Office of the
Deputy Prime Minister
Creating sustainable communities

The Building Act 1984
The Building Regulations 2000

The proposed new edition of Approved Document B: *Fire Safety* Volume 1 (*Dwellings*)

A consultation document

July 2005

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Office of the Deputy Prime Minister: London

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Notes for consultees

To more clearly highlight the proposed changes in this draft Approved Document, for the purposes of consultation, we have used a different colour for inserted text and strikeout for deleted text. Text boxes, highlighted in blue, have been used to identify the reasoning behind significant changes.

The draft Approved Document has also been split into two volumes: "Dwellings" and "Buildings other than Dwellings". This change was intended to make the guidance more accessible for smaller firms that specialise in domestic work. Where text in the 2000 edition of Approved Document B is not relevant to this volume it has been omitted.

It has not been possible to highlight specific changes to diagrams but where diagrams have been introduced or changed this is indicated by the words "NEW" or "AMENDED" in the title of the relevant diagram.

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Use of guidance

The Approved Documents

~~The Building Regulations 2000 (S.I. 2000/2531), which come into operation on 1st January 2001, replace the Building Regulations 1991 (S.I. 1991/2768) and consolidate all subsequent revisions to those regulations.~~ This document is one of a series that has been approved and issued by the Secretary of State for the purpose of providing practical guidance with respect to the requirements of Schedule 1 and Regulation 7 of the Building Regulations 2000 (SI 2000/2531) for England and Wales. SI 2000/2531 has been amended by the Building (Amendment) Regulations 2001 (SI 2001/3335), the Building (Amendment) Regulations 2002 (SI 2002/440), the Building (Amendment) (No 2) Regulations 2002 (SI 2002/2871), the Building (Amendment) Regulations 2003 (SI 2003/2692), the Building (Amendment) Regulations 2004 (SI 2004/1465) and the Building (Amendment) (No 3) Regulations (SI 2004/3210).

At the back of this document is a list of all the documents that have been approved and issued by the Secretary of State for this purpose.

The Approved Documents are intended to provide guidance for some of the more common building situations. However, there may well be alternative ways of achieving compliance with the requirements.

Thus there is no obligation to adopt any particular solution contained in an Approved Document if you prefer to meet the relevant requirement in some other way.

Supplementary guidance

The Office of the Deputy Prime Minister occasionally issues additional material to aid interpretation of the guidance contained in Approved Documents. This material may be conveyed in official letters to Chief Executives of Local Authorities and Approved Inspectors and/or posted on the websites accessed through: www.odpm.gov.uk/buildingregs.

Other requirements

The guidance contained in an Approved Document relates only to the particular requirements of the Regulations which that document addresses. The building work will also have to comply with the requirements of any other relevant paragraphs in Schedule 1 to the Regulations.

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There are Approved Documents which give guidance on each of the other requirements in Schedule 1 and on Regulation 7.

Limitation on requirements

In accordance with Regulation 8, the requirements in Parts A–D, F–K, N and P (except for paragraphs H2 and J6) of Schedule 1 to the Building Regulations do not require anything to be done except for the purpose of securing reasonable standards of health and safety for persons in or about buildings (and any others who may be affected by buildings or matters connected with buildings). This is one of the categories of purpose for which Building Regulations may be made.

Paragraphs H2 and J6 are excluded from Regulation 8 because they deal directly with prevention of the contamination of water. Parts E and M (which deal, respectively, with resistance to the passage of sound, and access to and use of buildings) are excluded from Regulation 8 because they address the welfare and convenience of building users. Part L is excluded from Regulation 8 because it addresses the conservation of fuel and power. All these matters are amongst the purposes, other than health and safety, that may be addressed by Building Regulations.

Materials and workmanship

Any building work which is subject to the requirements imposed by Schedule 1 of the Building Regulations should, in accordance with Regulation 7, be carried out with proper materials and in a workmanlike manner.

You may show that you have complied with Regulation 7 in a number of ways. These include the appropriate use of a product bearing CE marking in accordance with the Construction Products Directive (89/106/EEC)[1], the Low Voltage Directive (73/23/EEC and amendment 93/68/EEC)[2] and the EMC Directive (89/336/EEC)[3], as amended by the CE Marking Directive (93/68/EEC)[4], or a product complying with an appropriate technical specification (as defined in those Directives), a British Standard, or an alternative national technical specification of any state which is a contracting party to the European Economic Area which, in use, is equivalent, or a product covered by a national or

1 As implemented by the Construction Products Regulations 1991 (SI 1991 No 1620).

2 As implemented by the Electrical Equipment (Safety) Regulations 1994 (SI 1994 No 3260).

3 As implemented by the Electromagnetic Compatibility Regulations 1992 (SI 1992 No 2372).

4 As implemented by the Construction Products (Amendment) Regulations 1994 (SI 1994 No 3051) and the Electromagnetic Compatibility (Amendment) Regulations 1994 (SI 1994 No 3080).

European certificate issued by a European Technical Approval Issuing body, and the conditions of use are in accordance with the terms of the certificate. You will find further guidance in the Approved Document supporting Regulation 7 on materials and workmanship.

Independent certification schemes

There are many UK product certification schemes. Such schemes certify compliance with the requirements of a recognised document which is appropriate to the purpose for which the material is to be used. Materials which are not so certified may still conform to a relevant standard.

Many certification bodies which approve such schemes are accredited by UKAS.

Since the fire performance of a product, component or structure is dependent upon satisfactory site installation and maintenance, independent schemes of certification and ~~registration~~ accreditation of installers and maintenance firms of such will provide confidence in the appropriate standard of workmanship being provided.

Schemes such as those mentioned above may be accepted by Building Control Bodies as evidence of compliance. The Building Control Body will, however, wish to establish, in advance of the work, that the scheme is adequate for the purposes of the Building Regulations.

Technical specifications

Building Regulations are made for specific purposes: health and safety, energy conservation and the welfare and convenience of disabled people. Standards and technical approvals are relevant guidance to the extent that they relate to these considerations. However, they may also address other aspects of performance such as serviceability, or aspects which although they relate to health and safety are not covered by the Regulations.

When an Approved Document makes reference to a named standard, the relevant version of the standard is the one listed at the end of the publication. However, if this version of the standard has been revised or updated by the issuing standards body, the new version may be used as a source of guidance provided it continues to address the relevant requirements of the Regulations.

The appropriate use of a product which complies with a European Technical Approval as defined in the Construction Products Directive will meet the relevant requirements.

Inserted text ~~Deleted text~~

The ~~Department~~ Office intends to issue periodic amendments to its Approved Documents to reflect emerging harmonised European Standards. Where a national standard is to be replaced by a European harmonised standard, there will be a co-existence period during which either standard may be referred to. At the end of the co-existence period the national standard will be withdrawn.

The Workplace (Health, Safety and Welfare) Regulations 1992

The Workplace (Health, Safety and Welfare) Regulations 1992 contain some requirements which affect building design. The main requirements are now covered by the Building Regulations, but for further information see: *Workplace health, safety and welfare, The Workplace (Health, Safety and Welfare) Regulations 1992, Approved Code of Practice and Guidance*; the Health and Safety Commission, L24; published by HMSO 1992; ISBN 0-11-886333-9.

The Workplace (Health, Safety and Welfare) Regulations 1992 apply to the common parts of flats and similar buildings if people such as cleaners, wardens and caretakers are employed to work in these common parts. Where the requirements of the Building Regulations that are covered by this Part do not apply to dwellings, the provisions may still be required in the situations described above in order to satisfy the Workplace Regulations.

The Construction (Health, Safety and Welfare) Regulations 1996

The purpose of this Approved Document is to provide guidance on the fire safety requirements for the completed building. It does not address the risk of fire during the construction work which is covered by the Construction (Health, Safety and Welfare) Regulations 1996. HSE has issued the following guidance on these Regulations: Construction Information Sheet No 51 *Construction fire safety*; and HSG 168 *Fire safety in construction work* (ISBN 0-7176-1332-1).

When the construction work is being carried out on a completed building which, apart from the construction site part of the building, remains occupied, the fire and rescue authority is responsible for the enforcement of the 1996 Regulations in respect of fire. Where the building is unoccupied, the Health and Safety Executive is responsible for enforcement.

The Construction Products Directive

The Construction Products Directive (CPD) is one of the 'New Approach' Directives, which seek to remove technical barriers to trade within the European Economic Area (EEA) as part of the move to complete the Single Market. The EEA comprises the European Community and those states in the European Free Trade Association (other than Switzerland). The intention of the CPD is to replace existing national standards and technical approvals with a single set of European-wide technical specifications for construction products (i.e. harmonised European standards or European Technical Approvals). Any manufacturer whose products have CE marking showing that they are specified according to European technical specifications cannot have his products refused entry to EEA markets on technical grounds. In the UK, the CPD was implemented by the Construction Products Regulations, which came into force on 27 December 1991 and were amended on 1 January 1995 by the Construction Products (Amendment) Regulations 1994.

This document refers to, and utilises within its guidance, a large number of British Standards, in relation to Codes of Practice and fire test methods (typically the BS 476 series of documents). In order to facilitate harmonisation and the use of the new technical specifications and their supporting European test standards, guidance is also given on the classification of products in accordance with those standards.

Guidance is given for the appropriate use and/or specification of a product to which one or more of the following apply:

1. a product bearing CE marking in accordance with the Construction Products Directive (89/106/EEC) as amended by the CE Marking Directive (93/68/EEC);

2. a product tested and classified in accordance with the European Standards (BS EN) referred to in the Commission Decision 2000/147/EC[1] and/or Commission Decision 2000/367/EC[2];

3. a product complying with an appropriate technical specification (as defined in the Directives 89/106/EC as amended by 93/68/EEC).

The implementation of the Construction Products Directive (CPD) will necessitate a time period during which national (British) Standards and European technical specifications will co-exist. This is the so-called period of co-existence. The objective of this period of co-existence is to provide for a gradual adaptation to the requirements of the CPD. It will enable producers, importers and distributors of construction products to sell stocks of products

1 Implementing Council Directive 89/106/EEC as regards the classification of the reaction to fire (2000/147/EC) performance of construction products.

2 Implementing Council Directive 89/106/EEC as regards the classification of the resistance to fire (2000/367/EC) performance of construction products, construction works and parts thereof.

manufactured in line with the national rules previously in force and have new tests carried out. The duration of the period of co-existence in relation to the European fire tests has not yet been clearly defined.

As new information becomes available and further harmonised European standards relevant to this document are published, further guidance will be made available. For example, further guidance will be necessary in the areas of roof coverings and thermoplastics.

DESIGNATION OF STANDARDS

The designation of 'xxxx' is used for the year referred to for standards that are not yet published. The latest version of any standard may be used provided that it continues to address the relevant requirements of the Regulations.

COMMISSION GUIDANCE PAPERS AND DECISIONS

The following guidance papers and Commission decisions are directly relevant to fire matters under the Construction Products Directive:

Guidance Paper G

The European classification system for the reaction to fire performance of construction products.

Guidance Paper J

Transitional arrangements under the Construction Products Directive.

Commission Decision of 8 February 2000 (2000/147/EC) implementing Council Directive 89/106/EEC as regards the classification of the reaction to fire performance of construction products.

Commission Decision of 3 May 2000 (2000/367/EC) implementing Council Directive 89/106/EEC as regards the classification of the resistance to fire performance of construction products, construction works and parts thereof.

Commission Decision of 26 September 2000 (2000/605/EC) amending Decision 96/603/EC establishing the list of products belonging to Classes A 'No contribution to fire' provided for in Decision 94/611/EC implementing Article 20 of Council Directive 89/106/EEC on construction products.

Corrigenda – Corrigendum to Commission Decision 2000/147/EC of 8 February 2000 implementing Council Directive 89/106/EEC as regards the classification of the reaction to fire performance of construction products.

The publication and revision of Commission guidance papers and decisions are ongoing and the latest information in this respect can be found by accessing the European Commission's website via the link on the ODPM website at: ~~www.odpm.gov.uk/bregs/cpd/index.htm~~ www.odpm.gov.uk/buildingregs.

General introduction

Fire safety

ARRANGEMENT OF SECTIONS

0.1 The functional requirements B1–B5 of Schedule 1 of the Building Regulations are dealt with separately in one or more Sections. The requirement is reproduced at the start of the relevant Sections, followed by an introduction to the subject.

0.2 The provisions set out in this document deal with different aspects of fire safety, with the following aims.

B1: To ensure satisfactory provision of means of giving an alarm of fire and a satisfactory standard of means of escape for persons in the event of fire in a building.

B2: That fire spread over the internal linings of buildings is inhibited.

B3: To ensure the stability of buildings in the event of fire; to ensure that there is a sufficient degree of fire separation within buildings and between adjoining buildings; and to inhibit the unseen spread of fire and smoke in concealed spaces in buildings.

B4: That external walls and roofs have adequate resistance to the spread of fire over the external envelope, and that spread of fire from one building to another is restricted.

B5: To ensure satisfactory access for fire appliances to buildings and the provision of facilities in buildings to assist firefighters in the saving of life of people in and around buildings.

0.3 Whilst guidance appropriate to each of these aspects is set out separately in this document, many of the provisions are closely interlinked. For example, there is a close link between the provisions for means of escape (B1) and those for the control of fire growth (B2), fire containment (B3), and facilities for the fire service (B5). Similarly there are links between B3 and the provisions for controlling external fire spread (B4), and between B3 and B5. Interaction between these different requirements should be recognised where variations in the standard of provision are being considered. A higher standard under one of the requirements may be of benefit in respect of one or more of the other requirements. The guidance in the document as a whole should be considered as a package aimed at achieving an acceptable standard of fire safety.

0.4 ~~In the guidance on B1 the provisions for dwellings are separated from those for all other types of building, because there are important differences in the approach that has been adopted.~~ Dwellinghouses (Section 2) pose different problems from ~~flats and maisonettes~~ apartments, which are therefore treated separately in Section 3.

APPENDICES: PROVISIONS COMMON TO MORE THAN ONE OF PART B'S REQUIREMENTS

0.5 Guidance on matters that refer to more than one of the Sections is in a series of Appendices, covering the following subjects:

Appendix A – fire performance of materials, products and structures;

Appendix B – provisions regarding fire doors;

Appendix C – methods of measurement;

Appendix D – a classification of purpose groups;

Appendix E – definitions.

Appendix F – Standards and other publications referred to ~~insulating core panels.~~

PURPOSE GROUPS

0.6 Much of the guidance in this document is related to the use of the building. The use classifications are termed purpose groups, and they are described in Appendix D. This document deals only with buildings in Purpose Group 1. Where there is a mixed use, see paragraph 3.49.

HOUSES IN MULTIPLE OCCUPATION

~~**2.3**~~ **0.7** This guidance is also applicable to the design and construction of houses which are considered to be 'houses in multiple occupation' (HMOs) providing there are no more than six residents. For HMOs with a greater number of residents, then additional precautions may be necessary. ~~A house in multiple occupation is defined in section 345 of the Housing Act 1985 as "a house which is occupied by persons who do not form a single household". Guidance on the interpretation of this definition is given in DOE Circular 12/93 *Houses in multiple occupation. Guidance to local housing authorities on managing the stock in their area* and Welsh Office Circular 55/93 *Houses in multiple occupation. Guidance on management strategies.*~~

~~Technical guidance for HMOs is given in DOE Circular 12/92 *Houses in multiple occupation. Guidance to local housing authorities on standards of fitness under section 352 of the Housing Act 1985* and Welsh Office Circular 25/92 *Local Government and Housing Act 1989. Houses in multiple occupation: standards of fitness.*~~

The Housing Act 2004 makes important changes to the legislation and guidance relating to HMOs. Part 1 of the Act replaces the current standards and guidance under the Housing Act 1985 with a risk assessment procedure, the Housing Health and Safety Rating System (HHSRS).

Technical guidance on the assessment of hazards from fire and preventive measures is contained in *Housing Health and Safety Rating System Guidance* (Version 2) issued in November 2004 (ISBN 1-855112-752-6).

The Building Regulations generally only apply whenever 'building work' is undertaken, typically the erection, extension or alteration of a building. They would therefore typically not apply to existing premises. It is also important to appreciate that HMOs are not necessarily built, but rather they come under such a classification by virtue of the way in which they are occupied/used.

It is therefore intended to cross refer readers of the revised Approved Document B to the relevant guidance supporting the Housing Act 2004 (once it is all available) and to reinforce the importance that the client/designer consults, at an early stage, with the relevant Local Authority. It should be noted that depending upon the level risk once the building is occupied the Local Authority may ask for additional fire safety provisions.

REGISTERED GROUP HOMES

~~2.3~~ **0.8** Depending on the nature of the occupants and their management, it may be acceptable to treat an unsupervised group home with up to six residents as an ordinary dwelling. However because such places have to be registered, the registration authority should be consulted to establish whether there are any additional fire safety measures that the authority will require.

ADULT PLACEMENTS

0.9 Where a dwelling is used for the purposes of an Adult Placement Scheme and fulfils the criteria of the Adult Placement Schemes (England) Regulations (SI 2004 No 2070) and where no building work is proposed, the guidance in the joint code of practice published by the National Association of Adult Placement Services (www.naaps.co.uk) should be sufficient to satisfy the Part B of the Building Regulations if a material change of use has taken place.

Adult Placement is a scheme which provides for up to three adults to be taken into the private home of a carer. This could count as a 'material change of use' under the Building Regulations so that the home would be regarded as an 'institution'.

As the purpose of Adult Placement is for a person to be treated as a member of the carer's family and to share the benefits of family life, the reality of the situation is that the person cared for is a member of the family and the home remains a private home.

The recommendations in the Code on the minimum level of fire precautions recognise that the level of fire precautions suitable for a private home should also be suitable when that home is used for Adult Placement.

FIRE PERFORMANCE OF MATERIALS, PRODUCTS AND STRUCTURES

~~**0.7**~~ **0.10** Much of the guidance throughout this document is given in terms of performance in relation to standard fire test methods. Details are drawn together in Appendix A to which reference is made where appropriate. In the case of fire protection systems reference is made to standards for systems design and installation. Standards referred to are listed in Appendix ~~G~~ F.

FIRE DOORS

~~**0.8**~~ **0.11** Guidance in respect of fire doors is set out in Appendix B.

METHODS OF MEASUREMENT

~~**0.9**~~ **0.12** Some form of measurement is an integral part of much of the guidance in this document, and methods are set out in Appendix C. Aspects of measurement specific to means of escape are covered in the introduction to B1 (paragraphs B1.~~xxv~~ xiv onwards).

DEFINITIONS

~~**0.10**~~ **0.13** The definitions are given in Appendix E.

FIRE SAFETY ENGINEERING

~~**0.11**~~ **0.14** Fire safety engineering can provide an alternative approach to fire safety. It may be the only practical way to achieve a satisfactory standard of fire safety in some large and complex buildings, and in buildings containing different

uses, e.g. airport terminals. Fire safety engineering may also be suitable for solving a problem with an aspect of the building design which otherwise follows the provisions in this document.

British Standard ~~Draft for Development (DD) 240~~ BS 7974: *Fire safety engineering in buildings* and supporting published documents (PDs) provide a framework and guidance on the design and assessment of fire safety measures in buildings. Following the discipline of ~~DD 240~~ BS 7974 should enable designers and building control bodies to be aware of the relevant issues, the need to consider the complete fire safety system, and to follow a disciplined analytical framework.

~~0.12~~ 0.15 Some variation of the provisions set out in this document may also be appropriate where Part B applies to existing buildings, and particularly in buildings of special architectural or historic interest, where adherence to the guidance in this document might prove unduly restrictive. In such cases it would be appropriate to take into account a range of fire safety features, some of which are dealt with in this document, and some of which are not addressed in any detail, and to set these against an assessment of the hazard and risk peculiar to the particular case.

~~0.13~~ 0.16 Factors that should be taken into account include:

a. the anticipated probability of a fire occurring;

b. the anticipated fire severity;

c. the ability of a structure to resist the spread of fire and smoke; and

d. the consequential danger to people in and around the building.

~~0.14~~ 0.17 A wide variety of measures could be considered and incorporated to a greater or lesser extent, as appropriate in the circumstances. These include:

a. the adequacy of means to prevent fire;

b. early fire warning by an automatic detection and warning system;

c. the standard of means of escape;

d. provision of smoke control;

e. control of the rate of fire growth;

f. the adequacy of the structure to resist the effects of a fire;

g. the degree of fire containment;

h. fire separation between buildings or parts of buildings;

i. the standard of active measures for fire extinguishment or control;

j. facilities to assist the fire service;

k. availability of powers to require staff training in fire safety and fire routines ~~e.g. under the Fire Precautions Act 1971, the Fire Precautions (Workplace) Regulations 1997, or registration or licensing procedures~~;

l. consideration of the availability of any continuing control under other legislation that could ensure continued maintenance of such systems; and

m. management.

~~**0.15**~~ **0.18** It is possible to use quantitative techniques to evaluate risk and hazard. Some factors in the measures listed above can be given numerical values in some circumstances. The assumptions made when quantitative methods are used need careful assessment.

~~SHOPPING COMPLEXES AND~~ BUILDINGS CONTAINING ONE OR MORE ATRIA

~~**0.16**~~ **0.19** ~~An example of an overall approach to fire safety can be found in BS 5588: Part 10 *Fire precautions in the design, construction and use of buildings. Code of practice for shopping complexes*, which is referred to in Section 12.~~

~~Similarly~~ A building containing an atrium passing through compartment floors may need special fire safety measures. Guidance on suitable fire safety measures in these circumstances is to be found in BS 5588: Part 7 *Code of practice for the incorporation of atria in buildings*. (See also paragraph ~~9.8~~ 7.8.)

PROPERTY PROTECTION

~~**0.18**~~ **0.20** Building Regulations are intended to ensure that a reasonable standard of life safety is provided, in case of fire. The protection of property, including the building itself, may require additional measures, and insurers will in general seek their own higher standards, before accepting the insurance risk. ~~Guidance is given in the LPC *Design guide for the fire protection of buildings.*~~

Insurers use the Fire Protection Association's (FPA) Design Guide for the fire protection of buildings as a basis for providing guidance to the building designer on what they require, subject to the risk assessment. Insurers' key objectives for achieving satisfactory standards of property protection are:

a. to protect the buildings and assets within the business;

b. to minimise the effect of fire on a business;

c. to limit the effects of business interruption for the building occupier and owner; and

d. to allow the business to be trading in as short a time as possible following a fire.

The FPA Design Guide is a developing suite of publications which complement Building Regulations and which incorporate:

a. an essential principles document;

b. separate core documents on:

   i. fire protection of openings and services' penetrations;

   ii. fire compartmentation;

   iii. external fire exposure and arson; and

   iv. protected zone; and,

c. documents which deal with specific types of business premises, such as warehouses, food factories, cold stores and others, from the points of view of:

   i. design principles; and

   ii. fire safety management.

The importance of early consultation with main stakeholders, including insurers, during the building design phase should ensure that the most effective fire protection measures appropriate to the specific property, end use application and business protection needs are suitably satisfied.

Guidance for asset protection in the Civil and Defence Estates is given in the *Crown Fire Standards* published by the Property Advisers to the Civil Estate (PACE).

RESIDENTIAL SPRINKLERS

0.21 Sprinkler systems installed in dwellings can reduce the risk to life and significantly reduce the degree of damage caused by fire. Sprinkler protection can also sometimes be used as a compensatory feature where the provisions of this Approved Document are varied in some way. Where sprinklers are used in this way it may not always be necessary to provide sprinkler protection throughout the building.

Inserted text ~~Deleted text~~

Where a sprinkler system is recommended within this document it should be designed and installed in accordance with BS 9251 *Sprinkler systems for residential and domestic occupancies – Code of practice* and BS DD 252 *Components for residential sprinkler systems – Specification and test methods for residential sprinklers.*

There are many alternative or innovative fire suppression systems available. Where these are used it is necessary to ensure that such systems have been designed and tested for use in domestic buildings and are fit for their intended purpose.

This text is intended to recognise recent developments in standards and sprinkler technology for residential and domestic use.

In addition to the new text above, there are a number of proposed amendments to the Approved Document which will provide alternatives to existing provisions. For example, the potential to provide sprinkler protection instead of an alternative escape route where currently provided in both houses (typically four storeys and above) and multi-storey apartments. These new options will provide greater design freedom and promote innovation and may, in some cases, produce a design cost saving compared to current alternatives. See paragraphs 2.14, 3.15, 7.16, 12.16 and 16.5.

Residential sprinklers are also referred to in Approved Document B Volume 2 (*Buildings other than dwellings*).

MATERIAL ALTERATION

~~0.19~~ **0.22** An alteration which results in a building being less satisfactory in relation to compliance with the requirements of Parts B1, B3, B4 or B5, than it was before, is controllable under Regulations 3 (meaning of building work) and 4 (requirements relating to building work) of the Building Regulations, as a material alteration. Regulation 4(1) requires that the building work in question complies with the relevant requirements of Schedule 1 to the Regulations; and Regulation 4(2) requires that as a consequence of that building work being carried out, the building as a whole shall comply with the relevant requirements of Schedule 1, or where it did not comply before, shall be no more unsatisfactory than it was before the work was carried out.

PERFORMANCE OF PROTECTION SYSTEMS, MATERIALS, PRODUCTS AND STRUCTURES

~~0.20~~ **0.23** Since the performance of a system, product, component or structure is dependent upon satisfactory site installation, testing and maintenance, independent schemes of certification and ~~registration~~ accreditation of installers and maintenance firms of such will provide confidence in the appropriate standard of workmanship being provided.

Confidence that the required level of performance can be achieved, will be demonstrated by the use of a system, material, product or structure which is provided under the arrangements of a product conformity certification scheme and an accreditation ~~and registration~~ of installers scheme.

Third party accredited product conformity certification schemes not only provide a means of identifying materials and designs of systems, products or structures which have demonstrated that they have the requisite performance in fire, but additionally provide confidence that the systems, materials, products or structures actually supplied are provided to the same specification or design as that tested/assessed.

Third party accreditation ~~and registration~~ of installers of systems, materials, products or structures provides a means of ensuring that installations have been conducted by knowledgeable contractors to appropriate standards, thereby increasing the reliability of the anticipated performance in fire.

Schemes such as those mentioned above may be accepted by building control bodies as evidence of compliance. The Building Control Body will, however, wish to establish, in advance of the work, that the scheme is adequate for the purposes of the Building Regulations.

INCLUSIVE DESIGN

0.24 The fire safety aspects of the Building Regulations are made for securing reasonable standards of health and safety of persons in and about buildings, including firefighters and people with disabilities. The guidance set out in this Approved Document is considered to provide a reasonable standard. However, where a building is provided for use by persons with special needs additional measures may be appropriate.

Provision of information

0.25 For the provisions of this Approved Document to be effective it is essential that the eventual owners and occupiers are provided with sufficient information to operate, maintain and use the building in reasonable safety.

For individual dwellings basic advice on the proper use and maintenance of systems provided in the building such as emergency egress windows, fire doors, smoke alarms etc. can help to ensure that these systems are maintained and kept available for use.

For larger buildings a more detailed record of the fire safety design and procedures for operating and maintaining any fire protection measures of the building would be beneficial.

Inserted text ~~Deleted text~~

It is proposed that a new Regulation requiring the provision of adequate information should not be applied to dwellings.

Management of premises

~~**B1.vii**~~
0.26 This Approved Document has been written on the assumption that the building concerned will be properly managed. Failure to take proper management responsibility may result in the prosecution of a building owner or occupier under other legislation. ~~such as the Fire Precautions Act or the Health and Safety at Work etc Act, and/or prohibition of the use of the premises.~~

Building Regulations do not impose any requirements on the management of a building. However, in developing an appropriate fire safety design for a building it is necessary to consider the way in which it will be managed. A design which relies on an unrealistic or unsustainable management regime can not be considered to have met the requirements of the Regulations.

~~**2.2**~~ In providing fire protection of any kind in dwellings ~~houses~~ it should be recognised that measures which significantly interfere with the day-to-day convenience of the occupants may be less reliable in the long term.

Further guidance is also available in BS 5588-12: *Fire precautions in the design, construction and use of buildings. Managing fire safety.*

B1: Means of warning and escape

The Requirement

This Approved Document deals with the following Requirement from Part B of Schedule 1 to the Building Regulations 2000 (as amended).

Requirement	*Limits on application*
Means of warning and escape B1. The building shall be designed and constructed so that there are appropriate provisions for the early warning of fire, and appropriate means of escape in case of fire from the building to a place of safety outside the building capable of being safely and effectively used at all material times.	Requirement B1 does not apply to any prison provided under section 33 of the Prisons Act 1952 (power to provide prisons etc.).

Inserted text ~~Deleted text~~

Guidance

Performance

In the Secretary of State's view the Requirement of B1 will be met if:

a. there are routes of sufficient number and capacity, which are suitably located to enable persons to escape to a place of safety in the event of fire;

b. the routes are sufficiently protected from the effects of fire by enclosure where necessary;

c. the routes are adequately lit;

d. the exits are suitably signed; and

e. there are appropriate facilities to either limit the ingress of smoke to the escape route(s) or to restrict the fire and remove smoke;

all to an extent necessary that is dependent on the use of the building, its size and height; and

f. there is sufficient means for giving early warning of fire for persons in the building.

Introduction

B1.i These provisions relate to building work and material changes of use which are subject to the functional requirement B1, and they may therefore affect new or existing buildings. They are concerned with the measures necessary to ensure reasonable facilities for means of escape in case of fire. They are only concerned with structural fire precautions where these are necessary to safeguard escape routes.

They assume that in the design of the building, reliance should not be placed on external rescue by the fire service. This Approved Document has been prepared on the basis that, in an emergency, the occupants of any part of a building should be able to escape safely without any external assistance.

~~Special considerations, however, apply to some institutional buildings in which the principle of evacuation without assistance is not practical.~~

It should also be noted that the guidance for a typical 1 or 2 storey dwelling is limited to the provision of smoke alarms and to the provision of openable windows for emergency egress.

Interaction with other legislation

B1.ii Attention is drawn to the fact that there may be legislation, other than the Building Regulations, imposing requirements for means of escape in case of fire and other fire safety measures, with which the building must comply, and which will come into force when the building is occupied.

There ~~are also~~ may be other Acts, Orders and Regulations that impose fire safety requirements ~~as a condition of a licence or registration~~. Whilst this other legislation is enforced by a number of different authorities, in the majority of cases the applicant and/or enforcing authority is required to consult the Fire and Rescue Authority ~~before a licence or registration is granted~~.

B1.v **B1.iii** ~~Under the Housing Act 1985 the local authority is obliged to require means of escape in case of fire in certain types of houses which are occupied by persons not forming a single household (Houses in Multiple Occupation).~~

Under the Housing Act 2004, the local authority is under a duty to take the most appropriate action in respect of residential premises, including HMOs, in relation to a hazard from fire assessed under HHSRS. Where a hazard has been assessed, an authority can require means of escape and other fire precautions.

However, compliance with the guidance in this document ~~will~~ is likely to enable a newly constructed or converted House in Multiple Occupation to achieve an acceptable standard of fire safety. See paragraph 0.7.

~~B1.vi~~ **B1.iv** There are a number of other statutes enforced by the local authority or the Fire and Rescue Authority that may be applied to premises of specific uses once they are occupied.

Analysis of the problem

~~B1.viii~~ **B1.v** The design of means of escape, and the provision of other fire safety measures such as a fire alarm system ~~(where appropriate)~~, should be based on an assessment of the risk to the occupants in the event of fire. The assessment should take into account the nature of the building structure, the use of the building, the processes undertaken and/or materials stored in the building; the potential sources of fire; the potential of fire spread through the building; and the standard of fire safety management proposed. Where it is not possible to identify with any certainty any of these elements a judgement as to the likely level of provision must be made.

~~B1.ix~~ **B1.vi** Fires do not normally start in two different places in a building at the same time. Initially a fire will create a hazard only in the part in which it starts and it is unlikely, at this stage, to involve a large area. The fire may subsequently spread to other parts of the building, usually along the circulation routes. The items that are the first to be ignited are often furnishings and other items

not controlled by the Regulations. It is less likely that the fire will originate in the structure of the building itself and the risk of it originating accidentally in circulation areas, such as corridors, lobbies or stairways, is limited, provided that the combustible content of such areas is restricted.

~~**B1.x**~~ **B1.vii** The primary danger associated with fire in its early stages is not flame but the smoke and noxious gases produced by the fire. They cause most of the casualties and may also obscure the way to escape routes and exits. Measures designed to provide safe means of escape must therefore provide appropriate arrangements to limit the rapid spread of smoke and fumes.

CRITERIA FOR MEANS OF ESCAPE

~~**B1.xi**~~ **B1.viii** The basic principles for the design of means of escape are:

a. that there should be alternative means of escape from most situations;

b. where direct escape to a place of safety is not possible, it should be possible to reach a place of relative safety, such as a protected stairway, which is on a route to an exit, within a reasonable travel distance; and ~~In such cases the means of escape will consist of two parts, the first being unprotected in accommodation and circulation areas, and the second in protected stairways (and in some circumstances protected corridors).~~

c. in certain conditions a single direction of escape (a dead end) can be accepted as providing reasonable safety. These conditions depend on the use of the building and its associated fire risk, the size and height of the building, the extent of the dead end, and the numbers of persons accommodated within the dead end.

The ultimate place of safety is the open air clear of the effects of the fire. However, in modern buildings which are large and complex, reasonable safety may be reached within the building, provided suitable planning and protection measures are incorporated.

~~**B1.xii**~~ **B1.ix** For the purposes of Building Regulations the following are not acceptable as means of escape:

a. lifts (except for a suitably designed and installed evacuation lift ~~that may be used for the evacuation of disabled people, in a fire~~ – see paragraph 4.38);

b. portable ladders and throw-out ladders; and

c. manipulative apparatus and appliances e.g. fold down ladders and chutes.

ALTERNATIVE MEANS OF ESCAPE

B1.xiii There is always the possibility of the path of a single escape route being rendered impassable by fire, smoke or fumes and, ideally, people should be able to turn their backs on a fire wherever it occurs and travel away from it to a final exit or protected escape route leading to a place of safety. However in certain conditions a single direction of escape (a dead end) can be accepted as providing reasonable safety. These conditions depend on the use of the building and its associated fire risk, the size and height of the building, the extent of the dead end, and the numbers of persons accommodated within the dead end.

UNPROTECTED AND PROTECTED ESCAPE ROUTES

B1.xiv **B1.x** The unprotected part of an escape route is that part which a person has to traverse before reaching either the safety of a final exit or the comparative safety of a protected escape route, i.e. a protected corridor or protected stairway.

Unprotected escape routes should be limited in extent so that people do not have to travel excessive distances while exposed to the immediate danger of fire and smoke.

Even with protected horizontal escape routes the distance to a final exit or protected stairway needs to be limited because the structure does not give protection indefinitely.

B1.xv **B1.xi** Protected stairways are designed to provide virtually 'fire sterile' areas which lead to places of safety outside the building. Once inside a protected stairway, a person can be considered to be safe from immediate danger from flame and smoke. They can then proceed to a place of safety at their own pace. To enable this to be done, flames, smoke and gases must be excluded from these escape routes, as far as is reasonably possible, by fire-resisting structures or by an appropriate smoke control system, or by a combination of both of these methods. This does not preclude the use of unprotected stairs for day-to-day circulation, but they can only play a very limited role in terms of means of escape due to their vulnerability in fire situations.

Means of escape for disabled people

B1.xvi Part M of the Regulations, Access and facilities for disabled people, requires reasonable provision for access by disabled people to certain buildings, or parts of buildings. However it may not be necessary to incorporate special structural measures to aid means of escape for the disabled. Management arrangements to provide assisted escape may be all that is necessary. BS 5588: Part 8 *Fire precautions in the design, construction and use of buildings, Code of practice for means of escape for disabled people*, gives guidance on

~~means of escape for disabled people in all premises other than dwellings. It introduces the concept of refuges and the use of an evacuation lift, and stresses the need for effective management of the evacuation.~~

This paragraph has been modified and relocated to paragraph 0.24 – inclusive design.

Security

~~**B1.xvii**~~ **B1.xii** The need for easy and rapid evacuation of a building in case of fire may conflict with the control of entry and exit in the interest of security. Measures intended to prevent unauthorised access can also hinder entry of the fire service to rescue people trapped by fire.

Potential conflicts should be identified and resolved at the design stage and not left to ad hoc expedients after completion. The architectural liaison officers attached to most police forces are a valuable source of advice.

~~It is not appropriate to~~ This document does not ~~seek to control~~ intend for the type of lock used on windows (see paragraph 2.10) and ~~front~~ entrance doors to dwellings to be controlled under the Building Regulations. Some more detailed guidance on door security in buildings other than single family dwellinghouses is given in paragraph ~~6.11~~ 4.11 ~~and 6.12~~.

~~Alternative approaches~~

At the time of preparing this consultation document British Standard Draft for Development (DD) 9999 had not been published. However, should this document become available during the consultation period on this Approved Document we would welcome consultees' thoughts on the adequacy of DD 9999 to meet the functional requirements of Part B of the Building Regulations and as a replacement to the 5588 series of standards (paragraph 0.15).

~~**B1.xviii** The Building Regulations requirements for means of escape will be satisfied by following the relevant guidance given in either the publications in paragraphs B1.xix – B1.xxiii or in Sections 2 – 6 of this Approved Document.~~

~~GENERAL~~

~~**B1.xix** BS 5588: *Part 0 Fire precautions in the design, construction and use of buildings, Guide to fire safety codes of practice for particular premises/applications* includes reference to various codes and guides dealing with the provision of means of escape.~~

~~If one of those codes or guides is adopted, the relevant recommendations concerning means of escape in case of fire in the particular publication should be followed, rather than a mixture of the publication and provisions in the relevant sections of this Approved Document. However, there may be circumstances where it is necessary to use one publication to supplement another, as with the use in Section 18 of BS 5588: Part 5 *Code of practice for firefighting stairs and lifts.*~~

Use of the document

~~**B1.xxiv**~~ **B1.xiii** Section 1 deals with ~~fire alarm and~~ fire detection and alarm systems ~~in all buildings~~. Sections 2 and 3 deal with means of escape. Section 2 is about dwellinghouses and Sections 3 and 4 ~~is~~ are on ~~flats and maisonettes~~ apartments. ~~Section 6 gives guidance on matters common to all parts of the means of escape, other than in houses.~~

Methods of measurement

~~**B1.xxv**~~ **B1.xiv** The following methods of measurement apply specifically to B1 for dwellings. Other aspects of measurement applicable to Part B in general are given in Appendix C.

OCCUPANT CAPACITY

~~**B1.xxvi (Table 1)**~~ The **occupant capacity** of ~~a room, storey, building or part of a building~~:

B1.xv

a. a communal lounge in sheltered housing or a similar facility is:

   i. the maximum number of persons it is designed to hold; or

   ii. the number calculated by dividing the area of room ~~or storey(s)~~ (m^2) by a floor space factor (m^2 per person) ~~such as those given in Table 1 for guidance~~ of 1.0m^2/person.

b. car parks, is two persons per parking space.

~~**Note:** 'area' excludes stair enclosures, lifts, sanitary accommodation and any other fixed part of the building structure.~~

TRAVEL DISTANCE

~~**B1.xxvii**~~ **B1.xvi** Travel distance is measured by way of the shortest route which if it includes a stair, is along the pitch line on the centre line of travel.

~~a. there is fixed seating or other fixed obstructions, is along the centre line of the seatways and gangways;~~

~~b. it includes a stair, is along the pitch line on the centre line of travel.~~

WIDTH

~~**B1.xxviii**~~ **B1.xvii** The width of:

a. a **door (or doorway)** is the clear width when the door is open (see Diagram 1);

b. an **escape route** is the width at 1500mm above floor level when defined by walls or, elsewhere, the minimum width of passage available between any fixed obstructions; and

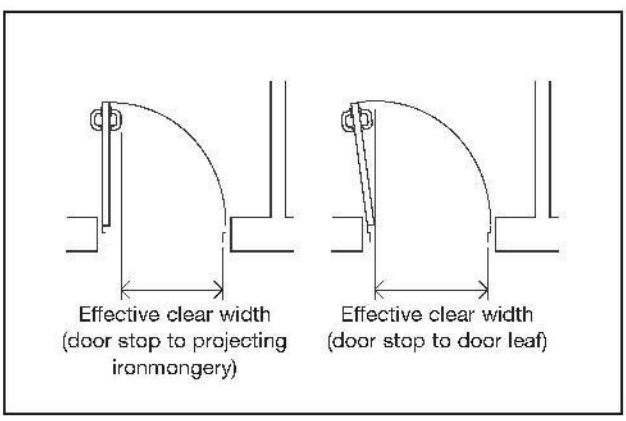
c. a **stair** is the clear width between the walls or balustrades.

Notes:

1. In the case of escape routes and stairs, ~~Door hardware,~~ handrails and strings which do not intrude more than 100mm into these widths may be ignored ~~(see Diagram 1)~~.

2. The rails used for guiding a stairlift may be ignored when considering the width of a stair. However, it is important that the chair or carriage is able to be parked in a position that does not cause an obstruction to ~~either~~ the stair, ~~or~~ landing or front door.

Diagram 1 (Amended) **Measurement of door width**



The method of measurement of door width has been amended to align with that in Approved Document M.

SECTION 1:
Fire alarm and fire detection systems

Introduction

1.1 Provisions are made in this section for suitable arrangements to be made in all buildings to give early warning in the event of fire.

GENERAL

1.2 In most houses the installation of smoke alarms together with heat alarms or automatic fire detection and alarm systems, can significantly increase the level of safety by automatically giving an early warning of fire.

1.3 If houses are not protected by an automatic fire detection and alarm system in accordance with the relevant recommendations of BS 5839: Part 1 *Fire detection and alarm systems for buildings, Code of practice for system design, installation, commissioning and maintenance* ~~*and servicing*~~ to at least an L2~~3~~ standard, or BS 5839: Part 6 *Code of practice for the design,* ~~*and*~~ *installation and maintenance of fire detection and alarm systems in dwellings* to at least a Grade DE type LD2~~3~~ standard (with an additional smoke alarm in the principal/largest bedroom), they should be provided with a suitable number of smoke alarms installed in accordance with the guidance in paragraphs 1.4 – 1.22 below.

1.4 The smoke and heat alarms should be mains-operated and conform to BS 5446: *Fire detection and fire alarm devices for dwellings,* Part 1 *Specification for smoke alarms*; or Part 2 *Specification for heat alarms.* ~~*Components of automatic fire alarm systems for residential premises,* Part 1 *Specification for self contained smoke alarms and point type smoke detectors.*~~ They may have a secondary power supply such as a battery (either rechargeable or replaceable) or capacitor. More information on power supplies is given in clause 15 of BS 5839: Part 6: 2004~~.13 of BS 5839: Part 6: 1995.~~

Note: BS 5446: Part 1 covers smoke alarms based on ionization chamber smoke detectors and optical (photo-electric) smoke detectors. The different types of detector respond differently to smouldering and fast flaming fires. Either type of detector is generally suitable. However, the choice of detector type should, if possible, take into account the type of fire that might be expected and the need to avoid false alarms. Optical detectors tend to be less affected by low levels of 'invisible' smoke that often cause false alarms.

BS 5839: Part 6 suggests that, in general, optical smoke alarms should be installed in circulation spaces such as hallways and landings, optical detectors are also appropriate in areas in which a likely cause of fire is ignition of furniture or bedding by a cigarette and ionization chamber-based smoke

alarms may be the more appropriate type in rooms, such as the living room or dining room where a fast burning fire may present a greater danger to occupants than a smouldering fire.

LARGE HOUSES

1.5 A house may be regarded as large if any of its storeys exceed 200m².

1.6 A large house of 3 or more storeys (including basement storeys) should be fitted with an LD2, Grade A system as described in BS 5839: Part 6: 2004 with detectors sited in accordance with the recommendations of BS 5839-1 for a category L2 system with a smoke detector installed in the main (largest) bedroom. ~~A large house of more than 3 storeys (including basement storeys) should be fitted with an L2 system as described in BS 5839: Part 1: 1988, except that the provisions in clause 16.5 regarding duration of the standby supply need not be followed. However with unsupervised systems, the standby supply should be capable of automatically maintaining the system in normal operation (though with audible and visible indication of failure of the mains) for 72 hours, at the end of which sufficient capacity remains to supply the maximum alarm load for at least 15 minutes.~~

1.7 A large house of no more than 3 storeys (including basement storeys) may be fitted with an automatic fire detection and alarm system of Grade B category ~~type~~ LD2~~3~~ as described in BS 5839: Part 6: 2004 with an additional smoke alarm in the principal/largest bedroom. ~~instead of an L2 system.~~

~~LOFT CONVERSIONS~~ MATERIAL ALTERATIONS

1.8 Where new habitable rooms are provided above ground floor level then an automatic smoke detection and alarm system based on linked smoke and heat alarms should be installed to ensure that the occupants of the new rooms are warned of any fire that may impede their escape. Smoke alarms may also be needed where new rooms are provided at ground floor level if a fire within the existing house might impede the escape of the occupants of the new room (see paragraph 2.18).

~~Where a loft in a one or two storey house is converted into habitable accommodation, an automatic smoke detection and alarm system based on linked smoke alarms should be installed (see paragraph 2.26).~~

~~FLATS AND MAISONETTES~~ APARTMENTS

1.9 The same principles apply within ~~flats and maisonettes~~ apartments as for houses, while noting that:

a. the provisions are not intended to be applied to the common parts of blocks of ~~flats~~ apartments and do not include interconnection between installations in separate ~~flats~~ apartments; and

b. ~~a flat~~ an apartment with accommodation on more than one level ~~(i.e. a maisonette)~~ should be treated in the same way as a house with more than one storey.

Note: Some student residential accommodation is constructed in the same way as a block of ~~flats~~ apartments. Where groups of students share one ~~flat~~ apartment with its own entrance door, it is appropriate to provide an automatic detection system within each ~~flat~~ apartment. In student ~~flats~~ apartments constructed on the compartmentation principles for ~~flats~~ apartments in Section 9 7 (B3), the automatic detection system will satisfy the requirements of Building Regulations if it gives a warning in the ~~flat~~ apartment of fire origin. ~~Where a general evacuation is required, the alarm system should follow the guidance in paragraph 1.30.~~

SHELTERED HOUSING

1.10 The detection equipment in a sheltered housing scheme with a warden or supervisor, should have a connection to a central monitoring point (or central alarm relay station) so that the person in charge is aware that a fire has been detected in one of the dwellings, and can identify the dwelling concerned. These provisions are not intended to be applied to the common parts of a sheltered housing development, such as communal lounges, or to sheltered accommodation in the Institutional or Other residential purpose groups.

INSTALLATIONS BASED ON SMOKE AND HEAT ALARMS

1.11 Smoke alarms should normally be positioned in the circulation spaces between sleeping spaces and places where fires are most likely to start (e.g. kitchens and living rooms) to pick up smoke in the early stages. In order to improve audibility, a smoke alarm should also be fitted in the main (largest) bedroom. ~~while also being close enough to bedroom doors for the alarm to be effective when occupants are asleep.~~

1.12 In a house (including bungalows) there should be at least one smoke alarm on every storey.

1.13 Where more than one smoke alarm is installed they should be linked so that the detection of smoke by one unit operates the alarm signal in all of them. The manufacturers' instructions about the maximum number of units that can be linked should be observed.

1.14 Smoke alarms should be sited so that:

a. there is a smoke alarm in the circulation space within 7.5m of the door to every habitable room;

b. where the kitchen area is not separated from the stairway or circulation space by a door, there should be a compatible interlinked heat detector or heat alarm in the kitchen, in addition to whatever smoke alarms are needed in the circulation space(s);

c. they are ceiling mounted and at least 300mm from walls and light fittings (unless in the case of light fittings there is test evidence to prove that the proximity of the light fitting will not adversely affect the efficiency of the detector). Units designed for wall mounting may also be used provided that the units are above the level of doorways opening into the space, and they are fixed in accordance with manufacturers' instructions; and

d. the sensor in ceiling mounted devices is between 25mm and 600mm below the ceiling (25-150mm in the case of heat detectors or heat alarms).

Note: This guidance applies to ceilings that are predominantly flat and horizontal.

1.15 It should be possible to reach the smoke alarms to carry out routine maintenance, such as testing and cleaning, easily and safely. For this reason smoke alarms should not be fixed over a stair shaft or any other opening between floors.

1.16 Smoke alarms should not be fixed next to or directly above heaters or air conditioning outlets. They should not be fixed in bathrooms, showers, cooking areas or garages, or any other place where steam, condensation or fumes could give false alarms.

Smoke alarms should not be fitted in places that get very hot (such as a boiler room), or very cold (such as an unheated porch). They should not be fixed to surfaces which are normally much warmer or colder than the rest of the space, because the temperature difference might create air currents which move smoke away from the unit.

A requirement for maintenance can not be made as a condition of passing plans by the Building Control Body. However the attention of developers and builders is drawn to the importance of providing the occupants with information on the use of the equipment, and on its maintenance (or guidance on suitable maintenance contractors). See paragraph 0.25.

Note: BS 5839: Part 1 and Part 6 recommend that occupiers should receive the manufacturers' instructions concerning the operation and maintenance of the alarm system.

POWER SUPPLIES

1.17 The power supply for a smoke alarm system should be derived from the dwelling's mains electricity supply. The mains supply to the smoke alarm(s) should comprise a single independent circuit at the dwelling's main distribution board (consumer unit). ~~If the smoke alarm installation does not include a stand-by power supply, no other electrical equipment should be connected to this circuit (apart from a dedicated monitoring device installed to indicate failure of the mains supply to the smoke alarms – see below).~~

~~1.18~~ ~~A smoke alarm, or smoke alarm system, that includes a standby power supply or supplies, can operate during mains failure. It can therefore be connected~~ ~~to~~ or a single regularly used local lighting circuit. This has the advantage that the circuit is unlikely to be disconnected for any prolonged period.

~~1.19~~ **1.18** Devices for monitoring the mains supply to the smoke alarm system may comprise audible or visible signals on each unit or on a dedicated mains monitor connected to the smoke alarm circuit. The circuit design of any mains failure monitor should avoid any significant reduction in the reliability of the supply, and should be sited so that the warning of failure is readily apparent to the occupants. If a continuous audible warning is given, it should be possible to silence it.

~~1.20~~ **1.19** The smoke alarm circuit should preferably not be protected by any residual current device (rcd). However if electrical safety requires the use of a rcd, either:

a. the smoke alarm circuit should be protected by a single rcd which serves no other circuit; or

b. the rcd protection of a smoke alarm circuit should operate independently of any rcd protection for circuits supplying socket outlets or portable equipment.

~~1.21~~ **1.20** Any cable suitable for domestic wiring may be used for the power supply and interconnection to smoke alarm systems. It does not need any particular fire survival properties. Any conductors used for interconnecting alarms (signalling) should be readily distinguishable from those supplying mains power, e.g. by colour coding.

Note: Mains powered smoke alarms may be interconnected using radio-links, provided that this does not reduce the lifetime or duration of any standby power supply below 72 hours.

~~1.22~~ **1.21** Other effective, though possibly more expensive, options exist and are described in BS 5839: Parts 1 and 6. For example, the mains supply may be reduced to extra low voltage in a control unit incorporating a standby trickle-charged battery, before being distributed at that voltage to the alarms.

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DESIGN AND INSTALLATION OF SYSTEMS

~~**1.32**~~ **1.22** It is essential that fire detection and fire warning systems are properly designed, installed and maintained. Where a fire alarm system is installed, an installation and commissioning certificate should be provided. Third party certification schemes for fire protection products and related services are an effective means of providing the fullest possible assurances, offering a level of quality, reliability and safety (see paragraph ~~0.20~~ 0.23).

SECTION 2:
Dwellinghouses

Introduction

2.1 The means of escape from a typical one or two storey house are relatively simple to provide. Few provisions are specified in this document beyond ensuring that means are provided for giving early warning in the event of fire (see Section 1) and that suitable means are provided for emergency egress from each storey.

With increasing height more complex provisions are needed because emergency egress through upper windows becomes increasingly hazardous. It is then necessary to protect the internal stairway. If there are floors more than 7.5m above ground level, the risk that the stairway will become impassable before occupants of the upper parts of the house have escaped is appreciable, and an alternative route from those parts is called for.

2.2 In providing fire protection of any kind in houses it should be recognised that measures which significantly interfere with the day-to-day convenience of the occupants may be less reliable in the long term.

2.3 ~~This guidance is also applicable to the design and construction of houses which are considered to be 'houses in multiple occupation' (HMOs) providing there are no more than 6 residents. For HMOs with a greater number of residents, then additional precautions may be necessary. A house in multiple occupation is defined in section 345 of the Housing Act 1985 as "a house which is occupied by persons who do not form a single household". Guidance on the interpretation of this definition is given in DOE Circular 12/93 *Houses in multiple occupation. Guidance to local housing authorities on managing the stock in their area* and Welsh Office Circular 55/93 *Houses in multiple occupation. Guidance on management strategies.*~~

~~Technical guidance for HMOs is given in DOE Circular 12/92 *Houses in multiple occupation. Guidance to local housing authorities on standards of fitness under section 352 of the Housing Act 1985* and Welsh Office Circular 25/92 *Local Government and Housing Act 1989. Houses in multiple occupation: standards of fitness.*~~

~~Depending on the nature of the occupants and their management, it may be acceptable to treat an unsupervised group home with up to 6 residents as an ordinary dwelling. However because such places have to be registered, the registration authority should be consulted to establish whether there are any additional fire safety measures that the authority will require.~~

This text has been modified and moved to paragraph 0.7 – Houses in Multiple Occupation.

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General provisions

INNER ROOMS

~~2.4~~ **2.3** A room whose only escape route is through another room is termed an inner room and is at risk if a fire starts in that other room (access room). This situation may arise with open plan layouts and ~~sleeping~~ galleries.

Such an arrangement is only acceptable where the inner room is:

a. a kitchen;

b. a laundry or utility room;

c. a dressing room;

d. a bathroom, WC, or shower room;

e. any other room on a floor not more than 4.5m above ground level which complies with paragraph 2.7, 2.8, ~~2.8b~~ or 2.9b ~~2.10~~ as appropriate; or

f. a ~~sleeping~~ gallery which complies with paragraph ~~2.9~~ 2.6.

Note: A room entered from an inner room (an inner-inner room) is acceptable if it complies with the above and not more than one door separates the room from a smoke alarm.

BALCONIES AND FLAT ROOFS

~~2.5~~ **2.4** A flat roof forming part of a means of escape should comply with the following provisions:

a. the roof should be part of the same building from which escape is being made;

b. the route across the roof should lead to a storey exit or external escape route; and

c. the part of the roof forming the escape route and its supporting structure, together with any opening within 3m of the escape route, should provide 30 minutes' fire resistance (see Appendix A Table A1).

~~2.6~~ **2.5** Where a balcony or flat roof is provided for escape purposes guarding may be needed, in which case it should meet the provisions in Approved Document K *Protection from falling, collision and impact.*

GALLERIES

~~2.9~~ 2.6 Where a ~~sleeping~~ gallery is provided and the gallery floor is not more than 4.5m above ground level an alternative exit, or an emergency egress window which complies with paragraph 2.10, is needed from the gallery.

Where the gallery floor is more than 4.5m above ground level it should comply with the following;

a. the gallery should ~~be not more than 4.5m above ground level~~ overlook at least 50% of the room below;

b. the distance between the foot of the access stair to the gallery and the door to the room containing the gallery should not exceed 3m;

c. ~~an alternative exit, or an emergency egress window which complies with paragraph 2.10, is needed if the~~ the distance from the head of the access stair to any point on the gallery should not exceeds 7.5m; and

d. any cooking facilities within a room containing a gallery should either:

   i. be enclosed with fire-resisting construction; or

   ii. be remote from the stair to the gallery and positioned such that they do not prejudice the escape from the gallery.

BASEMENTS

~~2.10~~ 2.7 Because of the risk that a single stairway may be blocked by smoke from a fire in the basement or ground storey, if the basement storey contains any habitable room, either provide:

a. an external door or window suitable for egress from the basement (see paragraph ~~2.11~~ 2.10); or

b. a protected stairway leading from the basement to a final exit.

Provisions for escape from floors not more than 4.5m above ground level

Note: Ground level is explained in Appendix C, Diagram C5.

~~2.7~~ 2.8 Except for kitchens, all habitable rooms in the upper storey(s) of a house served by only one stair should be provided with:

a. a window (or external door) which complies with paragraph ~~2.11~~ 2.10; or

b. direct access to a protected stairway.

Note: A single window can be accepted to serve two rooms provided both rooms have their own access to the stairs. A communicating door between the rooms must be provided so that it is possible to gain access to the window without passing through the stair enclosure.

~~2.8~~ **2.9** Except for kitchens, all habitable rooms in the ground storey should either:

a. open directly onto a hall leading to the entrance or other suitable exit; or

b. be provided with a window (or door) which complies with paragraph ~~2.11~~ 2.10.

EMERGENCY EGRESS WINDOWS AND EXTERNAL DOORS

~~2.11~~ **2.10** Any window provided for emergency egress purposes and any external door provided for escape should comply with the following conditions:

a. the window should have an unobstructed openable area that is at least 0.33m² and at least 450mm high and 450mm wide (the route through the window may be at an angle rather than straight through). The bottom of the openable area should be not more than 1100mm above the floor; and

Note 1: Approved Document K *Protection from falling, collision and impact* specifies a minimum guarding height of 800mm, except in the case of a window in a roof where the bottom of the opening may be 600mm above the floor.

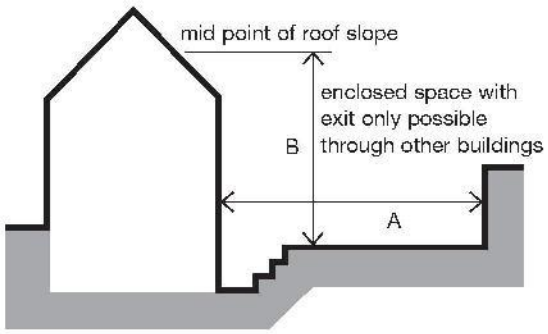
Note 2: Locks (with or without removable keys) and stays may be fitted to egress windows, subject to the stay being fitted with a release catch, which may be child resistant.

b. the window or door should enable the person escaping to reach a place free from danger from fire. This is a matter for judgement in each case, but in general a courtyard or back garden from which there is no exit other than through other buildings would have to be at least as deep as the dwelling is high to be acceptable, see Diagram 2.

~~c. Where provided in a loft conversion of a 2 storey house, a dormer window or roof window should be positioned in accordance with Diagram 6.~~

Diagram 2 **Ground or basement storey exit into an enclosed space**

See paragraph 2.10(b)



Depth of back garden A should exceed the height B of the house above ground level for it to be acceptable for an escape route from the ground or basement storey to open into the garden.

EXTERNAL ESCAPE STAIRS

2.11 Guidance on external escape stairs is given in paragraph 4.24.

~~Additional~~ Provisions for houses with a floor more than 4.5m above ground level

2.12 The provisions described in 2.13–2.16 ~~and 2.17~~ do not apply if the house has more than one internal stairway which afford effective alternative means of escape and are adequately separated from each other.

HOUSES WITH ONE FLOOR MORE THAN 4.5M ABOVE GROUND LEVEL

2.13 The house may either have a protected stairway as described in (a) below, or the top floor can be separated and given its own alternative escape route as described in (b). ~~A variation of (b) can be used where the roofspace of an existing two storey dwellinghouse is being converted into habitable accommodation to form a three storey dwellinghouse, see paragraphs 2.17 to 2.26.~~

a. The upper storeys (those above ground storey) should be served by a protected stairway which should either:

   i. extend to a final exit, see Diagram 3(a), or

   ii. give access to at least two escape routes at ground level, each delivering to final exits and separated from each other by fire-resisting construction and ~~self closing~~ fire doors, see Diagram 3(b).

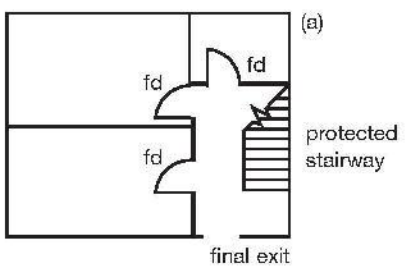
b. The top storey should be separated from the lower storeys by fire-resisting construction and be provided with an alternative escape route leading to its own final exit.

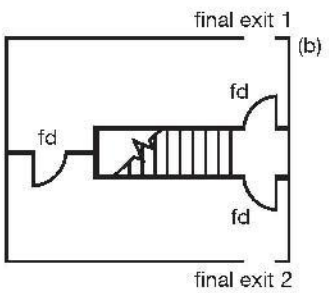
Note: ~~Fire doors in dwellings may be fitted with rising butt hinges rather than spring or other forms of self closing device (see Appendix F definition of "automatic self closing device").~~ These provisions are in addition to those in paragraph 2.9 on means of escape from ground floor rooms.

The ODPM is minded to remove the need for self-closing devices within dwellings. This is because they can present a hazard to children; they can interfere with the day-to-day convenience of the occupants and many of our stakeholders tell us they are often disabled soon after occupation. The fire safety benefits of closing doors, particularly at night, remain and it is proposed to reinforce this message through national and local Community Fire Safety programmes (see www.firekills.gov.uk) and other fire safety initiatives. We would therefore particularly welcome consultees' views on this particular proposal.

Diagram 3 (Amended) **Alternative arrangements for final exits**

See paragraphs 2.13(a) and 2.18





Key
fd FD20 fire door
— 30 minute fire-resisting construction

HOUSES WITH MORE THAN ONE FLOOR OVER 4.5M ABOVE GROUND LEVEL

2.14 Where a house has two or more storeys with floors more than 4.5m above ground level (typically a house of four or more storeys), then in addition to meeting the provisions in paragraph 2.13:

a. an alternative escape route should be provided from each storey or level situated 7.5m or more above ground level where the access to the alternative escape route is via:

i. the protected stairway to an upper storey; or

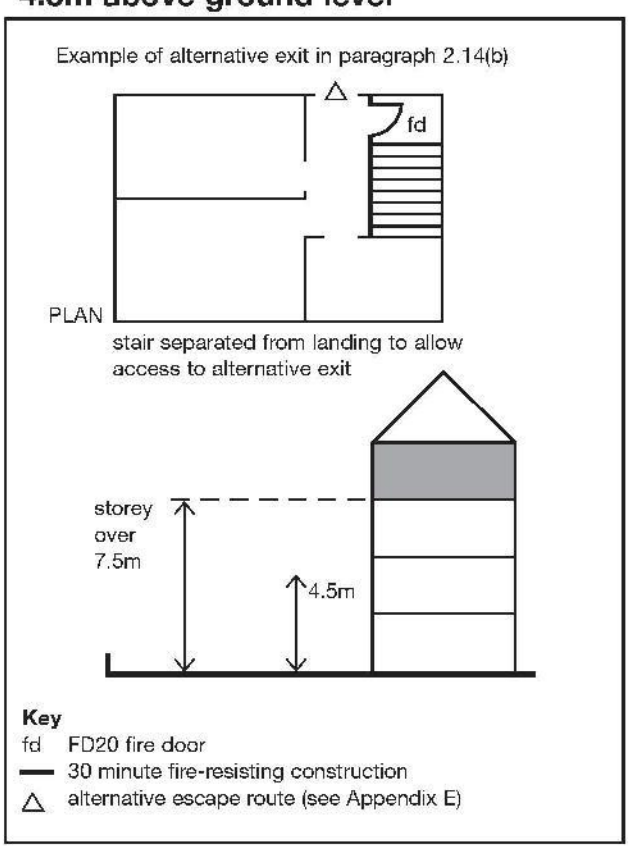
ii. a landing within the protected stairway enclosure to an alternative escape route on the same storey; then

iii. the protected stairway at or about 7.5m above ground level should be separated from the lower storeys or levels by fire-resisting construction, see Diagram 4.

or

b. the house should be fitted throughout with a sprinkler system designed and installed in accordance with BS 9251: *Sprinkler systems for residential and domestic occupancies. Code of practice.*

Diagram 4 (Amended) **Fire separation in houses with more than one floor over 4.5m above ground level**



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AIR CIRCULATION SYSTEMS FOR HEATING, ENERGY CONSERVATION OR CONDENSATION CONTROL IN HOUSES WITH A FLOOR MORE THAN 4.5M ABOVE GROUND LEVEL

2.15 With these types of systems, the following precautions are needed to avoid the possibility of the system allowing smoke or fire to spread into a protected stairway.

a. Transfer grilles should not be fitted in any wall, door, floor or ceiling enclosing a protected stairway.

b. All ductwork passing through the enclosure to a protected stairway should be so fitted that all joints between the ductwork and the enclosure are fire-stopped and provided with a fire damper.

c. Where ductwork is used to convey air into a protected stairway through the enclosure of the protected stairway, the return air from the protected stairway should be ducted back to the plant.

d. Air and return air grilles or registers should be positioned at a height not exceeding 450mm above the floor level.

e. A room thermostat for a ducted warm air heating system should be mounted in the living room at a height between 1370mm and 1830mm, and its maximum setting should not exceed 27°C.

f. Any system of mechanical ventilation which recirculates air should comply with the relevant recommendations in BS 5588: *Fire precautions in the design, construction and use of buildings:* Part 9 *Code of practice for ventilation and air conditioning ductwork.*

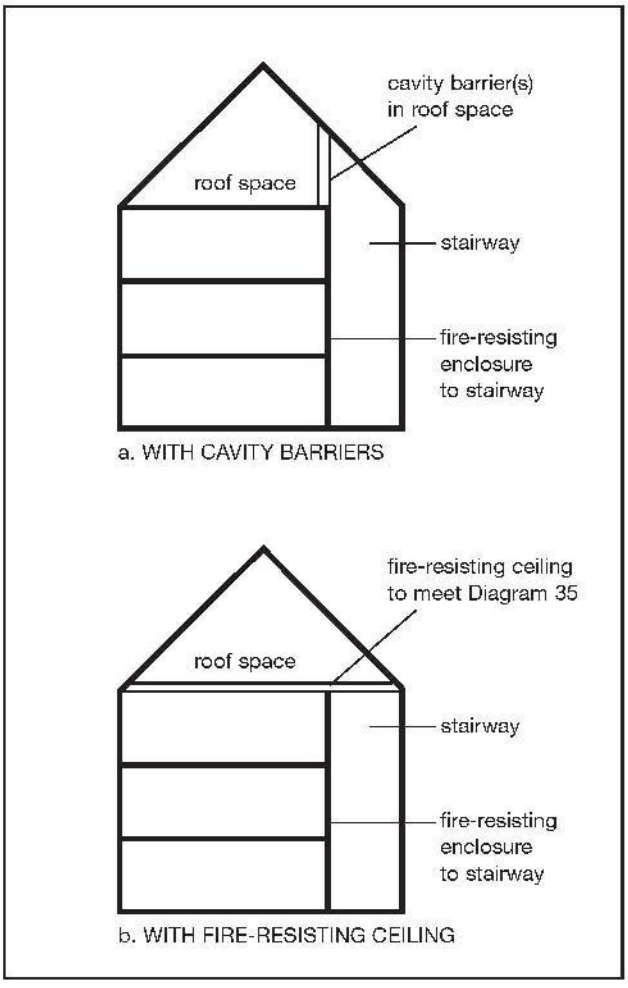
PASSENGER LIFTS

2.16 Where a passenger lift is provided in the house and it serves any floor more than 4.5m above ground level, it should either be located in the enclosure to the protected stairway (see paragraph 2.13) or be contained in a fire-resisting lift shaft.

CAVITY BARRIERS

2.17 Cavity barriers should be provided above the enclosures to a protected stairway in a house with a floor more than 4.5m above ground level (see Diagram 5).

Diagram 33 5 **Alternative cavity barrier arrangements in roof space over protected stairway in a house with a floor more than 4.5m above ground level**



Material alterations

2.18 Paragraph 0.22 sets out the requirements relating to material alterations. What constitutes reasonable provision where undertaking material alterations would depend on the circumstances in the particular case and would need to take account of historic value (see paragraph 0.15). Possible ways of satisfying the requirements include:

a. Loft conversions

Where a new storey is to be added by converting an existing roof space then the provisions for escape would need to be considered throughout the length of the escape route. This may often result in the need to protect a stairway (by providing fire-resisting doors and partitions) where previously no protection existed.

b. Smoke alarms

Where new habitable rooms are provided above ground floor level then smoke alarms should be provided in accordance with paragraph 1.8. Smoke alarms may also be needed for new rooms at ground floor level where a fire within the existing house might impede the escape of the occupants of the new room.

Replacement windows

2.19 The definition of building work in Regulation 3(1) includes the provision or extension of a controlled service or fitting in or in connection with a building. This is qualified in Regulation 3(1A) to include the provision of a replacement window.

Where windows are to be replaced (the requirement does not apply to repair work on parts of these elements) the replacement work should comply with the requirements of Parts L and N. In addition, the building should not have a worse level of compliance, after the work, with other applicable Parts of Schedule 1.

For the purposes of Part B1, where a window is located such that, in a new dwelling, an escape window would be necessary and the window is of sufficient size that it could be used for the purposes of escape then:

a. the replacement window opening should be sized to provide at least the same potential for escape as the window it replaces; or

b. where the original window is larger than necessary for the purposes of escape, the window opening could be reduced down to the minimum specified in paragraph 2.10.

~~Loft conversions~~

The ODPM is minded to omit the current B1 guidance for loft conversions. This is because the suggested new guidance on fire doors (without self closers) and smoke alarms is considered to make it obsolete. Also, the current loft conversion guidance is the only situation whereby the Approved Document effectively acknowledges that occupants may have to wait to be rescued by means of a ladder, as opposed to the basic principal that you should generally be able to make your own escape, unassisted, from a fire. We would therefore particularly welcome consultees' views on this proposal, especially in relation to the effect this may have on some existing domestic properties.

2.17 In the case of an existing two storey house to which a storey is to be added by converting the existing roof space into habitable rooms, the following provisions 2.18 2.25 can be applied as an alternative to those in paragraph 2.13.

However, these alternative provisions are not suitable if:

a. the new second storey exceeds 50m² in floor area; or

b. the new second storey is to contain more than two habitable rooms.

ENCLOSURE OF EXISTING STAIR

2.18 The stair in the ground and first storeys should be enclosed with walls and/or partitions which are fire resisting, and the enclosure should either:

a. extend to a final exit, see Diagram 3(a); or

b. give access to at least two escape routes at ground level, each delivering to final exits and separated from each other by fire-resisting construction and self-closing fire doors, see Diagram 3(b).

DOORWAYS

2.19 Every doorway within the enclosure to the existing stair should be fitted with a door which, in the case of doors to habitable rooms, should be fitted with a self-closing device.

Note: Rising butt hinges are adequate as self-closing devices (see Note to paragraph 2.13).

Any new door to a habitable room should be a fire door. Existing doors need only be fitted with self-closing devices. Existing glazed doors may need to have the glazing changed, see paragraph 2.20.

GLAZING

2.20 Any glazing (whether new or existing) in the enclosure to the existing stair, including all doors (whether or not they need to be fire doors), but excluding glazing to a bathroom or wc, should be fire-resisting and retained by a suitable glazing system and beads compatible with the type of glass. (See also Appendix A, Table A4.)

NEW STAIR

2.21 The new storey should be served by a stair (which may be an alternating tread stair or fixed ladder) meeting the provisions in Approved Document K, *Protection from falling, collision and impact*. The new stair may be located either in a continuation of the existing stairway, or in an enclosure that is separated from the existing stairway, and from ground and first floor accommodation, but which opens into the existing stairway at first floor level, see Diagram 5.

Diagram 5 **Alternatives for the fire separation of the stair and new storey in house conversion**

FIRE SEPARATION OF NEW STOREY

2.22 The new storey should be separated from the rest of the house by fire resisting construction, see paragraph 8.7. To maintain this separation, measures should be taken to prevent smoke and fire in the stairway from entering the new storey. This may be achieved by providing a self-closing fire door set in fire resisting construction either at the top or the bottom of the new stair, depending on the layout of the new stairway, see Diagram 5.

EMERGENCY EGRESS WINDOWS

2.23 Windows provided for emergency egress purposes from basement, ground or first storeys, provide a means of self rescue. At higher level escape may depend on a ladder being set up. While this is a departure from the general principle that escape should be without outside assistance it is considered that, in the case of a three storey domestic residential loft conversion this is reasonable as an emergency measure. A fixed ladder on the slope of the roof is not recommended.

2.24 The room (or rooms) in the new storey should each have an openable window or rooflight which meets the relevant provisions in Diagram 6. A door to a roof terrace is also acceptable.

In a 2 room loft conversion, a single window can be accepted provided both rooms have their own access to the stairs. A communicating door between the rooms must be provided so that it is possible to gain access to the window without passing through the stair enclosure.

2.25 The window should be located to allow access for rescue by ladder from the ground (there should therefore be suitable pedestrian access to the point at which a ladder would be set, for fire service personnel to carry a ladder from their vehicle, although it should not be assumed that only the fire service will make a rescue).

Escape across the roof of a ground storey extension is acceptable providing the roof is fire-resisting (see paragraph 2.5 and Appendix A, Table A1). The effect of an extension on the ability to escape from windows in other parts of the house (especially from a loft conversion) should be considered.

AUTOMATIC SMOKE DETECTION AND ALARMS

2.26 Smoke alarms should be fitted as described in Section 1.

Diagram 6 **Position of dormer window or rooflight suitable for emergency egress purposes from a loft conversion of a 2-storey dwellinghouse**

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SECTION 3:
~~Flats and maisonettes~~ Apartments

Introduction

3.1 The means of escape from ~~a flat or maisonette~~ an apartment with a floor not more than 4.5m above ground level are relatively simple to provide. Few provisions are specified in this document beyond ensuring that means are provided for giving early warning in the event of fire (see Section 1) and that suitable means are provided for emergency egress from these storeys.

With increasing height more complex provisions are needed because emergency egress through upper windows becomes increasingly hazardous, and in maisonettes internal stairs with a higher level of protection are needed.

3.2 The guidance in this section deals with some common arrangements of ~~flat and maisonette~~ apartment design. Other, less common, arrangements (for example ~~flats~~ apartments entered above or below accommodation level, or ~~flats~~ apartments containing galleries) are acceptable. Guidance on these is given in clauses 9 and 10 of BS 5588: *Fire precautions in the design, construction and use of buildings*, Part 1: 1990 *Code of practice for residential buildings.*

3.3 The provisions for means of escape for ~~flats and maisonettes~~ apartments are based on the assumption that:

a. the fire is generally in a dwelling;

b. there is no reliance on external rescue (e.g. by a portable ladder);

c. measures in Section ~~9~~ 7 (B3) provide a high degree of compartmentation and therefore a low probability of fire spread beyond the dwelling of origin, so that simultaneous evacuation of the building is unlikely to be necessary; and

d. although fires may occur in the common parts of the building, the materials and construction used there should prevent the fabric from being involved beyond the immediate vicinity (although in some cases communal facilities exist which require additional measures to be taken).

3.4 There are two distinct components to planning means of escape from buildings containing ~~flats and maisonettes~~ apartments; escape from within each dwelling, and escape from each dwelling to the final exit from the building.

Paragraphs 3.7–~~3.16~~ 3.17 deal with the means of escape within each unit, i.e. within the private domestic area. Paragraphs ~~3.17~~ 3.18–3.48 deal with the means of escape in the common areas of the building. Guidance on mixed use buildings is given in paragraphs 3.49–3.50 and for live/work units in 3.51.

HOUSES IN MULTIPLE OCCUPATION

3.5 This guidance is also applicable to ~~flats and maisonettes~~ apartments when they are considered to be houses in multiple occupation. Whether or not a building is a house in multiple occupation depends on the nature of the occupancy, rather than its physical form. See paragraph ~~2.3~~ 0.7 for guidance available for houses in multiple occupation.

SHELTERED HOUSING

3.6 Whilst many of the provisions in this Approved Document for means of escape from ~~flats~~ apartments are applicable to sheltered housing, the nature of the occupancy may necessitate some additional fire protection measures. The extent will depend on the form of the development. For example a group of specially adapted bungalows or two storey ~~flats~~ apartments, with few communal facilities, need not be treated differently from other one or two storey houses or flats. Where additional provisions are needed guidance on means of escape can be found in clause 17 of BS 5588: Part 1: 1990.

General provisions

INNER ROOMS

3.7 A room whose only escape route is through another room is at risk if a fire starts in that other room. The guidance in Section 2, paragraph ~~2.4~~ 2.3, on inner rooms in dwellinghouses, applies equally to ~~flats and maisonettes~~ apartments.

BASEMENTS

3.8 Because of the risk that a single stairway may be blocked by smoke from a fire in the basement or ground storey, the guidance in Section 2, paragraph ~~2.10~~ 2.7, about basements in dwellinghouses, applies equally to basement ~~flats and maisonettes~~ apartments.

BALCONIES AND FLAT ROOFS

3.9 The guidance in Section 2, paragraphs ~~2.5~~ 2.4 and ~~2.6~~ 2.5 on balconies and flat roofs of dwellinghouses, applies equally to ~~flats and maisonettes~~ apartments. In addition any balcony outside an alternative exit to a dwelling more than 4.5m above ground level should be a common balcony and meet the conditions in paragraph ~~3.15~~ 3.16.

Inserted text ~~Deleted text~~

GALLERIES

3.10 Guidance on galleries is given in Section 2, paragraph 2.6.

Provisions for escape from ~~flats and maisonettes~~ apartments where the floor is not more than 4.5m above ground level

~~3.10~~ 3.11 All rooms in the upper storey(s) should comply with Section 2, paragraph ~~2.7~~ 2.8 if the design of the dwelling and the common means of escape does not follow the guidance in paragraphs ~~3.11~~ 3.12–~~3.39~~ 3.41. All rooms in the ground storey should comply with paragraph ~~2.8~~ 2.9.

~~Additional~~ Provisions for ~~flats and maisonettes~~ apartments with a floor more than 4.5m above ground level

INTERNAL PLANNING OF ~~FLATS~~ APARTMENTS

~~3.11~~ 3.12 Three acceptable approaches (all of which should observe the restrictions concerning inner rooms given in paragraph 3.7) when planning ~~a flat~~ an apartment which has a floor at more than 4.5m above ground level are:

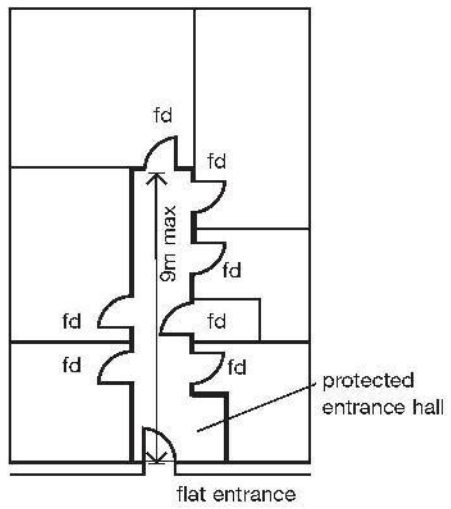
a. to provide a protected entrance hall which serves all habitable rooms, planned so that the travel distance from the entrance door to the door to any habitable room is 9m or less (see Diagram ~~7~~ 6); or

b. to plan the ~~flat~~ apartment so that the travel distance from the entrance door to any point in any of the habitable rooms does not exceed 9m and the cooking facilities are remote from the entrance door and do not prejudice the escape route from any point in the flat (see Diagram ~~8~~ 7); or

c. to provide an alternative exit from the ~~flat~~ apartment, complying with paragraph ~~3.12~~ 3.13.

Diagram ~~7~~ 6 (Amended) **Flat Apartment where all habitable rooms have direct access to an entrance hall**

See paragraph 3.12(a)



Note: Bathrooms need not have fire doors providing the bathroom is separated by fire-resisting construction from the adjacent rooms.

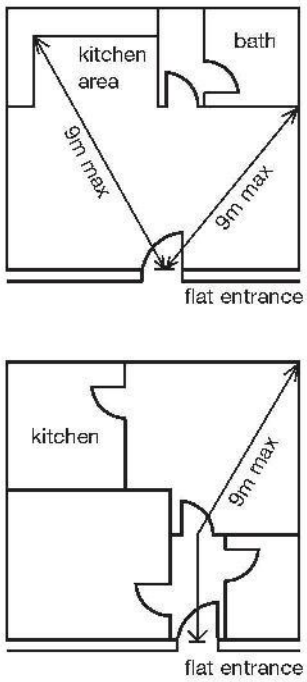
Key

fd FD20 fire door

▬ 30 minute fire-resisting construction around entrance hall

Diagram 8 7 **Flat Apartment with restricted travel distance from furthest point to entrance**

See paragraph 3.12(b)



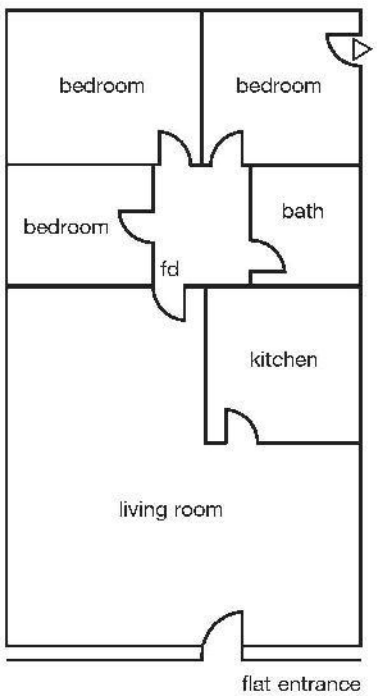
~~3.12~~
3.13 Where any ~~flat~~ apartment has an alternative exit and the habitable rooms do not have direct access to the entrance hall (see Diagram ~~9~~ 8):

a. the bedrooms should be separated from the living accommodation by fire-resisting construction and ~~self-closing~~ fire door(s); and

b. the alternative exit should be located in the part of the flat containing the bedroom(s).

Diagram ~~9~~ 8 (Amended) **~~Flat~~ Apartment with an alternative exit, but where all habitable rooms have no direct access to an entrance hall**

See paragraph 3.13



Note: The bedrooms are not classified as inner rooms because escape is possible in two directions.

Key
fd FD20 fire door
— 30 minute fire-resisting construction between living and bedroom accommodation
△ alternative exit

INTERNAL PLANNING OF ~~MAISONETTES~~ APARTMENTS WITH MORE THAN ONE STOREY

~~3.13~~ ~~A maisonette~~ A multi-storey apartment with an independent external entrance
3.14 at ground level is similar to a dwellinghouse and means of escape should be planned on the basis of paragraphs 2.13 or 2.14 depending on the height of the top storey above ground level.

~~3.14~~ Four ~~two~~ acceptable approaches to planning ~~a maisonette~~ a multi-storey
3.15 apartment, which does not have its own external entrance at ground level but has a floor at more than 4.5m above ground level, are:

a. to provide an alternative exit from each habitable room which is not on the entrance floor of the ~~maisonette~~ apartment, (see Diagram ~~10~~ 9); or

b. to provide one alternative exit from each floor (other than the entrance floor), with a protected landing entered directly from all the habitable rooms on that floor, (see Diagram ~~11~~ 10); or

c. where the vertical distance between the floor of the entrance storey and the floors above and below it does not exceed 7.5m, to provide a protected stairway plus additional smoke alarms in all habitable rooms and heat alarms in any kitchen; or

d. to provide a protected stairway plus a sprinkler system in accordance with BS 9251: *Sprinkler systems for residential and domestic occupancies. Code of practice* (smoke alarms should be provided in accordance with paragraph 1.9).

Diagram ~~10~~ 9 (Amended) ~~**Maisonette**~~ **Multi-storey apartment with alternative exits from each habitable room, except at entrance level**

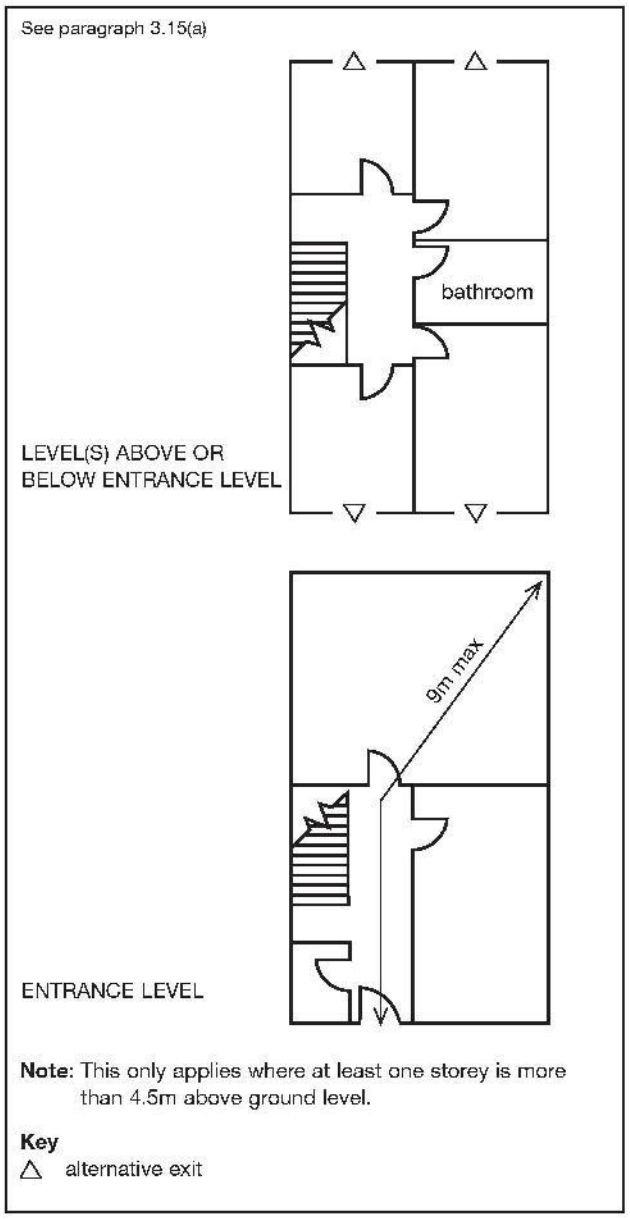
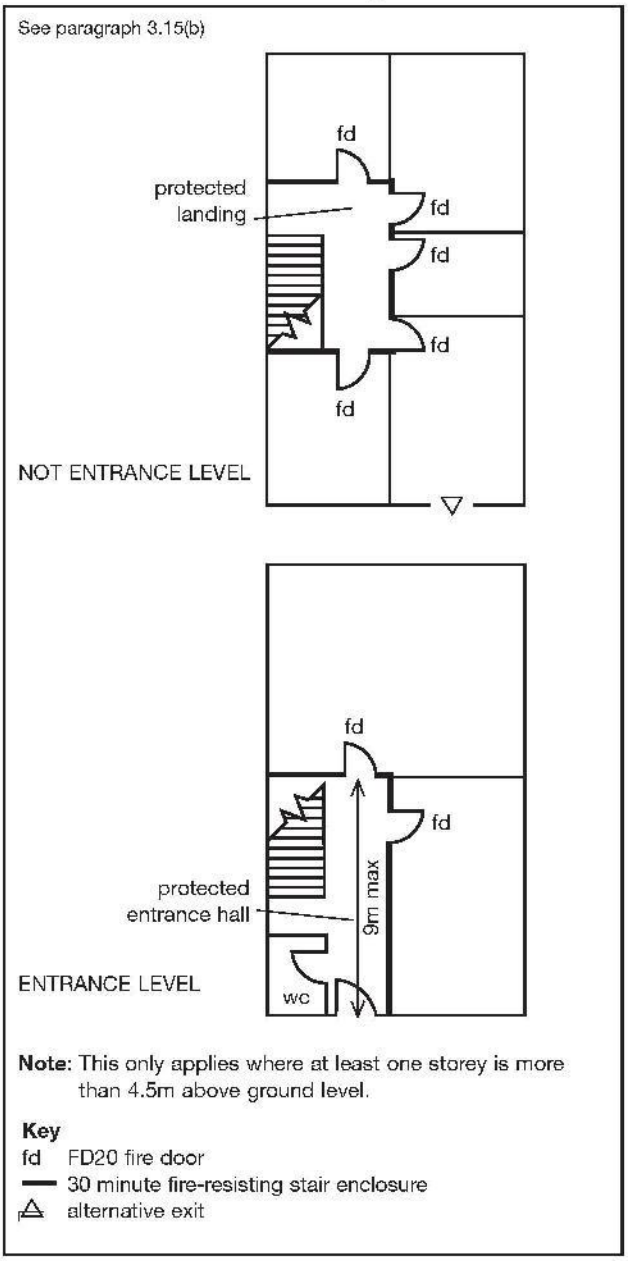


Diagram ~~11~~ 10 (Amended) ~~**Maisonette**~~ **Multi-storey apartment with protected entrance hall and landing**



ALTERNATIVE EXITS

~~**3.15**~~ **3.16** To be effective, an alternative exit from ~~a flat or maisonette~~ an apartment should satisfy the following conditions:

a. be remote from the main entrance door to the dwelling; and

b. lead to a final exit or common stair by way of:

i. a door onto an access corridor, access lobby or common balcony; or

ii. an internal private stair leading to an access corridor, access lobby or common balcony at another level; or

iii. a door into a common stair; or

iv. a door onto an external stair; or

v. a door onto an escape route over a flat roof.

Note: Any such access to a final exit or common stair should meet the appropriate provisions dealing with means of escape in the common parts of the building (see paragraph ~~3.17~~ 3.18).

AIR CIRCULATION SYSTEMS FOR HEATING, ENERGY CONSERVATION OR CONDENSATION CONTROL IN ~~FLATS AND MAISONETTES~~ APARTMENTS WITH A FLOOR MORE THAN 4.5M ABOVE GROUND LEVEL

~~3.16~~ 3.17 With these types of systems, the following precautions are needed to avoid the possibility of the system allowing smoke or fire to spread into a protected entrance hall or landing:

a. Transfer grilles should not be fitted in any wall, door, floor or ceiling enclosing a protected entrance hall of a dwelling or protected stairway and landing of ~~a maisonette~~ an apartment.

b. All ductwork passing through the enclosure to a protected entrance hall or protected stairway and landing should be so fitted that all joints between the ductwork and the enclosure are fire-stopped and provided with a fire damper.

c. Where ductwork is used to convey air into a protected entrance hall of the dwelling or protected stairway and landing within ~~a maisonette~~ an apartment through the enclosure of the protected hall or stairway, the return air from the protected hall or stairway should be ducted back to the plant.

d. Air and return air grilles or registers should be positioned at a height not exceeding 450mm above floor level.

e. A room thermostat for a ducted warm air heating system should be mounted at a height between 1370mm and 1830mm in an area from which air is drawn directly to the heating unit, and its maximum setting should not exceed 27°C.

f. Any system of mechanical ventilation which recirculates air should comply with paragraph ~~6.46~~ 4.45.

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Means of escape in the common parts of ~~flats and maisonettes~~ apartments

~~3.17~~ 3.18 The following paragraphs deal with means of escape from the entrance doors of dwellings to a final exit. They should be read in conjunction with the general provisions in Section ~~6~~ 4.

Note: Paragraphs ~~3.18~~ 3.19–~~3.48~~ 3.51 are not applicable where the top floor is not more than 4.5m above ground level. However, attention is drawn to the provisions in paragraph 3.6 regarding sheltered housing, Section ~~6~~ 4 regarding general provisions, Section 9 7 (B3) regarding the provision of compartment walls and protected shafts, and Section ~~17~~ 15 (B5) regarding the provision of access for the fire service.

Number of escape routes

~~3.18~~ 3.19 Every dwelling should have access to alternative escape routes so that a person confronted by the effects of an outbreak of fire in another dwelling can turn away from it and make a safe escape.

However, a single escape route from the dwelling entrance door is acceptable if either:

a. the dwelling is situated in a storey served by a single common stair and:

   i. every dwelling is separated from the common stair by a protected lobby or common corridor (see Diagram ~~12~~ 11); and

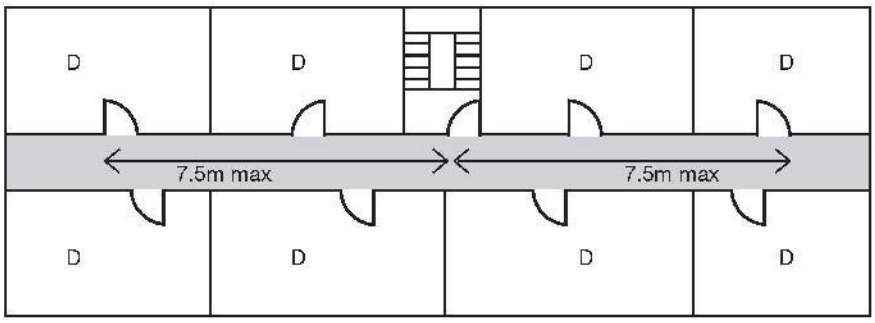
   ii. the travel distance limitations in Table ~~2~~ 1, on escape in one direction only, are observed; or

b. alternatively the dwelling is situated in a dead end part of a common corridor served by two (or more) common stairs, and the ~~distance to the nearest common stair~~ travel distance complies with the limitations in Table ~~2~~ 1 on escape in one direction only (see Diagram ~~13~~ 12).

Diagram ~~12~~ 11 (New) ~~Flats or maisonettes~~ Apartments served by one common stair

See paragraph 3.18(a) and 3.24

a. CORRIDOR ACCESS DWELLINGS



Note:

1. The arrangements shown also apply to the top storey.
2. See Diagram 14 for small single stair buildings.
3. All doors shown are self-closing FD30S fire doors.

Key

D dwelling

ventilated corridor / lobby space (wall vent, smoke shaft, mechanical vent, make-up air vent or air/smoke relief according to method used)

b. LOBBY ACCESS DWELLINGS

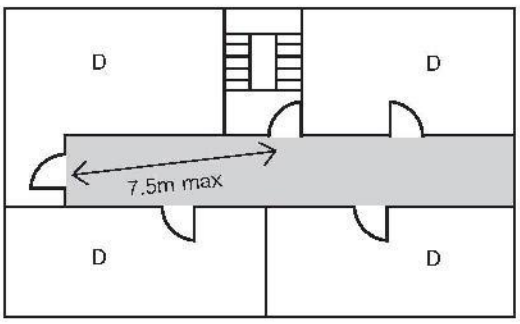
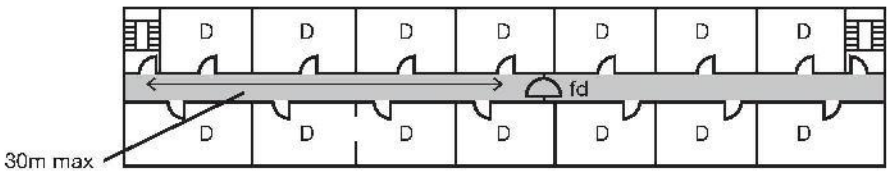


Diagram ~~13~~ 12 (New) ~~Flats or maisonettes~~ Apartments served by more than one common stair

See paragraphs 3.18(b) and 3.24

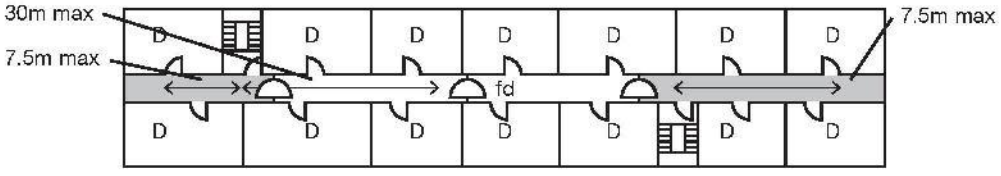
a. CORRIDOR ACCESS WITHOUT DEAD ENDS

Where a lobby provides additional protection to the stair, the travel distance is measured from the dwelling to the lobby door.

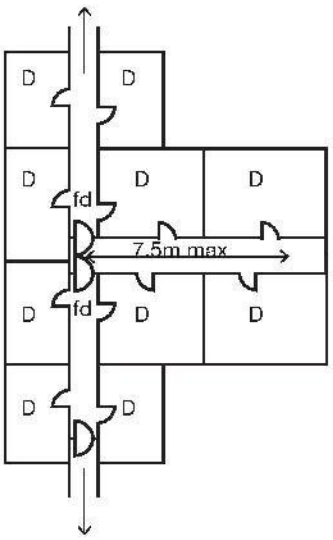


b. CORRIDOR ACCESS WITH DEAD ENDS

Where a lobby provides additional protection to the stair, the travel distance is measured from the dwelling to the lobby door. The central door may be omitted if maximum travel distance is no more than 15m.



c. 'T' JUNCTION WITH MAIN CORRIDOR



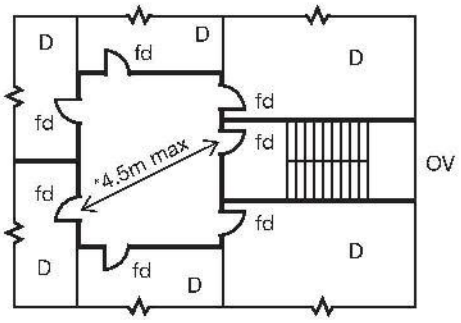
Note:
The arrangements shown also apply to the top storey.

Key

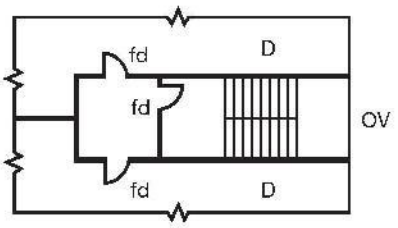
D dwelling
fd self-closing FD20S fire door (other doors shown are FD30S fire doors)
ventilated corridor space (wall vent, smoke shaft, mechanical vent, make-up air vent or air/smoke relief according to method used)

Diagram ~~14~~ 13 (Amended) Common escape route in small single stair building

See paragraph 3.18



a. SMALL SINGLE STAIR BUILDING
*If smoke control is provided in the lobby, the travel distance can be increased to 7.5m maximum (see Diagram 11, example b).



b. SMALL SINGLE STAIR BUILDING WITH NO MORE THAN 2 DWELLINGS PER STOREY
The door between stair and lobby should be free from security fastenings.

If the dwellings have protected entrance halls, the lobby between the common stair and dwelling entrance is not essential.

Notes:

1. The arrangements shown also apply to the top storey.
2. If the travel distance across the lobby in Diagram 13a exceeds 4.5m, Diagram 11b applies.
3. If there is one dwelling per storey in Diagram 13b, then the entrance door to the dwelling may form part of the stair enclosure, provided the dwelling has a protected entrance hall.
4. Where, in Diagram 13b, the lobby between the common stair and the dwelling is omitted in small single-stair buildings, an automatic opening vent with an equivalent free area of at least 1.0m² is required at the top of the stair, to be operated on detection of smoke at any storey in the stair.

Key:

———	fire-resisting construction
OV	openable vent at high level for fire service use (1.0m² minimum free area). (It may be replaced by a vent over the stair.)
D	dwelling
fd	self-closing FD30S fire door

SMALL SINGLE-STAIR BUILDINGS

~~3.19~~ 3.20 The provisions in paragraph ~~3.18~~ 3.19 may be modified and a single stair, protected in accordance with Diagram ~~14~~ 13, may be used provided that:

a. the top floor of the building is no more than 11m above ground level;

b. there are no more than 3 storeys above the ground level storey;

c. the stair does not connect to a covered car park ~~except if the car park is open-sided (see paragraph 12.4 for meaning of open-sided car park)~~; and

d. the stair does not serve ancillary accommodation unless

~~i. the storey containing the ancillary accommodation does not contain any dwellings, and~~

the ancillary accommodation is separated from the stair by a protected lobby, or protected corridor, which has not less than 0.4m² permanent ventilation or is protected from the ingress of smoke by a mechanical smoke control system.

~~FLATS AND MAISONETTES~~ APARTMENTS WITH BALCONY OR DECK ACCESS

~~3.20~~ **3.21** The provisions of paragraph ~~3.18~~ 3.19 may also be modified in the case of ~~flats and maisonettes~~ apartments with balcony or deck approach. Guidance on these forms of development is set out in clause 13 of BS 5588: *Fire precautions in the design, construction and use of buildings*, Part 1: 1990 *Code of practice for residential buildings*.

Table ~~2~~ 1 **Limitations on distance of travel in common areas of ~~flat and maisonette~~ apartment buildings**
(see paragraph ~~3.21~~ 3.22)

Maximum distance of travel (m) from dwelling entrance door to common stair, or to stair lobby (4) ~~door to lobby in corridor-access single stair flats (Diagram 12a)~~	
Escape in one direction only	Escape in more than one direction
7.5m (1)(2)	30m (2)(3)
Maximum distance of travel to storey exit in car parks	
Escape in one direction only	Escape in more than one direction
25m	45m

Notes:

1. Reduced to 4.5m in the case shown in Diagram ~~14~~13a.
2. Where all dwellings on a storey have independent alternative means of escape, the maximum distance of travel does not apply. However see paragraph ~~17.3~~ 15.3 (B5) which specifies fire service access requirements.
3. For sheltered housing, see paragraph 3.6.
4. Where travel distance is measured to a stair lobby, the lobby must not provide direct access to any storage room, apartment or other space containing a potential fire hazard.

Common escape routes

PLANNING OF COMMON ESCAPE ROUTES

~~3.21~~ **3.22** Escape routes in the common areas should comply with the limitations on travel distance in Table ~~2~~ 1. However there may be circumstances where some increase on these maximum figures will be reasonable.

Escape routes should be planned so that people do not have to pass through one stairway enclosure to reach another. However it is acceptable to pass through a protected lobby of one stairway in order to reach another.

PROTECTION OF COMMON ESCAPE ROUTES

~~3.22~~ 3.23 To reduce the risk of a fire in a dwelling affecting the means of escape from other dwellings, and common parts of the building, the common corridors should be protected corridors.

The wall between each apartment ~~dwelling~~ and the corridor should be a compartment wall (see Section ~~9~~ 7).

VENTILATION OF COMMON ESCAPE ROUTES

~~3.23~~ 3.24 Despite the provisions described in this Approved Document, it is probable that some smoke will get into a common corridor or lobby from a fire in an apartment ~~dwelling~~, if only because the entrance door will be open when the occupants escape.

There should therefore be some means of ventilating the common corridors/lobbies to control smoke and so protect the common stairs. This offers additional protection to that provided by the fire doors to the stair. (The ventilation also affords some protection to the corridors/lobbies.)

This can be achieved by either natural means in accordance with paragraph 3.25 or by means of mechanical ventilation as described in paragraph 3.26.

SMOKE CONTROL OF COMMON ESCAPE ROUTES BY NATURAL SMOKE VENTILATION

3.25 In buildings, other than small ones complying with Diagram 13, the corridor or lobby adjoining the stair should be provided with a vent. The vent from the corridor/lobby should be located as high as practicable, and such that the top edge is at least as high as the top of the door to the stair.

There should also be a vent, with an equivalent free area of at least 1.0m², from the top storey of the stairway to the outside.

In single stair buildings the smoke vents on the fire floor and at the head of the stair should be actuated by means of smoke detectors in the common access space providing access to dwellings. In buildings with more than one stair the smoke vents may be actuated manually (and accordingly smoke detection is not required for ventilation purposes).

Vents should either:

a. be located on an external wall with an equivalent area of 1.0m² (see Appendix E). Where the stair is a firefighting stair, the equivalent free area should be increased to 1.5m²; or

b. discharge into a vertical smoke shaft meeting the following criteria:

   i. (Closed at the base) of minimum cross-sectional area 1.2m² (minimum dimension 0.75m in any direction), opening at roof level at least 0.5m above any surrounding structures within a horizontal distance of 2.0m. The shaft should extend at least 3m above the ceiling of the highest storey served by the shaft.

   ii. The minimum equivalent free area of the vent from the corridor/lobby into the shaft, and at the opening at the head of the shaft, and at all internal locations within the shaft (e.g. safety grilles) should be at least 0.75m².

   iii. The smoke shaft should be constructed from non-combustible material, and all vents should have a fire/smoke resistance performance at least that of an E30S_a fire door. The shaft should be vertical from base to head, with no more than 4m at an inclined angle (maximum 30°).

   iv. On detection of smoke in the common corridor/lobby, the vent(s) on the fire floor, the vent at the top of the smoke shaft and to the stairway should all open simultaneously. The vents from the corridors/lobbies on all other storeys should remain closed.

   v. Where the stair is a firefighting stair, the minimum shaft cross-sectional area should be 1.5m². The minimum dimension in any direction should be 0.85m. The minimum equivalent free area of each vent from the corridor (and internal grilles etc) should be 1.0m².

~~There should therefore be some means of ventilating the common corridors/lobbies to disperse smoke. (The ventilation also affords protection to the common stairs.)~~

~~a. In single stair buildings, other than small ones complying with Diagram 14, and in any dead-end portion of a building with more than one stair, the common corridor or lobby should be ventilated by an automatic opening ventilator, triggered by automatic smoke detection located in the space to be ventilated. The ventilator should have a free area of at least 1.5m², and be fitted with a manual override. (See also Diagram 12 and Diagram 13c);~~

~~b. In buildings with more than one stair, common corridors should extend at both ends to the external face of the building where there should be openable ventilators, which may operate automatically, for fire service use (see Diagram 13a and b). The free area of the ventilators should be at least 1.0m² at each end of the corridor.~~

The changes to the provisions for ventilation in apartment buildings are as a result of recent research, carried out by BRE, into the effectiveness of ventilation systems.

SMOKE CONTROL OF COMMON ESCAPE ROUTES BY PRESSURE DIFFERENTIALS

3.26 As an alternative to the natural ventilation provisions in paragraph 3.25, mechanical ventilation may be provided to protect the stair(s) from smoke by means of pressure differentials. Each stair should be protected by one of the following means, and the associated performance criteria met.

a. Pressurization by supplying air to the stairway, with air/smoke relief from the adjoining corridor/lobby, such that with all doors closed, and the air relief in the corridor/lobby open, the pressure in the stair is at least 45Pa greater than in the corridor/lobby.

On any storey where the door between the stair and adjoining corridor/lobby is open, the air relief in the corridor/lobby open, and all other doors are closed, the average airflow through the doorway (from the stair) should be not less than $0.75ms^{-1}$. Where the stair is a firefighting stair, the system should be designed such that a minimum average airflow of $2ms^{-1}$ can be achieved for firefighting operations.

Where the lobby is a stair lobby, meeting the requirements in Table 1, and air relief is provided in the adjoining corridor(s), the design pressure differential should be achieved between the stair and the corridor(s), and the average airflow achieved simultaneously through the door from the stair to the lobby and the door from the lobby to the corridor (where there are two adjoining corridors, it is assumed that only one is open at any time).

b. Depressurization by extracting air/smoke from the adjoining corridor/lobby, such that with all doors closed, and any makeup air provision in the stair open, the pressure in the stair is at least 45Pa greater than in the corridor/lobby.

On any storey where the door between the stair and adjoining corridor/lobby is open, the air extraction in the corridor/lobby operating, and all other doors are closed, the average airflow through the doorway (from the stair) should be not less than $0.75ms^{-1}$. Where the stair is a firefighting stair, the system should be designed such that a minimum average airflow of 2ms-1 can be achieved for firefighting operations.

Note: Where depressurization is employed, the air/smoke extraction should always be from the corridor/lobby adjoining the stair regardless of whether the lobby is a stair lobby meeting the provisions specified in Table 1.

Where required, pressure relief should be provided in (a.) or (b.) above such that the door opening forces are not more than 100N (notwithstanding the provisions of Approved Document M which are still applicable in the non-fire condition).

In the case of single-stair buildings, the mechanical pressure differential system should be operated automatically on detection of smoke in the horizontal, common access space on that storey (see paragraph 3.25a). In buildings with more than one stair, the mechanical pressure differential system, for each stair, may be operated manually, e.g. by the fire service.

The performance of mechanical and electrical components, including the temperature/time design criteria, should comply with BS 5588: Part 4.

To assist, where necessary, in firefighting operations, there should be an openable vent, with an equivalent free area of at least 1.0m², from the top storey of the stair to the outside.

Smoke protection may be provided to the common corridors and lobbies by extending the pressurization to these spaces. This can be achieved by following guidance in BS 5588: Part 4. Smoke exhaust ventilation from the corridors and lobbies can also provide smoke protection to these spaces. This requires a fire engineering solution.

Note: Further guidance on the design of smoke control systems using pressure differentials is available in BS 5588: Part 4, *Fire precautions in the design, construction and use of buildings, Code of practice for smoke control using pressure differentials.*

~~PRESSURIZATION OF COMMON ESCAPE ROUTES~~

~~**3.26**~~ ~~Where the escape stairway and corridors/ lobbies are protected by a smoke control system employing pressure differentials, the design should comply with BS 5588: Part 4 *Fire precautions in the design, construction and use of buildings, Code of practice for smoke control using pressure differentials.* (In such cases the cross corridor fire doors and the openable and automatically opening vents may be omitted).~~

SUB-DIVISION OF COMMON ESCAPE ROUTES

~~**3.24**~~ **3.27** A common corridor that connects two or more storey exits should be sub-divided by a self-closing fire door with, if necessary, any associated fire-resisting screen (see Diagram ~~13~~ 12). The door(s) should be positioned so that smoke will not affect access to more than one stairway.

~~**3.25**~~ **3.28** A dead end portion of a common corridor should be separated from the rest of the corridor by a self-closing fire door with, if necessary, any associated fire-resisting screen (see Diagram ~~12a~~ 11a and Diagram ~~13c~~ 12c).

ANCILLARY ACCOMMODATION, ETC.

~~3.27~~ 3.29 Stores and other ancillary accommodation should not be located within, or entered from, any protected lobby or protected corridor forming part of the only common escape route from a dwelling on the same storey as that ancillary accommodation.

Reference should be made to paragraphs ~~6.50~~ 4.48–~~6.53~~ 4.51 for special provisions for refuse chutes and storage areas.

ESCAPE ROUTES OVER FLAT ROOFS

~~3.28~~ 3.30 If more than one escape route is available from a storey, or part of a building, one of those routes may be by way of a flat roof provided that it complies with the provisions in paragraph ~~6.35~~ 4.34.

Note: Access to designs described in paragraph ~~3.45~~–3.48 may also be via a flat roof if the route over the roof complies with the provisions in paragraph ~~6.35~~ 4.34.

Common stairs

NUMBER OF COMMON STAIRS

~~3.29~~ 3.31 As explained in paragraph ~~3.18~~ 3.19 and paragraph ~~3.19~~ 3.20 a single common stair can be acceptable in some cases, but otherwise there should be access to more than one common stair for escape purposes.

WIDTH OF COMMON STAIRS

~~3.30~~ 3.32 A stair of acceptable width for everyday use will be sufficient for escape purposes, but if it is also a firefighting stair, it should be at least 1100mm wide (see paragraph B1~~xxviii~~.xvii for measurement of width).

Protection of common stairs

GENERAL

~~3.31~~ 3.33 Common stairs need to have a satisfactory standard of fire protection if they are to fulfil their role as areas of relative safety during a fire evacuation. The provisions in paragraphs ~~3.32~~ 3.34–~~3.44~~ 3.46 should be followed.

~~3.32~~ 3.34 Stairs provide a potential route for fire spread from floor to floor. In Section 9 7 under the requirement of B3 to inhibit internal fire spread, there is guidance on the enclosure of stairs to avoid this. A stair may also serve as a firefighting stair in accordance with the requirement B5, in which case account will have to be taken of guidance in Section ~~18~~ 16.

ENCLOSURE OF COMMON STAIRS

~~3.33~~ 3.35 Every common stair should be situated within a fire-resisting enclosure (i.e. it should be a protected stairway), to reduce the risk of smoke and heat making use of the stair hazardous.

~~3.34~~ 3.36 The appropriate level of fire resistance is given in Appendix A, Tables A1 and A2.

EXITS FROM PROTECTED STAIRWAYS

~~3.35~~ 3.37 Every protected stairway should discharge:

a. directly to a final exit; or

b. by way of a protected exit passageway to a final exit.

Note: Any such protected exit passageway should have the same standard of fire resistance and lobby protection as the stairway it serves.

SEPARATION OF ADJOINING PROTECTED STAIRWAYS

~~3.36~~ 3.38 Where two protected stairways (or exit passageways leading to different final exits) are adjacent, they should be separated by an imperforate enclosure.

USE OF SPACE WITHIN PROTECTED STAIRWAYS

~~3.37~~ 3.39 A protected stairway needs to be relatively free of potential sources of fire. Consequently, it should not be used for anything else, except a lift well or electricity meter(s). There are other provisions for lifts in paragraphs ~~6.39 to 6.45~~ 4.38–4.44 and guidance on the installation of electricity meters is given in BS 5588: *Fire precautions in the design, construction and use of buildings*, Part 1, *Code of practice for residential buildings*.

FIRE RESISTANCE AND OPENINGS IN EXTERNAL WALLS OF PROTECTED STAIRWAYS

~~3.38~~ 3.40 The external enclosures to protected stairways should meet the provisions in paragraph ~~6.24~~ 4.23.

GAS SERVICE AND INSTALLATION PIPES IN PROTECTED STAIRWAYS

~~3.39~~ 3.41 Gas service and installation pipes or associated meters should not be incorporated within a protected stairway unless the gas installation is in accordance with the requirements for installation and connection set out in the Pipelines Safety Regulations 1996, SI 1996 No 825 and the Gas Safety (Installation and Use) Regulations 1998 SI 1998 No 2451. (See also paragraph ~~9.41~~ 7.37.)

Basement stairs

~~3.40~~ 3.42 Because of their situation, basement stairways are more likely to be filled with smoke and heat than stairs in ground and upper storeys.

Special measures are therefore needed in order to prevent a basement fire endangering upper storeys. These are set out in the following two paragraphs.

~~3.41~~ 3.43 If an escape stair forms part of the only escape route from an upper storey of a building (or part of a building) which is not a small building (see paragraph ~~3.19~~ 3.20), it should not be continued down to serve any basement storey. The basement should be served by a separate stair.

~~3.42~~ 3.44 If there is more than one escape stair from an upper storey of a building (or part of a building), only one of the stairs serving the upper storeys of the building (or part) need be terminated at ground level. Other stairs may connect with the basement storey(s) if there is a protected lobby, or a protected corridor between the stair(s) and accommodation at each basement level.

Stairs serving accommodation ancillary to ~~flats and maisonettes~~ apartments

~~3.43~~ 3.45 Except where described in paragraph ~~3.19~~ 3.20, where a common stair forms part of the only escape route from a dwelling, it should not also serve any covered car park, boiler room, fuel storage space or other ancillary accommodation of similar fire risk ~~on the same storey as that dwelling~~.

~~3.44~~ **3.46** Any common stair which does not form part of the only escape route from a dwelling may also serve ancillary accommodation if it is separated from the ancillary accommodation by a protected lobby or a protected corridor.

If the stair serves an enclosed car park or place of special fire hazard, the lobby or corridor should have not less than 0.4m² permanent ventilation or be protected from the ingress of smoke by a mechanical smoke control system.

EXTERNAL ESCAPE STAIRS

~~3.45~~ **3.47** If the building (or part of the building) is served by a single access stair, that stair may be external if it:

a. serves a floor not more than 6m above the ground level; and

b. meets the provisions in paragraph ~~6.25~~ 4.24.

~~3.46~~ **3.48** Where more than one escape route is available from a storey (or part of a building), some of the escape routes from that storey or part of the building may be by way of an external escape stair provided that there is at least one internal escape stair from every part of each storey (excluding plant areas) and the external stair(s):

a. serves a floor not more than 6m above either the ground level or a roof or podium which is itself served by an independent protected stairway; and

b. meets the provisions in paragraph ~~6.25~~ 4.24.

Dwellings in mixed use buildings

~~**Note:** See also paragraph 5.4.~~

~~3.47~~ **3.49** In buildings with not more than three storeys above the ground storey, stairs may serve both dwellings and other occupancies, provided that the stairs are separated from each occupancy by protected lobbies at all levels.

~~3.48~~ **3.50** In buildings with more than three storeys above the ground storey, stairs may serve both dwellings and other occupancies provided that:

a. the dwelling is ancillary to the main use of the building and is provided with an independent alternative escape route;

b. the stair is separated from any other occupancies on the lower storeys by protected lobbies (at those storey levels);

Note: The stair enclosure should have at least the same standard of fire resistance as stipulated in Table A2 for the elements of structure of the building (and take account of any additional provisions in Section ~~18~~ 16 if it is a firefighting stair).

c. any automatic fire detection and alarm system with which the main part of the building is fitted also covers the dwelling;

d. any security measures should not prevent escape at all material times.

Note: Additional measures, including increased periods of fire resistance between the dwelling and the storage area may be required where fuels such as petrol and LPG are present. Guidance on this is referenced in BS 5588: Part 0 *Fire precautions in the design, construction and use of buildings, Guide to fire safety codes of practice for particular premises/applications.*

LIVE/WORK UNITS

3.51 Where a dwelling is intended to serve as a workplace for its occupants and for persons who do not live on the premises then following additional fire precautions will be necessary:

a. The maximum travel distance to the dwelling entrance door from any part of the working area should not exceed 18m.

b. Any windowless accommodation should have escape lighting which illuminates the route if the main supply fails. Standards for the installation of a system of escape lighting are given in BS 5266: Part 1 *Emergency lighting. Code of practice for the emergency lighting of premises other than cinemas and certain other specified premises used for entertainment.*

Note: Where the unit is so large that (a.) can not be met then the guidance in Approved Document B Volume 2 (*Buildings Other than Dwellings*) should be followed.

This new text has been produced in response to growing demand for guidance on this increasingly popular type of development.

Inserted text ~~Deleted text~~

~~SECTION 6:~~ SECTION 4: General provisions for the common parts of apartment buildings ~~common to buildings other that dwellinghouses~~

Introduction

~~6.1~~ **4.1** This section gives guidance on the construction and protection of common escape routes generally, and on some services, installations and other matters associated with the design of escape routes. ~~It applies to all buildings other than dwellinghouses (refer to Section 2 for those).~~

It should therefore be read in conjunction with Section 3 (in respect of ~~flats and maisonettes~~ apartments).

Protection of escape routes

FIRE RESISTANCE OF ENCLOSURES

~~6.2~~ **4.2** Details of fire resistance test criteria, and standards of performance, are set out in Appendix A. Generally a 30 minute standard is sufficient for the protection of means of escape. The exceptions to this are when greater fire resistance is required by the guidance on Requirements B3 or B5.

~~6.3~~ **4.3** All walls, partitions and other enclosures that need to be fire-resisting to meet the provisions in this Approved Document (including roofs that form part of a means of escape), should have the appropriate performance given in Tables A1 and A2 of Appendix A.

~~6.4~~ **4.4** Elements protecting a means of escape should meet any limitations on the use of glass (see paragraph ~~6.7~~ 4.7).

FIRE RESISTANCE OF DOORS

~~6.5~~ **4.5** Details of fire resistance test criteria, and standards of performance, are set out in Appendix B.

~~6.6~~ **4.6** All doors that need to be fire-resisting to meet the provisions in this Approved Document should have the appropriate performance given in Table B1 of Appendix B.

Doors should also meet any limitations on the use of glass (see paragraph ~~6.7~~ 4.7).

FIRE RESISTANCE OF GLAZED ELEMENTS

~~6.7~~ 4.7 Where glazed elements in fire-resisting enclosures and doors are only able to satisfy the relevant performance in terms of integrity, the use of glass is limited. These limitations depend on whether the enclosure forms part of a protected shaft (see Section ~~9~~ 7) and the provisions set out in Appendix A, Table A4.

~~6.8~~ 4.8 Where the relevant performance can be met in terms of both integrity and insulation, there is no restriction in this Approved Document on the use or amount of glass, but there are some restrictions on the use of glass in firefighting stairs and lobbies under the recommendations in clause 9 in BS 5588: Part 5: 1991 *Fire precautions in the design, construction and use of buildings, Code of practice for firefighting stairs and lifts* for robust construction (which is referred to in Section ~~18~~ 16).

~~6.9~~ 4.9 Attention is also drawn to the guidance on the safety of glazing in Approved Document N *Glazing – safety in relation to impact, opening and cleaning.*

Doors on escape routes

~~6.10~~ 4.10 The time taken to negotiate a closed door can be critical in escaping. Doors on escape routes (both within and from the building) should therefore be readily openable, if undue delay is to be avoided. Accordingly the following provisions in paragraphs ~~6.11 to 6.18~~ 4.11–4.17 should be met.

DOOR FASTENINGS

~~6.11~~ 4.11 In general, doors on escape routes (whether or not the doors are fire doors), should either not be fitted with lock, latch or bolt fastenings, or they should only be fitted with simple fastenings that can be readily operated from the side approached by people making an escape. The operation of these fastenings should be readily apparent and without the use of a key and without having to manipulate more than one mechanism. This is not intended to prevent doors being fitted with hardware to allow them to be locked when the rooms are empty.

~~6.13~~ 4.12 Guidance about door closing and 'hold open' devices for fire doors is given in Appendix B.

DIRECTION OF OPENING

~~6.14~~ 4.13 The door of any doorway or exit should, if reasonably practicable, be hung to open in the direction of escape, and should always do so if the number of persons that might be expected to use the door at the time of a fire is more than 60.

AMOUNT OF OPENING AND EFFECT ON ASSOCIATED ESCAPE ROUTES

~~6.15~~ **4.14** All doors on escape routes should be hung to open not less than 90 degrees, and with a swing that is clear of any change of floor level, other than a threshold or single step on the line of the doorway (see paragraph ~~6.21~~ 4.20) and does not reduce the effective width of any escape route across a landing.

~~6.16~~ **4.15** A door that opens towards a corridor or a stairway should be sufficiently recessed to prevent its swing from encroaching on the effective width of the stairway or corridor.

VISION PANELS IN DOORS

~~6.17~~ **4.16** Vision panels are needed where doors on escape routes sub-divide corridors, or where any doors are hung to swing both ways, but note also the provision in Approved Document M *Access to and Use of buildings* ~~*facilities for disabled people*~~, concerning vision panels in doors across accessible corridors and passageways and the provisions for the safety of glazing in Approved Document N *Glazing – safety in relation to impact, opening and cleaning*.

REVOLVING AND AUTOMATIC DOORS

~~6.18~~ **4.17** Revolving doors, automatic doors and turnstiles can obstruct the passage of persons escaping. Accordingly, they should not be placed across escape routes unless:

a. they are to the required width and are automatic doors and they either:

   i. are arranged to fail safely to outward opening from any position of opening; or

   ii. are provided with a monitored failsafe system for opening the doors if the mains supply fails; or

   iii. fail safely to the open position in the event of power failure.

b. non-automatic swing doors of the required width are provided immediately adjacent to the revolving or automatic door or turnstile.

Stairs

CONSTRUCTION OF ESCAPE STAIRS

~~6.19~~ **4.18** The flights and landings of every escape stair should be constructed of materials of limited combustibility in the following situations:

a. if it is the only stair serving the building, or part of the building, unless the building is of two or three storeys; ~~and is in Purpose Group 1(a) or Purpose Group 3;~~

b. if it is within a basement storey (this does not apply to a private stair in ~~a maisonette~~ an apartment);

c. if it serves any storey having a floor level more than 18m above ground or access level;

d. if it is external, except in the case of a stair that connects the ground floor or paving level with a floor or flat roof not more than 6m above or below ground level; (There is further guidance on external escape stairs in paragraph ~~6.25~~ 4.24); or

e. if it is a firefighting stair (see Section ~~18~~ 16).

Note: In satisfying the above conditions combustible materials may be added to the ~~upper~~ horizontal surface of these stairs (except in the case of firefighting stairs).

~~6.20~~ 4.19 There is further guidance on the construction of firefighting stairs in Section ~~18~~ 16. Dimensional constraints on the design of stairs generally, to meet requirements for safety in use, are given in Approved Document K, *Protection from falling, collision and impact*.

SINGLE STEPS

~~6.21~~ 4.20 Single steps may cause falls and should only be used on escape routes where they are prominently marked. A single step on the line of a doorway is acceptable.

HELICAL STAIRS, SPIRAL STAIRS AND FIXED LADDERS

~~6.22~~ 4.21 Helical stairs, spiral stairs ~~(but not for pupils in schools)~~ and fixed ladders may form part of an escape route subject to the following restrictions:

a. helical and spiral stairs should be designed in accordance with BS 5395: Part 2 *Stairs, ladders and walkways, Code of practice for the design of helical and spiral stairs* and, if they are intended to serve members of the public, should be a type E (public) stair, in accordance with that standard;

b. fixed ladders should not be used as a means of escape for members of the public, and should only be intended for use in circumstances where it is not practical to provide a conventional stair, for example as access to plant rooms that are not normally occupied. ~~Fixed ladders should be constructed of non-combustible materials~~.

~~6.23~~ 4.22 Guidance on the design of helical and spiral stairs, and fixed ladders, from the aspect of safety in use, is given in Approved Document K *Protection from falling, collision and impact.*

EXTERNAL WALLS OF PROTECTED STAIRWAYS

~~6.24~~ 4.23 With some configurations of external wall, a fire in one part of a building could subject the external wall of a protected stairway to heat (for example, where the two are adjacent at an internal angle in the facade as shown in Diagram ~~21~~ 14). If the external wall of the protected stairway has little fire resistance, there is a risk that this could prevent the safe use of the stair. Therefore, if:

a. a protected stairway projects beyond, or is recessed from, or is in an internal angle of, the adjoining external wall of the building; then

b. the distance between any unprotected area in the external enclosures to the building and any unprotected area in the enclosure to the stairway should be at least 1800mm (see Diagram ~~21~~ 14).

EXTERNAL ESCAPE STAIRS

~~6.25~~ 4.24 Where an external escape stair is provided in accordance with paragraph ~~3.45~~ 3.47 or paragraph ~~3.46~~ 3.48 ~~or paragraph 5.33~~, it should meet the following provisions:

a. All doors giving access to the stair should be fire-resisting and self-closing, except that a fire-resisting door is not required at the head of any stair leading downwards where there is only one exit from the building onto the top landing.

b. Any part of the external envelope of the building within 1800mm of (and 9m vertically below), the flights and landings of an external escape stair should be of fire-resisting construction, except that the 1800mm dimension may be reduced to 1100mm above the top level of the stair if it is not a stair up from a basement to ground level (see Diagram ~~22~~ 15).

c. There is protection by fire-resisting construction for any part of the building (including any doors) within 1800mm of the escape route from the stair to a place of safety, unless there is a choice of routes from the foot of the stair that would enable the people escaping to avoid exposure to the effects of the fire in the adjoining building.

d. Any stair more than 6m in vertical extent is protected from the effects of adverse weather conditions. (This should not be taken to imply a full enclosure. Much will depend on the location of the stair and the degree of protection given to the stair by the building itself).

e. Glazing in areas of fire-resisting construction mentioned above should also be fire-resisting (integrity but not insulation) and fixed shut.

Diagram ~~21~~ 14 **External protection to protected stairways**

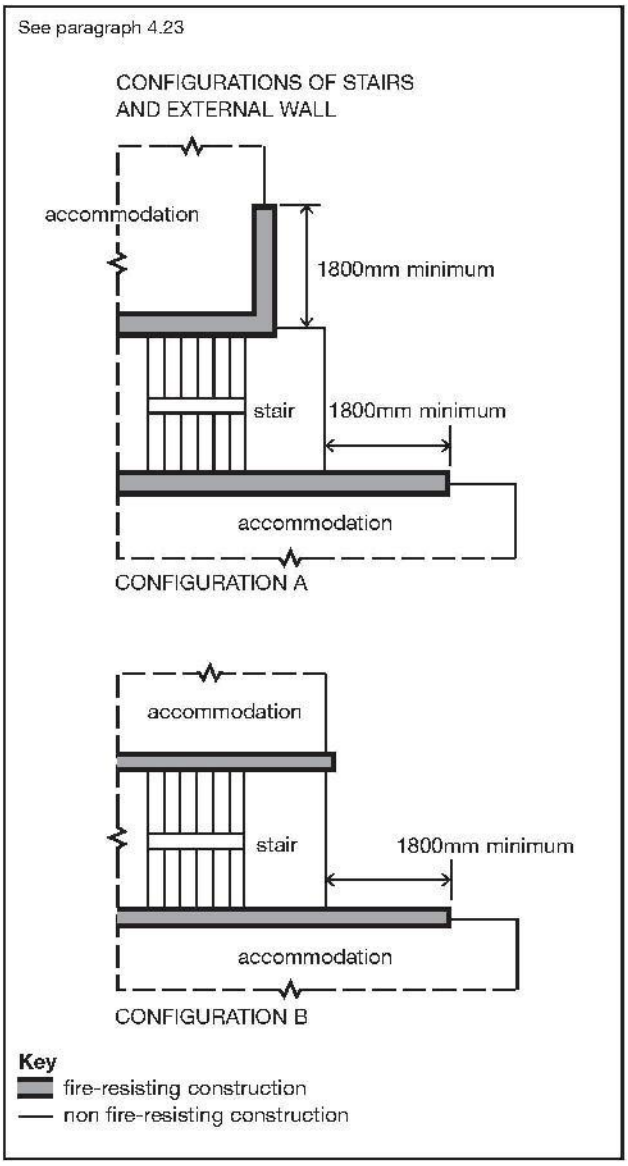
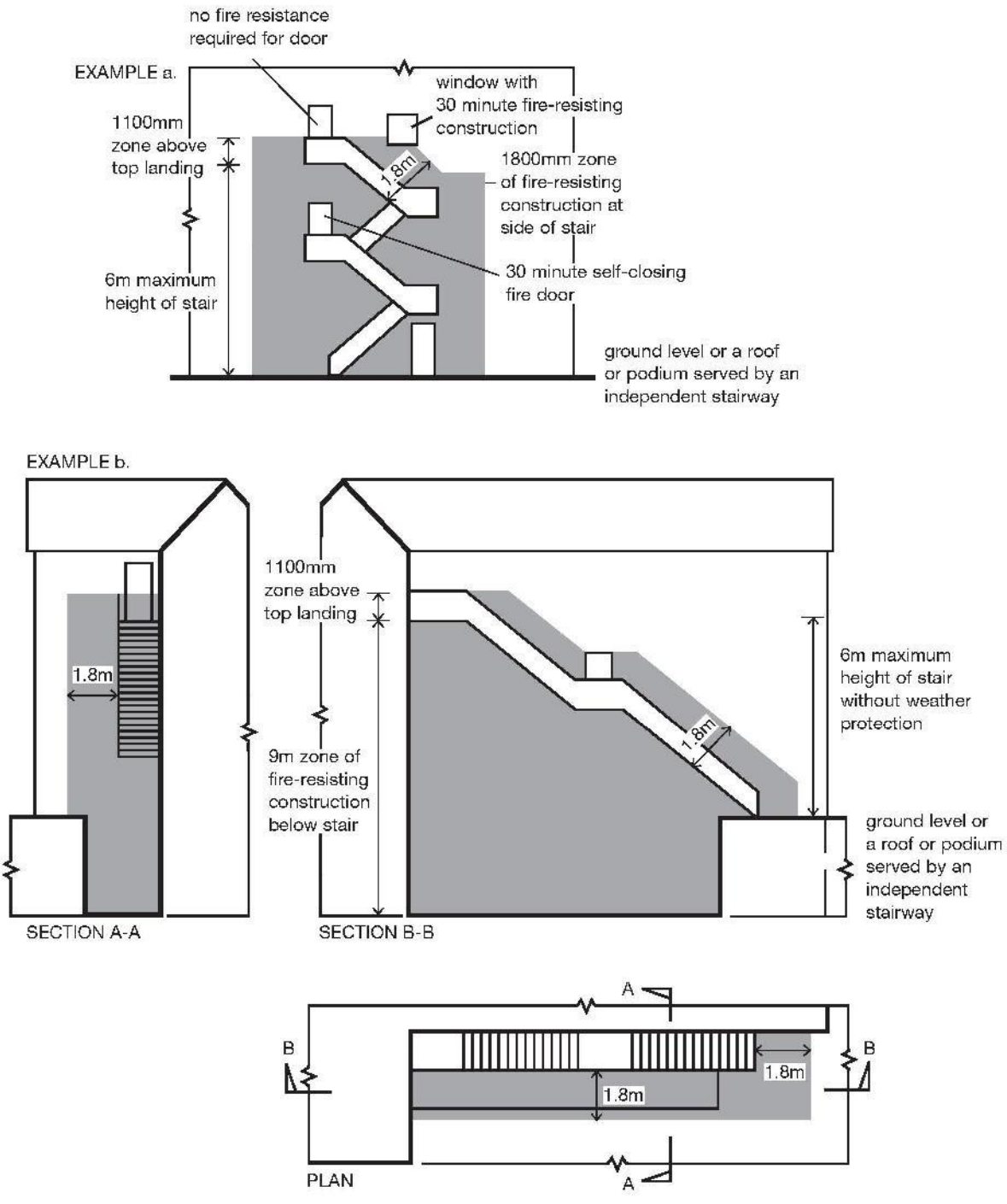


Diagram 22 15 Fire resistance of areas adjacent to external stairs

See paragraph 4.24



General

HEADROOM IN ESCAPE ROUTES

~~6.26~~ 4.25 All escape routes should have a clear headroom of not less than 2m and there should be no projection below this height (except for door frames).

FLOORS OF ESCAPE ROUTES

~~6.27~~ 4.26 The floorings of all escape routes (including the treads of steps, and surfaces of ramps and landings) should be chosen to minimise their slipperiness when wet.

RAMPS AND SLOPING FLOORS

~~6.28~~ 4.27 Where a ramp forms part of an escape route it should meet the provisions in Approved Document M *Access to and Use of buildings ~~facilities for disabled people~~*.

~~6.29~~ 4.28 Any sloping floor or tier should be constructed with a pitch of not more than 35° to the horizontal.

~~6.30~~ 4.29 Further guidance on the design of ramps and associated landings, and on aisles and gangways in places where there is fixed seating, from the aspect of safety in use, is given in Approved Document K *Protection from falling, collision and impact*, and in Approved Document M *Access to and Use of buildings ~~facilities for disabled people~~*.

FINAL EXITS

~~6.31~~ 4.30 Final exits need to be dimensioned and sited to facilitate the evacuation of persons out of and away from the building. Accordingly, they should be not less in width than the minimum width required for the escape route(s) they serve and should also meet the conditions in the following paragraphs ~~6.32 to 6.34~~ 4.31–4.33.

~~6.32~~ 4.31 Final exits should be sited to ensure rapid dispersal of persons from the vicinity of the building so that they are no longer in danger from fire and smoke. Direct access to a street, passageway, walkway or open space should be available. The route clear of the building should be well defined, and if necessary, ~~suitably guarded~~ have suitable guarding and a level threshold.

~~6.33~~ 4.32 Final exits need to be apparent to persons who may need to use them. This is particularly important where the exit opens off a stair that continues down, or up, beyond the level of the final exit.

~~6.34~~ **4.33** Final exits should be sited so that they are clear of any risk from fire or smoke in a basement (such as the outlets to basement smoke vents, see Section ~~19~~ 17), or from openings to transformer chambers, refuse chambers, boiler rooms and similar risks.

ESCAPE ROUTES OVER FLAT ROOFS

~~6.35~~ **4.34** Where an escape route over a flat roof is provided in accordance with paragraph ~~3.28~~ 3.30 ~~or paragraph 4.28~~, it should meet the following provisions:

a. the roof should be part of the same building from which escape is being made;

b. the route across the roof should lead to a storey exit or external escape route;

c. the part of the roof forming the escape route and its supporting structure, together with any opening within 3m of the escape route, should be fire-resisting (see Appendix A Table A1); and

d. the route should be adequately defined and guarded by walls and/or protective barriers which meet the provisions in Approved Document K, *Protection from falling, collision and impact*.

LIGHTING OF ESCAPE ROUTES

~~6.36~~ **(Table 9)** **4.35** All escape routes should have adequate artificial lighting. The following routes and areas ~~listed in Table 9~~ should also have escape lighting which illuminates the route if the main supply fails:

a. all common escape routes (including external escape routes), except in two-storey apartment buildings;

b. electricity and generator rooms;

c. switch room/battery room for emergency lighting system; and

d. emergency control room.

Lighting to escape stairs should be on a separate circuit from that supplying any other part of the escape route.

Standards for the installation of a system of escape lighting are given in BS 5266: Part 1 *Emergency lighting. Code of practice for the emergency lighting of premises other than cinemas and certain other specified premises used for entertainment*.

EXIT SIGNS

~~6.37~~ 4.36 Except in dwellings, every escape route (other than those in ordinary use) should be distinctively and conspicuously marked by emergency exit sign(s) of adequate size complying with the Health and Safety (*Safety Signs and Signals*) Regulations 1996. In general, signs containing symbols or pictograms which conform to BS 5499: Part 1 *Fire safety signs, notices and graphic symbols, Specification for fire safety signs*, satisfy these regulations. In some buildings additional signs may be needed to meet requirements under other legislation.

Note: Advice on fire safety signs, including emergency escape signs, is given in an HSE publication: *Safety Signs and Signals: Guidance on Regulations.*

PROTECTED POWER CIRCUITS

~~6.38~~ 4.37 Where it is critical for electrical circuits to be able to continue to function during a fire, protected circuits are needed. A protected circuit for operation of equipment in the event of fire should consist of cable meeting the requirements for classification as CWZ in accordance with BS 6387: *Specification for performance requirements for cables required to maintain circuit integrity under fire conditions.* It should follow a route selected to pass only through parts of the building in which the fire risk is negligible and should be separate from any circuit provided for another purpose.

Lifts

Evacuation lifts

~~6.39~~ 4.38 In general it is not appropriate to use lifts when there is a fire in the building because there is always the danger of people being trapped in a lift that has become immobilised as a result of the fire. However, in some circumstances a lift may be provided as part of a management plan for evacuating ~~disabled persons~~ people. In such cases the lift installation may ~~needs~~ to be appropriately sited and protected, and may ~~needs~~ to contain a number of safety features that are intended to ensure that the lift remains usable for evacuation purposes during the fire.

Guidance on the necessary measures is given in BS 5588: Part 8 *Fire precautions in the design, construction and use of buildings, Code of practice for means of escape for disabled people.*

Fire protection of lift installations

~~6.40~~ 4.39 Because lifts connect floors, there is the possibility that they may prejudice escape routes. To safeguard against this, the following conditions in paragraphs ~~6.41 to 6.45~~ 4.40–4.44 should be met.

~~6.41~~ 4.40 Lifts, such as wall-climber or feature lifts which rise within a large volume such as ~~a mall or~~ an atrium, and do not have a conventional well, may be at risk if they run through a smoke reservoir, in which case care is needed to maintain the integrity of the smoke reservoir, and protect the occupants of the lift.

~~6.42~~ 4.41 Lift wells should be ~~either~~:

~~a.~~ contained within the enclosures of a protected stairway. ~~or~~

~~b. be enclosed throughout their height with fire resisting construction if they are sited so as to prejudice the means of escape.~~

A lift well connecting different compartments should form a protected shaft (see Section ~~9~~ 7).

~~6.43~~ 4.42 In basements and enclosed car parks, or in mixed use buildings where the lift serves another purpose group, the lift should be approached only by a protected lobby (or protected corridor) unless it is within the enclosure of a protected stairway.

This is also the case in any storey that contains high fire risk areas, if the lift also delivers directly into corridors serving sleeping accommodation. Examples of fire risk areas in this context are kitchens, communal lounges and stores.

~~6.44~~ 4.43 A lift shaft should not be continued down to serve any basement storey if it is:

a. in a building (or part of a building) served by only one escape stair, and smoke from a basement fire would be able to prejudice the escape routes in the upper storeys; or

b. within the enclosures to an escape stair which is terminated at ground level.

~~6.45~~ 4.44 Lift machine rooms should be sited over the lift well whenever possible. If the lift well is within a protected stairway which is the only stairway serving the building (or part of the building), then if the machine room cannot be sited above the lift well it should be located outside the stairway (to avoid smoke spread from a fire in the machine room).

Mechanical ventilation and air conditioning systems

~~6.46~~ 4.45 Any system of mechanical ventilation should be designed to ensure that in a fire the air movement in the building is directed away from protected escape routes and exits, or that the system (or an appropriate section of it) is closed down. In the case of a system which recirculates air, it should meet the relevant recommendation for recirculating distribution systems in BS 5588:

Part 9 *Fire precautions in the design, construction and use of buildings, Code of practice for ventilation and air conditioning ductwork*, in terms of its operation under fire conditions.

~~6.48~~ 4.46 Where a pressure differential system is installed, ventilation and air conditioning systems in the building should be compatible with it when operating under fire conditions.

~~6.49~~ 4.47 Guidance on the design and installation of mechanical ventilation and air conditioning plant is given in BS 5720: *Code of practice for mechanical ventilation and air conditioning in buildings*, and on ventilation and air conditioning ductwork in BS 5588: Part 9 *Code of practice for ventilation and air conditioning ductwork*.

Note: Paragraphs ~~9.41~~ 7.37 and ~~11.10~~ 9.10 also deal with ventilation and air conditioning ducts.

Refuse chutes and storage

~~6.50~~ 4.48 Refuse storage chambers, refuse chutes and refuse hoppers should be sited and constructed in accordance with BS 5906: *Code of practice for storage and on-site treatment of solid waste from buildings*.

~~6.51~~ 4.49 Refuse chutes and rooms provided for the storage of refuse should:

a. be separated from other parts of the building by fire-resisting construction; and

b. not be located within protected stairways or protected lobbies.

~~6.52~~ 4.50 Rooms containing refuse chutes, or provided for the storage of refuse, should be approached either directly from the open air or by way of a protected lobby provided with not less than 0.2m² of permanent ventilation.

~~6.53~~ 4.51 Access to refuse storage chambers should not be sited adjacent to escape routes or final exits, or near to windows of dwellings.

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B2: Internal fire spread (linings)

The Requirement

This Approved Document deals with the following Requirement from Part B of Schedule 1 to the Building Regulations 2000 (as amended).

Requirement	*Limits on application*
Internal fire spread (linings) B2.-(1) To inhibit the spread of fire within the building, the internal linings shall- (a) adequately resist the spread of flame over their surfaces (b) have, if ignited, either a rate of heat release or a rate of fire growth, which is reasonable in the circumstances. (2) In this paragraph 'internal linings' means the materials or products used in lining any partition, wall, ceiling or other internal structure.	

Inserted text ~~Deleted text~~

Guidance

Performance

In the Secretary of State's view the Requirements of B2 will be met if the spread of flame over the internal linings of the building is restricted by making provision for them to have low rates of surface spread of flame, and in some cases to have a low rate of heat release, so as to limit the contribution that the fabric of the building makes to fire growth. In relation to the European fire tests and classification system, the requirement of B2 will be met if the heat released from the internal linings is restricted by making provision for them to have a resistance to ignition and a rate of fire growth which are reasonable in the circumstances.

The extent to which this is necessary is dependent on the location of the lining.

Introduction

FIRE SPREAD AND LINING MATERIALS

B2.i The choice of materials for walls and ceilings can significantly affect the spread of a fire and its rate of growth, even though they are not likely to be the materials first ignited.

It is particularly important in circulation spaces where linings may offer the main means by which fire spreads, and where rapid spread is most likely to prevent occupants from escaping.

Several properties of lining materials influence fire spread. These include the ease of ignition and the rate at which the lining material gives off heat when burning. The guidance relating to the European fire tests and classification provides for control of internal fire spread through control of these properties. This document does not give detailed guidance on other properties such as the generation of smoke and fumes.

FLOORS AND STAIRS

B2.ii The provisions do not apply to the upper surfaces of floors and stairs because they are not significantly involved in a fire until well developed, and thus do not play an important part in fire spread in the early stages of a fire that are most relevant to the safety of occupants.

However, it should be noted that the construction of some stairs and landings is controlled under Section ~~6~~ 4, paragraph ~~6.19~~ 4.18, and in the case of firefighting stairs, Section ~~18~~ 16, paragraph ~~18.11~~ 16.9.

OTHER CONTROLS ON INTERNAL SURFACE PROPERTIES

B2.iii There is also guidance on the control of flame spread inside buildings in two other Sections. In Section ~~10~~ 8 there is guidance on surfaces exposed in concealed spaces above fire-protecting suspended ceilings, and in Section ~~11~~ 9 on enclosures to above ground drainage system pipes.

Note: External flame spread is dealt with in Sections ~~13-15~~ 11-13. ~~the fire behaviour of insulating core panels used for internal structures is dealt with in Appendix F.~~

FURNITURE AND FITTINGS

B2.iv Furniture and fittings can have a major effect on fire spread but it is not possible to control them through Building Regulations, and they are not dealt with in this Approved Document. Fire characteristics of furniture and fittings may be controlled in some buildings under legislation that applies to a building in use, such as licensing conditions.

CLASSIFICATION OF PERFORMANCE

B2.v Appendix A describes the different classes of performance and the appropriate methods of test (see paragraphs 7-20).

The National classifications used are based on tests in BS 476: *Fire tests on building materials and structures*, namely Part 6: *Method of test for fire propagation for products* and Part 7: *Method of test to determine the classification of the surface spread of flame of products*. However, Part 4: *Non-combustibility test for materials* and Part 11: *Method for assessing the heat emission from building products* are also used as one method of meeting Class 0. Other tests are available for classification of thermoplastic materials if they do not have the appropriate rating under BS 476: Part 7 and three ratings, referred to as TP(a) rigid and TP(a) flexible and TP(b), are used.

The European classifications are described in BS EN 13501-1: 2002, *Fire classification of construction products and building elements*, Part 1 *Classification using data from reaction to fire tests*. They are based on a combination of four European test methods, namely:

- BS EN ISO 1182: 2002, *Reaction to fire tests for building products – Non combustibility test*
- BS EN ISO 1716: 2002, *Reaction to fire tests for building products – Determination of the gross calorific value*

- BS EN 13823: 2002, *Reaction to fire tests for building products – Building products excluding floorings exposed to the thermal attack by a single burning item*

- BS EN ISO 11925-2: 2002, *Reaction to fire tests for building products,* Part 2 *Ignitability when subjected to direct impingement of flame.*

For some building products, there is currently no generally accepted guidance on the appropriate procedure for testing and classification in accordance with the harmonised European fire tests. Until such a time that the appropriate European test and classification methods for these building products are published classification may only be possible using existing national test methods.

Table A8, in Appendix A, gives typical performance ratings which may be achieved by some generic materials and products.

~~SECTION 7:~~ SECTION 5: Wall and ceiling linings

Classification of linings

~~7.1~~ **5.1** Subject to the variations and specific provisions described in paragraphs ~~7.2~~ 5.2–~~7.17~~ 5.16 below, the surface linings of walls and ceilings should meet the following classifications:

Table ~~10~~ 2 **Classification of linings**

Location	National class (1)	European class (1)(3)(4)
Small rooms (2) of area not more than: a) 4m² in residential accommodation b) 30m² in non-residential accommodation	3	D-s3, d2
Domestic garages of area not more than 40m²		
Other rooms (2) (including garages)	1	C-s3, d2
Circulation spaces within dwellings		
Other circulation spaces, including the common areas of ~~flats and maisonettes~~ apartment buildings	0	B-s3, d2

Notes:

1. See paragraph B2.v.
2. For meaning of room, see definition in Appendix E.
3. The National classifications do not automatically equate with the equivalent classifications in the European column, therefore products cannot typically assume a European class, unless they have been tested accordingly.
4. When a classification includes 's3, d2', this means that there is no limit set for smoke production and/or flaming droplets/particles.

DEFINITION OF WALLS

~~7.2~~ **5.2** For the purpose of the performance of wall linings, a wall includes:

a. the surface of glazing (except glazing in doors); and

b. any part of a ceiling which slopes at an angle of more than 70° to the horizontal.

But a wall does not include:

c. doors and door frames;

d. window frames and frames in which glazing is fitted;

e. architraves, cover moulds, picture rails, skirtings and similar narrow members; and

f. fireplace surrounds, mantle shelves and fitted furniture.

DEFINITION OF CEILINGS

~~7.3~~ **5.3** For the purposes of the performance of ceiling linings, a ceiling includes:

a. the surface of glazing;

b. any part of a wall which slopes at an angle of 70° or less to the horizontal;

c. the underside of a gallery; and

d. the underside of a roof exposed to the room below.

But a ceiling does not include:

e. trap doors and their frames;

f. the frames of windows or rooflights (see Appendix E) and frames in which glazing is fitted; and

g. architraves, cover moulds, picture rails, exposed beams and similar narrow members.

Items (c) and (d) above have been inserted for clarification.

Variations and special provisions

WALLS

~~7.4~~ **5.4** Parts of walls in rooms may be of a poorer performance than specified in paragraph ~~7.1~~ 5.1 (but not poorer than Class 3 (National class) or Class D-s3, d2 (European class) provided the total area of those parts in any one room does not exceed one half of the floor area of the room, subject to a maximum of 20m² in residential accommodation, and 60m² in non-residential accommodation.

FIRE-PROTECTING SUSPENDED CEILINGS

~~7.5~~ **5.5** A suspended ceiling can contribute to the overall fire resistance of a floor/ceiling assembly. Such a ceiling should satisfy paragraph ~~7.1~~ 5.1. It should also meet the provisions of Appendix A, Table A3.

FIRE-RESISTING CEILINGS

~~7.6~~ **5.6** Cavity barriers are needed in some concealed floor or roof spaces (see Section ~~10~~ 8), however this need can be reduced by the use of a fire-resisting ceiling below the cavity. Such a ceiling should comply with Diagram ~~35~~ 25.

ROOFLIGHTS

~~7.7~~ **5.7** Rooflights should meet the relevant classification in ~~7.1~~ 5.1. However plastic rooflights with at least a Class 3 rating may be used where ~~7.1~~ 5.1 calls for a higher standard, provided the limitations in Table ~~11~~ 3 and in Table ~~18~~ 7 are observed.

Note: No guidance is currently possible on the performance requirements in the European fire tests as there is no generally accepted test and classification procedure.

SPECIAL APPLICATIONS

~~7.8~~ ~~Air supported structures should comply with the recommendations given in BS 6661 *Guide for the design, construction and maintenance of single skin air supported structures.*~~

~~7.9~~ **5.8** Any flexible membrane covering a structure (other than an air supported structure) should comply with the recommendations given in Appendix A of BS 7157: *Method of test for ignitability of fabrics used in the construction of large tented structures.*

~~7.10~~ **5.9** Guidance on the use of PTFE-based materials for tension-membrane roofs and structures is given in a BRE report *Fire safety of PTFE-based materials used in buildings* (BR 274, BRE 1994).

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Thermoplastic materials

GENERAL

~~7.11~~ **5.10** Thermoplastic materials (see Appendix A, paragraph 17) which cannot meet the performance given in Table ~~10~~ 2, can nevertheless be used in windows, rooflights and lighting diffusers in suspended ceilings if they comply with the provisions described in paragraphs ~~7.12~~ 5.11–~~7.16~~ 5.15 below. Flexible thermoplastic material may be used in panels to form a suspended ceiling if it complies with the guidance in paragraph ~~7.17~~–5.16. The classifications used in paragraphs ~~7.12~~ 5.11–~~7.17~~ 5.16, Table ~~11~~ 3 and Diagram ~~24~~ 17 are explained in Appendix A, paragraph 20.

Note: No guidance is currently possible on the performance requirements in the European fire tests as there is no generally accepted test and classification procedure.

WINDOWS AND INTERNAL GLAZING

~~7.12~~ **5.11** External windows to rooms (though not to circulation spaces) may be glazed with thermoplastic materials, if the material can be classified as a TP(a) rigid product.

Internal glazing should meet the provisions in paragraph ~~7.1~~ 5.1.

Notes:

1. A 'wall' does not include glazing in a door (see paragraph ~~7.2~~ 5.2).

2. Attention is drawn to the guidance on the safety of glazing in Approved Document N *Glazing – safety in relation to impact, opening and cleaning*.

ROOFLIGHTS

~~7.13~~ **5.12** Rooflights to rooms and circulation spaces (with the exception of protected stairways) may be constructed of a thermoplastic material if:

a. the lower surface has a TP(a) (rigid) or TP(b) classification

b. the size and disposition of the rooflights accords with the limits in Table ~~11~~ 3 and with the guidance to B4 in Table ~~19~~ 8.

LIGHTING DIFFUSERS

~~7.14~~ **5.13** The following provisions apply to lighting diffusers which form part of a ceiling, and are not concerned with diffusers of light fittings which are attached to the soffit of, or suspended beneath a ceiling (see Diagram ~~23~~ 16).

Lighting diffusers are translucent or open-structured elements that allow light to pass through. They may be part of a luminaire or used below rooflights or other sources of light.

~~7.15~~ **5.14** Thermoplastic lighting diffusers should not be used in fire-protecting or fire-resisting ceilings, unless they have been satisfactorily tested as part of the ceiling system that is to be used to provide the appropriate fire protection.

~~7.16~~ **5.15** Subject to the above paragraphs, ceilings to rooms and circulation spaces (but not protected stairways) may incorporate thermoplastic lighting diffusers if the following provisions are observed.

a. Wall and ceiling surfaces exposed within the space above the suspended ceiling (other than the upper surfaces of the thermoplastic panels) should comply with the general provisions of paragraph ~~7.1~~ 5.1, according to the type of space below the suspended ceiling.

b. If the diffusers are of classification TP(a) (rigid), there are no restrictions on their extent.

c. If the diffusers are of classification TP(b), they should be limited in extent as indicated in Table ~~11~~ 3 and Diagram ~~24~~ 17.

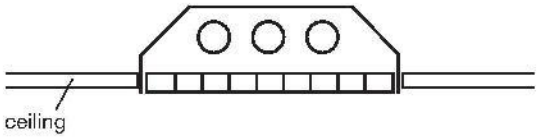
SUSPENDED OR STRETCHED-SKIN CEILINGS

~~7.17~~ **5.16** The ceiling of a room may be constructed either as a suspended or stretched skin membrane from panels of a thermoplastic material of the TP(a) flexible classification, provided that it is not part of a fire-resisting ceiling. Each panel should not exceed 5m² in area and should be supported on all its sides.

Diagram 23 16 Lighting diffuser in relation to ceiling

See paragraph 5.13

a. DIFFUSER FORMING PART OF CEILING



b. DIFFUSER IN FITTING BELOW AND NOT FORMING PART OF CEILING

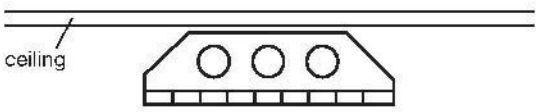


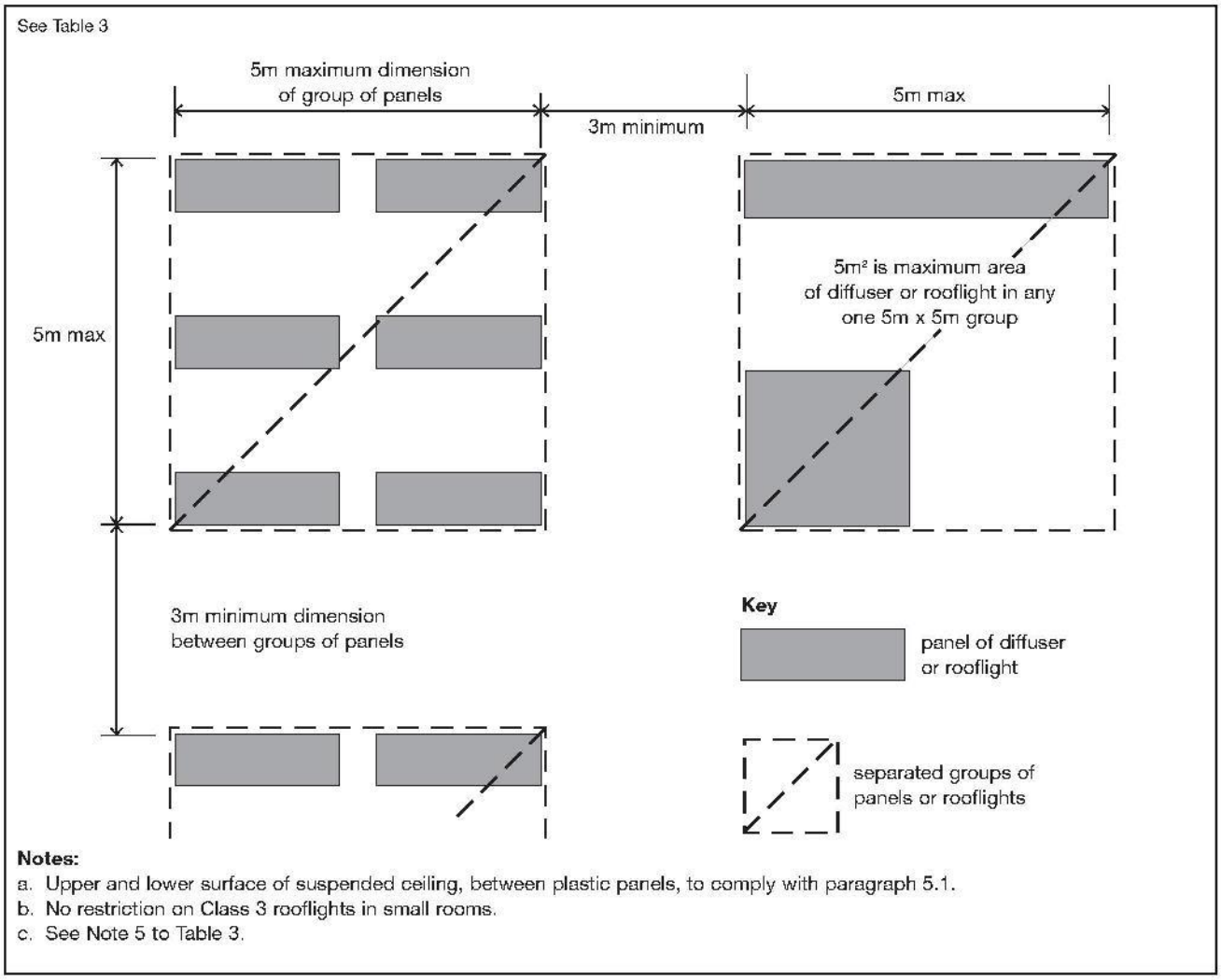
Table ~~11~~ 3 Limitations applied to thermoplastic rooflights and lighting diffusers in suspended ceilings and Class 3 plastic rooflights

Minimum classification of lower surface	Use of space below the diffusers or rooflight	Maximum area of each diffuser panel or rooflight (1) (m^2)	Max. total area of diffuser panels and rooflights as percentage of floor area of the space in which the ceiling is located (%)	Minimum separation distance between diffuser panels or rooflights (1) (m)
TP(a)	any except protected stairway	No limit (2)	No limit	No limit
Class 3 (3) or TP(b)	rooms	5	50 (4)(5)	3 (5)
	circulation spaces except protected stairways	5	15 (4)	3

Notes:

1. Smaller panels can be grouped together provided that the overall size of the group and the space between one group and any others satisfies the dimensions shown in Diagram 24 17.
2. Lighting diffusers of TP(a) flexible rating should be restricted to panels of not more than 5 sq.m each, see paragraph ~~7.17~~ 5.16.
3. There are no limits on Class 3 material in small rooms.
4. The minimum 3m separation specified in Diagram 24 17 between each 5m^2 must be maintained. Therefore, in some cases it may not also be possible to use the maximum percentage quoted.
5. Class 3 rooflights to rooms in industrial and other non-residential purpose groups may be spaced 1800mm apart provided the rooflights are evenly distributed and do not exceed 20% of the area of the room.

Diagram 24 17 Layout restrictions on Class 3 plastic rooflights, TP(b) rooflights and TP(b) lighting diffusers



Notes:

a. Upper and lower surface of suspended ceiling, between plastic panels, to comply with paragraph 5.1.
b. No restriction on Class 3 rooflights in small rooms.
c. See Note 5 to Table 3.

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B3: Internal fire spread (structure)

The Requirement

This Approved Document deals with the following Requirement from Part B of Schedule 1 to the Building Regulations 2000 (as amended).

Requirement	*Limits on application*
Internal fire spread (structure) B3.-(1) The building shall be designed and constructed so that, in the event of fire, its stability will be maintained for a reasonable period. (2) A wall common to two or more buildings shall be designed and constructed so that it adequately resists the spread of fire between those buildings. For the purposes of this sub-paragraph a house in a terrace and a semi-detached house are each to be treated as a separate building. (3) To inhibit the spread of fire within the building, it shall be sub-divided with fire-resisting construction to an extent appropriate to the size and intended use of the building. (4) The building shall be designed and constructed so that the unseen spread of fire and smoke within concealed spaces in its structure and fabric is inhibited.	Requirement B3(3) does not apply to material alterations to any prison provided under Section 33 of the Prisons Act 1952.

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Guidance

Performance

In the Secretary of State's view the Requirements of B3 will be met:

a. if the loadbearing elements of structure of the building are capable of withstanding the effects of fire for an appropriate period without loss of stability;

b. if the building is sub-divided by elements of fire-resisting construction into compartments;

c. if any openings in fire-separating elements (see Appendix E) are suitably protected in order to maintain the integrity of the element (i.e. the continuity of the fire separation); and

d. if any hidden voids in the construction are sealed and sub-divided to inhibit the unseen spread of fire and products of combustion, in order to reduce the risk of structural failure, and the spread of fire, in so far as they pose a threat to the safety of people in and around the building.

The extent to which any of these measures are necessary is dependent on the use of the building, and in some cases its size, and on the location of the element of construction.

Introduction

B3.i Guidance on loadbearing elements of structure is given in Section ~~8~~ 6. Section ~~9~~ 7 is concerned with the sub-division of a building into compartments, and Section ~~10~~ 8 makes provisions about concealed spaces (or cavities). Section ~~11~~ 9 gives information on the protection of openings and on fire-stopping which relates to compartmentation and to fire spread in concealed spaces. Section ~~12~~ 10 is concerned with special measures which apply to car parks ~~and shopping complexes~~. Common to all these sections, and to other provisions of Part B, is the property of fire resistance.

FIRE RESISTANCE

B3.ii The fire resistance of an element of construction is a measure of its ability to withstand the effects of fire in one or more ways, as follows:

a. resistance to collapse, i.e. the ability to maintain loadbearing capacity (which applies to loadbearing elements only);

b. resistance to fire penetration, i.e. an ability to maintain the integrity of the element; and

c. resistance to the transfer of excessive heat, i.e. an ability to provide insulation from high temperatures.

B3.iii 'Elements of structure' is the term applied to the main structural loadbearing elements, such as structural frames, floors and loadbearing walls. Compartment walls are treated as elements of structure although they are not necessarily loadbearing. Roofs, unless they serve the function of a floor, are not treated as elements of structure. External walls such as curtain walls or other forms of cladding which transmit only self weight and wind loads and do not transmit floor load are not regarded as loadbearing for the purposes of B3.ii(a) although they may need fire resistance to satisfy requirement B4 (see Sections ~~13–14~~ 11–12).

Loadbearing elements may or may not have a fire-separating function. Similarly, fire-separating elements may or may not be loadbearing.

Guidance elsewhere in the Approved Document concerning fire resistance

B3.iv There is guidance in Sections 2–~~6~~ 4 concerning the use of fire-resisting construction to protect means of escape. There is guidance in Section ~~13~~ 11 about fire resistance of external walls to restrict the spread of fire between buildings. There is guidance in Section ~~18~~ 16 about fire resistance in the construction of firefighting shafts. Appendix A gives information on methods of test and performance for elements of construction. Appendix B gives information on fire doors. Appendix C gives information on methods of measurement. Appendix D gives information on purpose group classification. Appendix E gives definitions.

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~~SECTION 8:~~ SECTION 6: Loadbearing elements of structure

Introduction

~~8.1~~ 6.1 Premature failure of the structure can be prevented by provisions for loadbearing elements of structure to have a minimum standard of fire resistance, in terms of resistance to collapse or failure of loadbearing capacity. The purpose in providing the structure with fire resistance is threefold, namely:

a. to minimise the risk to the occupants, some of whom may have to remain in the building for some time while evacuation proceeds if the building is a large one;

b. to reduce the risk to firefighters, who may be engaged on search or rescue operations; and

c. to reduce the danger to people in the vicinity of the building, who might be hurt by falling debris or as a result of the impact of the collapsing structure on other buildings.

Fire resistance standard

~~8.2~~ 6.2 Structural frames, beams, columns, loadbearing walls (internal and external), floor structures and gallery structures, should have at least the fire resistance given in Appendix A, Table A1.

APPLICATION OF THE FIRE RESISTANCE STANDARDS FOR LOADBEARING ELEMENTS

~~8.3~~ 6.3 The measures set out in Appendix A include provisions to ensure that where one element of structure supports or gives stability to another element of structure, the supporting element has no less fire resistance than the other element (see notes to Table A2). The measures also provide for elements of structure that are common to more than one building or compartment, to be constructed to the standard of the greater of the relevant provisions. Special provisions about fire resistance of elements of structure in single storey buildings are also given, and there are concessions in respect of fire resistance of elements of structure in basements where at least one side of the basement is open at ground level.

EXCLUSIONS FROM THE PROVISIONS FOR ELEMENTS OF STRUCTURE

~~8.4~~ **6.4** The following are excluded from the definition of element of structure for the purposes of these provisions:

a. structure that only supports a roof, unless:

i. the roof performs the function of a floor, such as for parking vehicles, or as a means of escape (see Sections 2–~~6~~ 4), or

ii. the structure is essential for the stability of an external wall which needs to have fire resistance;

b. the lowest floor of the building; and

c. a platform floor.

~~d. a loading gallery, fly gallery, stage grid, lighting bridge, or any gallery provided for similar purposes or for maintenance and repair (see definition of "Element of structure" in Appendix E).~~

ADDITIONAL GUIDANCE

~~8.5~~ **6.5** Guidance in other sections of this Approved Document may also apply if a loadbearing wall is:

a. a compartment wall (this includes a wall common to two buildings), (see Section ~~9~~ 7);

b. a wall between a house and a domestic garage, (see Section ~~9~~ 7, paragraph ~~9.14~~ 7.14);

c. a wall enclosing a place of special fire hazard (see Section ~~9~~ 7, paragraph ~~9.12~~ 7.12);

d. protecting a means of escape, (see Sections 2–~~6~~ 4);

e. an external wall, (see Sections ~~13~~ 11 ~~14~~ 12); or

f. enclosing a firefighting shaft, (see Section ~~18~~ 16).

~~8.6~~ **6.6** If a floor is also a compartment floor, see Section ~~9~~ 7.

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Floors in ~~domestic~~ loft conversions

~~8.7~~ 6.7 In altering an existing two storey single family dwellinghouse to provide additional storeys, the provisions in this Approved Document are for the floor(s), both old and new, to have the full 30 minute standard of fire resistance shown in Appendix A, Table A1. However, provided that the following conditions are satisfied, namely:

a. only one storey is being added;

b. the new storey contains no more than 2 habitable rooms; and

c. the total area of the new storey does not amount to more than 50m²;

then the existing first floor construction may be accepted if it has at least a modified 30 minute standard of fire resistance, in those places where

~~d.~~ the floor separates only rooms (and not circulation spaces).~~; provided that~~

~~e. the particular provisions for loft conversions in Section 2, paragraphs 2.17–2.26, are met.~~

Notes:

1. The 'modified 30 minute' standard satisfies the test criteria for the full 30 minutes in respect of loadbearing capacity, but allows reduced performances for integrity and insulation (see Appendix A, Table A1, item 3(a)).

2. Sub-paragraph (d) above means that the floor needs a full 30 minutes standard where it forms part of the enclosures to the circulation space between the loft conversion and the final exit.

Conversion to ~~flats~~ apartments

~~8.10~~ 6.8 Where an existing house or other building is converted into flats there is a material change of use to which Part B of the regulations applies. Where the existing building has timber floors and these are to be retained, the relevant provisions for fire resistance may be difficult to meet.

~~8.11~~ 6.9 Provided that the means of escape conform to Section 3, and are adequately protected, a 30 minute standard of fire resistance could be accepted for the elements of structure in a building having not more than 3 storeys.

Where the altered building has 4 or more storeys the full standard of fire resistance given in Appendix A would normally be necessary.

~~SECTION 9:~~ SECTION 7: Compartmentation

Introduction

~~9.1~~ 7.1 The spread of fire within a building can be restricted by sub-dividing it into compartments separated from one another by walls and/or floors of fire-resisting construction. The object is twofold:

a. to prevent rapid fire spread which could trap occupants of the building; and

b. to reduce the chance of fires becoming large, on the basis that large fires are more dangerous, not only to occupants and fire service personnel, but to people in the vicinity of the building. Compartmentation is complementary to provisions made in Sections 2–~~6~~ 4 for the protection of escape routes, and to provisions made in Sections ~~13–15~~ 11-13 against the spread of fire between buildings.

~~9.2~~ 7.2 The appropriate degree of sub-division depends on:

a. the use of, and fire load in, the building, which affects the potential for fires and the severity of fires, as well as the ease of evacuation;

b. the height to the floor of the top storey in the building, which is an indication of the ease of evacuation and the ability of the fire service to intervene effectively; and

c. the availability of a sprinkler system which affects the growth rate of the fire, and may suppress it altogether.

~~9.3~~ 7.3 Sub-division is achieved using compartment walls and compartment floors. The circumstances in which they are needed are given in paragraphs ~~9.9 to 9.20~~ 7.9–7.15.

~~9.4~~ 7.4 Provisions for the construction of compartment walls and compartment floors are given in paragraphs ~~9.21~~ 7.17 et seq. These construction provisions vary according to the function of the wall or floor.

SPECIAL FORMS OF COMPARTMENTATION

~~9.5~~ 7.5 Special forms of compartmentation to which particular construction provisions apply, are:

a. walls common to two or more buildings, see paragraph ~~9.23~~ 7.18;

b. walls dividing buildings into separated parts, see paragraph ~~9.24~~ 7.19;

c. construction enclosing places of special fire hazard, see paragraph ~~9.12~~ 7.12; and

d. construction protecting houses from attached or integral domestic garages, see paragraph ~~9.14~~ 7.14.

JUNCTIONS

~~9.6~~ 7.6 For compartmentation to be effective, there should be continuity at the junctions of the fire-resisting elements enclosing a compartment, and any openings from one compartment to another should not present a weakness.

PROTECTED SHAFTS

~~9.7~~ 7.7 Spaces that connect compartments, such as stairways and service shafts, need to be protected to restrict fire spread between the compartments, and they are termed protected shafts. Any walls or floors bounding a protected shaft are considered to be compartment walls or floors, for the purpose of this Approved Document.

BUILDINGS CONTAINING ONE OR MORE ATRIA

~~9.8~~ 7.8 Detailed advice on all issues relating to the incorporation of atria in buildings is given in BS 5588: Part 7 *Fire precautions in the design, construction and use of buildings, Code of practice for the incorporation of atria in buildings.* However it should be noted that for the purposes of Approved Document B, the standard is relevant only where the atrium breaches any compartmentation.

Provision of compartmentation

GENERAL

~~9.9~~ 7.9 Compartment walls and compartment floors should be provided in the circumstances described below, with the proviso that the lowest floor in a building does not need to be constructed as a compartment floor. Paragraphs ~~9.10–9.20~~ 7.10–7.15 give guidance on the provision of compartmentation in different building types. Information on the construction of compartment walls and compartment floors in different circumstances is given in paragraphs ~~9.21~~ 7.17 et seq. Provisions for the protection of openings in compartment walls and compartment floors are given in paragraphs ~~9.33~~ 7.29 et seq.

ALL PURPOSE GROUPS

~~9.10~~ **7.10** A wall common to two or more buildings should be constructed as a compartment wall.

~~9.11~~ **7.11** Parts of a building that are occupied mainly for different purposes should be separated from one another by compartment walls and/or compartment floors. This does not apply where one of the different purposes is ancillary to the other. Refer to Appendix D for guidance on whether a function should be regarded as ancillary or not.

PLACES OF SPECIAL FIRE HAZARD

~~9.12~~ **7.12** Every place of special fire hazard (see Appendix E) should be enclosed with fire-resisting construction; see Table A1, item 15.

Note: Any such walls and floors are not compartment walls and compartment floors.

HOUSES

~~9.13~~ **7.13** Every wall separating semi-detached houses, or houses in terraces, should be constructed as a compartment wall, and the houses should be considered as separate buildings.

~~9.14~~ **7.14** If a domestic garage is attached to (or forms an integral part of) a house, the garage should be separated from the rest of the house, as shown in Diagram ~~25~~ 18.

Note: The walls and floors shown in Diagram ~~25~~ 18 are not compartment walls and compartment floors and the 100mm difference in level between the garage floor and the door opening is to prevent any leakage of petrol vapour into the dwelling.

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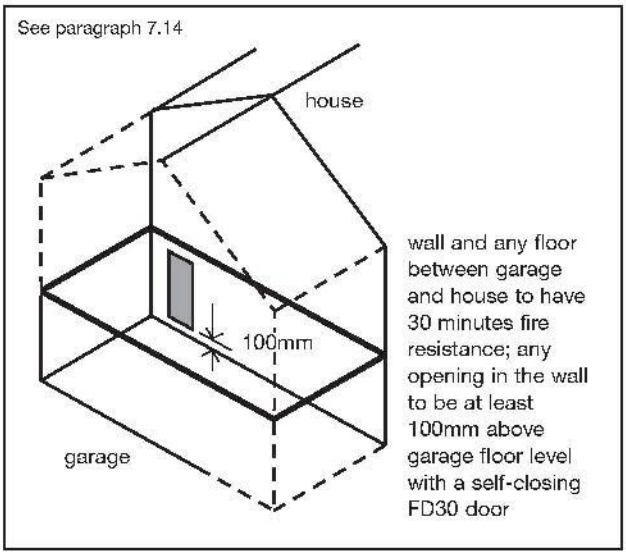
Diagram ~~25~~ 18 (Amended) **Separation between garage and dwellinghouse**



~~FLATS~~ APARTMENTS

~~9.15~~ 7.15 In buildings containing ~~flats or maisonettes~~ apartments the following should be constructed as compartment walls or compartment floors:

a. every floor (unless it is within ~~a maisonette~~ an apartment, i.e. between one storey and another within one dwelling); and

b. every wall separating ~~a flat or maisonette~~ an apartment from any other part of the building; and

Note: 'any other part of the building' does not include an external balcony/deck access.

c. every wall enclosing a refuse storage chamber.

7.16 Apartment buildings with a floor more than 30m above ground level should be fitted throughout with a sprinkler system in accordance with BS 9251: *Sprinkler systems for residential and domestic occupancies. Code of practice.*

Whilst the ODPM is minded to introduce the above provision for sprinklers in taller apartment buildings, this will be dependent on the final Regulatory Impact Assessment showing that it would be justified. Consultees' views on this matter are particularly sought.

Construction of compartment walls and compartment floors

GENERAL

9.22
7.17 Every compartment wall and compartment floor should:

a. form a complete barrier to fire between the compartments they separate; and

b. have the appropriate fire resistance as indicated in Appendix A, Tables A1 and A2.

Note: Timber beams, joists, purlins and rafters may be built into or carried through a masonry or concrete compartment wall if the openings for them are kept as small as practicable and then fire-stopped. If trussed rafters bridge the wall, they should be designed so that failure of any part of the truss due to a fire in one compartment will not cause failure of any part of the truss in another compartment.

COMPARTMENT WALLS BETWEEN BUILDINGS

9.23
7.18 Compartment walls that are common to two or more buildings should run the full height of the building in a continuous vertical plane. Thus adjoining buildings should only be separated by walls, not floors.

SEPARATED PARTS OF BUILDINGS

9.24
7.19 Compartment walls used to form a separated part of a building (so that the separated parts can be assessed independently for the purpose of determining the appropriate standard of fire resistance) should run the full height of the building in a continuous vertical plane. The two separated parts can have different standards of fire resistance.

OTHER COMPARTMENT WALLS

9.25
7.20 Compartment walls not described in the previous two paragraphs should run the full height of the storey in which they are situated.

9.26
7.21 Compartment walls in a top storey beneath a roof should be continued through the roof space (see definition of compartment in Appendix E).

JUNCTION OF COMPARTMENT WALL OR COMPARTMENT FLOOR WITH OTHER WALLS

~~9.27~~ **7.22** Where a compartment wall or compartment floor meets another compartment wall, or an external wall, the junction should maintain the fire resistance of the compartmentation. Fire-stopping should meet the provisions of paragraphs 9.13–9.14.

7.23 At the junction of a compartment floor with an external wall that has no fire resistance (such as a curtain wall) the external wall should be restrained at floor level to reduce the movement of the wall away from the floor when exposed to fire.

7.24 Compartment walls should be able to accommodate the predicted deflection of the floor above by either:

a. having a suitable head detail between the wall and the floor that can deform but maintain integrity when exposed to a fire; or

b. the wall may be designed to resist the additional vertical load from the floor above as it sags under fire conditions and thus maintain integrity.

Note: Where compartment walls are located within the middle half of a floor span the predicted deflection should be assumed to be span/100 unless a smaller value can be justified by assessment. Outside this area the limit can be reduced linearly to zero at the supports. For unprotected steel beams span/30 should be adopted.

The additional provision to accommodate deflection is based on recent research which shows that deflection can significantly affect the stability of compartment walls.

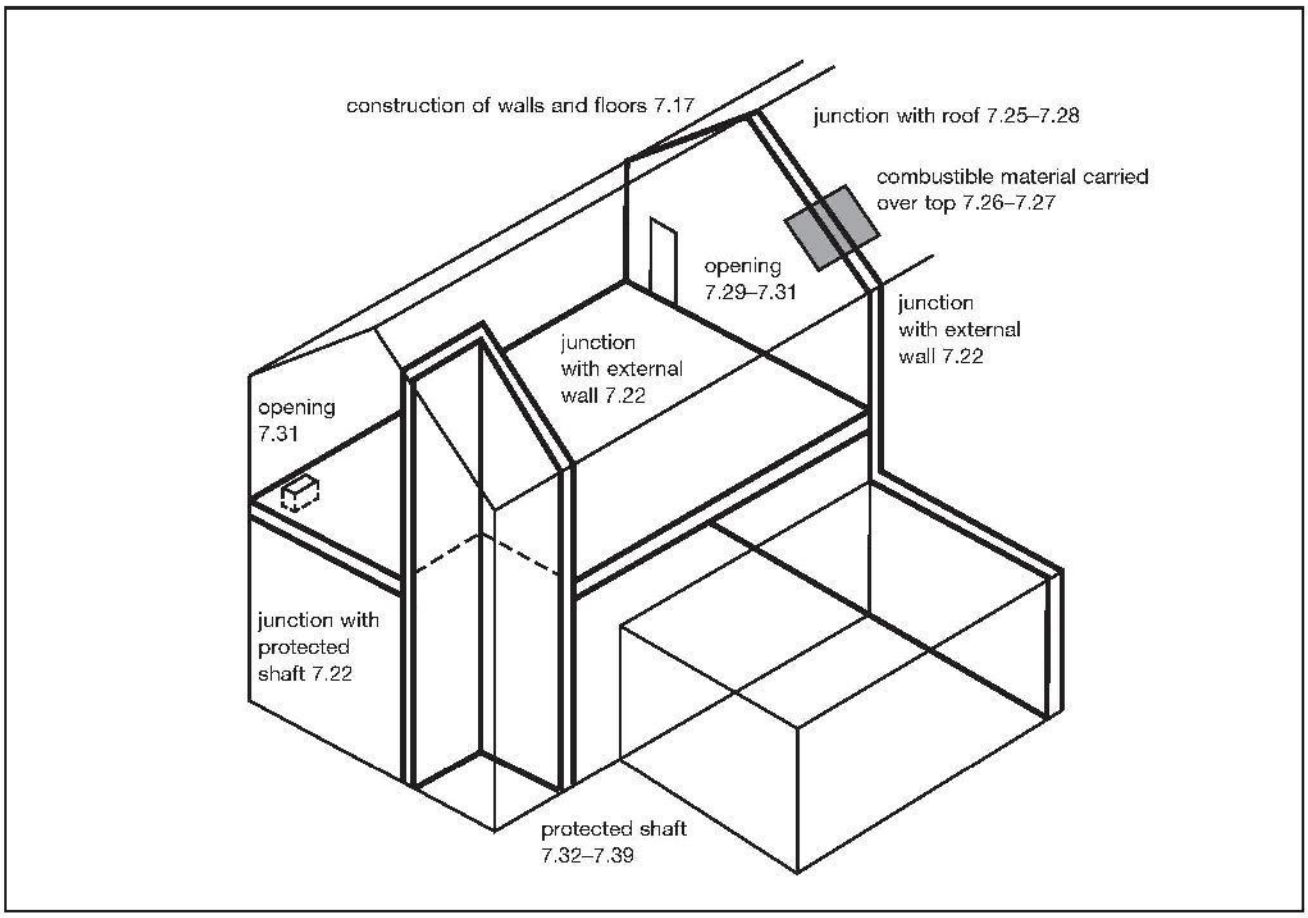
JUNCTION OF COMPARTMENT WALL WITH ROOF

~~9.28~~ **7.25** A compartment wall should be taken up to meet the underside of the roof covering or deck, with fire-stopping where necessary at the wall/roof junction to maintain the continuity of fire resistance. The compartment wall should also be continued across any eaves cavity (see paragraph ~~9.22a~~ 7.17a).

~~9.29~~ **7.26** If a fire penetrates a roof near a compartment wall there is a risk that it will spread over the roof to the adjoining compartment. To reduce this risk, and subject to ~~9.30~~ 7.27, a zone of the roof 1500mm wide on either side of the wall should have a covering of designation AA, AB or AC (see Appendix A, paragraph 6) on ~~a~~ any substrate or deck of a material of limited combustibility, as set out in Diagram ~~28a~~ 20a (page 117).

Note: Double skinned insulated roof sheeting should incorporate a band of material of limited combustibility.

Diagram ~~27~~ 19 **Compartment walls and compartment floors with reference to relevant paragraphs in Section 9 7**



~~9.30~~ 7.27 In buildings not more than 15m high, ~~of the purpose groups listed below,~~ combustible boarding used as a substrate to the roof covering, wood wool slabs, or timber tiling battens, may be carried over the compartment wall provided that they are fully bedded in mortar or other suitable material over the width of the wall (see Diagram ~~28b~~ 20b). ~~This applies to: Dwellinghouses, buildings or compartments in Residential use (other than Institutional), Office buildings, Assembly and recreation buildings.~~

~~9.31~~ 7.28 As an alternative to ~~9.29~~ 7.26 or ~~9.30~~ 7.27 the compartment wall may be extended up through the roof for a height of at least 375mm above the top surface of the adjoining roof covering (see Diagram ~~28c~~ 20c).

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Openings in compartmentation

OPENINGS IN COMPARTMENT WALLS SEPARATING BUILDINGS OR OCCUPANCIES

~~9.33~~ 7.29 Any openings in a compartment wall which is common to two or more buildings, or between different occupancies in the same building, should be limited to those for:

a. a door which is needed to provide a means of escape in case of fire and which has the same fire resistance as that required for the wall (see Appendix B, Table B1) and is fitted in accordance with the provisions of Appendix B; and

b. the passage of a pipe which meets the provisions in Section ~~11~~ 9.

DOORS

~~9.34~~ 7.30 Information on fire doors may be found in Appendix B.

OPENINGS IN OTHER COMPARTMENT WALLS OR IN COMPARTMENT FLOORS

~~9.35~~ 7.31 Openings in compartment walls (other than those described in paragraph ~~9.33~~ 7.29) or compartment floors should be limited to those for:

a. doors which have the appropriate fire resistance given in Appendix B, Table B1, and are fitted in accordance with the provisions of Appendix B;

b. the passage of pipes, ventilation ducts, service cables, chimneys, appliance ventilation ducts or ducts encasing one or more flue pipes, which meet the provisions in Section ~~11~~ 9;

c. refuse chutes of non-combustible construction;

d. atria designed in accordance with BS 5588: Part 7; and

e. protected shafts which meet the relevant provisions below.

Protected shafts

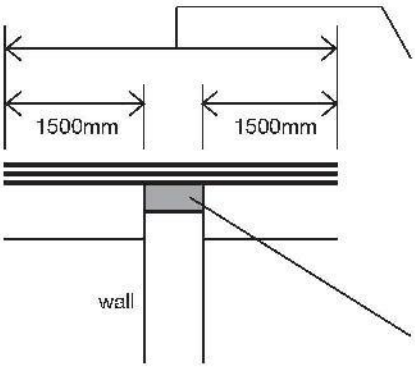
~~9.36~~ 7.32 Any stairway or other shaft passing directly from one compartment to another should be enclosed in a protected shaft so as to delay or prevent the spread of fire between compartments.

There are additional provisions in Sections 2–~~6~~ 4 for protected shafts that are protected stairways, and in Section ~~18~~ 16 if the stairway also serves as a firefighting stair.

Diagram ~~28~~ 20 (Amended) **Junction of compartment wall with roof**

See paragraphs 7.25–7.28

a. ANY BUILDING OR COMPARTMENT



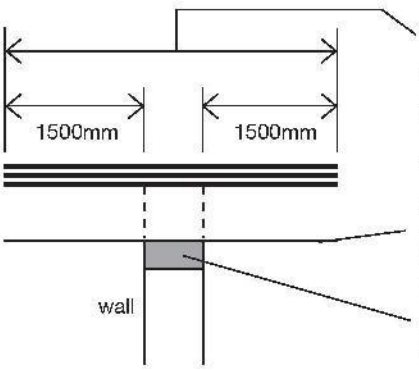
Roof covering over this distance to be designated AA, AB or AC on deck of material of limited combustibility. Roof covering and deck could be composite structure, e.g. profiled steel cladding.

Double-skinned insulated roof sheeting should incorporate a band of material of limited combustibility at least 300mm wide centred over the wall.

If roof support members pass through the wall, fire protection to these members for a distance of 1500mm on either side of the wall may be needed to delay distortion at the junction (see note to paragraph 7.17).

Resilient fire-stopping to be carried up to underside of roof covering e.g. roof tiles.

b. DWELLINGHOUSE AND BUILDING OR COMPARTMENT IN RESIDENTIAL (NOT INSTITUTIONAL), OFFICE OR ASSEMBLY USE and not more than 15m high



Roof covering to be designated AA, AB or AC for at least this distance.

Boarding (used as a substrate), wood wool slabs or timber tiling battens may be carried over the wall provided that they are fully bedded in mortar (or other no less suitable material) where over the wall.

Sarking felt may also be carried over the wall.

If roof support members pass through the wall, fire protection to these members for a distance of 1500mm on either side of the wall may be needed to delay distortion at the junction (see note to paragraph 7.17).

Fire-stopping to be carried up to underside of roof covering, boarding or slab.

c. ANY BUILDING OR COMPARTMENT

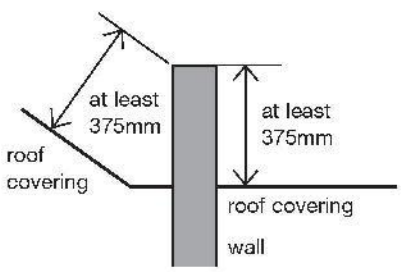
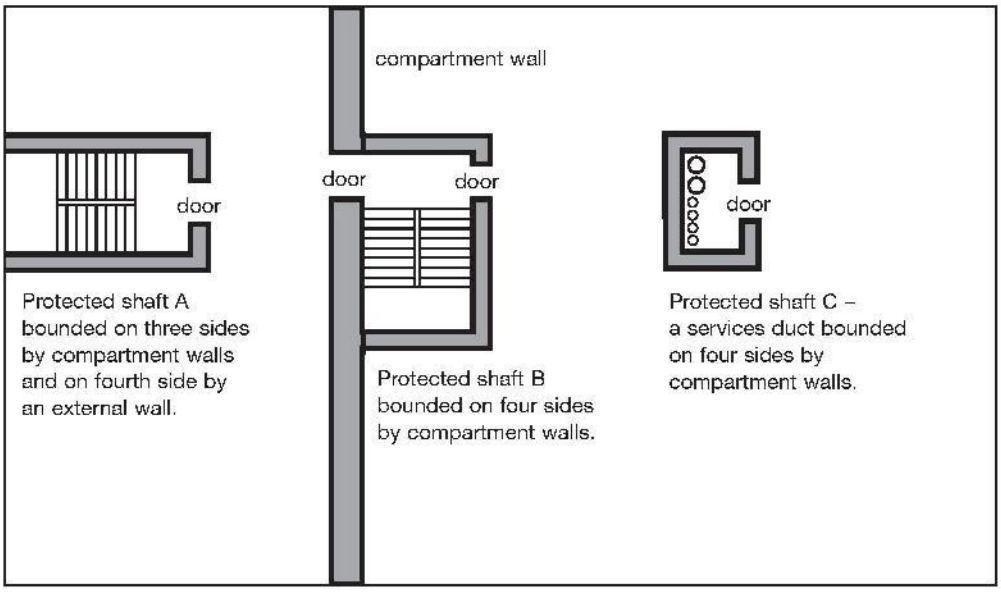


Diagram ~~29~~ 21 **Protected shafts**

See paragraphs 7.32–7.34

Protected shafts provide for the movement of people (e.g. stairs, lifts), or for passage of goods, air or services such as pipes or cables between different compartments. The elements enclosing the shaft (unless formed by adjacent external walls) are compartment walls and floors. The diagram shows three common examples which illustrate the principles.



The shaft structure (including any openings) should meet the relevant provisions for compartment walls see paragraphs 7.17–7.36, external walls see Sections 11–12 and Diagram 14.

USES FOR PROTECTED SHAFTS

~~9.37~~ 7.33 The uses of protected shafts should be restricted to stairs, lifts, escalators, chutes, ducts, and pipes. Sanitary accommodation and washrooms may be included in protected shafts.

CONSTRUCTION OF PROTECTED SHAFTS

~~9.38~~ 7.34 The construction enclosing a protected shaft (see Diagram ~~29~~ 21) should:

a. form a complete barrier to fire between the different compartments which the shaft connects;

b. have the appropriate fire resistance given in Appendix A, Table A1, except for uninsulated glazed screens which meet the provisions of paragraph ~~9.39~~ 7.35; and

c. satisfy the provisions about their ventilation and the treatment of openings in paragraphs ~~9.42~~ 7.38 et seq.

UNINSULATED GLAZED SCREENS TO PROTECTED SHAFTS

~~9.39~~ 7.35 If the conditions given below and described in Diagram ~~30~~ 22 are satisfied, an uninsulated glazed screen may be incorporated in the enclosure to a protected shaft between a stair and a lobby or corridor which is entered from the stair. The conditions to be satisfied are:

a. the standard of fire resistance for the stair enclosure is not more than 60 minutes; and

b. the protected shaft is not a firefighting shaft (if it is, refer to BS 5588: Part 5 *Fire precautions in the design, construction and use of buildings, Code of practice for firefighting stairs and lifts*, clauses on construction);

c. the glazed screen:

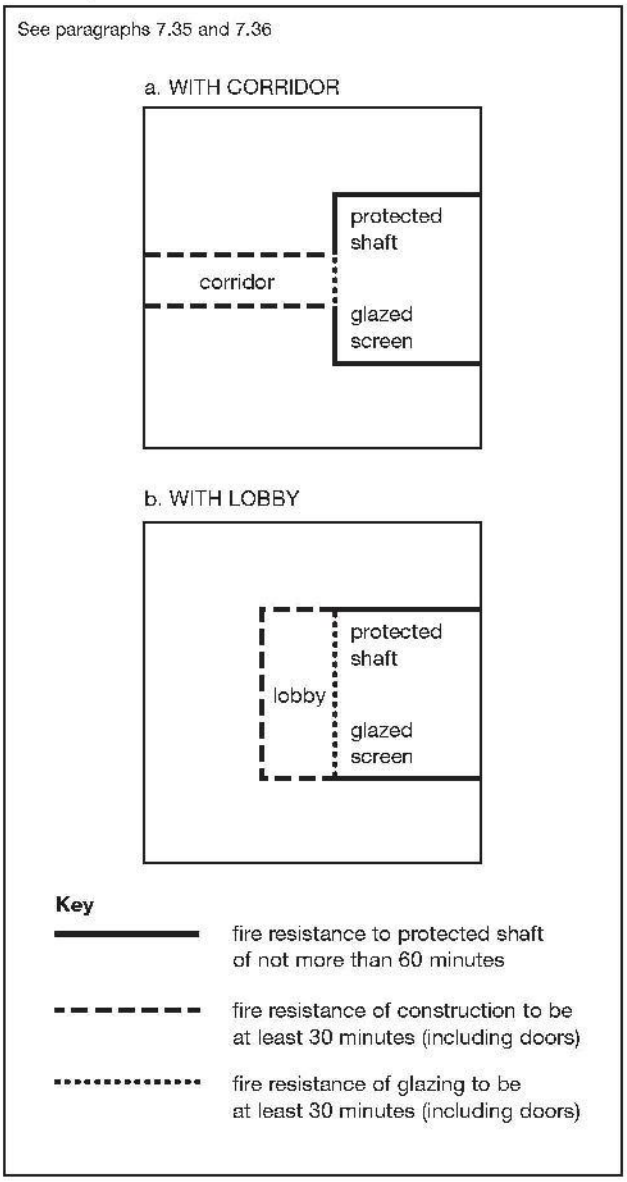
   i. has at least 30 minutes fire resistance, in terms of integrity, and

   ii. meets the guidance in Appendix A, Table A4, on the limits on areas of uninsulated glazing; and

d. the lobby or corridor is enclosed to at least a 30 minute standard.

~~9.40~~ 7.36 Where the measures in Diagram ~~30~~ 22 to protect the lobby or corridor, are not provided, the enclosing walls should comply with Appendix A, Table A1 (item 8c) and the doors with the guidance in Appendix A, Table A4.

Diagram 30 22 Uninsulated glazed screen separating protected shaft from lobby or corridor



PIPES FOR OIL OR GAS, AND VENTILATING DUCTS, IN PROTECTED SHAFTS

~~9.41~~ 7.37 If a protected shaft contains a stair and/or a lift, it should not also contain a pipe conveying oil (other than in the mechanism of a hydraulic lift) or contain a ventilating duct (other than a duct provided for the purposes of pressurizing the stairway to keep it smoke free or a duct provided solely for ventilating the stairway).

Any pipe carrying natural gas or LPG in such a shaft should be of screwed steel or of all welded steel construction, installed in accordance with the Pipelines Safety Regulations 1996, SI 1996 No 825, and the Gas Safety (Installation and Use) Regulations 1998, SI 1998 No 2451.

Note: A pipe is not considered to be contained within a protected shaft, if the pipe is completely separated from that protected shaft by fire-resisting construction.

VENTILATION OF PROTECTED SHAFTS CONVEYING GAS

~~9.42~~ **7.38** A protected shaft conveying piped flammable gas should be adequately ventilated direct to the outside air by ventilation openings at high and low level in the shaft.

Any extension of the storey floor into the shaft should not compromise the free movement of air over the entire length of the shaft. Guidance on such shafts, including sizing of the ventilation openings, is given in BS 8313: *Code of practice for accommodation of building services in ducts.*

OPENINGS INTO PROTECTED SHAFTS

~~9.43~~ **7.39** Generally an external wall of a protected shaft does not need to have fire resistance.

However, there are some provisions for fire resistance of external walls of firefighting shafts in Section 2 of BS 5588: Part 5: 1991, which is the relevant guidance called up by paragraph ~~18.11~~ 16.9, and of external walls to protected stairways (which may also be protected shafts) in paragraph ~~6.24~~ 4.23.

Openings in other parts of the enclosure to a protected shaft should be limited as follows:

a. Where part of the enclosure to a protected shaft is a wall common to two or more buildings, only the following openings should be made in that wall:

   i. a door which is needed to provide a means of escape in case of fire and which has the same fire resistance as that required for the wall (see Appendix B, Table B1) and is fitted in accordance with the provisions of Appendix B; and/or

   ii. the passage of a pipe which meets the provisions in Section ~~11~~ 9.

b. Other parts of the enclosure (other than an external wall) should only have openings for:

   i. doors which have the appropriate fire resistance given in Appendix B, Table B1, and are fitted in accordance with the provisions of Appendix B;

   ii. the passage of pipes which meet the provisions in Section ~~11~~ 9;

iii. inlets to, outlets from and openings for a ventilation duct, (if the shaft contains or serves as a ventilating duct) which meet the provisions in Section ~~11~~ 9; and/or

iv. the passage of lift cables into a lift machine room (if the shaft contains a lift). If the machine room is at the bottom of the shaft, the openings should be as small as practicable.

~~SECTION 10:~~ SECTION 8:
Concealed spaces (cavities)

~~Introduction~~

~~10.1~~ ~~Concealed spaces or cavities in the construction of a building provide a ready route for smoke and flame spread. This is particularly so in the case of voids above other spaces in a building, e.g. above a suspended ceiling or in a roof space. As any spread is concealed, it presents a greater danger than would a more obvious weakness in the fabric of the building. Provisions are made to restrict this by interrupting cavities which could form a pathway around a barrier to fire, sub dividing extensive cavities, and by closing the edges of openings.~~

~~Note:~~ ~~Cavity barriers are not appropriate for use above compartment walls (see paragraph 10.5). See also 'Limitation on requirements' on page 5 which explains the purpose of provisions made in connection with Building Regulations.~~

~~Note on cavities in rain screen cladding and the like:~~ ~~Cavities within an external wall are referred to in this Section, including the drained and ventilated cavities behind the outer cladding in "rainscreen" external wall construction. There are also provisions in paragraphs 13.6 and 13.7 about the construction of external walls which have a bearing on overcladding and rainscreen construction.~~

~~Provision of cavity barriers~~

~~10.2~~ ~~Provisions for cavity barriers are set out in Table 13 against specified locations and purpose groups.~~

~~10.3~~ ~~Table 14 lays down maximum dimensions for undivided concealed spaces.~~

~~10.4~~ ~~Diagram 31 illustrates the need for cavity barriers at the intersection of fire resisting construction and elements containing a concealed space.~~

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Table 13 Provision of cavity barriers

Cavity barriers to be provided:	Purpose group to which the provision applies (1)			
	1b & c Dwelling houses	1a Flat or maisonette	2 Other residential and Institutional	3-7 Office, Shop & Commercial, Assembly & Recreation, Industrial, Storage & Other non-residential
1. At the junction between an external cavity wall and a compartment wall that separates buildings; and at the top of such an external cavity wall. (2)	●	●	●	●
2. Above the enclosures to a protected stairway in a house with a floor more than 4.5m above ground level (see Diagram 33a). (3)	●	○	○	○
3. At the junction between an external cavity wall and every compartment floor and compartment wall. (2)	○	●	●	●
4. At the junction between a cavity wall and every compartment floor, compartment wall, or other wall or door assembly which forms a fire resisting barrier. (2)	○	●	●	●
5. In a protected escape route, above and below any fire-resisting construction which is not carried full storey height, or (in the case of a top storey) to the underside of the roof covering. (3)	○	●	●	●
6. Where the corridor should be sub-divided to prevent fire or smoke affecting two alternative escape routes simultaneously (see paragraph 4.23 & Diagram 34a), above any such corridor enclosures which are not carried full storey height, or (in the case of the top storey) to the underside of the roof covering. (4)	○	○	●	●
7. Above any bedroom partitions which are not carried full storey height, or (in the case of the top storey) to the underside of the roof covering. (3)	○	○	●	○
8. To sub-divide any cavity (including any roof space but excluding any underfloor service void) so that the distance between cavity barriers does not exceed the dimensions given in Table 14.	○	○	●	●
9. Within the void behind the external face of rainscreen cladding at every floor level, and on the line of compartment walls abutting the external wall, of buildings which have a floor 18m or more above ground level.	○	●	●	○
10. At the edges of cavities (including around openings).	●	●	●	●

Key: ● provision applies
○ provision does not apply

Notes:

1. The classification of purpose groups is set out in Appendix D, Table D1.
2. The provisions in items 1, 3 and 4 do not apply where the cavity wall complies with Diagram 32.
3. The provisions in items 2, 5 and 7 do not apply where the cavity is enclosed on the lower side by a fire-resisting ceiling (as shown in Diagram 35) which extends throughout the building, compartment or separated part.
4. The provision of item 6 does not apply where the storey is sub-divided by fire-resisting construction carried full storey height and passing through the line of sub-division of the corridor (see Diagram 34b), or where the cavity is enclosed on the lower side as described in Note 3.

Table 14 **Maximum dimensions of cavities in non-domestic buildings (Purpose Groups 2-7)**

Location of cavity	Class of surface/product exposed in cavity (excluding the surface of any pipe, cable or conduit, or any insulation to any pipe)		Maximum dimensions in any direction (m)
	National class	European class	
Between roof and a ceiling	Any	Any	20
Any other cavity	Class 0 or Class 1	Class A1or Class A2-s3, d2 or Class B-s3, d2 or Class C-s3, d2	20
	Not Class 0 or Class 1	Not any of the above classes	10

Notes:

1 Exceptions to these provisions are given in paragraphs 10.11-10.13.

2 The National classifications do not automatically equate with the equivalent classifications in the European column, therefore products cannot typically assume a European class unless they have been tested accordingly.

3 When a classification includes "s3, d2", this means that there is no limit set for smoke production and/or flaming droplets/particles.

10.5 As compartment walls should be carried up full storey height to a compartment floor or to the roof as appropriate, see paragraphs 7.22-7.25, it is not appropriate to complete a line of compartmentation by fitting cavity barriers above them. Therefore it is important to continue the compartment wall through the cavity to maintain the standard of fire resistance.

Construction and fixings for cavity barriers

10.6 Every cavity barrier should be constructed to provide at least 30 minutes fire resistance (see Appendix A, Table A1, item 16). However, cavity barriers in a stud wall or partition may be formed

10.7 A cavity barrier may be formed by any construction provided for another purpose if it meets the provisions for cavity barriers.

10.8 Cavity barriers should be tightly fitted to rigid construction and mechanically fixed in position wherever possible. Where this is not possible (for example, in the case of a junction with slates, tiles, corrugated sheeting or similar materials) the junction should be fire-stopped. Provisions for fire-stopping are set out in Section [11].

10.9 Cavity barriers should also be fixed so that their performance is unlikely to be made ineffective by:

a. movement of the building due to subsidence, shrinkage or temperature change, and movement of the external envelope due to wind; and

b. collapse in a fire of any services penetrating them; and

c. failure in a fire of their fixings (but see note below); and

d. ~~failure in a fire of any material or construction which they abut. (For example, if a suspended ceiling is continued over the top of a fire-resisting wall or partition, and direct connection is made between the ceiling and the cavity barrier above the line of the wall or partition, premature failure of the cavity barrier can occur when the ceiling collapses. However, this does not arise if the ceiling is designed to provide fire protection of 30 minutes or more.)~~

Note: ~~Where cavity barriers are provided in roof spaces, the roof members to which they are fitted are not expected to have any fire resistance.~~

~~Maximum dimensions of concealed spaces~~

10.10 ~~With the exceptions given in paragraphs 10.11 to 10.13, extensive concealed spaces should be subdivided to comply with the dimensions in Table 14.~~

10.11 ~~The provisions in Table 14 do not apply to any cavity described below:~~

a. ~~in a wall which should be fire-resisting only because it is loadbearing;~~

b. ~~in a masonry or concrete external cavity wall shown in Diagram 32;~~

c. ~~in any floor or roof cavity above a fire-resisting ceiling, as shown in Diagram 35 and which extends throughout the building or compartment, subject to a 30m limit on the extent of the cavity;~~

d. ~~below a floor next to the ground or oversite concrete, if the cavity is less than 1000mm in height or if the cavity is not normally accessible by persons, unless there are openings in the floor such that it is possible for combustibles to accumulate in the cavity (in which case cavity barriers should be provided, and access should be provided to the cavity for cleaning);~~

e. ~~within an underfloor service void;~~

f. ~~formed behind the external skin in rain screen external wall construction, or by overcladding an existing masonry (or concrete) external wall, or an existing concrete roof, provided that the cavity does not contain combustible insulation, and the provisions of Table 13 item 9 are observed; and~~

g. ~~between double skinned corrugated or profiled insulated roof sheeting, if the sheeting is a material of limited combustibility and both surfaces of the insulating layer have a surface spread of flame of at least Class 0 or 1 (National class) or Class C-s3, d2 or better (European class) (see Appendix A) and make contact with the inner and outer skins of cladding (see Diagram 36).~~

Note: When a classification includes "s3, d2", this means that there is no limit set for smoke production and/or flaming droplets/particles.

10.12 Where any room under a ceiling cavity exceeds the dimensions given in Table 14, cavity barriers need only be provided on the line of the enclosing walls/partitions of that room, subject to:

a. the cavity barriers being no more than 40m apart; and

b. the surface of the material/product exposed in the cavity being Class 0 or Class 1 National class) or Class C s3, d2 or better (European class).

Note: When a classification includes "s3, d2", this means that there is no limit set for smoke production and/or flaming droplets/particles.

10.13 Where the concealed space is over an undivided area which exceeds 40m (this may be in both directions on plan) there is no limit to the size of the cavity if:

a. the room and the cavity together are compartmented from the rest of the building;

b. an automatic fire detection and alarm system meeting the relevant recommendations of BS 5839: Part 1 *Fire detection and alarm systems for buildings, Code of practice for system design, installation and servicing* is fitted in the building (however, detectors are not required in the cavity);

c. if the cavity is used as a plenum, the recommendations about recirculating air distribution systems in BS 5588: Part 9 *Fire precautions in the design, construction and use of buildings, Code of practice for ventilation and air conditioning ductwork* are followed;

d. the surface of the material/product used in the construction of the ceiling and which is exposed in the cavity is Class 0 (National class) or Class B-s3, d2 or better (European class) and the supports and fixings in the cavity are of non combustible construction;

Note: When a classification includes "s3, d2", this means that there is no limit set for smoke production and/or flaming droplets/particles.

e. the flame spread rating of any pipe insulation system is Class 1;

f. any electrical wiring in the void is laid in metal trays, or in metal conduit; and

g. any other materials in the cavity are of limited combustibility.

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~~Openings in cavity barriers~~

~~10.14~~ ~~Any openings in a cavity barrier (except barriers identified in Table 13, item 7) should be limited to those for:~~

~~a. doors which have at least 30 minutes fire resistance (see Appendix B, Table B1, item 8(a)) and are fitted in accordance with the provisions of Appendix B;~~

~~b. the passage of pipes which meet the provisions in Section 11;~~

~~c. the passage of cables or conduits containing one or more cables;~~

~~d. openings fitted with a suitably mounted automatic fire damper; and~~

~~e. ducts which (unless they are fire resisting) are fitted with a suitably mounted automatic fire damper where they pass through the cavity barrier.~~

This section has been redrafted in order to provide greater clarity.

Introduction

8.1 Concealed spaces or cavities in the construction of a building provide a ready route for smoke and flame spread e.g. in walls, floors, ceilings and roofs. As any spread is concealed, it presents a greater danger than would a more obvious weakness in the fabric of the building.

Provision of cavity barriers

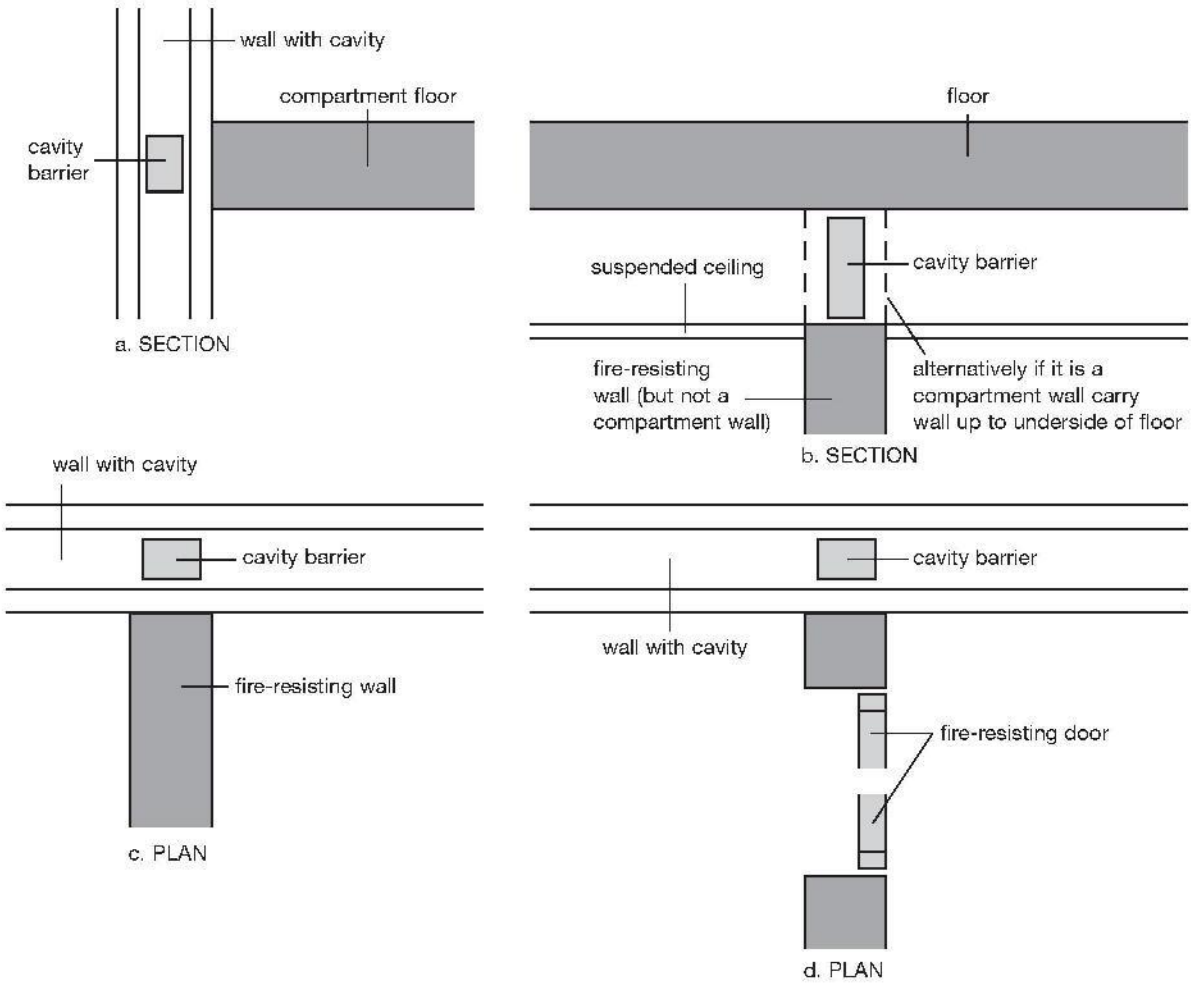
8.2 Provisions for cavity barriers are given below for specified locations. The provisions necessary to restrict the spread of smoke and flames through cavities are broadly for the purpose of sub-dividing cavities, which could otherwise form a pathway around a fire separating element, and closing the edges of cavities; therefore reducing the potential for unseen fire spread.

Note: These should not be confused with fire stopping details, see Section 9 and Diagram 23 (see paragraph 8.3).

Consideration should also be given to the construction and fixing of cavity barriers provided for these purposes and the extent to which openings in them should be protected. For guidance on these issues, see paragraphs 8.5–8.8 respectively.

Diagram ~~31~~ 23 Interrupting concealed spaces (cavities)

See paragraph 10.4 and Table 13



Cavity edges and pathways around fire-separating elements

8.3 Cavity closures and junctions

Cavity barriers should be provided at the edges of cavities, including around openings. Additionally, cavity barriers should be provided at the junction between an external cavity wall and a compartment wall that separates buildings; and at the top of such an external cavity wall, except where the cavity wall complies with Diagram 24.

For apartment buildings, cavity barriers should also be provided:

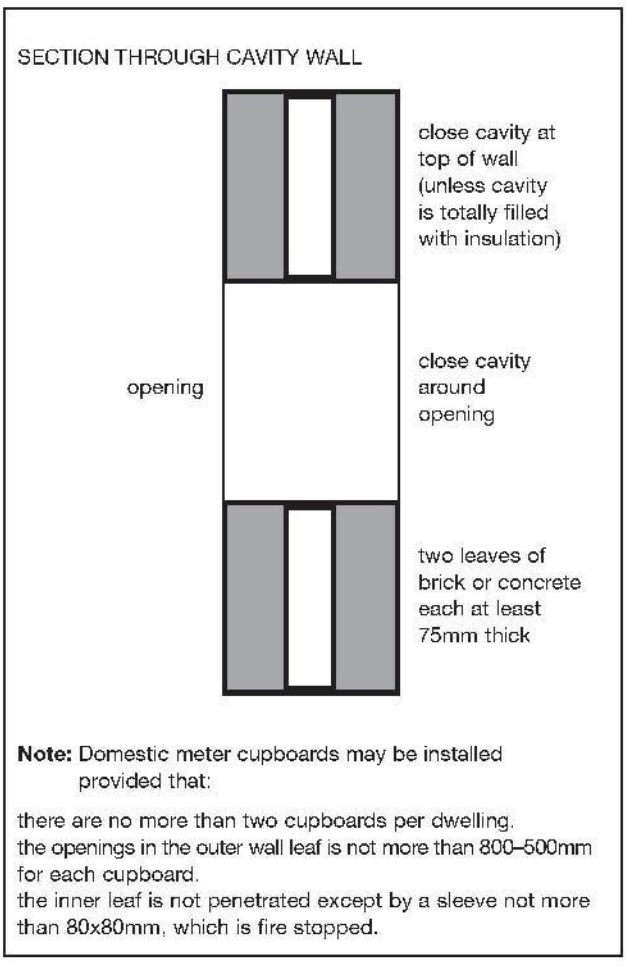
a. at the junction between an external cavity wall and every compartment floor and compartment wall, except where the cavity wall complies with Diagram 24; and

b. at the junction between a cavity wall and every compartment floor, compartment wall, or other wall or door assembly which forms a fire-resisting barrier, except where the cavity wall complies with Diagram 24.

For an apartment building, which has a floor 18m or more above ground level, any cavity in the construction of an external wall that does not comply with Diagram 24, but contains an inner leaf constructed of brick or concrete at least 75mm thick, should be provided with cavity barriers at every floor level and on the line of compartment walls abutting the external wall.

It is important to continue any compartment wall up through a ceiling or roof cavity to maintain the standard of fire resistance – therefore compartment walls should be carried up full storey height to a compartment floor or to the roof as appropriate, see paragraphs 7.17–7.20. It is therefore not appropriate to complete a line of compartment walls by fitting cavity barriers above them.

Diagram ~~32~~ 24 (Amended) **Cavity walls excluded from provisions for cavity barriers**



Note: Domestic meter cupboards may be installed provided that:

there are no more than two cupboards per dwelling.
the openings in the outer wall leaf is not more than 800–500mm for each cupboard.
the inner leaf is not penetrated except by a sleeve not more than 80x80mm, which is fire stopped.

8.4 Protected escape routes

For a protected escape route in an apartment building, a cavity that passes **above or below** any fire-resisting construction (but not compartment walls – see above), because the construction is not carried to full storey height or (in the case of a top storey) to the underside of the roof covering, should either be:

a. fitted with cavity barriers on the line of the enclosure(s) to the protected escape route; or

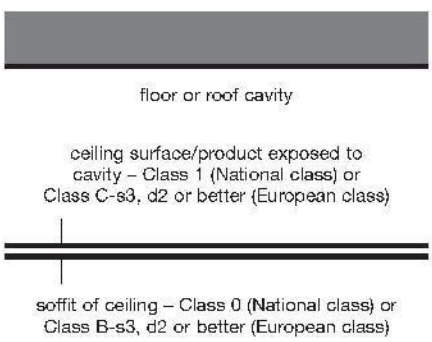
b. for cavities above the fire-resisting construction, enclosed on the lower side by a fire-resisting ceiling which extends throughout the building, compartment or separated part. (See Diagram 25.)

8.5 Double-skinned insulated roof sheeting

Cavity barriers need not be provided between double-skinned corrugated or profiled insulated roof sheeting, if the sheeting is a material of limited combustibility and both surfaces of the insulating layer have a surface spread of flame of at least Class 0 or 1 (National class) or Class C-s3, d2 or better (European class) (see Appendix A) and make contact with the inner and outer skins of cladding (see Diagram 26).

Note: When a classification includes 's3, d2', this means that there is no limit set for smoke production and/or flaming droplets/particles.

Diagram ~~35~~ 25 Fire-resisting ceiling below concealed space



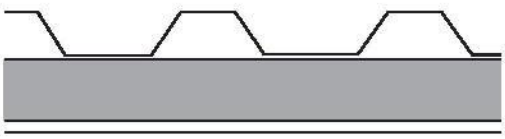
Notes:

1. The ceiling should:
   a. have at least 30 minutes fire resistance;
   b. be imperforate, except for an opening described in paragraph 8.9;
   c. extend throughout the building or compartment; and
   d. not be easily demountable.
2. The National classifications do not automatically equate with the equivalent classifications in the European column, therefore products cannot typically assume a European class unless they have been tested accordingly.
3. When a classification includes 's3, d2', this means that there is no limit set for smoke production and/or flaming droplets/particles.

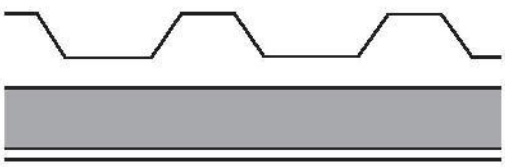
Diagram ~~36~~ 26 Provisions for cavity barriers in double-skinned insulated roof sheeting

See paragraph 8.5

a. ACCEPTABLE WITHOUT CAVITY BARRIERS



The insulation should make contact with both skins of sheeting. See also Diagram 20a regarding the need for a fire break where such roofs pass over the top of a compartment wall.



b. CAVITY BARRIERS NECESSARY

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Construction and fixings for cavity barriers

8.6 Every cavity barrier should be constructed to provide at least 30 minutes fire resistance and may be formed by any construction provided for another purpose if it meets the provisions for cavity barriers (see Appendix A, Table A1, item 16).

However, cavity barriers in a stud wall or partition, or provided around openings may be formed of:

a. steel at least 0.5mm thick; or

b. timber at least 38mm thick; or

c. polythene-sleeved mineral wool, or mineral wool slab, in either case under compression when installed in the cavity; or

d. calcium silicate, cement-based or gypsum-based boards at least 12mm thick.

8.7 A cavity barrier should, wherever possible, be tightly fitted to a rigid construction and mechanically fixed in position. Where this is not possible (for example, in the case of a junction with slates, tiles, corrugated sheeting or similar materials) the junction should be fire-stopped. Provisions for fire-stopping are set out in Section 7.

8.8 Cavity barriers should also be fixed so that their performance is unlikely to be made ineffective by:

a. movement of the building due to subsidence, shrinkage or temperature change, and movement of the external envelope due to wind; and

b. collapse in a fire of any services penetrating them; and

c. failure in a fire of their fixings (but see note below); and

d. failure in a fire of any material or construction which they abut. (For example, if a suspended ceiling is continued over the top of a fire-resisting wall or partition, and direct connection is made between the ceiling and the cavity barrier above the line of the wall or partition, premature failure of the cavity barrier can occur when the ceiling collapses. However, this may not arise if the ceiling is designed to provide fire resistance of 30 minutes or more.)

Note: Where cavity barriers are provided in roof spaces, the roof members to which they are fitted are not expected to have any fire resistance – for the purpose of supporting the cavity barrier(s).

Openings in cavity barriers

8.9 Any openings in a cavity barrier should be limited to those for:

a. doors which have at least 30 minutes fire resistance (see Appendix B, Table B1, item 8(a)) and are fitted in accordance with the provisions of Appendix B;

b. the passage of pipes which meet the provisions in Section 7;

c. the passage of cables or conduits containing one or more cables;

d. openings fitted with a suitably mounted automatic fire damper; and

e. ducts which (unless they are fire-resisting) are fitted with a suitably mounted automatic fire damper where they pass through the cavity barrier.

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~~SECTION 11:~~ SECTION 9: Protection of openings and fire-stopping

Introduction

~~11.1~~ 9.1 Sections ~~9~~ 7 and ~~10~~ 8 make provisions for fire-separating elements, and set out the circumstances in which there may be openings in them. This section deals with the protection of openings in such elements.

~~11.2~~ 9.2 If a fire-separating element is to be effective, then every joint, or imperfection of fit, or opening to allow services to pass through the element, should be adequately protected by sealing or fire-stopping so that the fire resistance of the element is not impaired.

~~11.3~~ 9.3 The measures in this section are intended to delay the passage of fire. They generally have the additional benefit of retarding smoke spread, but the test specified in Appendix A for integrity does not stipulate criteria for the passage of smoke as such.

~~11.4~~ 9.4 Detailed guidance on door openings and fire doors is given in Appendix B.

Openings for pipes

~~11.5~~ 9.5 Pipes which pass through ~~a compartment wall or compartment floor~~ fire-separating elements (unless the pipe is in a protected shaft), ~~or through a cavity barrier,~~ should meet the appropriate provisions in alternatives A, B or C below.

ALTERNATIVE A: PROPRIETARY SEALS (ANY PIPE DIAMETER)

~~11.6~~ 9.6 Provide a proprietary sealing system which has been shown by test to maintain the fire resistance of the wall, floor or cavity barrier.

ALTERNATIVE B: PIPES WITH A RESTRICTED DIAMETER

~~11.7~~ 9.7 Where a proprietary sealing system is not used, fire-stopping may be used around the pipe, keeping the opening as small as possible. The nominal internal diameter of the pipe should not be more than the relevant dimension given in Table ~~15~~ 4.

Table ~~15~~ 4 **Maximum nominal internal diameter of pipes passing through a compartment wall/floor** (see paragraphs ~~11.5~~ 9.5 et seq.)

Situation	Pipe material and maximum nominal internal diameter (mm)		
	(a) Non-combustible material (1)	(b) Lead, aluminium, aluminium alloy, uPVC (2), fibre cement	(c) Any other material
1. Structure (but not a wall separating buildings) enclosing a protected shaft which is not a stairway or a lift shaft.	160	110	40
2. Wall separating dwelling houses, or compartment wall or compartment floor between flats.	160	160 (stack pipe) (3) 110 (branch pipe) (3)	40
3. Any other situation.	160	40	40

Notes:

1. Any non-combustible material (such as cast iron, copper or steel) which if exposed to a temperature of 800°C, will not soften or fracture to the extent that flame or hot gas will pass through the wall of the pipe.
2. uPVC pipes complying with BS 4514 and uPVC pipes complying with BS 5255.
3. These diameters are only in relation to pipes forming part of an above-ground drainage system and enclosed as shown in Diagram ~~38~~ 28. In other cases the maximum diameters against situation 3 apply.

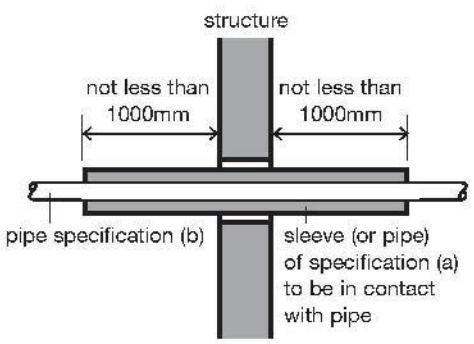
~~**11.8**~~ **9.8** The diameters given in Table ~~15~~ 4 for pipes of specification (b) used in situation (2) assume that the pipes are part of an above-ground drainage system and are enclosed as shown in Diagram ~~38~~ 28. If they are not, the smaller diameter given in situation (3) should be used.

ALTERNATIVE C: SLEEVING

~~**11.9**~~ **9.9** A pipe of lead, aluminium, aluminium alloy, fibre-cement or uPVC, with a maximum nominal internal diameter of 160mm, may be used with a sleeving of non-combustible pipe as shown in Diagram ~~37~~ 27. The specification for non-combustible and uPVC pipes is given in the notes to Table ~~15~~ 4.

Diagram ~~37~~ 27 **Pipes penetrating structure**

See paragraph 9.9, alternative method C.



Notes:

1. Make the opening in the structure as small as possible and provide fire-stopping between pipe and structure.
2. See Table 4 for materials specification.

Ventilating ducts

~~11.10~~ 9.10 BS 5588: Part 9 *Fire precautions in the design, construction and use of buildings, Code of practice for ventilation and air conditioning ductwork* sets out alternative ways in which the integrity of compartments may be maintained where ventilation and air conditioning ducts penetrate fire separating elements. The alternatives are equally acceptable, and the recommendations of that code should be followed where air handling ducts pass from one compartment to another.

Flues, etc.

~~11.11~~ 9.11 If a flue, or duct containing flues or appliance ventilation duct(s), passes through a compartment wall or compartment floor, or is built into a compartment wall, each wall of the flue or duct should have a fire resistance of at least half that of the wall or floor in order to prevent the by-passing of the compartmentation (see Diagram ~~39~~ 29).

Fire-stopping

~~11.12~~ 9.12 In addition to any other provisions in this document for fire-stopping:

a. joints between fire-separating elements should be fire-stopped; and

b. all openings for pipes, ducts, conduits or cables to pass through any part of a fire-separating element should be:

   i. kept as few in number as possible, and

   ii. kept as small as practicable, and

   iii. fire-stopped (which in the case of a pipe or duct, should allow thermal movement).

~~11.13~~ 9.13 To prevent displacement, materials used for fire-stopping should be reinforced with (or supported by) materials of limited combustibility in the following circumstances:

a. in all cases where the unsupported span is greater than 100mm; and

b. in any other case where non-rigid materials are used (unless they have been shown to be satisfactory by test).

~~11.14~~ 9.14 Proprietary fire-stopping and sealing systems, (including those designed for service penetrations) which have been shown by test to maintain the fire resistance of the wall or other element, are available and may be used.

Other fire-stopping materials include:

- cement mortar;
- gypsum-based plaster;
- cement-based or gypsum-based vermiculite/perlite mixes;
- glass fibre, crushed rock, blast furnace slag or ceramic-based products (with or without resin binders); and
- intumescent mastics.

These may be used in situations appropriate to the particular material. Not all of them will be suitable in every situation.

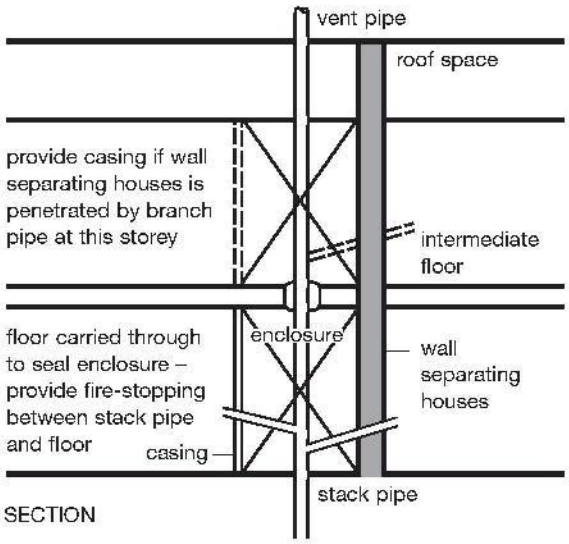
Guidance on the process of design, installation and maintenance of passive fire protection is available in *Ensuring Best Practice for Passive Fire Protection in Buildings* (ISBN 1-870409-19) produced by the Association for Specialist Fire Protection (ASFP).

Further information on the generic types of systems available, information about their suitability for different applications and guidance on test methods is given in the ASFP Red Book: *Fire Stopping and Penetration Seals for the Construction Industry – the 'Red Book'* published by the Association for Specialist Fire Protection and freely available from the ASFP website at www.asfp.org.uk.

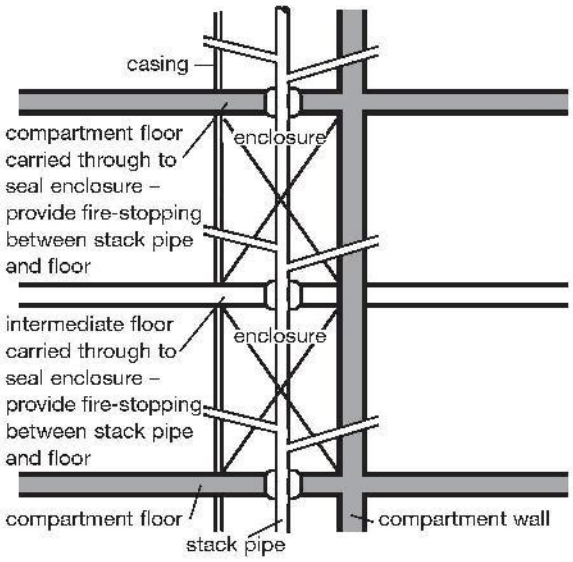
Diagram ~~38~~ 28 (Amended) Enclosure for drainage or water supply pipes

See paragraph 9.8 and Table 4

a. HOUSE WITH ANY NUMBER OF STOREYS



b. ~~OTHER BUILDINGS~~ APARTMENT



Notes:

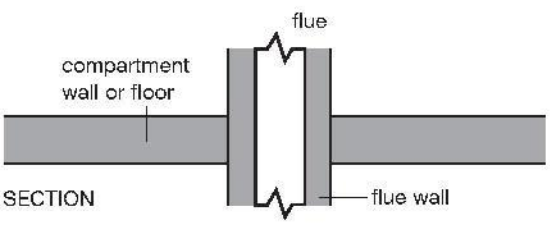
1.. The enclosure should:
   a. be bounded by a compartment wall or floor, an outside wall, an intermediate floor, or a casing (see specification at 2 below);
   b. have internal surfaces (except framing members) of Class 0 (National class) or Class B-s3, d2 or better (European class) **Note:** When a classification includes 's3, d2', this means that there is no limit set for smoke production and/or flaming droplets/particles);
   c. not have an access panel which opens into a circulation space or bedroom;
   d. be used only for drainage, or water supply, or vent pipes for a drainage system.
2. The casing should:
   a. be imperforate except for an opening for a pipe or an access panel;
   b. not be of sheet metal;
   c. have (including any access panel) not less than 30 minutes fire resistance.
3. The opening for a pipe, either in the structure or the casing, should be as small as possible and fire-stopped around the pipe.

Diagram ~~39~~ 29 Flues penetrating compartment walls or floors

(Note that there is guidance in Approved Document J concerning hearths adjacent to compartment walls.)

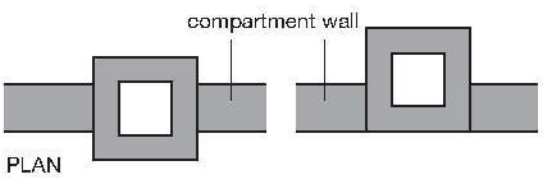
See paragraph 9.11

a. FLUE PASSING THROUGH COMPARTMENT WALL OR FLOOR



Flue walls should have a fire resistance of at least one half of that required for the compartment wall or floor, and be of non-combustible construction.

b. FLUE BUILT INTO COMPARTMENT WALL



In each case flue walls should have a fire resistance at least one half of that required for the compartment wall and be of non-combustible construction.

~~SECTION 12:~~ SECTION 10:
Special provisions for car parks

~~Introduction~~ General principles

~~12.1~~ 10.1 This section describes additional considerations which apply to the design and construction of car parks integral to apartment buildings ~~and shopping complexes~~.

~~GENERAL PRINCIPLES~~

~~12.2~~ 10.2 ~~Buildings or~~ Parts of buildings used as parking for cars and other light vehicles are unlike other buildings in certain respects which merit some departures from the usual measures to restrict fire spread within buildings.

a. The fire load is well defined and not particularly high.

b. Where the car park is well ventilated, there is a low probability of fire spread from one storey to another. Ventilation is the important factor, and as heat and smoke cannot be dissipated so readily from a car park that is not open-sided fewer concessions are made. The guidance in paragraphs ~~12.4~~ 10.4–~~12.7~~ 10.5 is concerned with three ventilation methods: open sided (high level of natural ventilation), natural ventilation and mechanical ventilation.

Note: Because of the above, car parks are not normally expected to be fitted with sprinklers.

~~PROVISIONS COMMON TO ALL CAR PARK BUILDINGS~~

~~12.3~~ ~~The relevant provisions of the guidance on requirements B1 and B5 will apply, but in addition all materials used in the construction of the building, compartment or separated part should be non combustible, except for:~~

~~a. any surface finish applied:~~

~~i. to a floor or roof of the car park, or~~

~~ii. within any adjoining building, compartment or separated part to the structure enclosing the car park, if the finish meets all relevant aspects of the guidance on requirements B2 and B4;~~

~~b. any fire door;~~

~~c. any attendant's kiosk not exceeding 15m² in area; and~~

~~d. any shop mobility facility.~~

~~OPEN SIDED CAR PARKS~~

~~12.4~~ ~~If the building, or separated part containing the car park, complies with the following provisions (in addition to those in paragraph 12.3) it may be regarded as an open sided car park for the purposes of fire resistance assessment in Appendix A, Table A2. The provisions are that:~~

~~a. there should not be any basement storeys;~~

~~b. each storey should be naturally ventilated by permanent openings at each car parking level, having an aggregate vent area not less than 1/20th of the floor area at that level, of which at least half (1/40th) should be equally provided between two opposing walls;~~

~~c. if the building is also used for any other purpose, the part forming the car park is a separated part.~~

The provisions allowing 15 minutes fire resistance in open-sided car parks has been deleted from this volume as it is not considered relevant to car parks which are integral to an apartment building.

~~CAR PARKS WHICH ARE NOT OPEN SIDED~~ VENTILATION

~~12.5~~
10.3 ~~Where car parks do not have the standard of ventilation set out in 12.4(b), they are not regarded as open-sided and a different standard of fire resistance is necessary (the relevant provisions are given in Appendix A, Table A2).~~

~~Such~~ Car parks ~~still~~ require some ventilation, which may be by natural or mechanical means, as described in ~~12.6~~ 10.4 or ~~12.7~~ 10.5 below. ~~The provisions of 12.3 apply to all car park buildings, whatever standard of ventilation is provided.~~

NATURAL VENTILATION

~~12.6~~
10.4 ~~Where car parks that are not open-sided are provided with some, more limited, natural ventilation,~~ Each storey should be ventilated by permanent openings (which can be at ceiling level) at each car parking level. ~~having an~~ These should have an aggregate free vent area not less than 1/40th of the floor area at that level, of which at least half (~~1/80th~~) should be split equally (1/160th on each side) and provided between two opposing walls. The

remaining 1/80th may be positioned anywhere around the perimeter of the storey. ~~Smoke vents at ceiling level may be used as an alternative to the provision of permanent openings in the walls. They should have an aggregate area of permanent opening totalling not less than 1/40th of the floor area and be arranged to provide a through draught~~. (See Approved Document F *Ventilation* for additional guidance on normal ventilation of car parks.)

MECHANICAL VENTILATION

~~12.7~~ **10.5** In most basement car parks, and in enclosed car parks, it may not be possible to obtain the minimum standard of natural ventilation openings set out in paragraph ~~12.6~~ 10.4 above. In such cases a system of mechanical ventilation should be provided as follows:

a. the system should be independent of any other ventilating system (other than any system providing normal ventilation to the car park) and be designed to operate at ten air changes per hour in a fire condition. (See Approved Document F *Ventilation* for guidance on normal ventilation of car parks.)

b. the system should be designed to run in two parts, each part capable of extracting 50% of the rates set out in (a) above, and designed so that each part may operate singly or simultaneously;

c. each part of the system should have an independent power supply which would operate in the event of failure of the main supply;

d. extract points should be arranged so that 50% of the outlets are at high level, and 50% at low level: and

e. the fans should be rated to run at 300°C for a minimum of 60 minutes, and the ductwork and fixings should be constructed of materials having a melting point not less than 800°C.

For further information on equipment for removing hot smoke refer to BS 7346: Part 2 *Components for smoke and heat control systems, Specification for powered smoke and heat exhaust ventilators.*

An alternative method of providing smoke ventilation from enclosed car parks is given in the BRE report *Design methodologies for smoke and heat exhaust ventilation* (BR 368, 1999).

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B4: External fire spread

The Requirement

This Approved Document deals with the following Requirement from Part B of Schedule 1 to the Building Regulations 2000 (as amended).

Requirement	*Limits on application*
External fire spread B4.-(1) The external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of the building. (2) The roof of the building shall adequately resist the spread of fire over the roof and from one building to another, having regard to the use and position of the building.	

Inserted text ~~Deleted text~~

Guidance

Performance

In the Secretary of State's view the Requirements of B4 will be met:

a. if the external walls are constructed so that the risk of ignition from an external source, and the spread of fire over their surfaces, is restricted by making provision for them to have low rates of heat release;

b. if the amount of unprotected area in the side of the building is restricted so as to limit the amount of thermal radiation that can pass through the wall, taking the distance between the wall and the boundary into account; and

c. if the roof is constructed so that the risk of spread of flame and/or fire penetration from an external fire source is restricted.

In each case so as to limit the risk of a fire spreading from the building to a building beyond the boundary, or vice versa.

The extent to which this is necessary is dependent on the use of the building, its distance from the boundary and, in some cases, its height.

Introduction

EXTERNAL WALLS

B4.i The construction of external walls and the separation between buildings to prevent external fire spread are closely related.

The chances of fire spreading across an open space between buildings, and the consequences if it does, depend on:

a. the size and intensity of the fire in the building concerned;

b. the distance between the buildings;

c. the fire protection given by their facing sides; and

d. the risk presented to people in the other building(s).

B4.ii Provisions are made in Section ~~13~~ 11 for the fire resistance of external walls and to limit the susceptibility of the external surface of walls to ignition and to fire spread.

B4.iii Provisions are made in Section ~~14~~ 12 to limit the extent of openings and other unprotected areas in external walls in order to reduce the risk of fire spread by radiation.

ROOFS

B4.iv Provisions are made in Section ~~15~~ 13 for reducing the risk of fire spread between roofs and over the surfaces of roofs.

Inserted text ~~Deleted text~~

~~SECTION 13:~~ SECTION 11: Construction of external walls

Introduction

~~13.1~~ **11.1** Provisions are made in this section for the external walls of the building to have sufficient fire resistance to prevent fire spread across the relevant boundary. The provisions are closely linked with those for space separation in Section ~~14~~ 12 (following) which sets out limits on the amount of unprotected area of wall. As the limits depend on the distance of the wall from the relevant boundary, it is possible for some or all of the walls to have no fire resistance, except for any parts which are loadbearing (see paragraph B3.ii).

External walls are elements of structure and the relevant period of fire resistance (specified in Appendix A) depends on the use, height and size of the building concerned. If the wall is 1000mm or more from the relevant boundary, a reduced standard of fire resistance is accepted in most cases and the wall only needs fire resistance from the inside.

~~13.2~~ **11.2** Provisions are also made to restrict the combustibility of external walls of buildings that are less than 1000mm from the relevant boundary and, irrespective of boundary distance and the external walls of high buildings. This is in order to reduce the surface's susceptibility to ignition from an external source, and to reduce the danger from fire spread up the external face of the building.

In the guidance to Requirement B3, provisions are made in Section ~~8~~ 6 for internal and external loadbearing walls to maintain their loadbearing function in the event of fire.

Fire resistance standard

~~13.3~~ **11.3** The external walls of the building should have the appropriate fire resistance given in Appendix A, Table A1, unless they form an unprotected area under the provisions of Section ~~14~~ 12.

External surfaces

~~13.5~~ **11.4** The external surfaces of walls should meet the provisions in Diagram ~~40~~ 30. However, the total amount of combustible material may be limited in practice by the provisions for space separation in Section ~~14~~ 12 (see paragraph ~~14.7~~ 12.7 et seq.). Where a mixed use building includes Assembly and Recreation Purpose Group accommodation, the external surfaces of walls should meet the provisions in Diagram ~~40c~~ 30c.

Note: One alternative to meeting the provisions in Diagram 40 could be BRE Fire Note 9 *Assessing the fire performance of external cladding systems: a test method* (BRE, 1999).

13.6 **11.5** In the case of the outer cladding of a wall of 'rainscreen' construction (with a drained and ventilated cavity), the surface of the outer cladding which faces the cavity should also meet the provisions of Diagram 40 30.

External wall construction

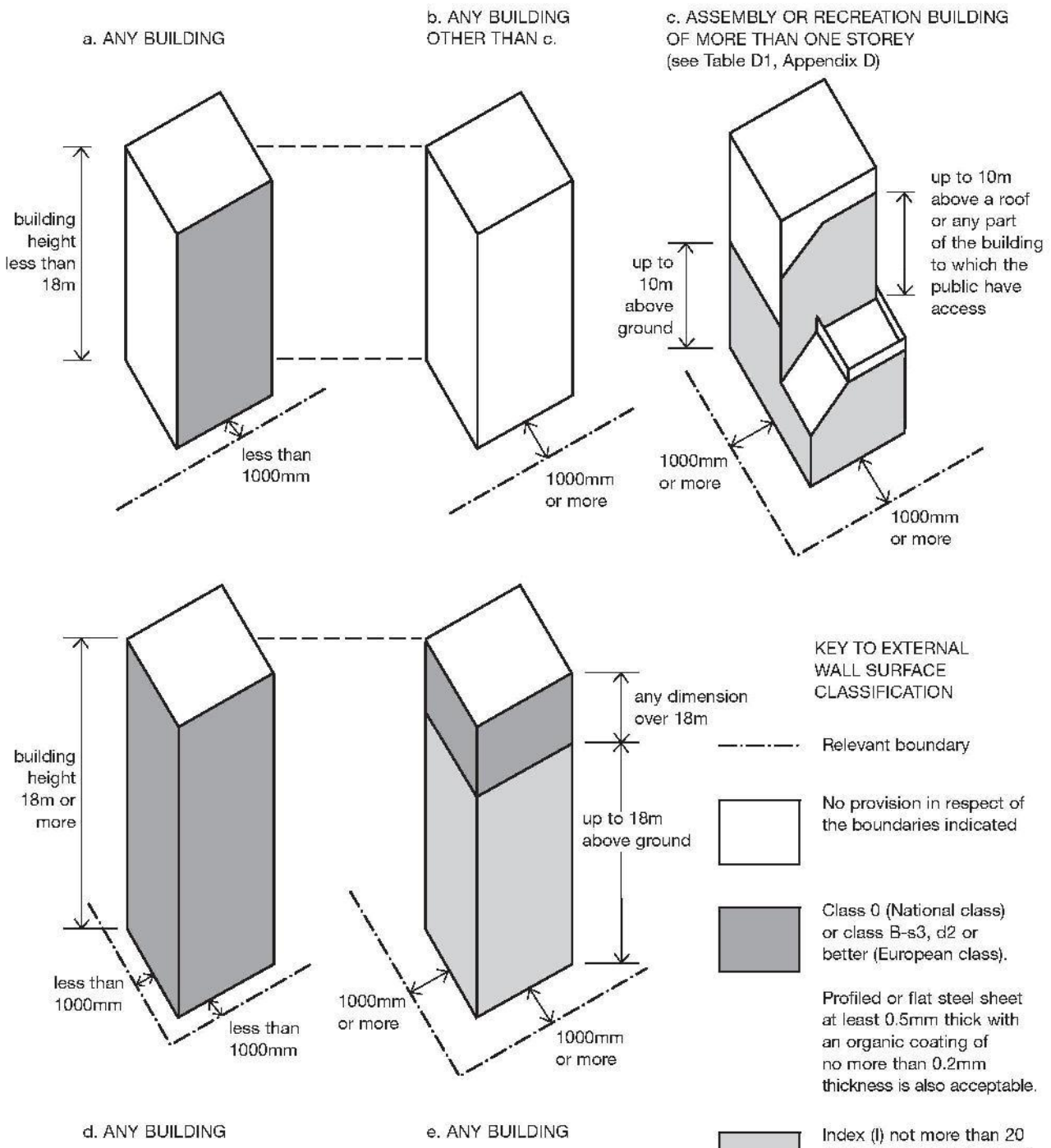
13.7 **11.6** The external envelope of a building should not provide a medium for fire spread if it is likely to be a risk to health or safety. The use of combustible materials for cladding framework, or of combustible thermal insulation as an overcladding or in ventilated cavities, may present such a risk in tall buildings, even though the provisions for external surfaces in Diagram 40 30 may have been satisfied.

11.7 In a building with a storey 18m or more above ground level, insulation material used in ventilated cavities in the external wall construction should be of limited combustibility (see Appendix A). This restriction does not apply to masonry cavity wall construction which complies with Diagram 32 24 in Section 10 8.

Further advice on the use of thermal insulation material is given in the BRE report *Fire performance of external thermal insulation for walls of multi-storey buildings* (BR 135,1998 2003). One alternative to meeting the provisions in paragraph 11.7 is to meet the performance criteria given in BR 135 for cladding systems using full scale test data from BS 8414-1: 2002 *Test method for non-loadbearing external cladding systems applied to the face of the building.*

Diagram ~~40~~ 30 (Amended) Provisions for external surfaces of walls

See paragraphs 11.4 and 11.5



Notes:

1. The National classifications do not automatically equate with the equivalent European classifications, therefore products cannot typically assume a European class unless they have been tested accordingly.
2. When a classification includes 's3, d2', this means that there is no limit set for smoke production and/or flaming droplets/particles.

~~SECTION 14:~~ SECTION 12: Space separation

Introduction

~~14.1~~ **12.1** The provisions in this Section are based on a number of assumptions, and whilst some of these may differ from the circumstances of a particular case, together they enable a reasonable standard of space separation to be specified. The provisions limit the extent of unprotected areas in the sides of a building (such as openings and areas with a combustible surface) which will not give adequate protection against the external spread of fire from one building to another.

A roof is not subject to the provisions in this Section unless it is pitched at an angle greater than 70° to the horizontal (see definition for 'external wall' in Appendix E). Similarly, vertical parts of a pitched roof such as dormer windows (which taken in isolation might be regarded as a wall), would not need to meet the following provisions unless the slope of the roof exceeds 70°. It is a matter of judgement whether a continuous run of dormer windows occupying most of a steeply pitched roof should be treated as a wall rather than a roof.

~~14.2~~ **12.2** The assumptions are:

a. that the size of a fire will depend on the compartmentation of the building, so that a fire may involve a complete compartment, but will not spread to other compartments;

b. that the intensity of the fire is related to the use of the building (i.e. purpose group), but that it can be moderated by a sprinkler system;

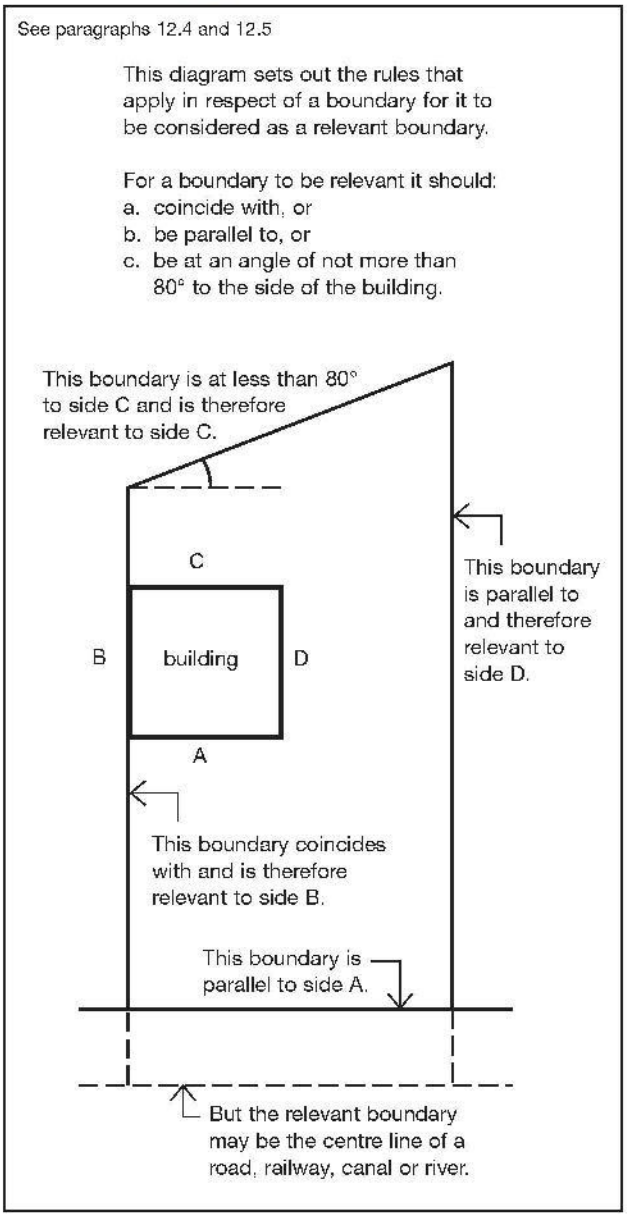
c. that Residential and Assembly and Recreation Purpose Groups represent a greater life risk than other uses;

d. that there is a building on the far side of the boundary that has a similar elevation to the one in question, and that it is at the same distance from the common boundary; and

e. that the amount of radiation that passes through any part of the external wall that has fire resistance may be discounted.

~~14.3~~ **12.3** Where a reduced separation distance is desired (or an increased amount of unprotected area) it may be advantageous to construct compartments of a smaller size.

Diagram ~~41~~ 31 Relevant boundary



Boundaries

~~14.4~~ 12.4 The use of the distance to a boundary, rather than to another building, in measuring the separation distance, makes it possible to calculate the allowable proportion of unprotected areas, regardless of whether there is a building on an adjoining site, and regardless of the site of that building, and the extent of any unprotected areas that it might have.

A wall is treated as facing a boundary if it makes an angle with it of 80° or less (see Diagram ~~41~~ 31).

Usually only the distance to the actual boundary of the site needs to be considered. But in some circumstances, when the site boundary adjoins a space where further development is unlikely, such as a road, then part of the adjoining space may be included as falling within the relevant boundary for the purposes of this section. The meaning of the term boundary is explained in Diagram ~~41~~ 31.

RELEVANT BOUNDARIES

~~14.5~~ **12.5** The boundary which a wall faces, whether it is the actual boundary of the site or a notional boundary, is called the relevant boundary (see Diagrams ~~41~~ 31 and ~~42~~ 32).

NOTIONAL BOUNDARIES

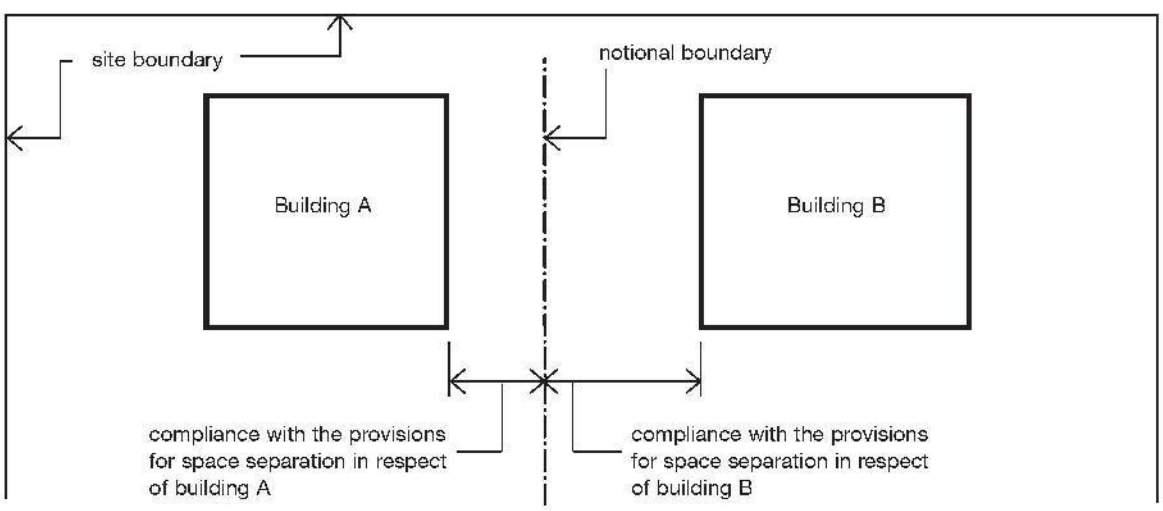
~~14.6~~ **12.6** ~~Generally separation distance between buildings on the same site is discounted. In some circumstances~~ The distances to other buildings on the same site also need to be considered. This is done by assuming that there is a boundary between those buildings. This assumed boundary is called a notional boundary. ~~A notional boundary is assumed to exist where either or both of the buildings concerned are in the Residential or Assembly and Recreation Purpose Groups~~. The appropriate rules are given in Diagram ~~42~~ 32.

The amendments to paragraph 12.6 above would extend the scope of this provision to all buildings that share the same site. Consultees may wish to consider if this should be limited only to those buildings which share the same site but are in different ownership, such as those on trading estates.

Diagram ~~42~~ 32 (Amended) **Notional boundary**

See paragraph 12.6

This diagram sets out the rules that apply where there is a building on the same site so that a notional boundary needs to be assumed between the buildings.



The notional boundary should be set in the area between the two buildings using the following rules:

1. The notional boundary is assumed to exist in the space between the buildings and is positioned so that one of the buildings would comply with the provisions for space separation having regard to the amount of its unprotected area. In practice, if one of the buildings is existing, the position of the boundary will be set by the space separation factors for that building.
2. The siting of the new building, or the second building if both are new, can then be checked to see that it also complies – using the notional boundary as the relevant boundary for the second building.

UNPROTECTED AREAS AND FIRE RESISTANCE

~~14.7~~ **12.7** Any part of an external wall which has less fire resistance than the appropriate amount given in Appendix A, Table A2, is considered to be an unprotected area.

EXTERNAL WALLS OF PROTECTED SHAFTS FORMING STAIRWAYS

~~14.8~~ **12.8** Any part of an external wall of a stairway in a protected shaft is excluded from the assessment of unprotected area.

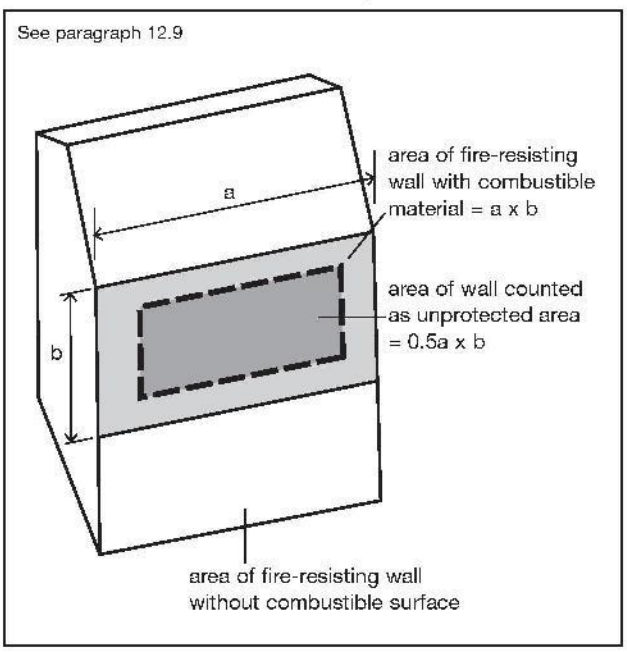
Note: There are provisions in the guidance to B1 (Diagram ~~21~~ 14) and B5 (paragraph ~~18.11~~ 16.9 which refers to Section 2 of BS 5588: Part 5: 1991 *Fire precautions in the design, construction and use of buildings, Code of practice for firefighting stairs and lifts*), about the relationship of external walls for protected stairways to the unprotected areas of other parts of the building.

STATUS OF COMBUSTIBLE SURFACE MATERIALS AS UNPROTECTED AREA

~~14.9~~ **12.9** If an external wall has the appropriate fire resistance, but has combustible material more than 1mm thick as its external surface, then that wall is counted as an unprotected area amounting to half the actual area of the combustible material, see Diagram ~~43~~ 33. (For the purposes of this provision, a material with a Class 0 rating (National class) or Class B-s3, d2 rating (European class) (see Appendix A, paragraphs 7 and 13) need not be counted as unprotected area.)

Note: When a classification includes 's3, d2', this means that there is no limit set for smoke production and/or flaming droplets/particles.

Diagram ~~43~~ 33 **Status of combustible surface material as unprotected area**



SMALL UNPROTECTED AREAS

~~14.10~~ **12.10** Small unprotected areas in an otherwise protected area of wall are considered to pose a negligible risk of fire spread, and may be disregarded. Diagram ~~44~~ 34 shows the constraints that apply to the placing of such areas in relation to each other and to lines of compartmentation inside the building. These constraints vary according to the size of each unprotected area.

CANOPIES

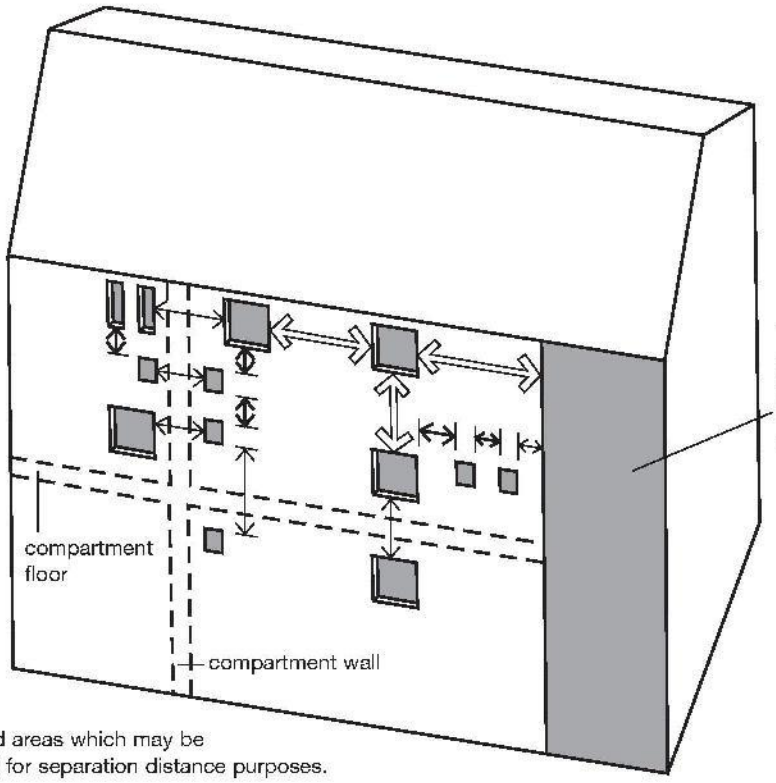
~~14.11~~ **12.11** Some canopy structures would be exempt from the application of the Building Regulations by falling within Class VI or Class VII of Schedule 2 to the Regulations (*Exempt buildings and works*). Many others may not meet the exemption criteria and in such cases the provisions in this section about limits of unprotected areas could be onerous.

In the case of a canopy attached to the side of a building, provided that the edges of the canopy are at least 2m from the relevant boundary, separation distance may be determined from the wall rather than the edge of the canopy (see Diagram ~~45~~ 35).

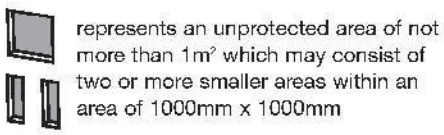
In the case of a free-standing canopy structure above a limited risk or controlled hazard ~~(for example over petrol pumps)~~, in view of the high degree of ventilation and heat dissipation achieved by the open sided construction, and provided the canopy is 1000mm or more from the relevant boundary, the provisions for space separation could reasonably be disregarded.

Diagram 44 34 Unprotected areas which may be disregarded in assessing the separation distance from the boundary

See paragraph 12.10



Unprotected areas which may be disregarded for separation distance purposes.



represents an unprotected area of not more than 1m² which may consist of two or more smaller areas within an area of 1000mm x 1000mm

represents an area of not more than 0.1m²

Dimensional restrictions

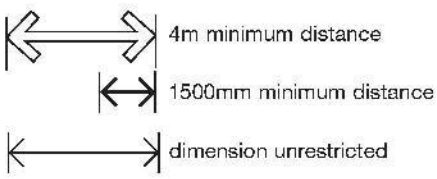
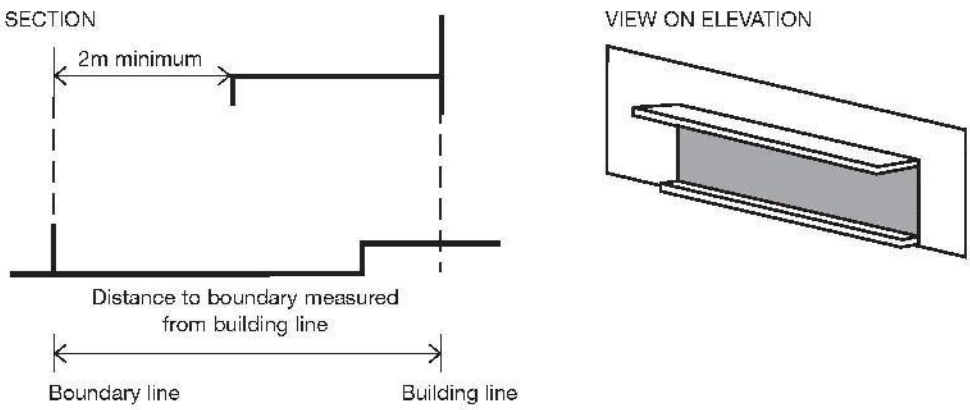


Diagram 45 35 The effect of a canopy on separation distance

See paragraph 12.11



Projections from the building line such as a canopy or a loading platform can be ignored when assessing separation distance. This would not apply to an enclosed loading bay, for example if the illustration had shown side walls beneath the canopy.

EXTERNAL WALLS WITHIN 1000MM OF THE RELEVANT BOUNDARY

~~14.13~~ **12.12** A wall situated within 1000mm from any point on the relevant boundary, and including a wall coincident with the boundary, will meet the provisions for space separation if:

a. the only unprotected areas are those shown in Diagram ~~44~~ 34; and

b. the rest of the wall is fire-resisting from both sides.

EXTERNAL WALLS 1000MM OR MORE FROM THE RELEVANT BOUNDARY

~~14.14~~ **12.13** A wall situated at least 1000mm from any point on the relevant boundary will meet the provisions for space separation if:

a. the extent of unprotected area does not exceed that given by one of the methods referred to in paragraph ~~14.15~~ 12.14; and

b. the rest of the wall (if any) is fire-resisting.

Methods for calculating acceptable unprotected area

~~14.15~~ **12.14** Two simple methods are given in this Approved Document for calculating the acceptable amount of unprotected area in an external wall that is at least 1000mm from any point on the relevant boundary. (For walls within 1000mm of the boundary see paragraph ~~14.13~~ 12.12 above.)

Method 1 may be used for small residential buildings ~~which do not belong to Purpose Group 2a (Institutional type premises),~~ and is set out in paragraph ~~14.19~~ 12.18.

Method 2 may be used for most buildings or compartments for which Method 1 is not appropriate, and is set out in paragraph ~~14.20~~ 12.19.

There are other more precise methods, described in a BRE report *External fire spread: Building separation and boundary distances* (BR 187, BRE 1991), which may be used instead of Methods 1 and 2. The 'Enclosing Rectangle' and 'Aggregate Notional Area' methods are included in the BRE report.

BASIS FOR CALCULATING ACCEPTABLE UNPROTECTED AREA

~~14.16~~ **12.15** The basis of Methods 1 and 2 is set out in Fire Research Technical Paper No 5, 1963. This has been reprinted as part of the BRE report referred to in paragraph ~~14.15~~ 12.14. The aim is to ensure that the building is separated from the boundary by at least half the distance at which the total thermal radiation intensity received from all unprotected areas in the wall would be 12.6 kw/m² (in still air), assuming the radiation intensity at each unprotected area is 84 kw/m², ~~if the building is in the Residential, or is an open sided multi storey car park in Purpose Group 7(b).~~

SPRINKLER SYSTEMS

~~14.17~~ **12.16** If a building is fitted throughout with a sprinkler system, it is reasonable to assume that the intensity and extent of a fire will be reduced. The sprinkler system should meet the relevant recommendations of ~~BS 5306: Part 2 *Fire extinguishing installations and equipment on premises, Specification for sprinkler systems*, i.e. the relevant occupancy rating together with the additional requirements for life safety~~ BS 9251: *Sprinkler systems for residential and domestic occupancies. Code of practice*. In these circumstances the boundary distance may be half that for an otherwise similar, but unsprinklered, building, subject to there being a minimum distance of 1m. Alternatively, the amount of unprotected area may be doubled if the boundary distance is maintained.

Note: The presence of sprinklers may be taken into account in a similar way when using the BRE report referred to in paragraph ~~14.15~~ 12.14.

ATRIUM BUILDINGS

~~14.18~~ **12.17** If a building contains one or more atria, the recommendations of clause 28.2 in BS 5588: Part 7: 1997 *Fire precautions in the design, construction and use of buildings, Code of practice for the incorporation of atria in buildings* should be followed.

METHOD 1 ~~– SMALL RESIDENTIAL~~

~~14.19~~ **12.18** This method applies only to a building ~~intended to be used as a dwellinghouse, or for flats or other residential purposes (not Institutional),~~ which is 1000mm or more from any point on the relevant boundary and meets the following rules for determining the maximum unprotected area which should be read with Diagram ~~46~~ 36:

a. The building should not exceed 3 storeys in height (basements not counted) or be more than 24m in length:

b. Each side of the building will meet the provisions for space separation if:

i. the distance of the side of the building from the relevant boundary, and

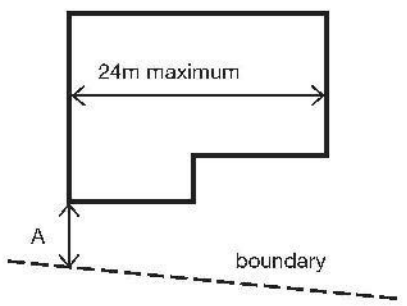
ii the extent of the unprotected area, are within the limits given in Diagram ~~46~~ 36.

Note: In calculating the maximum unprotected area, any areas falling within the limits shown in Diagram ~~44~~ 34, and referred to in paragraph ~~14.10~~ 12.10, can be disregarded.

c. Any parts of the side of the building in excess of the maximum unprotected area should be fire-resisting.

Diagram ~~46~~ 36 **Permitted unprotected areas ~~in small residential buildings~~ for Method 1**

See paragraph 12.18



Minimum distance (A) between side of building and relevant boundary (m)	Maximum total area of unprotected areas (sq.m)
1	5.6
2	12
3	18
4	24
5	30
6	no limit

METHOD 2 – ~~OTHER BUILDINGS OR COMPARTMENTS~~

~~**14.20**~~ **12.19** This method applies to a building or compartment intended for any use and which is ~~not less~~ more than 1000mm from any point on the relevant boundary. The following rules for determining the maximum unprotected area should be read with Table ~~16~~ 5.

a. ~~Except for an open-sided car park in Purpose Group 7(b) (see paragraph 14.4 12.4)~~The building or compartment should not exceed 10m in height.

Note: For any building or compartment more than 10m in height, the methods set out in the BRE report *External fire spread: Building separation and boundary distances* can be applied.

b. Each side of the building will meet the provisions for space separation if either:

i. the distance of the side of the building from the relevant boundary, and

ii. the extent of unprotected area,

are within the appropriate limits given in Table ~~16~~ 5.

Note: In calculating the maximum unprotected area, any areas shown in Diagram ~~44~~ 34, and referred to in paragraph ~~14.10~~ 12.10, can be disregarded.

c. Any parts of the side of the building in excess of the maximum unprotected area should be fire-resisting.

Table ~~16~~ 5 Permitted unprotected areas ~~in small buildings or compartments~~ for Method 2

Minimum distance between side of building and relevant boundary (m)		**Maximum total percentage of unprotected area %**
~~Purpose groups~~ Use		
Dwellings ~~Residential, Office, Assembly and Recreation~~	Car parks ~~Shop & Commercial, Industrial, Storage & other Non-residential~~	
(1)	(2)	(3)
n.a	1	4
1	2	8
2.5	5	20
5	10	40
7.5	15	60
10	20	80
12.5	25	100

Notes:

n.a = not applicable

a. Intermediate values may be obtained by interpolation.

b. For buildings which are fitted throughout with an automatic sprinkler system, see paragraph ~~14.17~~ 12.16.

c. ~~In the case of open-sided car parks in Purpose Group 7(b), the distances set out in column (1) may be used instead of those in column (2).~~

c. The total percentage of unprotected area is found by dividing the total unprotected area by the area of a rectangle that encloses all the unprotected areas and multiplying the result by 100.0.

~~SECTION 15:~~ SECTION 13: Roof coverings

Introduction

~~15.1~~ 13.1 The provisions in this section limit the use, near a boundary, of roof coverings which will not give adequate protection against the spread of fire over them. The term roof covering is used to describe constructions which may consist of one or more layers of material, but does not refer to the roof structure as a whole. The provisions in this Section are principally concerned with the performance of roofs when exposed to fire from the outside.

~~**Note:** Currently, no guidance is possible on the performance requirements in terms of the resistance of roof coverings to external fire exposure as determined by the methods specified in DD ENV 1187:2002, since there is no accompanying classification procedure and no supporting comparative data.~~

~~15.2~~ 13.2 The circumstances when a roof is subject to the provisions in Section ~~14~~ 12 for space separation are explained in paragraph ~~14.1~~ 12.1.

OTHER CONTROLS ON ROOFS

~~15.3~~ 13.3 There are provisions concerning the fire properties of roofs in three other Sections of this document. In the guidance to B1 (paragraph ~~6.3~~ 4.3) there are provisions for roofs that are part of a means of escape. In the guidance to B2 (paragraph ~~7.13~~ 5.12) there are provisions for the internal surfaces of rooflights as part of the internal lining of a room or circulation space. In the guidance to B3 there are provisions in Section ~~8~~ 6 for roofs which are used as a floor, and in Section ~~9~~ 7 for roofs that pass over the top of a compartment wall.

Classification of performance

~~15.4~~ 13.4 The performance of roof coverings is designated by reference to the test methods specified in BS 476 *Fire tests on building materials and structures*, Part 3: ~~1958~~ 2004 *External fire exposure roof tests* or determined in accordance with BS EN 13501-5:xxxx, *Fire classification of construction products and building elements*, Part 5 – *Classification using test data from external fire exposure to roof tests*, as described in Appendix A. The notional performance of some common roof coverings is given in Table A5 of Appendix A.

This draft Approved Document has been amended in recognition of the impending BS EN 13501-5 *Fire classification of construction products and building elements*, Part 5 – *Classification using test data from external fire exposure to roof tests.*

Rooflights are controlled on a similar basis, and plastic rooflights described in paragraphs ~~15.6~~ 13.6 and ~~15.7~~ 13.7 may also be used.

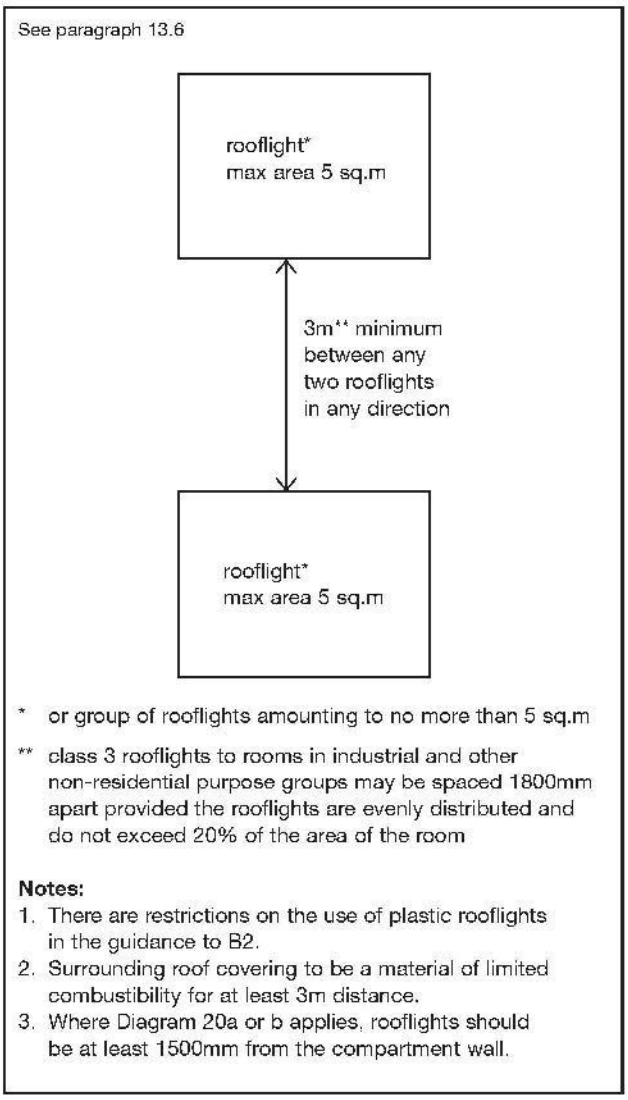
Separation distances

~~15.5~~ 13.5 The separation distance is the minimum distance from the roof (or part of the roof) to the relevant boundary, which may be a notional boundary.

Table ~~17~~ 6 sets out separation distances according to the type of roof covering and the size and use of the building. There are no restrictions on the use of roof coverings designated AA, AB or AC (National class) or $B_{ROOF}(t4)$ (European class) classification. In addition, roof covering products (and/or materials) as defined in Commission Decision 2000/553/EC of 6 September 2000 implementing Council Directive 89/106/EEC as regards the external fire performance of roof coverings can be considered to fulfil all of the requirements for performance characteristic 'external fire performance' without the need for testing provided that any national provisions on the design and execution of works are fulfilled. That is, the roof covering products (and/or materials) defined in this Commission Decision can be used without restriction.

Note: The boundary formed by the wall separating a pair of semi-detached houses may be disregarded for the purposes of this Section (but see Section 9 7, Diagram ~~28(b)~~ 20(b), which deals with roofs passing over the top of a compartment wall).

Diagram ~~47~~ 37 **Limitations on spacing and size of plastic rooflights having a Class 3 (National class) or Class D-s3, d2 (European class) or TP(b) lower surface**



PLASTIC ROOFLIGHTS

~~15.6~~ **13.6** Table ~~18~~ 7 sets out the limitations on the use of plastic rooflights which have at least a Class 3 (National class) or Class D-s3, d2 (European class) lower surface, and Table ~~19~~ 8 sets out the limitations on the use of thermoplastic materials with a TP(a) rigid or TP(b) classification (see also Diagram ~~47~~ 37). The method of classifying thermoplastic materials is given in Appendix A.

~~15.7~~ **13.7** When used in rooflights, a rigid thermoplastic sheet product made from polycarbonate or from unplasticised PVC, which achieves a Class 1 (National class) rating for surface spread of flame when tested to BS 476 *Fire tests on building materials and structures*, Part 7: 1971 (or 1987 or 1997) *Surface spread of flame tests for materials*, or Class C-s3,d2 (European class) can be regarded as having an AA (National class) designation or $B_{roof}(t4)$ (European class) classification, other than for the purposes of Diagram 20.

Inserted text ~~Deleted text~~

UNWIRED GLASS IN ROOFLIGHTS

~~15.8~~ **13.8** When used in rooflights, unwired glass at least 4mm thick has an AA designation (National class) or $B_{ROOF}(t4)$ (European class) classification.

THATCH AND WOOD SHINGLES

~~15.9~~ **13.9** Thatch and wood shingles should be regarded as having an AD/BD/CD designation or $E_{ROOF}(t4)$ (European class) classification in Table ~~17~~ 6 if performance under BS 476: Part 3: ~~1958~~ 2004 or EN 1187:part 4:xxxx respectively cannot be established.

Note: Consideration can be given to thatched roofs being closer to the boundary than shown in Table ~~17~~ 6 if, for example, the following precautions (based on *Thatched buildings. New properties and extensions* [the 'Dorset Model'] are incorporated in the design:

a. the rafters are overdrawn with construction having not less than 30 min fire resistance;

b. the guidance given in Approved Document J *Combustion appliances and fuel storage* is followed; and

c. the smoke alarm installation (see Section 1) is included in the roof space.

Table ~~17~~ 6 Limitations on roof coverings*

Designation† of covering of roof or part of roof		Minimum distance from any point on relevant boundary			
National Class	**European Class**	**Less than 6m**	**At least 6m**	**At least 12m**	**At least 20m**
AA, AB or AC	$B_{ROOF}(t4)$	●	●	●	●
BA, BB or BC	$C_{ROOF}(t4)$	○	●	●	●
CA, CB or CC	$D_{ROOF}(t4)$	○	● (1)(2)	● (1)	●
AD, BD or CD ~~(1)~~	$E_{ROOF}(t4)$	○	● (1)(2)	● (1)	● (1)
DA, DB, DC or DD ~~(1)~~	$F_{ROOF}(t4)$	○	○	○	● (1)(2)

Notes:

* See paragraph ~~15.8~~ 13.8 for limitations on glass; paragraph ~~15.9~~ 13.9 for limitations on thatch and wood shingles; and paragraphs ~~15.6~~ 13.6 and ~~15.7~~ 13.7 and Tables ~~18~~ 7 and ~~19~~ 8 for limitations on plastic rooflights.

† The designation of external roof surfaces is explained in Appendix A. (See Table A5, for notional designations of roof coverings.)

Separation distances do not apply to the boundary between roofs of a pair of semi-detached houses (see ~~15.5~~ 13.5) and to enclosed/covered walkways. However, see Diagram ~~28~~ 20 if the roof passes over the top of a compartment wall.

Openable polycarbonate and PVC rooflights which achieve a Class 1(National class) or Class C-s3, d2 (European class) rating by test, see paragraph ~~15.7~~ 13.7, may be regarded as having an AA (National class) designation or $B_{ROOF}(t4)$ (European class) classification.

● Acceptable

○ Not acceptable

1. Not acceptable on any of the following buildings:
   a. Houses in terraces of three or more houses
   b. ~~Industrial, Storage or Other non-residential purpose group buildings of any size;~~
   b. Any other buildings with a cubic capacity of more than 1500m³.
2. Acceptable on buildings not listed in Note 1, if the part of the roof is no more than 3m² in area and is at least 1500mm from any similar part, with the roof between the parts covered with a material of limited combustibility.

Table ~~18~~ 7 Class 3 (National class) or Class D-s3,d2 (European class) plastic rooflights: limitations on use and boundary distance

Minimum classification on lower surface (1)	Space which rooflight can serve	Minimum distance from any point on relevant boundary to rooflight with an external designation† of:	
		AD BD CA (National class) or $E_{ROOF}(t4)$ (European class) CA CB CC or $D_{ROOF}(t4)$ (European class)	DA DB DC DD (National class) or $F_{ROOF}(t4)$ (European class)
Class 3 (National class) or Class D-s3, d2 (European class)	a. balcony, verandah, carport, covered way or loading bay, which has at least one longer side wholly or permanently open	6m	20m
	b. detached swimming pool		
	c. conservatory, garage or outbuilding, with a maximum floor area of 40m²		
	d. circulation space (2) (except a protected stairway)	6m (3)	20m (3)
	e. room (2).		

Notes:

† The designation of external roof surfaces is explained in Appendix A.

None of the above designations are suitable for protected stairways – see paragraph ~~7.13~~ 5.12.

Polycarbonate and PVC rooflights which achieve a Class 1 (National class) or Class C-s3, d2 (European class) rating by test, see paragraph ~~15.7~~ 13.7, may be regarded as having an AA designation (National class) or $B_{ROOF}(t4)$ (European class) classification.

Where Diagram ~~28~~ 20a or b applies, rooflights should be at least 1.5m from the compartment wall.

Products may have upper and lower surfaces with different properties if they have double skins or are laminates of different materials – in which case the more onerous distance applies.

1. See also the guidance to B2.
2. Single skin rooflight only, in the case of non-thermoplastic material.
3. The rooflight should also meet the provisions of Diagram ~~47~~ 37.

Table ~~19~~ 8 TP(a) and TP(b) plastic rooflights: limitations on use and boundary distance

Minimum classification on lower surface (1)	Space which rooflight can serve	Minimum distance from any point on relevant boundary to rooflight with an external surface classification (1) of:	
		TP(a)	TP(b)
1. TP(a) rigid	any space except a protected stairway	6m (2)	not applicable
2. TP(b)	a. balcony, verandah, carport, covered way or loading bay, which has at least one longer side wholly or permanently open	not applicable	6m
	b. detached swimming pool		
	c. conservatory, garage or outbuilding, with a maximum floor area of 40m²		
	d. circulation space (3) (except a protected stairway)	not applicable	6m (4)
	e. room (3).		

Notes:

None of the above designations are suitable for protected stairways – see paragraph ~~7.13~~ 5.12.

Polycarbonate and PVC rooflights which achieve a Class 1 (National class) or Class C-s3, d2 (European class) rating by test, see paragraph ~~15.7~~ 13.7, may be regarded as having an AA designation (National class) or $B_{ROOF}(t4)$ (European class) classification.

Where Diagram ~~28~~ 20a or b applies, rooflights should be at least 1.5m from the compartment wall.

Products may have upper and lower surfaces with different properties if they have double skins or are laminates of different materials – in which case the more onerous distance applies.

1. See also the guidance to B2.
2. No limit in the case of any space described in 2a, b and c.
3. Single skin rooflight only, in the case of non-thermoplastic material.
4. The rooflight should also meet the provisions of Diagram ~~47~~ 37.

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B5: Access and facilities for the fire service

The Requirement

This Approved Document deals with the following Requirement from Part B of Schedule 1 to the Building Regulations 2000 (as amended).

Requirement	*Limits on application*
Access and facilities for the fire service B5.-(1) The building shall be designed and constructed so as to provide reasonable facilities to assist firefighters in the protection of life. (2) Reasonable provision shall be made within the site of the building to enable fire appliances to gain access to the building.	

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Guidance

Performance

In the Secretary of State's view the Requirements of B5 will be met:

a. if there is sufficient means of external access to enable fire appliances to be brought near to the building for effective use;

b. if there is sufficient means of access into, and within, the building for firefighting personnel to effect search and rescue and fight fire;

c. if the building is provided with sufficient internal fire mains and other facilities to assist firefighters in their tasks; and

d. if the building is provided with adequate means for venting heat and smoke from a fire in a basement.

These access arrangements and facilities are only required in the interests of the health and safety of people in and around the building. The extent to which they are required will depend on the use and size of the building in so far as it affects the health and safety of those people.

Introduction

B5.i The guidance given here covers the selection and design of facilities for the purpose of protecting life by assisting the fire and rescue service.

To assist the fire service some or all of the following facilities may be necessary, depending mainly on the size of the building:

a. vehicle access for fire appliances;

b. access for firefighting personnel;

c. the provision of fire mains within the building;

d. venting for heat and smoke from basement areas;

e. the provision of adequate water supplies.

FACILITIES APPROPRIATE TO A SPECIFIC BUILDING

B5.ii The main factor determining the facilities needed to assist the fire and rescue service is the size of the building. Generally speaking firefighting is carried out within the building.

a. In deep basements and tall buildings (see paragraph ~~18.2~~ 16.2) firefighters will invariably work inside. They need special access facilities (see Section ~~18~~ 16), equipped with fire mains (see Section ~~16~~ 14). Fire appliances will need access to entry points near the fire mains (see Section ~~17~~ 15).

b. In other buildings, the combination of personnel access facilities offered by the normal means of escape, and the ability to work from ladders and appliances on the perimeter, will generally be adequate without special internal arrangements. Vehicle access may be needed to some or all of the perimeter, depending on the size of the building (see Section ~~17~~ 15);

c. For dwellingshouses ~~and other small buildings~~, it is usually only necessary to ensure that the building is sufficiently close to a point accessible to fire brigade vehicles (see paragraph ~~17.2~~ 15.2);

d. In ~~taller blocks of flats~~ apartment buildings, ~~fire brigade personnel access facilities are needed within the building, although~~ the high degree of compartmentation means that some simplification is possible compared to other tall buildings (see paragraph ~~18.12~~ 16.7);

e. Products of combustion from basement fires tend to escape via stairways, making access difficult for fire service personnel. The problem can be reduced by providing vents (see Section ~~19~~ 17). Venting can improve visibility and reduce temperatures, making search, rescue and firefighting less difficult.

INSULATING CORE PANELS

B5.iii Guidance on the fire behaviour of insulating core panels used for internal structures is given in Appendix F in Approved Document B Volume 2 (*Buildings other than dwellings*).

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~~SECTION 16:~~ SECTION 14: Fire mains and hydrants

Introduction

~~16.1~~ 14.1 Where appropriate, ~~F~~ fire mains are installed in a building and equipped with valves etc. so that the fire and rescue service may connect hoses for water to fight fires inside the building. Rising fire mains serve floors above ground, or upwards from the level at which the fire service gain access (called the fire service vehicle access level) if this is not ground level. (In a podium design for instance, the fire and rescue service vehicle access level may be above the ground level, see Diagram ~~51~~ 40.) Falling mains serve levels below fire service vehicle access level.

Fire mains may be of the 'dry' type which are normally empty and are supplied through hose from a fire service pumping appliance. Alternately they may be of the 'wet' type where they are kept full of water and supplied from tanks and pumps in the building. There should be a facility to allow a wet system to be replenished from a pumping appliance in an emergency.

Provision of fire mains

~~16.2~~ 14.2 Buildings provided with firefighting shafts should be provided with fire mains in those shafts. The criteria for the provision of firefighting shafts are given in Section ~~18~~ 16.

~~16.3~~ 14.3 Wet rising mains should be provided in buildings with a floor at more than 60m above fire service vehicle access level. In lower buildings where fire mains are provided, either wet or dry mains are suitable.

Number and location of fire mains

~~16.4~~ 14.4 There should be one fire main in every firefighting shaft. (See Section ~~18~~ 16 for guidance on the provision of firefighting shafts.)

~~16.5~~ 14.5 The outlets from fire mains in firefighting shafts should be sited in each firefighting lobby or protected corridor giving access to the accommodation. (See Section ~~18~~ 16, paragraphs ~~18.9~~ 16.7 ~~and 18.10~~)

Design and construction of fire mains

~~16.6~~ 14.6 Guidance on ~~other~~ aspects of the design and construction of fire mains, not included in the provisions of this Approved Document, should be obtained from Sections 2 and 3 of BS 5306: Part 1: 1976 *Fire extinguishing installations and equipment on premises, Hydrant systems, hose reels and foam inlets.*

Provision of private hydrants

14.7 Where a building, which has a compartment of 250m² or more, is being erected more than 100m from an existing fire hydrant additional hydrants should be provided.

a. Buildings provided with fire mains – hydrants should be provided within 100m of any dry rising main inlet.

b. Buildings not provided with fire mains – hydrants should be provided within 75m of any point on the perimeter of the building.

Each fire hydrant should be clearly indicated by a plate, affixed nearby in a conspicuous position, in accordance with BS 3251: *Indicator plates for fire hydrants and emergency water supplies* 1976.

14.8 Where no piped water supply is available, or there is insufficient pressure and flow in the water main, or an alternative arrangement is proposed, the alternative source of supply should be provided in accordance with the following recommendations:

a. a charged static water tank of at least 45,000 litre capacity; or

b. a spring, river, canal or pond capable of providing or storing at least 45,000 litres of water at all times of the year, to which access, space and a hard standing are available for a pumping appliance; or

c. any other means of providing a water supply for firefighting operations considered appropriate by the fire and rescue authority.

The above guidance has been introduced to ensure that adequate water supplies are provided for those buildings which are not constructed within easy access of public hydrants.

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~~SECTION 17:~~ SECTION 15: Vehicle access

Introduction

~~17.1~~ **15.1** For the purposes of this Approved Document vehicle access to the exterior of a building is needed to enable high reach appliances, such as turntable ladders and hydraulic platforms, to be used, and to enable pumping appliances to supply water and equipment for firefighting, search and rescue activities.

Access requirements increase with building size and height.

Fire mains (see Section ~~16~~ 14) enable firefighters within the building to connect their hoses to a water supply. In buildings fitted with fire mains, pumping appliances need access to the perimeter at points near the mains, where firefighters can enter the building and where in the case of dry mains, a hose connection will be made from the appliance to pump water into the main.

Vehicle access routes and hard standings should meet the criteria described in paragraph~~s 17.8~~ 15.8 ~~to 15.11~~ where they are to be used by fire service vehicles.

Note: Requirements cannot be made under the Building Regulations for work to be done outside the site of the works shown on the deposited plans, building notice or initial notice. In this connection it may not always be reasonable to upgrade an existing route across a site to a small building such as a single dwellinghouse. The options in such a case, from doing no work to upgrading certain features of the route e.g. a sharp bend, should be considered by the Building Control Body in consultation with the fire and rescue service.

Buildings not fitted with fire mains

~~17.2~~ **15.2** There should be vehicle access for a pump appliance to ~~small buildings (those of up to 2000m² with a top storey up to 11m above ground level)~~ single family dwellinghouses to ~~either:~~ within 45m of all points within the dwelling. ~~entrance.~~

~~a. 15% of the perimeter; or~~

~~b. within 45m of every all point on the projected plan area (or 'footprint', see Diagram 48) of the building;~~

~~whichever is the less onerous.~~

~~**Note:** For single family dwellinghouses, the 45m may be measured to a door to the dwelling.~~

~~17.3~~ 15.3 There should be vehicle access for a pump appliance to blocks of ~~flats/maisonettes~~ apartments to within 45m of all points within each dwelling ~~entrance door~~.

Notes:

1. If the provisions in 15.2 or 15.3 cannot be met, a fire main or hydrant complying with paragraph 15.5 or 15.6 should be provided.

2. The 45m distance is the approximate length of two connected fire hoses.

~~17.5~~ 15.4 Every elevation to which vehicle access is provided in accordance with paragraphs ~~17.2~~ 15.2 or ~~17.3~~ 15.3 ~~or Table 20~~ should have a suitable door(s), not less than 750mm wide, giving access to the interior of the building. Door(s) should be provided such that there is no more than 60m between each door and/or the end of that elevation (e.g. a 150m elevation would need at least two doors).

Table ~~21~~ 9 **Typical fire service vehicle access route specification**

Appliance type	Minimum width of road between kerbs (m)	Minimum width of gateways (m)	Minimum turning circle between kerbs (m)	Minimum turning circle between walls (m)	Minimum clearance height (m)	Minimum carrying capacity (tonnes)
Pump	3.7	3.1	16.8	19.2	3.7	12.5
High reach	3.7	3.1	26.0	29.0	4.0	17.0

Notes:

1. Fire appliances are not standardised. Some fire services have appliances of greater weight or different size. In consultation with the Fire and Rescue Authority, the Building Control Body may adopt other dimensions in such circumstances.

2. Because the weight of high reach appliances is distributed over a number of axles, it is considered that their infrequent use of a carriageway or route designed to 12.5 tonnes should not cause damage. It would therefore be reasonable to design the roadbase to 12.5 tonnes, although structures such as bridges should have the full 17 tonnes capacity.

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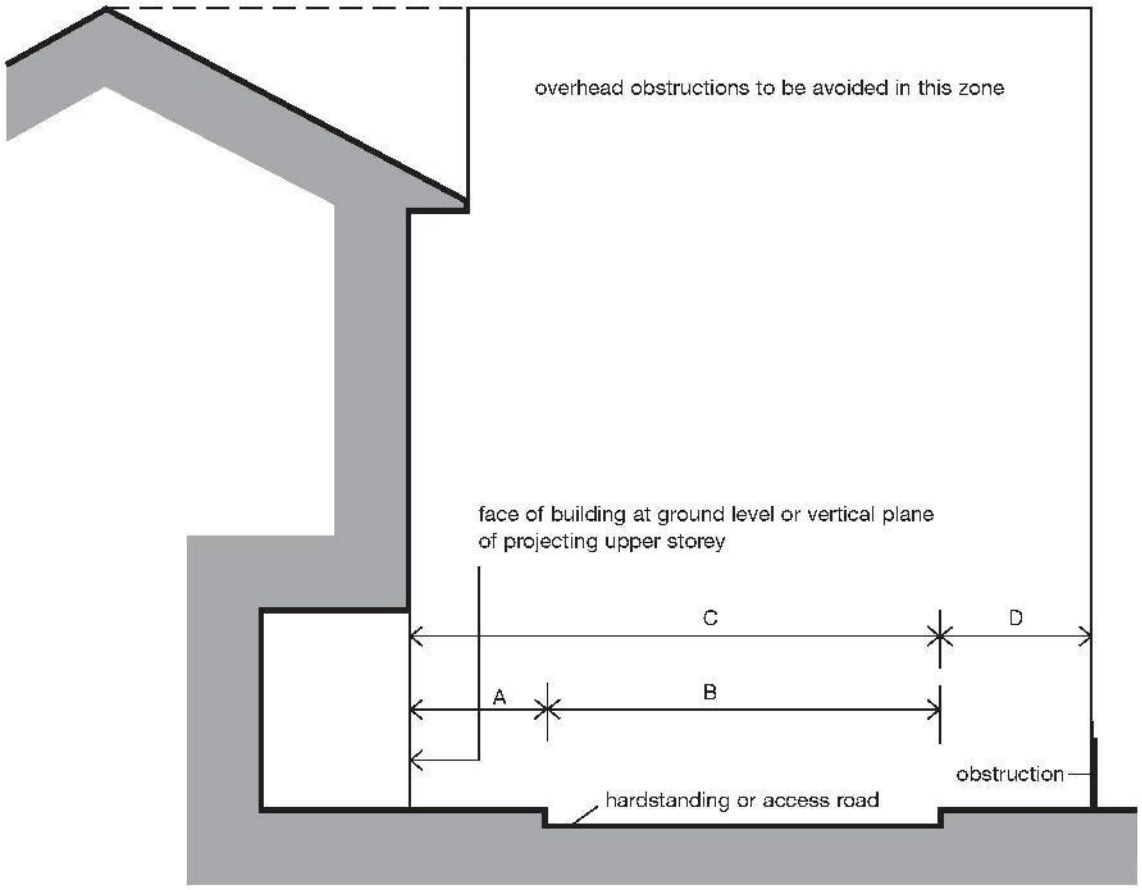
Diagram ~~49~~ 38 (Amended) Relationship between building and hard-standing/access roads for high reach fire appliances



	Type of appliance	
	Turntable ladder Dimension (m)	**Hydraulic platform Dimension (m)**
A. Maximum distance of near edge of hard-standing from building.	4.9	2.0
B. Minimum width of hard-standing.	5.0	5.5
C. Minimum distance of further edge of hard-standing from building.	10.0	7.5
D. Minimum width of unobstructed space (for swing of appliance platform).	NA	2.2

Notes:

1. Hard-standing for high reach appliances should be as level as possible and should not exceed a gradient of 1 in 12.
2. ~~The hard-standing should be capable of withstanding a point load of 8.3 kg/cm² to accomodate jacks.~~ Fire appliances are not standardised. Some fire services have appliances with a greater weight or different size. In consultation with the Fire and Rescue Authority, the Building Control Body should adopt the relevant dimensions and ground loading capacity.

Buildings fitted with fire mains

Note: Where fire mains are provided in buildings for which Sections ~~16~~ 14 and ~~18~~ 16 make no provision, vehicle access may be to paragraph ~~17.6~~ 15.5 or ~~17.7~~ 15.6 ~~rather than Table 20~~.

~~**17.6**~~ **15.5** In the case of a building fitted with dry fire mains there should be access for a pumping appliance to within 18m of each fire main inlet connection point. The inlet should be visible from the appliance.

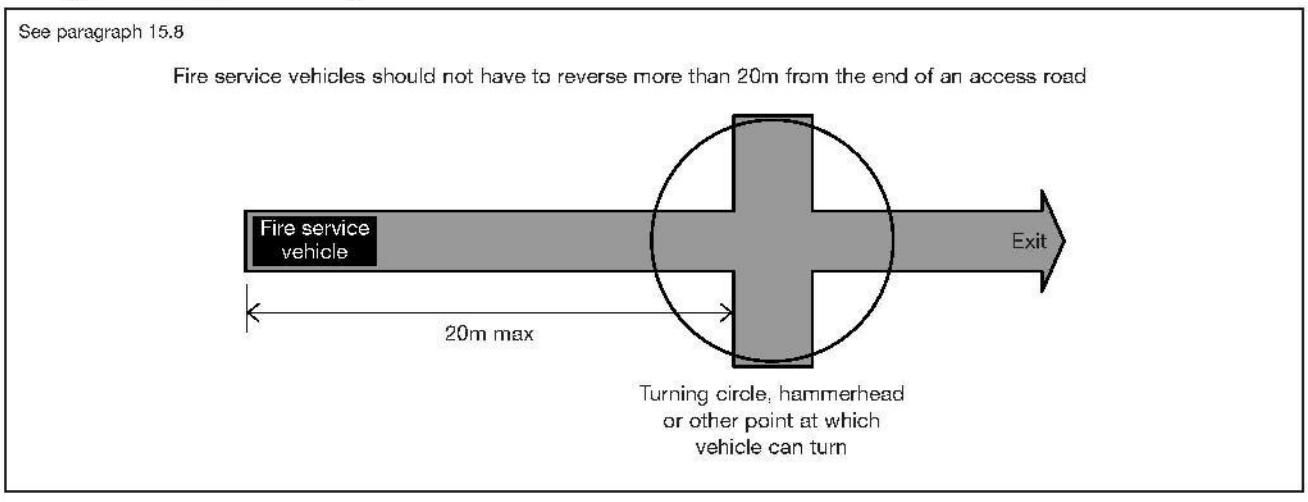
~~**17.7**~~ **15.6** In the case of a building fitted with wet mains the pumping appliance access should be to within 18m, and within sight of, a suitable entrance giving access to the main, and in sight of the inlet for the emergency replenishment of the suction tank for the main.

Design of access routes and hard-standings

~~**17.8**~~ **15.7** A vehicle access route may be a road or other route which, including any ~~manhole~~ inspection covers and the like, meets the standards in Table ~~21~~ 9 and the following paragraph.

~~**17.11**~~ **15.8** Turning facilities should be provided in any dead end access route that is more than 20m long (see Diagram ~~50~~ 39). This can be by a hammerhead or turning circle, designed on the basis of Table ~~21~~ 9.

Diagram ~~50~~ 39 **Turning facilities**



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~~SECTION 18:~~ SECTION 16: Access to buildings for firefighting personnel

Introduction

~~18.1~~ **16.1** In low rise buildings without deep basements fire service personnel access requirements will be met by a combination of the normal means of escape, and the measures for vehicle access in Section ~~17~~ 15, which facilitate ladder access to upper storeys. In other buildings the problems of reaching the fire, and working inside near the fire, necessitate the provision of additional facilities to avoid delay and to provide a sufficiently secure operating base to allow effective action to be taken.

These additional facilities include firefighting lifts, firefighting stairs and firefighting lobbies, which are combined in a protected shaft known as the firefighting shaft (Diagram ~~52~~ 41).

Guidance on protected shafts in general is given in Section 9 7.

Note: Because of the high degree of compartmentation in ~~blocks of flats/ maisonettes~~ apartment buildings, the provisions for the design and construction of firefighting shafts is different to other buildings. ~~in this Section may be modified (see paragraph 18.12 16.12).~~

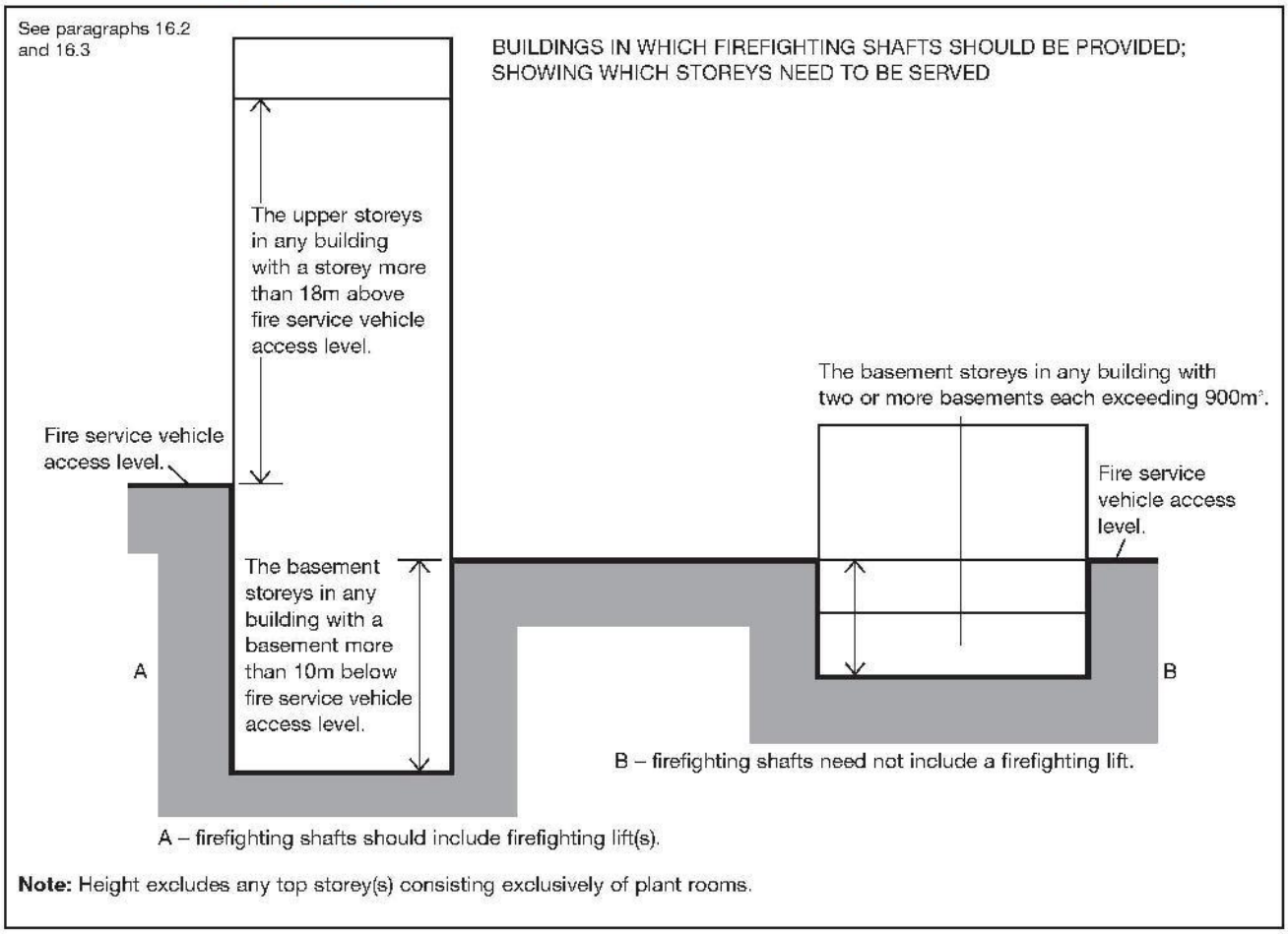
Provision of firefighting shafts

~~18.2~~ **16.2** Buildings with a floor at more than 18m above fire service vehicle access level, or with a basement at more than 10m below fire service vehicle access level, should be provided with firefighting shafts containing firefighting lifts (see Diagram ~~51~~ 40).

~~18.4~~ **16.3** Buildings with two or more basement storeys, each exceeding 900m^2 in area, should be provided with firefighting shaft(s), which need not include firefighting lifts.

~~18.5~~ **16.4** If a firefighting shaft is required to serve a basement it need not also serve the upper floors unless they also qualify because of the height or size of the building. Similarly a shaft serving upper storeys need not serve a basement which is not large or deep enough to qualify in its own right. However, a firefighting stair and any firefighting lift should serve all intermediate storeys between the highest and lowest storeys that they serve.

Diagram ~~51~~ 40 (Amended) **Provision of firefighting shafts**



Note: Height excludes any top storey(s) consisting exclusively of plant rooms.

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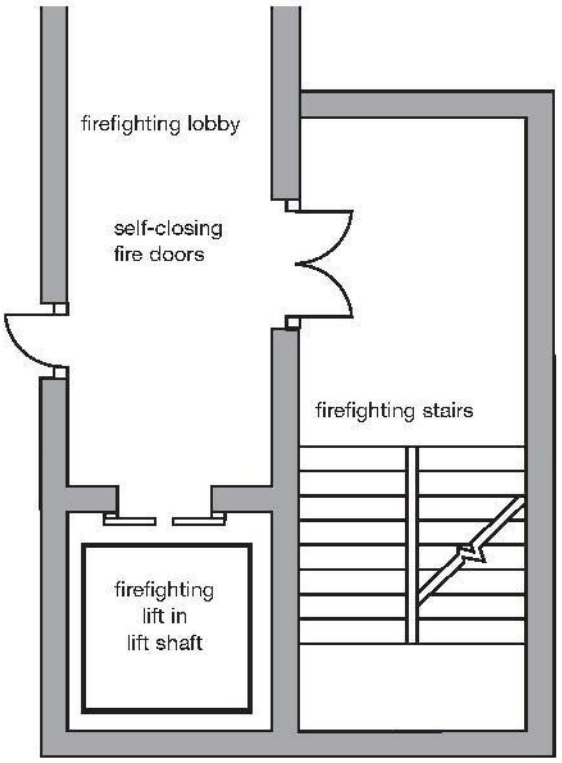
Diagram ~~52~~ 41 (Amended) **Components of a firefighting shaft**

See paragraph 16.1



Notes:

1. Outlets from a fire main should be located in the firefighting lobby.
2. A firefighting lift is required if the building has a floor more than 18m above, or more than 10m below, fire service vehicle access level.
3. This diagram is only to illustrate the basic components and is not meant to represent the only acceptable layout. Ventilation measures have not been shown (refer to BS 5588: Part 5 *Code of practice for firefighting stairs and lifts*).

Number and location of firefighting shafts

16.5 If the building is fitted throughout with an automatic sprinkler system in accordance with BS 9251: *Sprinkler systems for residential and domestic occupancies. Code of practice*, then sufficient firefighting shafts should be provided such that every part of every storey, that is more than 18m above fire service vehicle access level; is no more than 60m from a fire main outlet in a firefighting shaft, measured on a route suitable for laying hose.

16.6 If the building is not fitted with sprinklers then every part of every storey, that is more than 18m above fire service vehicle access level; should be no more than 45m from a fire main outlet in a protected stairway and 60m from a fire main in a firefighting shaft, measured on a route suitable for laying hose.

Note: In order to meet the 45m hose criterion it may be necessary to provide additional fire mains in escape stairs. This does not imply that these stairs should otherwise be designed as firefighting shafts.

The ODPM is minded to amend the above guidance in relation to provision of firefighting shafts and mains. The new text above, based on hose distances only, is a simplification of previous guidance. This performance-based guidance is also a reflection on the conclusions of the ODPM report *Physiological Assessment of Firefighting, Search and Rescue in the Built Environment* which is freely available on the internet at www.odpm.gov.uk/stellent/groups/odpm_fire/documents/downloadable/odpm_fire_033349.pdf. We would particularly welcome consultees' views on the impacts, particularly the costs and benefits, of this suggested amendment.

18.7 The number of firefighting shafts should:

a. comply with Table 22, if the building is fitted throughout with an automatic sprinkler system meeting the relevant recommendations of BS 5306: Part 2 *Fire extinguishing installations and equipment on premises, Specification for sprinkler.*; or

b. if the building is not fitted with sprinklers, be such that there is at least one within 45m of every part of for every 900m² (or part thereof) of floor area of the largest floor that is more than 18m above fire service vehicle access level (or above 7.5m covered by paragraph 18.3);

c. the same 900m² per firefighting 45m shaft criterion should be applied to calculate the number of shafts needed where basements require them.

Table 22 **Minimum number of firefighting shafts in buildings fitted with sprinklers**

Largest qualifying floor area (m²)	Minimum number of firefighting shafts
less than 900	1
900-2000	2
over 2000	2 plus 1 for every additional 1500m² or part thereof

18.8 **16.6** Firefighting shafts provided in accordance with paragraph 18.7 should be located such that every part of every storey, other than fire service access level, is no more than 60m from the fire main outlet, measured on a route suitable for laying hose. If the internal layout is unknown at the design stage, then every part of every such storey should be no more than 40m in a direct line from the fire main outlet.

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Design and construction of firefighting shafts

~~**18.9**~~ ~~Except in blocks of flats and maisonettes (see paragraph 18.12),~~ Every **16.7** firefighting stair and firefighting lift should be approached from the accommodation through a protected corridor or firefighting lobby. Similarly, the firefighting lift can open directly into such protected corridor or lobby, but the firefighting lift landing doors should not be more than 7.5m from the door to the firefighting stair.

~~**18.10**~~ All firefighting shafts should be equipped with fire mains having outlet **16.8** connections and valves in every firefighting lobby or access corridor immediately adjacent to the firefighting stair.

~~**18.11**~~ ~~Firefighting shafts should be designed, constructed and installed in accordance~~ **16.9** ~~with the recommendations of BS 5588: Part 5: 1991 *Code of practice for firefighting stairs and lifts* in respect of the following:~~

~~a. Section 2: Planning and construction;~~

~~b. Section 3: Firefighting lift installation;~~

~~c. Section 4: Electrical services.~~

A firefighting lift installation includes the lift car itself, the lift well and the lift machinery space, together with the lift control system and the lift communications system. Firefighting lift installations should conform to BS EN 81-72, and to BS EN 81-1 or BS EN 81-2 as appropriate for the particular type of lift.

BS 5588: Part 5: 2004 *Access and facilities for firefighting* has now been published in place of the 1991 version. Consultees' views would be welcomed on what, if any, sections of this standard should be referred to here.

~~**18.12**~~ ~~Where the design of means of escape in case of fire and compartmentation in blocks of flats/maisonettes apartments has followed the guidance in Sections 3 1 and 9 7, the addition of a firefighting lobby between the firefighting stair(s) and the protected corridor or lobby provided for means of escape purposes is not necessary. Similarly, the firefighting lift can open directly into such protected corridor or lobby, but the firefighting lift landing doors should not be more than 7.5m from the door to the firefighting stair.~~

Rolling shutters in compartment walls

~~**18.13**~~ Rolling shutters should be capable of being opened and closed manually by **16.10** the fire service without the use of a ladder.

~~SECTION 19:~~ SECTION 17: Venting of heat and smoke from basements

Introduction

The ODPM report *Firefighting in under-ventilated compartments: Literature review* identified some concerns about firefighter safety in basements. Consultees may wish to comment on the implications this work may have on Part B of the Building Regulations. The report is freely available on the internet at www.odpm.gov.uk/stellent/groups/odpm_fire/documents/downloadable/odpm_fire_033351.pdf

~~19.1~~ **17.1** The build-up of smoke and heat as a result of a fire can seriously inhibit the ability of the fire service to carry out rescue and firefighting operations in a basement. The problem can be reduced by providing facilities to make conditions tenable for firefighters.

~~19.2~~ **17.2** Smoke outlets (also referred to as smoke vents) provide a route for heat and smoke to escape to the open air from the basement level(s). They can also be used by the fire service to let cooler air into the basement(s). (See Diagram ~~53~~ 42.)

Provision of smoke outlets

~~19.3~~ **17.3** Where practicable each basement space should have one or more smoke outlets, but it is not always possible to do this where, for example, the plan is deep and the amount of external wall is restricted by adjoining buildings. It is therefore acceptable to vent spaces on the perimeter and allow other spaces to be vented indirectly by firefighters opening connecting doors. However if a basement is compartmented, each compartment should have direct access to venting, without having to open doors etc. into another compartment.

~~19.4~~ **17.4** Smoke outlets, connected directly to the open air, should be provided from every basement storey, except for:

a. a basement in a single family dwellinghouse of Purpose Group 1(b) or 1(c); or

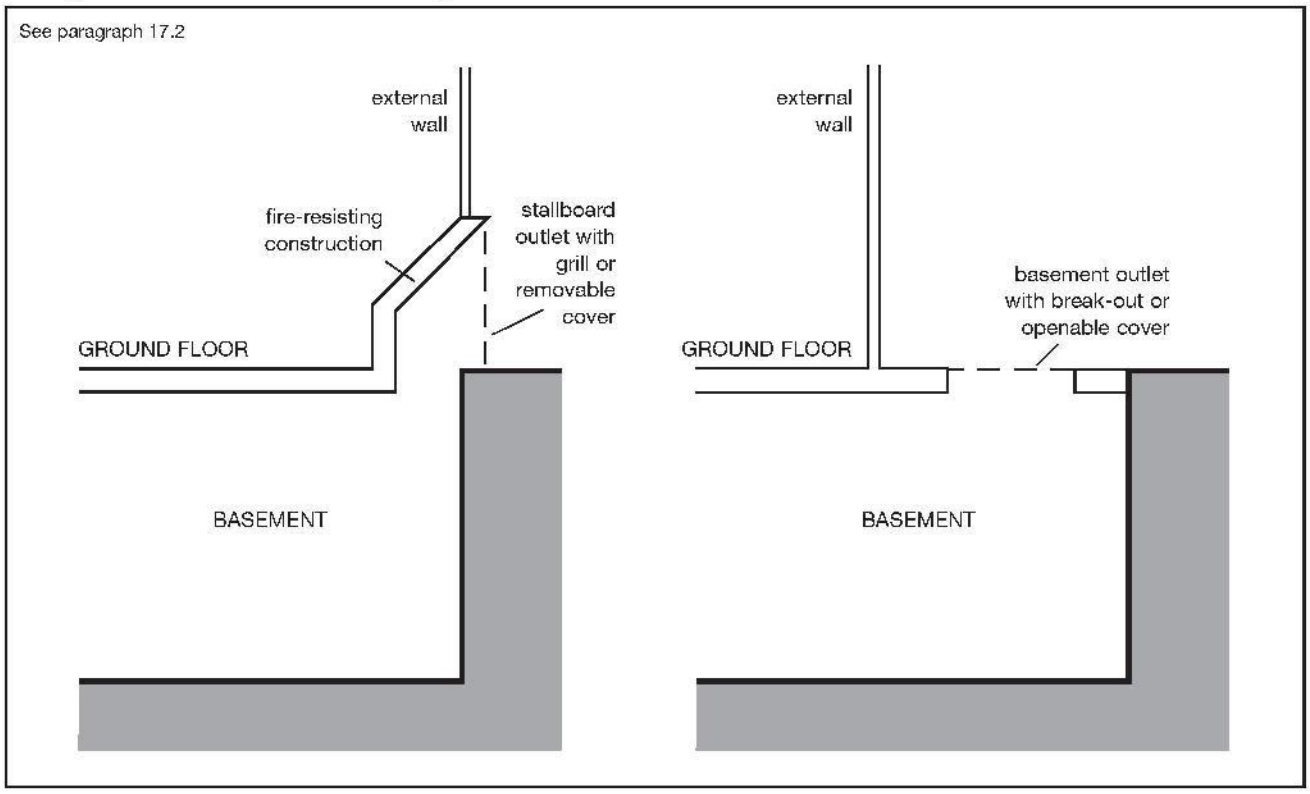
b. any basement storey that has:

   i. a floor area of not more than 200m², and

   ii. a floor not more than 3m below the adjacent ground level.

~~19.5~~
17.5 Strong rooms need not be provided with smoke outlets.

Diagram ~~53~~ 42 **Fire-resisting construction for smoke outlet shafts**



~~19.6~~
17.6 Where basements have external doors or windows, the compartments containing the rooms with these doors or windows do not need smoke outlets. It is common for basements to be open to the air on one or more elevations. This may be the result of different ground levels on different sides of the building. It is also common in 18th and 19th century terraced housing where an area below street level is excavated at the front and/or rear of the terrace so that the lowest storey has ordinary windows, and sometimes an external door.

NATURAL SMOKE OUTLETS

~~19.7~~
17.7 Smoke outlets should be sited at high level, either in the ceiling or in the wall of the space they serve. They should be evenly distributed around the perimeter to discharge in the open air outside the building.

~~19.8~~
17.8 The combined clear cross-sectional area of all smoke outlets should not be less than 1/40th of the floor area of the storey they serve.

~~19.9~~
17.9 Separate outlets should be provided from places of special fire hazard.

~~19.10~~
17.10 If the outlet terminates at a point that is not readily accessible, it should be kept unobstructed and should only be covered with a non-combustible grille or louvre.

~~19.11~~ 17.11 If the outlet terminates in a readily accessible position, it may be covered by a panel, stallboard or pavement light which can be broken out or opened. The position of such covered outlets should be suitably indicated.

~~19.12~~ 17.12 Outlets should not be placed where they would prevent the use of escape routes from the building.

MECHANICAL SMOKE EXTRACT

~~19.13~~ 17.13 A system of mechanical extraction may be provided as an alternative to natural venting to remove smoke and heat from basements, provided that the basement storey(s) are fitted with a sprinkler system. The sprinkler system should be in accordance with the principles of BS 5306: Part 2 *Fire extinguishing installations and equipment on premises, Specification for sprinkler systems.* (It is not considered necessary in this particular case to install sprinklers on the storeys other than the basement(s) unless they are needed for other reasons.)

Note: Car parks are not normally expected to be fitted with sprinklers (see paragraph ~~12.2~~ 10.2).

~~19.14~~ 17.14 The air extraction system should give at least ten air changes per hour and should be capable of handling gas temperatures of 300°C for not less than one hour. It should come into operation automatically on activation of the sprinkler system; alternatively activation may be by an automatic fire detection system which conforms to BS 5839: Part 1 *Fire detection and alarm systems for buildings, Code of practice for system design, installation and servicing* (at least L3 standard). For further information on equipment for removing hot smoke refer to BS 7346: Part 2 *Components for smoke and heat control systems, Specification for powered smoke and heat exhaust ventilators.*

Construction of outlet ducts or shafts

~~19.15~~ 17.15 Outlet ducts or shafts, including any bulkheads over them (see Diagram ~~53~~ 42), should be enclosed in non-combustible construction having not less fire resistance than the element through which they pass.

~~19.16~~ 17.16 Where there are natural smoke outlet shafts from different compartments of the same basement storey, or from different basement storeys, they should be separated from each other by noncombustible construction having not less fire resistance than the storey(s) they serve.

Basement car parks

~~19.17~~ 17.17 The provisions for ventilation of basement car parks in Section ~~12~~ 10 may be taken as satisfying the requirements in respect of the need for smoke venting from any basement that is used as a car park.

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APPENDIX A:
Performance of materials, products and structures

INTRODUCTION

1. Much of the guidance in this document is given in terms of performance in relation to British or European Standards for products or methods of test or design or in terms of European Technical Approvals. In such cases the material, product or structure should:

a. be in accordance with a specification or design which has been shown by test to be capable of meeting that performance; or

Note: For this purpose, laboratories accredited by the United Kingdom Accreditation Service (UKAS) for conducting the relevant tests would be expected to have the necessary expertise.

b. have been assessed from test evidence against appropriate standards, or by using relevant design guides, as meeting that performance; or

Note: For this purpose, laboratories accredited by UKAS for conducting the relevant tests and suitably qualified fire safety engineers might be expected to have the necessary expertise.

For materials/products where European standards or approvals are not yet available and for a transition period after they become available, British standards may continue to be used. Any body notified to the UK Government by the Government of another member state of the European Union as capable of assessing such materials/products against the relevant British Standards, may also be expected to have the necessary expertise. Where European materials/products standards or approvals are available, any body notified to the European Commission as competent to assess such materials or products against the relevant European standards or technical approval can be considered to have the appropriate expertise.

c. where tables of notional performance are included in this document, conform with an appropriate specification given in these tables; or

d. in the case of fire-resisting elements:

i. conform with an appropriate specification given in Part II of the Building Research Establishments' Report *Guidelines for the construction of fire resisting structural elements* (BR 128, BRE 1988); or

ii. be designed in accordance with a relevant British Standard or Eurocode.

Note: Any test evidence used to substantiate the fire resistance rating of a construction should be carefully checked to ensure that it demonstrates compliance that is adequate and applicable to the intended use. Small differences in detail (such as fixing method, joints, dimensions, etc.) may significantly affect the rating.

2. Building Regulations deal with fire safety in buildings as a whole. Thus they are aimed at limiting fire hazard.

The aim of standard fire tests is to measure or assess the response of a material, product, structure or system to one or more aspects of fire behaviour. Standard fire tests cannot normally measure fire hazard. They form only one of a number of factors that need to be taken into account. Other factors are set out in this publication.

FIRE RESISTANCE

3. Factors having a bearing on fire resistance, that are considered in this document, are:

a. fire severity;

b. building height; and

c. building occupancy.

4. The standards of fire resistance given are based on assumptions about the severity of fires and the consequences should an element fail. Fire severity is estimated in very broad terms from the use of the building (its purpose group), on the assumption that the building contents (which constitute the fire load) are similar for buildings in the same use.

A number of factors affect the standard of fire resistance specified. These are:

a. the amount of combustible material per unit of floor area in various types of building (the fire load density);

b. the height of the top floor above ground, which affects the ease of escape and of firefighting operations, and the consequences should large scale collapse occur;

c. occupancy type, which reflects the ease with which the building can be evacuated quickly;

d. whether there are basements, because the lack of an external wall through which to vent heat and smoke may increase heat build-up, and thus affect the duration of a fire, as well as complicating firefighting; and

e. whether the building is of single storey construction (where escape is direct and structural failure is unlikely to precede evacuation).

Because the use of buildings may change, a precise estimate of fire severity based on the fire load due to a particular use may be misleading. Therefore if a fire engineering approach of this kind is adopted the likelihood that the fire load may change in the future needs to be considered.

5. Performance in terms of the fire resistance to be met by elements of structure, doors and other forms of construction is determined by reference to either:

a. (National tests) BS 476: *Fire tests on building materials and structures*, Parts 20–24: 1987, i.e. Part 20 *Method for determination of the fire resistance of elements of construction (general principles)*, Part 21 *Methods for determination of the fire resistance of loadbearing elements of construction*, Part 22 *Methods for determination of the fire resistance of non-loadbearing elements of construction*, Part 23 *Methods for determination of the contribution of components to the fire resistance of a structure*, and Part 24 *Method for determination of the fire resistance of ventilation ducts* (or to BS 476: Part 8: 1972 in respect of items tested or assessed prior to 1 January 1988); or

b. (European tests) Commission Decision 2000/367/EC of 3 May 2000 implementing Council Directive 89/106/EEC as regards the classification of the resistance to fire performance of construction products, construction works and parts thereof.

Note: The designation of xxxx is used for the year reference for standards that are not yet published. The latest version of any standard may be used provided that it continues to address the relevant requirements of the Regulations.

All products are classified in accordance with BS EN 13501–2:xxxx, *Fire classification of construction products and building elements*, Part 2 – *Classification using data from fire resistance tests (excluding products for use in ventilation systems)*.

BS EN 13501–3:xxxx, *Fire classification of construction products and building elements*, Part 3 – *Classification using data from fire resistance tests on components of normal building service installations (other than smoke control systems)*.

BS EN 13501–4:xxxx, *Fire classification of construction products and building elements*, Part 4 – *Classification using data from fire resistance tests on smoke control systems*.

The relevant European test methods under BS EN 1364, 1365, 1366 and 1634 are listed in Appendix F ~~G~~.

Table A1 gives the specific requirements for each element in terms of one or more of the following performance criteria:

a. **resistance to collapse** (loadbearing capacity), which applies to loadbearing elements only, denoted R in the European classification of the resistance to fire performance;

b. **resistance to fire penetration** (integrity), denoted E in the European classification of the resistance to fire performance; and

c. **resistance to the transfer of excessive heat** (insulation), denoted I in the European classification of the resistance to fire performance.

Table A2 sets out the minimum periods of fire resistance for elements of structure.

Table A3 sets out criteria appropriate to the suspended ceilings that can be accepted as contributing to the fire resistance of a floor.

Table A4 sets out limitations on the use of uninsulated fire-resisting glazed elements. These limitations do not apply to the use of insulated fire-resisting glazed elements.

Information on tested elements is frequently given in literature available from manufacturers and trade associations.

Information on tests on fire-resisting elements is also given in such publications as:

Association for Specialist Fire Protection/Steel Construction Institute/Fire Test Study Group *Fire protection for structural steel in buildings*, ~~second~~ third edition – revised, 2004 ~~1992~~. (Available from the ASFP, Association House, 99 West Street, Farnham, Surrey GU9 7NP~~EN~~ www.asfp.org.uk and the Steel Construction Institute, Silwood Park, Ascot, Berks SL5 7QN).

ROOFS

6. Performance in terms of the resistance of roofs to external fire exposure is determined by reference to either:

a. (National tests) BS 476: Part 3: 2004 *External fire exposure roof tests*, or

b. (European tests) Commission Decision XXXX/YYY/EC amending Decision 2001/671/EC *Establishing a classification system for the external fire performance of roofs and roof coverings.*

~~the methods specified in BS 476: Part 3: 1958 *External fire exposure roof tests* under which constructions are designated.~~

Constructions are classified within the National system by two letters in the range A–D, with an AA designation being the best. The first letter indicates the time to penetration, and the second letter a measure of the spread of flame.

Constructions are classified within the European system as $B_{ROOF}(t4)$, $C_{ROOF}(t4)$, $D_{ROOF}(t4)$, $E_{ROOF}(t4)$ or $F_{ROOF}(t4)$ (with $B_{ROOF}(t4)$ being the highest performance and $F_{ROOF}(t4)$ being the lowest) in accordance with BS EN 13501-5: xxxx, *Fire classification of construction products and building elements*, Part 5 – *Classification using test data from external fire exposure to roof tests.*

~~**Note**~~ BS EN 13501-5 contains four separate tests. The suffix (t4) used above indicates that test 4 is to be used for the purposes of this Approved Document.

~~**Note:** This is not the most recent version of the standard.~~

~~Currently, no guidance is possible on the performance in terms of the resistance of roofs to external fire exposure as determined by the methods specified in DD ENV 1187:2002, since there is no accompanying classification procedure and no comparative supporting data.~~

In some circumstances roofs, or parts of roofs, may need to be fire-resisting, for example if used as an escape route or if the roof performs the function of a floor. Such circumstances are covered in Sections 2, ~~6 and 8~~ 4 and 6.

Table A5 gives notional designations of some generic roof coverings.

REACTION TO FIRE

7. Performance in terms of reaction to fire to be met by construction products is determined by Commission Decision 200/147/EC of 8 February 2000 implementing Council Directive 89/106/EEC as regards the classification of the reaction to fire performance of construction products.

Note: The designation of xxxx is used for the year reference for standards that are not yet published. The latest version of any standard may be used provided that it continues to address the relevant requirements of the Regulations.

All products, excluding floorings, are classified as †A1, A2, B, C, D, E or F (with class A1 being the highest performance and F being the lowest) in accordance with BS EN 13501-1:2002, *Fire classification of construction products and building elements*, Part 1 – *Classification using data from reaction to fire tests.*

† The classes of reaction to fire performance of A2, B, C, D and E are accompanied by additional classifications related to the production of smoke (s1, s2, s3) and/or flaming droplets/particles (d0, d1, d2).

The relevant European test methods are specified as follows:

- BS EN ISO 1182: 2002 *Reaction to fire tests for building products – Non-combustibility test*
- BS EN ISO 1716: 2002 *Reaction to fire tests for building products – Determination of the gross calorific value*
- BS EN 13823: 2002 *Reaction to fire tests for building products – Building products excluding floorings exposed to the thermal attack by a single burning item*
- BS EN ISO 11925-2: 2002 *Reaction to fire tests for building products,* Part 2 – *Ignitability when subjected to direct impingement of a flame.*
- BS EN 13238: 2001 *Reaction to fire tests for building products – conditioning procedures and general rules for selection of substrates.*

NON-COMBUSTIBLE MATERIALS

8. Non-combustible materials are defined in Table A6 either as listed products, or in terms of performance:

a. (National classes) when tested to BS 476: Part 4: 1970 *Non-combustibility test for materials* or Part 11: 1982 *Method for assessing the heat emission from building products*

b. (European classes) when classified as class A1 in accordance with BS EN 13501-1:2002, *Fire classification of construction products and building elements,* Part 1 – *Classification using data from reaction to fire tests* when tested to BS EN ISO 1182: 2002 *Reaction to fire tests for building products – Non-combustibility test* **and** BS EN ISO 1716: 2002 *Reaction to fire tests for building products – Determination of the gross calorific value.*

Table A6 identifies non-combustible products and materials, and lists circumstances where their use is necessary.

MATERIALS OF LIMITED COMBUSTIBILITY

9. Materials of limited combustibility are defined in Table A7:

a. (National classes) by reference to the method specified in BS 476: Part 11: 1982

b. (European classes) in terms of performance when classified as class A2-s3, d2 in accordance with BS EN 13501-1: 2002, *Fire classification of construction products and building elements*, Part 1 – *Classification using data from reaction to fire tests* when tested to BS EN ISO 1182: 2002, *Reaction to fire tests for building products – Non-combustibility test* **or** BS EN ISO 1716: 2002 *Reaction to fire tests for building products – Determination of the gross calorific value* **and** BS EN 13823: 2002 *Reaction to fire tests for building products – Building products excluding floorings exposed to the thermal attack by a single burning item.*

Table A7 also includes composite products (such as plasterboard) which are considered acceptable, and where these are exposed as linings they should also meet any appropriate flame spread rating.

INTERNAL LININGS

10. Flame spread over wall or ceiling surfaces is controlled by providing for the lining materials or products to meet given performance levels in tests appropriate to the materials or products involved.

11. Under the National classifications, lining systems which can be effectively tested for 'surface spread of flame' are rated for performance by reference to the method specified in BS 476: Part 7: 1971 *Surface spread of flame tests for materials*, or 1987 *Method for classification of the surface spread of flame of products*, or 1997 *Method of test to determine the classification of the surface spread of flame of products* under which materials or products are classified 1, 2, 3 or 4 with Class 1 being the highest.

Under the European classifications, lining systems are classified in accordance with BS EN 13501-1: 2002 *Fire classification of construction products and building elements*, Part 1 – *Classification using data from reaction to fire tests*. Materials or products are classified as A1, A2, B, C, D, E or F, with A1 being the highest. When a classification includes 's3, d2', it means that there is no limit set for smoke production and/or flaming droplets/particles.

12. To restrict the use of materials which ignite easily, which have a high rate of heat release and/or which reduce the time to flash over, maximum acceptable 'fire propagation' indices are specified, where the National test methods are being followed. These are determined by reference to the method specified in BS 476: Part 6: 1981 or 1989 *Method of test for fire propagation of products*. Index of performance (I) relates to the overall test performance, whereas sub-index (i_1) is derived from the first three minutes of test.

13. The highest National product performance classification for lining materials is Class 0. This is achieved if a material or the surface of a composite product is either:

a. composed throughout of materials of limited combustibility; or

b. a Class 1 material which has a fire propagation index (I) of not more than 12 and sub-index (i_1) of not more than 6.

Note: Class 0 is not a classification identified in any British Standard test.

14. Composite products defined as materials of limited combustibility (see paragraph 9 and Table A7) should in addition comply with the test requirement appropriate to any surface rating specified in the guidance on requirements B2, B3 and B4.

15. The notional performance ratings of certain widely used generic materials or products are listed in Table A8 in terms of their performance in the traditional lining tests BS 476: Parts 6 and 7 or in accordance with BS EN 13501-1: 2002 *Fire classification of construction products and building elements*, Part 1 – *Classification using data from reaction to fire tests.*

16. Results of tests on proprietary materials are frequently given in literature available from manufacturers and trade associations.

Any reference used to substantiate the surface spread of flame rating of a material or product should be carefully checked to ensure that it is suitable, adequate and applicable to the construction to be used. Small differences in detail, such as thickness, substrate, colour, form, fixings, adhesive etc. may significantly affect the rating.

THERMOPLASTIC MATERIALS

17. A thermoplastic material means any synthetic polymeric material which has a softening point below 200°C if tested to BS 2782: *Methods of testing plastics*, Part 1 *Thermal properties*, Method 120A: 1990 *Determination of the Vicat softening temperature of thermoplastics*. Specimens for this test may be fabricated from the original polymer where the thickness of material of the end product is less than 2.5mm.

18. A thermoplastic material in isolation can not be assumed to protect a substrate, when used as a lining to a wall or ceiling. The surface rating of both products must therefore meet the required classification. If however, the thermoplastic material is fully bonded to a non-thermoplastic substrate, then only the surface rating of the composite will need to comply.

19. Concessions are made for thermoplastic materials used for window glazing, rooflights, and lighting diffusers within suspended ceilings, which may not comply with the criteria specified in paragraphs 11 et seq. They are described in the guidance on requirements B2 and B4.

20. For the purposes of the requirements B2 and B4 thermoplastic materials should either be used according to their classification 0-3, under the BS 476: Parts 6 and 7 tests as described in paragraphs 11 et seq. if they have such a rating, or they may be classified TP(a) rigid, TP(a) flexible, or TP(b) according to the following methods:

TP(a) rigid:

i. Rigid solid pvc sheet;

ii. Solid (as distinct from double- or multiple-skin) polycarbonate sheet at least 3mm thick;

iii. Multi-skinned rigid sheet made from unplasticised pvc or polycarbonate which has a Class 1 rating when tested to BS 476: Part 7: 1971, 1987 or 1997;

iv. Any other rigid thermoplastic product, a specimen of which (at the thickness of the product as put on the market), when tested to BS 2782: 1970 as amended in 1974: Method 508A *Rate of burning (Laboratory method)*, performs so that the test flame extinguishes before the first mark, and the duration of flaming or afterglow does not exceed five seconds following removal of the burner.

TP(a) flexible:

Flexible products not more than 1mm thick which comply with the Type C requirements of BS 5867: *Specification for fabrics for curtains and drapes* Part 2 *Flammability requirements* when tested to BS 5438: *Methods of test for flammability of textile fabrics when subjected to a small igniting flame applied to the face or bottom edge of vertically oriented specimens*, Test 2, 1989 with the flame applied to the surface of the specimens for 5, 15, 20 and 30 seconds respectively, but excluding the cleansing procedure; and

TP(b):

i. Rigid solid polycarbonate sheet products less than 3mm thick, or multiple-skin polycarbonate sheet products which do not qualify as TP(a) by test; or

ii. Other products which, when a specimen of the material between 1.5 and 3mm thick is tested in accordance with BS 2782: 1970, as amended in 1974: Method 508A, has a rate of burning which does not exceed 50mm/minute.

Note: If it is not possible to cut or machine a 3mm thick specimen from the product then a 3mm test specimen can be moulded from the same material as that used for the manufacture of the product.

Note: Currently, no new guidance is possible on the assessment or classification of thermoplastic materials under the European system since there is no generally accepted European test procedure and supporting comparative data.

FIRE TEST METHODS

21. A guide to the various test methods in BS 476 and BS 2782 is given in PD 6520 *Guide to fire test methods for building materials and elements of construction* (available from the British Standards Institution).

A guide to the development and presentation of fire tests and their use in hazard assessment is given in BS 6336: *Guide to development and presentation of fire tests and their use in hazard assessment.*

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Table A1 Specific provisions of test for fire resistance of elements of structure etc

Part of building	Minimum provisions when tested to the relevant part of BS 476(1) (minutes)			Minimum provisions when tested to the relevant European standard (minutes)(12)	Method of exposure
	Loadbearing capacity (2)	Integrity	Insulation		
1. **Structural** frame, beam or column.	see Table A2	not applicable	not applicable	R see Table A2	exposed faces
2. **Loadbearing wall** (which is not also a wall described in any of the following items).	see Table A2	not applicable	not applicable	R see Table A2	each side separately
3. **Floors (3)**					
a. in upper storey of two-storey dwelling house (but not over garage or basement);	30	15	15	REI 30 (9)	
b. between a shop and flat above; and	60 or see Table A2 (whichever is greater)	60 or see Table A2 (whichever is greater)	60 or see Table A2 (whichever is greater)	REI 60 or see Table A2 (whichever is greater)	from underside (4)
c. any other floor, including compartment floors.	see Table A2	see Table A2	see Table A2	REI see Table A2	
4. **Roofs**					
a. any part forming an escape route;	30	30	30	REI 30	from underside (4)
b. any roof that performs the function of a floor.	see Table A2	see Table A2	see Table A2	REI see Table A2	
5. **External walls**					
a. any part less than 1000mm from any point on the relevant boundary;	See Table A2	see Table A2	see Table A2	REI see Table A2	each side separately
b. any part 1000mm or more from the relevant boundary(5);	see Table A2	see Table A2	15	REI see Table A2 (10)	from inside the building
c. any part adjacent to an external escape route (see Section 6 4, Diagram 22 15).	30	30	no provision (6)(7)	RE 30	from inside the building
6. **Compartment walls**					
~~Separating occupancies~~ separating an apartment from any other part of the building (see 7.15)	60 or see Table A2 (whichever is less)	60 or see Table A2 (whichever is less)	60 or see Table A2 (whichever is less)	REI 60 or see Table A2 (whichever is less)	each side separately
7. **Compartment walls** (other than in item 6)	see Table A2	see Table A2	see Table A2	REI see Table A2	each side separately
8. **Protected shafts**, excluding any firefighting shaft					
a. any glazing described in Section 9 7, Diagram 30 22;	not applicable	30	no provision (7)	E 30	
b. any other part between the shaft and a protected lobby/corridor described in Diagram 30 22 above;	30	30	30	REI 30	each side separately
c. any part not described in (a) or (b) above.	see Table A2	see Table A2	see Table A2	REI see Table A2	
9. **Enclosure** (which does not form part of a compartment wall or a protected shaft) to a:					each side separately
a. protected stairway;	30	30	30 (8)	REI 30 (8)	
b. lift shaft.	30	30	30	REI 30	

Table A1 continued

Part of building	Minimum provisions when tested to the relevant part of BS 476 (1) (minutes)			Minimum provisions when tested to the relevant European standard (minutes)(12)	Method of exposure
	Loadbearing capacity (2)	Integrity	Insulation		
10. **Firefighting shafts**					
a. construction separating firefighting shaft from rest of building;	120	120	120	REI 120	from side remote from shaft
	60	60	60	REI 60	from shaft side
b. construction separating firefighting stair, firefighting lift shaft and firefighting lobby.	60	60	60	REI 60	each side separately
11. **Enclosure** (which is not a compartment wall or described in item 8) to a:					each side separately
a. protected lobby;	30	30	30 (8)	REI 30 (8)	
b. protected corridor.	30	30	30 (8)	REI 30 (8)	
12. **Sub-division of a corridor**	30	30	30 (8)	REI 30 (8)	each side separately
13. **Wall separating** an attached or integral garage from a dwellinghouse.	30	30	30 (8)	REI 30 (8)	from garage side
14. **Enclosure** in a flat or maisonette to a protected entrance hall, or to a protected landing.	30	30	30 (8)	REI 30 (8)	each side separately
15. **Fire-resisting construction**:					each side separately
a. in dwellings not described elsewhere;	30	30	30 (8)	REI 30 (8)	
b. enclosing places of special fire hazard (see ~~9.12~~ 7.12);	30	30	30	REI 30	
~~c. between store rooms sales area in shops and (see 6.54)~~	30	30	30	REI 30	
~~d. fire-resisting subdivision described in Section 10, Diagram 34(b)~~	30	30	30	REI 30	
16. **Cavity barrier**	not applicable	30	15	EI 30 (11)	each side separately
17. **Ceiling** described in Section ~~10~~ 2, Diagram ~~33~~ 5 or Section 8 Diagram ~~35~~ 25	not applicable	30	30	EI 30	from underside
18. **Duct** described in paragraph ~~10.14e~~ 8.8e	not applicable	30	no provision	E 30	from outside
19. **Casing** around a drainage system described in Section ~~11~~ 9, Diagram ~~38~~ 28	not applicable	30	no provision	E 30	from outside
20. **Flue walls** described in Section ~~11~~ 9, Diagram ~~39~~ 29	not applicable	half the period specified in Table A2 for the compartment wall/floor	half the period specified in Table A2 for the compartment wall/floor	EI half the period specified in Table A2 for the compartment wall/floor	from outside
21. **Construction** described in Note (a) to paragraph ~~15.9~~ 13.9	not applicable	30	30	EI 30	from underside
22. **Fire doors**	see Table B1			see Table B1	

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Table A1 **continued**

Notes:

1. Part 21 for loadbearing elements, Part 22 for non-loadbearing elements, Part 23 for fire-protecting suspended ceilings, and Part 24 for ventilation ducts. BS 476: Part 8 results are acceptable for items tested or assessed before 1 January 1988.
2. Applies to loadbearing elements only (see B3.ii and Appendix E).
3. Guidance on increasing the fire resistance of existing timber floors is given in BRE Digest 208 *Increasing the fire resistance of existing timber floors* (BRE 1988).
4. A suspended ceiling should only be relied on to contribute to the fire resistance of the floor if the ceiling meets the appropriate provisions given in Table A3.
5. The guidance in Section 14 allows such walls to contain areas which need not be fire-resisting (unprotected areas).
6. Unless needed as part of a wall in item 5a or 5b.
7. Except for any limitations on glazed elements given in Table A4.
8. See Table A4 for permitted extent of uninsulated glazed elements.
9. For the purposes of meeting the Building Regulations floors under item 3a will be deemed to have satisfied the provisions above, provided that they achieve loadbearing capacity of at least 30 minutes and integrity and insulation requirements of at least 15 minutes when tested in accordance with the relevant European test.
10. For the purposes of meeting the Building Regulations external walls under item 5b will be deemed to have satisfied the provisions above, provided that they achieve the loadbearing capacity and integrity requirements as defined in Table A2 and an insulation requirement of at least 15 minutes.
11. For the purposes of meeting the Building Regulations cavity barriers will be deemed to have satisfied the provisions above, provided that they achieve an integrity requirement of at least 30 minutes and an insulation requirement of at least 15 minutes.
12. The National classifications do not automatically equate with the equivalent classifications in the European column, therefore products cannot typically assume a European class unless they have been tested accordingly.
    'R' is the European classification of the resistance to fire performance in respect of loadbearing capacity;
    'E' is the European classification of the resistance to fire performance in respect of integrity; and
    'I' is the European classification of the resistance to fire performance in respect of insulation.

Table A2 **Minimum periods of fire resistance**

~~Purpose group of building~~	Minimum periods (minutes) for elements of structure in a:					
	Basement storey ($) including floor over		Ground or upper storey			
	Depth (m) of a lowest basement		Height (m) of top floor above ground, in a building or separated part of a building			
	more than 10	not more than 10	not more than 5	not more than 18	not more than 30	more than 30
~~1. Residential (domestic):~~						
~~a. flats and maisonettes~~ Apartment buildings	90	60	30*	60**†	90**	120**
~~b. and c.~~ Dwellinghouses	not relevant	30*	30*	60@	not relevant	not relevant

Single storey buildings are subject to the periods under the heading 'not more than 5'. If they have basements, the basement storeys are subject to the period appropriate to their depth.

Apartment buildings with a floor above 30m from ground level should be fitted with sprinklers (see paragraph 7.16).

Modifications referred to in Table A2: [for application of the table see next page]

$ The floor over a basement (or if there is more than one basement, the floor over the topmost basement) should meet the provisions for the ground and upper storeys if that period is higher.

* Increased to a minimum of 60 minutes for compartment walls separating buildings.

** Reduced to 30 minutes for any floor within a ~~maisonette~~ multi-storey apartment, but not if the floor contributes to the support of the building.

~~œ Multi-storey hospitals designed in accordance with the NHS Firecode document should have a minimum 60 minutes standard.~~

Reduced to 90 minutes for elements not forming part of the structural frame.

\+ Increased to 30 minutes for elements protecting the means of escape.

† Refer to paragraph ~~8.10~~ 6.9 regarding the acceptability of 30 minutes in flat conversions.

@ 30 minutes in the case of three storey dwellinghouses, increased to 60 minutes minimum for compartment walls separating buildings.

Notes:

1. Refer to Table A1 for the specific provisions of test.
2. ~~'Sprinklered' means that the building is fitted throughout with an automatic sprinkler system meeting the relevant recommendations of BS 5306 *Fire extinguishing installations and equipment on premises*. Part 2 *Specification for sprinkler systems*; i.e. the relevant occupancy rating together with the additional requirements for life safety.~~
3. ~~The car park should comply with the relevant provisions in the guidance on requirement B3, Section 12.~~
4. ~~For the purposes of meeting the Building Regulations, the following types of steel elements are deemed to have satisfied the minimum period of fire resistance of 15 minutes when tested to the European test method:~~
   ~~i) Beams supporting concrete floors, maximum Hp/A=230m^{-1} operating under full design load.~~
   ~~ii) Free standing columns, maximum Hp/A=180m^{-1} operating under full design load.~~
   ~~iii) Wind bracing and struts, maximum Hp/A=210m^{-1} operating under full design load.~~

~~Guidance is also available in BS 5950 *Structural use of steelwork in building*. Part 8 *Code of practice for fire resistant design*.~~

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APPLICATION OF THE FIRE RESISTANCE STANDARDS IN TABLE A2:

a. Where one element of structure supports or carries or gives stability to another, the fire resistance of the supporting element should be no less than the minimum period of fire resistance for the other element (whether that other element is loadbearing or not).

   There are circumstances where it may be reasonable to vary this principle, for example:

   i. Where the supporting structure is in the open air, and is not likely to be affected by the fire in the building; or

   ii. where the supporting structure is in a different compartment, with a fire-separating element (which has the higher standard of fire resistance) between the supporting and the separated structure; or

   iii. where a plant room on the roof needs a higher fire resistance than the elements of structure supporting it.

b. Where an element of structure forms part of more than one building or compartment, that element should be constructed to the standard of the greater of the relevant provisions.

c. Where one side of a basement is (due to the slope of the ground) open at ground level, giving an opportunity for smoke venting and access for firefighting, it may be appropriate to adopt the standard of fire resistance applicable to above ground structures for elements of structure in that storey.

d. Although most elements of structure in a single storey building may not need fire resistance (see the guidance on requirement B3, paragraph ~~8.4~~ 6.4(a)), fire resistance will be needed if the element:

   i. is part of (or supports) an external wall and there is provision in the guidance on requirement B4 to limit the extent of openings and other unprotected areas in the wall; or

   ii. is part of (or supports) a compartment wall, including a wall common to two or more buildings, or a wall between a dwellinghouse and an attached or integral garage; or

   iii. supports a gallery.

   For the purposes of this paragraph, the ground storey of a building which has one or more basement storeys and no upper storeys, may be considered as a single storey building. The fire resistance of the basement storeys should be that appropriate to basements.

Table A3 **Limitations on fire-protecting suspended ceilings** (see Table A1, Note 4)

Height of building or separated part (m)	Type of floor	Provision for fire resistance or floor (minutes)	Description of suspended ceiling
less than 18	not compartment	60 or less	Type W, X, Y or Z
	compartment	less than 60	
		60	Type X, Y or Z
18 or more	any	60 or less	Type Y or Z
no limit	any	more than 60	Type Z

Notes:

1. Ceiling type and description (the change from Types A–D to Types W–Z is to avoid confusion with Classes A–D (European)):
   W. Surface of ceiling exposed to the cavity should be Class 0 or Class 1 (National) or Class C-s3, d2 or better (European).
   X. Surface of ceiling exposed to the cavity should be Class 0 (National) or Class B-s3, d2 or better (European).
   Y. Surface of ceiling exposed to the cavity should be Class 0 (National) or Class B-s3, d2 or better (European). Ceiling should not contain easily openable access panels.
   Z. Ceiling should be of a material of limited combustibility (National) or of Class A2-s3, d2 or better (European) and not contain easily openable access panels. Any insulation above the ceiling should be of a material of limited combustibility (National) or Class A2-s3, d2 or better (European).
2. Any access panels provided in fire protecting suspended ceilings of type Y or Z should be secured in position by releasing devices or screw fixings, and they should be shown to have been tested in the ceiling assembly in which they are incorporated.
3. European classifications

The National classifications do not automatically equate with the equivalent European classifications, therefore products cannot typically assume a European class unless they have been tested accordingly.
When a classification includes 's3, d2', this means that there is no limit set for smoke production and/or flaming droplets/particles.

Table A4 **Limitations on the use of uninsulated glazed elements on escape routes**

(These limitations do not apply to glazed elements which satisfy the relevant insulation criterion, see Table A1.) (See BS 5588: Part 7 for glazing to atria; see BS 5588: Part 8 for glazing to refuges.)

Position of glazed element	**Maximum total glazed area in parts of a building with access to:**			
	a single stairway		**more than one stairway**	
	walls	**door leaf**	**walls**	**door leaf**
Single family dwellinghouses				
1. a. Within the enclosures of a protected stairway, or within fire-resisting separation shown in Section 2 Diagram 3	fixed fanlights only	unlimited	fixed fanlights only	unlimited
~~ii. an existing stair (see para 2.18).~~	~~unlimited~~	~~unlimited~~	~~unlimited~~	~~unlimited~~
b. Within fire-resisting separation: i. shown in Section 2 Diagram 4 ii. described in paragraph 2.13b ~~& 2.20~~.	unlimited above 100mm from floor	unlimited above 100mm from floor	unlimited above 100mm from floor	unlimited above 100mm from floor
c. Existing window between an attached/integral garage and the house.	unlimited	not applicable	unlimited	not applicable
~~**Flats and maisonettes**~~ **Apartments** 2. Within the enclosures of a protected entrance hall or protected landing or within fire-resisting separation shown in Section 3 Diagram ~~9~~ 8.	fixed fanlights only	unlimited above 1100mm from floor	fixed fanlights only	unlimited above 1100mm from floor
General (except dwellinghouses) 3. Between residential/sleeping accommodation and a common escape route (corridor, lobby or stair).	nil	nil	nil	nil
4. Between a protected stairway (1) and: a. the accommodation; or b. a corridor which is not a protected corridor. Other than in item 3 above.	nil	25% of door area	unlimited above 1100mm[2]	50% of door area
5. Between: a. a protected stairway (1) and a protected lobby or protected corridor; or b. accommodation and a protected lobby. Other than in item 3 above.	unlimited above 1100mm from floor	unlimited above 100mm from floor	unlimited above 100mm from floor	unlimited above 100mm from floor
6. Between the accommodation and a protected corridor forming a dead end. Other than in item 3 above.	unlimited above 1100mm from floor	unlimited above 100mm from floor	unlimited above 1100mm from floor	unlimited above 100mm from floor
7. Between accommodation and any other corridor; or subdividing corridors. Other than in item 3 above.	not applicable	not applicable	unlimited above 100mm from floor	unlimited above 100mm from floor
~~8. Adjacent an external escape route described in para 4.27.~~	~~unlimited above 1100mm from paving~~	~~unlimited above 1100mm from paving~~	~~unlimited above 1100mm from paving~~	~~unlimited above 1100mm from paving~~
8. Adjacent an external escape stair (see paragraph ~~6.25~~ 4.24 and Diagram ~~22~~ 15) or roof escape (see paragraph ~~6.35~~ 4.34).	unlimited	unlimited	unlimited	unlimited

Notes:

1. If the protected stairway is also a protected shaft (see paragraph ~~9.36~~ 7.32) or a firefighting stair (see Section ~~18~~ 16) there may be further restrictions on the uses of glazed elements.
2. Measured vertically from the landing floor level or the stair pitch line.
3. The 100mm limit is intended to reduce the risk of fire spread from a floor covering.
4. Items 1c, 3 and 6 apply also to single storey buildings.
5. Glass should be marked with the manufacturer, product name and thickness.
6. Good guidance can be found in *A guide to best practice in the specification and use of fire-resistant glazed systems* published by the Glass and Glazing Federation. To obtain copies of this document either contact the GGF on 0870 042 4255 or go to www.ggf.org.uk

Table A5 **Notional designations of roof coverings**

Part i: Pitched roofs covered with slates or tiles

Covering material	Supporting structure	Designation
1. Natural slates 2. Fibre reinforced cement slates 3. Clay tiles 4. Concrete tiles	timber rafters with or without underfelt, sarking, boarding, woodwool slabs, compressed straw slabs, plywood, wood chipboard, or fibre insulating board	AA (National class) or $B_{roof}(t4)$ (European class)

Note: Although the table does not include guidance for roofs covered with bitumen felt, it should be noted that there is a wide range of materials on the market and information on specific products is readily available from manufacturers.

Part ii: Pitched roofs covered with self-supporting sheet

Roof covering material	Construction	Supporting structure	Designation
1. Profiled sheet of galvanised steel, aluminium, fibre reinforced cement, or pre-painted (coil coated) steel or aluminium with a PVC or PVF2 coating	single skin without underlay, or with underlay or plasterboard, fibre insulating board, or woodwool slab	structure of timber, steel or concrete	AA (National class) or $B_{Roof}(t4)$ (European class)
2. Profiled sheet of galvanised steel, aluminium, fibre reinforced cement, or pre-painted (coil coated) steel or aluminium with a PVC or PVF2 coating	double skin without interlayer, or with interlayer of resin bonded glass fibre, mineral wool slab, polystyrene, or polyurethane	structure of timber, steel or concrete	AA (National class) or $B_{Roof}(t4)$ (European class)

Part iii. Flat roofs covered with bitumen felt

A flat roof comprising of bitumen felt should (irrespective of the felt specification) be deemed to be of designation AA (National class) or $B_{Roof}(t4)$ (European class) if the felt is laid on a deck constructed of 6mm plywood, 12.5mm wood chipboard, 16mm (finished) plain edged timber boarding, compressed straw slab, screeded wood wool slab, profiled fibre reinforced cement or steel deck (single or double skin) with or without fibre insulating board overlay, profiled aluminium deck (single or double skin) with or without fibre insulating board overlay, or concrete or clay pot slab (in situ or pre-cast), and has a surface finish of:

a. bitumen-bedded stone chippings covering the whole surface to a depth of at least 12.5mm;
b. bitumen-bedded tiles of a non-combustible material;
c. sand and cement screed; or
d. macadam.

Part iv. Pitched or flat roofs covered with fully supported material

Covering material	Supporting structure	Designation
1. Aluminium sheet 2. Copper sheet 3. Zinc sheet 4. Lead sheet 5. Mastic asphalt 6. Vitreous enamelled steel 7. Lead/tin alloy coated steel sheet 8. Zinc/aluminium alloy coated steel sheet 9. Pre-painted (coil coated) steel sheet including liquid-applied PVC coatings	timber joists and tongued and grooved boarding, or plain edged boarding	AA* (National class) or $B_{Roof}(t4)$ (European class)
	steel or timber joists with deck of woodwool slabs, compressed straw slab, wood chipboard, fibre insulating board, or 9.5mm plywood	AA (National class) or $B_{Roof}(t4)$ (European class)
	concrete or clay pot slab (in situ or pre-cast) or non-combustible deck of steel, aluminium, or fibre cement (with or without insulation)	AA (National class) or $B_{Roof}(t4)$ (European class)

Notes:

* Lead sheet supported by timber joists and plain edged boarding is deemed to be designated class $C_{roof}(t4)$ (European class). ~~should be regarded as having a BA designation.~~

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Table A6 **Use and definitions of non-combustible materials**

References in AD.B guidance to situations where such materials should be used	**Definitions of non-combustible materials**	
	National class	**European class**
~~1. ladders referred to in the guidance to B1, paragraph 6.22.~~ 1. refuse chutes meeting provisions in the guidance to B3, paragraph ~~9.35e~~ 7.31c. ~~2. suspended ceilings and their supports where there is provision in the guidance to B3, paragraph 10.13, for them to be constructed of non-combustible materials.~~ 2. pipes meeting the provisions in the guidance to B3, Table ~~15~~ 4. 3. flue walls meeting the provisions in the guidance to B3, Diagram ~~39~~ 29. ~~6. construction forming car parks referred to in the guidance to B3, paragraph 12.3.~~	a. Any material which when tested to BS476: Part 11 does not flame nor cause any rise in temperature on either the centre (specimen) or furnace thermocouples. b. Totally inorganic materials such as concrete, fired clay, ceramics, metals, plaster and masonry containing not more than 1% by weight or volume of organic material. (Use in buildings of combustible metals such as magnesium/aluminium alloys should be assessed in each individual case). c. Concrete bricks or blocks meeting BS 6073: Part 1. d. Products classified as non-combustible under BS 476: Part 4.	a. Any material classified as class A1 in accordance with BS EN 13501–1: 2002 *Fire classification of construction products and building elements*, Part 1 – *Classification using data from reaction to fire tests.* b. Products made from one or more of the materials considered as Class A1 without the need for testing, as defined in Commission Decision 96/603/EC of 4 October 1996 establishing the list of products belonging to Class A1 'No contribution to fire' provided for in the Decision 94/611/EC implementing Article 20 of the Council Directive 89/106/EEC on construction products. None of the materials shall contain more than 1.0% by weight or volume (whichever is the lower) of homogeneously distributed organic material.
		Note: The National classifications do not automatically equate with the equivalent classifications in the European column, therefore products cannot typically assume a European class unless they have been tested accordingly.

Table A7 Use and definitions of materials of limited combustibility

References in AD.B guidance to situations where such materials should be used	Definitions of non-combustible materials	
	National class	**European class**
1. stairs where there is provision in the guidance to B1 for them to be constructed of materials of limited combustibility (see paragraph ~~6.19~~ 4.18). ~~2. materials above a suspended ceiling meeting the provisions in the guidance to B3, paragraph 10.13.~~ 2. reinforcement/support for fire-stopping referred to in the guidance to B3, see paragraph ~~11.13~~ 9.13. 4. roof coverings meeting provisions: ~~a. in the guidance to B3, paragraph 10.11 or~~ a. in the guidance to B4, Table ~~17~~ 6 or b. in the guidance to B4, Diagram ~~47~~ 37. ~~4. roof deck meeting the provisions of the guidance to B3, Diagram 28a.~~ 4. class 0 materials meeting the provisions in Appendix A, paragraph 13(a). 5. ceiling tiles or panels of any fire-protecting suspended ceiling (Type Z) in Table A3. ~~6. compartment walls and compartment floors in hospitals referred to in paragraph 9.32.~~	a. Any non-combustible material listed in Table A6. b. Any material of density 300/kg/m^3 or more, which when tested to BS476: Part 11, does not flame and the rise in temperature on the furnace thermocouple is not more than 20°C. c. Any material with a non-combustible core at least 8mm thick having combustible facings (on one or both sides) not more than 0.5mm thick. (Where a flame spread rating is specified, these materials must also meet the appropriate test requirements.)	a. Any material listed in Table A6. b. Any material/product classified as Class A2-s3, d2 or better in accordance with BS EN 13501-1: 2002 *Fire classification of construction products and building elements*, Part 1 – *Classification using data from reaction to fire tests.*
6. insulation material in external wall construction referred to in paragraph ~~13.7~~ 11.7. 7. insulation above any fire-protecting suspended ceiling (Type Z) in Table A3.	Any of the materials (a), (b) or (c) above, or: d. Any material of density less than 300kg/m^2, which when tested to BS476: Part 11, does not flame for more than ten seconds and the rise in temperature on the centre (specimen) thermocouple is not more than 35°C and on the furnace thermocouple is not more than 25°C.	Any of the materials/products (a) or (b) above
		Notes: 1. The National classifications do not automatically equate with the equivalent classifications in the European column, therefore products cannot typically assume a European class unless they have been tested accordingly. 2. When a classification includes 's3, d2', this means that there is no limit set for smoke production and/or flaming droplets/particles.

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Table A8 **Typical performance ratings of some generic materials and products**

Rating	Material or product
Class 0 (National)	1. Any non-combustible material or material of limited combustibility. (Composite products listed in Table A7 must meet test requirements given in Appendix A, paragraph 13(b)). 2. Brickwork, blockwork, concrete and ceramic tiles. 3. Plasterboard (painted or not with a PVC facing not more than 0.5mm thick) with or without an air gap or fibrous or cellular insulating material behind. 4. Woodwool cement slabs. 5. Mineral fibre tiles or sheets with cement or resin binding.
Class 3 (National)	6. Timber or plywood with a density more than 400kg/m^3, painted or unpainted. 7. Wood particle board or hardboard, either untreated or painted. 8. Standard glass reinforced polyesters.
Class A1 (European)	9. Any material that achieves this class and is defined as 'classified without further test" in a published Commission Decision.
Class A2-s3, d2 (European)	10. Any material that achieves this class and is defined as 'classified without further test' in a published Commission Decision.
Class B-s3, d2 (European)	11. Any material that achieves this class and is defined as 'classified without further test' in a published Commission Decision.
Class C-s3, d2 (European)	12. Any material that achieves this class and is defined as 'classified without further test' in a published Commission Decision.
Class D-s3, d2 (European)	13. Any material that achieves this class and is defined as 'classified without further test' in a published Commission Decision.

Notes (National):

1. Materials and products listed under Class 0 also meet Class 1.
2. Timber products listed under Class 3 can be brought up to Class 1 with appropriate proprietary treatments.
3. The following materials and products may achieve the ratings listed below. However, as the properties of different products with the same generic description vary, the ratings of these materials/products should be substantiated by test evidence.
   Class 0 – aluminium faced fibre insulating board, flame retardant decorative laminates on a calcium silicate board, thick polycarbonate sheet, phenolic sheet and UPVC.
   Class 1 – phenolic or melamine laminates on a calcium silicate substrate and flame-retardant decorative laminates on a combustible substrate.

Notes (European):

For the purposes of the Building Regulations:

1. Materials and products listed under Class A1 also meet Classes A2-s3, d2, B-s3, d2, C-s3, d2 and D-s3, d2.
2. Materials and products listed under Class A2-s3, d2 also meet Classes B-s3, d2, C-s3, d2 and D-s3, d2.
3. Materials and products listed under Class B-s3, d2 also meet Classes C-s3, d2 and D-s3, d2.
4. Materials and products listed under Class C-s3, d2 also meet Class D-s3, d2.
5. The performance of timber products listed under Class D-s3, d2 can be improved with appropriate proprietary treatments.
6. Materials covered by the CWFT process (classification without further testing) can be found by accessing the European Commission's website via the link on the ODPM website www.odpm.gov.uk/buildingregs
7. The national classifications do not automatically equate with the equivalent classifications in the European column, therefore products cannot typically assume a European class unless they have been tested accordingly.
8. When a classification includes 's3, d2', this means that there is no limit set for smoke production and/or flaming droplets/particles.

APPENDIX B:
Fire doors

1. All fire doors should have the appropriate performance given in Table B1 either:

a. by their performance under test to BS 476: *Fire tests on building materials and structures, Part 22: Methods for determination of the fire resistance of non-loadbearing elements of construction*, in terms of integrity for a period of minutes, e.g. FD30. A suffix (S) is added for doors where restricted smoke leakage at ambient temperatures is needed; or

b. as determined with reference to Commission Decision 2000/367/EC of 3 May 2000 implementing Council Directive 89/106/EEC as regards the classification of the resistance to fire performance of construction products, construction works and parts thereof. All fire doors should be classified in accordance with BS EN 13501-2: xxxx, *Fire classification of construction products and building elements*, Part 2 – *Classification using data from fire resistance tests (excluding products for use in ventilation systems)*. They are tested to the relevant European method from the following:

BS EN 1634-1: 2000, *Fire resistance tests for door and shutter assemblies*, Part 1 – *Fire doors and shutters;*

BS EN 1634-2: xxxx, *Fire resistance tests for door and shutter assemblies*, Part 2 – *Fire door hardware;*

BS EN 1634-3: xxxx, *Fire resistance tests for door and shutter assemblies*, Part 3 – *Smoke control doors*.

The performance requirement is in terms of integrity (E) for a period of minutes. An additional classification of S_a is used for all doors where restricted smoke leakage at ambient temperatures is needed.

The requirement (in either case) is for test exposure from each side of the door separately, except in the case of lift doors which are tested from the landing side only.

Any test evidence used to substantiate the fire resistance rating of a door or shutter should be carefully checked to ensure that it adequately demonstrates compliance that is applicable to the **complete installed assembly**. Small differences in detail (such as glazing apertures, intumescent strips, door frames and ironmongery etc.) may significantly affect the rating.

Notes:

1. The designation of xxxx is used for standards that are not yet published. The latest version of any standard may be used provided that it continues to address the relevant requirements of the Regulations.

2. Until such time that the relevant harmonised product standards are published, for the purposes of meeting the Building Regulations, products tested in accordance with BS EN 1634-1 (with or without pre-fire test mechanical conditioning) will be deemed to have satisfied the provisions provided that they achieve the minimum fire resistance in terms of integrity, as detailed in Table B1.

2. All fire doors should be fitted with a ~~automatic~~ self-closing device except for fire doors to cupboards and to service ducts which are normally kept locked shut and fire doors within dwellings (excluding any door to an apartment or to an attached or integral garage, see paragraph 7.14).

The ODPM is minded to remove the need for self-closing devices within dwellings. This is because they can present a hazard to children; they can interfere with the day-to-day convenience of the occupants and many of our stakeholders tell us they are often disabled soon after occupation. The fire safety benefits of closing doors, particularly at night, remain and it is proposed to reinforce this message through national and local Community Fire Safety programmes (see www.firekills.gov.uk) and other fire safety initiatives. We would therefore particularly welcome consultees' views on this particular proposal.

Note: All rolling shutters should be capable of being opened and closed manually for firefighting purposes (see Section ~~18~~ 16, paragraph ~~18.13~~ 16.10).

3. Where a self-closing device would be considered a hindrance to the normal approved use of the building, self-closing fire doors may be held open by:

a. a fusible link (but not if the door is fitted in an opening provided as a means of escape unless it complies with paragraph 4 below); or

b. an automatic release mechanism actuated by an automatic fire detection and alarm system; or

c. a door closer delay device.

4. Two fire doors may be fitted in the same opening so that the total fire resistance is the sum of their individual fire resistances, provided that each door is capable of closing the opening. In such a case, if the opening is provided as a means of escape, both doors should be self-closing, but one

of them may be fitted with an automatic self-closing device and be held open by a fusible link if the other door is capable of being easily opened by hand and has at least 30 minutes fire resistance.

5. Because fire doors often do not provide any significant insulation, there should be some limitation on the proportion of doorway openings in compartment walls. Therefore no more than 25% of the length of a compartment wall should consist of door openings, unless the doors provide both integrity and insulation to the appropriate level (see Appendix A, Table A2).

Note: Where it is practicable to maintain a clear space on both sides of the doorway, then the above percentage may be greater.

6. Roller shutters across a means of escape should only be released by a heat sensor, such as a fusible link or electric heat detector, in the immediate vicinity of the door. Closure of shutters in such locations should not be initiated by smoke detectors or a fire alarm system, **unless** the shutter is also intended to partially descend to form part of a boundary to a smoke reservoir.

7. Unless shown to be satisfactory when tested as part of a fire door assembly, the essential components of any hinge on which a fire door is hung should be made entirely from materials having a melting point of at least 800°C.

8. Except for doors identified in paragraph 9 below, all fire doors should be marked with the appropriate fire safety sign complying with BS 5499: *Fire safety signs, notices and graphic symbols*, Part 1 *Specification for fire safety signs*, according to whether the door is:

a. to be kept closed when not in use;

b. to be kept locked when not in use; or

c. held open by an automatic release mechanism.

Fire doors to cupboards and to service ducts should be marked on the outside; all other fire doors on both sides.

9. The following fire doors are not required to comply with paragraph 8 above:

a. doors within dwellinghouses;

b. doors to and within ~~flats or maisonettes~~ apartments;

c. lift entrance/landing doors.

10. Tables A1 and A2 set out the minimum periods of fire resistance for the elements of structure to which performance of some doors is linked. Table A4 sets out limitations on the use of uninsulated glazing in fire doors.

11. BS 8214: *Code of practice for fire door assemblies with non-metallic leaves* gives recommendations for the specification, design, construction, installation and maintenance of fire doors constructed with non-metallic door leaves.

Guidance on timber fire-resisting doorsets, in relation to the new European test standard, may be found in *'Timber fire-resisting doorsets: maintaining performance under the new European test standard'* published by TRADA (Timber Research and Development Association).

Guidance for metal doors is given in *Code of practice for fire-resisting metal doorsets* published by the DSMA (Door and Shutter Manufacturers' Association) in 1999.

12. Hardware used on fire doors can significantly affect performance in fire. Notwithstanding the guidance in this Approved Document guidance is available in *'Hardware for timber and escape doors'* published by the Builders' Hardware Industry Federation in November 2000.

Table B1 **Provisions for fire doors**

Position of door	Minimum fire resistance of door in terms of integrity (minutes) when tested to BS 476 part 22(1)	Minimum fire resistance of door in terms of integrity (minutes) when tested to the relevant European standard (3)
1. In a compartment wall separating buildings	As for the wall in which the door is fitted, but a minimum of 60	As for the wall in which the door is fitted, but a minimum of 60
2. In a compartment wall:		
a. if it separates ~~a flat or maisonette~~ an apartment from a space in common use	FD 30S (2)	E30 S_a (2)
b. enclosing a protected shaft forming a stairway situated wholly or partly above the adjoining ground in a building used for ~~Flats~~ Apartments, Other Residential, Assembly and Recreation, or Office purposes	FD 30S (2)	E30 S_a (2)
c. enclosing a protected shaft forming a stairway not described in (b) above	Half the period of fire resistance of the wall in which it is fitted, but 30 minimum and with suffix S (2)	Half the period of fire resistance of the wall in which it is fitted, but 30 minimum and with suffix S_a(2)
d. enclosing a protected shaft forming a lift or service shaft	Half the period of fire resistance of the wall in which it is fitted, but 30 minimum	Half the period of fire resistance of the wall in which it is fitted, but 30 minimum
e. not described in (a), (b), (c) or (d) above.	As for the wall it is fitted in, but add S (2) if the door is used for progressive horizontal evacuation under the guidance to B1	As for the wall it is fitted in, but add S_a(2) if the door is used for progressive horizontal evacuation under the guidance to B1
3. In a compartment floor	As for the floor in which it is fitted	As for the floor in which it is fitted
4. Forming part of the enclosures of a a protected stairway (except where described in item 9)	FD 30S (2)	E30 S_a (2)
~~b. a lift shaft (see paragraph 6.42b); which does not form a protected shaft in 2(b), (c) or (d) above.~~	FD 30	E30
5. Forming part of the enclosure of:		
a. a protected lobby approach (or protected corridor) to a stairway	FD 30S (2)	E30 S_a (2)
b. any other protected corridor ~~or~~	FD 20S (2)	E20 S_a (2)
~~c. a protected lobby approach to a lift shaft (see paragraph 6.42)~~	FD 30S (2)	E30 S_a (2)
6. Affording access to an external escape route	FD 30	E30
7. Sub-dividing:		
a. corridors connecting alternative exits	FD 20S (2)	E20 S_a (2)
b. dead end portions of corridors from the remainder of the corridor	FD 20S (2)	E20 S_a (2)
8. Any door:		
a. within a cavity barrier	FD 30	E30
b. between a dwellinghouse and a garage	FD 30	E30

Table B1 **continued**

Position of door	Minimum fire resistance of door in terms of integrity (minutes) when tested to BS 476 part 22(1)	Minimum fire resistance of door in terms of integrity (minutes) when tested to the relevant European standard
9. Any door: a. forming part of the enclosures to a protected stairway in a single family dwelling house;	FD 20	E20
b. forming part of the enclosure to a protected entrance hall or protected landing in ~~a flat or maisonette~~ an apartment; or	FD 20	E20
c. within any other fire-resisting construction in a dwelling not described elsewhere in this table	FD 20	E20
10. To a place of special fire hazard	Half the period of fire resistance of the wall in which it is fitted, but 30 minimum and with suffix S (2)	Half the period of fire resistance of the wall in which it is fitted, but 30 minimum and with suffix Sa(2)

Notes:

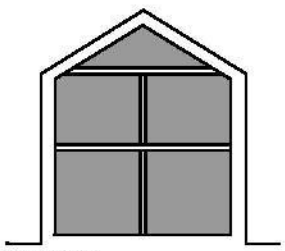
1. To BS 476: Part 22 (or BS 476: Part 8 subject to paragraph 5 in Appendix A).
2. Unless pressurization techniques complying with BS 5588: Part 4 *Fire precautions in the design, construction and use of buildings, Code of practice for smoke control using pressure differentials* are used, these doors should also either:
   (a) have a leakage rate not exceeding $3m^3/m$/hour (head and jambs only) when tested at 25 Pa under BS 476 *Fire tests on building materials and structures*, Section 31.1 *Methods for measuring smoke penetration through doorsets and shutter assemblies, Method of measurement under ambient temperature conditions*; or
   (b) meet the additional classification requirement of S_a when tested to BS EN 1634-3:xxxx, *Fire resistance tests for door and shutter assemblies*, Part 3 – *Smoke control doors*.
3. The National classifications do not automatically equate with the equivalent classifications in the European column, therefore products cannot typically assume a European class unless they have been tested accordingly.

APPENDIX C:
Methods of measurement

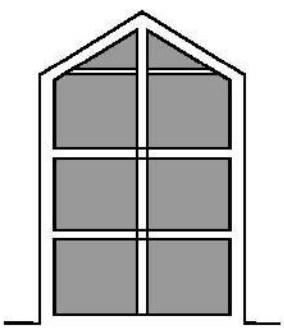
1. Some form of measurement is an integral part of many of the provisions in this document. Diagrams C1–C5 show how the various forms of measurement should be made.

Note: See Approved Document B1, paragraph ~~B1.xxv~~ B1.xiv for methods of measurement of occupant capacity, travel distance and width of doors, escape routes and stairs, which are specific to means of escape in case of fire.

Diagram C1 **Cubic capacity**



SECTION
a. BUILDING



SECTION
b. PART OR COMPARTMENT OF A BUILDING

in every case measure the volume contained by:
a. under surface of roof as appropriate;
b. upper surface of lowest floor;
c. the inner surface of enclosing walls (when there is not an enclosing outside wall, measure to the outermost edge of the floor) and ignore internal walls and partitions.

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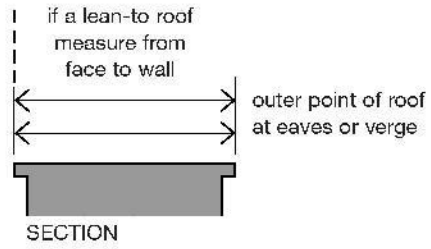
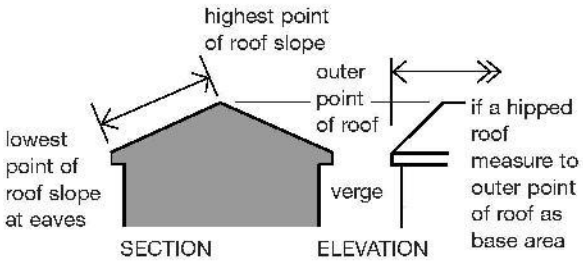
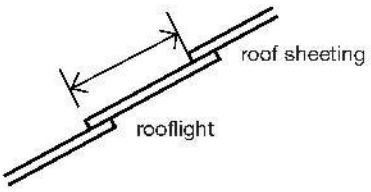
Diagram C2 **Area**



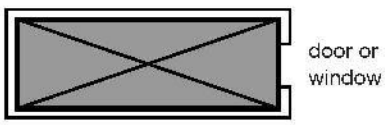
1. Flat or monopitch



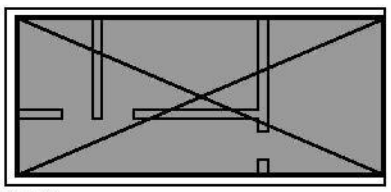
2. Double pitch



3. Rooflight, surface area: roofs and rooflights, in each case measure the visible area

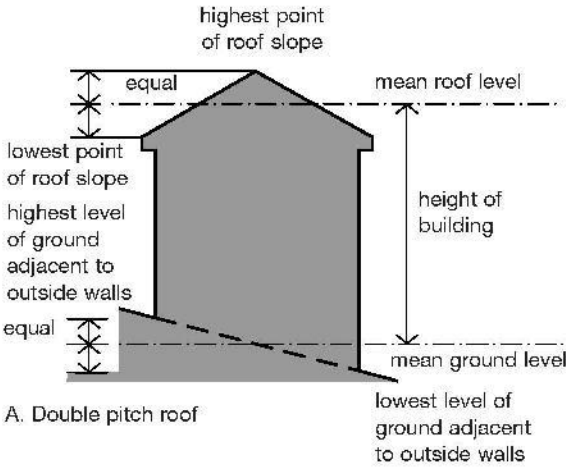


4. Floor area: room, garage, conservatory or outbuilding, measure to inner surface of enclosing walls

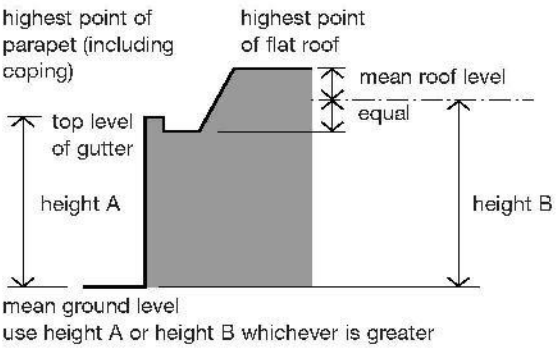


5. Floor area: storey, part or compartment, measure to inner surface of enclosing walls and include internal walls and partitions

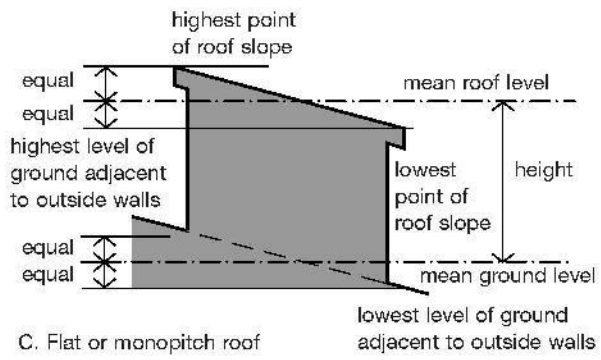
Diagram C3 **Height of building**



A. Double pitch roof



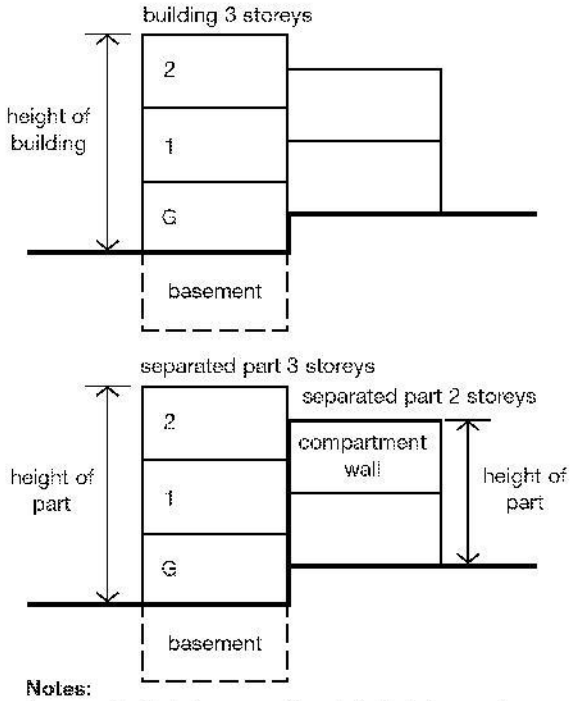
B. Mansard type roof



C. Flat or monopitch roof

Diagram C4 **Number of storeys**

To count the number of storeys in a building, or in a separated part of a building, count only at the position which gives the greatest number and exclude any basement storeys

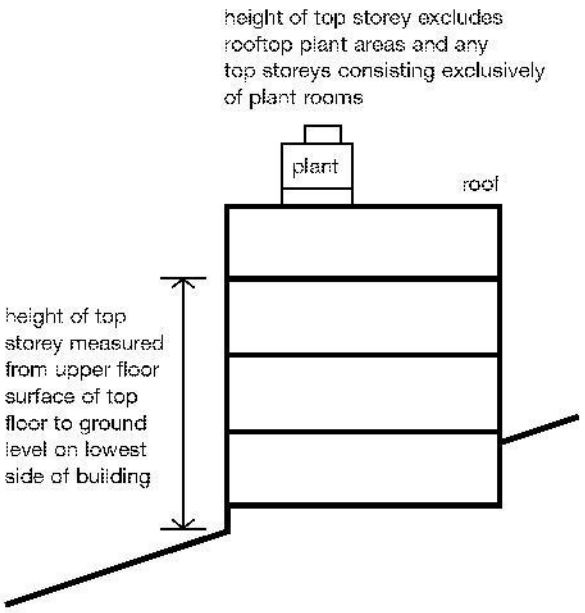


Notes:

In assembly buildings, a gallery is included as a storey, but not if it is a loading gallery, fly gallery, stage grid, lighting bridge, or any gallery provided for similar purposes, or for maintenance and repair.

In other purpose group buildings, galleries are not counted as a storey.

Diagram C5 **Height of top storey in building**



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APPENDIX D:
Purpose groups

1. Many of the provisions in this document are related to the use of the building. The use classifications are termed purpose groups and represent different levels of hazard. They can apply to a whole building, or (where a building is compartmented) to a compartment in the building, and the relevant purpose group should be taken from the main use of the building or compartment.

2. Table D1 sets out the purpose group classification.

Note: It is only of relevance to this Approved Document.

ANCILLARY AND MAIN USES

3. In some situations there may be more than one use involved in a building or compartment, and in certain circumstances it is appropriate to treat the different use as belonging to a purpose group in its own right. These situations are:

a. where the ancillary use is ~~a flat or maisonette~~ an apartment; or

b. where the building or compartment is more than 280m² in area and the ancillary use is of an area that is more than a fifth of the total floor area of the building or compartment; or

c. storage in a building or compartment of purpose group 4 (shop or commercial), where the storage amounts to more than one third of the total floor area of the building or compartment and the building or compartment is more than 280m² in area.

4. Some buildings may have two or more main uses that are not ancillary to one another. For example offices over shops from which they are independent. In such cases, each of the uses should be considered as belonging to a purpose group in its own right.

5. In other cases, and particularly in some large buildings, there may be a complex mix of uses. In such cases it is necessary to consider the possible risk that one part of a complex may have on another and special measures to reduce the risk may be necessary.

Table D1 Classification of purpose groups

Title	Group	Purpose for which the building or compartment of a building is intended to be used
Residential* (dwellings)	1(a)	~~Flat or maisonette~~ Apartment.
	1(b)	Dwellinghouse which contains a habitable storey with a floor level which is more than 4.5m above ground level.
	1(c)	Dwellinghouse which does not contain a habitable storey with a floor level which is more than 4.5m above ground level.
Residential (Institutional)	2(a)	Hospital, home, school or other similar establishment used as living accommodation for, or for the treatment, care or maintenance of persons suffering from disabilities due to illness or old age or other physical or mental incapacity, or under the age of five years, or place of lawful detention, where such persons sleep on the premises.
(Other)	2(b)	Hotel, boarding house, residential college, hall of residence, hostel, and any other residential purpose not described above.
Office	3	Offices or premises used for the purpose of administration, clerical work (including writing, book keeping, sorting papers, filing, typing, duplicating, machine calculating, drawing and the editorial preparation of matter for publication, police and fire service work), handling money (including banking and building society work), and communications (including postal, telegraph and radio communications) or radio, television, film, audio or video recording, or performance [not open to the public] and their control.
Shop and commercial	4	Shops or premises used for a retail trade or business (including the sale to members of the public of food or drink for immediate consumption and retail by auction, self-selection and over-the-counter wholesale trading, the business of lending books or periodicals for gain and the business of a barber or hairdresser) and premises to which the public is invited to deliver or collect goods in connection with their hire repair or other treatment, or (except in the case of repair of motor vehicles) where they themselves may carry out such repairs or other treatments.
Assembly and recreation	5	Place of assembly, entertainment or recreation; including bingo halls, broadcasting, recording and film studios open to the public, casinos, dance halls; entertainment, conference, exhibition and leisure centres; funfairs and amusement arcades; museums and art galleries; non-residential clubs, theatres, cinemas and concert halls; educational establishments, dancing schools, gymnasia, swimming pool buildings, riding schools, skating rinks, sports' pavilions, sports stadia; law courts; churches and other buildings of worship, crematoria; libraries open to the public, non-residential day centres, clinics, health centres and surgeries; passenger stations and termini for air, rail, road or sea travel; public toilets; zoos and menageries.
Industrial	6	Factories and other premises used for manufacturing, altering, repairing, cleaning, washing, breaking-up, adapting or processing any article; generating power or slaughtering livestock.
Storage and other non-residential+	7(a)	Place for the storage or deposit of goods or materials [other than described under 7(b)] and any building not within any of the purpose groups 1–6.
	7(b)	Car parks designed to admit and accommodate only cars, motorcycles and passenger or light goods' vehicles weighing no more than 2500 kg gross.

Notes:

This table only applies to Part B.

* Includes live/work units that meet the provisions of paragraph 3.51 ~~any surgeries, consulting rooms, offices or other accommodation, not exceeding 50m² in total, forming part of a dwelling and used by an occupant of the dwelling in a professional or business capacity.~~

\+ A detached garage not more than 40m² in area is included in purpose group 1(c); as is a detached open carport of not more than 40m², or a detached building which consists of a garage and open carport where neither the garage nor open carport exceeds 40m² in area.

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APPENDIX E:
Definitions

Note: Except for the items marked * (which are from the Building Regulations), these definitions apply only to Part B.

Access room A room through which the only escape route from an inner room passes.

Accommodation stair A stair, additional to that or those required for escape purposes, provided for the convenience of occupants.

Alternative escape routes Escape routes sufficiently separated by either direction and space, or by fire-resisting construction, to ensure that one is still available should the other be affected by fire.

> **Note:** A second stair, balcony or flat roof which enables a person to reach a place free from danger from fire, is considered an alternative escape route for the purposes of a dwellinghouse.

Alternative exit One of two or more exits, each of which is separate from the other.

Apartment A flat or maisonette (multi-storey flat).

Appliance ventilation duct A duct provided to convey combustion air to a gas appliance.

Atrium (plural atria) A space within a building, not necessarily vertically aligned, passing through one or more structural floors.

> **Note:** Enclosed lift wells, enclosed escalator wells, building services' ducts and stairways are not classified as atria.

Automatic release mechanism A device which will allow a door held open by it to close automatically in the event of each or any one of the following:

a. detection of smoke by automatic apparatus suitable in nature, quality and location;

b. operation of a hand-operated switch fitted in a suitable position;

c. failure of electricity supply to the device, apparatus or switch;

d. operation of the fire alarm system if any.

~~Automatic~~ Self-closing device A device which is capable of closing the door from any angle and against any latch fitted to the door.

Note: Rising butt hinges which do not meet the above criteria are acceptable where the door is:

a. to ~~(or within)~~ a dwelling;

b. between a dwellinghouse and its garage; or

c. in a cavity barrier.

Basement storey A storey with a floor which at some point is more than 1200mm below the highest level of ground adjacent to the outside walls. (However, see Appendix A, Table A2, for situations where the storey is considered to be a basement only because of a sloping site.)

Boundary The boundary of the land belonging to the building, or where the land abuts a road, railway, canal or river, the centre line of that road, railway, canal or river. (See Diagram ~~44~~ 31.)

* **Building** Any permanent or temporary building but not any other kind of structure or erection. A reference to a building includes a reference to part of a building.

Building Control Body A term used to include both Local Authority Building Control and Approved Inspectors.

Cavity barrier A construction, other than a smoke curtain, provided to close a concealed space against penetration of smoke or flame, or provided to restrict the movement of smoke or flame within such a space.

Ceiling A part of a building which encloses and is exposed overhead in a room, protected shaft or circulation space. (The soffit of a rooflight is included as part of the surface of the ceiling, but not the frame. An upstand below a rooflight would be considered as a wall.)

Circulation space A space (including a protected stairway) mainly used as a means of access between a room and an exit from the building or compartment.

Class 0 A product performance classification for wall and ceiling linings. The relevant test criteria are set out in Appendix A, paragraph 13.

Common balcony A walkway, open to the air on one or more sides, forming part of the escape route from more than one flat or maisonette.

Common stair An escape stair serving more than one flat or maisonette.

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Compartment (fire) A building or part of a building, comprising one or more rooms, spaces or storeys, constructed to prevent the spread of fire to or from another part of the same building, or an adjoining building. (A roof space above the top storey of a compartment is included in that compartment.) (See also 'Separated part'.)

Compartment wall or floor A fire-resisting wall/floor used in the separation of one fire compartment from another. (Constructional provisions are given in Section 9 7.)

Concealed space or cavity A space enclosed by elements of a building (including a suspended ceiling) or contained within an element, but not a room, cupboard, circulation space, protected shaft or space within a flue, chute, duct, pipe or conduit.

Corridor access A design of a building containing flats in which each dwelling is approached via a common horizontal internal access or circulation space which may include a common entrance hall.

Dead end Area from which escape is possible in one direction only.

Direct distance The shortest distance from any point within the floor area, measured within the external enclosures of the building, to the nearest storey exit ignoring walls, partitions and fittings, other than the enclosing walls/ partitions to protected stairways.

Dwelling A unit of residential accommodation occupied (whether or not as a sole or main residence):

a. by a single person or by people living together as a family

b. by not more than six residents living together as a single household, including a household where care is provided for residents.

* **Dwellinghouse** does not include a flat or a building containing a flat.

Element of structure:

a. a member forming part of the structural frame of a building or any other beam or column

b. a loadbearing wall or loadbearing part of a wall

c. a floor

d. a gallery (but not a loading gallery, fly gallery, stage grid, lighting bridge, or any gallery provided for similar purposes or for maintenance and repair)

e. an external wall

f. a compartment wall (including a wall common to two or more buildings). (However, see the guidance to B3, paragraph ~~8.4~~ 6.4, for exclusions from the provisions for elements of structure.)

Emergency lighting Lighting provided for use when the supply to the normal lighting fails.

Equivalent area A measure of the aerodynamic performance of a ventilator. It is the area of a sharp-edged orifice which air would pass at the same volume flow rate, under an identical applied pressure difference, as the opening under consideration.

Escape lighting That part of the emergency lighting which is provided to ensure that the escape route is illuminated at all material times.

Escape route Route forming that part of the means of escape from any point in a building to a final exit.

European Technical Approval A favourable technical assessment of the fitness for use of a construction product for an intended use, issued for the purposes of the Construction Products Directive by a body authorised by a Member State to issue European technical approvals for those purposes and notified by that Member State to the European Commission.

European Technical Approvals Issuing body

A body notified under Article 10 of the Construction Products Directive. The details of these institutions are published in the 'C' series of the *Official Journal of the European Communities*. (At the present time the listing for the United Kingdom is the British Board of Agrément and WIMLAS Ltd. An up-to-date listing can be found on the Building Regulations pages of the ODPM website at www.odpm.gov.uk/buildingregs)

Evacuation lift A lift that may be used for the evacuation of ~~disabled~~ people in a fire.

Exit passageway A protected passageway connecting a protected stairway to a final exit (exit passageways should be protected to the same standard as the stairway that they serve).

External wall (or side of a building) Includes a part of a roof pitched at an angle of more than 70° to the horizontal, if that part of the roof adjoins a space within the building to which persons have access (but not access only for repair or maintenance).

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Final exit The termination of an escape route from a building giving direct access to a street, passageway, walkway or open space, and sited to ensure the rapid dispersal of persons from the vicinity of a building so that they are no longer in danger from fire and/or smoke.

Note: Windows are not acceptable as final exits.

Fire door A door or shutter, provided for the passage of persons, air or objects, which together with its frame and furniture as installed in a building, is intended (when closed) to resist the passage of fire and/or gaseous products of combustion, and is capable of meeting specified performance criteria to those ends. (It may have one or more leaves, and the term includes a cover or other form of protection to an opening in a fire-resisting wall or floor, or in a structure surrounding a protected shaft.)

Firefighting lift A lift designed to have additional protection, with controls that enable it to be used under the direct control of the fire service in fighting a fire. (See Sections ~~16-19~~ 14-17.)

Firefighting lobby A protected lobby providing access from a firefighting stair to the accommodation area and to any associated firefighting lift.

Firefighting shaft A protected enclosure containing a firefighting stair, firefighting lobbies and, if provided, a firefighting lift, together with its machine room.

Firefighting stair A protected stairway communicating with the accommodation area only through a firefighting lobby.

Fire-resisting (fire resistance) The ability of a component or construction of a building to satisfy for a stated period of time, some or all of the appropriate criteria specified in the relevant part of BS 476.

Fire-separating element A compartment wall, compartment floor, cavity barrier and construction enclosing a protected escape route and/or a place of special fire hazard.

Fire stop A seal provided to close an imperfection of fit or design tolerance between elements or components, to restrict the passage of fire and smoke.

* **Flat** A separate and self-contained premises constructed or adapted for use for residential purposes and forming part of a building from some other part of which it is divided horizontally.

Gallery ~~A floor which is less than one half of the area of the space into which it projects~~ A raised area or platform around the sides or at the back of a room which provides extra space.

Habitable room A room used, or intended to be used, for dwelling purposes (including for the purposes of Part B, a kitchen, but not a bathroom).

Height (of a building or storey for the purposes of Part B) Height of a building is measured as shown in Appendix C, Diagram C3, and height of the floor of the top storey above ground is measured as shown in Appendix C, Diagram C5.

Inner room Room from which escape is possible only by passing through another room (the access room).

Live/Work Unit A dwelling which is intended to serve as a workplace for its occupants and for persons who do not live on the premises. Includes surgeries, consulting rooms, offices or other accommodation forming part of a dwelling.

~~**Maisonette** means a 'Flat' on more than one level.~~

Material of limited combustibility A material performance specification that includes noncombustible materials, and for which the relevant test criteria are set out in Appendix A, paragraph 9.

Means of escape Structural means whereby [in the event of fire] a safe route or routes is or are provided for persons to travel from any point in a building to a place of safety.

Measurement Area, cubic capacity, height of a building and number of storeys, see Appendix C, Diagrams C1–C5; occupant capacity, travel distance, and width of a doorway, escape route and a stair, see paragraph ~~B1.xxv~~ B1.xiv.

Non-combustible material The highest level of reaction to fire performance. The relevant test criteria are set out in Appendix A, paragraph 8.

Notional boundary A boundary presumed to exist between buildings on the same site (see Section ~~14~~ 12, Diagram ~~42~~ 32). ~~The concept is applied only to buildings in the residential and the assembly and recreation purpose groups.~~

Occupancy type A purpose group identified in Appendix D.

Open spatial planning The internal arrangement of a building in which more than one storey or level is contained in one undivided volume, e.g. split-level floors. For the purposes of this document there is a distinction between open spatial planning and an atrium space.

Perimeter (of building) The maximum aggregate plan perimeter, found by vertical projection onto a horizontal plane (see Section ~~17~~ 15, ~~Diagram 48~~).

Pipe (for the purposes of Section ~~11~~ 9) Includes pipe fittings and accessories; and excludes a flue pipe and a pipe used for ventilating purposes (other than a ventilating pipe for an above around drainage system).

Places of special fire hazard Oil-filled transformer and switch gear rooms, boiler rooms, storage space for fuel or other highly flammable substances, and rooms housing a fixed internal combustion engine and (additionally in schools) laboratories, technology rooms with open heat sources, kitchens and stores for PE mats or chemicals.

Platform floor (access or raised floor) A floor supported by a structural floor, but with an intervening concealed space which is intended to house services.

Protected circuit An electrical circuit protected against fire.

Protected corridor/lobby A corridor or lobby which is adequately protected from fire in adjoining accommodation by fire-resisting construction.

Protected entrance hall/landing A circulation area consisting of a hall or space in a dwelling, enclosed with fire-resisting construction (other than any part which is an external wall of a building).

Protected shaft A shaft which enables persons, air or objects to pass from one compartment to another, and which is enclosed with fire-resisting construction.

Protected stairway A stair discharging through a final exit to a place of safety (including any exit passageway between the foot of the stair and the final exit) that is adequately enclosed with fire-resisting construction.

Purpose group A classification of a building according to the purpose to which it is intended to be put. See Appendix D, Table D1.

Relevant boundary The boundary which the side of the building faces, (and/or coincides with) and which is parallel, or at an angle of not more than 80°, to the side of the building (see Section ~~14~~ 12 Diagram ~~41~~ 31). A notional boundary can be a relevant boundary.

Rooflight A dome light, lantern light, skylight, ridge light, glazed barrel vault or other element intended to admit daylight through a roof.

Room (for the purposes of B2) An enclosed space within a building that is not used solely as a circulation space. (The term includes not only conventional rooms, but also cupboards that are not fittings, and large spaces such as warehouses, and auditoria. The term does not include voids such as ducts, ceiling voids and roof spaces.)

Separated part (of a building) A form of compartmentation in which a part of a building is separated from another part of the same building by a compartment wall. The wall runs the full height of the part, and is in one vertical plane. (See paragraph ~~9.24~~ 7.19, and Appendix C, Diagram C4.)

Sheltered housing means:

a. two or more dwellings in the same building;

b. two or more dwellings on adjacent sites

where those dwellings are, in each case, designed and constructed for the purpose of providing residential accommodation for vulnerable or elderly people who receive, or who are to receive, a support service.

Single storey building A building consisting of a ground storey only. (A separated part which consists of a ground storey only, with a roof to which access is only provided for repair or maintenance, may be treated as a single storey building.) Basements are not included in counting the number of storeys in a building (see Appendix C).

Site (of a building) is the land occupied by the building, up to the boundaries with land in other ownership.

Smoke alarm A device containing within one housing all the components, except possibly the energy source, necessary for detecting smoke and giving an audible alarm.

Storey includes:

a. any gallery in any other type of building if its area is more than half that of the space into which it projects; and

b. a roof, unless it is accessible only for maintenance and repair.

Storey exit A final exit, or a doorway giving direct access into a protected stairway, firefighting lobby, or external escape route.

Suspended ceiling (fire-protecting) A ceiling suspended below a floor, which contributes to the fire resistance of the floor. Appendix A, Table A3, classifies different types of suspended ceiling.

Technical specification A standard or a European Technical Approval Guide. It is the document against which compliance can be shown in the case of a standard and against which an assessment is made to deliver the European technical approval.

Thermoplastic material See Appendix A, paragraph 17.

Travel distance (unless otherwise specified, e.g. as in the case of flats apartments) The actual distance to be travelled by a person from any point within the floor area to the nearest storey exit, having regard to the layout of walls, partitions and fittings.

Inserted text ~~Deleted text~~

Unprotected area In relation to a side or external wall of a building means:

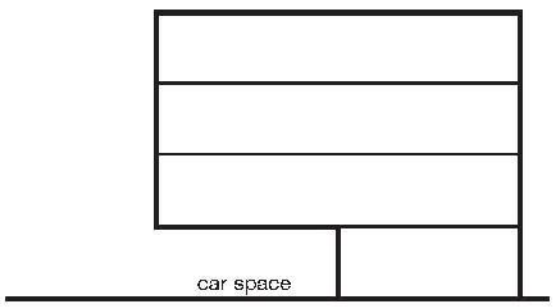
a. window, door or other opening; and

Note: Windows that are not openable and are designed and glazed to provide the necessary level of fire resistance, and recessed car parking areas shown in Diagram E1, need not be regarded as an unprotected area.

b. any part of the external wall which has less than the relevant fire resistance set out in Section ~~13~~ 11

c. any part of the external wall which has combustible material more than 1mm thick attached or applied to its external face, whether for cladding or any other purpose. Combustible material in this context is any material which does not have a Class 0 rating.)

Diagram E1 **Recessed car parking areas**



Note: The parking area should be:

a. open fronted
b. separated from the remainder of the building by a compartment wall(s) and floor(s) having not less than the period of fire resistance specified in Table A2 in Appendix A.

APPENDIX F:
Standards and other publications referred to

This appendix will be fully updated once the text for the Approved Document is finalised. Consultees may wish to suggest additional references that may prove useful to users of the Approved Document.

STANDARDS REFERRED TO

General Introduction

BS 5588: *Fire precautions in the design, construction and use of buildings:*

Part 7: 1997 *Code of practice for the incorporation of atria in buildings.*

Part 10: 1991 *Code of practice for shopping complexes.*

DD 240: 1997 *Fire safety engineering in buildings.*

Approved Document B1

BS EN 54-11: *Fire detection and fire alarm systems* – Part 11: *Manual call points.*

BS 5266: *Emergency lighting:* Part 1: 1988 *Code of practice for the emergency lighting of premises other than cinemas and certain other specified premises used for entertainment.*

BS 5306: *Fire extinguishing installations and equipment on premises:* Part 2: 1990 *Specification for sprinkler systems.*

BS 5395: *Stairs, ladders and walkways:* Part 2: 1984 *Code of practice for the design of helical and spiral stairs.*

Amendment slip

1: AMD 6076

BS 5446: *Components of automatic fire alarm systems for residential premises:* Part 1: 1990 *Specification for self-contained smoke alarms and point-type smoke detectors.*

BS 5449: *Fire safety signs, notices and graphic symbols:* Part 1: 1990 *Specification for fire safety signs.*

BS 5588: *Fire precautions in the design, construction and use of buildings:*

Part 0: 1996 *Guide to fire safety codes of practice for particular premises/ applications.*

Part 1: 1990 *Code of practice for residential buildings.*

Part 4: 1998 *Code of practice for smoke control using pressure differentials.*

Part 5: 1991 *Code of practice for firefighting stairs and lifts.*

Part 6: 1991 *Code of practice for places of assembly.*

Part 7: 1997 *Code of practice for the incorporation of atria in buildings.*

Part 8: 1999 *Code of practice for means of escape for disabled people.*

Part 9: 1989 *Code of practice for ventilation and air conditioning ductwork.*

Part 10: 1991 *Code of practice for shopping complexes.*

Part 11: 1997 *Code of practice for shops, offices, industrial, storage and other similar buildings.*

BS 5720: 1979 *Code of practice for mechanical ventilation and air conditioning in buildings.*

BS 5839: *Fire detection and alarm systems for buildings:*

Part 1: 1988 *Code of practice for system design installation and servicing.*

Part 2: 1983 *Specification for manual call points.*

Part 6: 1995 *Code of practice for the design and installation of fire detection and alarm systems in dwellings.*

Part 8: 1998 *Code of practice for the design, installation and servicing of voice alarm systems.*

BS 5906: 1980 *Code of practice for storage and on-site treatment of solid waste from buildings.*

BS 6387: 1994 *Specification for performance requirements for cables required to maintain circuit integrity under fire conditions.*

CP 1007: 1955 *Maintained lighting for cinemas.*

Approved Document B2

BS 476: *Fire tests on building materials and structures:*

Part 4: 1970 (1984) *Non-combustibility test for materials.*

Amendment slips

1: AMD 2483

2: AMD 4390

Part 6: 1981 *Method of test for fire propagation for products.*

Part 6: 1989 *Method of test for fire propagation for products.*

Part 7: 1971 *Surface spread of flame test for materials.*

Part 7: 1987 *Method for classification of the surface spread of flame of products.*

Amendment slip

1: AMD 6249

Part 7: 1997 *Method of test to determine the classification of the surface spread of flame of products.*

Part 11: 1982 *Method for assessing the heat emission from building materials.*

BS 6661: 1986 *Guide for design, construction and maintenance of single-skin air supported structures.*

BS 7157: 1989 *Method of test for ignitability of fabrics used in the construction of large tented structures.*

Approved Document B3

BS 4514: 1983 *Specification for unplasticized PVC soil and ventilating pipes, fittings and accessories:*

Amendment slips

1: AMD 4517

2: AMD 5584

BS 5255: 1989 *Specification for thermoplastics waste pipe and fittings.*

BS 5306: *Fire extinguishing installations and equipment on premises:*

Part 2: 1990 *Specification for sprinkler systems.* BS 5588: *Fire precautions in the design, construction and use of buildings.*

Part 5: 1991 *Code of practice for firefighting stairs and lifts.*

Part 7: 1997 *Code of practice for the incorporation of atria in buildings.*

Part 9: 1989 *Code of practice for ventilation and air conditioning ductwork.*

Part 10: 1991 *Code of practice for shopping complexes.*

BS 5839: *Fire detection and alarm systems for buildings:*

Part 1: 1988 *Code of practice for system design, installation and servicing.*

BS 7346: *Components for smoke and heat control systems:*

Part 2: 1990 *Specification for powered smoke and heat exhaust ventilators.*

BS 8313: 1989 *Code of practice for accommodation of building services in ducts.*

Approved Document B4

BS 476: *Fire tests on building materials and structures:*

Part 3: 1958 *External fire exposure roof tests.*

Part 6: 1981 *Method of test for fire propagation for products.*

Part 6: 1989 *Method of test for fire propagation for products.*

Part 7: 1971 *Surface spread of flame tests for materials.*

Part 7: 1987 *Method for classification of the surface spread of flame of products.*

Amendment slip

1: AMD 6249

Part 7: 1997 *Method of test to determine the classification of the surface spread of flame of products.*

BS 5306: *Fire extinguishing installations and equipment on premises:*

Part 2: 1990 *Specification for sprinkler systems.*

BS 5588: *Fire precautions in the design, construction and use of buildings:*

Part 5: 1991 *Code of practice for firefighting stairs and lifts.*

Part 7: 1997 *Code of practice for the incorporation of atria in buildings.*

Approved Document B5

BS 5306: *Fire extinguishing installations and equipment on premises:*

Part 1: 1976 (1988) *Hydrant systems, hose reels and foam inlets.*

Amendment slips

1: AMD 4649

2: AMD 5766

Part 2: 1990 *Specification for sprinkler systems.*

BS 5588: *Fire precautions in the design, construction and use of buildings:*

Part 5: 1991 *Code of practice for firefighting stairs and lifts.*

Part 10: 1991 *Code of practice for shopping complexes.*

BS 5839: *Fire detection and alarm systems for buildings:* Part 1: 1988 *Code of practice for system design, installation and servicing.*

BS 7346: *Components for smoke and heat control systems:* Part 2: 1990 *Specification for powered smoke and heat exhaust ventilators.*

Appendix A

BS 476: *Fire tests on building materials and structures:*

Part 3: 1958 *External fire exposure roof tests.*

Part 4: 1970 (1984) *Non-combustibility test for materials.*

Amendment slips

1: AMD 2483

2: AMD 4390

Part 6: 1981 *Method of test for fire propagation for products.*

Part 6: 1989 *Method of test for fire propagation for products.*

Part 7: 1971 *Surface spread of flame tests for materials.*

Part 7: 1987 *Method for classification of the surface spread of flame of products.*

Amendment slip

1: AMD 6249

Part 7: 1997 *Method of test to determine the classification of the surface spread of flame of products.*

Part 8: 1972 *Test methods and criteria for the fire resistance of elements of building construction.*

Amendment slips

1: AMD 1873

2: AMD 3816

3: AMD 4822

Part 11: 1982 *Method for assessing the heat emission from building products.*

Part 20: 1987 *Method for determination of the fire resistance of elements of construction (general principles).*

Amendment slip

1: AMD 6487

Part 21: 1987 *Methods for determination of the fire resistance of loadbearing elements of construction.*

Part 22: 1987 *Methods for determination of the fire resistance of non-loadbearing elements of construction.*

Part 23: 1987 *Methods for determination of the contribution of components to the fire resistance of a structure.*

Part 24: 1987 *Method for determination of the fire resistance of ventilation ducts.*

BS 2782: 1970 *Methods of testing plastics: Part 5: Miscellaneous methods:* Method 508A. *Rate of burning (laboratory method).*

BS 2782: *Methods of testing plastics:*

Part 1: *Thermal properties:* Methods 120A–120E: 1990 *Determination of the Vicat softening temperature of thermoplastics.*

BS 5306: *Fire extinguishing installations and equipment on premises:* Part 2: 1990 *Specification for sprinkler systems.*

BS 5438: 1989 *Methods of test for flammability of textile fabrics when subjected to a small igniting flame applied to the face or bottom edge of vertically oriented specimens,* Test 2.

BS 5588: *Fire precautions in the design, construction and use of buildings:*

Part 7: 1997 *Code of practice for the incorporation of atria in buildings.*

Part 8: 1999 *Code of practice for means of escape for disabled people.*

BS 5867: *Specification for fabrics for curtains and drapes:* Part 2: 1980 *Flammability requirements.*

Amendment slip

1: AMD 4319

BS 6073: *Precast concrete masonry units:* Part 1: 1981 *Specification for precast concrete masonry units.*

Amendment slips

1: AMD 3944

2: AMD 4462

BS 6336: 1998 *Guide to development and presentation of fire tests and their use in hazard assessment.*

PD 6520: 1988 *Guide to fire test methods for building materials and elements of construction.*

European test methods and classifications

(Reaction to fire)

BS EN ISO 1182:2002, *Reaction to fire tests for building products – Non-combustibility test.*

BS EN ISO 1716:2002, *Reaction to fire tests for building products – Determination of the gross calorific value.*

BS EN 13823:2002, *Reaction to fire tests for building products – Building products excluding floorings exposed to the thermal attack by a single burning item.*

BS EN ISO 11925-2:2002, *Reaction to fire tests for building Products,* Part 2 – *Ignitability when subjected to direct impingement of a flame.*

BS EN 13238:2001, *Reaction to fire tests for building products – Conditioning procedures and general rules for selection of substrates.*

BS EN 13501-1:2002, *Fire classification of construction products and building elements:*

Part 1 – *Classification using data from reaction to fire tests.*

European test methods and classifications

(Fire resistance)

BS EN 1363-1:1999, *Fire resistance tests,* Part 1 – *General requirements.*

BS EN 1363-2:1999, *Fire resistance tests,* Part 2 – *Alternative and additional procedures.*

DD ENV 1363-3:1999, *Fire resistance tests,* Part 3 – *Verification of furnace performance.*

BS EN 1364-1:1999, *Fire resistance tests for non-loadbearing elements,* Part 1 – *Walls.*

BS EN 1364-2:1999, *Fire resistance tests for non-loadbearing elements,* Part 2 – *Ceilings.*

BS EN 1364-3:xxxx, *Fire resistance tests for non-loadbearing elements,* Part 3 – *Curtain walls – full configuration.*

BS EN 1364-4:xxxx, *Fire resistance tests for non-loadbearing elements,* Part 4 – *Curtain walls – part configuration.*

BS EN 1364-5:xxxx, *Fire resistance tests for non-loadbearing elements,* Part 5 – *Semi-natural fire test for façades and curtain walls.*

BS EN 1364-6:xxxx, *Fire resistance tests for non-loadbearing elements,* Part 6 – *External wall systems.*

BS EN 1365-1:1999, *Fire resistance tests for loadbearing elements,* Part 1 – *Walls.*

BS EN 1365-2:1999, *Fire resistance tests for loadbearing elements,* Part 2 – *Floors and roofs.*

BS EN 1365-3:1999, *Fire resistance tests for loadbearing elements,* Part 3 – *Beams.*

BS EN 1365-4:xxxx, *Fire resistance tests for loadbearing elements,* Part 4 – *Columns.*

BS EN 1365-5:xxxx, *Fire resistance tests for loadbearing elements,* Part 5 – *Balconies.*

BS EN 1365-6:xxxx, *Fire resistance tests for loadbearing elements,* Part 6 – *Stairs and walkways.*

BS EN 1366-1:1999, *Fire resistance tests for service installations,* Part 1 – *Ducts.*

BS EN 1366-2:1999, *Fire resistance tests for service installations,* Part 2 – *Fire dampers.*

BS EN 1366-3:xxxx, *Fire resistance tests for service installations,* Part 3 – *Penetration seals.*

BS EN 1366-4:xxxx, *Fire resistance tests for service installations,* Part 4 – *Linear joint seals.*

BS EN 1366-5:xxxx, *Fire resistance tests for service installations,* Part 5 – *Service ducts and shafts.*

BS EN 1366-6:xxxx, *Fire resistance tests for service installations,* Part 6 – *Raised floors.*

BS EN 1366-7:xxxx, *Fire resistance tests for service installations,* Part 7 – *Closures for conveyors and trackbound transportation systems.*

BS EN 1366-8:xxxx, *Fire resistance tests for service installations,* Part 8 – *Smoke extraction ducts.*

BS EN 1366-9:xxxx, *Fire resistance tests for service installations,* Part 9 – *Single compartment smoke extraction ducts.*

BS EN 1366-10:xxxx, *Fire resistance tests for service installations,* Part 10 – *Smoke control dampers.*

BS EN 13501-2:xxxx, *Fire classification of construction products and building elements:* Part 2 – *Classification using data from fire resistance tests (excluding products for use in ventilation systems).*

BS EN 13501-3:xxxx, *Fire classification of construction products and building elements,* Part 3 – *Classification using data from fire resistance tests on components of normal building service installations (other than smoke control systems).*

BS EN 13501-4:xxxx, *Fire classification of construction products and building elements,* Part 4 – *Classification using data from fire resistance tests on smoke control systems.*

DD ENV 13381-1:xxxx, *Test methods for determining the contribution to the fire resistance of structural members,* Part 1 – *Horizontal protective membranes.*

DD ENV 13381-2:2002, *Test methods for determining the contribution to the fire resistance of structural members,* Part 2 – *Vertical protective membranes.*

DD ENV 13381-3:2002, *Test methods for determining the contribution to the fire resistance of structural members,* Part 3 – *Applied protection to concrete members.*

DD ENV 13381-4:2002, *Test methods for determining the contribution to the fire resistance of structural members,* Part 4 – *Applied protection to steel members.*

DD ENV 13381-5:2002, *Test methods for determining the contribution to the fire resistance of structural members,* Part 5 – *Applied protection to concrete/profiled sheet steel composite members.*

DD ENV 13381-6:2002, *Test methods for determining the contribution to the fire resistance of structural members,* Part 6 – *Applied protection to concrete filled hollow steel columns.*

DD ENV 13381-7:2002, *Test methods for determining the contribution to the fire resistance of structural members,* Part 7 – *Applied protection to timber members.*

European test methods and classifications

(External fire exposure of roofs)

DD ENV 1187:2002, *Test methods for external fire exposure to roofs.*

Appendix B

BS 476: *Fire tests on building materials and structures:*

Part 8: 1972 *Test methods and criteria for the fire resistance of elements of building construction.*

Amendment slips

1: AMD 1873

2: AMD 3816

3: AMD 4822

Part 22: 1987 *Methods for determination of the fire resistance of non-loadbearing elements of construction.*

Part 31: *Methods for measuring smoke penetration through doorsets and shutter assemblies:* Section 31.1: 1983 *Measurement under ambient temperature conditions.*

Amendment slip

1. AMD 8366

BS 5499: *Fire safety signs, notices and graphic symbols:*

Part 1: 1990 *Specification for fire safety signs.*

BS 5588: *Fire precautions in the design, construction and use of buildings:*

Part 4: 1998 *Code of practice for smoke control using pressure differentials.*

BS 8214: 1990 *Code of practice for fire door assemblies with non-metallic leaves.*

BS EN 1634-1:2000, *Fire resistance tests for door and shutter assemblies,* Part 1 – *Fire doors and shutters.*

BS EN 1634-2:xxxx, *Fire resistance tests for door and shutter assemblies,* Part 2 – *Fire door hardware.*

BS EN 1634-3:xxxx, *Fire resistance tests for door and shutter assemblies,* Part 3 – *Smoke control doors.*

Inserted text ~~Deleted text~~

OTHER PUBLICATIONS REFERRED TO

Use of guidance

Construction Products Directive (CPD). The Council Directive reference 89/106/EEC dated 21 December 1988 and published in the *Official Journal of the European Communities* No L40/12 dated 11.2.89. The CE Marking Directive (93/68/EEC) amends the CPD.

Construction fire safety, Construction Information Sheet No 51. *Fire safety in construction work*, HSG 168 (ISBN 0-7176-1332-1).

Workplace health, safety and welfare. The Workplace (Health, Safety and Welfare) Regulations 1992.

Approved Code of Practice and Guidance; The Health and Safety Commission, L24; HMSO 1992; ISBN 0-11-886333-9.

General Introduction

Crown Fire Standards. Property Advisers to the Civil Estate (PACE). (Available from Corporate Documents' Services, Savile House, Trinity Arcade, Leeds, LS1 6QW.)

Firecode. HTM 81. *Fire precautions in new hospitals.* (NHS Estates) HMSO, 1996.

LPC Design guide for the fire protection of buildings. Loss Prevention Council, 1996.

Approved Document B1

The Building Regulations 1991 (DETR/Welsh Office) HMSO

Approved Document K, *Protection from falling, collision and impact*

Approved Document M, *Access and facilities for disabled people*

Approved Document N, *Glazing – safety in relation to impact, opening and cleaning*

Building Regulation and Fire Safety – Procedural Guidance. (DOE/Home Office/Welsh Office 1992.)

Design methodologies for smoke and heat exhaust ventilation. BR 368, BRE 1999. (*Revision of design principles for smoke ventilation in enclosed shopping centres.* BR 186, BRE, 1990.)

DOE Circular 12/92. *Houses in multiple occupation*. Guidance to local housing authorities on standards of fitness under section 352 of the Housing Act.

1985. HMSO, 1992. DOE Circular 12/93. *Houses in multiple occupation*. Guidance to local housing authorities on managing the stock in their area. HMSO, 1993.

Draft guide to fire precautions in existing residential care premises. Home Office/Scottish Home and Health Department, 1983.

Firecode. HTM 81. *Fire precautions in new hospitals*. (NHS Estates) HMSO, 1996.

Firecode. HTM 88. *Guide to fire precautions in NHS housing in the community for mentally handicapped (or mentally ill) people*. (DHSS)

HMSO, 1986. Fire Precautions Act 1971. *Guide to fire precautions in existing places of work that require a fire certificate. Factories, offices, shops and railway premises*. (Home Office/Scottish Office) HMSO, 1993.

Fire Precautions (Workplace) Regulations 1997, (SI 1997 No 1840) as amended by the Fire Precautions (Workplace) (Amendment) Regulations 1999.

Gas Safety (Installation and Use) Regulations 1998, SI 1998 No 2451.

Guide to fire precautions in existing places of entertainment and like premises. (Home Office/Scottish Home and Health Department) HMSO, 1990.

Guide to Safety at Sports Grounds. (Department of National Heritage/Scottish Office) HMSO, 1997.

Pipelines Safety Regulations 1996, SI 1996 No 825.

Safety signs and signals. The Health and Safety (Safety signs and signals) Regulations 1996. Guidance on Regulations. (HSE, L64). HSE Books,1996. Welsh Office Circular 25/92.

Local Government and Housing Act 1989. *Houses in multiple occupation: standards of fitness*. Welsh Office, 1992.

Welsh Office Circular 55/93. *Houses in multiple occupation. Guidance on management strategies*. Welsh Office, 1993.

Approved Document B2

The Building Regulations 1991. Approved Document N, *Glazing – safety in relation to impact, opening and cleaning* (DETR/Welsh Office) HMSO.

Fire safety of PTFE-based materials used in buildings. BR 274, BRE 1994.

Approved Document B3

The Building Regulations 1991 (DETR/Welsh Office) HMSO.

Approved Document F, *Ventilation.*

Approved Document J, *Combustion appliances and fuel storage.*

Design methodologies for smoke and heat exhaust ventilation. BR 368, BRE 1999. (*Revision of design principles for smoke ventilation in enclosed shopping centres.* BR 186, BRE, 1990.)

Gas Safety (Installation and Use) Regulations 1998, SI 1998 No 2451.

Pipelines Safety Regulations 1996, SI 1996 No 825

Fire protection for structural steel in buildings (second edition – revised). ASFP/SCI/FTSG, 1992 (available from the ASFP, Association House, 99 West Street, Farnham, Surrey GU9 7EN and the Steel Construction Institute, Silwood Park, Ascot, Berks SL5 7QN).

Guidelines for the construction of fire-resisting structural elements. BR 128, BRE, 1988.

Increasing the fire resistance of existing timber floors. BRE Digest 208, 1988.

Appendix B

Hardware for timber and escape doors published by the Building Hardware Industry Federation in November 2000 is available from the BHIF, 42 Heath Street, Tamworth, Staffordshire, B79 7JH.

Code of practice for fire-resisting metal doorsets published by the DSMA (Door and Shutter Manufacturers' Association) in 1999 is available from DSMA, 42 Heath Street, Tamworth, Staffs B79 7JH.

Timber Fire Resisting Doorsets: maintaining performance under the new European test standard published by TRADA is available from TRADA Technology Limited, Stocking Lane, Hughenden Valley, High Wycombe, Bucks, HP14 4ND.

Appendix F

Design, construction, specification and fire management of insulated envelopes for temperature controlled environments. The International Association of Cold Storage Contractors (European Division), 1999. (Available from the IACSC, Downmill Road, Bracknell, Berks RG12 1G.