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British Standard

Fire precautions in the design and construction of buildings

Part 2. Code of practice for shops

(Formerly CP 3 : Chapter IV : Part 2)

Règles de prévention des incendies dans la conception et la construction des bâtiments
Partie 2. Code de bonne pratique dans les boutiques et magasins

Brandschutzmaßnahmen bei Planung und Errichtung von Gebäuden
Teil 2. Leitfaden für Läden

British Standards Institution

Foreword

This code of practice, prepared under the direction of the Fire Standards Committee, is a revision of CP 3 : Chapter IV : Part 2 : 1968, which is withdrawn.

In accordance with current BSI practice, this revised code is published as a Part of BS 5588. In addition to the existing BS 5588 : Part 1 : Section 1.1, BS 5588 : Part 3 and BS 5588 : Part 4, other Parts will include new codes for fire-fighting lifts and stairways and for the precautions to be taken in places of public assembly, and the revision of CP 3 : Chapter IV : Part 1 'Flats and maisonettes (in blocks over two storeys)', which will appear as BS 5588 : Part 1 : Section 1.2.

It is intended to prepare a Part to cover shopping developments that include shopping malls.

Other Parts may be added to BS 5588.

Some of the more important changes from the text of CP 3 : Chapter IV : Part 2 are as follows.

(a) In sections three, four, five and six, 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 previously. The commentary on the relevant principles is intended to provide an explanatory background to any recommendations that are made, especially if the recommendations might otherwise appear to be arbitrary. Structural precautions against fire that have to be implemented, for example those in building regulations, if discussed are not repeated as recommendations, but reference may be made to them if the regulations are not consistent in all parts of the UK.

(b) Diagrams have been included.

(c) The subdivision of escape routes into first stage, second stage and third stage has been superseded by a division into horizontal travel and travel down or up stairways.

(d) Fire doors are no longer referred to by 'type', instead reference is made to their performance in fire tests.

(e) The term 'departmental stores' has been removed from the title and in the scope clause the meaning of shops has been clarified to include departmental stores.

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.

Compliance with a British Standard does not of itself confer immunity from legal obligations. In particular, attention is drawn to 3.5 and 25.1.

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Section one. General

1 Scope

This code of practice provides guidance for designers and the building construction team in their task of incorporating into new buildings or alterations to existing buildings, measures that should in the event of fire safeguard the lives of the public and staff in shops of all sizes and heights and that may help to protect the building and its contents against the effects of fire.

This code broadly covers premises that would be classed as shops in the Offices, Shops and Railway Premises Act 1963. It includes shops in the everyday sense of the word, to which the public or a section of the public normally have access; in addition it covers the following:

(a) larger premises such as department stores, variety stores, supermarkets and hypermarkets;

(b) premises where goods may not necessarily be sold over the counter but in which a trade or business is carried out, such as hairdressers' salons, television rental shops or auction rooms;

(c) cafes, restaurants, public houses and other places of refreshment;

(d) premises where goods are received for treatment or repairs such as dry cleaners, launderettes and shoe repair shops.

Premises where the activity is more akin to that of an office, such as banks and estate agents, are considered as offices and are dealt with in BS 5588 : Part 3. Office accommodation that is ancillary to a shop is dealt with in 12.4.

This code does not provide guidance on fire precautions in the design and construction of covered and enclosed access areas for pedestrians that are common to a number of shops. Guidance on fire precautions in such access areas is available from the Home Office and Scottish Home and Health Department*.

This code deals with planning, construction and equipment for fire safety, and the provision of escape routes in case of fire, in new shops and in alterations and extensions to existing shops. It includes the measures and equipment necessary for preventing the rapid spread of fire and those required to assist fire-fighting in buildings with upper storeys beyond the reach of mobile fire appliances operating outside the building. This code 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.

Appendix A provides guidance for managers of shops to aid them in making the best use of these design features of the building and acts as a guide to designers in passing to their clients information about the fire precautions designed into a building. In a building that has to have a fire certificate, the advice given may have to be varied in accordance with the conditions of the fire certificate.

This code is not intended to apply to buildings during the course of construction or alteration. Guidance on fire precautions in such buildings is available from HMSO†. In those cases where a building is in course of construction or alteration and is in part used, guidance for management is given in appendix A.

NOTE. The titles of the publications referred to in this code are listed on page 52.

2 Definitions

For the purposes of this code the following definitions apply.

2.1 access room. A room that forms the only escape route from an inner room.

2.2 accommodation stairway. A stairway, additional to that or those required for escape purposes, provided for the convenience of occupants.

2.3 dead end. A place from which escape is possible in one direction only, or in directions less than 45° apart that are not separated by fire-resisting construction.

2.4 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.

2.5 escape lighting. Lighting, for use when the normal lighting fails, provided to ensure that the means of escape can be safely and effectively used.

2.6 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.

2.7 fire door. A door or shutter provided for the passage of persons, air or things 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.

2.8 firefighting stairway. A protected stairway communicating with the accommodation only through a firefighting lobby.

2.9 fire resistance. The ability of a component or construction of a building to satisfy for a stated period of time the appropriate criteria specified in the relevant Part of BS 476.

'2.10 fire resistance. The ability of a component or construction of a building to satisfy for a stated period of time the appropriate criteria specified in the relevant Part of BS 476.'

* Fire Prevention Guide No. 1, *Fire precautions in town centre redevelopment*, HMSO.

† *Standard fire precautions to be taken by contractors engaged on building and engineering works for the Department of the Environment* (P.5), HMSO.

2.11 **higher fire risk area.** An area with a fire risk higher than that of a sales area.

2.12 **inner room.** A room from which escape is possible only by passing through an access room.

2.13 **means of escape.** Structural means whereby a safe route is provided for persons to travel from any point in a building to a place of safety.

2.14 **non-combustible.** Capable of satisfying the performance requirements specified in BS 476 : Part 4, or any material which when tested in accordance with BS 476 : Part 11 does not flame nor cause any rise in temperature on either the centre (specimen) or furnace thermocouples.'

2.15 **open spatial (vertical) planning.** The internal arrangement of a building in which several storeys or working levels are contained in one undivided volume.

2.16 **open storey (horizontal) planning.** The internal arrangement of the storeys of a building in which almost the whole area of each storey is undivided by partitions.

2.17 **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.

2.18 **protected stairway/lobby/corridor.** A stairway, including any exit passageway leading therefrom to its final exit, or lobby or corridor enclosed with (other than any part that is an external wall of a building) fire-resisting construction.

2.19 **shopping mall.** A covered or enclosed access area for pedestrians common to a number of shops.

2.20 *Text deleted.*

2.21 **storey exit.** A final exit, or a doorway giving direct access to a protected stairway, firefighting lobby, or external escape route.

2.22 **travel distance.** 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.

2.23 **firefighting lobby.** A protected lobby for providing access from a firefighting stairway to the accommodation area, and to any associated firefighting lift.

2.24 **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.

2.25 **material of limited combustibility.** Either:

(a) a non-combustible material; or

(b) any material of density 300 kg/m^3 or more which, when tested in accordance with BS 476 : Part 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.'

3 Use of this code

3.1 Means of providing for safety

The recommendations in this code 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 any person confronted by an outbreak of fire to turn away and make a safe escape without outside assistance;

(b) construction and finishing with suitable materials and embodying adequate fire resistance in the structure where these are not covered by building regulations;

(d) the provision of means of giving warning of fire and, where appropriate, of detecting outbreaks of fire;

(e) the provision of fire-fighting equipment, whether for use by the staff in containing fire in its early stages, or by way of assistance to the fire service, or for automatically extinguishing an outbreak of fire.

3.2 Avoidance of manipulative apparatus for means of escape

Reliance for fire safety on manipulative apparatus 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 the public and staff on any storey of a shop being able to escape safely from the building without outside assistance should a fire occur.

3.3 Use of the principles and recommendations

It is not possible to make comprehensive recommendations capable of covering every possible risk, and an intelligent appreciation of the principles and application of the recommendations of this code is therefore essential. The fire hazard of a particular shop and its contents have to be appreciated when designing a building, and in order to use this code effectively, the behaviour of a fire occurring in the building has to be anticipated according to the assessment made.

3.4 Application of all the recommendations

Individual recommendations of this code should not be applied in isolation. To secure maximum benefit all of the recommendations should be applied. Although the basic principles and recommendations for escape from sales areas are described in section three, the most conscientious application of these recommendations would be undermined unless supported by the necessary measures relating to ancillary accommodation, construction, engineering services, and fire protection facilities set out in sections four to six.

3.5 Relationship with statutory provisions

3.5.1 *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 and to the fire precautions to be provided in existing buildings. The relevant legislation indicated in general terms in **3.5.2** and **3.5.3** 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 and its contents from fire as well as the safety of the occupants.

3.5.2 *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.

3.5.3 *Legislation and other regulations for fire safety in shops.* In addition to the controls mentioned in 3.5.2, fire safety and means of escape for a wide variety of buildings is dealt with under the following legislation.

England and Wales:

The Fire Precautions Act, 1971 as amended by the Health and Safety at Work etc. Act, 1974

The Building Act, 1984 (except in Inner London where the fire provisions of the London Building Acts, 1939–1982 as amended by the Local Government Act, 1985 apply)

Scotland:

The Fire Precautions Act, 1971 as amended by the Health and Safety at Work etc. Act, 1974

The Building (Scotland) Act, 1959

Northern Ireland:

The Fire Services (Northern Ireland) Order, 1984 and the Health and Safety at Work (Northern Ireland) Order, 1978

The Building Regulations (Northern Ireland) Order, 1979

It should be noted that for premises subject to the Fire Certificate (Special Premises) Regulations, 1976, the regulations apply to all buildings within the premises.

There are also a number of local Acts as well as entertainment and other licensing legislation which deal with fire safety and means of escape. The designer should consult the fire authority or building authority at an early stage to make certain the building as planned will meet the requirements those authorities may make particularly if a fire certificate or licence may be necessary.

Designers may find it useful to study 'Guides to the Fire Precautions Act; No. 3; Offices, Shops and Railway Premises', HMSO, in addition to the Acts and Regulations mentioned above.

NOTE. Under the Fire Precautions Act, 1971, fire authorities in England and Wales cannot, as a condition of the issue of a fire certificate, require structural or other alterations relating to escape from the premises if the plans of the building comply with building regulations, unless the fire authority is satisfied that the means of escape in case of fire are inadequate by reason of matters or circumstances of which particulars were not required to be supplied to the local authority in connection with the deposit of plans for building regulation purposes.

3.6 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 advice given in appendix A is intended not only as a guide to the management of fire precautions in a shop, 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.

3.7 Diagrams

The figures are intended to clarify concepts, and should not be taken as indicating the only acceptable forms of planning.

Section two. Analysis of the problem

4 Planning in relation to fire

4.1 Spread of fire

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

In shops designed, maintained and supervised in accordance with this code, the risk of fire starting in malls, passages, lobbies or stairways intended for use only for access or means of escape may be regarded as negligible. It is also unlikely that fire will originate in the structure itself. Outbreak of fire is more to be expected in display equipment, furnishing, decorations or service plant in the building, and the point of origin is therefore likely to be in the display areas, store rooms, kitchens or offices, or possibly in the service installations. Malls, passages, lobbies and stairways ought to be kept clear of obstructions, as should circulatory routes within the sales and storage areas, which ought to be clearly defined, e.g. by the use of floor coverings of a contrasting colour.

When a fire occurs in an enclosed space, hot smoke-laden gases rise to form a layer which at first flows under the entire ceiling and then deepens to fill the whole space. The fire tends to grow in area, the flames spreading to nearby combustible furnishings, fittings, exposed papers, etc. The flames increase in height until they reach the ceiling where they are deflected horizontally and, radiating downwards, accelerate fire growth. If the ceiling is combustible it may ignite and add to the volume of flame and speed of fire growth. If the space has insufficient openings to provide a continuing air supply, the burning rate of the fire will diminish as it draws on increasingly vitiated products of combustion, but the gases generated will then be extremely toxic.

Once ignited, upholstery, bedding and other products wholly or partly comprising cellular plastics burn rapidly giving off hot, smoke-laden and toxic gases. The horizontal deflection and downwards radiation also occurs rapidly and because of the extremely high temperature of the gases, other materials and products within the area of the fire will ignite more easily further accelerating the progress of the fire.

The effects of the fire will seldom be confined to the space in which it originated. If the enclosing walls have no fire resistance or do not form a fire-tight joint with a fire-resisting floor (or ceiling) above, the fire will soon penetrate at ceiling level, where the attack from the flames or hot gases is most severe, to the adjoining space. Even with fire-resisting construction the buoyancy and expansion of the fire gases can cause them to be driven out of the space to affect other parts of the building. If they penetrate into a vertical shaft, such as a stairwell, liftwell or duct, they will rise rapidly, attacking the top of the shaft and spreading elsewhere if there are any openings in the shaft. In such circumstances, if a substantial flow of air reaches the fire through, say, a window or door, the vertical shaft can act as a chimney and may greatly accelerate fire growth.

A fire occurring anywhere within a compartment of a building has therefore to be regarded as offering an immediate risk to all occupants within that compartment even though in the initial stages of fire development it might seem that persons are well removed from immediate danger. It should also be realized that there may also be a risk to persons in other parts of the building.

4.2 Smoke

In the early stages of a fire, the most important effects will usually be those of smoke and other products of combustion. Often smoke will be the first evidence of fire detectable by the occupants and is thus likely to be the first cause of alarm, ... When first present, smoke tends (in the absence of any strong air currents) to collect at ceiling level, filling the space from the top downwards. When it extends down to head height it will produce discomfort to the eyes and difficulty in breathing, both of which will interfere with the efforts of occupants to find their way towards the exits. The extremely hot, smoke-laden and toxic gases from burning cellular plastics will add considerably to their difficulties. People who are prevented from escaping by dense smoke, or who are unduly retarded from escaping by it, may suffer from the toxic effects of the products of combustion that accompany the smoke, the asphyxiant effect caused by lack of oxygen or by the intense heat of the gases making up the smoke. Intoxication, incapacity, unconsciousness and possibly death may result.

These considerations are particularly important when dealing with large numbers of persons, many of whom may be unfamiliar with their surroundings, and who may also vary widely in age and degree of mobility.

To facilitate escape it is necessary

(a) that protected escape routes are safeguarded against the ingress of smoke in bulk by self-closing fire doors;

(b) to regulate the distance people have to travel before they reach a storey exit or a final exit (because they may be especially endangered by smoke in any unprotected part of the escape route). In premises where cellular plastics are stored, e.g. furniture shops/departments, easy access to sufficient and well-sited routes is of particular importance.

To assist the fire brigade in rescue, fire-fighting and clearance of smoke after the fire, means of smoke control may be necessary. This would be made use of as required in relation to prevailing wind conditions by the fire brigade; it is not intended that it should be operated by people escaping from the building.

After the outbreak of fire there may be only a short time during which the actions necessary for ensuring the safety of occupants can be carried out. This time will only be sufficient if all contributing factors, e.g. the design of the building, the materials at risk, the cooperation of the staff, the functioning of equipment, are planned and managed so as to be effective when the occasion arises.

4.3 Site planning

The siting of shops 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 lay down structural requirements for the external walls of buildings in relation to the distance between the building and the site boundary, and these requirements are related to the nature and use of the areas inside the building and adjacent to the external walls. There are also legal requirements for access to buildings by fire appliances; these, together with the effect of car parking adjoining the building, have to be considered at the planning stage.
A further site planning consideration is the safety of escape routes outside the building, and outside neighbouring buildings, from the effects of a fire in the building concerned.

4.4 Mixed user developments

The principles and recommendations of this code will apply straightforwardly where a shop is contained in a single, separate building or where the entire building comprises a department store, and the words shop and building are both used in this sense.

However, complications may arise where a shop forms part of a shopping complex or a comprehensive development. In such cases it is important to consider the effect of one risk on another. A fire in a shop could have serious consequences for a residential or office user in the same building.

It is therefore important to consider whether completely separate routes of escape should be provided from each different use within the building, or whether other effective means to protect common escape routes can be provided.

In reaching a conclusion the following factors need to be considered in addition to items (a) and (b) of 4.2:

(a) the extent of a risk and its relationship to another;

(b) provision for giving warning in case of fire, including any automatic fire detection;

(c) the provision of sprinkler protection and controlled smoke ventilation arrangements;

(d) the management and control of the building or development from a fire safety point of view.

The recommendations of the relevant Part of BS 5588 or legislation appropriate to each use should be applied to the whole of any route where passing through and connected to other users, right up to the final exit, even if such standard is higher than that required for the use through which the route is passing (e.g. the use of fully ventilated lobbies).

4.5 Shops in different occupation

Different shops, whether on the same storey or different storeys, may be occupied by different tenants in the same building. In these cases considerations apply similar to those applicable to mixed users as referred to in 4.4 so far as the risk of fire in an unattended shop or a shop in different occupation is concerned.

4.6 Internal subdivision

4.6.1 *General.* The manner in which a building is subdivided internally will affect the risk to users and their ability to use the means of escape arrangements in case of fire. The various forms of subdivision and their effects on users are considered separately in **4.6.2** to **4.6.6.**

4.6.2 *Compartments.* To reduce danger from fire, building regulations state the maximum floor areas and cubic capacities of compartments and specify standards of fire resistance for structures. In shop premises it is usual in planning floors to provide extensive open areas to meet the needs of marketing and, therefore, openings in compartment floors for accommodation stairways or escalators and in compartment walls are normally protected by steel fire shutters held open by fusible links.

It follows that compartmentation of a building may not provide the necessary smoke control for each compartment to be considered as a separate entity for means of escape and evacuation procedures. However, where openings in the horizontal or vertical separations between compartments are fitted with self-closing fire-resisting doors, or where a suitable smoke control system is installed, evacuation procedures may be based on individual compartments.

4.6.3 *Open spatial (vertical) planning.* In open spatial (vertical) planning several storeys are contained in one uncompartmented volume such that smoke and heat will travel readily throughout all floors. This form arises (for example) by the adoption of one or more of the following planning arrangements:

(a) split-level floors;

(b) balconies or gallery floors overlooking a central well or courtyard, as in the case of an atrium.

Open spatial planning may, to some extent, infringe upon the requirements in building regulations relating to compartmentation of buildings. Where this form of planning is envisaged, early discussion with the relevant control authorities is desirable because a relaxation or special consent may be necessary.

Although many of the occupants would be aware of smoke from a fire at the outset, or soon after, and therefore would have early warning in this type of planning, they would all be at risk simultaneously. Due to the large numbers of the public who may be involved and the readily combustible nature of the fire load, this arrangement is not recommended for buildings with more than a few storeys or levels and then only where a suitable smoke control system is provided.

4.6.4 *Open storey (horizontal) planning.* In open storey (horizontal) planning almost the whole floor area of a storey is undivided by partitions although there may be some screens or high furniture for display purposes. In this case many of the occupants of one storey may be aware of smoke from a fire at the outset and this will give the

advantage of early warning. Nevertheless, the rapid spread of fire and smoke by some modern furniture materials in the early stages of a fire can produce very hazardous conditions. It is therefore particularly important to ensure the maximum possible visibility across sales areas so that exit signs are clearly visible.

4.6.5 *Shopping arcade.* This is a type of planning where a narrow covered or enclosed pedestrian circulation route is lined on one or both sides by a limited number of small shops.

4.6.6 *Shopping mall.* Many developments include shops of various sizes fronting on to one or more shopping malls; the provision of smoke control arrangements may allow shop exits on to a shopping mall to be treated as storey exits. Individual shops within the development need to be separated one from another by fire resisting construction to an appropriate standard, and where large shops are involved, and particularly where large shop units face one another across a mall, compartmentation by means of fire shutters operated by fusible links, or fire restricting back up walls behind the shop windows may be necessary.

4.7 Ancillary accommodation and higher fire risk areas

Sections three and four contain principles and recommendations for the planning and construction of those parts of shop premises that are allocated to the sales floor areas and that are likely to be occupied by the public and staff. Other parts, ancillary to the sales floor areas, are referred to in this code as ancillary accommodation, and are covered in section five.

Where highly flammable or explosive substances are stored or used in any quantity, the area is considered to be of high fire risk. The fire authority may impose special requirements for such areas in connection with the issue of a certificate under the Fire Precautions Act 1971; early consultation is desirable.

5 Escape from fire

5.1 General

In an emergency there have to be exit facilities sufficient to allow the public and staff to reach an area of relative safety without delay. The place of ultimate safety is of course beyond the final exit but it may not always be practicable to evacuate the whole of the building immediately upon the incidence of fire in any part. Nevertheless, it is essential that the occupants are able to reach, without undue delay, areas of relative safety, e.g. protected routes and stairways within the building that lead ultimately to the open air.

The exit capacities tabulated in table 3 have been based on an evacuation time of 2.5 min through a storey exit on the assumption that a unit width of exit of 500 mm permits the flow of 40 persons per minute. Stairway widths have been similarly calculated taking into account also the number of persons who could occupy a stairway (see tables 4 and 5).

5.2 Evacuation

The assumption need not be made that the whole building necessarily has to be evacuated in a fire emergency.

If adequate measures are taken in large department stores and shopping developments, it may be practical and suitable to evacuate in stages. Where compartments are separated in such a manner as to prevent the spread of smoke in the early stages of a fire, or there is a system controlling the movement of smoke, the public and staff may remain in a fire compartment not affected by the fire, provided that they are still free to leave the building by protected escape routes. Evacuation procedure is dealt with in A.4.6 to A.4.8.

5.3 Disabled persons

When a shop is being planned, whilst it will not as a rule be possible to reliably predict its usage by disabled persons, it may be expected that some employees or members of the public will be people with a disability of some kind. The designer should therefore study the recommendations of BS 5588 : Part 8.

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Section three. Planning of escape from public areas

6 General

Planning of means of escape from shop sales floor areas, public restaurants and other public areas involves consideration of a number of interrelated aspects which ought to be considered as a whole and not in isolation.

For example, although maximum distances of travel (see 7.1) may have a major influence on the number of escape routes and stairways required and their disposition, the geometry of the building (see 8.3.1) and the number of persons to be evacuated (see 7.2.1 and 8.4.1) will also have a bearing on the size and disposition of the stairways.

Small shops may require somewhat different considerations and are dealt with in clause 9. The sales floor areas of some shops are so small as to render onerous the application of all of the recommendations applicable to shops in general. All occupants of a shop may be able to quickly reach a single entrance/exit in an emergency and the limited size of the shop ought to permit clear vision of all parts when undivided thereby ensuring adequate early warning.

Clause 7 deals with horizontal escape along a suitable escape route to a storey exit. The recommendations are mainly concerned with providing more than one escape route (except in severely restricted circumstances), limiting the distance to be travelled, and ensuring that the routes are wide enough.

Clause 8 deals with vertical travel down or up a stairway towards a final exit. The recommendations are mainly concerned with the provision of a sufficient number of stairways of adequate aggregate width. Lifts are disregarded for purposes of escape except for some disabled persons (see 5.3 and A.4.7).

Means of escape from ancillary accommodation is covered in 12.4.

7 Escape routes within, and exits from, a storey

7.1 Distances of travel and number of escape routes

7.1.1 *Commentary.* For the purpose of certifying the fire precautions in a building, travel distances (see 2.22) are used. In designing a shop building however, the use of direct distances (see 2.4) may be adopted so that changes may be made to the layout of counters and display areas, etc. (see figure 1). However, before the layout of counters and display areas is adopted or changed, the resultant travel distances should be checked so that in use they will not exceed the permitted travel distances.

Exits ought to be sited so that a person confronted by an outbreak of fire can turn to an alternative exit and make a safe escape. To achieve this two exits ought to be accessible in substantially different directions. If the two directions diverge by less than 45° and are not separated by fire-resisting construction they are considered to provide escape in one direction only, and a situation in which this occurs is considered to be a dead end. Escape in one direction is, however, acceptable in small shops (see clause 9), where a single exit may be permitted, and from parts of a storey (see figures 2 and 3), but in these cases the distance of travel has to be restricted.

Where a floor area is divided into separate departments or uses, such as sales areas and a restaurant, at least one of the exits from each area should be direct to a final exit or storey exit, with the exception of small inner rooms with restricted accommodation where adequate safeguards exist including the provision of early warning in the event of an outbreak of fire in the access room.

It is essential that ancillary accommodation does not form any part of an escape route for the public.

In the recommendations a limited distance from any point in a storey to the nearest storey exit has been adopted as the maximum. This is an arbitrary figure. The shorter the distance, the better, but it could not be said that a slightly greater distance would be so unsafe that it should under no circumstances be adopted. However, the maximum distance recommended should not generally be exceeded.

There may be circumstances in which travel distances in single storey shops (and possibly in ground storeys in multi-level department stores) may be extended. Where the travel distance is increased it is essential that it is shown (by calculation of fire growth and smoke volumes) that, given the levels and types of materials stored and displayed, a clear air space would remain (beneath any smoke layer) to allow the safe evacuation of the shop; that the sales area (on the ground storey) is open storey (horizontal) planning; that the ground storey exits are remote from each other, are sited at intervals not exceeding 60 m apart and are distributed uniformly around the perimeter of that storey (see figure 4); and that the ground storey exits are clearly visible and well marked.

7.1.2 *Recommendations.* The following recommendations are applicable.

(a) The escape routes from any storey should be of such a number and so situated that the travel distance from any point to the nearest storey exit does not exceed the appropriate limits set out in table 1.

(b) Not less than two escape routes should be provided from every storey or floor level (except for small shops, see clause 9 and certain ancillary accommodation, see 12.4.2) and such escape routes should give direct access to either:

(1) a final exit; or

(2) a storey exit.

(c) Where a storey includes a restaurant area, or is divided into separate floor areas, each area (except inner rooms complying with item (d)) should be provided with not less than two escape routes, one of which should lead directly, without entering any area of ancillary accommodation, to either:

(1) a final exit; or

(2) a storey exit.

(d) An inner room:

(1) should not be designed to accommodate more than 50 persons;

(2) should be provided with escape routes arranged to pass through not more than one access room, and should not have a travel distance, including the portion through the access room, exceeding the appropriate limit given in table 1;

(3) should not have an access room that is a higher fire risk area (see 2.11);

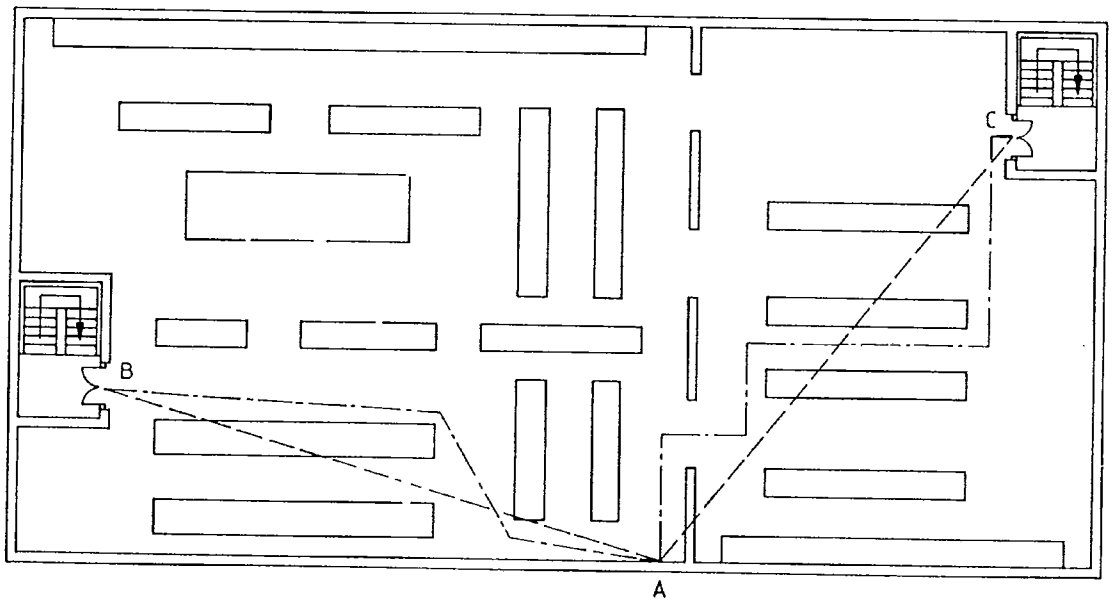
(4) should, except in the case of a fitting room, have clear glazed panels provided in the enclosures to the inner room so that a fire in the access room will be visible from the inner room at an early stage.

Table 1. Maximum permitted distances of travel in a storey*

Available directions of escape	Maximum travel distance	Maximum direct distance (see note)
(a) All forms of planning except open spatial (vertical) planning		
(1) In one direction only	18 m	12 m
(2) In directions less than 45 ° apart that are not separated by fire-resisting construction		
(3) In more than one direction, in directions 45 ° or more apart	45 m which may include up to 18 m with escape direction as in (1) or (2)	30 m which may include up to 12 m with escape direction as in (1) or (2)
(4) In more than one direction, in directions less than 45 ° apart but separated by fire-resisting construction		
(b) Open spatial (vertical) planning, in directions either 45 ° or more apart or separated by fire-resisting construction (see 7.1.2(b))	45 m	30 m

*Additional limitations of travel within certain ancillary accommodation are given in **12.4.2** and table 8. See clause **9** for small shops.

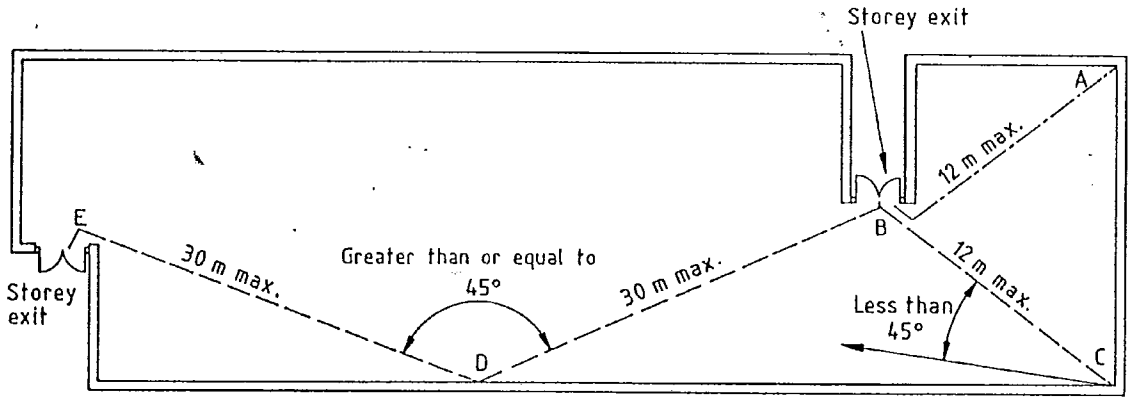
NOTE. Direct distances are for design purposes only. The limitations on travel distance need to be met when the floor space is furnished.



— · — · — indicates travel distance.
— — — — indicates direct distance.

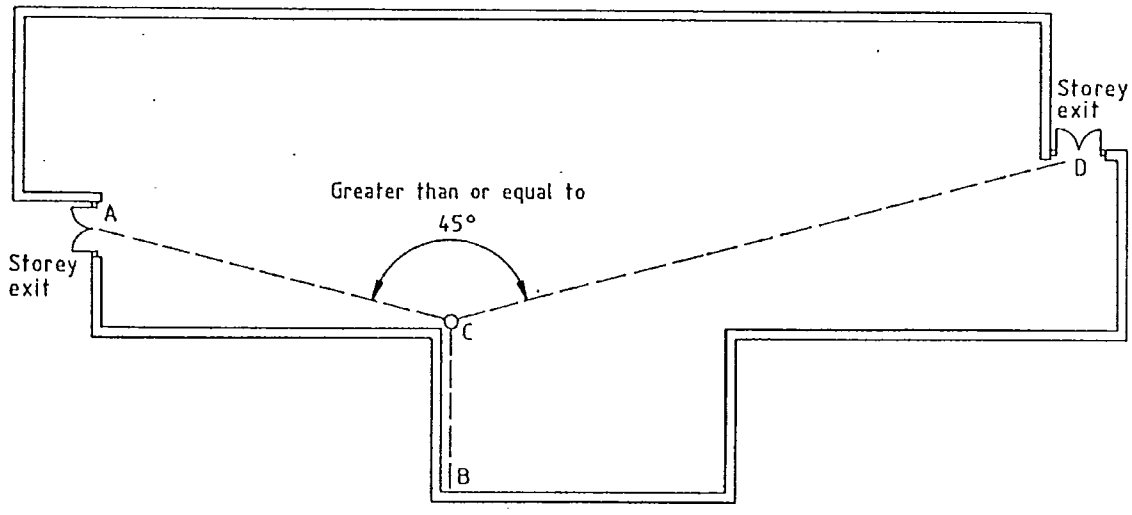
B and C are storey exits.

Figure 1. Travel distance and direct distance



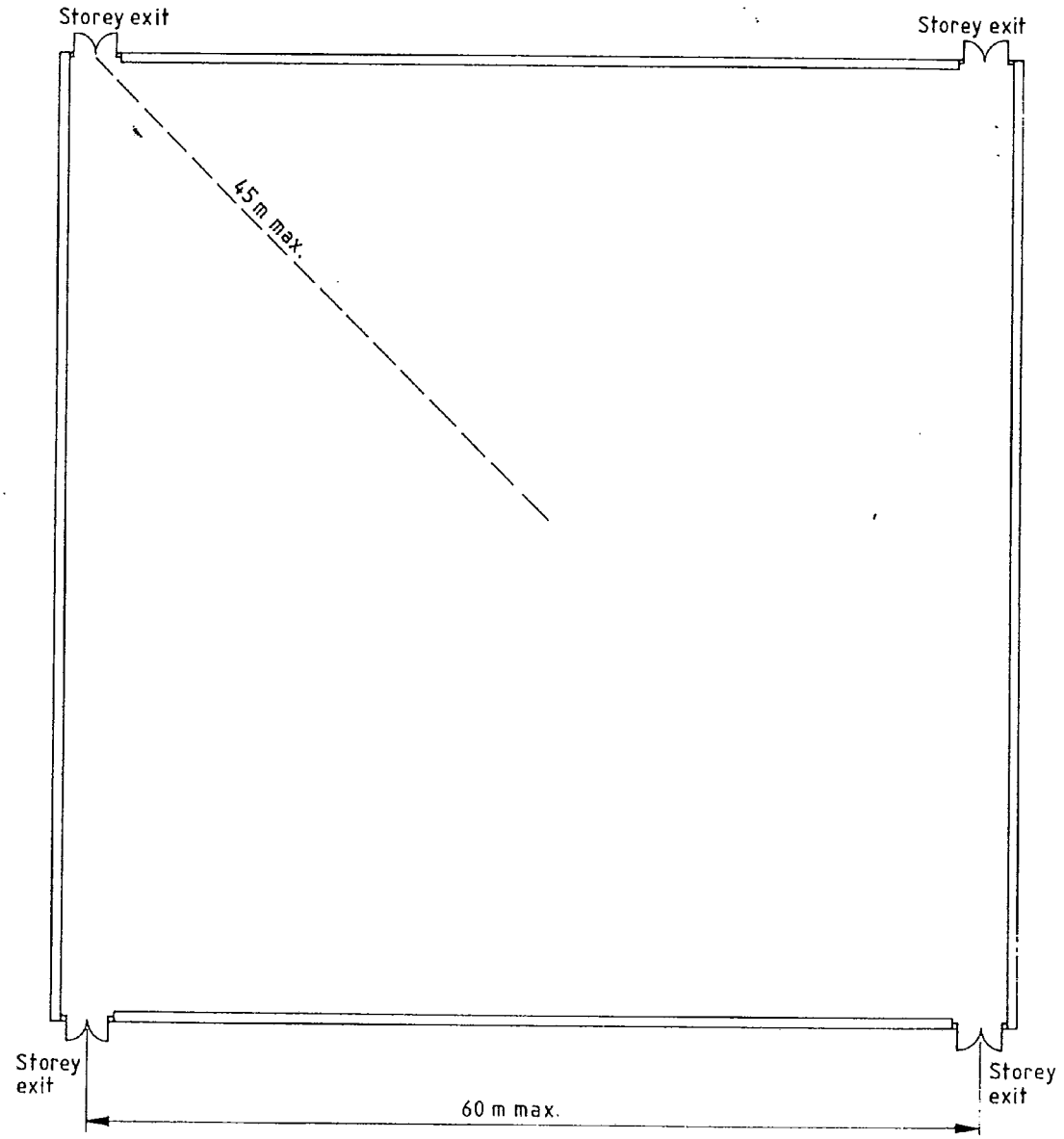
AB Indicates maximum direct distance in a dead end or single exit situation.
CB Indicates maximum direct distance where the angle to another exit (BCE) is less than 45°.
DB & DE indicate maximum direct distance where two exits are available.

Figure 2. Direct distance



Direct distance AB (nearest exit) not exceeding 30 m.
Direct distance BC not exceeding 12 m.
C is the point from which escape is available in separate directions.

Figure 3. Direct distance in association with a dead end



NOTE. Storey exits should be uniformly distributed around the perimeter, well marked and clearly visible.

Figure 4. Direct distance in open storey (horizontal) planning sales areas at ground level

7.2 Width of exits and escape routes

7.2.1 *Commentary.* Every exit should be wide enough to enable the quick passage of all the occupants who may need to use it. In the case of small rooms or storeys no calculation is necessary because an 800 mm wide door would be sufficient. For corridors, etc., the width should be not less than the door width to the stairway or the width of the final exit as appropriate.

Except where a single exit is acceptable, one of the exits should be assumed to be obstructed by fire. Therefore in the case of two exits, each should be capable of letting all the occupants pass. Where three or more exits are provided, each exit in turn should be discounted in assessing the widths of the others.

The number of occupants for whom provision should be made may be known for certain areas, otherwise the numbers may be calculated from the floor space per person given in table 2; in that case the number of occupants of a room or storey can be calculated from

$$\frac{\text{area of room or storey (in m}^2\text{)}}{\text{floor space per person (in m}^2\text{)}}$$

Whatever method is used for assessing the number of persons using a room or storey, the appropriate authority will need to be satisfied that adequate exits and widths of exits are provided for the number of persons actually using the premises when occupied. This is particularly important if a fire certificate is required.

The number of occupants of a building is the sum of the numbers of occupants of the storeys in the building.

7.2.2 *Recommendations.* The following recommendations are applicable.

(a) The capacities of exits or escape routes should be calculated in accordance with table 3. The capacity or aggregate capacity of exits and escape routes should be not less than the number of occupants of the storey. If two or more exits or escape routes are required, the capacity or aggregate capacity should be not less than the number of occupants of the storey when in turn the capacity of each exit or escape route is discounted. For the purposes of table 3, the width of a doorway is that of the leaf or leaves, and the width of a passage is between the sides at shoulder level.

(b) If a storey exit or a final exit is approached through a check-out point (e.g. in a supermarket) each check-out passage should be not less than 500 mm in clear width and the combined width of the check-out passageways should be not less than twice the required width of the storey exit at the final exit unless a further exit independent of the check-out points is provided.

Table 3. Capacities of escape routes within a storey and of any exit leading therefrom

Maximum number of persons	Width	Maximum number of persons	Width
	mm		mm
50	800	280	1400
110	900	300	1500
220	1100	320	1600
240	1200	340	1700
260	1300	360	1800

NOTE. Other values of width for a maximum number of persons greater than 220 may be obtained by linear interpolation or extrapolation

Table 2. Suggested floor space factors

Description of room or storey	Floor space per person excluding stairway enclosures, lifts and sanitary accommodation
	m^2
1 Shops and showrooms other than items 2 and 3	7.0
2 Supermarkets and areas with a similar high customer density	2.0
3 Department stores: main sales areas	2.0
: sparsely occupied sales areas	7.0
4 Public restaurants and lounges	1.0*
5 Bars	0.3*
6 Staff coffee lounge, committee room, conference room, dining room, meeting room, restaurant, common room, lounge, reading room, staffroom, waiting room	1.0*
7 Library, kitchens	7.0
8 Storage accommodation, car park†	30.0

NOTE. These floor space factors are for guidance only and should not be taken as the only acceptable densities.

* Or, where the occupants will normally be seated, the number of seats provided.

† Alternatively two persons per parking space.

7.3 Escape route across a flat roof

7.3.1 *Commentary.* Preferably an escape route from a shop should not involve access on to a roof. However, occasionally the planning of a building may be such that to satisfy travel distances (particularly those involving dead ends) it may be necessary to consider access on to an adjacent flat roof and thence to the head of a protected or external stairway leading to a final exit.

In other situations, the portion of the escape route between the final exit and street level may involve access across a roof at low level.

Escape routes over flat roofs may, of course, be necessary in the case of ancillary accommodation situated at roof level.

7.3.2 *Recommendations.* If more than one escape route is available from a storey, one of the escape routes from that storey may be by way of a flat roof provided that the four following conditions are satisfied:

(a) such a roof is part of the same building from which escape is being made;

(b) the route across the roof:

(1) leads to another storey exit;

(2) is adequately defined and guarded with protective barriers in accordance with BS 6180;

(c) such a part of the escape route and its supporting structure is constructed as a fire-resisting floor;

(d) where an escape route is in one direction only, any ventilation outlets or other extract system, and any doors, rooflights, or windows that are not fire-resisting, should not be sited within 3 m of such a route.

8 Stairways and final exits

8.1 Accommodation stairways and escalators

8.1.1 *Commentary.* The provision of accommodation stairways and escalators depends on the degree of compartmentation of the building. They are disregarded for escape purposes even though they would be used if free of heat and smoke.

The siting of accommodation stairways or escalators in open wells allows the passage of smoke from one storey to another, and therefore should not be such that the means of escape on the upper floor levels is prejudiced.

8.1.2 *Recommendation.* Accommodation stairways and escalators should be so sited that their location does not prejudice the access to the means of escape at the upper floor level(s).

8.2 Number of protected stairways

8.2.1 *Commentary.* The safety of a protected stairway cannot be ensured for an unlimited period of time. Therefore a building with only one stairway can only be considered safe if it is of limited height and area. If there is more than one protected stairway, all but the one nearest the fire may be expected to remain usable until any necessary evacuation is complete.

8.2.2 *Recommendations.* The following recommendations are applicable.

(a) There should be not less than two protected stairways available from each storey except in the case of small shops (see clause **9**).

(b) Additional protected stairways should be provided as necessary to meet requirements for travel distance.

8.3 Siting of protected stairways

8.3.1 *Commentary.* Except where a single stairway is permitted in a small shop (see clause **9**) stairways should be so located that they are remote from each other, thus enabling the occupants to turn away from any fire (other than in permitted dead end situations).

8.3.2 *Recommendations.* The following recommendations are applicable.

(a) The siting of two or more protected stairways should be such that they afford effective alternative directions of travel from any relevant point in a storey.

(b) In buildings having open spatial (vertical) planning, the protected stairways should be sited at the extremities of the building away from the open connections between floors.

8.4 Width of protected stairways

8.4.1 *Commentary.* The widths of stairways should be such as to allow the full number of occupants who may need to use them for escape purposes to do so without risk of overcrowding or delay. In determining the number of persons in any storey who may need to use a stairway, the considerations of **7.2.1** apply.

The maximum number of persons in any other storey of whom account needs to be taken is governed by the extent to which storeys are compartmented one from another, and therefore whether or not there is a need to evacuate more than two storeys initially at the discovery of fire.

The occupants of all storeys require to evacuate the building simultaneously unless each storey is an individual compartment and the stairways are provided with added protection against the ingress of smoke and heat.

Except where a single stairway is acceptable (see clause **9**), it is reasonable to assume that only one stairway may become obstructed by fire and therefore the number and widths of stairways have to be adequate when one stairway is discounted.

8.4.2 *Recommendations.* The capacities of stairways and exits therefrom should be calculated in accordance with table 4. The aggregate capacity of protected stairways and of exits leading therefrom should be not less than the number of occupants of the building. If two or more protected stairways are required, the capacity (or aggregate capacity) should be not less than the number of occupants of the building when, in turn, each stairway is discounted. For the purposes of table 4, the width of a protected stairway is the clear width between the walls or balustrades. This clear width should be maintained for a vertical distance of 2.0 m, measured from the pitch line or landing floor level, with the following exceptions:

(a) stringers, each intruding into the stairway not more than 30 mm;

(b) handrails, each intruding into the stairway not more than 75 mm.

8.5 Enclosure of protected stairways

8.5.1 *Commentary.* The fire-resisting enclosure of a protected stairway is provided to prevent:

(a) smoke and heat from entering the stairway and rendering it impassable for escape purposes;

(b) fire spreading from one storey to another.

In the event of a failure of a protected stairway enclosure in fire conditions, where there is more than one stairway in accordance with **8.2.2**, it is important to arrange access to an alternative stairway so that persons need not pass through one stairway to reach another.

It is also important to ensure that there are no fire risks within a protected stairway, but sanitary accommodation is permissible, as are properly enclosed cupboards where there is more than one stairway.

In general, every protected stairway should be entered from only one storey exit at each level. Where it is necessary to provide more than one storey exit into a protected stairway in order to meet the limitations on distances of travel, such exits should not form the sole means of access from one part of the storey to another because where normal communication between different parts of the same storey is through a protected stairway, the doors to the stairway will tend to become either wedged open or the self-closing devices removed or tampered with, so destroying the effectiveness of the fire-resisting enclosure.

NOTE. A protected stairway includes any corridor between the stairway and a final exit (see **2.18**).'

Table 5. Table deleted.

Table 4. Capacity of a stairway

Number of floors served	Maximum number of persons accommodated on one stairway of width:								
	1000 mm	1100 mm	1200 mm	1300 mm	1400 mm	1500 mm	1600 mm	1700 mm	1800 mm
1	150	220	240	260	280	300	320	340	360
2	190	260	285	310	335	360	385	410	435
3	230	300	330	360	390	420	450	480	510
4	270	340	375	410	445	480	515	550	585
5	310	380	420	460	500	540	580	620	660
6	350	420	465	510	555	600	645	690	735
7	390	460	510	560	610	660	710	760	810
8	430	500	555	610	665	720	775	830	885
9	470	540	600	660	720	780	840	900	960
10	510	580	645	710	775	840	905	970	1035

NOTE. The capacity of stairways serving more than 10 floors may be obtained by linear extrapolation.'

8.5.2 *Recommendations.* The following recommendations are applicable.

(a) A protected stairway other than a firefighting stairway may contain only the following:

(1) sanitary accommodation or washrooms provided that the accommodation:

(i) is not used as a cloakroom;

(ii) does not contain any portable heating appliance;

(iii) does not contain any gas appliance other than a water heater or incinerator;

2 '(2) cupboards enclosed with fire-resisting construction except in the case of a building (or part) served by a single stairway;

2 (3) lift wells, except lift wells which are sited directly above lift motor rooms in buildings (or parts) served by a single stairway.'

(b) Where a protected stairway is served by more than one storey exit at the same level, provision should be made for normal communication between the parts of the floor area served by the different storey exits to be independent of the protected stairway.

(c) Where a protected stairway enclosure is common with the enclosure of another protected stairway that part should be imperforate.

(d) Protected stairways should be sited so that access to alternative protected stairways may be obtained from any point in that storey without passing through any other such stairway.

2 (e) If a protected stairway projects beyond, or is recessed from, the external enclosures to a building:

(1) the distance between any opening in the external enclosures to the building and any opening in the enclosure to the stairway should be not less than 1.8 m;

(2) the enclosures within that distance and 9 m vertically below should be of fire-resisting construction that may contain non-opening fire-resisting glazed elements.

8.6 Basement stairways

8.6.1 *Commentary.* Special considerations apply to stairways in basements because areas below ground level, especially if used for storage, are more likely to become completely filled with smoke and heat from a fire than are the ground and upper storeys. There is therefore a greater risk that a stairway in a basement will become obstructed by smoke and heat. For this reason it is preferable that all stairways to basements be entered at ground level only from the open air and from such positions that smoke from any basement fire will not obstruct any exit serving the ground and upper storeys of the building. However, in buildings

2 having two or more stairways available for escape from the upper storeys, no objection is seen to one or more stairways continuing down to the basement provided each such stairway is adequately protected from ingress of smoke from the basement and at least one stairway serving the upper floors of the building (or part) is terminated at ground level.

8.6.2 *Recommendation.* Except for small shops (see clause 9), at least one protected stairway serving the upper storeys of the building (or part) should be terminated at ground level; any other stairway may connect with the basement storey(s) provided that it is separated from each basement level by a protected lobby in accordance with 8.7.2.

8.7 Access lobbies to protected stairways

8.7.1 *Commentary.* Although it is unusual for shops to be carried to any great height, it should be borne in mind that because of the greater hazard to the occupants of a high building than of a low one, the protection afforded to stairways serving high buildings should therefore be greater.

Thus direct access from public sales floor areas into a protected stairway is considered adequately safe in buildings of limited height. However, in high buildings, access to the stairway should be by way of a protected lobby.

Corridors are unusual in the public portions of shop premises but if a corridor is provided it should be a protected corridor in accordance with 12.5.2. Such a corridor would fulfil the functions of a lobby.

Lobby protection to protected stairways is also necessary to safeguard stairways connecting with enclosed car parks, boiler rooms and transformer chambers, etc.

Still greater protection is necessary in connection with fire-fighting stairways provided in buildings having storeys beyond the reach of external fire-fighting equipment (see clause 30).

8.7.2 *Recommendations.* If a protected stairway, other than an external escape stairway, serves a storey or storeys in any of the following circumstances it should be approached only by way of a protected lobby at the levels indicated.

(a) If the stairway is in a building of height (see 2.10) greater than 18 m there should be a lobby at every level excluding a top storey consisting exclusively of plant rooms.

(b) If the stairway connects the ground or upper storeys with a basement storey or storeys, or serves only basement storeys, there should be a lobby at every basement level.

(c) If the stairway provides access to an enclosed car park, there should be a lobby at every car park access level.

(d) If the stairway directly serves an area of higher fire risk (see 12.7), such as a boiler room or transformer chamber, there should be a lobby at that level.

The protected lobbies described in items (b), (c) and (d) should be provided with ventilation in accordance with 31.2.

8.8 External escape stairways

8.8.1 *Commentary.* External escape stairways provided for means of escape purposes (i.e. to meet the recommendations of **8.2.2** and **8.3.2**) are deemed to be protected stairways, and hence need to satisfy the recommendations given in **8.4.2**, **8.5.2**, **8.6.2** and **8.9.2** as well as those given in **8.8.2**. External escape stairways should in general be protected from the effects of adverse weather conditions. It is also necessary to ensure that their use at the time of a fire cannot be prejudiced by smoke and flames from nearby doors and windows.

8.8.2 *Recommendations.* The following recommendations are applicable.

(a) An external stairway used as means of escape should:

(1) be roofed and at least partly covered in at the sides, depending on the degree of exposure of the stairway and building, so as to ensure freedom at all times from adverse weather conditions; except that a stairway that does not rise more than 6 m above ground level or 6 m above a roof or podium served by an independent protected escape route need not be protected from the weather;

(2) be constructed of non-combustible material except that a stairway that does not rise more than 6 m above ground level or 6 m above a roof or podium served by an independent escape route may be constructed of hardwood.

(b) Any wall (or portion) (other than at the top floor level of a stairway not being a basement stairway) within 1.8 m of, or within 9 m vertically below, any external escape stairway should be of fire-resisting construction that may contain non-opening fire-resisting glazed elements, and the doors to the stairway should be fire-resisting and self-closing.

(c) Lobbies are not required to an external escape stairway.

8.9 Discharge from stairways and final exits

8.9.1 *Commentary.* All occupants of the building using the stairways to reach safety in the open air ought to be assured of the same degree of protection from the effects of smoke and heat in this part of the escape route as that provided in the other parts. In achieving safety in this part of an escape route the following considerations apply.

The safest discharge arrangement is for the stairway or final exit to discharge directly to the street at ground floor level. However, consideration may be given to ground floor final exits discharging by way of a shopping mall or arcade where adequate provision is made for people to reach safety away from the building. Stairways should not discharge into shopping malls or arcades.

An arrangement by which two stairways terminate in the same enclosure at final exit level should not be employed because an outbreak of fire leading to penetration of the enclosure at that level would render both stairways simultaneously unusable.

8.9.2 *Recommendations.* The following recommendations are applicable.

(a) Where the exit passageway from a protected stairway is common with the exit passageway from another protected stairway, that part should be imperforate.

(b) Final exits should give direct access to a street, passageway, walkway or open space sited so as to ensure the rapid dispersal of persons from the vicinity of the building so that they are no longer in danger from fire or smoke.

(c) Any final exit should be immediately apparent to any person using a stairway that serves above and below the point of final exit.

(d) A ground floor final exit may discharge through a display window area where the distance from such a final exit to the exit from the display window area (the building line) does not exceed the narrowest dimension of the arcade by more than 9 m.

(e) Any external portion of an escape route between a final exit and street level, where across a concourse, pedestrian walkway, etc., should be clearly defined and if necessary guarded with protective barriers in accordance with BS 6180.

(f) Final exits should be so sited that they are clear of any risk from fire or smoke in a basement.

(g) Transformer chambers, boiler rooms and similar risks should not have any openings near any exits from the building.

8.10 Text deleted.

9 Small shops

9.1 Commentary

This clause is concerned with the planning of means of escape from small shops which may involve a departure from the recommendations outlined in clause **8**.

The small size of these shops limits their capacity in terms of the number of persons using them at any one time, and ought to permit the exits to be clearly seen and to be relatively easily accessible from all parts of the sales floor areas. Thus, consideration may be given to a reduction in the number of exits and stairways and, in certain cases, to the omission of a protected stairway.

However, where the sale, storage or use of highly flammable materials is involved, it is necessary for persons to rapidly vacate the premises in the event of a fire, and, to facilitate this, the recommendations in clauses **7** and **8** should be strictly observed.

9.2 Recommendations

The following recommendations should be applied in place of only those recommendations in clauses **7** and **8** relating to the number and siting of exits and protected staircases.

9.2.1 *General*

(a) The shop should not comprise more than a basement, a ground and a first storey; no storey should have a floor area greater than 280 m^2; the shop should be in a single occupancy.

(b) The shop should not be used principally for the storage and/or sale of highly flammable liquids or materials.

(c) Any kitchen or other open cooking arrangement should be sited at the extremity of any dead end remote from the exit(s).

(d) The planned seated accommodation or the assessed standing accommodation (see table 2) for small shops comprising a bar or restaurant should not exceed 30 persons per storey. This figure may be increased to 100 persons for the ground storey if that storey has an independent final exit.

9.2.2 *Construction* (see also clause **10**)

(a) The floor areas should be generally undivided (except for kitchens, ancillary offices and stores) to ensure that exits are clearly visible from all parts of the floor areas.

(b) Store rooms should be enclosed with fire-resisting construction.

(c) Sufficient clear glazed areas should be provided in any partitioning separating a kitchen or ancillary office from the open floor area to enable any person within the kitchen or office to obtain early visual warning of an outbreak of fire.

9.2.3 *Distance of travel and number of escape routes*

(a) The escape routes from any storey should be of such a number and so situated that the distance of travel* from any point to the nearest storey exit does not exceed the appropriate limits set out in table **6**.

(b) The siting of two or more exits or stairways should be such that they afford effective alternative directions of travel from any relevant point in a storey.

*The distance of travel in a small shop with an open stairway is measured to the foot of the stairway in a basement or to the head of the stairway in a first storey.

Table 6. Maximum permitted distances of travel* in small shops

	Maximum travel distance	Maximum direct distance
	m	m
Ground storey with a single exit	27	18
Basement or first storey with a single stairway	18	12
Storey with more than one exit/stairway	45	30

* See footnote to **9.2.3.**

9.2.4 *Stairways*

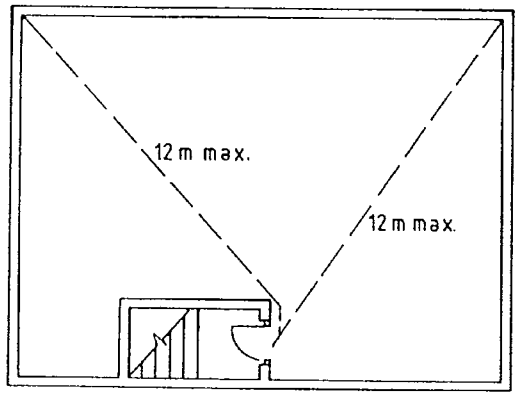
(a) In a small shop comprising a bar or restaurant, all stairways should be protected stairways discharging to a final exit.

(b) In a small shop that is not a bar or restaurant, stairways should be protected stairways discharging to a final exit except that a stairway may be open if it does not connect more than two storeys, and delivers into the ground storey not more than 3 m from the final exit (see figures 6 and 7), and either

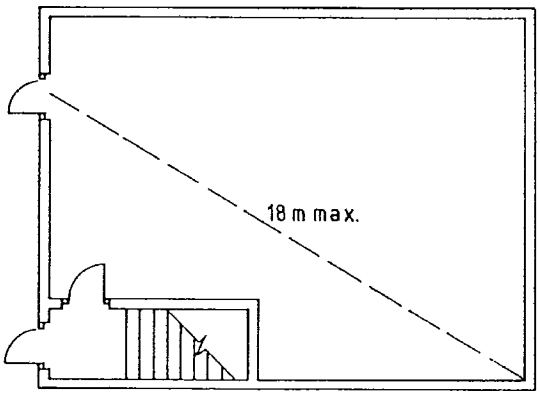
(1) the storey is also served by a protected stairway;

or

(2) it is a single stairway in a small shop with the floor area in any storey not exceeding 90 m^2 and, if the shop contains three storeys, the stairway serving either the top or the bottom storey is enclosed with fire-resisting construction at the ground storey level and discharges to a final exit independent of the ground storey (see figure 7).



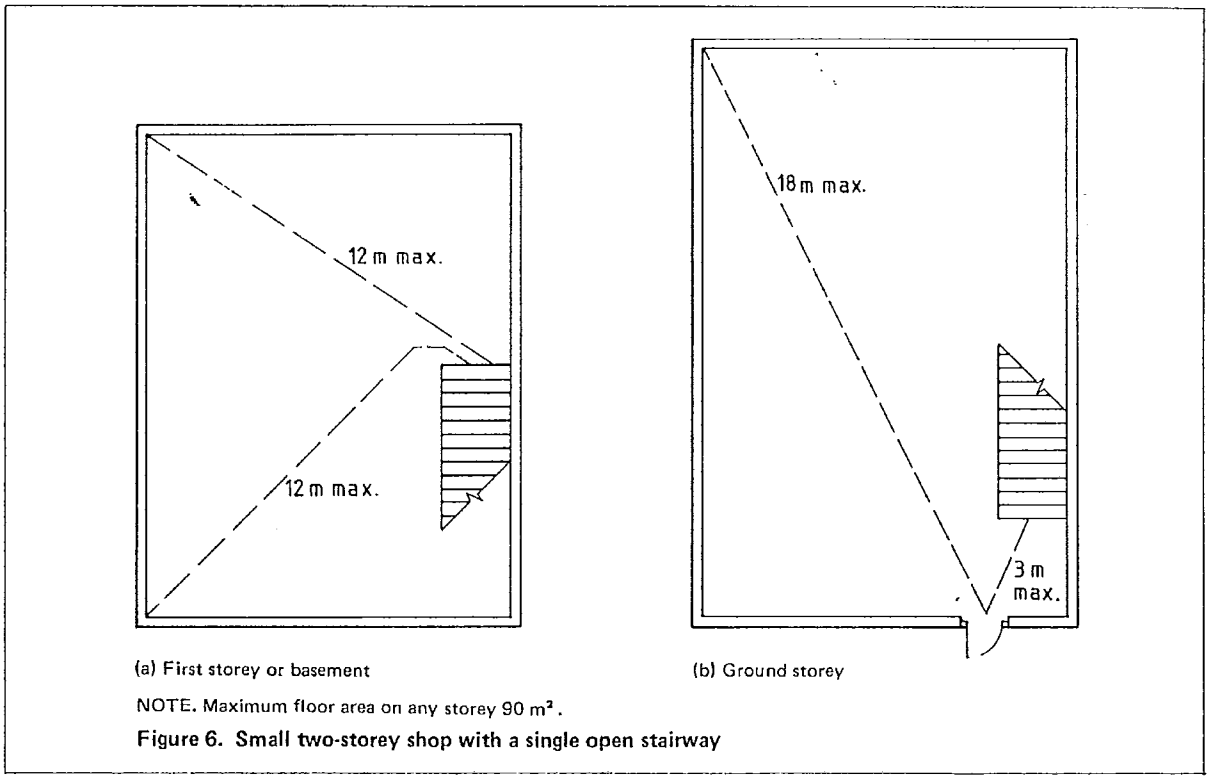
(a) First storey and/or basement



(b) Ground storey

NOTE. Maximum floor area on any storey 280 m^2. Restricted accommodation if used as a restaurant or bar.

Figure 5. Small two- or three-storey shop with a single protected stairway to each storey

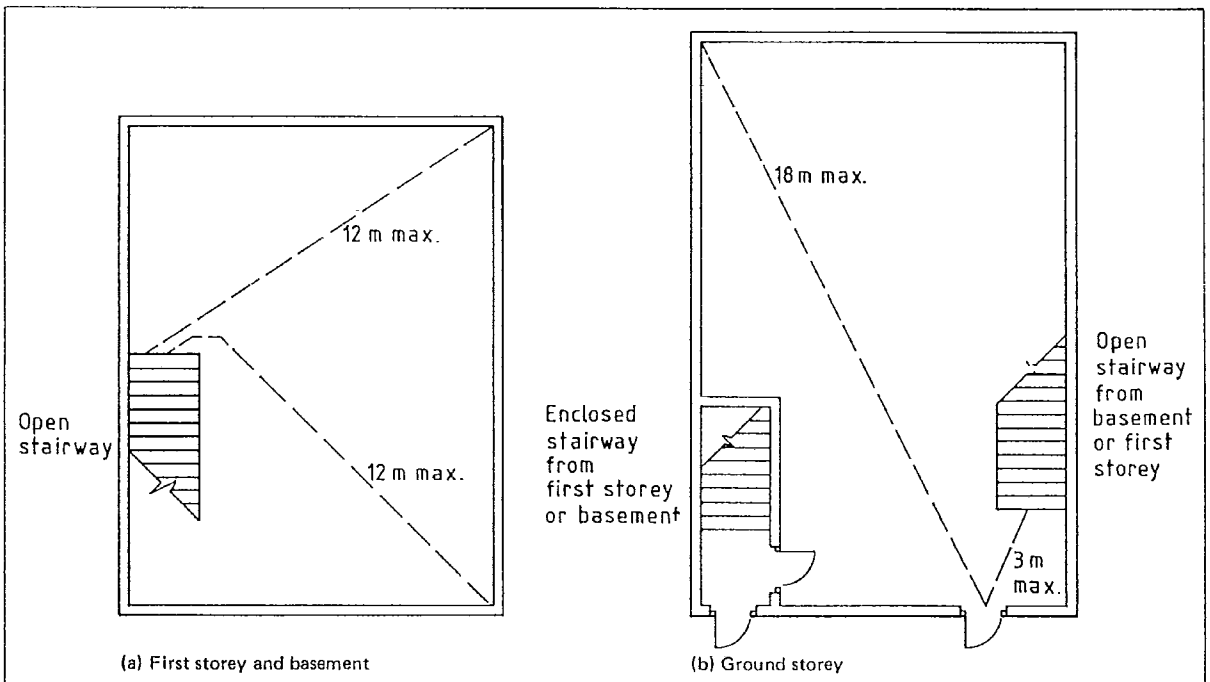


(a) First storey or basement

(b) Ground storey

NOTE. Maximum floor area on any storey 90 m².

Figure 6. Small two-storey shop with a single open stairway



(a) First storey and basement

(b) Ground storey

NOTE 1. Maximum floor area on any storey 90 m².

NOTE 2. Enclosed stairway at ground storey level may be from either the basement or the first storey.

Figure 7. Small three-storey shop with a single stairway to each storey

Section four. Construction and fire safety signs and notices

10 Construction

10.1 General

The recommendations in section three are made on the assumption that the provisions for structural fire protection of any building to which this code applies comply with the appropriate building regulations. Structural fire protection embraces the matters listed below, but the actual requirements of some of these depend on the size of the building and its relation to the site boundary.

Fire resistance of structural elements

Possible subdivision of the building into compartments

Protection of all shafts connecting different compartments

Provision of cavity barriers and fire stops

Restriction of spread-of-flame on surfaces of walls and ceilings

Construction of stairways

Construction of roofs

Construction of external walls

The provision of adequate fire resistance in the building structure is intended to ensure that the building will not collapse prematurely in fire, and that the means of escape will remain unaffected by fire for long enough to ensure that the escape of the occupants can take place without undue risk. It will not, however, necessarily avoid the material loss of property to the building owner. It may therefore be desirable that the building designer considers reducing the cubic capacity and floor area at risk to below that permitted by building regulations or incorporating 'active' fire protection measures (such as a sprinkler system) into the building, or both.

10.2 Protection of structural members

Elements of structure (columns, floors, walls, etc.) that do not inherently possess the fire resistance prescribed by building regulations require to be protected so that the regulations are complied with. For this, a variety of methods of protection is available in the form of protective coverings, casings or membranes.

Designers should, however, consider the risk of mechanical or other damage when selecting methods and materials, because in some cases such damage can easily destroy the fire-resisting quality of the element, with very serious risks as a result.

Some forms of protection to structural members may suffer the disadvantage that weaknesses may occur at the joints because of the method of fixing. Care should also be taken to eliminate any continuity of cavities between adjacent elements. In the case of suspended ceilings a further weakness may occur by the introduction of recessed light fittings, ventilation ducts or other features that necessitate the introduction of access panels, and by so doing create a risk to the fire-protective integrity of the membrane concerned.

10.3 Fire resistance

10.3.1 *Commentary.* For the purposes of complying with the recommendations for means of escape in case of fire, a 30 min period of fire resistance is generally considered adequate. However, increased periods of fire resistance may be necessary to comply with building regulations for structural fire protection or to ensure adequate safety for fire-fighting.

Satisfactory performance of fire resistance of structural elements is ascertained by compliance with one of the following:

(a) specifications tested, or assessed, under the appropriate part of BS 476;

NOTE. Requirements made in connection with statutory provisions may still refer to BS 476 : Part 8 although it has been superseded by BS 476 : Parts 20, 21, 22 and 23, with the tests relevant to loadbearing elements published in Part 21, and those for non-loadbearing elements in Part 22; glazed elements are non-loadbearing and hence are tested in accordance with Part 22.

The criterion of 'stability' has been replaced by the criterion of 'loadbearing capacity'; however, in line with international practice, non-loadbearing elements tested in accordance with BS 476 : Part 22 are assessed only for integrity and insulation.

(b) appropriate British Standard specifications or codes of practice;

(c) specifications referred to under building legislation.

Brief details of these tests are given in PD 6520.

10.3.2 *Recommendations.* Fire resistance, where recommended in this code, should be taken (in the absence of any recommendation to the contrary) as requiring not less than a 30 min period of fire resistance, and implies the following:

(a) for walls and partitions, equal compliance for loadbearing capacity integrity and insulation from either side;

(b) for glazed elements, equal compliance for the appropriate criteria from either side (see 10.5.2);

(c) for doors, compliance for integrity from either side, except in the case of doors to lift shafts where performance is in respect of exposure of the landing side only;

(d) for suspended ceilings (other than suspended ceilings protecting structural members), equal compliance for integrity and insulation from the underside.

10.4 Vertical shafts for lifts, hoists, ducts, etc.

10.4.1 *Commentary.* The penetration of fire-resisting floors by services and vertical shafts can prejudice the safety of occupants and create points of weakness in the compartmentation, if any, of the building. All such services and shafts where connecting different compartments have to comply with the provisions of building regulations.

If a lift well is located within a protected lobby or protected stairway, the preferred location of the lift motor room is either above the lift well or outside the stairway and lobby enclosures (see also item (a) (3) of 8.5.2). Lift wells ought to be sited so as not to prejudice escape routes.

10.4.2 *Recommendations.* The following recommendations are applicable.

(a) Lift wells (other than in a protected stairway (see 8.5.2)) where contained wholly within one compartment and located such as to be prejudicial to the means of escape should be enclosed throughout their height with fire-resisting construction.

(b) Service shafts and other vertical ducts should be enclosed throughout their height with fire-resisting construction. Service ducts should comply with CP 413 and BS 5588 : Part 9

2

10.5 Glazed elements

10.5.1 *Commentary.* Partitions, doors and windows, containing traditional annealed wired glass based on soda-lime-silica, although possibly able to satisfy the requirements of the appropriate Part of BS 476 for periods of up to 90 min in terms of integrity, nevertheless permit local high heat transmission and radiation through the glass and so are unable to satisfy the requirement for insulation for more than a few minutes. Such heat transmission and radiation can constitute a hazard to people escaping nearby and could ignite adjacent combustible materials. Unwired 'glass' products able to satisfy the requirements for integrity are available, and some products provide 'insulation' for at least 30 min.

2

2

2

NOTE. PD 6512 : Part 3 gives advice and information on the fire performance of glazed elements in buildings.

The type of glass permitted in a fire-resisting construction depends on whether either:

(a) the glazed element should afford the same protection as the remainder of the enclosure in which it is situated; or

(b) it is only necessary for the glazed element to afford protection against the passage of flames and hot gases.

10.5.2 *Recommendations.* The following recommendations are applicable.

(a) Glazed elements that are fire resistant in terms of integrity and insulation may be used without restriction.

(b) Glazed elements that are fire resistant in terms of integrity only should conform to the limitations in table 7 appropriate to their position and the provision of escape stairways.

NOTE. The recommendations in BS 6262 should also be followed. These recommendations may impose further restrictions on the position, size and composition of glazed elements.

10.6 Fire doors

10.6.1 *Commentary.* Fire doors are one of the most important links in the chain of fire safety precautions, and care in their selection to ensure that they are adequate for their purpose cannot be over-emphasized. The failure of doors under fire conditions usually occurs either at the gap between the door and the frame, or at one or more of the points where ironmongery is fixed (particularly at the hinges or lock positions), or, in the case of glazed doors,

Table 7. Limitations on non-insulating glazed elements installed in stairways, lobbies and corridors

Position of glazed elements	Maximum total glazed area in:	
	the fire-resisting wall (see note 1)	any leaf of a fire door (see note 2)
(a) Directly between a protected stairway and the floor area or a non fire-resisting corridor (see note 3)	Unlimited above 1.1 m height*	50 % of door area†
(b) Between a protected stairway and a protected lobby or protected corridor	Unlimited above 0.1 m height‡	Unlimited above 0.1 m height
(c) Between a protected lobby and the floor area	Unlimited above 0.1 m height‡	Unlimited above 0.1 m height
(d) Between a protected corridor forming a dead end and the floor area	Unlimited above 1.1 m height*	Unlimited above 0.1 m height
(e) Between a protected corridor not forming a dead end and the floor area	Unlimited above 0.1 m height	Unlimited above 0.1 m height
(f) Subdividing corridors	Unlimited above 0.1 m height	Unlimited above 0.1 m height

*Nil in small shops or in parts of buildings served by a single staircase.

†25 % of the door area in small shops or in parts of buildings served by a single staircase.

‡Nil below 1.1 m in small shops or in parts of buildings served by a single staircase.

NOTE 1. The size of individual panes of glass making up the permitted total glazed area should be limited to sizes that have been satisfactorily demonstrated to comply with the relevant criteria for an appropriate duration under test. Similarly, any mullions or transoms, especially between adjacent glazed elements, should also be proven.

NOTE 2. The suitability of any door with respect to incorporating fire-resistant glass should be established before glazing. Moreover, not all doors can be glazed without affecting the stability of the door leaf.

NOTE 3. Measured vertically from the landing floor level or the stairway pitch line.

at the line of the junction between the glazed area and the rest of the door. For this and other reasons it is particularly important to ensure that doors delivered on site comply precisely, in dimensions and workmanship, with the manufacturer's specification for the appropriate fire resistance test report. Doors should also be hung to ensure a good fit to the frame when closed.

The ability of fire doors to perform their designed function will depend upon their being fully closed at the time of fire; they are, therefore, normally required to be fitted with self-closing devices. Where a closed door would cause problems to the normal usage of the building, and therefore possibly become wedged or otherwise held open or have the closer disconnected, electromagnetic (or similar) 'hold open' systems may be considered for use except in critical situations, for example the doors to protected lobbies of fire-fighting lifts or to the sole escape stairway to a building.

The performance of a fire door when tested in accordance with BS 476 : Part 22 is judged by its time to failure (in minutes) for each of the criteria of 'integrity' and 'insulation'; regulations and codes of practice do not however normally specify any performance for insulation.

2 For the purposes of this code, fire doors are designated by reference to their required performance (in minutes) for integrity only, e.g. a reference FD 20 implies that the door in that situation should achieve not less than 20 minutes integrity when tested in accordance with BS 476 : Part 22, and a reference FD 30 implies not less than 30 minutes integrity. Where doors are also required to retard the passage of smoke at ambient temperature, the suffix 'S' is added (see **10.6.2**).

Methods for the evaluation of doors to control the movement of smoke will be published as Sections of BS 476 : Part 31. The methods take account of three different stages of a fire:

(a) ambient temperature;

(b) medium temperature;

(c) high temperature conditions.

Although the above-mentioned system of designation specifically excludes reference to any performance for insulation (because of problems of radiation through traditional fire-resisting glass), table 7 recommends limits to 2 the extent of non-insulating glazed areas in fire doors in certain circumstances.

Any reference to performance when tested in accordance with BS 476 : Part 8 or Part 22 is for the purposes of this code only. Depending upon circumstances, a higher performance may be necessary to satisfy building regulations or insurance requirements for structural fire protection.

10.6.2 *Recommendations.* The following recommendations are applicable.

(a) A fire door should be provided to comply with the minimum performance recommended for any of the following circumstances:

(1) a fire door forming part of the enclosures of

(i) a protected stairway, FD 30S;

(ii) a protected lobby (see **8.7.2**) or protected corridor approach to a protected stairway (see item (a) of **12.5.2**), FD 30S;

(iii) ancillary accommodation (see table 9, items 1 to 4), FD 30;

(iv) ancillary accommodation (see table 9, items 5 to 14), FD 60;

(v) all lift shafts except those within enclosures of a protected stairway (see item (a) of **10.4.2**), FD 30;

(vi) builders' ducts, etc. (see item (b) of **10.4.2**), FD 30.

(2) a fire door subdividing

(i) corridors connecting alternative exits (see item (b) of **12.5.2**), FD 20S;

(ii) dead end portions of corridors from the remainder of such corridor (see item (b) of **12.5.2**), FD 20S.

(3) A fire door affording access on to an external stairway (see **8.8.2**), FD 30.

(b) A fire door required to resist the passage of smoke at ambient temperature conditions (i.e. those having the suffix S in item (a)) should, when tested in accordance with BS 476 : Section 31.1 with the threshold taped and subjected to a pressure of 25 Pa, have a leakage rate not exceeding 3 m^3/m/h. The threshold gap should be sealed by a seal either with a leakage rate not exceeding 3 m^3/m/h at 25 Pa or just contacting the floor; where this is impracticable the threshold gap should not exceed 3 mm at any point.

NOTE. The term 'fire door' includes both the door frame and the door leaf or leaves.

(c) A fire door (except to a cupboard or service duct, see item (e)) should be fitted with a self-closing device (other than rising butt hinges) that:

(1) should be of a type that cannot readily be disconnected or immobilized and does not embody a stand-open action;

(2) should override any latches fitted to the door(s); or, in the absence of a suitable latch or other positive device for holding the door shut in its frame, should be of a type that has been shown by test in accordance with BS 476 : Part 8 or Part 22 to be capable of holding the door closed in the frame for a sufficient period of time for the closing role to be taken over by a thermally activated sealing device (such as an intumescent seal), or throughout the full period of exposure if such seals are not incorporated.

NOTE. Standards for self-closing devices for fire doors are in course of preparation.

(d) Unless shown to be satisfactory when tested in accordance with BS 476 : Part 8 or Part 22, no part of a hinge on which any fire door is hung, and that provides the sole means of support at the hanging edge, should be made either of combustible material or of non-combustible material having a melting point of less than 800 °C.

* A recommendation for performance when tested in accordance with BS 476 : Section 31.1 is under consideration.

(e) A fire door to a cupboard or service duct in lieu of being self-closing should have means to enable it to be kept locked shut when not in use and be so marked on the outside with the appropriate sign complying with BS 5499 : Part 1.

(f) Except for doors to firefighting lobbies, to firefighting stairways or to the only protected stairway in a building or part of a building, means of holding any fire door open or of overriding its self-closing device may be provided by a hold open system incorporating an automatic release mechanism complying with BS 5839 : Part 3. The automatic release mechanism should release the door to close automatically in the event of each or any of the following:

(1) the detection of smoke by suitable automatic apparatus;

(2) failure of the power supply;

(3) operation of the manual fire alarm system or automatic fire alarm system;

(4) if the facility is provided, manual operation at a central control point.

Such doors should be suitably marked on both sides, at about eye level, with the appropriate sign complying with BS 5499 : Part 1.

(g) Any fire door (except one referred to in items (e) or (f)) should be marked on both sides, at about eye level, with the appropriate sign complying with BS 5499 : Part 1 to the effect that it should be kept closed when not in use.

(h) Fire doors on escape routes should not be fitted with threshold upstands.

NOTE to **10.6.2.** Advice on the provision of door furniture for fire doors is given in *'Code of practice for hardware essential to the optimum performance of fire-resisting timber doorsets'* (1983), prepared by and available from the Association of Builders' Hardware Manufacturers, Heath Street, Tamworth, Staffordshire B77 7JH.

10.7 Recommendations for doors on escape routes

The following recommendations are applicable.

(a) Doors affording means of escape from, and within, the building should:

(1) be hung to open in the direction of escape, except that this need not apply if the number of occupants expected to use them does not exceed 50;

(2) be hung clear of any change of floor level;

(3) be hung so that they do not reduce the effective width of any escape route across a landing;

(4) if opening towards a corridor be recessed to the full width of the door;

(5) where hung to swing both ways, and on all doors subdividing corridors, be provided with at least a vision panel;

(6) open not less than 90°.

(b) Automatic doors, turnstiles and revolving doors should not be provided across escape routes unless:

(1) they are automatic doors complying with BS 7036 and either:

(i) they are arranged to fail safely to outward opening from any position of opening; or

(ii) they are provided with a monitored fail-safe system for opening the doors if the mains power supply fails; or

(2) swing doors to the required width are provided immediately adjacent.

10.8 Recommendations for fastenings of doors on escape routes

The following recommendations are applicable.

(a) Where large numbers of the public are likely to be present, exit doors should be either free from fastenings or fitted with panic bolts complying with BS 5725 : Part 1.

(b) Doors other than those covered by item (a) should be fitted only with simple fastenings that can be operated from the escape side of the door without the use of a key.

(c) Additional security devices should only be fitted subject to the approval of the fire authority.

10.9 Recommendations for construction of escape routes

The following recommendations are applicable.

(a) The floors of an escape route should have non-slippery even surfaces.

(b) An escape route should have a clear headroom of not less than 2 m and there should be no projection from any wall (except normal handrails), ceilings (except door frames), or false ceilings, below this height which would impede the free flow of persons using them.

(c) Ramps should have an easy gradient in no case steeper than 1 in 12.

(d) Clear gangways should be provided from all parts of each storey or floor up to and between stairways and exits.

10.10 Recommendation for stairways

Stairways should be designed and constructed in accordance with the appropriate Part of BS 5395.

10.11 Ladders

10.11.1 *Commentary.* Portable ladders and throw-out type ladders are not considered suitable means of escape. Fixed vertical and raking ladders will only be suitable in exceptional circumstances.

10.11.2 *Recommendations.* The following recommendations are applicable.

(a) Ladders should not be provided as means of escape for members of the public.

(b) Ladders should be provided only as means of escape for not more than 10 able-bodied and active members of staff in exceptional circumstances where it is impractical to provide a more satisfactory escape route.

(c) Ladders provided as means of escape should be constructed of non-combustible materials, and if:

(1) raking, should be fixed at an angle not steeper than 60° to the horizontal and be provided with flat treads 130 mm in depth and not more than 200 mm apart;

(2) vertical, be in accordance with BS 4211.

11 Fire safety signs and notices

11.1 Commentary

The fire authority should be consulted with regard to the siting and positioning of all relevant fire safety signs and notices.

11.2 Recommendations

The following recommendations are applicable.

(a) Exits, other than those in normal use for egress, should be marked and be readily visible so that the occupants of a building can clearly and readily see where the exits are and where to go in an emergency at any time.

(b) Fire safety signs and notices should comply with the relevant requirements of BS 5499 : Part 1.

Section five. Engineering services (other than fire protection facilities) and ancillary accommodation

12 General

12.1 List of engineering services

In this code, engineering services comprise the following:

(a) electrical services and wiring;
(b) lighting;
(c) heating;
(d) ventilation and air conditioning systems;
(e) systems for the transport of people or goods;
(f) telephones;
(g) refuse disposal;
(h) refrigeration.

12.2 List of ancillary accommodation

Ancillary accommodation covers all those parts of shop premises ancillary to the main areas occupied by sales staff and possibly the public. In addition to rooms associated with engineering services, such accommodation includes loading bays, main storage areas, refuse rooms, car parks, offices, workshops, kitchens, platform floors and computer suites.

12.3 Enclosure of engineering services

12.3.1 *Commentary.* Some engineering services are known potential sources of fire, and the equipment associated with them should be installed and maintained in accordance with the relevant codes of practice and safety regulations. The importance of correct installation in the first place is emphasized, because lighting, heating and ventilation systems are often concealed above suspended ceilings and within ductwork. Control gear is also often located behind ceiling and wall panels. Installation faults that might lead to fire are particularly dangerous because the fire is likely to remain undiscovered for a time if it is concealed. Rooms in which engineering services are contained are dealt with under ancillary accommodation in **12.4**.

12.3.2 *Recommendations.* The following recommendations are applicable.

(a) Ducts for engineering and building services should comply with CP 413 and BS 5588 : Part 9 .

(b) A platform floor should incorporate cavity barriers at spacings to satisfy building regulations. Any penetration of cavity barriers or floor panels by services should be fire stopped. Where partitions above the platform floor are required to have specified fire resistance they should be carried down to the structural floor.

12.4 Ancillary accommodation

12.4.1 *Commentary.* With a few exceptions, e.g. staff rest rooms, office areas and telephone exchanges, ancillary accommodation tends to present a greater fire hazard than normal sales floor areas. Partly this is because the ancillary accommodation may contain flammable materials in quantity, and partly because it may only be occasionally visited and therefore not under regular surveillance. Ancillary accommodation therefore needs to be adequately separated from shop areas, and especially from any accommodation used by the general public. The degree of separation varies according to the risk and recommendations are given in **12.4.2**; these should be read in conjunction with section four.

In so far as means of escape from ancillary accommodation is concerned, the recommendations in section three generally apply except that in some cases limitations on the part of the travel distance within the ancillary accommodation are necessary because of the greater risk to persons present in the event of fire. Also, additional measures to safeguard the means of escape from sales floor areas may be necessary in some cases.

Large offices forming a separate department should be dealt with according to the recommendations of BS 5588 : Part 3. Small office areas are not likely to pose an undue hazard to shop users and separation from the sales area with fire-resisting construction need only be provided if such separation is a necessary part of the means of escape of the shop as a whole.

12.4.2 *Recommendations.* The following recommendations are applicable.

(a) Ancillary accommodation should have means of escape in accordance with the recommendations in section three except that the part of the travel distance within any area of ancillary accommodation listed in table 8 should not exceed the distance recommended in table 8.

(b) Except for small areas of low fire risk, ancillary accommodation should not open directly into a protected stairway enclosure (see **8.5.2**).

(c) Ancillary accommodation should be separated from other parts of the building in accordance with table 9 except for those situations where recommendations on fire separation are given in other documents to which reference is made in this section.

12.5 Corridors

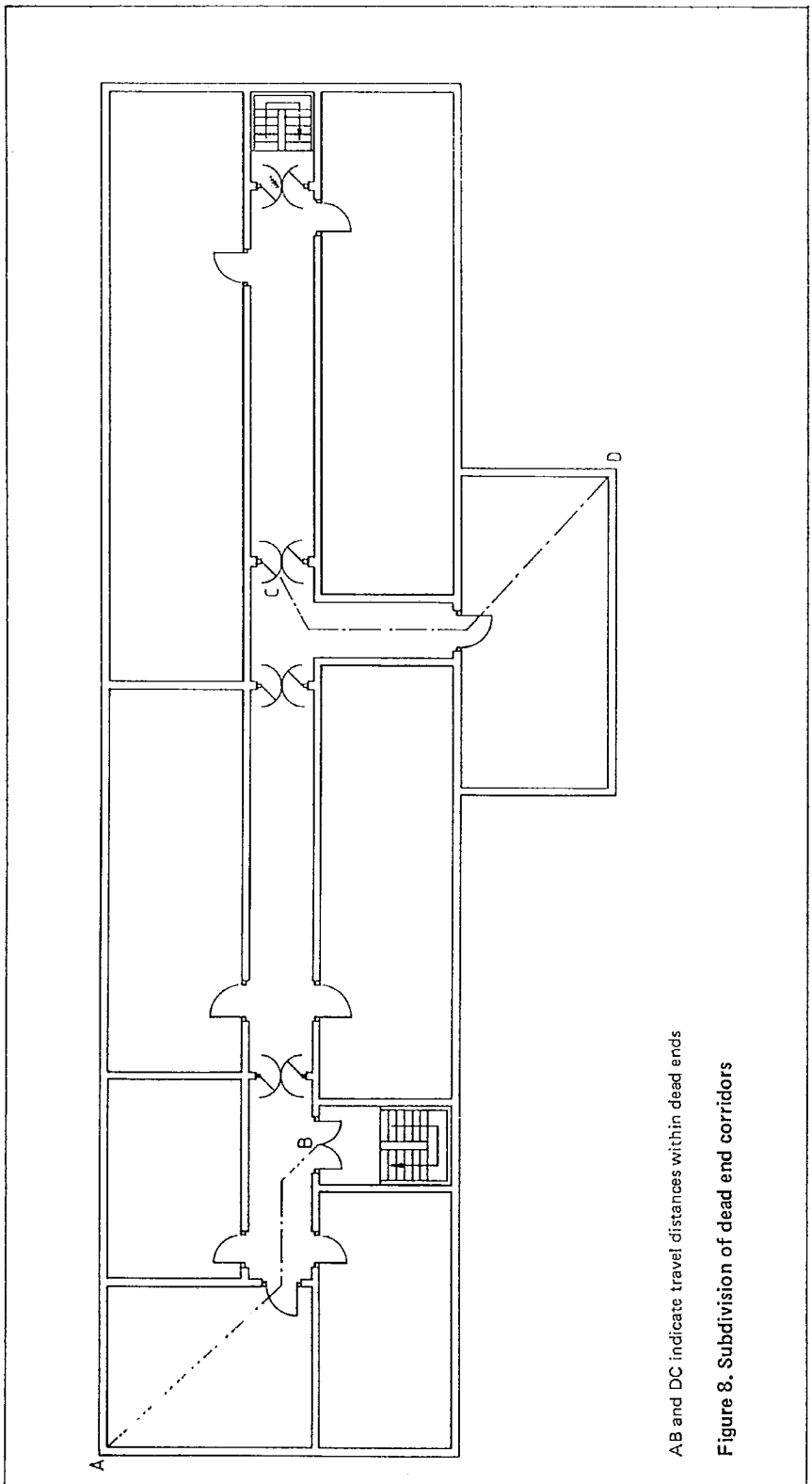
12.5.1 *Commentary.* Although corridors are not required for means of escape purposes they are commonly formed to provide access to ancillary accommodation. In view of the special risks associated with ancillary accommodation such corridors should be completely enclosed.

To prevent a corridor that connects alternative exits becoming smoke logged along its length, it is necessary to divide that corridor by the erection of a smoke control door and associated screen. Similarly, connecting corridors and dead end corridors need to be separated so as to restrict the movement of smoke.

12.5.2 *Recommendations.* The following recommendations are applicable.

(a) Corridors serving ancillary accommodation should be enclosed by construction with a fire resistance of not less than 30 min and all doors within the enclosures should be fire-resisting and self-closing.

(b) Corridors connecting alternative exits (other than corridors not exceeding 12 m in length), communicating corridors and dead end corridors should be subdivided and separated as indicated in figure 8.



AB and DC indicate travel distances within dead ends

Figure 8. Subdivision of dead end corridors

Table 8. Maximum permitted part of travel distance in certain areas of ancillary accommodation

Areas of ancillary accommodation	Cross-reference	Maximum part of travel distance within the room*	
		For escape in one direction only, or in directions less than 45° apart that are not separated by fire-resisting construction	Escape in more than one direction in directions 45° or more apart, or in directions less than 45° apart but separated by fire-resisting construction
		m	m
1 Higher fire risk areas other than items 2, 3, 4, 5 and 6	12.7	6	12
2 Transformer and switchgear rooms	13.2		
3 Boiler rooms	15.7		
4 Some fuel storage spaces	15.8		
5 Room housing a fixed internal combustion engine	15.9		

* See table 1 for maximum travel distances.

△3

Table 9. Structural fire protection of areas of ancillary accommodation

Area of ancillary accommodation	Cross-reference	Structural fire protection: the area of ancillary accommodation should be separated from other parts of the building by:
1 Storage areas not greater than 450 m^2 (see notes 1 and 2)	19	Robust construction having a minimum standard of fire resistance of 30 min (see note 3)
2 Repair and maintenance workshops (see note 1)	21	
3 Kitchens (separately or in conjunction with an associated staff restaurant/canteen)	22	
4 Transformer, switchgear, and battery rooms for low voltage or extra low voltage equipment	13.2	
5 Covered loading bays	19	Robust solid non-combustible construction having a minimum standard of fire resistance of 60 min (see note 3)
6 Storage areas greater than 450 m^2 (see notes 1 and 2)	19	
7 Service installation rooms other than those covered by items 4 and 10 to 14 inclusive	12.6	
8 Car parks within or adjoining a shopping development and not greater than 450 m^2 in area	20	
9 Car parks within or adjoining a shopping development and greater than 450 m^2 in area	20	Robust solid non-combustible construction having a minimum standard of fire resistance equivalent to that required of the elements of construction of the building and in no case less than 60 min (see note 3)
10 Boiler rooms (see note 4)	15.7	
11 Fuel storage spaces (see notes 4 and 5)	15.8	
12 Transformer and switchgear rooms for equipment above low voltage	13.2	
13 Rooms housing fixed internal combustion engines	15.9	
14 Any higher fire risk area other than items 10 to 13	12.7	

NOTE 1. Not higher fire risk areas.
NOTE 2. Other than waste storage and treatment areas (see clause 18).
NOTE 3. Any openings in the required construction to be protected by doors having a similar standard of fire resistance.
NOTE 4. Other than oil fired boiler installations and oil storage (see 15.7).
NOTE 5. Other than liquefied petroleum gas storage (see 15.8).

12.6 Service installation rooms

12.6.1 *Commentary.* Service installation rooms include electrical switchgear rooms, boiler rooms, fuel storage spaces, mechanical ventilation and air conditioning plant rooms, lift motor rooms, rooms housing fixed internal combustion engines, rooms housing refrigeration plant that utilizes a flammable or toxic refrigerant (other than equipment of a domestic nature) and battery charging rooms.

12.6.2 *Recommendations.* The following recommendations are applicable.

(a) Service installation rooms having an exit situated at basement level should be sited so that escape from other exits is not prejudiced by the risk of such a service installation room.

(b) Service installation rooms in which flammable liquids or gases are used or stored should have imperforate cills to doorways and any necessary drainage should be provided with interceptors.

(c) Service installation rooms should have adequate ventilation to the external air.

12.7 Recommendations for higher fire risk areas (see 2.11)

The following recommendations are applicable.

(a) Higher fire risk areas should have escape routes of such number and be so situated that the part of travel distance within the room from any point does not exceed the limitations given in table 8.

(b) Higher fire risk areas should be separated from any protected stairway by a fire-resisting lobby or corridor at the storey in which the place of higher fire risk is situated (see 8.7.2 and 12.5.2).

12.8 Walk-in refrigerated cold rooms and associated systems

12.8.1 *Commentary.* Refrigerated cold rooms, cold stores and other refrigerated enclosures of the walk-in type (all referred to as cold rooms) vary in size up to a maximum of 500 m^3: beyond this size such a refrigerated space could be described as a warehouse type and would cease to be walk-in. Only walk-in refrigerated cold rooms associated with shops are covered by this code.

Cold rooms can be considered to be areas of low risk because in use sources of ignition can be reduced to a minimum. However, in the event of a fire external to the cold room, insulating materials used in the construction of pre-fabricated cold rooms and in the lining of purpose built cold rooms may be a hazard both to people working in the cold room and to those attempting to put out the fire. During construction and maintenance care should therefore be taken to avoid using heat sources in close proximity to combustible insulating materials and adequate firefighting equipment should be provided within the cold room (see A.6).

In particular, some modern cellular plastics insulating materials give off large volumes of dense toxic smoke. It is therefore essential that such materials are protected from flame by suitable facings that, if exposed to a localized high intensity fire external to the cold room, do not rapidly fall away. The effects of fire on ceiling panels and their support system also need to be considered. Protection of the insulation may be achieved by incorporating returns to all panels and incorporating some means of ensuring that close contact is maintained between mating faces under fire conditions, or by covering all joints.

If the cold room is large enough, mechanical aids for loading and unloading may be provided, and care should be taken to minimize damage to the lining, usually by the provision of suitable barriers or a thicker lining. In large and/or deep cold rooms access points need to be provided to enable firefighting to be more effective.

Refrigeration systems associated with cold rooms should comply with the current codes of practice issued by the Institute of Refrigeration* and, where applicable, with BS 4434 : Part 1; refrigeration plant rooms are covered in 12.6. Refrigerators of a domestic type and refrigerated display cabinets are considered not to need any special consideration.

12.8.2 *Recommendations.* The following recommendations are applicable.

(a) Walk-in refrigerated cold rooms should have escape routes of such a number and so situated that the travel distance from any point within the cold room does not exceed the appropriate limits set out in table 1.

(b) Cold rooms exceeding 250 m^3 in volume should be provided with suitable fire access points as agreed with the fire authority.

(c) Any area containing a cold room should, wherever possible, be protected with:

(1) a sprinkler system (see clause 26); and

(2) either adequate cross ventilation or a suitable smoke control system (see clause 31).

(d) Any area containing a cold room should be separated from the public areas by fire-resisting construction unless:

(1) the area is protected by a sprinkler system; or

(2) the area is part of a small shop (see clause 9).

(e) Where the cold room construction incorporates cellular plastics insulating materials:

(1) the insulation should be protected on all sides with materials of limited combustibility; and

(2) the facing system should be independently supported or adjacent panels should be mechanically linked; and

(3) either:

(i) the facings should be mechanically interlinked so as to prevent a continuous fire path to the insulation; or

(ii) the joints between facings external to the cold store should be covered by strips of facing material not less than 50 mm in width attached mechanically to both facings.

*The Institute of Refrigeration, 76 Mill Lane, Carshalton, Surrey SM5 2JR.

13 Electrical services

13.1 Recommendation for electrical installations

Electrical services should be installed and maintained in accordance with the IEE Wiring Regulations 'Regulations for electrical installations' published by the Institution of Electrical Engineers.

13.2 Recommendations for transformer and switchgear rooms

The following recommendations are applicable.

(a) A transformer or switchgear room, unless situated on the roof or in a separate enclosure, where possible should be sited adjacent to an external wall and entered only from the open air.

(b) A transformer or switchgear room should:

(1) have adequate provision for ventilation;

(2) have escape routes of such a number and so situated that the part of the travel distance within the room from any point does not exceed the limitations given in table 8.

(c) A transformer chamber should be separated from any protected stairway by a fire-resisting lobby or corridor.

13.3 Recommendations for protected circuits for the operation of equipment in the event of fire

A protected circuit for the operation of equipment in the event of fire should:

(a) consist of mineral insulated metal sheathed cable or other heat-resistant cable;

(b) follow a route selected to pass only through parts of the building in which the fire risk is negligible;

(c) be separate from any circuit provided for another purpose.

14 Lighting

14.1 Types of luminaire

Although medium size and smaller shops tend to use spot luminaires, for general and display lighting the tendency in department stores and larger shops is towards a higher level of general lighting and this is now often provided by tubular fluorescent luminaires. These operate at relatively low temperatures and the tubes themselves are not likely to be a source of fire; electrical breakdown of associated gear and wiring in the luminaire, however, may lead to ignition of adjacent combustible materials. Correct installation is therefore essential.

All incandescent filament lamps and high pressure discharge lamps operate at elevated temperatures, and where these are used they should not be close to or fixed to materials that are readily ignited. Minimum separation distances are given in the IEE Wiring Regulations 'Regulations for electrical installations' published by the Institution of Electrical Engineers (see 13.1). Care should be taken in the selection of plastics materials or finishes, some of which can be highly flammable; preference should be given to those with superior fire-resistant qualities such as UPVC and ABS.

Methods of lighting can be subdivided broadly into three groups:

(a) recessed luminaires;

(b) illuminated ceilings;

(c) luminaires at or below ceiling level.

14.2 Recessed luminaires

14.2.1 *Commentary.* When recessed luminaires are within suspended ceilings they can overheat, resulting in failure of the insulation of electric wiring and apparatus. The control gear of fluorescent luminaires is particularly likely to cause overheating, as is the use of incandescent lamps of a wattage in excess of the design standard.

Such overheating may result in fire within a concealed space, with consequential problems of early detection and extinguishment. A ceiling having recessed luminaires may be intended to contribute to the fire resistance of beams or a floor over. In such a case any perforations for fittings or access are a potential source of failure of the ceiling.

14.2.2 *Recommendation.* Where luminaires are recessed into any fire-resisting ceiling, the integrity of the ceiling should be maintained by the provision of a fire-resistant barrier behind the fitting and any access way to the fitting.

14.3 Illuminated ceilings

Illuminated ceilings take a variety of forms of which the most common are the perforated types, e.g. louvre, egg crate diffusers, etc. By the nature of their function and the construction and materials used, these ceilings contribute nothing to the fire resistance of the structure. The materials may be combustible and care in their selection is important in order to reduce to a minimum their contribution to any fire that may occur.

14.4 Luminaires at or below ceiling level

Luminaires at or below ceiling level, if properly fitted and maintained, usually present a negligible fire risk, but care is necessary in siting to avoid interference with the water distribution pattern of sprinkler heads. Care is also necessary to prevent accidental operation of sprinklers and fire detectors by heat from luminaires. Where spot and other low level luminaires are used, care needs to be taken to avoid close contact with combustible goods and materials and to ensure that there is no heat built up within a confined area. In higher risk areas the use of pendant type luminaires should be avoided; bulkhead type luminaires are preferable.

14.5 Lighting of escape routes

14.5.1 *Commentary.* Staff of a shop can be expected to be familiar with normal circulation stairways, corridors, etc., which in turn are generally accepted as forming the escape routes in the event of fire. Members of the public cannot be expected to be conversant with the various circulation routes within a shop although they may be aware of the access to and egress from a particular sales floor. The internal storey layout should assist in clearly delineating

such circulatory routes. Special provision should be made for the lighting of escape routes in certain places to ensure that the public and staff in the building can see their way to safety should the main electricity supply fail for any reason. It should also be possible for them to see any directional or warning signs associated with escape routes, changes in floor level, the location of fire alarm points and fire-fighting equipment. This facility is particularly important in a large development which may incorporate a shopping mall.

The essential feature of escape lighting is that it is designed to illuminate when the normal lighting has failed; it may therefore be of various types, e.g.: maintained alight continuously; not alight until the mains fail, then lighting automatically; single independent luminaires or central battery or generator systems, etc.

It will not normally be necessary to provide escape lighting in small shop premises where rooms and escape routes have adequate natural lighting always available when the premises are occupied by staff, etc. When determining the need to provide escape lighting, factors such as the number of members of the public and staff likely to be on the premises and any adjacent occupancies may have to be taken into account. It is therefore advised that consultation with the appropriate enforcing authorities should be sought at an early stage.

14.5.2 *Recommendations.* The following recommendations are applicable.

(a) Adequate artificial lighting should be provided in all escape routes and should be of a sufficient standard to enable persons to escape.

(b) In addition to the system of artificial lighting, escape lighting should be provided within:

(1) underground or windowless accommodation;

(2) stairways in a central core;

(3) internal corridors exceeding 30 m in length without borrowed light;

(4) stairways in buildings of height (see **2.10**) greater than 18 m;

(5) those parts of the building used by members of the public except that such lighting need not be provided in the following situations:

(i) within a ground storey sales floor not exceeding 280 m^2 in area provided that the travel distance to a final exit does not exceed 15 m;

(ii) to staircases which are lighted naturally and provided with a satisfactory degree of borrowed artificial street lighting within a building not exceeding two storeys above the ground level with no sales floor exceeding 280 m^2 in area;

(iii) in a ground storey only restaurant, banqueting room, public house, bar or premises used for a similar purpose, accommodating less than one hundred persons and from which there are a sufficient number of final exits.

(c) Escape lighting systems should conform to the appropriate recommendations of BS 5266 : Part 1.

15 Heating and fuel storage

15.1 General

Experience has shown that in buildings of all sizes, few fires are caused by central heating systems, i.e. those in which energy conversion takes place at one point in the building. The majority of fires from heating appliances are produced by local heating units, particularly those that are not fixed (see item (c) of **A.5.4**).

15.2 Central heating (water)

Central heating (water) systems, whether high or low pressure, and whether fired by solid fuel, gas, oil or with a facility to burn alternative fuels, should give rise to little fire risk if installed in accordance with building regulations and relevant standards.

15.3 Warm air heating

Considerations similar to **15.2** apply. With this form of heating, rigorous precautions are necessary to avoid any risk that the system will permit either the products of combustion to be distributed through the ducting or that a fire starting in one part of the building will be transferred to another part of the building.

15.4 Electric and gas heaters

Electric and gas heaters should be of the convector rather than the radiant open element type, and, if so, should present little fire risk. Gas fires have to be flued. Although gas convector heaters are available in flued and flueless versions, the former are preferable.

15.5 Electrical thermal storage

An electrical thermal storage system, whether used as underfloor heating or as individual heaters, depends for its safety on being installed in such a manner or in such positions that the risk of overheating and ignition of adjacent materials is eliminated.

15.6 Recommendation for the installation of heating appliances and systems

All heating appliances and systems should comply with appropriate standards and should be installed in accordance with requirements made in connection with building regulations, standards, codes of practice and regulations applicable to the fuel used.

15.7 Boiler rooms

15.7.1 *Commentary.* In the design of a boiler room and ancillary spaces the possibility of a future change to other fuels may require consideration.

15.7.2 *Recommendations.* The following recommendations are applicable.

(a) Oil fired installations should be in accordance with BS 5410 : Parts 1 and 2.

(b) Town, natural and liquified petroleum gas installations should be in accordance with BS 6644 or BS 6798.

(c) Boiler rooms (other than those covered by BS 5410 : Part 2):

(1) should have adequate provision for smoke venting;

(2) should have escape routes of such a number and so situated that the part of the travel distance within the room from any point does not exceed the limitations given in table 8.

(d) Boiler rooms should be separated from any protected stairway by a fire-resisting lobby or corridor.

15.8 Recommendations for fuel storage spaces

The following recommendations are applicable.

(a) Oil should be stored in accordance with BS 5410 : Parts 1 and 2 and BS 799 : Part 5.

(b) Solid fuel should be stored in bunkers protected by non-combustible walls of sufficient thickness to prevent heating of the fuel by boilers or steam pipes.

(c) Fuel storage spaces (other than those covered by BS 5410 : Part 2):

(1) should have escape routes of such a number and so situated that the part of the travel distance within the room from any point does not exceed the limitations given in table 8;

(2) if for the bulk storage of liquefied petroleum gas, should be in accordance with the Health and Safety Executive guidance note HS(G) 34The storage of liquefied petroleum gas at fixed installations'.

(d) Fuel storage spaces should be separated from any protected stairway by a fire-resisting lobby or corridor.

15.9 Recommendations for rooms housing fixed internal combustion engines

The following recommendations are applicable.

(a) Rooms housing fixed internal combustion engines should have escape routes of such a number and so situated that the part of the travel distance within the room from any point does not exceed the limitations given in table 8.

(b) Liquefied petroleum gas fired engines should be surrounded by a bund wall not less than 600 mm in height above floor level (for storage of liquefied petroleum gas see item (c)(2) of 15.8).

(c) Rooms housing fixed internal combustion engines should be separated from any protected stairway by a fire-resisting lobby or corridor.

16 Mechanical ventilation, air conditioning and pressurization

16.1 Mechanical ventilation and air conditioning

16.1.1 *Commentary.* Mechanical ventilation may vary from a simple ventilation system to full air conditioning. In large buildings, extensive ductwork is likely to be required, and an understanding of the principles of fire protection in such systems is essential to avoid fire hazards of which the major ones are as follows.

(a) Flames and hot gases, by breaking into and out of a horizontal or vertical duct, can spread a fire from one part of the building to another. If the duct insulation is flammable this hazard is greater.

(b) Flames may spread to another part of the building because of lack of fire-stopping around ducts.

(c) In the event of a fire, a ventilating or air conditioning system using a proportion of recirculated air may distribute smoke and hot gases throughout the building.

(d) In higher buildings with sealed windows, the smashing of glass to facilitate smoke removal could be a hazard to people from falling glass or flying shards. This situation may be avoided if smoke venting openable windows are installed in accordance with the recommendations of 31.9.

It is also important to ensure that the movement of air is away from escape routes so as to prevent, as far as possible, smoke-laden air being carried into protected escape routes and exits.

Mechanical ventilation and air conditioning plant rooms are most likely to be situated in a basement, on the roof, or possibly both. The main risk of fire in such areas, provided the enclosures are adequate, is from the nature of the installation itself, unless there is provision for an automatic detection system to close down the plant, and unless adequate fire dampers are included in the duct system.

16.1.2 *Recommendations.* The following recommendations are applicable.

(a) Mechanical ventilation and air conditioning plant should be installed in accordance with BS 5720.

(b) Service and ventilation ducts should be installed in accordance with CP 413.

(c) Any system of mechanical ventilation should be designed to ensure that the normal airflow pattern is away from protected escape routes and exits.

(d) If a system of mechanical ventilation recirculates air, smoke detectors should be provided within the extract ductwork, which on operation will cause the recirculation of air to stop and the direction of all extract air to the outside of the building.

(e) Ventilation and air conditioning systems should be compatible with any pressurization system installed.

16.2 Pressurization

16.2.1 *Commentary.* If a pressurization system is to be employed for the protection of escape routes against the ingress of smoke and toxic gases the accepted practice in the design of ventilation and air conditioning systems should be modified so as to achieve compatibility between the ventilation system and the pressurization system.

16.2.2 *Recommendation.* Any pressurization system should be designed and installed in accordance with BS 5588 : Part 4.

17 Lifts

17.1 Use of lifts

Except in very special circumstances passenger 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 car and landing doors open in a fire area their design is normally such that they remain open, exposing the occupants to fire.

Goods and service lifts should not be used in the event of fire.

The enclosure of lift shafts is dealt with in **10.4.2**.

Fire-fighting lifts are dealt with in **30.2** and **30.3**.

17.2 Lift motor rooms

17.2.1 *Commentary.* Lift motor rooms should preferably be sited over the lift well; where they have to be at the foot of the well, the fire separation from the well is crucial.

17.2.2 *Recommendation.* Lift motor rooms should comply with the appropriate Part of BS 5655.

18 Waste storage and treatment, and incinerators

18.1 Waste storage and treatment

18.1.1 *Commentary.* Waste retained in premises constitutes a fire risk, particularly if it is bulky. BS 5906 gives advice on the collection, storage and disposal of waste, together with information about on-site treatment systems such as compactors, balers and incinerators which reduce the volume of waste and its fire risk.

18.1.2 *Recommendation.* Waste storage chambers, waste chutes and waste hoppers should be sited and constructed in accordance with BS 5906.

18.2 Incinerators

18.2.1 *Commentary.* There are two main types of incinerators:

(a) for the disposal of bulk waste;

(b) sanitary incinerators for toilets.

Incinerators may be fired by gas or electricity, but irrespective of the source of heating, the fire risk arises from the nature and bulk of the waste to be consumed.

All types of incinerators, except those fired by electricity, are controlled (as fittings) by building regulations. The means of flueing incinerators, including those fired by electricity, are controlled by building regulations with regard to the discharge of products of combustion and the risk of fire spread.

18.2.2 *Recommendation.* Incinerators with a capacity larger than 0.08 m^3 require special consideration with respect to building regulations and preferably should be isolated in a separate building.

19 Main storage areas (including receiving and dispatch areas) and covered loading bays

19.1 Main storage areas

19.1.1 *Commentary.* Main storage areas include any area to be used for the storage of goods for sale, waste packaging and similar combustible material (see clause **18**), receiving and dispatch rooms, loading bays and packing and sorting rooms.

Smoke-venting of large storage areas is important, especially those below ground level where windows cannot normally be provided. If possible, storage areas should be sited adjacent to an external wall to facilitate the provision of clean air inlets and smoke extracts, which should discharge at or above ground level and be so situated that smoke from them cannot jeopardize the means of escape from the building. It is preferable, moreover, that storage areas are not sited adjacent to escape routes to which the public have access.

Where highly flammable or explosive substances are stored or used, even on a temporary basis, the area will be considered to be of high fire risk. Examples of such substances are liquids with a flashpoint below 65 °C, liquefied petroleum gases and highly flammable solids. The enforcing authority may consider that certain other parts of shops, e.g. large boiler rooms, come into this category. If there is cause to store or use highly flammable substances in shops the attention of building designers and management is drawn to the necessity of complying with relevant legislation and advice should be sought from the fire authority or, in appropriate cases, the Petroleum Licensing Authority (see also **20.1**). The authority will impose appropriate requirements and these may be additional to any recommendations in this code.

Sales areas generally, and areas used by the public in particular, should be kept free of highly flammable substances to avoid their being considered as areas of higher fire risk. Such substances should be kept in stock rooms to which the public are not admitted.

19.1.2 *Recommendation.* Main storage areas, if either:

(a) situated below ground level; or

(b) exceeding 450 m^2 in area;

should have adequate provision for smoke venting in accordance with **31.7** or **31.8**.

19.2 Covered loading bays

19.2.1 *Commentary.* Covered loading bays are often associated with receiving and dispatch areas and generally

require large openings into the building for easy movement of stores. It is essential to ensure that should fire occur in a covered loading bay there can be no rapid spread into the building.

19.2.2 *Recommendation.* Covered loading bays should be separated from sales areas by fire-resisting construction to a standard equivalent to the fire resistance of the building as a whole.

20 Car parks

20.1 Commentary

Car parks within or adjoining a shop, and any storage of petrol in cans, drums or other receptacles, may be required to be licensed under the Petroleum (Consolidation) Act, 1928 by the Petroleum Licensing Authority for the area.

20.2 Recommendation

Any car park within or adjoining a shop, whether required to be licensed or not:

(a) should have any permitted access between the garage or car park and the shop protected by a lobby (see 8.7.2);

(b) should have any external openings situated so as not to endanger any escape route or final exit from the shop;

(c) should have adequate provision in accordance with 31.7 or 31.8 for venting smoke;

(d) should be provided with suitable access for firefighting (see 30.1).

21 Repair or maintenance workshops

In some premises, space may be required for workshops, for instance for the repair of goods or for maintenance or repair of equipment.

If highly flammable materials are used or stored in any of these areas the area will be considered to be of high fire risk and special requirements may be imposed by the fire authority or Inspectors of the Health and Safety Executive.

22 Kitchens, staff restaurants and canteens

22.1 Commentary

In kitchens, staff restaurants and canteens the main fire risk is associated with the kitchen; it is therefore desirable that the kitchen be separated from its associated restaurant/canteen area by fire-resisting construction. This may not always be conveniently possible in which case the protection ought to encompass the kitchen and restaurant/canteen areas and the kitchen ought to be sited remotely from the canteen exit.

22.2 Recommendations

The following recommendations are applicable.

(a) A kitchen should have at least one escape route independent of any service door to the restaurant or canteen area.

(b) An escape route from a restaurant or canteen area should not pass through the kitchen.

NOTE. The term 'kitchen' includes food preparation areas and any corridors associated with kitchen stores.

23 Data processing areas

Some rooms may be used for the accommodation of data processing equipment, which is not only of great intrinsic value but also susceptible to damage by fire, heat, smoke or water. Such rooms do not normally offer any substantial risk of fire but, for the protection of the contents from a fire occurring elsewhere, the room should be adequately enclosed. Many other special precautions may have to be considered in relation to these rooms, including the choice of materials for enclosure and interior surfaces, the restriction of entry by ventilation or service ducts into the rooms, the provision of fire detection equipment, and the provision of special fire-fighting equipment. These matters are dealt with in detail in BS 6266. Advice is also obtainable from the Fire Offices' Committee*.

* *Recommendations for the protection of computer installations against fire*, Fire Offices' Committee, Aldermary House, Queen Street, London EC4N 4JD.

Section six. Fire protection facilities

24 General

The contents of sections three, four and five of this code deal with those passive aspects of fire protection in which the fixed and permanent features of the design and construction of the building are so selected and disposed as to provide either control of the progress of a fire or protection of the building's occupants in the event of fire, or both. The contents of this section and appendix A deal with active measures of fire protection in which provision is made for taking action to discover a fire, to give the alarm, to check the development of a fire, to extinguish a fire, and to secure the safe escape of the occupants.

These active features of fire protection are divided into physical and mechanical equipment and systems that are dealt with in this section, and those organizational or managerial activities that are dealt with in appendix A and that are designed to secure that the correct action will be taken by occupants, either to avoid the occurrence of fire altogether or to ensure that in the event of fire, appropriate action is taken.

On the occurrence of a fire in a shop, there are certain actions that need to be carried out quickly and effectively. In broad outline, these actions, on discovery of the existence of a fire, are to:

(a) establish the location of the fire;

(b) operate the alarm system and alert employees, or selected employees, to the emergency;

(c) send an alarm call to the fire brigade immediately;

(d) organize and effect the movement and evacuation of the public and the employees;

(e) take steps consistent with the safety of individuals to fight the fire or to contain it;

(f) ensure that, on the arrival of the fire brigade, every assistance is given to enable them to attack the fire effectively;

(g) inform the fire brigade of the situation as regards the safety and whereabouts of the occupants of the building.

The contents of this section are a miscellany in the sense that some of them arise from legal requirements relating to life safety, whereas the remainder recommend installations or equipment a wise management will prescribe in the building for the reduction of the risk of property loss. Many of the recommendations are consequent upon the requirement for occupied buildings in designated use categories under the Fire Precautions Act 1971, in which shops are included, to be provided with a fire certificate from the fire authority. Because of this requirement, and because the facilities required for use by the fire brigade may vary from one area to another, consultation at an early stage with the fire authority is desirable.

NOTE. Offsets may be available against the cost of fire protection equipment installed in buildings, whether compulsorily or voluntarily. These in part may arise from rebates on insurance premiums, and attention is drawn to these, and to the need to consult the rules and recommendations of the Fire Offices' Committee (Fire Offices' Committee, Aldermary House, Queen Street, London EC4N 4JD). Also, capital investment in fire protection equipment may be subject to tax concessions under the Finance Acts.

25 Fire alarms and fire detection and alarm systems

25.1 General

Irrespective of any other device that may be installed in a building to detect and give warning of a fire outbreak, such as an automatic fire alarm or extinguishing system, all buildings except those of very small extent are required by law to have some means whereby the alarm of fire may be given by a person discovering an outbreak of fire. This will consist of either:

(a) a manually operated fire alarm (or more than one), i.e. a manually operated device that makes a distinctive sound; or

(b) a manual fire alarm system, i.e. an electrical system in which the alarm is initiated manually from one of a series of manual call points with frangible covers, the warning being produced by the electrical operation of suitable warning devices.

Mandatory requirements for the provision of fire warning systems are contained in the Fire Precautions Act 1971, and the appropriate fire authority should be consulted.

25.2 Manual fire alarms

A manual fire alarm is a manually operated sounder, such as a gong, triangle or bell, and is only suitable in single storey and small two-storey buildings if any one sounder is clearly audible throughout the building.

25.3 Manual fire alarm systems

Even in small shops it will generally be found more satisfactory to install a manual fire alarm system, the electrical operation of which is manually initiated at manual call points situated on escape routes. Simple systems of this kind, for a single-storey shop, comprise only one or two call points and two or more sounders; where more than this number are required, and nearly always in multi-storey shops, fire alarm indicating equipment may also be required, to show the location of the call point(s) that have been operated.

Reference should be made to BS 5839 : Part 1, which provides recommendations for manual fire alarm systems, concerning general design, control and indicating equipment, zoning, power supplies, call points, buildings in multiple occupancy and many other details.

Visual signals may be used in areas where it is intended to alert only members of staff and where, for example, the background noise is excessive, or the occupants may be deaf.

25.4 Telephones as fire alarms

The use of telephones instead of manual call points is not recommended. The use of telephones for giving the fire alarm within a building is no longer recommended in BS 5839 : Part 1. The telephone system may be used to summon the local authority fire brigade, either verbally or automatically, subject to the recommendations of BS 5839 : Part 1.

25.5 Fire detection and alarm systems

In the arrangements described in 25.1 to 25.4, reliance is placed on the human element for discovering and giving warning of fire. In some instances this is adequate in terms of compulsory provision for life safety but it will not suffice in all such cases nor may it suffice for the protection of property:

(a) in parts of a building only visited occasionally, such as store rooms;

(b) in buildings or premises left unattended at night time.

In these two cases a fire detection and alarm system may be of great value in reducing the time between the outbreak of a fire and its discovery; in the case of item (b), the value will only be fully realized if the system is connected either to a fire brigade control room or to a central fire alarm station. Fire detection and alarm systems are now available that respond to a variety of phenomena associated with fire, such as the detection of heat, an unnaturally rapid rise in ambient temperature, smoke, the products of combustion, and flame. Advice should be sought from specialist firms of consultants as to the correct type of system for given circumstances. BS 5839 : Part 1 should also be consulted.

NOTE. Rebates may be available from insurance premiums for the installation of a fire detection alarm system that complies with the Rules of the Fire Offices' Committee, and it is important to discuss any proposals with insurers.

If it is intended to provide for a fire detection and alarm system in a building that will also be fitted with a manual system, the two should be designed as one system according to the recommendations of BS 5839 : Part 1.

A fire detection and alarm system will give warning of fire but cannot itself take appropriate action to contain it. However, it is possible for a fire detection and alarm system, in addition to giving an alarm, to initiate a variety of functions, such as closing down ventilating or air conditioning plant, opening vents for the removal of smoke from escape routes, bringing a pressurization system into operation or releasing doors that close automatically.

NOTE. A code of practice for the automatic release of extinguishing systems and other fire protection equipment is in course of preparation.

25.6 Two-stage fire alarm systems

In most shops it is best if operation of a manual call point or fire detector gives an almost instantaneous warning for a total evacuation of the premises from all the fire alarm sounders. However, in some very large and/or tall buildings a phased evacuation procedure may be adopted, in which the operation of a call point or detector gives an evacuation signal in the floor or zone affected, and an alert or standby warning in all other parts of the premises. The evacuation signal may then be sounded as necessary in other parts of the premises to facilitate the orderly evacuation of the remaining occupants. In such systems, called two-stage fire alarm systems, it is essential that there are adequate means of communication between the floor areas or zones and a central control point, and there are advantages in using a public address system instead of, or in addition to, the fire alarm sounders (subject to the recommendations of BS 5839 : Part 1) to control the evacuation.

NOTE. It should be appreciated that the term 'two-stage fire alarm system' refers to the two types of alarm signal (i.e. evacuate or alert) and not to the number of evacuation phases: this would depend on the degree of fire separation within the building and on the particular circumstances prevailing in a fire. Further details of the two-stage alarm systems are given in BS 5839 : Part 1 : 1988.

If a two-stage fire alarm system is considered it is essential that there is early consultation with the fire authority.

25.7 Recommendations for fire alarms and fire detection and alarm systems

The following recommendations are applicable.

(a) Fire alarms that are audible/perceptible throughout the premises should be installed in a building:

(1) if an outbreak of fire cannot be readily seen from any part of any floor area;

(2) if required by legislation.

(b) In a single-storey or small two-storey building, one or more manual fire alarms may be installed, and if installed:

(1) the alarm should be audible throughout the building when any one manual fire alarm is operated;

(2) each manual fire alarm should be placed in a safe area near an exit;

(3) the mechanism of any manual fire alarm should be reliable.

(c) The installation of a manual fire alarm or a fire detection and alarm system should be in accordance with the relevant recommendations of BS 5839 : Part 1.

26 Automatic fire extinguishing systems and special risk protection

26.1 General

The value of automatic fire extinguishing systems in shops lies not only in overcoming unavoidable delays in fire-fighting but also as a compensatory feature for allowing shop compartments of larger dimensions. Automatic extinguishing systems may also be necessary to protect special risks. They are useful in high and in deep buildings, and buildings with basements where fire-fighting may be difficult.

A distinction has to be made between 'space protection', i.e. covering the bulk of the building space likely to contain predominantly carbonaceous materials for which water is a suitable extinguishing medium, and protection covering a special risk, which may need a particular extinguishing medium.

26.2 Sprinkler systems

26.2.1 *Commentary.* For what has been termed 'space protection' the practice has for many years centred on the automatic sprinkler system, using water, and it is doubtful whether there is any alternative with equal advantages. A sprinkler system will automatically ensure:

(a) detection of a fire in its early stages;

(b) control of fire spread, by delivery of water to the seat of the fire;

(c) simultaneous sounding of an alarm;

(d) if appropriately arranged, the transmission of an alarm to the fire brigade.

The success rate of sprinkler systems in containing fire outbreaks until the arrival of the fire brigade has been put as high as 95 % in cases where the system was in operative order at the time of the fire. There appears to be virtually no weakness in these systems unless they are turned off for maintenance or building work, or through negligence.

NOTE. Rebates on insurance premiums may be available for a sprinkler installation, and the cost normally qualifies for tax concessions under the Finance Acts.

The following are some of the main points to be considered in the design, installation and maintenance of a sprinkler system in a shop.

(1) The decision to install a sprinkler system should be taken at an early stage in the design of a shop development. By so doing larger compartments might be allowed under building regulations than would be permitted for an unsprinklered shop. Indeed, the installation of a sprinkler system might be a requirement in some developments, e.g. those incorporating covered shopping malls. An early decision to install a sprinkler system could also avoid the necessity of installing unsightly (and costly) exposed pipe runs.

(2) The design of suspended ceilings, light fittings and ventilation systems will all be affected by the installation of sprinklers.

(3) Adequate supplies of water will be required.

(4) Pipework will need to be protected from corrosion.

(5) Water for the system will need to be protected against the risk of frost.

(6) Falls should be provided in sprinkler pipe runs to facilitate drainage.

The efficient operation of a sprinkler system depends upon the heat of a fire opening the appropriate sprinkler head or heads. Any obstruction to the flow of heated air to the heads by a suspended ceiling, light fittings or partitioned off areas closed at the top, can severely interfere with the system. It is desirable that within a radius of each sprinkler head a clear space be maintained below the level of the sprinkler deflector plate. In rooms used for storage, goods should be stacked to a limited height. Recommendations for these distances are included in BS 5306 : Part 2.

26.2.2 *Recommendations.* The following recommendations are applicable.

(a) A sprinkler system should be installed in a shop building having a fire compartment exceeding 7000 m^3.

(b) The design and construction of sprinkler systems and the operating temperatures of the sprinkler heads should be in accordance with BS 5306 : Part 2.

(c) If an area (e.g. a covered loading bay) is protected by sprinklers, any fusible link or other heat sensitive device designed to close a door or shutter within its surrounding walls should be designed to operate before the sprinklers to prevent the cooling effect of the water from the sprinklers jeopardizing the effective operation of such a device and the door or shutter.

26.3 Special risk protection

26.3.1 *Commentary.* Apart from the general coverage of space with a sprinkler system, there may be special risks which justify the installation of an automatic extinguishing system associated with the risk alone. Examples already mentioned elsewhere in this code are walk-in refrigerated cold rooms (see **12.8**), service installation rooms, e.g. transformers and switchgear rooms (see **13.2**), air filters and oil baths in ventilation systems (see **16.1.2**) and data processing equipment (see clause **23**). In general, systems for the protection of special risks require to be designed to suit the specific circumstances, and specialized designers and manufacturers should be consulted. Carbon dioxide systems are covered in BS 5306 : Part 4, halon systems in BS 5306 : Part 5 and foam systems in BS 5306 : Part 6*; BS 6266 should be referred to for data processing equipment.

Fire risks, such as oil storage tank chambers and oil fired boiler rooms, for which foam is used as the extinguishing medium may be situated where the fire brigade cannot obtain access to the space for the purpose of applying foam. The most common situation is where such fire risks are below ground.

If it is not possible to apply foam through windows, louvres, etc., then foam inlets complying with BS 5306 : Part 1 are required. These consist of an inlet or inlets to which fire brigade equipment can be connected, piping from that external point to inside the space, and a fitting or fittings at the delivery end of the pipe placed suitably for the protection of the risk.

26.3.2 *Recommendation.* Automatic fire extinguishing systems, foam inlets and equipment on premises should be installed in consultation with the fire authority, in accordance with the appropriate parts of BS 5306, or for data processing equipment in accordance with BS 6266.

27 Manual fire-fighting equipment

27.1 Commentary

Whether or not any other fire protection facilities are installed in a shop or department store, there is a legal requirement in the Fire Precautions Act 1971 to provide equipment for fire-fighting purposes for use by persons in the building. Hose reels and/or portable extinguishers are needed so that the staff can make an attempt to fight or contain a fire in its early stages (if this is consistent with personal safety) while the fire brigade is on its way.

NOTE. Many of the items in this section are matters on which the provision of equipment is, or may, be related to insurance premiums, and as a consequence the rules and recommendations of the Fire

* In preparation.

Offices' Committee may be relevant (Fire Offices' Committee, Aldermary House, Queen Street, London EC4N 4JD).

The fire authority should be consulted as regards the provision, siting, etc. of all manual fire-fighting equipment.

Water supplies for fire-fighting are dealt with in clause **28**.

Hose reels provide the best means whereby a fire can be fought with water by persons who have not received much training; the apparatus is light and simple to operate, the water flow is continuous and maintenance is minimal.

27.2 Recommendations

The following recommendations are applicable.

(a) Premises should be provided with means of fighting fire, for use by persons in the building.

(b) Portable fire extinguishers should comply with BS 5423 and should be installed in accordance with BS 5306 : Part 3.

(c) Hydraulic hose reels should comply with BS 5274 and should be installed in accordance with BS 5306 : Part 1.

(d) Equipment should if possible be grouped at fire points preferably adjacent to exits from nominated rooms or storey exits, or by fire alarm call points.

28 Water supplies for fire-fighting

28.1 Commentary

Water supplies for fire-fighting are normally provided from hydrants, either those of the water authority on street mains or private hydrants installed by the building owner or developer.

Hydrant systems include internal fire mains, whether wet or dry, fitted with landing valves, and private hydrants on water mains external to the building.

However, in areas without available mains, a bulk or 'static' supply should be arranged. If this takes the form of a static tank or dam, a capacity is required related to the size of the building and the risk involved. The capacity should be agreed with the fire authority. An unlimited and guaranteed natural water source may be acceptable to the fire authority subject to adequate access and hard standing for appliances being provided. The natural water supply and position of fire appliance access points have to be agreed with the fire authority.

Internal rising fire mains enable the fire brigade to attack a fire on any storey of a building, however high, without the time-wasting necessity for laying out hose to that storey, whether inside or outside the building. All buildings with a height (see **2.10**) exceeding 18 m should have internal rising fire mains, but it would be wise to consider this provision in extensive buildings not exceeding 18 m in height.

28.2 Recommendations

The following recommendations are applicable.

(a) All premises should be provided with an adequate supply of water for fire-fighting purposes by one of the following means:

(1) hydrants complying with BS 5306 : Part 1 and any relevant water legislation for the area; or

(2) a static or natural water supply satisfactory to the fire authority.

(b) Internal rising mains should be installed in accordance with BS 5306 : Part 1 in a building exceeding 18 m in height (see **2.10**). If the height of the highest floor does not exceed 60 m above ground level, dry rising mains may be installed, but if 60 m is exceeded wet rising mains should be installed.

29 Firemen's emergency switches for discharge lighting installations

Discharge lighting installations, such as neon advertizing signs, floodlights, etc., may operate at voltages that are a hazard to firemen. An exterior discharge lighting installation, or an interior discharge lighting installation operating unattended, operating at a voltage exceeding low voltage ought to be controlled by a fireman's emergency switch, installed and situated in accordance with the IEE Wiring Regulations 'Regulations for electrical installations' published by the Institution of Electrical Engineers (see **13.1**), and the requirements of the fire authority.

30 Access for fire-fighting

30.1 Access for fire appliances, on the exterior of a building

In making provision for access for fire brigade appliances it will be necessary to consult the local fire brigade to ascertain their recommendations relating to access roads in terms of load bearing capability, turning circles, width, headroom, etc., provision of hard standing areas adjacent to buildings for rescue purposes, and proximity to dry riser inlets.

30.2 Access for firemen, to the interior of a large building

In high buildings or buildings with a number of basements it is necessary to provide firefighters with a firefighting lift to take them and their equipment to the fire, so as to avoid the delays and fatigue that would occur in walking up or down stairs with heavy equipment. Associated with a fire-fighting lift is a firefighting stairway for access and escape in emergency, with protected lobbies at each landing, containing a landing valve on a dry or wet rising or falling fire main. In large buildings which, although not high or deep enough to warrant a firefighting lift, are sufficiently large to make firefighting from outside the building difficult, a firefighting stairway without a firefighting lift may be required. The envelope enclosing a firefighting stairway and its associated firefighting lobbies and, if provided, a fire-fighting lift is known as a firefighting shaft.

30.3 Recommendations

The following recommendations are applicable.

(a) Buildings or parts of buildings of height (see **2.10**) exceeding 18 m or depth (see **2.24**) exceeding 9 m should be provided with firefighting shafts (each incorporating a firefighting lift) complying with BS 5588 : Part 5.

NOTE. The reference to parts of buildings covers situations such as a tower block rising above a podium.

(b) Buildings of height (see **2.10**) exceeding 7.5 m with the area of any storey above the ground storey not less than 600 m^2 should be provided with firefighting shafts (which need not incorporate a firefighting lift) complying with BS 5588 : Part 5.

(c) In buildings where the provision of firefighting shafts is recommended (see items (a) and (b)) sufficient firefighting shafts should be provided such that on every storey:

(1) with a height (see **2.10**) exceeding 18 m; or

(2) with a depth (see **2.24**) exceeding 9 m; or

(3) above the ground storey in buildings described in item (b);

the area on that storey served by any firefighting shaft does not exceed 900 m^2 and the distance along which hose can be laid from the doorway between the firefighting shaft and the accommodation to any point on that storey does not exceed 60 m.

31 Smoke control provisions other than for firefighting shafts

31.1 General

If stairways are to be safely used by occupants of a building to escape from a fire it is essential that they remain free from smoke and heat for sufficient time for evacuation of the building. This need is considered to be met under normal circumstances by the provision of fire-resisting enclosures and fire-resisting self-closing doors. However, additional precautions are necessary in the case of stairways serving basements or areas of higher fire risk. Guidance on smoke control in enclosed shopping complexes has been published by HMSO*.

31.2 Recommendations for the permanent ventilation of protected lobbies

A protected lobby recommended in **8.7.2**, where associated with a protected stairway in any of the following circumstances, should be ventilated by means of permanent openings not smaller than the following areas:

(a) if the protected stairway serves a basement storey, 0.05 m^2;

(b) if the protected stairway connects an enclosed car park with the remainder of the building, 0.4 m^2;

(c) if the protected stairway directly serves a boiler room, transformer chamber or other area of a higher fire risk, 0.4 m^2.

31.3 Smoke control for the fire brigade on protected stairways and on floor areas

The need for smoke control will be at its greatest in the later stages of the development of a fire and the fire brigade may need to release smoke from any protected stairway and from floor areas.

Smoke control is usually obtained by opening windows. Unfenestrated walls or walls sealed for the purpose of air-conditioning will need to be provided with other openable means to serve the same purpose, and in basements, smoke outlets may have to be provided if windows cannot be provided. It should however be appreciated that such smoke control provisions are not required for means of escape purposes or for use by the occupants.

Means for smoke control are also used for the release of heat.

Details and plans showing the provision for the release of heat and smoke from floor areas should be submitted to the local fire authority for approval before building work commences.

31.4 Recommendations for smoke control on a protected stairway

A protected stairway enclosure other than a fire-fighting stairway enclosure should be provided with:

(a) openable windows at each upper storey or landing level; or

(b) a window or vent at the top having a clear openable area of not less than 1 m^2.

31.5 Text deleted.

Figure 9. Figure deleted.

Figure 10. Figure deleted.

Figure 11. Figure deleted.

31.6 Text deleted.

31.7 Recommendation for smoke control in floor areas of ground and higher storeys

Ground and higher storeys should be provided with openable windows or other means aggregating not less than 2.5 % of the floor area, arranged to induce cross-ventilation.

31.8 Recommendations for smoke control in floor areas of basement storeys

Basement storeys should either:

(a) be provided with openable windows or other means aggregating not less than 2.5 % of the floor area, arranged to induce cross-ventilation; or

(b) be provided with smoke outlets that should:

(1) be situated at high level in well distributed positions along street frontages or adjacent to external walls easily accessible to the fire brigade;

(2) be as numerous and as large as possible;

(3) aggregate not less than 2.5 % of the floor area they serve;

(4) if covered, have breakable covers;

(5) if permanently open, be sited away from exits.

31.9 Recommendations for means of opening of windows and vents for smoke control

The following recommendations are applicable.

(a) All openable windows and vents provided for smoke control should be clearly identifiable and should be fitted with:

(1) simple lever handles; or

(2) locks that can be operated by the fire brigade with a square-ended key.

(b) If openable windows and vents are not easily accessible, provision should be made for their operation by a remote control mechanism that, in the case of any vent provided in accordance with item (b) of **31.4**, should be located adjacent to the entrance doorway in the ground/access storey and be clearly marked as to its function and means of operation.

* *Smoke control methods in enclosed shopping complexes of one or more storeys: a design summary*, Morgan H.P., Department of the Environment Building Research Establishment, HMSO.

31.10 Recommendation for breakable covers

Breakable covers provided in accordance with item (b) of **31.8** should be capable of being opened by the fire brigade from outside the building and a permanent notice identifying the area they serve should be provided on or adjacent thereto.

31.11 Recommendations for shafts for smoke outlets

The following recommendations are applicable.

(a) If it is not possible or convenient for a smoke outlet to terminate at a level accessible to a fire brigade, the shafts may be led up through the building to discharge direct to the open air at a suitable point, and the outlets should be maintained unobstructed or be covered only with a non-combustible grille and/or non-combustible louvres.

(b) Shafts serving smoke outlets should:

(1) be provided separately from different basement levels and from such accommodation as boiler rooms, rooms containing oil-filled switchgear, storage space and car parks;

(2) have throughout their length not less cross-sectional area than the smoke outlet they serve;

(3) be enclosed with solid non-combustible material having not less than the period of fire resistance required for the storey served, or through which they pass, whichever is the higher.

31.12 Recommendations for smoke control by pressurization

The following recommendations are applicable.

(a) Any pressurization scheme for smoke control should be in accordance with BS 5588 : Part 4.

(b) According to the details of the pressurization scheme, the recommendations of **31.2** and **31.4** may not need to be implemented.

32 Plans for fire brigade use

32.1 Commentary

In large shops and shops having extensive accommodation below ground level, it is of considerable advantage to the fire brigade if plans of the building showing fire protection and escape facilities are made available. Such plans should be drawn to scale; 1:100 will normally suffice. The plans need to be permanently displayed where they can be readily referred to in an emergency. Normally this would be near the fire brigade access. If there is basement accommodation, plans of such accommodation need to be displayed at access storey in any stairway (or lobby) leading to a basement. It is desirable that additional copies of the plans be furnished to the fire brigade so that they can preplan for an emergency.

32.2 Recommendation

Scale plans of the building for the guidance and use of the fire brigade should be prepared in consultation with the fire brigade.

The plans should clearly indicate the location of:

(a) surrounding streets;

(b) exits, stairways and corridors;

(c) gas and oil main controls;

(d) electrical main and sub-main controls;

(e) ventilation plant and control switches, including pressurization controls;

(f) sprinkler valves;

(g) hose reels;

(h) hydrants and rising mains;

(i) shutters and doors released automatically in the event of fire, and any central control point for release;

(j) smoke outlets;

(k) openable windows in sealed buildings;

(l) main and any secondary fire alarm panels;

(m) pump rooms supplying fire protection systems;

(n) fire-fighting lifts;

(p) automatic fire extinguishing systems;

(q) foam inlets.

A 'You are here' indicator should be included. The plans should be mounted on a rigid surface and should be displayed in a location or locations agreed with the fire brigade.

Appendix

Appendix A. Advice to management and procedure in case of fire

A.1 General

The advice given in this appendix is likely to be applicable to any shop; however it is necessarily incomplete with respect to the requirements of the fire certificate for the building.

The spread of fire and particularly of smoke can be rapid in shops because of the nature of their contents, the way they are disposed and other factors. The recommendations of this code can be completely negated unless management and staff are fully aware of their duties and responsibilities for the prevention of fire and the action to be taken in case of fire. This can only be achieved by the use of comprehensive instructions and the training of all staff to ensure their observance. Advice on such matters can be obtained from the local fire brigade, and from the Fire Protection Association*.

Management also have to be aware of the statutory requirements in connection with certificated premises concerning the maintenance of the means of escape, fire warning systems, portable fire extinguishers, escape lighting, fire safety instructions to staff, etc.

A.2 Fire and security staff

A.2.1 Fire safety officer

Depending on the size of the establishment, a senior official should be appointed, with the necessary deputy or deputies, with the responsibility and authority that fire precautions are satisfactorily maintained, and that the necessary instructions are issued to the staff so that they are conversant with the fire procedure and other safety features of the building.

The fire safety officer should take full charge on the outbreak of a fire, check that the fire brigade has been called, that evacuation is proceeding and that the door-keepers know where to direct the brigade. The fire brigade will assume control on arrival, but in the meantime the fire safety officer should see that fire appliances are used to the best advantage. In large shops it is desirable to train a proportion of the staff in elementary fire-fighting; the fire safety officer can obtain advice in such matters from the local fire brigade. In a building having a two-stage alarm and evacuation procedure, the fire safety officer should arrange for the evacuation of the building as necessary.

In multi-occupancy buildings close cooperation and effective liaison between all occupiers will be necessary where formulating and exercising fire routines.

In all premises one person should be responsible for organizing fire instruction and training and in larger premises a person or persons should be nominated to coordinate the actions of persons in the event of fire.

A.2.2 Other fire and security personnel

These staff should be fully briefed as to the extent of their duties concerning precautions against fire during and outside office hours, which should include:

(a) the timing of the patrols of all parts of the building;

(b) how to call the fire brigade in every case of fire or suspected fire;

(c) which telephones are available (at least one per floor or more if floor areas are large, connected to an exchange line);

(d) the action on finding a fire, including the use of manual fire-fighting equipment;

(e) the operation of automatic fire alarms, sprinklers, etc;

(f) the position of all mains services controls.

It is essential that the person on duty at the point of arrival of the fire brigade should be able to direct them on arrival; he should have instructions to be ready with any necessary keys and to conduct the fire officer to the affected area.

A.3 Staff training and fire drills

A.3.1 General

All staff should be trained to understand the fire precautions and the action to be taken in the event of fire. This should include persons engaged on regular duties outside normal working hours. The aim should be to ensure that all staff receive training, based on written instructions, appropriate to their responsibilities in the event of an emergency.

Instruction should be given by a competent person, at such intervals as will ensure that all employed persons are instructed at least once, and preferably twice, in each period of 12 months.

Instruction and training generally should provide for:

(a) the action to be taken upon discovering a fire;

(b) raising the alarm, including the location of alarm call points, and alarm indicator panels;

(c) the action to be taken upon hearing the fire alarm;

(d) the correct method of calling the fire brigade;

(e) the location and use of fire-fighting equipment;

(f) knowledge of the escape routes;

(g) appreciation of the importance of fire doors and of the need to close all doors at the time of a fire and on hearing the fire alarm;

(h) stopping machines and processes and isolating power supplies, where appropriate;

(i) evacuation of the building; this will include reassuring members of the public, escorting them to exits, and encouraging them to get well clear of the building.

Additionally, certain categories of staff should be trained in

*Fire Protection Association, 140 Aldersgate Street, London EC1A 4HX.

all matters relating to their specific responsibilities in the event of fire. Categories include:

(1) department heads;

(2) floor supervisors;

(3) security staff (including night security patrols);

(4) telephonists.

Any staff on the premises outside normal working hours should be briefed on which telephones are available.

A practice fire drill should be carried out at least once a year simulating conditions in which one or more of the escape routes from the building is obstructed. During these drills the fire alarm should be operated by a member of the staff who is told of the supposed outbreak and, thereafter, the fire routine should be rehearsed as fully as possible. Consideration should be given to holding such a practice when the public are on the premises and if this is done the fire brigade should be informed of the intention and asked to cooperate in the exercise. This may raise some difficulties where large numbers of the public may be present but such a procedure is still desirable. If times are chosen at which relatively few people are present such as early morning or just before closing time and if (in these particular circumstances) advance notice of the drill is given many of the difficulties may be overcome.

A.3.2 Records of training

Details to show the training given should be recorded. The following are examples of matters which may need to be included in such a record:

(a) date of the instruction or exercise;

(b) duration;

(c) name of the person giving the instruction;

(d) names of the persons receiving the instruction;

(e) the nature of the instruction, training or drill.

A.3.3 Instruction notices

At conspicuous positions in all parts of the building printed 'Fire instruction' notices should be exhibited stating, in concise terms, the essentials of the action to be taken upon discovering a fire and on hearing the fire alarm.

A.4 Emergency actions

A.4.1 Action on discovery

The existence of the fire may be discovered by a person, by the operation of an automatic fire alarm, or by the operation of an extinguishing system. In the first case the person should immediately raise the alarm using the system provided (see clause 25). If there is a two-stage alarm system, the floor or zone affected should be evacuated (and the others alerted). A decision on the evacuation of other floors or zones should be made as quickly as possible, and the safety of any remaining occupants should be continually reviewed by the person managing the evacuation.'

A.4.2 Warning and evacuation signals

Fire evacuation procedures govern the particular design of the fire alarm system provided in the building. It is important therefore that the fire authority is consulted during the building design stage to ensure compliance with relevant mandatory requirements.

The normal evacuation signal consists of a continuous signal by means of bells, sirens, hooters, etc., that indicates that all persons must evacuate the building immediately.

In large buildings a two-stage alarm is desirable. The initial warning should be given to staff by means of a discreet audible and visible warning or a special coded announcement over the public address system (see A.4.3) so that they can take up their pre-arranged emergency positions before the general evacuation signal is given. Where a building is subdivided into separate horizontal or vertical fire compartments this method may be used to phase the evacuation of each compartment. The alarm system should be capable of giving a continuous signal in the zone or floor where the alarm has been actuated, and simultaneously causing the alarm sounders in all other zones or floors to give an intermittent (alert or standby) warning signal. Facilities are required to allow all sounders to be switched over to a continuous (total evacuation) signal. A recommended intermittent signal is given in BS 5839 : Part 1.

A.4.3 Use of a public address system

The use of suitable signals on the bells or sounders of the fire alarm system will be adequate for most purposes. In very large shops, however, it may be of considerable advantage to provide a public address system and use it for this purpose. Not only will it possess far greater flexibility by allowing specific instructions or information to be given, but it is also likely that response to a human voice will be better than to the mere sounding of signals. The control point for the fire alarm system and/or the public address system should be so located that easy and quick evacuation to the open air is possible. The recommendations of BS 5839 : Part 1 for the use of public address systems should be followed.

A.4.4 Calling the fire brigade

The fire brigade should always be called to a fire, however small the incident may appear. This should be done immediately, and other actions of equal urgency (such as alerting the staff or public) should be done simultaneously with the brigade call. The correct calling procedure and the giving of the address, etc., should be posted conspicuously at appropriate points, and this should form an important part of the staff practices held from time to time; prior notification to the fire brigade of the proposal to hold a practice, together with the use of a code word, will enable the full procedure to be carried out without omitting this most important feature. If an automatic device for calling the brigade is provided, such as a connection from an automatic alarm or extinguishing system, a confirmatory call by telephone should be made to check that the call has been received.

A.4.5 Fighting the fire

Attempts at fighting a fire with the equipment provided should never be given priority over giving the alarm, calling

the fire brigade or any other action in the fire procedure. It should only be undertaken if:

(a) staff are available for the purpose;

(b) it is safe to do so;

(c) such action would contain or extinguish the fire.

When it becomes necessary to abandon fire-fighting, the staff involved should withdraw, closing doors behind them and leave the building.

A.4.6 Evacuation procedure

In the event of a general alarm to evacuate the building being given, all staff who have not been allotted specific fire duties should without stopping to collect coats, petty cash, keys, etc., leave the storey and the building in an orderly manner and without haste. There will, in addition, be the following duties to perform.

(a) Senior staff members on each storey, or assistants instructed by them, should supervise the evacuation from that storey and check that no one is left behind. They should report to that effect to the appropriate fire safety officer.

(b) In the meantime a 'fire party', if any, or members of the staff directed on the spot, should be attempting (if this is possible, see A.4.5) to fight or contain the fire with the equipment provided for the purpose. The fire brigade will have been called at once in accordance with A.4.4.

(c) Doors should be closed by the last persons to leave as each floor or section is cleared.

(d) A responsible member of the staff should have the duty of meeting the fire brigade on its arrival and giving all relevant information.

(e) The positions of switchgear rooms and isolating switches should be made known to the fire brigade.

(f) Cars parked within the building or nearby should be left there until after the emergency because the occupants should be reporting at assembly points (see A.4.8) and because of the risk of impeding the access of the fire brigade.

(g) Passenger lifts should be brought immediately to the final exit level and kept there during a fire emergency. Escalators moving away from final exit level should be stopped.

A.4.7 Evacuation of non-ambulant disabled people

For certain disabled people, special arrangements should be made within fire drill procedures whereby the nominated members of the staff assist with the evacuation of such people without impeding the use of escape routes by others; responsibility for these procedures will be with the building management.

Detailed guidance on management procedures is given in BS 5588 : Part 8.

A.4.8 Completion of evacuation

On completion of evacuation, all staff should report to a previously determined assembly point or points, which should be sufficiently far from the premises to avoid interference with the fire brigade or danger from falling debris. No one should re-enter the building without the permission of the fire brigade officer in charge.

A.5 Routine precautions

A.5.1 General

(a) It is recommended that the premises should be inspected daily before opening to ensure that:

(1) all exits are unlocked and available or capable of being opened in the event of fire;

(2) all escape routes are clear of any obstructions and that shutters or sliding doors are not obstructed.

(b) All parts of the premises should be checked regularly throughout the day with particular attention being paid to those parts not normally visited by staff and to cloakrooms, medical rooms, etc.

(c) A daily final inspection should be carried out after closing to ensure that the premises are left in a safe condition. The non-maintained electrical services should be turned off at the mains, and all plugs should be removed from socket outlets. Particular attention should be paid to gas-fired equipment; any not equipped with flame supervision devices should be turned off.

(d) Automatic fire alarms and sprinkler installations should be tested and serviced in accordance with the manufacturer's recommendations and with BS 5839 : Part 1 and BS 5306 : Part 2.

A.5.2 Fire-fighting equipment

The equipment provided should be checked and tested in accordance with BS 5306 : Part 1 for hydrant systems, hose reels and foam inlets, and BS 5306 : Part 3 for portable fire extinguishers. The equipment should be maintained in working order.

The fire safety officer should check the simpler points at frequent intervals, i.e. that appliances have not been moved out of position, are not obstructed and that the nozzles are not clogged. Any extinguisher used in a fire, or for training, should be recharged immediately. The fire safety officer should also check hose reels periodically to make sure that valves have not been turned off and water is still reaching the equipment.

If management have no staff available for carrying out such tests, maintenance services can be undertaken by most fire appliance companies.

A.5.3 Escape routes

It is essential to keep all escape routes clear of obstruction; goods, sacks of waste paper, furniture, etc. should not be stacked or stored on stairways, in lobbies or in corridors. Fire safety signs and notices and escape lighting should not be obstructed by stock, nor by advertising banners, posters, etc.

Entrance halls, lobbies or corridors should not contain furniture or fittings that would reduce, at any point, the required width. In a building or part served by a single stairway and in fire-fighting stairways, furniture should not be placed within the stair enclosures and exitways therefrom. In multi-stairway premises, with the consent of the fire authority, furniture may be placed within the entrance hall forming part of one protected stairway only, provided that upholstered furniture be kept to a minimum and be of a type not easily ignited (see BS 5852 : Part 1).

2 In addition to the daily checking of all doors to escape routes, including automatic doors (see item (a) of **A.5.1**), the operation of the fail-safe mechanisms for all automatic doors should be checked (and recorded) every month, either by 'breaking-out' the doorset or by simulating failure of the mains power supply, as appropriate.

A.5.4 Housekeeping

(a) Refuse, waste paper, etc., should not be allowed to accumulate and provision should be made for separate storage pending its removal from the premises. Wherever possible, all combustible waste should be baled and removed from the premises daily.

(b) Paints, flammable liquids and/or polishes when not in use should be kept in a metal container, preferably outside the building. A separate metal container should be provided for rags or cotton waste used in connection with polishes and cleaning fluids.

(c) Particular attention should be paid to the maintenance of clear space around heaters of all types and especially convector, tubular, or thermal storage heaters. Guards should be provided to prevent the close stacking of any combustible materials. Similarly, a clear air space has to be provided around the vents of refrigerator compressor motors.

(d) In store rooms, goods should not be stacked close to windows, and if there is a sprinkler system, not higher than the height recommended in BS 5306 : Part 2.

(e) Vital records, accounts, etc., should be safeguarded against loss in fire by keeping them in cabinets, safes or strongrooms affording protection against fire.

(f) The non-slip even surfaces of floors of corridors, lobbies, landings and passages forming part of escape routes should be maintained.

(g) At all times attention should be paid to preventing fire safety signs, fire shutters and fire doors from being obscured either temporarily or permanently. This is most important when adding special decorative effects and special advertising displays.

A.5.5 Special risks

Where special risks exist or are introduced anywhere into the building, such as the introduction of motor vehicles for display purposes, advice as to their storage and protection should be obtained from the appropriate authorities.

A.5.6 Smoking

It is probable that the real danger lies in surreptitious smoking, especially by members of the staff in store rooms or other back rooms not in continuous view of supervisory staff. The best recommendation that can be made is that smoking be prohibited in these places.

A.5.7 Engineering services and equipment

Any alterations, additions, repairs or modifications to services and equipment should be carried out only by competent persons. Arrangements should be made for all services (including fire detection systems, door control mechanisms, pressurization systems, fire lifts, emergency lighting, standby power systems) to be regularly inspected and maintained.

A.5.8 Shop fittings, linings, special displays and grottoes

Shop fittings, linings, special displays and grottoes should be constructed of materials that are not readily ignitable. Siting should be such that exitways are kept clear and unobstructed, and exit signs should be visible from the relevant part of the premises. Grottoes may present particular problems and advice should be sought from the fire authority.

A.6 Extensions and alterations to buildings

A number of serious fires have occurred during maintenance, alterations and additions to buildings carried out by contractors and subcontracting specialists.

Work by contractors should be closely controlled. Heat processes, involving the use of fuel tanks, welding, blowlamps, etc., present a special risk during the work and after the completion of the work.

Management are reminded that dangers can arise when buildings are in the course of extension and alteration but still partly in use. These dangers arise in part from loss or diversion of escape routes, and in part from the disruption of fire protection facilities, such as fire alarm systems, fire-fighting equipment, sprinkler systems, etc. It is therefore essential that such dangers be minimized by making any necessary alternative arrangements, and that adequate provision has also to be made where extensions and alterations involve escape routes and/or fire protection facilities serving adjacent occupancies, premises or buildings.

Occupiers should be aware of the legal requirement to consult the local building and fire authorities prior to the implementation of extensions or alterations within the building, also to necessary approvals under planning acts, which control external elevations of buildings, e.g. external staircases, large oil storage tanks adjacent to buildings.

Guidance on fire precautions in buildings under construction or alteration is available from HMSO*.

* *Standard fire precautions to be taken by contractors engaged on building and engineering works for the Department of the Environment* (P.5), HMSO.

Index

References are to clause, table and figure numbers, not to page numbers. Alphabetization is letter-by-letter. References in bold type denote clauses giving recommendations. Subheadings marked general denote clauses that are wholly concerned with the subjects to which they refer.

Publications referred to

Standards publications

BS 476 Fire tests on building materials and structures
Part 4 Non-combustibility test for materials
Part 7 Surface spread of flame tests for materials
Part 8 Test methods and criteria for the fire resistance of elements of building construction
Part 11 Method for assessing the heat emission from building materials‡
Part 20 Method for determination of the fire resistance of elements of building 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
Part 31 Methods for measuring smoke penetration through doorsets and shutter assemblies
Section 31.1 Measurement under ambient temperature conditions

BS 799 Oil burning equipment
Part 5 Oil storage tanks

BS 4211 Steel ladders for permanent access

BS 4434 Requirements for refrigeration safety
Part 1 General

BS 5266 Emergency lighting
Part 1 Code of practice for the emergency lighting of premises other than cinemas and certain other specified premises used for entertainment

BS 5274 Specifications for fire hose reels (water) for fixed installations

BS 5306 Fire extinguishing installations and equipment on premises
Part 1 Hydrant systems, hose reels and foam inlets
Part 2 Sprinkler systems
Part 3 Code of practice for selection, installation and maintenance of portable fire extinguishers
Part 4 Carbon dioxide systems
Part 5 Halon systems
Section 5.1 Halon 1301 total flooding systems
Section 5.2 Halon 1211 total flooding systems
‡Part 6 Foam systems

BS 5395 Stairs, ladders and walkways
Part 1 Code of practice for the design of straight stairs
Part 2 Code of practice for the design of helical and spiral stairs

BS 5410 Code of practice for oil firing
Part 1 Installations up to 44 kW output capacity for space heating and hot water supply purposes
Part 2 Installations of 44 kW or above output capacity for space heating, hot water and steam supply purposes

BS 5423 Specification for portable fire extinguishers

BS 5499 Fire safety signs, notices and graphic symbols
Part 1 Specification for fire safety signs

BS 5588 Fire precautions in the design and construction of buildings
*Part 1 Residential buildings
*Section 1.1 Code of practice for single-family dwelling houses
Part 3 Code of practice for office buildings
Part 4 Code of practice for smoke control in protected escape routes using pressurization
Part 5 Code of practice for firefighting stairways and lifts
Part 8 Code of practice for means of escape for disabled people
Part 9 Code of practice for ventilation and air conditioning ductwork

BS 5655 Lifts and service lifts

BS 5720 Code of practice for mechanical ventilation and air conditioning in buildings

BS 5725 Emergency exit devices
Part 1 Specification for panic bolts and panic latches mechanically operated by a horizontal push-bar

BS 5810 Code of practice for access for the disabled to buildings

BS 5839 Fire detection and alarm systems for buildings
Part 1 Code of practice for system design, installation and servicing
Part 3 Specification for automatic release mechanisms for certain fire protection equipment‡

BS 5852 Fire tests for furniture
Part 1 Methods of test for the ignitability by smokers' material of upholstered composites for seating

BS 5906 Code of practice for the storage and on-site treatment of solid waste from buildings

BS 6180 Code of practice for protective barriers in and around buildings

BS 6262 Code of practice for glazing for buildings

BS 6266 Code of practice for fire protection for electronic data processing installations

BS 6644 Specification for installation of gas-fired hot water boilers of rated inputs between 60 kW and 2 MW (2nd and 3rd family gases)

BS 6798 Specification for installation of gas-fired hot water boilers of rated input not exceeding 60 kW

BS 7036 Code of practice for provision and installation of safety devices for automatic power operated pedestrian door systems‡

CP 3 Code of basic data for the design of buildings
†Chapter IV : Part 1 Flats and maisonettes (in blocks over two storeys)

CP 413 §Ducts for building services

PD 6512 Use of elements of structural fire protection with particular reference to the recommendations given in BS 5588 'Fire precautions in the design and construction of buildings'
Part 1 Guide to fire doors
Part 3 Guide to the fire performance of glass

PD 6520 Guide to fire test methods for building materials and elements of construction

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* Referred to in the foreword only.

†Under revision, to be published as BS 5588 : Section 1.2. Referred to in the foreword only.

‡ In preparation.

§ Under revision. The revision of the main body of CP 413 will be published as BS 8313 and the revision of appendix A to CP 413 will be published as BS 5588 : Part 9.

Other publications

Standard fire precautions to be taken by contractors engaged on building and engineering works for the Department of the Environment (P.5), HMSO

Guides to the Fire Precautions Act 1971; No. 3; Offices, Shops and Railway Premises, HMSO

Fire Prevention Guide No. 1, *Fire precautions in town centre redevelopment*, Home Office and Scottish Home and Health Department, HMSO

Smoke control methods in enclosed shopping complexes of one or more storeys: a design summary, Morgan H.P., Department of the Environment Building Research Establishment, HMSO

Code of practice for hardware essential to the optimum performance of fire-resisting timber doorsets, Association of Builders Hardware Manufacturers, 1983

IEE Wiring Regulations, *Regulations for electrical installations*, Institution of Electrical Engineers

Guidance note HS(G) 34, *The storage of liquefied petroleum gas at fixed installations*, Health and Safety Executive

2 *Recommendations for the protection of computer installations against fire*, Fire Offices' Committee

Fire Offices' Committee, rules and recommendations for particular types of fire protection equipment

BS 5588 : Part 2 : 1985

This British Standard, having been prepared under the direction of the Fire Standards Committee, was published under the authority of the Board of BSI and comes into effect on 29 March 1985.

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The following BSI references relate to the work on this standard:
Committee reference FSM/14 Draft for comment 78/12714 DC

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Fire Standards Committee (FSM/-) to Technical Committee FSM/14, upon which the following bodies were represented:

Association of Metropolitan Authorities
British Fire Services Association
British Gas Corporation
British Retailers' Association
Chief and Assistant Chief Fire Officers' Association
Consumer Standards Advisory Committee of BSI
Department of Education and Science
Department of Health and Social Security
Department of the Environment (Building Research Establishment, Fire Research Station)
Department of the Environment for Northern Ireland
Department of the Environment (Housing and Construction)
Department of the Environment (Property Services Agency)
Electricity Supply Industry in England and Wales
Fire Insurers' Research and Testing Organization (FIRTO)
Fire Offices' Committee
Fire Protection Association
Greater London Council
Health and Safety Executive
Home Office
Incorporated Association of Architects and Surveyors
Institution of Building Control Officers Ltd.
Institution of Fire Engineers
Institution of Gas Engineers
Institution of Structural Engineers
National Council of Building Materials Producers
Royal Institute of British Architects
Royal Institution of Chartered Surveyors
Scottish Development Department

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

Association of British Theatre Technicians
Cinematograph Exhibitors' Association of Great Britain and Ireland
Steel Window Association
Theatres' Advisory Council

Amendments issued since publication

Amd. No.	Date of issue	Text affected
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British Standards Institution · 2 Park Street London W1A 2BS · Telephone 01-629 9000 · Telex 266933

BS 5588 : Part 2 : 1985

BSI BS*5588: PART*2 85 ■ 1624669 0028642 6 ■

BSI

AMD 6239

Amendment No. 2
published and effective from 31 October 1989
to BS 5588 : Part 2 : 1985

Fire precautions in the design and construction of buildings
Part 2 Code of practice for shops

Revised text

AMD 6239
October 1989

Contents

In the list of tables, delete the title of table 7 and substitute the following.

'7 Limitations on non-insulating glazed elements installed in stairways, lobbies and corridors'

AMD 6239
October 1989

Clause 2.9 fire resistance (as amended by Amendment No. 1)

Delete the existing term and definition and substitute the following.

'**2.9 fire resistance.** The ability of a component or construction of a building to satisfy for a stated period of time the appropriate criteria specified in the relevant Part of BS 476.'

AMD 6239
October 1989

Clause 2.14 non-combustible

After 'BS 476 : Part 4' insert the following.

',or any material which when tested in accordance with BS 476 : Part 11 does not flame nor cause any rise in temperature on either the centre (specimen) or furnace thermocouples'

AMD 6239
October 1989

New definitions 2.24 and 2.25

After definition **2.23** insert the following two new definitions.

'**2.24 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.

2.25 material of limited combustibility. Either:

(a) a non-combustible material; or

(b) any material of density 300 kg/m^3 or more which, when tested in accordance with BS 476 : Part 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.'

AMD 6239
October 1989

Clause 3.5.3 Legislation and other regulations for fire safety in shops (as amended by Amendment No. 1)

Delete the penultimate paragraph. After the final paragraph insert the following new note.

'NOTE. Under the Fire Precautions Act, 1971, fire authorities in England and Wales cannot, as a condition of the issue of a fire certificate, require structural or other alterations relating to escape from the premises if the plans of the building comply with building regulations, unless the fire authority is satisfied that the means of escape in case of fire are inadequate by reason of matters or circumstances of which particulars were not required to be supplied to the local authority in connection with the deposit of plans for building regulation purposes.'

AMD 6239
October 1989

Clause 4.2 Smoke

In paragraph 1, line 5, delete ', and possibly panic'.

AMD 6239
October 1989

Clause 5.3 Disabled persons

Delete the existing clause and substitute the following.

'**5.3 Disabled persons**

When a shop is being planned, whilst it will not as a rule be possible to reliably predict its usage by disabled persons, it may be expected that some employees or members of the public will be people with a disability of some kind. The designer should therefore study the recommendations of BS 5588 : Part 8.'

AMD 6239
October 1989

Clause 7.2.1 Commentary (as amended by Amendment No. 1)

In paragraph 1, line 4, delete '826 mm' and substitute '800 mm'.

AMD 6239
October 1989

Table 4. Capacity of a stairway (as amended by Amendment No. 1)

At the end of the table insert the following new note.

'NOTE. The capacity of stairways serving more than 10 floors may be obtained by linear extrapolation.'

AMD 6239
October 1989

Clause 8.5.2 Recommendations (as amended by Amendment No. 1)

Delete items (a) (2) and (a) (3) and substitute the following.

'(2) cupboards enclosed with fire-resisting construction except in the case of a building (or part) served by a single stairway;

(3) lift wells, except lift wells which are sited directly above lift motor rooms in buildings (or parts) served by a single stairway.'

AMD 6239
October 1989

Clause 8.7.1 Commentary

Delete the final paragraph.

AMD 6239
October 1989

Clause 8.7.2 Recommendations (as amended by Amendment No. 1)

At the end of the existing text, after item (d), insert the following new paragraph.

'The protected lobbies described in items (b), (c) and (d) should be provided with ventilation in accordance with 31.2.'

AMD 6239
October 1989

Clause 10.3.1 Commentary (as amended by Amendment No. 1)

At the end of the note to item (a) insert the following new paragraph to the note.

'Brief details of these tests are given in PD 6520.'

AMD 6239
October 1989

Clause 10.3.2 Recommendations

In item (a), line 2, delete 'stability' and substitute 'loadbearing capacity'.

In item (d), line 3, delete 'stability'.

AMD 6239
October 1989

Clause 10.4.1 Commentary (as amended by Amendment No. 1)

At the end of the existing text insert the following new paragraph.

'If a lift well is located within a protected lobby or protected stairway, the preferred location of the lift motor room is either above the lift well or outside the stairway and lobby enclosures (see also item (a) (3) of **8.5.2**). Lift wells ought to be sited so as not to prejudice escape routes.'

AMD 6239
October 1989

Clause 10.4.2 Recommendations (as amended by Amendment No. 1)

In item (b), line 3, insert 'and BS 5588 : Part 9' between 'CP 413' and the full stop.

AMD 6239
October 1989

Clause 10.5.1 Commentary (as amended by Amendment No. 1)

In paragraph 1, lines 5 and 12, delete 'stability and'.

AMD 6239
October 1989

Clause 10.5.2 Recommendations (as amended by Amendment No. 1)

In item (a), line 2, delete 'stability,'.

In item (b), line 2, delete 'stability and'.

AMD 6239
October 1989

Table 7. Limitations on glazed elements that are fire resistant in terms of stability and integrity only, when installed in stairways, lobbies and corridors

Delete the existing table title and substitute 'Limitations on non-insulating glazed elements installed in stairways, lobbies and corridors'.

AMD 6239
October 1989

Clause 10.6.1 Commentary (as amended by Amendment No. 1)

In the penultimate paragraph, line 5, insert 'non-insulating' between 'extent of' and 'glazed areas'.

AMD 6239
October 1989

Clause 10.6.2 Recommendations (as amended by Amendment No. 1)

Delete item (b) and substitute the following.

'(b) A fire door required to resist the passage of smoke at ambient temperature conditions (i.e. those having the suffix S in item (a)) should, when tested in accordance with BS 476 : Section 31.1 with the threshold taped and subjected to a pressure of 25 Pa, have a leakage rate not exceeding 3 m^3/m/h. The threshold gap should be sealed by a seal either with a leakage rate not exceeding 3 m^3/m/h at 25 Pa or just contacting the floor; where this is impracticable the threshold gap should not exceed 3 mm at any point.

NOTE. The term 'fire door' includes both the door frame and the door leaf or leaves.'

Delete item (f) (including its associated notes) and substitute the following.

'(f) Except for doors to firefighting lobbies, to firefighting stairways or to the only protected stairway in a building or part of a building, means of holding any fire door open or of overriding its self-closing device may be provided by a hold open system incorporating an automatic release mechanism complying with BS 5839 : Part 3. The automatic release mechanism should release the door to close automatically in the event of each or any of the following:

(1) the detection of smoke by suitable automatic apparatus;

(2) failure of the power supply;

(3) operation of the manual fire alarm system or automatic fire alarm system;

(4) if the facility is provided, manual operation at a central control point.

Such doors should be suitably marked on both sides, at about eye level, with the appropriate sign complying with BS 5499 : Part 1.'

Insert the following new item between the existing item (g) and the note to **10.6.2.**

'(h) Fire doors on escape routes should not be fitted with threshold upstands.'

In the note to **10.6.2,** delete the address of the Association of Builders' Hardware Manufacturers and substitute 'Heath Street, Tamworth, Staffordshire B77 7JH.'

AMD 6239
October 1989

Clause 10.7 Recommendations for doors on escape routes

Delete item (b) and substitute the following.

'(b) Automatic doors, turnstiles and revolving doors should not be provided across escape routes unless:

(1) they are automatic doors complying with BS 7036 and either:

(i) they are arranged to fail safely to outward opening from any position of opening; or

(ii) they are provided with a monitored fail-safe system for opening the doors if the mains power supply fails; or

(2) swing doors to the required width are provided immediately adjacent.'

AMD 6239
October 1989

Clause 12.3.2 Recommendations

In item (a) insert 'and BS 5588 : Part 9' between 'CP 413' and the full stop.

BSI BS*5588: PART*2 85 ■ 1624669 0028646 3 ■

AMD 6239
October 1989

Clause 12.8 Walk-in refrigerated cold rooms

Delete the existing clause and substitute the following.

'**12.8 Walk-in refrigerated cold rooms and associated systems**

12.8.1 *Commentary.* Refrigerated cold rooms, cold stores and other refrigerated enclosures of the walk-in type (all referred to as cold rooms) vary in size up to a maximum of 500 m^3: beyond this size such a refrigerated space could be described as a warehouse type and would cease to be walk-in. Only walk-in refrigerated cold rooms associated with shops are covered by this code.

Cold rooms can be considered to be areas of low risk because in use sources of ignition can be reduced to a minimum. However, in the event of a fire external to the cold room, insulating materials used in the construction of pre-fabricated cold rooms and in the lining of purpose built cold rooms may be a hazard both to people working in the cold room and to those attempting to put out the fire. During construction and maintenance care should therefore be taken to avoid using heat sources in close proximity to combustible insulating materials and adequate firefighting equipment should be provided within the cold room (see A.6).

In particular, some modern cellular plastics insulating materials give off large volumes of dense toxic smoke. It is therefore essential that such materials are protected from flame by suitable facings that, if exposed to a localized high intensity fire external to the cold room, do not rapidly fall away. The effects of fire on ceiling panels and their support system also need to be considered. Protection of the insulation may be achieved by incorporating returns to all panels and incorporating some means of ensuring that close contact is maintained between mating faces under fire conditions, or by covering all joints.

If the cold room is large enough, mechanical aids for loading and unloading may be provided, and care should be taken to minimize damage to the lining, usually by the provision of suitable barriers or a thicker lining. In large and/or deep cold rooms access points need to be provided to enable firefighting to be more effective.

Refrigeration systems associated with cold rooms should comply with the current codes of practice issued by the Institute of Refrigeration* and, where applicable, with BS 4434 : Part 1; refrigeration plant rooms are covered in 12.6. Refrigerators of a domestic type and refrigerated display cabinets are considered not to need any special consideration.

12.8.2 *Recommendations.* The following recommendations are applicable.

(a) Walk-in refrigerated cold rooms should have escape routes of such a number and so situated that the travel distance from any point within the cold room does not exceed the appropriate limits set out in table 1.

(b) Cold rooms exceeding 250 m^3 in volume should be provided with suitable fire access points as agreed with the fire authority.

(c) Any area containing a cold room should, wherever possible, be protected with:

(1) a sprinkler system (see clause **26**); and

(2) either adequate cross ventilation or a suitable smoke control system (see clause **31**).

(d) Any area containing a cold room should be separated from the public areas by fire-resisting construction unless:

(1) the area is protected by a sprinkler system; or

(2) the area is part of a small shop (see clause **9**).

(e) Where the cold room construction incorporates cellular plastics insulating materials:

(1) the insulation should be protected on all sides with materials of limited combustibility; and

(2) the facing system should be independently supported or adjacent panels should be mechanically linked; and

(3) either:

(i) the facings should be mechanically interlinked so as to prevent a continuous fire path to the insulation; or

(ii) the joints between facings external to the cold store should be covered by strips of facing material not less than 50 mm in width attached mechanically to both facings.'

At the foot of the page insert the following footnote.

'*The Institute of Refrigeration, 76 Mill Lane, Carshalton, Surrey SM5 2JR.'

AMD 6239
October 1989

Clause 15.8 Recommendations for fuel storage spaces (as amended by Amendment No.1)

In item (c) (2), line 3, delete 'CS 5' and substitute 'HS(G) 34'.

AMD 6239
October 1989

Clause 16.1.2 Recommendations

In item (b) insert 'and BS 5588 : Part 9' between 'CP 413' and the full stop.

AMD 6239
October 1989

Clause 25.3 Manual fire alarm systems

Delete paragraphs 3 and 5.

AMD 6239
October 1989

New clause 25.6

After **25.5**, insert the following new clause **25.6** and renumber the existing clause **25.6** as **25.7**.

'**25.6 Two-stage fire alarm systems**

In most shops it is best if operation of a manual call point or fire detector gives an almost instantaneous warning for a total evacuation of the premises from all the fire alarm sounders. However, in some very large and/or tall buildings a phased evacuation procedure may be adopted, in which the operation of a call point or detector gives an evacuation signal in the floor or zone affected, and an alert or standby

warning in all other parts of the premises. The evacuation signal may then be sounded as necessary in other parts of the premises to facilitate the orderly evacuation of the remaining occupants. In such systems, called two-stage fire alarm systems, it is essential that there are adequate means of communication between the floor areas or zones and a central control point, and there are advantages in using a public address system instead of, or in addition to, the fire alarm sounders (subject to the recommendations of BS 5839 : Part 1) to control the evacuation.

NOTE. It should be appreciated that the term 'two-stage fire alarm system' refers to the two types of alarm signal (i.e. evacuate or alert) and not to the number of evacuation phases: this would depend on the degree of fire separation within the building and on the particular circumstances prevailing in a fire. Further details of the two-stage alarm systems are given in BS 5839 : Part 1 : 1988.

If a two-stage fire alarm system is considered it is essential that there is early consultation with the fire authority.'

AMD 6239
October 1989

Clause 30.3 Recommendation (as amended by Amendment No. 1)

Delete the existing text and substitute the following.

'**30.3 Recommendations**

The following recommendations are applicable.

(a) Buildings or parts of buildings of height (see **2.10**) exceeding 18 m or depth (see **2.24**) exceeding 9 m should be provided with firefighting shafts (each incorporating a firefighting lift) complying with BS 5588 : Part 5.

NOTE. The reference to parts of buildings covers situations such as a tower block rising above a podium.

(b) Buildings of height (see **2.10**) exceeding 7.5 m with the area of any storey above the ground storey not less than 600 m^2 should be provided with firefighting shafts (which need not incorporate a firefighting lift) complying with BS 5588 : Part 5.

(c) In buildings where the provision of firefighting shafts is recommended (see items (a) and (b)) sufficient firefighting shafts should be provided such that on every storey:

(1) with a height (see **2.10**) exceeding 18 m; or

(2) with a depth (see **2.24**) exceeding 9 m; or

(3) above the ground storey in buildings described in item (b);

the area on that storey served by any firefighting shaft does not exceed 900 m^2 and the distance along which hose can be laid from the doorway between the firefighting shaft and the accommodation to any point on that storey does not exceed 60 m.'

AMD 6239
October 1989

Clause A.3.1 General

In item (b), line 2, delete ', internal fire alarm telephones'.

AMD 6239
October 1989

Clause A.4.1 Action on discovery

Delete the third and fourth sentences and substitute the following.

'If there is a two-stage alarm system, the floor or zone affected should be evacuated (and the others alerted). A decision on the evacuation of other floors or zones should be made as quickly as possible, and the safety of any remaining occupants should be continually reviewed by the person managing the evacuation.'

AMD 6239
October 1989

Clause A.4.7 Evacuation of non-ambulant disabled people

In paragraph 1, lines 1 and 2, delete 'may need to' and substitute 'should'.

Insert the following sentence at the end of paragraph 1.

'Detailed guidance on management procedures is given in BS 5588 : Part 8.'

Delete paragraphs 2, 3 and 4.

AMD 6239
October 1989

Clause A.5.3 Escape routes

At the end of the existing text insert the following new paragraph.

'In addition to the daily checking of all doors to escape routes, including automatic doors (see item (a) of **A.5.1**), the operation of the fail-safe mechanisms for all automatic doors should be checked (and recorded) every month, either by 'breaking-out' the doorset or by simulating failure of the mains power supply, as appropriate.'

AMD 6239
October 1989

Index (as amended by Amendment No. 1)

Insert the new term 'Automatic doors **10.7**, A.5.3'.

Insert the new term 'Automatic release mechanisms **10.6.2**'.

Insert the new term 'BS 476 : Part 11 2.25'.

Insert the new term 'BS 4434 : Part 1 12.8.1'.

Insert the new term 'BS 5588 : Part 8 5.3, A.4.7'.

Insert the new term 'BS 5588 : Part 9 **10.4.2, 12.3.2, 16.1.2**'.

Insert the new term 'BS 5839 : Part 3 **10.6.2**'.

Insert the new term 'BS 7036 **10.7**'.

Insert the new term 'Depth 2.24'.

Under the term 'Fire alarm systems', in the sub-term 'two-stage alarm for phased evacuation',delete the references and substitute '**25.6**, A.4.1, A.4.2'.

Under the term 'Lifts', in the sub-term 'motor rooms', insert a reference to '**8.5.2**'.

Delete the term 'Lift shafts' and substitute 'Lift wells'; delete the sub-term 'doors to lift shafts' and substitute 'doors to lift wells'; and in the sub-term 'general', insert a reference to '**8.5.2**'.

Insert the new term 'Limited combustibility 2.25'.

Insert the new term 'PD 6512 : Part 3 10.5.1'.

Insert the new term 'PD 6520 10.3.1'.

Insert the new term 'Revolving doors **10.7**'.

Insert the new term 'Turnstiles **10.7**'.

AMD 6239
October 1989

Publications referred to (as amended by Amendment No. 1)

Insert the following new Part of BS 476.

'Part 11 Method for assessing the heat emission from building materials'.

Insert the following new Parts of BS 5588.

'Part 8 Code of practice for means of escape for disabled people
Part 9 Code of practice for ventilation and air conditioning ductwork'

Delete the reference to BS 5839 : Part 1 and substitute the following.

'BS 5839 Fire detection and alarm systems for buildings
Part 1 Code of practice for system design, installation and servicing
Part 3 Specification for automatic release mechanisms for certain fire protection equipment'

Insert the following new standard in the correct numerical order.

'BS 7036 Code of practice for provision and installation of safety devices for automatic power operated pedestrian door systems'

At the end of the list of *Standards publications* insert the following

'PD 6520 Guide to fire test methods for building materials and elements of construction'

Under '*Other publications*', in line 9, delete 'CS 5' and substitute 'HS(G) 34'.

BSI

AMD 6478

Amendment No. 3
published and effective from 31 August 1990
to BS 5588 : Part 2 : 1985

Fire precautions in the design and construction of buildings
Part 2. Code of practice for shops

Deletions

AMD 6478
August 1990

Table 8. Maximum permitted part of travel distance in certain areas of ancillary accommodation

Delete item 6 'Walk-in refrigerated cold rooms' and the associated cross-reference '12.8'.

AMD 6478
August 1990

Index (as amended by Amendments Nos. 1 and 2)

Under the term 'Walk-in refrigerated cold rooms' delete the reference to 'table 8'.