# WESTSIDE
## FIRE SERVICES
*'CARING AND RESPONSIVE"*

**Fire Detection**

Occupant Warning

Exit

Exit & Emergency Lighting

Fire Extinguishers

Fire Doors

Fire Hose Reels

Fire Hydrants

Fire Pumps

Gas Suppression

Sprinkler Systems

# FIRE DETECTION

# What Is A Fire Detection System?

Fire detection systems provide a means to identify a fire through either manual or automatic methods and then alert building occupants to a fire condition.

Another common function is the transmission of an alarm notification signal to the fire department, control room or other emergency areas. They may also shut down electrical, air handling equipment, or special process operations, and they may be used to initiate suppression systems.

# Why Do Buildings Have A Fire Detection System?

The Building Code of Australia volume 1 parts E2.2 and G3.8 detail the mandatory requirement for automatic fire detection systems to be provided in various classes of buildings.

# Types Of Fire Detection Systems

### Conventional
Conventional fire alarm systems indicate fires by zone. A zone can have a maximum of 40 detectors connected on the same cable. These systems are inexpensive and suitable for small facilities. The disadvantage is a prolonged response time when a fire occurs because there is no way to know which detector in the zone has activated. A search of the zone is required to find the fire.

### Addressable
An addressable fire alarm system is one in which all fire detection devices are connected and communicate with each other and the control panel. This interconnectivity allows the control panel to identify the location or "address" where the initial detection occurred. The information directs the emergency response team to pinpoint their efforts immediately to the precise location of the developing fire.

Specific actions can be programmed such as delaying evacuations from areas not immediately threatened, thereby reducing bottlenecks of evacuating occupants.

Each element of the system is automatically monitored for operational health.

# Types Of Fire Detectors

### Thermal
These detectors are highly reliable and have a good resistance to false alarms. The disadvantage is they do not function until the room temperature has increased substantially, at which point the fire is well underway. Thermal detectors are not permitted in life safety applications, they are also not recommended for protection of high value assets.

### Smoke
There are three types of smoke detectors, all designed to identify a fire when it's smouldering or at the early flame stage. The most common smoke detectors are point type, they are located strategically along ceilings and in concealed spaces.

For open spaces such as atria a light beam is transmitted to a receiver that can be up to 100 metres away from the transmitter. If smoke obscures the light beam an alarm is activated on the fire alarm panel.

The third type of smoke detector consists of a control unit that contains a very sensitive detection chamber and a fan connected to a network of sampling tubes or pipes. A series of sampling points are located along the pipes to allow air to be transported to the detector. These are the most sensitive type of smoke detector and are used widely for protection of high value assets.

### Flame
These are line of sight devices that detect either infrared, ultraviolet or a combination of both light frequencies. As radiant energy from a fire reaches a flaming condition the sensors recognise a fire signature.

### Carbon Monoxide (CO)
CO detectors contain a long-life electro-chemical sensor which is tolerant of low levels of common vapours and household products. Fast rises in the carbon monoxide level are often associated with hot fires. The detector is rate limited to remove nuisance alarms resulting from short-term high levels caused by sources such as gas flame ignition.

### Multisensor
Multisensor detectors comprise optical smoke, thermal and CO sensors in combinations that give both a combined signal as well as separate signals for improved false alarm management.

## Where Should Fire Detectors Be Located?

Australian Standard AS1670.1 sets out requirements for the design, installation and commissioning of fire detection and alarm systems comprising components conforming to the requirements of the appropriate component Standards.

Detection equipment forming part of a smoke control system must be in accordance with AS1668.1.

Where detection equipment forms part of a special hazard system in must be in accordance with AS4214, the additional requirements are covered in AS1670.5 Fire — Special Hazards.

## How Do I Operate A Fire Detection System?

A fire system is generally configured to be activated by;

- An automatic fire sprinkler system; or
- A fire detector; or
- A manual break glass point

Manual control of the system should only be undertaken by qualified people that have been trained in the use of the panel.

Modern fire panels have a standard control and indicating section that is for use by firefighters and end users. Previously each panel manufacturer could design their own arrangement of controls and indicators.



## System Components

### Control Panel

The control panel is the "brain" of the fire detection and alarm system. It is responsible for monitoring the various "input" devices such as sprinkler system pressure switches, manual call points (MCPs) and the thermal, smoke and flame detectors. When an alarm is detected various outputs are activated. Control panels range from simple units with a single input and output zone, to complex systems that network multiple panels together to monitor several buildings over an entire site.

### Output Devices

Upon receiving an alarm notification, the control panel provides notification that an emergency is underway. The primary function of the alarm outputs is to notify a monitoring station or the fire brigade and to initiate the Occupant warning system - typically sounders or loudspeakers.

Other output functions include shutting down electrical equipment such as HVAC, computers, shutting off air handling fans to prevent smoke migration, and shutting down operations such as chemical movement through piping in the alarmed area. They may also activate fans to extract smoke, which is a common function in large atria spaces. These systems can also activate the discharge of gaseous fire extinguishing systems, or pre-action sprinkler systems.

Output devices can be in the control panel or on the same cabling circuit as the detectors and other input devices.

## Maintenance, Inspection & Testing

Western Australia's building legislation requires owners of Class 2 to Class 9 buildings (which includes residential apartments) to ensure the building's firefighting services and equipment are maintained. This is to ensure that safety systems remain capable of performing to a standard not less than they were originally required and commissioned to achieve.

There is a financial penalty for noncompliance with the building legislation.

The Building Commission considers the adoption of Australian Standard AS1851-2012 Routine service of fire protection systems and equipment as good practice and a means for owners to ensure fire safety measures are serviced at regular frequencies to demonstrate suitable operation, and rectified or repaired if necessary to meet their regulatory obligation on maintenance.

AS1851 requires fire detection systems to be inspected every month. There is an additional inspection and test checklist required to be undertaken six monthly, yearly and five yearly.

For conventional systems smoke detectors are required to be in situ sensitivity tested ten years after installation and every five years thereafter.

| ROUTINE SERVICE FREQUENCIES | Monthly | Three Monthly | Six Monthly | Yearly | Five Yearly | Ten Yearly | Twenty Five Yearly | Thirty Yearly |
|---|---|---|---|---|---|---|---|---|
| Fire Detection | ✓ | | ✓ | ✓ | ✓ | | | |
| Occupant Warning | ✓ | | | ✓ | ✓ | | | |
| Exit & Emergency Lighting | | | ✓ | ✓ | | | | |
| Fire Extinguishers | | | ✓ | ✓ | ✓ | | | |
| Fire Doors | | ✓ (Horizontal Sliding Doors) | ✓ | ✓ | | | | |
| Fire Hose Reels | | | ✓ | ✓ | | | | |
| Fire Hydrants | ✓ (Where Pumpsets Fitted) | | ✓ | ✓ | ✓ | | | |
| Fire Pumps | ✓ | | ✓ | ✓ | ✓ | | | |
| Gas Suppression | ✓ | | ✓ | ✓ | | ✓ | | |
| Sprinkler Systems | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

### Design
We design solutions, tailored to your building.

### Installation
Our installation teams are focused on delivering on time and on budget projects.

### Service & Maintenance
We offer regular servicing and maintenance to ensure that your systems are working at their optimum level.

### Emergency Call Out
The Emergency Call Out Service ensures that you are covered 24 hours, 7 days a week for fault and emergency.

### Fire Safety Training
We deliver training courses to ensure your team has the knowledge to act competently during an emergency.

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National Fire Industry Association Member

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