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### COMMON MISCONCEPTIONS CONCERNING FIRE SPRINKLER

#### SYSTEMS IN RESIDENTIAL OCCUPANCIES

##### Mandates

The International Code Council (ICC) is the largest building and safety code organization dedicated to protecting the property, health and safety of people worldwide. However, codes adopted by the ICC are not nationally mandated. They are adopted by individual states and local jurisdictions.

##### Public Opinion

Opponents of residential sprinklers have suggested that the general public would oppose residential sprinklers, but a recent national poll conducted by Harns Interactive indicates that this claim misrepresents public opinion. A survey of over 1,000 adults revealed that:

- 45% of homeowners said that a sprinklered home is more desirable than an unsprinklered home,
- 69% of homeowners said that having a fire sprinkler system increases the value of a home, and
- 38% of homeowners said that they would be more likely to purchase a home with fire sprinklers than without.

##### Life-Saving Potential

Fire sprinklers are the most effective fire safety device ever invented. The National Fire Protection Association reports that people with smoke alarms in their home have a 50 percent better chance of surviving a fire. Adding fire sprinklers and smoke alarms increases your chances of surviving a fire by over 97 percent. Fire sprinkler systems will also prevent deaths and injuries among emergency response personnel, since a shocking 45% of firefighter deaths that occur on the fire ground occur at residential occupancies. Firefighters will have less risk of injury or life loss since they will be fighting a fire of less intensity.

##### Do Sprinklers save property?

Residential fire sprinklers are designed to save lives, but because they control fires so quickly, they also reduce property damage. Fire reports nationwide show that property damage is **nine** times lower in sprinklered homes.

### **Smoke Alarms vs. Fire Sprinkler Systems**

Some people suggest that smoke alarms are adequate protection for the public and that residential sprinklers aren't justified. Everyone can agree that smoke alarms save lives and that they are largely responsible for a reduction in the fire death rates that occurred over the past 30 years. Nevertheless, smoke alarms on their own do nothing to stop the spread of fire, protect property or protect firefighters. As smoke alarms age, their reliability declines and should be replaced on a 10-year cycle. The questions before us are how many alarms will actually be replaced, and what will happen to the reliability of alarms that are not replaced? The effectiveness of smoke alarms in further reducing fire death rates has to do with performance and waking effectiveness. In a study that was completed in 2006, only 58% of a test group of children ages 6 – 12 awakened when a standard smoke alarm sounded, and only 38% of the test group successfully evacuated. Another study revealed that a surprising 34% of fire deaths in one- and two-family dwellings during the 2000-2004 period occurred in homes with a working smoke alarm. Perhaps this statistic correlates with the fact that fire death rates for the young and the elderly, those who are least likely to be capable of self-preservation even if they are awakened by a smoke alarm, are roughly double those for individuals in other age groups. Smoke alarms are good, but they can only go so far in reducing the nation's fire death and injury rates.

In contrast, residential sprinkler systems have a life expectancy of 50 years and require essentially no maintenance, particularly for multipurpose systems. With these systems, if the domestic water is turned on, sprinklers are on as well. With the combination of sprinklers and smoke alarms, homeowners will have the best of both technologies.

### **Correlation Between the Age of a Home and Fire Risk**

Opponents of residential sprinklers would like to convince us that residential fire deaths are a function of a home's age; and new homes, built in accordance with the IRC, are safe. Many people agree with these arguments because on the surface they seem to make sense. However, further analysis paints a different picture.

- Most residential fire deaths result from fires caused directly or indirectly by people. Compliance with the IRC doesn't prevent these types of fires or many other common fire causes, and once a fire starts, compliance with the IRC will not slow its spread. The speed by which a fire spreads in a home is instead a function of contents and room geometry.
- A simplistic correlation of residential fire deaths with the age of homes ignores several variables that tend to vary based on the age of a home. These include the socioeconomic status of the occupants, the number of occupants, the age of the occupants, and the presence or omission of smoke detectors, among others. Fire safety experts know that these factors are far more likely to be contributory factors in fire deaths than the age of a structure. In addition, the fact that more fire deaths occur in "older" homes than newer

homes may also be related to the fact that the median age of homes in the U.S., according to a recent HUD study, is 32 years. By sheer numbers, a lot of people live in older homes.

## **Fire Sprinkler Maintenance**

Residential sprinkler systems are essentially maintenance free. The homeowner just needs to be taught what **not** to do:

- Don't close the valve.
- Don't paint the sprinkler heads.
- Don't hang clothes from the sprinkler.

Multipurpose systems are essentially tested every time the domestic water is used. For systems with water flow alarms (not required by NFPA 13D, but installed on some systems) the alarm can easily be tested by the homeowner by turning a valve to create some flow and seeing if the alarm sounds. The test is no more complicated than testing a burglar alarm and replacing a furnace filter.

## **Leakage**

The chance of a sprinkler system leaking is highly unlikely. Their piping is pressure-tested at two to three times higher than a plumbing system, even though they use the same pressure as your plumbing. Like the plumbing pipes, sprinkler pipes are not exposed to cold areas so they are protected from freezing. They do not leak because, unlike faucets and other fixtures that are operated often throughout their lives, fire sprinklers remain closed until needed and thus do not receive the wear and tear of daily use.

## **Sprinkler Head Activation**

Heat from a fire will open the nearest sprinkler. Its water cools the hot fire gases, making it unlikely other sprinklers will open. Thus, in nearly all cases there is not enough heat to open the next nearest sprinkler. In the rare case that the heat is too much for the nearest sprinkler, the next nearest sprinkler will open to overcome the fire. The operation of more than one sprinkler occurs in a small percentage of commercial buildings, but is very unlikely in homes.

Thus, only the sprinklers necessary to stop the fire will operate, and fire records show that it usually takes just one. Why, then, do people think that all of the sprinklers in the room go off at the same time? There are two reasons:

- Hollywood gag writers show all of them going off for effect. They have shown this happening from someone merely lighting a cigar or pulling a fire alarm switch. Those actions cannot make one sprinkler open, let alone all of them.
- People mistakenly think that smoke will open a sprinkler. Only heat can open a sprinkler head, and only a threatening fire can generate enough heat for activation.

## **Water Damage**

One of the myths about sprinklers is that they will cause water damage. While this may seem logical (after all, they spray water), fire records show that the reverse is actually true. Here is why. A residential fire sprinkler sprays about 10-18 gallons of water per minute and operates early in a fire to stop the burning. A hose used by firefighters flows ten times that amount, 175-200 gallons a minute. If sprinklers are not present, fires typically burn for an additional 10-15 minutes until firefighters arrive and begin spraying it with their hoses. Two things happen to cause more damage than sprinklers. First, more of your possessions have burned up before the firefighters intervened, and then you have 10 times more water being sprayed on what is left at a very high pressure.

### **Cost of Fire Sprinkler Systems**

Opponents of residential sprinkler systems argue that fire sprinkler costs prohibit widespread installation. The cost to install fire sprinkler systems in one and two-family varies by region; however, expected cost per square foot in South Carolina is between \$2 - \$3.