

# fast facts

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## Fire Sprinkler System: A Life Saver and Building Protector

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Fire sprinkler systems are expected to detect, control and suppress unwanted fires. They do not necessarily have to extinguish fires since the main goal for fire sprinklers is to dramatically reduce heat, flame, smoke, control fire growth, and provide additional time to safely exit a building. Fire sprinkler systems are required in most public buildings constructed since the 1970's because if inspected, maintained, and tested annually, they are one of the most effective ways to protect buildings and their occupants from unwanted fires.



Figure 1: Stacked materials too high blocking sprinkler's range.



Figure 2 Completely covered sprinkler

### SPRINKLER OBSTRUCTION

Fire sprinkler systems are designed to provide full protection by overlapping the sprinkler heads' radii of coverage. This overlapping coverage can be rendered ineffective, however, if materials are stacked so high that they block the sprinkler's effective range to reach combustible hazards. Blocking the sprinkler's effective range with stacked materials, as shown in Figure 1, is a violation of both Occupational Safety and Health Association and National Fire Prevention Association standards. OSHA and NFPA standards require that stored material not be closer than 18 inches below the plane or horizontal level of the sprinklers except that shelf-stored materials along the perimeter walls of the room may be above the 18 inch clearance but below the sprinkler deflector.

When ceilings or pipes have to be repainted, sprinklers should be covered to make sure no paint gets onto the sprinkler. Only the sprinkler maker is permitted to paint its sprinkler. Figure 2 shows a photo of a sprinkler head completely covered with a bag that was not removed after the painting was complete. This cover renders the sprinkler incapable of performing its intended function in emergency situations. Therefore, it is essential to inspect sprinkler systems periodically and to immediately report any condition hindering their intended performance. If a sprinkler is painted during a painting operation, it must be replaced.



Figure 3. Decoration hanging on sprinkler guard.

Figure 3 shows a photo of a decoration hanging on the sprinkler guard. There should never be anything hanging on the sprinkler pipes, sprinklers or the sprinkler guard, as such decoration can block or obstruct the sprinkler system's full coverage.



Figure 4. Corroded sprinkler in an area where chlorine chemicals were stored.

### SPRINKLER INSPECTION AND COVERAGE

If the fire sprinkler system is not maintained, inspected, and tested annually as required by the codes, sprinklers may not function properly. For example, corroded fire sprinklers like the one shown in Figure 4 may not function properly in case of fire emergency, and must be replaced. In addition, spare sprinklers (which are approved and of the type used in the sprinkler system) need to be kept on site in order to be able to promptly return the sprinkler system to service after a fire has occurred.

Fire sprinkler systems are active fire protection systems and fully complement the building's passive fire protection features. For the most benefit, a building needs to be 100 percent protected with fire sprinkler system coverage, otherwise the fire can quickly grow out of control in non-protected areas. Therefore, it is critical to fully sprinkler the building to ensure the safety of employees, visitors and the building.

## fast stats

### Statistics on Sprinkler Effectiveness

- When properly-maintained sprinklers are present, the chances of an individual dying in a fire are reduced by 50-75%, and the average property loss per fire is cut by one-third to two-thirds (34-68%), compared to fires where sprinklers are not present. Many of the deaths in sprinkler properties occurred in the room of fire origin. ([www.nfpa.org](http://www.nfpa.org) Research & Reports: Fact Sheets - Home Fire Sprinklers (September 2008))
- Fires were controlled or extinguished with the activation of only one or two sprinkler heads in 81% of the fires with wet pipe sprinkler systems and in 56% of the fires with dry pipe systems. ([www.nfpa.org](http://www.nfpa.org) Research & Reports: Fact Sheets - Home Fire Sprinklers (September 2008))
- Based on 2002-2004 fires reported to U.S. fire departments, sprinklers activated in 93% of reported structure fires operated effectively 97% of the time, resulting in a combined effectiveness reliability of 90%.
- Estimated Damage per Fire With and Without sprinklers. 2002-2004

Stores and Offices:	With Sprinklers	Without Sprinklers	% Reduction
	\$31,700	\$49,500	36%

- Estimated Reduction in Civilian Deaths per Thousand Fires Due to Sprinklers In Stores and Offices - 1.3 persons saved.

Source: NFPA Fire Analysis and Research, June 2007.

### Codes and Standards from OSHA and NFPA 13 and 25

- Occupational Safety and Health Administration (OSHA) and the National Fire Protection Association (NFPA) require that shelves and stacked materials not exceed the height of 18 inches below sprinkler heads except for those perimeter wall-mounted shelving-stored materials. [29CFR§1910.37(a)(4); 29CFR§1910.159(c)(10); NFPA 101 §9.7.1.1, §9.7.1.4, and §9.7.5; NFPA 13 §8.6.6, §8.7.5.2.1.1, A.8.6.6 ; NFPA 25 §5.2.1.2]
- Automatic sprinkler system installations shall be inspected and tested at least annually as required by OSHA 29CFR§1910.159(c)(2); NFPA 25 §5.1 and Table 5.1.
- Sprinklers shall be replaced that have signs of leakage, are painted (other than by the sprinkler manufacturer), corroded, damaged, or in an improper orientation. [NFPA 25 §5.2.1.1.2]



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