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NFPA 25: Requirements for Less Frequently Performed Fire Sprinkler System Inspections and Tests

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Sprinkler Business Processes

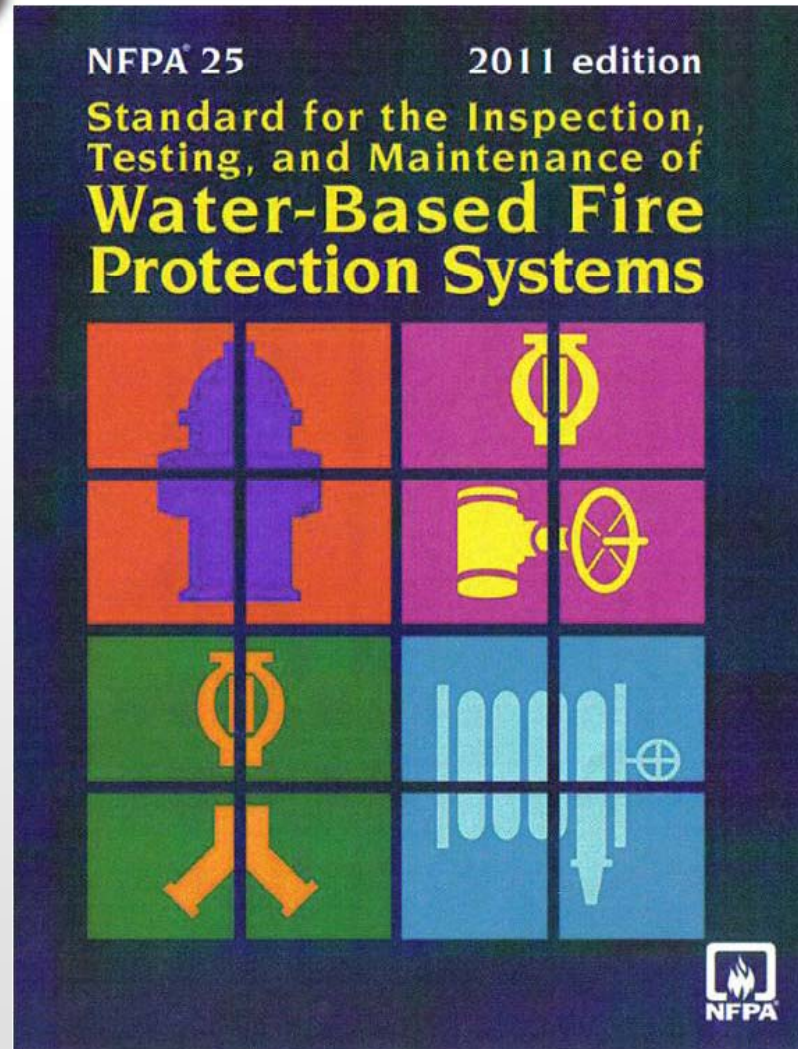
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with:

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Principal Engineer
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This 2011 edition was issued by the NFPA Standards Council on August 5, 2010 with an effective date of August 25, 2010.

We will answer these questions:

- What longer-interval inspection and test requirements are included in NFPA 25
- Why and how does NFPA 25 give building owners the responsibility for having these inspections and tests performed?
- Why are there different frequencies for testing different types of sprinklers?
- What types of sprinklers experience high failure rates when tested?
- How often should private underground mains and standpipe systems be full flow tested?
- What valves are required to be internally inspected at least every five years?
- Which systems are subject to the 5-year internal pipe inspection requirement – and which may be exempt?
- What is Annex E and does it address missed inspections and tests?

Webinar Outline

- **Chapters 1, 3, and 4: Administration, Definitions, and General Requirements**
- **Chapter 5: Sprinkler Systems**
- **Chapter 6: Standpipe and Hose Systems**
- **Chapter 7: Private Fire Service Mains**
- **Chapter 9: Water Storage Tanks**
- **Chapter 10: Water Spray Fixed Systems**
- **Chapter 13: Valves, Valve Components, and Trim**
- **Chapter 14: Obstruction Investigation**
- **Annex E: Examples of Classifications of Needed Repairs**

Administration

- **1.1* Scope.** This document

- **1.1.3** This standard addresses the **operating condition** of fire protection systems as well as impairment handling and reporting and **applies to fire protection systems that have been properly installed in accordance with generally accepted practice.**

This statement seems to be clear, but there will still be cases when the inspector will be questioned about the adequacy of the system to protect the building or hazard.

Administration

In the 2011 edition new text was added:

- **1.1.3.1*** This standard does not require the inspector to verify the **adequacy of the design of the system**.

A new Annex note was also added:

- **A.1.1.3.1** The requirement to evaluate the adequacy of the design of the installed system is not a part of the periodic inspection, testing and maintenance requirements of this standard. However such evaluation **is the responsibility of the property owner** or designated representative as indicated in Sections 4.1.5 and 4.1.6.

..... the technical committee wanted to make it clear what an inspector isn't required to do.

Definitions

- **3.3.18 Inspection.** A **visual examination** of a system or portion thereof to verify that it appears to be in operating condition and is free of physical damage. [820, 2008]
-
- **3.3.35* Testing.** A **procedure used to determine the operational status** of a component or system by conducting periodic **physical checks**, such as waterflow tests, fire pump tests, alarm tests, and trip tests of dry pipe, deluge, or preaction valves.

By definition, an inspection is a visual examination of the existing system, and a test is a physical check of components or systems.

General Requirements

- **4.1.1* Responsibility for Inspection, Testing, Maintenance, and Impairment.** The **property owner** or designated representative **shall be responsible** for properly maintaining a water-based fire protection system.
- **A.4.1.1.3** Examples of **designated representatives** can include the occupant, management firm, or managing individual through **specific provisions** in the lease, written use agreement, or management contract.

It's stated very clearly throughout NFPA 25 that the building owner has the ultimate responsibility to properly maintain any water based fire protection system in their building.

General Requirements

- **4.1.1.2** Inspection, testing, and maintenance shall be performed by personnel who have developed **competence through training and experience.**
- **A.4.1.1.2** Inspection, testing, and maintenance **can be permitted to be contracted with an inspection, testing, and maintenance service.**

It's stated very clearly throughout NFPA 25 that the building owner has the ultimate responsibility to properly maintain any water based fire protection system in their building.

Chapter 5 Sprinkler Systems

- Internal Pipe
- Gauges
- Sprinklers
 - Extra High Temp
 - Dry Type
 - Fast Response
 - 50 Years Old
 - 75 Years Old

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

Item	Frequency	Reference
Inspection		
Gauges (dry, preaction, and deluge systems)	Weekly/monthly	5.2.4.2, 5.2.4.3, 5.2.4.4
Control valves		Table 13.1
Waterflow alarm devices	Quarterly	5.2.5
Valve supervisory alarm devices	Quarterly	5.2.5
Supervisory signal devices (except valve supervisory switches)	Quarterly	5.2.5
Gauges (wet pipe systems)	Monthly	5.2.4.1
Hydraulic nameplate	Quarterly	5.2.6
Buildings	Annually (prior to freezing weather)	4.1.1.1
Hanger/seismic bracing	Annually	5.2.3
Pipe and fittings	Annually	5.2.2
Sprinklers	Annually	5.2.1
Spare sprinklers	Annually	5.2.1.4
Information sign	Annually	5.2.6.1
Fire department connections		Table 13.1
Valves (all types)		Table 13.1
Obstruction, internal inspection of piping	5 years	14.2
Test		
Waterflow alarm devices		
Mechanical devices	Quarterly	5.3.3.1
Vane and pressure switch type devices	Semiannually	5.3.3.2
Valves supervisory alarm devices		Table 13.1
Supervisory signal devices (except valve supervisory switches)		Table 13.1
Main drain		Table 13.1
Antifreeze solution	Annually	5.3.4
Gauges	5 years	5.3.2
Sprinklers — extra-high temperature	5 years	5.3.1.1.4
Sprinklers — fast-response	At 20 years and every 10 years thereafter	5.3.1.1.3
Sprinklers	At 50 years and every 10 years thereafter	5.3.1.1.1
Sprinklers	At 75 years and every 5 years thereafter	5.3.1.1.5
Sprinklers — dry	At 10 years and every 10 years thereafter	5.3.1.1.6

Sprinkler Systems - Gauges

- **5.3.2* Gauges.**
- **A.5.3.2** The normal life expectancy of a gauge is between 10 and 15 years. A gauge can be permitted to have a reading with an error of ± 3 percent of the maximum (full scale) gauge reading. For example, a gauge having 200 psi (13.8 bar) maximum radius installed on a system with 60 psi (4.1 bar) normal pressure can be permitted if the gauge reads from 54 psi to 66 psi (3.7 bar to 4.5 bar).
- **5.3.2.1** Gauges shall be **replaced every 5 years** or **tested every 5 years** by comparison with a calibrated gauge.
- **5.3.2.2** Gauges not accurate to within **3 percent of the full scale** shall be recalibrated or replaced.

This requirement ... has been in NFPA 25 since the first edition in 1992.

Sprinkler Systems - Gauges

- Must be tested or replaced every five years
- Replacement is normally less expensive because the list price for a gauge is from \$22 to \$80 each.
- When replacing or after testing, mark the gauge with the installation date or the successful test date.



Gauges used to be manufactured with a date on the face.

Sprinkler Systems - Sprinklers

- **5.3 Testing.**
- **5.3.1* Sprinklers.**
- **5.3.1.1*** Where required by this section, sample sprinklers shall be submitted to a **recognized testing laboratory** acceptable to the authority having jurisdiction for field service testing.
-
- **5.3.1.2*** A **representative sample** of sprinklers for testing per 5.3.1.1 shall consist of a minimum of not less than **four sprinklers or 1 percent** of the number of sprinklers per individual sprinkler sample, whichever is greater.
- **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**.

Before removing any sprinklers for testing, replacement sprinklers must be on hand.

Sprinkler Systems - Sprinklers

- **5.3 Testing.**
- **5.3.1* Sprinklers.**

- **5.3.1.1.1** Where sprinklers have been **in service for 50 years**, they shall be replaced or representative samples from one or more sample areas shall be tested.
- **5.3.1.1.1.1** Test procedures shall be **repeated at 10-year intervals.**
- **5.3.1.1.1.2** **Sprinklers manufactured prior to 1920 shall be replaced.**

- **5.3.1.1.1.5** Where sprinklers have been **in service for 75 years**, 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.**

... the date the installation or the age of the installed sprinklers must be known.

Sprinkler Systems - Sprinklers

- **5.3 Testing.**
- **5.3.1* Sprinklers.**
 -
 - **5.3.1.1.1.4*** Representative samples of solder-type sprinklers with a temperature classification of **extra high [325°F (163°C)] or greater** that are exposed to semicontinuous to continuous maximum allowable ambient temperature conditions shall be **tested at 5-year intervals.**
 -
 - **5.3.1.1.2*** Where sprinklers are **subjected to harsh environments**, including **corrosive atmospheres** and **corrosive water supplies**, on a **5-year basis**, either sprinklers shall be **replaced or** representative sprinkler samples shall be **tested.**

The requirement to test sprinklers subjected to harsh environments was added in the 2002 edition.

Sprinkler Systems - Sprinklers

- **5.3 Testing.**
- **5.3.1* Sprinklers.**

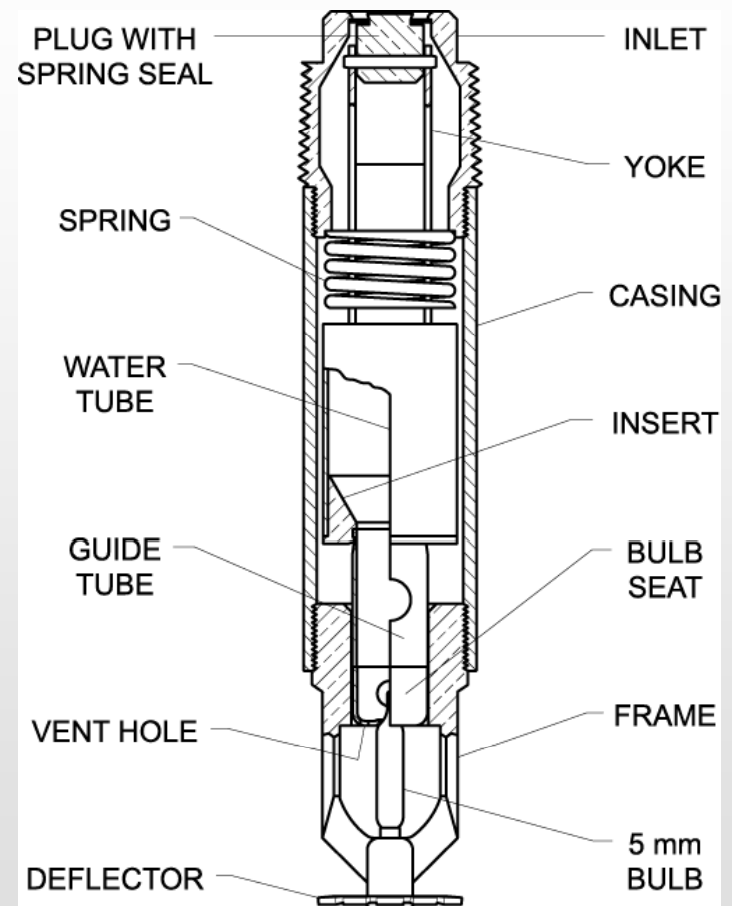
- **5.3.1.1.1.3*** Sprinklers manufactured using **fast-response elements** that have been **in service for 20 years** shall be replaced, or representative samples shall be tested and then **retested at 10-year intervals.**



Fast or quick response sprinklers were first installed in the early 1980's.

Sprinkler Systems - Sprinklers

- **5.3 Testing.**
- **5.3.1* Sprinklers.**
- **5.3.1.1.1.6* Dry sprinklers** that have been **in service for 10 years** shall be replaced, or representative samples shall be tested and then **retested at 10-year intervals.**



The failure rates for dry sprinklers are the highest of all types of sprinklers.

Sprinkler Systems - Sprinklers

Results of UL Field Sample Testing of Sprinkler

- **Criteria** – Samples that do not operate within the required time frame or do not release their operating parts with a 7 psi inlet pressure are reported as operating **abnormally** (fail the operation test).
- Approximately 97% of the samples tested (not including O-ring sealed or dry type sprinklers) have operated **normally**
- Approximately 50% of dry type sprinklers tested have operated **abnormally** (fail the operation test).
- Approximately 80% of the dry type sprinklers tested incorporate an **O-ring water seal**.

A large percentage of dry type sprinklers in the field incorporate an O-ring water seal

Sprinkler Systems - Sprinklers

UL Contact Information

Field Sprinkler Testing

UL LLC

333 Pfingsten Rd.

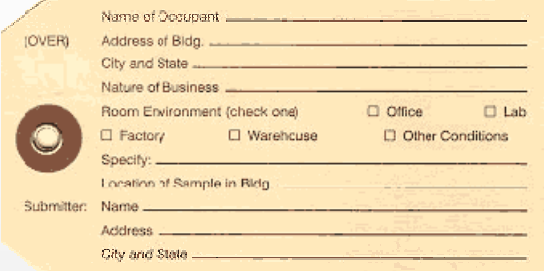
Northbrook, IL 60062

Tel: 847.664.2488

Fax: 847.509.6391

E-mail: Field.SprinklerNBK@ul.com

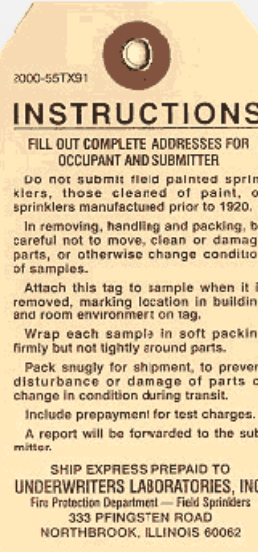
Web: www.ul.com



UL
Field Sprinkler Testing

(OVER)

Name of Occupant _____
Address of Bldg. _____
City and State _____
Nature of Business _____
Room Environment (check one) Office Lab
 Factory Warehouse Other Conditions
Specify: _____
Location of Sample in Bldg. _____
Submitter: Name _____
Address _____
City and State _____



2000-55TX91

INSTRUCTIONS

FILL OUT COMPLETE ADDRESSES FOR OCCUPANT AND SUBMITTER

Do not submit field painted sprinklers, those cleaned of paint, or sprinklers manufactured prior to 1920.

In removing, handling and packing, be careful not to move, clean or damage parts, or otherwise change condition of samples.

Attach this tag to sample when it is removed, marking location in building and room environment on tag.

Wrap each sample in soft packing firmly but not tightly around parts.

Pack snugly for shipment, to prevent disturbance or damage of parts or change in condition during transit.

Include prepayment for test charges.

A report will be forwarded to the submitter.

SHIP EXPRESS PREPAID TO
UNDERWRITERS LABORATORIES, INC.
Fire Protection Department—Field Sprinklers
333 PFINGSTEN ROAD
NORTHBROOK, ILLINOIS 60062

Sprinkler sample identification tags are available from UL free of charge.

Sprinkler Systems - Sprinklers

- Inspectors must determine when sprinklers were installed or their age.
- Replacement sprinklers are needed for those being removed for testing.
- Dry sprinklers installed that were manufactured prior to 2003 have over a 50% failure rate when tested.

... sprinkler testing is critical to determine the operating condition of a sprinkler system.

Chapter 6 Standpipe & Hose Systems

- Hose
- Dry Standpipes
 - Manual
 - Semi-automatic
 - FDC
- Wet Standpipes
 - Manual
- Automatic
 - Wet
 - Dry

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

Item	Frequency	Reference
Inspection		
Control valves		Table 13.1
Pressure regulating devices		Table 13.1
Piping	Annually	6.2.1
Hose connections		Table 13.1
Cabinet	Annually	NFPA 1962
Gauges	Weekly	6.2.2
Hose	Annually	NFPA 1962
Hose storage device	Annually	NFPA 1962
Hose nozzle	Annually and after each use	NFPA 1962
<hr/>		
Hydraulic design information sign	Annually	6.2.3
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Test		
Waterflow alarm devices		Table 13.1
Valve supervisory alarm devices		Table 13.1
Supervisory signal devices (except valve supervisory switches)		Table 13.1
Hose storage device	Annually	NFPA 1962
Hose	5 years/3 years	NFPA 1962
Pressure control valve		Table 13.1
Pressure reducing valve		Table 13.1
Hydrostatic test	5 years	6.3.2
Flow test	5 years	6.3.1
Main drain test		Table 13.1

... section 6.1.7 allows hoses to be removed if approved by the authority having jurisdiction.

Standpipe & Hose Systems – Flow Test

- **6.3.1 Flow Tests.**
- **6.3.1.1*** A **flow test** shall be conducted **every 5 years** at the hydraulically most remote hose connections of each zone of an automatic standpipe system to **verify** the water supply still provides **the design pressure at the required flow.**
- **6.3.1.2** Where a flow test of the hydraulically most remote outlet(s) is not practical, the authority having jurisdiction shall be consulted for the appropriate location for the test.
- **6.3.1.3** All systems shall be flow tested and pressure tested at the **requirements for the design criteria** in effect at the time of the installation.
- **6.3.1.3.1** The actual test method(s) and performance criteria shall be discussed in advance with the authority having jurisdiction.

What has changed over the years is the pressure requirement at the standpipe hose valve.

Standpipe & Hose Systems - Flow Test

- All standpipes must be flow tested every five years at design flow and pressure.
- The hydraulically most remote hose connections are generally at a roof manifold, or at the top of a stair leading to the roof.
- A water supply source must be provided to test a manual wet or dry standpipe.



In some cases a fire department pumper or portable fire pump will be needed.

Standpipe & Hose Systems – Hydro Test

- **6.3.2 Hydrostatic Tests.**
- **6.3.2.1** Hydrostatic tests of **not less than 200 psi** (13.8 bar) pressure for 2 hours, or at 50 psi (3.4 bar) in excess of the maximum pressure, where maximum pressure is in excess of 150 psi (10.3 bar), shall be conducted **every 5 years** on **manual standpipe systems** and **semi-automatic dry standpipe systems**, including piping in the fire department connection.
- **6.3.2.1.1** Manual wet standpipes that are part of a combined sprinkler/standpipe system shall not be required to be tested in accordance with 6.3.2.1.
- -----
- **6.3.2.3** The hydrostatic test pressure shall be **measured at the low elevation** point of the individual system or zone being tested.
- **6.3.2.3.1** The inside standpipe piping shall show **no leakage**.

This requirement has remained unchanged since the 1992 first edition.

Standpipe & Hose Systems - Hydro Test

- Certain standpipes must be hydrostatically tested every five years.
- Test pressures are to be measured at the lowest point in the standpipe.
- The requirement to test manual wet standpipes was added in the 2002 edition.



Firefighters are depending on the integrity of the standpipe systems they attach their hoses to.

Chapter 7 Private Fire Service Mains

- Piping
 - Exposed
 - Underground

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

Item	Frequency	Reference
Inspection		
Hose houses	Quarterly	7.2.2.7
Hydrants (dry barrel and wall)	Annually and after each operation	7.2.2.4
Monitor nozzles	Semiannually	7.2.2.6
Hydrants (wet barrel)	Annually and after each operation	7.2.2.5
Mainline strainers	Annually and after each significant flow	7.2.2.3
Piping (exposed)	Annually	7.2.2.1
Piping (underground)	See 7.2.2.2	7.2.2.2
Test		
Monitor nozzles	Flow, annually (range and operation)	7.3.3
Hydrants	Flow, annually	7.3.2
Piping (exposed and underground) (flow test)	5 years	7.3.1

In most applications, inspection testing and maintenance of underground supplies starts at the building property line.

Private Fire Service Mains – Flow Test

- **7.3 Testing.**
- **7.3.1* Underground and Exposed Piping Flow Tests.**
Underground and exposed piping shall be **flow tested** to determine the internal condition of the piping **at minimum 5-year intervals**.
- **7.3.1.1** Flow tests shall be made **at flows representative of those expected during a fire**, for the purpose of **comparing the friction loss** characteristics of the pipe with those expected for the particular type of pipe involved, with due consideration given to the age of the pipe and to the results of previous flow tests.
- **7.3.1.2** Any flow test results that indicate **deterioration** of available waterflow and 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**.

There are several challenges to perform this test in a way that accomplishes the stated goal

Private Fire Service Mains – Flow Test

- Mains must be flow tested at least every five years
- The flow shall “represent” what’s expected during a fire
- The actual friction losses in the pipes are to be compared to those anticipated by the calcs
- Deterioration shall be investigated



Performing this test is problematic in most underground supplies.

Chapter 9 Water Storage Tanks

- Tank Interior
 - No corrosion protection
 - All others
- Level Indicators
- Gauges

Table 9.1.1.2 Summary of Water Storage Tank Inspection, Testing, and Maintenance

Item	Frequency	Reference
Inspection		
Water temperature — low temperature alarms connected to constantly attended location	Monthly	9.2.4.2
Water temperature — low temperature alarms not connected to constantly attended location	Weekly	9.2.4.3
Heating system — tanks with supervised low temperature alarm connected to constantly attended location	Weekly*	9.2.3.1
Heating system — tanks without supervised low temperature alarm connected to constantly attended location	Daily*	9.2.3.2
Control valves		Table 13.1
Water level — tanks equipped with supervised water level alarms connected to constantly attended location	Quarterly	9.2.1.1
Water level — tanks without supervised water level alarms connected to constantly attended location	Monthly	9.2.1.2
Air pressure — tanks that have their air pressure source supervised	Quarterly	9.2.2.1
Air pressure — tanks without their air pressure source supervised	Monthly	9.2.2.2
Tank — exterior	Quarterly	9.2.5.1
Support structure	Quarterly	9.2.5.1
Catwalks and ladders	Quarterly	9.2.5.1
Surrounding area	Quarterly	9.2.5.2
Hoops and grillage	Annually	9.2.5.4
Painted/coated surfaces	Annually	9.2.5.5
Expansion joints	Annually	9.2.5.3
Interior — tanks without corrosion protection	3 years	9.2.6.1.1
Interior — all other tanks	5 years	9.2.6.1.2
Temperature alarms — connected to constantly attended location	Monthly*	9.2.4.2
Temperature alarms — not connected to constantly attended location	Weekly*	9.2.4.3
Check valves		Table 13.1
Test		
Tank heating system	Prior to heating season	9.3.2
Low water temperature alarms	Monthly*	9.3.3
High temperature limit switches	Monthly*	9.3.4
Water level alarms	Semiannually	9.3.5
Level indicators	5 years	9.3.1
Pressure gauges	5 years	9.3.6

The condition of a water storage tank is critical for the water-based fire protection system because in most cases the tank is the sole-source of water for the system.

Water Storage Tanks – Interior Inspection

- **9.2.6 Interior Inspection.**
- **9.2.6.1 Frequency.**
- **9.2.6.1.1*** The interior of steel tanks **without corrosion protection** shall be inspected **every 3 years**.
- **9.2.6.1.2** The interior of **all other types** of tanks shall be inspected **every 5 years**.
- **9.2.6.2** Where interior inspection is made by means of underwater evaluation, silt shall first be removed from the tank floor.
- **9.2.6.3** The tank interior shall be inspected for signs of pitting, corrosion, spalling, rot, other forms of deterioration, waste materials and debris, aquatic growth, and local or general failure of interior coating.

There are other components that need to be inspected including the heating system as described in 9.2.6.6 and the anti-vortex plate in 9.2.6.7.

Water Storage Tanks – Interior Inspection

- Without corrosion protection must be performed every 5 years and with corrosion protection every 3 years
- Includes the heating system and anti-vortex plate
- Includes additional tests if signs of pitting, corrosion, or failure of the coating are found



Many times the tanks can be inspected while still full of water using special equipment.

Water Storage Tanks – Level Indicators

- **9.3 Testing.**
- **9.3.1*** Level indicators shall be **tested every 5 years** for **accuracy** and **freedom of movement**.

These are not electronic water level alarms, but are either a mercury gauge sometimes found on older tanks, or a mechanical indicator connected to a float in ground storage tanks.

Water Storage Tanks – Level Indicators

- If the tank needs to be drained for the internal inspection, the indicator is tested while draining and refilling the tank.
- If the internal inspection is done with the water in the tank, water will be lost while removing the silt and the indicator tested.



Normal maintenance including lubrication of the cables and pulleys will ensure their freedom of movement.

Chapter 10 Water Spray Fixed Systems

Mainline Strainers

Table 10.1.1.2 *Continued*

Item	Frequency	Reference
Maintenance		
Backflow preventer		Chapter 13
Check valves		Chapter 13
Control valves	Annually	10.2.1.4, Chapter 13
Deluge valve		10.2.2, Chapter 13
Detection systems		NFPA 72
Detector check valve		Chapter 13
Electric motor		10.2.9, Chapter 8
Engine drive		10.2.9, Chapter 8
Fire pump		10.2.9, Chapter 8
Gravity tanks		10.2.10, Chapter 9
Pressure tank		10.2.6, Chapter 9
Steam driver		10.2.9, Chapter 8
Strainers	Annually	10.2.1.4, 10.2.1.6, 10.2.7
Strainers (baskets/screen)	5 years	10.2.1.4, 10.2.1.7, A.10.2.7
Suction tanks		10.2.10, Chapter 9
Water spray system	Annually	10.2.1.4, Chapter 13

Most of these systems require a mainline strainer, because most of the nozzles installed on them have waterways smaller than 3/8 of an inch.

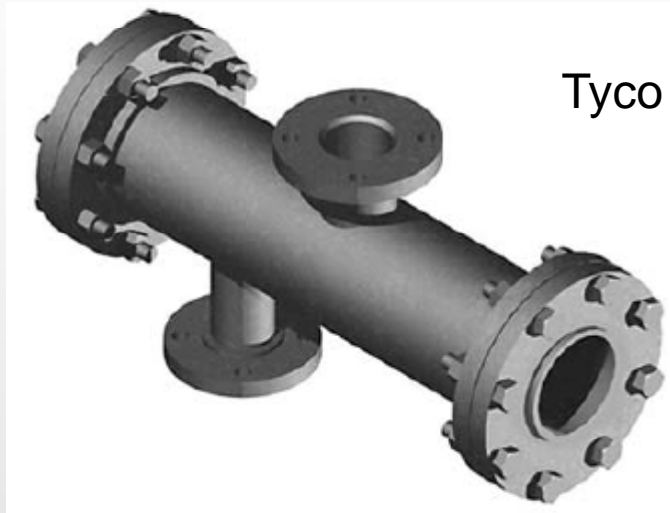
Water Spray Fixed Systems – Strainers

- **10.2 Inspection and Maintenance Procedures.**

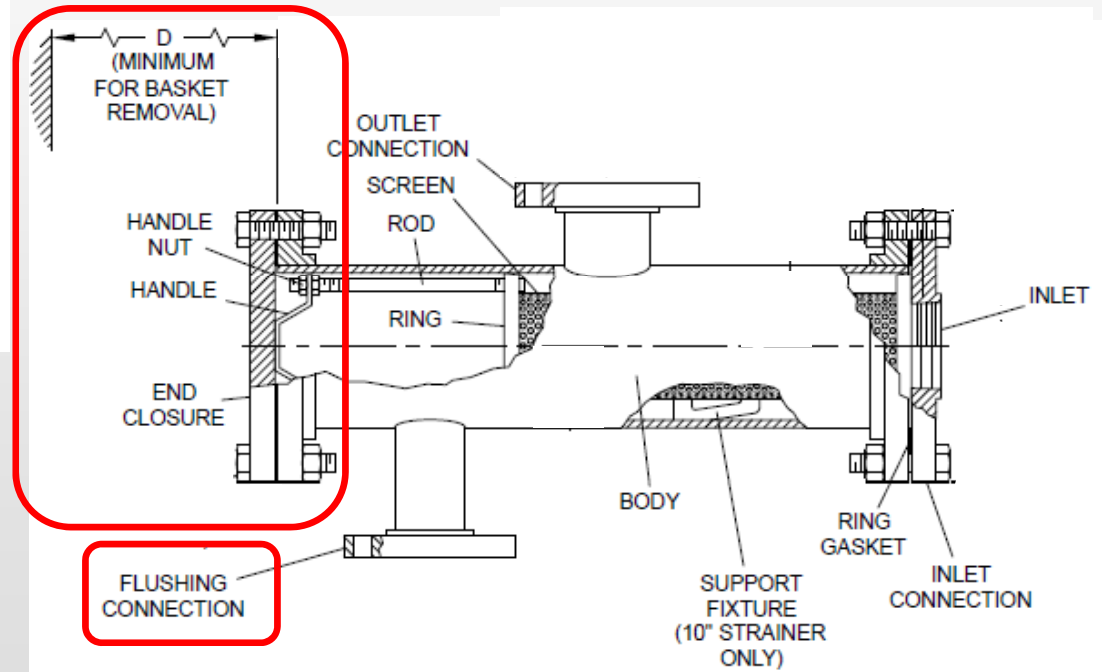
- **10.2.1.7** Mainline strainers shall be removed and **inspected every 5 years** for damaged and corroded parts.

NFPA 15 requires that these strainers be installed so they're accessible for flushing and cleaning.

Water Spray Fixed Systems – Strainers



Tyco Model A Pipe Line Strainer



Most mainline strainers are designed and installed to allow for required inspection and maintenance.

Chapter 13 Valves, Valve Components and Trim (Inspection)

- Alarm Valves**
 - Interior
 - Strainers, filters, orifices
- Check Valves - Interior**
- Preaction/Deluge Valve**
 - Interior
 - Strainers, filters, orifices
- Dry Pipe Valves/QODs**
 - Strainers, filters, orifices

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

Item	Frequency	Reference
Inspection		
<i>Control Valves</i>		
Sealed	Weekly	13.3.2.1
Locked	Monthly	13.3.2.1.1
Tamper switches	Monthly	13.3.2.1.1
<i>Alarm Valves</i>		
Exterior	Monthly	13.4.1.1
Interior	5 years	13.4.1.2
Strainers, filters, orifices	5 years	13.4.1.2
<i>Check Valves</i>		
Interior	5 years	13.4.2.1
<i>Preaction/Deluge Valves</i>		
Enclosure (during cold weather)	Daily/weekly	13.4.3.1
Exterior	Monthly	13.4.3.1.6
Interior	Annually/5 years	13.4.3.1.7
Strainers, filters, orifices	5 years	13.4.3.1.8
<i>Dry Pipe Valves/ Quick-Opening Devices</i>		
Gauges	Weekly/monthly	13.4.4.1.2.4, 13.4.4.1.2.5
Enclosure (during cold weather)	Daily/weekly	13.4.4.1.1
Exterior	Monthly	13.4.4.1.4
Interior	Annually	13.4.4.1.5
Strainers, filters, orifices	5 years	13.4.4.1.6
<i>Pressure Reducing and Relief Valves</i>		
Sprinkler systems	Quarterly	13.5.1.1
Hose connections	Annually	13.5.2.1
Hose racks	Annually	13.5.3.1
Fire Pumps		
Casing relief valves	Weekly	13.5.7.1, 13.5.7.1.1
Pressure relief valves	Weekly	13.5.7.2, 13.5.7.2.1
<i>Backflow Prevention Assemblies</i>		
Reduced pressure	Weekly/monthly	13.6.1
Reduced pressure detectors	Weekly/monthly	13.6.1
<i>Fire Department Connections</i>		
	Quarterly	13.7.1

Valves, Valve Components and Trim - Inspections

- **13.4 System Valves.**
- **13.4.1 Inspection of Alarm Valves.** Alarm valves shall be inspected as described in 13.4.1.1 and 13.4.1.2.

- **13.4.1.2*** Alarm valves and their associated strainers, filters, and restriction orifices shall be inspected internally every 5 years unless tests indicate a greater frequency is necessary.

- **13.4.2 Check Valves.**
- **13.4.2.1 Inspection.** Valves shall be inspected internally every 5 years to verify that all components operate correctly, move freely, and are in good condition.

These requirements have remained unchanged since the 1992 first edition.

Valves, Valve Components and Trim - Inspections

- Sludge and sediment can accumulate in the alarm valve making it improbable that it will fully open in a fire scenario.
- The FDC check valve is never exercised unless the fire department charges the connection.



Clappers in the FDC check valves will sometimes become frozen to the seat

Valves, Valve Components and Trim - Inspections

- **13.4 System Valves.** (continued)

- **13.4.3 Preaction Valves and Deluge Valves.**
- **13.4.3.1 Inspection.**

- **13.4.3.1.7.1 Internal inspection of valves that can be reset without removal of a faceplate** shall be permitted to be conducted **every 5 years.**
- **13.4.3.1.8 Strainers, filters, restricted orifices, and diaphragm chambers** shall be inspected internally **every 5 years** unless tests indicate a greater frequency is necessary.

These requirements have remained unchanged since the 1992 first edition.

Valves, Valve Components and Trim - Inspections

- Preaction and deluge valves, and their check valves, strainers, filters, and restriction orifices be inspected internally every 5 years.
- Larger check valves are found in the riser of a preaction system and in the FDC.



There are deluge and preaction valves that can be externally reset without removing the face plate.

Valves, Valve Components and Trim - Inspections

- **13.4 System Valves.** (continued)

- **13.4.3.1 13.4.4 Dry Pipe Valves/Quick-Opening Devices.**

- **13.4.4.1 Inspection.**

- **13.4.4.1.6 Strainers, filters, and restricted orifices** shall be **inspected internally every 5 years** unless tests indicate a greater frequency is necessary.

This requirement has remained unchanged since the 1992 first edition.

Chapter 13 Valves, Valve Components and Trim (Testing)

- ☑ **Preaction Systems**
 - ☑ Air leakage test
- ☑ **Dry Pipe Valves/Systems**
 - ☑ Full flow trip test
 - ☑ Air leakage test
- ☑ **Pressure Reducing and Relief valves**
 - ☑ Sprinkler systems
 - ☑ Hose connections
 - ☑ Hose racks
- ☑ **Hose Valves**

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

Item	Frequency	Reference
Testing		
<i>Dry Pipe Valves/ Quick-Opening Devices</i>		
Priming water	Quarterly	13.4.4.2.1
Low air pressure alarm	Quarterly	13.4.4.2.6
Quick-opening devices	Quarterly	13.4.4.2.4
Trip test	Annually	13.4.4.2.2
Full flow trip test	3 years	13.4.4.2.2.2
<i>Pressure Reducing and Relief Valves</i>		
Sprinkler systems	5 years	13.5.1.2
Circulation relief	Annually	13.5.7.1.2
Pressure relief valves	Annually	13.5.7.2.2
Hose connections	5 years	13.5.2.2
Hose racks	5 years	13.5.3.2
<i>Backflow Prevention Assemblies</i>	Annually	13.6.2

* Not currently shown in Table 13.1.1.2:

Preaction Systems

Air leakage test 3 years 13.4.3.2.6

Dry Pipe Systems

Air leakage test 3 years 13.4.4.2.9

Hose Valves (on hose stations & Class II)

Open & close test 3 years 13.5.6.2.2

Valves, Valve Components and Trim - Testing

- **13.4.3 Preaction Valves and Deluge Valves.**

- **13.4.3.2 Testing.**

- **13.4.3.2.2* Each deluge valve shall be trip tested annually**

- **13.4.3.2.2.2* Where the nature of the protected property is such that water cannot be discharged for test purposes,**
- **13.4.3.2.2.3 Where the nature of the protected property is such that water cannot be discharged unless**
- **13.4.3.2.2.4 The full flow test frequency shall not exceed 3 years.**

- **13.4.3.2.5 Preaction or deluge valves protecting freezers shall ...**

This exception and the 3 year requirement were in the first 1992 edition.

Valves, Valve Components and Trim - Testing

- **13.4.3.2.6** Preaction systems shall be tested **once every 3 years** for air leakage, using one of the following test methods:
 - (1) A pressure test **at 40 psi (3.2 bar) for 2 hours**. The system **shall be permitted to lose up to 3 psi (0.2 bar)** during the duration of the test. Air leaks shall be addressed if the system loses more than 3 psi (0.2 bar) during this test.
 - (2) With the system **at normal system pressure, shut off the air source** (compressor or shop air) **for 4 hours**. **If the low air pressure alarm goes off** within this period, the air leaks shall be addressed.

This requirement for preaction systems was added in the 2011 edition.

Valves, Valve Components and Trim - Testing

- **13.4.4 Dry Pipe Valves/Quick-Opening Devices.**

- **13.4.4.2 Testing.**

- **13.4.4.2.2.2*** Every 3 years and whenever the system is altered, the dry pipe valve shall be **trip tested with the control valve fully open** and the quick-opening device, if provided, in service.

This requirement has remained unchanged since the first 1992 edition.

Valves, Valve Components and Trim - Testing

- Full flow trip testing normally requires 2 people, one at the dry pipe valve and one at the inspectors test valve.
- There is an exception for dry pipe systems protecting freezers so moisture isn't introduced into the piping in the freezer.



The dry valve full flow trip test is performed with regularity.

Valves, Valve Components and Trim - Testing

- **13.4.4.2.9** Dry pipe systems shall be tested once **every 3 years** for air leakage, using one of the following test methods:
 - (1) A pressure test **at 40 psi** (3.2 bar) shall be performed **for 2 hours**.
 - (a) The system **shall be permitted to lose up to 3 psi** (0.2 bar) during the duration of the test.
 - (b) Air leaks shall be addressed if the system loses more than 3 psi (0.2 bar) during this test.
 - (2) With the system **at normal system pressure**, the **air source** (compressor or shop air) shall be **shut off for 4 hours**. If the low air pressure alarm goes off within this period, the air leaks shall be addressed.

This requirement for dry systems was added in the 2008 edition.

Valves, Valve Components and Trim - Testing

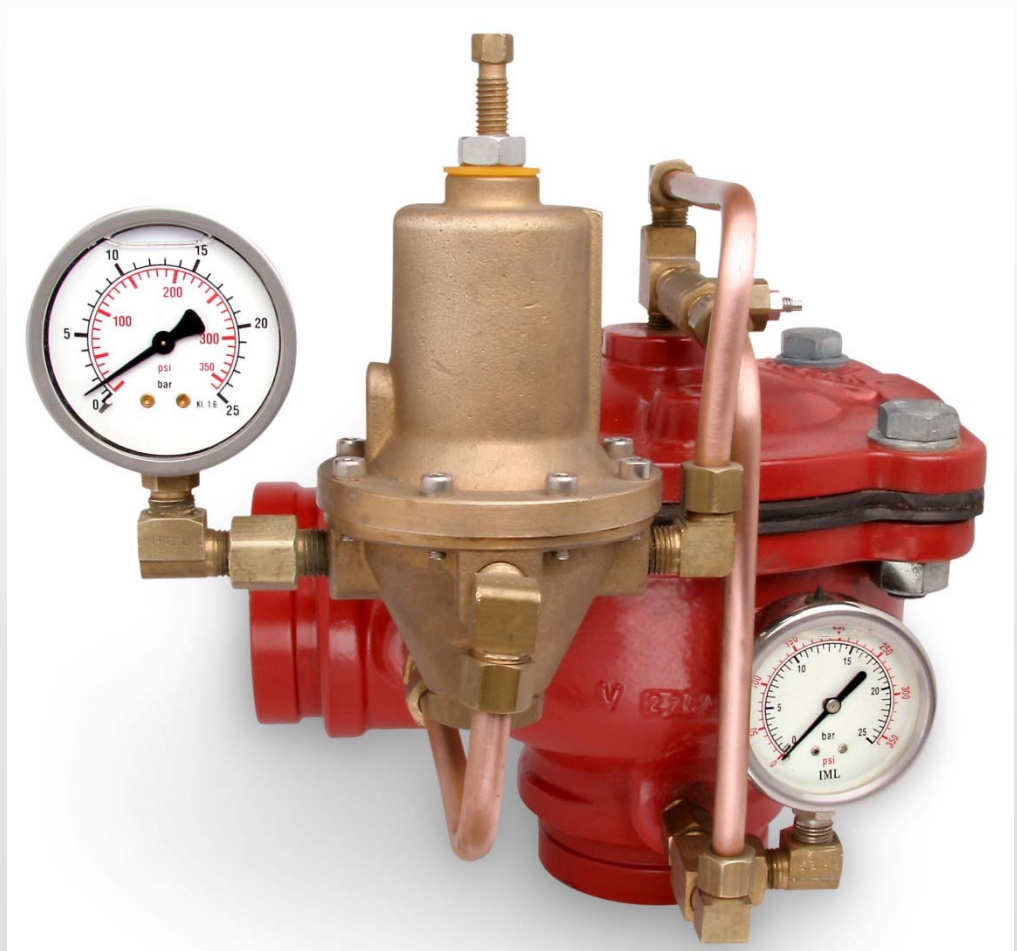
- **13.5 Pressure Reducing Valves and Relief Valves.**
- **13.5.1 Inspection and Testing of Sprinkler Pressure Reducing Valves.** Sprinkler pressure reducing valves shall be inspected and tested as described in 13.5.1.1 and 13.5.1.2.

- **13.5.1.2*** A full flow test shall be conducted on each valve at 5-year intervals and shall be compared to previous test results.
- **A.13.5.1.2** The sectional drain valve should be opened to compare the results with the original installation or acceptance tests.

In the 1992 edition stated: "A flow test shall be conducted on each valve annually."

Valves, Valve Components and Trim - Testing

- PRVs for sprinkler systems are typically installed with gauges on the inlet and outlet so pressure readings can be observed.
- The sectional drain should be fully opened and the pressures compared to previous results.



It isn't required or necessary to measure the flow.

Valves, Valve Components and Trim - Testing

- **13.5 Pressure Reducing Valves and Relief Valves.**

- **13.5.2 Hose Connection Pressure Reducing Valves.**

- **13.5.2.2*** A **full flow test** shall be conducted on **each valve at 5-year intervals** and shall be compared to previous test results.

- **13.5.3 Hose Rack Assembly Pressure Reducing Valves.**

- **13.5.3.2** A **full flow test** shall be conducted on **each valve at 5-year intervals** and compared to previous test results.

These requirements for flow testing every 5 years were in the 1992 first edition, although there was no requirement to compare to previous results.

Valves, Valve Components and Trim - Testing

- PRV devices can be bench tested or tested in place.
- To test in place, a gauge is connected to both sides of the device, and flow readings are taken.
- Field-adjustable valves are to be reset
- Nonadjustable valves should be replaced.



Extreme caution should be exercised because of the high pressure involved when testing.

Valves, Valve Components and Trim - Testing

- **13.5.6 Hose Valves.**
- **13.5.6.2 Testing.**
- **13.5.6.2.1* Class I and Class III** standpipe system **hose valves** shall be **tested annually** by opening and closing the valves.
- **A.13.5.6.2.1** Hose valves can be tested without a full flow if the cap is left on the hose threads. The purpose of this requirement is to exercise the valve so it can be operated easily.
-
- **13.5.6.2.2*** Hose valves on **hose stations** attached to sprinkler systems and **Class II** standpipe systems shall be **tested every 3 years** by opening and closing the valves.

These requirements were added in the 2002 edition.

Chapter 14

Obstruction Investigation



Obstruction Investigation

In the 2011 edition, this chapter was reorganized:

Chapter 14 Obstruction Investigation

- **14.1* General.** This chapter shall provide the minimum requirements for conducting investigations of fire protection **system** piping for possible sources of materials that could cause pipe blockage.
- **14.2 Internal Inspection of Piping.**

- **14.3 Obstruction Investigation and Prevention.**

- **14.4 Ice Obstruction.**

The requirement to perform an internal pipe inspection every 5 years first appeared in the 2002 edition of NFPA 25.

Obstruction Investigation

- **14.2 Internal Inspection of Piping.**
- **14.2.1 Except as discussed in 14.2.1.1 and 14.2.1.4 an inspection of piping and branch line conditions shall be conducted every 5 years** by opening a flushing connection at the end of one main and by removing a sprinkler toward the end of one branch line for the purpose of inspecting for the presence of foreign organic and inorganic material.

Two exceptions to the internal inspection every 5 years were added.

Obstruction Investigation

Two new exceptions were added:

- **14.2.1.4 Non-metallic pipe** shall not be required to be inspected internally.

-
- **14.2.1.6*** Inspection of a cross main is not required where the system **does not have a means of inspection**.
 - **A.14.2.1.6** The inspection of piping is not required where the pipe is not readily accessible, such as above gypsum ceilings. Additionally, **not all systems**, such as those installed in accordance with NFPA13R, **have grooved couplings or flushing connections**.

The second exception was less controversial as most committee members agreed that if a means to perform the inspection is not provided, this document will not require one to be retrofitted.

Obstruction Investigation

A new requirement was added:

- **14.2.1.3*** If the presence of sufficient foreign organic or inorganic material is found to obstruct pipe or sprinklers, **an obstruction investigation shall be conducted as described in Section 14.3.**

A new requirement was added:

- **14.2.1.5** In dry pipe systems and pre-action systems, the sprinkler removed for inspection shall be from the most remote branch line from the source of water that is **not equipped with the inspector's test valve.**

This new requirement in 14.2.1.3 makes it clear that if obstructing material was found during the internal pipe inspection, corrective action must be taken which may include a complete flush of the system.

Obstruction Investigation

A new exception was added:

- **14.2.2*** In buildings having multiple wet pipe systems, **every other system** shall have an internal inspection of piping every 5 years as described in 14.2.1.
- **14.2.2.1** During the next inspection frequency required by 14.2.1, **the alternate systems** not inspected during the previous inspection shall have an internal inspection of piping as described in 14.2.1.
- **14.2.2.2** If the presence of foreign organic and/or inorganic material is **found in any system in a building** during the 5 year internal inspection of piping, all systems shall have an internal inspection.

This section was added to the chapter to try to reduce the number of systems that need to be inspected when multiple systems are in the same building.

Obstruction Investigation

A new annex note was added:

- **A.14.2.2** In large warehouses, high rise buildings, and other **buildings having multiple systems**, it is reasonable to perform the internal inspection on half of the systems, and conclude that these are representative of all systems in the building. The systems in the building not inspected during one inspection cycle should be inspected during the next one. As long as there is no evidence of any foreign organic and/or inorganic material found in any of the systems being inspected, every other system would be inspected once every 10 years. However, if foreign organic and/or inorganic material is found in any system in the building during the 5 year inspection cycle, all systems must then be inspected during that inspection cycle.

This annex note was added to try to provide guidance on how to apply the exception for buildings with multiple systems.

Annex E

Examples of Classifications of Needed Repairs

A new Annex E was added:

Annex E Examples of Classifications of Needed Repairs

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

- **E.1** Table E.1 is an **example** of classifications (e.g., impairment, critical deficiency, or noncritical deficiency) of some of the needed corrections and repairs that are identified during the inspection, testing, and maintenance of some systems. This table **is not all-inclusive** but is included in this annex **to provide some guidance** in responding to needed corrections and repairs. **The table does not take into account the nature of the hazard or the life safety exposure of the occupancy and should be used with good judgment.**

In using the tables the public will have the opportunity to apply the guidance and submit proposals for the next edition of NFPA 25.

Annex E Tables

Table E.1 Examples of Classifications of Needed Corrections and Repairs

Item	Finding	Reference	Impairment	Critical Deficiency	Noncritical Deficiency
Chapter 5: Sprinkler Systems — Inspection					
Sprinklers	Leaking, heavily corroded, painted operating element or bulb or deflector or cover plate, heavily loaded, foreign materials attached to or suspended from, improper orientation, glass bulbs that have lost fluid	5.2.1.1.1	X		
Sprinklers	Lightly corroded, painted frame arm or boss, lightly loaded	5.2.1.1.1		X	
Gauges	Not replaced or calibrated in 5 years, not accurate within 3% of scale	5.3.2			X
Alarm devices	Water motor and gong not functioning	5.3.3		X	
Alarm devices	Pressure switch or vane type switch not functioning or no alarm	5.3.3		X	
Antifreeze systems	Specific gravity of antifreeze not correct	5.3.4		X	
Main drain	Large drop in full flow pressure or slow return to normal static pressure	13.2.5.2	X		
Obstruction investigation	No inspection of main and branch line after 5 years or inspection revealed presence of MIC, zebra mussels, rust, and scale	14.3		X	

You will notice that the tables are the only place in NFPA 25 where not performing an inspection or test is designated as a deficiency.

Questions?

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