HOCHIKI

BLOG

BS5839-6 GRADE A

Why EN 54-29 and EN 54-30 Approved Multi-Sensors are Recommended for Grade A Domestic Fire Alarms

When it comes to fire safety in domestic premises like houses in multiple occupation (HMOs) and sheltered accommodation, taking the proper precautions is absolutely critical. A fire in these types of residences can quickly put multiple lives at risk. That's why the latest version of BS 5839 Part 6 (fire detection for residential buildings) specifies Grade A systems for certain high-risk areas, and in some instances, for the whole building.

Table 1 — *Minimum grade and category of fire detection and fire alarm system for protection of life in typical premises*

Class of premises	Minimum grade and category of system for installation in:			
	New or materially altered premises		Existing premises	
	Grade	Category	Grade	Category
Single-family dwellings [A] and shared houses [B] with no floor greater than 200 m² in area				
Owner-occupied [C] bungalow, flat or other single-storey unit	D2	LD2 [D]	F2 [E], [F], [G]	LD3 [F], [G], [H]
Rented bungalow, flat or other single-storey unit	D1	LD2 [D]	D1	LD2 [D]
Owner-occupied [C] maisonette with no floor above 4.5 m from ground level or owner-occupied two-storey house	D2	LD2 [D]	F2 [E], [F], [G]	LD3 [F], [G], [H]
Rented maisonette with no floor above 4.5 m from ground level or rented two-storey house	D1	LD2 [D]	D1	LD2 [D]
Rented maisonette with any floor above 4.5 m from ground level and with alternative means of escape	D1	LD2 [D]	D1	LD2 [D]
Any maisonette with any floor above 4.5 m from ground level and no alternative means of escape	D1	LD1	D1	LD1
Owner-occupied [C] three-storey house	D2	LD2 [D]	F2 [E], [F], [G]	LD2 [D]
Rented three-storey house	D1	LD2 [D]	D1	LD2 [D]
Owner-occupied [C] four- (or more) storey house	A	LD2 [D]	D2 [I]	LD2 [D]
Rented four- (or more) storey house	A	LD1 [D]	D1	LD1 [I]
Single-family dwellings [A] and shared houses [B] with one or more floors greater than 200 m² in area				
Owner-occupied [C] bungalow, flat or other single-storey unit	D2	LD2 [D]	D2 [I]	LD3 [F], [G], [H]
Rented bungalow, flat or other single-storey unit	D1	LD2 [D]	D1	LD2 [D]
Owner-occupied [C] maisonette with no floor above 4.5 m from ground level or owner-occupied two-storey house	A	LD2 [D]	D2 [I]	LD3 [F], [G], [H]
Rented maisonette with no floor above 4.5 m from ground level or rented two-storey house	A	LD2 [D]	D1	LD2 [D]
Rented maisonette with any floor above 4.5 m from ground level and with alternative means of escape	A	LD2 [D]	D1	LD2 [D]
Any maisonette with any floor above 4.5 m from ground level and no alternative means of escape	A	LD1	D1	LD1
Owner-occupied [C] three-storey house	A	LD2 [D]	D2 [I]	LD2 [D]
Rented three-storey house	A	LD2 [D]	D1	LD2 [D]
Owner-occupied [C] four- (or more) storey house	A	LD2 [D]	A	LD2 [D]
Rented four- (or more) storey house	A	LD1 [D]	A	LD1 [D]

Table 1 *(continued)*

Class of premises	Minimum grade and category of system for installation in:			
	New or materially altered premises		Existing premises	
	Grade	Category	Grade	Category
Houses in multiple occupation [K],[L] (HMOs)				
HMOs of one or two storeys with no floor greater than 200 m² in area	D1	LD1 [J]	D1	LD2 [D]
Other HMOs:				
Individual dwelling units, within the HMO, comprising a single room, which include cooking facilities (bedsits)	D1 [M]	LD1 [J],[N]	D1 [M]	LD1 [J],[N]
Individual dwelling units, within the HMO, comprising a single room, which do not include cooking facilities (bedsits)	D1 [M]	LD1 [J]	D1 [M]	LD1 [J]
Individual dwelling units, within the HMO, comprising two or more rooms	D1 [M]	LD2 [D]	D1 [M]	LD2 [D]
Communal areas of the HMO	Grade A, Category LD2, with detectors sited in accordance with the recommendations of BS 5839-1:2017 for a Category L2 system [O]			
Sheltered housing [F]				
Individual dwelling units	D2	LD1 [J]	D2	LD2 [Q]
Communal areas	Grade A in accordance with the recommendations of BS 5839-1:2017 for a Category L4 or L5 system [R]			
Self-catering premises or premises with short-term paying guests	D1	LD1 [J]	D1	LD1 [J]
Supported housing				
Single-storey	D1	LD1 [J]	D1	LD1 [J]
Two or more storeys and not more than four bedrooms	D1	LD1 [J]	D1	LD1 [J]
Two or more storeys and more than four bedrooms	A	LD1 [J]	A	LD1 [J]

[A] Including premises with long-term lodgers, but not boarding houses, the latter of which are outside the scope of this part of BS 5839.

[B] Houses shared by no more than six persons, generally living in a similar manner to a single family (e.g. houses rented by a number of students).

[C] Including premises in which lodgers live as their principal home.

[D] Heat detectors should be installed in every kitchen. A smoke detector should be installed in the principal habitable room (see 3.47). Where more than one room might be used as the principal habitable room, a smoke detector should be installed in each of these rooms. The detector in the principal habitable room (but not the kitchen) may alternatively be a carbon monoxide fire detector. However, consideration needs to be given to the potential for false alarms from a smoke detector in the lounge if a kitchen opens directly into, or is combined with, the lounge.

[E] A Grade F1 system should be installed if there is any doubt regarding the long-term suitability or reliability of a battery-powered system, i.e. the ability to replace batteries.

[F] Where electrical work such as a rewire is undertaken, a Grade D (D1 or D2), Category LD2 system should be installed.

BS 5839 Part 6 defines a Grade A system as:

Grade A: A fire detection and fire alarm system, which incorporates CIE conforming to BS EN 54 2 and power supply equipment conforming to BS EN 54 4, and which is designed and installed in accordance with all the recommendations of BS 5839 1:2017,

There are a few differences between the BS 5839 Part 6 (residential buildings) and Part 1 (commercial buildings), including battery standby. But an often-overlooked recommendation is **Section 5.2 (C) System**, that states

c) Multi-sensor fire detectors should conform to **BS EN 54-29, BS EN 54-30**

Therefore, when the use of multi-sensor fire detectors has been determined the best solution within a Grade A system, that these multi-sensors, must be independently tested and approved to the latest European product standards: EN 54-29 for multi-sensor fire detectors using a combination of smoke and heat sensors, and EN 54-30 for multi-sensor fire detectors using a combination of carbon monoxide (CO) and heat sensors.

The popularity of multi-sensors has been growing within the fire industry over the last few years because of their enhanced detection capabilities and resilience against the potential causes of nuisance alarms. But it's becoming increasingly important to ensure your multi-sensors are "true" multi-sensors, tested and accredited to the latest multi-sensors standards.

Improved Fire Detection with Multi-Sensing Technology

Traditional single-sensor smoke detectors have been around for decades and still play an important role in most domestic fire safety scenarios. However, in some circumstances their use as the only detection technology present in a building can sometimes lead to delayed fire detection or issues with nuisance alarms from sources like cooking fumes or steam.

Multi-sensor fire detectors overcome these limitations by analysing multiple combustion byproducts released by a fire. The **EN 54-29** approved models combine smoke and heat sensing, while **EN 54-30** certified detectors incorporate carbon monoxide (CO) sensing alongside heat detection.

By requiring confirmation from two different sensor types before triggering an alarm, these multi-criteria detectors can provide faster and more reliable fire detection compared to single-sensor smoke alarms. They are also better equipped to distinguish between fires and non-fire sources like cigarette smoke or shower steam that might cause nuisance alarms on regular smoke detectors.

Reducing Nuisance Alarms in Residential Settings

Frequent nuisance alarms are highly disruptive in any environment, but they are an even greater issue in domestic dwellings where residents are going about their daily lives. A smoke detector that frequently activates due to non-fire sources like cooking fumes or bathroom humidity is likely to be disabled or removed – leaving that area unprotected in a real fire emergency.

EN 54-29 and EN 54-30 approved multi-sensor detectors are designed to prevent this scenario through a combination of multi-criteria sensors and advanced algorithms that vastly improve their resistance to nuisance alarm sources. Their enhanced detection patterns and sensor combinations make it far less likely that they will be triggered by something like a brief burst of cooking smoke or humid air from a shower.

With fewer nuisance alarms to deal with, residents are much less inclined to remove or disable their fire alarm protection. This helps ensure the overall system remains reliable and effective at all times.

Meeting the Highest Standards for Life Safety

Beyond just their technical detection capabilities, EN 54-29 and EN 54-30 certified multi-sensor detectors provide an essential layer of assurance that they have been independently tested and verified to meet the latest European fire safety standards. Achieving these particular standards also shows the devices are using all detection elements to generate a fire decision and that they have passed all relevant fire tests .

Approvals from these EN 54 product certification schemes demonstrate that the fire detectors have passed rigorous performance evaluations for criteria like:

- Fire detection and nuisance alarm resistance across a wide range of test fires and environmental conditions, utilising all detection elements simultaneously to reach a fire decision.
- Electromagnetic compatibility and interference resilience
- Operational reliability requirements
- Environmental testing for factors like temperature, humidity, and corrosion resistance

With these comprehensive assessments complete, system designers and building owners/occupants can have confidence that EN 54 approved multi-sensor fire detectors meet the highest benchmark for life safety and performance in fire detection and alarm systems.

Aligning with New “Call Challenge” Policies

The importance of deploying reliable multi-sensor fire detectors is further underscored by recent policy changes in Scotland and other regions within the UK, aimed at reducing unwanted fire signals from automatic fire alarm systems. In 2023, the Scottish Fire and Rescue Service (SFRS) introduced a “Call Challenge” approach wherein emergency control room operators will challenge the duty holder at a premises before mobilising firefighter resources in response to an automatic fire alarm generated by just a single smoke sensor.

The goal of “Call Challenge” is to cut down on the high numbers of unwanted fire signals that crews attend each year, the vast majority of which turn out to be false alarms with no fire situation. However, premises with fire alarm systems still need to ensure their detectors provide highly dependable and accurate fire detection to avoid potentially catastrophic failures to mobilise firefighters in a real emergency.

This has led the SFRS to actively recommend the use of multi-sensor fire detectors over traditional single-sensor smoke alarms. The enhanced detection capabilities and resilience to nuisance alarms offered by multi-criteria detectors like those certified to EN 54-29 and EN 54-30 give the SFRS greater confidence in the fire signals they receive from those systems.

Conclusion

For Grade A domestic fire alarm applications covered under BS 5839 Part 6 where multiple lives may depend on fast and reliable fire detection and the use of multi-sensors has been recommended, only EN 54-29 and EN 54-30 approved multi-sensor fire detectors can provide enhanced detection capabilities, resilience against nuisance alarms, and compliance with rigorously tested European standards for life safety and performance within HMO and other residential settings.