

Shropshire Fire and Rescue Service

Fire Safety Advice Sheet

Fire Warning and Detection Systems

Introduction

All non-domestic premises to which the Regulatory Reform (Fire Safety) Order 2005 applies will be required to have a suitable method of both detecting a fire, and then of giving warning to the occupants of the building as part of the General Fire Precautions, so they have ample time to safely evacuate the building to a place of safety.

The type, complexity and standard of this warning and detection system will depend on a number of factors, but will include:

- The size and layout of a premises.
- The number of people who will need to evacuate.
- The abilities of those people to respond to a warning, their understanding of the warning signal, and the escape routes available to them.
- The circumstances of their occupancy within the premises e.g. familiarity with the layout, whether asleep or awake, any assistance they may require to evacuate or the requirements of any Personal Emergency Evacuation Plan (PEEP – see below).

What system do I need?

The type, extent and complexity of your fire warning and detection system can only be decided upon once a suitable and sufficient fire risk assessment has been carried out. This will enable you to identify the risks associated with a fire starting, where people are likely to be in relation to the escape routes and the fire itself, and how long it will take for them to evacuate. Further information is available in the government's guidance documents available through our web site detailed below.

In some small, open-plan, single-storey offices and shops, a fire may be obvious to everyone as soon as it starts. In these cases, where the number and position of exits and the travel distance to them is adequate, a simple shout of 'fire' or a simple manually operated device, such as a gong or air horn that can be heard by everybody when operated from any safe single point within the building, may be all that is needed. Where a simple shout or manually operated device is not adequate, it is likely that an electrical fire warning system will be required.

Note: The Health and Safety (Safety Signs and Signals) Regulations 1996 require any mains powered fire alarm system to be provided with a battery back-up to ensure continuity in the event of a mains power failure. It is not uncommon for false alarm signals to be generated when a fire alarm system switches between mains and battery power supplies, so any system should be installed correctly to prevent such an occurrence. This may include the fitting of surge or other protection devices, but advice should always be sought from a competent fire alarm engineer.

In larger premises, particularly those with more than one floor, where an alarm given from any single point is unlikely to be heard throughout the building an electrical system incorporating sounders and manually operated call points (break-glass boxes) is likely to be required. This type of system is likely to be acceptable where all parts of the building are occupied at the same time and it is unlikely that a fire could start without somebody noticing it quickly.

However, where there are unoccupied areas, or common corridors and circulation spaces in multi-occupied premises, in which a fire could develop to the extent that escape routes could be affected before the fire is discovered, an automatic fire detection system may be necessary. You may need to consider special arrangements for times when people are working alone, are disabled, or when your normal occupancy patterns are different, e.g. when maintenance staff or other contractors are working at the weekend.

For non-domestic premises that provide sleeping accommodation, some form of automatic fire detection is essential to provide the earliest indication of an outbreak of fire to people who are asleep. In simple premises of limited size/occupation e.g. ground and first floor with no floor larger than 200m² and with a small number of guest/residents (usually no more than 6), an alternative system of interconnected smoke alarms or point detectors, incorporating interconnected manual call points and, where necessary separate sounders may be acceptable.

However, most premises providing sleeping accommodation will need automatic fire detection which conforms to BS 5839: Part 1:2002, or other similar international standard. Automatic fire detection provides the means to know that you have a fire at the earliest possible time. It offers you the possibility of carrying out firefighting (because the fire is still small) and the maximum period of time to implement your emergency plan and to evacuate residents, staff or any other relevant persons.

The system can be linked to other active fire safety systems in your building (e.g. door closing devices and smoke control vents) so that they operate automatically. Automatic fire detection is usually needed in the following circumstances:

- for alerting people who are sleeping;
- if you have areas where people are isolated or remote and could become trapped by a fire because they are unaware of its development, such as lone workers;
- if you have areas where a fire can develop unobserved (e.g. storerooms);
- as a compensating feature, e.g. for inadequate structural fire protection, in dead ends or where there are extended travel distances;

- where smoke control and ventilation systems are controlled by the automatic fire-detection system;
- areas of high risk, e.g. boiler rooms, kitchens;
- to give warning to occupants of inner rooms;
- other areas such as, high risk unoccupied areas, storage areas and walk in cupboards, large rooms, access rooms to sleeping accommodation, areas or buildings served by a single stairway; and
- to reduce the effects of arson.

The precise design and scope of the system required will be subject to the findings of your risk assessment, advice from competent system designers and guidance from appropriate standards.

In large or complex premises, particularly those accommodating large numbers of people, such as department stores and multi-storey office blocks, it is likely that a more sophisticated form of warning and evacuation, possibly phased, should be provided.

British Standard BS5839: Part 1:2002 is the usual standard that covers fire warning and detection systems in non-domestic premises, but systems complying with other recognized standards are also usually acceptable. In some small, lower risk premises, it may be possible to install a lesser grade system and still achieve the same levels of safety. You will need to ensure, through your fire risk assessment that it is appropriate to move away from the recognised non-domestic standard, and that the safety of Relevant Persons is not compromised in any way. Where your fire risk assessment has determined that a lesser grade of system is suitable and sufficient, reference should be made to BS5839: Part 6:2005.

Vulnerable people

In many premises, there will be people who may be unable to recognise the normal audible fire alarm because of environmental conditions (noisy work processes) or through some sensory impairment such as a loss of normal hearing or sight. Fire warning systems can easily incorporate both visual indicators such as strobe lighting, or devices that vibrate upon activation of the fire alarm e.g. pillows or pagers.

The preparation of a Personal Emergency Evacuation Plan (PEEP) will allow you to identify vulnerable people and put in place those measures necessary to ensure their safety.

Maintenance and testing of fire warning and detection systems

All forms of fire warning and detection systems should be subject to regular testing and maintenance. The regime described in BS 5839: Part 1 states that:

⇒ Weekly test by the user

- Operate a manual call point to test the control panel can process the signal and operate the audible devices (bells/sirens).

- A different call point should be used each week, and their location recorded against each weekly test result in the log book.
- Where the facility is provided, check the fire alarm signal is received by any alarm receiving centre.
Note: the centre should be informed prior to the test not to send a '999' call resulting in an unnecessary attendance by the fire and rescue service, and you will need to confirm with the centre when the test has been completed.
- The weekly test should be carried out at the same time every week, but further tests may be necessary to ensure other staff e.g. night shift workers become familiar with the fire alarm, and staff should be instructed to report any instance of poor audibility.
- The test should last no longer than 1 minute, so that in the event of a genuine alarm at the time of the test, occupants will be alerted by the prolonged activation of the sounders.

⇒ **Monthly test by the user**

- If the back-up power supply is provided by either a generator or vented batteries (these are not the small batteries housed within the alarm panel), testing should be carried out in accordance with paragraph 44.3 of BS 5839:Part 1: 2002

⇒ **Inspection and servicing by a competent person**

- Unless a fault is shown on the fire alarm panel, when a competent and qualified engineer should be immediately contacted, most systems should be inspected and serviced by a qualified engineer at intervals not exceeding 6 months. Your fire risk assessment may determine that more frequent visits are necessary, or that the system is of sufficient size and complexity that it would be prudent to divide the testing into sections so that the overall frequency is still obtained e.g. 50% every quarter.
- Some equipment used in detection systems will require additional testing for example optical beam detectors or the correct functioning of heat and smoke detectors. Your competent service engineer will be able to advise you if such items should be tested annually to comply with the recommendations of the British Standard.

Records of these tests should be kept as proof of the maintenance of the system and to record any defects, subsequent repairs and routine maintenance.

Where 'non standard' fire warning systems are used e.g. air horns, a suitable test regime should be put in place that mirrors the tests contained in BS 5839.

Preventing false alarms

False alarms from electrical fire warning systems are a major problem (e.g. malicious activation of manual call points, inappropriate detection for the environmental conditions, poor or incomplete maintenance etc) and result in many unwanted calls to the fire and rescue service every year. To help reduce the number of false alarms, the design and

location of activation devices should be reviewed against the way the premises are currently used, and further advice is available in Advice Sheet AS6/2007.

Further information on fire warning and detection systems can be found in British Standard BS 5839 series, the fire safety guides published by HM Government available through our web site at www.shropshirefire.gov.uk or by telephoning Shropshire Fire and Rescue Service on 01743 260260.