



**BIM4Housing's Expert's Recommendations on Mitigating Risk
to Fire Alarm and Fire Detector Systems, while Strengthening the Golden**

Thread

(In their own words with edits)

Third Edition

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Below are recommendations that we, as BIM4Housing, are putting forward as the findings of our subject matter experts. We do not claim these findings to be definitive, but we would hope that they would provide 'accountable' and 'responsible' persons with some of the detail they would require to ensure that risks are mitigated.

Format

The structure of this set of information is designed to be consumed in various ways by different stakeholder groups doing different things. Therefore, information mentioned in one section may be repeated in another, so they can be applied to a particular activity.

Also, we have sought to organize the information to make it more machine-readable so, although the lists could be reduced by combining similar items, this would make them less easily used in applications.

Despite the need to edit and contextualise, we have tried to retain the authentic voice of our experts throughout. This is especially so in the Appendices, where no colloquialism is left unturned.

Terms of use

This document is not intended as an end-result, but as a snapshot of a dynamic, on-going piece of work being developed by Subject Matter Experts who represent the different interest groups.

We hope it is helpful, but it should not be used in isolation, since, as we have learned from our collaboration, no one knows everything- and experts often disagree. It should therefore be used to supplement other sources of information, all of which should be validated by a responsible person applying it to a project.

Comments and additional contributions are welcome, and a panel of volunteer experts will review suggestions to assess/validate them and augment our recommendations as required.

This document can be viewed, downloaded and commented upon at <https://bim4housing-blackbox.com/publications/>

INTRODUCTION

BIM4Housing Structure

We have six Working Groups of experts who understand the individual Stakeholder needs of Development, Design, Construction, Manufacturing, Operations, and the specialist Advisors who support the whole process. Each Working Group determines the problems they are experiencing that could be alleviated by better information, often from a different Stakeholder group and they collectively establish Workstreams to collaborate and share knowledge to come up with practical solutions.

They have established Workstreams for MMC, Data Standardisation, Sustainability and Fire Safety and the latter has, in turn, established Round Table workshops that bring together SMEs who really understand specific asset types.

(See Appendix 1 for Structure Diagram)

Fire Safety Methodology

In 2021 it was determined to take individual fire-critical assets and examine impacts and influences through their lifecycle. A series of online discussions were held, along with one-on-one calls and an email gathering of views and inputs. In 2022 this consultation culminated in a series of Roundtable discussions, each with a clear focus and targeted output. BIM4Housing's expert team was enhanced by guests from the GTI, along with other fire safety specialists throughout the process.

Phase 1 defined the over-arching questions that need to be answered, for each asset type, to deliver the BIM-plus solution necessary to the effective functioning of the Golden Thread in terms of Fire Safety.

The questions defined are:

- What risks does the asset mitigate?
- To what risks is the asset, itself, susceptible?
- What information is needed about an asset, to ensure it performs as required?
- What tasks/method statements/procedures are required to ensure the asset is installed, commissioned, inspected, and maintained properly?
- What level of competency/training needs to be in place?
- How should product changes be recorded?

Phase 2 sought to answer those questions, offering a set of recommendations to mitigate risk and to help to deliver The Golden Thread, through the effective management of required information.

Phase 3 saw the Recommendations published on the BIM4Housing Blackbox web site enabling further comment and input to enhance the document.

Phase 4 saw a second tranche of roundtables, which sought to update the Recommendations in the light of the Fire and Building Safety Acts and other industry changes. This Second Edition is the result.

Fire Alarm and Fire detector system Methodology

The output from a Roundtable (20th September 2021) was collated and contextualized and combined with further subject matter expert input. Significant participant engagement was achieved prior to the event. The resulting report was then peer-reviewed.

Now, eighteen months on, we are reviewing the Recommendations in light of recent legislation and any change in industry practice.

What is a Fire Alarm and Fire Detector system?

Approved document B, Fire Safety, Volume 2, Buildings other than dwelling houses (2019 edition), defines a fire alarm system as a: '...combination of components for giving an audible and/or other perceptible warning of fire.'

Live investigations of false fire alarms, published by BRE in December 2015, suggests that a Fire Detection and Fire Alarm System is '...control equipment that utilises detectors, warning devices and other components to detect fires and provide warning.'

Most fire detection and alarm systems operate on the same basic principles. If a fire is detected, then an alarm is triggered. This warns building managers and occupants that there may be a fire and that evacuation may be necessary. Some systems include remote signalling equipment which can alert the fire brigade or a remote monitoring centre.

Fire can be detected by; heat detectors, flame detectors, smoke detectors, carbon monoxide detectors and multi sensor detectors, or an alarm can be triggered at manual call points. Alarms may consist of bells, sirens, horns, lights or a combination these. Two power supplies are required, generally a mains supply and batteries providing 24 hours back up.

It is important that a thorough assessment of need is undertaken before a fire detection and alarm system is designed or purchased.

In the UK, fire alarm systems are categorised as:

L, (L1 to L5): automatic systems intended for the protection of life.

M: manual systems, fitted with sounders and call points.

P, (P1 and P2): automatic systems intended for the protection of property.

Fire detection and alarm systems can be divided into a number of general types:

- Conventional systems
- Addressable systems
- Analogue addressable systems
- Wireless systems
- Self-contained units

Conventional systems generally consist of a series of detectors and call points wired to a control panel which drives the detectors and a minimum of two sounder circuits, includes LED indicators and allows de-activation and resetting. Typically, separate circuits will be provided for each fire 'zone' (usually a floor of a building or a fire compartment). This separation into zones means that the approximate location of the fire is known and so the appropriate response can be instigated. It also allows for easier diagnosis of faults.

Addressable systems are similar to conventional systems, but the central control panel can identify exactly which detector or call point triggered the alarm (rather than just a zone), or whether communication has been lost with a detector. In this system the circuit is wired in a loop, with a number of detectors or call points on each loop. The loop can be powered from both ends, so that it continues to function even if there is a break in the loop (separate loops may still be provided for each zone).

The control panel can be programmed to show specific information or trigger specific responses for different detectors within the system. Addressable systems are generally used for larger or more complex installations because of the benefits of more accurate detection, and so fault finding, and the reduced wiring requirement.

Analogue addressable systems, or intelligent systems can include an analytical capability in each detector which can assess local parameters to determine whether there is a fire, a fault, or a maintenance requirement. This can be useful in preventing the occurrence of false alarms. A pre-alarm warning may be indicated if a detector is approaching a trigger condition.

Wireless fire alarm systems connect detectors and call-points to the control panel using wireless signals.

Self-contained fire alarm units are generally only suitable for small installations. They consist of a single unit, including break glass contact, sounder, power supply, battery, and charger.

FINDINGS

It was determined to look to 'codify' risks to enable teams to coalesce around tackling a problem, run scenarios to simulate what might happen and how collaboration can reduce the risk of them happening.

Clearly, it is not desirable for the 'Accountable Person' to be absolved of responsibility for not anticipating a risk, simply because it was not on this list of suggested risks- which should be considered a 'steer' not an absolute. However, without a list, it becomes impossible to define and deliver the information needed.

1. What are the component elements of Fire detection and Fire Alarm Systems?

- a) Fire alarm control panel
- b) Associated relays/accessories
- c) Fire detectors:
 - Manual call points
 - Beam detectors
 - interfaces between fire detection and fire alarm systems with ancillary systems and equipment
 - Point detectors:
 - Heat
 - Smoke
 - Carbon Monoxide
 - Multisensor variants
 - Optical/multidetector
- d) Interfaced systems
 - Aspirating air sampling very early smoke detectors
 - Linear heat detectors
 - Video smoke detectors
 - Wireless Detection
 - PAVA (public address voice alarm) systems
- e) Fire alarm devices:
 - Wireless alarms
 - sounders & voice sounders
 - visual fire alarm devices
 - vibrating devices
 - Beacons
- f) Remote signalling
- g) Fire resistant cables- type
 - FP200 & enhanced, FP400, FP600 rating from 30min – 2h
- h) Remote data extraction
- i) Containment and support system
- j) CIE (control and indicating equipment)

Are there any dependencies on other systems?

- a) Emergency lighting
 - o Escape and anti-panic
- b) Security CCTV
- c) Door Access control
- d) Mechanical Ventilation
- e) Natural gas supply cut-off
- f) Lifts
- g) Communication – red care (tele care)
- h) Automatic suppression systems
- i) Sprinklers and water mist
- j) Automatically Opening Vents and Smoke Control systems
- k) Electrical supply
- l) Electrical generator backup
- m) Back-up power supply
- n) Smoke control systems
- o) MCC (mechanical control) panels
- p) BMS system

Q1a. What risks does a Fire detection and Fire Alarm System mitigate?

- a) Failure to detect fire early
- b) Panic and confusion allowing early safe evacuation
- c) Property loss
- d) Loss of life

Q 1b. To what risks are Fire detection and Fire Alarm Systems, themselves, susceptible?

- a) Incorrect initial design
- b) Lack of weekly user tests
- c) Lack of six-monthly maintenance
- d) Changes to layout e.g., splitting rooms so automatic detection is not correctly sited
- e) False alarms
- f) Poorly designed cause and effect at the outset
 - o unintended operation
 - o difficulty in safe evacuation
- g) Inconsistency in design
 - o Residential Building - Cause & Effect when fire/smoke detected in communal area – Tenant's within the Flats are being told to Stay put or elsewhere to evacuate – no consistency
 - o Residential Building - Disconnect between common parts and residential areas detection systems
 - Often there is no connection for early warning
- h) Vandalism
- i) Detectors being muted or left in test
- j) Removal of detectors
- k) Covering over detectors
- l) Painting over detectors
- m) Incorrect location of detectors

- n) Failure to communicate with other systems (e.g. interfaces with automatic vents, smoke vents, ventilation)
- o) Fireman lift including programming of lift position and provision of a secondary power supply
- p) Power failure
- q) Incorrect dB levels
- r) Associated relays/accessories
- s) Incorrect sensor/sensitivity setting
- t) Moving a large metal object may alter the radio environment and disrupt communications (e.g. Scaffolding)
- u) Inadequate earthing and protection against shock from exposed metal parts
- v) Breaking (or displacing) the glass on an MCP
- w) Cable disconnection or system damage during works
- x) Dust covers left on detection devices during work

Q2. What information is needed about Fire detection and Fire Alarm systems to ensure they perform as required?

It is important to understand how the information will be used and how the context will vary what information is required. Initially, this was the subject of quite a lot of debate – largely driven by a worry about ‘information overload’. However, with a truly cross disciplinary team of SMEs, it was possible to drill down to understand the detail of why a role would need certain information.

The aim was to collect all the information all stakeholders need against all products and leave it to each role to configure their software applications to see only the information they need for that individual task.

- a) Cause and effect matrix and description of operation
- b) Location of interfaces
- c) Location of control and indication panel(s) inc x,y coordinates
- d) Location of manual call points for user tests
- e) Location of detectors inc x,y coordinates
- f) Contact details of maintenance contractor and call-out response time
- g) Manufacturer
- h) Model number
- i) Installer
- j) Commissioner
- k) basic system information to residents and tenants
- l) Ratings of the various cabling in the system
- m) Zone details
- n) The battery backup or life safety supply
- o) Clear evacuation and alarm plan
- p) Software version
- q) Setting of sound pressure levels of the system sounders (dB levels recorded)
- r) life cycle of components
- s) Location of paging systems and any vibrating pillows etc inc x,y coordinates.
- t) Location of any Vibrating pillows
- u) What standards the system complies with
- v) Category and level of system design i.e. Property, Life, Manual
- w) Grade of system design as per BS 5839-6 2019
- x) Identification of high-risk areas
- y) What certification & date of certification
- z) Electrical power and secondary supply sources
- aa) Types and location of notification e.g. flashing lights
- bb) Location and DB test of refuge areas
- cc) Volume dispersal and reach where communal alarms are concerned for a stay put policy for internal flats
- dd) The riser strategy when vertical becomes horizontal
- ee) The detection strategy changes. i.e. detection at every level inside the cupboard
- ff) Approval by the authorities for the configuration of alarm zones
- gg) Siting of Control And Indicating Equipment (CIE)
- hh) Design, Installation, and commissioning certificates of the system
- ii) Agreed variations on the original system design specifications
- jj) System events, e.g., Fire alarm / fault signals, routine maintenance visits
- kk) Certificate of acceptance

II) [O&M manual](#)

- mm) Fire Strategy which includes the design requirements of the system and includes a riser strategy with suitable compartmentation drawings to supplement the document
- nn) Associated certification required in line with appropriate certification authority (BAFE SP-203 or LPS1014)

Q3. What tasks are required to ensure Fire detection and Fire Alarm are installed, commissioned, inspected, and maintained properly?

It should be a given that any work on fire safety critical assets should always be undertaken by competent people, probably 3rd party accredited. However, that person must be supported with any information that they might need to reduce the risk of an important step being missed and to provide an auditable record of what tasks were completed. This is common practice in M&E maintenance, where the industry has developed a significant library of standard procedures and tasks lists, along with roles/competency required.

An air-conditioning unit, for example, is maintained by a qualified air conditioning engineer, but the engineer is also issued with a check list for them to record what was done.

A similar industry-wide check list for installation, commissioning, handover, maintenance and recycling could be agreed.

BS5839-1:2017 & BS5839-6:2019+A1:2020 Provides the details for Fire detection and fire alarm systems for buildings. Code of practice for the design, installation, commissioning and maintenance of fire detection and fire alarm systems in domestic premises.

Installed

As per BS 5389 and in line with manufacturers specifications for their equipment.

Consider the requirement to have 15lux in an event of emergency (emergency lighting) near Fire Fighting equipment. Location of such equipment should be established early and included in fire strategy, including illuminated and photoluminescent exit signage.

The installer should ensure that all control, indicating and power supply equipment that is likely to need routine attention for maintenance is sited in readily accessible locations that facilitate safe maintenance access.

Documentation and information including system drawings are completed reflecting as built status.

Commissioned

Test of the full cause and effects

Sound pressure levels recorded in all areas.

User training and system handover completed.

Entire system should conform to the requirements of BS5839-1:2017 & BS5839-6:2019+A1:2020, BS 7671, issue certificate of compliance and completion – independent verification if required.

Issue a certificate for the electrical supply.

Logbook is issued- including any subsequent amendments.

Maintained

Weekly user test

Monthly standby supply verification checks

6 monthly inspections and tests

12 monthly inspections and tests

The user should record all faults or damage in the system logbook and should arrange for repair to be carried out as soon as possible.

False alarm records

Battery replacement dates

By way of an example:

Industry-standard maintenance instructions – extract from BESA's SFG20.

Addressable Fire Alarm System

Code	Task	Action	Notes	Core Competency
23185.00.15	Log book	The system log book should be examined. It should be ensured that any faults recorded have received appropriate attention.		Specialist
23185.00.16	Visual inspection	A visual inspection should be made to check whether structural or occupancy changes have affected the compliance of the system with the recommendations of this standard for the siting of manual call points, automatic fire detectors and fire alarm devices.	Particular care should be taken to verify whether: 1. all manual call points remain unobstructed and conspicuous; 2. all manual call points are fitted with a protective cover which can be moved to gain access to the frangible element; 3. any new exits have been created without the provision of an adjacent manual call point; 4. any new or relocated partitions have been erected within 500mm horizontally of any automatic fire detector; 5. any storage encroaches within 300mm of ceilings; 6. a clear space of 500mm is maintained below each automatic fire detector and that the ability of the detector to receive the stimulus that it has been designed to detect has not been impeded by other means; 7. any changes to the use or occupancy of an area makes the existing types of automatic fire detector unsuitable for detection of fire or prone to unwanted alarms; 8. any building alterations or extensions require additional fire detection and alarm equipment to be installed. The building occupier should inform the maintenance engineer of any structural or occupancy changes which might affect the siting or operation of the detector.	Specialist
23185.00.17	False alarms	The records of false alarms should be checked in accordance with current British Standards. The rate of false alarms during the previous 12 months should be recorded. Action taken in respect of false alarms recorded should comply with the recommendations in current BS Codes of Practice.		Specialist
23185.00.18	Stand-by battery	1. The stand-by battery should be disconnected and full load alarm should be simulated. 2. Check correct battery fuse rating and charge rate. 3. Check battery voltage and connections and test together with charging equipment. 4. Check and record specific gravity of battery where applicable. 5. Simulate mains and charger failure. 6. Check that the battery is within the manufacturer's recommendations (including battery life).		Specialist
		1. Batteries and their connections should be examined and momentarily load tested with the mains disconnected (other than those within devices such as manual call points, detectors and fire alarm		

Smoke Detector

Code	Task	Action
21075.00.T1	Cleanliness	Check sensing device and where appropriate sampling system for cleanliness and possible obstructions.
21075.00.T2	Operation	Test for correct response and operation as per manufacturer's guidelines.
21075.00.T3	General	Check security of mountings. Inspect for physical damage. Check termination for tightness and corrosion. Check cable/pipework locally for fixing and condition. Verify correct location and installation as per manufacturer's instructions and check for any extraneous influences. Note settings prior to commencing maintenance. Check for element deterioration. Pneumatics - Particular attention should be paid to the quality of the instrument air. Check for contamination by dirt, oil or water. All sensors should be maintained in accordance with the manufacturer's recommendations. Special sensors such as are used for glycol concentration, detection of smoke and gas, together with sensors used in water treatment may require specialist attention.
21075.00.T4	Battery	Check batteries against battery life, condition and if necessary replace.

Gas Detector

Code	Task	Action
21076.00.T1	Flammable Gases and Oxygen Sensors	-
21076.00.T3	General	1. Check security of mountings. 2. Inspect for physical damage. 3. Check for cleanliness. Obscuration of sensors with dust can reduce sensitivity and affect the signal. 4. Check termination for tightness and corrosion. 5. Check cable/pipework locally for fixing and condition. 6. Verify correct location and installation as per manufacturer's instructions and check for any extraneous influences. 7. Note settings prior to commencing maintenance. 8. Check for element deterioration. 9. Pneumatics - Particular attention should be paid to the quality of the instrument air. Check for contamination by dirt, oil or water. 10. All sensors should be maintained in accordance with the manufacturer's recommendations. 11. Special sensors such as are used for glycol concentration, detection of smoke and gas, together with sensors used in water treatment may require specialist attention.
21076.00.T4	Carbon Monoxide Sensors	-
21076.00.T5	Cleanliness	Check sensing device and where appropriate sampling system for cleanliness and possible obstructions.
21076.00.T6	Operation	Test for correct response and operation.
21076.00.T7	General	1. Check security of mountings. 2. Inspect for physical damage. 3. Check for cleanliness. Obscuration of sensors with dust can reduce sensitivity and affect the signal. 4. Check termination for tightness and corrosion. 5. Check cable/pipework locally for fixing and condition. 6. Verify correct location and installation as per manufacturer's instructions and check for any extraneous influences. 7. Note settings prior to commencing maintenance. 8. Check for element deterioration. 9. Pneumatics - Particular attention should be paid to the quality of the instrument air. Check for contamination by dirt, oil or water. 10. All sensors should be maintained in accordance with the manufacturer's recommendations. 11. Special sensors such as are used for glycol concentration, detection of smoke and gas, together with sensors used in water treatment may require specialist attention.

Q4. What level of competency/training needs to be in place?

Industry training courses are vital, but they must be complemented by additional knowledge-transfer from people with many years real experience.

Individual manufacturers have product-specific training which complements the more general training. Such training resources need to be provided in all cases where a product is used – both for new build but also as part of the long-term H&S/O&M information, ideally held as machine-readable data in the Asset information model to ensure maintenance teams have easy access to critical information.

Installation

- a) Those involved in the design and installation should be able to demonstrate training /qualifications relevant to the systems they design/install and be members of a recognised organisation with accreditation through the likes of UKAS
- b) Competency of individual installers demonstrated through certification with a suitable 3rd party accreditation provider. This should include the provision of the manufacturer's fitting instructions
- c) Specification of which third party accreditations are acceptable
- d) BAFE SP203/ LPS1014 for fire alarms
- e) Electrical Certificates to be as the current version BS 7671 or as amended
- f) SDI19 for smoke control systems
- g) Domestic fire - Qualified Electrician NAPIT, SELECT etc.
- h) Expert manufacturer Installer training (such as City & Guilds, Aico)
- i) Installer should have manufacturer-led product-specific installation training, in addition to any formal UKAS accreditation
- j) Manufacturers should offer installation training, either in their own right, or sub-contracted out to a specialist to provide that service
- k) code of practice should include training materials
- l) Organisational acceptance for compliance of the installation

Maintenance

- a) Competency training. BSI Flex 8670 focuses on the competence of individuals and expects that organisations use this core criteria as part of their management of competency (planning, monitoring, reviewing etc.). This also enables the capture of the skills, knowledge, experience, and behaviours necessary to the undertaking of a defined role, function, activity, or task
- b) Manufacturer-specific installation, commissioning, inspection, maintenance/repair, replacement, and recycling requirements should be retained to inform future maintainers of the manufacturers' recommendations

- c) Mandatory awareness training should be in place for all people working on site and carrying out maintenance in buildings
- d) Training for the operational team should be required on Standards (BS, CEN etc) plus to give a basic understanding of how to read drawings, commissioning certs and O&M's
- e) Fire Risk Assessment (FRA) be carried out by a competent person to identify areas of high fire risk

Testing

- a) Audibility test should be tested weekly in line with BS 5839-8
- b) Operate one MCP during normal working hours at approximately the same time each week
- c) Additional tests at least once a month for any staff who are not usually present during the weekly test
- d) A different MCP to be tested each week so that all tested over time
- e) The alarm should not sound for more than a one minute so that the occupants can distinguish between tests and a real fire alarm
- f) If the standby power supply includes an automatically started emergency generator, this should be tested every month
- g) If the standby power supply has vented batteries, these should be inspected visually. Also, all vented batteries and their connections should be examined every three months by a person competent in battery technology
- h) Occupant testing of domestic systems will require some training

Q5. How are the changes from one product to another recorded?

Robust Change Management requires an information baseline against which the different states – current, proposed, final and ongoing change – can be measured and reported.

The baseline information should contain the required performance in a machine-readable/actionable form and the Change Management process should enable that to be compared with:

- a) the actual performance of the designed solution (probably generic)*
- b) the performance of the chosen product against the generic*
- c) the performance of an alternative (value engineered?) product*
- d) the record of what was actually used/installed.*

Requirements and Suggestions

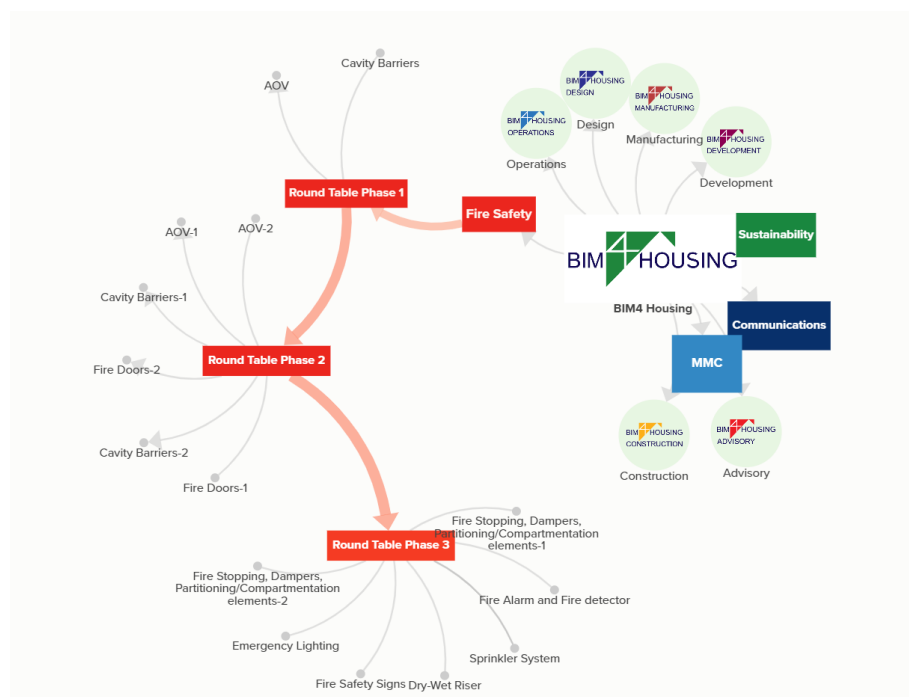
- a) A schedule of safety critical elements for the building, to include products specified
- b) This schedule would be “Locked” at a specific design stage, after which changes to products specified should not occur except for exceptional reasons
- c) Baseline against which to compare proposed alternative products (Some designers have expressed reluctance to propose (not specify) a specific manufactured product that will satisfy their design due to liability, procurement rules and fees)
- d) A formal change management system is required to ensure that any unavoidable changes are validated by a ‘responsible’ person e.g., original designer and/or fire engineer
- e) There is a well-established change management process in construction called Technical Submissions in which requested changes from the specifications/recommendations, that were created by the designers (and selected manufacturers), need to be formally reviewed and approved. Design-and-Build procurement has affected that process and it should be re-established in a way that the performance of a proposed product, and its constituent components, is easily compared with the proposed alternative and, if agreed, it is recorded as a Technical Deviation
- f) Validation of changes would include verifying that the new product met all the requirements for the application with no detriment to the overall design, the details of which should be recorded (Changes in the product may be made between design and procurement, procurement and installation, handover and ongoing maintenance)
- g) Listed as a part of draft Building Safety Case content is Cost .v. Quality with Evidence of Competency
- h) More onus needs to be made by the client to ensure collation of Information Requirements and the updating of design models into ‘as installed’ content suitable for Asset/Facilities Management. Compliance systems should be informed with the information from the AIM
- i) Full Disclosure of the product is needed at handover so that after Work Stage 7, if a manufacturer goes out of business or products change the record is there in perpetuity
- j) Asset database must be kept up to date with core data for new installs. Installation documents should be held in a centralised digital location. Once BIM/COBie level data is manageable within the asset management system then this will be used as the main source

of data. . Asset tagging (barcode) systems and processes should be considered as forming part of the change management process

- k) Procurement should be included in the process, recording what was purchased and feeding that into the BIM process to locate where they were installed, or which products they are replacing
- l) BIM, CAFM, Asset and Housing management systems must inform the change management process. The asset information needs to enable comparison but the original performance spec of the dry or wet riser and the related information such as Fire Strategy and Cause and Effect should form part of that Technical Deviation process. The FM's must be able to update the Asset Information Model with machine-readable data of the newly installed product
- m) H&S files for each building (cradle to grave) must be supplied, recorded and be updated with notification of changes and the implications
- n) Warranty information of the existing and the proposed products should be provided to allow proper consideration to be made on the selection of an alternative or replacement. If a product has a shorter life than another, this information should be available to inform selection. Given some of the products will be in locations that are difficult to locate, the longevity of a product could have safety implications
- o) Specification or design brief for the business (performance and or product) should be recorded in a machine-readable format to enable validation against the Golden Thread
- p) Recording who has worked on/replaced the component and their entitlement/competence to do so
- q) Evidence that the component's performance in relation to the part it plays in the system has been considered and is warranted
- r) Evidence of commissioning – cause & effect at completion
- s) Evidence of re-commissioning – cause and effect after change
- t) Cause and effect check list
- u) Use of the fire logbook to capture changes
- v) Evidence of procured product meeting appropriate British manufacturing standards

APPENDIX 1

BIM4Housing Structure



APPENDIX 2

Comply with BS5839-1:2017

Section 7: User's responsibilities

43 Premises management

43.1 Commentary

The user needs to appoint a single, named member of the premises management to supervise all matters pertaining to the fire detection and fire alarm system. The role of this person is to ensure that the system should be maintained in accordance with the recommendations of this part of BS 5839, that appropriate records are kept and that all relevant occupants in the protected premises are aware of their roles and responsibilities in connection with the fire detection and fire alarm system. This person also needs to ensure that necessary steps are taken to avoid situations that are detrimental to the standard of protection afforded by the system and to ensure that the level of false alarms is minimized.

43.2 Recommendations

A single, named member of the premises management should be appointed to supervise all matters pertaining to the fire detection and fire alarm system.

This person should normally be the keeper of the documentation as described in Clause 40 and should be given sufficient authority to carry out the following duties.

- a) Ensuring that the CIE is checked at least once every 24 h to confirm that there are no faults on the system.
- b) Ensuring that arrangements are in place for testing and maintenance of the system in accordance with Section 6 of this standard.
- c) Ensuring that the system logbook (see Clause 48) is kept up-to-date and is available for inspection by any authorized person (e.g. representatives of enforcing authorities and property insurers).
- d) Ensuring that all relevant occupants of the protected premises are instructed in the proper use of the system.

Particular care should be taken to ensure that relevant occupants are able to interpret fire, pre-alarm (see 47.3) and fault indications, and that they are adequately familiar with the appropriate controls, including those associated with initiation of fire alarm signals, silencing of fire alarm signals and resetting the system.

It should also be ensured that all occupants are aware of the measures necessary to avoid the generation of false alarms.

Relevant occupants should also be instructed in the facilities for disablement and the circumstances in which they should, and should not, be used.

In premises in multiple occupation, it should be ensured that sufficient representatives of each occupier are instructed.

NOTE 1 Different levels of instruction might be necessary for different occupants.

- e) Ensuring that appropriate action is taken to limit the rate of false alarms [see 30.2g), 30.2h) and 35.2.7.3].
- f) Ensuring that a clear space of at least 500 mm is preserved in all directions around and below every fire detector, and that all manual call points remain unobstructed and conspicuous.
- g) Establishing a liaison between those responsible for changes in, or maintenance of, the building fabric (including redecoration, etc.) to ensure that the work does not unnecessarily compromise the protection afforded by the system, create system faults or cause false alarms (see Section 3). If structural or occupancy changes occur or are planned, it should be ensured that any necessary changes to the fire alarm system are considered at an early stage.
- h) Ensuring that, when changes are made to the system, record drawings and operating instructions, supplied in accordance with 40.2b) and TO.2c j respectively, are updated.
- i) Ensuring that, where necessary, a suitable zone plan is displayed and is kept up to date [see 23.2.2e)].
- j) Ensuring that the following spare parts are held within the premises:
 - 1) six frangible elements and appropriate tools for manual call points, unless there are less than twelve manual call points in the protected premises, in which case only two spare frangible elements with appropriate tools need be held; and
 - 2) such other spare parts agreed between the user and the organization responsible for servicing the system.

NOTE 2 It would be of value for the premises management to be aware of the policy of the relevant fire and rescue service with regard to response to calls from the premises and/or any ARC, in the event of operation of the fire detection and fire alarm system.

43.3 Action in the event of pre-alarms

A pre-alarm can be a response to a slow growing fire or to indicate detector contamination. Whatever the reason, the following actions should be taken:

- a) determine and thoroughly inspect the area from whence the pre-alarm has originated.
- b) if a fire is discovered, carry out the predetermined fire routine; and
- c) if no fire is discovered, record the events or activities near the suspect detector in the logbook and, if there is need for work to be undertaken on the fire detection and fire alarm system, inform the maintenance company.

44 Logbook

44.1 Commentary

A logbook needs to be kept for the purpose of recording all events that occur in respect of the system, including fire signals, fault signals and work on the system. This information can be of value to the organization that services the system and if special action is taken to address false alarm problems. The logbook might provide evidence of compliance with certain fire safety legislation (such as the Regulatory Reform (Fire Safety) Order 2005 [12], the Fire (Scotland) Act 2005 [13], the Fire Safety (Scotland) Regulations 2006 [14], the Fire and Rescue Services (Northern Ireland) Order 2006 [15] and the Fire Safety Regulations (Northern Ireland) 2010 [16]).

44.2 Recommendations

Commented [JPM1]: Should this include the time limit allowed?

NOTE 1 A model format for a logbook is contained in Annex F.

The following information should be recorded in the logbook:

- a) the name(s) of the member(s) of the premises management to whom responsibility for the fire detection and fire alarm system is delegated.
- b) brief details of maintenance arrangements.
- c) dates and times of all fire alarm signals (regardless of whether the signal is a false alarm or is initiated as the result of a test, fire drill or genuine fire); if the fire alarm signal has resulted from the operation of a manual call point or fire detector, the device and its location should be recorded.
- d) causes, circumstances surrounding and category of all false alarms (see Section 3);
- e) dates, times, and types of all tests.
- f) dates, times and types of all faults and defects; and
- g) dates and types of all maintenance (e.g., service visit or non-routine attention).

NOTE 2 The logbook may be kept in electronic form but needs to be accessible for all interested parties.

BS EN 54-1 Fire detection and fire alarm systems - Introduction

BS EN 54-2 Control and indicating equipment.

BS EN 54-3 Fire Alarm Sounders

BS EN 54-4 Power supplies

BS EN 54-5 Point Heat Detectors

BS EN 54-6 product standards, including specific standards for sensors within Multisensor devices.

BS EN 54-7 Point Smoke Detectors

BS EN 54-10 Point flame detectors

BS EN 54-11 Manual Call Points

BS EN 54-12 Line fire detectors

BS EN 54-13 Compatibility

BS EN 54-14 Installation (BS 5839-8 in UK)

BS EN 54-16 Voice Alarm Control & Indicating Equipment

BS EN 54-17 Short circuit isolators

BS EN 54-18 Input Output Units

BS EN 54-20 Aspirating smoke detectors

BS EN 54-21 Alarm and Fault Routing

BS EN 54-22 Resettable Line heat detectors

BS EN 54-23 visual alarm devices

BS EN 54-24 Loudspeakers

BS EN 54-25 Components using radio links.

BS EN 54-26 CO Detectors

BS EN 54-27 Duct Detectors

BS EN 54-28 Non-resettable line-type heat detectors

BS EN 54-29 smoke & heat multisensor point fire detector.

BS EN 54-30 CO & Heat multisensor point fire detector.

BS EN 54-31 smoke, CO (and heat) multisensor point fire detector

APPENDIX 3

(For detectors)

How about we follow the BSI Fire. Vocabulary BS 4422:2005



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Fire Detection and Fire Alarm Systems

Fire Detection and Fire Alarm Systems

It is a legal requirement for all non-domestic/commercial properties to (where appropriate) equip the building with fire detectors and fire alarms. It is also part of these requirements to ensure they are maintained appropriately, ready to activate in the event of a fire.

As the person or team appointed responsible for fire safety in your building (Responsible Person/Duty Holder), it is important to demonstrate you have acted with due diligence to source a competent provider for these works. BAFE strongly recommends using an appropriately Third Party Certificated provider.

BAFE manage and maintain a Scheme called **BAFE SP203-1** which covers **Fire Detection and Fire Alarm Systems**. This Scheme exists to deliver quality, independent evidence that providers are competent to deliver **design, installation, commissioning** and/or **maintenance** fire detection and fire alarm system services.

3.313

fire detection system

system by which an alarm of fire initiated by a fire detector is given automatically at a central control panel.

3.282

fire alarm system

combination of components for giving an audible and/or other perceptible alarm of fire

APPENDIX 4

A Summary of BS 5839-1 (2017)

BS 5839-1:2017 FIRE DETECTION AND FIRE ALARM SYSTEMS FOR BUILDINGS — PART 1: CODE OF PRACTICE FOR DESIGN, INSTALLATION, COMMISSIONING AND MAINTENANCE OF SYSTEMS IN NON-DOMESTIC PREMISES

WRITER'S NOTES

1 The term 'premises management' is used to describe the individual or organisation that is responsible for the premises rather than 'responsible person' (which has a legal meaning) or building safety manager (which doesn't yet formally exist).

2 Codes of practice are not intended to be prescriptive and so include recommendations rather than requirements. However, this does not mean that the recommendations can be ignored, and variations need to be justified and formally agreed with relevant people.

3 BS 5839-1 Clause 7, Variations from the recommendations of this standard, describes how variations should be handled. However, in practice, installers tend not to include variations, no matter how sensible, because:

Someone has to take responsibility, and this is rarely forthcoming.
Variations may be used as an excuse to withhold payment.

4 Text in BS 5839-1 in *italics* is explanatory commentary and does not make recommendations – hence some odd phrases are used to avoid saying 'should'.

5 Fire alarms for dwellings are covered in BS 5839-6, but this does not include the common areas of general needs blocks of flats. These areas are not dwellings and so are within the scope of BS 5839-1.

6 Voice alarm systems, which are a type of fire alarm that is normally connected to a fire detection system, are covered by BS 5839-8.

7 Emergency voice communication systems, which are two-way speech systems for use by firefighters or for management to communicate with people in refuges, are covered by BS 5839-9.

8 Evacuation alert systems for residential buildings, which are a fire alarm for use only by the fire and rescue service as a last resort, and do not incorporate manual call points or automatic fire detectors, are covered by BS 8629.

WHEN ARE FIRE DETECTION AND FIRE ALARM SYSTEMS NEEDED?

The Foreword says "*national building regulations¹ require fire detection and fire alarm systems to be installed in many buildings at the time of construction. In addition, legislation requires that, where*

¹ England and Wales, Scotland, and Northern Ireland have their own building regulations

*necessary to safeguard relevant persons in case of fire, existing premises are equipped with "appropriate fire detection and fire alarm systems"*².

There are several references to residential care premises but there is no mention of general needs residential buildings, so it is not clear exactly what equipment, if any, should be installed in common areas of residential buildings².

Annex A, *Choice of appropriate category of fire detection and fire alarm system*, lists types of non-domestic premises including places of work such as shops, offices, factories and warehouses; hotels, schools, hospitals; places of assembly such as cinemas, theatres and churches; residential care homes, shopping centres, etc. Absence from the list does not mean that a fire detection and fire alarm system is not needed.

In all cases, a fire risk assessment should be carried out to determine whether a fire detection and fire alarm system is required and, if so, what type of system to install.

WHAT ARE FIRE DETECTION AND FIRE ALARM SYSTEMS?

Fire detection and fire alarm systems range from manually operated systems with no automatic detection, through to sophisticated, digitally controlled networks. BS 5839-1, which also applies to extensions and alterations to existing systems says: *"the term fire detection and fire alarm systems ... includes systems that range from those comprising only one or two manual call points and sounders to complex networked systems that incorporate a large number of automatic fire detectors, manual call points and sounders, connected to numerous inter-communicating control and indicating panels"*.

Clause 3 is a list of definitions, from "addressable system" to "zone plan".

Clause 4, *Need for a fire detection and fire alarm system and type of system*, gives guidance on whether a fire alarm is needed and clause 5, *Categories of system* talks about the different types of coverage for life protection (M for manual and L for automatic) and property protection (P) systems needed for different types of premises. It is OK for a system to use a mixture of categories to achieve the necessary outcome.

CATEGORY L AND M - LIFE PROTECTION

² The LACORS Guidance on fire safety provisions for certain types of existing housing gives guidance on fire alarms for blocks of flats, such as conversions, that do not comply with building regulations re fire precautions such as compartmentation. Its sibling, Fire safety in purpose-built blocks of flats, assumes that fire precautions will fully comply with building regulations, and says that fire alarms are not normally recommended in common areas. However, it does not offer any advice on purpose-built blocks that do not comply with the building regulations, nor what to install. The writer's view is that the LACORS guide should be used in this case.

CATEGORY M

Category M systems rely on humans to operate manual call points (MCPs) and are useful for places where occupants are likely to notice a fire quickly, or where automatic fire detection would not be reliable, such as workshops. All Category M installations need fire alarm devices such as sounders and visual alarm devices (VADs), to warn people who may be present.

Example of a manual call point



CATEGORY L

Category L systems are designed to protect life and so focus on installing automatic fire detectors in escape routes and areas with a high fire risk. There are five categories, L4 gives the least cover and L1 gives total cover. L5 is an 'engineered' solution designed to suit specific risks.

Category L installations should have fire alarm devices such as sounders, VADs, or voice alarms throughout the building regardless of the requirements for detection devices.

Example of a sounder VAD (beacon)



CATEGORY L4

Category L4 has MCPs throughout the building and at all final exits and automatic fire detection (AFD) in all escape routes, including stairwells.

A typical optical smoke detector



CATEGORY L3

L4 plus AFD in all rooms, corridors and compartments that open onto escape routes.

CATEGORY L2

L3 plus specified areas of high fire hazard level and/or high fire risk.

CATEGORY L1

L1 recommend MCPs and AFD throughout the entire premises. Care should be taken to choose the detector types according to not only the fire risks in each room, but also the persons at risk. For example, heat detectors should not be the primary detector type in bedrooms as they will not provide quick enough warning to protect the occupant's life.

CATEGORY L5

Category L5 is used to meet special fire safety objectives, often in variation to the recommendations of BS 5839-1. In common areas of residential buildings this might mean omitting MCPs due a perceived risk of misuse.

CATEGORY L5/M

This is a combination of a category M system (MCPs and fire alarm devices throughout) with AFD or other specialised systems with the intention of protecting life in specific areas.

CATEGORY P - PROPERTY PROTECTION

Although intended to protect property, most Category P systems will provide some protection for life and will be used in addition to Category L requirements. Category P systems are usually provided in response to assessments made by insurance companies.

CATEGORY P1

P1 is intended to protect the entire building, and thus requires AFD throughout the premises. However, it is focused on the protection of property so alarm devices (sounders, VADs, voice alarms, etc) are only required where people are likely to be present such as a manned office.

CATEGORY P1/M

This means that a full Category M system should be combined with a full Category P1 system and there should be AFD, MCPs, and alarm devices throughout the building.

CATEGORY P2

Category P2 uses AFDs in high-risk areas only and are commonly used when combining with a life protection system other than Category M. For example, a building may have L3 protection for escape routes and adjoining rooms, with additional AFD in a server room that is not directly connected to an escape route.

CATEGORY P2/M

AFDs as specified for P2 with MCPs and alarm devices throughout the building as per a Category M installation.

SECTION 2, DESIGN CONSIDERATIONS

THE MAIN DESIGN CONSIDERATIONS FOR A FIRE DETECTION AND FIRE ALARM SYSTEM

Section 2 covers the design process from defining the system category and its fire safety requirements to electrical earthing. Each clause is presented in a clear and easy to follow format, with a commentary on each design aspect, followed by a list of recommendations.

This is a very basic guide so here are important topics.

SYSTEM TYPE

The commentary in 8.1.1, says " *The appropriate extent of automatic fire detection is normally determined by a fire risk assessment, rather than a rigid application of system category to every building of a specific type or occupancy.*

SYSTEM COMPONENTS

It is important that system components, e.g., MCPs, automatic fire detectors, sounders, control and indicating equipment (CIE) and other devices conform to relevant British Standards or are third-party certified to the EN 54 series of European Standards.

MONITORING, INTEGRITY AND RELIABILITY OF CIRCUITS EXTERNAL TO CONTROL EQUIPMENT

The design should limit the effect of faults or maintenance work. A fault (but not fire) signal needs to be given at the CIE in the event of any failure in a critical signal path, which comprises all the components and interconnections between every manual or automatic fire alarm initiation point and the input terminals of each fire alarm device, as well as transmission equipment within the premises for routing of signals to an Alarm Receiving Centre (ARC).

DETECTION ZONES

Sub-dividing a building into detection zones of MCPs and / or AFDs, is recommended for all but the smallest premises. This ensures that those responding to a fire alarm are directed to the location of the fire.

ALARM ZONES

Most premises have a simple 'one-out all-out' evacuation procedure in the event of fire. When an MCP or AFD is activated, an alarm sounds throughout the building to warn everyone to leave. However, in more complex buildings a phased evacuation policy might be appropriate, in which case separate alarm zones will be required. In this case it is recommended that the boundaries of every alarm zone are of fire-resisting construction. As this means that people in some parts of the building will not hear the alarm unless the fire spreads the configuration of alarm zones might require approval by the authorities.

COMMUNICATION WITH THE FIRE AND RESCUE SERVICE

If fire breaks out it is important that the fire and rescue service is alerted as quickly as possible. Depending on the category of system this can be achieved manually via a telephone call or automatically via a 24-hour manned alarm receiving centre. Category M and category L systems are acceptable in buildings without sleeping accommodation, but category L systems in buildings with sleeping accommodation and category P are likely to benefit from automatic transmission of alarm signals.

Strangely, power supplies, cable types and cable routing for alarm routing equipment that do not comply with BS 5839-1 need not be regarded as a variation in the minimum standby battery capacity and any cable(s) between the CIE and the alarm routing equipment must conform to the recommendations.

FIRE ALARM DEVICES

It is essential that alarm signals can warn all those for whom they are intended. In some situations, e.g., in noisy spaces or in spaces where people with impaired hearing will often be alone, such as toilets and hotel bedrooms, it may be necessary to supplement the audible alarm with a flashing light from a VAD, although it is not normally recommended that only a visual alert is used.

In sleeping accommodation such as residential care homes, additional tactile alarm devices that can be placed under pillows or mattresses may also be appropriate. The Standard also gives recommendations relating to portable equipment (paggers) carried by staff or hearing-impaired occupants, usually controlled by radio.



A typical vibrating "pillow pad"

MANUAL CALL POINTS

MCPs need to be prominently sited, easily distinguishable from non-fire alarm call points, and distributed so that it is not possible to leave the floor or building without passing one. They should also be enough to ensure that the time between the discovery of a fire and the alarm being sounded is as short as possible. Breaking (or displacing) the glass on an MCP should result in an alarm signal being sent to the CIE immediately, although protective covers may be fitted.

TYPES OF FIRE DETECTOR AND THEIR SELECTION

Automatic fire detectors detect one or more of the four main components of a fire, which are: heat, smoke, carbon monoxide; and infrared and / or ultraviolet radiation from flames.

Multi-sensor fire detectors are increasingly available and contain more than one sensor type, each of which responds to a different characteristic of fire. Signals from Multisensors can be analysed by algorithms so that, for instance, a smoke detector will normally be relatively insensitive and so avoid false alarms. However, if the temperature is increasing, the smoke sensitivity is also increased, and a fire alarm signal will be sent very quickly. It is important to make sure that multisensors are certified to the relevant EN 54 standards, which are:

BS EN 54-29 smoke & heat multisensor point fire detector

BS EN 54-30 CO & Heat multisensor point fire detector

BS EN 54-31 smoke, CO (and heat) multisensor point fire detector



Example of a fire detector and fire alarm device comprising smoke, heat and carbon monoxide detection with an alarm sounder and visual alarm device.

The choice of AFD for each space is governed by three main considerations: the speed of response required, as determined by the fire risk assessment and fire safety objectives; the need to minimize false alarms; and the nature of fire hazard. Other issues such as cost and maintenance requirements

may also be significant. It is important that all factors are considered at the design stage as no one type of fire detector is suitable for all applications.

The spacing and siting of fire automatic fire detectors is very technical and is covered in detail in sub-section 22.

CONTROL AND INDICATING EQUIPMENT (CIE); NETWORKED SYSTEMS

The CIE, which is normally installed in an entrance lobby where it can be accessed by the FRS, performs the following main functions: supply of power and automatic monitoring and control of external circuits external; indication of fire and fault signals and their location; and manual controls to enable actions such as routine testing and resetting the system.

In networked systems, the functions of the CIE are distributed amongst several "sub-panels" that are located around the building and interconnected by means of a network. Some sub-panels may only act "repeat indicators", while others may be fully functional control and indicating panels that will continue to operate normally even if the communications link between the sub-panels fails

The rest of Section 2 covers topics such as power supplies; cables, wiring, radio-linked systems and electromagnetic compatibility with other equipment such as mobile phones. The final clause (29) concerns electrical earths with attention drawn to maintenance issues and the need to ensure the adequate earthing and protection against shock from exposed metal parts.

THE MAIN INSTALLATION ISSUES

Fire alarms are electrical systems that need to be connected to the mains electricity supply by an electrician who can issue an electrical safety certificate. According to the IET, an electrician is generally someone who has completed an apprenticeship and holds a Level 3 technical and vocational qualification or Level 3 Diploma.

However, there are no legal requirements for installers of fire alarms to have any formal qualifications, but there are several schemes for demonstrating competence that will help responsible clients ensure that work is of an acceptable standard, such as BAFE SP203.

LIMITING FALSE ALARMS

It is vital that MCPs or AFDs are sited so that the possibility of false alarms is limited as much as possible: for example, smoke detectors should never be fitted in kitchens (cooking fumes) or bathrooms (steam). Clause 21, Types of fire detector and their selection, describes the fundamental design considerations when using point AFDs and optical beam smoke detectors, and offers an example of the issues that might be picked up and flagged to the designer or end user at the installation stage.

BS 5839-1 makes it clear that, unless the installer is also the designer, "the identification of design shortcomings is not generally the responsibility of an installer", however, best practice is that "if the installer is aware of such shortcomings, particularly those arising from features of the building that might not have been known to the designer, they be drawn to the attention of the designer, user or purchaser".

RESPONSIBILITY FOR COMPLIANCE

It is important that, before the installation of a fire detection and fire alarm system starts, one organisation accepts responsibility for compliance of the installation. This is emphasised because

more than one organisation may be involved from design through to installation, commissioning and handover.

For example, following the risk assessment, a designer may specify the system for quotation. The successful bidder is likely to be a main electrical contractor, who may sub-contract the work to a specialist fire alarm contractor, who may, in turn, employ sub-contractors for running cables. In this case, it is likely that the specialist fire alarm contractor will accept the responsibility and issue the relevant certificates

WHAT HAPPENS ONCE THE INSTALLATION IS COMPLETE?

COMMISSIONING

Commissioning involves testing the installation for compliance with BS 5839-1 and the specification. This should be carried out by a "competent person", who possesses the relevant current training, experience and capability to perform the task in accordance with all the relevant drawings and reference materials.

The purpose of commissioning is to ensure the installation was carried out and that the system operates correctly as designed, and that, for example, the audibility of the sounders is acceptable.

DOCUMENTATION

Adequate records and other documents must be provided to purchaser of the fire detection and fire alarm system. It is particularly important to include accurate "as-fitted" drawings and operation and maintenance manuals describing operational details of the system. Also, design, installation and commissioning certificates and records of any agreed variations from the design specification.

A logbook should be provided for the user to record all system events, such as weekly tests, fire alarm and fault signals, routine maintenance visits, etc. Annex F gives an example of the layout of an acceptable logbook.

CERTIFICATION

Once a system has been commissioned, certificates must be provided for design, installation and commissioning. Certification can be carried out more than one organisation but, *"it is essential that the person who signs these certificates is competent to verify whether the recommendations of this Standard in respect of the process to which the certificate refers have, or have not, been satisfied"*. Annex G gives examples of model certificates.

Following satisfactory certification, the system should be formally handed over to the purchaser. At this point, the organisation that has accepted responsibility for the system should issue a certificate of acceptance for the purchaser to complete.

On large or complex installations, the purchaser may commission an optional independent check of the system, in which case Annex G also includes a model verification certificate, that can be used to confirm compliance with the recommendations of BS 5839-1.

Once the handover has been completed, responsibility for the day-to-day running and maintenance of the system passes to the premises management, which is covered by Section 6, *Maintenance*.

MAINTENANCE

Regardless of the system's built-in fault monitoring, this cannot be relied on to ensure that a fire detection and fire alarm system will always be fully operational and that no changes have taken place to the building that will prevent this happening.

There are three main reasons for routine maintenance and testing

1. To identify any faults and make sure they are rectified
2. To ensure there have been no major failures of the system
3. To familiarise occupants of the building with the fire alarm signal(s)

It is important that the premises management to institutes set up a schedule of weekly and monthly tests, and record them in the logbook (Annex F).

WEEKLY USER TESTS

1. Operate one MCP during normal working hours at approximately the same time each week
2. Additional tests at least once a month for any staff who are not usually present during the weekly test
3. A different MCP to be tested each week so that all tested over time.
4. The alarm should not sound for more than a one minute so that the occupants can distinguish between tests and a real fire alarm.

Voice alarms should be tested weekly in line with BS 5839-8, which recommends that, because the meaning of a voice alarm is very clear, it is likely that occupants will respond in less than a minute, weekly tests should be done out of hours with one test every three months when the building is occupied.

MONTHLY USER TESTS

1. If the standby power supply includes an automatically started emergency generator, this should be tested every month
2. If the standby power supply has vented batteries, these should be inspected visually. Also, all vented batteries and their connections should be examined every three months by a person competent in battery technology

INSPECTION AND SERVICING BY A SPECIALIST

It is important that regular inspection and servicing of is carried out to identify and rectify any faults, including causes of false alarms. The user should be notified of any changes made to the building such as extensions, alterations, or remedial work that might affect the fire alarm. Changes in use and or occupancy levels can also alter the effectiveness of the fire alarm so this must also be considered.

Inspection and servicing visits should not be more than six months apart and failure to implement this recommendation will result in the system no longer being compliant with BS 5839-1, with no allowance for variation.

Because of the specialist nature of the work, inspections are usually contracted out to a fire alarm service organisation, whose competence can be assured by third-party certification such as BAFE SP203.

Functions included in the periodic inspection and testing of the system include an examination of the logbook including following up on any recorded faults, and a visual inspection of all the MCPs, AFDs and fire alarm devices, Clause 45.3 gives recommendations for periodic system inspection and

testing as well as some annual tasks. As this is a labour-intensive, some elements can be spread over two or more service visits during each twelve-month period.

Clause 45.3 also recommends that all types of detectors be tested in such a way that the stimulus they are designed to measure (normally smoke) passes into each detector and is detected. This is normally done with a special test 'pole' that injects a tiny amount of stimulus into the detector.

Clause 45.4.j. gives recommendations for the testing of multi-sensor detectors.

There are several recommendations related to non-routine attention to the fire alarm. These range from the appointment of a new servicing organisation, which will need a special inspection of the system, through fault repair and system modifications to inspection and test of the system following a fire.

USER'S RESPONSIBILITIES AND PREMISES MANAGEMENT

Fire detection and fire alarm system are intended to protect life and or property and so it is essential that maintenance, inspection and testing of are carried out on a regular, scheduled basis.

This is a complex process that can involve several different parties, so BS 5839-1 recommends that the system user appoints *"a single, named member of the premises management to supervise all matters pertaining to the fire detection and fire alarm system"*. This places responsibility firmly in the hands of one individual whose role is *"to ensure that the system is tested and maintained in accordance with the recommendations of this part [Section 7: User's responsibilities] of BS 5839"*.

These responsibilities include: the keeping the system records and relevant documents, ensuring that occupants of the protected premises are aware of any role or responsibility assigned to them in respect of the fire detection and fire alarm system; and that the system itself is protected from any development that might negatively affect the standard of protection or contribute to false alarms.

The logbook is important and should contain details of the person responsible for the fire detection and fire alarm system and a record of all events, whether scheduled or not, such as tests, routine maintenance visits, fault signals, alarm signals, etc). This information can be invaluable to whoever services the system and might also provide evidence of compliance with fire safety legislation, should the need arise.

LIST OF EN 54 PRODUCT STANDARDS

- BS EN 54-1 Fire detection and fire alarm systems - Introduction
- BS EN 54-2 Control and indicating equipment
- BS EN 54-3 Fire Alarm Sounders
- BS EN 54-4 Power supplies
- BS EN 54-5 Point Heat Detectors
- BS EN 54-7 Point Smoke Detectors
- BS EN 54-10 Point flame detectors
- BS EN 54-11 Manual Call Points
- BS EN 54-12 Line fire detectors
- BS EN 54-13 Compatibility

BS EN 54-14 Installation (BS 5839-1 in UK)

BS EN 54-16 Voice Alarm Control & Indicating Equipment

BS EN 54-17 Short circuit isolators

BS EN 54-18 Input Output Units

BS EN 54-20 Aspirating smoke detectors

BS EN 54-21 Alarm and Fault Routing

BS EN 54-22 Resettable Line heat detectors

BS EN 54-23 visual alarm devices

BS EN 54-24 Loudspeakers

BS EN 54-25 Components using radio links

BS EN 54-26 CO Detectors

BS EN 54-27 Duct Detectors

BS EN 54-28 Non-resettable line-type heat detectors

BS EN 54-29 smoke & heat multisensor point fire detector

BS EN 54-30 CO & Heat multisensor point fire detector

BS EN 54-31 smoke, CO (and heat) multisensor point fire detector.

DISCLAIMER

This guide is an overview of the main recommendations of BS 5839-1 2017, and, of necessity, a lot of detail is missing so it must not be relied on. If you need to understand details of the standard, a copy can be bought from the BSI <https://shop.bsigroup.com>.

no Appendix or reference to BS 5839-6

APPENDIX 5

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