

Hardfacts



Maintenance & Testing of Automatic Sprinkler Systems

Loss prevention activities for eliminating ignition sources are the best method of preventing fires however they are not always completely effective. Automatic sprinkler systems are the preferred method of detecting and controlling fires in structures.

Automatic fire sprinklers detect a fire in the early stages and sound an alarm as well as provide immediate fire controlling and extinguishing water. The systems are designed to provide a specific amount of water over a given space (i.e. density) using a defined pattern to control a fire. The sprinkler system consists of a network of piping that is connected to a water source under pressure. Individual sprinkler heads are attached to the piping with each sprinkler head protecting a specific area.

The sprinkler systems can be one or a combination of:

- *Wet system* where the piping is continuously filled with water.
- *Antifreeze system* where piping in areas subject to freezing is filled with an antifreeze solution.
- *Dry system* where the piping is filled with air and fills with water only after the operation of a sprinkler head.
- *Pre-action system* where the distribution piping is allowed to fill with water only after the operation of a heat reactive detection system. These systems have closed heads.
- *Deluge systems* are similar to the pre-action system, only these systems have open heads.

Automatic sprinkler heads seldom fail (failure rate is approximately 1 in 16 million). The main reasons for failure of a sprinkler system to control fires are:

- closed control valves
- obstructions to water supplies
- freezing

- mechanical damage
- incomplete sprinkler coverage
- under design of the sprinkler densities
- sabotage

Proper maintenance, inspection and testing are required to ensure the reliable operation of the system and to conform to local Fire Codes. Each type of system has particular maintenance, inspection and testing requirements. These requirements are outlined in National Fire Prevention Association (NFPA) 25 "Standard for the Inspection, Testing and Maintenance of Water Based Fire Protection Systems". All sprinkler system inspection and testing should be conducted by personnel with competence developed through training and experience (often independent specialty contractors). The following are highlights of the testing and inspection requirements:

Weekly

- Dry valves controlling water supplies and used exclusively for fire protection should be inspected to ensure they are working properly and accessible.

Monthly

- Wet valves should be inspected to ensure that they are wide open and are sealed or locked in that position.

Quarterly

- The sprinkler system alarm should be tested using the most hydraulically remote test connection or the alarm by-pass test connection when conditions warrant.
- Where electrical supervisory signal service is provided the transmitters and water flow actuated devices should be tested.

Annually

- Sprinkler system water pressure should be tested with the main drain valve fully open to ensure that there are no obstructions or deterioration of the main water supply.
- Dry-pipe valves should be trip tested by means of the system test pipe to ensure that they operate satisfactorily and that the sprinkler alarms are in operating condition.
- Antifreeze systems should be tested by measuring the specific gravity and adjusting the solutions as necessary.
- Sample heat actuated devices on each circuit for pre-action and deluge systems should be tested in accordance with NFPA 72 "National Fire Alarm Code".

Every Three Years

- Dry pipe system full flow trip test should be conducted

Sprinkler head testing of representative samples or the replacement of the heads should be considered at the following intervals:

- Every 5 years for heads in harsh environments
- 10 for dry pipe heads
- 20 years for fast response heads
- 50 years for ordinary sprinkler heads.

Sources of further information:

Other Aviva Hardfacts
A-5652 Automatic Fire Detection Systems

Additional References

NFPA Fire Protection Handbook
IAO School of Loss Control Technology
NFPA No 72 "National Fire Alarm Code"
Ontario Fire Code