Reducing
Your Risk

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We've inspected over 34,000 facilities in the last 18 months, and have had the ability to repair every deficiency found.

- **16,000+ sprinkler inspections**
- **2,500+ mechanical PM inspections**
- **15,700+ fire extinguisher inspections**

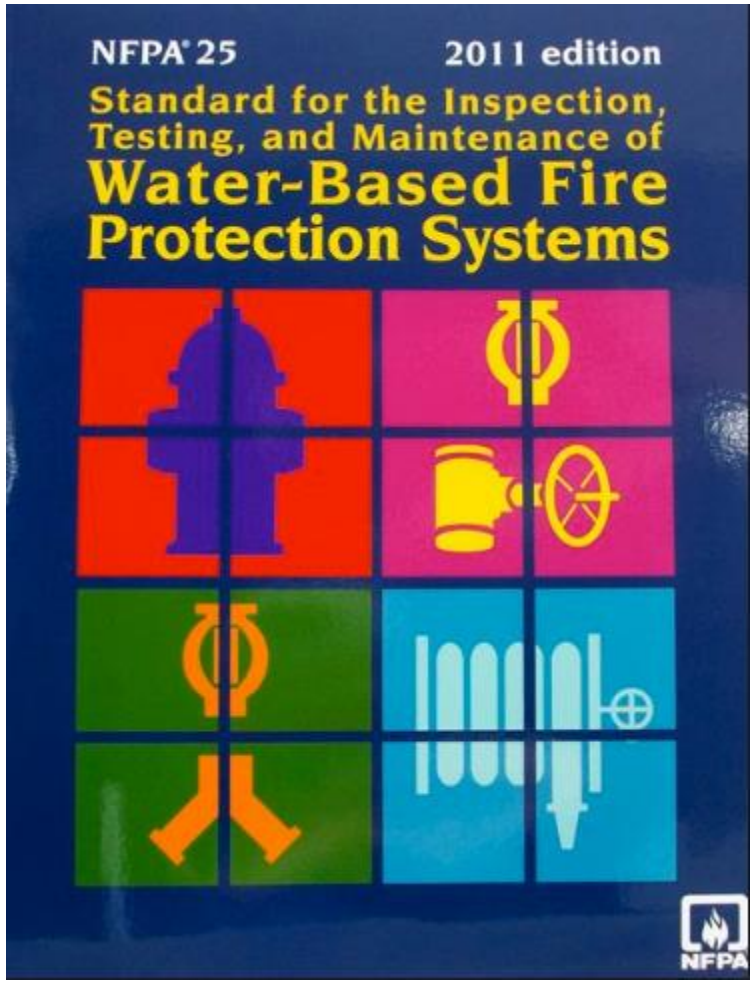
*****In Ahern's Northwest Region we have performed service work at 76% of the Hospitals listed in the DHS directory.**

WHEA Lunch and Learn

- Pre-inspection Preparations for NFPA 25 Inspections
- Frequency of NFPA Inspection and Requirements
- Building Owner Requirements
- Extended Interval Testing
- NFPA Sprinkler Head Testing

AHERN SINCE 1880®

NFPA-25



NFPA-25
2011
Edition

What is NFPA 25?

- **National Fire Protection Association** (**NFPA**):
  is a United States trade association that creates and maintains private, copyrighted standards and codes for usage and adoption by local governments.

- **NFPA-25:**The standard for inspection, testing, and maintenance of water-based fire protection systems.

NFPA 25 Definitions

3.3.18 – Inspection: visual examination

3.3.35 – Testing: a procedure used to determine the operational status of a component or system.

3.2.4 – Shall: Indicates a mandatory requirement

3.2.5 – Should: Indicates a recommendation or that which is advised but not required.

Authority Having Jurisdiction

- 3.2.2 – Authority Having Jurisdiction – examples:
  - Fire department
  - Insurance company
  - State agency
  - Joint Commission

Pre-Inspection Preparation and Frequency of NFPA 25 Inspections and Requirements

- Observations & recommendations for efficient, less disruptive, comprehensive NFPA-25 inspections.

NFPA - 25

Quarterly

Or

Semi-annual

Or

Annual?

NFPA - 25

Quarterly/Semi-Annual

- Water flow Alarm Tests
- Valve Supervisory (tamper switch test)
- Other Supervisory Devices
- Main Drain Tests

Water flow alarm tests

Inspectors Test

Water flow alarm tests

Inspector's Test Connection

Main Drain Tests

- 13.2.5.2 Main Drain Tests
  - Pass/fail criteria:
    - Identify and correct a cause of 10% or greater reduction of full flow pressure **when compared with original acceptance test or previously performed tests.**

Main Drain Tests

- Main Drain Tests

Main Drain Tests

Main Drain Test Flowing

Planning Quarterly Inspections

- Best time to test alarms
- Coordinate monitoring of alarm signals
- Water flow:
  - Are test drains piped to floor drains?
  - Do any test drains require temporary hoses?
  - Are there sidewalks, landscaping or parked cars near an outside drain?

Annual

- Arrange for access to inspect & test
- Similar preparation for quarterly inspections
- Annual walk-thru inspection
- Other possible items
  - Fire pump test – water flow and alarm signals
  - Backflow preventer testing – water flow
  - Pressure reducing valves - water flow

Backflow Preventer Testing

- 13.6.2.1 Backflow Preventer Forward-Flow Testing
  - Only the flow rate should be measured, not the pressure.

Backflow Preventer Testing

AHERN SINCE 1880

5315 Freitag Drive
Menomonie, WI 54751-8908
800.481.8009

Calculation Riser Placard for **AREA/DENSITY** Designed Systems.
System Design Area: **2nd Floor - Remote Area 1**
At: **222 Water Street - Any Town, Wisconsin**
Contract No.: **123456** Print No.(s): **FP - 6** Dated: **3/23/17**

This system, as shown on **J. F. Ahern Co.** drawing, is designed for **19** sprinklers to discharge at a density of **0.10** GPM/SqFt over a minimum area of **947.50** SqFt when supplied with water at the rate of **241.58 GPM** at a pressure of **76.15** PSI at the **connection point**.

System Demand: 241.58 GPM

Occupancy Classification: **Light Hazard**
Commodity Classification: **N/A**
Inside Hose Stream added at base of riser: **0** GPM
Outside Hose Stream added at source: **100** GPM
Standard / Issue: **NFPA 13, 2007 Edition**

Antifreeze System Solution: **N/A**
Antifreeze System Capacity: **N/A** Gallons; **N/A**% Antifreeze

Storage Height (max.): **N/A**
Other Storage: **N/A**

General Information	Yes	No
High Pile	☐	☒
Rack Storage	☐	☒
Hazardous Material	☐	☒
Idle Pallets	☐	☒
Flammable/Combustible Liquids	☐	☒
Solid Shelving	☐	☒
Encapsulation	☐	☒
Aisle Width (min.)	N/A	Feet

Sprinkler Head Quantity & Type:

Qty.	Make/Vendor	Model/Type	K-Factor	Temp.
13	Tyco	TY-FRB Upright TY2131	4.2	155° F
6	Tyco	TY-FRB Pendent TY2231	4.2	155° F

Backflow Preventer Testing

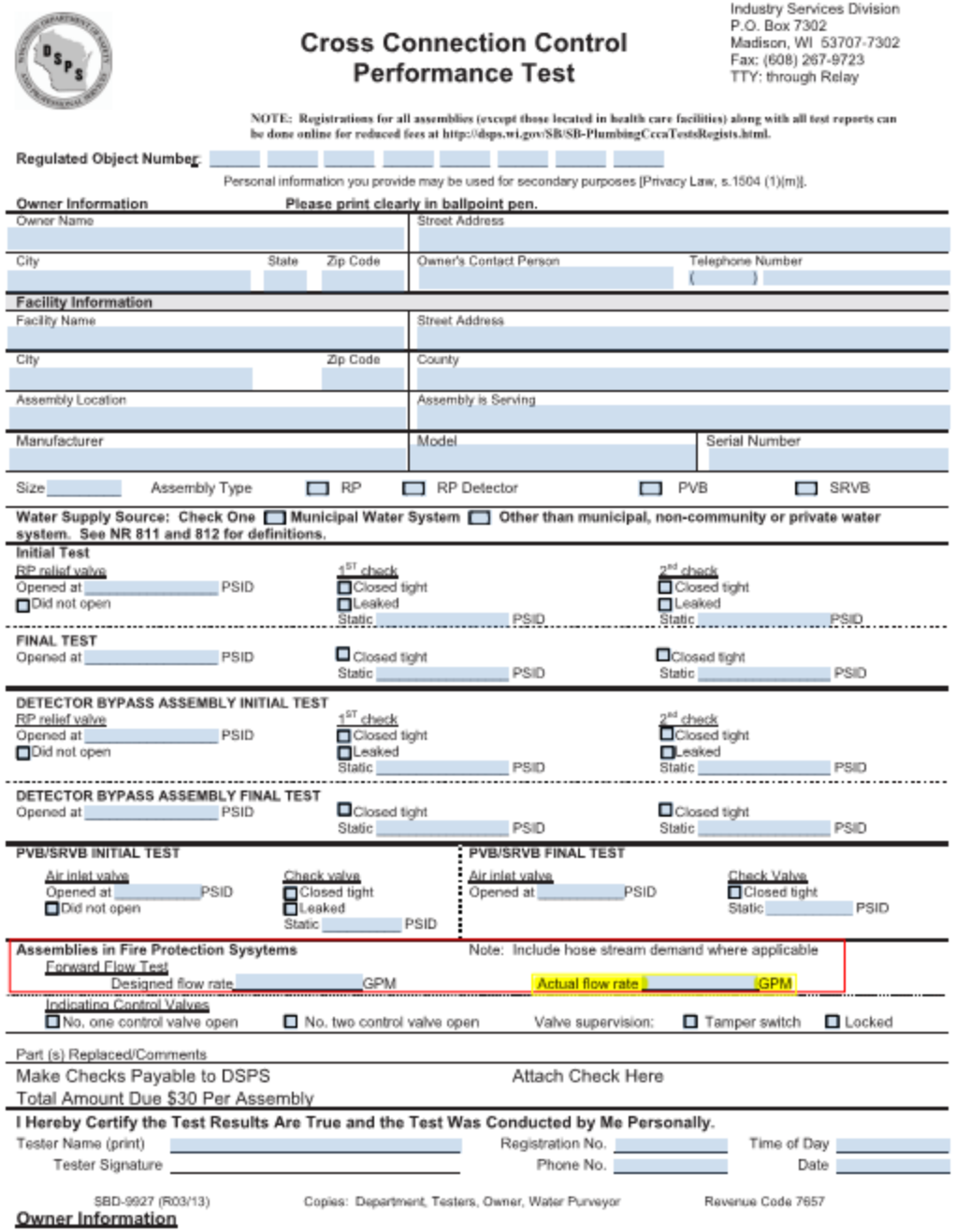
- Backflow Preventer Forward Flow Test

DC Backflow Assembly

Backflow Preventer Testi

BFP Forward Flow Through FDC

Cross Connection Performance



Cross Connection Control Performance Test

Industry Services Division
P.O. Box 7302
Madison, WI 53707-7302
Fax: (608) 267-9723
TTY: through Relay

NOTE: Registrations for all assemblies (except those located in health care facilities) along with all test reports can be done online for reduced fees at http://dsps.wi.gov/SB/SB-PlumbingCccaTestsRegists.html.

Regulated Object Number:

Personal information you provide may be used for secondary purposes [Privacy Law, s.1504 (1)(m)].

Owner Information Please print clearly in ballpoint pen.

Owner Name | Street Address
City | State | Zip Code | Owner's Contact Person | Telephone Number ( )

Facility Information

Facility Name | Street Address
City | Zip Code | County
Assembly Location | Assembly is Serving
Manufacturer | Model | Serial Number

Size Assembly Type ☐ RP ☐ RP Detector ☐ PVB ☐ SRVB

Water Supply Source: Check One ☐ **Municipal Water System** ☐ **Other than municipal, non-community or private water system. See NR 811 and 812 for definitions.**

Initial Test

RP relief valve: Opened at PSID; ☐ Did not open
1ST check: ☐ Closed tight; ☐ Leaked; Static PSID
2nd check: ☐ Closed tight; ☐ Leaked; Static PSID

FINAL TEST

Opened at PSID
☐ Closed tight; Static PSID
☐ Closed tight; Static PSID

DETECTOR BYPASS ASSEMBLY INITIAL TEST

RP relief valve: Opened at PSID; ☐ Did not open
1ST check: ☐ Closed tight; ☐ Leaked; Static PSID
2nd check: ☐ Closed tight; ☐ Leaked; Static PSID

DETECTOR BYPASS ASSEMBLY FINAL TEST

Opened at PSID
☐ Closed tight; Static PSID
☐ Closed tight; Static PSID

PVB/SRVB INITIAL TEST

Air inlet valve: Opened at PSID; ☐ Did not open
Check valve: ☐ Closed tight; ☐ Leaked; Static PSID

PVB/SRVB FINAL TEST

Air inlet valve: Opened at PSID
Check Valve: ☐ Closed tight; Static PSID

Assemblies in Fire Protection Sysytems Note: Include hose stream demand where applicable

Forward Flow Test
Designed flow rate GPM Actual flow rate GPM

Indicating Control Valves
☐ No, one control valve open ☐ No. two control valve open Valve supervision: ☐ Tamper switch ☐ Locked

Part (s) Replaced/Comments

Make Checks Payable to DSPS Attach Check Here
Total Amount Due $30 Per Assembly

I Hereby Certify the Test Results Are True and the Test Was Conducted by Me Personally.

Tester Name (print) Registration No. Time of Day
Tester Signature Phone No. Date

SBD-9927 (R03/13) Copies: Department, Testers, Owner, Water Purveyor Revenue Code 7657

Owner Information

Static _____ PSID

Assemblies in Fire Protection Sysytems Note: Include hose stream demand where applicable

Forward Flow Test

Designed flow rate _____ GPM Actual flow rate _____ GPM

Indicating Control Valves

☐ No. one control valve open ☐ No. two control valve open Valve supervision: ☐ Tamper switch ☐ Locked

Part (s) Replaced/Comments

Make Checks Payable to DSPS Attach Check Here

Total Amount Due $30 Per Assembly

I Hereby Certify the Test Results Are True and the Test Was Conducted by Me Personally.

Tester Name (print) _____ Registration No. _____ Time of Day _____

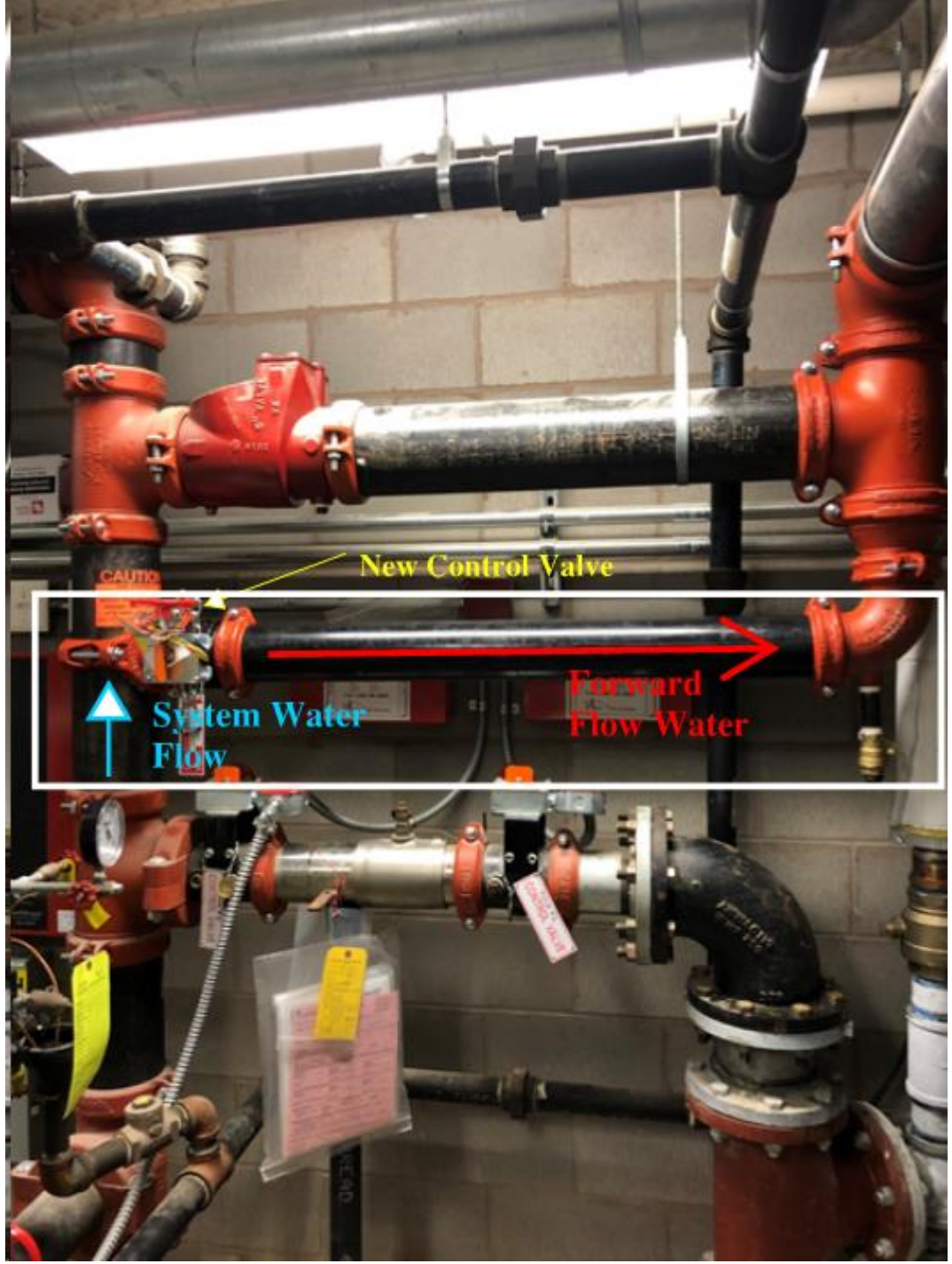
Tester Signature _____ Phone No. _____ Date _____

SBD-9927 (R03/13) Copies: Department, Testers, Owner, Water Purveyor Revenue Code 7657

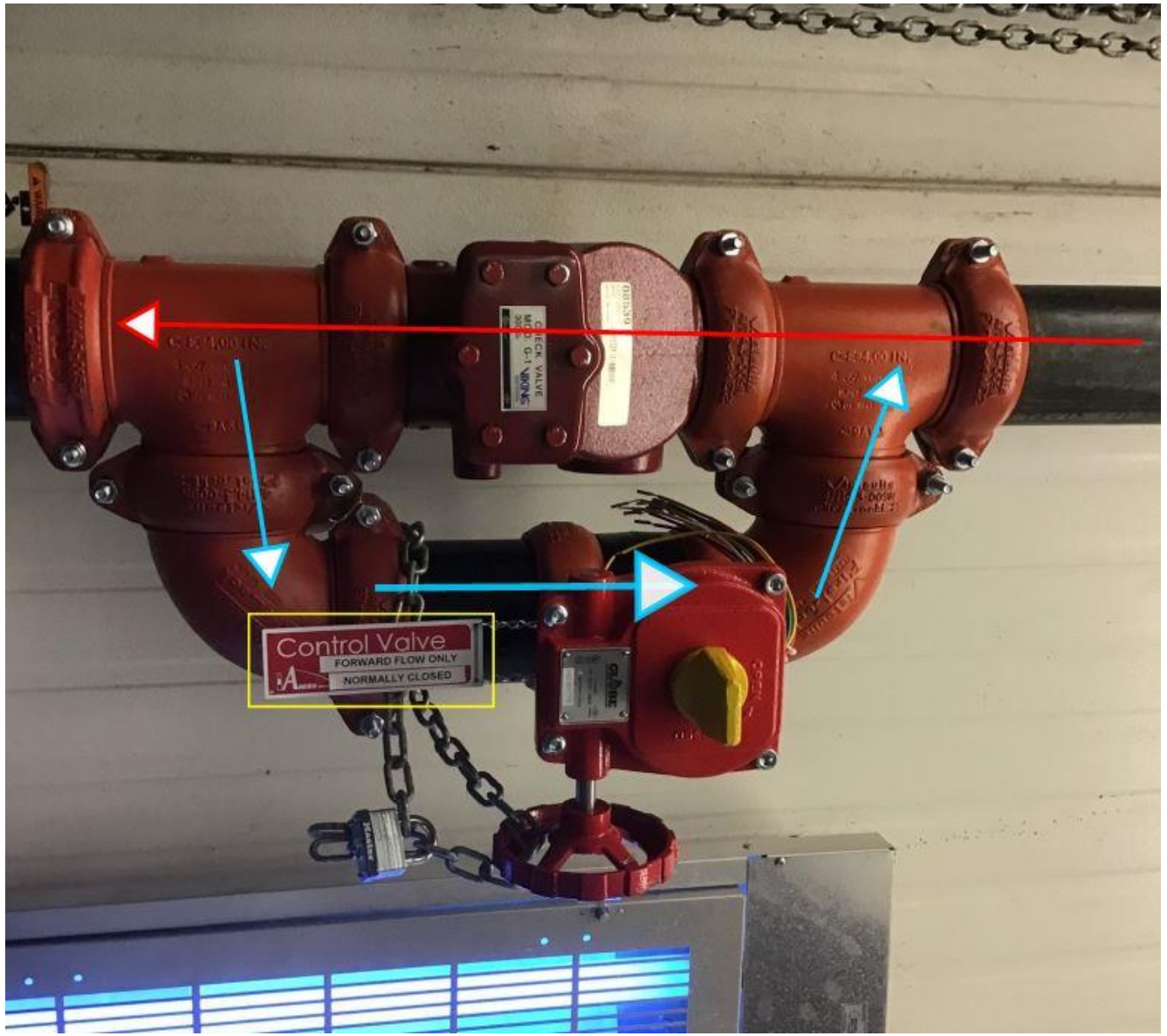
Owner Information

BFP Forward Flow Through FDC

Forward Flow Provisions



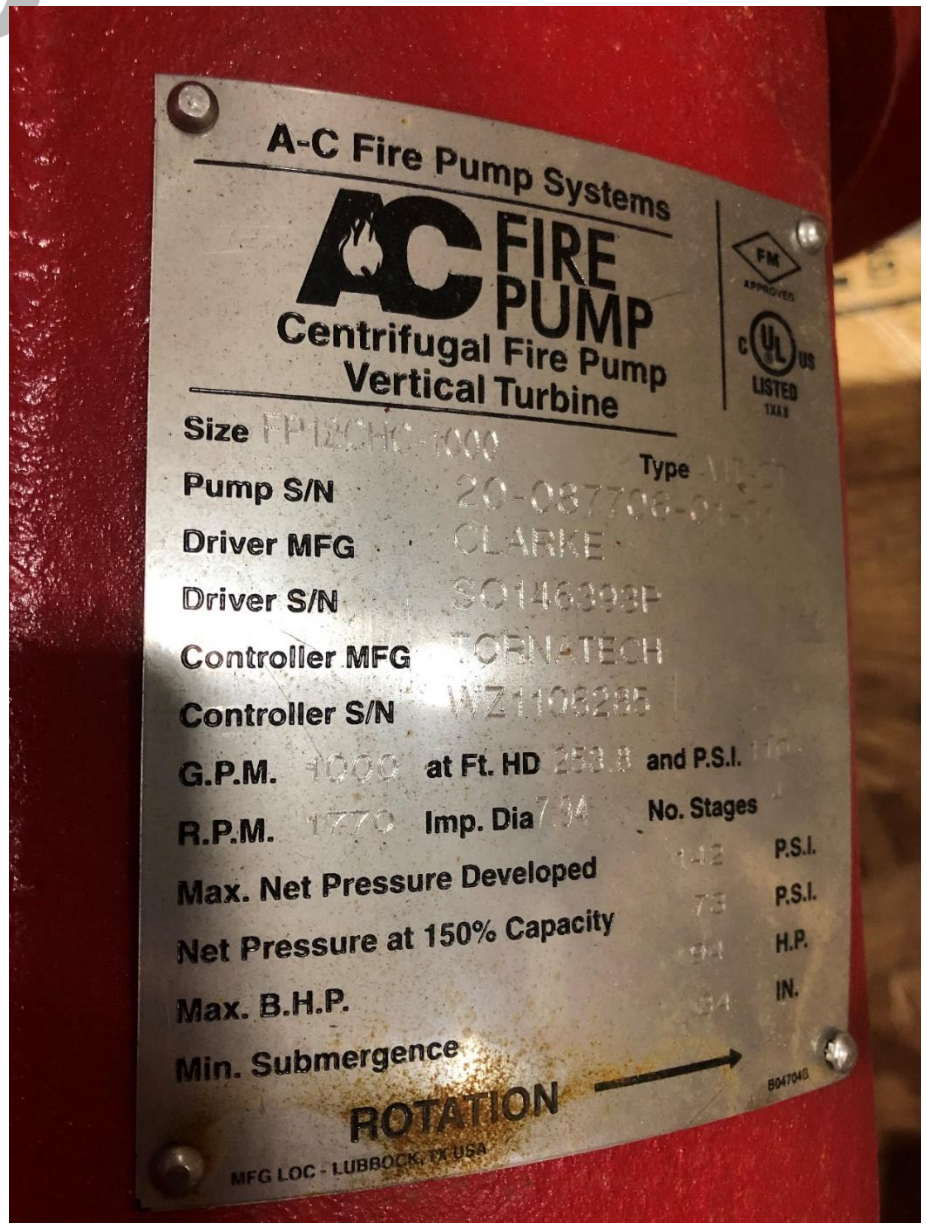
Forward Flow Provisions



Forward Flow Provisions

Annual Pump Test

- 8.3.5.3 Annual Pump Test
  - The pass/fail criteria
  - The test pressure at rated flow is within 95% of the initial certified field test curve.
  - The test pressure is within 95% of the performance characteristics on the pump nameplate.



Annual Fire Pump Tests

- Fire Pump Test

Electric Pump with Bypass

Annual Fire Pu

Fire Pump Test

Annual Fire Pump Tests

Fire Pump Test

Building Owner Requirements

- Accessibility 4.1.2
  "The property owner or designated representative shall provide ready accessibility to components of water-based fire protection systems that require inspection, testing, and maintenance."

NFPA - 25

Building Owner Requirements

- Accessibility 4.1.2 (cont'd)
- Access to valves, drain assemblies, devices

Accessibility

Accessibility

Building Owner Requirements

- Accessibility 4.1.2 (cont'd)

- Should an 'Access Plan' be established prior to the inspection?
  - More efficient, less disruptive inspection
  - More logical progression of inspection

Building Owner Requirements

- Accessibility 4.1.2 (cont'd)
- Does Access Plan consider best time of day to provide access for inspection?

Accessibility

Accessibility

Accessibility

Building Owner Requirements

- Accessibility 4.1.2 (cont'd)
- Any areas require special preparation prior to inspection & testing?

NFPA - 25

“Inspections from Floor Level”

- “Inspection” – defined by NFPA-25 as, “a visual examination of a system or portion thereof to verify that it appears to be in operating conditions and if free of physical damage (3.3.18).”

"Inspections from Floor Level" (cont'd)

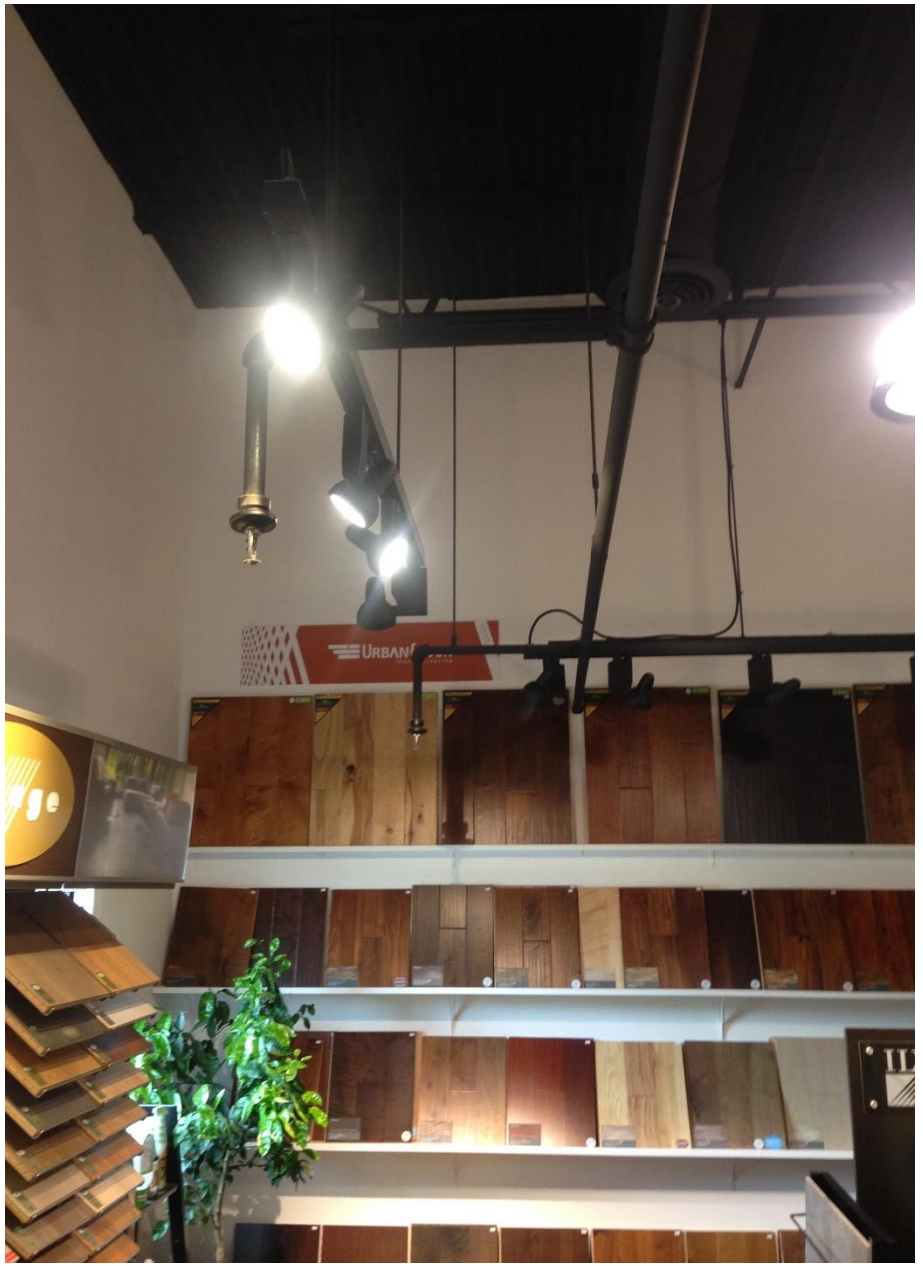
- Sprinklers shall be inspected from the floor level annually (5.2.1.1)
- Sprinklers installed in concealed spaces such as above suspended ceilings shall not require inspection (5.2.1.1.6)
- Sprinkler pipe and fittings shall be inspected annually from the floor level (5.2.2)
- Pipe and fittings installed in concealed spaces such as above suspended ceilings shall not require inspection (5.2.2.3)
- Similar inspection requirements for sprinkler pipe hangers (5.2.3, 5.2.3.3)

NFPA 25

NFPA 25

NFPA 25

What's wrong here?



Extended Interval Testing

- Extended Interval Testing – required less frequently than annually and often not included in annual or quarterly inspections.

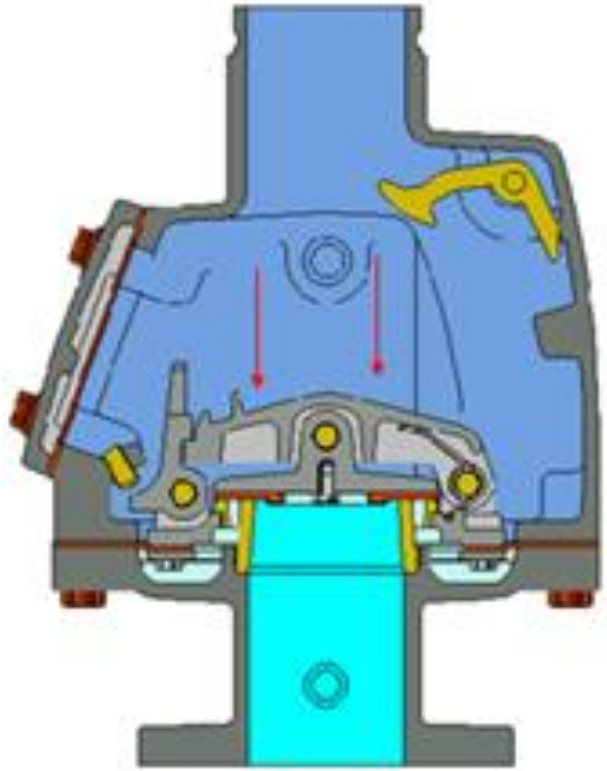
Extended Interval Testing(cont'd)

- Extended Interval Testing Examples:
  - 3-year pressure tests – Dry pipe & Preaction systems
  - 5-year check valve maintenance
  - 5-year interval pipe inspections
  - 5-year standpipe testing

Dry Pipe System

Dry Pipe Valve

- Air pressure in system piping will cause the clapper to close against the air seat and water seat.



Dry System Leakage Test

- 13.4.4.2.9 Dry System Leakage Test – every 3 years

  - Test with air at 40 psi for 2-hours.

  - Turn off the system air source for 4-hours.

Extended-Interval Testing

- 5-Year Internal Check Valve Maintenance.

Swing Check

Extended-Interval Testing

- 5-Year Internal Check Valve Maintenance.

Wafer Check

Extended-Interval Testing

- 5-Year Internal Check Valve Maintenance.

Flanged Swing Check

Extended-Interval Testing

- Obstruction found during an internal inspection of a check valve.

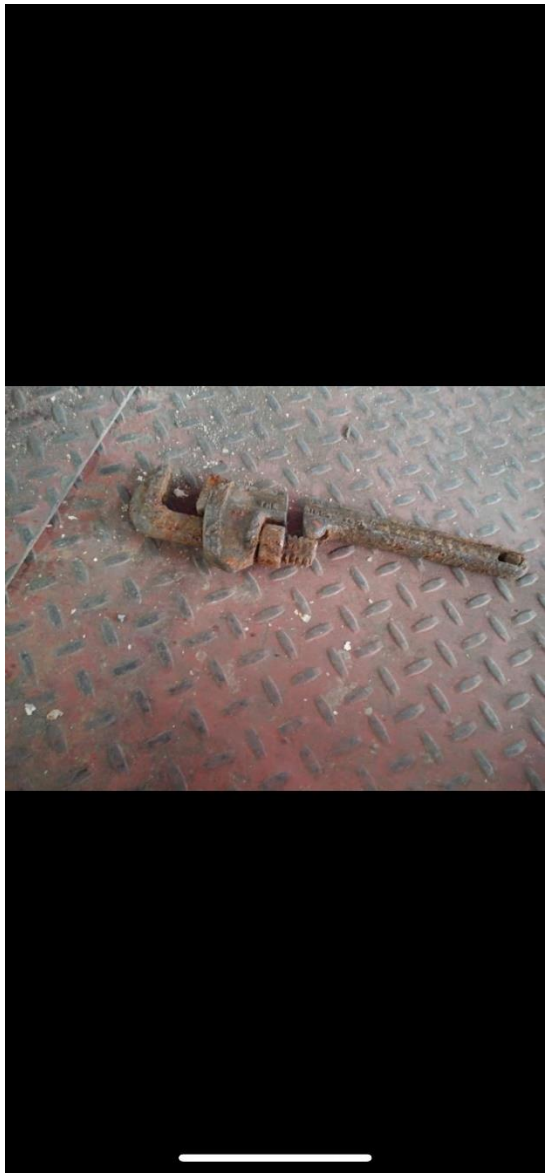
5-Year Testing – Internal Pipe Inspection

- Standard Internal Pipe Exam
  - End of one main
  - End of one branchline
- Internal Pipe Exam for ‘at-risk’ systems
  - System Valve
  - Riser
  - Cross Main
  - Branch line
- Obstruction Investigation – if certain conditions are present. Complete flushing procedure may be required.

Failing to Internally Inspect Piping

Failing to Internally Inspect Piping

Failing to Internally Inspect Piping



Failing to Internally Inspect Piping

Obstructed Piping May Require Replacement or Flushing

Repair Plan (cont'd)

- Extended Interval Testing Recommendations:
  - Coordinate with other system repairs or modifications
  - Add 5-year pipe inspections to projects requiring pipe modifications

Future Inspection & Testing

- Recommendations to improve inspection & testing processes:
  - Relocate valves to accessible areas
  - Main drain & test drains piped to proper floor drains, drain risers or to discharge outside

System Zones / Emergency Shut-Down Procedures

- Conduct periodic review of system zoning: location of control valves & system drains
- Conduct periodic drills for emergency shut down procedures

System Zones / Emergency Shut-Down Procedures (cont'd)

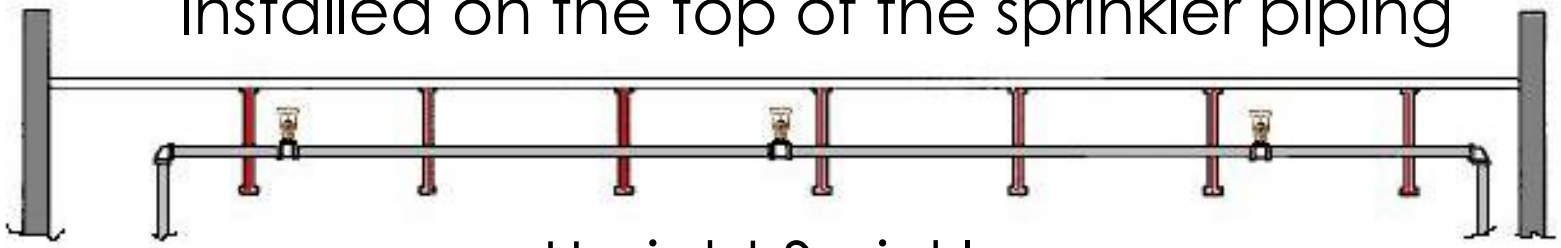
- Example:
  - One (1) sprinkler discharging at 18 GPM x 10 minutes = 180 gallons

Common Sprinklers

NFPA Sprinkler Head Testing

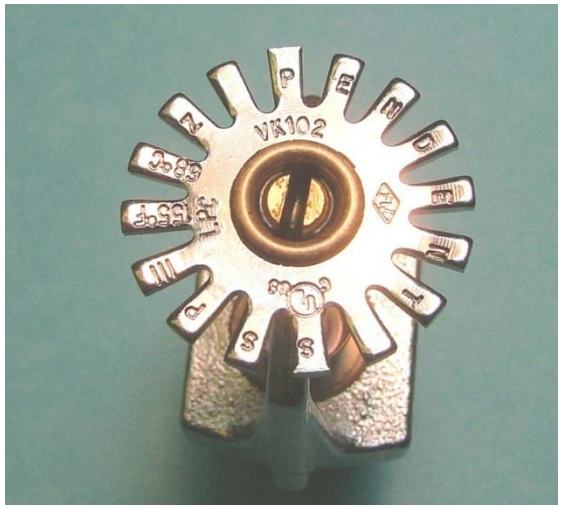
Sprinkler Head Identification

Installed on the top of the sprinkler piping

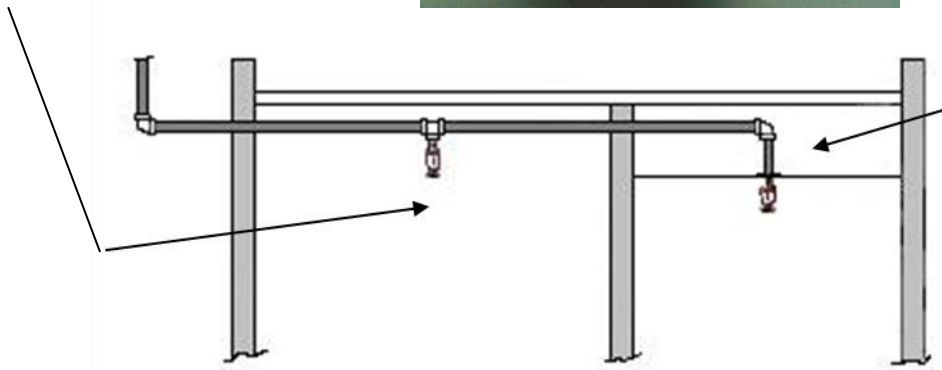


Upright Sprinklers

Sprinkler Head Identification



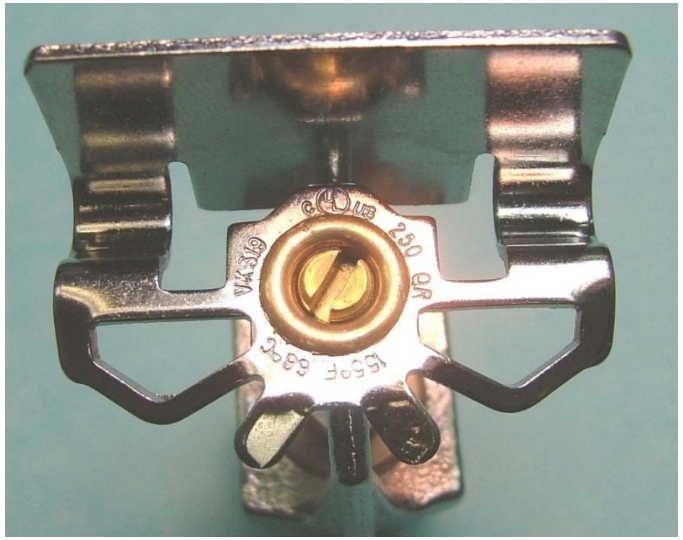
Pendent sprinkler
on exposed piping

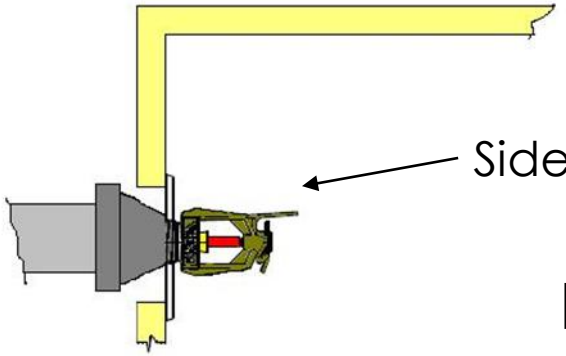


Pendent sprinkler
fed through a ceiling

Pendent Sprinklers are Installed on bottom of piping or through a ceiling

Sprinkler Head Identification



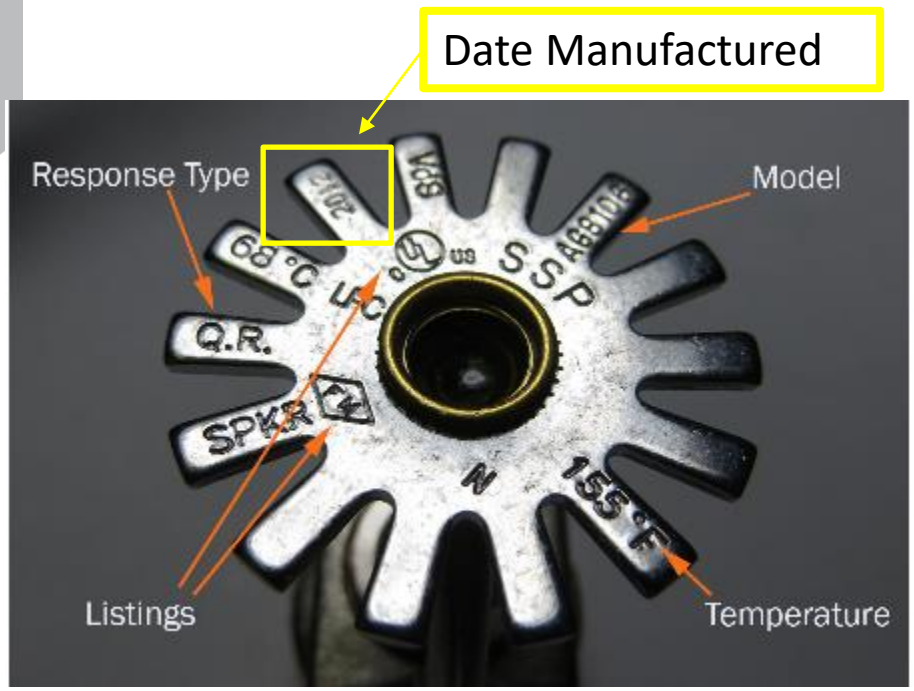


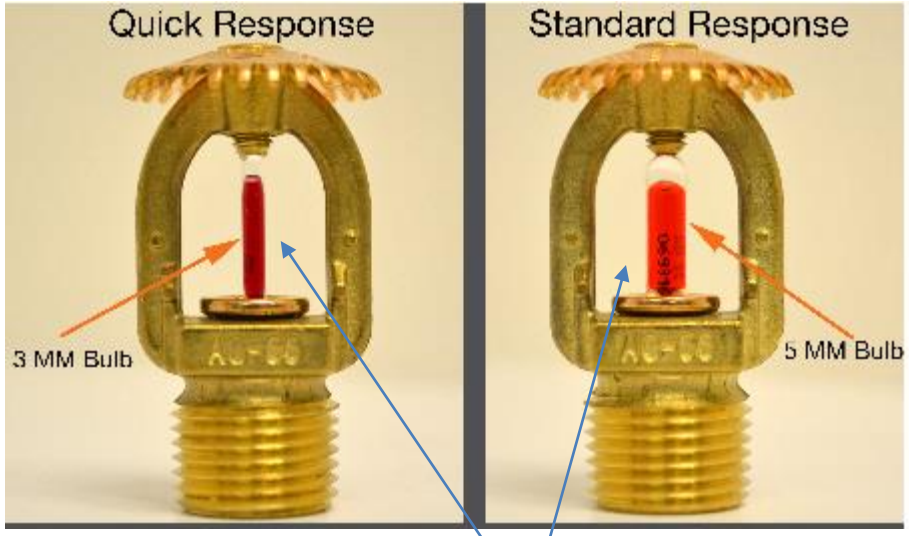
Sidewall Sprinklers are generally installed through a wall

Horizontal Sidewall Sprinkler

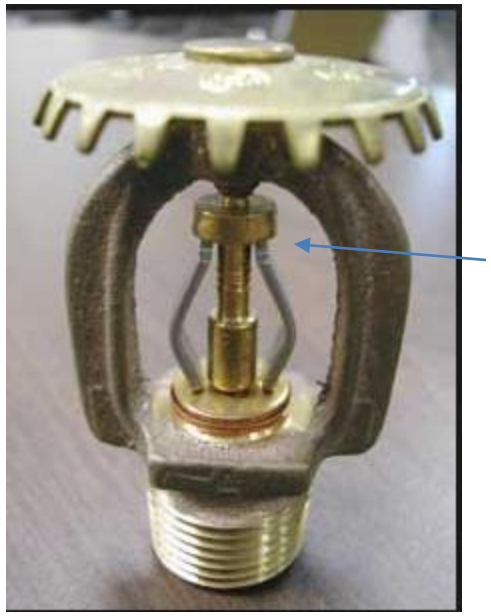
Sprinkler Identification

- If sprinklers are of the quick response type they will have Q.R. written on the deflector. This is the safest way to identify quick response sprinklers.
- Most sprinklers will have the manufactured date somewhere on the sprinkler. See picture to the right.



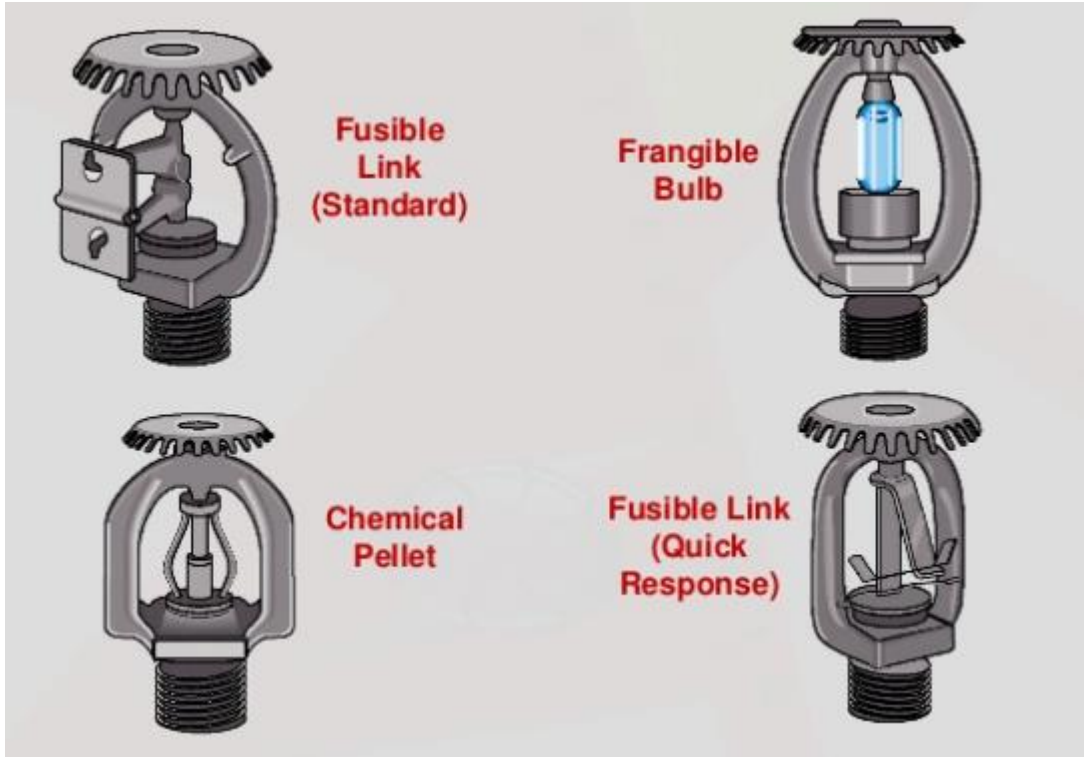


Bulb type elements



Standard response sprinkler with a link instead of a bulb type element

Sprinklers


Fusible Link (Standard)
Frangible Bulb
Chemical Pellet
Fusible Link (Quick Response)

Dry Sprinklers

NFPA-25 3.3.30.3 Dry Sprinklers. A sprinkler secured in an extension nipple that has a seal at the inlet end to prevent water from entering the nipple until the sprinkler operates.

The nipple is the black piece of pipe on each of these Sprinkler. There is no water in these nipples till the sprinkle goes off

Sprinkler Temperature Ratings

NFPA 13: Table 6.2.5.1 Temperature Ratings, Classification, and Color Codings				
Maximum Ceiling Temperature	**Temperature Rating**	**Temperature Classification**	**Color Code**	**Glass Bulb Colors**
100°F / 38°C	135-170°F / 57-77°C	Ordinary	Uncolored or Black	Orange or Red
150°F / 66°C	175-225°F / 79-107°C	Intermediate	White	Yellow or Green
225°F / 107°C	250-300°F / 121-149°C	High	Blue	Blue
300°F / 149°C	325-375°F / 163-191°C	Extra High	Red	Purple
375°F / 191°C	400-475°F / 204-246°C	Very High	Green	Black
475°F / 246°C	500-575°F / 260-302°C	Ultra High	Orange	Black
625°F / 329°C	650°F / 343°C	Ultra High	Orange	Black

Sprinkler Temperature Ratings

Bulb Colour	Temperature	Temperature Rating	maximun Ceiling Temperature
	135˚F 57˚C	Ordinary	100˚F 38˚C
	155˚F 68˚C	Ordinary	100˚F 38˚C
	175˚F 79˚C	Intermediate	150˚F 65˚C
	200 or 212˚F 93 or 100˚C	Intermediate	150˚F 65˚C
	286˚F 141˚C	Intermediate	225˚F 107˚C
	360˚F 182˚C	High	300˚F 149˚C
	500˚F 260˚C	Extra High	465˚F 240˚C

Summary Table 5.1.1.2

Below the required sprinkler testing is numbered to correspond to the following slides

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
Sprinklers — extra-high temperature	5 years	5.3.1.1.1.4
Sprinklers — fast-response	At 20 years and every 10 years thereafter	5.3.1.1.1.3
Sprinklers	At 50 years and every 10 years thereafter	5.3.1.1.1
Sprinklers	At 75 years and every 5 years thereafter	5.3.1.1.1.5
Sprinklers — dry	At 10 years and every 10 years thereafter	5.3.1.1.1.6

1
2
3
4
5

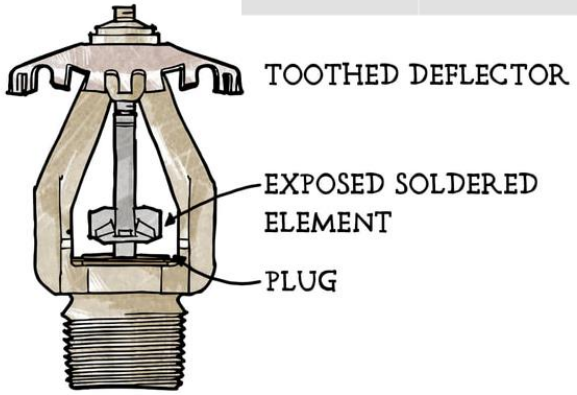
#1 Sprinkler Testing

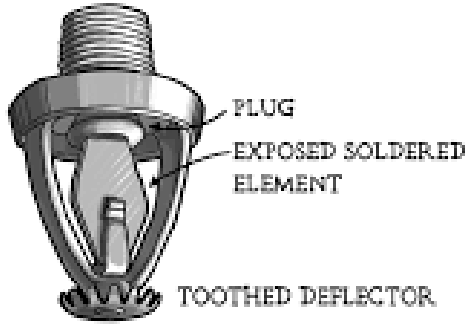
NFPA-25 5.3.1.1.1.4*

- Solder-type sprinklers, extra high (325 degree Fahrenheit) or greater shall be tested at 5-year intervals.

NFPA 13: Table 6.2.5.1 Temperature Ratings, Classification, and Color Codings

Maximum Ceiling Temperature	Temperature Rating	Temperature Classification	Color Code	Glass Bulb Colors
300°F / 149°C	325-375°F / 163-191°C	Extra High	Red	Purple
375°F / 191°C	400-475°F / 204-246°C	Very High	Green	Black
475°F / 246°C	500-575°F / 260-302°C	Ultra High	Orange	Black
625°F / 329°C	650°F / 343°C	Ultra High	Orange	Black

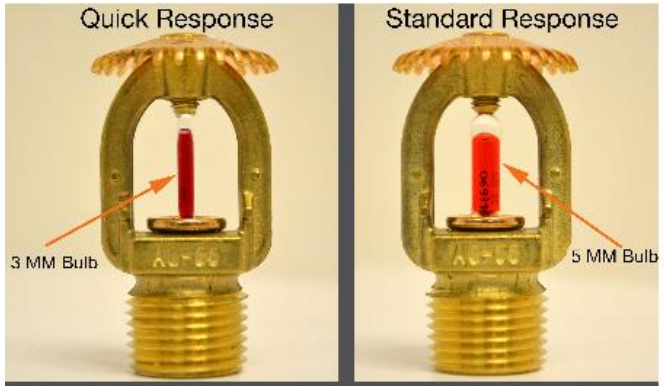


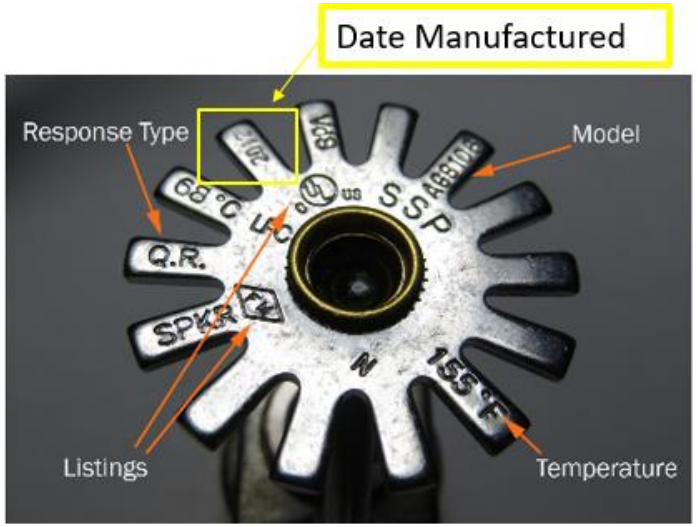


#2 Sprinkler Testing

NFPA-25 5.3.1.1.1.3**

- Sprinklers manufactured using fast-response (or Q.R. Quick Response) elements shall elements that have been in service for 20 years shall be replaced or a representative sample shall be tested and then retested at 10 year intervals.
- Some times it is more cost effective to simply replace all the sprinklers in the space.





#3 & #4 Sprinkler Testing

(NFPA-25 5.3.1.1.1, 5.3.1.1.1.5)

- #3 Where sprinkler have been in service for 50 years they shall be replaced or representative sample from one of more sample area shall be tested. Test procedures shall be repeated at 10-year intervals.
- #4 Where sprinklers have been in service for 75 years they shall be replaced or a representative samples from one of more sample area shall be tested. Test procedures shall be repeated at 5-year intervals.
- Sprinklers manufactured prior to 1920 shall be replaced

#5 Dry Type Sprinkler Testing

NFPA 25-2011 (5.3.1.1.16)

Listed Dry-type 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.

Sprinkler Testing

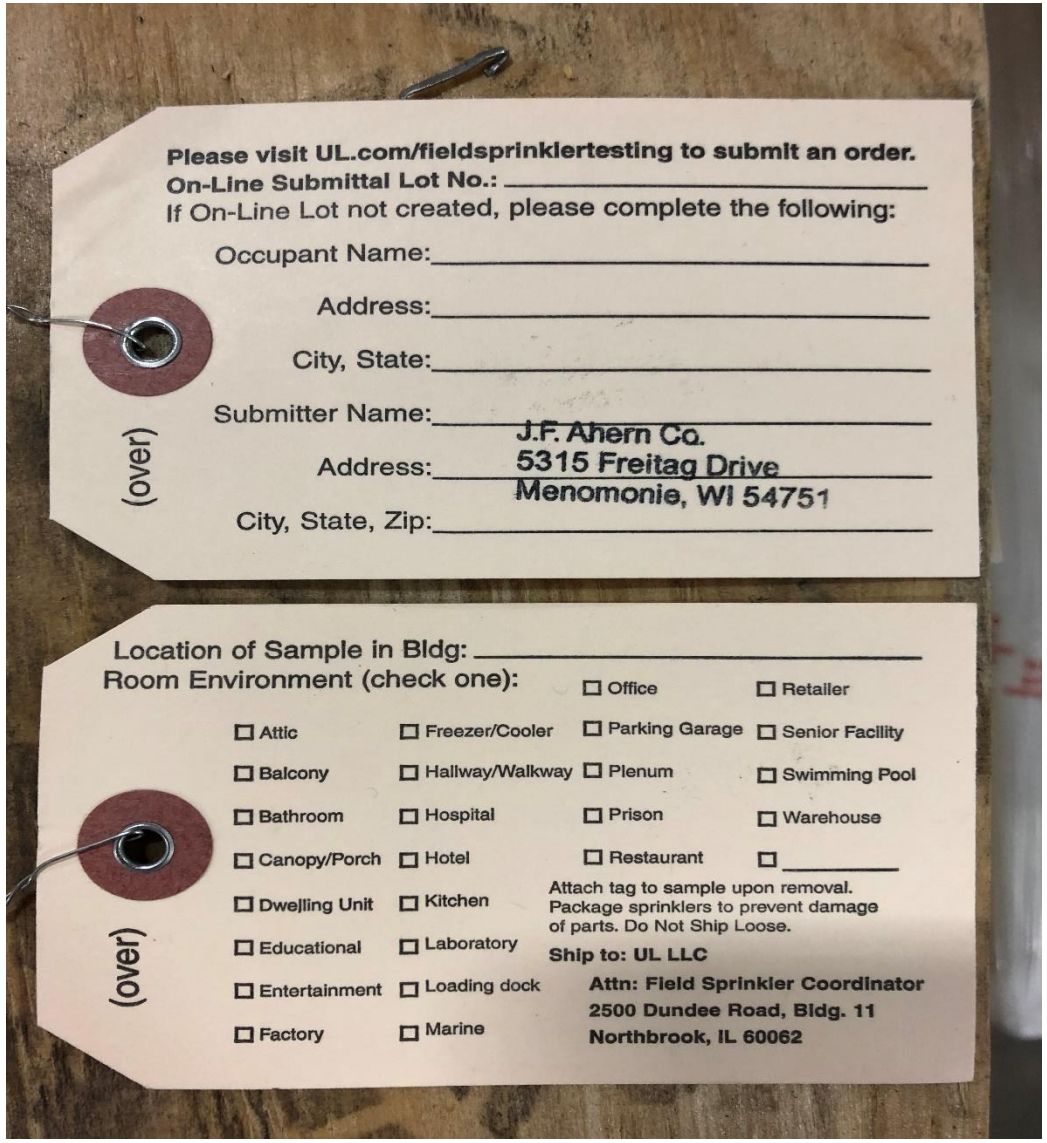
(NFPA-25 5.3.1.1.2*)

- Where sprinklers are subject to harsh environments they shall be replaced or tested.
- Testing shall be repeated at 5-year intervals.
- Harsh environments per the Annex include paper mills, tanneries, steam rooms, areas exposed to outside weather, cold storage areas etc..

Annex Referencing

- Any section like 5.3.1.1.2* that has an asterisk (*) additional information can be found in the Annex.
- The Annex area for sprinkler testing can be can be found in
  NFPA 25 on page 70 in the upper left of the page.

Sprinkler Tag for Testing



FAQs per NFPA

7. **What is meant by "indivdual sprinkler sample" as referenced in Section 5.3.1.2, does this pertain to the style of the sprinkler (such as upright, pendent etc.)?**

   Individual sprinkler sample refers to each type of sprinkler in a system. For example, if a system contains upright and pendent sprinklers, one percent or not less than four of each type must be removed for testing.

8. **If a system has only one riser but serves several tenant spaces, such as a strip mall, should a sprinkler sample be taken from the system as a whole or from each individual tenant space?**

   In your case, a sample from each tenant space is not required. The sampling requirement in Section 5.3.1.2 is intended to be random sampling, meaning that sprinklers should not be removed from a single branchline but should be taken from a number of different areas in a building (where practical). Removing sprinklers from as many different areas as possible will better represent the condition of all or most of the sprinklers in that system.

9. **How many sprinklers must be removed from a system for testing?**

   Section 5.3.1.2 requires that one percent (or no less than four) be removed and submitted to a testing laboratory for evaluation. If a system contains 500 sprinklers for example (400 upright and 100 pendent) then a total of eight sprinklers must be removed; 400X.01=4 and 100X.01=1 (but not less than 4).

Thank You

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