

Fire precautions in the design, construction and use of buildings —

Part 1: Code of practice for residential buildings

ICS 13.220.01; 91.040.30

Committees responsible for this British Standard

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- Association of Metropolitan Authorities
- British Fire Services' Association
- British Gas plc
- British Retailers' Association
- Building Employers' Confederation
- Chartered Institution of Building Services Engineers
- Chief and Assistant Chief Fire Officers' Association
- Consumer Policy Committee of BSI
- Department of Education and Science
- Department of Health
- Department of the Environment [Building Research Establishment (Fire Research Station)]
- Department of the Environment (Construction Industries Directorate)
- Department of the Environment (Property Services Agency)
- Department of the Environment for Northern Ireland
- Electricity Supply Industry in England and Wales
- Fire Brigades' Union
- Health and Safety Executive
- Home Office
- Incorporated Association of Architects and Surveyors
- Institute of Building Control
- Institution of Fire Engineers
- Institution of Gas Engineers
- Institution of Structural Engineers
- London Fire and Civil Defence Authority
- Loss Prevention Council
- National Council of Building Materials Producers
- Royal Institute of British Architects
- Royal Institution of Chartered Surveyors
- Scottish Development Department
- Timber Research and Development Association

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- Access Committee for England
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- Cinematograph Exhibitors' Association of Great Britain and Ireland
- Flat Glass Manufacturers' Association
- Hevac Association
- Intumescent Fire Seals Association
- National House-Building Council
- Recreation and Leisure Trade Association
- Sports Council
- Steel Window Association
- Theatres Advisory Council

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Foreword

This part of BS 5588, prepared under the direction of the Fire Standards Policy Committee, is a revision of BS 5588-1.1:1984 and CP 3:Chapter IV-1:1971, which are withdrawn.

All matters dealing with fire safety management are now located in BS 5588-12.

Other parts of BS 5588 which are already published are as follows:

- *Part 0: Guide to fire safety codes of practice for particular premises/applications;*
- *Part 4: Code of practice for smoke control using pressure differentials;*
- *Part 5: Code of practice for firefighting stairs and lifts;*
- *Part 6: Code of practice for places of assembly;*
- *Part 7: Code of practice for the incorporation of atria in buildings;*
- *Part 8: Code of practice for means of escape for disabled people;*
- *Part 9: Code of practice for ventilation and air conditioning ductwork;*
- *Part 10: Code of practice for shopping complexes;*
- *Part 11: Code of practice for shops, offices, industrial, storage and other similar buildings;*
- *Part 12: Managing fire safety.*

The only significant change from the text of BS 5588-1.1:1984 is the addition of a recommendation for the provision of some form of automatic fire detection and alarm equipment.

Some of the more important changes from the text of CP 3:Chapter IV-1:1971 are as follows.

- a) This code covers flats and maisonettes in any type of building and in blocks of any height, including flats in blocks of not more than two storeys, which were previously covered in CP 3:Chapter IV:1948.
- b) This code includes recommendations specific to sheltered housing.
- c) In Section 2, Section 3, Section 4, Section 5, Section 6 and Section 7 the commentary on the relevant principles is followed by any recommendations that are made. The specific recommendations do not form a separate section of the code as in CP 3:Chapter IV-1.

The commentary on the relevant principles is intended to provide an explanatory background to any recommendations which might otherwise appear to be arbitrary. Structural precautions against fire that have to be implemented, for example those required in connection with building regulations, if discussed are not repeated as recommendations, but reference may be made to them if the requirements are not consistent in all parts of the UK.

- d) Although CP 3:Chapter IV-1 included details of two alternative methods of smoke control termed “smoke containment” and “smoke dispersal” for the horizontal escape routes from dwellings to stairways, both methods had disadvantages (e.g. the provision of cross-corridor doors and/or permanent ventilation) which were subject to abuse by building occupiers.

Improved fire doors incorporating smoke seals that secure a high degree of protection against the ingress of smoke are now available, and this code therefore incorporates provisions for smoke control in these areas which, on the one hand, seek to maximize the satisfactory operation of its component parts and, on the other, reflect the lower risk involved.

NOTE The omission of “smoke containment” and “smoke dispersal” does not mean that these methods will not be satisfactory.

This code also formally recognizes that the pressurization of escape routes is an acceptable form of smoke control.

e) Permanent ventilation to common corridors and stairways in buildings containing flats and maisonettes is not acceptable to occupiers and hence is no longer recommended.

f) The provision of a protected entrance hall is now but one of several ways of providing a safe escape route within a flat or maisonette.

g) Fire doors are no longer referred to by “type”; instead reference is made to their performance in fire tests.

h) Designs using subsidiary stairs are not recommended and therefore are no longer included.

i) Linking balcony designs for flats and maisonettes are no longer included because they do not necessarily provide a place of safety.

j) It is recommended that all dwellings are provided with some form of automatic fire detection and alarm equipment.

A bibliography on fire in dwellings is given in Appendix A.

It has been assumed in the drafting of this code that the execution of its provisions will be entrusted to appropriately qualified and experienced people.

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

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

Compliance with a British Standard does not of itself confer immunity from legal obligations.

In particular, attention is drawn to **3.6**, **3.7** and Clauses **22** and **24**.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 75 and a back cover.

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Section 1. General

1 Scope

This part of BS 5588 provides recommendations and guidance for designers and building construction teams in their task of incorporating into the following buildings measures that should, in the event of fire, safeguard the lives of people residing in, or visiting, such buildings, and that may help to protect the building against the effects of fire.

- a) New houses of any height used as single-family dwellings, or alterations to existing houses similarly used.
- b) New buildings of any height containing flats, maisonettes or sheltered housing, or alterations to existing such buildings.
- c) Conversions of existing non-residential premises to form dwellings.

Hostels, houses in multiple occupation, caravans and mobile homes are not covered. Requirements for means of escape from caravans and mobile homes are given in BS 3632.

This code includes recommendations on the measures and equipment necessary for preventing the rapid spread of fire and for those required to assist firefighting in buildings with upper storeys beyond the reach of mobile fire appliances operating outside the building. It makes specific recommendations in terms of protection, number and position of exits, provides guidance on design principles for preventing the spread of fire and indicates the fire precautions necessary in these buildings.

Guidance for owners of buildings containing flats or maisonettes to aid them in making the best use of the design features of the building, and to act as a guide to designers in passing to their clients information about fire precautions designed into a building is contained in BS 5588-12.

Advice to occupiers of domestic residential buildings on precautions against fire that they may take is contained in BS 5588-12.

This code is not intended to apply to buildings during the course of construction or alteration.

Flats and maisonettes provided with their own entrances situated at ground or access level (i.e. not through any common stair or shared internal circulation space) should be designed on the basis of the recommendations given in Section 2 of this code. Examples of such buildings or developments would include housing schemes on sloping sites with car parking beneath, and terraces having flats at basement level with maisonettes above.

NOTE The titles of the publications referred to in this standard are listed on page 76.

2 Definitions

For the purposes of this part of BS 5588 the following definitions apply.

2.1

access level

a level used for normal access to the building that either incorporates, or leads directly to, a place of safety

2.2

access room

a room through which passes the only escape route from an inner room

2.3

alternative escape route (from a house)

a route from any point within a room of a house that gives easy access to a second stair, a balcony or a flat roof by means of which a person can reach a place free from danger from fire

2.4

alternative exit (from a flat or maisonette)

one of two or more exits from within a flat or maisonette, each of which is separate from the other

2.5**ancillary accommodation**

all parts of the building that are ancillary to the dwellings, such as rooms associated with engineering services, common amenity areas (see 2.8), refuse rooms, covered car parks, etc.

2.6**balcony access/balcony approach**

a design in which each dwelling is approached externally via an open balcony (see also 2.12)

2.7**basement**

a storey that is below the ground storey (see 2.25)

2.8**common amenity areas**

areas such as kitchens, laundries, drying areas and occupiers' stores that are remote from individual dwellings

2.9**common stair**

a protected stairway which forms part of a vertical escape route finally leading to the outside of a building at podium or ground level

2.10**corridor access/corridor approach**

a design in which each dwelling is approached via a common horizontal internal access or circulation space which may include a common entrance hall

2.11**dead end**

an area from which escape is possible in one direction only

2.12**deck access/deck approach**

similar to balcony access; a term often used to indicate a wide approach balcony but not enclosed (see also 2.6)

2.13**depth (of a building)**

the level of the surface of the lowest point of the floor of the lowest storey, measured at the centre of that face of the building where the measurement is greatest from the level of the footway or paving in front of that face, or if there is no such footway or paving, from the level of the ground

2.14**dwelling**

a single-family dwelling house, self-contained flat or maisonette

2.15**dwelling of origin**

a dwelling in which a fire has originated

2.16**escape lighting**

lighting provided, for use when the supply to the normal lighting fails, to ensure that the escape route(s) is (are) illuminated at all material times

2.17**escape route**

a route forming part of the means of escape from any point in a building to a final exit

2.18**final exit**

the termination of an escape route from a building giving direct access to a street, passageway, walkway or open space 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

2.19**fire door (assembly)**

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

2.20**firefighting lift**

a lift designated to have additional protection with controls that enable it to be used under the direct control of the fire service in fighting a fire

2.21**firefighting lobby**

a protected lobby for providing access from a firefighting stair to dwellings and to the firefighting lift

2.22**firefighting stair**

a protected stairway communicating with dwellings only through a firefighting lobby

2.23**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

2.24**flat**

a dwelling, forming part of a larger building, that has all its rooms on one level or, in the case of “split level” flats, not more than half a storey height apart

2.25**ground storey**

a storey, the floor of which is situated at such a level or levels that any given point on its perimeter is at, or about, or not more than 1.2 m below, the level of the finished surface of the ground adjoining the building in the vicinity of that point

2.26**habitable room**

any room in a dwelling with the exception of any kitchen, utility room, bathroom, dressing room or WC

2.27**height (of a building)**

the level of the surface of the highest point of the floor of the highest storey (excluding any such top storey consisting exclusively of plant rooms) measured at the centre of that face of the building where the measurement is greatest from the level of the footway or paving in front of that face, or if there is no such footway or paving, from the level of the ground

2.28**higher fire risk area**

an area with a fire risk higher than that of a dwelling

2.29**house**

a self-contained building used as a single-family dwelling having one or more storeys or levels, that is not horizontally separated from any other dwelling forming part of the building, and that has its own main entrance door situated at ground level or at any level that serves as ground level

2.30**independent alternative escape route**

one of two or more escape routes from a dwelling, each with its own exit from the dwelling and each of which is separate from the others

2.31**inner room**

a room from which escape is possible only by passing through another room (the access room, see 2.2)

2.32**maisonette**

a dwelling, forming part of a larger building, which has its rooms divided between two or more levels which are more than half a storey height apart

2.33**material of limited combustibility**

either:

- a) a non-combustible material; or
- b) any material of density 300 kg/m³ or more which, when tested in accordance with BS 476-11, does not flame and the rise in temperature on the furnace thermocouple is not more than 20 °C; or
- c) any material with a non-combustible core of 8 mm thick or more, having combustible facings (on one or both sides) not more than 0.5 mm thick.

2.34**means of escape**

structural means whereby a safe route or routes is or are provided for persons to travel from any point in a building to a place of safety

2.35**non-combustible material**

any material capable of satisfying the performance requirements specified in BS 476-4 or any material which when tested in accordance with BS 476-11 does not flame nor cause any rise in the temperature on either the centre (specimen) or furnace thermocouples

2.36**open-plan dwelling**

a dwelling in which the internal living arrangements are almost entirely undivided by partitions

2.37**place of safety**

a place in which persons are in no danger from fire

2.38**pressurization**

a method of protecting escape routes against the ingress of smoke by maintaining the air within them at pressures higher than those in adjacent parts of the building

2.39**protected circuit**

an electrical circuit protected against fire

2.40**protected entrance hall/landing**

a circulation area consisting of a hall or space within the dwelling enclosed with fire-resisting construction (other than any part which is an external wall of a building)

2.41**protected lobby/corridor**

a circulation area consisting of a lobby or a corridor enclosed with fire-resisting construction (other than any part that is an external wall of a building)

2.42**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 protected from fire elsewhere in the building by fire-resisting construction

2.43**self-closing fire door**

a fire door fitted with a device which fully closes the door overriding the resistance of any latch

2.44**sheltered housing**

blocks of flats and/or maisonettes, with each dwelling incorporating its own cooking and sanitary facilities, designed specifically for persons who might require assistance, e.g. elderly people, and where some form of assistance is available at all times

NOTE 1 This should not be taken as implying that assistance need be provided on the premises.

NOTE 2 Sheltered housing usually includes amenities common to all occupiers such as lounges, guest rooms, etc.

2.45**single stair**

a common stair which is the only one to which dwellings in a block of flats or maisonettes have access

2.46**storey exit**

a final exit, or a doorway giving direct access to a protected stairway or external escape route

2.47**travel distance**

the actual distance to be travelled by a person along an escape route

NOTE Recommendations for maximum travel distances may apply to travel within dwellings and ancillary accommodation, and from dwellings and ancillary accommodation to storey exits.

3 Analysis of the problem and use of the code

3.1 Planning in relation to fire

The only sound basis for designing means of escape from fire is to attempt to locate the positions of all possible sources of outbreak of fire, and to predict the courses that might be followed by the fire as it develops or, more particularly, the risks to the occupants that smoke and hot gases are likely to produce. Only against this background is it possible to design and protect escape routes with some certainty that they will be safe.

NOTE A more detailed description of the development of fire in buildings is given in Appendix C.

By far the greatest number of deaths from fire occur in houses and the majority of these deaths are of children or old people. However, this is a consequence of the greater number of these buildings that exist in comparison with other types of building, rather than an indication of a high level of risk to life in houses. Although there is a significant risk of outbreak of fire in the average house, the prospects of escape are good. Fire occurring anywhere within a house has to be regarded as offering an immediate risk to all occupants even though in the initial stages of fire development it might seem that persons are well removed from immediate danger.

Many buildings containing flats and/or maisonettes have been built with storeys so high above ground level that a proportion of residents live without any possibility of escape or rescue from windows or balconies. In spite of this, the number of deaths and dangerous incidents have been remarkably small: lower, indeed, in relation to numbers, than in ordinary dwelling houses. Careful attention to detail in the planning and construction of flats and maisonettes in the light of the risks that can be shown to exist from the outbreak and development of a fire in a dwelling should ensure that this good record is maintained.

In buildings containing flats and/or maisonettes designed, maintained and supervised in accordance with this code, the risk of fire starting in corridors, lobbies or stairways intended for use only for access or means of escape may be regarded as negligible as long as they are kept clear of obstructions, and adequate and convenient protected storage space is provided. It is also unlikely that fire will originate in the structure itself.

It is worthy of note that research into the burning characteristics of furniture suggests that the materials used in present-day furniture may well give rise to greater dangers from fire in a dwelling than was the case with traditional materials. Certain polymeric materials commonly used in the manufacture of furniture are capable of producing greater volumes of smoke and other combustion products in a given time, and a hotter fire, and may respond to an increase in air supply by producing yet greater volumes of smoke and combustion products.

3.2 Fire development within a dwelling

It is within the house, flat or maisonette itself that the most direct and serious risks to life arise. The following three situations can be identified.

a) A fire may be started in an occupied room by the actions of an occupant, such as by deep fat frying, smoking in bed or children playing with matches. The risk to the occupant will be severe, but it is to be hoped that he or she will be able to make his or her way to the door and give the alarm to other occupants. If this is done, and the door of the room of origin is closed, the fire will be initially confined to that room before involving the rest of the dwelling should the fire continue to develop; this may take an appreciable time to occur.

If the occupant of the room is overcome by the fire and unable to give the alarm, while the room door remains closed the effect outside the room will be similar to that just described, except that there may well be a delay in realizing that a fire exists. If, however, the room door is left open, there is risk that the products of combustion will fill those parts of the dwelling to which they can obtain access, including the stairway and any rooms with open doors, and this will threaten the escape of other occupants. The risk is more serious in houses with storeys above the ground storey and in maisonettes rather than in flats, as are all the risks associated with fire, due to the greater speed with which heat transfer takes place upwards rather than sideways.

b) A fire may start in an unoccupied room because of discarded smoking materials, electrical faults, furniture left too close to heating appliances, etc. The risk will be to all occupants of the dwelling, particularly any who may be asleep, but a fire will take time to develop unless the room door is open. If the latter is the case, an immediate danger arises of other occupants being trapped by the presence of the products of combustion between them and the exit door of the dwelling. If the door of the room of origin is closed, the fire will not emerge from the room for some time, during which the occupants may become aware of it. If they do not, their escape will be threatened when the products of combustion penetrate the door of the room of origin; the more so in a multi-storey situation when smoke permeates the stairway or fire penetrates the ceiling of the room of origin.

c) Conceivably, a fire may start or be started in the entrance hall or circulation spaces (corridors, stairways, etc.) of the house, flat or maisonette, which will present the most immediate and severe danger possible to the occupants, particularly on any upper floor. For this reason, it is essential to ensure, so far as possible at the design stage, that the potential for a fire starting in an entrance hall or circulation space is minimized.

3.3 Fire development outside the dwelling

The risks to occupants of other dwellings from a fire in another dwelling are parallel to, but much less direct than, the risks to the occupants of the dwelling of origin. The corresponding situations are as follows.

a) In the case of semi-detached or terraced houses, the risk to occupants of an adjoining house will only arise if the fire spreads through the separating walls, or across the face of the building from one window to another or by radiated heat from a fire in adjacent premises.

b) A fire in an occupied flat or maisonette is discovered by the occupants, who make their way out and leave the door closed, presumably then giving the alarm. The fire should present little or no risk to the occupants of other dwellings if they remain within their own dwelling as it will not break out of the dwelling of origin for some considerable time (during which, no doubt, the fire service will deal with the fire).

If extinction of the fire is delayed, there will be a direct risk to persons using any common access, through smoke and heat affecting the route, and the fire may begin to penetrate to other dwellings. If the dwelling entrance door is left open after the occupants' departure, any access corridor will be quickly filled with the products of combustion, and other occupants trying to use the corridor will be in serious difficulty.

c) A fire may start (or be started) in an unoccupied dwelling, there will be no one to give the alarm, and the fire may develop fully within the dwelling before other occupants are aware of it. After a time the dwelling entrance door will be penetrated, as in item b), and with the same consequences. If the dwelling entrance door gives on to an open balcony rather than an internal corridor, smoke would be of little consequence but, at a later stage, there could be difficulty in passing the door.

d) A fire may start (or be started) in an access corridor, lobby or stairway, or in ancillary accommodation, in a building containing flats or maisonettes. This is capable of rendering all circulation spaces, including stairways, impassable in a short time unless provision had been made in the design of the building to prevent it. Complete safety cannot be assured, moreover, while there is any risk that a fire may start in escape routes or circulation spaces. It is essential, therefore, that, as in 3.2c), the building is furnished and used in such a way as to reduce the risk that fire will occur in circulation spaces.

e) In mixed user buildings it is important to consider the effect of one risk upon another. A fire in an unattended office or shop premises could have serious consequences on any dwelling in the same building.

3.4 Safety measures

Against the risks described in 3.2 and 3.3, the designer has available to him the following safeguards:

- a) automatic fire detection and alarm;
- b) structural fire barriers between dwellings;
- c) structural fire barriers between dwellings and common escape routes, i.e. circulation spaces such as corridors, lobbies, stairways, etc.;
- d) structural fire barriers within dwellings;
- e) self-closing fire-doors;
- f) selective positioning of rooms within dwellings;
- g) alternative exits and escape routes from rooms and dwellings;
- h) restriction of travel distances;
- i) provision for the control of smoke.

NOTE Item c) is not applicable to houses, and items h) and i) are not normally necessary nor practicable in houses.

3.5 Site planning

The siting of residential buildings is usually dictated by restrictions imposed by urban development. These restrictions may produce conditions potentially dangerous from the point of view of fire spread from a building on fire to another exposed to its effects. Building regulations accordingly require adequate separation between the side of any building and its boundary. At the planning stage access to buildings by fire appliances and the effects of car parking adjoining the building should be considered and the fire authority consulted. A further site planning consideration is the safety of escape routes outside the building, and outside neighbouring buildings, from the effects of fire in the building concerned.

3.6 Relationship with statutory provisions

3.6.1 General

It is important to appreciate the relationships between this code and the various statutory provisions relevant to the design and construction of new buildings. The relevant legislation indicated in general terms in 3.6.2 has to be complied with in the event of a conflict with this code. However, there are two main ways in which this code is intended to supplement the legislation. The first is that, since Acts and Regulations are necessarily drafted in broad terms and cannot deal in detail with a wide variety of different situations, one of the objects of this code is to provide guidance for the building designer in matters not covered in sufficient detail by the legislation. Secondly, because the objectives of the legislation are mainly concerned with the health and safety of the general public, this code is of wider scope and includes matters relevant to the protection of the building from fire as well as the safety of the occupants.

3.6.2 Building regulations

The design and construction of new buildings, and of alterations of existing buildings, are controlled by the following statutory provisions collectively referred to as building regulations in this code.

England and Wales: The Building Regulations.

Scotland: The Building Standards (Scotland) Regulations.

Northern Ireland: The Building Regulations (Northern Ireland).

It should be noted that some county and other authorities in England and Wales have local powers in respect of fire precautions.

3.7 Disabled persons

- | In addition to the guidance given in BS 8300, there is legislation governing access for the disabled into and within buildings which the designer will need to study.

3.8 Use of the principles and application of the recommendations

A basic understanding of the principles associated with the inherent fire risk and the spread of fire in residential buildings is essential for the correct application of the recommendations.

Individual recommendations of this code should not be applied in isolation because of their interdependence: to secure maximum benefit all of the appropriate recommendations need to be applied. Although the basic principles and recommendations for escape from dwellings are described in Section 2 and Section 3, the most conscientious application of these recommendations would be undermined unless supported by the necessary measures relating to construction, ancillary accommodation, engineering services and fire protection facilities set out in Section 4, Section 5, Section 6 and Section 7.

3.9 Distances of travel

Many recommendations include a limitation on the distance of travel between two points: these are based on past experience and practice and represent the maximum distance a person can reasonably be expected to walk to escape from fire. Although it could not be said that a slightly greater distance would be so unsafe that it should under no circumstances be adopted, designers should aim to keep travel distances as short as possible, rather than designing to the maximum distance recommended.

3.10 Diagrams

The figures in this code are intended to clarify concepts and form an integral part of the recommendations. However, they should not be taken as indicating the only acceptable forms of planning of dwellings or storeys. Features (such as windows) not relevant to the concepts or principle(s) being illustrated are not shown.

3.11 Information to be given to clients

Designers are advised to inform their clients of the nature, function and (if necessary) limitations of the fire precautions that have been designed into the building, and especially those whose nature may be less evident. This will enable a better understanding of the responsibility for ensuring that a high standard of safety is maintained.

- | The recommendations provided in BS 5588-12 is intended not only as a guide to the owner of buildings containing flats and/or maisonettes, but also as a guide to the information concerning the fire precautions that have been designed into the building which designers are advised to pass to their clients.
- | BS 5588-12 has an annex containing information regarding fire safety advice for occupiers of flats and maisonettes.

Section 2. Single-family dwelling houses

4 Means of escape and provision for rescue

4.1 Commentary

Few houses have more than one stair. Because of the risk that a single stairway may be blocked by smoke, other escape routes from basements or upper storeys may need to be contemplated. From first floor level these other escape routes may have to be via openable windows (or a door to a balcony) from which rescue should be possible. In an open-plan dwelling, unless the stairway is enclosed, the upper floor bedrooms will be inner rooms (see 2.31) and hence need to be provided with openable windows or a door to a balcony.

With houses having one or more floors situated more than 4.5 m above ground or access level [a traditional three (or more) storey house], protection of the single stairway is necessary. Where houses have one or more floors situated 7.5 m or more above ground or access level [a traditional four (or more) storey house], it is necessary to provide alternative means of escape from the upper floors without reliance on a single protected stairway.

Similarly, escape from any bedroom within a basement should not rely on access being available solely by way of the ground storey.

In the planning of single storey houses it is preferable that bedrooms (or any rooms likely to be used for sleeping) do not form inner rooms.

Lowering lines and portable, retractable and throw-out ladders are not considered to be a suitable alternative to permanent means of escape (although occupants may wish to provide them as additional means of escape). Vertical or raking ladders permanently fixed in the position required will only be suitable in exceptional circumstances.

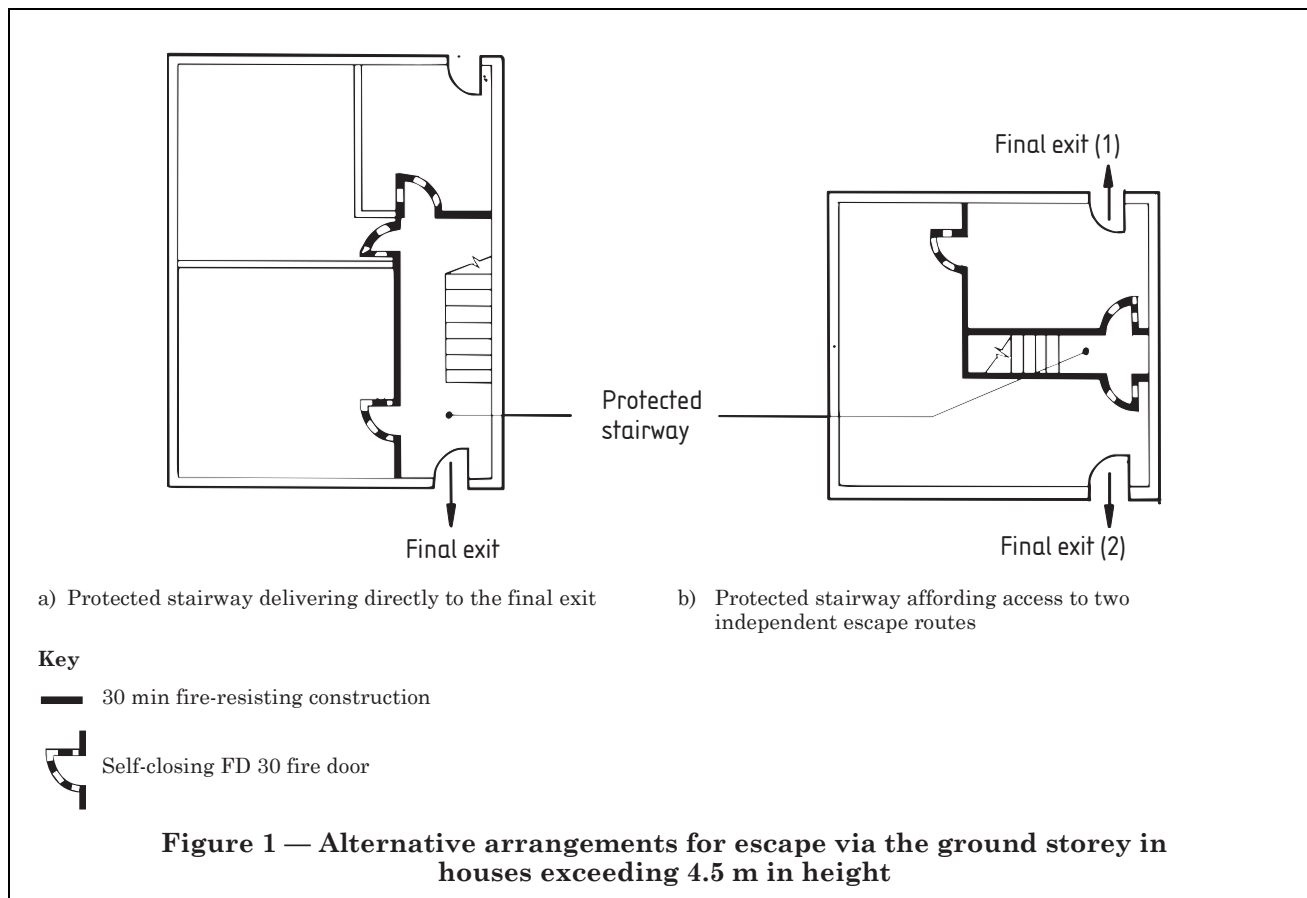
4.2 Recommendation for houses not exceeding 4.5 m in height

A habitable room should not be an inner room unless it is provided with a door or window complying with 4.7 for escape or rescue purposes.

4.3 Recommendations for houses exceeding 4.5 m in height by one floor level

The following recommendations are applicable.

- a) A habitable room should not be an inner room unless:
 - 1) it has a floor level not more than 4.5 m above ground or access level; and
 - 2) it is provided with a door or window complying with 4.7 for escape or rescue purposes.
- b) Unless the top story or level is separated from the lower storeys by fire-resisting construction and is provided with an alternative escape route leading to its own final exit, the internal stairway should:
 - 1) be constructed as a protected stairway;
 - 2) connect the ground and all upper storeys; and
 - 3) either
 - i) deliver directly to a final exit [see Figure 1(a)]; or
 - i) afford access to not less than two independent escape routes delivering to alternative final exits [see Figure 1(b)].



4.4 Recommendations for houses exceeding 4.5 m in height by more than one floor level

The following recommendations are applicable.

- a) A habitable room should not be an inner room unless:
 - 1) it has a floor level not more than 4.5 m above ground or access level; and
 - 2) it is provided with a door or window complying with 4.7 for escape or rescue purposes.
- b) *Text deleted.*
- c) All upper floors should be served by a stair that should:
 - 1) be constructed as a protected stairway;
 - 2) connect the ground and all upper storeys; and
 - 3) either:
 - i) deliver directly to a final exit [see Figure 1(a)]; or
 - i) afford access to not less than two independent escape routes delivering to alternative final exits [see Figure 1(b)].
- d) An alternative escape route should be provided from each storey or level situated 7.5 m or more above ground or access level. Where the access to the alternative escape route is by way of the protected stairway (i.e. to an upper storey), or a landing within the protected stairway enclosure (i.e. to an alternative escape route on the same storey), the protected stairway at or about 7.5 m above ground or access level should be separated from the lower storeys or levels by fire-resisting construction (see Figure 2).

4.5 Recommendations for basements

The following recommendations are applicable.

- a) Any basement in which a bedroom is situated should be provided with an alternative escape route.
- b) Any door or window provided for means of escape should comply with 4.7.

4.6 Recommendation for escape by way of an external balcony or flat roof

Any alternative escape route by way of a balcony or flat roof should be defined and guarded with protective barriers in accordance with BS 6180.

4.7 Recommendations for doors and windows for escape or rescue purposes

The following recommendations are applicable.

- a) Escape windows should have an unobstructed openable area that is at least 0.33 m² and at least 450 mm high and 450 mm wide.

NOTE 1 The route through the window may be at an angle rather than straight through.

- b) The bottom of any openable area should be not more than 1 100 mm above the floor of the room in which it is situated.

NOTE 2 To provide protection against falling, building regulations will generally be satisfied if the bottom of the opening is not less than 800 mm above the floor (except for a rooflight, in which case the bottom of the opening should be not less than 600 mm above the floor).

- c) Where provided for escape or rescue purposes from a room above ground level:
 - 1) if a window is a dormer window or a roof light, the distance from the eaves of the roof to the cill or vertical plane of the window or cill of the roof light should not exceed 1.5 m when measured along the roof;
 - 2) any doors (including a french window or a patio window) should lead to a balcony guarded with a protective barrier in accordance with BS 6180;
 - 3) the ground beneath the window or balcony should be clear of any obstructions (such as iron railings or horizontally hung windows) and should be of a size and material suitable and safe for supporting a ladder.
 - 4) for security purposes many windows are kept locked with a key. In such cases the key should be kept close to the escape window where it can be easily located.

5 Automatic fire detection and alarm

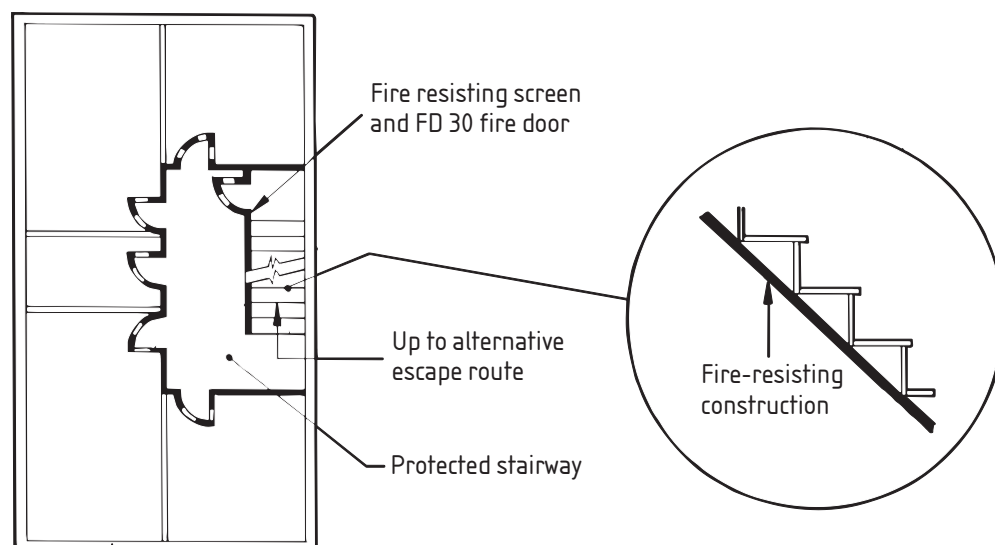
5.1 Commentary

In most single-family dwelling houses the installation of self-contained smoke alarms can significantly increase the level of fire safety by automatically giving an early warning of fire. However, the use of self-contained smoke alarms, even if interconnected, is not considered to be a suitable method of protection for large private dwellings, for example a country mansion, and a full fire detection and alarm system needs to be installed to protect the occupants.

5.2 Recommendation

All houses should be provided with either:

- a) self-contained mains powered smoke alarms complying with BS 5446-1 and installed as described in Appendix D of this code; or
- b) a type L system designed and installed in accordance with BS 5839-1.



a) Plan of the floor at or about 7.5 m above ground

b) Section through the stair showing fire protection of the underside

Key

— 30 min fire-resisting construction

Self-closing FD 30 fire door

NOTE 1 The stair should be considered to be a floor for the purposes of protection.

NOTE 2 If the alternative escape route(s) for all rooms situated 7.5 m or more above ground or access level do not pass through the protected stairway, the fire-resisting screen and FD 30 fire door are not necessary.

Figure 2 — Fire separation in houses exceeding 4.5 m in height by more than one floor level

6 Ducted warm air heating systems

6.1 Commentary

With this form of heating, precautions are necessary within any house having at least one of its floors situated more than 4.5 m above ground or access level to avoid any risk that such a system (irrespective of fuel) would permit the spread of smoke or fire (whether by forced convection, natural convection or fire-induced convection) from rooms to the protected stairway.

6.2 Recommendations

The following recommendations are applicable in any house having at least one of its floors situated more than 4.5 m above ground or access level.

- Transfer grilles should not be fitted in any wall, floor or ceiling enclosing a protected stairway.
- 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.
- Where ductwork is used to convey warm 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 heater.
- Warm air and return air grilles or registers should be positioned at a height not exceeding 450 mm above floor level.
- A room thermostat should be mounted in the living room at a height between 1 370 mm and 1 830 mm, and its maximum setting should not exceed 27 °C.

Section 3. Flats and maisonettes

7 Escape from fire

7.1 General

Planning of means of escape from those storeys in which flats or maisonettes are situated involves a number of interrelated aspects which ought to be considered as a whole and not in isolation.

The recommendations of this code for flats, maisonettes and sheltered housing are intended to provide safety from fire by means of:

- a) planning and protection of escape routes leading to safety both horizontally and downwards (and/or possibly upwards in a few special circumstances) from any area that may be threatened by fire, so enabling a person confronted by an outbreak of fire to turn and make a safe escape without outside assistance;
- b) construction and finishing with suitable materials and embodying adequate fire resistance in the structure;
- c) segregation of higher fire risk areas;
- d) the provision of means of detecting outbreaks of fire;
- e) the provision of firefighting equipment, whether for use by the occupants in containing fire in its early stages, or by way of assistance to the fire service.

Owing to the high degree of compartmentation provided in blocks of flats and/or maisonettes, the spread of fire from one dwelling to another is unusual. It is, therefore, no longer assumed that in the event of fire it is necessary to evacuate the whole building, whole floors or even dwellings adjacent to the fire.

However, the occupants of other dwellings in a building in which there is a fire in one dwelling may feel a need to leave, especially those in dwellings close to the affected one, and will seek to find their way out of the building. This is why this code places the same emphasis on the safety of escape routes outside dwellings as within them.

The risks to occupants in escape routes when escaping from fire are as follows.

- 1) Risk to persons in a dwelling or ancillary accommodation area from a fire in that dwelling or area.
- 2) Risk to persons from the effects of fire or smoke penetrating and obstructing the horizontal routes formed by protected lobbies and corridors or external escape balconies.
- 3) Risk to persons at all floor levels from the effects of fire or smoke penetrating and obstructing the protected stairways and protected exit route(s) to a place of safety external to the building.

To facilitate escape it is necessary that common escape routes are safeguarded by some form of smoke control.

Reliance for fire safety on manipulative apparatus, e.g. lowering lines or throw-out ladders, for means of escape, or on external rescue from the lower storeys of a building by the fire service using mobile ladders, is not satisfactory. This code provides for residents and visitors on any storey to be able to escape safely from the building without outside assistance should a fire occur.

Except in very special circumstances lifts should not be used for escape from fire. Experience in fires has shown that misuse or malfunctioning of lifts has caused a number of deaths, attributed amongst other things to failure of the power supply or from lifts being called to or held at the fire floor. Once the lift doors open in a fire area their design is normally such that they remain open, exposing the occupants to fire.

Recommendations applicable to sheltered housing, in addition to those in Clauses 8 to 16, are given in Clause 17.

Section 3 and Section 4 contain principles and recommendations for the planning and construction of those parts of the building that comprise flats and/or maisonettes. Other parts, ancillary to residential accommodation, are covered in Section 5 and Section 6.

7.2 Internal planning of dwellings

Clauses **9**, **10** and **11** are concerned with the safety of occupants within their dwellings. The aim should be to ensure that a fire which starts in a dwelling will not prejudice the escape of the occupants of that dwelling. The recommendations for the internal planning of a dwelling depend on whether it is a flat or maisonette, its size, whether it is situated at or close to ground level and whether it has an independent final exit. Clauses **9** and **10** deal respectively with the internal planning of flats and maisonettes; Clause **11** deals with alternative exits from flats and maisonettes.

However, dwellings entered directly from outside the building at ground level are basically no different from houses: the recommendations made for houses in Section 2 of this code apply (see **9.2** and **10.2**), and the recommendations in Clauses **11**, **12**, **13** and **14** do not apply.

7.3 Escape routes from dwellings

Clauses **12**, **13** and **14** are concerned with the safety of occupants using that part of the escape route which leads from the exit of an individual dwelling to a final exit.

The aim should be to ensure that a fire which starts in any one dwelling will not obstruct the escape route of the occupants of any other dwelling. The planning of this part of the escape route depends on the number of common stairs serving the storey, the arrangement of the dwellings within the building and, in particular, the normal method of approach to dwellings having a common access (i.e. by an internal corridor or lobby or an external balcony or deck).

The provisions of these clauses apply equally to all types of dwellings except for those entered directly from outside the building at ground or access level. Similarly, small buildings, which may require somewhat different considerations, are dealt with in **12.2**. Although it is preferable for the layout of common means of escape to be uniform throughout a building, there may be situations, for example a large low block which incorporates a tower, where this is not practicable. In such cases the lowermost four storeys of higher buildings may also be designed on a similar basis to that appropriate for small buildings provided that an alternative escape route (or routes) is (are) provided from each and every storey other than the lowermost four.

Clauses **12** and **13**, which deal with horizontal escape along common escape routes to storey exits, make recommendations according to the degree of smoke control provided.

Clause **14** deals with vertical travel down or up a stair towards a final exit. Lifts are disregarded for purposes of escape unless they are evacuation lifts in sheltered housing.

Means of escape from communal areas in sheltered housing are covered in **17.4** and from ancillary accommodation in **19.1**.

8 Automatic fire detection and alarm

8.1 Commentary

This code has been prepared on the principle that the only sure way to secure the safety of occupants whose dwelling is attacked by fire is to enable them to leave without delay, and this is best achieved by the provision of automatic fire detection and alarm equipment. In situations, therefore, where the occupants are faced with a fire in their own dwelling, evacuation of the dwelling is accepted as the only safe course; reliance should not be placed on successfully attacking the fire or rescue by the fire service as a means of ensuring occupant safety.

8.2 Recommendations

The following recommendations are applicable.

- a) All sheltered housing flats and maisonettes should be protected by automatic fire detection and alarm equipment as described in **31.2c**).
- b) An automatic fire detection and alarm system protecting any part of a mixed user building should also protect any flat or maisonette in that building [see **31.2d**].
- c) All dwellings in buildings not protected by an automatic fire detection and alarm system should be provided with either:
 - 1) self-contained mains powered smoke alarms complying with BS 5446-1 and installed as described in Appendix D of this code; or
 - 2) a type L system designed and installed in accordance with BS 5839-1.

9 Internal planning of flats

9.1 Commentary

Flats range in size from those consisting of a single habitable room to those larger than many single-family dwelling houses, with many habitable rooms. However, irrespective of size, two basic considerations apply: firstly it is necessary to ensure that the internal planning of a flat is such that a fire anywhere in the flat will not trap the occupants; and secondly it is necessary to ensure that escape is possible from the flat in which a fire has broken out. It is essential, particularly in open-plan dwellings, that cooking facilities are so located that occupants when escaping can turn their backs to any fire in this area.

Some flats, particularly those provided in existing buildings with very high ceilings, incorporate galleries that may be used, for example, for sleeping accommodation. Such areas will be subject to additional risks unless provisions additional to those in otherwise identical non-galleried accommodation are made.

There are several ways of providing safe escape routes: the provision of an alternative exit; ensuring that the escape route from any habitable room is by way of a protected entrance hall within which no likely source of fire exists, and within which the travel distance is limited; or by the limitation of the travel distance from any point in the flat to the flat entrance door. However, where a flat is entered from a floor above the flat, the likelihood that the stair up to the flat entrance door would become smoke-logged is such that an alternative exit is necessary: suitable forms of alternative exit are discussed in Clause **11**.

These constraints are unnecessary in the case of ground floor flats entered from outside the building and for flats situated above the ground floor provided with their own external entrance at ground level. Similar considerations apply to flats entered from a first floor podium.

9.2 Recommendation for flats provided with an independent external entrance at ground or access level

The dwelling should comply with the appropriate recommendations in Section 2.

9.3 Recommendations for basement flats

The following recommendations are applicable.

- a) No flat should be so planned that any habitable room is an inner room unless that room is provided with a door or window complying with **11.5** for escape or rescue purposes.
- b) A basement flat that is not provided with its own external entrance at the level of the basement should be provided with an alternative exit (see **11.2**).

9.4 Recommendation for flats situated not more than 4.5 m above ground or access level

No flat should be so planned that any habitable room is an inner room unless that room is provided with a door or window complying with **11.5** for escape or rescue purposes.

9.5 Recommendations for flats situated more than 4.5 m above ground or access level and entered at the same level as the flat

The following recommendations are applicable.

- a) No flat should be so planned that any habitable room is an inner room.
- b) The flat should be so planned that:
 - 1) an alternative exit is provided (see Figure 3 and Clause 11) and, where habitable rooms do not have direct access to the entrance hall, a fire-resisting partition should separate the living and sleeping accommodation [see Figure 3(b)]; or
 - 2) all habitable rooms are entered directly from a protected entrance hall, and the travel distance from the flat entrance door to the door of any habitable room does not exceed 9 m (see Figure 4); or
 - 3) both:
 - i) the travel distance from the flat entrance door to any point in any habitable room does not exceed 9 m (see Figure 5); and
 - ii) the position of any cooking facilities is remote from the dwelling entrance door and does not prejudice the escape route from any point in the flat.

9.6 Recommendations for flats situated more than 4.5 m above ground or access level and entered from the floor below the flat

The following recommendations are applicable.

- a) No flat should be so planned that any habitable room is an inner room.
- b) The flat should be so planned that:
 - 1) an alternative exit is provided from the upper floor level (see Figure 6 and Clause 11) and, where habitable rooms do not have direct access to the landing, a fire-resisting partition should separate the living and sleeping accommodation [see Figure 6(b)]; or
 - 2) all habitable rooms are entered directly from a protected landing, and the travel distance from the head of the stair to the door of any habitable room does not exceed 9 m (see Figure 7); or
 - 3) both:
 - i) the travel distance from the head of the stair to any point in any habitable room does not exceed 9 m (see Figure 8); and
 - ii) the position of any cooking facilities is remote from the head of the stair and does not prejudice the escape route from any point in the flat.

9.7 Recommendations for flats situated more than 4.5 m above ground or access level and entered from the floor above the flat

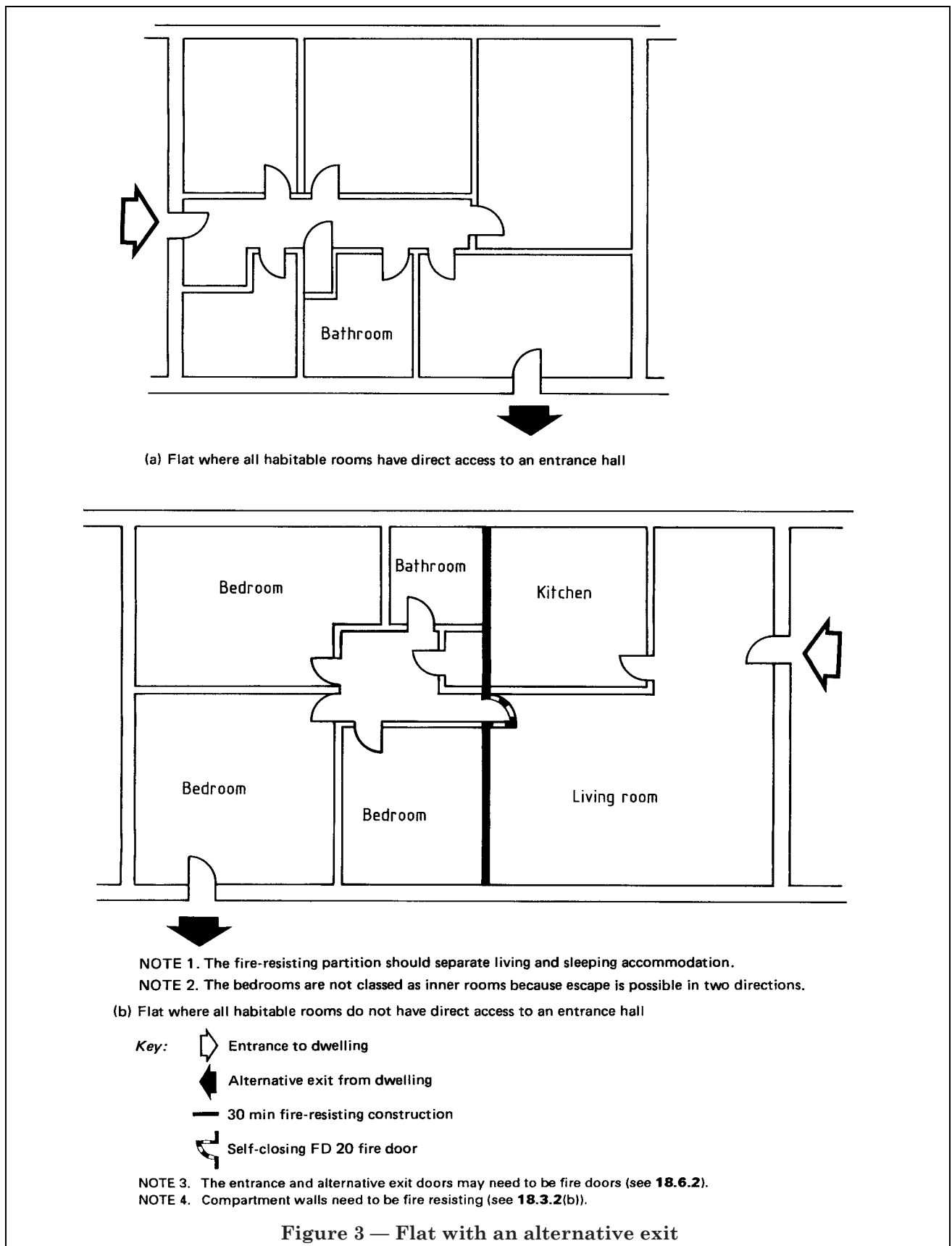
The following recommendations are applicable.

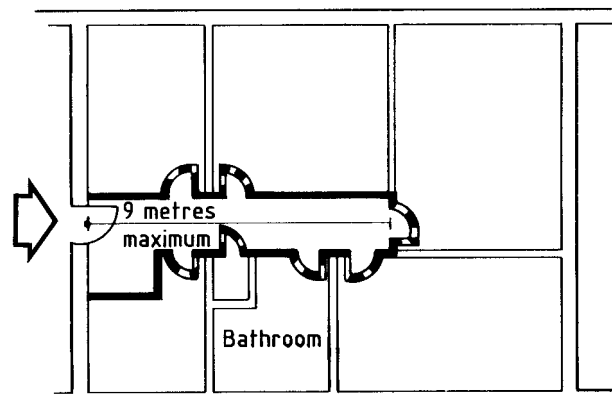
- a) No flat should be so planned that any habitable room is an inner room.
- b) An alternative exit should be provided from the lower floor level (see Figure 6 and Clause 11) and, where habitable rooms do not have direct access to the landing, a fire-resisting partition should separate the living and sleeping accommodation [see Figure 6(b)].

9.8 Recommendations for flats with galleries

The following recommendations are applicable (in addition to those of 9.3, 9.4, 9.5, 9.6 and 9.7).

- a) The main level of the flat should be planned in accordance with the principles illustrated in Figure 4, Figure 5(a) or Figure 5(b).
- b) Unless the cooking facilities are enclosed with fire-resisting construction, any cooking facilities within a room containing a gallery should be remote from the stair to the gallery and positioned such that they do not prejudice the escape route from the gallery.
- c) The distance between the foot of the access stair to the gallery and either the flat entrance door or a door leading to a protected entrance hall should not exceed 3 m.
- d) An alternative exit should be provided from a gallery if the travel distance from the head of the access stair to the gallery to any point in the gallery exceeds 7.5 m.





Key:

- Entrance to dwelling
- Self-closing FD 20 fire door
- 30 min fire-resisting construction

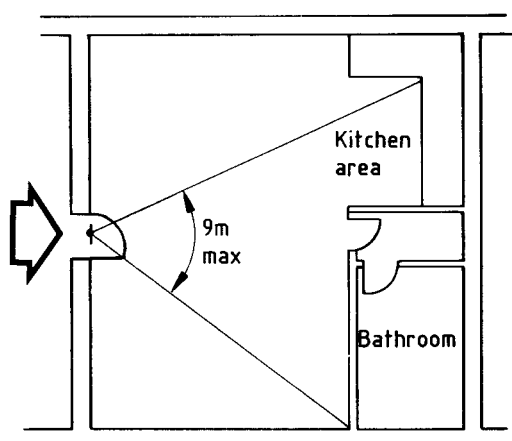
NOTE 1. The entrance door may need to be a fire door (see 18.6.2).

NOTE 2. If the partitions between the bathroom and the adjacent rooms have a 30 min fire resistance then the partition between the bathroom and the hall need not be fire-resisting and the bathroom door need not be a fire door.

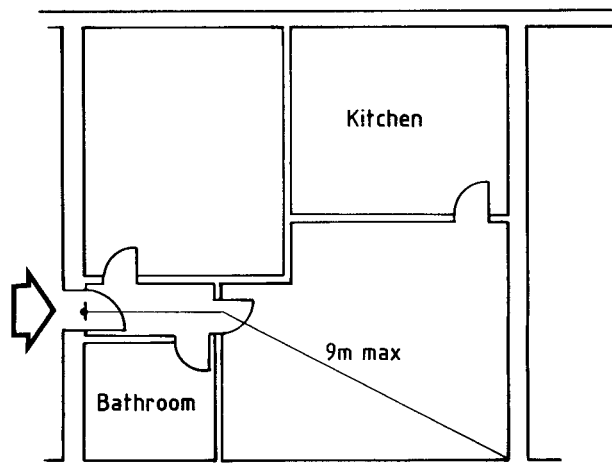
NOTE 3. The cupboard door need not be self-closing.

NOTE 4. Compartment walls need to be fire-resisting (see 18.3.2(b)).

Figure 4 — Flat with a protected entrance hall and restricted travel distance



(a) Open-plan flat (bedsitter)



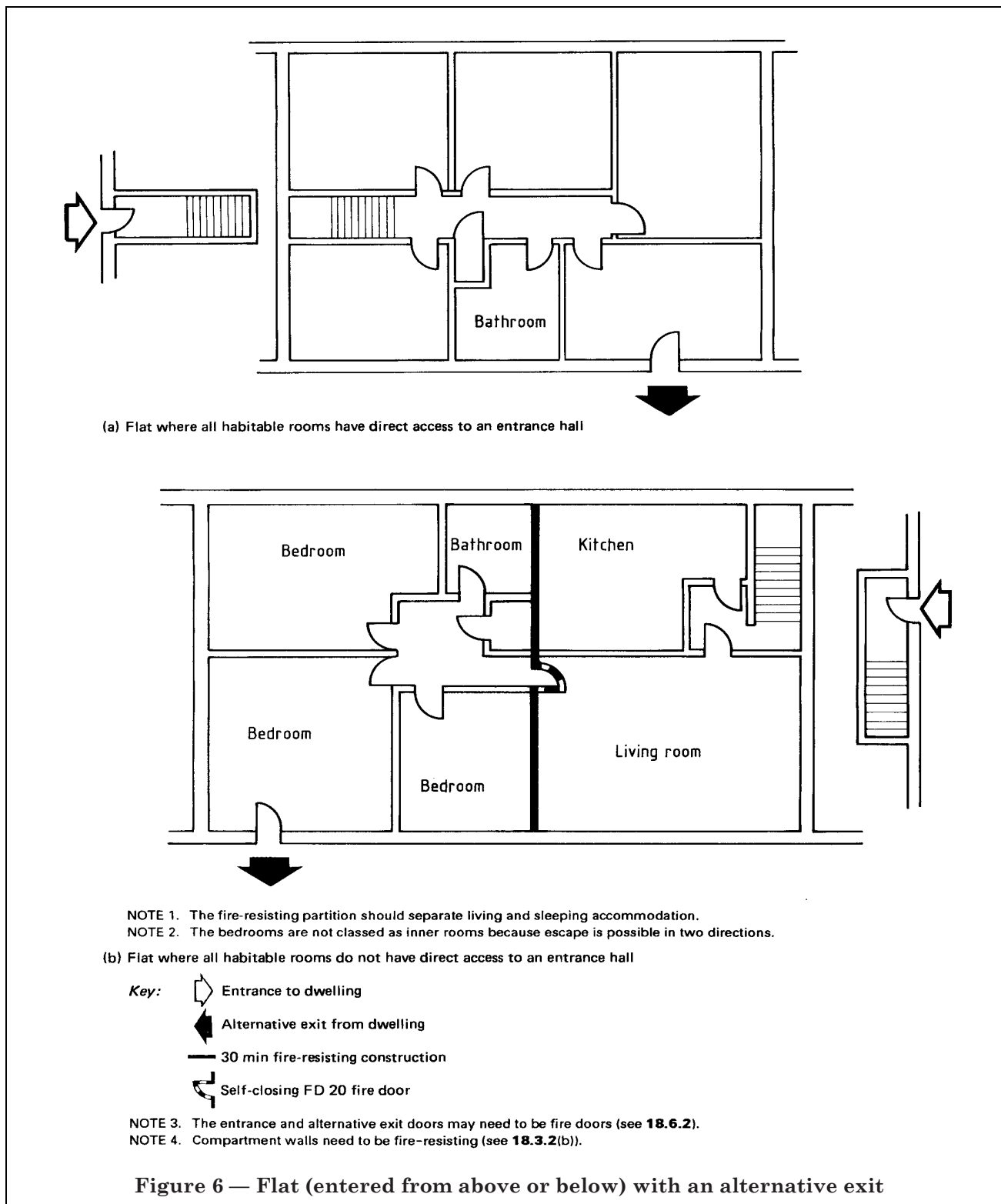
(b) Flat with separate habitable rooms

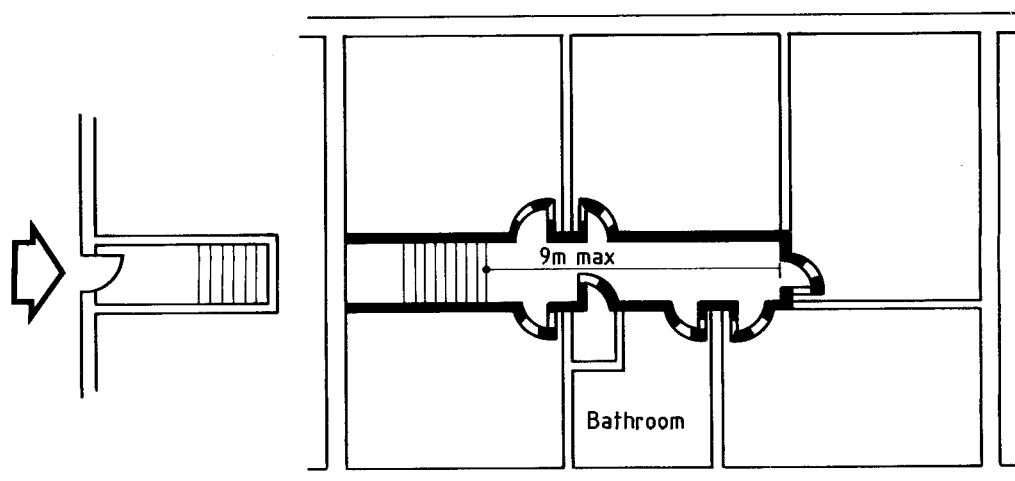
Key: Entrance to dwelling

NOTE 1. The entrance door may need to be a fire door (see 18.6.2).

NOTE 2. Compartment walls need to be fire-resisting (see 18.3.2(b)).

Figure 5 — Flat with restricted travel distance





NOTE 1. The entrance door may need to be a fire door (see **18.6.2**).

NOTE 2. If the partitions between the bathroom and the adjacent rooms have a 30 min fire resistance then the partition between the bathroom and the hall need not be fire-resisting and the bathroom door need not be a fire door.

NOTE 3. The cupboard door need not be self-closing.

NOTE 4. Compartment walls need to be fire-resisting (see **18.3.2(b)**).

Figure 7 — Flat (entered from below) with a protected entrance hall and restricted travel distance