



Fire detection and

Don Holmes looks in detail at the law regarding this important area of fire prevention



In this article we shall look at the requirements of BS 5839: Fire Detection and Fire Alarm Systems for Buildings. Due to the volume of information in this standard we will limit the content to an overview involving the following parts – Part 1: Code of Practice For System Design, Installation, Commissioning and Maintenance; Part 6: Code of Practice for the Design, Installation and Maintenance of Fire Alarm Systems in Dwellings.

Part 1

In general, it is appropriate to install some form of fire alarm system in all buildings other than very small premises that are open plan in layout.

In cases where there is uncertainty regarding the need for a fire alarm system, or the category of a system, reference should be made by the developer, potential purchaser or user to the following:

- guidance documents that support fire safety legislation
- any authority responsible for enforcing fire safety legislation
- the insurer of the property
- any relevant fire risk assessment.

Categories of system

Fire alarm systems are usually installed in buildings to satisfy one or more of the following objectives:

- protection of life
- protection of property
- protection against business interruption
- protection of the environment.

Category M systems are manual systems, for example a manually operated bell. Category L systems are automatic fire detection systems intended for the protection of life.

L1 systems are installed throughout all areas of a building, to offer the earliest possible warning of a fire to allow the longest possible time for escape.

L2 systems are installed in defined parts of a building. The system should meet the requirements of a category L3 system, with the additional objective of providing early warning of fire in specified areas.

L3 systems are designed to give a warning of fire at the early stage to enable all occupants, other than those in the room where the fire originated to escape safely, before the escape routes become impassable due to the presence of fire, smoke or toxic gases.

L4 systems are installed within escape routes consisting of circulation areas and spaces, eg corridors and stairways, to enhance the safety of the occupants by providing early warning of smoke.

L5 systems protect areas; the location of

detectors is designed to satisfy a specific fire safety objective not covered by any of the previous systems.

Category P systems are automatic fire detection systems intended for the protection of property sub-divided into two categories.

P1 systems are installed throughout all areas of the building, to offer the earliest possible warning of a fire in order to minimise the time between the ignition of the fire and the arrival of the fire fighters.

P2 systems are installed only in defined parts of a building, in order to provide early warning of a fire in high fire hazard areas or areas in which the risk to property or business continuity from fire is high.

Part 6

This code of practice covers fire detection and alarm systems specific to dwellings.

Fire risk assessment for dwellings

The final design of a fire detection and fire alarm system for a particular dwelling should where reasonably practical be based on a fire risk assessment.

When assessing the fire risk each room needs to be considered separately. Account needs to be taken of the statistical data when assessing the probability of fire. Table A.1 in part 6 of BS5839 titled Relative Frequency Of Fire in Rooms Within Dwellings provides such information. The table is based on information provided by The Office of The Deputy Prime Minister, which has been replaced by The Department for Communities and Local Government. A simplified version of this table is shown below.

Location	%
Kitchen	54
Bedroom, bedsitting room	12
Living room, dining room	12
Access area	6
Refuse area	3
Store room	2
Bathroom, cloakroom, WC	2
Roof space	1
Laundry	1
Airing cupboard, drying cupboard	1
Miscellaneous and unknown	7

Other factors which need to be considered are:

- the detection and warning objectives
- characteristics of the occupants
- lifestyle factors
- sources of ignition
- considerations for protection of property.

fire alarm systems

Grades of system for dwellings

The standard provides detail of six grades of system.

Grade A system is a fire detection and fire alarm system which incorporates control, indicating equipment and power supply equipment conforming to standards BS EN54-2 and BS EN54-4 respectively.

Grade B system is a fire detection and fire alarm system comprising fire detectors (other than smoke and heat alarms); fire sounders, control and indicating equipment and power supplies conforming to BS EN54-2 and BS EN54-4.

Grade C system is a system of fire detectors and alarm sounders connected to a common power supply, consisting normal mains and a standby supply with central control equipment.

Grade D system is a system of one or more mains powered smoke alarms, where each alarm has an integral standby supply.

Grade E system is a system of one or more mains powered smoke alarms with no standby supply.

Grade F system is a system of one or more battery powered smoke alarms.

Category of systems for dwellings

For the purpose of Part 6 of BS5839 systems are classified as follows.

Category LD is a fire detection and alarm system intended for the protection of life and is sub divided into three categories.

LD 1 is a system installed throughout a dwelling, incorporating detectors in all circulation spaces forming part of an escape route, also in all rooms and areas, in which a fire may start (excluding toilets, bathroom and shower rooms).

LD 2 is a system incorporating detectors in all circulation spaces that form the escape route and in all rooms or areas that are of high fire risk to the occupants.

LD 3 is a system incorporating detectors in all circulating spaces that form the escape route.

Category PD is a fire detection and fire alarm system intended for the protection of property and is sub divided into two categories.

PD1 is a system installed throughout a dwelling incorporating detectors in all rooms and areas in which a fire may start (excluding toilets, bathroom and shower rooms).

PD2 is a system incorporating detectors installed only in rooms or areas of a dwelling in which the risk of fire to the property is judged to warrant the provision.

Table 1 of the standard provides information on the

minimum grade and category of fire detection and fire alarm systems for the protection of life in typical dwellings.

Illustrated below is a simplified version of some of the information from that table.

DWELLING CLASS	New or materially altered dwellings complying with		Existing dwellings complying with		Existing dwellings where structural fire precautions are of a lower standard than	
	BS 5588-1 or guidance supporting Building Regulations					
	GRADE	CATEGORY	GRADE	CATEGORY	GRADE	CATEGORY
Single-family dwellings and shared houses with no floor greater than 200m ² Bungalow, flat or other single-storey unit	D	LD2	F	LD3	D	LD2
Maisonette or owner-occupied two-storey house	D	LD2	F	LD3	D	LD2
Three-storey house	D	LD2	D	LD3	D	LD2
Four (or more) storey house	B	LD2	D	LD2	B	LD2
Single-family dwellings and shared houses with one or more floors greater than 200m ² Bungalow, flat or other single-storey unit	D	LD2	D	LD3	D	LD2
Maisonette or two-storey house	B	LD2	B	LD2	B	LD2
Three (or more) storey house	Grade A, Category LD2, with detectors sited in accordance with the recommendations of BS 5839-1 for a Category L2 system					

Table 2 of the standard provides recommendations for the minimum grade and category of system that should be installed for the protection of property in typical dwellings. Illustrated is a simplified version of that table.

Dwelling Class	Grade	Category
Single-storey and two-storey dwellings	C	PD2
Other types of dwellings	A system conforming to the recommendations of BS 5839-1 for a Category P1 system	

In the next issue of *The Competent Person* I shall continue with types of fire detectors and their installation.