

# Fire Detection

& Alarm Systems BS5839

## Risk Assessment

The 'Fire precautions (Workplace) Regulations' require any business employing five or more persons to hold a written 'Fire Risk Assessment' and 'Emergency Plan'. This must be periodically reviewed.

The local fire brigade can enforce compliance, and close any building that does not meet this act.

In the event of a fire in a building without a written 'Fire Risk Assessment', those responsible may face fines and imprisonment, and/or private litigation.

## What the law requires you to do:

- Complete a fire risk assessment for your work place (considering all employees, the public, disabled people and people with special needs).
- Identify and record any significant findings or persons at risk.
- Provide and maintain fire precautions.
- Provide information, instruction and training.
- Nominate persons responsible to implement your emergency plan.
- Consult employees about the above nominations and your proposals to improve fire precautions.
- Inform other employees who may have work places in the building about any significant risks which may affect their safety and co-operate with them to reduce/control these risks.
- If you are not an employer, but control premises which contain more than one workplace, you are responsible for complying with fire regulations.
- You must establish a suitable means of contacting the emergency services.
- Your employees must co-operate to ensure the workplace is safe from fire and its effects.

# System Zoning

Information

In order to aid identification of the source of a possible fire, the protected building should be divided into 'zones'. When deciding on a suitable zoning scheme for a building, consideration should be given to the size, any existing fire routines, escape routes, zone accessibility, and structural fire compartmentation.

## The following guide lines should be observed:

- If the total floor area of the building is less than 300m<sup>2</sup> then the building needs only one zone, regardless of the number of storeys.

## If the total floor area is greater than 300m<sup>2</sup>:

- The maximum area for a zone is 2000m<sup>2</sup>
- If a stairwell (or similar) extends beyond one floor it should be a separate zone.
- If a zone covers more than one fire compartment then the zone boundaries should follow the compartment boundaries.
- The search distance within the zone in order to ascertain the position of the fire should not exceed 60m. Remember that the use of Remote Indicator lamps may help to reduce the distance travelled.
- If a building is divided between occupiers, zones must not be shared between them.

## Manual Call Points

A 'Manual Call Point' is a device which enables personnel to raise an alarm in the event of a fire incident by pressing a frangible element to activate the alarm system.

Manual Call Points should be installed at a height of 1.4m above floor level at easily accessible, conspicuous positions, on exit routes, at the entry floor landings of staircases and at all exits to the open air.

Manual Call Points should be spaced so that one may always be found within a maximum distance of 30m apart.

## Automatic Detectors

When deciding on the type of detector to be used in any area it is important to remember that the detector has to discriminate between a genuine fire and the normal conditions existing therein.

# Detector Information

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## Smoke Detectors

In open spaces under flat horizontal ceilings, every point should lie within 7.5m of a smoke detector.

Smoke detection should be generally avoided in the following areas to avoid unwanted alarms. They should be protected by means of other detectors such as heat detectors.

Contamination in dusty areas may cause unwanted alarms and reduce the life of the detector.

Damp or humid conditions such as showers, bathrooms and external areas should be avoided as the water vapour may cause unwanted alarms and reduce the life of the detector.

Detectors should not be mounted where gases, vapours or fumes are present.

Detectors should never be used at low temperature where ice or condensation can affect detector sensitivity.

Kitchens, garages, welding shops and boiler houses should generally be avoided.

## Heat Detectors General

In open spaces under flat horizontal ceilings, every point should lie within 5.3m of a heat detector.

Heat detectors are designed to either detect a rapid rise in temperature or to operate at a fixed temperature. Although they provide a slower response time than smoke detectors they do provide a method of protection for areas where smoke detectors cannot be used.

Heat detectors should not be used for the protection of life or where extensive property loss may be expected.

## 'Rate of Rise' Heat Detectors

'Rate of Rise' heat detectors respond to both rapid increases of temperature and to fixed top temperature.

## 'Fixed Temperature' Heat Detectors

Fixed temperature heat detectors are available with different temperature settings, and are normally installed in kitchens, boiler rooms, etc.

## Detection In Apex Roofs

if the ceiling is pitched or sloping, smoke will tend to rise towards the highest point (apex) of the roof, therefore detection should be placed in the apex. As the slope tends to reduce the delay before smoke or heat reaches the detectors, it is permissible to use a greater spacing between the detectors mounted there.

## Fire Alarm Sounders

Fire Alarm Sounders should be installed throughout the building with an even distribution, to generally provide a minimum sound level of 65dB(A) or 5dB(A) above any background noise which is likely to persist for more than 30 seconds.

Where the alarm may have to arouse sleeping persons e.g. Hotel bedrooms, nursing homes, etc, a minimum sound level of 75dB(A) is required, at the bed head with all the doors shut.

All fire alarm sounders in a building should produce the same sound, distinct from any other audible warning devices in the building.

Where fire alarm sounders are required in extremely noisy areas e.g. Machine shops, it may be necessary to install additional 'Visual Indication Beacons'.

## Cabling

The operation of a Fire Alarm and Detection System' depends on the cabling and connections between the components. It is essential that connection between Manual Call Points and Detectors function correctly when they are operated.

Cables within the system are required to function correctly for significant periods after being attacked by fire. These include the power supply cables to the control panel, the detection circuits and the fire alarm sounder circuits. Thus the cables chosen must be correctly rated to withstand these conditions.

# User Responsibilities

## Introduction

the responsible person is required under BS5839 to undertake certain tasks with respect to the testing and maintenance of the fire alarm system.

The responsible person is also required to liaise with the building maintenance personnel to ensure that their work does not impair or otherwise affect the operation of the fire alarm system, and to ensure that a clear space is maintained in the vicinity of detectors, and call-points remain unobstructed and conspicuous.

## Routine Testing

The responsible person should also ensure that the following routine is carried out. If there is a link to a remote monitoring centre it will be necessary to advise the centre prior to a test. On larger systems it may be necessary to isolate building services interfaces to avoid disruption to the occupants. In any case the panel should provide audible and visual indication that parts of the system are disabled.

## Daily

Check that the panel

indicates normal operation and that any fault is recorded. Also check that the recorded faults have been dealt with.

## Weekly

Every week, a different Manual Call Point should be operated to test the ability of the control equipment to receive a signal and sound the alarm. The results should be recorded in the log book.

## Biannually

The system should be checked by a fire alarm service organisation. This may be the system installer or an approved maintenance company, and is normally arranged via a maintenance agreement which specifies the number of visits and the level of service. The agreement should also cover non-maintenance visits, e.g. Call outs to attend to faults, etc.

The standard specifies a number of maintenance tasks which include a visual inspection of the installation to ensure that there are no alterations or obstructions which could affect the operation of the system, and functional checks to

confirm the operation of the system.

Any defects should be recorded in the log book and reported to the responsible person. A certificate of testing should also be completed and given to the responsible person.

## Annually

Each device on the system should be tested for correct operation as before.

Any defects should be recorded in the log book and reported to the responsible person. A certificate of testing should also be completed and given to the responsible person.

## Action By The User After A Fire

Advise the servicing company and arrange for the system to be tested by them. A certificate of testing should be issued to confirm the system operation following the inspection and any remedial work that is necessary.

## Action By The user After Any False Alarm

The user can assist the servicing company in the

identification of false alarms by observing the following:

Always make a note of all illuminated indicators and messages displayed at the control panel.

Try and identify the activated device i.e. Do not reset the system until the area of the incident has been inspected.

Record any other incidents occurring at the same time which could affect the system, e.g. Power supply failure, building works, etc.

The service organisation will be more likely to trace the false alarm if the above information is available.

## Action by The User Following A Fault

When a fault is reported by the control panel, the user should note all illuminated LED's, and the circumstances at the time the fault occurred, and report to the servicing company.

The service company will be able to advise if the system is still able to respond to a fire alarm or whether extra vigilance should be observed until the fault is rectified. Faults should not be left unreported.