SFS
SABRE FIRE & SECURITY

BS5839 PART 1: 2017

A GUIDE TO FIRE ALARM SYSTEMS DESIGN

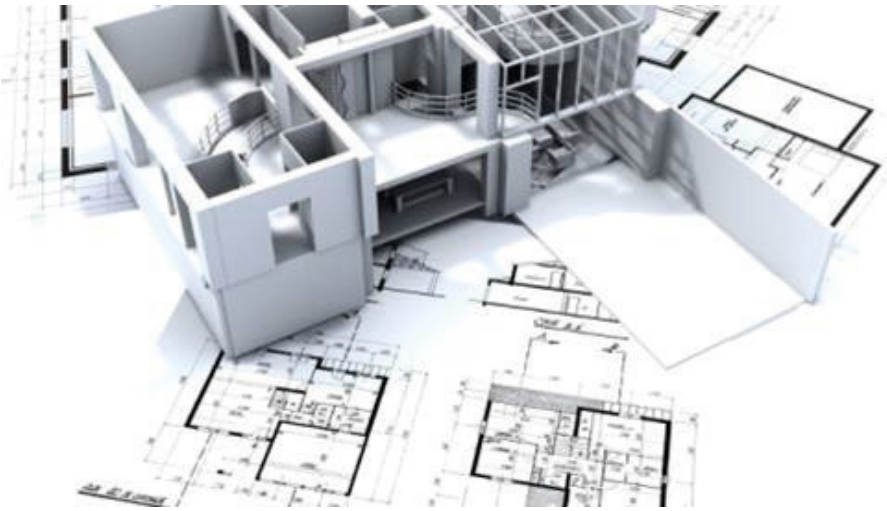
WELCOME

This guide has been developed to highlight the key points of the latest version of the standard:

BS5839 Fire detection and fire alarm systems for buildings – Part 1 2017: Code of practice for design, installation, commissioning and maintenance of systems in non-domestic premises.

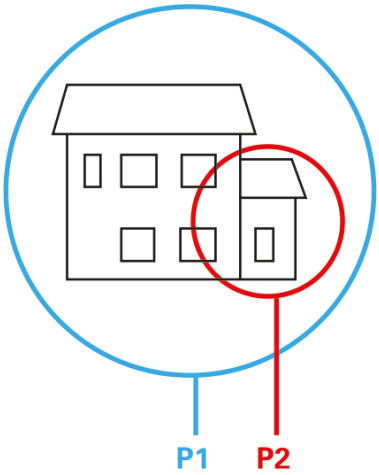
The guide should not be used as a substitute for the standard.

This guide will be of particular interest for those designers and installers that need simple guidance to the selection, spacing and location of fire devices.



CATEGORIES

Fire Alarm and Fire Detection systems are categorised in the following way:

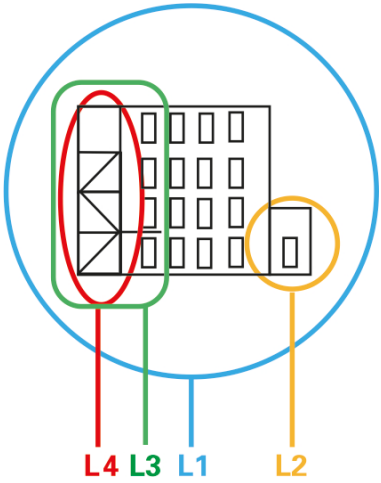


P - AFD* designed to primarily protect property

- **P1** - AFD installed throughout all areas
- **P2** - AFD Installed only in defined areas

L - AFD designed to primarily protect human life

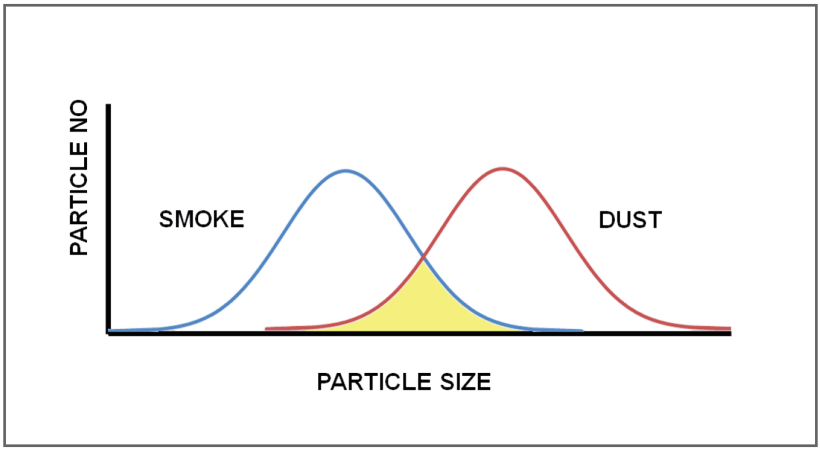
- **L1** - AFD installed throughout all areas
- **L2** - AFD Installed in defined areas in addition to L3
- **L3** - AFD installed in escape routes and rooms opening onto these routes
- **L4** - AFD installed in escape routes comprising circulation areas and spaces such as corridors and stairways
- **L5** - A non-prescriptive system in which the protected area(s) is designed to satisfy a specific fire risk objective (other than that of L1 to L4)



M - System designed to be operated manually (no AFD)

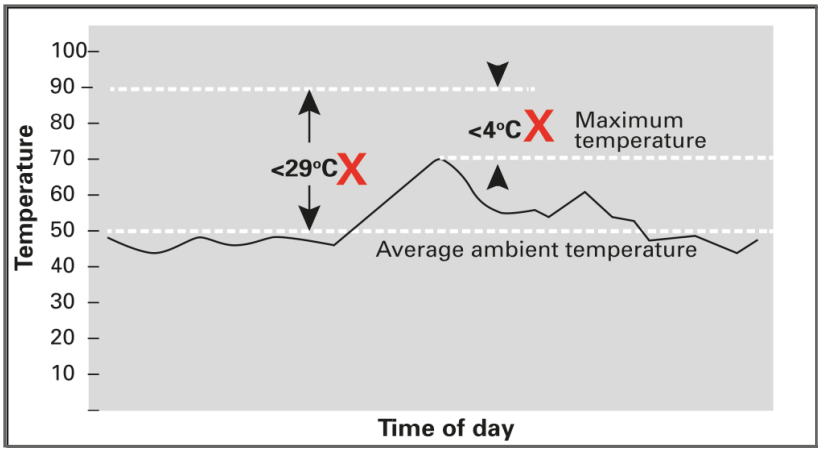
***AFD** = **Automatic Fire Detection**

SMOKE DETECTORS



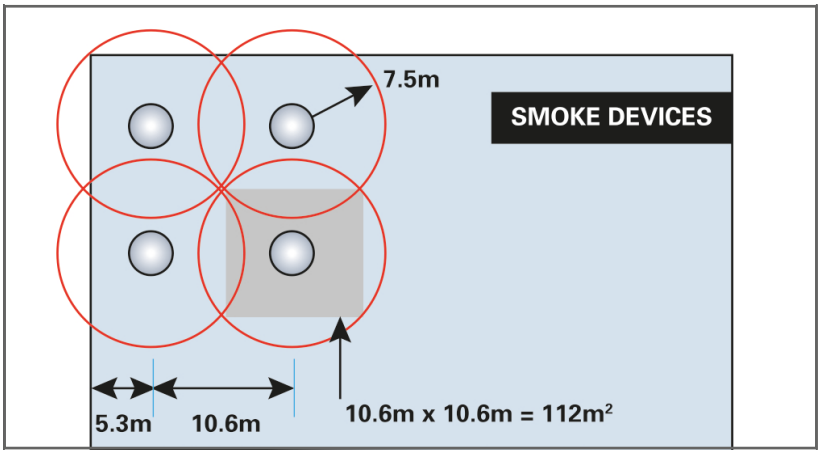
It should be noted that large smoke particles will have a similar particle size to small particle contaminates including some types of dust and aerosols. As such care should be taken when siting smoke detectors to limit subjection to this phenomenon.

HEAT DETECTORS

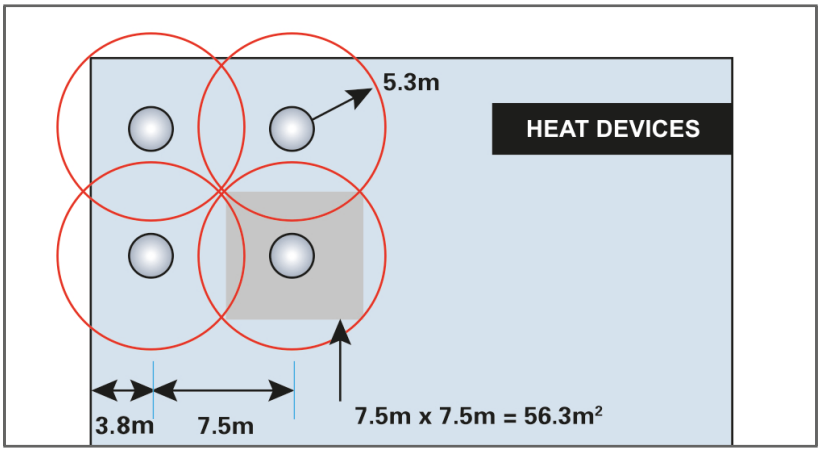


The minimum static response of heat devices should not be less than 29°C above the average ambient temperature, or less than 4°C above the highest temperature the device can be expected to experience.

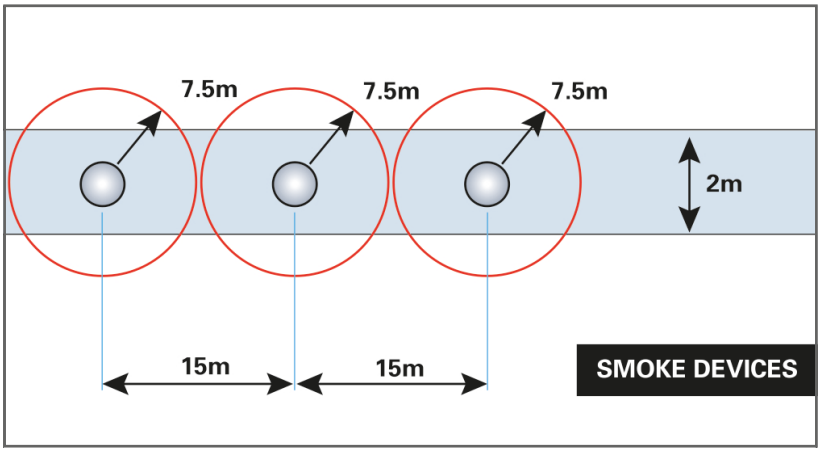
FIRE DETECTOR COVERAGE & POSITIONING



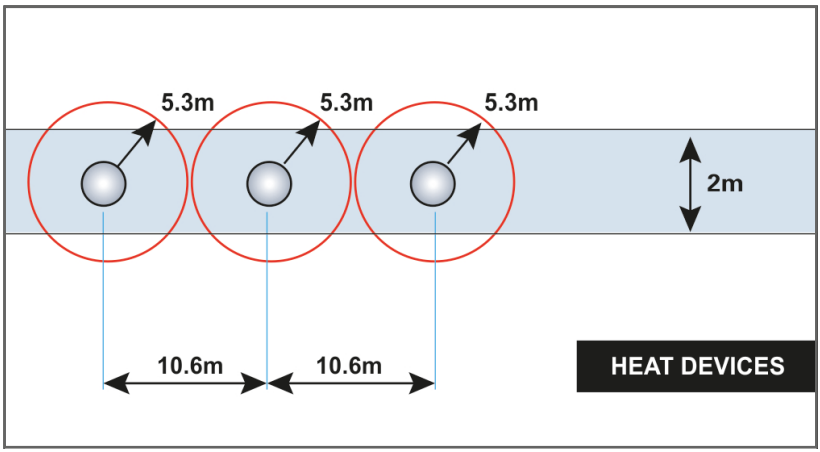
Smoke detection devices have an individual coverage of 7.5m radius. However these radii must overlap to ensure there are no 'blind spots'. Therefore the individual coverage can be represented by a square measuring 10.6 x 10.6m giving an actual area coverage of 112m^2 per device.

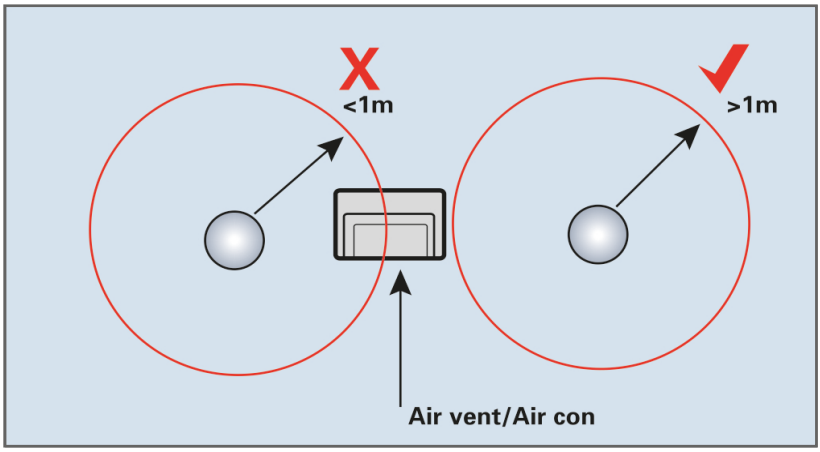


Heat detection devices have an individual coverage of 5.3m radius. However these radii must overlap to ensure there are no 'blind spots'. Therefore the individual coverage can be represented by a square measuring 7.5 x 7.5m giving an actual area coverage of 56.3m^2 per device.

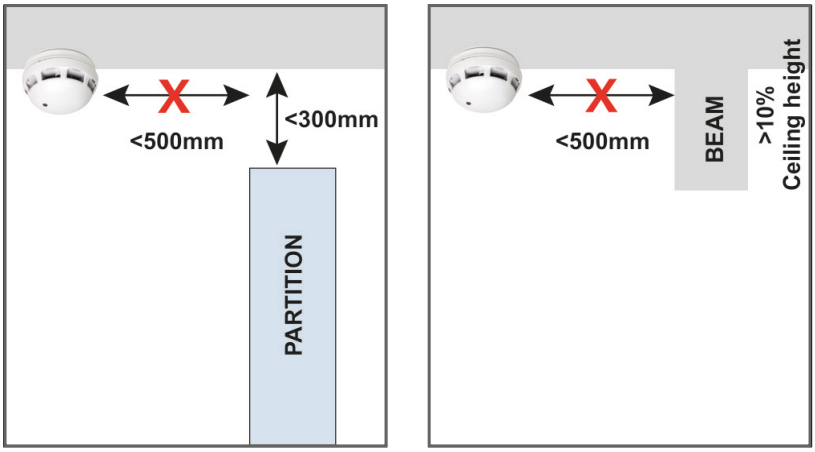


In corridors less than 2m wide the horizontal spacing of detectors may be increased, the areas of coverage need not overlap as in the case of a room. Any corridor over 2m wide is deemed a room and device spacing should follow the standard for rooms (see page 5).

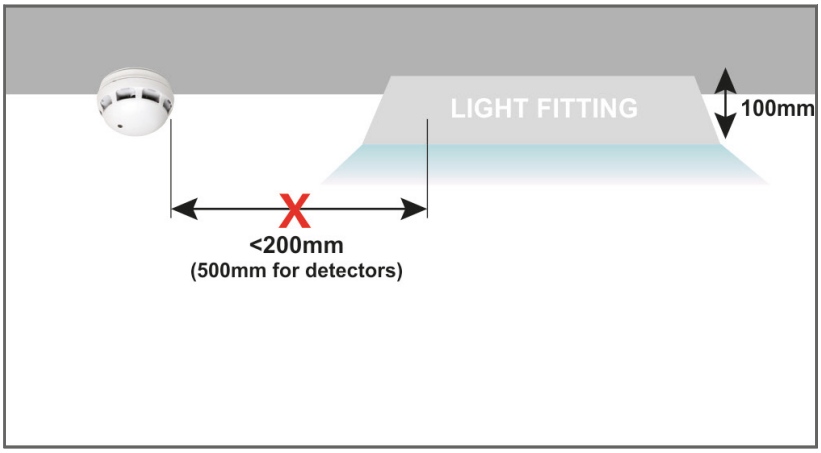




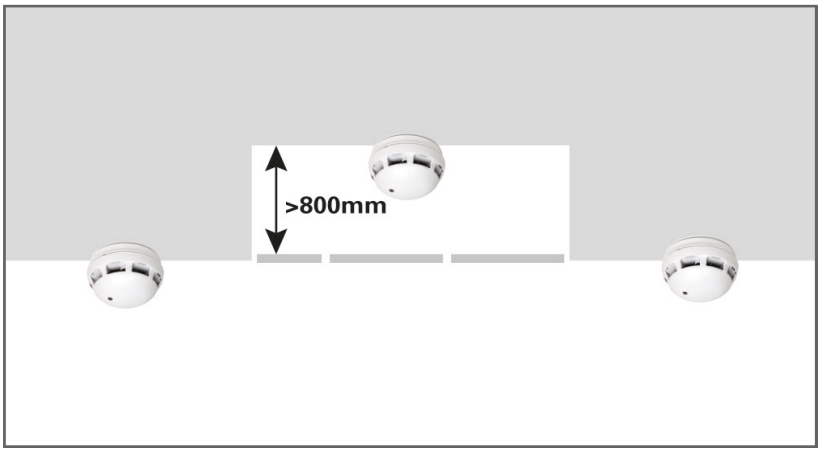
Detectors must not be sited less than 1m from air inlets or air conditioning units.



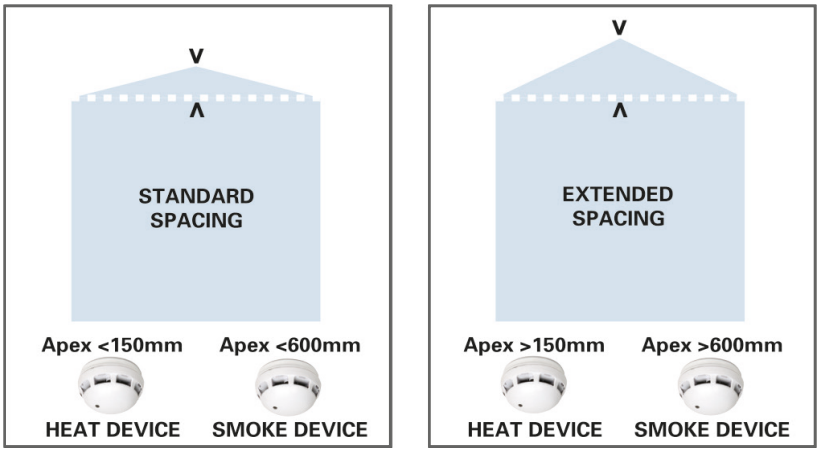
A device should not be mounted within 500mm of any obstruction. If the top of a solid partition is less than 300mm from the ceiling then treat it as a wall. Similarly, ceiling obstructions such as beams should be treated as walls if deeper than 10% of the ceiling height.



Never mount devices closer than twice the depth of light fittings.



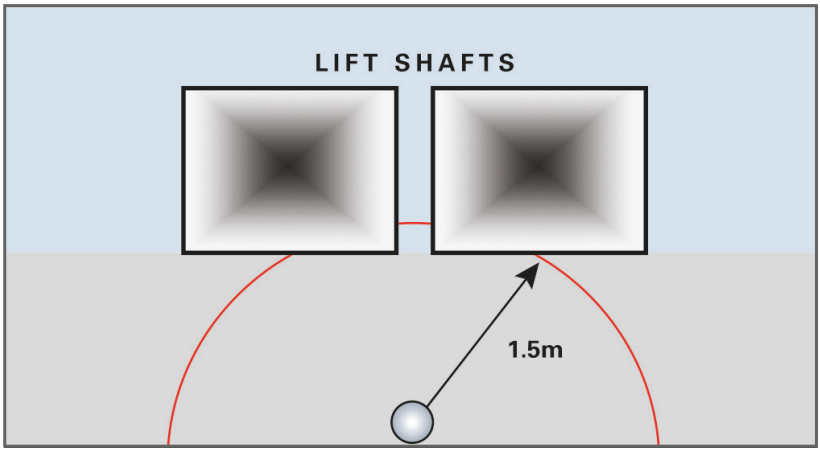
Voids less than 800mm in height need not have independent coverage, unless fire or smoke is able to spread from one area to another through the void or risk assessment shows AFD (Automatic Fire Detection) to be necessary.



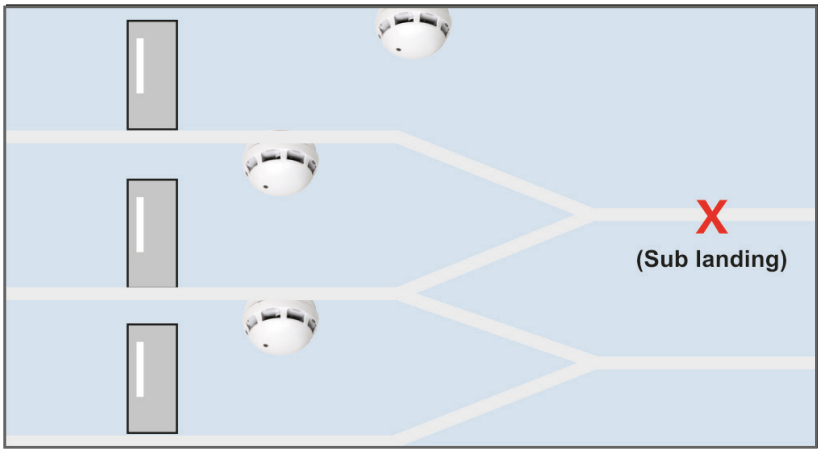
For ceilings that feature an apex: as long as the height of the apex from the rest of the ceiling is less than 150mm for heat detectors or less than 600mm for smoke detectors then these can be treated the same as flat ceilings. For higher apexes, a device should be installed at the highest point. The distance to adjacent devices can be increased by 1% per degree of angle of the roof up to a maximum of 25%.

Detector Type	Ceiling Height (m)	
	General Limits	Maximum
Heat RoR	9.0	10.5
Heat Fixed	7.5	12.5
Point Smoke Detector	10.5	12.5
Aspirating Smoke Detection Class C with 5 holes	15	18
Aspirating Smoke Detection Class C with 15 holes	25	28
Aspirating Smoke Detection Class B with 5 holes	40	43
Optical Beam Normal Sensitivity	25	28
Optical Beam Enhanced Sensitivity	40*	43

*Supplemented detection recommended unless risk of stratification is minimal.

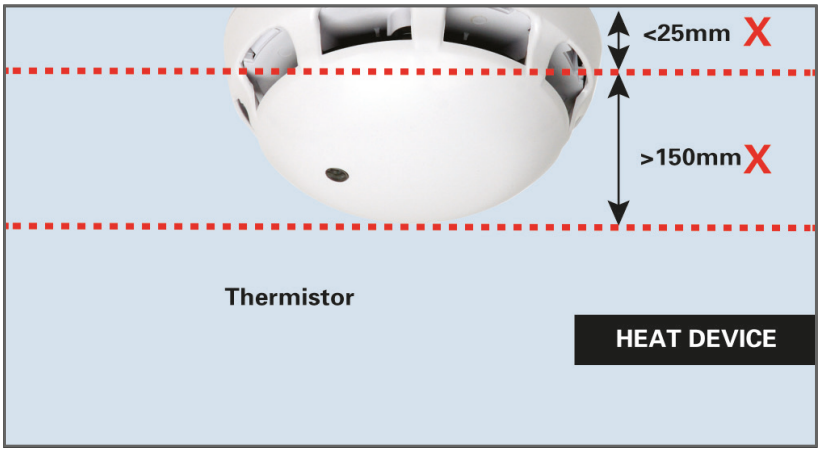


Vertical shafts like lifts and stairways should have a device mounted within 1.5m of any opening.

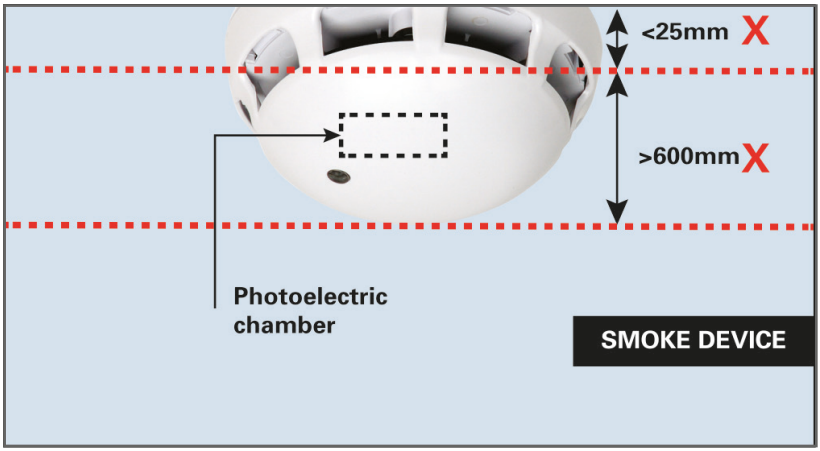


Enclosed stairways should have a detector on each main landing.

DETECTOR SPECIFICATION

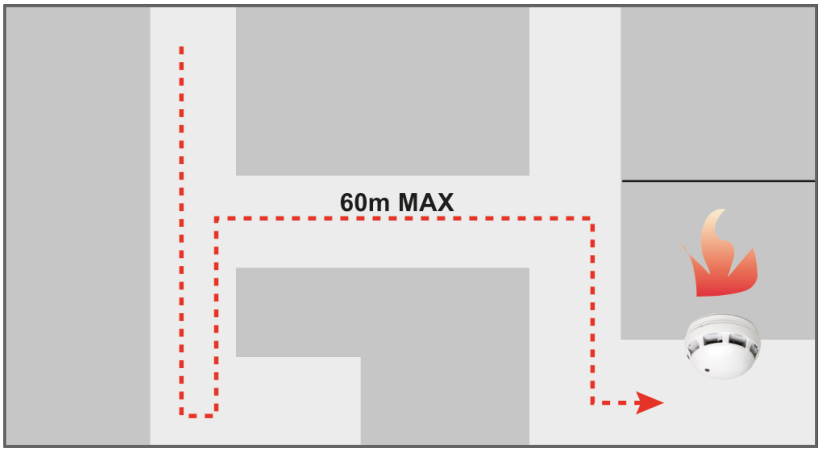


The sensing element of a heat detection device (thermistor) should not be less than 25mm below ceiling, and not greater than 150mm below ceiling.

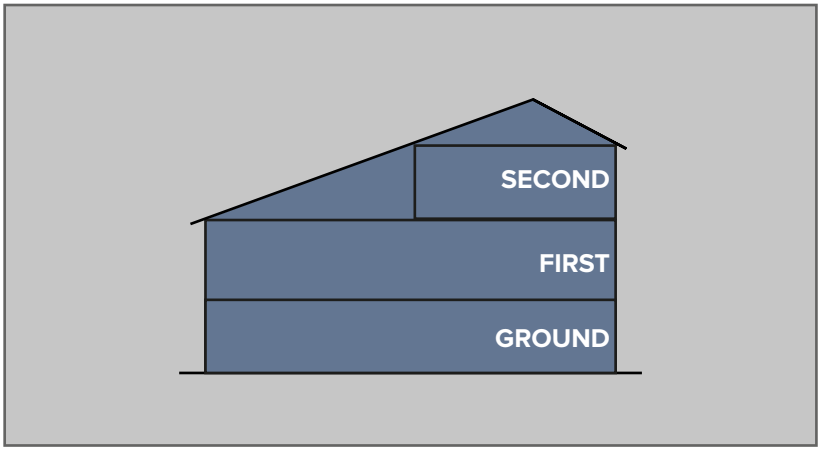


The sensing element of a smoke detection device (photoelectric smoke chamber) should not be less than 25mm below ceiling, and not greater than 600mm below ceiling.

SEARCH DISTANCE



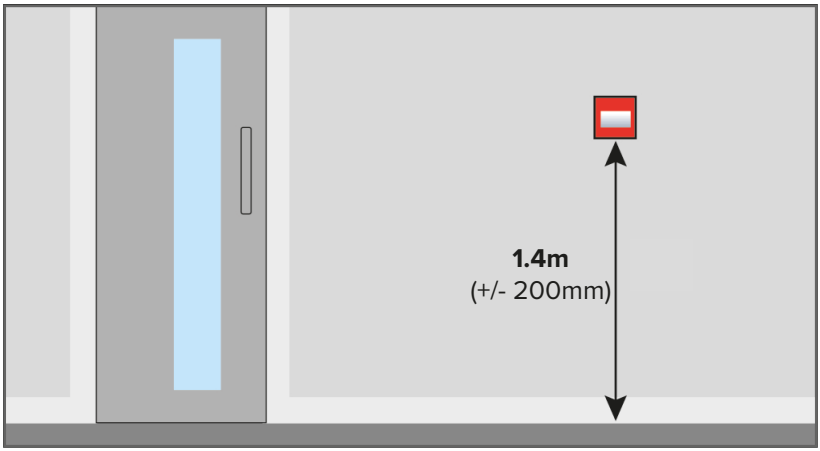
A person searching a zone for a fire should not have to travel more than 60m from the entrance of a zone to identify the source of a fire. Particular attention is required when siting the detectors LED to minimise the search.



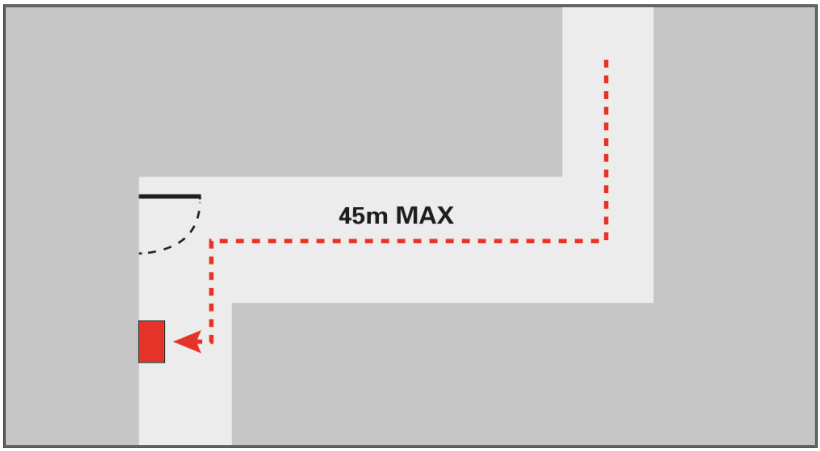
Less than 300m² can be covered by a single zone. When the total floor area exceeds 300m², each floor would require a zone (or zones if the floor area exceeds 2000m²). Stairwells, liftwells or similar should be separate zones.

Zones should not cross floors.

MANUAL CALL POINTS (MCP)

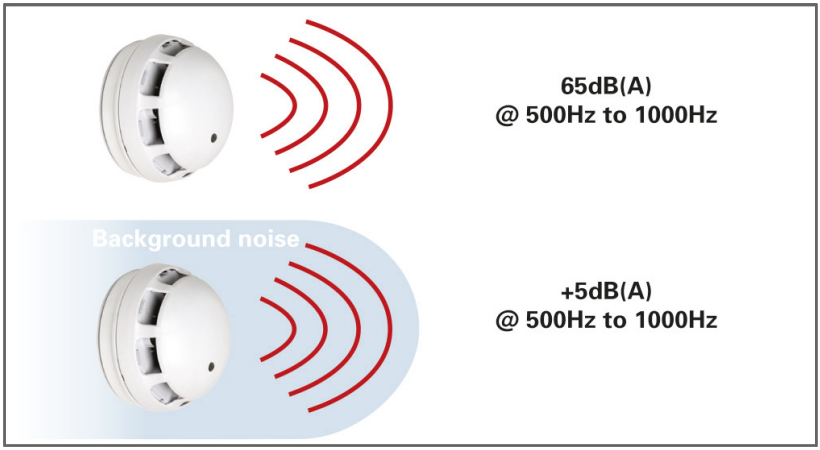


The centre of the element of the manual callpoint should be positioned 1.4m (+/-200mm) from floor level (unless a wheelchair user is likely to be the first person to raise the alarm, when this is applicable it should be noted on any certification). All manual call points should be fitted with a protective cover, which is moved to gain access to the frangible element.

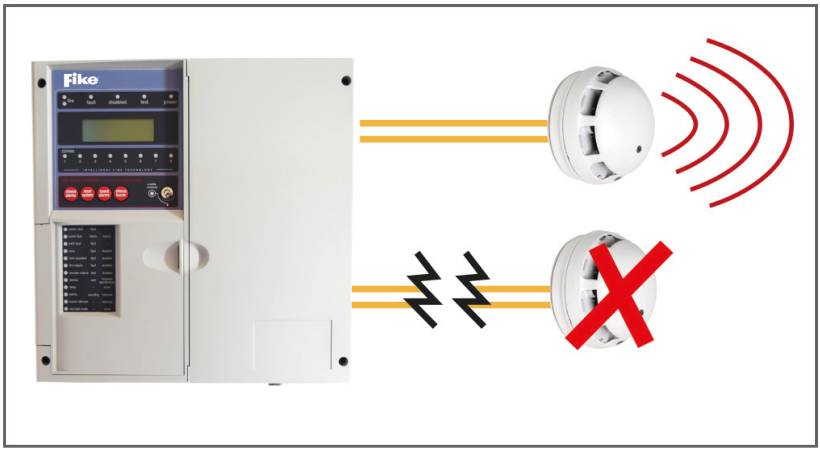


A person should not have to travel more than 45m along an escape route to reach a manual call point (25m if disabled person to operate, or rapid fire development is likely). Manual call points should be sited at all stairwells and exits from the building.

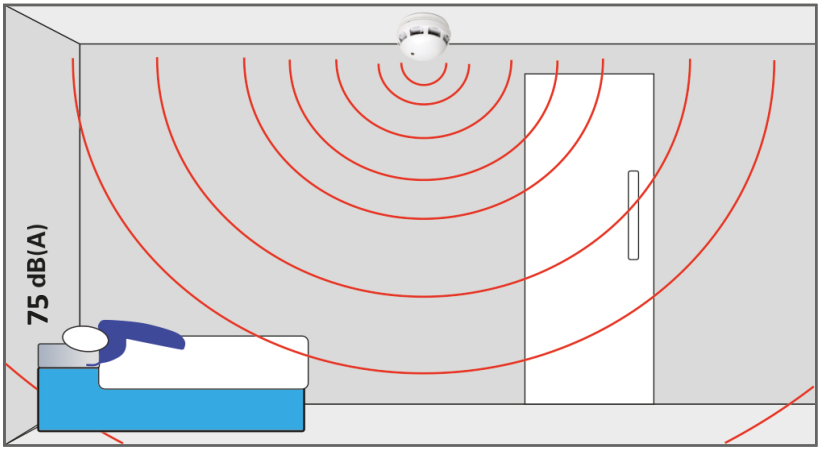
SOUNDERS



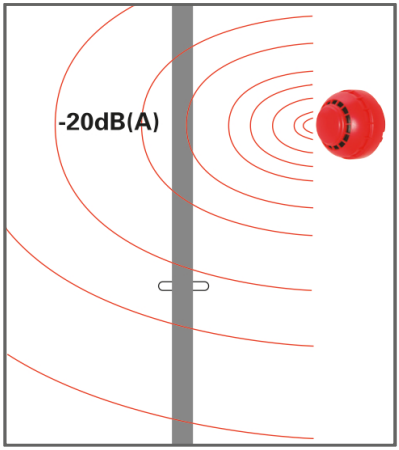
The minimum sound level of a sounder device should be 65dB(A) or 5dB(A) above a background noise which is louder than 60dB(A) (if lasting more than 30 seconds) and at a frequency of between 500Hz and 1000Hz. The maximum sound level should not be greater than 120dB(A) at any normally accessible point. Sounder volume may be reduced to 60dB(A) in stairways, enclosures up to 60m and specific points of limited extent.

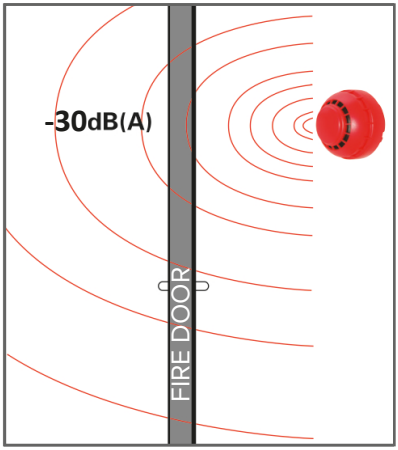


Sounder device cabling should be arranged so that in the event of a fault at least one sounder will remain operational during a fire condition.



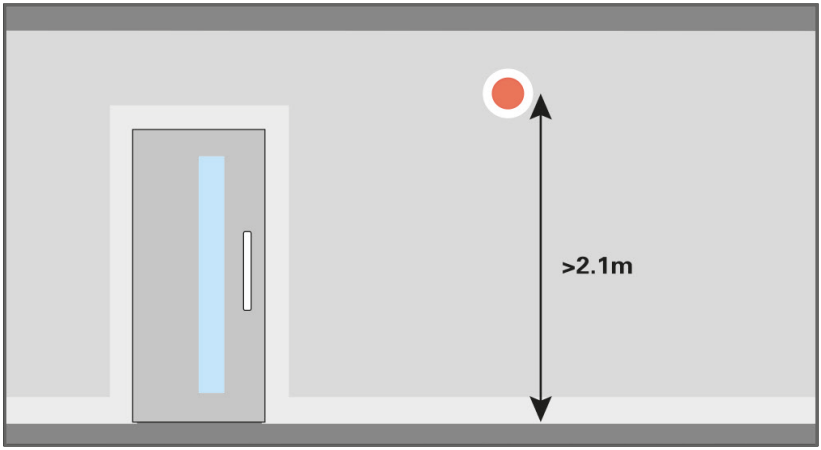
For areas where people are sleeping, sounder devices should produce a minimum of 75dB(A) at the bed-head with all doors shut.



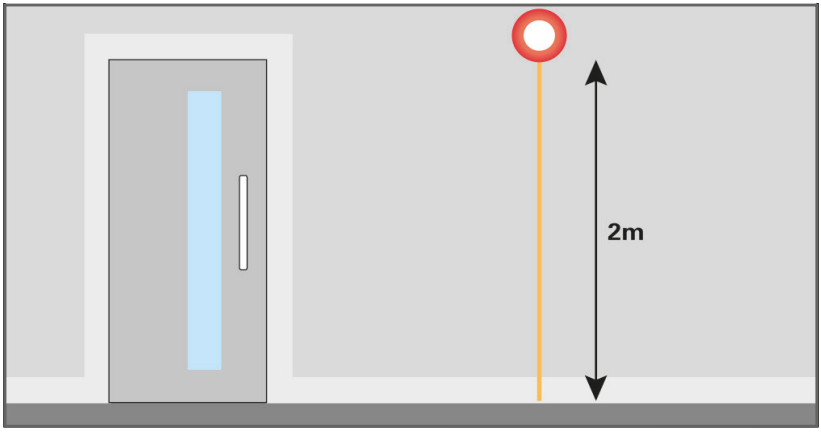


Decibel loss occurs through doors. Approximately -20dB(A) through a normal door, and approximately -30dB(A) through a fire door.

VISUAL INDICATION DEVICES



Visual indication devices (VIDs), such as strobes, can be ceiling or wall mounted. For wall mounting they should always be mounted 2.1m above floor level. Visual alarm devices should conform to BS EN 54-23.



Unless MICC cable is used, all cabling should be mechanically protected from floor level up to a height of 2m.

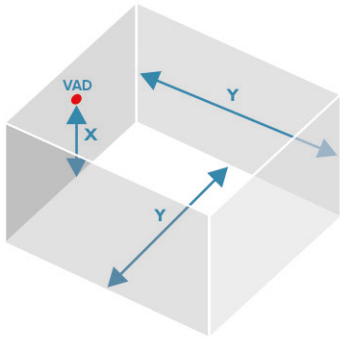
VISUAL ALARM DEVICE CATEGORIES

EN54-23 specifies that the VAD produces an illumination of 0.4 lux on surfaces perpendicular to the direction of the light emitted from the device. They are not designed to wake people that are asleep and can be red or white light. VADs are classified into three categories based on their application:

W - Wall-mounted
C - Ceiling-mounted
O - Open Category

Wall and Ceiling mounting categories are specified at specific installation heights and particular patterns of coverage - see diagrams. For W and C categories, the shape of the volume covered is fixed by the standard. The dimensions of this coverage volume are specified by the manufacturer. For all categories, the volume covered can be used to determine VAD spacing within the building. Open category allows manufacturers to specify the coverage shape and volume and does not put any restriction on mounting height.

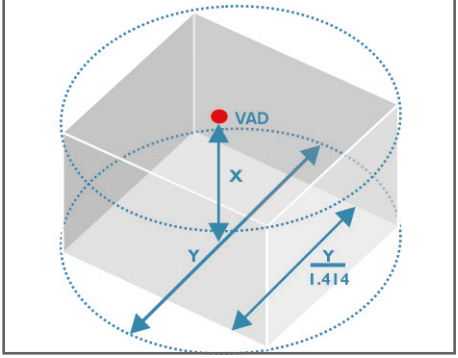
Wall-Mounted - Coverage Volume



Wall-mounted VADs cover a cuboid volume with a square floor area. The coverage volume is presented as a code in the form of **W-X-Y**, where W is Wall-mounted, X is the max mounting height (m) and Y is the width and length (m) of the coverage floor area. The min mounting height is 2.4 m.

E.g. : **W-2.4-12** means it should be mounted at 2.4m from the floor and will cover an area of up to 12 by 12m.

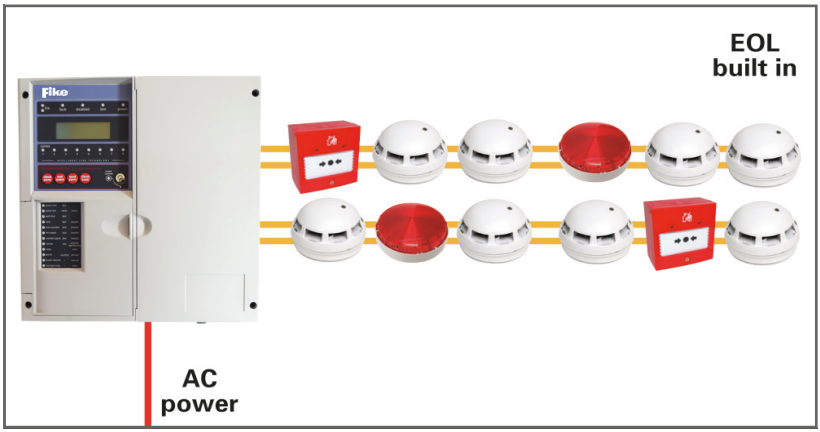
Ceiling-Mounted - Coverage Volume



Ceiling-mounted VADs cover a cylindrical area. The coverage volume is presented as a code in the form C-X-Y, where C is Ceiling-mounted, X is the max mounting height (m) and Y is the diameter (m) of the coverage volume's floor area. The max mounting height can only be specified as 3, 6 or 9m.

E.g. : **C-3-15** means it can be mounted up to 3m from the floor and will cover a cylindrical area of least 15m diameter.

CABLING



Fire resistant cabling is now required within the whole fire alarm system including the main supply cables. The use of non-fire resisting cables, whether mechanically protected by fire-resisting construction or not, will no longer comply with BS5839.

To avoid mechanical damage and electromagnetic interference, fire alarm cables should not be installed in the same conduit as the cables for other services. Where fire alarm cables share common trunking, a compartment of the trunking, separated from other compartments by a strong, rigid and continuous partition reserved solely for fire cables should be implemented.

TWINFLEX®pro²

Smart 2-Wire Fire Alarm System

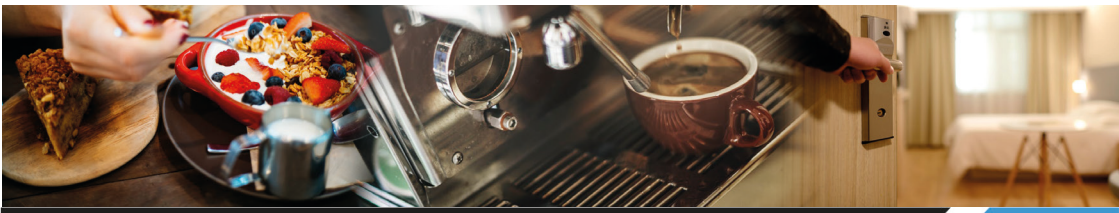
A conventional 2-wire fire alarm system is often the natural choice for smaller applications or where budget constraints exist.

Fike's TWINFLEXpro² 2-wire fire alarm system has long been known for its adaptability and cost-effectiveness within a variety of applications, big or small ... making it one of the most flexible products on the market.

Building on those strengths and designed for ease of use and state-of-the-art monitoring, the LPCB-Approved TWINFLEXpro² is the next generation in 2-wire fire alarm reliability.

The Reliable Fire Protection System You Can Count On

This versatile fire alarm system incorporates Fike's ASD Multipoint detector using smoke and heat detection with optional built-in sounder, allowing the whole system to be installed using only one pair of wires per zone. That means easier, faster installations AND cost savings.



Fike® FIRE DETECTION & ALARM SYSTEMS

DUONET®& QUADNET®

Multi- Loop Intelligent Addressable Systems

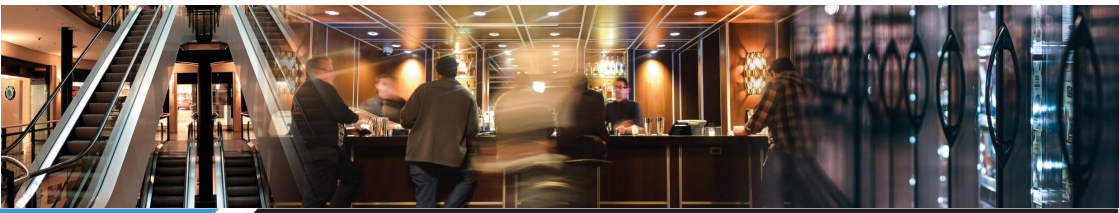
The Duonet & Quadnet intelligent fire alarm systems offer both cost-effective and reliable solutions for a wide variety of fire detection applications. The innovative technology built into the Duonet and Quadnet panels is designed to significantly reduce false alarms. The systems can support up to 200 Multipoint ASD combined detector/ sounders on a single loop.

Integrity of the system is maintained by way of a built-in isolator incorporated within every device. System intelligence has been harnessed in such a way that equipment used is very easy to install, commission and maintain.

Intelligent Fire Alarm Solutions

The system has been designed to high specification and quality standards, and complies with the EN54-2 and EN54-4 standards and EU directives.

LOSS PREVENTION CERTIFICATION BOARD LPCB



MULTI-SENSOR DETECTORS

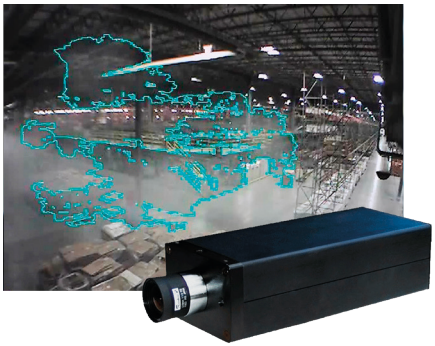
Using the Multipoint ASD detector as part of a Fike system means that when a detector is wired to the system, a sounder and strobe can also be connected without extra installation time or cost. This greatly reduces the number of points that need to be installed and the time it takes to install.

- 7/15 modes of fire detection including combined smoke/heat
- Optional built-in sounder and/or strobe in a single device
- Self-calibrates every 6 hours
- Continuously monitors for dust contamination
- Easily removable for maintenance at height
- LED to report status of detector (normal / fault / fire)

FIKE VIDEO FIRE DETECTION

Specifically for L5 and P2 consultant specified categories, Video Fire Detection is now a recognised specialised fire detection technique.

Fike Video Analytics is a turnkey video smoke detection solution. The state-of-the-art camera-based video smoke detection system visually detects the presence of flame or smoke at its source, independent of airflow in the area. Fike Video Analytics represents a critical advantage for early warning fire detection, especially for challenging environments and open area venues.



FIKE TRAINING

Module 1: TWINFLEXpro² - Remote Venues

TWINFLEX system presentation providing an overview of the control panel, connections and menu structure. Field devices, fault finding and other associated equipment are covered. **(As part of module 3 in office or remote venues only)**

Price - £25 (Includes software)

Module 2: DUONET & QUADNET

Duonet/Quadnet system presentation providing an overview of the control panel, connections and menu structure. Field devices, fault finding, associated equipment and principles of soft addressing are covered.
Price - £50.00 (Includes software)

Module 3: TWINFLEXpro² / DUONET & QUADNET

Full indepth training on all of Fike's fire alarm control panels and associated devices. providing an overview of the control panels, connections and menu structures. Field devices, fault finding and other associated equipment are also covered.

Price - £50.00 (Includes software)

To reserve a place or for more information on one of the courses, please contact:
Fike Safety Technology Ltd,
31 Springvale Industrial Estate,
Cwmbran NP44 58D UK
Tel: +44 (0) 1633 865 558
E-Mail: fst.info@fike.com

Other training modules are also available.

Fike Safety Technology Ltd has a duty of care to ensure that persons are competent for the task. The training covers the installation and operation of Fike safety Technology's product range and does not cover more general skills and practices relating to BS5839. Upon completing each module all delegates will undergo an open book written exam to ensure they meet the required standard.

CPD Accredited Presentations

CPDs offered by Fike

Introduction to Fire Alarms

This CPD presentation is suitable for anyone wishing to have a greater understanding of Fire Detection and covers a range of Detection methods. It also gives overview of BS5839 Pt1, Pt6 and of the requirements of the 'responsible person'. It will enable the attendee to have an understanding of the different types of Detection currently available in the market place and help them make an informed choice when selecting and specifying the appropriate system(s) for their requirements.

Introduction to Fire Suppression

This CPD looks into the history of fire suppression and an understanding of how fires develop including the classification of fire types. It highlights the various types of extinguishing methods and the different inert and clean agent gases available on the market, plus the different hazard types / applications and principles of operation including the benefits of constant or regulatory flow valve systems. We also cover the safe handling / transportation of cylinders, pressure relief venting, integrity testing requirements and F-Gas regulations, with an outline on the basic information required to survey and design a system.

Introduction To Water Mist

This CPD is aimed at providing an overview on the principles of water mist which can be further developed for specific applications. The course reviews the background and development of water mist and provides an understanding of the principles and process of how water mist efficiently fights fires. The presentation identifies the most common types of system available in today's market and identifies suitable applications for each specific technology. An emphasis is drawn to applicable UK design and installation standards along with associated system approvals through risk specific type testing.

Introduction to Video Detection

Video analytics is a state-of-the-art camera-based flame & smoke recognition system. it visually detects the presence of flame / smoke at its source and represents a critical advantage for early warning fire detection, identifying and reacting to fire situations in their earliest stages protecting lives and property.

Many of today's modern large structures may not have adequate fire protection. Atriums, open areas and high ceilings make the use of traditional detection methods impractical, ineffective and difficult to maintain. High airflow and stratification can prevent smoke from reaching point detectors, adding to the ineffectiveness of traditional detection.

SFS
SABRE FIRE & SECURITY

Sabre Fire and Security Ltd are an authorised Fike supply and service centre.

We are listed in the LPCB (Loss Prevention Certification Board) and The National Landlords Association Recommended Supplier List. We are also members of the UKFA (UK Fire Association) and FSB (Federation of Small Business).

Sabre Fire and Security Ltd are the sole UK and European distributors of StoveTop FireStop® an automatic domestic pan fire suppression system – details can be found on our website.

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Sabre Fire & Security Ltd
6 South Mundells, Welwyn
Garden City, Herts
AL7 1EP
Tel: 01707 393888
Fax: 01707 393777
sales@sabre-fire.co.uk

WWW.SABRE-FIRE.CO.UK