



# Risktopics

2-6.007 December 2007

## Wet pipe sprinkler system inspection and maintenance

### Introduction

The reliability and effectiveness of automatic sprinkler systems has been demonstrated many times. For the most part, automatic sprinkler systems are mechanically quite simple and provide reliable protection with a minimum amount of care. However, a simple program of inspection, testing and maintenance is necessary to ensure the system will operate as designed.

Recommended steps as outlined in this document can easily be accomplished using your own employees or an outside sprinkler contractor. There are several advantages to using your own employees, such as cost savings and the increased familiarity these key employees will develop with the fire-protection systems of your facility. Whether this service is conducted by an outside sprinkler company or your own maintenance personnel, the records of these activities should be kept on file.

The suggested frequencies listed below are minimums. The presence of high hazard operations or a high frequency of malicious mischief may require inspections that are more frequent.

### Weekly inspection items

**Sprinkler heads and piping:** During extremely cold weather, areas where pipe freezing is a possibility should be checked at least weekly. The air temperature where wet pipe sprinklers are present must always be 40°F or greater.

**Control valves:** Approximately 30 percent of all sprinkler system malfunctions are attributed to shut control valves. For this reason, control valves should be secured in the open position and periodically inspected. The most positive method of security is a standard padlock. Most post-indicator control valves are designed to accept a padlock that secures the operating wrench in a position that prevents tampering. Other valves can be secured with a padlock supplemented by a steel chain.

Other acceptable means of security are "breakaway" locks, lead or plastic seals, and U.L. listed central station supervision of valve tamper switches. As compared with a standard padlock, these methods of security are merely visual deterrents to mischief. Therefore, it is recommended that these valves be visually inspected on a weekly basis. Valves secured with padlocks or provided with tamper switches supervised by a U.L. listed central station can be inspected monthly.

**Pumper connections:** Fire Department pumper connections, also known as siamese connections, are used by the fire department to provide additional pressure to private fire mains and/or sprinkler systems during a fire. Inspect these connections for broken threads and missing protective caps. Pumper connections with missing caps invariably attract pop cans, bird's nests and a variety of insect life, which can plug up the sprinkler system when it is needed most.

## Monthly inspection items

**Sprinkler heads and piping:** Visually inspect for physical damage such as bent pipes, leaking fittings and bent or missing sprinkler deflectors. In corrosive atmospheres such as plating operations, check heads and piping for excessive corrosion or leaks.

Sprinkler heads in spray paint booths must be free of paint accumulations. A good way to protect these heads is by covering with a lightweight plastic or paper bag, which should be changed periodically if the accumulation exceeds 1/16 inch.

**Post indicator control valves:** These valves have targets, which read "open" or "shut" behind a small window located at the top of the valve. Unfortunately, these targets can become misaligned and are not a foolproof indicator as to the condition of the valve. Therefore, a post indicator valve must be physically tried or "spring tested" monthly to ensure it is fully open. This is accomplished by putting the operating wrench on the valve and attempting to turn it in the open direction. The handle should move no more than 1/4 of a full turn, at which time a "spring-like" resistance will be felt. This is simply the torsion resistance of the connecting rod to any further rotation and indicates that the valve is fully open. The operating wrench should then be resecured to the valve. Before securing the wrench to the post indicator valve, it may be necessary to rotate the operating nut slightly in the closed direction to allow the handle to line up properly with the locking hardware.

## Quarterly inspection items

**Water flow alarms:** Test wet pipe system water flow alarms by opening the inspector's test connection valve, which is generally found on an exterior wall leading down from a branch line at a remote corner of the system. If your alarms are monitored remotely by a central station or fire department, notify them before proceeding with the test. The alarm should be received within 90 seconds of opening the inspector's test connection.

## Semiannual items

**Valve tamper alarms:** The first step is to inform the central station alarm company that you intend to test the system. Then unlock the valve and turn the operating wheel or wrench three complete rotations in the closed direction. Wait approximately 30 seconds, return the valve to the fully open position and contact the alarm company to determine if the signal was received.

## Annual items

**Two-inch drain test:** This test is used to confirm the water supply is available to the sprinkler system riser and no major obstructions are present between the riser and the water supply. The two-inch drain is attached directly to the sprinkler system riser and is generally piped to a floor drain or through an exterior wall to the outside.

To conduct this test, fully open the two-inch drain valve while observing the lower pressure gage on the riser. The pressure should drop and stabilize as soon as the valve is fully open. Record this "residual" reading and close the two-inch drain valve. The pressure gage now indicates the "static" pressure, and this value should also be recorded. The reason for recording the static pressure after performing the two-inch drain test is that the pressure indicated before the test may be artificially high due to pressure trapped in the system by check valves.

The results of the two-inch drain test should be compared to previous tests. An unusually low residual reading may indicate a partially closed control valve or obstruction in the supply line from the water supply to the sprinkler system riser. Abnormally low static and residual pressures generally indicate a problem in the public water supply. In either case, further investigation at this point is warranted.

As with all testing of this nature, good judgment must be used. If the two-inch drain discharges outside, do not perform this test during freezing weather if it will result in ice forming on sidewalks, steps, parking lots, streets or other roadways. The installation of splash blocks is a good idea to prevent damage to land.

**Control valves:** At least once a year, exercise sprinkler control valves by turning them completely closed and then reopening. Count the number of turns it takes to close the valve completely and the number of turns to open the same valve completely. The number of turns should be the same (this confirms that the operating shaft has not been detached from the gate). If the valve is difficult to operate, the moving parts should be lubricated.

**Antifreeze systems:** Before freezing weather, check the antifreeze solution with a hydrometer to determine if the concentration is proper.

## Summary

A simple program of inspection, testing and maintenance for your sprinkler system will greatly reduce the chance of malfunction during a fire. This effort can be incorporated into a larger scope fire safety inspection program. For a sample inspection form, please refer to Risktopic 2-6.003. For details on the testing and maintenance requirements for dry pipe sprinkler systems and valves, see Risktopic 2-6.001.

## References

NFPA 25: Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems

**Zurich Services Corporation**

1400 American Lane, Schaumburg, Illinois 60196-1056  
800 982 5964 [www.zurichservices.com](http://www.zurichservices.com)

Zurich Services Corporation  
Risk Engineering



**ISO 9001:2000**

Quality-Assured Solutions Provider

The information in this publication was compiled by Zurich Services Corporation from sources believed to be reliable. We do not guarantee the accuracy of this information or any results and further assume no liability in connection with this publication, including any information, methods or safety suggestions contained herein. Moreover, Zurich Services Corporation reminds you that this publication cannot be assumed to contain every acceptable safety and compliance procedure or that additional procedures might not be appropriate under the circumstances. The subject matter of this publication is not tied to any specific insurance product nor will adopting these procedures insure coverage under any insurance policy.

©2007 Zurich Services Corporation

