Fire Protection System Basics

Maintenance and Inspections

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Introduction

This fourth installment of the ***Fire Protection System Basics*** white paper series seeks to outline the requirements for Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems:

- General Requirements
- Sprinkler System Requirements
- Standpipe and Hose System Requirements
- Fire Pump Requirements

General Requirements

All inspection, testing, and maintenance requirements for fire protection systems are the responsibility of the building owner, or a designated representative of the building owner. All requirements shall be performed by qualified personnel.

It is the owner's responsibility to ensure the following requirements are met for any buildings they own with fire protection systems:

- Ensure all water filled piping is maintained at a minimum temperature of 40 degrees unless an approved antifreeze solution is utilized.
- Provide ready accessibility to all components of the fire protection system.
- Notify the AHJ, Fire Department, and alarm-receiving facility before and after testing or shutting down a system or its supply, for testing purposes.
- Correct or repair any deficiencies or impairments found during inspections.
- Shall not change occupancy, use, process, or materials stored in the facility without first performing an evaluation of the existing fire protection system and any new requirements.
- Records of all inspections, tests, and overall maintenance shall be kept and made available to the AHJ.

Sprinkler System Requirements

Table 5.1.1.2 of NFPA 25 states the minimum required frequencies for routine inspection, testing, and maintenance of fire sprinkler systems and components.

Below is a breakdown of the main requirements that the owner needs to ensure are completed on the sprinkler system.

- Inspections:
  - Annual visual inspections of the entire sprinkler system shall be performed from floor level.
  - Sprinklers showing any of these signs shall be replaced:
    - Leakage
    - Corrosion detrimental to performance
    - Physical damage
    - Loss of fluid in the glass bulb
    - Loading detrimental to performance
    - Loading = Dirt and Debris
    - Paint other than that applied by the sprinkler manufacturer
    - Any sprinklers that are found to no longer meet NFPA 13 requirements shall be adjusted/replaced.
  - Pipe and fittings shall be free of damage, leakage, and corrosion.
  - Piping shall not be subjected to external loads by materials resting on the pipe or hung from the pipe.
  - Hangers/braces shall not be damaged, loose, or unattached. Replace or repair as necessary.
  - Water flow alarms and supervisory signal initiating devices shall be inspected quarterly to verify they are free of physical damage.
  - Hydraulic Design information signage shall be inspected annually to verify it is provided, attached securely to the riser, and is legible. Replace as necessary.

- Testing:
  - Sprinklers have different testing interval requirements depending on the type of head.
    - Standard response heads shall be replaced or sample tested after the first 50 years and then every 10 years.
    - Refer to NFPA 25 chapter 5 for more specific information.
  - Water flow alarm devices shall be tested quarterly.
  - Antifreeze systems shall be tested annually, prior to the onset of freezing weather.

- Maintenance:
  - Sprinkler heads which have been removed from a system shall not be re-installed and must be replaced.
  - A minimum of six spare sprinkler heads of each type shall be provided on the premises so that any sprinklers that have operated or been damaged in any way can be promptly replaced.
  - A wrench specific to the manufacturer of sprinkler heads shall also be provided on site.
  - Table 5.5.1 of NFPA 25 indicates required actions to be performed anytime a component from a sprinkler system is adjusted, repaired, reconditioned, or replaced.

Standpipe and Hose System Requirements

Table 6.1.1.2 of NFPA 25 states the minimum required frequencies for routine inspection, testing, and maintenance of Standpipe and hose systems.

Below is a breakdown of the main requirements that the owner needs to ensure are completed on the standpipe and hose systems.

- Inspections:
  - Components of a standpipe and hose system shall be visually inspected annually at a minimum.
  - Hydraulic Design information signage shall be inspected annually to verify it is provided, attached securely to the riser, and is legible. Replace as necessary.
  - Hose connections shall be inspected annually for issues like, missing or damaged caps, general damage to hose connection, missing valve handles, leaking, etc.
  - Piping shall be inspected annually for damage.
  - Hoses shall be inspected annually for mildew, cuts, deterioration, hose thread damage, missing gaskets, etc.
  - Hose nozzles shall be inspected annually for hose nozzle missing, missing gaskets, obstructions, etc.
  - Hose storage devices shall be inspected annually for difficulty to operate, damage, obstructions, improper hose storage, etc.
  - Cabinets shall be inspected annually for corrosion, damage, door functionality, broken glass, etc.

- Testing:
  - Flow tests shall be performed every five years to verify the required flow and pressure are still available at the hydraulically most remote hose valve outlets for automatic and manual standpipe systems.
  - Common components of the system shall be inspected, tested, and maintained per chapter 13 of NFPA 25.

- Maintenance:
  - Shall be performed per chapter 13 of NFPA 25.
  - Table 6.5.1 of NFPA 25 indicates required actions to be performed anytime a component from a standpipe and hose system is adjusted, repaired, reconditioned, or replaced.

Fire Pump Requirements

Table 8.1.1.2 of NFPA 25 states the minimum required frequencies for routine inspection, testing, and maintenance of fire pumps.

- Inspections:
  - Visual inspections of the pump house conditions, pump system conditions, electrical system conditions, diesel engineer system conditions, and steam system conditions shall be performed weekly.

- Tests:
  - Diesel and electric driven fire pumps shall be tested weekly unless an approved risk analysis is performed and an alternative frequency is established.
  - Flow testing of the fire pumps shall be performed on an annual basis.

- Maintenance:
  - Preventative maintenance shall be performed for all components of the pump assembly in accordance with the manufacturer's recommendations, or an approved alternative maintenance plan.

About Layne

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