

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. A fire sprinkler system consists of sprinklers connected to a water supply that provides adequate pressure and flow to a water distribution piping system. In the event of a fire, an automatic fire sprinkler will release a heat-sensitive element (fusible link or glass bulb) when it is exposed to sufficient heat. Once this heat-sensitive element is released, the sprinkler dispenses water. 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. The fire alarm initiating device signals the fire alarm panel to open the deluge valve.

Types of Systems

Wet Pipe System

A wet pipe system is the most common type of system. It is 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

A dry pipe system is the second most common type of system. 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

Antifreeze systems are 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 deluge system is a sprinkler system employing open sprinklers that are attached to a piping system. This piping system 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.

Preaction System

A preaction system is used in locations where accidental activation is undesired, such as in museums with rare artwork, 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 preaction 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 should be performed by personnel who have developed competence through training and experience. The inspection, testing, and maintenance can also be contracted to a service company. Records should be maintained by the property owner for the expected life of the system, even if he or she passes on the authority for inspecting, testing, and maintaining the fire protection system to somebody else.

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

Monthly

Control valves, alarm valves, and pressure gauges should be inspected, tested, and maintained monthly. Control valves should have the appropriate identification and wrench, be accessible, and be locked in the open position or electronically supervised during inspection.

Pressure gauges should show that normal water supply pressure is being maintained.

Quarterly

The fire department connection (FDC), water flow/supervisory signal devices, and alarm devices should be inspected, tested, and maintained quarterly.

The FDC should be visible and accessible and, identification signs and caps should be in place.

Annually

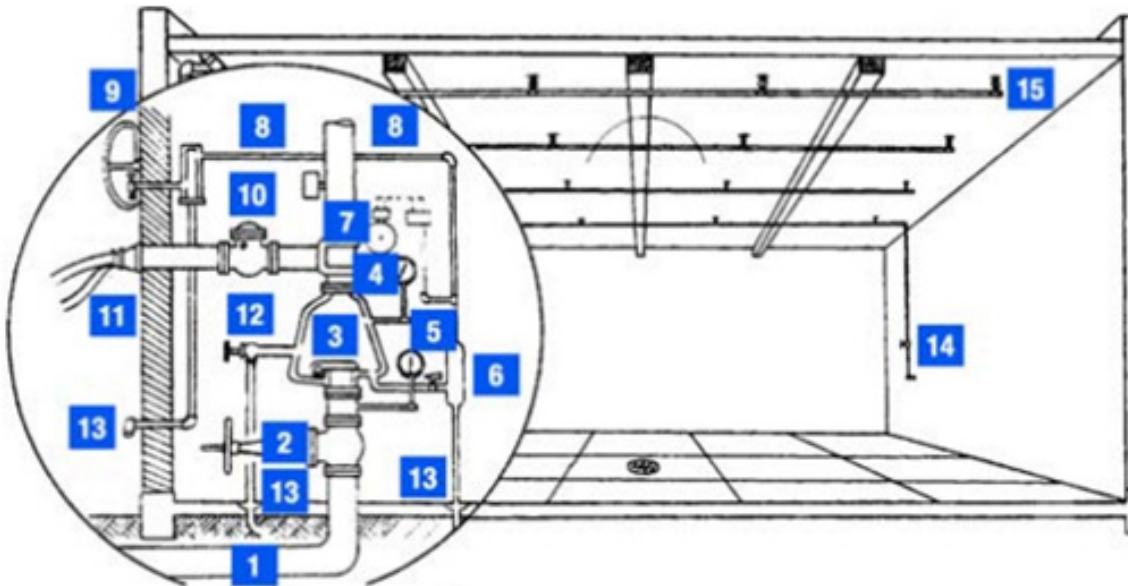
Sprinklers, pipe and fittings, hangers and seismic braces, and spare sprinklers should be inspected, tested, and maintained annually. Sprinkler heads should be installed in the proper orientation (e.g., upright, pendent, or sidewall); not show signs of leakage; and should be free of corrosion, foreign materials, paint, and physical damage. In addition there should be 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 should include all types and ratings currently used in the existing system. There should be no fewer than six sprinklers for facilities having fewer than 300 sprinklers; no fewer than 12 sprinklers for facilities having 300 to 1000 sprinklers; and no fewer than 24 spare sprinklers for facilities having over 1000 sprinklers. A sprinkler wrench should also be available.

Additional Testing and Maintenance

There are specific requirements for the testing and maintenance of the valve and device components of sprinkler systems that should 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 should be tested quarterly. Vane-type or pressure switch-type water flow devices should 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 anyone than an authorized sprinkler installer.

Basic Components of a Typical Wet Pipe 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

IMPORTANT NOTICE - The information and suggestions presented by Western National Insurance Company in this Technical Bulletin are for your consideration in your loss prevention efforts. They are not intended to be complete or definitive in identifying all hazards associated with your business, preventing workplace accidents, or complying with any safety related, or other, laws or regulations. You are encouraged to alter them to fit the specific hazards of your business and to have your legal counsel review all of your plans and company policies.