

Your chances of dying in a home fire may be reduced by 50 per cent if a working smoke alarm is present in your home. Smoke alarms, when properly installed, tested and maintained, provide an early warning of smoke and fire danger, which helps increase your chance of escape and/or your chance of putting out a fire.

The Facts

- Most fire deaths happen in homes, especially at night when people are asleep. People, who die from home fires, often die from breathing the smoke and toxic gases from the fire—not from being burned by flames. These poisonous gases, including carbon monoxide, can render a person confused and disoriented or even unconscious after only a few short breaths. These toxic effects may overcome you long before you have time to orient yourself to get out of your own home. If you are asleep and breathe poisonous gases, you may never be able to wake up in time to escape the fire danger.
- Once a fire starts it can spread rapidly. In as little as three minutes, a small fire can erupt into a 'flashover' (when a room gets so hot everything that can burn suddenly bursts into flames). Three minutes isn't a lot of time to notice the fire danger, round up your family, identify a safe escape route, and escape from your home. Every second counts in a fire emergency.

It's the Law

Smoke Alarms are mandatory in all homes and sleeping rooms.

- Under the British Columbia Fire Code, **all** dwelling units and sleeping rooms not within dwelling units are required to be protected by a smoke alarm.
 - A dwelling unit includes any building or part of a building operating as a housekeeping suite, used or intended to be used as a domicile where one or more persons might sleep, eat and/or cook. This includes all types of homes.
 - A sleeping room not within a dwelling unit provides transient accommodation, such as a hotel room and a recreational cabin.

Homes

- All dwelling units are required to have working smoke alarms.
- Dwelling units constructed before the British Columbia Building Code required smoke alarms in 1979 are also required to have a smoke alarm. Smoke alarms should be located between the living and sleeping area or in the hallway of the sleeping area if one exists. Multi level or larger homes may require additional smoke alarms for complete coverage for all sleeping areas.
- Smoke alarms are permitted to be battery operated in a dwelling unit constructed before the March 31, 1979 British Columbia Building Code inception date or in a building which is not supplied with electrical power.
- Dwelling units constructed after the 1979 inception date require the smoke alarm(s) to be wired permanently to the home's electrical system, and on each level of the home, including a smoke alarm located between the living and sleeping area or in the hallway of the sleeping area if a hallway exists. Smoke alarms are required to be interconnected in multi-level or larger homes that require additional smoke alarms for complete coverage.

- Existing smoke alarms that are hardwired to an electrical circuit, as required above, can NOT be replaced with a battery operated smoke alarm. Any replacement must be of a type comparable to the original or better.
- Smoke alarms installed 'in addition' to the requirements above are permitted to be battery operated.
- Dwelling units undergoing renovation may be subject to further requirements, such as the installation of additional interconnected smoke alarms, hardwired to an electrical circuit. Contact your local building/fire officials regarding renovation requirements.

Landlords

- It is the responsibility of the landlord to install smoke alarms as required by the year of construction (above) and test them to ensure they are in working order prior to tenant occupancy. The landlord is also required to maintain the smoke alarm in working condition.

Tenants

Landlords are responsible for testing and maintaining smoke alarms in their units. This may include regular testing, vacuuming units to remove dust and replacing batteries (if applicable) when required. Defective units should be immediately reported to the landlord. In the event that there is a defective smoke alarm, the tenant should consider installing their own temporary battery operated smoke alarm to keep themselves safe.

Sleeping Rooms

Sleeping rooms in hotels are typically supplied with electrical power, usually equipped with hardwired smoke alarms, and monitored by maintenance staff. However, seasonally occupied cabins are likely not provided with electrical power or monitoring. Smoke alarms installed in cabins that are left for many months may not be in proper working condition, due to moisture, insects or dead battery. Be sure to test the existing smoke alarm or install a new smoke alarm when reoccupying your cabin.

Types of Smoke Alarms

There are two basic kinds of smoke alarms: ionization and photoelectric. Each senses smoke by a different principle of operation.

Ionization

- The smoke chamber in an ionization alarm emits a small amount of radiation that ionizes the air within the smoke chamber. This ionization process creates a weak electrical current that is sensed by the detector's circuit. When tiny particles of smoke drift into the chamber, the particles reduce the electrical current flow, which triggers the circuit and turns on the alarm.
 - The ionization process allows detection of very small or even invisible particles of smoke. Hot blazing fires produce smaller, more invisible smoke particles.
 - The ionization type of smoke detector is generally better at detecting fast, flaming fires that burn combustible materials rapidly and spread quickly. Sources could include paper burning in a waste basket or a grease fire in the kitchen. These kinds of fires account for 70% of home fires

- Ionization smoke alarms are considered to be more prone to nuisance alarms as they are more sensitive to humidity, dust and vapours.

Photoelectric

- When smoke enters the chamber in a photoelectric alarm, light from a small lamp in the device is interrupted and scattered. The scattered light falls onto a photosensitive cell, which creates a small electrical current. When enough particles enter and scatter light on the photosensitive cell the circuit will trigger the alarm.
- The photoelectric process responds to larger, more visible particles as these particles reflect light more efficiently. Cooler, smouldering fires produce more of these large particles than hot blazing fires.
- The photoelectric type of smoke detector is generally better suited for detecting slow-burning fires. These fires may smoulder for hours before they burst into flames and are caused by such things as cigarettes burning in couches or bedding. These kinds of fires make up 30% of home fires.
- Photoelectric alarms are considered to be less prone to nuisance alarms.

Ionization or Photoelectric: Which Type of Smoke Alarm is Better?

- Either type of alarm is considered to be equally effective in the home. Many household fires produce detectable amounts of both visible and invisible smoke.
- Either alarm should provide suitable warning for a safe escape from a fire emergency.
- Nevertheless, to cover all possibilities you may want to install one of each type of smoke alarm.

Smoke Alarms for the Hearing Impaired

- Alerting Devices for the hearing impaired notify individuals of a smoke or fire danger by transmitting a warning signal that can be seen, in the form of strobe light flashes, and/or felt, in the form of vibrations on watches and body receivers as well as beds.
- These devices are activated when a signal is sent from the 'horn sound' of a smoke alarm to a central receiving unit, which transmits the alternative signal. This signal can be sent by wire or by radio waves.

Vocal Smoke Alarms

A new item on the market that is generating interest is the 'Vocal Smoke Alarm'. This device enables parents to record a personalized fire escape warning message, which will allow them to give their children directions in their voice during a fire emergency.

These devices must comply with the Canadian Standards for smoke alarms. Always check the certification label when choosing these, and other smoke alarms.

Smoke Alarm Features

Smoke alarms are available in basic' models and are also available with a variety of options, such as the following:

- a low battery indicator

- an optional alarm hush feature to silence the alarm
- a power 'on' indicator light to show that power is being supplied to the unit
- dual sensor units – ionization and photoelectric
- sealed long life battery
- tamper resistance
- a combination hardwired/battery back-up units
- a remote control to silence the alarm from a distance
- wireless and interconnected smoke alarms that all sound at once and are battery powered

How are Smoke Alarms Powered and Installed?

Smoke alarms are powered two ways – batteries or hardwired into the household electrical circuit.

Battery Operated

- Are the easiest and cheapest to install.
- Can be moved and/or placed in any location.
- Batteries need to be present and replaced at least once a year.

Plug-In

- Can be directly plugged in to a standard household electrical outlet.
- Usually located in an easy to see and reach area, which can provide easy access for testing and resetting, but also allows for easy tampering.
- Requires no annual battery replacement. If choosing this type of smoke alarm be sure that it has the battery back-up feature in case of power outage.

Hardwired

- Are wired permanently into your home's electrical circuit.
- Installation can be complicated and/or expensive as the electrical work must comply with the British Columbia Electrical Code and may require installation by a licensed electrician.
- Location may be less flexible.
- Household electricity is a more reliable power source. They are less prone to have their power source disconnected or removed. However, in the event of a power failure, smoke alarms that do not have a battery back-up will become inoperable. If choosing this type of smoke alarm be sure it has the battery back-up feature in case of power failure.
- Hardwired smoke alarms can usually be interconnected so that every smoke alarm sounds regardless of the location of the fire. This is an advantage in early warning as it gives occupants extra time to escape if they are in one part of the home and a fire breaks out in another part. Interconnected smoke alarms have been required by the British Columbia Building Code since 1979 for homes requiring more than one smoke alarm.

Lithium Powered

- The use of lithium power cells/batteries allows smoke alarms to function for 10 years without battery replacement. After 10 years the smoke alarm 'chirps' to notify the owner that the unit

must be replaced. This 10-year replacement requirement is in line with NFPA's 10 year smoke alarm replacement recommendation.

- Lithium powered batteries cannot be removed from their current smoke alarm or used in any other device. This prevents owners from 'borrowing' batteries and forgetting to replace them.

Battery or Electric Current: Which Power Source is Better?

- Either power source is acceptable. However, hardwired or lithium powered smoke alarms are recommended as they are less prone to be tampered with or have their power source disconnected or removed.

Buying Smoke Alarms

Several brands and types of smoke alarms are readily available in hardware, department, and discount stores. Be sure that the smoke alarm(s) you buy; despite brand, type or power source; meet the Canadian Standards and have been certified, listed and labelled by an independent testing laboratory, such as Underwriters Laboratories of Canada (ULC), Underwriters Laboratories (cUL) or the Canadian Standards Association (CSA).

Smoke Alarm Placement - Requirements and Recommendations

- Follow manufacturer's instructions on the proper installation of smoke alarms.
- Install at least one smoke alarm on every level of your home; including the basement (avoid areas that are not insulated such as unfinished attics).
- Locate a smoke alarm outside of each bedroom or sleeping area in your home. Consider installing a smoke alarm inside a bedroom if the occupant sleeps with the bedroom door closed.
- On floors without bedrooms, install the smoke alarm in or near each living area such as dens, living rooms or family rooms.
- Remember to place smoke alarms near the bottom of all stairways that travel to upper floors.
- Do not install a smoke alarm near a window or air register where drafts can reduce the smoke alarms operation and sensitivity.
- Because smoke rises, each smoke alarm should be mounted high on a wall or ceiling. For a wall-mounted unit, the top of the smoke alarm should be placed at least ten centimetres (4 in) from the ceiling. A ceiling mounted smoke alarm should be placed ten centimetres (4 in) from any wall.

How to Ensure Reliable Operation of Your Smoke Alarm

Studies show that more than 60 per cent of fire deaths and injuries occur in homes with inoperable smoke alarm(s). Therefore, regular maintenance and testing of your smoke alarm(s) is essential.

Maintenance

- Replace the batteries in your smoke alarms once a year, or as soon as the smoke alarm 'chirps' warning that the battery is low. **Helpful hint:** schedule battery replacements for the same day you change your clock from daylight to standard time in the fall.

- Smoke alarms don't last forever. Replace your smoke alarms once every 10 years whether they are battery powered or wired into your home's electrical system.
- Never borrow a battery from a smoke alarm. Smoke alarms can't warn you of fire if their batteries are dead, missing or have been removed for other purposes.
- Regular vacuuming of your smoke alarm can help keep it working properly. Follow manufacturer's instructions for cleaning directions. Dirt, dust, and cobwebs can lead to a nuisance alarm or cause the smoke alarm to malfunction in a fire emergency.
- Don't disable smoke alarms even temporarily—you may forget to replace the battery. If your smoke alarm is sounding nuisance alarms, it may need vacuuming. If that doesn't work, try relocating it further away from kitchens and bathrooms, where cooking fumes and steam can trigger the smoke alarm to sound.
- Don't paint your smoke alarms. Paint, stickers or other decorations could inhibit them from working properly.

Testing

- Test your smoke alarms at least once a month. Regular testing will help discover a malfunction as well as dead or missing batteries.
- When testing your smoke alarm, you are checking for two things: ensure that power is being transmitted to the smoke alarm, and that it will activate in the presence of smoke.
- Test your smoke alarm(s) by following the manufacturer's directions, which may include; using the test button, smoke, or an approved smoke substitute.
- Never use an open-flame to test the smoke alarm as you could burn yourself or start a fire.

If Your Smoke Alarm Does Not Sound

- The battery may be dead. Replace the battery immediately.
- There may be no electricity energizing the device. Check the fuse box/breaker panel or contact an electrician.
- The smoke alarm may be past its useful 10-year life. Replace the smoke alarm immediately.

What to do when the Smoke Alarm Sounds

- Being awakened by the sound of an activated smoke alarm can leave you frightened and disoriented in a fire emergency. But, if you've planned and practiced for a fire emergency, your familiarity with your escape plan will guide you out of the danger despite your reactions to the emergency.
- Make sure everyone in your home can hear and recognize the sound of the smoke alarm and knows how to react immediately. If someone in your home can not hear or awaken to the smoke alarm, ensure that someone is assigned to assist them in a fire emergency.
- Plan regular fire drills (twice a year is best) to ensure that everyone knows exactly what to do when the smoke alarm sounds. Ensure two ways out of every room and establish primary and secondary meeting places outside the home.

Avoiding Nuisance Alarms

Nuisance alarms may be caused by the following:

- **Improper location** - installing a smoke alarm in the kitchen or other high smoke or steam production area may induce activation of the smoke alarm.
- **Wear and tear** - a smoke alarm may wear out, regardless of type or quality. After 10 years of age, it is highly recommended that the smoke alarm be replaced.
- **Poor maintenance** - nuisance alarms can be heightened in dirty or greasy environments. Dirt will often collect in the smoke alarm, making it dirty and more sensitive to activation.
- **Early Installation** - if smoke alarms are installed too early during the construction or renovation of a home or building, the alarm may become contaminated, dirty, clogged or inactive.

Some solutions to these problems may be to relocate the existing smoke alarm a short distance away, gently vacuum the inside of the unit as per manufacturer's directions or replace the smoke alarm with a new unit with a hush feature. When in hush mode, the smoke alarm stays silently armed so you can clear the air while still staying safe should a real fire break out.

Sprinklers and Smoke Alarms

- Sprinklers and smoke alarms together further helps reduce your risk of being injured or dying in a home fire. If you are building a new home or remodelling your existing home, consider installing an automatic home fire sprinkler system.

For more information

Contact the Office of the Fire Commissioner at 250-356-9000 Toll Free 1-888-988-9488
<http://www.pssg.gov.bc.ca/firecom/>.

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