

BS 6266:2011



BSI Standards Publication

Fire protection for electronic equipment installations – Code of practice

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Foreword

Publishing information

This British Standard is published by BSI and came into effect on 31 August 2011. It was prepared by Technical Committee FSH/14, *Fire precautions in buildings*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This British Standard supersedes BS 6266:2002, which is withdrawn.

Relationship with other publications

This British Standard is complementary to BS 7974, which gives a structured method for determining the most appropriate fire protection strategy for a building as a whole.

Information about this document

This is a full revision of the standard, and introduces the following principal changes:

- reduction from five risk categories to four, of which three are addressed in this edition of the standard;
- reinstatement of detection performance tests;
- update of detection technologies, including the classification of aspirating systems;
- update of structural fire protection provisions, taking account of the publication of BS 9999:2008.

Product certification/inspection/testing. Users of this British Standard are advised to consider the desirability of third-party certification/inspection/testing of products and systems installed to achieve conformity with this British Standard. Appropriate conformity attestation arrangements are described in the relevant product standards. Users seeking assistance in identifying appropriate conformity assessment bodies or schemes may ask BSI to forward their enquiries to the relevant association.

Hazard warnings

WARNING. This British Standard calls for the use of substances and/or procedures that can be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

WARNING. The tests described in this standard give off noxious fumes, and suitable precautions should be taken to protect operators in accordance with appropriate risk assessments.

WARNING. There is a fire hazard associated with these tests and an appropriate type of fire extinguisher should always be to hand when preparing for and undertaking the tests.

WARNING. It is the responsibility of the person carrying out the tests that electrical safety is maintained at all times. The electrical tests described within this standard are functional methods and do not attempt to cover the requirements for electrical safety.

Use of this document

This British Standard is intended for use by persons involved in the specification, design, installation, commissioning and operation of fire protection systems for areas containing electronic equipment.

As a code of practice, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Any user claiming compliance with this British Standard is expected to be able to justify any course of action that deviates from its recommendations.

BSI permits the reproduction of BS 6266:2011, Table I.1. This reproduction is only permitted where it is necessary for the user to record calculations on the table during each application of the standard.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is "should".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

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

Compliance with a British Standard cannot confer immunity from legal obligations.

Introduction

A fire in an electronic equipment installation can lead to extensive physical damage to the electronic equipment and serious interruption of operations and services. The occurrence of a fire in an electronic installation, however, is a rare event, and is more often determined by the presence of sources of ignition or fire hazards other than the electronic equipment itself, such as:

- a) supporting electrical equipment and installations, e.g. power supplies;
- b) control equipment and switchgear;
- c) air-handling equipment;
- d) hot works/maintenance;
- e) deliberate ignition;
- f) poor housekeeping;
- g) fire from adjacent areas or premises;
- h) availability of combustible materials.

If a fire does occur, its effects can be minimized by appropriate structural fire protection measures, early detection and extinguishing of the fire, either of which might occur automatically (by fixed systems) or manually (by persons on the premises). This British Standard gives guidance on these measures, taking into consideration the characteristics of those environments in which electronic equipment installations are located. The extensive use of fire protection systems in electronic installations arises not from a high probability of fire, nor from a significant hazard to life, but from the consequences of fire loss.

In practice, a wide variation of dependence on electronic equipment is found. At one extreme, a processing operation might be duplicated at a second location, so that there is redundancy. In this case, a fire at either location would not be expected to cause significant interruption to the operation. The fire protection strategy for electronic equipment fires could then be related entirely to the physical damage to the equipment and its surroundings and the associated financial cost.

At the other extreme, a “real-time” facility might be critical to the revenue-earning capacity of an organization, e.g. it might control a major manufacturing process or provide financial dealing information. In such circumstances, even a few minutes’ downtime can result in significant interruption to users. It might be impractical to provide facilities for the restoration of the service at another location in a short time, in which case a sophisticated fire protection system will be necessary.

It is often necessary to consider the potential for business interruption separately from the potential for material damage. It is essential that the level of protection is reviewed periodically to ensure that it remains appropriate to the exposure to loss.

1 Scope

This British Standard gives recommendations for the protection against fire of electronic equipment installations, including the equipment (e.g. computers, servers and systems for communications, design, manufacturing and distribution), and the areas containing such equipment (e.g. computer rooms, internet hosting centres, switching centres and data centres).

It also gives recommendations for the protection against fire in adjacent areas.

This British Standard covers electronic equipment installations categorized as medium, high and critical risk.

Low risk environments are not addressed in this standard. The standard may however be used as guidance for the protection of such environments.

The standard is applicable to new installations; the recommendations may however be used with an existing installation, and when alterations are made to existing areas containing electronic equipment.

2 Normative references

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

Standards publications

BS 476-11, *Fire tests on building materials and structures – Part 11: Method for assessing the heat emission from building materials*

BS 476-20, *Fire tests on building materials and structures – Part 20: Method for determination of the fire resistance of elements of construction (general principles)*

BS 476-21, *Fire tests on building materials and structures – Part 21: Method for determination of the fire resistance of loadbearing elements of construction*

BS 476-22, *Fire tests on building materials and structures – Part 22: Method for determination of the fire resistance of non-loadbearing elements of construction*

BS 5287, *Specification for assessment and labelling of textile floor coverings tested to BS 4790*

BS 5306-2, *Fire extinguishing installations and equipment on premises – Part 2: Specification for sprinkler systems*

BS 5306-4, *Fire extinguishing installations and equipment on premises – Part 4: Specification for carbon dioxide systems*

BS 5306-8, *Fire extinguishing installations and equipment on premises – Part 8: Selection and installation of portable fire extinguishers – Code of practice*

BS 5839 (all parts), *Fire detection and alarm systems for buildings*

BS 5867-2:1980, *Fabrics for curtains, drapes and window blinds – Part 2: Flammability requirements – Specification*

BS 5979, *Remote centres receiving signals from fire and security systems – Code of practice*

BS 7176:2007, *Specification for resistance to ignition of upholstered furniture for non-domestic seating by testing composites*

BS 7273-1, *Code of practice for the operation of fire protection measures – Part 1: Electrical actuation of gaseous total flooding extinguishing systems*

BS 7273-2, *Code of practice for the operation of fire protection measures – Part 2: Mechanical actuation of gaseous total flooding and local application extinguishing systems*

BS 7273-3, *Code of practice for the operation of fire protection measures – Part 3: Electrical actuation of pre-action watermist and sprinkler systems*

BS 7273-5, *Code of practice for the operation of fire protection measures – Part 5: Electrical actuation of watermist systems (except pre-action systems)*

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

BS 8519, *Selection and installation of fire-resistant power and control cable systems for life safety and fire-fighting applications – Code of practice*

BS 9999:2008, *Code of practice for fire safety in the design, management and use of buildings*

BS EN 3 (all parts), *Portable fire extinguishers* ¹⁾

BS EN 54 (all parts), *Fire detection and fire alarm systems*

BS EN 140, *Respiratory protective devices – Half masks and quarter masks – Requirements, testing, marking*

BS EN 166, *Personal eye protection – Specifications*

BS EN 1047 (all parts), *Secure storage units – Classification and methods of test for resistance to fire*

BS EN 1363 (both parts), *Fire resistance tests*

BS EN 1364 (all parts), *Fire resistance tests for non-loadbearing elements*

BS EN 1365 (all parts), *Fire resistance tests for loadbearing elements*

BS EN 1634 (all parts), *Fire resistance and smoke control tests for door, shutter and, openable window assemblies and elements of building hardware*

BS EN 12845, *Fixed firefighting systems – Automatic sprinkler systems – Design, installation and maintenance*

BS EN 13501-1:2007+A1:2009, *Fire classification of construction products and building elements – Part 1: Classification using test data from reaction to fire tests*

BS EN 13823, *Reaction to fire tests for building products – Building products excluding floorings exposed to the thermal attack by a single burning item*

BS EN 15004 (all parts), *Fixed firefighting systems – Gas extinguishing systems*

BS EN 62305 (all parts), *Protection against lightning*

BS EN ISO 1182, *Reaction to fire tests for products – Non-combustibility test*

BS EN ISO 1716, *Reaction to fire tests for products – Determination of the gross heat of combustion (calorific value)*

DD 8489-1, *Fixed fire protection systems – Industrial and commercial watermist systems – Part 1: Code of practice for design and installation*

DD 8489-7, *Fixed fire protection systems – Industrial and commercial watermist systems – Part 7: Tests and requirements for watermist systems for the protection of low hazard occupancies*

¹⁾ This standard also gives an informative reference to BS EN 3-7:2004+A1:2007.

Other publications

[N1] FIRE INDUSTRY ASSOCIATION. *Code of practice for design, installation, commissioning and maintenance of aspirating smoke detector (ASD) systems*. Hampton, Surrey: Fire Industry Association, 2006.²⁾

3 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply.

3.1 aspirating smoke detector (ASD)

automatic fire detector which uses a fan or pump to draw samples from the atmosphere in a protected space into a smoke detector that can be remote from that protected space

3.2 coincidence detection

facility designed so that an output is obtained only when at least two independent inputs are present at the same time

NOTE 1 For example, an output suitable for triggering a fire suppression system is obtained only after a detector has detected a fire, and at least one other independent detector covering the same protected space has confirmed the existence of the fire.

NOTE 2 Also referred to as "coincidence connection".

3.3 competent person

person, suitably trained and qualified by knowledge and practical experience, and provided with the necessary instructions, to enable the required task(s) to be carried out correctly

3.4 electronic equipment area

room, or rooms, containing machinery and electronic equipment that requires protection from fire

3.5 fire load

quantity of heat that would be released by the complete combustion of all the combustible materials in a volume of a room or area, including the facings of all bounding surfaces

3.6 fire resistance

ability of an item to fulfil for a stated period of time the required stability and/or integrity and/or insulation from the heat of a fire and/or other expected duty specified in a standard fire resistance test

NOTE BS 476, BS EN 1364, BS EN 1365 and BS EN 1366 give guidance on fire resistance.

3.7 fire risk

product of the following parameters:

- probability of the occurrence of a fire, to be expected in a given technical operation or state; and
- consequence or extent of damage to be expected following the occurrence of the fire

²⁾ This document is undergoing revision at the time of publication of BS 6266:2011.

3.8 fire-stopping

sealing or closing an imperfection of fit between elements, components or construction of a building, or any joint, so as to restrict penetration of smoke and flame through the imperfection or joint

3.9 hypoxic fire prevention system

system that maintains air with a reduced oxygen content in the enclosed volume to inhibit a fire from starting

3.10 limited combustibility

material performance specification that includes non-combustible materials and for which the relevant test criteria are:

- a) (national classes) by reference to the method specified in BS 476-11; or
- b) (European classes) in terms of performance when classified as class A2-s3, d2 in accordance with BS EN 13501-1:2007+A1:2009, when tested to BS EN ISO 1182 or BS EN ISO 1716 and BS EN 13823

3.11 non-combustible

not capable of undergoing combustion under specified conditions [BS EN ISO 13943]

3.12 pre-alarm

indication that conditions are approaching a full fire signal

NOTE This is distinct from an early warning signal, which indicates that conditions have deviated from what are considered as normal.

3.13 protected space

area or volume protected by a fire detection and/or suppression system

3.14 staged alarm

alarm system in which two or more stages of alarm are given within a specific area

3.15 stakeholder

party with a direct or indirect interest in the life cycle of an electronic equipment area

NOTE The interest might be:

- *financial, e.g. owner or insurance company;*
- *as a customer (internal or external);*
- *as an authority having jurisdiction, e.g. building control officer, fire authority;*
- *in a professional capacity as an adviser to one of the parties, e.g. architect, fire engineer, building service engineer; or*
- *in a contractual capacity, e.g. a manufacturer, installer or maintainer of equipment.*

3.16 total flooding

discharge of an extinguishing agent into an enclosed volume in order to achieve a uniform concentration of the agent within that volume sufficient to extinguish a fire

4 Risk assessment

4.1 General

Prior to establishing the specification for the electronic equipment installation, the building and environment in which the equipment will be sited, and the design of fire protection systems, an appropriate risk assessment should be undertaken.

Risk assessment should be an ongoing process as changes and modifications are made to the equipment, its environment, its use, recovery plans etc.

The risk assessment should be carried out by competent persons.

NOTE This is not the same as the risk assessment for the building associated with fire safety legislation in the UK.

4.2 Risk assessment categories

4.2.1 General

The criticality of most electronic equipment areas can be categorized subjectively, based on the following factors:

- equipment redundancy and replacement availability;
- business continuity plans;
- tolerance to system downtime;
- environmental operational requirements specific to an individual system.

The categories are:

- low;

NOTE Examples include CAD offices, call centres, small PABX rooms, etc. Low risk categories are not covered in this standard).

- medium;
- high;
- critical.

The medium, high and critical categories of risk are typified by having dedicated equipment rooms and centralized server/computer facilities.

These categories of risk should be used to determine the type and level of fire prevention and protection deemed appropriate. In order to choose a category, the criteria given in 4.2.2, 4.2.3, and 4.2.4 should be used.

4.2.2 Medium category risk

Typical features are as follows:

- a) equipment is standard but not immediately replaceable;
- b) operations are transferable to another location;
- c) there is a need for files to be backed up periodically on a remote server;
- d) interruption to business operations can be tolerated in the medium term.

An example of medium risk electronic equipment installations is call centre communication facilities, where alternative call centre operations exist.

4.2.3 High category risk

Typical features are as follows:

- a) equipment is non-standard and is not replaceable in the short term;
- b) operations are not easily transferable without robust contingency plans;
- c) there is a need for files to be backed up frequently on a remote server;
- d) interruption to business operations can be tolerated in the short term.

Examples of high risk electronic equipment installations are: main IT facility; major telecommunication facility; production control computers.

4.2.4 Critical category risk

Typical features are as follows:

- a) equipment is high value or purpose-built and is not easily replaceable;
- b) operations are not easily transferable;
- c) there is a need for data to be backed up on a continual basis on a remote server;
- d) interruption to business operations is likely to have serious consequences.

Examples of critical risk electronic equipment installations are: financial dealing computer operations; internet hosting centres; air traffic control facilities; nuclear and chemical plant control facilities.

5 Fire detection and fire protection strategy

The application of fire detection and fire suppression systems should be based on the risk category as identified in Clause 4. Similarly, the fire protection strategy should be formulated taking into account fire safety management strategies (see Clause 11) and recovery plans (see Clause 12).

Typically, the higher the risk category, the greater the sophistication of the fire detection and suppression systems. The level of detection and suppression can vary from simple fire alarm systems and the availability of portable fire extinguishers, to an extensive fire detection system and automatic fire suppression.

The final choice should take into account the following factors, and should be fully documented:

- a) the findings of the risk assessment (see Clause 4);
- b) the type and layout of the building in which the electronic equipment installations are located;
- c) the effects of the environment and processes on the efficacy of detection and suppression systems in and around the electronic equipment installations;
- d) fire and rescue service attendance time;
- e) practical and commercial restrictions on detection and suppression system choice;
- f) the type and number of persons in the area;
- g) the availability of persons who would be able to provide the necessary manual actions, where manual intervention is part of the strategy.

NOTE Typical features of fire detection and suppression systems that might be found for each of the risk categories are given in Table 1.

Table 1 Typical features of fire detection and suppression systems for each risk category

Risk category	Fire detection system	Fire suppression/inhibition system
Medium	A smoke detection system as part of the main building system (see 8.3.2.3 and Annex A)	Automatic fixed fire suppression/inhibition (see 9.1) where early fire-fighting action is unlikely Portable fire extinguishers as first aid fire-fighting (see 9.2)
High	A smoke detection system interfaced with the main building system (see 8.3.2.2 and Annex A) High sensitivity smoke detection (e.g. Class A aspirating smoke detection) to monitor air flows returning to the air-conditioning	Automatic fixed fire suppression/inhibition (see 9.1) unless there is a robust recovery plan (see Clause 12) Portable fire extinguishers as first aid fire-fighting (see 9.2)
Critical	A smoke detection system interfaced with the main building system (see 8.3.2.2 and Annex A) High sensitivity smoke detection (e.g. Class A aspirating smoke detection) to monitor air flows returning to the air-conditioning	Automatic fixed fire suppression/inhibition (see 9.1) Portable fire extinguishers as first aid fire-fighting (see 9.2)

6 Separation and construction of electronic equipment areas

6.1 Separation and location of electronic equipment areas

Electronic equipment should be separated from other operations, such as offices, storage, unrelated processes and ancillary accommodation (see 6.5). Separation should be achieved by enclosing the electronic equipment area using fire-resisting construction that has a fire resistance appropriate to the risk and the fire load in the adjacent area.

When tested in accordance with BS 476-20, BS 476-21 BS 476-22, or the relevant parts of BS EN 1363, BS EN 1364, BS EN 1365 or BS EN 1634, as appropriate:

- a) the construction for medium risk installations should have a fire resistance of not less than 30 min;
- b) the construction for high and critical risk installations (without automatic fire extinguishing or suppression systems) should have a fire resistance of not less than:
 - 1) 60 min when the remainder of the building has a low fire load, e.g. offices or factories involved in processes involving wet or non-combustible materials;
 - 2) 120 min when the remainder of the building has a medium fire load, e.g. metalworking premises where there is a limited quantity of combustible materials;
 - 3) 240 min when the remainder of the building has a high fire load, e.g. warehouses containing a large quantity of combustible materials.

Where automatic sprinklers or other automatic fire extinguishing or suppression systems giving an equivalent level of protection are installed in the adjacent area, the fire resistance of the enclosure may be reduced by 30 min, subject to a minimum of 30 min.

Electronic equipment should not be sited where fire-fighting could be impeded or where there is a risk of flooding from fire-fighting operations.

6.2 Construction of the electronic equipment area

The number of openings in any construction enclosing an electronic equipment area should be kept to a minimum. Any openings should be fitted with fire- and smoke-resisting doors, shutters or hatches with the same fire resistance as the wall in which they are fitted.

Fire-resisting walls and partitions separating the electronic equipment area should fill the space between a structural floor and the underside of the structural floor or roof above.

Any glazing in a separating and enclosing wall, or in a dividing partition, should normally be fire-resistant in terms of both integrity and insulation. Where radiation through the glazing in the event of an external fire is unlikely to be a hazard, e.g. where there is no electronic equipment or other combustibles in close proximity to the glazing, integrity-only glazing may be used.

NOTE Some types of integrity fire-resistant glass allow heat transmission at a sufficient level to cause smoking and smouldering of materials and fittings on the non-fire side (without ignition). The risks of smoke contamination and damage to the equipment might therefore need to be taken into account in the risk assessment. Where this risk is considered unacceptable then it might be necessary to use an integrity rating for the specified time together with a supplementary insulation classification at 15 min (e.g. 30 min integrity, 15 min insulation).

Ventilation ductwork or service ducts serving other parts of the building should normally not pass through an electronic equipment area. Where it is not practicable to avoid this, the ductwork should be enclosed within a fire-resisting construction in accordance with BS 9999:2008.

Linings to walls, partitions, soffits, ceilings and voids should be made of materials which are of limited combustibility.

6.3 Raised floors within an electronic equipment area

Where raised floors within an electronic equipment area are constructed of combustible materials, the floor should be faced on the underside with non-combustible material.

Where modular raised floors are installed, appropriate lifters should be provided that are easy to locate and readily accessible.

6.4 Suspended ceilings within an electronic equipment area

Suspended ceilings within an electronic equipment area should be made of materials that are of limited combustibility. Such materials should not give rise to the production of decomposition particles, nor of corrosive or toxic fumes, in the event of a fire.

If a filling is inserted above ceiling tiles (e.g. for acoustic or air balancing reasons), it should either be non-combustible (e.g. mineral fibre or glass fibre), or, if combustible, be sealed in non-combustible bags.

Where a suspended ceiling is designed to provide a specified fire resistance, the ceiling should be installed in accordance with the manufacturer's instructions.

6.5 Walls and partitions within an electronic equipment area

Due to the high property value and potential for interruption to operations, it is recommended that additional subdivision of electronic equipment areas is provided. Suitably designed lightweight partitions can limit the spread of smoke during the early stages of a fire, thus reducing the extent of damage in terms of both the area affected and the severity of damage to equipment. Such partitions should be installed from floor to soffit and all penetrations sealed in order to form effective smoke barriers.

The detection system should be designed to take into account any partitioning. If an area is protected by a gaseous extinguishing system, the walls or partitions surrounding the area should fill the space between a structural floor and the underside of the structural floor or roof above in order to maintain room integrity, and suitable provision for pressure relief should be provided.

Ancillary accommodation within an electronic equipment area or processes with a higher fire risk, e.g. IT personnel offices, printer rooms, and data-storage and other media storage, should be separated from the rest of the electronic equipment area by a suitably rated fire-resisting partition that is sealed against smoke penetration. This separation should comprise the following measures:

- a) 30 min fire- and smoke-resisting construction for small offices with limited fire load and areas having similar fire risk, e.g. the partitions between the main server room and the communications room, or between processing and data-storage equipment;
- b) 60 min fire- and smoke-resisting construction for data preparation areas, data-storage media rooms, service rooms and working stationery stores, which typically contain a higher than normal level of ordinary combustible materials.

Joints between fire-resisting walls, floor and ceilings should be stopped with suitable fire-resisting materials.

6.6 Cable and service penetrations

All penetrations created for the passage of cables, ducts and pipework should be fire-stopped in accordance with BS 9999:2008, 33.5. Service ducts, pipes and shafts should conform to BS 9999:2008, 33.4.

NOTE 1 Where there are multiple penetrations (e.g. for aspirating smoke detection systems), it is good practice to use intumescent seals in addition to the provisions recommended in BS 9999:2008.

In designing provision for cable and service penetrations, facilities should be provided to satisfy any reasonably foreseeable future need to install additional cables.

NOTE 2 Proprietary fire-stopping systems are available that facilitate ready modification to accommodate new cables.

6.7 Storage

6.7.1 Storage of combustible materials

Storage facilities for combustible materials not required for immediate use, and for waste material, should be provided outside the electronic equipment area. Metal or non-combustible bins with self-closing lids for paper waste, etc. should be provided within the electronic equipment area itself.

NOTE See also 11.2.2.

6.7.2 Storage of recorded data

The quantity of data-storage media held within the electronic equipment area should be kept to the minimum required for efficient operations. This is intended to minimize exposure of the electronic equipment to fire in the storage media and to protect data in the event of a fire elsewhere in the room.

Where there is a need to protect data from exposure to fire, then it should be stored in a fire-rated container, cabinet or data room conforming to BS EN 1047.

To protect the electronic equipment itself against fire originating in data stores, the following precautions should be taken.

- a) Stored data media should be located in an area separated from the main electronic equipment area by fire- and smoke-resisting construction of either 30 min or 60 min as appropriate (see 6.5).
- b) Where the fire load of the stored data is high, i.e. requiring 60 min fire- and smoke-resisting construction (see 6.5), additional provisions should be made as necessary to protect the data and/or the building and adjacent areas, e.g. early warning smoke detection systems and/or a fire suppression system.
- c) Automatic storage and retrieval carousels used for storage of media should be provided with smoke detection within the carousel. A fixed fire suppression system should also be installed if protection of the data, the building or adjacent areas is required.

6.8 Furniture and furnishings

Combustible fittings and furniture should be kept to a minimum.

Upholstered furniture should meet the requirements for the medium hazard resistance classification specified in BS 7176:2007, Table 1.

Fabrics and fabric assemblies used for curtains, drapes and window blinds should be made of materials which are classified as type C in accordance with BS 5867-2:1980.

Textile floor coverings should be made of materials which have a low radius of effects of ignition in accordance with BS 5287.

7 Building engineering services for electronic equipment areas

7.1 Air-conditioning

7.1.1 Design

Air-conditioning systems should meet the following recommendations.

- a) A separate air-handling plant should be provided for the electronic equipment area.
- b) Positive air pressure should be provided within the electronic equipment area relative to adjacent areas.
- c) Wherever possible, an intake for the air-handling system for the electronic equipment area should be situated in an area where it is unlikely to draw in smoke or other contaminants from fires and/or damaging fumes from nearby processes. Where this is not possible, smoke detection should be installed in the make-up air-handling unit and used: either to shut down the air intake or to act as a reference detector for the smoke detection system (see 8.3.1.5).

- d) Surfaces of air filters, air attenuators and similar components of ventilation systems exposed to the airflow should be inherently non-flammable, or so treated as to make them non-flammable for the duration of their recommended working life. Viscous fluids in air filters should have a flash point of not less than 177 °C.
- e) Combustible material should not be used for ductwork.
- f) Where flexible connections are used in the air-handling ductwork, they should conform to BS 9999:2008, **33.4.14**.
- g) The inter-relationship between the air-conditioning and fire detection systems is critical, and in consequence the system should provide appropriate interfaces for interaction with the fire detection system (see **8.2.4**).
- h) The shutdown procedure for the system should be designed to take into account the susceptibility of the equipment to changes in temperature and/or atmosphere.

NOTE The following three situations are the most common.

- *Where the tolerance of the electronic equipment is such that it is possible to power down ventilation for some considerable time without significant ill-effects, it is appropriate to do so on the first operation of a detection system.*
 - *Where ventilation is essential for the correct functioning of the electronic equipment, as is likely to be the case with high and critical category electronic equipment installations, shutting down ventilation at an early stage following operation of fire detection in the electronic equipment area is likely to be undesirable. In these cases, it is appropriate for ventilation shutdown to be initiated only following confirmation of the fire, e.g. by a second stage Class B alarm from the air return or by coincidence detection.*
 - *If it is important to maintain a supply of cool air throughout an incident, it is appropriate for ventilation to be continued. If it is necessary to continue ventilation during a fire, the system may be configured so that following activation of the suppression system, recirculation is maintained but fresh air make-up is shut down. This will serve to improve the hold time of rooms protected by gaseous extinguishing systems and to take advantage of the benefits of mechanical mixing of gas and air within the room.*
- i) Where hypoxic fire prevention systems are used, air-conditioning should be designed such that the inward leakage of air (fresh air intake) does not affect the operation of the hypoxic fire prevention system.
 - j) Provision should be made for the detection of products of combustion emanating from within the air-conditioning plant, to prevent the spread of smoke into the electronic equipment area.

Self-contained air-conditioning units eliminate the need for ductwork and dampers at the electronic equipment area boundary, but can present an additional fire hazard within the electronic equipment area. They should be designed and installed to minimize the risk of fire and smoke and should have the features described in a) to j) above.

7.1.2 Fire dampers

Fire-resisting dampers should be selected and installed in accordance with BS 9999:2008, **33.4.5**.

Dampers should be positioned to allow for maintenance and easy resetting after operation. Controls should be clearly labelled and accessible.

Dampers held in the open position should fail safe, i.e. in the event of a fault the dampers should close.