



# Position Statement

## Use of Residential Smoke Alarms

*Submitted by the Fire & Life Safety Section Board*

The International Association of Fire Chiefs, through its Fire & Life Safety Section (FLSS), is adopting this position paper on residential smoke alarms so the fire and emergency service can better respond to inquiries about smoke alarms and more effectively develop community risk reduction outreach programs.

### **The Problem: Home Escape Times Are Reduced to Three Minutes**

Modern homes contain a large quantity of synthetic furnishings which ignite and burn faster than natural materials such as wood and cotton. The National Institute of Standards and Technology (NIST) conducted full scale fire tests and concluded that escape time in flaming fires can be as little as three minutes, as compared to 17 minutes in tests conducted in the 1970s. Early smoke detection and alarm notification is needed so occupants can escape before conditions become untenable. Interconnecting smoke alarms allows for faster notification of occupants in areas remote from where initial ignition occurs in the home.

### **Smoke Alarms Save Lives**

Statistics show that the risk of dying is twice as high in a home without working smoke alarms than in a home with working smoke alarms.

### **Ionization Versus Photoelectric Detection Technologies**

There are two types of smoke detection technologies currently in widespread use, with additional technologies under development. There is a difference in activation times for the different sensing technologies (photoelectric or ionization) depending upon the type of fire development (fast-flaming fires versus smoldering fires).

The International Association of Fire Chiefs (IAFC) has carefully reviewed recent, credible research and does not find sufficient evidence to warrant a call to eliminate ionization technology. It does, however, recommend installation instructions which state that ionization alarms need to be spaced further away from fixed cooking appliances than photoelectric alarms to avoid nuisance activations.

While a properly installed and maintained alarm of either technology provides a critical baseline of protection, the IAFC strongly recommends the installation of at least one smoke alarm of each type or the installation of dual-sensor alarms, as long as the alarms are tested and listed by a nationally-recognized testing laboratory.”

### **Continued Research is the Answer**

A significant amount of research has been conducted on smoke alarm detection and response, flammability of furnishings, and movement of smoke in typical homes. In the U.S., this work was performed primarily by NIST and Underwriters Laboratories (UL).<sup>ii</sup> Findings from this research have resulted in changes to smoke alarm installation requirements in NFPA 72.

In 2011, the California State Fire Marshal formed a Smoke Alarm Task Force [[http://osfm.fire.ca.gov/SFM\\_SATF\\_Rpt.pdf](http://osfm.fire.ca.gov/SFM_SATF_Rpt.pdf)] to perform an in-depth review of current issues that limit the effectiveness of smoke alarms. After a comprehensive review of available research, the task force concluded that currently available listed smoke alarms, regardless of the sensing technology, provide an acceptable level of protection if they are properly located, installed and maintained.

It is vitally important to note that smoke alarms are only effective if they are maintained in operable condition.

### **Other Variables**

1. Nuisance Alarms - Cooking is the leading cause of nuisance alarms. Users often disable smoke alarms that produce frequent unwanted alarms. The recommendation is for fire chiefs to educate the public not to locate smoke alarms in close proximity to cooking appliances as required in the 2010 edition of NFPA 72, and discussed in the CSFM report.
2. Batteries - One study showed that 19 % of the smoke alarms present in reported home fires had dead or discharged batteries. Most of these were probably smoke alarms using replaceable batteries (which should provide a minimum of one year of operation). Public education efforts should continue to encourage occupants not to disable smoke alarms and to replace batteries periodically. Alternately, the public should be encouraged to consider smoke alarms with long-life (nominal 10-year) non-replaceable batteries.
3. Life expectancy of smoke alarms - Smoke alarms cannot last forever and must be replaced when they fail to respond to operability tests, or no later than ten years from the marked date of manufacture. Fire chiefs may address this concern through regulations, public education or with the assistance of other stakeholders, such as landlords and real estate agents.
4. Hard-Wired Alarms - The IAFC encourages homeowners to upgrade their battery-operated alarms with approved hard-wired smoke alarms with battery backup.

### **Education Efforts**

Fire departments should create and provide public and fire service education messages focusing on the following:

1. The brevity of time available for occupants to safely exit the house once hearing a smoke alarm sound;
2. The advisability of having multiple alarms in the house, including both ionization and photoelectric or dual-sensor alarms;
3. The importance of having at least one alarm on every level of the house, and particularly having an alarm outside every sleeping area;
4. The reasons for locating ionization alarms away from cooking areas and bathrooms (steam from the shower);
5. The available technology of hard-wired smoke alarms with battery backup for when they replace their current smoke alarms;
6. The need for families to familiarize themselves with the dangers of smoke and fire, to have an exit plan and to teach their children what to do if the alarm sounds;
7. The need to replace smoke alarms that are more than ten years old;
8. The increased protection provided by having multiple interconnected alarms;
9. The need to plan and practice home fire drills so every member of the home understands how to get out quickly if the alarms sounds;
10. The safety practice of testing all home alarms on a regular schedule and replacing the batteries if they do not sound during the test.

## Installation Programs

Following are four examples of popular smoke alarm programs which have gained universal acceptance and can be easily initiated:

- Discussing smoke alarm installation and use during an individual emergency response and installing a new smoke alarm before leaving;
- Targeting specific residential areas based upon a local risk assessment and household risk factors and performing a door-to-door campaign to introduce occupants to the value of smoke alarms;
- Setting up a "call-in" household smoke alarm assistance program; fire department personnel would assist occupants with installation and explain maintenance requirements, as requested;
- Promoting smoke alarms as part of a "comprehensive approach to home safety" including fire sprinklers, building and fire codes, CO detectors, and education of the public and fire emergency services.

## Conclusion

The existence of working smoke alarms in a residence constitutes the most cost-effective way to save lives of both occupants and firefighters. This is especially true today as most newly-constructed homes, due to the use of engineered lumber and the increased flammability of modern furnishings, burn hotter and can experience flashover in as little as three (3) minutes.

The IAFC/FLSS recognizes the importance of economically practical solutions to providing safe homes to residents. Many existing and new homes do not have residential fire sprinklers. Sprinklers and modern, up-to-date smoke alarms give people time to escape with the greatest chance of survival for occupants.

Although the optimal solution is for homes to be protected by multiple interconnected smoke alarms located in all code-required locations, it is recognized that installing even a single, working smoke alarm in a home that previously had no working smoke alarms increases the level of fire safety. A best practice recommendation is for all homes to be protected by an alarm on every level of the house and to follow other guidelines presented in this document.

The IAFC/FLSS stresses the importance for fire chiefs to educate the community and their personnel to understand all issues related to home fires and smoke alarms, to be aware of factors that may prevent smoke alarms from operating when needed, and to take all possible steps to minimize these risks through enforcement, public education and interaction with other stakeholders in the community.

<sup>i</sup> This position paper supersedes previous IAFC smoke alarm position papers.

<sup>ii</sup> [UL Report.](http://www.ul.com/global/documents/offerings/perspectives/regulators/SmokeAlarmsInModernResidences.pdf)  
[<http://www.ul.com/global/documents/offerings/perspectives/regulators/SmokeAlarmsInModernResidences.pdf>]

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