

Smoke Alarms

Your chances of dying in a home fire may be significantly reduced 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 can increase your chance of escape.

The Facts

- Most fire deaths in Alberta 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 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. Home fires can double in size every 30 seconds. Seconds count in a fire emergency.

It’s the Law

The Alberta Fire Code requires **all** homes in the province to have working smoke alarms.

Homes

- All homes constructed prior to July 5, 1977 are required to have a smoke alarm, which is to be located between the living and sleeping area or in the hallway of the sleeping area if one exists. The required smoke alarm may be battery operated.
- All homes constructed between July 5, 1977 and 1997 must contain at least one smoke alarm. This smoke alarm must be wired permanently to the home’s electrical system and must be located between the living and sleeping area or in the hallway of the sleeping area if one exists. Where there is more than one hardwired alarm, the alarms must be interconnected such that all alarms sound when one is triggered. Multi level or larger homes may require additional smoke alarms for complete coverage.
- All homes constructed after 1997 require hardwired and interconnected smoke alarms on each storey of the home, including one located between the living and sleeping area or in the hallway of the sleeping area if one exists.
- Redevelopment of existing dwelling units may require the installation of additional smoke alarms that may have to be wired permanently to the home’s electrical system. Contact your Building Safety Codes Officer for an interpretation of these redevelopment requirements.

Smoke Alarms

- Homes that have 'existing' smoke alarms hardwired to an electrical circuit, as required above, can NOT be replaced with a battery operated alarm. Any replacement must be of a type comparable to the original or better.
- Alarms installed 'in addition' to the requirements above are permitted to be battery operated.

Rental properties

- It is the responsibility of the owner or the authorized agent to ensure that smoke alarms are installed, tested and cleaned prior to occupancy. Upon occupancy, it is the renter's responsibility to test and maintain the smoke alarm in good working condition. This includes dusting units and replacing batteries when they are due. Faulty units should be immediately reported to the landlord. This does not apply to hotels or motels, which must maintain their fire alarm systems, including smoke alarms, on a regular basis.

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. Fast flaming fires produce smaller, more invisible smoke particles. Therefore, ionization alarms respond quicker to open, flaming fires.
 - In an ionization alarm, humidity, dust, vapours, cooking activities and air velocity can set off a nuisance alarm.

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 fast flaming fires. Therefore, photoelectric alarms are more likely to sound the alarm quicker when a fire is in the smouldering stage.
 - Photoelectric alarms are also less prone to sound nuisance alarms due to cooking activities, and are recommended for installation near kitchens.

Ionization or photoelectric: Which type of smoke alarm is better?

- Either type of alarm is equally effective in the home. Many household fires produce detectable amounts of both visible and invisible smoke.

For more information, please contact the Alberta Emergency Management Agency at (780) 422-9000 (dial 310-000 for toll-free access outside of Edmonton) or visit www.aema.alberta.ca

Last updated/reviewed June 15, 2009

Smoke Alarms

- Either detector will 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 as recommended by the National Fire Protection Association. Dual Ionization/Photoelectric alarms, which combine both technologies in one alarm, are also available.

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.
- An alternative smoke alarm device, “The Scent of Life”, releases a pungent aerosol spray while it emits a strobe light flash.
- 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 on a wire or by radio waves.

Smoke alarm features

Smoke Alarms are available in “basic” models and are also available with a variety of options, such as the following:

- 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 the unit
- Dual sensor units with both a photoelectric sensor that protects best against slow, smouldering fires and an ionization sensor that protects best against fast, flaming fires.
- Sealed long life battery units
- End of life notification
- Tamper-proof alarms
- Combination hardwired/battery back up units
- There are more technologically advanced models of smoke alarms in the market today. For example, there are wireless interconnected smoke alarms that save costly rewiring. These new alarms, which are battery-operated, are connected by radio frequency, which means that when one alarm sounds, the others in the home will go off, as well.
- Available in the market in recent years are the ‘Talking Combination Smoke/CO Alarms’ which have pre-recorded voice messages with sounding alarm to identify different dangers. These alarms carry the cUL and CSA label, which means they are evaluated to Canadian safety requirements, and therefore meet the requirements of the Alberta building and fire codes.

Smoke Alarms

How are smoke alarms powered and installed?

Smoke Alarms are powered two ways – batteries or household electric current.

Battery Operated

- Are the easiest and least expensive to install. The alarms use adhesives, fasteners, or screws to mount to walls or ceilings.
- Can be moved and/or replaced in any location.
- Batteries need to be present and replaced at least once a year, or as needed, in order to continue operation of the alarm.

Hardwired

- Can be wired permanently into your home's electrical system.
- Installation can be complicated and/or expensive as they should be installed by a licensed electrician.
- Location is 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, these alarms will become inoperable and require a battery back up.
- Can be interconnected so that every alarm sounds regardless of the fire's location. 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.

Lithium Powered

- The use of lithium power cells/batteries allows smoke alarms to function for 10 years without battery replacement. After 10 years the alarm will “chirp” 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, wired 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 of alarms are available in hardware and department stores. Be sure that the smoke alarms you buy; despite brand, type or power source; have been tested and labelled by an independent testing laboratory such as Underwriters Laboratories of Canada (cUL) which means the product is certified for the Canadian market, and to the applicable Canadian standard.

For more information, please contact the Alberta Emergency Management Agency at (780) 422-9000 (dial 310-000 for toll-free access outside of Edmonton) or visit www.aema.alberta.ca

Last updated/reviewed June 15, 2009

Smoke Alarms

Location and placement of smoke alarms

- 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 (but not in unfinished attics).
- Locate a smoke alarm outside of each bedroom or sleeping area in your home. If you close your bedroom doors at night, installing a smoke alarm inside each bedroom is recommended for added protection. This enables early warning of smoke and fire danger if a fire starts inside a bedroom during sleeping hours. Installing an additional smoke alarm in bedrooms is also important if there are smokers in your home.
- 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.
- Smoke alarms are not recommended in kitchens, garages, or bathrooms as dust, steam, exhaust, and cooking fumes can set off a false alarm. You may want to install heat detectors in these areas instead.
- Do not install an alarm near a window or air register where drafts can reduce the alarm operation and sensitivity.
- Because smoke rises, each alarm should be mounted high on a wall or ceiling. For a wall-mounted unit, the top of the alarm should be placed at least ten centimetres from the ceiling. A ceiling mounted alarm should be placed ten centimetres from any wall.

How to ensure reliable operation of your smoke alarm

A large proportion of fire deaths and injuries occur in homes with an inoperable smoke alarm. Therefore, regular maintenance and testing of your smoke alarms is advisable.

Maintenance

- Replace the batteries in your smoke alarms once a year, or as soon as the 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.
- 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.
- 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 dusting or vacuuming. If that doesn't work, try relocating it further away from kitchens and bathrooms, where cooking fumes and steam can trigger the alarm to sound.

Smoke Alarms

- Regular vacuuming or dusting 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 false alarm or cause the alarm to malfunction in a fire emergency.
- Don't paint your smoke alarms. Paint, stickers or other decorations could keep them from working properly.

Testing

- Test your smoke alarms at least once a month. Regular testing will help discover alarm failures 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 alarm, and that it will activate in the presence of smoke.
- Test your smoke alarm units by using the test button or an approved smoke substitute.
- Never use an open-flame to test the alarm as you could burn yourself or start a fire.

What to do when the alarm sounds

- Being awakened by a 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 alarm and knows how to react immediately. If a person in your home can not hear or awaken to the smoke alarm, ensure that someone is assigned to assist them in a fire emergency.
- As children can be 'deep sleepers', they can sleep through smoke alarms. Parents/caregivers should never assume young children will be woken by smoke alarm activation. Children under the age of 9 experience the deepest sleep of all groups studied. Children under 5 make up about 7% of the population, but account for 12% of home fire deaths, almost twice that of the general population, therefore it is important to designate someone to assist them in the event of a fire. Parents or adult caregivers have a vital role and responsibility in waking up children and teenagers to the sound of smoke alarms.
- 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 a meeting place outside the home.
- If you are building a new home or remodelling your existing home, consider installing an automatic home fire sprinkler system. Sprinklers and smoke alarms together can cut your risk of dying in a home fire.

If your 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

For more information, please contact the Alberta Emergency Management Agency at (780) 422-9000 (dial 310-000 for toll-free access outside of Edmonton) or visit www.aema.alberta.ca

Last updated/reviewed June 15, 2009

Smoke Alarms

- The smoke alarm may be dead. Replace the alarm immediately.

Avoiding nuisance alarms

Nuisance alarms are caused by non-threatening smoke or smoke-like stimuli, including cigarette smoke, the smoke from burnt toast, and steam. Since a properly operating system could include such stimuli in its sensing scope, they aren't false alarms, but they are nuisance alarms because the warning the alarms provide isn't needed.

Nuisance alarms may be caused by the following:

- **Improper location.** Installing an alarm in the kitchen or other high smoke or steam area will induce a nuisance activation of the alarm.
- **Wear and tear.** A smoke alarm may wear out, regardless of type or quality. After 10 years of age, the failure rate can increase significantly.
- **Poor maintenance.** Nuisance alarms can be heightened in dirty or greasy environments. Dirt, insects, and pet dander, among other household pollutants, can often collect in the alarm, making it dirty and more sensitive to activation.
- **Early Installation.** If alarms are installed too early during the construction or renovation of a home or building the alarm may become contaminated, dirty, clogged or inactive.

Smoke alarms should not be disabled to avoid nuisance alarms. Some solutions to nuisance alarms may be to relocate the existing alarm a short distance away, gently vacuum the unit as per manufacturers directions or replace the alarm with a new one, replace it with a unit that has a 'hush' feature, or replace an ionization type smoke alarm in the kitchen area with a photoelectric type.