



Smoke Detectors For Your Home¹

Ohio State University Extension²

WHY HAVE A SMOKE DETECTOR?

Home fires are a serious threat to your family's safety. Every year in the United States, approximately 5,000 people are killed and more than 40,000 are injured by residential fires. In addition, more than \$8 billion worth of property damage is done by home fires. Many fire victims die of inhalation of smoke and toxic gases, not because of burns. Most deaths and injuries occur in fires that happen at night while the victims are asleep. Sleepers must be warned before it is too late.

When properly installed and maintained, the home smoke detector is one of the best and least expensive ways to provide early warning when a fire begins. Before the concentration of smoke reaches a dangerous level, or before the fire becomes too intense, the alarm will sound. Smoke detectors save lives, prevent injuries and minimize property damage. The risk of dying from fire is twice as high in homes that do not have functioning detectors.

HOW DO THEY WORK?

Smoke detectors work by sensing the rising smoke from a fire and sounding a piercing alarm. There are two types of smoke detectors on the market today:

Ionization Chamber detectors use a radioactive source to produce electrically charged molecules (ions) in the air. This sets up an electric current within the detector chamber. When smoke enters the chamber, it attaches

itself to the ions and reduces the flow of electric current, thus setting off an alarm.

Photoelectric detectors sound when the smoke is dense enough to deflect a beam of light.

Smoke detectors also differ by power source. The batteries in battery-powered smoke detectors last approximately one year. When the battery begins to lose power and needs to be replaced, the detector will begin to emit "beeps" every minute or so. Some will keep this up for a week or longer.

Smoke detectors that operate on household electric current operate as long as there is current in the circuit to which they are connected. They are, therefore, vulnerable to power failure. Plug-in units must be located near an electric outlet where they will not be unplugged or turned off by a wall switch. They should not get their power from a distant plug using an extension cord. Always use the hold-in clips to prevent accidental plug removal from the outlet.

Heat detectors are also available, sometimes a part of a smoke detector and sometimes as separate products. These use a special metal that melts or distorts when heat enters the air surrounding it. When built into smoke detectors, these set off the smoke detectors main alarm. Alone, they may sound their own alarm or a central alarm, if part of a system. Heat detectors add protection, but by themselves are not effective early-warning devices. They must be very close to a fire to be set off.

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Therefore, they are useful in places where smoke detectors can be fooled, such as a kitchen. They are also useful in areas of the home where smoke detectors cannot function because it is too hot or cold. Remember, smoke, not heat, is the leading cause of death in home fires.

WHAT KIND OF SMOKE DETECTOR SHOULD I BUY?

Each type of detector, if properly installed and maintained, is effective. Since photoelectric detectors react more quickly to smoldering fires and ionization units will respond faster to flaming fires, you may wish to buy at least one unit of each or a combination detector. However, because most home fires produce a mixture of smoke types with detectable amounts of large particle and small particle smoke early in the fire growth, either an ionization or a photoelectric detector will meet most needs.

Several new features are available in smoke detectors today. These include detectors that have an escape light, are portable, or transmit their alarm to a central console by radio signal as part of a unified emergency alert system. These can be used with burglar and other warning or detection devices. Electric current detectors with a rechargeable battery for power outages are also available.

HOW MANY DO I NEED?

There should be at least one smoke detector on every floor of the house. Tests conducted by the National Bureau of Standards have shown that two detectors, on different levels of a two-story home, are twice as likely to provide enough time for escape as one detector. Although the upstairs detector senses smoke wherever it originates, the downstairs unit will react sooner to a fire that could block escape routes on the first floor.

Having two detectors also allows you to select both an ionization type and a photoelectric model, giving you the best capabilities of both. In addition, it lets you select one battery-powered and one plug-in or wired-in model. Neither a battery failure nor a power outage will leave your family unprotected. Finally, two smoke detectors are far less likely to be inoperative at the same time as is possible with a lone detector.

SOURCE

U.S. Consumer Product Safety Commission, What You Should Know About Smoke Detectors (January 1985).

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