

Sprinkler Facts

Fire kills more people in the United States every year than all natural disasters combined.

Residential Sprinklers

80% of all fire deaths occur in the home. The single most effective way to prevent fire-related deaths is the installation of residential fire sprinklers. Combined with smoke alarms, they cut the risk of dying in a home fire by 82% compared to having neither.

Fire Sprinklers Save Money

Through the use of trade-ups, developers and builders can achieve reduced construction costs while providing higher value homes for their customers. In the event of a home fire, homeowners can expect financial losses 90% lower than those that occur from fires in homes without sprinklers. Communities can deploy emergency service resources more effectively by reducing the burden caused by home fires.

Installing both smoke alarms and a fire sprinkler system reduces the risk of death in a home fire by 82%, relative to having neither.

- Sprinklers typically reduce chances of dying in a fire and the average property loss by one-half to two-thirds compared to where sprinklers are not present.
- NFPA has no record of a fire killing more than two people in a public assembly, educational, institutional or residential building where the system was working properly.
- In 1999, 34% of public assembly properties where fires occurred in the U.S. were equipped with sprinklers, compared with 7% of residential properties.
- In 2002, 79% of fires occurred in the home, resulting in 2670 fire deaths.

Minimal Sprinkler Malfunctions

Each sprinkler is individually activated by heat. Despite “sight gaps” on TV sitcoms, smoke does not trigger the sprinkler operation. The rest of the sprinklers in a house will not activate unless there is also a fire in that location. 90% of all home fires are contained with a single sprinkler.

Water Conservation

According to the Scottsdale Report, a 15 year study of fire sprinkler effectiveness, a fire sprinkler uses, on average, 341 gallons of water to control a fire. Firefighters, on average, use 2935. Reduced water damage is a major source of savings for homeowners.

Modern Fire Sprinklers

The likelihood that a sprinkler will accidentally discharge because of a manufacturing defect is extremely rare. Sprinkler mishaps are generally less likely and less severe than accidents involving home plumbing systems.

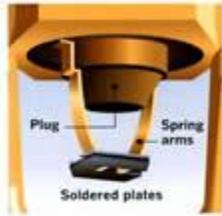
Unlike commercial fire sprinklers, residential sprinklers are small, and can be recessed in to ceilings or walls. Some models are completely concealed by plates that can be matched to room paint colors.

How Fire Sprinklers Operate

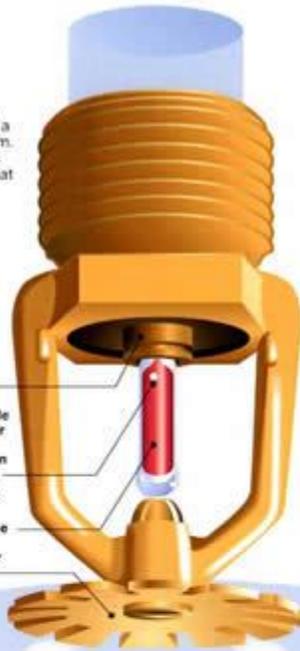
How fire sprinklers work

1 The typical sprinkler head consists of a plug held in place by a trigger mechanism. The most common type of trigger is a glass ampule filled with a glycerin-based liquid that expands when heated.

A less commonly used type of trigger consists of two metal plates held together by a solder point. When the solder melts, two spring arms pull the plates apart, releasing the plug.



Plug
Air bubble allows for normal expansion of liquid
Vacuum-sealed glass tube
Deflector plate



2 This liquid is designed to expand and break the tube at a certain temperature. The most common are designed to break at 155 degrees. In the average sized room, a 5mm diameter ampule will usually break in about one to one and a half minutes from contact with a heat source. Ampules as thin as 1mm are manufactured for a faster response time.

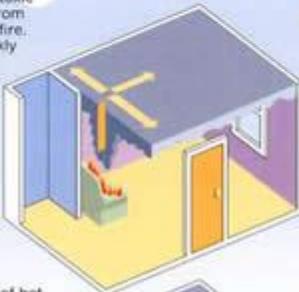


3 The plug is forced out by the pressurized water behind it and deflected away by a beveled edge. The water sprays over the deflector plate which is designed to distribute it in an even pattern. Water will continue to flow until the main valve is shut off.

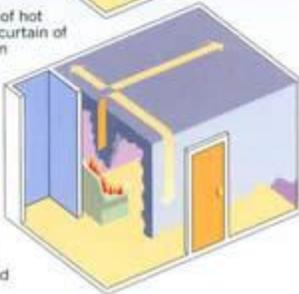


How an uncontrolled fire spreads

1 Smoke and toxic gases rise from the source of the fire. They spread quickly along the ceiling and heat the air in the room.



2 The current of hot air forces a curtain of deadly gases down the walls, making escape more difficult. In a few minutes the air will become so hot that the entire contents of the room will ignite spontaneously. This is known as flashover and usually occurs between 1,000 and 1,500 degrees.

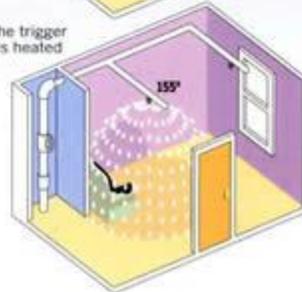


How a sprinkler system puts the fire out

1 Even a small smoldering fire acts like a heat engine as it steadily increases the air temperature directly above it. The hot air fans out across the ceiling, heating up the nearest sprinkler head.



2 As soon as the trigger mechanism is heated to the required temperature, it trips and the water is released. The immediate cooling of the heat source usually prevents other sprinkler heads from activating. Often, one or two sprinkler heads are enough to control a fire.



SOURCES: Tyco Fire Products, Blaze, by Nicholas Faith

JOURNAL GRAPHIC / TOM MURPHY