

# SMOKE ALARMS

## Q & A

**Q: What is the principal reason for smoke alarms not functioning?**

**A:** Over a recent three year period, an analysis was undertaken of people that died in homes where smoke alarms were present but did not work. 85% of those victims did not have a functioning smoke alarm because of a dead or missing battery/power source.

**Q: What types of smoke alarms are available on the market?**

**A:** There are two types of household smoke alarms in common use. These are known as ionization or photoelectric type smoke alarms.

**Q: How does an ionization type smoke alarm work?**

**A:** This type of alarm uses a small amount of radioactive material to ionize air in the sensing chamber. As a result, the air chamber becomes conductive permitting current to flow between two charged electrodes. When smoke particles enter the chamber, the conductivity of the chamber air decreases. When this reduction in conductivity is reduced to a predetermined level, the alarm is set off. Most smoke alarms in use are of this type.

**Q: How does a photoelectric type smoke alarm work?**

**A:** A photoelectric type smoke alarm consists of a light emitting diode and a light sensitive sensor in the sensing chamber. The presence of suspended smoke particles in the chamber scatters the light beam. This scattered light is detected and sets off the alarm.

**Q: Which type of alarm is more effective?**

**A:** There is no simple answer to this question. The two types operate on different principles and therefore may respond differently to various conditions. Some advantages to each type are set out below:

**Ionization**

- Fastest type to respond to flaming fires
- Lowest cost and most commonly sold
- Some models have a hush or temporary silence feature that allows silencing without removing the battery
- Some models are available with a long life battery

**Photoelectric**

- Fastest type to respond to slow smouldering fires and white or gray smoke
- Less prone to nuisance alarms from cooking



Notwithstanding these differences, to achieve ULC listing, both alarms must be tested to the same standard and meet the same requirements. Photoelectric smoke alarms may respond slightly faster to smoldering fires, while ionization alarms respond slightly faster to flaming fires. Since you can't predict the type of fire that will occur, it is difficult to recommend which is best. Both alarms will detect all types of fires that commonly occur in the home. Installing both types of smoke alarms in your home can enhance fire safety.

**Q: Which type of smoke alarm should a homeowner purchase?**

**A:** It is the consumer's responsibility to assess the circumstances of their household and to select the most appropriate alarm. However, an important consideration in the purchase of a smoke alarm is conformance to a recognized standard. In British Columbia, CAN/ULC-S531 is the recognized standard for both the ionization and photoelectric types of alarms. Both ionization and photoelectric type products conforming to this standard are available on the market. A homeowner will know that a smoke alarm meets the requirements of this standard by the ULC or cUL label on the device.

**Q: What maintenance is required for smoke alarms?**

**A:** The British Columbia Fire Code requires that smoke alarms be maintained in operating condition at all times. Smoke alarms should be maintained in accordance with the manufacturer's instructions. Occasional light vacuuming will keep the air vents clean. On battery powered units, check to see that the battery is in place, connected, not corroded and functioning. Although the test frequency is not prescribed in the British Columbia Fire Code, smoke alarms should be tested on a regular basis. Some manufacturers and authorities recommend that smoke alarms be tested at least once a month. Additional information on smoke alarm maintenance, particularly in rental accommodation, is available in the OFM guideline "Maintenance of Smoke Alarms."

**Q: How many smoke alarms should I have in my home?**

**A:** The British Columbia Fire Code requires a smoke alarm that meets CAN/ULC-S531 between each sleeping area and the remainder of the building. The Office of the Fire Marshal recommends that homeowners install one smoke alarm on every level of their home and outside all sleeping areas. For maximum protection, we suggest installing a smoke alarm in every room.

**Q: How should they be installed?**

**A:** Smoke alarms should be installed according to the manufacturer's instructions.

**Q: What are the features I can expect to find on a current smoke alarm model?**

**A:** These are some features you can expect to find:

- a "missing battery" indicator,
- an optional alarm hush or silence feature,
- the use of a power "on" indicator light to show that ac power is being supplied to 120 volt wired in smoke alarms.

**Q: Studies suggest that a significant percentage of smoke alarms in use do not work because of dead or missing batteries. What is being done about this problem?**

**A:** The OFM and the British Columbia fire service have been stressing the importance of smoke alarm maintenance through various public education initiatives. This effort is now backed by requirements in the British Columbia Fire Code which mandate smoke alarm maintenance. The Standard for Smoke Alarms

has also been amended and now requires smoke alarms to have a visual indicator to flag a missing battery, for example, the inability to close the smoke alarm cover when a battery is removed. Nuisance alarms are a frequent reason for removing batteries. As a result, the use of smoke alarms with a hush or silence feature is being promoted in public safety programs. In addition, smoke alarms with long life batteries are now available on the market.

**Q: What are long life smoke alarms?**

**A:** Long life smoke alarms have been designed to use lithium batteries where the battery life is predicted to last 10 years with the normal low battery drain of ionization type smoke alarms. The smoke alarms are still designed to provide a low battery audible signal as the battery charge is reduced to a level that may make the smoke alarm inoperable. It should be noted that although these batteries are designed to last 10 years, ongoing testing and maintenance is required as per manufacturers' instructions.

**Q: Can long life lithium batteries be used in any smoke alarm?**

**A: No.** Only battery types recommended by the manufacturer should be used in a smoke alarm. Incorrect batteries may not provide the operating characteristics expected of the smoke alarm.

**Q: How often should a smoke alarm be replaced?**

**A:** As a rule of thumb, the Office of the Fire Marshal recommends replacing smoke alarms every 10 years or when it has exceeded the manufacturer's recommended life cycle. Additional information for recommended smoke alarm replacement is available in the OFM guideline "Maintenance of Smoke Alarms."

**Q: How can I be sure that my smoke alarms will work?**

**A:** We have every reason to believe that alarms listed by a certification agency accredited by the Standards Council of Canada will function as intended. To ensure that an alarm has been manufactured and tested to an acceptable standard, there should be a marking by the Underwriters Laboratories of Canada (ULC), or Underwriters Laboratories Incorporated (UL).