# Building Practice Note ESM-03: Self-contained smoke alarms for existing buildings

**This Practice Note provides guidance on the automatic smoke detection and alarm systems concession for certain Classes of buildings built before 1 August 1997.**

The context below provides guidance for:

- Building Interim Regulations 2017 requirements
- Power Supply
- Location of Smoke Alarms
- Maintaining Smoke Alarms
- False Alarms
- Should Smoke Alarms be interconnected

## Abbreviations & Definitions

The abbreviations and definitions set out below are for guidance only. They are not intended to vary those set out in the Building Act 1993 (the Act), Building Regulations 2018 (Regulations) or the National Construction Code (NCC).

- **Act** – The Building Act 1993
- **AS** – Australian Standard
- **BCA** – Building Code of Australia
- **Regulations** – Building Regulations 2018



## Building interim regulations 2017 requirements

Most fire fatalities occur in residential buildings while people are asleep and so are unable to smell smoke. A smoke alarm that is properly installed, regularly tested, and adequately maintained will help to reduce injuries.

Mandatory requirements for smoke alarms (combining both smoke detection and alarm function in a single device) are specified in the BCA and regulations 707 and 709 of the Building Interim Regulations 2017.

Regulation 707 requires self-contained smoke alarms that comply with AS 3786 to be installed in all Class 1, 2, and 3 buildings and Class 4 parts of a building constructed or for which approval was granted before 1 August 1997. The number and location of smoke alarms will depend on the building's size and layout.

Regulation 709 applies to Class 9a residential care buildings and Class 1b and Class 3 buildings constructed or for which approval was granted before 1 August 1997.

AS 3786 specifies requirements for the design, performance, and testing of electrically operated smoke alarms. It does not detail location requirements.

## Power Supply

Smoke alarms required under regulation 707 of Building Interim Regulations 2017 need only to have power supplied by an internal battery.

Smoke alarms required under regulation 709 of Building Interim Regulations 2017 must be powered from the mains electricity supply if a mains electricity supply is available to the building.

## Location of Smoke Alarms

Smoke alarms should be positioned to detect smoke before it reaches the sleeping occupants of a building. The alarm is designed to wake the occupants as early as possible and give them sufficient time to evacuate the building.

### Class 1 Buildings

The following provisions apply to installations in Class 1 dwellings.

Smoke alarms must be located between each area containing bedrooms and the remainder of the dwelling. In some dwellings, bedrooms are located in a common area and connected by a hallway. In this case, the alarm must be located as shown in Diagram 1.

Diagram 1 shows a smoke alarm on the hallway ceiling, located between sleeping area and remainder of the dwelling.

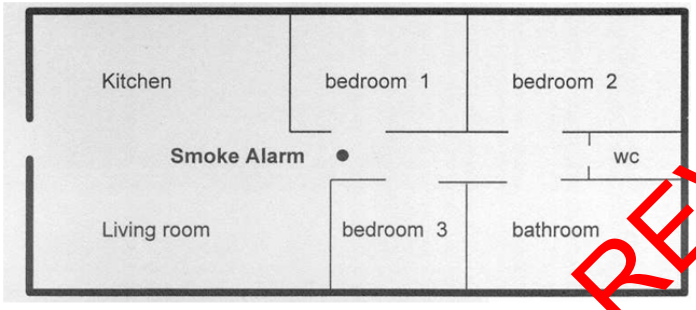


Diagram 1 – Residential building with common sleeping areas.



If the bedrooms are not grouped in a common area or no connecting hallway exists, then an alarm must be located within 1.5m of the entrance to each bedroom, as shown in Diagram 2.

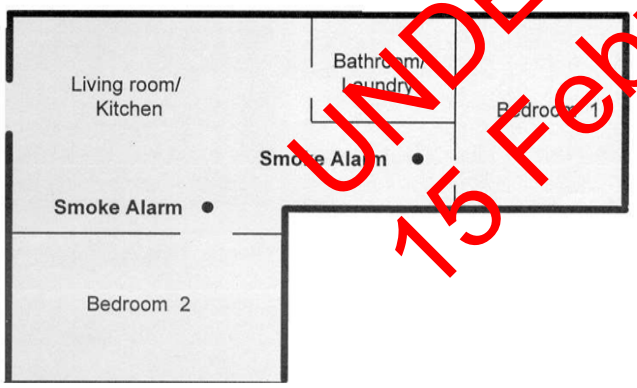


Diagram 2 – Residential building with no common hallway.

An alarm is required on every storey, located in the path of travel people will most likely take to evacuate the building. This will ensure an alarm is sounded before smoke makes the common exit path impassable.

If the bedrooms are on the first floor, then an alarm must be positioned near the area of the inter-connecting stair at ground level.

If the other storey is not connected to the remainder of the building — for instance, a ground floor garage — then the alarm must be centrally located in the lower area.

In all cases, the alarm must be audible in the other storey.

Interconnecting the smoke alarm units so that alarms near the sleeping areas are activated, will meet this requirement.

## Class 2 Buildings

Requirements for protecting sleeping areas and positioning smoke alarms within dwellings (sole- occupancy units) are as per Diagram 1 and 2. In other areas (public corridors, lobbies, etc.), smoke alarms must be installed not more than 5m from any wall and not more than 10m between detectors. These alarms must be audible to sleeping residents.

Other storeys not connected to the remainder of the building (for instance a garage or laundry), or not part of a public corridor, must have a centrally located alarm.

In all cases, the alarm must be audible in the other storeys. As with alarms in public corridors, a cheap and effective way of achieving this would be to interconnect the smoke alarm devices so that alarms in each dwelling near the sleeping areas are activated.

## Class 3 Buildings

Class 3 buildings must firstly comply with the provisions for Class 1 and 2 buildings. In addition to smoke alarms within sole-occupancy units, they must also have a smoke alarm installed in all other habitable rooms. Kitchen and other areas likely to result in causing false alarms are the exception, in which case suitable self- contained heat alarms may be installed. In all cases, alarms must be audible in the sleeping areas.

Note, some Class 3 residential buildings require additional fire and life safety equipment.

A smoke detection system complying with AS1670.1, having smoke detectors installed in all sleeping areas and with alarm devices audible to all sleeping residents, is an alternative to the provision of smoke alarms that complies with the requirements of regulation 709.

## Class 4 Buildings

A Class 4 part of a building is a single dwelling within a building of another (non- residential) class and must comply with the provisions of Section E2.2 of the BCA Volume 1. It must also have smoke alarms installed within any non-fire- isolated exit and any public corridors serving the Class 4 part of the building, unless the building is sprinkler protected.

## Mounting Smoke Alarms

Smoke alarms must be installed on or near the ceiling. Take special care to avoid dead air spaces.

A dead air space is an area in which trapped air will prevent smoke from reaching the alarm.

This generally occurs at the apex of cathedral ceilings, the corner junction of walls and ceilings, or between exposed floor joists, etc. If it is impractical to mount the smoke alarm on the ceiling, then it may be located on the wall. The top of the smoke alarm must be between 300mm and 500mm from the ceiling (see Diagram 3).

The distance from the apex of a cathedral ceiling and the top of a smoke alarm must be between 500mm and 1500mm (see Diagram 3).

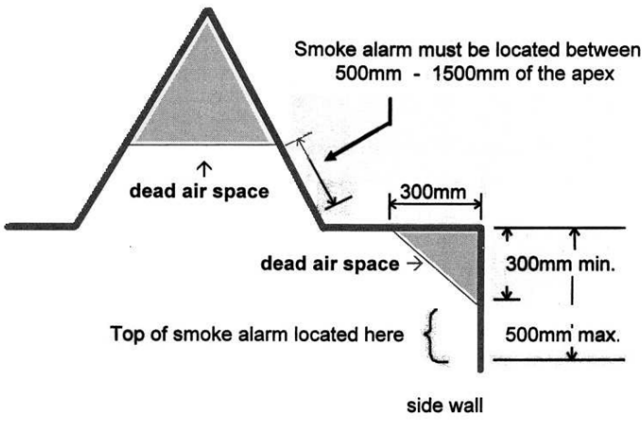


Diagram 3 – Dead air space and proper mounting of smoke alarms on side walls

## Maintaining Smoke Alarms

To be effective, smoke alarms must be properly maintained. The level of maintenance required for each building classification is determined under Part 15 of the Regulations.

Alarms should be tested in accordance with the manufacturer's instructions. The operation of most smoke alarms can be easily checked by depressing a button on the outside of the alarm.

The battery in most smoke alarms will need replacing each year (lithium batteries lasting up to seven years are also available). Smoke alarms should emit a warning sound when the battery needs replacement.

The alarm should also be cleaned annually, by carefully extracting dust particles that may affect the operation of the unit. It is important to read the manufacturer's installation and operation details before cleaning the alarms.

Neither municipal nor private building surveyors are required to check that owners maintain their smoke alarms. However, a municipal building surveyor can check that required smoke alarms are installed and operational.



## False Alarms

Smoke alarms are extremely sensitive and may detect smoke and moisture created by common household activities, such as burnt toast or steam from a bathroom. To reduce the likelihood of false alarms, the smoke alarm should not be located near cooking appliances or bathrooms.

Some types of smoke alarms may be provided with a method for switching off a false alarm.

Other solutions include a simple time delay switch that deactivates the alarm for a period of time while the smoke clears or opening a window to remove the contaminated air.

If false alarms persist, then the smoke alarm should be moved to a more suitable location, or another device installed in accordance with BCA requirements.

## Should Smoke Alarms be interconnected?

If a building has a number of smoke alarms, there is usually no requirement that they be interconnected (some types of alarm are capable of interconnection to other alarms so that if one alarm sounds then the other alarms are also activated).

However, as it is inexpensive to interconnect alarms, it is advisable that smoke alarms be interconnected. This is particularly relevant where a detector is located within an unoccupied storey such as a garage.

## Related Documents

- AS 1670.1 – Fire detection, warning, control and intercom systems – System design, installation and commissioning
- AS 3786- 2014 – Smoke Alarms
- Building Act 1993
- Building Regulations 2018
- Building Interim Regulations 2017

## Contact Us

If you have a technical enquiry, please email technicalenquiry@vba.vic.gov.au or call 1300 815 127.

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## Version History

- Version 2.0, published 28 June 2021, supersedes Practice Note 27: Self-contained smoke alarms for existing buildings



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