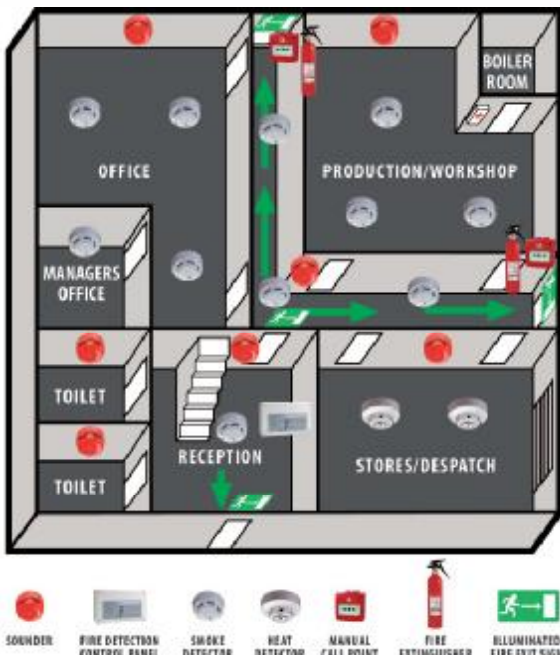


Installation Design Guide

This guide should be read in conjunction with, but never as a substitute for BS5839 Part 1: 2002. The full fire safety system specification shall be agreed between the responsible persons, which may include the local fire authority, the fire safety consultant, health and safety officer, system installer and the insurance company.



Risk Assessment

Further to recent changes to the fire act, fire officers will no longer issue fire certificates for buildings. Ensuring that a building is safe for the occupants is now the responsibility of the employer.

Insurance companies may refuse to insure buildings that have not had a risk assessment carried out. Fire officers are planning to carry out spot-checks on buildings without giving prior notice. As the new requirements are backed by criminal law, failure to have carried out risk assessments or operating in an unsafe environment may render the employer liable to court action, heavy fines and possibly imprisonment.

Zone Requirements

- Only one zone is required if the total floor area is not greater than 300m²
- The total area of a zone must not exceed 2000m² (Dependent on the risk present)
- The maximum search distance for a zone fire shall not exceed 60m
- Where stairwells or similar extend beyond one floor but are in one fire compartment, the stairwell shall be a separate zone
- If the zone covers more than one compartment, the zone boundaries shall follow compartment boundaries
- If the building is split into several occupancies, no zone shall be split between two occupancies.

Classification (Property or Life)

Category P Systems

Category P systems are automatic fire detection systems where the objective is to protect property. Categories are subdivided into the following systems:

P1 The objective of a category P1 system is to reduce the time from the discovery of a fire to the arrival of the fire brigade to a minimum. P1 systems should have fire detectors installed throughout all areas of the building.

Unless combined with category M, in a category P system it may be adequate for alarm signals simply to allow fire fighting action to be taken, for example a signal to alert a responsible person to call the fire brigade.

P2 Category P2 systems are intended to provide an early warning of fire in areas of high hazard, or to protect high-risk property. Automatic fire detection should be installed in defined areas of a building.

Category L Systems

Category L systems are automatic fire detection systems where the objective is to protect life. Categories are subdivided into the following systems:

L1 This is the highest category for the protection of life and is intended to give the earliest possible notification of a fire in order to allow maximum time for evaluation.

Automatic and manual fire detection should be installed throughout all areas of the building with smoke detectors employed wherever possible to protect rooms in which people are expected to be present. All alarm signals given in a category L system must be sufficient to warn people for whom the alarm is intended to allow time for an evacuation.

L2 intended to offer early notification of a fire to allow evacuation before escape routes become smoke filled. Automatic fire detection should be specified in defined areas in addition to L3 and additional protection should be provided in rooms at higher risk.

L3 As with L2, category L3 is intended to offer early notification of a fire to allow evacuation before escape routes become smoke filled. Smoke or heat detectors should be installed in escape routes and in rooms opening onto escape routes.

L4 Category L4 is designed to offer protection to the escape routes from a building and should comprise category M plus smoke detectors in corridors and stairways.

L5 Category L5 is a non-prescriptive system in which the protected areas are designed to satisfy a specific fire risk objective other than that of L1 to L4. Within the building, certain areas defined by the fire system specification are protected by automatic fire detection in order to reduce risk to life. Category L5 may also include manual fire protection.

Category M Systems

Category M systems are reliant on human intervention and use only manually operated fire detection such as break glass call points. Category M systems should only be employed if there are no persons sleeping in the building and if a fire is likely to be detected by people before escape routes are affected. Any alarm signals given in a category M system must be sufficient to ensure that any persons within the alarm areas are warned of a fire condition.



Break Glass Call Point Positioning

- Break glass call points shall be located on exit routes and in particular on the floor landings of stair cases and at all exits to the open air.
- Dependent upon the risk present, break glass call points shall be located so that no person needs to travel more than 45m from any position within the building.
- Generally call points shall be fixed 1.4m above the floor in easily accessible, well-illuminated and conspicuous positions clear of any obstruction.
- Detection devices may be installed on the same system, though it is advisable to install call points on separate zones where automatic detection needs to be delayed.

Alarm Sounders

- A minimum sound level of 65dBA or 5dBA above any background noise likely to persist for longer than 30 seconds is required at any point in an occupied building.
- If the alarm system is to be used in buildings in such as hotels, a minimum sound level of 75dBA at the bed head is required in order to wake a sleeping person.
- Audible warning devices should have a similar sound and be distinct from alarms used for other purposes and noisy areas may require high output sounders.
- To prevent alarm sounds from exceeding comfortable levels, the use of a greater number of quieter sounders should be considered.
- Two sounders installed on two independent circuits must be used on a fire system so that a failure on one circuit does not cause a total failure of all sounders.
- Most standard doors will cause a 20dB drop in sound levels. Fire doors will cause a drop of 30dB.
- For P systems, a red external sounder marked 'FIRE ALARM' is required.
- When mains Voltage sounders are used in addition to 24V DC sounders, the mains sounder supply must be monitored.

Smoke Detectors

- Optical smoke detectors are designed to rapidly detect visible and invisible smoke particles, in the range of 0.2µm to 60µm. An optical arrangement is located within a light proof chamber, which triggers the detector when smoke enters the chamber.
- Smoke detection devices have an individual coverage of 7.5m radius. However, these radii must overlap to ensure there are no 'blind spots'. The individual coverage can therefore be represented by a square measuring 10.6m x 10.6m giving an actual area coverage of 112m² per device.

Heat/Rate of Rise Detectors

- Fixed temperature heat detectors are suitable in environments where there is a high ambient temperature or in areas where sudden changes in the ambient temperatures are common e.g. boiler rooms, drying rooms, kitchens.
- Rate of rise detectors are designed to detect a fire as the temperature increases. They incorporate a fixed upper temperature limit if the rate of temperature increase has been too slow to trigger the detector earlier. These detectors are suitable where the ambient temperature is stable and a fast to sudden temperature increase is required, for example, areas unsuitable for smoke detection due to dust or other contamination.
- Heat detection devices have an individual coverage of 5.3m radius. However, these radii must overlap to ensure there are no 'blind spots'. The individual coverage can therefore be represented by a square measuring 7.5m x 7.5m giving an actual area coverage of 56.25m² per device.

Detector Selection

Type of Detector	Ideal Application	Unsuitable Application
Ionisation Smoke Detector	General purpose, ideal for fast flaming fires	Unsuitable for areas subjected to smoke, steam, dust or dirt during normal use
Optical Smoke Detector	General purpose, ideal for smouldering fires	Unsuitable for areas subjected to smoke, steam, dust or dirt during normal use
Combined Optical Smoke /Heat Detector	General purpose, ideal for both fast flaming and smouldering fires	Unsuitable for areas subjected to smoke, steam, dust or dirt during normal use
Optical Beam Smoke Detector	Large and high rooms	Unsuitable for areas subjected to smoke, steam, dust or dirt during normal use
Rate of Rise Heat Detector	Areas subjected to smoke, steam, dust or dirt during normal use	Unsuitable for areas subjected to temperatures of over 43°C and rapid changes of temperature
58°C Fixed Heat Detector	Areas subjected to smoke, steam, dust or dirt and rapid changes of temperature during normal use	Unsuitable for areas subjected to temperatures of over 43°C
78°C Fixed Heat Detector	Areas subjected to smoke, steam, dust or dirt and temperatures of over 43°C during normal use	Unsuitable for areas subjected to temperatures of over 70°C

Maximum Ceiling Heights for Detectors

Type of Detector	Maximum Ceiling Height
EN54-7 Smoke Detector	10.5m
EN54-5 Class A1 58°C Fixed Heat Detector	9m
EN54-5 Class B 78°C Fixed Heat Detector	6m
Optical Beam Smoke Detector	25m