,* 2016.

SSPC PA 9, *White (or Colored) Vinyl Paint,* 2015.

SSPCSP 6, *Commercial Blast Cleaning,* 2007.

SSPCSP 8, *Pickling,* 2004.

SSPCSP 10, *Near-White Blast Cleaning,* 2015.

I.2.2.3 U.S. Government Publications.

U.S. Government Publishing Office, Washington, DC 20402.

Federal Specification TT-P-86, *Specifications for Vinyl Resin Paint,* M-54, 1995.

I.3 References for Extracts in Informational Sections.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 2022 edition.

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*, 2019 edition.

NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*, 2022 edition.

NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection*, 2022 edition.

NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*, 2022 edition.

NFPA 1142, *Standard on Water Supplies for Suburban and Rural ~~Fire Fighting~~ Firefighting* , 2022 edition.

Supplemental Information

File Name	Description	Approved
25-2020_Annex_H.docx	For staff use	

Submitter Information Verification

Committee: INM-AAA

Submittal Date: Thu Sep 16 11:17:14 EDT 2021

Committee Statement

Committee Statement: Updated references to reflect all proposed changes.

Response Message: SR-86-NFPA 25-2021