



TECHNICAL MEMORANDUM 022
(5 page document)

Houses in Multiple Occupation
General guidance relating to proposed fire alarm installations

Introduction

The installation of automatic fire detectors is required in new houses, flats and maisonettes in order to satisfy building regulations .

In existing houses in multiple occupation, the installation of an automatic fire detection and fire alarm system is normally required by the relevant enforcing authorities as part of an overall fire safety package.

This basic guidance gives information of the basic fire detection and alarm systems together with the system gradings and typical configurations relating to houses in multiple occupation only. This document does not amount to a design specification.

You are advised to always consult your professional designers and installers relating to compliant installations appropriate for your project circumstances, as well as consulting the relevant British Standards and Approved Documents.

Design considerations/grades of system

BS 5839: part 6 grades fire detection and alarm systems for residential premises according to the complexity of the system. For the purpose of specifying fire detection and alarm systems and the associated engineering design parameters, **there are six grades.**

For houses used in multiple occupation **grade A and grade D are most relevant**, but all six grades are described in table 1 as a general overview of systems listed.

Table 1: Grades of automatic fire detection and warning systems as specified in BS 5839: part 6 (2004)

System Grade	Description
GRADE A	<p>A fire detection and alarm system that is designed and installed in accordance with the recommendations of BS 5839: part 1 (2002), except clauses relating to alarm audibility, alarm warnings for the hearing-impaired, standby supplies, manual call points and radio-linked systems, which are replaced by part 6.</p> <p>This comprises a system of electrically operated smoke and/or heat detectors which are linked to a control panel. The control panel must conform to current BS 5839: part 4 (or equivalent). In general the system must incorporate manual call points which should be located next to final exits, and, in larger multi-storey properties, on each landing.</p> <p>The alarm signal must achieve sound levels of not less than 65dB (A) in all accessible parts of the building and not less than 75dB(A) at all bed-heads when all doors are shut, to arouse sleeping persons.</p>

GRADE B	A fire detection and alarm system including detectors (other than smoke or heat alarms), alarm sounders and control and indicating equipment which either conforms to BS EN 54-2 (power supply to BS EN 54-4) or to a simpler type laid out in annexe C of BS 5839: part 6.
GRADE C	A system of fire detectors and sounders (which may be combined in the form of smoke or heat alarms) connected to a common power supply with both mains and a standby supply, with an element of central control – for example a small dedicated fire control panel.
GRADE D	A system of one or more mains-powered smoke (or heat) alarms each with integral battery standby supply. These are designed to operate in the event of mains failure and therefore could be connected to the local lighting circuit rather than an independent circuit at the dwelling’s main distribution board. There is no control panel.
GRADE E	A system of one or more mains-powered smoke (or heat) alarms with no standby power supply. This grade of system will not function if mains power is disconnected or interrupted. It must therefore be wired to a dedicated circuit at the dwelling’s main distribution board.
GRADE F	A system of one or more battery-powered smoke alarms. These are not recommended in HMOs. <i>note: in grades D, E, and F, where more than one alarm is installed they must be interlinked.</i>
PLEASE NOTE THAT THIS GUIDANCE DOES NOT ADDRESS ESCAPE LIGHTING PROVISIONS	

Mixed grade systems

Is an arrangement whereby two different grades of fire detection and fire alarm system are provided within the same premises for the purpose of satisfying two different fire safety objectives.

These systems are installed to meet differing life safety objectives and may be to differing grades, having regard for the need to avoid false alarms from one dwelling unit affecting all occupiers, and any pertaining exceptions or circumstances relating to the subject premises. An example of such an exception is a House in Multiple Occupation (HMO) that has three or more storeys.

Table 1 of BS 5839: part 6 recommends a mixed system for HMOs of three storeys and above (grade A for communal areas and grade D within individual dwelling units). However, for shared house HMOs of normal risk on the basis of risk assessment, this guidance does not recommend a mixed system as detection is not normally recommended within bedrooms in this type of accommodation.

A “mixed grade system” results in a mixture of fire detection and alarm system grades, that meets both life safety objectives. You should although be aware that the objectives could be met by a single system which has detectors sited in accordance with BS 5839-1 and that incorporates smoke detectors in communal escape routes and in the circulation areas within dwellings (and detectors in any rooms in which protection is necessary within dwellings).

Level of protection:

Types of system BS 5839: part 6 (2019) recommends various levels of coverage for detection within premises, based on risk.

These are outlined below in table 2.

Table 2: Levels of coverage of automatic fire detection and warning systems as specified in BS 5839: part 6 (2019)

SYSTEM COVERAGE	DESCRIPTION
LD1	<i>A system installed throughout the premises, incorporating detectors in all circulation areas that form part of the escape routes from the premises, and in all rooms and areas, other than those with negligible sources of ignition, such as toilets, bathrooms and shower rooms;</i>
LD2	<i>A system incorporating detectors in all circulation areas that form part of the escape routes from the premises, and in all specified rooms or areas that present a high fire risk to occupants, including any kitchen and the principal habitable room</i>
LD3	<i>A system incorporating detectors in all circulation areas that form part of the escape routes from the premises.</i>

Guidance on grade and coverage of fire detection and warning systems within various types of existing residential premises

As outlined above, when specifying a system it is necessary to follow the principles of fire risk assessment. The design and complexity of the system should reflect the risk presented by the subject property and the type of occupier.

The recommendations for system design outlined in **table 3** below are based on a broad risk assessment using data sourced from BS 5839: part 6 (2019).

The recommendations constitute an acceptable benchmark and will, in the majority of cases, provide a reasonable level of protection. However, individual characteristics of the subject property must always be considered before specifying a particular system.

The recommendations below are based on properties considered to present a normal risk for their type.

They will have a suitable level of protection to the escape route and adequate other fire precautions as recommended in this guidance.

Their occupiers will not be from high-risk groups. If this is not the case in the property under consideration then the risk can be considered as higher, and it may therefore be considered appropriate to recommend a higher standard of fire detection and warning or provide additional fire safety measures as appropriate to the case.

DETERMINING STOREY HEIGHTS :

For the purposes of fire safety, when counting the number of storeys you should count all floors from the level of the final exit to the topmost floor (include mezzanines as storeys). Where the final exit is located on the ground floor (or raised ground floor) any lower ground floor/basement/cellar should not be counted.

Therefore, a house with a basement, ground and two upper floors with its entrance/final exit at ground floor level should be counted as a three-storey house.

Note: this is a different convention to that in the HMO licensing definition (which counts cellars/basements) as this guidance is considering the distance of travel to the final exit as a factor in determining fire risk.

Table 3: Recommended grade and coverage of automatic fire detection and warning system for various categories of existing residential premises (normal risk)

Project Arrangement	BS System configuration
1. Single household occupancy up to four storeys	Grade D: LD3 coverage (interlinked)
2. Single household occupancy up to four storeys	Grade D: LD3 coverage (interlinked)
3. Single household occupancy five or six storeys	Grade A: LD3 coverage
4. Shared house HMO of up to two storeys (shared cooking facilities)	Grade D: LD3 coverage + additional detection to the kitchen, lounge and any cellar containing a risk (interlinked)
5. Shared house HMO of up to two storeys (shared cooking facilities)	Grade D: LD3 coverage + additional detection to the kitchen, lounge and any cellar containing a risk (interlinked)
6. Shared house HMO of three or four storeys (shared cooking facilities)	Grade D: LD3 coverage + additional detection to the kitchen, lounge and any cellar containing a risk (interlinked)
7. Shared house HMO of five or six storeys (shared cooking facilities)	Grade A: LD2 coverage (detection in all risk rooms i.e. bedrooms, kitchen and lounge) (interlinked)
8. Bedsit HMO of one or two storeys with individual cooking facilities within bedsits	A mixed system: <ul style="list-style-type: none"> • Grade D: LD2 coverage in the common areas and heat detectors in bedsits (interlinked) • Grade D smoke alarm in each bedsit to protect the sleeping occupants (non-interlinked)
9. Bedsit HMO of three to six storeys with individual cooking facilities within bedsits	A mixed system: <ul style="list-style-type: none"> • Grade A: LD2 coverage in the common areas and heat detectors in bedsits (interlinked) • Grade D smoke alarm in each bedsit to protect the sleeping occupants (non-interlinked)
10. Two-storey house converted to self-contained flats (prior to Building Regulations 1991, approved document B standard)	A mixed system: <ul style="list-style-type: none"> • Grade D: LD2 coverage in the common areas and a heat detector in each flat in the room/lobby opening onto the escape route (interlinked) • Grade D: LD3 coverage in each flat (non-interlinked smoke alarm in the room/lobby opening onto the escape route) to protect the sleeping occupants
11. Three- to six-storey house converted to self-contained flats (prior to Building Regulations 1991, approved document B standard)	<ul style="list-style-type: none"> • Grade A: LD2 coverage in the common areas and a heat detector in each flat in the room/lobby opening onto the escape route (interlinked) • Grade D: LD3 coverage in each flat (non-interlinked smoke alarm in the room/lobby opening onto the escape route) to protect the sleeping occupants
12. Building converted partly into self-contained flats and partly into bedsits or non-self-contained lets	A mixed system: <ul style="list-style-type: none"> • Apply the appropriate recommendation for each unit of accommodation from this table and the appropriate whole-house system based on the storey height
13. Flat in multiple occupation (FMO) (any storey height and regardless of date of construction/conversion)	Grade D: LD3 coverage + additional heat detector in the kitchen (and shared living room depending on risk)