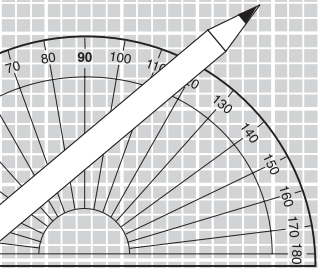

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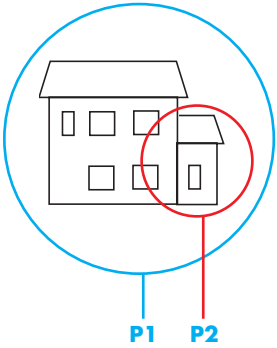
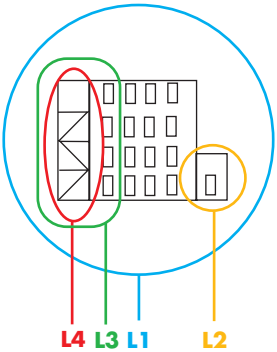
A guide to
Fire Alarm Systems Design

BS5839
Part 1: 2002

Fire Alarm and 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

This booklet is a guide to BS5839 part 1
All designs are based on a site specific written risk assessment.

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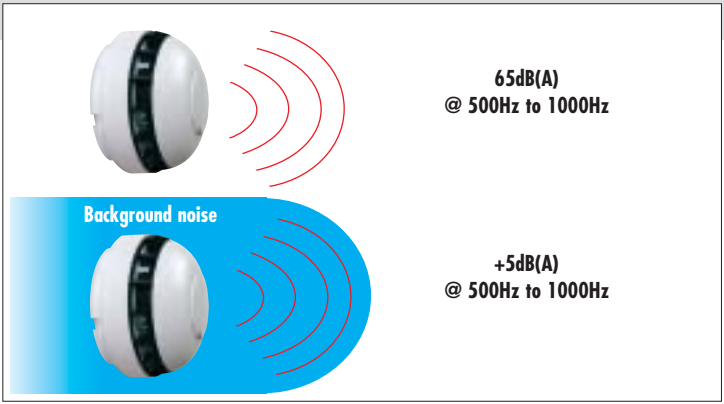
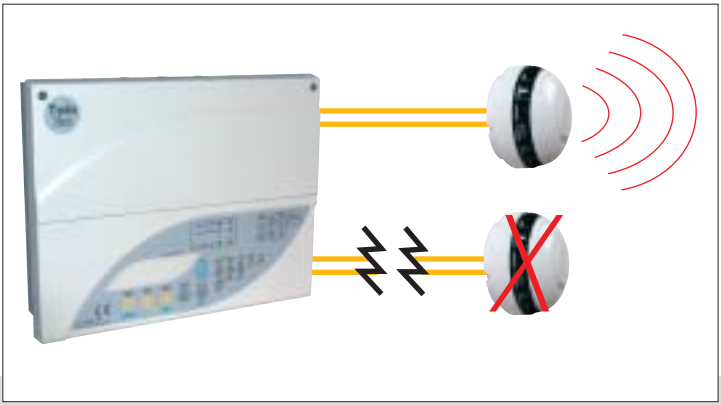
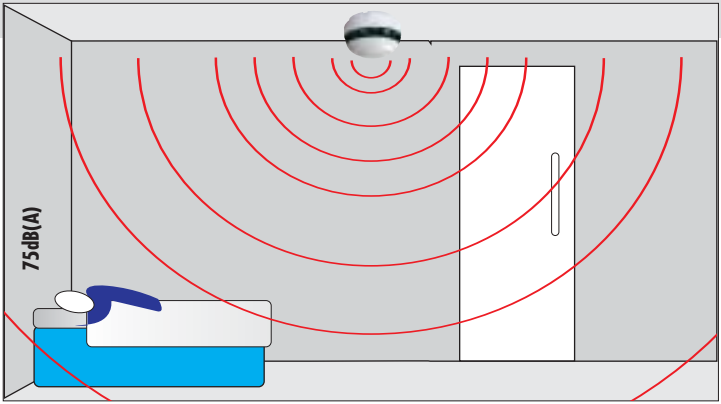


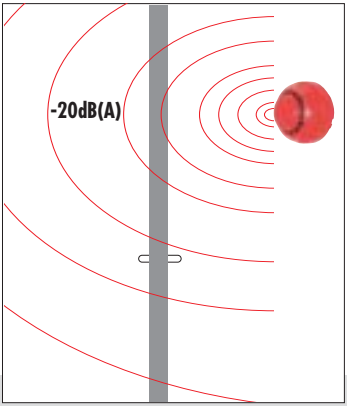
The minimum sound level of a sounder device should be 65dB(A) or 5dB(A) above a background noise which is louder than 60dB(A) (if lasting more than 30 seconds) and at a frequency of between 500Hz and 1000Hz. The maximum sound level should not be greater than 120dB(A) at any normally accessible point. May be reduced to 60dB(A) in stairways, enclosures up to 60m^2 and specific points of limited extent.

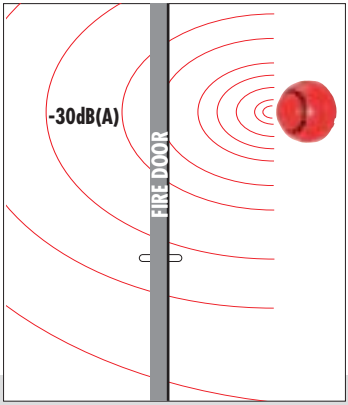


Sounder device cabling should be arranged so that in the event of a fault at least one sounder will remain operational during a fire condition.

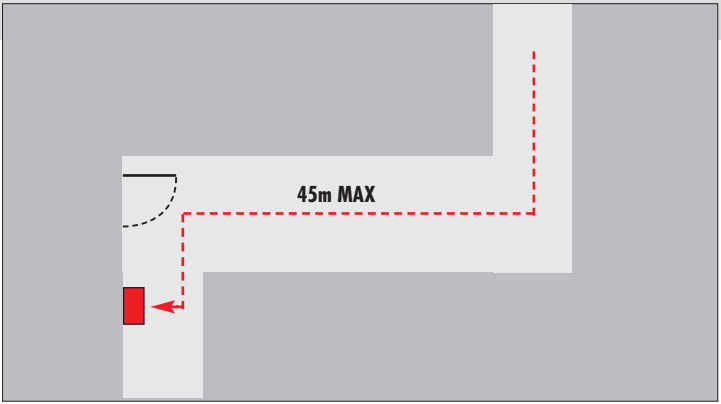


For areas where people are sleeping, sounder devices should produce a minimum of 75dB(A) at the bed-head with all doors shut.

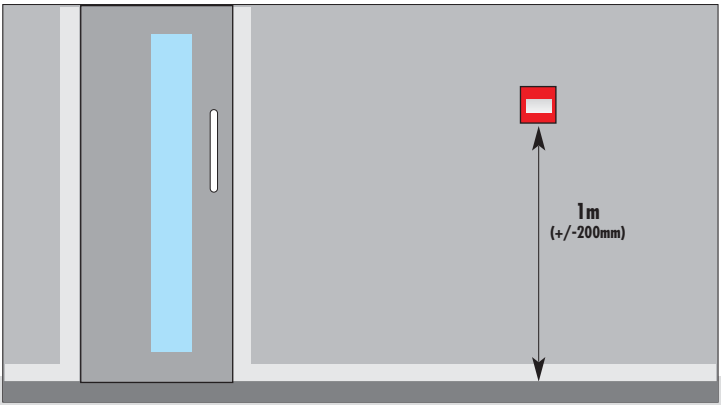




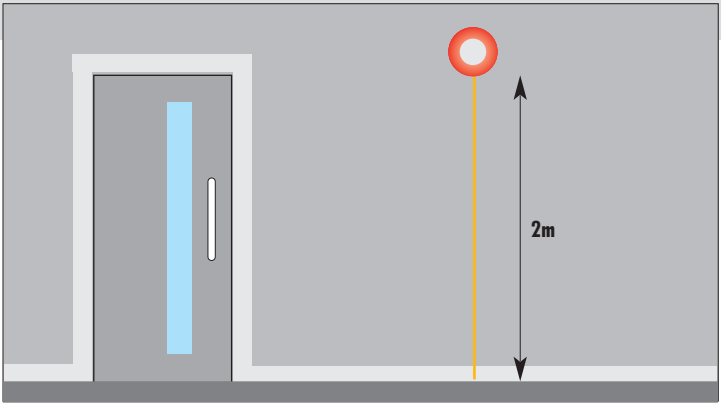
Decibel loss occurs through doors: approximately -20dB(A) through a normal door, and approximately -30dB(A) through a fire door.



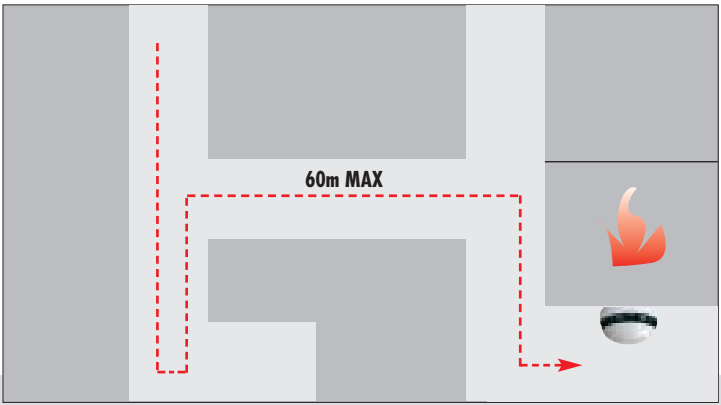
A person should not have to travel more than 45m along an escape route to reach a Manual Call Point. (25m if disabled person to operate, or rapid fire development is likely). Manual Call Points should be sited at all stair wells and exits from the building.



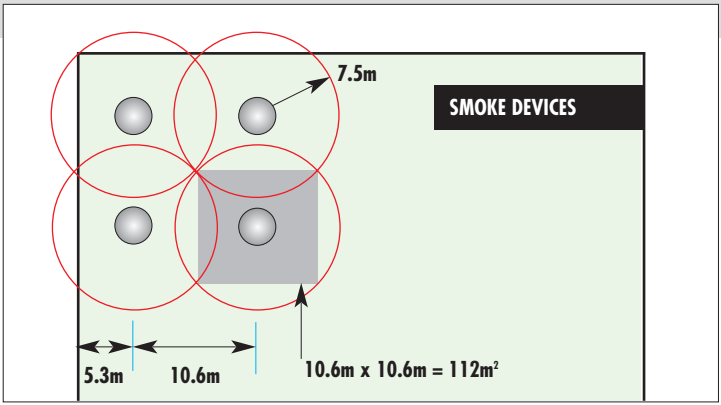
Manual call points should be positioned between 800mm to 1200mm from floor level.. Any non-mechanically protected cable medium should have additional protection up to a height of 2m from floor level.



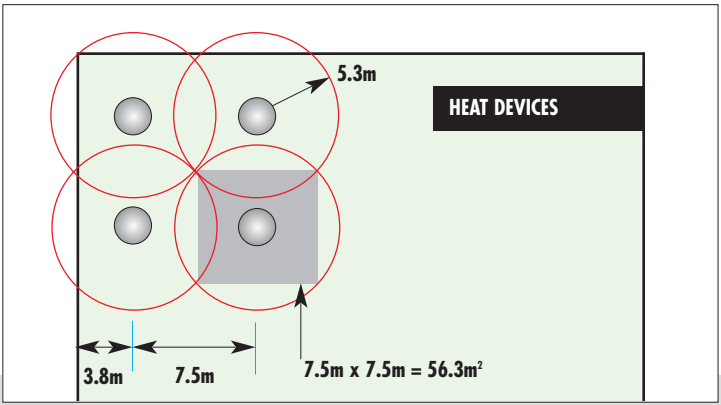
Unless MICC cable is used, all cabling should be mechanically protected from floor level up to a height of 2m.



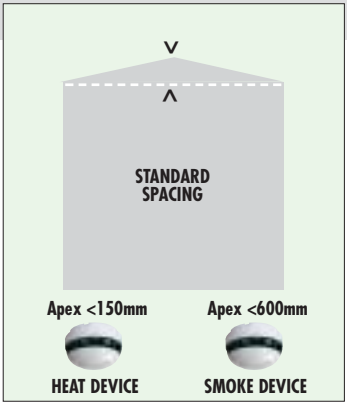
A person searching a Zone for a fire should not have to travel more than 60m to identify the source of a fire.

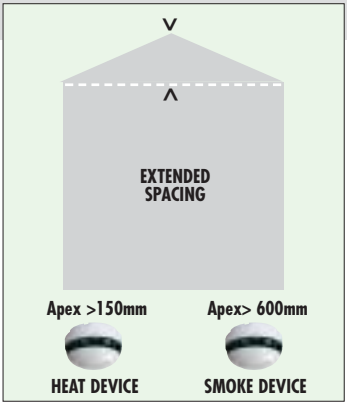


Smoke detection devices have an individual coverage of 7.5m radius. However these radii must overlap to ensure there are no 'blind spots'. Therefore the individual coverage can be represented by a square measuring 10.6 x 10.6m giving an actual area coverage of 112m² per device.



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 56.3m² per device.

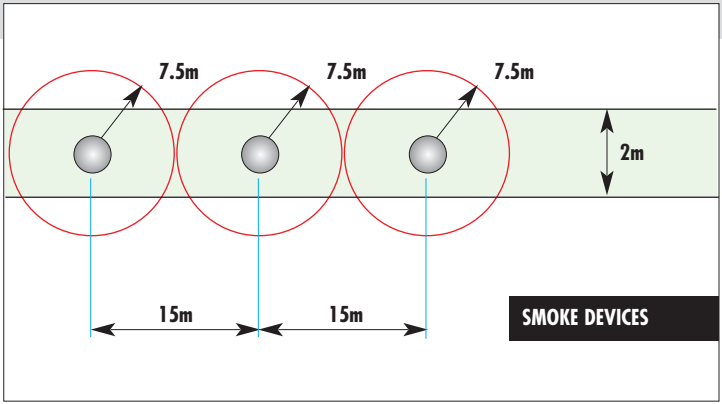




For ceilings that feature a apex: as long as the height of the apex from the rest of the ceiling is less than 150mm for Heat detectors or less than 600mm for Smoke detectors then these can be treated the same as flat ceilings. For higher apexes, a device should be installed at the highest point. The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

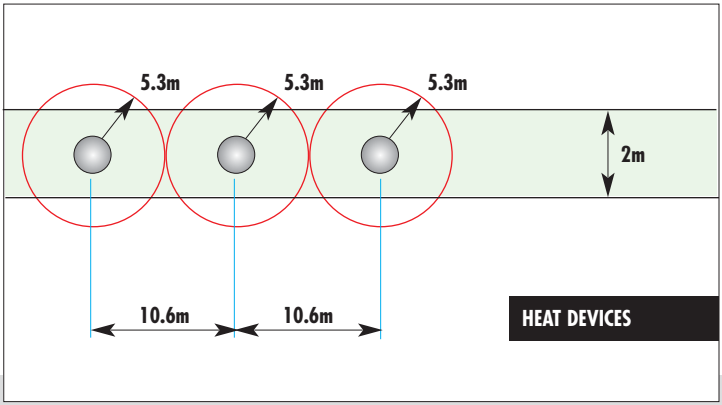
Detector type	Ceiling heights (m)	
	General limits	Rapid attendance
Heat detectors BS EN 54-5 grade 1		
Class 1	9.0	13.5
Other Classes	7.5	12.0
Point smoke detectors	10.5	15.0
Aspirating smoke Detection systems (category 1)	Normal 10.5 Enhanced 12.0 Very high 15.0	Normal 15.0 Enhanced 17.0 Very high 21.0
Optical beam smoke detectors BS5839:part 5	25.0	40.0

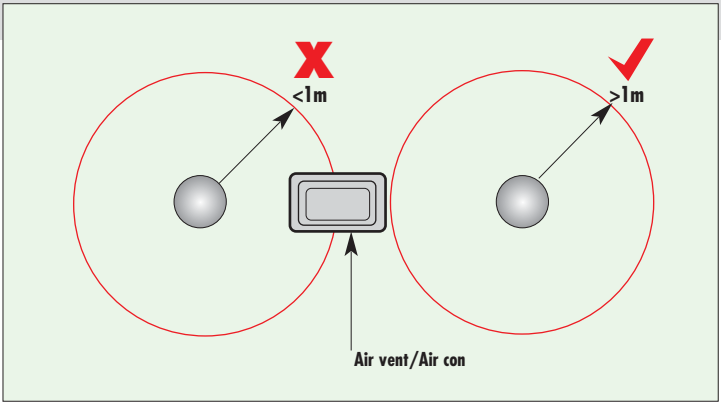
Limits of Ceiling Heights



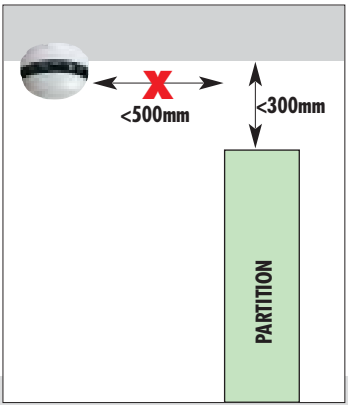
In corridors less than 2m wide the horizontal spacing of detectors may be increased, the areas of coverage need not overlap as in the case of a room.

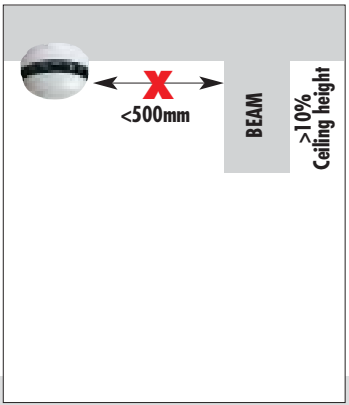
Any corridor over 2m wide is deemed a room and device spacing should follow the standard for rooms (see page7).



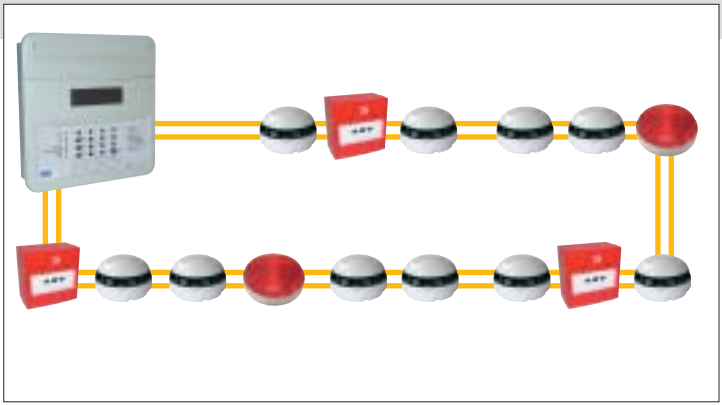


Don't site detectors less than 1m from air Inlets or air conditioning units.

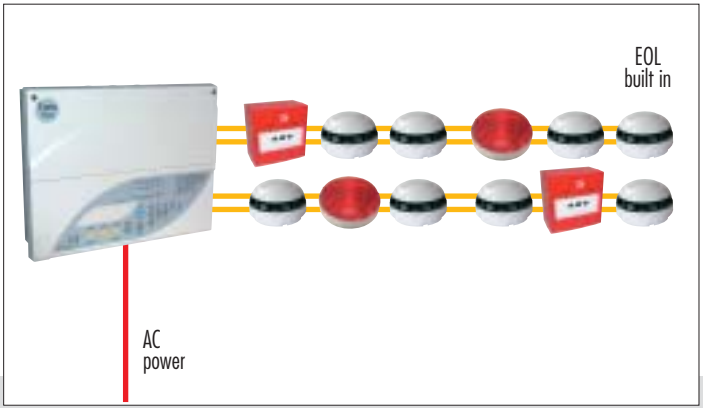




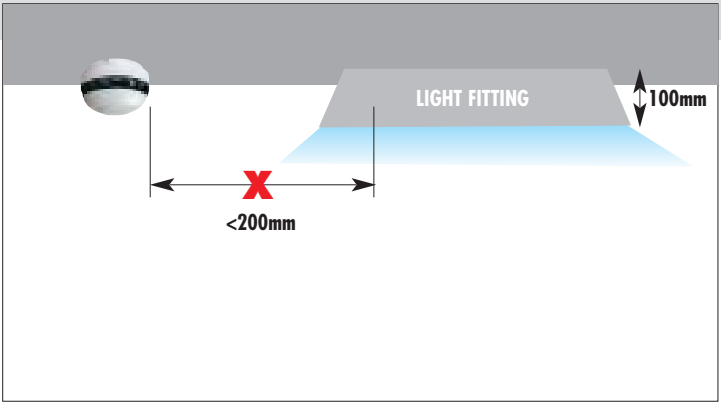
A device should not be mounted within 500mm of any obstruction.
If the top of a solid partition is less than 300mm from ceiling then treat it as a wall. Similarly, ceiling obstructions such as beams should be treated as walls if deeper than 10% of the ceiling height.



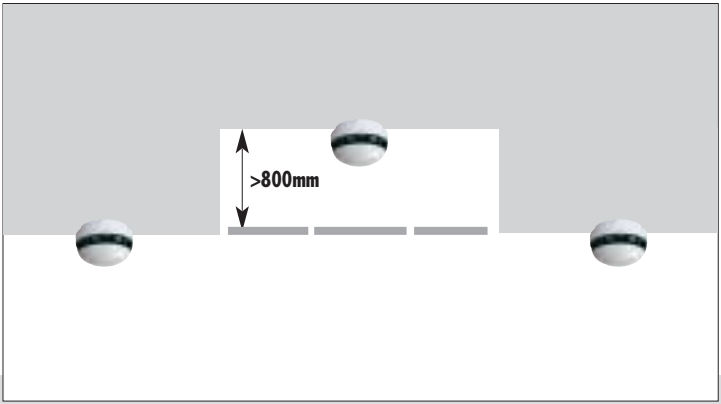
Short circuit isolators limit the effect of one fault to 2000m². '2 simultaneous faults on a circuit should not disable protection within an area greater than 10,000m²'. With the Sita 200 Plus the isolator is built in to every device for maximum protection.



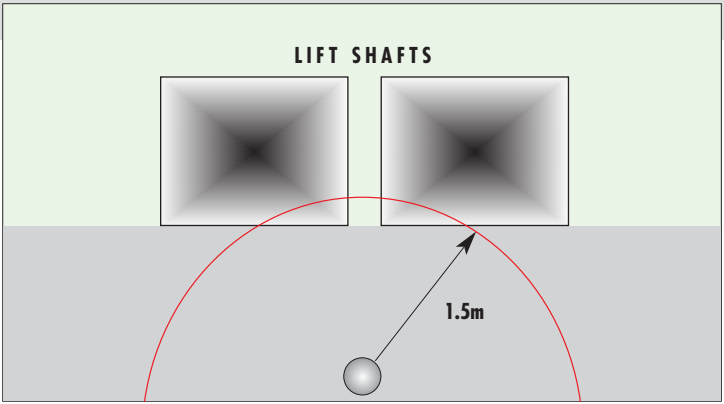
Fire resistant cabling is now required within the whole fire alarm system including the mains supply cables. The use of non-fire resisting cables whether mechanically protected by fire-resisting construction or not, will no longer comply with BS5839. With the Twinflex system, separate sounder units are not required as each zone incorporates a sounder unit.



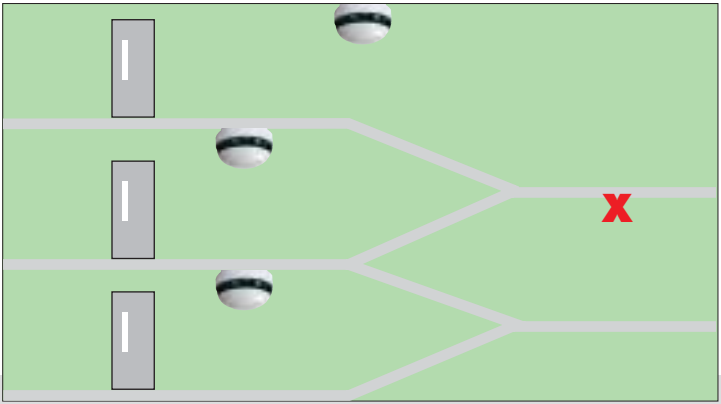
Never mount devices closer than twice the depth of light fittings.



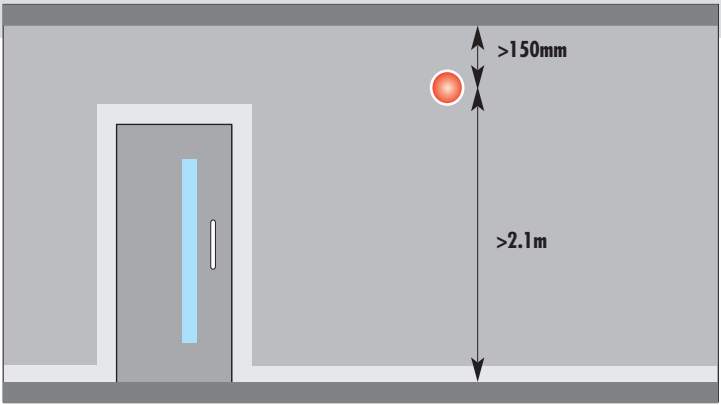
Voids less than 800mm in height need not have independent coverage, unless fire or smoke is able to spread from one area to another through the void or risk assessment shows AFD (Automatic Fire Detection) to be necessary.



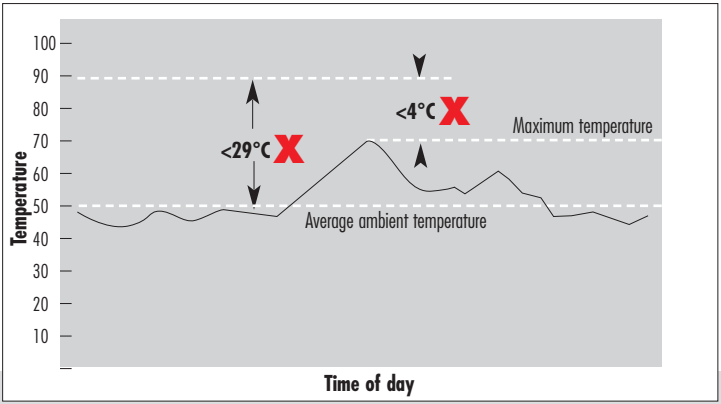
Vertical shafts like lifts and stairways should have a device mounted within 1.5m of any opening.



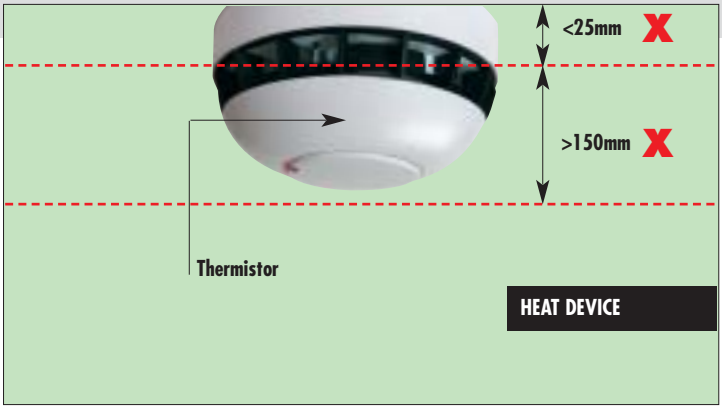
Enclosed stairways should have a detector on each main landing.



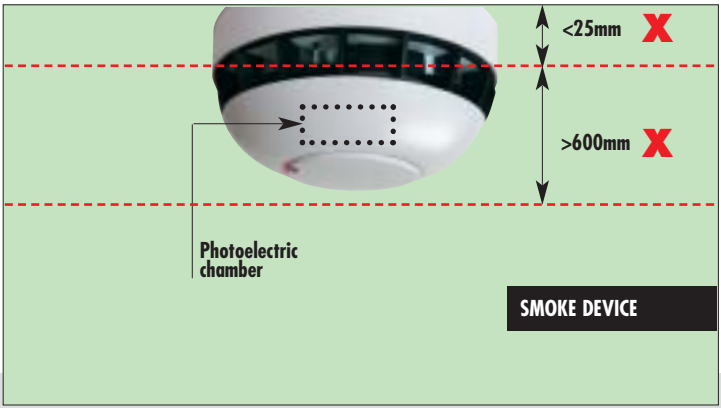
Visual alarms such as strobes should always be mounted above 2.1m from floor level but never closer than 150mm to the ceiling.



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.



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.

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Issue 2

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This booklet is intended as a guide to BS5839 pt 1, we would always recommend that any person working with Fire Alarm systems is familiar with the full standard.