**Auditing simple premises**

**Module: Means of escape**

**Support Note**

Extracts: Approved Document B (Fire safety), Volume 2

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Introduction

4.1 The general principle to be followed when designing facilities for means of escape is that any person confronted by an outbreak of fire within a building can turn away from it and make a safe escape. This Section deals with the provision of means of escape from any point to the storey exit of the floor in question, for all types of building. It should be read in conjunction with the guidance on the vertical part of the escape route in Section 5 and the general provisions in Section 6.

It should be noted that guidance in this Section is directed mainly at smaller, simpler types of buildings. Detailed guidance on the needs of larger, more complex or specialised buildings, can be found elsewhere (see paragraphs 0.19 to 0.33).

It should also be noted that although most of the information contained in this Section is related to general issues of design, special provisions apply to the layouts of certain institutional buildings (see paragraphs 4.38 onwards).

In the case of small shop, office, industrial, storage and other similar premises (ones with no storey larger than 280m² and having no more than 2 storeys plus a basement storey), the guidance in paragraph 4.32 to 4.37 may be followed instead of the other provisions in this Section.

Escape route design

Number of escape routes and exits

4.2 The number of escape routes and exits to be provided depends on the number of occupants in the room, tier or storey in question and the limits on travel distance to the nearest exit given in Table 2.

Note: It is only the distance to the nearest exit that should be so limited. Any other exits may be further away than the distances in Table 2.

4.3 In multi-storey buildings (see Section 5) more than one stair may be needed for escape, in which case every part of each storey will need to have access to more than one stair. This does not prevent areas from being in a dead-end condition provided that the alternative stair is accessible in case the first one is not usable.

4.4 In mixed-use buildings, separate means of escape should be provided from any storeys (or parts of storeys) used for Residential or Assembly and Recreation purposes.

Single escape routes and exits

4.5 In order to avoid occupants being trapped by fire or smoke, there should be alternative escape routes from all parts of the building.

However a single route is acceptable for:

a. parts of a floor from which a storey exit can be reached within the travel distance limit for travel in one direction set in Table 2 (see also paragraph 4.7). This is provided that, in the case of places of assembly and bars, no one room in this situation has an occupant capacity of more than 60 people or 30 people if the building is in Institutional
use (Purpose Group 2a). The calculation of occupant capacity is described in Appendix C; or
b. a storey with an occupant capacity of not more than 60 people, where the limits on travel in one direction only are satisfied (see Table 2).

4.6 In many cases there will not be an alternative at the beginning of the route. For example, there may be only one exit from a room to a corridor, from which point escape is possible in two directions. This is acceptable provided that the overall distance to the nearest storey exit is within the limits for routes where there is an alternative and the ‘one direction only’ section of the route does not exceed the limit for travel where there is no alternative, see Table 2. Diagram 10 shows an example of a dead-end condition in an open storey layout.

Access control measures

4.7 Measures incorporated into the design of a building to restrict access to the building or parts of it should not adversely affect fire safety provisions.

Whilst it may be reasonable to secure some escape routes outside normal business hours, the measures left in place should be sufficient to allow safe evacuation of any persons left inside the building (see paragraph 6.11).

Diagram 10 Travel distance in dead-end condition

See para 4.7

Angle ABD should be at least 45°. CBA or CBD (whichever is less) should be no more than the maximum distance of travel given for alternative routes and CB should be no more than the maximum distance for travel where there are no alternative routes.
## Section 4: Design for horizontal B1 escape – buildings other than flats

### Table 2  Limitations on travel distance

<table>
<thead>
<tr>
<th>Purpose group</th>
<th>Use of the premises or part of the premises</th>
<th>One direction only (m)</th>
<th>More than one direction(m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2(a)</td>
<td>Institutional</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>2(b)</td>
<td>Other residential:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) in bedrooms</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>(b) in bedroom corridors</td>
<td>9</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>(c) elsewhere</td>
<td>18</td>
<td>35</td>
</tr>
<tr>
<td>3</td>
<td>Office</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>18</td>
<td>45</td>
</tr>
<tr>
<td>4</td>
<td>Shop and commercial</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>18 (4)</td>
<td>45</td>
</tr>
<tr>
<td>5</td>
<td>Assembly and recreation:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) buildings primarily for disabled people</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>(b) areas with seating in rows</td>
<td>15</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>(c) elsewhere</td>
<td>18</td>
<td>45</td>
</tr>
<tr>
<td>6</td>
<td>Industrial</td>
<td>Normal Hazard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>25</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Higher Hazard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>7</td>
<td>Storage and other non-residential</td>
<td>Normal Hazard</td>
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<td></td>
<td></td>
<td>25</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Higher Hazard</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>2-7</td>
<td>Place of special fire hazard</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9 (7)</td>
<td>18 (7)</td>
</tr>
<tr>
<td>2-7</td>
<td>Plant room or rooftop plant:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) distance within the room</td>
<td>9</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>(b) escape route not in open air (overall</td>
<td>18</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>travel distance)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(c) escape route in open air (overall</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>travel distance)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes:

1. The dimensions in the Table are travel distances. If the internal layout of partitions, fittings, etc is not known when plans are deposited, direct distances may be used for assessment. The direct distance is taken as 2/3rds of the travel distance.

2. Maximum part of travel distance within the room. (This limit applies within the bedroom (and any associated dressing room, bathroom or sitting room, etc) and is measured to the door to the protected corridor serving the room or suite. Sub-item (b) applies from that point along the bedroom corridor to a storey exit.)


4. BS 5588:Part 10 applies more restrictive provisions to units with only one exit in covered shopping complexes.
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5. In industrial and storage buildings the appropriate travel distance depends on the level of fire hazard associated with the processes and materials being used. Higher hazard includes manufacturing, processing or storage of significant amounts of hazardous goods or materials, including: any compressed, liquefied or dissolved gas, any substance which becomes dangerous by interaction with either air or water, any liquid substance with a flash point below 65ºC including whisky or other spirituous liquor, any corrosive substance, any oxidising agent, any substance liable to spontaneous combustion, any substance that changes or decomposes readily giving off heat when doing so, any combustible solid substance with a flash point less than 120º Celsius, any substance likely to spread fire by flowing from one part of a building to another.

6. Places of special fire hazard are listed in the definitions in Appendix E.

7. Maximum part of travel distance within the room/area. Travel distance outside the room/area to comply with the limits for the purpose group of the building or part.

Number of occupants and exits

4.8 The figure used for the number of occupants will normally be that specified as the basis for the design. When the number of occupants likely to use a room, tier or storey is not known, the capacity should be calculated on the basis of the appropriate floor space factors. Guidance for this is set out in Appendix C.

Table 3 gives the minimum number of escape routes and exits from a room or storey according to the number of occupants. (This number is likely to be increased by the need to observe travel distances and by other practical considerations.)

The width of escape routes and exits is the subject of paragraph 4.18.

<table>
<thead>
<tr>
<th>Maximum number of persons</th>
<th>Minimum number of escape routes/exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>1</td>
</tr>
<tr>
<td>600</td>
<td>2</td>
</tr>
<tr>
<td>More than 600</td>
<td>3</td>
</tr>
</tbody>
</table>

Alternative escape routes

4.9 A choice of escape routes is of little value if they are all likely to be disabled simultaneously. Alternative escape routes should therefore satisfy the following criteria:

a. they are in directions 45º or more apart (see Diagram 11); or
b. they are in directions less than 45º apart, but are separated from each other by fire-resisting construction.
**Inner rooms**

4.10 A room from which the only escape route is through another room is called an inner room. It is at risk if a fire starts in the other room, called the access room (see Diagram 12).

Such an arrangement is only acceptable if the following conditions are satisfied:

a. the occupant capacity of the inner room should not exceed 60 (30 in the case of a building in purpose group 2a (Institutional));
b. the inner room should not be a bedroom;
c. the inner room should be entered directly off the access room (but not via a corridor);
d. the escape route from the inner room should not pass through more than one access room;
e. the travel distance from any point in the inner room to the exit(s) from the access room should not exceed the appropriate limit given in Table 2;
f. the access room should not be a place of special fire hazard and should be in the control of the same occupier; and
g. one of the following arrangements should be made:
   i. the enclosures (walls or partitions) of the inner room should be stopped at least 500mm below the ceiling; or
   ii. a suitably sited vision panel not less than 0.1m² should be located in the door or walls of the inner room, to enable occupants of the inner room to see if a fire has started in the outer room; or
   iii. the access room should be fitted with a suitable automatic fire detection and
alarm system to warn the occupants of the inner room of the outbreak of a fire in the access room.

**Planning of exits in a central core**

**4.11** Buildings with more than one exit in a central core should be planned so that storey exits are remote from one another and so that no two exits are approached from the same lift hall, common lobby or undivided corridor, or linked by any of these (see Diagram 13).

**Open spatial planning**

**4.12** Escape routes should not be prejudiced by openings between floors, such as an escalator. (see Diagram 14).

An escape route should not be within 4.5m of the openings unless:

a. the direction of travel is away from the opening; or

b. there is an alternative escape route which does not pass within 4.5m of the open connection.

**Access to storey exits**

**4.13** Any storey which has more than one escape stair should be planned so that it is not necessary to pass through one stairway to reach another. However it would be acceptable to pass through one stairway’s protected lobby to reach another stair.
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Diagram 13 Exits in a central core

See para 4.11

Diagram 14 Open connections

From A and B at least one direction of travel is away from the opening. From C where the initial direction of travel is towards the opening, one of the escape routes is not less than 4.5m from the opening.

Note: The doors at both ends of the area marked ‘S’ should be self-closing fire doors unless the area is sub-divided such that any fire in that area will not be able to prejudice both sections of corridor at the same time. If that area is a lift lobby, doors should be provided as shown in Figure 8 in BS 5588: Part 11: 1997.

Key:
- L: Lift
- S: Services, toilets, etc.
- fd: Self-closing FD20S fire doors
- fda: Possible alternative position for fire door
- C: Corridor off which accommodation opens
- PS: Protected stairway
- A: Accommodation (e.g. office space)

Separation of circulation routes from stairways

4.14 Unless the doors to a protected stairway and any associated exit passageway are fitted with an automatic release mechanism (see Appendix B, paragraph 3b), the stairway and any associated exit passageway should not form part of the primary circulation route between different parts of the building at the same level. This is because the self-closing fire doors are more likely to be rendered ineffective as a result of their constant use, or because some occupants may regard them as an impediment. For example, the doors are likely to be wedged open or have their closers removed.

Storeys divided into different uses

4.15 Where a storey contains an area (which is ancillary to the main use of the building) for the consumption of food and/or drink, then:

a. not less than two escape routes should be provided from each such area (except inner rooms which meet the provisions in paragraph 4.10); and
b. the escape routes from each such area should lead directly to a storey exit without entering any kitchen or similar area of high fire hazard.

**Storeys divided into different occupancies**

4.16 Where any storey is divided into separate occupancies (i.e. where there are separate ownerships or tenancies of different organisations):

a. the means of escape from each occupancy should not pass through any other occupancy; and

b. if the means of escape include a common corridor or circulation space, either it should be a protected corridor, or a suitable automatic fire detection and alarm system should be installed throughout the storey.

**Height of escape routes**

4.17 All escape routes should have a clear headroom of not less than 2m except in doorways.

**Width of escape routes and exits**

4.18 The width of escape routes and exits depends on the number of persons needing to use them. They should not be less than the dimensions given in Table 4. (Attention is also drawn to the guidance in Approved Document M Access to and Use of buildings).

4.19 Where the maximum number of people likely to use the escape route and exit is not known, the appropriate capacity should be calculated on the basis of the occupant capacity. Guidance is set out in Appendix C.

4.20 Guidance on the spacing of fixed seating for auditoria is given in BS 5588-6:1991.

<table>
<thead>
<tr>
<th>Maximum number of persons</th>
<th>Minimum width mm&lt;sup&gt;(1)(2)(3)&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>750&lt;sup&gt;(4)&lt;/sup&gt;</td>
</tr>
<tr>
<td>110</td>
<td>850</td>
</tr>
<tr>
<td>220</td>
<td>1050</td>
</tr>
<tr>
<td>More than 220</td>
<td>5 per person&lt;sup&gt;(5)&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

**Notes:**

1. Refer to Appendix C on methods of measurement.
2. In order to follow the guidance in the Approved Document to Part M the widths given in the table may need to be increased.
3. Widths less than 1050mm should not be interpolated.
4. May be reduced to 530mm for gangways between fixed storage racking, other than in public areas of Purpose Group 4 (shop and commercial).
5. 5mm/person does not apply to an opening serving less than 220 persons.
Calculating exit capacity

4.21 If a storey or room has two or more storey exits it has to be assumed that a fire might prevent the occupants from using one of them. The remaining exit(s) need to be wide enough to allow all the occupants to leave quickly. Therefore when deciding on the total width of exits needed according to Table 4, the largest exit should be discounted. This may have implications for the width of stairs, because they should be at least as wide as any storey exit leading onto them. Although some stairs are not subject to discounting (see paragraphs 5.20 and 5.21), the storey exits onto them will be.

4.22 The total number of persons which two or more available exits (after discounting) can accommodate is found by adding the maximum number of persons that can be accommodated by each exit width. For example, 3 exits each 850mm wide will accommodate 3 x 110 = 330 persons (not the 510 persons accommodated by a single exit 2550mm wide).

4.23 Where a ground floor storey exit shares a final exit with a stair via a ground floor lobby, the width of the final exit should be sufficient to enable a maximum evacuation flow rate equal to or greater than that from the storey exit and stair combined (see Diagram 15).

![Diagram 15 Merging flows at final exit](image)

This can be calculated from the following formula:

\[ W = \frac{(N/2.5) + (60S)}{80} \]

Where:

\( W \) = width of final exit, in metres

\( N \) = number of people served by ground floor storey exit
Section 4: Design for horizontal B1 escape – buildings other than flats

S = stair width in metres

Note: Where the number of persons (N) entering the lobby from the ground floor is more than 60 then the distance from the foot of the stair, or the storey exit, to the final exit should be a minimum of two metres (see Diagram 15). Where this cannot be achieved then the width of the final exit (W) should be no less than the width of the stair plus the width of the storey exit.

Worked example
A ground floor storey exit serving 250 persons shares a common final exit with a 1.2 m wide stair

Required final exit = ((250/2.5) + (1.2 x 60))/80 width (metres) = 2.150 metres

Protected corridors

4.24 A corridor which serves a part of the means of escape in any of the following circumstances should be a protected corridor:

a. every corridor serving bedrooms;

b. every dead-end corridor (excluding recesses and extensions not exceeding 2m deep as shown in Figures 10 and 11 of BS 5588-11:1997); and

c. any corridor common to two or more different occupancies (see also paragraph 4.16).

Enclosure of corridors that are not protected corridors

4.25 Where a corridor that is used as a means of escape, but is not a protected corridor, is enclosed by partitions, those partitions provide some defence against the spread of smoke in the early stages of a fire, even though they may have no fire resistance rating. To maintain this defence the partitions should be carried up to the soffit of the structural floor above, or to a suspended ceiling and openings into rooms from the corridor should be fitted with doors, which need not be fire doors. Open planning, while offering no impediment to smoke spread, has the compensation that occupants can become aware of a fire quickly.

Sub-division of corridors

4.26 If a corridor provides access to alternative escape routes, there is a risk that smoke will spread along it and make both routes impassable before all occupants have escaped.

To avoid this, every corridor more than 12m long which connects two or more storey exits, should be sub-divided by self-closing fire doors (and any necessary associated screens). The fire door(s) and any associated screen(s) should be positioned approximately mid-way between the two storey exits to effectively safeguard the route from smoke (having regard to the layout of the corridor and to any adjacent fire risks).

In a building of Purpose Groups 2 to 7, where a cavity exists above the enclosures to any such corridor, because the enclosures are not carried to full storey height or (in the case of a top storey) to the underside of the roof covering, the potential for smoke to bypass the sub-division should be restricted by:
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a. fitting cavity barriers on the line of the enclosure(s) to and across the corridor (see Diagram 16a); or

b. sub-dividing the storey using fire-resisting construction passing through the line of the sub-division of the corridor (see diagram 16b). Any void above this subdivision should be fitted with cavity barriers on the line of sub-division of the storey and the corridor; or

c. enclosing the cavity on the lower side by a fire-resisting ceiling which extends throughout the building, compartment or separated part.

Any door which could provide a path for smoke to bypass the sub-division should be made self closing (but need not necessarily be fire-resisting).

Diagram 16 Subdivision of corridors

a. SECTION TO SHOW USE OF CAVITY BARRIERS ABOVE THE CORRIDOR ENCLOSURE

b. PLAN SHOWING SUB-DIVISION OF THE STOREY BY FIRE-RESISTING CONSTRUCTION

Where the corridor is a protected escape route, cavity barriers may also be required in any floor void beneath the corridor enclosure (see paragraph 10.4)
4.27 If a dead-end portion of a corridor provides access to a point from which alternative escape routes are available, there is a risk that smoke from a fire could make both routes impassable before the occupants in the dead-end have escaped.

To avoid this, unless the escape stairway(s) and corridors are protected by a pressurization system complying with BS EN 12101-6:2005, every dead-end corridor exceeding 4.5m in length should be separated by self-closing fire doors (together with any necessary associated screens) from any part of the corridor which:
a. provides two directions of escape (see Diagram 17(a)); or
b. continues one storey exit to another (see Diagram 17(b)).

Cavity barriers

4.28 Additional measures to safeguard escape routes from smoke are given in Section 10 (B3).

External escape routes

4.29 Guidance on the use of external escape stairs from buildings is given in paragraph 5.44.

4.30 Where an external escape route (other than a stair) is beside an external wall of the building, that part of the external wall within 1800mm of the escape route should be of fire-resisting construction, up to a height of 1100mm above the paving level of the route. For guidance on external escape stairs see paragraph 6.25.

Escape over flat roofs

4.31 If more than one escape route is available from a storey, or part of a building, one of those routes may be by way of a flat roof, provided that:
a. the route does not serve an Institutional building, or part of a building intended for use by members of the public; and
b. it meets the provisions in paragraph 6.35.
Small premises

4.32 In small premises, as described in paragraph 4.33, the number of persons is generally limited and the size of the premises, when undivided, will tend to enable clear vision of all parts. Therefore the occupants will be able to quickly reach an entrance/exit in an emergency. Thus a reduction in the number of exits and stairs as set out in paragraphs 4.33 to 4.37, 5.6 and 5.33 is acceptable. 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. To facilitate this, the general guidance in paragraph 4.33 would not apply.

General

4.33 The following paragraphs apply in place of only those provisions relating to the number and positioning of exits and protected stairways and measurement of distances of travel.

Note 1: They do not apply to premises used principally for the storage and/or sale of highly flammable liquids or materials

Note 2: In covered shopping complexes, the size of small units that may be of small units that may be served by a single exit is further restricted. This is dealt with in

a. The premises should be in a single occupancy and should not comprise more than a basement, a ground floor and a first storey. No storey should have a floor area greater than 280m² (see Diagram 18);

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

c. The planned seating accommodation or the assessed standing accommodation (see Table C1) for small premises 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.

Note: Maximum floor area in any one storey 280m². Restricted accommodation if used as a restaurant or bar.

See para 4.33
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Construction

4.34 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.

4.35 Store rooms should be enclosed with fire-resisting construction.

4.36 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. Alternatively, an automatic fire detection and alarm system may be provided in the outer room.

Note: The clear glazed area or vision panel may need to be provided for other reasons.

Distance of travel and number of escape routes

4.37 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 5.

Note: The distance of travel in small premises with an open stairway is measured to the foot of the stair in a basement or to the head of the stair in a first storey see paragraph 5.33.

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

<table>
<thead>
<tr>
<th>Storey</th>
<th>Maximum Travel Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground storey with a single exit</td>
<td>27</td>
</tr>
<tr>
<td>Basement or first storey with a single stair</td>
<td>18</td>
</tr>
<tr>
<td>Storey with more than one exit/stair</td>
<td>45</td>
</tr>
</tbody>
</table>

Note:
The dimensions in the Table are travel distances. If the internal layout of partitions, fittings, etc is not known when plans are deposited, direct distances may be used for assessment. The direct distance is taken as 2/3rds of the travel distance.
Residential care homes

General

4.38 Residential care homes are quite diverse and can be used by a variety of residents, often requiring different types of care to suit their specific needs. They can include homes for the elderly, children and people who are physically or mentally disabled. The choice of fire safety strategy is dependent upon the way a building is designed, furnished, staffed and managed and the level of dependency of the residents.

4.39 Generally, in care homes for the elderly it is reasonable to assume that at least a proportion of the residents will need some assistance to evacuate. As such these buildings should be designed for progressive horizontal evacuation (PHE) in accordance with paragraphs 4.41 to 4.52 below. For other types of care home a judgement should be made as to whether PHE or a simultaneous evacuation strategy is appropriate. Whatever approach is adopted in the design of a building this must be recorded and communicated to the building management to ensure that procedures are adopted that are compatible with the building design.

4.40 The guidance on PHE given in paragraphs 4.41 to 4.52 is for those care homes, to which the provisions of the “Firecode” documents are no applicable (see Para 0.21).

Planning for progressive horizontal evacuation

4.41 The concept of PHE requires those areas used for the care of residents to be subdivided into protected areas separated by compartment walls and compartment floors. This allows horizontal escape to be made by evacuating into adjoining protected areas. The objective is to provide a place of relative safety within a short distance, from which further evacuation can be made if necessary but under less pressure of time.

4.42 Each storey, used for the care of residents, should be divided into at least three protected areas by compartment walls and all floors should be compartment floors.

4.43 Every protected area should be provided with at least two exits to adjoining, but separate protected areas. Travel distances within a protected area to these exits should not exceed those given in Table 2. The maximum travel distance from any point should be not more than 64m to a storey exit or a final exit.

4.44 A fire in any one protected area should not prevent the occupants of any other area from reaching a final exit (see Diagram 19). Escape routes should not pass through ancillary accommodation such as that listed in paragraph 4.50.

4.45 The number of residents’ beds in protected areas should be established based on assessment of the number of staff likely to be available and the level of assistance that residents may require. In no case should this exceed 10 beds in any one protected area.

4.46 Adjoining protected areas into which horizontal evacuation may take place should each have a floor area sufficient to accommodate not only their own occupants but also the occupants from the largest adjoining protected area.
Section 4: Design for horizontal escape – buildings other than flats

Fire detection

4.47 A fire detection and alarm system should be provided to an L1 standard in accordance with BS 5839-1:2002.

Bedrooms

4.48 Each bedroom should be enclosed in fire-resisting construction with fire resisting doors, and every corridor serving bedrooms should be a protected corridor (see paragraph 4.24).

4.49 Bedrooms should not contain more than one bed (this includes a double bed).

Ancillary accommodation

4.50 Ancillary accommodation such as the following, should be enclosed by fire-resisting construction.

a. chemical stores;  
b. cleaners’ rooms;
Section 4: Design for horizontal escape – buildings other than flats

Door-closing devices

4.51 The specification of door-closing devices for fire doors should take account of the needs of residents. In particular where self-closing doors could present an obstacle to the residents of the building then the following hardware in accordance with BS EN 1155:1997 would be appropriate;

Bedrooms – free-swing door closers.
Circulation spaces – hold-open devices.

Automatic fire suppression systems

4.52 Care homes shall comply with Section 2. Where an automatic fire suppression system is provided in accordance with section 2, the following variations to the guidance given in paragraphs 4.41 to 4.51 are acceptable,

a. Fire doors to bedrooms need not be fitted with self closing devices.
b. Protected areas may contain more than 10 beds.
c. Bedrooms may contain more than one bed.

Note: Management procedures will need to take account of the larger number of residents that may need assistance and the need to manually close bedroom doors during sleeping hours.
Section 5: Design for vertical escape – buildings other than flats

Introduction

5.1 An important aspect of means of escape in multi-storey buildings is the availability of a sufficient number of adequately sized and protected escape stairs. This Section deals with escape stairs and includes measures necessary to protect them in all types of building.

The limitation of distances of horizontal travel for means of escape purposes means that most people should be able independently to reach the safety of a protected escape route or final exit. However, some people, for example those who use wheelchairs, may not be able to use stairways without assistance. For them evacuation involving the use of refuges on escape routes and either assistance down (or up) stairways, or the use of suitable lifts, will be necessary.

This Section should be read in conjunction with the general provisions in Section 6.

Number of escape stairs

5.2 The number of escape stairs needed in a building (or part of a building) will be determined by:

a. the constraints imposed in Section 4 on the design of horizontal escape routes;

b. whether independent stairs are required in mixed occupancy buildings (see paragraph 5.4);

c. whether a single stair is acceptable (see paragraphs 5.5 and 5.6); and

d. provision of adequate width for escape (see paragraph 5.15) while allowing for the possibility that a stair may have to be discounted because of fire or smoke (see paragraph 5.20).

5.3 In larger buildings, provisions for access for the Fire and Rescue Service may apply, in which case, some escape stairs may also need to serve as firefighting stairs. The number of escape stairs may therefore be affected by provisions made in Section 18, paragraphs 18.8 and 18.9.

Mixed use buildings

5.4 Where a building contains storeys (or parts of storeys) in different purpose groups, it is important to consider the effect of one risk on another. A fire in a shop, or unattended office, could have serious consequences on, for example, a residential or hotel use 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.

Single escape stairs

5.5 Provided that independent escape routes are not necessary from areas in different
purpose groups in accordance with paragraph 3.50 or 5.4, the situations where a building (or part of a building) may be served by a single escape stair are:

a. from a basement which is allowed to have a single escape route in accordance with paragraph 4.5b and Table 2;

b. from a building (other than small premises, see 5.5c) which has no storey with a floor level more than 11m above ground level and in which every storey is allowed to have a single escape route in accordance with paragraph 4.5b and Table 2;

c. in the case of small premises (see paragraph 4.32), in situations where the guidance in paragraph 5.6 is followed.

**Single escape stairs in small premises**

5.6 A single escape stair may be used from:

a. small premises as described in paragraph 4.33;

b. an office building comprising not more than five storeys above the ground storey, provided that:

i. the travel distance from every point in each storey does not exceed that given in Table 2 for escape in one direction only; and

ii. every storey at a height greater than 11m has an alternative means of escape;

c. a factory comprising not more than:

i. two storeys above the ground storey (if the building, or part of the building, is of low risk); or

ii. one storey above the ground storey (if the building, or part of the building, is of normal risk); provided that the travel distance from every point on each storey does not exceed that given in Table 2 for escape in one direction only; or

d. process plant buildings with an occupant capacity of not more than 10.

**Provision of refuges**

5.7 Refuges are relatively safe waiting areas for short periods. They are not areas where disabled people should be left alone indefinitely until rescued by the fire and rescue service, or until the fire is extinguished.

A refuge should be provided for each protected stairway affording egress from each storey, except storeys consisting exclusively of plant rooms.

**Note:** Whilst a refuge should be provided for each stairway, they need not necessarily be located within the stair enclosure but should enable direct access to the stair. The number of refuge spaces need not necessarily equal the sum of the number of wheelchair users who can be present in the building. Refuges form a part of the management plan and it may be that more than one disabled person will use a single
refuge as they pass through as a part of the evacuation procedure.

5.8 The following are examples of satisfactory refuges:

a. an enclosure such as a compartment (see Diagram 20), protected lobby, protected corridor or protected stairway (see Diagram 21); and

b. an area in the open air such as a flat roof, balcony, podium or similar place which is sufficiently protected (or remote) from any fire risk and provided with its own means of escape.

5.9 Each refuge should provide an area accessible to a wheelchair of at least 900mm x 1400mm in which a wheelchair user can await assistance. Where a refuge is a protected stairway or protected lobby or protected corridor, the wheelchair space should not reduce the width of the escape route. Where the wheelchair space is within a protected stairway, access to the wheelchair space should not obstruct the flow of persons escaping.

Diagram 20 Refuge formed by compartmentation

See para 5.8

Storey divided into two refuges by compartment wall (stairways not provided with wheelchair space).

Note: Persons occupying the left-hand compartment would not reach a refuge until they had entered the right-hand compartment. Two doorsets in the partition are necessary in case access to one of the doorsets is blocked by fire.
5.10 Refuges and evacuation lifts should be clearly identified by appropriate fire safety signs. Where a refuge is in a lobby or stairway the sign should be accompanied by a blue mandatory sign worded “Refuge – keep clear”.

Communication

5.11 To facilitate the effective evacuation of people from refuges an emergency voice communication (EVC) system should be provided. It is essential that the occupants of each refuge are able to alert other people that they are in need of assistance and for them to be reassured that this assistance will be forthcoming.

5.12 The EVC system should comply with BS5839-9:2003 and consist of Type B outstations which communicate with a master station located in the building control room (where one exists) or adjacent to the fire alarm panel.

5.13 In some buildings it may be more appropriate to use an alternative approach such as the use of wireless technology.
Section 5: Design for vertical escape – buildings other than flats

Evacuation lifts

5.14 Guidance on the use of lifts when there is a fire is given in paragraph 6.39.

Width of escape stairs

5.15 The width of escape stairs should:

a. be not less than the width(s) required for any exit(s) affording access to them;

b. conform with the minimum widths given in Table 6;

c. not exceed 1400mm if their vertical extent is more than 30m, unless it is provided with a central handrail (see Notes 1 and 2); and

d. not reduce in width at any point on the way to a final exit.

Note 1: The 1400mm width has been given for stairs in tall buildings because research indicates that people prefer to stay within reach of a handrail when making a prolonged descent, so much so that the centre part of a wider stair is little used and could be hazardous. Thus additional stair(s) may be needed.

Note 2: Where a stair wider than 1400mm is provided with a central handrail, then the stair width on each side of the central handrail needs to be considered separately for the purpose of assessing stair capacity.

5.16 If the resultant width of the stair is more than 1800mm, then for reasons of safety in use the guidance in Approved Document K Protection from falling, collision and impact is that, in public buildings, the stair should have a central handrail. In such a case see Note 2 to paragraph 5.15.

5.17 Where an exit route from a stair also forms the escape from the ground and/or basement storeys, the width may need to be increased accordingly. (See paragraph 4.23).

Calculation of minimum stair width

General

5.18 Every escape stair should be wide enough to accommodate the number of persons needing to use it in an emergency. This width will depend on the number of stairs provided and whether the escape strategy for the building (or part of the building) is based on simultaneous evacuation see (paragraph 5.22) or phased evacuation see (paragraph 5.26).

5.19 As with the design of horizontal escape routes, where the maximum number of people needing to use the escape stairs is not known, the occupant capacity should be calculated on the basis of the appropriate floor space factors. Guidance for this is set out in Appendix C.
### Section 5: Design for vertical escape – buildings other than flats

#### Table 6: Minimum widths of escape stairs

<table>
<thead>
<tr>
<th>Situation of stair</th>
<th>Maximum number of people served</th>
<th>Minimum stair width (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a. In an institutional building (unless the stair will only be used by staff)</td>
<td>150</td>
<td>1000&lt;sup&gt;(2)&lt;/sup&gt;</td>
</tr>
<tr>
<td>1b. In an assembly building and serving an area used for assembly purposes (unless the area is less than 100m²)</td>
<td>220</td>
<td>1100</td>
</tr>
<tr>
<td>1c. In any other building and serving an area with an occupancy of more than 50</td>
<td>Over 220</td>
<td>See Note&lt;sup&gt;(3)&lt;/sup&gt;</td>
</tr>
<tr>
<td>2. Any stair not described above</td>
<td>50</td>
<td>800&lt;sup&gt;(4)&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

**Notes:**
1. Assessed as likely to use the stair in a fire emergency.
2. BS 5588-5 recommends that firefighting stairs should be at least 1100mm wide.
3. See Table 7 for sizing stairs for simultaneous evacuation, and Table 8 for phased evacuation.
4. In order to comply with the guidance in the Approved Document to Part M on minimum widths for areas accessible to disabled people, this may need to be increased to 1000mm.

### Discounting of stairs

**5.20** Whether phased or simultaneous evacuation is used, where two or more stairs are provided it should be assumed that one of them might not be available due to fire. It is therefore necessary to discount each stair in turn in order to ensure that the capacity of the remaining stair(s) is adequate for the number of persons needing to escape. The stair discounting rule applies to a building fitted with an automatic fire suppression system.

**5.21** Two exceptions to the above discounting rules are if the escape stairs:

- are protected by a smoke control system designed in accordance with BS EN 12101-6:2005.
- are approached on each storey through a protected lobby (a protected lobby need not be provided on the topmost storey for the exception still to apply).

**Note:** Paragraph 5.34 identifies several cases where stairs need lobby protection.

In such cases the likelihood of a stair not being available is significantly reduced and it is not necessary to discount a stair. However, a storey exit still needs to be discounted,
see paragraph 4.21. See also paragraph 5.27 for additional guidance on the potential need to discount stairs in tall buildings utilising phased evacuation.

**Simultaneous evacuation**

5.22 In a building designed for simultaneous evacuation, the escape stairs (in conjunction with the rest of the means of escape) should have the capacity to allow all floors to be evacuated simultaneously. In calculating the width of the stairs account is taken of the number of people temporarily housed in the stairways during the evacuation.

5.23 Escape based on simultaneous evacuation should be used for:

a. all stairs serving basements;

b. all stairs serving buildings with open spatial planning; and

c. all stairs serving Other Residential or Assembly and Recreation buildings.

**Note:** BS 5588-7:1997 includes designs based on simultaneous evacuation.

### Table 7 Capacity of a stair for basements and for simultaneous evacuation of the building

<table>
<thead>
<tr>
<th>No. of floors served</th>
<th>1000mm</th>
<th>1100mm</th>
<th>1200mm</th>
<th>1300mm</th>
<th>1400mm</th>
<th>1500mm</th>
<th>1600mm</th>
<th>1700mm</th>
<th>1800mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>150</td>
<td>220</td>
<td>240</td>
<td>260</td>
<td>280</td>
<td>300</td>
<td>320</td>
<td>340</td>
<td>360</td>
</tr>
<tr>
<td>2.</td>
<td>190</td>
<td>260</td>
<td>285</td>
<td>310</td>
<td>335</td>
<td>360</td>
<td>385</td>
<td>410</td>
<td>435</td>
</tr>
<tr>
<td>3.</td>
<td>230</td>
<td>300</td>
<td>330</td>
<td>360</td>
<td>390</td>
<td>420</td>
<td>450</td>
<td>480</td>
<td>510</td>
</tr>
<tr>
<td>4.</td>
<td>270</td>
<td>340</td>
<td>375</td>
<td>410</td>
<td>445</td>
<td>480</td>
<td>515</td>
<td>550</td>
<td>585</td>
</tr>
<tr>
<td>5.</td>
<td>310</td>
<td>380</td>
<td>420</td>
<td>460</td>
<td>500</td>
<td>540</td>
<td>580</td>
<td>620</td>
<td>660</td>
</tr>
<tr>
<td>6.</td>
<td>350</td>
<td>420</td>
<td>465</td>
<td>510</td>
<td>555</td>
<td>600</td>
<td>645</td>
<td>690</td>
<td>735</td>
</tr>
<tr>
<td>7.</td>
<td>390</td>
<td>460</td>
<td>510</td>
<td>560</td>
<td>610</td>
<td>660</td>
<td>710</td>
<td>760</td>
<td>810</td>
</tr>
<tr>
<td>8.</td>
<td>430</td>
<td>500</td>
<td>555</td>
<td>610</td>
<td>665</td>
<td>720</td>
<td>775</td>
<td>830</td>
<td>885</td>
</tr>
<tr>
<td>9.</td>
<td>470</td>
<td>540</td>
<td>600</td>
<td>660</td>
<td>720</td>
<td>780</td>
<td>840</td>
<td>900</td>
<td>960</td>
</tr>
<tr>
<td>10.</td>
<td>510</td>
<td>580</td>
<td>645</td>
<td>710</td>
<td>775</td>
<td>840</td>
<td>905</td>
<td>970</td>
<td>1035</td>
</tr>
</tbody>
</table>

**Notes:**

1. The capacity of stairs serving more than 10 storeys may be obtained by using linear extrapolation.
2. The capacity of stairs not less than 1100mm wide may also be obtained by using the formula in paragraph 5.25.
3. Stairs with a rise of more than 30m should not be wider than 1400mm unless provided with a central handrail (see paragraph 5.15).
4. Stairs wider than 1800mm should be provided with a central handrail (see paragraph 5.16).
5.24 Where simultaneous evacuation is to be used, the capacity of stairs of widths from 1000 to 1800mm is given in Table 7.

5.25 As an alternative to using Table 7, the capacity of stairs 1100mm or wider (for simultaneous evacuation) can be derived from the formula:

\[
P = 200w + 50(w - 0.3)(n - 1), \text{ or } \\
w = \frac{P + 15n - 15}{150 + 50n}
\]

where:

- \( P \) is the number of people that can be served;
- \( w \) is the width of the stair, in metres;
- and \( n \) is the number of storeys served.

**Note 1:** Stairs with a rise of more than 30m should not be wider than 1400mm unless provided with a central handrail (see paragraph 5.15).

**Note 2:** Separate calculations should be made for stairs/flights serving basement storeys and those serving upper storeys.

**Note 3:** The population ‘P’ should be divided by the number of available stairs.

**Note 4:** The formula is particularly useful when determining the width of stairs serving a building (or part of a building) where the occupants are not distributed evenly – either within a storey or between storeys.

**Note 5:** In the formula, the first part [200w] represents the number of persons estimated to have left the stair after 2.5 minutes of evacuation. The second part [50(w-0.3)(n-1)] represents the number of persons estimated to be accommodated on the stair after this time.

**Worked examples:**

A 14-storey building comprises 12 storeys of offices (ground + 11) with the top two storeys containing flats served by separate stairs. What is the minimum width needed for the stairs serving the office floors with a population of 1200 people (excluding the ground floor population which does not use the stairs), using simultaneous evacuation? Two stairs satisfy the travel distance limitations.

a. **The population is distributed evenly.**

As the top office storey is at a height greater than 18m, both stairs need lobby protection (see paragraph 5.34). Therefore, as both stairs are entered at each level via a protected lobby, then both stairs can be assumed to be available (see paragraph 5.21).

\[P = \frac{1200}{2} = 600, \ n = 11\]

From the formula:

\[600 = 200w + 50(w - 0.3)(11 - 1)\]
Section 5: Design for vertical escape – buildings other than flats

600 = 200w + (50w – 15)(10)
600 = 200w + 500w – 150
750 = 700w

\[ w = 1070\text{mm} \]

Therefore both stairs should be at least 1070mm wide. But this needs to be increased to 1100mm as the formula applies to stairs 1100mm or wider (see paragraph 5.25).

This width will also be adequate when one storey exit is discounted in accordance with paragraph 4.21 and the need to comply with paragraph 5.15(a) (i.e. the stair widths are not less than the minimum widths needed for 110 persons in Table 4).

b. The population is not distributed evenly

(e.g. 1000 people occupy floors 1 to 9 and 200 occupy floors 10 and 11).

As the top office storey is at a height greater than 18m, both stairs need lobby protection (see paragraph 5.34). As both stairs are entered at each level via a protected lobby, then both stairs can be assumed to be available (see paragraph 5.21).

To find the width of the stairs serving floors 10 and 11:

\[ P = \frac{200}{2} = 100, \quad n = 2 \]

From the formula:

\[ 100 = 200w + 50(w – 0.3)(2 – 1) \]
\[ 100 = 200w + (50w – 15)(1) \]
\[ 100 = 200w + 50w – 15 \]
\[ 115 = 250w \quad w = 460\text{mm} \]

Therefore both stairs between the 9th floor landing and the top floor should be at least 460mm. But this needs to be increased to 1100mm as the formula applies to stairs 1100mm or wider (see paragraph 5.25).

This width will also be adequate when one storey exit is discounted in accordance with paragraph 4.21 and the need to comply with paragraph 5.15(a) (i.e. the stair widths are not less than the minimum widths needed for 100 persons in Table 4).

the stairs serving floors 1 to 9:

\[ P = \frac{1200}{2} = 600, \quad n = 9 \]

From the formula:

\[ 600 = 200w + 50(w – 0.3)(9 – 1) \]
\[ 600 = 200w + (50w – 15)(8) \]
\[ 600 = 200w + 400w – 120 \]
\[ 720 = 600w \]
Therefore both stairs between the 9th floor landing and the ground floor should be at least 1200mm wide.

This width will also be adequate when one storey exit is discounted in accordance with paragraph 3.21 and the need to comply with paragraph 5.15(a) (i.e. the stair widths are not less than the minimum widths needed for 111 persons in Table 4).

Phased evacuation

5.26 Where it is appropriate to do so, it may be advantageous to design stairs in high buildings on the basis of phased evacuation. In phased evacuation the first people to be evacuated are all those of reduced mobility and those on the storey most immediately affected by the fire. Subsequently, if there is a need to evacuate more people, it is done two floors at a time. It is a method which cannot be used in every type of building and it depends on the provision (and maintenance) of certain supporting facilities such as fire alarms. It does however enable narrower stairs to be incorporated than would be the case if simultaneous evacuation were used and has the practical advantage of reducing disruption in large buildings.

5.27 In tall buildings over 30m in height, where phased evacuation is adopted, there is a potential that persons attempting to escape could be impeded by firefighters entering and operating within the building. This potential varies with the height of the building and with the number of escape stairs that are available. Generally, this can be addressed by incorporating special management procedures into the evacuation strategy in consultation with Fire and Rescue Service. However, in some very tall buildings, typically those over 45m in height, physical measures may need to be incorporated into the building (e.g. by discounting a stair or by some other suitable means).

5.28 Phased evacuation may be used for any building provided it is not identified in paragraph 5.23 as needing simultaneous evacuation.

5.29 The following criteria should be satisfied in a building (or part of a building) that is designed on the basis of phased evacuation:

a. the stairways should be approached through a protected lobby or protected corridor at each storey, except a top storey;

b. the lifts should be approached through a protected lobby at each storey (see paragraph 6.42);

c. every floor should be a compartment floor;

d. if the building has a storey with a floor over 30m above ground level, the building should be protected throughout by an automatic fire suppression system in accordance with section 2.

e. the building should be fitted with an appropriate fire warning system, conforming to at least the L3 standard given in BS 5839-1:2002; and

f. an internal speech communication system should be provided to permit conversation
between a control point at fire and rescue service access level and a fire warden on every storey. In addition, the recommendations relating to phased evacuation provided in BS 5839-1 should be followed. Where it is deemed appropriate to install a voice alarm this should be in accordance with BS 5839-8: 1998.

5.30 The minimum width of stair needed when phased evacuation is used is given in Table 8. This table assumes a phased evacuation of the fire floor first followed by evacuation of not more than two floors at a time.

<table>
<thead>
<tr>
<th>Maximum number of people in any storey</th>
<th>Stair width mm (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>1000</td>
</tr>
<tr>
<td>120</td>
<td>1100</td>
</tr>
<tr>
<td>130</td>
<td>1200</td>
</tr>
<tr>
<td>140</td>
<td>1300</td>
</tr>
<tr>
<td>150</td>
<td>1400</td>
</tr>
<tr>
<td>160</td>
<td>1500</td>
</tr>
<tr>
<td>170</td>
<td>1600</td>
</tr>
<tr>
<td>180</td>
<td>1700</td>
</tr>
<tr>
<td>190</td>
<td>1800</td>
</tr>
</tbody>
</table>

Notes:
1. Stairs with a rise of more than 30m should not be wider than 1400mm unless provided with a central handrail (see paragraph 6.6).
2. As an alternative to using this table, provided that the minimum width of a stair is at least 1000mm, the width may be calculated from: \( [(P \times 10) - 100] \)mm where \( P \) = the number of people on the most heavily occupied storey.

Worked example using Table 8

What is the minimum width needed for the stairs serving an 15-storey office building (ground + 14 office floors) assuming a total population of 2500 people (excluding the ground floor population which does not use the stairs). Three stairs satisfy the travel distance limitations.

The building is over 45 metres in height and designed for phased evacuation. It has been decided to discount one stair to take account of fire and rescue service operations as described in paragraphs 5.27. Therefore:
Number of persons per storey = 2500/14 = 179;
Each remaining stair must be able to accommodate half the population of one storey (i.e. 90 persons)
Thus each stair requires a width of 1000mm (maximum capacity 100 persons)
This width will also be adequate when one storey exit is discounted in accordance with paragraph 4.21 and the need to comply with paragraph 5.15(a) (i.e. the stair widths are not less than the minimum width needed for 90 persons in Table 4).
At least one of those stairs will need to be a firefighting stair thus a minimum width of 1100mm will be needed (see note 2 to Table 7).

Additional worked example using Table 8
What is the minimum width needed for the stairs serving a 9-storey office building (ground + 8 office floors) assuming a total population of 1920 people (excluding the ground floor population which does not use the stairs). Two stairs satisfy the travel distance limitations.
As both stairs need to be entered at each level by a protected lobby (see paragraph 5.29), then both stairs can be assumed to be available (see paragraph 5.21). Therefore:
Number of persons per storey = 1920/8 = 240;
Each stair must be able to accommodate half the population of one storey (i.e. 240/2 = 120 persons)
Thus both stairs would require a width of 1100mm (maximum capacity 120 persons) according to Table 8, but:
Each storey exit needs to be able to serve 240 persons due to discounting, in accordance with paragraph 4.21. The minimum exit width needed for 240 persons in Table 4 is 1200mm. In accordance with paragraph 5.15(a) the stair width should be at least as wide as the storey exit serving it.
The required stair width is therefore 1200mm.

Protection of escape stairs
General
5.31 Escape stairs need to have a satisfactory standard of fire protection if they are to fulfill their role as areas of relative safety during a fire evacuation. The guidance in paragraphs 5.32 to paragraph 5.33 should be followed to achieve this.

Enclosure of escape stairs
5.32 Every internal escape stair should be a protected stairway (i.e. it should be within a fire-resisting enclosure).
However an unprotected stair (e.g. an accommodation stair) may form part of an internal
route to a storey exit or final exit, provided that the distance of travel and the number of people involved are very limited. For example, small premises (described in paragraph 4.32, 5.6 and 5.33) and raised storage areas (see paragraphs 8.7 and 8.8).

There may be additional measures if the protected stairway is also a protected shaft (where it penetrates one or more compartment floors, see Section 9) or if it is a firefighting shaft (see Section 18).

Small Premises

5.33 A stair in a small premises, which is not a bar or restaurant, may be open if it does not connect more than two storeys and delivers into the ground storey not more than 3m from the final exit (see Diagrams 22 and 23) and either:

a. the storey is also served by a protected stairway; or

b. it is a single stair in a small premises with the floor area in any storey not exceeding 90m² and, if the premises contains three storeys, the stair serving either the top or 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 Diagram 23).
Diagram 22 Maximum travel distance in a small two-storey premises with a single open stair

- **a. FIRST STOREY**
  - 18m max

- **b. GROUND STOREY**
  - 27m max
  - 3m max

- **c. BASEMENT**
  - 18m max

Diagram 23 Maximum travel distance in a small three-storey premises with a single stair to each storey

- **a. FIRST STOREY**
  - 18m max

- **b. GROUND STOREY**
  - Open stair from basement or first storey
  - 3m max

- **c. BASEMENT**
  - 18m max

Note 1: Maximum floor area in any one storey 90m²
Note 2: The premises may not be used as a restaurant or bar
Note 3: Only acceptable in two storey premises (a+b or b+c)
Note 4: Travel distances are set out in Table 4.

Note 1: Maximum floor area in any one storey 90m²
Note 2: Enclosed stair at ground storey level may be from either the basement or the first storey
Note 3: The premises may not be used as a restaurant or bar
Note 4: Travel distances are set out in Table 4.
Access lobbies and corridors

5.34 There are situations where an escape stair needs the added protection of a protected lobby or protected corridor. These are:

a. where the stair is the only one serving a building (or part of a building) which has more than one storey above or below the ground storey (except for small premises covered in paragraph 5.6a); or

b. where the stair serves any storey at a height greater than 18m; or

c. where the building is designed for phased evacuation (see paragraph 5.29a).

In these cases protected lobbies or protected corridors are needed at all levels, except the top storey and at all basement levels; or

d. where the stair is a firefighting stair.

Lobbies are also needed where the option in paragraph 5.21(b) has been used so as not to discount one stairway when calculating stair widths.

An alternative that may be considered in (a) to (c) above is to use a smoke control system as described in paragraph 5.21(a).

5.35 A protected lobby should be also provided between an escape stairway and a place of special fire hazard. In this case, the lobby should have not less than 0.4m² permanent ventilation, or be protected from the ingress of smoke by a mechanical smoke control system.

Exits from protected stairways

5.36 Every protected stairway should discharge:

a. directly to a final exit; or

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

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

The exit from a protected stairway should meet the provisions in paragraphs 6.30 to 6.34.

Separation of adjoining stairways

5.37 Where two protected stairways are adjacent, they and any protected exit passageways linking them to final exits, should be separated by an imperforate enclosure.

Use of space within protected stairways

5.38 A protected stairway needs to be free of potential sources of fire. Consequently, facilities that may be incorporated in a protected stairway are limited to the following:
Section 5: Design for vertical escape – buildings other than flats

Approved Document B (Fire safety)

a. sanitary accommodation or washrooms, so long as the accommodation is not used as a cloakroom. A gas water heater or sanitary towel incinerator may be installed in the accommodation but not any other gas appliance;
b. a lift well may be included in a protected stairway, if it is not a firefighting stair;
c. a reception desk or enquiry office area at ground or access level, if it is not in the only stair serving the building or part of the building. The reception or enquiry office area should not be more than 10m² in area; and/or
d. cupboards enclosed with fire-resisting construction, if it is not in the only stair serving the building or part of the building.

External walls of protected stairways

5.39 The external enclosures to protected stairways should meet the provisions in paragraph 6.24.

Gas service pipes in protected stairways

5.40 Gas service and installation pipes or associated meters should not be incorporated within a protected stairway unless the gas installation is in accordance with the requirements for installation and connection set out in the Pipelines Safety Regulations 1996, SI 1996 No 825 and the Gas Safety (Installation and Use) Regulations 1998 SI 1998 No 2451. (See also paragraph 9.40.)

Basement stairs

5.41 Because of their situation, basement stairways are more likely to be filled with smoke and heat than stairs in ground and upper storeys. Special measures are therefore needed in order to prevent a basement fire endangering upper storeys. These are set out in the following two paragraphs.

5.42 If an escape stair forms part of the only escape route from an upper storey of a building (or part of a building) it should not be continued down to serve any basement storey. The basement should be served by a separate stair.

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

External escape stairs

5.44 If more than one escape route is available from a storey (or part of a building), some of the escape routes from that storey or part of the building may be by way of an external escape stair, provided that:
a. there is at least one internal escape stair from every part of each storey (excluding
Section 5: Design for vertical escape – buildings other than flats

...plant areas);

b. in the case of an Assembly and Recreation building, the route is not intended for use by members of the public; or

c. in the case of an Institutional building, the route serves only office or residential staff accommodation.

5.45 Where external stairs are acceptable as forming part of an escape route, they should meet the provisions in paragraph 6.25.
Introduction

6.1 This Section gives guidance on the construction and protection of escape routes generally, service installations and other matters associated with the design of escape routes. It applies to all buildings.

It should therefore be read in conjunction with Section 3 (in respect of flats) and in conjunction with Sections 4 and 5 (in respect of other buildings).

Protection of escape routes

Fire resistance of enclosures

6.2 Details of fire resistance test criteria and standards of performance, are set out in Appendix A. Generally, a 30-minute standard is sufficient for the protection of means of escape. The exceptions to this are when greater fire resistance is required by the guidance on Requirements B3 or B5, or some other specific instance to meet Requirement B1, in Sections 3 and 4.

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

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

Fire resistance of doors

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

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

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

Fire resistance of glazed elements

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

6.8 Where the relevant performance can be met in terms of both integrity and insulation, there is no restriction in this Approved Document on the use or amount of glass.

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

Doors on escape routes

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

Door fastenings

6.11 In general, doors on escape routes (whether or not the doors are fire doors), should
either not be fitted with lock, latch or bolt fastenings, or they should only be fitted with simple
fastenings that can be readily operated from the side approached by people making an
escape. The operation of these fastenings should be readily apparent; without the use of a key
and without having to manipulate more than one mechanism. This is not intended to prevent
doors being fitted with hardware to allow them to be locked when the rooms are empty. There
may also be situations such as hotel bedrooms where locks may be fitted that are operated
from the outside by a key and from the inside by a knob or lever, etc.

Where a door on an escape route has to be secured against entry when the building or part of
the building is occupied, it should only be fitted with a lock or fastening which is readily
operated, without a key, from the side approached by people making their escape. Similarly,
where a secure door is operated by a code, combination, swipe or proximity card, biometric
data or similar means, it should also be capable of being overridden from the side approached
by people making their escape.

Electrically powered locks should return to the unlocked position:

a. on operation of the fire alarm system;

b. on loss of power or system error;

c. on activation of a manual door release unit (Type A) to BS EN 54-11:2001 positioned at the
door on the side approached by people making their escape. Where the door provides
escape in either direction, a unit should be installed on both sides of the door.

6.12 In the case of places of assembly, shop and commercial buildings, doors on escape
routes from rooms with an occupant capacity of more than 60 should either not be fitted with
lock, latch or bolt fastenings, or be fitted with panic fastenings in accordance with BS EN

In non-residential buildings it may also be appropriate to accept on some final exit doors locks
for security that are used only when the building is empty. In these cases the emphasis for the
safe use of these locks must be placed on management procedures.

6.13 Guidance about door closing and ‘hold open’ devices for fire doors is given in
Appendix B.

Direction of opening

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

Note: Where there is a very high fire risk with potential for rapid fire growth, such as with
some industrial activities, doors should open in the direction of escape even where the
number of persons does not exceed 60.

Amount of opening and effect on associated escape routes

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

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

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

Revolving and automatic doors

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

a. they are to the required width and are automatic doors and either they:
   i. are arranged to fail safely to outward opening from any position of opening; or
   ii. are provided with a monitored failsafe system for opening the doors if the mains supply fails; or
   iii. they fail safely to the open position in the event of power failure; or

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

Stairs

Construction of escape stairs

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

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

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

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

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

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

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

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

Single steps

6.21 Single steps may cause falls and should only be used on escape routes where they are prominently marked. A single step on the line of a doorway is acceptable, subject to paragraph 6.32.

Helical stairs, spiral stairs and fixed ladders

6.22 Helical stairs, spiral stairs and fixed ladders may form part of an escape route subject to the following restrictions:

a. helical and spiral stairs should be designed in accordance with BS 5395-2:1984 and, if they
Section 6: General provisions

are intended to serve members of the public, should be a type E (public) stair, in accordance with that standard; and

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

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

External walls of protected stairways

6.24 With some configurations of external wall, a fire in one part of a building could subject the external wall of a protected stairway to heat (for example, where the two are adjacent at an internal angle in the facade as shown in Diagram 24). If the external wall of the protected stairway has little fire resistance, there is a risk that this could prevent the safe use of the stair. Therefore, if:

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

b. the distance between any unprotected area in the external enclosures to the building and any unprotected area in the enclosure to the stairway should be at least 1800mm (see Diagram 24).

External escape stairs

6.25 Where an external escape stair is provided in accordance with paragraph 5.44, it should meet the following provisions:

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

b. any part of the external envelope of the building within 1800mm of (and 9m vertically below), the flights and landings of an external escape stair should be of fire-resisting construction, except that the 1800mm dimension may be reduced to 1100mm above the top level of the stair if it is not a stair up from a basement to ground level (see Diagram 25);

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

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

e. glazing in areas of fire-resisting construction mentioned above should also be fire-resisting (integrity but not insulation) and fixed shut.
Diagram 24  External protection to protected stairways

See para 6.24

CONFIGURATIONS OF STAIRS AND EXTERNAL WALL

- Accommodation
  - 1800mm minimum
  - Stair
  - 1800mm minimum
  - Accommodation

CONFIGURATION A

- Accommodation
  - 1800mm minimum
  - Stair
  - 1800mm minimum
  - Accommodation

CONFIGURATION B

Key
- Fire-resisting construction
- Non fire-resisting construction
Diagram 25 Fire resistance of areas adjacent to external stairs

See para 6.25

EXAMPLE a.
- No fire resistance required for door
- Window with 30 minute fire-resisting construction
- 1800mm zone of fire-resisting construction at side of stair
- 30 minute self-closing fire door
- Ground level or a roof or podium served by an independent stairway

EXAMPLE b.
- 1100mm zone above top landing
- 1.8m
- 9m zone of fire-resisting construction below stair

SECTION A-A
- 1100mm zone above top landing
- 1.8m

SECTION B-B
- 6m maximum height of stair without weather protection
- Ground level or a roof or podium served by an independent stairway

PLAN
- A
- B
Section 6: General provisions

General

Headroom in escape routes

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

Floors of escape routes

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

Ramps and sloping floors

6.28 Where a ramp forms part of an escape route it should meet the provisions in Approved Document M Access to and Use of buildings. Any sloping floor or tier should be constructed with a pitch of not more than 35° to the horizontal.

6.29 Further guidance on the design of ramps and associated landings and on aisles and gangways in places where there is fixed seating, from the aspect of safety in use, is given in Approved Document K Protection from falling, collision and impact and in Approved Document M Access to and Use of buildings. The design of means of escape in places with fixed seating is dealt with in Section 4 by reference to BS 5588-6:1991.

Final exits

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

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

6.32 Final exits should not present an obstacle to wheelchair users and other people with disabilities. Where a final exit is accessed without the need to first traverse steps then a level threshold and, where necessary, a ramp should be provided.

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

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

Escape routes over flat roofs

6.35 Where an escape route over a flat roof is provided in accordance with paragraph 3.31 or 4.31, it should meet the following provisions:

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

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

c. the part of the roof forming the escape route and its supporting structure, together with any opening within 3m of the escape route, should be fire-resisting (see Appendix A Table A1); and
d. the route should be adequately defined and guarded by walls and/or protective barriers which meet the provisions in Approved Document K, *Protection from falling, collision and impact*.

**Lighting of escape routes**

**6.36** All escape routes should have adequate artificial lighting. Routes and areas listed in Table 9 should also have escape lighting which illuminates the route if the main supply fails. Lighting to escape stairs should be on a separate circuit from that supplying any other part of the escape route. Standards for the installation of a system of escape lighting are given in BS 5266-1:2005.

**Exit signs**

**6.37** Except within a flat, every escape route (other than those in ordinary use) should be distinctively and conspicuously marked by emergency exit sign(s) of adequate size complying with the *Health and Safety (Safety signs and signals) Regulations 1996*. In general, signs containing symbols or pictograms which conform to BS 5499-1:2002, satisfy these regulations. In some buildings additional signs may be needed to meet requirements under other legislation.

Suitable signs should also be provided for refuges (see paragraph 5.10).

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

**Protected power circuits**

**6.38** Where it is critical for electrical circuits to be able to continue to function during a fire, protected circuits are needed. The potential for damage to cables forming protected circuits should be limited by the use of sufficiently robust cables, careful selection of cable routes and/or by the provision of physical protection in areas where cables may be susceptible to damage. Methods of cable support should generally be non-combustible and such that circuit integrity will not be reduced below that afforded by the cable.

A protected circuit for operation of equipment in the event of fire should consist of cable meeting at least the requirements for PH 30 classification when tested in accordance with BS EN 50200:2006 (incorporating Appendix E), or an equivalent standard. It should follow a route selected to pass only through parts of the building in which the fire risk is negligible and should be separate from any circuit provided for another purpose.

In large or complex buildings there may be fire protection systems that need to operate for an extended period during a fire. Further guidance on the selection of cables for such systems is given in BS 5839-1, BS 5266-1 and BS 7346-6.
### Table 9  Provisions for escape lighting

<table>
<thead>
<tr>
<th>Purpose group of the building or part of the building</th>
<th>Areas requiring escape lighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Residential</td>
<td>All common escape routes (^{(1)}), except in 2-storey flats</td>
</tr>
</tbody>
</table>
| 2. Office, Industrial, storage and Other non-residential | a. Underground or windowless accommodation  
b. Stairways in a central core or serving storey(s) more than 18m above ground level  
c. Internal corridors more than 30m long  
d. Open-plan areas of more than 60m² |
| 3. Shop and Commercial and car parks                  | a. Underground or windowless accommodation  
b. Stairways in a central core or serving storey(s) more than 18m above ground level  
c. Internal corridors more than 30m long  
d. Open-plan areas of more than 60m²  
e. All escape routes to which the public are admitted \(^{(1)}\) (except in shops of three or fewer storeys with no sales floor more than 280m², provided that the shop is not a restaurant or bar) |
| 4. Assembly and Recreation                            | All escape routes \(^{(1)}\), and accommodation except for:  
a. accommodation open on one side to view sport or entertainment during normal daylight hours |
| 5. Any Purpose Group                                   | a. All toilet accommodation with a floor area over 8m²  
b. Electricity and generator rooms  
c. Switch room/battery room for emergency lighting system  
d. Emergency control room |

**Notes:**  
1. Including external escape routes

### Lifts

**Evacuation lifts**

6.39 In general it is not appropriate to use lifts when there is a fire in the building because there is always the danger of people being trapped in a lift that has become immobilised as a result of the fire. However, in some circumstances a lift may be provided as part of a management plan for evacuating people. In such cases the lift installation may need to be appropriately sited and protected and may need to contain a number of safety features that are intended to ensure that the lift remains usable for evacuation purposes during the fire. Guidance on the design and use of evacuation lifts is given in BS 5588-8:1999.

Where a firefighting lift has been provided to satisfy requirement B5, this can be utilised as part of a management plan for evacuating disabled people. Any such plan should include a contingency for when the Fire and Rescue Service arrive.
Fire protection of lift installations

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

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

6.42 Lift wells should be either:

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

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

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

In buildings designed for phased or progressive horizontal evacuation, where the lift well is not contained within the enclosures of a protected stairway, the lift entrance should be separated from the floor area on every storey by a protected lobby.

6.43 In basements and enclosed (non open-sided) car parks the lift should be approached only by a protected lobby (or protected corridor), unless it is within the enclosure of a protected stairway.

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

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

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

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

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

Mechanical ventilation and air-conditioning systems

6.46 Any system of mechanical ventilation should be designed to ensure that, in a fire, the ductwork does not assist in transferring fire and smoke through the building and put at risk the protected means of escape from the accommodation areas. Any exhaust points should be sited so as not to further jeopardize the building, i.e. away from final exits, combustible building cladding or roofing materials and openings into the building.

6.47 Ventilation ducts supplying or extracting air directly to or from a protected escape route, should not also serve other areas. A separate ventilation system should be provided for each protected stairway. Guidance on ventilation systems that circulate air only within an individual flat is given in paragraph 3.18.

Where the ductwork system serves more than one part of a sub-divided (see paragraph 4.26) escape route, a fire damper should be provided where ductwork enters each section of the

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escape route operated by a smoke detector or suitable fire detection system (see also Section 11). The fire dampers should close when smoke is detected.

**6.48** Ducts passing through the enclosure of a protected escape route should be fire-resisting, i.e. the ductwork should be constructed in accordance with Method 2 or Method 3, (see paragraph 11.9).

**Note:** Fire dampers activated only by fusible links are not suitable for protecting escape routes. However an ES classified fire and smoke damper which is activated by a suitable fire detection system may be used. See paragraph 11.15.

**6.49** In the case of a system which recirculates air, smoke detectors should be fitted in the extract ductwork before the point of separation of the recirculated air and the air to be discharged to the open air and before any filters or other air cleaning equipment. Such detector(s) should:

a. cause the system to immediately shut down; or

b. switch the ventilation system from recirculating mode to extraction to open air, so as to divert the any smoke to the outside of the building.

**6.50** Non-domestic kitchens, car parks and plant rooms should have separate and independent extraction systems and the extracted air should not be recirculated.

**6.51** Guidance on the use of mechanical ventilation in a place of assembly is given in BS 5588-6:1991.

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

**6.53** Further guidance on the design and installation of mechanical ventilation and air conditioning plant is given in BS 5720:1979. Guidance on the provision of smoke detectors in ventilation ductwork is given in BS 5839-1:2002.

**Note:** Paragraphs 9.41 and 11.9 also deal with ventilation and air-conditioning ducts.

**Refuse chutes and storage**

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

**6.55** Refuse chutes and rooms provided for the storage of refuse should:

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

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

**6.56** Rooms containing refuse chutes, or provided for the storage of refuse, should be approached either directly from the open air or by way of a protected lobby provided with not less than 0.2m$^2$ of permanent ventilation.

**6.57** Access to refuse storage chambers should not be sited adjacent to escape routes or final exits, or near to windows of flats.

**Shop store rooms**

**6.58** Fully enclosed walk-in store rooms in shops (unless provided with an automatic fire detection and alarm system or fitted with an automatic fire suppression system) should be
separated from retail areas with fire-resisting construction (see Appendix A, Table A1), if they are sited so as to prejudice the means of escape.
This Approved Document deals with the following Requirement from Part B of Schedule 1 to the Building Regulations 2010.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Limits on application</th>
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<tbody>
<tr>
<td>Internal fire spread (linings)</td>
<td></td>
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<tr>
<td>B2. (1) To inhibit the spread of fire within the building, the internal linings shall –</td>
<td></td>
</tr>
<tr>
<td>(a) adequately resist the spread of flame over their surfaces; and</td>
<td></td>
</tr>
<tr>
<td>(b) have, if ignited, a rate of heat release or a rate of fire growth, which is reasonable in the circumstances.</td>
<td></td>
</tr>
<tr>
<td>(2) In this paragraph ‘internal linings’ mean the materials or products used in lining any partition, wall, ceiling or other internal structure.</td>
<td></td>
</tr>
</tbody>
</table>
Guidance

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

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

Introduction

Fire spread and lining materials

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

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

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

Floors and stairs

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

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

Other controls on internal surface properties

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

Note: External flame spread is dealt with in Sections 13 to 15; the fire behaviour of insulating core panels used for internal structures is dealt with in Appendix F.
Furniture and fittings

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

Classification of performance

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

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

The European classifications are described in BS EN 13501-1:2007, Fire classification of construction products and building elements, Part 1 – Classification using data from reaction to fire tests. They are based on a combination of four European test methods, namely:

- BS EN ISO 1182:2002 Reaction to fire tests for building products – Non combustibility test;
- BS EN ISO 1716:2002 Reaction to fire tests for building products – Determination of the gross calorific value;
- BS EN 13823:2002 Reaction to fire tests for building products – Building products excluding floorings exposed to the thermal attack by a single burning item; and
- BS EN ISO 11925-2:2002, Reaction to fire tests for building products. Ignitability when subjected to direct impingement of flame.

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

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

7.1 Subject to the variations and specific provisions described in paragraphs 7.2 to 7.16, the surface linings of walls and ceilings should meet the following classifications:

Table 10 Classification of linings

<table>
<thead>
<tr>
<th>Location</th>
<th>National class (1)</th>
<th>European class (1)(3)(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small rooms (2) of area not more than:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. 4m² in residential accommodation</td>
<td>3</td>
<td>D-s3, d2</td>
</tr>
<tr>
<td>b. 30m² in non-residential accommodation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other rooms (2) including garages</td>
<td>1</td>
<td>C-s3, d2</td>
</tr>
<tr>
<td>Circulation spaces within dwellings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other circulation spaces, including the common areas of blocks of flats</td>
<td>0</td>
<td>B-s3, d2</td>
</tr>
</tbody>
</table>

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

Definition of walls

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

a. the surface of glazing (except glazing in doors); and
b. any part of a ceiling which slopes at an angle of more than 70° to the horizontal.

But a wall does not include:

c. doors and door frames;
d. window frames and frames in which glazing is fitted;
e. architraves, cover moulds, picture rails, skirtings and similar narrow members; or
f. fireplace surrounds, mantle shelves and fitted furniture.
Section 7: Wall and Ceiling linings

Definition of ceilings

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

a. the surface of glazing;
b. any part of a wall which slopes at an angle of 70º or less to the horizontal;
c. the underside of a mezzanine or gallery; and
d. the underside of a roof exposed to the room below.

But a ceiling does not include:

e. trap doors and their frames;
f. the frames of windows or rooflights (see Appendix E) and frames in which glazing is fitted; or
g. architraves, cover moulds, picture rails, exposed beams and similar narrow members.

Variations and special provisions

Walls

7.4 Parts of walls in rooms may be of a poorer performance than specified in paragraph 7.1 and Table 10 (but not poorer than Class 3 (National class) or Class D-s3, d2 (European class)), provided the total area of those parts in any one room does not exceed one half of the floor area of the room; and subject to a maximum of 20m² in residential accommodation and 60m² in non-residential accommodation.

Fire-protecting suspended ceilings

7.5 A suspended ceiling can contribute to the overall fire resistance of a floor/ceiling assembly. Such a ceiling should satisfy paragraph 7.1 and Table 10. It should also meet the provisions of Appendix A, Table A3.

Fire-resisting ceilings

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

Rooflights

7.7 Rooflights should meet the relevant classification in 7.1 and Table 10. However plastic rooflights with at least a Class 3 rating may be used where 7.1 calls for a higher standard, provided the limitations in Table 11 and Table 18 are observed.

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

Special applications

7.8 Any flexible membrane covering a structure (other than an air supported structure) should comply with the recommendations given in Appendix A of BS 7157:1989.
7.9 Guidance on the use of PTFE-based materials for tension-membrane roofs and structures is given in a BRE report *Fire safety of PTFE-based materials used in buildings* (BR 274, BRE 1994).

**Thermoplastic materials**

**General**

7.10 Thermoplastic materials (see Appendix A, paragraph 17) which cannot meet the performance given in Table 10, can nevertheless be used in windows, rooflights and lighting diffusers in suspended ceilings if they comply with the provisions described in paragraphs 7.11 to 7.15. Flexible thermoplastic material may be used in with the guidance in paragraph 7.16. The classifications used in paragraphs 7.11 to 7.16, Table 11 and Diagram 27 are explained in Appendix A, paragraph 20.

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

**Windows and internal glazing**

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

Internal glazing should meet the provisions in paragraph 7.1 and Table 10 above.

*Note 1*: A “wall” does not include glazing in a door (see paragraph 7.2).

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

**Rooflights**

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

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

b. the size and disposition of the rooflights accords with the limits in Table 11 and with the guidance to B4 in Tables 17 and 18.

**Lighting diffusers**

7.13 The following provisions apply to lighting diffusers which form part of a ceiling and are not concerned with diffusers of light fittings which are attached to the soffit of, or suspended beneath, a ceiling (see Diagram 26).

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

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

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

b. to reduce the chance of fires becoming large, on the basis that large fires are more dangerous, not only to occupants and fire and rescue service personnel, but also to people in the vicinity of the building.

Compartmentation is complementary to provisions made in Sections 3 to 6 for the protection of escape routes and to provisions made in Sections 13 to 15 against the spread of fire between buildings.

9.2 The appropriate degree of sub-division depends on:

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

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

c. the availability of an automatic fire suppression system which affects the growth rate of the fire and may suppress it altogether.

9.3 Sub-division is achieved using compartment walls and compartment floors. The circumstances in which they are needed are given in paragraphs 9.9 to 9.19.

9.4 Provisions for the construction of compartment walls and compartment floors are given in paragraphs 9.20 onwards. These construction provisions vary according to the function of the wall or floor.

Special forms of compartmentation

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

a. walls common to two or more buildings, see paragraph 9.10;

b. walls dividing buildings into separated parts, see paragraph 9.11; and

c. construction enclosing places of special fire hazard, see paragraph 9.12.

Junctions

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

Protected shafts

9.7 Spaces that connect compartments, such as stairways and service shafts, need to be protected to restrict fire spread between the compartments and they are termed
Section 9: Compartmentation

protected shafts. Any walls or floors bounding a protected shaft are considered to be compartment walls or floors for the purpose of this Approved Document.

Buildings containing one or more atria

9.8 Detailed advice on all issues relating to the incorporation of atria in buildings is given in BS 5588-7:1997. However, it should be noted that for the purposes of Approved Document B, the standard is relevant only where the atrium breaches any compartmentation.

Provision of compartmentation

General

9.9 Compartment walls and compartment floors should be provided in the circumstances described below, with the proviso that the lowest floor in a building does not need to be constructed as a compartment floor. Paragraphs 9.10 to 9.19 give guidance on the provision of compartmentation in different building types. Information on the construction of compartment walls and compartment floors in different circumstances is given in paragraphs 9.20 to 9.31. Provisions for the protection of openings in compartment walls and compartment floors are given in paragraphs 9.32 to 9.34.

All purpose groups

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

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

Places of special fire hazard

9.12 Every place of special fire hazard (see Appendix E) should be enclosed with fire-resisting construction; see Table A1, Item 13.

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

Flats

9.13 In buildings containing flats, the following should be constructed as compartment walls or compartment floors:

a. every floor (unless it is within a flat, i.e. between one storey and another within one individual dwelling); and

b. every wall separating a flat from any other part of the building; and

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

c. every wall enclosing a refuse storage chamber.
9.14 Blocks of flats with a floor more than 30m above ground level should be fitted with a sprinkler system in accordance with section 2.

Note: Sprinklers need only be provided within the individual flats, they are not required in the common areas such as stairs, corridors or landings. For the purposes of this paragraph the limit on the scope of BS 9251:2005 to buildings below 20m in height can be ignored.

Institutional buildings including health care

9.15 All floors should be constructed as compartment floors.

9.16 Paragraphs 4.41 to 4.52 give guidance on the provisions for compartment walls in care homes utilising progressive horizontal evacuation.

Other residential buildings

9.17 All floors should be constructed as compartment floors.

Non-residential buildings

9.18 The following walls and floors should be constructed as compartment walls and compartment floors in buildings of a non-residential purpose group (i.e. Office, Shop and Commercial, Assembly and Recreation, Industrial, Storage or Other non-residential):

a. every wall needed to sub-divide the building to observe the size limits on compartments given in Table 12 (see Diagram 28a);

b. every floor, if the building or separated part (see paragraph 9.22) of the building, has a storey with a floor at a height of more than 30m above ground level (see Diagram 28b);

c. the floor of the ground storey if the building has one or more basements (see Diagram 28c), with the exception of small premises (see paragraph 4.1);

d. the floor of every basement storey (except the lowest floor) if the building, or separated part (see paragraph 9.19), has a basement at a depth of more than 10m below ground level (see Diagram 28d);

e. if the building forms part of a shopping complex, every wall and floor described in Section 6 of BS 5588-0:1991 Fire precautions in the design, construction and use of buildings, Code of practice for shopping complexes as needing to be constructed to the standard for a compartment wall or compartment floor; and

f. if the building comprises Shop and Commercial, Industrial or Storage premises, every wall or floor provided to divide a building into separate occupancies, (i.e. spaces used by different organisations whether they fall within the same Purpose Group or not).

Note: See also the provision in paragraph 6.58 for store rooms in shops to be separated from retail areas by fire-resisting construction to the standard given in Table A1.

9.19 In a two storey building in the Shop and Commercial or Industrial Purpose Groups, where the use of the upper storey is ancillary to the use of the ground storey, the ground storey may be treated as a single storey building for fire compartmentation...
purposes, provided that:

a. the area of the upper storey does not exceed 20% of the area of the ground storey, or 500m$^2$, whichever is less;

b. the upper storey is compartmented from the lower one; and

c. there is a means of escape from the upper storey that is independent of the routes from the lower storey.

Diagram 28 Compartment floors: illustration of guidance in paragraph 9.18

A. Example of compartmentation in an unsprinklered shop see paragraph 9.18(a)

None of the floors in this case would need to be compartment floors, but the two storeys exceeding 2000m$^2$ would need to be divided into compartments not more than 2000m$^2$ by compartment walls.

B. Compartmentation in tall Buildings see paragraph 9.18(b)

C. SHALLOW BASEMENTS

See paragraph 9.18(c)

Only the floor of the ground storey need be a compartment floor if the lower basement is at a depth of not more than 10m

D. DEEP BASEMENTS

See paragraph 9.18(d)

All basement storeys to be separated by compartment floors if any storey is at a depth of more than 10m
### Table 12 Maximum dimensions of building or compartment (non-residential buildings)

<table>
<thead>
<tr>
<th>Purpose Group of building or part</th>
<th>Height of floor of top storey above ground level (m)</th>
<th>Floor area of any one storey in the building or any one storey in a compartment (m²)</th>
<th>In multi-storey buildings</th>
<th>In single-storey buildings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office</td>
<td>No limit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assembly and recreation Shop and commercial</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shops – sprinklered&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>No limit</td>
<td>4000</td>
<td>No limit</td>
<td></td>
</tr>
<tr>
<td>b. Elsewhere – not sprinklered</td>
<td>No limit</td>
<td>2000</td>
<td>No limit</td>
<td></td>
</tr>
<tr>
<td>Elsewhere – sprinklered&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>No limit</td>
<td>4000</td>
<td>No limit</td>
<td></td>
</tr>
<tr>
<td>Industrial&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not sprinklered</td>
<td>Not more than 18</td>
<td>7000</td>
<td>No limit</td>
<td>N/A</td>
</tr>
<tr>
<td>Sprinklered&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>More than 18</td>
<td>2000&lt;sup&gt;(3)&lt;/sup&gt;</td>
<td>No limit</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Not more than 18</td>
<td>14,000</td>
<td>No limit</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>More than 18</td>
<td>4000&lt;sup&gt;(3)&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height of floor of top storey above ground level (m)</td>
<td>Maximum compartment volume m³</td>
<td>Maximum floor area (m²)</td>
<td>Maximum height (m)&lt;sup&gt;(4)&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Multi storey buildings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single storey buildings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage (2) and other non-residential:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Car park for light vehicles</td>
<td>No limit</td>
<td>No limit</td>
<td>No limit</td>
<td>No limit</td>
</tr>
<tr>
<td>b. Any other building or part:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not sprinklered</td>
<td>Not more than 18</td>
<td>20,000&lt;sup&gt;(3)&lt;/sup&gt;</td>
<td>20,000</td>
<td>18</td>
</tr>
<tr>
<td>Sprinklered&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>More than 18</td>
<td>4000&lt;sup&gt;(3)&lt;/sup&gt;</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Not more than 18</td>
<td>8000&lt;sup&gt;(3)&lt;/sup&gt;</td>
<td>No limit</td>
<td>No limit</td>
</tr>
</tbody>
</table>

**Notes:**

1. ‘Sprinklered’ means that the building is fitted throughout with an automatic fire suppression system in accordance with Section 2.
2. There may be additional limitations on floor area and/or automatic fire suppression provisions in certain industrial and storage uses under other legislation, for example in respect of storage of LPG and certain chemicals.
3. This reduced limit applies only to storeys that are more than 18m above ground level. Below this height the higher limit applies.
4. Compartment height is measured from finished floor level to underside of roof or ceiling.
Construction of compartment walls and compartment floors

General

9.20 Every compartment wall and compartment floor should:

a. form a complete barrier to fire between the compartments they separate; and
b. have the appropriate fire resistance as indicated in Appendix A, Tables A1 and A2.

Note 1: Timber beams, joists, purlins and rafters may be built into or carried through a masonry or concrete compartment wall if the openings for them are kept as small as practicable and then fire-stopped. If trussed rafters bridge the wall, they should be designed so that failure of any part of the truss due to a fire in one compartment will not cause failure of any part of the truss in another compartment.

Note 2: Where services are incorporated within the construction that could provide a potential source of ignition, care should be taken to ensure the risk of fire developing and spreading prematurely into adjacent compartments is controlled.

Compartment walls between buildings

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

Separated parts of buildings

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

Other compartment walls

9.23 Compartment walls not described in paragraphs 9.21 and 9.22 should run the full height of the storey in which they are situated.

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

Junction of compartment wall or compartment floor with other walls

9.25 Where a compartment wall or compartment floor meets another compartment wall or an external wall, the junction should maintain the fire resistance of the compartmentation. Fire-stopping should meet the provisions of paragraphs 11.17 to 11.19.

9.26 At the junction of a compartment floor with an external wall that has no fire resistance (such as a curtain wall) the external wall should be restrained at floor level to reduce the movement of the wall away from the floor when exposed to fire.
9.27 Compartment walls should be able to accommodate the predicted deflection of the floor above by either:

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

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

**Note:** Where compartment walls are located within the middle half of a floor between vertical supports, the predicted deflection may be assumed to be 40mm unless a smaller value can be justified by assessment. Outside this area the limit can be reduced linearly to zero at the supports. For steel beams that do not have the required fire resistance, reference should be made to SCI Publication 288 *Fire safe design: A new approach to multi-storey steel-framed buildings* (Second Edition) 2000 (ISBN: 1 85942 169 5).
Junction of compartment wall with roof

9.28 A compartment wall should be taken up to meet the underside of the roof covering or deck, with fire-stopping where necessary at the wall/roof junction to maintain the continuity of fire resistance. The compartment wall should also be continued across any eaves cavity (see paragraph 9.20a).

9.29 If a fire penetrates a roof near a compartment wall there is a risk that it will spread over the roof to the adjoining compartment. To reduce this risk and subject to paragraph 9.30, a zone of the roof 1500mm wide on either side of the wall should have a covering of designation AA, AB or AC (see Appendix A, paragraph 6) on a substrate or deck of a material of limited combustibility, as set out in Diagram 30a.

Note: Thermoplastic rooflights which, by virtue of paragraph 15.7, are regarded as having an AA (National class) designation or $B_{ROOF}(t_4)$ (European class) classification are not suitable for use in the zone described above.

9.30 In buildings not more than 15m high, of the purpose groups listed below, combustible boarding used as a substrate to the roof covering, wood wool slabs, or timber tiling battens, may be carried over the compartment wall provided that they are fully bedded in mortar or other suitable material over the width of the wall (see Diagram 30b). This applies to, buildings or compartments in Residential use (other than Institutional), Office buildings, Assembly and Recreation buildings.

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

9.31 As an alternative to paragraphs 9.29 or 9.30 the compartment wall may be extended up through the roof for a height of at least 375mm above the top surface of the adjoining roof covering. Where there is a height difference of at least 375mm between two roofs or where the roof coverings on either side of the wall are AA, AB or AC this height may be reduced to 200mm (see Diagram 30c).

Openings in compartmentation

Openings in compartment walls separating buildings or occupancies

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

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

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

Doors

9.33 Information on fire doors may be found in Appendix B.

Openings in other compartment walls or in compartment floors

9.34 Openings in compartment walls (other than those described in paragraph 9.32) or compartment floors should be limited to those for:
Section 9: Compartmentation

- doors which have the appropriate fire resistance given in Appendix B, Table B1 and are fitted in accordance with the provisions of Appendix B;
- the passage of pipes, ventilation ducts, service cables, chimneys, appliance ventilation ducts or ducts encasing one or more flue pipes, which meet the provisions in Section 10;
- refuse chutes of non-combustible construction;
- atria designed in accordance with BS 5588-7:1997; and
- protected shafts which meet the relevant provisions below.

Protected shafts

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

There are additional provisions in Sections 3 to 6 for protected shafts that are protected stairways and in Section 18 if the stairway also serves as a firefighting stair.
Appendix A: Performance of materials, products and structures

Introduction

1 Much of the guidance in this document is given in terms of performance in relation to British or European Standards for products or methods of test or design or in terms of European Technical Approvals. In such cases the material, product or structure should:

a. be in accordance with a specification or design which has been shown by test to be capable of meeting that performance; or

   Note: For this purpose, laboratories accredited by the United Kingdom Accreditation Service (UKAS) for conducting the relevant tests would be expected to have the necessary expertise.

b. have been assessed from test evidence against appropriate standards, or by using relevant design guides, as meeting that performance; or

   Note: For this purpose, laboratories accredited by UKAS for conducting the relevant tests and suitably qualified fire safety engineers might be expected to have the necessary expertise.

For materials/products where European standards or approvals are not yet available and for a transition period after they become available, British standards may continue to be used. Any body notified to the UK Government by the Government of another member state of the European Union as capable of assessing such materials/products against the relevant British Standards, may also be expected to have the necessary expertise. Where European materials/products standards or approvals are available, any body notified to the European Commission as competent to assess such materials or products against the relevant European standards or technical approval can be considered to have the appropriate expertise.

c. where tables of notional performance are included in this document, conform with an appropriate specification given in these tables; or

d in the case of fire-resisting elements:

i. conform with an appropriate specification given in Part II of the Building Research Establishment’s report Guidelines for the construction of fire resisting structural elements (BR 128, BRE 1988); or

ii. be designed in accordance with a relevant British Standard or Eurocode.

Note 1: Different forms of construction can present different problems and opportunities for the provision of structural fire protection. Further information on some specific forms of construction can be found in;

   Timber – BRE 454 Multi-storey timber frame buildings – a design guide 2003
   (ISBN: 1 86081 605 3)

   Steel – SCI P197 Designing for structural fire safety: A handbook for architects and engineers 1999
   (ISBN: 1 85942 074 5)

Note 2: Any test evidence used to substantiate the fire resistance rating of a construction should be carefully checked to ensure that it demonstrates compliance that is adequate and applicable to the intended use. Small differences in detail (such as fixing method, joints, dimensions and the introduction of insulation materials etc.) may significantly affect the rating.
Appendix A: Performance of materials, products and structures

2 Building Regulations deal with fire safety in buildings as a whole. Thus they are aimed at limiting fire hazard.

The aim of standard fire tests is to measure or assess the response of a material, product, structure or system to one or more aspects of fire behaviour. Standard fire tests cannot normally measure fire hazard. They form only one of a number of factors that need to be taken into account. Other factors are set out in this publication.

Fire resistance

3 Factors having a bearing on fire resistance, that are considered in this document, are:
   a. fire severity;
   b. building height; and
   c. building occupancy.

4 The standards of fire resistance given are based on assumptions about the severity of fires and the consequences should an element fail. Fire severity is estimated in very broad terms from the use of the building (its purpose group), on the assumption that the building contents (which constitute the fire load) are similar for buildings in the same use.

A number of factors affect the standard of fire resistance specified. These are:
   a. the amount of combustible material per unit of floor area in various types of building (the fire load density);
   b. the height of the top floor above ground, which affects the ease of escape and of firefighting operations and the consequences should large scale collapse occur;
   c. occupancy type, which reflects the ease with which the building can be evacuated quickly;
   d. whether there are basements, because the lack of an external wall through which to vent heat and smoke may increase heat build-up and thus affect the duration of a fire, as well as complicating firefighting; and
   e. whether the building is of single storey construction (where escape is direct and structural failure is unlikely to precede evacuation).

Because the use of buildings may change, a precise estimate of fire severity based on the fire load due to a particular use may be misleading. Therefore if a fire engineering approach of this kind is adopted the likelihood that the fire load may change in the future needs to be considered.

5 Performance in terms of the fire resistance to be met by elements of structure, doors and other forms of construction is determined by reference to either:
   a. (National tests) BS 476 Fire tests on building materials and structures, Parts 20-24: 1987, i.e. Part 20 Method for determination of the fire resistance of elements of construction (general principles), Part 21 Methods for determination of the fire resistance of loadbearing elements of construction, Part 22 Methods for determination of the fire resistance of non-loadbearing elements of construction, Part 23 Methods for determination of the contribution of components to the fire resistance of a structure and Part 24 Method for determination of the fire resistance of ventilation ducts (or to
Appendix A: Performance of materials, products and structures

BS 476-8:1972 in respect of items tested or assessed prior to 1 January 1988; or


Note: The latest version of any standard may be used provided that it continues to address the relevant requirements of the Regulations.

All products are classified in accordance with BS EN 13501-2:2007, Fire classification of construction products and building elements – Classification using data from fire resistance tests (excluding products for use in ventilation systems).

BS EN 13501-3:2005, Fire classification of construction products and building elements – Classification using data from fire resistance tests on components of normal building service installations (other than smoke control systems).

BS EN 13501-4:2007, Fire classification of construction products and building elements – Classification using data from fire resistance tests on smoke control systems.

The relevant European test methods under BS EN 1364, 1365, 1366 and 1634 are listed in Appendix G.

Table A1 gives the specific requirements for each element in terms of one or more of the following performance criteria:

a. resistance to collapse (loadbearing capacity), which applies to loadbearing elements only, denoted R in the European classification of the resistance to fire performance;

b. resistance to fire penetration (integrity), denoted E in the European classification of the resistance to fire performance; and

c. resistance to the transfer of excessive heat (insulation), denoted I in the European classification of the resistance to fire performance.

Table A2 sets out the minimum periods of fire resistance for elements of structure.

Table A3 sets out criteria appropriate to the suspended ceilings that can be accepted as contributing to the fire resistance of a floor.

Table A4 sets out limitations on the use of uninsulated fire-resisting glazed elements.

These limitations do not apply to the use of insulated fire-resisting glazed elements.

Information on tested elements is frequently given in literature available from manufacturers and trade associations.

Information on tests on fire-resisting elements is also given in such publications as: Association for Specialist Fire Protection Fire protection for structural steel in buildings 4th Edition (ISBN: 1 87040 925 6).

Roofs

6 Performance in terms of the resistance of roofs to external fire exposure is determined by reference to either:
Appendix A: Performance of materials, products and structures

a. (National tests) BS 476-3:2004 External fire exposure roof tests; or

Constructions are classified within the National system by 2 letters in the range A to D, with an AA designation being the best. The first letter indicates the time to penetration; the second letter a measure of the spread of flame.

Constructions are classified within the European system as B_{ROOF}(t4), C_{ROOF}(t4), D_{ROOF}(t4), E_{ROOF}(t4) or F_{ROOF}(t4) (with B_{ROOF}(t4) being the highest performance and F_{ROOF}(t4) being the lowest) in accordance with BS EN 13501-5:2005, Fire classification of construction products and building elements – Classification using test data from external fire exposure to roof tests.

BS EN 13501-1 refers to four separate tests. The suffix (t4) used above indicates that Test 4 is to be used for the purposes of this Approved Document.

Some roof covering products (and/or materials) can be considered to fulfil all of the requirements for the performance characteristic “external fire performance” without the need for testing, subject to any national provisions on the design and execution of works being fulfilled. These roof covering products are listed in Commission Decision 2000/553/EC of 6th September 2000 implementing Council Directive 89/106/EEC as regards the external fire performance of roof coverings.

In some circumstances roofs, or parts of roofs, may need to be fire-resisting, for example if used as an escape route or if the roof performs the function of a floor. Such circumstances are covered in Sections 3, 5 and 7.

Table A5 gives notional designations of some generic roof coverings.

Reaction to fire


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

All products, excluding floorings, are classified as †A1, A2, B, C, D, E or F (with class A1 being the highest performance and F being the lowest) in accordance with BS EN 13501-1:2007, Fire classification of construction products and building elements, Part 1 – Classification using data from reaction to fire tests.

The relevant European test methods are specified as follows,


BS EN 13823:2002, Reaction to fire tests for building products – Building products.
Appendix A: Performance of materials, products and structures

excluding floorings exposed to the thermal attack by a single burning item.

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


Non-combustible materials

8 Non-combustible materials are defined in Table A6 either as listed products, or in terms of performance:

a. (National classes) when tested to BS 476-4:1970 Non-combustibility test for materials or BS 476-11:1982 Method for assessing the heat emission from building products; or

b. (European classes) when classified as class A1 in accordance with BS EN 13501-1:2007, Fire classification of construction products and building elements, Part 1 – Classification using data from reaction to fire tests when tested to BS EN ISO 1182:2002, Reaction to fire tests for building products – Non-combustibility test and BS EN ISO 1716:2002 Reaction to fire tests for building products – Determination of the gross calorific value.

Table A6 identifies non-combustible products and materials and lists circumstances where their use is necessary.

Materials of limited combustibility

9 Materials of limited combustibility are defined in Table A7:

a. (National classes) by reference to the method specified in BS 476: Part 11:1982; or

b. (European classes) in terms of performance when classified as class A2-s3, d2 in accordance with BS EN 13501-1:2007, Fire classification of construction products and building elements, Part 1 – Classification using data from reaction to fire tests when tested to BS EN ISO 1182:2002, Reaction to fire tests for building products – Non-combustibility test or BS EN ISO 1716:2002 Reaction to fire tests for building products – Determination of the gross calorific value and BS EN 13823:2002, Reaction to fire tests for building products – Building products excluding floorings exposed to the thermal attack by a single burning item.

Table A7 also includes composite products (such as plasterboard) which are considered acceptable and where these are exposed as linings they should also meet any appropriate flame spread rating.

Internal linings

10 Flame spread over wall or ceiling surfaces is controlled by providing for the lining materials or products to meet given performance levels in tests appropriate to the materials or products involved.

11 Under the National classifications, lining systems which can be effectively tested for ‘surface spread of flame’ are rated for performance by reference to the method specified in BS 476-7:1971 Surface spread of flame tests for materials, or 1987 Method for classification of the surface spread of flame of products, or 1997 Method of test to
Appendix A: Performance of materials, products and structures

determine the classification of the surface spread of flame of products under which materials or products are classified 1, 2, 3 or 4 with Class 1 being the highest.

Under the European classifications, lining systems are classified in accordance with BS EN 13501-1:2007, Fire classification of construction products and building elements, Part 1 – Classification using data from reaction to fire tests. Materials or products are classified as A1, A2, B, C, D, E or F, with A1 being the highest. When a classification includes “s3, d2”, it means that there is no limit set for smoke production and/or flaming droplets/particles.

† The classes of reaction to fire performance of A2, B, C, D and E are accompanied by additional classifications related to the production of smoke (s1, s2, s3) and/or flaming droplets/particles (d0, d1, d2).

12 To restrict the use of materials which ignite easily, which have a high rate of heat release and/or which reduce the time to flashover, maximum acceptable ‘fire propagation’ indices are specified, where the National test methods are being followed. These are determined by reference to the method specified in BS 476-6:1981 or 1989 Method of test for fire propagation of products. Index of performance (I) relates to the overall test performance, whereas sub-index (i1) is derived from the first three minutes of test.

13 The highest National product performance classification for lining materials is Class 0. This is achieved if a material or the surface of a composite product is either:

a. composed throughout of materials of limited combustibility; or

b. a Class 1 material which has a fire propagation index (I) of not more than 12 and sub-index (i1) of not more than 6.

Note: Class 0 is not a classification identified in any British Standard test.

14 Composite products defined as materials of limited combustibility (see paragraph 9 above and Table A7) should in addition comply with the test requirement appropriate to any surface rating specified in the guidance on requirements B2, B3 and B4.

15 The notional performance ratings of certain widely used generic materials or products are listed in Table A8 in terms of their performance in the traditional lining tests BS 476 Parts 6 and 7 or in accordance with BS EN 13501-1:2007, Fire classification of construction products and building elements, Part 1 – Classification using data from reaction to fire tests.

16 Results of tests on proprietary materials are frequently given in literature available from manufacturers and trade associations.

Any reference used to substantiate the surface spread of flame rating of a material or product should be carefully checked to ensure that it is suitable, adequate and applicable to the construction to be used. Small differences in detail, such as thickness, substrate, colour, form, fixings, adhesive etc, may significantly affect the rating.

Thermoplastic materials

17 A thermoplastic material means any synthetic polymeric material which has a softening point below 200ºC if tested to BS EN ISO 306:2004 method A120 Plastics – Thermoplastic materials – Determination of Vicat softening temperature. Specimens for this test may be fabricated from the original polymer where the thickness of material of the end product is
Appendix A: Performance of materials, products and structures

less than 2.5mm.

18 A thermoplastic material in isolation cannot be assumed to protect a substrate, when used as a lining to a wall or ceiling. The surface rating of both products must therefore meet the required classification. If however, the thermoplastic material is fully bonded to a non-thermoplastic substrate, then only the surface rating of the composite will need to comply.

19 Concessions are made for thermoplastic materials used for window glazing, rooflights and lighting diffusers within suspended ceilings, which may not comply with the criteria specified in paragraphs 11 onwards. They are described in the guidance on requirements B2 and B4.

20 For the purposes of the requirements B2 and B4 thermoplastic materials should either be used according to their classification 0-3, under the BS 476: Parts 6 and 7 tests as described in paragraphs 11 onwards, (if they have such a rating), or they may be classified TP(a) rigid, TP(a) flexible, or TP(b) according to the following methods:

TP(a) rigid:

i. rigid solid PVC sheet;

ii. solid (as distinct from double- or multiple-skin) polycarbonate sheet at least 3mm thick;

iii. multi-skinned rigid sheet made from unplasticised PVC or polycarbonate which has a Class 1 rating when tested to BS 476-7:1971, 1987 or 1997; or

iv. any other rigid thermoplastic product, a specimen of which (at the thickness of the product as put on the market), when tested to BS 2782-0:2004 Method 508A Rate of burning, Laboratory method, performs so that the test flame extinguishes before the first mark and the duration of flaming or afterglow does not exceed 5 seconds following removal of the burner.

TP(a) flexible:

Flexible products not more than 1mm thick which comply with the Type C requirements of BS 5867-2:1980 Specification for fabrics for curtains and drapes – Flammability requirements when tested to BS 5438:1989 Methods of test for flammability of textile fabrics when subjected to a small igniting flame applied to the face or bottom edge of vertically oriented specimens, Test 2, with the flame applied to the surface of the specimens for 5, 15, 20 and 30 seconds respectively, but excluding the cleansing procedure; and

TP(b):

i. rigid solid polycarbonate sheet products less than 3mm thick, or multiple-skin polycarbonate sheet products which do not qualify as TP(a) by test; or

ii. other products which, when a specimen of the material between 1.5 and 3mm thick is tested in accordance with BS 2782-0:2004 Method 508A, has a rate of burning which does not exceed 50mm/minute.

Note: If it is not possible to cut or machine a 3mm thick specimen from the product then a 3mm test specimen can be moulded from the same material as that used for the manufacture of the product.
Appendix A: Performance of materials, products and structures

Note: Currently, no new guidance is possible on the assessment or classification of thermoplastic materials under the European system since there is no generally accepted European test procedure and supporting comparative data.

Fire test methods

21 A guide to the various test methods in BS 476 and BS 2782 is given in PD 6520: *Guide to fire test methods for building materials and elements of construction* (available from the British Standards Institution).

A guide to the development and presentation of fire tests and their use in hazard assessment is given in BS 6336:1998 *Guide to development and presentation of fire tests and their use in hazard assessment.*
### Table A1 Specific provisions of test for fire resistance of elements of structure etc

<table>
<thead>
<tr>
<th>Part of building</th>
<th>Minimum provisions when tested to the relevant part of BS 476 (minutes)</th>
<th>Minimum provisions when tested to the relevant European standard (minutes)</th>
<th>Method of exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loadbearing capacity (2)</td>
<td>Integrity</td>
<td>Insulation</td>
<td></td>
</tr>
<tr>
<td><strong>1. Structural frame, beam or column</strong></td>
<td>See Table A2</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td><strong>2. Loadbearing wall</strong> (which is not also a wall described in any of the following items)</td>
<td>See Table A2</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td><strong>3. Floors (3)</strong></td>
<td>60 or see Table A2 (whichever is greater)</td>
<td>60 or see Table A2 (whichever is greater)</td>
<td>60 or see Table A2 (whichever is greater)</td>
</tr>
<tr>
<td>a. between a shop and flat above</td>
<td>See Table A2</td>
<td>See Table A2</td>
<td>See Table A2</td>
</tr>
<tr>
<td>b. Any other floor – including compartment floors</td>
<td>60 or see Table A2 (whichever is greater)</td>
<td>60 or see Table A2 (whichever is greater)</td>
<td>60 or see Table A2 (whichever is greater)</td>
</tr>
<tr>
<td><strong>4. Roofs</strong></td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>a. any part forming an escape route;</td>
<td>See Table A2</td>
<td>See Table A2</td>
<td>See Table A2</td>
</tr>
<tr>
<td>b. any roof that performs the function of a floor</td>
<td>See Table A2</td>
<td>See Table A2</td>
<td>See Table A2</td>
</tr>
<tr>
<td><strong>5. External walls</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. any part less than 1000mm from any point on the relevant boundary(5)</td>
<td>See Table A2</td>
<td>See Table A2</td>
<td>See Table A2</td>
</tr>
<tr>
<td>b. any part 1000mm or more from the relevant boundary(5)</td>
<td>See Table A2</td>
<td>See Table A2</td>
<td>15</td>
</tr>
<tr>
<td>c. any part adjacent to an external escape route (see Section 6 Diagram 25)</td>
<td>30</td>
<td>30</td>
<td>No provision (6)(7)</td>
</tr>
<tr>
<td><strong>6. Compartment walls</strong> Separating a. a flat from any other part of the building (see 8.13)</td>
<td>60 or see Table A2 (whichever is less)</td>
<td>60 or see Table A2 (whichever is less)</td>
<td>60 or see Table A2 (whichever is less)</td>
</tr>
<tr>
<td>b. occupancies (see 8.18f)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>7. Compartment walls</strong> (other than in item 6)</td>
<td>See Table A2</td>
<td>See Table A2</td>
<td>See Table A2</td>
</tr>
</tbody>
</table>
### Table A1: Specific provisions of test for fire resistance of elements of structure etc.

<table>
<thead>
<tr>
<th>Part of building</th>
<th>Minimum provisions when tested to the relevant part of BS 476 (^{(1)}) (minutes)</th>
<th>Minimum provisions when tested to the relevant European standard (minutes) (^{(9)})</th>
<th>Method of exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Loadbearing capacity (^{(2)})</td>
<td>Integrity</td>
<td>Insulation</td>
</tr>
<tr>
<td>8. Protected shafts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excluding any firefighting shaft</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. any glazing described in Section 9, Diagram 32;</td>
<td>Not applicable</td>
<td>30</td>
<td>No provision (^{(7)})</td>
</tr>
<tr>
<td>b. any other part between the shaft and a protected lobby/corridor described in Diagram 32 above.</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>c. any part not described in (a) or (b) above.</td>
<td>See Table A2</td>
<td>See Table A2</td>
<td>See Table A2</td>
</tr>
<tr>
<td>9. Enclosure (which does not form part of a compartment wall or a protected shaft) to a:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. protected stairway:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. lift shaft</td>
<td>30</td>
<td>30</td>
<td>30 (^{(8)})</td>
</tr>
<tr>
<td>10. Firefighting shafts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. construction separating firefighting shaft from rest of building;</td>
<td>120</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>b. construction separating firefighting stair, firefighting lift shaft and firefighting lobby</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>11. Enclosure (which is not a compartment wall or describe in item 8) to a:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. protected lobby;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. protected corridor</td>
<td>30</td>
<td>30</td>
<td>30 (^{(8)})</td>
</tr>
<tr>
<td>12. Sub-division of a corridor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Fire-resisting construction:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. enclosing places of special fire hazard (see 8.12):</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

\(^{(1)}\) BS 476: Building Materials—Fire Tests—Fire Resistance of Elements of Structure etc.

\(^{(2)}\) For elements subject to loadbearing capacity requirements as defined in BS 476.

\(^{(3)}\) For elements subject to wind loading as defined in BS 476.

\(^{(4)}\) For elements subject to fire loading as defined in BS 476.

\(^{(5)}\) For elements subject to smoke loading as defined in BS 476.

\(^{(6)}\) For elements subject to radiant heat loading as defined in BS 476.

\(^{(7)}\) For elements subject to heat transfer loading as defined in BS 476.

\(^{(8)}\) Loadbearing capacity for shaft enclosure.

\(^{(9)}\) EN 13501-1: Fire tests—Fire resistance test methods for building elements—Part 1: General requirements.
### Table A1 Specific provisions of test for fire resistance of elements of structure etc (continued)

<table>
<thead>
<tr>
<th>Part of building</th>
<th>Minimum provisions when tested to the relevant part of BS 476 (1) (minutes)</th>
<th>Minimum provisions when tested to the relevant European standard (minutes) (9)</th>
<th>Method of exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Loadbearing capacity (2)</td>
<td>Integrity</td>
<td>Insulation</td>
</tr>
<tr>
<td>b. between store rooms and sales area in shops (see 5.58)</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>c. fire-resisting subdivision described in Section 3, Diagram 16(b)</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>d. enclosing bedrooms an ancillary accommodation in care homes (see 4.48 and 4.50)</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>14. Enclosure In a flat to a protected entrance hall, or to a protected landing.</td>
<td>30</td>
<td>30</td>
<td>30(8)</td>
</tr>
<tr>
<td>15. Cavity barrier</td>
<td>Not applicable</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td>16. Ceiling Diagram 35</td>
<td>Not applicable</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>17. Duct described in paragraph 10.16e</td>
<td>Not applicable</td>
<td>30</td>
<td>No provision</td>
</tr>
<tr>
<td>18. Casing around a drainage system described in Section 11, Diagram 38</td>
<td>Not applicable</td>
<td>30</td>
<td>No provision</td>
</tr>
<tr>
<td>19. Flue walls described in Section 11, Diagram 39</td>
<td>Not applicable</td>
<td>Half the period specified in Table A2 for the compartment wall/floor</td>
<td>Half the period specified in Table A2 for the compartment wall/floor</td>
</tr>
<tr>
<td>20. Fire doors</td>
<td>See Table B1</td>
<td>See Table B1</td>
<td>See Table B1</td>
</tr>
</tbody>
</table>

**Notes:**

1. Part 21 for loadbearing elements, Part 22 for non-loadbearing elements, Part 23 for fire-protecting suspended ceilings, and Part 24 for ventilation ducts. BS 476-8 results are acceptable for items tested or assessed before 1 January 1988.

2. Applies to loadbearing elements only (see B3.ii and Appendix E).
Appendix A: Performance of materials, products and structures

3. Guidance on increasing the fire resistance of existing timber floors is given in BRE Digest 208 *Increasing the fire resistance of existing timber floors* (BRE 1988).

4. A suspended ceiling should only be relied on to contribute to the fire resistance of the floor if the ceiling meets the appropriate provisions given in Table A3.

5. The guidance in Section 13 allows such walls to contain areas which need not be fire-resisting (unprotected areas).

6. Unless needed as part of a wall in item 5a or 5b.

7. Except for any limitations on glazed elements given in Table A4.

8. See Table A4 for permitted extent of uninsulated glazed elements.

9. The National classifications do not automatically equate with the equivalent classifications in the European column, therefore products cannot typically assume a European class unless they have been tested accordingly. ‘R’ is the European classification of the resistance to fire performance in respect of loadbearing capacity; ‘E’ is the European classification of the resistance to fire performance in respect of integrity; and ‘I’ is the European classification of the resistance to fire performance in respect of insulation.
# Appendix A: Performance of materials, products and structures

## Volume 2 – Buildings other than dwellinghouses

**Approved Document B (Fire safety)**

### Table A2 minimum periods of fire resistance

<table>
<thead>
<tr>
<th>Purpose group of building</th>
<th>Minimum provisions when tested to the relevant part of BS 476&lt;sup&gt;(1)&lt;/sup&gt; (minutes)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Basement storey'&lt;sup&gt;3&lt;/sup&gt; including floor over</td>
<td>Ground or upper storey</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth (m) of a lowest basement</td>
<td></td>
<td>Height (m) of top floor above ground, in a building or separated part of a building</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than 10&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td>Not more than 10</td>
<td>Not more than 5</td>
<td>Not more than 18</td>
<td>Not more than 30</td>
<td>Not more than 30</td>
<td></td>
</tr>
</tbody>
</table>

1. Residential:
   a. Block of flats
      - not sprinklered
      - sprinklered
   b. Institutional
   c. Other residential

2. Office
   - not sprinklered
   - sprinklered<sup>(2)</sup>

3. Shop and commercial:
   - not sprinklered
   - sprinklered<sup>(2)</sup>

4. Assembly and recreation:
   - not sprinklered
   - sprinklered<sup>(2)</sup>

5. Industrial:
   - not sprinklered
   - sprinklered<sup>(2)</sup>

6. Storage and other non-residential:
   a. any building or part not described elsewhere:
      - not sprinklered
      - sprinklered<sup>(2)</sup>
   b. car park for light vehicles:
      i. open sided car park<sup>(3)</sup>
      ii. any other car park

---

Single storey buildings are subject to the periods under the heading “not more than 5”. If they have basements, the basement storeys are subject to the period appropriate to their depth.

$\$ The floor over a basement (or if there is more than 1 basement, the floor over the topmost basement) should meet the provisions for the ground and upper storeys if that period is higher.
Appendix A: Performance of materials, products and structures

* Increased to a minimum of 60 minutes for compartment walls separating buildings.

** Reduced to 30 minutes for any floor within a flat with more than one storey, but not if the floor contributes to the support of the building.

# Reduced to 90 minutes for elements not forming part of the structural frame.

+ Increased to 30 minutes for elements protecting the means of escape.

† Refer to paragraph 8.9 regarding the acceptability of 30 minutes in flat conversions.

Notes:

1. Refer to Table A1 for the specific provisions of test.

2. “Sprinklered” means that the building is fitted throughout with an automatic fire suppression system in accordance with section 2.

3. The car park should comply with the relevant provisions in the guidance on requirement B3, Section 12.

4. For the purposes of meeting the Building Regulations, the following types of steel elements are deemed to have satisfied the minimum period of fire resistance of 15 minutes when tested to the European test method:

   i. Beams supporting concrete floors maximum $Hp/A=230m^{-1}$ operating under full design load.

   ii. Free standing columns, maximum $Hp/A=180m^{-1}$ operating under full design load.

   iii. Wind bracing and struts, maximum $Hp/A=210m^{-1}$ operating under full design load.

Guidance is also available in BS 5950 Structural use of steelwork in building. Part 8 Code of practice for fire resistant design.

Application of the fire resistance standards in Table A2:

a. Where one element of structure supports or carries or gives stability to another, the fire resistance of the supporting element should be no less than the minimum period of fire resistance for the other element (whether that other element is loadbearing or not).

   There are circumstances where it may be reasonable to vary this principle, for example:

   i. where the supporting structure is in the open air and is not likely to be affected by the fire in the building; or

   ii. the supporting structure is in a different compartment, with a fire-separating element (which has the higher standard of fire resistance) between the supporting and the separated structure; or

   iii. where a plant room on the roof needs a higher fire resistance than the elements of structure supporting it.

b. Where an element of structure forms part of more than one building or compartment, that element should be constructed to the standard of the greater of the relevant provisions.

c. Where one side of a basement is (due to the slope of the ground) open at ground level, giving an opportunity for smoke venting and access for fire fighting, it may be appropriate to adopt the standard of fire resistance applicable to above-ground structures for elements of structure in that storey.

d. Although most elements of structure in a single storey building may not need fire resistance (see the guidance on requirement B3, paragraph 8.4(a)), fire resistance will
be needed if the element:

i. is part of (or supports) an external wall and there is provision in the guidance on requirement B4 to limit the extent of openings and other unprotected areas in the wall; or

ii. is part of (or supports) a compartment wall, including a wall common to two or more buildings; or

iii. supports a gallery.

For the purposes of this paragraph, the ground storey of a building which has one or more basement storeys and no upper storeys, may be considered as a single storey building. The fire resistance of the basement storeys should be that appropriate to basements.

<table>
<thead>
<tr>
<th>Height of building or separated part (m)</th>
<th>Type of floor</th>
<th>Provision for fire resistance or floor (minutes)</th>
<th>Type of floor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 18</td>
<td>Not compartment</td>
<td>60 or less</td>
<td>Type W, X, Y or Z</td>
</tr>
<tr>
<td></td>
<td>Compartment</td>
<td>Less than 60</td>
<td></td>
</tr>
<tr>
<td>18 or more</td>
<td>any</td>
<td>60</td>
<td>Type X, Y or Z</td>
</tr>
<tr>
<td>No limit</td>
<td>any</td>
<td>More than 60</td>
<td>Type Z</td>
</tr>
</tbody>
</table>

Notes:
1. Ceiling type and description (the change from Types A-D to Types W-Z is to avoid confusion with Classes A-D (European)):
   
   W. Surface of ceiling exposed to the cavity should be Class 0 or Class 1 (National) or Class C-s3, d2 or better (European).
   
   X. Surface of ceiling exposed to the cavity should be Class 0 (National) or Class B-s3, d2 or better (European).
   
   Y. Surface of ceiling exposed to the cavity should be Class 0 (National) or Class B-s3, d2 or better (European). Ceiling should not contain easily openable access panels.
   
   Z. Ceiling should be of a material of limited combustibility (National) or of Class A2-s3, d2 or better (European) and not contain easily openable access panels. Any insulation above the ceiling should be of a material of limited combustibility (National) or Class A2-s3, d2 or better (European).

2. Any access panels provided in fire protecting suspended ceilings of type Y or Z should be secured in position by releasing devices or screw fixings, and they should be shown to have been tested in the ceiling assembly in which they are incorporated.

3. The National classifications do not automatically equate with the equivalent European classifications, therefore, products cannot typically assume a European class unless they have been tested accordingly.

When a classification includes ‘s3, d2’, this means that there is no limit set for smoke production and/or flaming droplets/particles.
# Appendix A: Performance of materials, products and structures

## Table A4 Limits on the use of uninsulated glazed elements on escape routes
(These limitations do not apply to glazed elements which satisfy the relevant insulation criterion, see Table A1)

<table>
<thead>
<tr>
<th>Position of glazed element</th>
<th>A single stairway</th>
<th>More than one stairway</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Walls</td>
<td>Door leaf</td>
</tr>
<tr>
<td>Flats</td>
<td>Fixed Fanlights only</td>
<td>Unlimited above 1100mm from floor</td>
</tr>
<tr>
<td></td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>General</td>
<td>Nil</td>
<td>25% of door area</td>
</tr>
<tr>
<td></td>
<td>Unlimited above 1100mm from floor</td>
<td>Unlimited above 100mm from floor</td>
</tr>
<tr>
<td></td>
<td>Unlimited above 1100mm from floor</td>
<td>Unlimited above 100mm from floor</td>
</tr>
<tr>
<td></td>
<td>Unlimited above 1100mm from floor</td>
<td>Unlimited above 100mm from floor</td>
</tr>
<tr>
<td></td>
<td>Unlimited above 1100mm from floor</td>
<td>Unlimited above 100mm from floor</td>
</tr>
<tr>
<td></td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td></td>
<td>Unlimited above 1100mm from floor</td>
<td>Unlimited above 100mm from floor</td>
</tr>
<tr>
<td></td>
<td>Unlimited above 1100mm from floor</td>
<td>Unlimited above 100mm from floor</td>
</tr>
<tr>
<td></td>
<td>Unlimited above 1100mm from floor</td>
<td>Unlimited above 100mm from floor</td>
</tr>
<tr>
<td>Notes:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. If the protected stairway is also a protected shaft (see paragraph 9.35) or a firefighting stair (see Section 18) there may be further restrictions on the uses of glazed elements.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Measured vertically from the landing floor level or the stair pitch line.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. The 100mm limit is intended to reduce the risk of fire spread from a floor covering.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Items 1 and 4 apply also to single storey buildings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Fire-resisting glass should be marked with the manufacturer and product name.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Further guidance can be found in A guide to best practice in the specification and use of fire-resistant glazed systems published by the Glass and Glazing Federation.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix A: Performance of materials, products and structures

| Table A5  Notional designations of roof coverings |
|-----------------|-----------------|-----------------|
| Part i: Pitched roofs covered with slates or tiles |
| Covering material | Supporting structure | Designation |
| 1. Natural slates | Timber rafters with or without underfelt, sarking, boarding, woodwool slabs, compressed straw slabs, plywood, wood chipboard, or fibre insulating board | AA (National class) or B_{ROOF}(t4) (European class) |
| 2. Fibre reinforced cement slates | | |
| 3. Clay tiles | | |
| 4. Concrete tiles | | |

**Note:** Although the Table does not include guidance for roofs covered with bitumen felt, it should be noted that there is a wide range of materials on the market and information on specific products is readily available from manufacturers.

| Part ii: Pitched roofs covered with self-supporting sheet |
|-----------------|-----------------|-----------------|
| Roof covering material | Construction | Supporting structure | Designation |
| 1. Profiled sheet of galvanised steel, aluminium, fibre reinforced cement, or pre-painted (coil coated) steel or aluminium with a PVC or PVF2 coating | Single skin without underlay, or with underlay or plasterboard, fibre insulating board, or woodwool slab | Structure of timber, steel or concrete | AA (National class) or B_{ROOF}(t4) (European class) |
| 2. Profiled sheet of galvanised steel, aluminium, fibre reinforced cement, or pre-painted (coil coated) steel or aluminium with a PVC or PVF2 coating | Double skin without interlayer, or with interlayer of resin bonded glass fibre, mineral wool slab, polystyrene, or polyurethane | Structure of timber, steel or concrete | AA (National class) or B_{ROOF}(t4) (European class) |

| Part iii. Flat roofs covered with bitumen felt |
|-----------------|-----------------|-----------------|
| A flat roof comprising bitumen felt should (irrespective of the felt specification) be deemed to be of designation AA (National class) or B_{ROOF}(t4) (European class) if the felt is laid on a deck constructed of 6mm plywood, 12.5mm wood chipboard, 16mm (finished) plain edged timber boarding, compressed straw slab, screeded wood wool slab, profiled fibre reinforced cement or steel deck (single or double skin) with or without fibre insulating board overlay, profiled aluminium deck (single or double skin) with or without fibre insulating board overlay, or concrete or clay pot slab (insitu or pre cast), and has a surface finish of: a. bitumen-bedded stone chippings covering the whole surface to a depth of at least 12.5mm; b. bitumen-bedded tiles of a non-combustible material; c. sand and cement screed; or d. macadam. |
### Table A5 Notional designations of roof coverings (continued)

<table>
<thead>
<tr>
<th>Covering material</th>
<th>Supporting structure</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Aluminium sheet</td>
<td>timber joists and:</td>
<td>AA* (National class) or B&lt;sub&gt;ROOF(t4)&lt;/sub&gt; (European class)</td>
</tr>
<tr>
<td>2. Copper sheet</td>
<td>tongued and grooved boarding, or plain edged boarding</td>
<td></td>
</tr>
<tr>
<td>3. Zinc sheet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Lead sheet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Mastic asphalt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Vitreous enamelled steel</td>
<td>steel or timber joists with deck of: woodwool slabs, compressed straw slab, wood chipboard, fibre insulating board, or 9.5mm plywood</td>
<td></td>
</tr>
<tr>
<td>7. Lead/tin alloy coated steel sheet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Zinc/aluminium alloy coated steel sheet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Pre-painted (coil coated) steel sheet including liquid-applied pvc coatings</td>
<td>non-combustible deck of steel, aluminium, or fibre cement (with or without insulation)</td>
<td>AA (National class) or B&lt;sub&gt;ROOF(t4)&lt;/sub&gt; (European class)</td>
</tr>
</tbody>
</table>

**Notes:**

* Lead sheet supported by timber joists and plain edged boarding should be regarded as having a BA designation and is deemed to be designated class C<sub>ROOF(t4)</sub> (European class).

The National classifications do not automatically equate with the equivalent classifications in the European column, therefore products cannot typically assume a European class unless they have been tested accordingly.
## Table A6  Use and definitions of non-combustible materials

<table>
<thead>
<tr>
<th>References in AD B guidance to situations where such materials should be used</th>
<th>Definitions of non-combustible materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. refuse chutes meeting the provisions in the guidance to B3, paragraph 9.34c</td>
<td>a. Any material which when tested to BS 476-11:1982 does not flame nor cause any rise in temperature on either the centre (specimen) or furnace thermocouples.</td>
</tr>
<tr>
<td>2. suspended ceilings and their supports where there is provision in the guidance to B3, paragraph 10.12, for them to be constructed of non-combustible materials.</td>
<td>b. Totally inorganic materials such as concrete, fired clay, ceramics, metals, plaster and masonry containing not more than 1% by weight or volume of organic material. (Use in buildings of combustible metals such as magnesium/aluminium alloys should be assessed in each individual case).</td>
</tr>
<tr>
<td>3. pipes meeting the provisions in the guidance to B3. Table 14.</td>
<td>c. Concrete bricks or blocks meeting BS EN 771-3:2003</td>
</tr>
<tr>
<td>4. flue walls meeting the provisions in the guidance to B3, Diagram 39.</td>
<td>d. Products classified as non-combustible under BS 476-4:1970</td>
</tr>
<tr>
<td>5. construction forming car parks referred to in the guidance to B3, paragraph 12.3.</td>
<td>a. Any material classified as class A1 in accordance with BS EN 13501-1:2002 Fire classification of construction products and building elements. Classification using data from reaction to fire tests.</td>
</tr>
<tr>
<td></td>
<td>b. Products made from one or more of the materials considered as Class A1 without the need for testing as defined in Commission Decision 2003/424/EC of 6th June 2003 amending Decision 96/603/EC establishing the list of products belonging to Classes A1 “No contribution to fire” provided for in the Decision 94/611/EC implementing Article 20 of the Council Directive 89/106/EEC on construction products. None of the materials shall contain more than 1% by weight or volume (whichever is the more onerous) of homogeneously distributed organic material</td>
</tr>
</tbody>
</table>

**Note:**
The National classifications do not automatically equate with the equivalent classifications in the European column, therefore products cannot typically assume a European class unless they have been tested accordingly.
### Table A7 Use and definitions of materials of limited combustibility

<table>
<thead>
<tr>
<th>References in AD B guidance to situations where such materials should be used</th>
<th>Definitions of materials of limited combustibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Stairs where there is provision in the guidance to B1 for them to be constructed of materials of limited combustibility (see 6.19)</td>
<td>a. Any non-combustible material listed in Table A6.</td>
</tr>
<tr>
<td>2. Materials above a suspended ceiling meeting the provisions in the guidance to B3, paragraph 10.12 Reinforcement/support for fire-stopping referred to in the guidance to B3, see 11.18.</td>
<td>b. Any material of density 300/kg/m³ or more, which when tested to BS 476-11:1982, does not flame and the rise in temperature on the furnace thermocouple is not more than 20°C.</td>
</tr>
<tr>
<td>4. Roof coverings meeting provisions: a. in the guidance to B3, paragraph 9.29 or b. in the guidance to B4. Table 16 or c. in the guidance to B4. Diagram 47</td>
<td>c. Any material with a non-combustible core at least 8mm thick having combustible facings (on one or both sides) not more than 0.5mm thick (Where a flame spread rating is specified, these materials must also meet the appropriate test requirements).</td>
</tr>
<tr>
<td>5. Roof deck meeting the provisions of the guidance to B3, Diagram 30a</td>
<td></td>
</tr>
<tr>
<td>6. Class O materials meeting the provisions in Appendix A, paragraph 13(a).</td>
<td></td>
</tr>
<tr>
<td>7. Ceiling tiles or panels of any fire protecting suspended ceiling (Type Z) in Table A3.</td>
<td></td>
</tr>
<tr>
<td>8. Insulation material in external wall construction referred to in paragraph 13.7.</td>
<td></td>
</tr>
<tr>
<td>9. Insulation above any fire-protecting suspended ceiling (Type Z) in Table A3.</td>
<td>Any of the materials (a), (b) or (c) above, or: d. Any material of density less than 300kg/m³, which when tested to BS 476-11:1982, does not flame for more than 10 seconds and the rise in temperature on the centre (specimen) thermocouple is not more than 35°C and on the furnace thermocouple is not more than 25°C.</td>
</tr>
<tr>
<td></td>
<td>Any of the materials/products (a) or (b) above.</td>
</tr>
</tbody>
</table>

**Note:**

1. The National classifications do not automatically equate with the equivalent classifications in the European column, therefore products cannot typically assume a European class unless they have been tested accordingly.

2. When a classification includes “s3, d2”, this means that there is no limit set for smoke production and/or flaming droplets/particles.
Table A8  Typical performance ratings of some generic materials and products

<table>
<thead>
<tr>
<th>Rating</th>
<th>Material or product</th>
</tr>
</thead>
</table>
| Class 0 (National)          | 1. Any non-combustible material or material of limited combustibility. (composite products listed in Table A7 must meet test requirements given in Appendix A, paragraph 13(b)).  
                              | 2. Brickwork, blockwork, concrete and ceramic tiles.  
                              | 3. Plasterboard (painted or not with a PVC facing not more than 0.5mm thick) with or without an air gap or fibrous or cellular insulating material behind.  
                              | 5. Mineral fibre tiles or sheets with cement or resin binding.                      |
| Class 3 (National)          | 6. Timber or plywood with a density more than 400kg/m³, painted or unpainted.       
                              | 7. Wood particle board or hardboard, either untreated or painted.                   
| Class A1 (European)         | 9. Any material that achieves this class or is defined as ‘classified without further test’ in a published Commission Decision. |
| Class A2-s3, d2 (European)  | 10.Any material that achieves this class or is defined as ‘classified without further test’ in a published Commission Decision. |
| Class B-s3, d2 (European)   | 11. Any material that achieves this class or is defined as ‘classified without further test’ in a published Commission Decision. |
| Class C-s3, d2 (European)   | 12. Any material that achieves this class or is defined as ‘classified without further test’ in a published Commission Decision. |
| Class D-s3, d2 (European)   | 13. Any material that achieves this class or is defined as ‘classified without further test’ in a published Commission Decision. |

Notes (National):
1. Materials and products listed under Class 0 also meet Class 1.
2. Timber products listed under Class 3 can be brought up to Class 1 with appropriate proprietary treatments.
3. The following materials and products may achieve the ratings listed below. However, as the properties of different products with the same generic description vary, the ratings of these materials/products should be substantiated by test evidence.
   - Class 0 – aluminium faced fibre insulating board, flame retardant decorative laminates on a calcium silicate board, thick polycarbonate sheet, phenolic sheet and UPVC.
   - Class 1 – phenolic or melamine laminates on a calcium silicate substrate and flame-retardant decorative laminates on a combustible substrate.

Notes (European):
For the purposes of the Building Regulations:
1. Materials and products listed under Class A1 also meet Classes A2-s3, d2, B-s3, d2, C-s3, d2 and D-s3, d2.
2. Materials and products listed under Class A2-s3, d2 also meet Classes B-s3, d2, C-s3, d2 and D-s3, d2.
3. Materials and products listed under Class B-s3, d2 also meet Classes C-s3, d2 and D-s3, d2.
4. Materials and products listed under Class C-s3, d2 also meet Class D-s3, d2.
5. The performance of timber products listed under Class D-s3, d2 can be improved with appropriate proprietary treatments.
6. Materials covered by the CWFT process (classification without further testing) can be found by accessing...
Appendix A: Performance of materials, products and structures

the European Commission's website via the link on the CLG website www.communities.gov.uk

7. The national classifications do not automatically equate with the equivalent classifications in the European column, therefore products cannot typically assume a European class unless they have been tested accordingly.

8. When a classification includes ‘s3, d2’, this means that there is no limit set for smoke production and/or flaming droplets/particles.
Appendix B: Fire doors

1. All fire doors should have the appropriate performance given in Table B1 either:

   a. by their performance under test to BS 476-22 *Fire tests on building materials and structures. Methods for determination of the fire resistance of non-loadbearing elements of construction*, in terms of integrity for a period of minutes, e.g. FD30. A suffix (S) is added for doors where restricted smoke leakage at ambient temperatures is needed; or

   b. as determined with reference to Commission Decision 2000/367/EC of 3 May 2000 implementing Council Directive 89/106/EEC as regards the classification of the resistance to fire performance of construction products, construction works and parts thereof. All fire doors should be classified in accordance with BS EN 13501-2: 2003, *Fire classification of construction products and building elements. Classification using data from fire resistance tests (excluding products for use in ventilation systems)*. They are tested to the relevant European method from the following:

   - BS EN 1634-1:2008 *Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware. Fire resistance tests for doors, shutters and openable windows*;
   - BS EN 1634-2: 2008 *Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware. Fire resistance characterisation test for elements of building hardware*;
   - BS EN 1634-3:2004 *Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware. Smoke control test for door and shutter assemblies*; or


   The performance requirement is in terms of integrity (E) for a period of minutes. An additional classification of Sa is used for all doors where restricted smoke leakage at ambient temperatures is needed.

   The requirement (in either case) is for test exposure from each side of the door separately, except in the case of lift doors which are tested from the landing side only.

   Any test evidence used to substantiate the fire resistance rating of a door or shutter should be carefully checked to ensure that it adequately demonstrates compliance and is applicable to the adequately complete installed assembly. Small differences in detail (such as glazing apertures, intumescent strips, door frames and ironmongery etc) may significantly affect the rating.

   **Note 1:** The latest version of any standard may be used provided that it continues to address the relevant requirements of the Regulations.

   **Note 2:** Until such time that the relevant harmonised product standards are published, for the purposes of meeting the Building Regulations, products tested in accordance with BS EN 1634-1 (with or without pre-fire test mechanical conditioning) will be deemed to have satisfied the provisions provided that they achieve the minimum fire resistance in terms of...
Appendix B: Fire doors

integrity, as detailed in Table B1.

2. All fire doors should be fitted with a self-closing device except for fire doors to cupboards and to service ducts which are normally kept locked shut and fire doors within flats (self-closing devices are still necessary on flat entrance doors).

Note: All rolling shutters should be capable of being opened and closed manually for firefighting purposes (see Section 18, paragraph 18.15).

3. Where a self-closing device would be considered a hindrance to the normal approved use of the building, self-closing fire doors may be held open by:
   a. a fusible link (but not if the door is fitted in an opening provided as a means of escape unless it complies with paragraph 4 below); or
   b. an automatic release mechanism actuated by an automatic fire detection and alarm system; or
   c. a door closer delay device.

4. Two fire doors may be fitted in the same opening so that the total fire resistance is the sum of their individual fire resistances, provided that each door is capable of closing the opening. In such a case, if the opening is provided as a means of escape, both doors should be self-closing, but one of them may be fitted with an automatic self-closing device and be held open by a fusible link if the other door is capable of being easily opened by hand and has at least 30 minutes fire resistance.

5. Because fire doors often do not provide any significant insulation, there should be some limitation on the proportion of doorway openings in compartment walls. Therefore no more than 25% of the length of a compartment wall should consist of door openings, unless the doors provide both integrity and insulation to the appropriate level (see Appendix A, Table A2).

Note: Where it is practicable to maintain a clear space on both sides of the doorway, then the above percentage may be greater.

6. Roller shutters across a means of escape should only be released by a heat sensor, such as a fusible link or electric heat detector, in the immediate vicinity of the door. Closure of shutters in such locations should not be initiated by smoke detectors or a fire alarm system, unless the shutter is also intended to partially descend to form part of a boundary to a smoke reservoir.

7. Unless shown to be satisfactory when tested as part of a fire door assembly, the essential components of any hinge on which a fire door is hung should be made entirely from materials having a melting point of at least 800°C.

8. Except for doors identified in paragraph 9 below, all fire doors should be marked with the appropriate fire safety sign complying with BS 5499-5:2002 according to whether the door is:
   a. to be kept closed when not in use (Fire door keep shut);
   b. to be kept locked when not in use (Fire door keep locked shut); or
   c. held open by an automatic release mechanism or free swing device (Automatic fire door keep clear).

Fire doors to cupboards and to service ducts should be marked on the outside; all other fire
doors on both sides.

9. The following fire doors are not required to comply with paragraph 8 above:
   a. doors to and within flats;
   b. bedroom doors in ‘Other-residential’ premises; and
   c. lift entrance/landing doors.

10. Tables A1 and A2 set out the minimum periods of fire resistance for the elements of structure to which performance of some doors is linked. Table A4 sets out limitations on the use of uninsulated glazing in fire doors.

11. BS 8214:1990 gives recommendations for the specification, design, construction, installation and maintenance of fire doors constructed with non-metallic door leaves.

Guidance on timber fire-resisting doorsets, in relation to the new European test standard, may be found in *Timber Fire-Resisting Doorsets: maintaining performance under the new European test standard* published by TRADA.

Guidance for metal doors is given in *Code of practice for fire-resisting metal doorsets* published by the DSMA (Door and Shutter Manufacturers’ Association) in 1999.

12. Hardware used on fire doors can significantly affect performance in fire. Notwithstanding the guidance in this Approved Document, guidance is available in *Hardware for fire and escape doors* published by the Builders Hardware Industry Federation and Guild of Architectural Ironmongers.
### Table B1 Provisions for fire doors

<table>
<thead>
<tr>
<th>Position of door</th>
<th>Minimum fire resistance of door in terms of integrity (minutes) when tested to BS 476-22&lt;sup&gt;(1)&lt;/sup&gt;</th>
<th>Minimum fire resistance of door in terms of integrity (minutes) when tested to the relevant European standard&lt;sup&gt;(3)&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In a compartment wall separating buildings</td>
<td>As for the wall in which the door is fitted, but a minimum of 60</td>
<td>As for the wall in which the door is fitted, but a minimum of 60</td>
</tr>
<tr>
<td>2. In a compartment wall:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. If it separates a flat from a space in common use</td>
<td>FD 30&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td>E30&lt;sup&gt;S&lt;sub&gt;a&lt;/sub&gt;(2)&lt;/sup&gt;</td>
</tr>
<tr>
<td>b. Enclosing a protected shaft forming a stairway situated wholly or partly above the adjoining ground in a building used for Flats, Other Residential, Assembly and Recreation, or Office purposes;</td>
<td>FD 30&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td>E30&lt;sup&gt;S&lt;sub&gt;a&lt;/sub&gt;(2)&lt;/sup&gt;</td>
</tr>
<tr>
<td>c. Enclosing a protected shaft forming a stairway not described in (b) above;</td>
<td>Half the period of fire resistance of the wall in which it is fitted, but 30 minimum and with suffix S&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td>Half the period of fire resistance of the wall in which it is fitted, but 30 minimum and with suffix S&lt;sup&gt;(2)&lt;/sup&gt;</td>
</tr>
<tr>
<td>d. Enclosing a protected shaft forming a lift or service shaft;</td>
<td>Half the period of fire resistance of the wall in which it is fitted, but 30 minimum</td>
<td>Half the period of fire resistance of the wall in which it is fitted, but 30 minimum</td>
</tr>
<tr>
<td>e. not described in (a), (b), (c) or (d) above</td>
<td>As for the wall it is fitted in, but add S&lt;sub&gt;a&lt;/sub&gt;&lt;sup&gt;(2)&lt;/sup&gt; if the door is used for progressive horizontal evacuation under the guidance to B1</td>
<td>As for the wall it is fitted in, but add S&lt;sub&gt;a&lt;/sub&gt;&lt;sup&gt;(2)&lt;/sup&gt; if the door is used for progressive horizontal evacuation under the guidance to B1</td>
</tr>
<tr>
<td>3. In a compartment floor</td>
<td>As for the floor in which it is fitted</td>
<td>As for the floor in which it is fitted</td>
</tr>
<tr>
<td>4. Forming part of the enclosures of:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. a protected stairway (except as described in item 9); or</td>
<td>FD 30&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td>E30&lt;sup&gt;S&lt;sub&gt;a&lt;/sub&gt;(2)&lt;/sup&gt;</td>
</tr>
<tr>
<td>b. a lift shaft (see paragraph 6.42b); which does not form a protected shaft in 2(b), (c) or (d) above.</td>
<td>FD 30&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td>E30&lt;sup&gt;S&lt;sub&gt;a&lt;/sub&gt;&lt;/sup&gt;</td>
</tr>
<tr>
<td>5. Forming part of the enclosure of:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. a protected lobby approach (or protected corridor) to a stairway;</td>
<td>FD 30&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td>E30&lt;sup&gt;S&lt;sub&gt;a&lt;/sub&gt;(2)&lt;/sup&gt;</td>
</tr>
<tr>
<td>b. any other protected corridor; or</td>
<td>FD 20&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td>E20&lt;sup&gt;S&lt;sub&gt;a&lt;/sub&gt;(2)&lt;/sup&gt;</td>
</tr>
<tr>
<td>c. a protected lobby approach to a lift shaft (see paragraph 6.42)</td>
<td>FD 30&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td>E30&lt;sup&gt;S&lt;sub&gt;a&lt;/sub&gt;(2)&lt;/sup&gt;</td>
</tr>
</tbody>
</table>
## Appendix C: Methods of measurement

### Table B1 Provisions for fire doors (continued)

<table>
<thead>
<tr>
<th>Position of door</th>
<th>Minimum fire resistance of door in terms of integrity (minutes) when tested to BS 476-22 (1)</th>
<th>Minimum fire resistance of door in terms of integrity (minutes) when tested to the relevant European standard (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Affording access to an external escape route</td>
<td>FD 30</td>
<td>E30</td>
</tr>
<tr>
<td>7. Sub-dividing:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. corridors connecting alternative exits</td>
<td>FD 20S(2)</td>
<td>E20 Sₐ(2)</td>
</tr>
<tr>
<td>b. dead-end portions of corridors from the remainder of the corridor</td>
<td>FD 20S(2)</td>
<td>E20 Sₐ(2)</td>
</tr>
<tr>
<td>8. Any door within a cavity barrier</td>
<td>FD 30</td>
<td>E 30</td>
</tr>
<tr>
<td>9. Any door forming part of the enclosure to a protected entrance hall or protected landing in a flat;</td>
<td>FD 20</td>
<td>E20</td>
</tr>
<tr>
<td>10. Any door forming part of the enclosure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. to a place of special fire risk</td>
<td>FD30</td>
<td>E30</td>
</tr>
<tr>
<td>b. to ancillary accommodation in care homes (see paragraph 4.50)</td>
<td>FD30</td>
<td>E30</td>
</tr>
</tbody>
</table>

### Notes

1. To BS 476-22:1987 (or BS 476-8:1972 subject to paragraph 5 in Appendix A).
2. Unless pressurization techniques complying with BS EN 12101-6:2005 Code of practice for smoke control using pressure differentials are used, these doors should also either:
   a. have a leakage rate not exceeding 3m³/m/hour (head and jambs only) when tested at 25 Pa under BS 476 Fire tests on building materials and structures, Section 31.1 Methods for measuring smoke penetration through doorsets and shutter assemblies, Method of measurement under ambient temperature conditions; or
   b. meet the additional classification requirement of Sₐ when tested to BS EN 1634-3:2001 Fire resistance tests for door and shutter assemblies, Part 3 – Smoke control doors.
3. The National classifications do not automatically equate with the equivalent classifications in the European column, therefore products cannot typically assume a European class unless they have been tested accordingly.
Appendix C: Methods of measurement

1. Some form of measurement is an integral part of many of the provisions in this document. Paragraphs 2 to 5 and Diagrams C1 to C7 show how the various forms of measurement should be made.

Occupant capacity

2. The **occupant capacity** of a room, storey, building or part of a building is:
   a. the maximum number of persons it is designed to hold;
   b. the number calculated by dividing the area of room or storey(s) (m²) by a floor space factor (m² per person) such as those given in Table C1 for guidance.

**Note:** ‘area’ excludes stair enclosures, lifts, sanitary accommodation and any other fixed part of the building structure (but counters and display units, etc. should not be excluded).

<table>
<thead>
<tr>
<th>Type of accommodation</th>
<th>Floor space factor m²/person</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Standing spectator areas, bar areas (within 2m of serving point) similar refreshment areas</td>
<td>0.3</td>
</tr>
<tr>
<td>2. Amusement arcade, assembly hall (including a general purpose place of assembly), bingo hall, club, crush hall, dance floor or hall, venue for pop concert and similar events and bar areas without fixed seating</td>
<td>0.5</td>
</tr>
<tr>
<td>3. Concourse, queuing area or shopping mall</td>
<td>0.7</td>
</tr>
<tr>
<td>4. Committee room, common room, conference room, dining room, licensed betting office (public area), lounge or bar (other than in 1 above), meeting room, reading room, restaurant, staff room or waiting room</td>
<td>1.0</td>
</tr>
<tr>
<td>5. Exhibition hall or studio (film, radio, television, recording)</td>
<td>1.5</td>
</tr>
<tr>
<td>6. Skating rink</td>
<td>2.0</td>
</tr>
<tr>
<td>7. Shop sales area</td>
<td>2.0</td>
</tr>
<tr>
<td>8. Art gallery, dormitory, factory production area, museum or workshop</td>
<td>5.0</td>
</tr>
<tr>
<td>9. Office</td>
<td>6.0</td>
</tr>
<tr>
<td>10. Shop sales area</td>
<td>7.0</td>
</tr>
<tr>
<td>11. Kitchen or library</td>
<td>7.0</td>
</tr>
<tr>
<td>12. Bedroom or study-bedroom</td>
<td>8.0</td>
</tr>
<tr>
<td>13. Bed-sitting room, billiards or snooker room or hall</td>
<td>10.0</td>
</tr>
<tr>
<td>14. Storage and warehousing</td>
<td>30.0</td>
</tr>
<tr>
<td>15. Car park</td>
<td>Two persons per parking space</td>
</tr>
</tbody>
</table>

**Notes:**
1. As an alternative to using the values in the table, the floor space factor may be determined by reference to actual data taken from similar premises. Where appropriate, the data should reflect the average occupant density at a peak trading time of year.
Appendix C: Methods of measurement

2. Where accommodation is not directly covered by the descriptions given, a reasonable value based on a similar use may be selected.

3. Where any part of the building is to be used for more than one type of accommodation, the most onerous factor(s) should be applied. Where the building contains different types of accommodation, the occupancy of each different area should be calculated using the relevant space factor.


5. For detailed guidance on appropriate floor space factors for concourses in sports grounds refer to “Concourses” published by the Football Licensing Authority (ISBN: 0 95462 932 9).

6. Alternatively the occupant capacity may be taken as the number of fixed seats provided, if the occupants will normally be seated.

7. Shops excluding those under item 10, but including - supermarkets and department stores (main sales areas), shops for personal services such as hairdressing and shops for the delivery or collection of goods for cleaning, repair or other treatment or for members of the public themselves carrying out such cleaning, repair or other treatment.

8. Shops (excluding those in covered shopping complexes but including department stores) trading predominantly in furniture, floor coverings, cycles, prams, large domestic appliances or other bulky goods, or trading on a wholesale self-selection basis (cash and carry).

---

Travel distance

3. Travel distance is measured by way of the shortest route which if:
   a. there is fixed seating or other fixed obstructions, is along the centre line of the seatways and gangways;
   b. it includes a stair, is along the pitch line on the centre line of travel.

Width

4. The width of:
   a. a door (or doorway) is the clear width when the door is open (see Diagram C1);
   b. an escape route is the width at 1500mm above floor level when defined by walls or, elsewhere, the minimum width of passage available between any fixed obstructions;
   c. a stair is the clear width between the walls or balustrades.

Note 1: In the case of escape routes and stairs, handrails and strings which do not intrude more than 100mm into these widths may be ignored (see Diagram C1).

Note 2: The rails used for guiding a stair-lift may be ignored when considering the width of a stair. However, it is important that the chair or carriage is able to be parked in a position that does not cause an obstruction to either the stair or landing.
Appendix C: Methods of measurement

**Diagram C1 Measurement of door width**

Effective clear width (door stop to projecting ironmongery)

Effective clear width (door stop to door leaf)

**Diagram C2 Cubic capacity**

In every case measure the volume contained by:

a. under surface of roof as appropriate;

b. upper surface of lowest floor;

c. the inner surface of enclosing walls (when there is not an enclosing outside wall, measure to the outermost edge of the floor) and ignore internal walls and partitions.

**Diagram C3 Area**

1. Flat or monopitch

SECTION

Outer point of roof at eaves or verge

If a lean-to roof measure from face to wall

2. Double pitch

SECTION

Highest point of roof slope

Outer point of roof

Verge

If a hipped roof measure to outer point of roof as base area

3. Rooflight, surface area: roofs and rooflights, in each case measure the visible area

SECTION

Roof sheeting

Rooflight

4. Floor area: room, garage, conservatory or outbuilding, measure to inner surface of enclosing walls

PLAN

Door or window

When there is not an outer enclosing wall, measure to the outermost edge of the floor slab

5. Floor area: storey, part or compartment, measure to inner surface of enclosing walls and include internal walls and partitions
Appendix C: Methods of measurement

Diagram C4 Height of building

A. Double pitch roof

B. Mansard type roof

C. Flat or monopitch roof

Diagram C5 Number of storeys

To count the number of storeys in a building, or in a separated part of a building, count only at the position which gives the greatest number and exclude any basement storeys.

Notes:
In assembly buildings, a gallery is included as a storey, but not if it is a loading gallery, fly gallery, stage grid, lighting bridge, or any gallery provided for similar purposes, or for maintenance and repair.

In other purpose group buildings, galleries are not counted as a storey.
Appendix C: Methods of measurement

Free Area of Smoke Ventilators
5. The free area of a smoke ventilator, specified in this Approved Document, may be measured by either:

a. the declared aerodynamic free area in accordance with BS EN 12101-2:2003 *Smoke and heat control systems. Specification for natural smoke and heat exhaust ventilators*; or,

b. The total unobstructed cross sectional area, measured in the plane where the area is at a minimum and at right angles to the direction of air flow (see diagram C7).
Appendix D: Purpose groups

1. Many of the provisions in this document are related to the use of the building. The use classifications are termed purpose groups and represent different levels of hazard. They can apply to a whole building, or (where a building is compartmented) to a compartment in the building and the relevant purpose group should be taken from the main use of the building or compartment.

2. Table D1 sets out the purpose group classification.

Note: This is only of relevance to this Approved Document.

Ancillary and main uses

3. In some situations there may be more than one use involved in a building or compartment and in certain circumstances it is appropriate to treat the different use as belonging to a purpose group in its own right. These situations are:
   a. where the ancillary use is a flat; or
   b. where the building or compartment is more than 280m$^2$ in area and the ancillary use is of an area that is more than a fifth of the total floor area of the building or compartment; or
   c. storage in a building or compartment of Purpose Group 4 (shop or commercial), where the storage amounts to more than 1/3rd of the total floor area of the building or compartment and the building or compartment is more than 280m$^2$ in area.

4. Some buildings may have two or more main uses that are not ancillary to one another. For example offices over shops from which they are independent. In such cases, each of the uses should be considered as belonging to a purpose group in its own right.

5. In other cases and particularly in some large buildings, there may be a complex mix of uses. In such cases it is necessary to consider the possible risk that one part of a complex may have on another and special measures to reduce the risk may be necessary.
## Table D1: Classification of Purpose Groups

<table>
<thead>
<tr>
<th>Title</th>
<th>Group</th>
<th>Purpose for which the building or compartment of a building is intended to be used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential (dwellings)</td>
<td>1(a)*</td>
<td>Flat</td>
</tr>
<tr>
<td></td>
<td>1(b)†</td>
<td>Dwellinghouse which contains a habitable storey with a floor level which is more than 4.5m above ground level.</td>
</tr>
<tr>
<td></td>
<td>1(c)†+</td>
<td>Dwellinghouse which does not contain a habitable storey with a floor level which is more than 4.5m above ground level.</td>
</tr>
<tr>
<td>Residential (Institutional)</td>
<td>2(a)</td>
<td>Hospital, home, school or other similar establishment used as living accommodation for, or for the treatment, care or maintenance of persons suffering from disabilities due to illness or old age or other physical or mental incapacity, or under the age of 5 years, or place of lawful detention, where such persons sleep on the premises.</td>
</tr>
<tr>
<td>(Other)</td>
<td>2(b)</td>
<td>Hotel, boarding house, residential college, hall of residence, hostel and any other residential purpose not described above.</td>
</tr>
<tr>
<td>Office</td>
<td>3</td>
<td>Offices or premises used for the purpose of administration, clerical work (including writing, book keeping, sorting papers, filing, typing, duplicating, machine calculating, drawing and the editorial preparation of matter for publication, police and fire and rescue service work), handling money (including banking and building society work), and communications (including postal, telegraph and radio communications) or radio, television, film, audio or video recording, or performance (not open to the public) and their control. or (except in the case of repair of motor vehicles) where they themselves may carry out such repairs or other treatments.</td>
</tr>
<tr>
<td>Shop and commercial</td>
<td>4</td>
<td>Shops or premises used for a retail trade or business (including the sale to members of the public of food or drink for immediate consumption and retail by auction, self-selection and over-the-counter wholesale trading, the business of lending books or periodicals for gain and the business of a barber or hairdresser and the rental of storage space to the public) and premises to which the public is invited to deliver or collect goods in connection with their hire repair or other treatment, or (except in the case of repair of motor vehicles) where they themselves may carry out such repairs or other treatments.</td>
</tr>
<tr>
<td>Assembly and recreation</td>
<td>5</td>
<td>Place of assembly, entertainment or recreation; including bingo halls, broadcasting, recording and film studios open to the public, casinos, dance halls; entertainment, conference, exhibition and leisure centres; funfairs and amusement arcades; museums and art galleries; non-residential clubs, theatres, cinemas and concert halls; educational establishments, dancing schools, gymnasias, swimming pool buildings, riding schools, skating rinks, sports pavilions, sports stadia; law courts; churches and other buildings of worship, crematoria; libraries open to the public, non-residential day centres, clinics, health centres and surgeries; passenger stations and termini for air, rail, road or sea travel; public toilets; zoos and menageries.</td>
</tr>
</tbody>
</table>
### Table D1: Classification of Purpose Groups (continued)

<table>
<thead>
<tr>
<th>Title</th>
<th>Group</th>
<th>Purpose for which the building or compartment of a building is intended to be used (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial</td>
<td>6</td>
<td>Factories and other premises used for manufacturing, altering, repairing, cleaning, washing, breaking-up, adapting or processing any article; generating power or slaughtering livestock.</td>
</tr>
<tr>
<td>Storage and other non-residential+</td>
<td>7(a)</td>
<td>Place for the storage or deposit of goods or materials (other than described under 7(b)) and any building not within any of the Purpose Groups 1 to 6</td>
</tr>
<tr>
<td></td>
<td>7(b)</td>
<td>Car parks designed to admit and accommodate only cars, motorcycles and passenger or light goods vehicles weighing no more than 2500kg gross.</td>
</tr>
</tbody>
</table>

**Notes:**

This table only applies to Part B.

* Includes live/work units that meet the provisions of paragraph 3.52.

† includes any surgeries, consulting rooms, offices or other accommodation, not exceeding 50m² in total, forming part of a dwellinghouse and used by an occupant of the dwellinghouse in a professional or business capacity.

+ A detached garage not more than 40m² in area is included in purpose group 1(c); as is a detached open carport of not more than 40m², or a detached building which consists of a garage and open carport where neither the garage nor the open carport exceeds 40m² in area.
Note: Except for the items marked* (which are from the Building Regulations), these definitions apply only to Part B.

Access room A room through which passes the only escape route from an inner room.

Accommodation stair A stair, additional to that or those required for escape purposes, provided for the convenience of occupants.

Alternative escape routes Escape routes sufficiently separated by either direction and space, or by fire-resisting construction, to ensure that one is still available should the other be affected by fire.

Alternative exit One of two or more exits, each of which is separate from the other.

Appliance ventilation duct A duct provided to convey combustion air to a gas appliance.

Atrium (plural atria) A space within a building, not necessarily vertically aligned, passing through one or more structural floors.

Note: Enclosed lift wells, enclosed escalator wells, building services’ ducts and stairways are not classified as atria.

Automatic fire suppression System For the purposes of section 2 this refers to a system designed and installed in accordance with an appropriate, fully implemented, technical standard such as BS9251: 2005, BSEN12845: 2009 or equivalent.

Automatic release mechanism A device which will allow a door held open by it to close automatically in the event of each or any one of the following:

a. detection of smoke by automatic apparatus suitable in nature, quality and location;
b. operation of a hand-operated switch fitted in a suitable position;
c. failure of electricity supply to the device, apparatus or switch;
d. operation of the fire alarm system if any.

Basement storey A storey with a floor which at some point is more than 1200mm below the highest level of ground adjacent to the outside walls. (However, see Appendix A, Table A2, for situations where the storey is considered to be a basement only because of a sloping site.)

Boundary The boundary of the land belonging to the building, or, where the land abuts a road, railway, canal or river, the centreline of that road, railway, canal or river. (See Diagram 41.)

*Building Any permanent or temporary building but not any other kind of structure or erection. A reference to a building includes a reference to part of a building.

Building Control Body A term used to include both Local Authority Building Control and Approved Inspectors.

Cavity barrier A construction, other than a smoke curtain, provided to close a concealed space against penetration of smoke or flame, or provided to restrict the movement of smoke or flame within such a space.

Ceiling A part of a building which encloses and is exposed overhead in a room, protected shaft or circulation space. (The soffit of a rooflight is included as part of the surface of the ceiling, but not the frame. An upstand below a rooflight would be considered as a wall).
Appendix E: Definitions

**Circulation space** A space (including a protected stairway) mainly used as a means of access between a room and an exit from the building or compartment.

**Class 0** A product performance classification for wall and ceiling linings. The relevant test criteria are set out in Appendix A, paragraph 13.

**Common balcony** A walkway, open to the air on one or more sides, forming part of the escape route from more than one flat.

**Common stair** An escape stair serving more than one flat.

**Compartment (fire)** A building or part of a building, comprising one or more rooms, spaces or storeys, constructed to prevent the spread of fire to or from another part of the same building, or an adjoining building. (A roof space above the top storey of a compartment is included in that compartment.) (See also “Separated part”.)

**Compartment wall or floor** A fire-resisting wall/floor used in the separation of one fire compartment from another. (Construcational provisions are given in Section 9).

**Concealed space or cavity** A space enclosed by elements of a building (including a suspended ceiling) or contained within an element, but not a room, cupboard, circulation space, protected shaft or space within a flue, chute, duct, pipe or conduit.

**Corridor access** A design of a building containing flats in which each flat is approached via a common horizontal internal access or circulation space which may include a common entrance hall.

**Dead end** Area from which escape is possible in one direction only.

**Direct distance** The shortest distance from any point within the floor area, measured within the external enclosures of the building, to the nearest storey exit ignoring walls, partitions and fittings, other than the enclosing walls/partitions to protected stairways.

**Dwelling** A unit of residential accommodation occupied (whether or not as a sole or main residence):

a. by a single person or by people living together as a family; or
b. by not more than 6 residents living together as a single household, including a household where care is provided for residents.

**Element of structure**

a. a member forming part of the structural frame of a building or any other beam or column;
b. a loadbearing wall or loadbearing part of a wall;
c. a floor;
d. a gallery (but not a loading gallery, fly gallery, stage grid, lighting bridge, or any gallery provided for similar purposes or for maintenance and repair);
e. an external wall; and
f. a compartment wall (including a wall common to two or more buildings). (However, see the guidance to B3, paragraph 8.4, for exclusions from the provisions for elements of structure.)

**Emergency lighting** Lighting provided for use when the supply to the normal lighting fails.
**Appendix E: Definitions**

**Escape lighting** That part of the emergency lighting which is provided to ensure that the escape route is illuminated at all material times.

**Escape route** Route forming that part of the means of escape from any point in a building to a final exit.

**European Technical Approval** A favourable technical assessment of the fitness for use of a construction product for an intended use, issued for the purposes of the Construction Products Directive by a body authorised by a member State to issue European Technical Approvals for those purposes and notified by that member State to the European Commission.

**European Technical Approvals Issuing body** A body notified under Article 10 of the Construction Products Directive. The details of these institutions are published in the “C” series of the Official Journal of the European Communities.

**Evacuation lift** A lift that may be used for the evacuation of people in a fire.

**Exit passageway** A protected passageway connecting a protected stairway to a final exit (exit passageways should be protected to the same standard as the stairway they serve).

**External wall (or side of a building)** Includes a part of a roof pitched at an angle of more than 70º to the horizontal, if that part of the roof adjoins a space within the building to which persons have access (but not access only for repair or maintenance).

**Final exit** The termination of an escape route from a building giving direct access to a street, passageway, walkway or open space and sited to ensure the rapid dispersal of persons from the vicinity of a building so that they are no longer in danger from fire and/or smoke.

**Note:** Windows are not acceptable as final exits.

**Fire damper** Mechanical or intumescent device within a duct or ventilation opening which is operated automatically and is designed to prevent the passage of fire and which is capable of achieving an integrity E classification and/or an ES classification to BS EN13501-3:2005 when tested to BS EN1366-2:1999. Intumescent fire dampers may be tested to ISO 10294-5.

**Fire and smoke damper** Fire damper which when tested in accordance with BS EN 1366-2:1999 meets the ES classification requirements defined in EN 13501-3:2005 and achieves the same fire resistance in relation to integrity, as the element of the building construction through which the duct passes. Intumescent fire dampers may be tested to ISO 10294-2.

**Fire door** A door or shutter, provided for the passage of persons, air or objects, which, together with its frame and furniture as installed in a building, is intended (when closed) to resist the passage of fire and/or gaseous products of combustion and is capable of meeting specified performance criteria to those ends. (It may have one or more leaves and the term includes a cover or other form of protection to an opening in a fire-resisting wall or floor, or in a structure surrounding a protected shaft.)

**Firefighting lift** A lift designed to have additional protection, with controls that enable it to be used under the direct control of the fire and rescue service in fighting a fire. (See Sections 16-18.)

**Firefighting lobby** A protected lobby providing access from a firefighting stair to the accommodation area and to any associated firefighting lift.
Appendix E: Definitions

Firefighting shaft A protected enclosure containing a firefighting stair, firefighting lobbies and, if provided, a firefighting lift, together with its machine room.

Firefighting stair A protected stairway communicating with the accommodation area only through a firefighting lobby.

Fire-resisting (fire resistance) The ability of a component or construction of a building to satisfy for a stated period of time, some or all of the appropriate criteria specified in the relevant standard test.

Fire-separating element A compartment wall, compartment floor, cavity barrier and construction enclosing a protected escape route and/or a place of special fire hazard.

Fire stop A seal provided to close an imperfection of fit or design tolerance between elements or components, to restrict the passage of fire and smoke.

* Flat A separate and self contained premises constructed or adapted for use for residential purposes and forming part of a building from some other part of which it is divided horizontally.

Gallery A floor or balcony which does not extend across the full extent of a building’s footprint and is open to the floor below.

Habitable room A room used, or intended to be used, for dwelling purposes (including for the purposes of Part B, a kitchen, but not a bathroom).

Height (of a building or storey for the purposes of Part B) Height of a building is measured as shown in Appendix C, Diagram C4 and height of the floor of the top storey above ground is measured as shown in Appendix C, Diagram C6.

Inner room Room from which escape is possible only by passing through another room (the access room).

Live/Work Unit A flat which is intended to serve as a workplace for its occupants and for persons who do not live on the premises.

Material of limited combustibility A material performance specification that includes non-combustible materials and for which the relevant test criteria are set out in Appendix A, paragraph 9.

Means of escape Structural means whereby [in the event of fire] a safe route or routes is or are provided for persons to travel from any point in a building to a place of safety.

Measurement Width of a doorway, area, cubic capacity, height of a building and number of storeys, see Appendix C, Diagrams C1 to C7; occupant capacity, travel distance and, escape route and a stair, see Appendix C.

Non-combustible material The highest level of reaction to fire performance. The relevant test criteria are set out in Appendix A, paragraph 8.

Notional boundary A boundary presumed to exist between buildings on the same site (see Section 14, Diagram 42).

Occupancy type A purpose group identified in Appendix D.

Open spatial planning The internal arrangement of a building in which more than one storey or level is contained in one undivided volume, e.g. split-level floors. For the purposes of this document there is a distinction between open spatial planning and an atrium space.
Appendix E: Definitions

**Perimeter (of a building)** The maximum aggregate plan perimeter, found by vertical projection onto a horizontal plane (see Section 17, Diagram 48).

**Pipe** (for the purposes of Section 11) – includes pipe fittings and accessories and excludes a flue pipe and a pipe used for ventilating purposes (other than a ventilating pipe for an above around drainage system).

**Places of special fire hazard** Oil-filled transformer and switch gear rooms, boiler rooms, storage space for fuel or other highly flammable substances and rooms housing a fixed internal combustion engine.

**Platform floor** (access or raised floor) A floor supported by a structural floor, but with an intervening concealed space which is intended to house services.

**Protected circuit** An electrical circuit protected against fire.

**Protected corridor/lobby** A corridor or lobby which is adequately protected from fire in adjoining accommodation by fire-resisting construction.

**Protected entrance hall/landing** A circulation area consisting of a hall or space in a flat, enclosed with fire-resisting construction (other than any part which is an external wall of a building).

**Protected shaft** A shaft which enables persons, air or objects to pass from one compartment to another and which is enclosed with fire-resisting construction.

**Protected stairway** A stair discharging through a final exit to a place of safety (including any exit passageway between the foot of the stair and the final exit) that is adequately enclosed with fire-resisting construction.

**Purpose group** A classification of a building according to the purpose to which it is intended to be put. See Appendix D, Table D1.

**Relevant boundary** The boundary which the side of the building faces, (and/or coincides with) and which is parallel, or at an angle of not more than 80°, to the side of the building (see Section 14, Diagram 41). A notional boundary can be a relevant boundary.

**Rooflight** A dome light, lantern light, skylight, ridge light, glazed barrel vault or other element intended to admit daylight through a roof.

**Room** (for the purposes of B2) An enclosed space within a building that is not used solely as a circulation space. (The term includes not only conventional rooms, but also cupboards that are not fittings and large spaces such as warehouses and auditoria. The term does not include voids such as ducts, ceiling voids and roof spaces.)

**School** A place of education for children older than 2 and younger than 19 years. Includes nursery schools, primary schools and secondary schools as defined in the Education Act 1996.

**Self-closing device** A device which is capable of closing the door from any angle and against any latch fitted to the door.

  **Note:** Rising butt hinges which do not meet the above criteria are acceptable where the door is in a cavity barrier.

**Separated part** (of a building) A form of compartmentation in which a part of a building is separated from another part of the same building by a compartment wall. The wall runs the full height of the part and is in one vertical plane. (See paragraph 9.22 and Appendix C, Diagram C5.)
Appendix E: Definitions

Sheltered housing includes:

a. two or more dwellings in the same building;
b. two or more dwellings on adjacent sites

where those dwellings are, in each case, designed and constructed for the purpose of providing residential accommodation for vulnerable or elderly people who receive, or who are to receive, a support service.

Short Stay Hostel For the purposes of Paragraph 2.2 this is a hostel used for short term accommodation for leisure purposes whilst a person is away from his or her main place of residence.

Single storey building A building consisting of a ground storey only. (A separated part which consists of a ground storey only, with a roof to which access is only provided for repair or maintenance, may be treated as a single storey building). Basements are not included in counting the number of storeys in a building (see Appendix C).

Site (of a building) is the land occupied by the building, up to the boundaries with land in other ownership.

Smoke alarm A device containing within one housing all the components, except possibly the energy source, necessary for detecting smoke and giving an audible alarm.

Storey includes:

a. any gallery in an assembly building (Purpose Group 5); and
b. any gallery in any other type of building if its area is more than half that of the space into which it projects; and

   Note: Where there is more than one gallery and the total aggregate area of all the galleries in any one space is more than half of the area of that space then the building should be regarded as being a multi storey building.

c. a roof, unless it is accessible only for maintenance and repair.

Storey exit A final exit, or a doorway giving direct access into a protected stairway, firefighting lobby, or external escape route.

   Note: A door in a compartment wall in an institutional building is considered as a storey exit for the purposes of B1 if the building is planned for progressive horizontal evacuation, see paragraph 4.41.

Suspended ceiling (fire-protecting) A ceiling suspended below a floor, which contributes to the fire resistance of the floor. Appendix A, Table A3, classifies different types of suspended ceiling.

Technical specification A standard or a European Technical Approval Guide. It is the document against which compliance can be shown in the case of a standard and against which an assessment is made to deliver the European Technical Approval.

Thermoplastic material See Appendix A, paragraph 17.

Travel distance (unless otherwise specified, e.g. as in the case of flats) 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.
Appendix E: Definitions

**Unprotected area** In relation to a side or external wall of a building means:

a. window, door or other opening; and
   
   **Note:** Windows that are not openable and are designed and glazed to provide the necessary level of fire resistance and recessed car parking areas shown in Diagram E1, need not be regarded as an unprotected area.

b. any part of the external wall which has less than the relevant fire resistance set out in Section 13; and

c. any part of the external wall which has combustible material more than 1mm thick attached or applied to its external face, whether for cladding or any other purpose. (Combustible material in this context is any material which does not have a Class 0 rating.)

![Diagram E1 Recessed car parking areas](image-url)