



# Information Bulletin

NUMBER 3

## Water-Based Fire Protection Systems

A fire sprinkler system that is properly installed and maintained can provide protection against loss of life and property in the event of a fire. The fire sprinkler system consists of a water supply, which provides adequate pressure and flow rate to a water distribution piping system, onto which fire sprinklers are connected. In the event of a fire, an automatic fire sprinkler will allow water to flow from the sprinkler when it is exposed to sufficient heat to release a heat sensitive element (fusible link or glass bulb). Only sprinklers subjected to a temperature at or above their specific temperature rating will operate.

There are systems that have open sprinklers, which do not have a heat sensitive element, and would release water from all sprinklers in the system when a fire alarm initiating device (smoke detectors, heat detectors, or optical flame detectors) is activated or manually activated, and signals the fire alarm panel to open the deluge valve.

### Types of Systems

**Wet Pipe System** – this is the most common type of system. A sprinkler system employing automatic sprinklers attached to a piping system containing water and connected to a water supply so that water discharges immediately from sprinklers opened by heat from a fire.

**Dry Pipe System** – this is the second most common system type. It is used in spaces where the ambient temperature may be cold enough to freeze the water in a wet pipe system, rendering the system inoperable,

such as in refrigerated coolers. This system employs automatic sprinklers attached to a piping system containing air or nitrogen under pressure. The release of the pressure permits the water pressure to open a valve known as a dry pipe valve, and the water then flows into the piping system and out the opened sprinkler.

**Antifreeze System** – used in spaces where the ambient temperature may be cold enough to freeze the water in a wet pipe system. This system employs automatic sprinklers attached to a piping system containing an antifreeze solution. The antifreeze solution is discharged, followed by water, immediately upon operation of sprinklers opened by heat from a fire.

**Deluge System** – A sprinkler system employing open sprinklers that are attached to a piping system that is connected to a water supply through a valve that is opened by the operation of a detection system installed in the same areas as the sprinklers. When the valve opens, water flows into the piping system and discharges from all sprinklers.

**Precision System** – used in locations where accidental activation is undesired, such as in museums with rare art works, manuscripts, or books. The system employs automatic sprinklers attached to a piping system that contains air that might or might not be under pressure. When a supplemental detection system installed in the same areas as the sprinklers is activated, the precision valve will open and allow water to flow into the piping. Water will not flow from the sprinklers until a fire has generated enough heat to open one or more sprinklers.

## Inspection, Testing, and Maintenance

It is the responsibility of the property owner to inspect, test, and maintain the water-based fire protection system. If the property owner is not the occupant, the property owner is permitted to pass on the authority for inspecting, testing, and maintaining the fire protection systems to the occupant, management firm, or managing individual through specific provisions in the lease, written use agreement, or management contract. These tasks shall be performed by personnel who have developed competence through training and experience. The inspection, testing, and maintenance can be contracted to a service company. Records should be maintained by the owner for the expected life of the system.

It is recommended that the following items be inspected to verify that they are in good condition and free of physical damage:

**Monthly** – control valves, alarm valves, and pressure gauges. Control valves should be locked in the open position or be electronically supervised, accessible, provided with appropriate identification and wrench. Pressure gauges should show that normal water supply pressure is being maintained.

**Quarterly** – fire department connection (FDC), water flow/supervisory signal devices, and alarm devices. The FDC should be visible and accessible, identification signs in place and caps in place.

**Annually** – sprinklers, pipe and fittings, hangers and seismic braces, spare sprinklers. Sprinkler heads shall not show signs of leakage and be free of corrosion, foreign materials, paint, and physical damage; and installed in the proper orientation (e.g., up right, pendent, or sidewall); and have a minimum 18 inch clearance below all sprinklers. Twice this clearance is required in high-hazard areas such as tire or lumber storage. The stock of spare sprinklers shall include all types and ratings currently used in the existing system. There shall be no fewer than 6 sprinklers for facilities having under 300 sprinklers; no fewer than 12 sprinklers for facilities having 300 to 1000 sprinklers; and no fewer than 24 sprinklers for facilities having over 1000 sprinklers. A sprinkler wrench shall also be available.

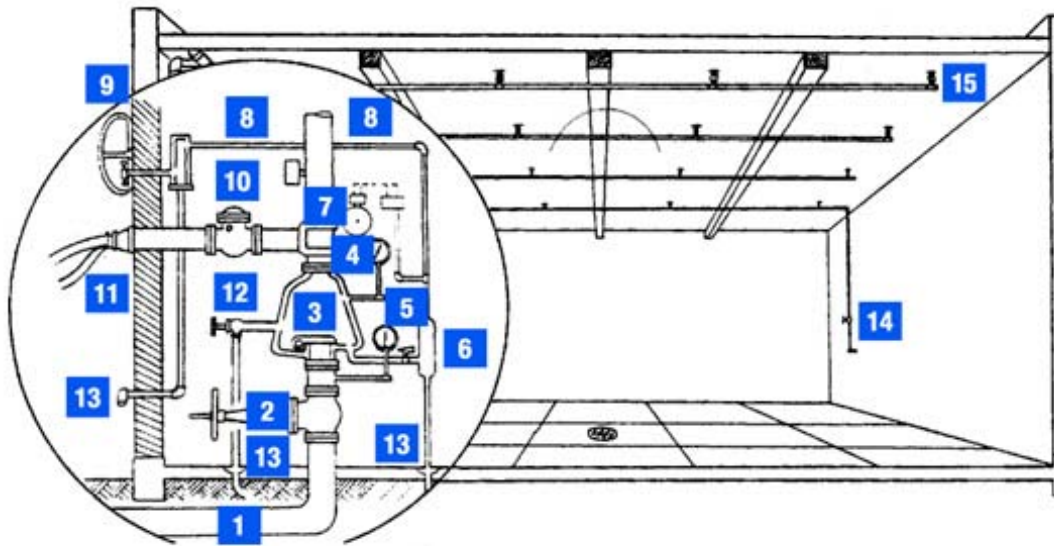
There are specific requirements for the testing and maintenance of the valve and device components of the sprinkler system to be done quarterly, semiannually, and annually. Fire sprinkler system service contractors are usually contracted to perform these services. Mechanical water flow devices, including but not limited to water motor gongs shall be tested quarterly. Vane-type or pressure switch-type water flow devices shall be tested semiannually.

It is also important to review any planned changes in structure, partitions, operations or processes with your sprinkler contractor in advance. Do not allow alterations by other than an authorized sprinkler installer.

*The information compiled from NFPA® 25 Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems, 2008 Edition.*

*This bulletin is intended only as a reminder and is offered solely as a guide to assist management in its responsibility of providing a safer working environment. This bulletin is not intended to cover all possible hazardous conditions or unsafe acts that may exist. Other unsafe acts or hazardous conditions should also be noted and corrective action taken*

## Basic Components of a Typical Wet Sprinkler System



1. Water supply from city main
2. System shutoff, indicating valve, Outside Screw & Yoke (O, S, & Y)
3. Alarm Check Valve
4. Pressure Gauges (water or air and water)
5. Shutoff Valve
6. Retard Chamber (air accelerator or exhauster, on dry system, from air above priming water)
7. Riser
8. Electric flow Alarms (and/or connection to central station, fire department or proprietary facilities)
9. Water Motor Gong (local)
10. Check Valve (from fire department connection)
11. Fire Department Connection (FDC)
12. Main Drain
13. Drains (outside or to other safe locations)
14. Inspector's Test Valve and top line drain
15. Sprinklers