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Queries and interpretations on BS 5839-1

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Summary of pages

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Foreword

Publishing information

This Published Document is published by BSI and came into effect on 30 October 2010. It was prepared by Subcommittee FSH/12/1, *Installation and servicing*, under the authority of Technical Committee FSH/12, *Fire detection and alarm services*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This Published Document supersedes PD 6531:1997, which is withdrawn.

Relationship with other publications

Since the publication of BS 5839-1, a number of queries on interpretation have been submitted to BSI. In some cases, the queries have shown that although the standard is correct, misunderstandings have arisen over both its interpretation and the philosophies behind its recommendations.

This document, therefore, gives not merely the queries and answers, but seeks to give the intentions of the standard in the hope that these might help future users of the standard.

Information about this document

This Published Document gives supplementary information on the recommendations and application of BS 5839-1:2002+A2; it does not in any way supersede the recommendations in BS 5839-1. Any user claiming compliance with BS 5839-1 is expected to be able to justify any course of action that deviates from its recommendations.

Unless stated otherwise, all clause and subclause references in this Published Document are to BS 5839-1:2002+A2.

This is a full revision of the Published Document and all queries and answers have been revised in line with BS 5839-1:2002+A2. All queries and answers relating to BS 5839-4 have been removed, as this standard has been withdrawn and superseded by BS EN 54-2 and BS EN 54-4.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a Published Document cannot confer immunity from legal obligations.

1 Scope

This Published Document gives queries concerning the interpretation of BS 5839-1:2002+A2, together with the relevant answers.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 5839-1:2002+A2:2008, *Fire detection and fire alarm systems for buildings – Part 1: Code of practice for system design, installation, commissioning and maintenance*

BS 7671:2008, *Requirements for electrical installations – IEE Wiring Regulations – Seventeenth edition*

3 Queries and interpretations on BS 5839-1:2002+A2

3.1 The use of isolators between zones

Query

BS 5839-1:2002+A2, **12.2.2**, sets limitations as to the effect of a fault or faults in the wiring. What is the philosophy behind these limitations? Why are the areas limited by a fault for addressable systems not identical to the zones for non-addressable systems?

Answer

The commentary to Clause **13** describes that zones should be small enough for the source of the fire to be quickly located. The recommended limit to the area of a non-addressable or addressable zone with automatic fire detection is given in **13.2.3a)** and **13.2.4b)** as 2 000 m². A zone should also be limited to one storey for buildings larger than 300 m².

Clause **12** includes the recommendations for system integrity. Subclause **12.2.2** recommends that a single short circuit or open circuit fault on an automatic fire detector circuit should disable protection neither within an area of more than 2 000 m², nor on more than one floor of the building plus a maximum of five devices (automatic detection, manual call points, sounders or a combination of these) on the floor immediately above and five devices on the floor immediately below that floor.

For a non-addressable system, and for an addressable system wired with a radial circuit for each zone, each circuit is dedicated to an individual zone, so the area limit for a zone would be identical to the area limit for system integrity (generally up to 2 000 m²).

For a loop wired addressable system, the area limits for zones and for system integrity need not be identical. A zone is limited to an area of 2 000 m², and system integrity also limits the area affected by a fault to 2 000 m². However, they need not be the identical 2 000 m² areas. Up to five devices on the floor above and up to five devices on the floor below may be included in the 2 000 m² area for system

integrity. For loop wired systems, the integrity for short circuit faults would be achieved using short circuit isolators, such that the area protected between isolators did not exceed 2000 m².

The five devices above and below were included so that the designer did not necessarily have to site the isolators exactly at the zone boundaries and to help expedite work at the installation stage so that if a void or riser not known to the designer were found, then it could be covered using some of these five devices.

It can be seen that for loop systems some flexibility is permitted. Where a storey is protected by just one zone, the flexibility would be the five devices above and below. Where a storey is larger than 2000 m², it would be protected by more than one zone of 2000 m² and more than one integrity area, also of 2000 m². The integrity areas in this case, providing they are within the 2000 m², need not be within the five devices or the zone boundaries.

3.2 Optical beam detectors in congested roof spaces

Query

We have a large warehouse with a series of bays, each having a shallow pitched roof. The warehouse is protected by optical beam smoke detectors, the beams passing close above the trusses supporting the roof. There is a high rate of false alarms (possibly due to birds perching in the beams) and our installers have recommended mounting the detectors so that the beams pass below the trusses. The beams will then be 1.8 m below the underside of the roof, although BS 5839:2002+A2, 22.3d), recommends that, for smoke detectors, this distance should not exceed 600 mm. Subclause 22.5c) states that the recommendations of 22.3d) apply. What should we do? The apex of the roof is 15 m above the ground, the eaves are 13 m above the ground and the bays are 25 m wide.

Answer

The revised system would not conform strictly to the standard, but this might be a case in which a variation from the standard should be considered. In a building of this type, the smoke usually rises into the apex of the roof, and then gradually builds downwards until it can pass under the valley of the roof into the next bay. It could be that detection beams at valley level would be satisfactory, since detection would occur while the smoke is restricted to one bay.

However, these beams would not be able to detect fires starting within the roof apex. If the apex contains fuel and ignition sources (such as electrical or mechanical equipment), it is important that detection facilities are placed higher than any potential fire.

3.3 Detectors in lift shafts

Query

BS 5839-1 recommends the provision of detectors within lift shafts. These can be difficult to install, particularly retrospectively, and give problems of ongoing maintenance. Under the circumstances, given the difficulties that provision creates, is it really necessary to install detectors within lift shafts?

Answer

The Committee acknowledges the difficulties described in the question. The original intention behind the provision of detectors within lift shafts in earlier editions of BS 5839-1 was to give warning of a fire within the lift shaft itself. A subsidiary benefit is to warn those responding to a fire that smoke from a fire outside the lift shaft is spreading vertically via the lift shaft.

Because of the difficulties described, when BS 5839-1 was revised in 2002, consideration was given to the possibility of omitting detectors from lift shafts. Accordingly, research was carried out into the frequency with which fires actually occur within the lift shaft itself. This research revealed that a significant number of fires still occur in lift shafts each year (according to statistics based on fire report forms completed by fire and rescue services). These appear to be caused by the build-up of detritus in the base of the shaft.

The Committee did introduce a relaxation whereby, for compliance with BS 5839-1, these detectors are not necessary in Category L4, L5 and P2 systems, although the standard does suggest that in the case of category L5 and P2 systems, the need for the provision of these detectors, over and above the detection necessary for compliance with the standard, should be considered at the design stage.

It should also be noted that BS 5839-1 is a Code of Practice. If it is considered (e.g. on the basis of a risk assessment) that, in any category of system, detection within lift shafts is unnecessary, a variation, whereby the detectors are omitted, may be agreed within the interested parties.

Where detection is necessary, forms of detection, other than point detection, could be considered (e.g. an aspirating system), or it might be possible for there to be an arrangement whereby the detector could be removed for maintenance from a position above the lift shaft, without the need for entry to the shaft.

3.4 Diagrammatic representation of the building/zone plan

Query

Other than in small buildings, where, arguably, a zone plan is less important, most modern fire alarms are of the addressable type, so that a clear text description of the location of a fire can be given. Under these circumstances, is there a need for a zone plan to be available in close proximity to the control panel?

Answer

The Committee has given consideration to the need for both zonal indicators and zone plans on more than one occasion since the advent of addressable systems. In considering the question, it should be noted that there is a clear relationship between the provision of zonal indicators and a zone plan, since the zonal indicators will be of little value without a diagrammatic representation of the building, showing its sub-division into detection zones.

The Committee is cognizant of the benefits afforded by an addressable system and its associated text display, particularly for those familiar with the premises and the operation of the fire alarm control and indicating equipment (CIE). However, at the time of a fire, the building might be

unoccupied, or those present (e.g. a contract security officer) might not be fully familiar with the building and designations given to areas or rooms within it. The Committee considers that zonal indicators provide immediate, at-a-glance information to those responding to an alarm signal, particularly firefighters, regarding the area to which firefighters should be dispatched.

The plan of the building is then extremely useful for firefighters in the orientation and determination of the best route to the detection zone of fire origin. Moreover, zonal indicators and the associated zone plan can provide firefighters with information regarding spread of fire, which might not be as readily obvious from scrolling through text information regarding detectors in the alarm condition, a process that would, in any case, prove difficult for those unfamiliar with the fire alarm CIE.

Notwithstanding the above, in subdividing a building into detection zones, the need to apply the search distance criterion is relaxed in the case of an addressable system in which the text display shows the location of the first detector to initiate an alarm signal (as this is the most likely location of the fire), but this relaxation only applies where the text information can be readily related to the associated zone plan, so that, again, firefighters can proceed directly to the exact location of the fire.

3.5 Use of a 500 volt insulation resistance meter every five years

Query

I have been told that all electrical circuitry needs to be checked with an insulation resistance tester every five years. This would require the removal of every field device.

Answer

There is nothing in BS 5839 that recommends such action. Furthermore, the current (seventeenth) edition of BS 7671, the IEE Wiring Regulations, makes it clear that the periodicity between inspections of electrical installations is a matter of assessment by the inspector. Dismantling of the system is to be avoided. Fire Alarm final extra low voltage (ELV) circuits from the CIE are all wired in fire resisting cable which is continuously monitored for faults by the CIE. The low voltage (LV) mains cabling is not continuously monitored and has to be assessed as part of the general electrical installation.

3.6 Time delays used with conventional control and indicating equipment (CIE)

Query

The Chief Fire Officers' Association (CFOA) *Policy for the reduction of false alarms and unwanted fire signals* [1] recommends that steps should be taken to limit transmission of false alarms to the Fire and Rescue Service by on-site call filtering, such as inclusion of an automatic time delay before the alarm signal is transmitted. How can I implement this recommendation on a conventional fire detection and alarm system and still comply with BS 5839-1:2002+A2, 35.2.7, which recommends that filtering should not be applied to signals initiated by manual call points?