Smoke Detectors

Here are some facts and common questions frequently asked about Smoke detectors and the answers to those questions.

Smoke Detector Facts:

Over 93 percent of homes in the U. S. now have at least one smoke detector. As the number of smoke detectors in homes increased over the years, the residential fire death rate has dropped nearly 50 percent. This success story is tempered by the fact that the number of inoperable smoke detectors is growing. Experts warn that the trend to fewer fire deaths will reverse if we do not solve the problem of inoperable smoke detectors. They estimate that one in three homes have an inoperable smoke detector. Some fire departments have found units in one half of homes to be disabled.

How often and how should I clean my smoke detector?

You should clean your smoke detector every six months with the bristle attachment on you vacuum.

How often should I change the battery in my smoke detector?

You should change the battery twice a year; "Change your battery when you change your clocks" is the recommended interval.

What if my smoke detector "chirps"?

People often mistake the low-battery signal for a nuisance alarm. When the battery is getting low, smoke detectors are designed to "chirp" every minute or so while the battery still has enough power to warn you that it is about to stop working. The "chirp" is distinctive because it is a single, very short sound that occurs every minute or so. If your smoke alarm does this intermittently, first replace the battery to see if that solves the problem. If not, then the unit needs replacement due to old age or needs cleaning.

How effective are smoke detectors?

Residential fire deaths have decreased steadily as the number of homes with smoke detectors increased. Reports from the National Fire Protection Association show that people have nearly a 50 percent better chance of surviving a fire if their home has the recommended number of smoke detectors.

Are there places where I should NOT put a smoke detector?

Smoke detectors are not designed to work in extreme heat or cold, or in areas where smoke and dust are common. Thus, they are not recommended for unheated attics or similar spaces. The manufacturers instructions will include the temperature range that the unit is designed for. Smoke detectors should not be used in garages for two reasons. First, garages are usually not heated or cooled, and thus are sometimes above or below the temperature range that the unit was designed for. Second, the smoke from engine exhaust fumes will cause nuisance alarms and clog the smoke detector. Another area of concern is the kitchen. A smoke detector that is installed too close to cooking appliances may result in nuisance alarms. NFPA 72 addresses this problem by requiring that when a smoke detector is installed within 20 feet of cooking, it should either be photoelectric or have a silencing button.

How many smoke detectors should I have?

All but the smallest home or apartment needs more than one. The exact number depends on two things, the number of levels in the home and the number of bedrooms. The following recommendations are based on a standard published by the National Fire Protection Association (NFPA 72), which contains a chapter on household fire alarms. For new homes, the standard requires a smoke detector in each bedroom, one outside the bedroom area that is close enough to be heard through closed doors, and a minimum of one on each level of the home. The objective of having a smoke detector outside the bedroom area is to alert sleeping occupants of a fire that starts outside of the bedrooms. For this reason, if the bedrooms in a home are located in different areas, then each area should have its own smoke detector. If a home is large, it is better to use more than one on each level. The closer the smoke alarm is to the fire source the faster it will work, so extra units give you more safety.

The requirements for existing homes are not as stringent. The State of Illinois Statute requires that ALL existing homes, a smoke detector outside the bedroom area and one on each level of the home. However, it also recommends that homeowners install additional smoke alarms, and we recommend that existing homes be equipped with at least the same number of smoke detectors that are required in new homes. It makes sense to install a smoke detector in each bedroom. A good number of fires start in bedrooms, and the closer the smoke detector is to the fire, the faster it will alert you.

Is there more than one type of smoke detector, and how do they differ?

There are two types of smoke detectors designed for homes. One type is called an ionization detector because it uses "ions", or electrically charged particles, to detect smoke in the air. Smoke particles entering the sensing chamber change the electrical balance of the air. The greater the amount of smoke, the higher the electrical imbalance. The horn will sound when the electrical imbalance reaches a preset level. The other type of detector is called photoelectric because its sensing chamber uses a beam of light and a light sensor. The sensing chamber is designed so that the light beam does not strike the sensor, but smoke particles entering the chamber deflect the light onto the sensor. The greater the amount of smoke entering the chamber, the more light will be deflected onto the sensor. The alarm sounds when the amount of light hitting the sensor reaches a preset level.

Is one type better than the other?

Both types can meet the test standards of Underwriters Laboratories, but each has its own advantages. The ionization detector responds faster to small smoke particles, while the photoelectric responds faster to large smoke particles. Flaming fires produce more small smoke particles and smoldering fires produce more large particles.

Fire researchers have learned that a fire that generates a lot of small smoke particles will cause an ionization smoke detector to sound sooner than a photoelectric. The time delay between the two is relatively small, but these types of fires will make the room untenable to life more quickly, so time is of the essence. On the other hand, a fire with a lot of large smoke particles will cause a photoelectric smoke detector to sound sooner than an ionization. In this case the time delay between the two can be relatively long, but these types of fires take longer to make the room untenable to life. If you want the advantages of both, you can install one of each everywhere that a smoke alarm is required or recommended, or you can buy "combination" units that have both sensors.

Because the ionization type detector is sensitive to small smoke particles, it will respond more quickly to cooking. If you experience this problem, you have several options:

- Move the unit farther away from the cooking area. The cooking gases will be more diluted in the air when they reach the smoke detector. If you choose this option, be aware of how air is flowing through the space. You don't want to move it away only to find out that the air current is carrying the cooking gases right to the new location.
- Install a photoelectric smoke detector. You lose some warning time in a fire that generates smaller smoke particles, but you gain by removing the one nuisance that results in a lot of smoke detectors being disabled.

- Install a combination ionization/photoelectric detector. When the two sensors are combined in one unit, the ionization sensor is set at a slightly less sensitive level. Thus the unit is less prone to nuisance alarms and you have a unit with greater sensitivity to both fast-flaming and slow smoldering fires.
- Install an ionization smoke detector that has a hush button. This allows you to silence the unit for 15 minutes while you remove the source of the nuisance alarm (e.g., burnt toast) and clear the air. This is not as convenient as options 2 or 3, but it will work as long as you can reach the button and don't get aggravated enough to remove the battery.

My smoke alarm goes off when I cook. How can I stop this?

Ionization-type smoke detectors are more sensitive to cooking smoke and gases than the photoelectric type. Although you cannot see any smoke, the combustion from the flame is causing "products of combustion" to be released. When these particles are under one micron in size, they cannot be seen with the naked eye; when they are larger than one micron, these "products of combustion" become visible smoke. Although the small particles are too small to be seen, they will change the electrical balance in the ionization-sensing chamber, thus making the smoke detector operate. There are several options for handling this problem. One way is to replace the ionization alarm with one that has a "silence button" that quiets it for a few minutes.

Another option is to move the alarm farther away from the cooking area, giving the particles a chance to dissipate; The fewer particles per volume of air, the less likely they are to cause the imbalance in the sensing chamber. If the smoke detector is ceiling-mounted, moving it to a wall can also reduce nuisance alarms. However, this will also make it a little slower to respond to a real fire. If you do this, make sure to follow the manufacturers instructions for the correct height. If you misplaced your instructions, stop in at a hardware store and review the instructions in one of the smoke detector boxes.

Another option is to replace the ionization-type detector with a photoelectric alarm. This alarm is less sensitive to the smaller (sub-micron) smoke particles and thus is less affected by cooking smoke. You can also select a combination ionization/photoelectric detector (both sensors in one unit). It will be less sensitive to cooking and will respond faster to smoldering fires than ionization units. The reason that it is less sensitive to cooking is because the manufacturer can make the ionization sensor less sensitive when a photoelectric sensor is also present.

How can I test my smoke detector?

Every smoke detector comes with a test button. We recommend that people test their alarms regularly, at least once a month.