



Inspecting Fire Sprinkler Systems

Among the requirements needed to keep commercial fire sprinklers working and code compliant are the routine inspections, which can seem complex. Most of the inspection, testing, and maintenance (ITM) of sprinkler systems requires a qualified life safety professional, but some of the work can be done by in-house facility personnel.



NFPA 25, the standard for the inspection, testing, and maintenance of water-based fire protection systems, is the primary standard for most facilities; this standard assigns specific responsibilities to the property owner or their designated representative. The property owner is responsible for the integrity of the fire sprinkler system even if ITM is being provided by an outside contractor.

Property owners using independent contractors for ITM services can still utilize onsite personnel to perform basic inspection requirements and maintenance to proactively manage sprinkler systems. The responsibilities of both the ITM contractor and the property owner must be clearly defined in writing in order to eliminate any possible confusion. Furthermore, property owners are responsible for ensuring their contractor's reporting forms meet the requirements of their local authority having jurisdiction (AHJ). Even if a property owner or facility manager defers all inspections to a contractor, the owner must be able to identify issues and proactively address them before they become a system impairment or flood a facility.

Visual Inspections

NFPA 25 requires an annual visual inspection "from the floor level" of sprinkler heads,

the pipes, and fittings to which they are attached. Visual inspection of sprinklers is meant to determine if the system will operate correctly in the event of a fire. The inspector must understand the local requirements for reporting, tagging, and any local exception or requirements to NFPA 25. If any part of the sprinkler system shows signs of deficiencies, property owners are responsible for making repairs.

The following list covers things to look for during a visual inspection, along with recommendations on how to fix and prevent future impairments.

Damage or Leakage

Damage to the sprinkler head, pipe, and fittings is most obvious when there is an active leak. Visual inspections do not require removal of cover plates or inspection of sprinklers in concealed spaces, but signs of water damage are an obvious indication of an issue which requires further investigation. Pipe couplings should also be inspected for signs of damage, leaking, and corrosion.

Paint, caulking, and spray insulation are common problems that are visible on a sprinkler head or cover plate. Sprinkler heads and concealed cover plates may only be painted by the manufacturer and must be deemed deficient if painted. It is important to view a head from multiple angles to get an adequate inspection. Furthermore, cover plates cannot be glued, caulked, or epoxied as these products would prevent them from functioning correctly in the event of a fire.

Many sprinklers are manufactured using a clear glass bulb with a colored fluid and bubble designed to break at specific temperatures. The liquid is most often red in color,

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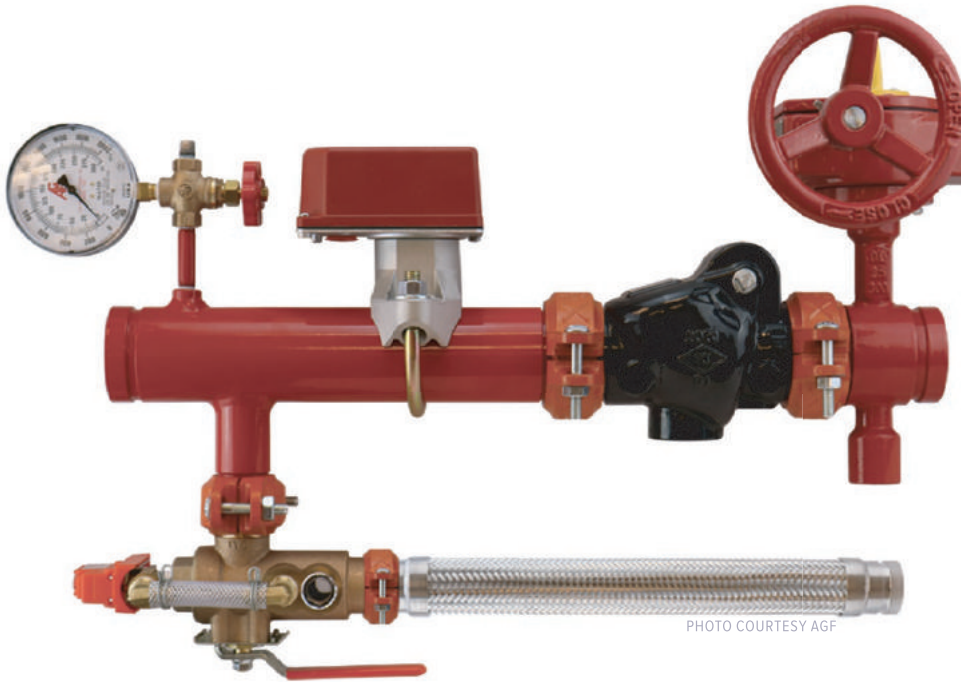


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but it could be orange, yellow, green, blue, or purple, depending on the sprinkler's temperature rating. A system inspection should include a close look at these sprinklers to confirm that the fluid and bubble are not missing. Without this fluid and bubble, the glass will not break when exposed to high temperature, resulting in a sprinkler that may not activate during a fire. Other components that can be visually inspected from the floor might include hangers, braces, and supports. Loose, bent, or damaged system bracing needs to be replaced.

Corrosion

Corrosion occurs when water, oxygen, and ferrous metal react. Steel fire sprinkler pipe filled with a mixture of water and trapped air provides the perfect environment for corrosion. Corrosion can also occur on the sprinkler head or deflector; such corrosion would impact the water distribution patterns and is considered a deficiency requiring replacement. Sprinklers that are loaded with dust should be carefully cleaned with a vacuum or compressed air. Facility managers should work with their service providers to determine who is responsible for cleaning heads.

Internal corrosion is more difficult to spot during a floor level inspection. Evidence of

pipe corrosion would be visible corrosion at pipe joints and pin-hole leaks. Corrosion monitors with visual indicators are an easier gauge of what is going on inside of the system piping and can alert facilities managers of internal corrosion before leaking becomes an issue.

One simple method for preventing internal pipe corrosion on wet sprinkler systems is installing air vents. Air vents are now required on new systems but can also be retrofitted onto existing systems. By removing trapped air, internal pipes no longer have the oxygen needed for the metal to react and create corrosion. An excellent time to retrofit air vents into a system to extend the life of the pipe is when the ITM contractor performs the required five-year internal inspection.

Orientation

A bit more technical and sometime hard to observe from the ground, sprinkler head orientation is important. Sprinkler heads may look similar, but they are manufactured for specific applications and only function correctly when installed correctly. Facility personnel might need to rely on their ITM Contractors for this inspection and will need them to fix any sprinklers that are incorrectly installed.

Clearances

Visual inspection for clearances is less about the sprinkler and more about the items stored around them. Space can be limited, and storage space can become overcrowded. When items are stacked, the general rule is that there must be at least 18" of clearance around a sprinkler head to prevent obstruction of the water discharge. Other items to look for are temporary obstructions like banners or decorations and permanent structures that were installed after the sprinkler system, such as fans and lighting.

Repair Inventory

When a sprinkler system is installed, a spare sprinkler cabinet is a requirement, and it should have a small supply of replacement sprinklers matching those installed in the

system, a wrench for each type of sprinkler, and a list of spare sprinklers. This cabinet should also be inspected to confirm nothing is missing.

Freeze Protection

Although it is not a requirement of the annual visual inspection, property owners are still responsible for making sure their sprinkler systems are in a heated space. When an area cannot be heated, like a parking garage, a dry system will need to be installed. A dry system contains pressurized air; when a sprinkler is activated, the internal air pressure drops, tripping the dry valve open and allowing water to be released into the system to fight a fire. Although they are called dry systems, they still require draining. Auxiliary drains, also referred to as low-point drains or drum drips, collect condensation that forms in the pipes. During colder months, if auxiliary drains are

improperly maintained, they can easily freeze and break, causing major flooding. The cost to repair and reset the fire sprinkler system itself is negligible compared to the cost of water damage mitigation, potential slip and fall liability, possible lost inventory, tenant interruption, and increased insurance premiums.

To proactively manage auxiliary drains, facilities personnel must not only inspect them but also drain them frequently. There are several options to help with this task. Heat tracing is one solution, but it can be expensive to install and operate and difficult to maintain. Heated auxiliary drain cabinets, with manually operated drain valves or automatic drain valves, are another option that will prevent freezing. Less expensive options include devices designed to prevent flooding. These devices can be installed into the piping system above an auxiliary drain, and they will stop the flow of water if a drain breaks.

This list of required attention and maintenance might seem overwhelming, but it is essential for the safety of building occupants that property owners ensure that their fire sprinkler systems are functioning correctly. A comprehensive and well documented inspection, testing and maintenance plan that identifies and clearly defines the responsibilities of the property owner, the facility's internal staff, and contracted ITM life safety professionals is a critical first step to avoid confusion and manage those responsibilities. Proactively managing fire sprinkler systems will save lives, will protect property, will extend system life, and will ultimately save money.

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