

Insight: Automatic Sprinklers Systems

Recognizing the Risk (and Value)

According to research conducted by the National Fire Protection Agency (NFPA), automatic fire sprinklers can make a significant impact in fighting fire. For example, in one study, it was documented that fire spread was confined to the object or room of origin in 95 percent of reported structure fires in which sprinkler systems were present compared to 71 percent in properties without. In another study, sprinklers operated in 92 percent of such fires and were effective at controlling the fire in 96 percent of the incidents in which they operated.¹ Their purpose is to protect life and property and allow time for the public fire-fighting authorities to arrive.

Most times, we hear about the larger fire incidents where the majority if not all of the sprinklers are activated. However, in most cases, fires can be extinguished with one or two sprinklers opening up. Studies show many fires are controlled by 1-2 sprinklers and most by under 5 sprinklers. According to BAFSA (British Automatic Fire Sprinkler Association Limited) European statistics over a 10-year period in fully sprinkler protected buildings 99% of fires were controlled by sprinklers alone.

The risk when it comes to automatic sprinklers is that a building may not have them. For buildings that are not sprinklered, early detection, separation and other means of reducing the potential for a total loss will need to be heightened among potentially other loss control activities.

When a fire occurs and the sprinklers open, water is discharged leading to the question of what is the risk for water damage to the stock. The amount of water from 1-2 open sprinklers is remarkably smaller (10,000 times smaller) than the amount of water from a fire hose used by a fire brigade/department. From the same BAFSA study, fire brigades often use 10,000 times more water from hoses to do same job as sprinkler systems.

Controlling the Hazard

In general, sprinklers operate by detecting temperatures above a set point, opening and discharging water over a specified area. However, there are several kinds of fire sprinkler systems. In order of popularity, they include wet pipe, dry pipe, pre-action, and deluge systems. Wet pipe systems are the most common type installed globally. These are also the simplest to maintain and typically the least expensive to install (excluding the cost of potential upgrades to the water supply).

How do sprinklers work? In the event of a fire, heat produced rises causing a fusible link on the sprinkler directly above or adjacent to the fire to reach its preset temperature, allowing water to discharge onto the fire below. Each sprinkler must sense this heat. As a fire grows, more sprinklers operate. As fire heat intensity shrinks, other sprinklers do not operate.

Sprinklers are reliable. Another misconception is the frequency of accidental discharge. International statistics indicate this occurs in only 1 out of every 500,000 sprinklers per year of service. Another study found that the chances of a sprinkler activating due to a manufacturing defect are approximately 1 in 16M per year in service.

Fire sprinklers can be considered "green" too. Some green building certifications give green building credit for installed fire sprinklers as, in the event of a fire, the smoke pollution and water used would be exponentially less than for a sprinklered building verses an equivalent building with no sprinkler protection.

AIG recommends all fire sprinkler systems be designed to NFPA 13. This included water mains per NFPA 24 and, if needed fire pumps per NFPA 20. Local codes and standards offering truly equivalent or superior design, installation, and materials NFPA 13 are acceptable subject to review. Why use NFPA for guidance:

- 1) NFPA document are based on open-access committee proceedings with global expert representation.
- 2) All major codes and standards are revised every three years to insure upkeep with technology and details from large-loss events.
- 3) Documents such as NFPA 13 are based on fire testing for protection against both life and property. This is critical as many other international codes are only life-safety based with much lower design requirements against fire.

- 4) NFPA technical committees recognize operate with discussion and consensus that balances risks, benefits and costs of compliance.

Well-designed fire protection systems are only as good as their installation quality and maintenance. Only approved contractors, equipment and materials evaluated and listed by an acceptable third-party organization (i.e. Underwriters Laboratories, Loss Prevention Certification Board, etc.) should be used. Automatic sprinkler systems should be inspected, tested and maintained with recorded activity records in accordance with the minimum NFPA 25 requirements. Where local standards are available, these should be completed. On the other hand, where NFPA 25 exceeds local requirements, AIG recommends increasing activities to meet both. This includes following NFPA 25 requirements for a tag-based impairment handling program as a proven way to reduce hidden valve closures, etc.

Automatic sprinkler systems should also be continuously monitored by an approved central station (CS), alarm receiving center (ARC), or continuous proprietary (site operated) monitoring system. Each should comply with NFPA 72 (or international equivalent).

References & Resources

"US Experience with Sprinklers", NFPA <https://www.nfpa.org/-/media/files/news-and-research/fire-statistics-and-reports/suppression/ossprinklers.pdf>

AIG Insight: Fire Protection Impairments

Fire Sprinkler System Myths vs. Facts: <https://www.bafsa.org.uk/sprinkler-systems/sprinkler-facts/>

National Fire Protection Association (NFPA) NFPA 13: Standard for Installation of Sprinkler Systems

National Fire Protection Association (NFPA) NFPA 24: Standard for the Installation of Private Fire Service Mains and Their Appurtenances

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

National Fire Protection Association (NFPA) NFPA 72: National Fire Alarm and Signaling Code

*While NFPA documents are the global standard used by AIG, international equivalents may be acceptable.

[For more information, contact your local AIG Risk Engineer.](#)

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