

Frequently Asked Questions: Types of Fires and Types of Smoke Alarms

Q: What are the types of fires?

A: Experts divide home fires into two groups: **flaming and smoldering**. Flaming fires result from the ignition of items such as flammable liquids, wood or paper, cooking accidents, or from open flames such as candles that ignite other items. They produce large quantities of flames and lesser visible amounts of smoke.

Smoldering fires most often occur when smoking materials, such as cigarettes, are left unattended. In general, they initially produce minimal amounts of flames and larger, visible amounts of smoke.¹ Smoldering fires may or may not transition to flaming fires.

Q: What type of fire occurs most often in homes?

A: **Ninety-three percent of home fires are flaming.** Flaming fires are the leading cause of fire-related deaths and injuries, causing 2,000 deaths and 10,000 injuries each year on average.²

Q: What smoke alarm technologies are currently available?

A: There are two types of smoke alarm technologies currently available to homeowners: ionization and photoelectric.³ These technologies are sold in either single-station ionization or photoelectric smoke alarms, or in a dual-sensor smoke alarm that combines both technologies into one unit.

Q: How does ionization technology work?

A: Ionization smoke alarms sound when electrically charged ("ionized") particles released in a fire interfere with the electrical current that flows through the alarm's detection chamber. The disruption in the current causes the smoke alarm to sound.

Q: How does photoelectric technology work?

A: Photoelectric smoke alarms sound when smoke particles interfere with and reflect the alarm's light beam that travels through the alarm's detection chamber, thereby triggering the alarm.

Q: How do the technologies differ?

A: Because of the different detection technology, ionization sensors are more likely to detect smaller, less visible fire particles, like those produced by flaming fires, sooner than photoelectric sensors. However, photoelectric sensors are more likely to detect larger, more visible fire particles, such as those produced by smoldering fires, sooner than ionization sensors.⁴

Q: What kind of smoke alarm is best?

A: Consumers should only install smoke alarms that are listed and tested to approved third-party standards such as Underwriters Laboratories (UL) 217. Most states require smoke alarms to be listed by a third party.

In 2004, the National Institute of Standards and Technology (NIST) completed a study on photoelectric

¹ Kidde, National Fire Protection Association and industry research

² National Fire Incident Reporting Service (NFIRS) data, 1992-1996

³ Consumer Product Safety Commission (CPSC), Smoke Alarms – Why, Where and Which

⁴ National Institute of Standards and Technology (NIST), Home Smoke Alarm Study, 2004

and ionization smoke alarms and found both types responded to all fires. While the ionization alarms may respond quicker to flaming fires, and the photoelectric alarms may respond quicker to smoldering fires under specific test conditions, **both technologies are effective in providing adequate escape time to occupants in "real-life" home fire conditions.**⁴ **Both also must pass identical performance standards to obtain third-party approval from organizations such as UL.**

Q: I've heard that in some fires, the photoelectric alarm goes off sooner than an ionization alarm. Does that mean it provides better protection?

A: Both photoelectric and ionization smoke alarms have been shown to provide adequate escape time from a fire. Fire and consumer experts, including the National Fire Protection Association, the U.S. Fire Administration, the Consumer Product Safety Commission, Consumers Reports and UL recommend installing both photoelectric and ionization smoke alarms in order to maximize protection from both types of fires. Kidde supports this recommendation, and states on its packaging, website and in its owner's manuals that, for maximum protection, consumers should install both photoelectric and ionization alarms. Kidde offers photoelectric smoke alarms, ionization smoke alarms and dual-sensor alarms that combine both technologies in one unit.

Q: Where should I install ionization alarms, and where should I install photoelectric alarms? What about dual-sensor units?

A: Regardless of technology, the most important thing is to ensure that you have working smoke alarms on every floor of your home, inside each bedroom and outside sleeping areas. Studies show placing alarms in both bedrooms and hallways could increase a family's escape time by up to 15 minutes.⁴ On average, a person will have less than three minutes from the time the first smoke alarm sounds to escape a home fire.⁴ For additional warning, a family can interconnect smoke alarms, so that when one alarm sounds, they all sound.³

Some studies have shown that ionization smoke alarms may be more prone to nuisance alarms, such as those that occur due to cooking. Consumers may reduce that potential by placing ionization smoke alarms at least 20 feet from appliances, or by installing a photoelectric alarm near a cooking area.⁴ Most smoking-material fires, which tend to smolder, begin in a den, family room, living room or a bedroom.⁵ Families with members who smoke may consider installing photoelectric alarms or dual-sensor alarms in those areas.

Q: Are there other steps I should take besides installing smoke alarms?

A: Installing smoke alarms throughout the home is the first step in an overall fire safety plan. Also remember to test smoke alarms weekly. Two thirds of home fire deaths occur in homes without working smoke alarms, mostly due to dead or missing batteries.⁶ Families must also develop and regularly practice an escape plan, so that they know what to do when the alarm sounds.³

Q: Is there a big difference in cost between the types of smoke alarms?

A: Ionization smoke alarms range in price from about \$8 to \$15, and photoelectric smoke alarms tend to cost \$15 to \$20. A dual-sensor smoke alarm will range in price from about \$20 to \$25.⁷

⁵ National Fire Protection Association, The Smoking-Material Fire Problem, August 2006

⁶ National Fire Protection Association, U.S. Experience with Smoke Alarms, April 2007

⁷ Kidde Residential & Commercial MSRP