

Common Questions Regarding Fire Safety and Residential Sprinkler Systems

What are the chances of a house catching fire?

Because of changes in residential construction technology, improved building code requirements -- especially for electrical and smoke alarm systems, as well as consumer behavior and the concerted efforts of fire fighters, home builders and other safety advocates - the number of fatal fires has dropped dramatically in the last 20 years. This trend is continuing, and the decline is even more impressive given our nation's significant growth in population and housing stock.

Even more dramatic is the drop in the actual death rate per million persons from house fires. According to the Centers for Disease Control, the rate dropped by more than 58 percent between 1979 and 2003. That trend will continue as more new housing stock is constructed and especially as homeowners continually maintain their smoke alarm systems.

What can be done to reduce the chances of a fire?

Occupants should risky activities such as leaving cooking or lit candles unattended and smoking, among others. Changes in smoking habits – such as not smoking in bed, fire-safe cigarettes and ignition-resistant furnishings – have also helped reduce the risk. As with smoke alarms, fire prevention education is a more practical, effective and proven approach to reducing home fire incidents, injury and fatalities than mandates for home fire sprinklers.

How reliable are fire sprinklers?

Proponents claim that residential sprinkler systems have proven reliable in 96 percent to 99 percent of reported structure fires when the fire was large enough to activate the system. However, according to reports from the National Fire Protection Association, there are so few fires in one- and two-family dwellings equipped with sprinklers that they are not shown in most of its recent studies.

Furthermore, it was suggested in the report that these sprinklered dwellings are built and maintained better than homes built before significant improvements in the building code. It is important to note that the sprinklers often receive credit for life saving when it was actually the result of the overall integrated system of balanced fire protection and preparedness.

The reliability of residential fire sprinklers is also questionable. There is no study that shows how long sprinkler systems will last. After smaller recalls by other companies in 1998 and 1999, a major fire sprinkler manufacturer recalled 35 million fire sprinkler heads in 2001. Any requirements that the manufacturer notify owners of homes where these defective heads were installed have now expired.

I have heard horror stories of sprinkler systems accidentally discharging, causing major water damage. Are these stories true?

Yes. Typically, these accidental discharges occur in cases of overheating, freezing, mechanical damage, corrosion or deliberate sabotage. In fact, accidental discharge is one of the major concerns with the implementation of residential sprinklers. While accidental discharge due to a manufacturing defect is rare, there have been several reported incidents of discharge when there was no fire present and the cause was due to other events.

Quick-response heads activate at lower temperatures to ensure that they react during the early stages of a fire. The drawback is that these heads cannot discern between a “good” and “bad” heat source. That is why there are certain distances that must be maintained between the sprinkler and fixtures such as fireplaces, skylights, cooking appliances and lighting.

A typical accidental discharge occurs in areas where the wet piping system is exposed to freezing temperatures. In most homes, where the sprinkler is located in the ceiling, the piping for that system is installed in the attic, where temperatures can reach the freezing point. If any portion of the piping system is exposed to these temperatures, ice can form, creating thousands of pounds of pressure on the pipe, which can crack or loosen the joints. When installed in attics and exterior walls, it is important that the insulation is installed correctly and reinstalled properly if it is disturbed.

Damage to the sprinkler can also result in a premature discharge. The sprinkler consists of a frame, the seat and the operating mechanism, which is usually a solder link or a glass vial. If the sprinkler is struck by an object or the link is dislodged, the sprinkler may be set off. Most sprinklers flow about 12 to 16 gallons a minute, so water damage can occur very rapidly.

What should I do in the event of an accidental discharge?

The system should be shut off immediately. It is important that the owner fully understand how the system works, where the shut-off valve is located (if provided) or how to turn the main water system off to the house. In many cases, the residential sprinkler system is connected to the same water piping system serving the plumbing fixtures. Shutting the main valve to the plumbing system will also shut down the sprinkler system.

The next priority is to remove as much of the water as possible before it causes permanent damage. If water has found its way into the walls or ceiling, it is important to remove all the drywall and insulation to allow these areas to air out and reduce the chance of mold or rot.

What are the maintenance requirements for a residential system? Is it something I can do myself?

Sprinkler systems are expected to work in the event of the fire, but like any system, maintenance is required to ensure it will operate when a fire is detected. Proponents claim that a NFPA 13 D does not require any maintenance to be performed on the residential sprinkler system and that the system can be installed and forgotten.

The fact is that all sprinkler systems, whether they are commercial or residential, require routine maintenance and inspection. NFPA 13 D states that it is the responsibility of the installer to provide the owner all the maintenance information and to educate the owner regarding how the system works.

When homeowners are led to believe that no precautions are necessary and no preventive maintenance needs to be performed, it leads to a false sense of security. The owner is responsible for properly maintaining a sprinkler system and should understand the components and how they work.

NFPA 13D and manufacturers suggest the minimum monthly maintenance program should include the following:

- (1) Visual inspection of all sprinklers to ensure against obstruction of spray.
- (2) Inspection of all valves to ensure that they are open.
- (3) Testing of all water flow devices.
- (4) Testing of the alarm system, where installed.
- (5) Operation of pumps, where employed.
- (6) Checking of the pressure of air used with dry systems.
- (7) Checking of water level in tanks.
- (8) Special attention to ensure that sprinklers are not painted either at the time of installation or during subsequent redecoration.

Also, if a backflow prevention device is installed as can be required, an expensive annual inspection may be mandated by the local water purveyor.

Standards also specify that antifreeze-type sprinkler systems that are installed in colder climates should be emptied and then refilled with an antifreeze solution every winter, and that monthly inspections and tests of all the water flow devices, pumps, air pressure and water level be performed.

Unlike smoke alarms, there is no way to test sprinklers other than applying heat. Smoke alarms can be tested by pressing the test button or using products that simulate smoke to verify that the smoke alarm is properly functioning and ready to alert occupants. Sprinkler manufacturers must rely on test sampling to see if the sprinkler will react to the presence of heat and activate. Defects with the sprinkler will not be known until the sprinkler fails to activate in a fire and reports are issued later for the recall of the defective sprinkler.

How many residential sprinkler systems are installed annually?

According to a national poll conducted by sprinkler advocates, 63 percent of those surveyed indicated that they were aware that residential sprinkler systems are available for one- and two- family dwellings and townhouses. However, trade reports have indicated that there is a low market demand for residential sprinklers, except for those areas where sprinkler ordinances have been mandated. The number of homes built annually that are equipped with sprinklers continue to be less than 2 percent, many of which are required by local ordinance and not as an option elected by the homebuyer.

Why aren't more systems being installed?

Opponents, including code officials and home builders, have consistently argued against fire sprinkler mandates because they are expensive, have an unreasonable impact on housing affordability and have not been demonstrated to be a practical, cost-effective, assured means for reducing fatalities. More lives can be saved by education and by ensuring that every home has and maintains working smoke alarms than by mandates for home fire sprinklers.

Costs vary significantly depending on a home's location, layout, number of stories, and other factors – especially access to water. A 2007 survey of home builders indicated that builder costs for those installations averaged \$2.66 per square foot and ranged as high as \$6.88 per square foot. When overhead and any other factors are added in, costs to home buyers escalate further.

For homes on wells, typical costs are even higher because of the need for additional components such as storage tanks and larger pumps. Owners of homes on well water need to consider how the sprinklers will operate if the power goes out or if water pressure is a problem – and solutions, like extra water tanks, pumps and generators, are costly.

What about smoke alarms?

The International Residential Code currently requires hardwired, interconnected smoke alarms to be installed in all bedrooms, outside of them and on each additional story, including basements. When one alarm is activated, all other alarms are activated as well. This effective early-warning system is the most important measure for protecting occupants against fire. More than 90 percent of the occupants survived fires that were reported to have occurred in homes equipped with hardwired interconnected smoke alarms from 2000 to 2004.

Another study published in the *Journal of the American Medical Association* found that when public health strategies to reduce residential fire-related injuries and deaths include information about smoke alarm installation, monthly testing of smoke alarms, reduction of residential fire hazards, design and practice of fire escape plans, fire safety education, and implementation of smoke alarm ordinances, residential fire-related deaths will continue to decline. It's clear that resources should be focused on ensuring every home has and maintains working smoke alarms rather than pushing for mandatory home fire sprinklers.

According to the most recent NFPA report on smoke alarms, it is estimated that over 890 lives could be saved annually if every home had working smoke alarms. Sixty-five percent of the fire fatalities reported from 2000- 2004 occurred in homes where smoke alarms were not present or smoke alarms were present and did not operate.

What do most people think about sprinklers versus smoke alarms?

When asked in a 2007 survey of 800 likely voters by Public Opinion Strategies if fire sprinklers should be required in new homes, an overwhelming 89 percent of consumers said that smoke detectors already do an adequate job of protecting them in their homes and 28 percent would not want sprinklers at all, even if they were provided free of charge. Survey results show that only 15 percent of consumers in the sample were willing to pay \$4,800 or more for a residential fire sprinkler system.

What guarantees do I have that the sprinkler system will save my life or the life of a loved one?

There are no guarantees that smoke alarms or sprinklers will prevent a fire fatality, although the use of either system will increase your chances of surviving a fire. While smoke alarms alert or notify occupants that there is a fire, if the occupant is physically impaired due to drugs or alcohol, disabled or unable to move on his or her own volition, the alarm will not prevent a fatality. There are also situations when the sprinkler system will not be able to prevent the loss of life such as when the victim is too close to the source of ignition, the system is damaged by the fire or an explosion, when the fire originates in concealed, combustible locations, when the fire is shielded by foreign objects from the effective coverage area of the sprinkler, or when the victim succumbs to smoke inhalation due to a smoldering fire -- which does not produce enough heat to activate the sprinkler system.