

If one piece of fire protection equipment is likely to save your life, it will be your residential smoke alarm.

Along with the ongoing educational work of NZFS and organisations such as FPA New Zealand, legislative requirements are aimed at a continued reduction in the number of residential fire deaths each year; however, residential fire safety is still an ongoing concern for the fire safety industry, authorities and the community. A significant number of fire deaths and injuries in New Zealand occur in residential buildings, far more than any other building type. Also, the speed at which fires develop is increasing due to the properties of materials and commodities now commonly found in residential buildings. This has the effect of reducing the time available to escape from a building.

The following are some important points to be aware of with regard to residential smoke alarms.

### Ionisation versus Photoelectric

Currently, compliance with EN14604 is required for smoke alarms. Within the fire protection community, there has been an ongoing debate as to which type of smoke detection technology offers the optimal performance in providing sufficient early warning to occupants in residential buildings. The debate is due to the two different types of fires that can occur in residential environments.

Building fires can be identified as either smouldering fires or flaming fires. While there are no significant data to suggest that one of these fire types happens more frequently than the other, the types of materials found in homes, combined with likely ignition sources, suggest the most likely fire encountered in a home while occupants are asleep will be a smouldering fire. Sleeping is the most vulnerable time as sensory cues are reduced. Each smoke alarm type performs differently as described below.

### Photoelectric

Photoelectric smoke alarms contain a chamber with a light source projected into it. When visible smoke enters the chamber, it scatters and disturbs the light source, which is detected by a light sensitive receiver, causing the alarm to sound.

Published research has shown that although photoelectric smoke alarms are superior to ionisation smoke alarms in detecting the visible smoke produced by smouldering fires, they can be slower to respond to flaming fires.

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## Ionisation

Ionisation smoke alarms contain a chamber that is charged with electrical particles, called ions, by a small amount of radioactive material. This chamber is sensitive to small particles of combustion (typically not seen by the human eye) that enter the chamber and disrupt the balance of ions in the chamber, causing the alarm to sound.

Conversely, published research has shown that ionisation alarms are marginally superior to photoelectric smoke alarms in detecting flaming fires, which produce significantly less visible smoke than smouldering fires.

NZFS refers that all residential buildings should be fitted with photoelectric smoke alarms in the first instance in order to treat the highest fire safety risk in residential buildings.

## Interconnection

Many models of smoke and heat alarms offer the optional function of interconnection. When an interconnected smoke or heat alarm actuates, it places a small voltage on the interconnect circuit, which in turn powers the sounders in all other interconnected devices. The only device that is actually 'in alarm' is the one in the area of fire origin, even though all are raising the alarm.

Manufacturers specify the maximum number of devices that can be interconnected and exceeding this number may mean that the sounders will not function correctly and thereby not provide sufficient warning to the occupants. Manufacturers also specify the types and models of device that can be successfully interconnected. As individual manufacturers have no control over their competitors' product specifications, no manufacturer can claim a universal interconnection capability.

Manufacturers therefore preclude the interconnection of their devices with those of other manufacturers. The interconnection of non-related devices will void warranty, leaving the installer/certifier liable for the performance of the smoke alarm system. Simply interconnecting the devices and testing the interconnect function at time of installation does not provide an adequate assessment of long-term reliability.

Mains powered smoke/heat alarms typically do not use an isolation transformer when converting the 230Vac to 9Vdc. Instead, they use a capacitive/resistive circuit through a regulator and zener diode. This means the negative of the DC voltage is directly connected to the neutral of the incoming mains. The negative of the interconnect signal is therefore also directly connected

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to the neutral of the incoming mains. For this reason, when interconnecting mains powered smoke/heat alarms, the interconnect wiring must be treated as if it were at mains voltage and double insulation integrity must be maintained.

Heat alarms are not early warning and should never be used as the sole form of detection; sole reliance on heat alarms reduces safe evacuation time because a fire will have generally reached the flaming stage before triggering a heat sensor. Heat alarms provide supplementary detection in areas where smoke alarms may be overly prone to nuisance alarms. Heat alarms must be interconnected to the installed smoke alarms to provide a general warning.

### When do Smoke Alarm Batteries Require Replacement?

Generally, smoke alarm batteries should be changed every 12 months. Available are 9 volt models with a 10 year non-removable battery, and these also do not require battery replacement.

### Why does the test button flash red?

The smoke alarm performs a self-check approximately every 40-60 seconds. The red flash is to tell you that the alarm is normal. This feature may not be included on all smoke alarms.

### What does the 'hush' button do?

If your smoke alarm sounds because of cooking, for example, the hush button will silence the smoke alarm for approximately 10 minutes. This gives you time to clear the cooking fumes from the room. The alarm will automatically reset back to normal after 10 minutes.

### How do I test a smoke alarm?

All smoke alarms have a test button, which may be a separate, clear button in the centre of the smoke alarm or a part of the smoke alarm cover. Gently push the test button and hold for approximately 10 seconds. The smoke alarm will sound. Release the test button and the smoke alarm will continue to sound for a few seconds and then stop.

### Why do alarms chirp or alarm for no reason?

There could be many reasons for a random chirp; however, the most likely reason is something causing electrical noise or spikes. This could be caused by the switching on or off of lights, particularly fluorescent lights, or some other appliance, such as air conditioning, heaters, or fans. Electrical noises like this can also cause flickering patterns on your TV or crackling/humming in your stereo or radio.

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