

Information for retail and industry.

Smoke Alarms

Selection, installation and maintenance



This booklet is designed to assist fire-related industries and retailers with information and advice for their customers.

For more information, phone 1300 369 003 (for the cost of a local call) or go to the Queensland Fire and Rescue Service website at www.fire.qld.gov.au



**Queensland
Government**

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Introduction

Legislation makes it compulsory for all homes in Queensland to have smoke alarms installed.

The Fire and Rescue Service Act 1990 (sections 104RB – 104 RJ):

- requires homes built before July 1997 to have smoke alarms installed which
 - *comply with Australian Standard AS 3786*
 - *are correctly located (see page 15), and*
- specifies the responsibilities of landlords and tenants for the installation and maintenance of smoke alarms (see pages 16 and 13).

This legislation complements other legislation which requires that all new homes, and substantial renovations to existing homes, have hard-wired smoke alarms installed.

The level of protection against fire increases with the quality, type and number of smoke alarms installed and whether they are free standing smoke alarms or interconnected smoke alarms.

This booklet will assist you to give reliable information to customers to help them choose smoke alarms wisely.

For more information, telephone 1300 369 003 (for the cost of a local call) or go to the Queensland Fire and Rescue Service website at www.fire.qld.gov.au

Only working smoke alarms save lives.

Facts

- Smoke alarms are early fire detection devices that save lives.
- The risk of death from a fire is more than twice as high in homes without smoke alarms when compared to homes with smoke alarms.
- The vast majority of Queensland homes have smoke alarms. However, people still die because their smoke alarms have not been looked after and batteries aren't working or have been removed.
- Each year there are more than 1,250 residential fires in Queensland.

'I've been to jobs ... where someone has died and you think to yourself, 'if only they had a smoke alarm'. (Fire fighter, *The Townsville Bulletin* 21/11/09)

A Sunshine Coast mother said a smoke alarm helped save her son's life when their Mooloolaba home was destroyed by fire last night... Ms P. said checking smoke alarms were working correctly was essential ... it helped save her son's life. (*The Courier Mail* 29/11/08)

Four fires, five days...in a devastating week (on the) Sunshine Coast...
'The smoke alarm alerted her .. – it was a damn good thing'
(Husband, *Sunshine Coast Daily* 02/12/09)

Only working smoke alarms save lives.

'Smoke alarms saved us.'
(*Toowoomba Chronicle* 28/11/09)

A family of four escaped unscathed as a blaze raged through their weatherboard home in the north Brisbane suburb of Nundah this morning...The family was alerted to the fire by smoke alarms...(*The Courier Mail* 01/12/08)

Burning candles have almost cost a ... woman her life – and her home. The woman was woken by a smoke alarm ... (*The Courier Mail* 30/10/09)

(A) family of seven was forced to flee their home after clothes drying around a heater in the living room caught alight...Within a few minutes of the alarm sounding, the whole house was in flames .. the single-storey brick veneer house was damaged so badly it (will) most likely have to be demolished... the family owed their lives to the smoke alarm.'
(*The Courier Mail* 22/07/08)

A house at Howard, 30 km north of Maryborough, was destroyed by fire about 1 am this morning. The home's occupants were awoken by their smoke alarms and escaped the house with no injuries. (*The Courier Mail* 30/10/09)

The house was completely destroyed in the fire which early investigations indicate was started from a candle...The owner told me that by the time she gathered up the kids and came out the front door ... the house was totally up in flames. It goes to show how important it is to have smoke detectors.
(*Queensland Times* 27/11/09)

The toaster caught fire and spread through the kitchen... The entire front of the house was destroyed .. there was also minor damage to the neighbouring property which shares a common wall. There were no working smoke alarms in the house.
(*The Courier Mail* 16/10/08)

Smoke kills

Toxic smoke and fumes kill. In a house fire, flames cause structural damage and smoke is the main danger to people. Smoke poisoning causes the majority of fire-related deaths.

Homes contain many materials, such as foam, wood, wool, nylon and plastics. When burning, these materials release heavy smoke and toxic fumes such as carbon monoxide and cyanide gas. These materials can smoulder for a long time, emitting a lot of smoke and fumes before they burst into flames.

Research indicates that house fires today burn faster and kills quicker than house fires a few decades ago.

Research in the 1970s showed a safe escape time of 17 minutes. This has now decreased to an escape time of just three minutes. The significant drop in escape time is due to the contents of modern homes (such as furnishings) which smoulder, releasing toxic gases, and burn faster and more intently.

If you are asleep when a fire starts, you could suffer from smoke inhalation before you wake up. The combination of toxic smoke and reduced oxygen in the air can make waking more difficult. For these reasons, it is important to have a smoke alarm that detects smoke and alerts you to the danger.

The Queensland Fire and Rescue Service (QFRS) recommends photoelectric smoke alarms (see pages 7-10, 12 and 18).

Fire fighters pulled an unconscious man from his burning unit ...The fire burned a bedroom and a section of the roof and caused heat and smoke damage to the remainder of the unit... There were no working smoke alarms in the unit. *(The Courier Mail 06/05/09)*

A unit at Gympie was engulfed in smoke after oil residue on a stove smoked up about 2 am. The emergency services spokeswoman said there was no fire and the occupants were also woken by their smoke alarms. One person was taken to Gympie General Hospital with smoke inhalation.

(Media and Corporate Communications, Department of Emergency Services 30/10/08)

Types of smoke alarms

There are two main types of smoke alarms - ionisation and photoelectric.

Ionisation smoke alarms

Ionisation smoke alarms 'smell' the smoke and detect invisible particles of combustion (e.g from cooking toast).

Ionisation smoke alarms activate quickly for fast, flaming fires with little visible smoke. Such fires are not common in domestic situations except in the kitchen from cooking. When this occurs, often people are in the kitchen and can turn off the gas or electric stove element, smother the flames with a saucepan lid, fire blanket or bread board, and call Triple Zero (000). Even if no-one is present during a cooking kitchen fire, nearby material often catches fire quickly, giving off smoke, which would activate a photoelectric smoke alarm.

Ionisation smoke alarms take longer to respond to smouldering fires than photoelectric smoke alarms. This longer period of response results in lower visibility from smoke which makes escape more difficult.

If you have an ionisation smoke alarm installed, QFRS recommends that you:

- supplement that existing alarm with a photoelectric smoke alarm, particularly between the sleeping and living areas and between the sleeping areas and exits from your home (such as hallways), and
- replace your ionisation smoke alarm with a photoelectric smoke alarm before the alarm's use-by-date.

Advantages

- Inexpensive.
- Activate quickly with fast flaming fires with little visible smoke.
- Less prone to false alarms caused by dust and steam.

Disadvantages

- Prone to nuisance alarms due to cooking.
- May be slow to respond to slow smouldering fires.
- Contain small amounts of radioactive material.

Photoelectric smoke alarms (recommended for use in homes)

Photoelectric smoke alarms 'see' smoke and detect visible particles of combustion (e.g. smouldering cigarette smoke).

Photoelectric smoke alarms respond to a wide range of fires and are particularly responsive to smouldering fires and dense smoke such as that released by foam filled furnishings or overheated PVC wiring.

Studies show that photoelectric alarms typically respond to smouldering fires within three to five minutes, when the level of smoke is fairly low and escape is relatively easy.

Protection from fires increases with the quality and type of smoke alarms installed. Research shows that photoelectric smoke alarms are generally more effective than ionisation smoke alarms across a wider range of fires experienced in homes.

Photoelectric smoke alarms are recommended by the Queensland Fire and Rescue Service for use in homes.

Advantages

- Respond well to smouldering fires and dense smoke.
- Less prone to cooking nuisance alarms.
- Do not contain radioactive material.
- Suitable for general use.

Disadvantages

- Prone to nuisance alarms from dust and insects. (All smoke alarms should be vacuumed or cleaned with a brush once a month.)
- More expensive than ionised smoke alarms.

Classes of smoke alarms

There are three classes of ionisation and photoelectric smoke alarms, which are classed according to the type of power supply.

A 240 volt (hardwired) smoke alarm is connected to the home's electrical system and has battery back-up power supply such as a long-life lithium or 9 volt short-term battery. 240 volt (hardwired) smoke alarms are available as photoelectric and ionisation alarms.

Advantages

- More reliable than battery operated smoke alarms.
- Early warning – occupants alerted in the shortest possible time.
- Battery backup used if the AC power fails.
- Models can be interconnected – this sounds alarms in all connected units simultaneously.
- May come with a long-life lithium battery which is built-in and tamper proof.
- Power-on indicator.
- Some models have a hush button to stop nuisance alarms.
- Test button to check that the alarm is operating correctly.
- Tested by Scientific Services laboratories (SSL) to comply with AS 3786.
- Some may be purchased with a rechargeable battery, which is non-replaceable.

Disadvantages

- More expensive than other classes of smoke alarms.
- Needs to be installed by a qualified electrician.

The 240 volt photoelectric smoke alarm is highly recommended by the Queensland Fire and Rescue Service for all homes.

Queensland law specifies that hardwired smoke alarms are required to be installed in all properties built since 1 July 1997 and properties significantly renovated since that date (i.e. renovations exceeding 50 per cent of the original building, measured over the roof and the external walls).

A 10-year battery smoke alarm stands alone, is operated by a 9 volt long-life lithium battery, and is available in both photoelectric or ionisation forms.

Advantages

- Easy to install; does not require an electrician.
- The battery lasts for the lifespan of the alarm.
- Test button to check that the alarm is operating correctly.

The Queensland Fire and Rescue Service recommend a 10-year battery photoelectric smoke alarm.

Disadvantages

- Nil.

A 9 volt smoke alarm stands alone and is operated by a 9 volt battery. This basic alarm is available in both photoelectric or ionisation forms. The Queensland Fire and Rescue Service recommends photoelectric alarms.

Advantages

- Easy to install.
- Test button to check that the alarm is operating correctly.
- Low battery indicator.
- Some models have a hush button to stop nuisance alarms.
- Battery missing indicator.
- Tested by Scientific Services Laboratories (SSL) to comply with AS 3786.
- Some models can be interconnected.

Disadvantages

- Battery needs to be replaced regularly. (The Queensland Fire and Rescue Service recommend that the battery be replaced every 12 months on April Fool's Day, or a memorable anniversary.)

Other smoke alarm options

Other options include:

- Specialised alarms for deaf and hearing impaired people.
- Alarms with emergency lights.
- Special smoke alarm models for kitchens.
- Inter-connectable smoke alarm models which sound alarms in all interconnected smoke alarm devices.
- Combination ionisation and photoelectric smoke alarms.

Smoke alarms for deaf and hearing impaired people

For people who can not hear a conventional smoke alarm, there are special smoke alarms which make use of a vibrating pad and/ or a flashing light in addition to the audible warning. These smoke alarms are available from specialist smoke alarm suppliers. For a list of suppliers, go to www.fire.qld.gov.au and type 'deaf and hearing impaired' in to the search box. Alternatively, telephone the Queensland Fire and Rescue Service on (07) 36351952 or TTY (07) 32749987.

CAN YOU HEAR ME?

If you cannot hear a **standard smoke alarm** you may be eligible for **financial assistance** to help buy special smoke alarms designed for **people who are deaf or hearing impaired**.

FOR MORE INFORMATION:
Contact (07) 3635 1952
or visit www.fire.qld.gov.au

Queensland Government

Choosing a smoke alarm

Protection against fire increases with the quality and type of smoke alarm installed.

- 240 volt (hard wired) photoelectric smoke alarms are recommended over battery operated smoke alarms.
- 10-year 9 volt lithium battery operated photoelectric smoke alarms are recommended over one-year 9 volt battery smoke alarms which require a new battery once a year.
- A one-year 9 volt battery operated photoelectric or ionisation smoke alarm is the minimum legal requirement.
- The Queensland Fire and Rescue Service recommend photoelectric smoke alarms.
- Select smoke alarm models that display either the **Australian Standard (AS)** or **Scientific Services Laboratory (SSL)** symbols.



“It’s so easy to lose track of the years and not realise your smoke alarm is too old to be relying on.”

Maintaining a smoke alarm

- **Clean** smoke alarms with a vacuum cleaner or a soft brush once a month to remove dust, insects and cobwebs.
- **Test** smoke alarms every month, following the manufacturer’s instructions.
- **Record** the use-by-date of the smoke alarm in indelible ink near the battery.
- **Replace** the entire smoke alarm before or by the use-by-date.
- **Never paint** a smoke alarm.
- **240 volt (hardwired) smoke alarm** – do not replace the supplied battery back up with a different type of battery. In particular, do not replace a zinc carbon or alkaline battery with a non-rechargeable lithium battery. Using incorrect batteries can deteriorate the performance of the smoke alarm. An explosion will occur if a non-rechargeable lithium battery is subject to a charging current in a 240-volt device.
- **10-year lithium battery** – some models come with a pre-installed 10-year lithium battery which will last for the life of the smoke alarm. The entire smoke alarm unit needs to be replaced before or by the use-by-date.
- **12-month 9 volt batteries** – need to be changed at least once a year. Change batteries on April Fool’s Day or a memorable anniversary.



Old smoke alarms take longer to respond to smoke, or may not respond at all, reducing critical escape time from a house fire. (The Courier Mail 23/02/09)

How many smoke alarms are required?

Legally required minimum

The minimum legal requirement is that:

- A smoke alarm be installed on or near the ceiling on each storey of a residence
- Between bedrooms and living areas
- On a storey not containing bedrooms but on the most likely evacuation route from the storey.

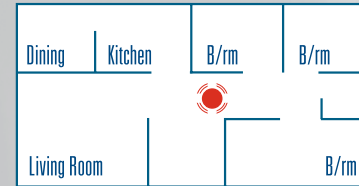
Queensland Fire and Rescue Service additional recommendations

In addition to the legal minimum requirements, the Queensland Fire and Rescue Service recommends that:

- In single dwellings, smoke alarms be installed in all sleeping areas and along all paths of travel between sleeping areas and exits to the open air.
- In buildings containing two or more separate dwellings, smoke alarms be located in all sleeping areas and in all paths of travel between sleeping areas and exits to common corridors.
- In multi-level dwellings, smoke alarms be located in the path of travel between each level as well as in all sleeping areas and in all paths of travel between sleeping areas and exits to common corridors.

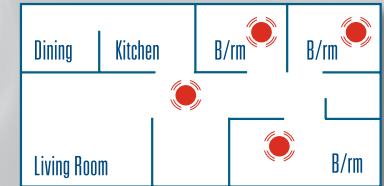
Ideal smoke alarm locations

Between the bedrooms and the rest of the house.



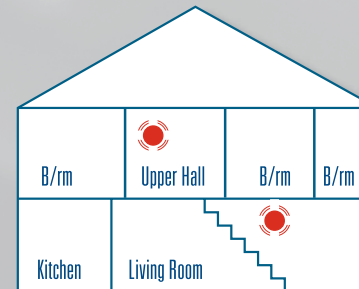
* Minimum by law.

Inside the bedroom if you are a heavy sleeper or if you close the door.



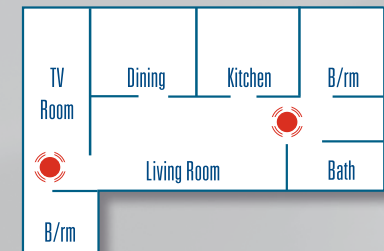
* Additional recommendation for added safety (not law).

Near bedrooms and on every storey of a multi-level house.



* Minimum by law.

Additional alarms are needed in homes with separated sleeping areas.



* Minimum by law.

Seller, landlord and tenant responsibilities

Sellers

On the sale of a property, the seller must lodge a form with the Queensland Land Registry (www.nrw.qld.gov.au) stating that smoke alarms are installed in the property and that the purchaser has been informed that smoke alarms are installed.

Landlords

Landlords are required to:

- install and maintain smoke alarms in rental properties in accordance with Australian Standard 3786. This can be a 9 volt battery operated smoke alarm, with a one year battery for dwellings built before 1997. However, a good quality 10-year battery alarm or hard-wired alarm is more reliable and effective in the long term. Homes built after 1997 must have hard-wired smoke alarms installed.
- test and clean each smoke alarm within 30 days before the start of a tenancy agreement. A landlord may arrange for an agent to do this.
- replace each battery in the smoke alarm that is flat or that the landlord or the landlord's agent is aware is almost flat within 30 days before the start of the tenancy. This must be done in accordance with the manufacturers' instructions.
- replace the smoke alarm unit before it reaches the end of its service life. The service life is usually indicated by the warranty offered by the smoke alarm manufacturer.
- have checked by a competent professional a smoke alarm which the tenant has reported as not operating. Repair the smoke alarm as required. Alternatively, replace the smoke alarm.

A managing property agent may be able to arrange for a landlord's legislative requirements to be met.

Fire Officers will investigate complaints received. There is a maximum fine of \$500 for failing to install smoke alarms.

Tenants

Tenants are required to:

- test and clean each smoke alarm in the dwelling at least once every 12 months (once a month is recommended)
- replace, in accordance with the information statement in RTA Form 171 provided to you, each battery that is flat or is almost flat during your tenancy
- advise the landlord or the landlord's agent as soon as practical if a smoke alarm in the rented property is not working other than because the battery is flat or almost flat.

Disposal of smoke alarms

There are two main types of household smoke alarms – ionisation, which contain a very small amount of radioactive material; and photoelectric, which do not contain any such material.

Whether stand-alone or hardwired into a home's electricity system, each type needs replacing according to their service life, which is usually at the end of the warranty period given by the manufacturer.

Ionisation smoke alarms are safe under all normal conditions they may encounter, including a fire, and pose no threat to people or the environment.

The Australian Radiation Protection and Nuclear Safety Agency, Queensland Fire and Rescue Service (QFRS), and Queensland Health, advise that in relation to ionisation smoke alarms:

- the radiation dose to occupants of a house from a domestic ionisation smoke alarm is very small compared to naturally occurring radiation
- the dose rate to the hands when handling an ionisation smoke alarm is higher but still less than one tenth that from naturally occurring radiation
- the temperature in a fire may be high enough to melt the radioactive material, but not to vaporise it. So, there is no inhalation danger during a fire or afterwards
- individual or small numbers of ionisation smoke alarms can be safely disposed of in household rubbish, and
- the amount of the same type of radioactivity in normal soils is equivalent to a dozen or more ionisation smoke alarms in every cubic metre. Therefore, the dispersal of ionisation smoke alarms, even in large numbers, through refuse land-fill sites, is not of concern.

For people with philosophical concerns about the radiation in ionisation alarms, the alternative is photoelectric smoke alarms which are highly recommended by all Australian fire services because of their better smoke detection qualities. These are particularly good at detecting fires that start without immediate flames and only small amounts of smoke.

Photoelectric smoke alarms, which do not contain any radioactive material, are also safe for disposal through normal household rubbish disposal methods.

Other smoke alarm facts

- ⦿ Research indicates that a primary reason why smoke alarms do not operate when needed is because batteries have been removed, often after repeated false alarms. Only working smoke alarms save lives.
- ⦿ False alarms are often caused by steam from bathrooms or by cooking fumes. Smoke alarms should be positioned carefully to avoid false alarms caused by steam or cooking fumes.
- ⦿ Research indicates that photoelectric smoke alarms are less prone to false alarms from cooking fumes.
- ⦿ Smoke alarms not be installed in close proximity to kitchens and bathrooms as steam and cooking can cause unwanted alarms.
- ⦿ Due consideration be given to the effect on smoke alarm performance by air conditioners, heaters, fans and other temperature control devices. Smoke alarms should be located where these devices will not compromise the effectiveness of the smoke alarms.
- ⦿ Smoke alarms can be installed as either stand alone independent alarms or they can be interconnected. Interconnection allows all smoke alarms to sound simultaneously when any one alarm activates. This alerts all occupants and maximises the opportunity for escape.
- ⦿ Children's bedrooms should have a smoke alarm and be connected to the parent's bedroom because children sleep more soundly than adults.
- ⦿ A significant percentage of residences fitted with smoke alarms remain unprotected due to depleted or missing batteries.

What is the difference between smoke alarms and smoke detectors?

Smoke alarms are self-contained, single or multiple-station smoke-sensing devices. Smoke alarms may include two or more single station units wired to operate in conjunction with each other. Alarms have a detection device and sounder. Smoke alarms are required in most domestic settings.

Smoke detectors are smoke-sensing devices that are not self-contained and are intended for use in conjunction with a fire alarm system control panel. Detectors only have a detection device. Smoke detectors are often found in high rise apartment buildings and are frequently used in conjunction with smoke alarms.



The Queensland Fire and Rescue Service offers a FREE fire and home safety visit to resident Queenslanders whether they rent or own a home.

As part of the service, fire fighters will provide advice on the correct positioning and installation of smoke alarms as well as their maintenance and replacement.

If a Queenslanders lives in a part of Queensland serviced by volunteer rural fire fighters, a fire fighter may not be able to visit the home. If this is the case, the caller will receive a Safehome kit, a Bushfire Preparedness package, and contact details for their local fire station.

To request a Safehome booking with a Queensland fire fighter from your local station, telephone 1300 369 003 or request your booking on-line at www.fire.qld.gov.au. Type Safehome into the search engine, and complete and submit the form on-line.

FREE assistance with smoke alarms and other fire and safety issues in the home

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YOU HAVE THREE MINUTES TO ESCAPE

What's your plan if the
smoke alarm goes off?

For help with home fire safety, book
a **FREE** **safehome** visit today
with a firefighter.

Call 1300 369 003 or book on-line
www.fire.qld.gov.au

Safehome visits are conducted by operational firefighters in Queensland. If your area is serviced by volunteer rural firefighters a visit may not be possible. However, you will receive a free Safehome kit from which you will be able to conduct your own safety assessment as well as a bushfire preparedness kit.

Remember to:

- ✓ Test and vacuum smoke alarms monthly.
- ✓ Change batteries annually.
- ✓ Replace smoke alarms by use-by-date.

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