

FIRE SPRINKLER Q & A

Background:

Sprinklers were invented by an American, Henry S. Parmalee, in 1874 to protect his piano factory.

Until the 1940s and 1950s, sprinklers were installed almost exclusively for the protection of buildings – especially warehouses and factories. Insurance savings, which could pay back the cost of the system in a few years time, were the major incentives.

Following fires with large losses of life (Coconut Grove Nightclub, Boston, 1942 – 492 dead; LaSalle Hotel, Chicago, 1946 – 61 dead; Winecoff Hotel, Atlanta, 1946 – 119 dead) fire and building officials searched for a means to provide life safety for building occupants. They found that factories and other buildings equipped with automatic sprinklers had an amazingly good life safety record compared with similar unsprinklered buildings.

Q. Why are fire sprinklers required in some areas, and not in others? Why are there variations in sprinkler requirements?

Fire sprinkler systems are installed in accordance with consensus standards developed through the National Fire Protection Association (NFPA). These standards are very specific in defining how sprinklers are to be installed in different types of occupancies and different hazard classifications. The three primary standards that define the installation requirements are NFPA-13 (Installation of Sprinkler Systems); NFPA-13R (Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height); and NFPA-13D (Installation of Sprinkler Systems in One-and Two-Family Dwellings and Manufactured Homes).

The standards adopted by NFPA represent the best recommended practices, but the standards by themselves are not law. Development of the consensus is a dynamic process and the standard is changed to reflect new technologies, science and experience. A new version of the standard containing changes and updates is issued every three years.

The requirements for the installation of fire sprinklers are adopted as law by state or local jurisdictions as a part of their building codes or local ordinances. At times, jurisdictions may vary some of the requirements contained in the NFPA documents. Differences in requirements will vary from city to city based on local changes made to the NFPA standards, or the year of the standard adopted by the local jurisdiction. For example, if one city adopts the 1999 NFPA 13 standard, and another city adopts the 2002 issue of the same standard, there will be differences.

Q. How do sprinklers operate?

Automatic fire sprinklers are individually heat-activated, and tied into a network of piping with water under pressure. When the heat of a fire raises the sprinkler temperature to its operating point (usually 165°F), a solder link will melt or a liquid-filled glass bulb will shatter to open that single sprinkler, releasing water directly over the source of the heat.

Q. Why are sprinklers so effective?

Sprinklers operate automatically in the area of fire origin, preventing a fire from growing undetected to a dangerous size while simultaneously sounding an alarm.

Automatic fire sprinklers keep fires small. The majority of fires in sprinklered buildings are handled by one or two sprinklers.

Q. Why are sprinklers important for life safety?

Sprinklers do not rely upon human factors such as familiarity with escape routes or emergency assistance. They go to work immediately to reduce the danger.

Sprinklers prevent the fast developing fires of intense heat which are capable of trapping and killing dozens of building occupants.

Q. What about smoke?

Smoke, a by-product of fire, is generally the cause of death to building occupants. Although smoke is produced as sprinklers extinguish a fire, such quantities of smoke are less than those which would be produced by an unsprinklered fire permitted to grow.

Q. Why are there additional local ordinances?

Where the building codes don't go far enough, many states and cities enact special tough sprinkler ordinances. The State of West Virginia, for example, requires sprinklers throughout all new buildings exceeding 40 feet in height. The city of Oak Brook, Illinois, requires sprinklers throughout all new buildings exceeding 1,000 square feet in area except single-family dwellings. Over 200 communities, such as San Clemente, California, Scottsdale, Arizona and Greenburgh, New York require fire sprinkler protection even in new single-family homes.

Q. What is retrofit legislation?

In addition to requiring sprinklers throughout new buildings, some cities have encouraged sprinkler installation in existing buildings. These include New York City's landmark Local Law 5 for high-rise office buildings and a Chicago ordinance requiring sprinklers throughout all nursing homes.

High-rise hotels have been required to retrofit with fire sprinklers in the states of Nevada and Florida, and in the city of Honolulu, Hawaii. Recent high-rise retrofit laws include those enacted in Atlanta in 1989 and in Philadelphia in 1991.

Q. What is the life safety record for fully sprinklered buildings?

Aside from firefighting and explosion fatalities, there has never been a multiple loss of life in a fully sprinklered building due to fire or smoke. Individual lives have been lost when the victim or his clothing or immediate surroundings became the source of the fire.

Q. How reliable are fire sprinklers?

All fire protection features have a reliability factor. Walls and shafts can be breached by means of poke-throughs and building alterations. Exit doors can be blocked or locked.

Sprinklers may be the most reliable fire protection system known. Detailed fire records for Australia and New Zealand, where fire must be reported, for the years 1886 through 1968 showed that 99.76% of all fires were extinguished or controlled by the sprinklers. Fire records in this country are less dependable due to lack of full reporting, especially for small fires where the sprinklers are successful. Nevertheless, the range includes a 96.2% success record reported by the National Fire Protection Association for the years 1925 through 1969, 98.4% success record for New York City high-rise buildings between 1969 and 1978 and a 98.2% success record for U.S. Department of Energy facilities between 1952 and 1980.

Q. How can you be sure a system will operate when needed?

Electrical supervision of sprinkler systems to monitor valves and water flow is a major plus in assuring system reliability and effectiveness and is required by many building codes for large and important system installations.

Q. How much does a new sprinkler system cost?

The cost of a complete sprinkler system depends on many factors, such as the building type and construction, availability of public water supply and degree of hazard of the occupancy. For new construction, systems usually cost from \$1.00 to \$2.00 per square foot – less than the cost of carpeting.

Q. How much does retrofit cost?

Retrofit installations in existing buildings can be expected to cost somewhat more than for new construction, depending on the difficulty of installation and other factors. A general rule of thumb is to add 50%.

Q. What are "trade-offs"?

The system cost can often be offset by insurance savings, and by specific design alternatives or "trade-offs" permitted by most building codes in view of the superior protection afforded by sprinklers. These trade-offs often include reduced fire-resistant requirements for structural components, longer exit travel distances and larger building areas and heights.

Q. Aren't sprinklers ugly?

Due to advances in sprinkler technology, sprinklers look better than ever – if you can see them at all. Sprinklers can be concealed behind ceilings, out of sight until needed to extinguish a fire.

Sprinklers are also available in a range of colors and sizes to blend into the background of any room.

Q. What about water damage?

Reports of water damage due to fires in sprinklered buildings are often exaggerated due to comparisons with the small fire loss which occurs thanks to the sprinklers.

The amount of water which is put on a fire by fire department hoses in an unsprinklered building fire is nearly always tens to hundreds of times more than that which sprinklers would have discharged. During a fire, only those residential sprinklers closest to the fire activate, limiting the total amount of water needed. The fire damage, as reflected by insurance claims, is also many times greater.