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# Placing smoke alarms correctly

It's not enough to just install smoke alarms in houses. To work reliably, they need to be the right type, installed in the right place and tested regularly.

**UNDER NEW ZEALAND BUILDING CODE** clause F7 Warning systems, a fire detection and warning system must be provided in all new homes and in existing homes when alteration work is carried out.

## Some must-haves with domestic alarms

The Acceptable Solution F7/AS1 stipulates that Type 1 smoke alarms are required for risk groups SH and SM where no other type of fire alarm system is required. Risk group SH applies to houses, townhouses and small multi-unit dwellings. Risk group SM applies to permanent accommodation.

Type 1 smoke alarms are defined as domestic type alarms with an integral alerting device. They must have:

- a hush button so the alarm can be silenced for at least 60 seconds without cutting the power supply, for example, removing the battery
- a test button that is easily able to be reached by the building occupants
- a sound pressure level not less than 75 dBA when measured at the sleeping position and not more than 100 dBA when measured at 1.8 m height (in accordance with NZS 4514:2009 Interconnected smoke alarms for houses).

A range of domestic Type 1 smoke alarms are available that are either battery-powered or mains-connected systems. While mains-connected systems should be interconnected, this is not a requirement in a domestic situation.

## Smoke alarms required in rental properties

Under an amendment to the Residential Tenancies Act 1986 coming into effect on 1 July 2016,

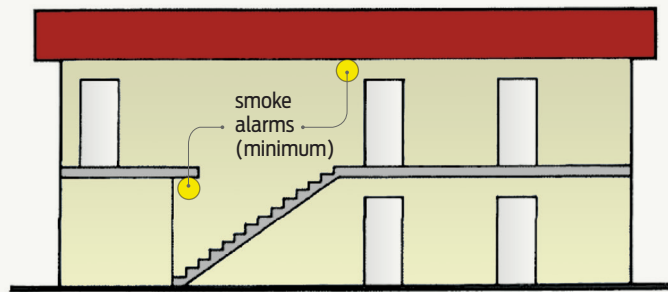
smoke alarms will be required to be installed in all residential rental properties.

The landlord will be responsible for installation of operational smoke alarms in their properties, and tenants will be responsible for changing batteries and reporting faulty alarm systems.

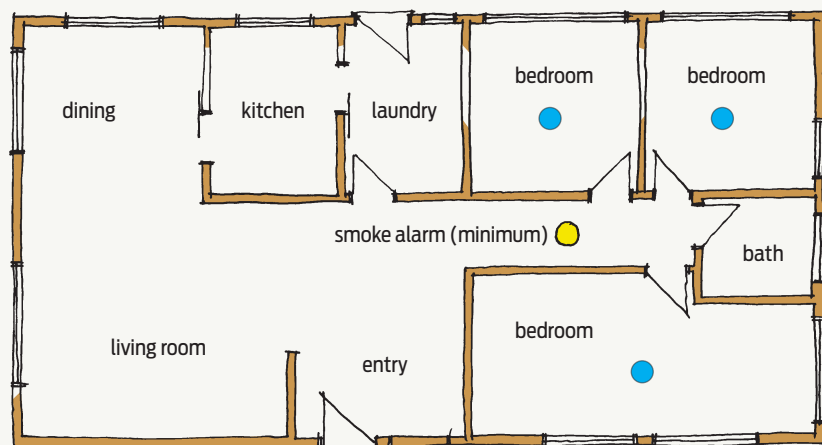
## Location important

F7/AS1 requires smoke alarms to be installed:

- on every level in multi-storey buildings (see Figure 1)
- either in every sleeping space, or within 3 m of a sleeping space door (the New Zealand Fire



**Figure 1** Where a house has more than one storey there must be a smoke alarm on each level. Installing one in each bedroom is also recommended.



● recommended smoke alarm positions

**Figure 2** Placement of smoke alarms in a single-storey 3-bedroom dwelling.

Service recommends smoke alarms in every sleeping and living space).  
Where a single smoke alarm is installed, it should be between the living and sleeping spaces (see Figure 2) in a location that the alarm is given before escape routes become blocked by smoke.

At least two smoke alarms should be installed where sleeping areas are separated by living spaces.

For optimum smoke detection, smoke alarms should be located on the ceiling or high on a wall in accordance with NZS 4514:2009. Dead air spaces such as corners and close to exposed beams or other ceiling obstructions must be avoided. NZS 4514:2009 Figure 5.1 describes areas where dead air spaces may occur (see Figure 3).

Install smoke alarms in accordance with the manufacturer's instructions.

### A few places to avoid

Smoke alarms should not be installed:

- in a kitchen, garage or bathroom (unless specifically intended for the space)
- near a heat source such as a stove, space heater or flue
- in damp or humid areas such as near showers or in saunas
- in draughty areas such as near an extract fan or air supply vent.

### Different types of smoke alarms

There are two main types of domestic smoke alarm that detect smoke:

- An ionisation alarm monitors ions or electrically-charged particles in the air.
- A photoelectric alarm uses a beam of light and a light sensor.

NZS 4514:2009 Table C1 sets out recommendations for alarm types in different locations (see Table 1).

Smoke alarms with extra features such as an extra loud alarm sound, flashing strobe lights or

vibrating devices are also available for people with hearing impairments.

### Regular maintenance and testing needed

F7/AS1 requires that smoke alarms must be tested according to the maintenance requirements described in NZS 4514:2009. These include:

- monthly testing by activating the test function to check power supply and alarm sounding device
- 6-monthly inspection and in situ cleaning with a vacuum cleaner and brush to remove dust and dirt that may block smoke entry into the unit – do not use liquid cleaners or solvents as this may damage the unit ➔

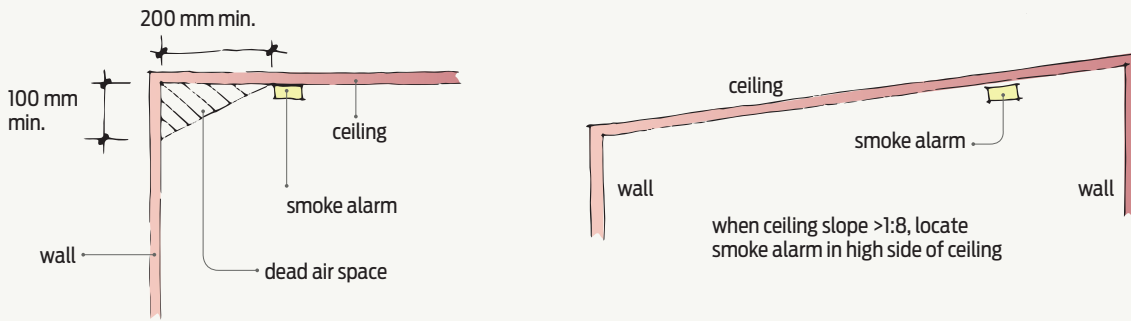
**Table 1**

## RECOMMENDED ALARM TYPES FOR DIFFERENT LOCATIONS (BASED ON NZS 4514:2009 TABLE C1).

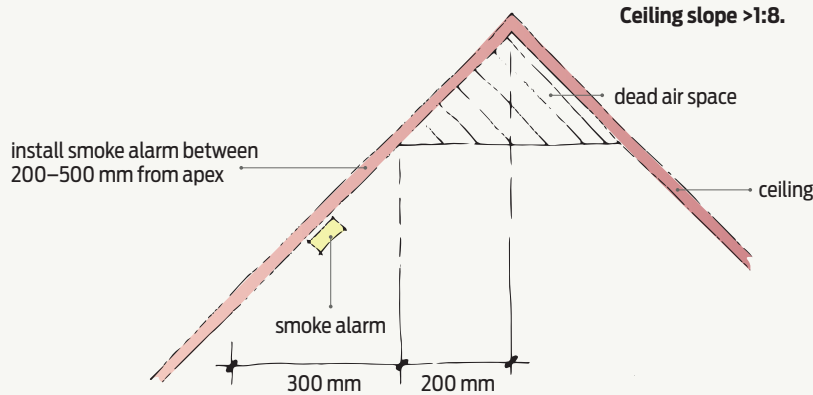
LOCATION	TYPE OF SMOKE ALARM		
	IONISATION	PHOTOELECTRIC	COMBINED IONISATION/PHOTOELECTRIC
SLEEPING AREAS	OK <sup>1</sup>	OK	Best
AREAS SEPARATING BEDROOMS AND REST OF HOUSE, E.G. HALLWAYS	OK	Better	Best
LANDINGS IN MULTI-STOREY UNITS	OK	Better	Best
LIVING SPACES	Better	Better	Best
LIVING SPACES NEAR KITCHEN	No	OK <sup>2</sup>	No
KITCHEN	No	OK <sup>2</sup>	No
BATHROOMS, LAUNDRIES	No	No	No
ATTACHED GARAGE	No	No	No

#### Notes:

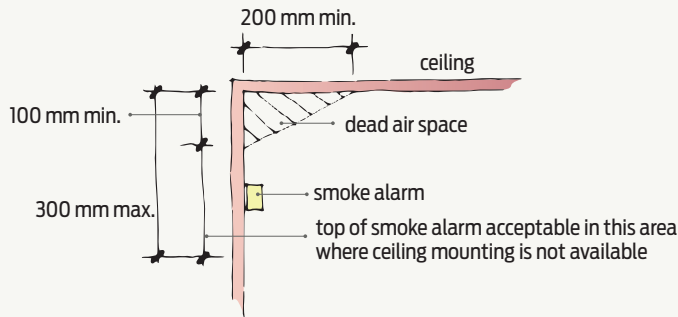
1. OK is the minimum level of suitability. Better and best are improvements.
2. In this situation, smoke alarms have a higher risk of being set off inadvertently, for example, burning toast, so they should be located as far from the cooking area as possible?



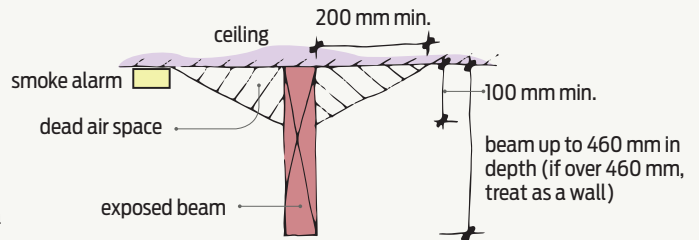
**Horizontal ceiling.**



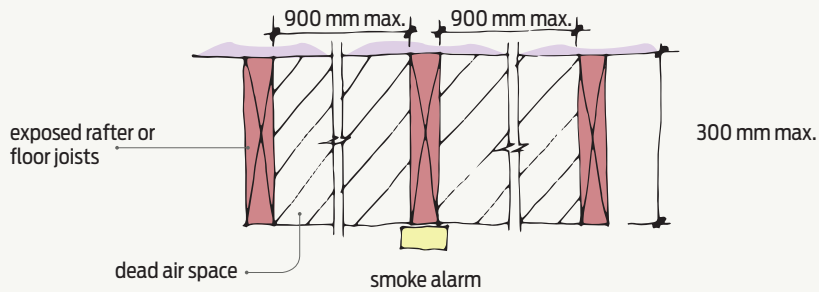
**Steep pitch ceiling slope.**



**Wall-mounted when ceiling mount is not available.**



**Exposed beams or other obstructions.**



**Exposed rafters or beams.**

**Figure 3** Locating smoke alarms to avoid dead air space.

- annual testing of the smoke-detecting element using a joss stick or commercial smoke alarm test smoke – do not test using a naked flame.

Battery-operated smoke alarms should have batteries replaced annually. The New Zealand Fire Service recommends picking a date that is easy to remember such as the beginning or end of daylight saving.

**Replace every 10 years**

Smoke alarms may have a service life of about 10 years. After this, they are likely to become less reliable and should therefore be replaced. ◀