

Section 1: Fire detection and alarm systems

General provisions

- 1.1** All **dwelling**s should have a fire detection and alarm system, minimum Grade D2 Category LD3 standard, in accordance with the relevant recommendations of **BS 5839-6**.
A higher standard of protection should be considered where occupants of a proposed **dwelling** would be at special risk from fire. Further advice on this is also given in **BS 5839-6**.
- 1.2** Smoke alarms should be mains operated and conform to **BS EN 14604**.
- 1.3** Heat alarms should be mains operated and conform to **BS 5446-2**.
- 1.4** Smoke and heat alarms should have a standby power supply, such as a battery (rechargeable or non-rechargeable) or capacitor. More information on power supplies is given in clause 15 of **BS 5839-6**.

NOTE: The term ‘fire alarm system’ describes the combination of components for giving an audible and/or other perceptible warning of fire.

NOTE: In this document, the term ‘fire detection system’ describes any type of automatic sensor network and associated control and indicating equipment. Sensors may be sensitive to smoke, heat, gaseous combustion products or radiation. Automatic sprinkler systems can also be used to operate a fire alarm system.

Large dwellinghouses

- 1.5** A large **dwellinghouse** has more than one **storey**, and at least one **storey** exceeds 200m².
- 1.6** A large **dwellinghouse** of two **storeys** (excluding **basement storeys**) should be fitted with a Grade A Category LD3 fire detection and alarm system, as described in **BS 5839-6**.
- 1.7** A large **dwellinghouse** of three or more **storeys** (excluding **basement storeys**) should be fitted with a Grade A Category LD2 fire detection and alarm system as described in **BS 5839-6**.

Extensions and material alterations

- 1.8** A fire detection and alarm system should be installed where either of the following applies.
 - a. A new **habitable room** is provided above or below the ground **storey**.
 - b. A new **habitable room** is provided at the ground **storey**, without a **final exit**.
- 1.9** Smoke alarms should be provided in the **circulation spaces** of the **dwelling** in accordance with paragraphs 1.1 to 1.4.

Blocks of flats

- 1.10** Each flat in a block should have alarms as set out in paragraphs 1.1 to 1.4. With effective compartmentation, a communal fire alarm system is not normally needed. In some buildings, detectors in common parts of the building may need to operate smoke control or other fire protection systems but do not usually sound an audible warning.

Student accommodation

- 1.11** In student residences that are designed and occupied as a block of flats, separate automatic detection should be provided in each self-contained flat where all of the following apply.

- A group of up to six students shares the flat.
- Each flat has its own entrance door.
- The compartmentation principles for flats in Section 7 have been followed.

Where a total evacuation strategy is adopted, the alarm system should follow the guidance for buildings other than dwellings in Volume 2 of Approved Document B.

Sheltered housing

- 1.12** The fire detection and alarm systems in flats should connect to a central monitoring point or alarm receiving centre. The systems should alert the warden or supervisor and identify the individual flat where a fire has been detected.

- 1.13** These provisions do not apply to the following.

- The common parts of a sheltered housing development, such as communal lounges.
- Sheltered accommodation in the 'residential (institutional)' or 'residential (other)' purpose groups (purpose group 2(a) or 2(b)).

In these parts, means of warning should follow the guidance for buildings other than dwellings in Volume 2 of Approved Document B.

Design and installation of systems

- 1.14** Fire detection and alarm systems must be properly designed, installed and maintained. A design, installation and commissioning certificate should be provided for fire detection and alarm systems. Third party certification schemes for fire protection products and related services are an effective means of providing assurances of quality, reliability and safety.

Interface between fire detection and alarm systems and other systems

- 1.15** Fire detection and alarm systems sometimes trigger other systems. The interface between systems must be reliable. Particular care should be taken if the interface is facilitated via another system. Where any part of BS 7273 applies to the triggering of other systems, the recommendations of that part of BS 7273 should be followed.

Section 2: Means of escape – dwellinghouses

Escape from the ground storey

- 2.1 See Diagram 2.1a. All **habitable rooms** (excluding kitchens) should have either of the following.
- An opening directly onto a hall leading to a **final exit**.
 - An emergency escape window or door, as described in paragraph 2.10.

Escape from upper storeys a maximum of 4.5m above ground level

- 2.2 See Diagram 2.1b. Where served by only one stair, all **habitable rooms** (excluding kitchens) should have either of the following.
- An emergency escape window or external door, as described in paragraph 2.10.
 - Direct access to a **protected stairway**, as described in paragraph 2.5a.
- 2.3 Two **rooms** may be served by a single window. A door between the **rooms** should provide access to the window without passing through the stair enclosure. Both **rooms** should have their own access to the internal stair.

Escape from upper storeys more than 4.5m above ground level

- 2.4 **Dwellinghouses** with one internal stair should comply with paragraphs 2.5 and 2.6. In **dwellinghouses** with more than one stair, the stairs should provide effective alternative **means of escape**. The stairs should be physically separated by either of the following.
- Fire resisting** construction (minimum REI 30).
 - More than one **room**.

Dwellinghouses with one storey more than 4.5m above ground level

- 2.5 See Diagram 2.1c. The **dwellinghouse** should have either of the following.
- Protected stairway** – a stair separated by **fire resisting** construction (minimum REI 30) at all **storeys**, that complies with one of the following.
 - Extends to a **final exit** (Diagram 2.2a).
 - Gives access to a minimum of two ground level **final exits** that are separated from each other by **fire resisting** construction (minimum REI 30) and **fire doorsets** (minimum E 20) (Diagram 2.2b).
- Cavity barriers** or a **fire resisting ceiling** (minimum EI 30) should be provided above a **protected stairway** enclosure (Diagram 2.3).

- b. **Alternative escape route** – a top storey separated from lower storeys by fire resisting construction (minimum REI 30) and with an alternative escape route leading to its own final exit.

See paras 2.1 to 2.6

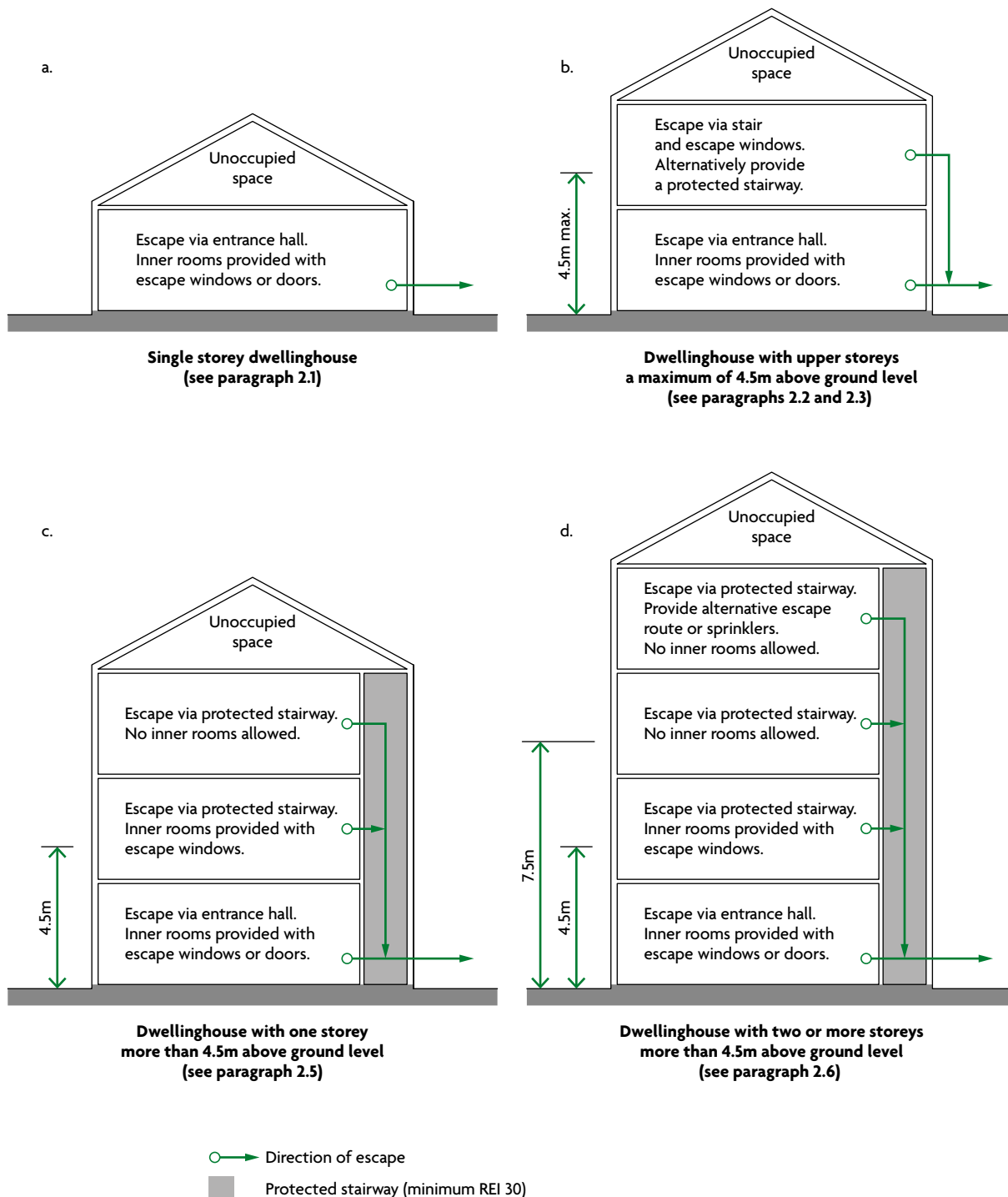


Diagram 2.1 Means of escape from dwellinghouses

See para 2.5

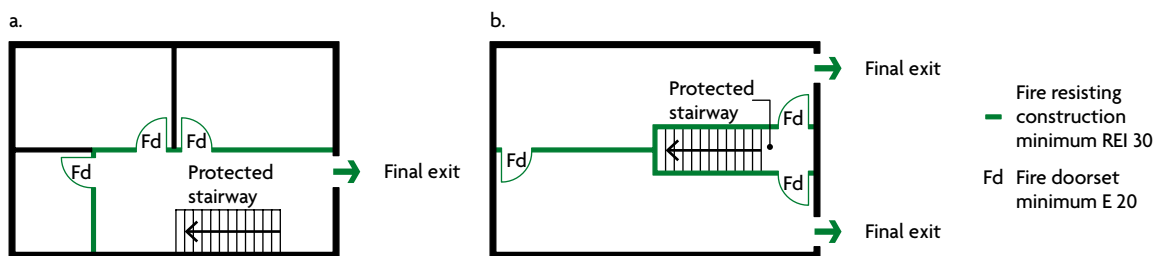


Diagram 2.2 Alternative arrangements for final exits

See para 2.5

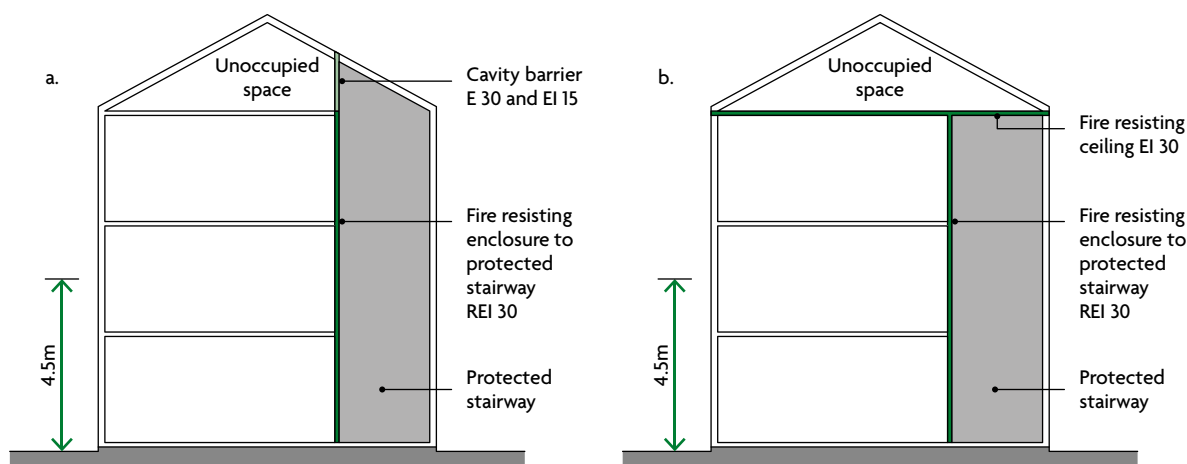
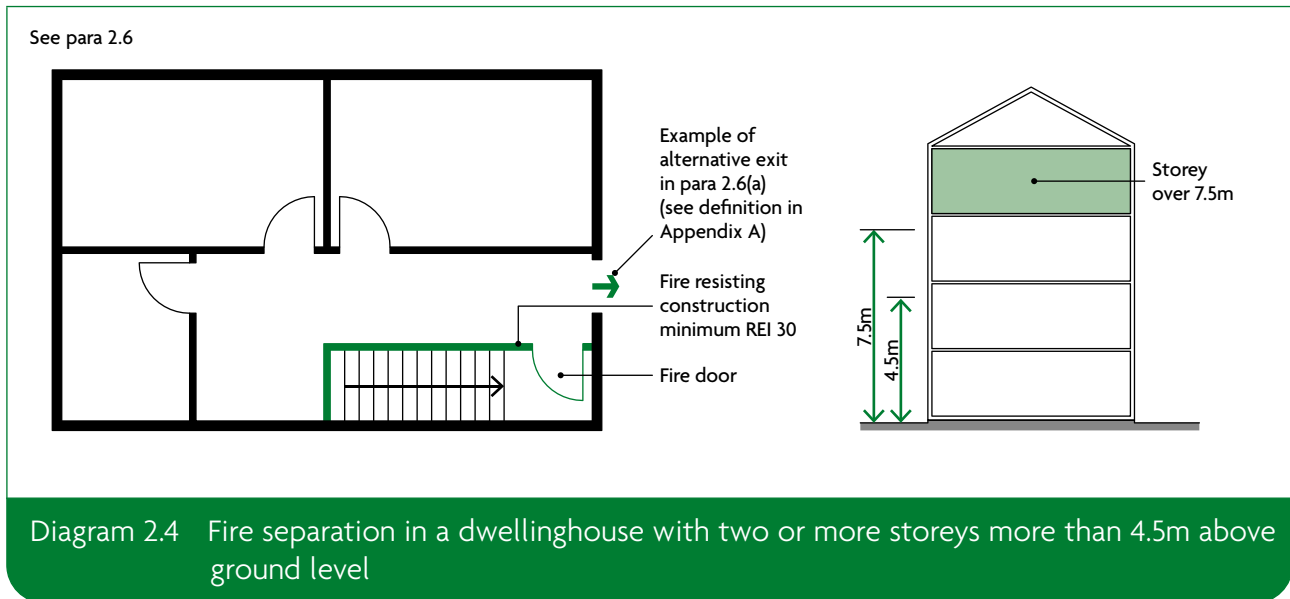


Diagram 2.3 Alternative cavity barrier arrangements in roof space over protected stairway in a house with a storey more than 4.5m above ground level

Dwellinghouses with two or more storeys more than 4.5m above ground level

2.6 See Diagram 2.1d. In addition to meeting the provisions in paragraph 2.5, the dwellinghouse should comply with either of the following.

- Provide an alternative escape route from each storey more than 7.5m above ground level. At the first storey above 7.5m, the protected stairway should be separated from the lower storeys by fire resisting construction (minimum REI 30) if the alternative escape route is accessed via either of the following.
 - The protected stairway to an upper storey.
 - A landing within the protected stairway enclosure to an alternative escape route on the same storey. The protected stairway at or about 7.5m above ground level should be separated from the lower storeys or levels by fire resisting construction (see Diagram 2.4).
- Provide a sprinkler system throughout, designed and installed in accordance with BS 9251.



Passenger lifts

2.7 A passenger lift serving any storey more than 4.5m above ground level should be in either of the following.

- The enclosure to the protected stairway, as described in paragraph 2.5.
- A fire resisting lift shaft (minimum REI 30).

Air circulation systems

2.8 Air circulation systems which circulate air within an individual dwellinghouse with a floor more than 4.5m above ground level should meet the guidance given in paragraph 2.9.

2.9 All of the following precautions should be taken to avoid the spread of smoke and fire to the protected stairway.

- Transfer grilles should not be fitted in any wall, door, floor or ceiling of the stair enclosure.
- Any duct passing through the stair enclosure should be rigid steel. Joints between the ductwork and stair enclosure should be fire-stopped.
- Ventilation ducts supplying or extracting air directly to or from a protected stairway should not serve other areas as well.
- Any system of mechanical ventilation which recirculates air and which serves both the stair and other areas should be designed to shut down on the detection of smoke within the system.
- For ducted warm air heating systems, a room thermostat should be sited in the living room. It should be mounted at a height between 1370mm and 1830mm above the floor. The maximum setting should be 27°C.

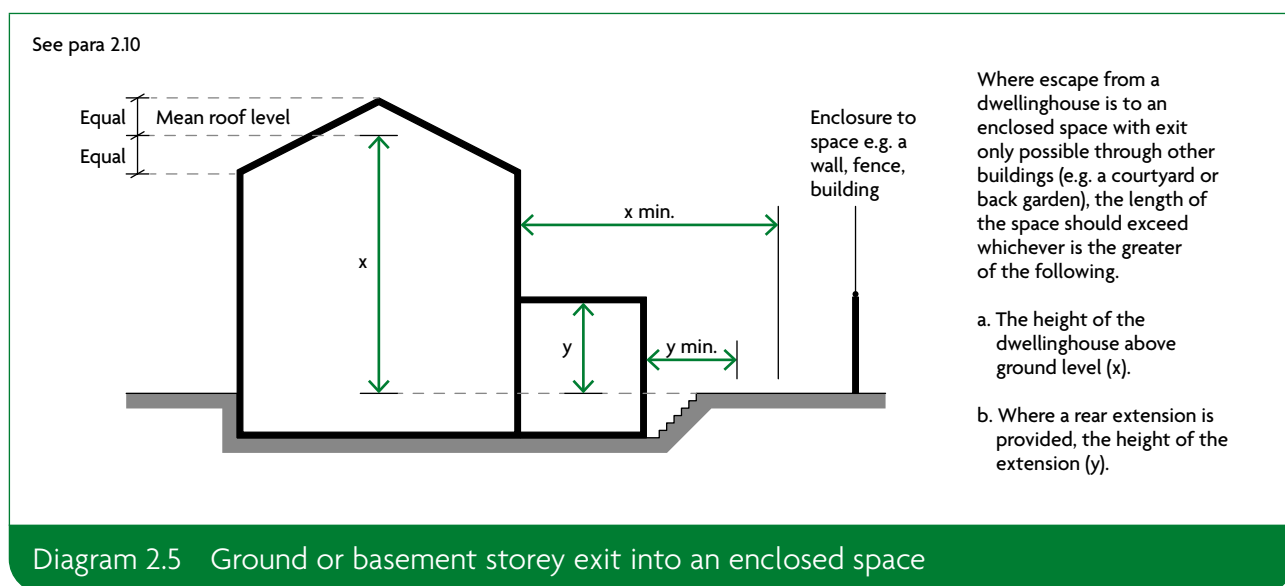
NOTE: Ventilation ducts passing through compartment walls should comply with the guidance in Section 9.

General provisions

Emergency escape windows and external doors

2.10 Windows or external doors providing emergency escape should comply with all of the following.

- a. Windows should have an unobstructed openable area that complies with all of the following.
 - i. A minimum area of 0.33m^2 .
 - ii. A minimum height of 450mm and a minimum width of 450mm (the route through the window may be at an angle rather than straight through).
 - iii. The bottom of the openable area is a maximum of 1100mm above the floor.
- b. People escaping should be able to reach a place free from danger from fire. Courtyards or inaccessible back gardens should comply with Diagram 2.5.
- c. Locks (with or without removable keys) and opening stays (with child-resistant release catches) may be fitted to escape windows.
- d. Windows should be capable of remaining open without being held.



Inner rooms

2.11 An inner room is permitted when it is one of the following.

- a. A kitchen.
- b. A laundry or utility room.
- c. A dressing room.
- d. A bathroom, WC or shower room.
- e. Any room on a storey that is a maximum of 4.5m above ground level which is provided with an emergency escape window as described in paragraph 2.10.
- f. A gallery that complies with paragraph 2.15.

2.12 A room accessed only via an inner room (an inner inner room) is acceptable when all of the following apply.

- It complies with paragraph 2.11.
- The access rooms each have a smoke alarm (see Section 1).
- None of the access rooms is a kitchen.

Balconies and flat roofs

2.13 Where a flat roof forms part of a means of escape, it should comply with all of the following.

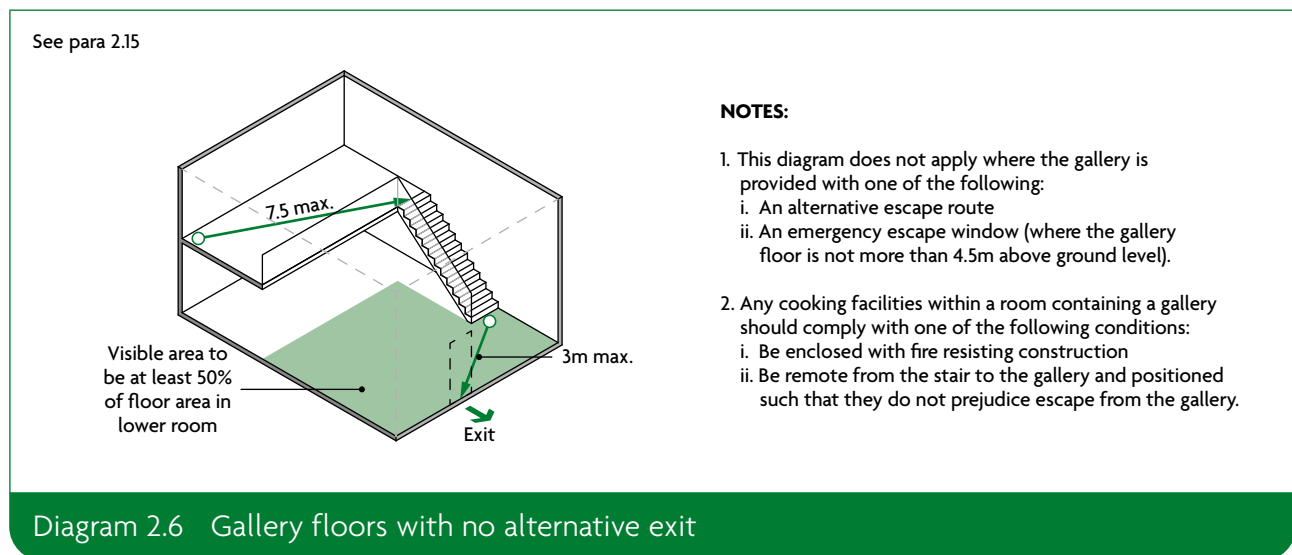
- It should be part of the same building from which escape is being made.
- The route across the roof should lead to a storey exit or external escape route.
- The part of the roof (including its supporting structure) forming the escape route, and any opening within 3m of the escape route, should be of fire resisting construction (minimum REI 30).

2.14 A balcony or flat roof intended to form part of an escape route should be provided with guarding etc. in accordance with Approved Document K.

Galleries

2.15 A gallery should comply with one of the following.

- It should be provided with an alternative exit.
- It should be provided with an emergency escape window, as described in paragraph 2.10, where the gallery floor is a maximum of 4.5m above ground level.
- It should meet all the conditions shown in Diagram 2.6.



Basements

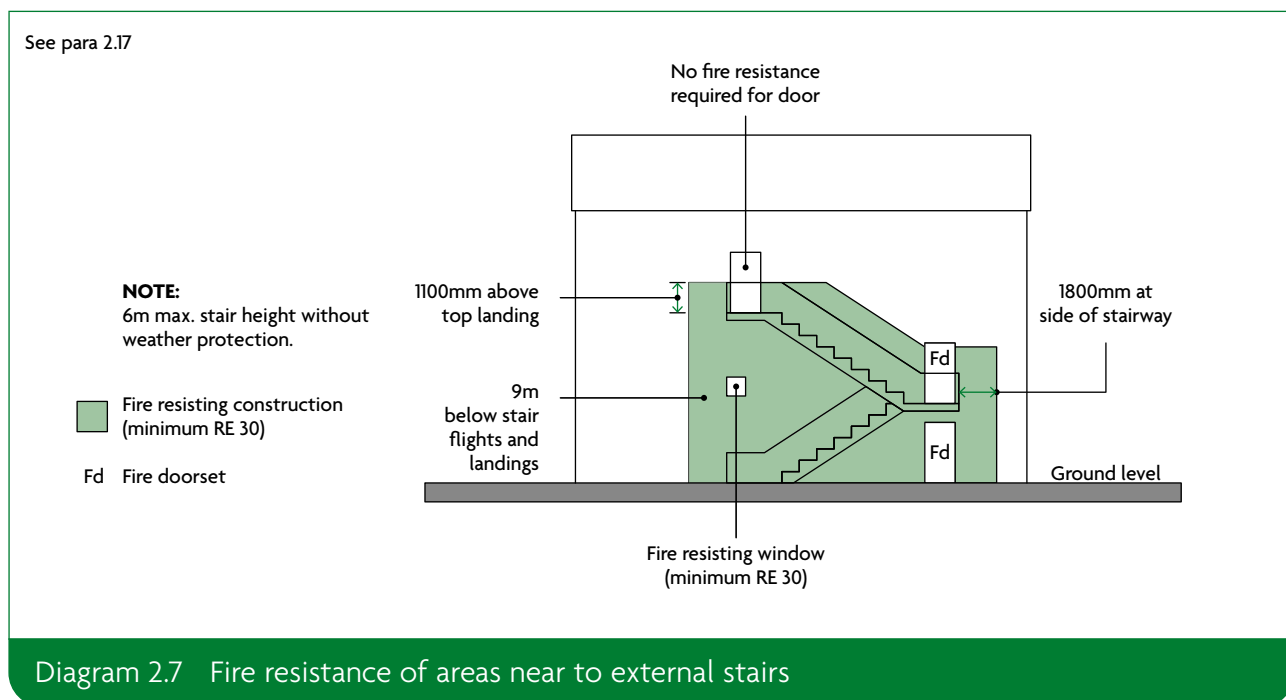
2.16 Basement storeys containing habitable rooms should have one of the following.

- An emergency escape window or external door providing escape from the basement (paragraph 2.10).
- A protected stairway (paragraph 2.5a) leading from the basement to a final exit.

External escape stairs

2.17 Any external escape stair should meet all of the following conditions (Diagram 2.7).

- Doors to the stair should be **fire resisting** (minimum E 30), except for a single exit door from the **building** to the top landing of a downward-leading external stair.
- Fire resisting** construction (minimum RE 30) is required for the **building** envelope within the following zones, measured from the flights and landings of the external stair.
 - 1800mm horizontally.
 - 9m vertically below.
 - 1100mm above the top landing of the stair (except where the stair leads from basement to ground level).
- Fire resisting** construction (minimum RE 30) should be provided for any part of the **building** (including doors) within 1800mm of the **escape route** from the foot of the stair to a place of safety. This does not apply if there are **alternative escape routes** from the foot of the external escape stair.
- Stairs more than 6m in **height** should be protected from adverse weather. Protection should prevent the build-up of snow or ice but does not require full enclosure.
- Glazing in areas of **fire resisting** construction should be fixed shut and **fire resisting** (in terms of integrity, but not insulation) (minimum E 30).



Work on existing dwellinghouses

Replacement windows

- 2.18** Work should comply with Parts K and L of Schedule 1 to the Building Regulations. When complete, the **building** should comply with other applicable parts of Schedule 1 to at least the same level as before.
- 2.19** Where an existing window would be an escape window in a new **dwellinghouse**, and is big enough to be used for escape purposes, then the replacement should comply with one of the following.
- The replacement window should be sized to provide at least the same potential for escape.
 - If the existing window was larger than required for escape purposes, the opening can be reduced to the minimum described in paragraph 2.10.
- 2.20** If windows are replaced, it may be necessary to provide **cavity barriers** around the opening in accordance with Section 5.

Loft conversions

- 2.21** Where a new **storey** is added through conversion to create a **storey** above 4.5m, both of the following should apply.
- The full extent of the **escape route** should be addressed.
 - Fire resisting** doors (minimum E 20) and partitions (minimum REI 30) should be provided, including upgrading the existing doors where necessary.
- NOTE:** Where the layout is open plan, new partitions should be provided to enclose the **escape route** (Diagram 2.2).
- 2.22** Where it is undesirable to replace existing doors because of historical or architectural merit, the possibility of retaining, and where necessary upgrading, them should be investigated.
- 2.23** An alternative approach to that described in paragraph 2.21 would be to comply with all of the following.
- Provide sprinkler protection to the open-plan areas.
 - Provide a **fire resisting** partition (minimum REI 30) and door (minimum E 20) to separate the ground **storey** from the upper **storeys**. The door should allow occupants of the loft **room** access to a first **storey** escape window.
 - Separate cooking facilities from the open-plan area with **fire resisting** construction (minimum REI 30).

Section 3: Means of escape – flats

Introduction

- 3.1** Separate guidance applies to **means of escape** within the **flat** and within the common parts of the **building** that lead to a place of safety. **Flats** at ground level are treated similarly to **dwellinghouses**. With increasing **height**, more complex provisions are needed.
- 3.2** The provisions in this section make the following assumptions.
- Any fire is likely to be in a **flat**.
 - There is no reliance on external rescue.
 - Simultaneous evacuation of all **flats** is unlikely to be necessary due to compartmentation.
 - Fires in common parts of the **building** should not spread beyond the fabric in the immediate vicinity. In some cases, however, communal facilities exist that require additional measures to be taken.
- 3.3** Provisions are recommended to support a stay put evacuation strategy for blocks of **flats**. It is based on the principle that a fire is contained in the **flat** of origin and common **escape routes** are maintained relatively free from smoke and heat. It allows occupants, some of whom may require assistance to escape in the event of a fire, in other **flats** that are not affected to remain.
- Sufficient protection to common **means of escape** is necessary to allow occupants to escape should they choose to do so or are instructed/aided to by the fire service. A higher standard of protection is therefore needed to ensure common **escape routes** remain available for a longer period than is provided in other **buildings**.
- 3.4** Paragraphs 3.6 to 3.23 deal with the **means of escape** within each **flat**. Paragraphs 3.25 to 3.89 deal with the **means of escape** in common areas of the **building** (including mixed use **buildings** in paragraphs 3.76 and 3.77). Guidance for **live/work units** is given in paragraph 3.24.

General provisions

Mixed use buildings

- 3.5** In mixed use **buildings**, separate **means of escape** should be provided from any **storeys** or parts of **storeys** used for the ‘residential’ or ‘assembly and recreation’ **purpose groups** (**purpose groups** 1, 2 and 5), other than in the case of certain small **buildings** or **buildings** in which the residential accommodation is ancillary (see paragraphs 3.76 and 3.77)

Emergency escape windows and external doors

- 3.6** Windows or external doors providing emergency escape should comply with all of the following.
- Windows should have an unobstructed openable area that complies with all of the following.
 - A minimum area of 0.33m².

- ii. A minimum height of 450mm and a minimum width of 450mm (the route through the window may be at an angle rather than straight through).
- iii. The bottom of the openable area is a maximum of 1100mm above the floor.
- b. People escaping should be able to reach a place free from danger from fire.
- c. Locks (with or without removable keys) and opening stays (with child-resistant release catches) may be fitted to escape windows.
- d. Windows should be capable of remaining open without being held.

Inner rooms

3.7 An **inner room** is permitted when it is one of the following.

- a. A kitchen.
- b. A laundry or utility **room**.
- c. A dressing **room**.
- d. A bathroom, WC or shower **room**.
- e. Any **room** on a **storey** that is a maximum of 4.5m above ground level which is provided with an emergency escape window as described in paragraph 3.6.
- f. A **gallery** that complies with paragraph 3.13.

3.8 A **room** accessed only via an **inner room** (an inner **inner room**) is acceptable when all of the following apply.

- a. It complies with paragraph 3.7.
- b. The **access rooms** each have a smoke alarm (see Section 1).
- c. None of the **access rooms** is a kitchen.

Basements

3.9 **Basement storeys** containing **habitable rooms** should have one of the following.

- a. An emergency escape window or external door providing escape from the basement (see paragraph 3.6).
- b. A **protected stairway** (minimum REI 30) leading from the basement to a **final exit**.

Balconies and flat roofs

3.10 Where a flat roof forms part of a **means of escape**, it should comply with all of the following.

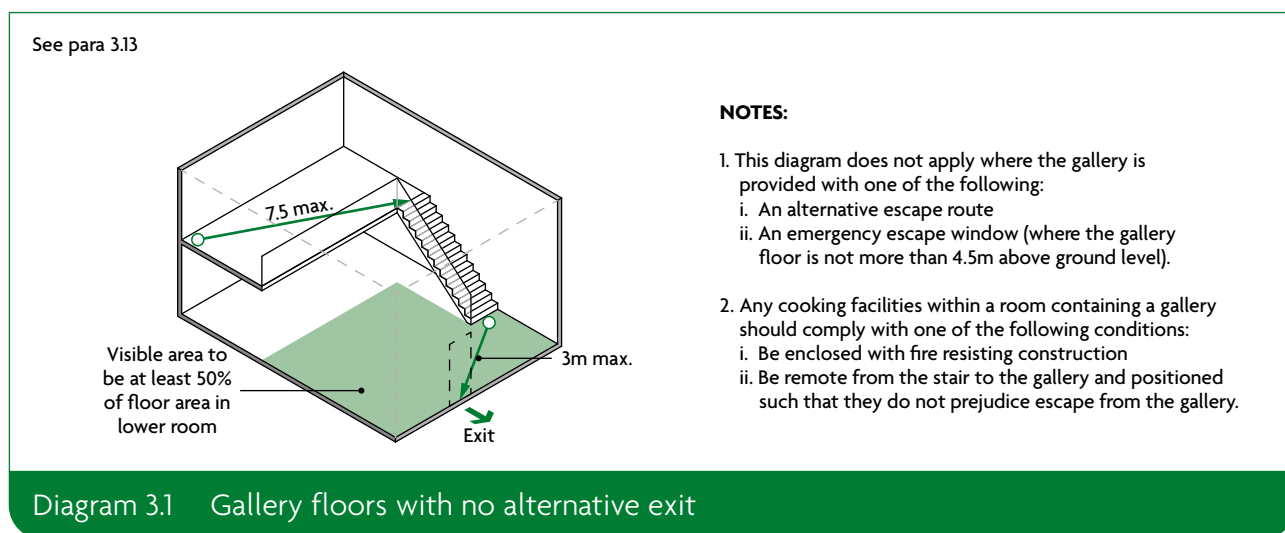
- a. It should be part of the same **building** from which escape is being made.
- b. The route across the roof should lead to a **storey exit** or external **escape route**.
- c. The part of the roof (including its supporting structure) forming the **escape route**, and any opening within 3m of the **escape route**, should be of **fire resisting** construction (minimum REI 30).

3.11 A balcony or flat roof intended to form part of an **escape route** should be provided with guarding etc. in accordance with Approved Document K.

3.12 For **flats** more than 4.5m above ground level, a balcony outside an **alternative exit** should be a **common balcony** meeting the conditions described in paragraph 3.22.

Galleries

- 3.13** A gallery should comply with one of the following.
- It should be provided with an alternative exit.
 - It should be provided with an emergency escape window, as described in paragraph 3.6, where the gallery floor is a maximum of 4.5m above ground level.
 - It should meet the conditions shown in Diagram 3.1.



Flats with upper storeys a maximum of 4.5m above ground level

- 3.14** The internal arrangement of single storey or multi-storey flats should comply with paragraphs 3.15 to 3.17. Alternatively, the guidance in paragraphs 3.18 to 3.22 may be followed.

Where a flat is accessed via the common parts of a block of flats it may be necessary to provide a protected entrance hall to meet the provisions of paragraph 3.28 and Diagram 3.9.

Escape from the ground storey

- 3.15** All habitable rooms (excluding kitchens) should have either of the following.
- An opening directly onto a hall leading to a final exit.
 - An emergency escape window or door, as described in paragraph 3.6.

Escape from upper storeys a maximum of 4.5m above ground level

- 3.16** All habitable rooms (excluding kitchens) should have either of the following.
- An emergency escape window or external door, as described in paragraph 3.6.
 - In multi-storey flats, direct access to a protected internal stairway (minimum REI 30) leading to an exit from the flat.
- 3.17** Two rooms may be served by a single escape window. A door between rooms should provide access to the escape window without passing through the stair enclosure. Both rooms should have their own access to the internal stair.

Flats with storeys more than 4.5m above ground level

Internal planning of single storey flats

3.18 One of the following approaches should be adopted, observing the **inner room** restrictions described in paragraphs 3.7 and 3.8.

- Provide a **protected entrance hall** (minimum REI 30) serving all **habitable rooms** that meets the conditions shown in Diagram 3.2.
- Plan the **flat** to meet the conditions shown in Diagram 3.3, so that both of the following apply.
 - The **travel distance** from the **flat** entrance door to any point in any **habitable room** is a maximum of 9m.
 - Cooking facilities are remote from the main entrance door and do not impede the **escape route** from anywhere in the **flat**.
- Provide an **alternative exit** from the **flat** complying with paragraph 3.19.

See para 3.18a

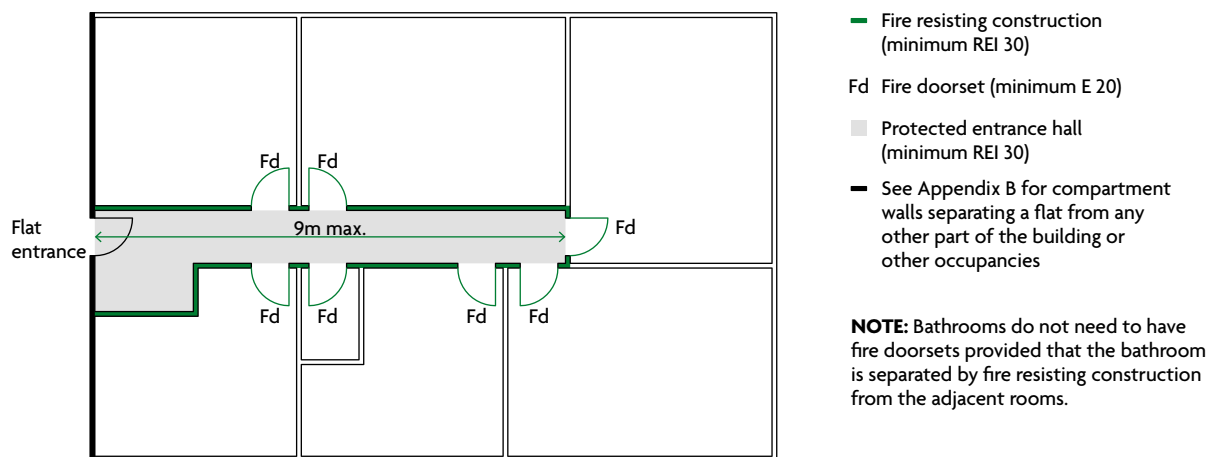


Diagram 3.2 Flat where all habitable rooms have direct access to an entrance hall

See para 3.18

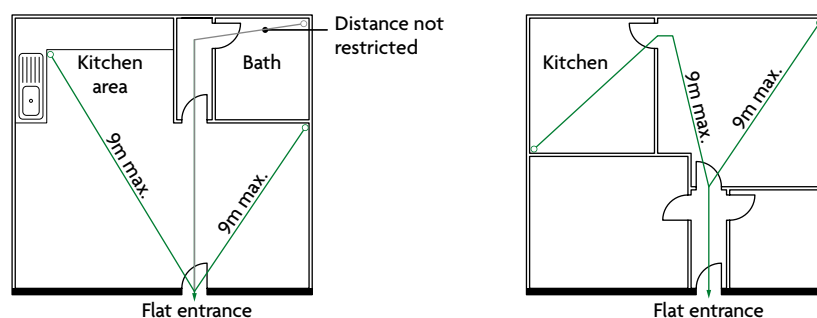
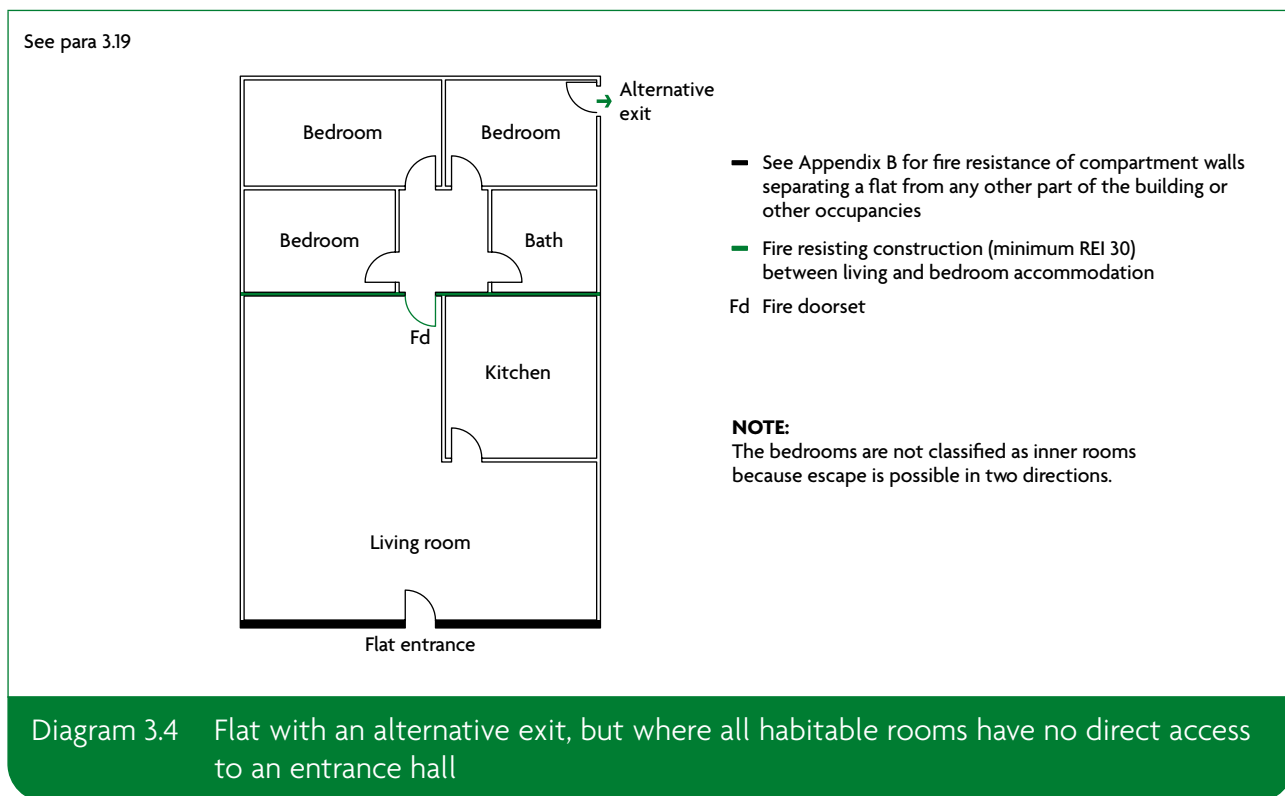


Diagram 3.3 Flat with restricted travel distance from furthest point to entrance

Flats with an alternative exit

- 3.19** Where access from any **habitable room** to the entrance hall or **flat** entrance is impossible without passing through another **room**, all of the following conditions should be met (Diagram 3.4).
- Bedrooms should be separated from living accommodation by **fire resisting** construction (minimum REI 30) and **fire doorsets** (minimum E 20).
 - The **alternative exit** should be in the part of the **flat** that contains the bedrooms.



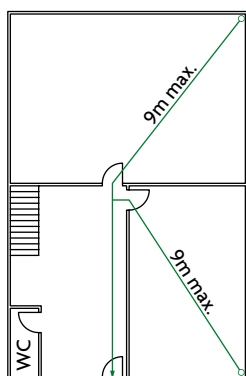
Internal planning of multi-storey flats

- 3.20** A multi-storey **flat** with an independent external entrance at ground level is similar to a **dwellinghouse** and **means of escape** should be planned on the basis of Section 2, depending on the **height** of the top **storey** above ground level.
- 3.21** When multi-storey **flats** do not have their own external entrance at ground level, adopt one of the following approaches.
- Approach 1** – provide at least one **alternative exit** from each **habitable room** that is not on the entrance **storey** of the **flat** (Diagram 3.5 and paragraph 3.22).
 - Approach 2** – provide at least one **alternative exit** from each **storey** that is not the entrance **storey** of the **flat**. All **habitable rooms** should have direct access to a **protected landing** (Diagram 3.6 and paragraph 3.22).
 - Approach 3** – provide a **protected stairway** plus a sprinkler system in accordance with Appendix E (smoke alarms should also be provided in accordance with Section 1).
 - Approach 4** – if the vertical distance between the entrance **storey** of the **flat** and any of the **storeys** above or below does not exceed 7.5m, provide all of the following.

- i. A **protected stairway**.
- ii. Additional smoke alarms in all **habitable rooms**.
- iii. A heat alarm in any kitchen.

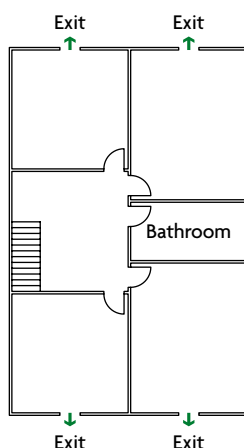
See para 3.21

a. Entrance level



Flat entrance

b. Level(s) above or below entrance level



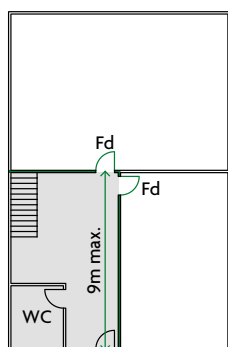
↑ Alternative exit

NOTE: This only applies where at least one storey is more than 4.5m above ground level.

Diagram 3.5 Multi-storey flat with alternative exits from each habitable room, except at entrance level

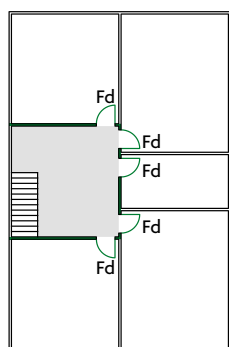
See para 3.21

a. Entrance level



Flat entrance

b. Level(s) above or below entrance level



Alternative exit

— Fire resisting construction (minimum REI 30)
Fd Fire doorset
■ Protected landing/entrance hall

NOTE: This only applies where at least one storey is more than 4.5m above ground level.

Diagram 3.6 Multi-storey flat with protected entrance hall and landing

Alternative exits

3.22 Any **alternative exit** from a **flat** should comply with all of the following.

- a. It should be remote from the main entrance door to the **flat**.
- b. It should lead to a **final exit**, via a **common stair** if necessary, through one of the following.
 - i. A door to an access corridor, access lobby or **common balcony**.
 - ii. An internal private stair leading to an access corridor, access lobby or **common balcony** at another level.
 - iii. A door to a **common stair**.
 - iv. A door to an external stair.
 - v. A door to an **escape route** over a flat roof.

Any access route leading to a **final exit** or **common stair** should comply with the provisions for means of escape in the common parts of a flat (see paragraph 3.25).

Air circulation systems in flats with a protected stairway or entrance hall enclosure

3.23 For systems circulating air only within an individual **flat**, take all of the following precautions.

- a. Transfer grilles should not be fitted in any wall, door, floor or **ceiling** of the enclosure.
- b. Any duct passing through the enclosure should be rigid steel. Joints between the ductwork and enclosure should be **fire-stopped**.
- c. Ventilation ducts serving the enclosure should not serve any other areas.
- d. Any system of mechanical ventilation which recirculates air and which serves both the stair and other areas should be designed to shut down on the detection of smoke within the system.
- e. For ducted warm air heating systems, a room thermostat should be sited in the living **room**. It should be mounted at a height between 1370mm and 1830mm above the floor. The maximum setting should be 27°C.

NOTE: Ventilation ducts passing through **compartment walls** should comply with the guidance in Section 9.

Live/work units

3.24 For **flats** serving as a workplace for both occupants and people who do not live on the premises, provide both of the following.

- a. A maximum **travel distance** of 18m between any part of the working area and either of the following.
 - i. The **flat** entrance door.
 - ii. An alternative **means of escape** that is not a window.

If the **travel distance** is over 18m, the assumptions in paragraph 3.2 may not be valid. The design should be considered on a case-by-case basis.

- b. **Escape lighting** to windowless accommodation in accordance with **BS 5266-1**.

Means of escape in the common parts of flats

3.25 The following paragraphs deal with means of escape from the entrance doors of flats to a final exit. They do not apply to flats with a top storey that is a maximum of 4.5m above ground level (designed in accordance with paragraphs 3.15 to 3.17).

Reference should also be made to the following.

- a. Requirement B3 regarding compartment walls and protected shafts.
- b. Requirement B5 regarding access for the fire and rescue service.

Number of escape routes

3.26 A person escaping through the common area, if confronted by the effects of a fire in another flat, should be able to turn away from it and make a safe escape via an alternative route.

3.27 From the flat entrance door, a single escape route is acceptable in either of the following cases.

- a. The flat is on a storey served by a single common stair and both of the following apply.
 - i. Every flat is separated from the common stair by a protected lobby or common protected corridor (see Diagram 3.7).
 - ii. The maximum travel distance in Table 3.1, for escape in one direction only, is not exceeded.
- b. The flat is in a dead end of a common corridor served by two (or more) common stairs and the maximum travel distance given in Table 3.1, for escape in one direction only, is not exceeded (Diagram 3.8).

Table 3.1 Limitations on travel distance in common areas of blocks of flats

Maximum travel distance from flat entrance door to common stair or stair lobby⁽¹⁾

Escape in one direction

Escape in more than one direction

7.5m⁽²⁾⁽³⁾

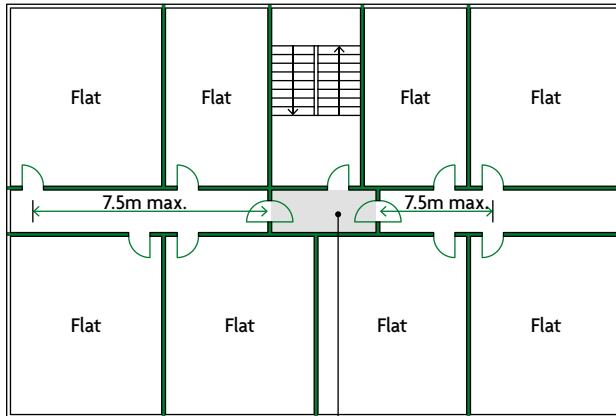
30m⁽³⁾⁽⁴⁾

NOTES:

1. If travel distance is measured to a stair lobby, the lobby must not provide direct access to any storage room, flat or other space containing a fire hazard.
2. In the case of a small single stair building in accordance with Diagram 3.9, this is reduced to 4.5m.
3. Does not apply if all flats on a storey have independent alternative means of escape.
4. Sheltered housing may require reduced maximum travel distances.

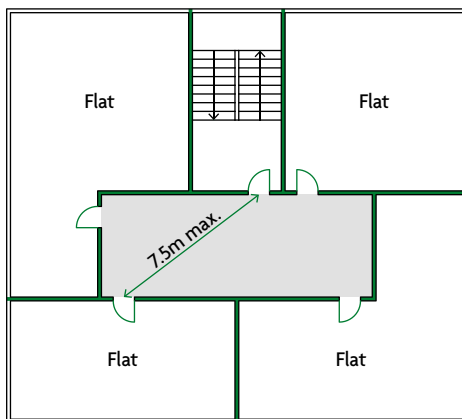
See para 3.27 and 3.36

a. Corridor access flats



Stair lobby with no flat opening directly into it

b. Lobby access flats



■ Shaded areas indicate zones where ventilation should be provided in accordance with paragraphs 3.50 to 3.53 (An external wall vent or smoke shaft located anywhere in the shaded area)

— Fire resisting construction

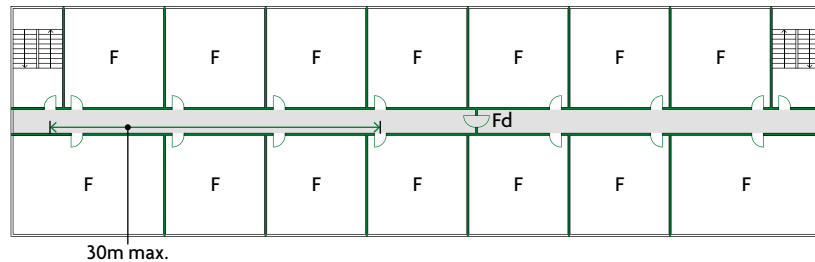
NOTES:

1. The arrangements shown also apply to the top storey.
2. See Diagram 3.9 for small single stair buildings.
3. All doors shown are fire doorsets.
4. Where travel distance is measured to a stair lobby, the lobby must not provide direct access to any storage room, flat or other space containing a potential fire hazard.
5. For further guidance on the performance of the fire doorsets from the corridor to the flat and/or stairway refer to Appendix C, Table C1.

Diagram 3.7 Flats served by one common stair

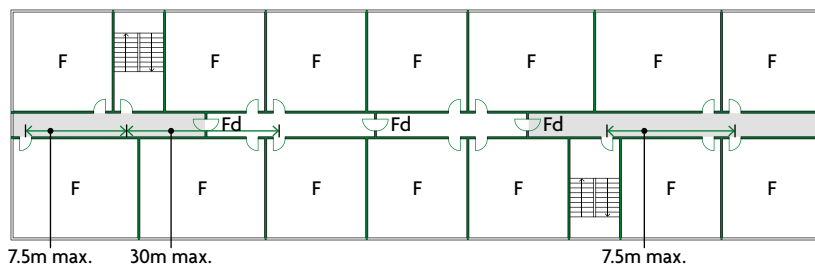
See para 3.27 and 3.36

a. Corridor access without dead ends

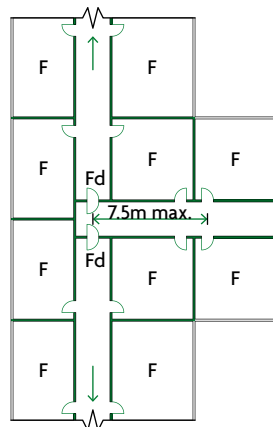


b. Corridor access with dead ends

The central door may be omitted if maximum travel distance is not more than 15m



c. 'T' junction with main corridor



Fd Cross-corridor fire doorset

F Flat

Shaded areas indicate zones where ventilation should be provided in accordance with paragraphs 3.50 to 3.53 (An external wall vent or smoke shaft located anywhere in the shaded area)

Fire resisting construction

→ Escape route

NOTES:

1. The arrangements shown also apply to the top storey.
2. For further guidance on the fire resistance rating of the fire doorsets from the corridor to the flat and/or stairway refer to Appendix C, Table C1.

Diagram 3.8 Flats served by more than one common stair

Small single stair buildings

3.28 For some low rise buildings, the provisions in paragraphs 3.26 and 3.27 may be modified and the use of a single stair, protected in accordance with Diagram 3.9, may be permitted where all of the following apply.

- a. The top storey of the building is a maximum of 11m above ground level.
- b. No more than three storeys are above the ground storey.
- c. The stair does not connect to a covered car park, unless the car park is open sided (as defined in Section 11 of Approved Document B Volume 2).

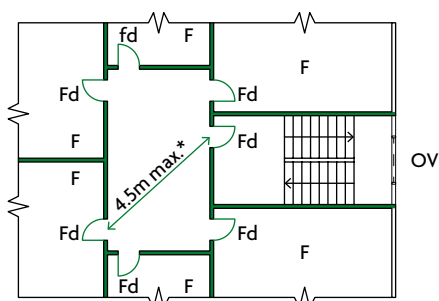
- d. The stair does not serve offices, stores or other ancillary accommodation. If it does, they should be separated from the stair by a **protected lobby** or **protected corridor** (minimum REI 30) with a minimum 0.4m² of permanent ventilation, or be protected from the ingress of smoke by a mechanical smoke control system.

NOTE: For refuse chutes and storage see paragraphs 3.55 to 3.58.

- e. Either of the following is provided for the fire and rescue service.
- A high-level openable vent with a free area of at least 1m² at each **storey**.
 - A single openable vent with a free area of at least 1m² at the head of the stair, operable remotely at the fire and rescue service access level.

See para 3.28

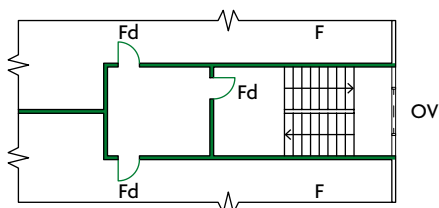
a. Small single stair building



- Fire resisting construction
- OV Openable vent at high level for fire service use (1.0m² minimum free area); see paragraph 3.28e
- F Flat
- Fd Fire doorset

*If smoke control is provided in the lobby, the travel distance can be increased to 7.5m maximum (see Diagram 3.7, example b).

b. Small single stair building with no more than two flats per storey



The door between stair and lobby should be free from security fastenings.

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

NOTES:

- The arrangements shown also apply to the top storey.
- If the travel distance across the lobby in diagram (a) exceeds 4.5m, Diagram 3.7 applies.
- Where, in Diagram (b), the lobby between the common stair and the flat is omitted in small single stair buildings, an automatic opening vent with a geometric free area of at least 1m² is required at the top of the stair, which is operated on detection of smoke at any storey in the stair.
- For further guidance on the fire rating of the fire doorsets from the corridor to the flat and/or stairway refer to Appendix C, Table C1.

Diagram 3.9 Common escape route in small single stair building

Flats with balcony or deck access

3.29 Paragraph 3.27 may be modified using the guidance in clause 7.3 of **BS 9991**.

Escape routes over flat roofs

- 3.30** Where a **storey** or part of a **building** has multiple **escape routes** available, one may be over a flat roof that complies with all of the following.
- It should be part of the same **building** from which escape is being made.
 - The route across the roof should lead to a **storey exit** or external **escape route**.
 - The part of the roof (including its supporting structure) forming the **escape route**, and any opening within 3m of the **escape route**, should be of **fire resisting** construction (minimum REI 30).
 - The route should be clearly defined and guarded by walls and/or protective barriers to protect against falling.

Common escape routes

- 3.31** The following paragraphs deal with **means of escape** from the entrance doors of **flats** to a **final exit**.
- 3.32** **Escape route travel distances** should comply with Table 3.1.
- 3.33** An **escape route** should not pass through one stair enclosure to reach another. It may pass through a **protected lobby** (minimum REI 30) of one stair to reach another.
- 3.34** Common corridors should be **protected corridors**. The wall between each **flat** and the corridor should be a **compartment wall** (minimum REI 30 where the top **storey** is up to 5m above ground level, otherwise REI 60).
- 3.35** Divide a common corridor connecting two or more **storey exits** with a **fire doorset** fitted with a **self-closing device** (minimum E 30 S_a). See Diagram 3.8. Associated screens should be **fire resisting**. Site doors so that smoke does not affect access to more than one stair.
- 3.36** A **fire doorset** (minimum E 30 S_a) fitted with a **self-closing device** (and **fire resisting** screen, where required) should separate the **dead-end** portion of a common corridor from the rest of the corridor (Diagrams 3.7a, 3.8b and 3.8c).
- 3.37** Ancillary accommodation should not be located in, or entered from, a **protected lobby** or **protected corridor** forming the only common **escape route** on that **storey**.

Headroom in common escape routes

- 3.38** **Escape routes** should have a minimum clear headroom of 2m. The only projections allowed below this height are door frames.

Flooring of common escape routes

- 3.39** **Escape route** floor finishes should minimise their slipperiness when wet. Finishes include the treads of steps and surfaces of ramps and landings.

Ramps and sloping floors

- 3.40** A ramp forming part of an **escape route** should meet the provisions in Approved Document M. Any sloping floor or tier should have a pitch of not more than 35 degrees to the horizontal.

Lighting of common escape routes

- 3.41** Except for two **storey** blocks of **flats**, all **escape routes** should have adequate artificial lighting. If the mains electricity power supply fails, **escape lighting** should illuminate the route (including external **escape routes**).

3.42 In addition, **escape lighting** should be provided to all of the following.

- a. Toilet accommodation with a minimum floor area of 8m².
- b. Electricity and generator **rooms**.
- c. Switch **room**/battery **room** for emergency lighting system.
- d. Emergency control **rooms**.

3.43 Escape stair lighting should be on a separate circuit from the electricity supply to any other part of the **escape route**.

3.44 **Escape lighting** should conform to **BS 5266-1**.

Exit signs on common escape routes

3.45 Every doorway or other exit providing access to a **means of escape**, other than exits in ordinary use (e.g. main entrances), should be distinctively and conspicuously marked by an exit sign in accordance with **BS ISO 3864-1** and **BS 5499-4**. For this reason, blocks of **flats** with a single stair in regular use would not usually require any fire exit signage.

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

Some **buildings** may require additional signs to comply with other legislation.

Protected power circuits

3.46 To limit potential damage to cables in **protected circuits**, all of the following should apply.

- a. Cables should be sufficiently robust.
- b. Cable routes should be carefully selected and/or physically protected in areas where cables may be exposed to damage.
- c. Methods of cable support should be class A1 rated and offer at least the same integrity as the cable. They should maintain circuit integrity and hold cables in place when exposed to fire.

3.47 A **protected circuit** to operate equipment during a fire should achieve all of the following.

- a. Cables should achieve PH 30 classification when tested in accordance with **BS EN 50200** (incorporating Annex E) or an equivalent standard.
- b. It should only pass through parts of the **building** in which the fire risk is negligible.
- c. It should be separate from any circuit provided for another purpose.

3.48 Guidance on cables for large and complex **buildings** is given in **BS 5839-1**, **BS 5266-1** and **BS 8519**.

Smoke control in common escape routes

3.49 Despite the provisions described, it is probable that some smoke will get into the common corridor or lobby from a fire in a **flat**.

There should therefore be some means of ventilating the common corridors/lobbies to control smoke and so protect the **common stairs**. This means of ventilation offers additional protection to that provided by the fire doors to the stair, as well as some protection to the corridors/lobbies.

Ventilation can be natural (paragraphs 3.50 to 3.53) or mechanical (paragraph 3.54).

Smoke control of common escape routes by natural smoke ventilation

3.50 Except in **buildings** that comply with Diagram 3.9, the corridor or lobby next to each stair should have a smoke vent. The location of the vent should comply with both of the following.

- a. Be as high as practicable.
- b. Be positioned so the top edge is at least as high as the top of the door to the stair.

3.51 Smoke vents should comply with one of the following.

- a. They should be located on an **external wall** with minimum free area of 1.5m².
- b. They should discharge into a vertical smoke shaft, closed at the base, that meets all of the following criteria.
 - i. The shaft should conform to the following conditions.
 - Have a minimum cross-sectional area of 1.5m² (minimum dimension 0.85m in any direction).
 - Open at roof level, minimum 0.5m above any surrounding structures within 2m of it horizontally.
 - Extend a minimum of 2.5m above the **ceiling** of the highest **storey** served by the shaft.
 - ii. The free area of all the following vents should be a minimum of 1m² in the following places.
 - From the corridor or lobby into the shaft.
 - At the opening at the head of the shaft.
 - At all internal locations within the shaft (e.g. safety grilles).
 - iii. The smoke shaft should be constructed from a class A1 material. All vents should either be a smoke leakage (S_a) rated **fire doorset** (see Appendix C, Table C1, item 2.e for minimum **fire resistance**) or fitted with a smoke control damper achieving the same period of **fire resistance** and designed to operate as described below. The shaft should be vertical from base to head, with a maximum of 4m at a maximum inclined angle of 30 degrees.
 - iv. If smoke is detected in the common corridor or lobby, both of the following should occur.
 - Simultaneous opening of vents on the **storey** where the fire is located, at the top of the smoke shaft and to the stair.
 - Vents from the corridors or lobbies on all other **storeys** should remain closed, even if smoke is subsequently detected on **storeys** other than where the fire is located.

3.52 A vent to the outside with a minimum free area of 1m² should be provided from the top **storey** of the stair.

3.53 In single stair **buildings**, smoke vents on the **storey** where the fire is initiated, and the vent at the head of the stair, should be activated by smoke detectors in the common parts.

In **buildings** with more than one stair, smoke vents may be activated manually. The control system should open the vent at the head of the stair before, or at the same time as, the vent on the **storey** where the fire is located. Smoke detection is not required for ventilation purposes in this instance.

Smoke control of common escape routes by mechanical ventilation

3.54 Guidance on the design of smoke control systems that use pressure differentials is available in **BS EN 12101-6**.

Refuse chutes and storage

- 3.55** Refuse storage chambers, refuse chutes and refuse hoppers should be sited and constructed in accordance with **BS 5906**.
- 3.56** Refuse chutes and rooms for storing refuse should meet both of the following conditions.
- Be separated from other parts of the building by fire resisting construction (minimum REI 30 in buildings with a top storey up to 5m above ground level; otherwise REI 60).
 - Not be situated within a protected stairway or protected lobby.
- 3.57** The approach to rooms containing refuse chutes or for storing refuse should comply with one of the following conditions.
- Be directly from the open air.
 - Be through a protected lobby with a minimum of 0.2m² of permanent ventilation.
- 3.58** Access openings to refuse storage chambers should *not* be sited in the following areas.
- Next to escape routes or final exits.
 - Near the windows of flats.

Common stairs

Number of common stairs

- 3.59** A building should provide access to more than one common stair if it does not meet the criteria for a single common stair (see paragraph 3.26 and 3.27).

Width of common stairs

- 3.60** A stair of acceptable width for everyday use will be sufficient for escape purposes. If it is also a firefighting stair, it should be at least 1100mm wide. The width is the clear width between the walls or balustrades. Any handrails and strings intruding into that width by a maximum of 100mm on each side may be ignored.

Protection of common stairs

- 3.61** Section 7 provides guidance on avoiding the spread of fire between storeys. For a stair that is also a firefighting stair, guidance in Section 15 should be followed.

Enclosure of common stairs

- 3.62** Every common stair should be a protected stairway. Where the protected stairway passes from one compartment to another, it should be within a protected shaft.

External walls adjacent to protected stairways

- 3.63** 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 façade, as shown in Diagram 3.10).
- 3.64** If a protected stairway projects beyond, is recessed from or is in an internal angle of the adjoining external wall of the building, then the minimum distance between an unprotected area of the building enclosure and an unprotected area of the stair enclosure should be 1800mm.

See para 3.63

Configurations of stairs and external wall

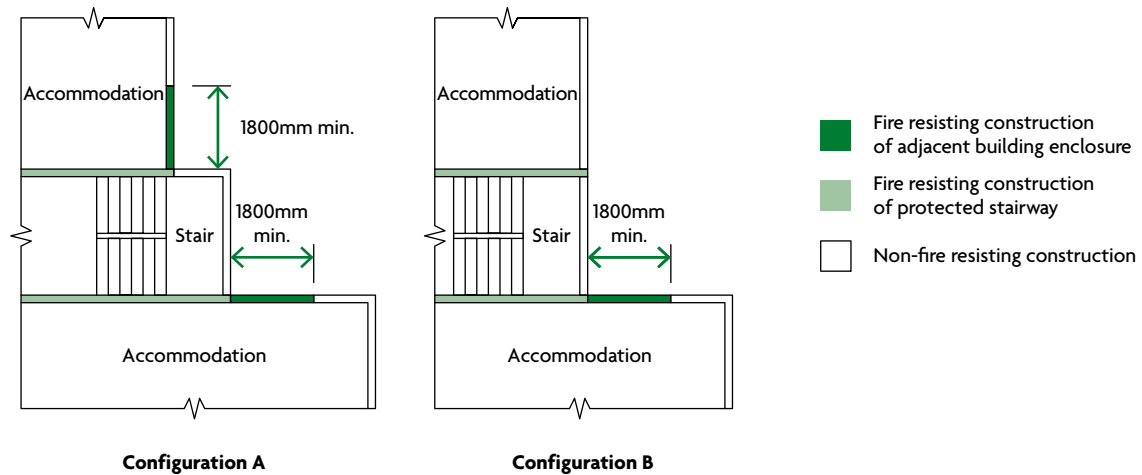


Diagram 3.10 External protection to protected stairways

External escape stairs

3.65 Flats may be served by an external stair if the provisions in paragraphs 3.66 to 3.69 are followed.

3.66 Where a storey (or part of a building) is served by a single access stair, that stair may be external provided both of the following conditions are met.

- The stair serves a floor not more than 6m above the ground level.
- The stair meets the provisions in paragraph 3.68.

3.67 Where more than one escape route is available from a storey (or part of a building), then some of the escape routes from that storey or part of the building may be by way of an external stair provided all of the following conditions are met:

- There is at least one internal escape stair from every part of each storey (excluding plant areas).
- The stair serves a floor not more than 6m above either the ground level or a roof podium which is itself served by an independent protected stairway.
- The stair meets the provisions in paragraph 3.68.

[illegible]

Diagram 3.11 Fire resistance of areas near to external stairs

a. Doors to the stair should be **fire resisting** (minimum E 30) and be fitted with a **self-closing device**, except for a single exit door from the **building** to the top landing of a downward-leading external stair, provided it is the only door onto the landing.

- b. **Fire resisting** construction (minimum RE 30) is required for the **building** envelope within the following zones, measured from the flights and landings of the external stair.
 - i. 1800mm above and horizontally.
 - ii. 9m vertically below.
 - iii. 1100mm above the top landing of the stair (except where the stair leads from basement to ground level).
 - c. **Fire resisting** construction (minimum RE 30) should be provided for any part of the **building** (including doors) within 1800mm of the **escape route** from the foot of the stair to a place of safety. This does not apply if there are **alternative escape routes** from the foot of the external escape stair.
 - d. Glazing in areas of **fire resisting** construction should be fixed shut and **fire resisting** (in terms of integrity but not insulation) (minimum E 30).
 - e. Stairs more than 6m in height above ground level (e.g. where they are provided above a podium) should be protected from adverse weather. Protection should prevent the build-up of snow or ice but does not require full enclosure.
- 3.69** Access to an external escape stair may be via a flat roof, provided the flat roof meets the requirements of paragraph 3.30.

Separation of adjoining protected stairways

- 3.70** The construction separating two adjacent **protected stairways** (or **exit passageways** leading to different **final exits**) should be imperforate.

Basement stairs

- 3.71** If a **building** does not meet the criteria of paragraph 3.28, an escape stair forming part of the only **escape route** from an upper **storey** should *not* continue down to serve a **basement storey**. The **basement storey** should be served by a separate escape stair.
- 3.72** Where multiple escape stairs serve the upper **storeys**, only one needs to end at ground level. Other stairs may connect with the **basement storeys** if there is a **protected lobby** or a **protected corridor** between the stairs and accommodation at each basement level.

Stairs serving ancillary accommodation

- 3.73** Except in **buildings** described in paragraph 3.28, **common stairs** forming part of the only **escape route** from a **flat** should not serve any of the following.
- a. Covered car park.
 - b. Boiler **room**.
 - c. Fuel storage space.
 - d. Other ancillary accommodation of similar fire risk.
- 3.74** Where a **common stair** is not part of the only **escape route** from a **flat**, it may also serve ancillary accommodation from which it is separated by a **protected lobby** or **protected corridor** (minimum REI 30).
- 3.75** Where a stair serves an enclosed car park or **place of special fire hazard**, the lobby or corridor should have a minimum 0.4m² of permanent ventilation or be protected from the ingress of smoke by a mechanical smoke control system.

NOTE: For refuse chutes and storage see paragraphs 3.55 to 3.58.

Flats in mixed use buildings

- 3.76** In buildings with a maximum of three storeys above the ground storey, stairs may serve both flats and other occupancies, provided that the stairs are separated from each occupancy by protected lobbies (minimum REI 30) at each storey.
- 3.77** In buildings with more than three storeys above the ground storey, stairs may serve the flats and other occupancies if all of the following apply.
- The flat is ancillary to the main use of the building.
 - The flat has an independent alternative escape route.
 - The stair is separated from occupancies on lower storeys by a protected lobby (minimum REI 30) at each of those storeys.
 - The stair enclosure has at least the same standard of fire resistance as the structural elements of the building (see Appendix B, Table B4); if the stair is a firefighting stair, it should comply with the provisions in Section 15 (see also paragraph 3.60).
 - Any automatic fire detection and alarm system fitted in the main part of the building also covers all flats.
 - Any security measures in any parts of the building do not prevent escape at all material times.

Use of space within protected stairways

- 3.78** A protected stairway should not be used for anything else, except a lift well or electricity meters.

Electricity meter(s) in protected stairways

- 3.79** In single stair buildings, electricity meters should be in securely locked cupboards. Cupboards should be separated from the escape route by fire resisting construction.

Gas service and installation pipes in protected stairways

- 3.80** Gas service and installation pipes and meters should not be within a protected stairway, unless installed in accordance with the Pipelines Safety Regulations 1996 and the Gas Safety (Installation and Use) Regulations 1998.

Exits from protected stairways

- 3.81** Every protected stairway should lead to a final exit, either directly or via a protected exit passageway. Any protected exit corridor or stair should have the same standard of fire resistance and lobby protection as the stair it serves.

Construction of escape stairs

- 3.82** The flights and landings of escape stairs should be constructed of materials achieving class A2-s3, d2 or better in all of the following situations.
- If the escape stair is the only stair in a building with more than three storeys.
 - If the escape stair is within a basement storey.
 - If the escape stair serves any storey that has a floor level more than 18m above ground or access level.
 - If the escape stair is an external escape stair, except where the stair connects the ground storey or ground level with a floor or flat roof a maximum of 6m above or below ground level.
 - If the escape stair is a firefighting stair.

Materials achieving class B-s3, d2 or worse may be added to the top horizontal surface, except on **firefighting stairs**.

3.83 Further guidance on the construction of **firefighting stairs** is given in Section 15 (see also paragraph 3.60). Dimensional constraints on the design of stairs are given in Approved Document K.

Single steps

3.84 Single steps on **escape routes** should be prominently marked. A single step on the line of a doorway is acceptable, subject to paragraph 3.107.

Fixed ladders

3.85 Fixed ladders should not be provided as a **means of escape** for members of the public. They should only be provided where a conventional stair is impractical, such as for access to plant **rooms** which are not normally occupied.

Helical stairs and spiral stairs

3.86 Helical stairs and spiral stairs may form part of an **escape route** provided they are designed in accordance with **BS 5395-2**. If they are intended to serve members of the public, stairs should be type E (public) stairs.

Fire resistance of doors

3.87 **Fire resistance** test criteria are set out in Appendix C. Standards of performance are summarised in Table C1.

Fire resistance of glazed elements

3.88 If glazed elements in **fire resisting** enclosures and doors can only meet the required integrity performance, their use is limited. These limitations depend on whether the enclosure forms part of a **protected shaft** (see Section 7) and the provisions set out in Appendix B, Table B5. If both integrity and insulation performance can be met, there is no restriction in this document on the use or amount of glass.

3.89 Glazed elements should also comply with the following, where necessary.

- a. If the enclosure forms part of a **protected shaft**: Section 7.
- b. Appendix B, Table B5.
- c. Guidance on the safety of glazing: Approved Document K.

Doors on escape routes

3.90 Doors should be readily openable to avoid undue delay to people escaping. Doors on **escape routes** (both within and from the **building**) should comply with paragraphs 3.91 to 3.98. Guidance on door closing and 'hold open' devices for **fire doorsets** is set out in Appendix C.

NOTE: Paragraphs 3.91 to 3.98 do not apply to **flat** entrance doors.

Door fastenings

3.91 In general, doors on **escape routes** (whether or not the doors are **fire doorsets**) should be either of the following.

- a. Not fitted with a lock, latch or bolt fastenings.
- b. Fitted only with simple fastenings that are all of the following.

- i. Easy to operate; it should be apparent how to undo the fastening.
- ii. Operable from the side approached by people escaping.
- iii. Operable without a key.
- iv. Operable without requiring people to manipulate more than one mechanism.

Doors may be fitted with hardware to allow them to be locked when **rooms** are empty.

If a secure door is operated by code or combination keypad, swipe or proximity card, biometric data, etc., a security mechanism override should be possible from the side approached by people escaping.

- 3.92** Electrically powered locks should return to the unlocked position in all of the following situations.
- a. If the fire detection and alarm system operates.
 - b. If there is loss of power or system error.
 - c. If the security mechanism override is activated.

Security mechanism overrides for electrically powered locks should be a Type A call point, as described in **BS 7273-4**. The call point should be positioned on the side approached by people escaping. If the door provides escape in either direction, a call point should be installed on both sides of the door.

- 3.93** Guidance on door closing and 'hold open' devices for **fire doorsets** is set out in Appendix C.

Direction of opening

- 3.94** The door of any doorway or exit should be hung to open in the direction of escape whenever reasonably practicable. It should always be hung to open in the direction of escape if more than 60 people might be expected to use it during a fire.

Amount of opening and effect on associated escape routes

- 3.95** All doors on **escape routes** should be hung to meet both of the following conditions.
- a. Open by a minimum of 90 degrees.
 - b. Open with a swing that complies with both of the following.
 - i. Is clear of any change of floor level, other than a threshold or single step on the line of the doorway.
 - ii. Does not reduce the effective width of any **escape route** across a landing.
- 3.96** Any door opening towards a corridor or a stair should be recessed to prevent its swing encroaching on the effective width.

Vision panels in doors

- 3.97** Doors should contain vision panels in both of the following situations.
- a. Where doors on **escape routes** divide corridors.
 - b. Where doors are hung to swing both ways.

Approved Document M contains guidance about vision panels in doors across accessible corridors and Approved Document K contains guidance about the safety of glazing.

Revolving and automatic doors

- 3.98** Where revolving doors, automatic doors and turnstiles are placed across **escape routes** they should comply with one of the following.
- They are automatic doors of the required width and comply with one of the following conditions.
 - Their failsafe system provides outward opening from any open position.
 - They have a monitored failsafe system to open the doors if the mains electricity supply fails.
 - They failsafe to the open position if the power fails.
 - Non-automatic swing doors of the required width are provided immediately adjacent to the revolving or automatic door or turnstile.

Lifts

Fire protection of lift installations

- 3.99** Lift wells should comply with one of the following conditions.
- Be sited within the enclosures of a **protected stairway**.
 - Be enclosed with **fire resisting** construction (minimum REI 30) when in a position that might prejudice the **means of escape**.
- 3.100** A lift well connecting different **compartments** should form a **protected shaft** (see Section 7).
- 3.101** In **buildings** designed for phased evacuation or progressive horizontal evacuation, if the lift well is not within the enclosures of a **protected stairway**, its entrance should be separated at every **storey** by a **protected lobby** (minimum REI 30).
- 3.102** In basements and enclosed car parks, the lift should be within the enclosure of a **protected stairway**. Otherwise, the lift should be approached only via a **protected lobby** or **protected corridor** (minimum REI 30).
- 3.103** If a lift delivers into a **protected corridor** or **protected lobby** serving sleeping accommodation and also serves a **storey** containing a high fire risk (such as a kitchen, communal areas, stores, etc.) then the lift should be separated from the high fire risk area(s) by a **protected lobby** or **protected corridor** (minimum REI 30).
- 3.104** A lift shaft serving storeys above ground level should not serve any basement, if either of the following applies.
- There is only one escape stair serving **storeys** above ground level and smoke from a basement fire would adversely affect **escape routes** in the upper **storeys**.
 - The lift shaft is within the enclosure to an escape stair that terminates at ground level.
- 3.105** Lift machine **rooms** should be sited over the lift well where possible. Where **buildings** or part of a **building** with only one stairway make this arrangement impractical, the lift machine **room** should be sited outside the **protected stairway**.

Final exits

- 3.106** People should be able to rapidly leave the area around the **building**. Direct access to a street, passageway, walkway or open space should be available. The route away from the **building** should comply with the following.
- Be well defined.
 - If necessary, have suitable guarding.
- 3.107** **Final exits** should not present a barrier for disabled people. Where the route to a **final exit** does not include stairs, a level threshold and, where necessary, a ramp should be provided.
- 3.108** **Final exit** locations should be clearly visible and recognisable.
- 3.109** **Final exits** should avoid outlets of basement smoke vents and openings to transformer chambers, refuse chambers, boiler rooms and similar risks.

Requirement B2: Internal fire spread (linings)

This section deals with the following requirement from Part B of Schedule 1 to the Building Regulations 2010.

Requirement

Requirement

Internal fire spread (linings)

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

Limits on application

Intention

In the Secretary of State’s view, requirement B2 is met by achieving a restricted spread of flame over internal linings. The **building** fabric should make a limited contribution to fire growth, including a low rate of heat release.

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.

Requirement B2 *does not* include guidance on the following.

- a. Generation of smoke and fumes.
- b. The upper surfaces of floors and stairs.
- c. Furniture and fittings.

Section 4: Wall and ceiling linings

Classification of linings

4.1 The surface linings of walls and ceilings should meet the classifications in Table 4.1.

Table 4.1 Classification of linings

Location	Classification
Small rooms of maximum internal floor area of 4m ²	D-s3, d2
Garages (as part of a dwellinghouse) of maximum internal floor area of 40m ²	
Other rooms (including garages)	C-s3, d2
Circulation spaces within a dwelling	
Other circulation spaces (including the common areas of blocks of flats)	B-s3, d2 ⁽¹⁾
NOTE:	
1. Wallcoverings which conform to BS EN 15102 , achieving at least class C-s3, d2 and bonded to a class A2-s3, d2 substrate, will also be acceptable.	

Walls

4.2 For the purposes of this requirement, a wall includes both of the following.

- The internal surface of internal and external glazing (except glazing in doors).
- Any part of a ceiling which slopes at an angle greater than 70 degrees to the horizontal.

4.3 For the purposes of this requirement, a wall *does not* include any of the following.

- Doors and door frames.
- Window frames and frames in which glazing is fitted.
- Architraves, cover moulds, picture rails, skirtings and similar narrow members.
- Fireplace surrounds, mantle shelves and fitted furniture.

4.4 Parts of walls in rooms may be of lower performance than stated in Table 4.1, but no worse than class D-s3, d2. In any one room, the total area of lower performance wall lining should be less than an area equivalent to half of the room's floor area, up to a maximum of 20m² of wall lining.

Ceilings

4.5 For the purposes of this requirement, a ceiling includes all of the following.

- Glazed surfaces.
- Any part of a wall at 70 degrees or less to the horizontal.
- The underside of a gallery.
- The underside of a roof exposed to the room below.

- 4.6 For the purposes of this requirement, a **ceiling** *does not* include any of the following.
- Trap doors and their frames.
 - The frames of windows or **rooflights** and frames in which glazing is fitted.
 - Architraves, cover moulds, picture rails, exposed beams and similar narrow members.

Rooflights

- 4.7 **Rooflights** should meet the following classifications, according to material. No guidance for European fire test performance is currently available, because there is no generally accepted test and classification procedure.
- Non-plastic **rooflights** should meet the relevant classification in Table 4.1.
 - Plastic **rooflights**, if the limitations in Table 4.2 and Table 12.2 are observed, should be a minimum class D-s3, d2 rating. Otherwise they should meet the relevant classification in Table 4.1.

Special applications

- 4.8 Any flexible membrane covering a structure, other than an air-supported structure, should comply with Appendix A of **BS 7157**.
- 4.9 Guidance on the use of PTFE-based materials for tension-membrane roofs and structures is given in the BRE report BR 274.

Fire behaviour of insulating core panels used internally

- 4.10 Insulating core panels consist of an inner core of insulation sandwiched between, and bonded to, a membrane, such as galvanised steel or aluminium.

Where they are used internally they can present particular problems with regard to fire spread and should meet all of the following conditions.

- Panels should be sealed to prevent exposure of the core to a fire. This includes at joints and where services penetrate the panel.
- In high fire risk areas, such as kitchens, **places of special fire hazard**, or in proximity to where hot works occur, only class A1 cored panels should be used.
- Fixing systems for all panels should be designed to take account of the potential for the panel to delaminate. For instance, where panels are used to form a **suspended ceiling**, the fixing should pass through the panel and support it from the lower face.

Other controls on internal surface properties

- 4.11 Guidance on the control of flame spread is given in the following sections.
- Stairs and landings: Sections 2 and 3 (escape stairs) and Section 15 (**firefighting shafts**).
 - Exposed surfaces above fire-protecting **suspended ceilings**: Section 8.
 - Enclosures to above-ground drainage system **pipes**: Section 9.

Thermoplastic materials

General provisions

4.12 Thermoplastic materials that do not meet the classifications in Table 4.1 can be used as described in paragraphs 4.13 to 4.17. No guidance for European fire test performance is currently available, because there is no generally accepted test and classification procedure.

Thermoplastic materials are defined in Appendix B, paragraph B11. Classifications used here are explained in paragraph B13.

Windows

4.13 Thermoplastic material classified as a TP(a) rigid product may be used to glaze external windows to rooms, *but not* external windows to circulation spaces. Approved Document K includes guidance on the safety of glazing.

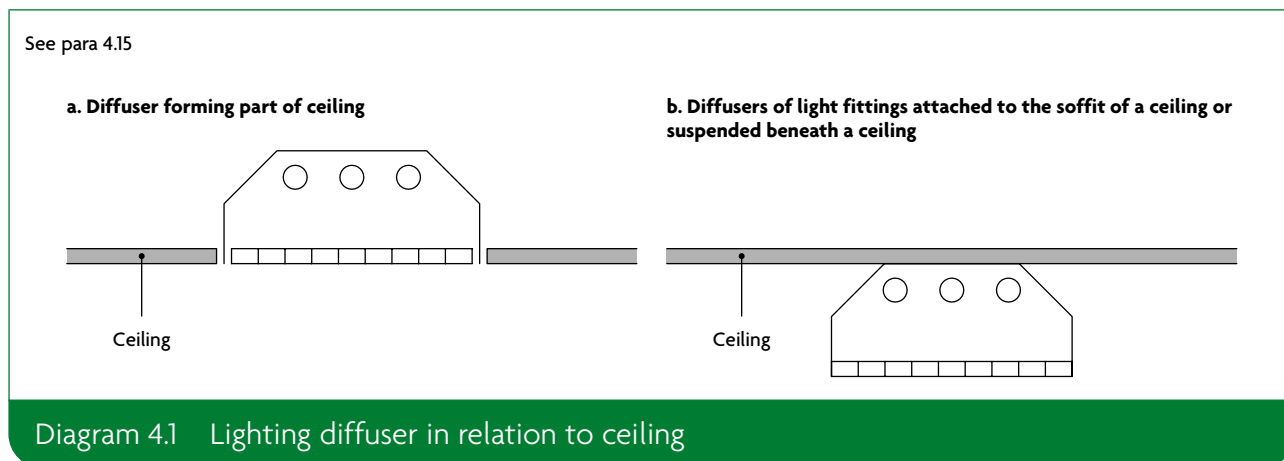
Rooflights

4.14 In rooms and circulation spaces other than protected stairways, rooflights may be constructed of thermoplastic material if they comply with both of the following.

- a. The lower surface is classified as TP(a) rigid or TP(b).
- b. The size and location of the rooflights follow the limits in Table 4.2, Table 12.2 and Table 12.3.

Lighting diffusers

4.15 The following paragraphs apply to lighting diffusers forming part of a ceiling. Diffusers may be part of a luminaire or used below sources of light. The following paragraphs *do not* apply to diffusers of light fittings attached to the soffit of a ceiling or suspended beneath a ceiling (Diagram 4.1).



4.16 Diffusers constructed of thermoplastic material may be incorporated in ceilings to rooms and circulation spaces, but not to protected stairways, if both the following conditions are met.

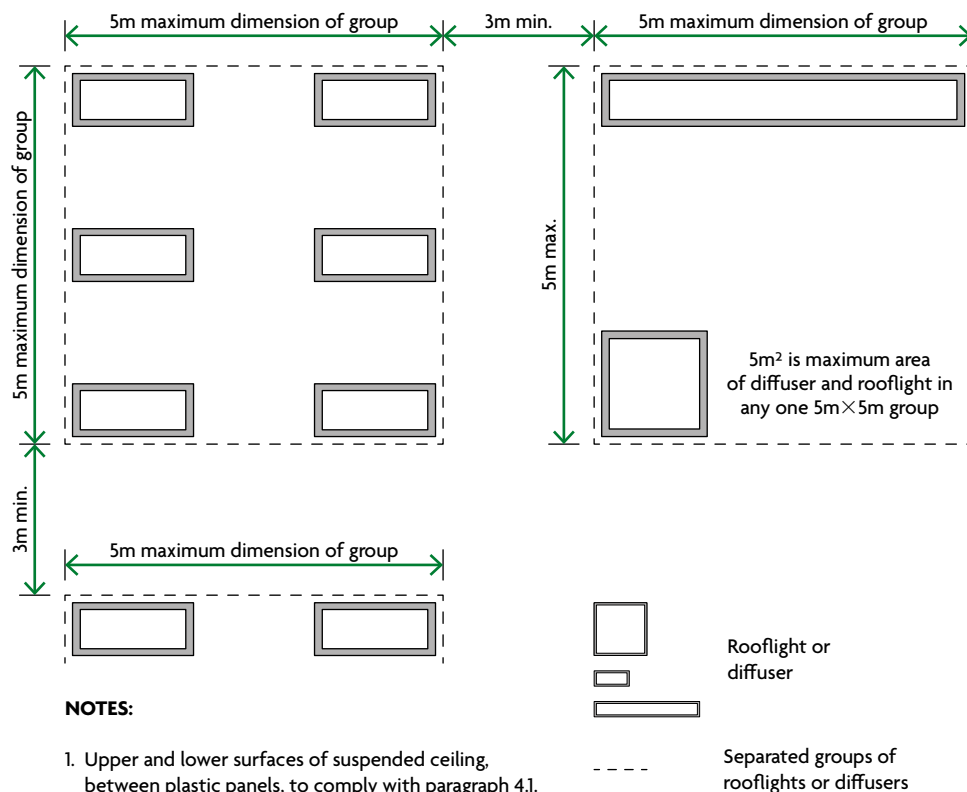
- a. Except for the upper surfaces of the thermoplastic panels, wall and ceiling surfaces exposed in the space above the suspended ceiling should comply with paragraph 4.1.
- b. Diffusers should be classified as one of the following.
 - i. TP(a) rigid – no restrictions on their extent.
 - ii. TP(b) – limited in their extent (see Table 4.2 and Diagram 4.2).

Suspended or stretched-skin ceilings

4.17 A ceiling constructed from TP(a) flexible panels should meet the following conditions.

- Have a maximum area of 5m^2 .
- Be supported on all sides.

See Table 4.2



NOTES:

- Upper and lower surfaces of suspended ceiling, between plastic panels, to comply with paragraph 4.1.
- No restriction on class D-s3, d2 diffusers or rooflights in small rooms.
- See note 4 to Table 4.2.

Diagram 4.2 Layout restrictions on class D-s3, d2 plastic rooflights, TP(b) rooflights and TP(b) lighting diffusers

Table 4.2 Limitations applied to thermoplastic rooflights and lighting diffusers in suspended ceilings and class D-s3, d2 plastic rooflights⁽¹⁾

Minimum classification of lower surface	Use of space below the diffusers or rooflights	Maximum area of each diffuser or rooflight ⁽²⁾ (m ²)	Maximum total area of diffusers and rooflights as a percentage of floor area of the space in which the ceiling is located (%)	Minimum separation distance between diffusers or rooflights ⁽²⁾ (m)
TP(a)	Any except protected stairways	No limit ⁽³⁾	No limit	No limit
Class D-s3, d2 ⁽⁴⁾ or TP(b)	Rooms	5	50 ⁽⁵⁾	3
	Circulation spaces except protected stairways	5	15 ⁽⁵⁾	3

NOTES:

1. This table does not apply to products that meet the provisions in Table 4.1.
2. Smaller rooflights and diffusers can be grouped together provided that both of the following satisfy the dimensions in Diagram 4.2 or 4.3.
 - a. The overall size of the group.
 - b. The space between one group and any others.
3. Lighting diffusers of TP(a) flexible rating should be used only in panels of a maximum of 5m² each. See paragraph 4.17.
4. There are no limits on the use of class D-s3, d2 materials in small rooms. See Table 4.1.
5. The minimum 3m separation given in Diagram 4.2 between each 5m² group must be maintained. Therefore, in some cases, it may not be possible to use the maximum percentage quoted.

See Table 4.2

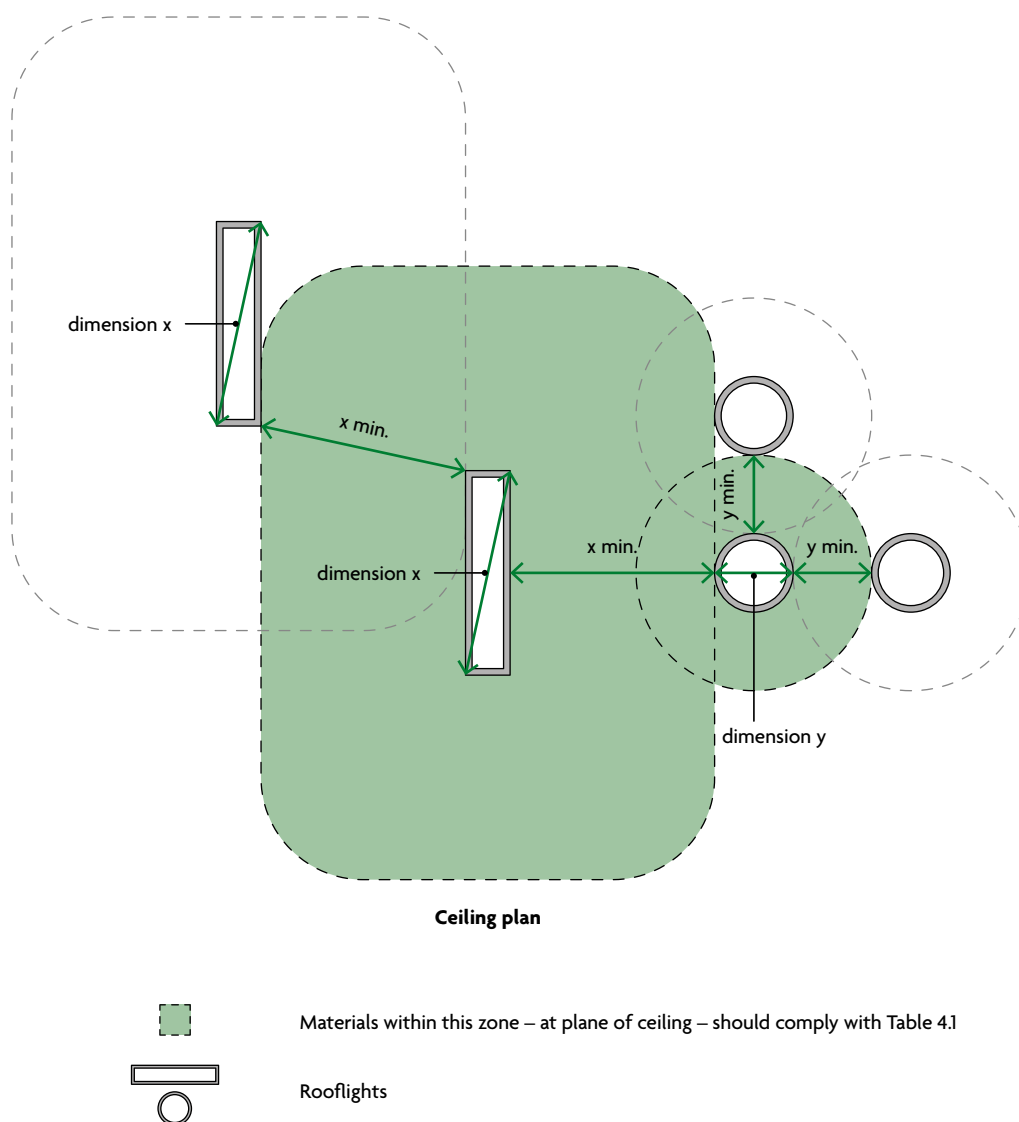


Diagram 4.3 Layout restrictions on small class D-s3, d2 plastic rooflights, TP(b) rooflights and lighting diffusers

Requirement B3: Internal fire spread (structure)

These sections deal with the following requirement from Part B of Schedule 1 to the Building Regulations 2010.

Requirement

Requirement

Internal fire spread (structure)

- B3.** (1) The building shall be designed and constructed so that, in the event of fire, its stability will be maintained for a reasonable period
- (2) A wall common to two or more buildings shall be designed and constructed so that it adequately resists the spread of fire between those buildings. For the purposes of this sub-paragraph a house in a terrace and a semi-detached house are each to be treated as a separate building.
- (3) Where reasonably necessary to inhibit the spread of fire within the building, measures shall be taken, to an extent appropriate to the size and intended use of the building, comprising either or both of the following—
- (a) sub-division of the building with fire-resisting construction;
 - (b) installation of suitable automatic fire suppression systems.
- (4) The building shall be designed and constructed so that the unseen spread of fire and smoke within concealed spaces in its structure and fabric is inhibited.

Limits on application

Requirement B3(3) does not apply to material alterations to any prison provided under section 33 of the Prison Act 1952.

Intention

In the Secretary of State's view, requirement B3 is met by achieving all of the following.

- a. For defined periods, loadbearing **elements of structure** withstand the effects of fire without loss of stability.
- b. Compartmentation of **buildings** by **fire resisting** construction elements.
- c. Automatic fire suppression is provided where it is necessary.
- d. Protection of openings in **fire-separating elements** to maintain continuity of the fire separation.
- e. Inhibition of the unseen spread of fire and smoke in **cavities**, in order to reduce the risk of structural failure and spread of fire and smoke, where they pose a threat to the safety of people in and around the **building**.

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

Section 5: Internal fire spread – dwellinghouses

Loadbearing elements of structure

Fire resistance standard

- 5.1** Elements of structure such as structural frames, beams, columns, loadbearing walls (internal and external), floor structures and gallery structures should have, as a minimum, the fire resistance given in Appendix B, Table B3.
- 5.2** If one element of structure supports or stabilises another, as a minimum the supporting element should have the same fire resistance as the other element.
- 5.3** The following are excluded from the definition of 'element of structure'.
- A structure that supports only a roof, unless either of the following applies.
 - The roof performs the function of a floor, such as a roof terrace, or as a means of escape.
 - The structure is essential for the stability of an external wall that needs to be fire resisting (e.g. to achieve compartmentation or for the purposes of preventing fire spread between buildings).
 - The lowest floor of the building.
 - External walls, such as curtain walls or other forms of cladding, which transmit only self weight and wind loads and do not transmit floor load.

NOTE: In some cases, structural members within a roof may be essential for the structural stability system of the building. In these cases, the structural members in the roof do not just support a roof and must demonstrate the relevant fire resistance for the building as required by paragraph 5.2 above.

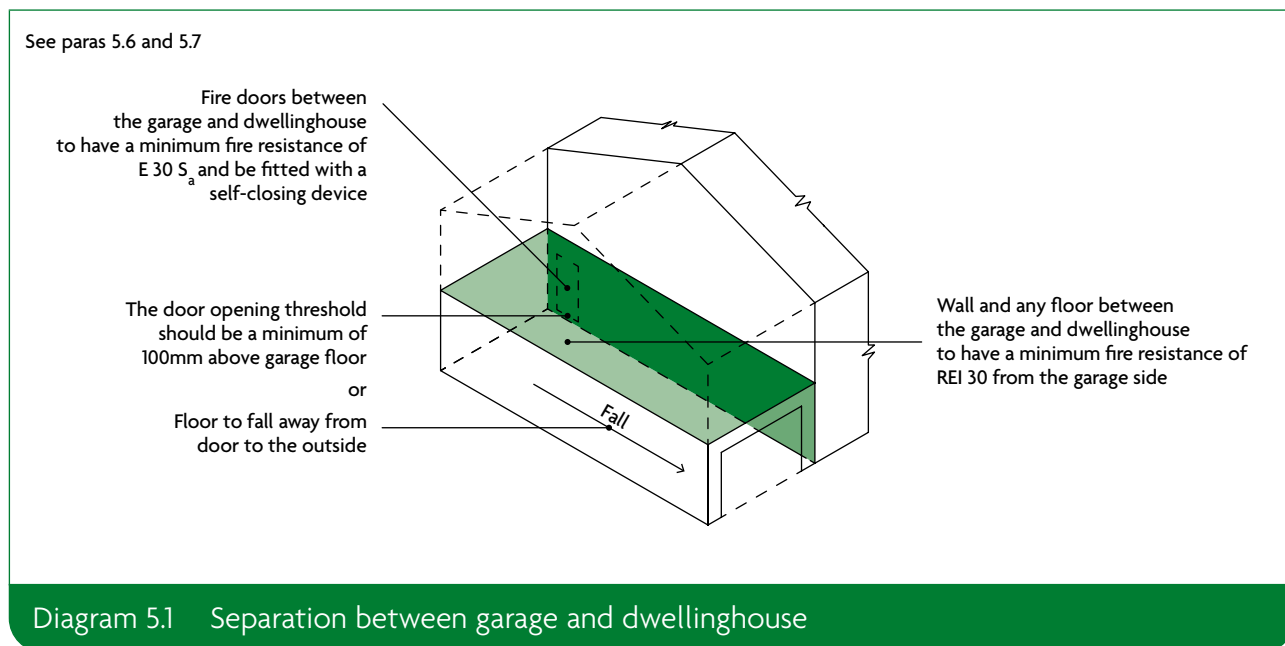
Floors in loft conversions

- 5.4** Where adding an additional storey to a two storey single family dwellinghouse, new floors should have a minimum REI 30 fire resistance. Any floor forming part of the enclosure to the circulation space between the loft conversion and the final exit should achieve a minimum rating of REI 30.
- The existing first-storey construction should have a minimum rating of R 30. The fire performance may be reduced for integrity and insulation, when both of the following conditions are met.
- Only one storey is added, containing a maximum of two habitable rooms.
 - The new storey has a maximum total area of 50m².

Compartmentation

Provision of compartmentation

- 5.5** Dwellinghouses that are semi-detached or in terraces should be considered as separate buildings. Every wall separating the dwellinghouses should be constructed as a compartment wall (see paragraphs 5.8 to 5.12).
- 5.6** If a garage is attached to or forms an integral part of a dwellinghouse, the garage should be separated from the rest of the dwellinghouse by fire resisting construction (minimum REI 30) (Diagram 5.1).
- 5.7** Where a door is provided between a dwellinghouse and the garage (see Diagram 5.1), it should meet one of the following conditions.
- The garage floor should be laid such that it falls away from the door to the outside, to allow fuel spills to flow away.
 - The door opening should be a minimum of 100mm above the level of the garage floor.



Construction of compartment walls and compartment floors

General provisions

- 5.8** All compartment walls and compartment floors should achieve both of the following.
- Form a complete barrier to fire between the compartments they separate.
 - Have the appropriate fire resistance, as given in Appendix B, Table B3 and Table B4.
- 5.9** 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 both of the following.
- As small as practicable.
 - Fire-stopped.

If trussed rafters bridge the wall, failure of the truss due to a fire in one **compartment** should not cause failure of the truss in another **compartment**.

Compartment walls between buildings

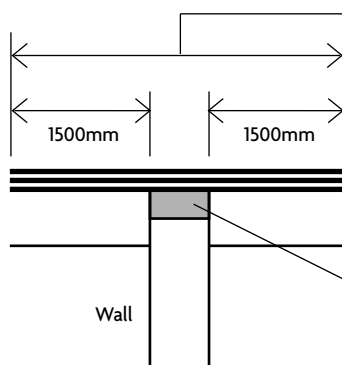
- 5.10** Adjoining **buildings** should only be separated by walls, not floors. **Compartment walls** common to two or more **buildings** should comply with both of the following.
- Run the full **height** of the **building** in a continuous vertical plane.
 - Be continued through any roof space to the underside of the roof (see Diagram 5.2).

Junction of compartment wall with roof

- 5.11** A **compartment wall** should achieve both of the following.
- Meet the underside of the roof covering or deck, with **fire-stopping** to maintain the continuity of **fire resistance**.
 - Be continued across any eaves.
- 5.12** To reduce the risk of fire spreading over the roof from one **compartment** to another, a 1500mm wide zone of the roof, either side of the wall, should have a covering classified as $B_{ROOF}(t4)$, on a substrate or deck of a material rated class A2-s3, d2 or better, as set out in Diagram 5.2a.
- Thermoplastic **rooflights** that, because of paragraph 12.7, are regarded as having a $B_{ROOF}(t4)$ classification are *not* suitable for use in that zone.
- 5.13** Materials achieving class B-s3, d2 or worse used as a substrate to the roof covering and any timber tiling battens, fully bedded in mortar or other suitable material for the width of the wall (Diagram 5.2b), may extend over the **compartment wall** in **buildings** that are a maximum of 15m high.
- 5.14** Double-skinned insulated roof sheeting should incorporate a band of material rated class A2-s3, d2 or better, a minimum of 300mm in width, centred over the wall.
- 5.15** As an alternative to the provisions of paragraphs 5.12 to 5.14, the **compartment wall** may extend through the roof for a minimum of either of the following (see Diagram 5.2c).
- Where the height difference between the two roofs is less than 375mm, 375mm above the top surface of the adjoining roof covering.
 - 200mm above the top surface of the adjoining roof covering where either of the following applies.
 - The height difference between the two roofs is 375mm or more.
 - The roof coverings either side of the wall are of a material classified as $B_{ROOF}(t4)$.

See paras 5.12 to 5.15

a. ANY BUILDING OR COMPARTMENT



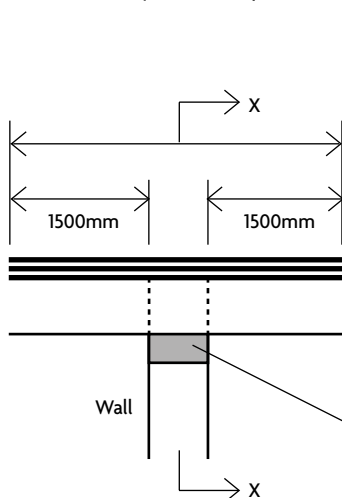
Roof covering over this distance to be designated $B_{\text{ROOF}}(t4)$ rated on deck of material of class A2-s3, d2 or better. Roof covering and deck could be composite structure, e.g. profiled steel cladding.

Double-skinned insulated roof sheeting should incorporate a band of material rated class A2-s3, d2 or better, a minimum of 300mm in width, centred over the wall.

If roof support members pass through the wall, fire protection to these members for a distance of 1500mm on either side of the wall may be needed to delay distortion at the junction (see paragraph 5.9).

Fire-stopping to be carried up to underside of roof covering, e.g. roof tiles.

b. RESIDENTIAL (DWELLINGS) AND RESIDENTIAL (OTHER) A MAXIMUM OF 15M HIGH



Roof covering to be designated $B_{\text{ROOF}}(t4)$ rated for at least this distance.

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

Thermoplastic insulation materials should not be carried over the wall.

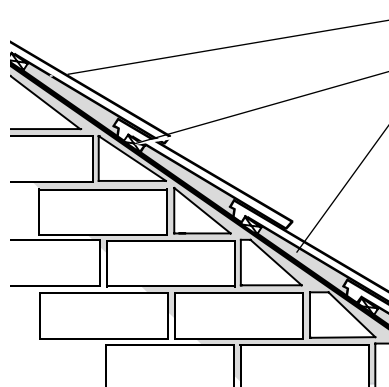
Double-skinned insulated roof sheeting with a thermoplastic core should incorporate a band of material of class A2-s3, d2 at least 300mm wide centred over the wall.

Sarking felt may also be carried over the wall.

If roof support members pass through the wall, fire protection to these members for a distance of 1500mm on either side of the wall may be needed to delay distortion at the junction (see paragraph 5.9).

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

Section X-X



Roof covering to be designated $B_{\text{ROOF}}(t4)$ rated for at least 1500mm either side of wall.

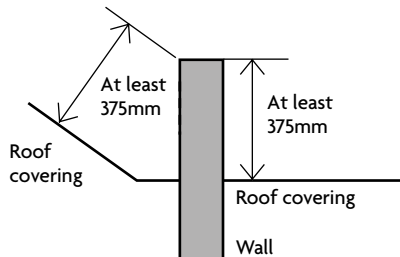
Roofing battens and sarking felt may be carried over the wall.

Fire-stopping to be carried up to underside of roof covering above and below sarking felt.

NOTES:

1. Fire-stopping should be carried over the full thickness of the wall.
2. Fire-stopping should be extended into any eaves.
3. The compartment wall does not necessarily need to be constructed of masonry.

c. ANY BUILDING OR COMPARTMENT



The wall should 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 375 mm between two roofs or where the roof coverings on either side of the wall are $B_{\text{ROOF}}(t4)$ rated, the height of the upstand/parapet wall above the highest roof may be reduced to 200mm.

Diagram 5.2 Junction of compartment wall with roof

Cavities

5.16 Cavities in the construction of a building provide a ready route for the spread of smoke and flame, which can present a greater danger as any spread is concealed. For the purpose of this document, a cavity is considered to be any concealed space.

Provision of cavity barriers

5.17 To reduce the potential for fire spread, cavity barriers should be provided for both of the following.

- To divide cavities.
- To close the edges of cavities.

Cavity barriers should not be confused with fire-stopping details (Section 9).

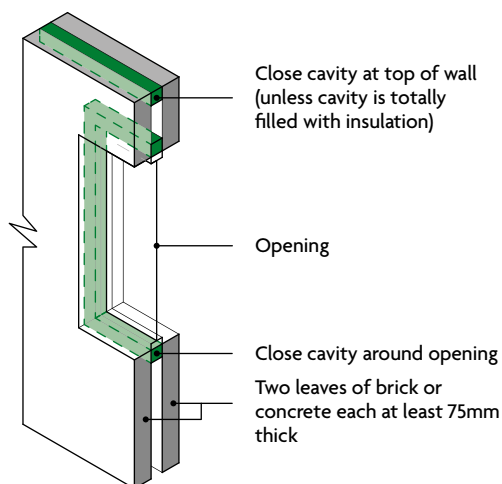
5.18 Cavity barriers should be provided at all of the following locations.

- At the edges of cavities, including around openings (such as windows, doors and exit/entry points for services).
- At the junction between an external cavity wall and every compartment floor and compartment wall.
- At the junction between an internal cavity wall and every compartment floor, compartment wall or other wall or door assembly forming a fire resisting barrier.

This does not apply where a wall meets the conditions of Diagram 5.3.

5.19 It is not appropriate to complete a line of compartment walls by fitting cavity barriers above them. The compartment wall should be extended to the underside of the floor or roof above.

See para 5.18



NOTES:

- Materials used to close the cavity in this arrangement do not need to achieve a specific performance in relation to fire resistance.
- Domestic meter cupboards may be installed provided that the following conditions are met:
 - There are no more than two cupboards per dwelling
 - The openings in the outer wall leaf are not bigger than 800×500mm for each cupboard
 - The inner leaf is not penetrated except by a sleeve not more than 80×80mm, which is fire-stopped.
- Materials achieving class B-s3, d2 or worse may be placed within the cavity.

Diagram 5.3 Cavity walls excluded from provisions for cavity barriers

Construction and fixings for cavity barriers

5.20 Cavity barriers, tested from each side separately, should provide a minimum of both of the following:

- a. 30 minutes' integrity (E 30)
- b. 15 minutes' insulation (I 15).

They may be formed by a construction provided for another purpose if it achieves the same performance.

5.21 Cavity barriers in a stud wall or partition, or provided around openings, may be formed of any of the following.

- a. Steel, a minimum of 0.5mm thick.
- b. Timber, a minimum of 38mm thick.
- c. Polythene-sleeved mineral wool, or mineral wool slab, under compression when installed in the cavity.
- d. Calcium silicate, cement-based or gypsum-based boards, a minimum of 12mm thick.

These do not necessarily achieve the performance specified in paragraph 5.20.

NOTE: Cavity barriers provided around openings may be formed by the window or door frame, if the frame is constructed of steel or timber of the minimum thickness in (a) or (b), as appropriate.

5.22 Cavity barriers should be tightly fitted to a rigid construction and mechanically fixed in position. If this is not possible (e.g. where a cavity barrier joins to slates, tiles, corrugated sheeting or similar materials) the junction should be fire-stopped.

5.23 Cavity barriers should be fixed so their performance is unlikely to be made ineffective by any of the following.

- a. Movement of the building due to subsidence, shrinkage or temperature change, and movement of the external envelope due to wind.
- b. During a fire, collapse of services penetrating the cavity barriers, either by the failure of the supporting system or through degradation of the service itself (e.g. by melting or burning).
- c. During a fire, failure of the cavity barrier fixings. (In roof spaces, where cavity barriers are fixed to roof members, there is no expectation of fire resistance from roof members provided for the purpose of support.)
- d. During a fire, failure of any material or construction to which cavity barriers abut. (For example, a suspended ceiling that continues over a fire resisting wall or partition collapses, and the cavity barrier fails prematurely because the ceiling was not designed to provide a minimum fire resistance of EI 30.)

Openings in cavity barriers

5.24 Openings should be limited to the following.

- a. Fire doorsets with a minimum E 30 rating, fitted in accordance with Appendix C.
- b. The passage of pipes that follow the provisions in Section 9.
- c. The passage of cables or conduits containing one or more cables.
- d. Openings fitted with a suitably mounted and appropriate fire damper.

- e. Ducts that are either of the following.
 - i. Fire resisting (minimum E 30).
 - ii. Fitted with a suitably mounted and appropriate fire damper where they pass through the cavity barrier.

NOTE: For further guidance on openings in cavity barriers see Section 9.

Section 6: Loadbearing elements of structure – flats

Fire resistance standard

6.1 Elements of structure such as structural frames, beams, columns, loadbearing walls (internal and external), floor structures and gallery structures should have, as a minimum, the fire resistance given in Appendix B, Table B3.

NOTE: If one element of structure supports or stabilises another, as a minimum the supporting element should have the same fire resistance as the other element.

6.2 The following are excluded from the definition of 'element of structure'.

- a. A structure that supports only a roof, unless either of the following applies.
 - i. The roof performs the function of a floor, such as for parking vehicles, or as a means of escape.
 - ii. The structure is essential for the stability of an external wall that needs to be fire resisting (e.g. to achieve compartmentation or for the purposes of preventing fire spread between buildings).
- b. The lowest floor of the building.
- c. A platform floor.
- d. External walls, such as curtain walls or other forms of cladding, which transmit only self weight and wind loads and do not transmit floor load.

NOTE: In some cases, structural members within a roof may be essential for the structural stability system of the building. In these cases, the structural members in the roof do not just support a roof and must demonstrate the relevant fire resistance for the building as required by the note to paragraph 6.1 above.

Additional guidance

6.3 If a loadbearing wall is any of the following, guidance in other sections may also apply.

- a. A compartment wall (including a wall common to two buildings): Section 7.
- b. Enclosing a place of special fire hazard: Section 7.
- c. Protecting a means of escape: Sections 2 and 3.
- d. An external wall: Sections 10 and 11.
- e. Enclosing a firefighting shaft: Section 15.

6.4 If a floor is also a compartment floor, see Section 7.

Conversion to flats

- 6.5 Where an existing **dwellinghouse** or other **building** is converted into **flats**, a review of the existing construction should be carried out. Retained timber floors may make it difficult to meet the relevant provisions for **fire resistance**.
- 6.6 In a converted **building** with a maximum of three **storeys**, a minimum REI 30 **fire resistance** could be accepted for **elements of structure** if the **means of escape** conform to the provisions of Section 3.
- 6.7 In a converted **building** with four or more **storeys**, the full standard of **fire resistance** given in Appendix B is necessary.

Section 7: Compartmentation/sprinklers – flats

Provision of compartmentation

- 7.1** All of the following should be provided as **compartment walls** and **compartment floors** and should have, as a minimum, the **fire resistance** given in Appendix B, Table B3.
- a. Any floor (unless it is within a **flat**, i.e. between one **storey** and another within one individual **dwelling**).
 - b. Any wall separating a **flat** from another part of the **building**.
 - c. Any wall enclosing a refuse storage chamber.
 - d. Any wall common to two or more **buildings**.

Places of special fire hazard

- 7.2** **Fire resisting** construction enclosing these places should achieve minimum REI 30. These walls and floors are not **compartment walls** and **compartment floors**.
- 7.3** Parts of a **building** occupied mainly for different purposes should be separated from one another by **compartment walls** and/or **compartment floors**. Compartmentation is not needed if one of the different purposes is ancillary to the other. See paragraphs 0.18 and 0.19.

Sprinklers

- 7.4** Blocks of **flats** with a top **storey** more than 11m above ground level (see Diagram D6) should be fitted with a sprinkler system throughout the **building** in accordance with Appendix E.

NOTE: Sprinklers should be provided within the individual flats, they do not need to be provided in the common areas such as stairs, corridors or landings when these areas are fire sterile.

Construction of compartment walls and compartment floors

General provisions

- 7.5** All **compartment walls** and **compartment floors** should achieve both of the following.
- a. Form a complete barrier to fire between the **compartments** they separate.
 - b. Have the appropriate **fire resistance**, as given in Appendix B, Tables B3 and B4.
- 7.6** 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 both of the following.
- a. As small as practicable.
 - b. **Fire-stopped**.

If trussed rafters bridge the wall, failure of the truss due to a fire in one **compartment** should not cause failure of the truss in another **compartment**.

- 7.7 Where services could provide a source of ignition, the risk of fire developing and spreading into adjacent **compartments** should be controlled.

Compartment walls between buildings

- 7.8 Adjoining **buildings** should only be separated by walls, not floors. **Compartment walls** common to two or more **buildings** should comply with both of the following.
- Run the full **height** of the **building** in a continuous vertical plane.
 - Be continued through any roof space to the underside of the roof (see Diagram 5.2).

Separated parts of buildings

- 7.9 **Compartment walls** forming a **separated part** of a **building** should run the full **height** of the **building** in a continuous vertical plane.

Separated parts can be assessed independently to determine the appropriate standard of **fire resistance** in each. The two **separated parts** can have different standards of **fire resistance**.

Other compartment walls

- 7.10 **Compartment walls** not described in paragraphs 7.8 and 7.9 should run the full **height** of the **storey** in which they are situated.
- 7.11 **Compartment walls** in a top **storey** beneath a roof should be continued through the roof space.

Junction of compartment wall or compartment floor with other walls

- 7.12 At the junction with another **compartment wall** or an **external wall**, the **fire resistance** of the compartmentation should be maintained. **Fire-stopping** that meets the provisions in paragraphs 9.24 to 9.29 should be provided.
- 7.13 At the junction of a **compartment floor** and an **external wall** with no **fire resistance**, the **external wall** should be restrained at floor level. The restraint should reduce movement of the wall away from the floor if exposed to fire.
- 7.14 **Compartment walls** should be able to accommodate deflection of the floor, when exposed to fire, by either of the following means.
- Between the wall and floor, provide a head detail that is capable of maintaining its integrity while deforming.
 - Design the wall so it maintains its integrity by resisting the additional vertical load from the floor above.

Where **compartment walls** are located within the middle half of a floor between vertical supports, the 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 P288.

Junction of compartment wall with roof

- 7.15 The requirements are the same as for **dwellinghouses**, detailed in paragraphs 5.11 and 5.12.
- 7.16 Materials achieving class B-s3, d2 or worse used as a substrate to the roof covering and any timber tiling battens, fully bedded in mortar or other suitable material for the width of the wall (Diagram 5.2b), may extend over the **compartment wall** in **buildings** that are both of the following.

- a. A maximum of 15m high.
- b. In one of the following **purpose groups**.
 - i. All residential **purpose groups** (**purpose groups** 1 and 2) other than 'residential (institutional)' (**purpose group** 2(a)).
 - ii. 'Office' (**purpose group** 3).
 - iii. 'Assembly and recreation' (**purpose group** 5).

7.17 Double-skinned insulated roof sheeting with a thermoplastic core should incorporate a band of material rated class A2-s3, d2 or better, a minimum of 300mm in width, centred over the wall.

7.18 As an alternative to the provisions of paragraph 7.16 or 7.17, the **compartment wall** may extend through the roof for a minimum of either of the following (see Diagram 5.2c).

- a. Where the height difference between the two roofs is less than 375mm, 375mm above the top surface of the adjoining roof covering.
- b. 200mm above the top surface of the adjoining roof covering where either of the following applies.
 - i. The height difference between the two roofs is 375mm or more.
 - ii. The roof coverings either side of the wall are of a material classified as $B_{ROOF}(t4)$.

Openings in compartmentation

Openings in compartment walls separating buildings or occupancies

7.19 Openings in a **compartment wall** common to two or more **buildings** should be limited to those for either of the following.

- a. A **fire doorset** providing a **means of escape**, which has the same **fire resistance** as the wall and is fitted in accordance with the provisions in Appendix C.
- b. The passage of a **pipe** that complies with the provisions in Section 9.

Openings in other compartment walls, or in compartment floors

7.20 Openings should be limited to those for any of the following.

- a. **Fire doorsets** of the appropriate **fire resistance**, fitted in accordance with the provisions in Appendix C.
- b. **Pipes**, ventilation ducts, service cables, chimneys, **appliance ventilation ducts** or ducts encasing one or more flue **pipes**, complying with the provisions in Section 9.
- c. Refuse chutes of class A1 construction.
- d. **Atria** designed in accordance with Annexes B and C of **BS 9999**.
- e. **Protected shafts** that conform to the provisions in the following paragraphs.

Protected shafts

7.21 Stairs and service shafts connecting **compartments** should be protected to restrict the spread of fire between the **compartments**. These are called **protected shafts**. Walls or floors surrounding a **protected shaft** are considered to be **compartment walls** or **compartment floors**.

7.22 Any stair or other shaft passing directly from one **compartment** to another should be enclosed in a **protected shaft**. **Protected shafts** should be used for the following only, but may also include sanitary accommodation and washrooms.

- a. Stairs.
- b. Lifts.
- c. Escalators.
- d. Chutes.
- e. Ducts.
- f. Pipes.
- g. Additional provisions apply for both of the following.
 - i. **Protected shafts** that are **protected stairways**: Sections 2 to 4.
 - ii. Stairs that are also **firefighting stairs**: Section 15.

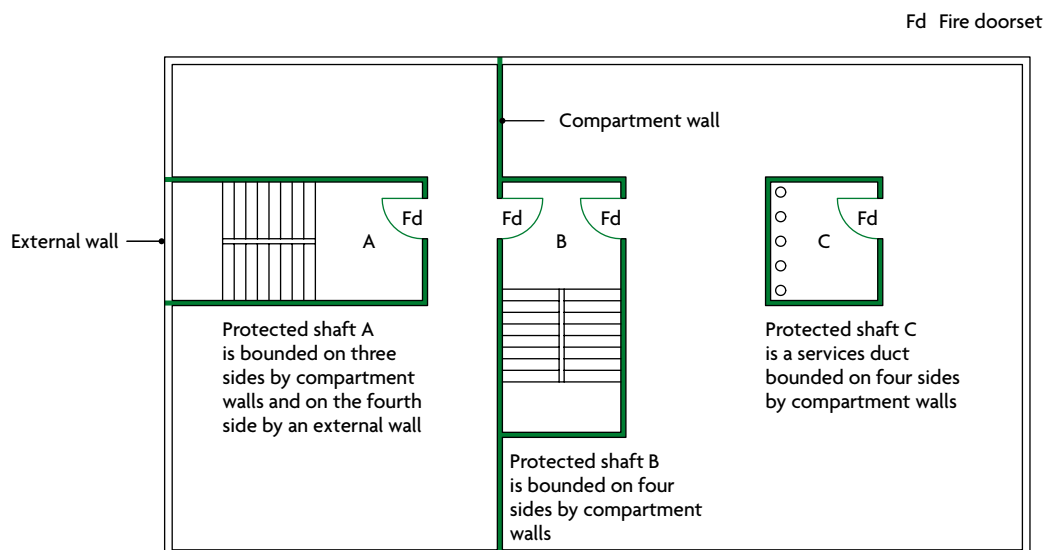
Construction of protected shafts

7.23 The construction enclosing a **protected shaft** (Diagram 7.1) should do all of the following.

- a. Form a complete barrier to fire between the **compartments** connected by the shaft.
- b. Have the appropriate **fire resistance** given in Appendix B, Table B3, *except for uninsulated glazed screens that meet the provisions of paragraph 7.24.*
- c. Satisfy the provisions for ventilation and the treatment of openings in paragraphs 7.28 and 7.29.

See para 7.23

This diagram shows three common examples which illustrate the principles of the construction of protected shafts. The elements enclosing the shaft (unless formed by adjacent external walls) are compartment walls and floors.



The shaft structure (including any openings) should meet the relevant provisions for both of the following: compartment walls (see paragraphs 7.5 to 7.20) and external walls (see Sections 10 and 11 and Diagram 3.10).

Diagram 7.1 Construction of protected shafts

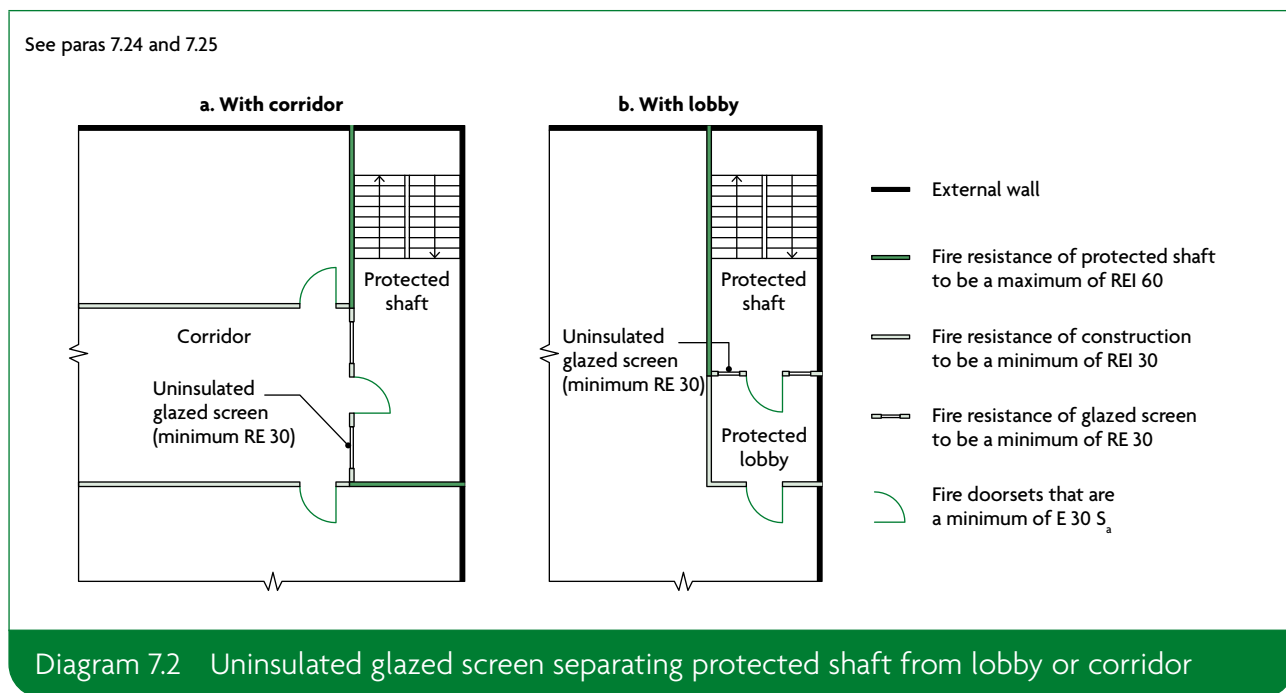
Uninsulated glazed screens to protected shafts

7.24 An uninsulated glazed screen may be incorporated in the enclosure to a **protected shaft** between a stair and a lobby or corridor entered from the stair. The enclosure must conform to Diagram 7.2 and meet all of the following conditions.

- a. The standard of **fire resistance** required for the **protected stairway** is not more than REI 60.
- b. The glazed screen complies with the following.
 - i. It achieves a minimum rating of E 30.
 - ii. It complies with the guidance on limits on areas of uninsulated glazing in Appendix B, Table B5.
- c. The lobby or corridor is enclosed with **fire resisting** construction achieving a minimum rating of REI 30.

7.25 Where the measures in Diagram 7.2 are not provided, then both of the following apply.

- a. The enclosing walls should comply with Appendix B, Table B3.
- b. The doors should comply with Appendix B, Table B5.



Pipes for oil or gas and ventilation ducts in protected shafts

7.26 A **protected shaft** containing a **protected stairway** and/or a lift *should not* also contain either of the following.

- a. A **pipe** that conveys oil, other than in the mechanism of a hydraulic lift.
- b. A ventilating duct. Two exceptions are as follows.
 - i. A duct provided for pressurising the **protected stairway** to keep it smoke free.
 - ii. A duct provided only to ventilate the **protected stairway**.

A **pipe** that is completely separated from a **protected shaft** by **fire resisting** construction is not considered to be contained within that shaft.

7.27 In a **protected shaft**, any **pipe** carrying natural gas or LPG should be both of the following.

- a. Of screwed steel or all-welded steel construction.
- b. Installed in accordance with both of the following.
 - i. The Pipelines Safety Regulations 1996.
 - ii. The Gas Safety (Installation and Use) Regulations 1998.

Ventilation of protected shafts conveying gas

7.28 A **protected shaft** conveying piped flammable gas should be ventilated direct to the outside air, by ventilation openings at high and low level in the shaft.

Any extension of the **storey** floor into the **protected shaft** should not compromise the free movement of air throughout the entire length of the shaft.

Guidance on shafts conveying piped flammable gas, including the size of ventilation openings, is given in **BS 8313**.

Openings into protected shafts

7.29 The **external wall** of a **protected shaft** does not normally need to have **fire resistance**. Situations where there are provisions are given in paragraph 3.63 (**external walls** of **protected stairways**, which may also be **protected shafts**) and paragraphs 15.8 to 15.11 (**firefighting shafts**).

Openings in other parts of the enclosure to a **protected shaft** should be limited to the following.

- a. If a wall common to two or more **buildings** forms part of the enclosure, only the following openings should be made in that wall.
 - i. A **fire doorset** providing a **means of escape**, which has the same **fire resistance** as the wall and is fitted in accordance with the provisions in Appendix C.
 - ii. The passage of a **pipe** that meets the provisions in Section 9.
- b. Other parts of the enclosure (other than an **external wall**) should only have openings for any of the following.
 - i. **Fire doorsets** of the appropriate **fire resistance**, fitted in accordance with the provisions in Appendix C.
 - ii. The passage of **pipes** which meet the provisions in Section 9.
 - iii. Inlets to, outlets from and openings for a ventilation duct (if the shaft contains or serves as a ventilating duct), meeting the provisions in Section 9.
 - iv. The passage of lift cables into a lift machine **room** (if the shaft contains a lift). If the machine **room** is at the bottom of the shaft, the openings should be as small as practicable.

Section 8: Cavities – flats

- 8.1** Cavities in the construction of a building provide a ready route for the spread of smoke and flame, which can present a greater danger as any spread is concealed. For the purpose of this document, a cavity is considered to be any concealed space.

Provision of cavity barriers

- 8.2** To reduce the potential for fire spread, cavity barriers should be provided for both of the following.
- To divide cavities.
 - To close the edges of cavities.
- See Diagram 8.1. Cavity barriers should not be confused with fire-stopping details (Section 9).

Pathways around fire-separating elements

Junctions and edges of cavities

- 8.3** Cavity barriers should be provided at all of the following locations.
- At the edges of cavities, including around openings (such as windows, doors and exit/entry points for services).
 - At the junction between an external cavity wall and every compartment floor and compartment wall.
 - At the junction between an internal cavity wall and every compartment floor, compartment wall or other wall or door assembly forming a fire resisting barrier.

This does not apply where a wall meets the conditions of Diagram 8.2.

- 8.4** It is not appropriate to complete a line of compartment walls by fitting cavity barriers above them. The compartment walls should extend to the underside of the floor or roof above.

Protected escape routes

- 8.5** If the fire resisting construction of a protected escape route is either of the following.
- Not carried to full storey height.
 - At the top storey, not carried to the underside of the roof covering.
- Then the cavity above or below the fire resisting construction should be either of the following.
- Fitted with cavity barriers on the line of the enclosure.
 - For cavities above the fire resisting construction, enclosed on the lower side by a fire resisting ceiling (minimum EI 30) that extends throughout the building, compartment or separated part (see Diagram 8.3).

See para 8.2

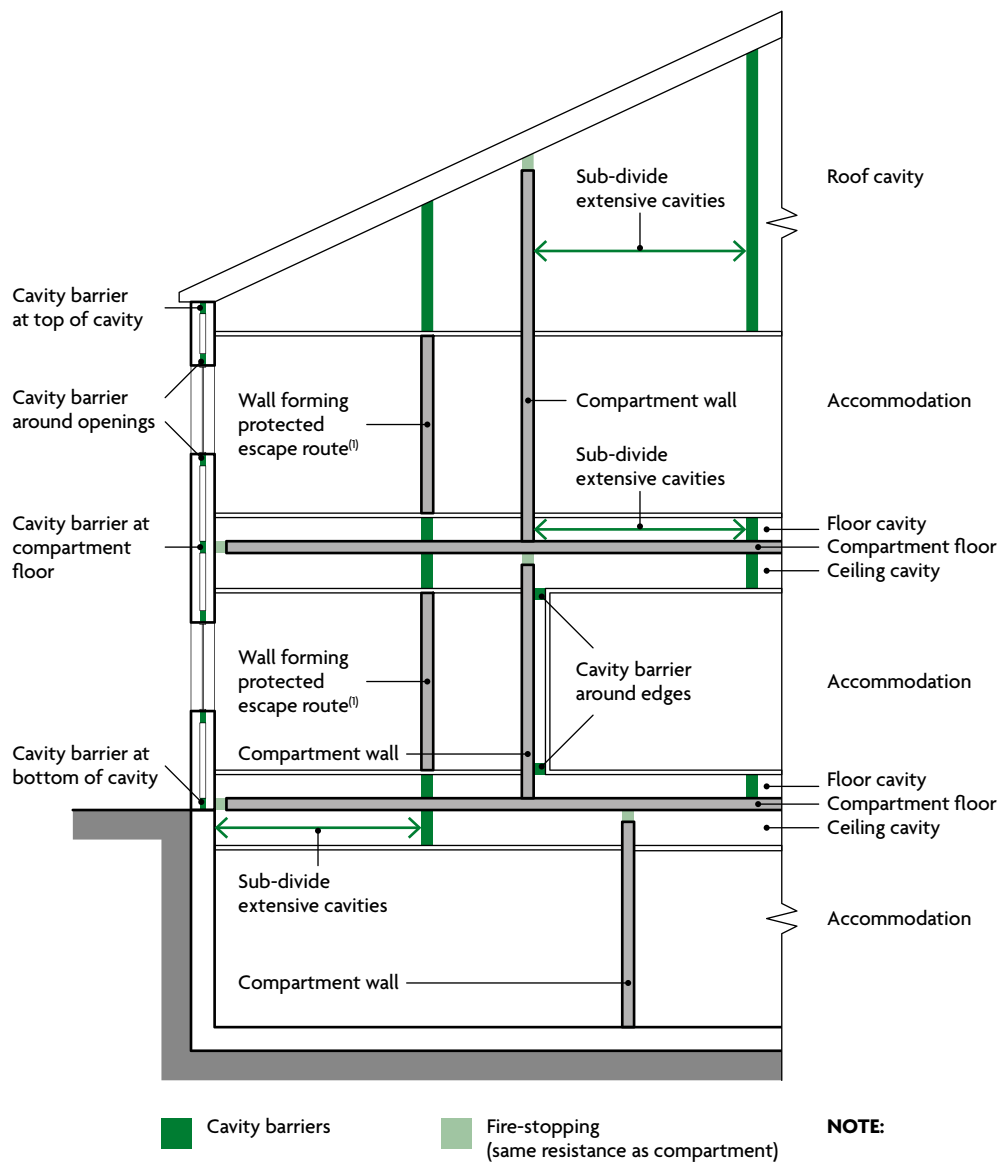


Diagram 8.1 Provisions for cavity barriers

Cavities affecting alternative escape routes

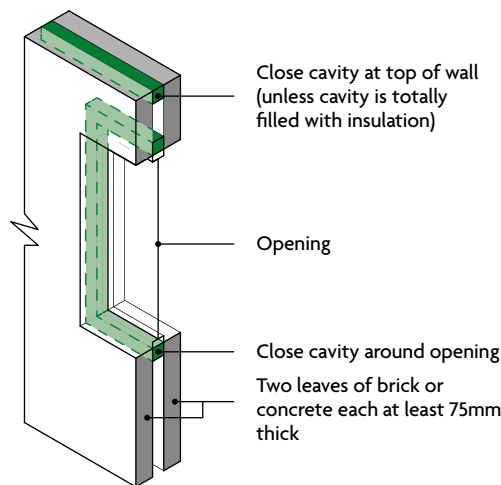
8.6 In divided corridors (paragraph 3.25 and following) with cavities, **fire-stopping** should be provided to prevent **alternative escape routes** being affected by fire and/or smoke.

Double-skinned corrugated or profiled roof sheeting

8.7 Cavity barriers are not required between double-skinned corrugated or profiled insulated roof sheeting, if the sheeting complies with all of the following.

- The sheeting is rated class A2-s3, d2 or better.
- Both surfaces of the insulating layer are rated class C-s3, d2 or better.
- Both surfaces of the insulating layer make contact with the inner and outer skins of cladding (Diagram 8.4).

See para 8.3

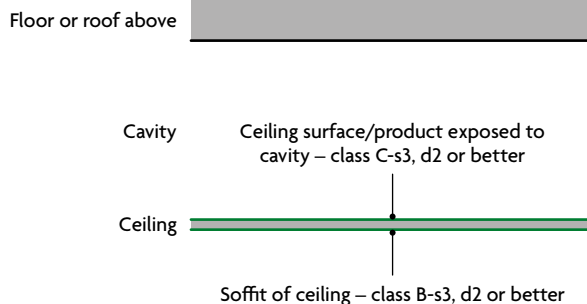


NOTES:

- Materials used to close the cavity in this arrangement do not need to achieve a specific performance in relation to fire resistance.
- Domestic meter cupboards may be installed provided that the following conditions are met:
 - There are no more than two cupboards per dwelling
 - The openings in the outer wall leaf are not bigger than 800×500mm for each cupboard
 - The inner leaf is not penetrated except by a sleeve not more than 80×80mm, which is fire-stopped.
- Materials achieving class B-s3, d2 or worse may be placed within the cavity.

Diagram 8.2 Cavity walls excluded from provisions for cavity barriers

See para 8.5



NOTE:

The ceiling should meet all of the following conditions.

- Provide a minimum fire resistance of EI 30.
- Be imperforate, except for an opening described in paragraph 5.24.
- Extend throughout the building or compartment.
- Not be easily demountable.

Diagram 8.3 Fire resisting ceiling below cavity

See para 8.7

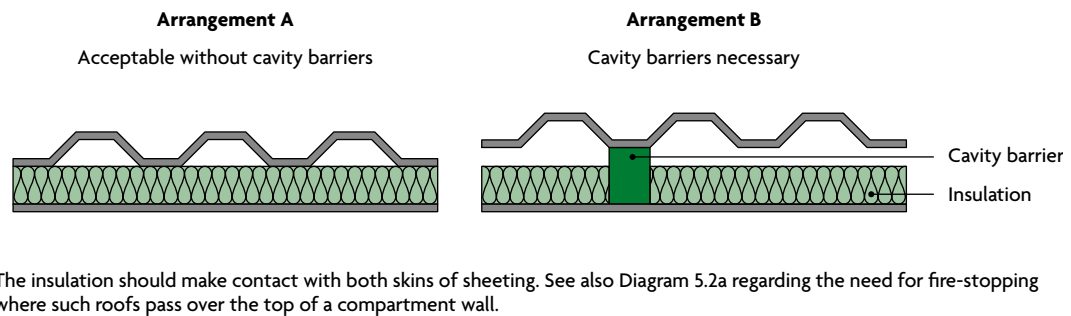


Diagram 8.4 Provisions for cavity barriers in double-skinned insulated roof sheeting

Construction and fixings for cavity barriers

8.8 Cavity barriers, tested from each side separately, should provide a minimum of both of the following:

- a. 30 minutes' integrity (E 30)
- b. 15 minutes' insulation (I 15).

They may be formed by a construction provided for another purpose if it achieves the same performance.

8.9 Cavity barriers should meet the requirements set out in paragraphs 5.21 to 5.24.

Section 9: Protection of openings and fire-stopping

Introduction

- 9.1 Every joint, imperfect fit and opening for services through a fire-separating element should be sealed with fire-stopping to ensure that the fire resistance of the element is not impaired. Fire-stopping delays the spread of fire and, generally, the spread of smoke as well.

Openings for pipes

- 9.2 Pipes passing through a fire-separating element, unless in a protected shaft, should meet one of the alternatives A, B or C below.

Alternative A: Proprietary seals (any pipe diameter)

- 9.3 Provide a proprietary, tested sealing system that will maintain the fire resistance of the wall, floor or cavity barrier.

Alternative B: Pipes with a restricted diameter

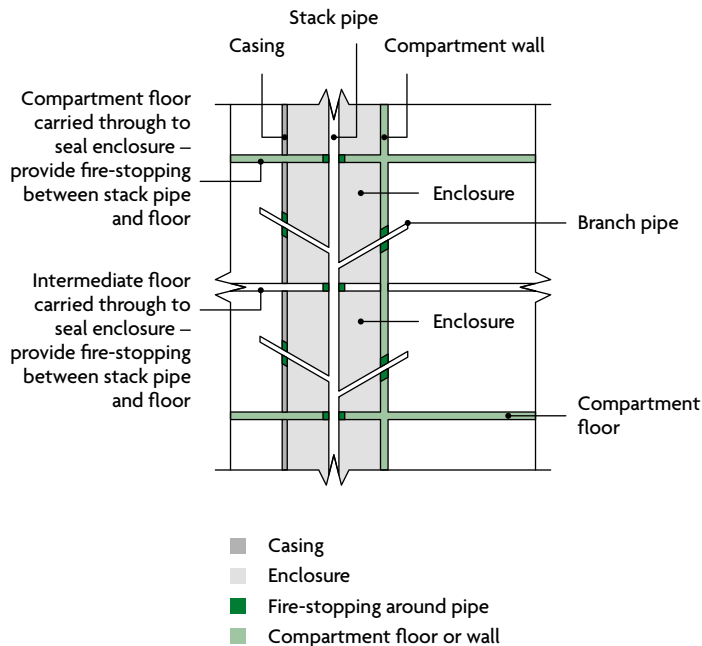
- 9.4 Where a proprietary sealing system is not used, fire-stop around the pipe, keeping the opening for the pipe as small as possible. The nominal internal diameter of the pipe should not exceed the relevant dimension given in Table 9.1. The diameter given in Table 9.1 for pipes of specification (b) used in situation 2 or 3 assumes that the pipes are part of an above-ground drainage system and are enclosed as shown in Diagram 9.1. If they are not, the smaller diameter given for situation 5 should be used.

Alternative C: Sleeving

- 9.5 A pipe with a maximum nominal internal diameter of 160mm may be used with a sleeve made out of a high melting point metal, as shown in Diagram 9.2, if the pipe is made of one of the following.
- Lead.
 - Aluminium.
 - Aluminium alloy.
 - Fibre-cement.
 - uPVC (pipes should also comply with either BS 4514 or BS 5255).

A high melting point metal means any metal (such as cast iron, copper or steel) which, if exposed to a temperature of 800°C, will not soften or fracture to the extent that flame or hot gas will pass through the wall of the pipe.

See para 9.4 and Table 9.1

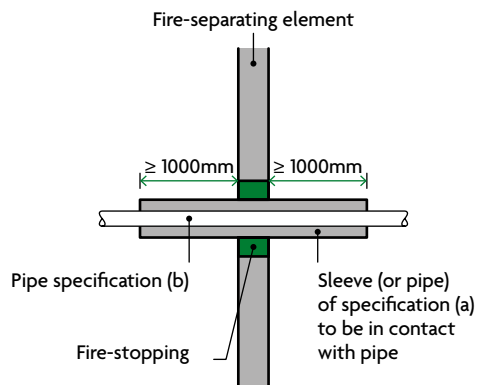


NOTES:

- The enclosure should meet all of the following conditions.
 - Be bounded by a compartment wall or floor, an outside wall, an intermediate floor or a casing (see specification at 2 below).
 - Have internal surfaces (except framing members) of class B-s3, d2 or better.
Note: when a classification includes 's3, d2', this means that there is no limit set for smoke production and/or flaming droplets/particles.
 - Not have an access panel which opens into a circulation space or bedroom.
 - Be used only for drainage or water supply or vent pipes for a drainage system.
- The casing should meet all the following conditions.
 - Be imperforate except for an opening for a pipe or an access panel.
 - Not be of sheet metal.
 - Not have fire resistance less than E 30 (including any access panel).
- The opening for a pipe, in either the element of structure or the casing, should be as small as possible and fire-stopped around the pipe.

Diagram 9.1 Enclosure for drainage or water supply pipes

See para 9.5



NOTES:

- Make the opening in the fire-separating element as small as possible and provide fire-stopping between pipe and fire-separating element.
- See Table 9.1 for materials specification.
- The sleeve should be class A1 rated.

Diagram 9.2 Pipes penetrating fire-separating elements

Table 9.1 Maximum nominal internal diameter of pipes passing through a fire-separating element

Situation	Pipe material and maximum nominal internal diameter (mm)		
	(a) High melting point metal ⁽¹⁾	(b) Lead, aluminium, aluminium alloy, uPVC, ⁽²⁾ fibre cement	(c) Any other material
1. Structure (but not a wall separating buildings) enclosing a protected shaft that is not a stair or a lift shaft	160	110	40
2. Compartment wall or compartment floor between flats	160	160 (stack pipe) ⁽³⁾ 110 (branch pipe) ⁽³⁾	40
3. Wall separating dwellinghouses	160	160 (stack pipe) ⁽³⁾ 110 (branch pipe) ⁽³⁾	40
4. Wall or floor separating a dwellinghouse from an attached garage	160	110	40
5. Any other situation	160	40	40

NOTES:

- Any metal (such as cast iron, copper or steel) which, if exposed to a temperature of 800°C, will not soften or fracture to the extent that flame or hot gas will pass through the wall of the pipe.
- uPVC pipes that comply with either **BS 4514** or **BS 5255**.
- These diameters are only in relation to pipes that form part of an above-ground drainage system and are enclosed as shown in Diagram 9.1. In other cases, the maximum diameters given for situation 5 apply.

Mechanical ventilation and air-conditioning systems

General provisions

- 9.6** Ductwork should not help to transfer fire and smoke through the **building**. Terminals of exhaust points should be sited away from **final exits**, cladding or roofing materials achieving class B-s3, d2 or worse and openings into the **building**.
- 9.7** Ventilation ducts supplying or extracting air directly to or from a **protected stairway** should not also serve other areas. A separate ventilation system should be provided for each **protected stairway**.
- 9.8** A **fire and smoke damper** should be provided where ductwork enters or leaves each section of the protected **escape route** it serves. It should be operated by a smoke detector or suitable fire detection system. **Fire and smoke dampers** should close when smoke is detected. Alternatively, the methods set out in paragraphs 9.16 and 9.17 and Diagrams 9.3 and 9.4 may be followed.
- 9.9** In a system that recirculates air, smoke detectors should be fitted in the extract ductwork before both of the following.
- The point where recirculated air is separated from air to be discharged to the outside.
 - Any filters or other air cleaning equipment.

When smoke is detected, detectors should do one of the following.

- i. Cause the system to immediately shut down.
- ii. Switch the ventilation system from recirculating mode to extraction to divert smoke to outside the **building**.

9.10 In mixed use **buildings**, non-domestic kitchens, car parks and plant **rooms** should have separate and independent extraction systems. Extracted air should not be recirculated.

9.11 Under fire conditions, ventilation and air-conditioning systems should be compatible with smoke control systems and need to be considered in their respective design.

Ventilation ducts and flues passing through fire-separating elements

General provisions

9.12 If air handling ducts pass through **fire-separating elements**, the fire performance of the elements should be maintained using one or more of the following four methods. In most ductwork systems, a combination of the four methods is best.

- a. Method 1 – thermally activated **fire dampers**.
- b. Method 2 – **fire resisting** enclosures.
- c. Method 3 – protection using **fire resisting** ductwork.
- d. Method 4 – automatically activated **fire and smoke dampers** triggered by smoke detectors.

9.13 Further information on **fire resisting** ductwork is given in the ASFP Blue Book.

Flats and dwellings

9.14 Where ducts pass between **fire-separating elements** to serve multiple **flats** or **dwellings**, **fire dampers** or **fire and smoke dampers** should be actuated by both of the following.

- a. Smoke detector-controlled **automatic release mechanisms**.
- b. Thermally actuated devices.

Kitchen extract

9.15 Methods 1 and 4 should not be used for extract ductwork serving kitchens. The likely build-up of grease within the duct can adversely affect dampers.

Ducts passing through protected escape routes

9.16 Method 1 should not be used for extract ductwork passing through the enclosures of protected **escape routes** (Diagrams 9.3 and 9.4), as large volumes of smoke can pass thermal devices without triggering them.

9.17 An ES classified **fire and smoke damper** which is activated by a suitable fire detection system (method 4) may also be used for protected **escape routes**.

See para 9.16

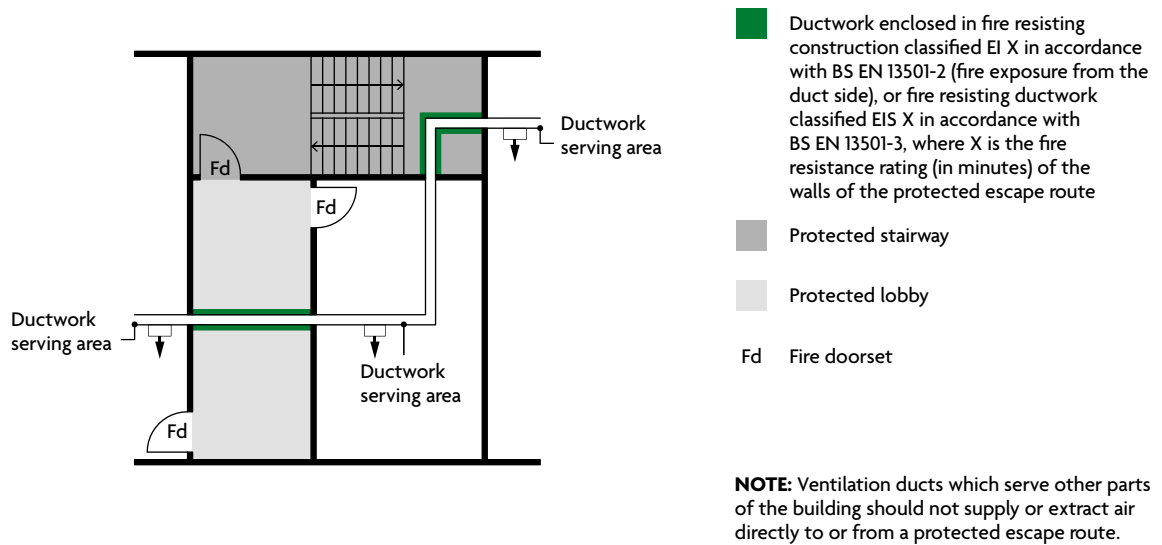


Diagram 9.3 Ductwork passing through protected escape routes – method 2 or method 3

See para 9.16

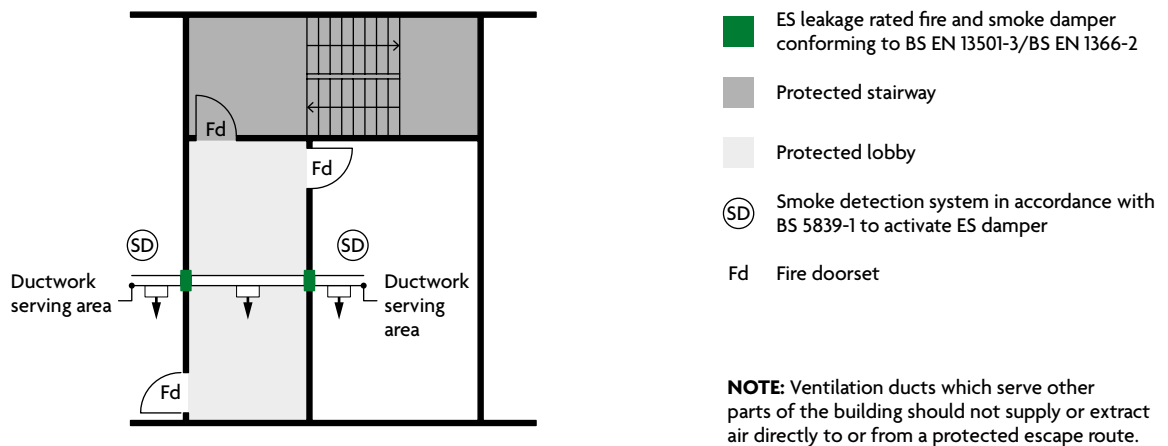


Diagram 9.4 Ductwork passing through protected escape routes – method 4

Installation and specification of fire dampers

- 9.18** Both **fire dampers** and **fire and smoke dampers** should be all of the following.
- Sited within the thickness of the **fire-separating elements**.
 - Securely fixed.
 - Sited such that, in a fire, expansion of the ductwork would not push the **fire damper** through the structure.
- 9.19** Access to the **fire damper** and its actuating mechanism should be provided for inspection, testing and maintenance.
- 9.20** **Fire dampers** should meet both of the following conditions.
- Conform to **BS EN 15650**.
 - Have a minimum E classification of 60 minutes or to match the integrity rating of the **fire resisting** elements, whichever is higher.
- 9.21** **Fire and smoke dampers** should meet both of the following conditions.
- Conform to **BS EN 15650**.
 - Have a minimum ES classification of 60 minutes or to match the integrity rating of the **fire resisting** elements, whichever is higher.
- 9.22** Smoke detectors should be sited so as to prevent the spread of smoke as early as practicable by activating the **fire and smoke dampers**. Smoke detectors and **automatic release mechanisms** used to activate **fire dampers** and/or **fire and smoke dampers** should conform to **BS EN 54-7** and **BS 5839-3** respectively.

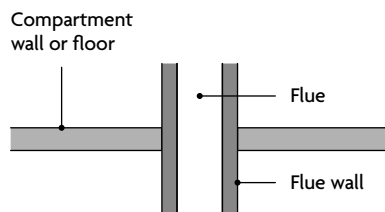
Further information on **fire dampers** and/or **fire and smoke dampers** is given in the ASFP Grey Book.

Flues, etc.

- 9.23** The wall of a flue, duct containing flues or **appliance ventilation duct(s)** should have a **fire resistance (REI)** that is at least half of any **compartment wall** or **compartment floor** it passes through or is built into (Diagram 9.5).

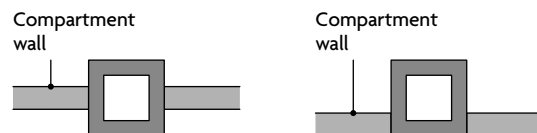
See para 9.23

a. Flue passing through compartment wall or floor



Flue walls should have a fire resistance of at least one half of that required for the compartment wall or floor and be of class A1 construction.

b. Flue built into compartment wall



In each case flue walls should have a fire resistance of at least one half of that required for the compartment wall and be of class A1 construction.

Diagram 9.5 Flues penetrating compartment walls or floors

Fire-stopping

9.24 In addition to any other provisions in this section, both of the following conditions should be met.

- a. Joints between fire-separating elements should be fire-stopped.
- b. Openings through a fire resisting element for pipes, ducts, conduits or cable should be all of the following.
 - i. As few as possible.
 - ii. As small as practicable.
 - iii. Fire-stopped (allowing thermal movement in the case of a pipe or duct).

NOTE: The fire-stopping around fire dampers, fire resisting ducts, fire and smoke dampers and smoke control ducts should be in accordance with the manufacturer or supplier's installation instructions.

9.25 Materials used for fire-stopping should be reinforced with (or supported by) materials rated class A2-s3, d2 or better to prevent displacement in both of the following cases.

- a. Where the unsupported span is greater than 100mm.
- b. Where non-rigid materials are used (unless subjected to appropriate fire resistance testing to show their suitability).

9.26 Proprietary, tested fire-stopping and sealing systems are available and may be used. Different materials suit different situations and not all are suitable in every situation.

9.27 Other fire-stopping materials include the following.

- a. Cement mortar.
- b. Gypsum-based plaster.
- c. Cement-based or gypsum-based vermiculite/perlite mixes.
- d. Glass fibre, crushed rock, blast furnace slag or ceramic-based products (with or without resin binders).
- e. Intumescent mastics.

These may be used in situations appropriate to the particular material. Not all materials will be suitable in every situation.

9.28 Guidance on the design, installation and maintenance of measures to contain fires or slow their spread is given in *Ensuring Best Practice for Passive Fire Protection in Buildings* produced by the Association for Specialist Fire Protection (ASFP).

9.29 Further information on generic systems, their suitability for different applications and guidance on test methods, is given in the ASFP Red Book.

Requirement B4: External fire spread

These sections deal with the following requirement from Part B of Schedule 1 to the Building Regulations 2010. Section 10 also refers to regulation 7(2) of the Building Regulations 2010. Guidance on regulation 7(1) can be found in Approved Document 7.

Requirement

Requirement

External fire spread

- B4.** (1) The external walls of the building shall adequately resist the spread of fire over the walls and from one building to another having regard to the height, use and position of the building.
- (2) The roof of the building shall adequately resist the spread of fire over the roof and from one building to another, having regard to the use and position of the building.

Limits on application

Regulation

Regulation 7 – Materials and workmanship

- (1) Building work shall be carried out—
- (a) with adequate and proper materials which—
 - (i) are appropriate for the circumstances in which they are used,
 - (ii) are adequately mixed or prepared, and
 - (iii) are applied, used or fixed so as adequately to perform the functions for which they are designed; and
 - (b) in a workmanlike manner.
- (1A) Building work shall be carried out so that relevant metal composite material does not become part of an external wall, or specified attachment, of any building.
- (2) Subject to paragraph (3), building work shall be carried out so that materials which become part of an external wall, or specified attachment, of a relevant building are of European Classification A2-s1, d0 or A1 (classified in accordance with the reaction to fire classification).

Regulation continued

(3) Paragraph (2) does not apply to—

- (a) cavity trays when used between two leaves of masonry;
- (b) any part of a roof (other than any part of a roof which falls within paragraph (iv) of regulation 2(6)) if that part is connected to an external wall;
- (c) door frames and doors;
- (d) electrical installations;
- (da) fibre optic cables;
- (e) insulation and water proofing materials used below ground level or up to 300mm above that level;
- (f) intumescent and fire stopping materials where the inclusion of the materials is necessary to meet the requirements of Part B of Schedule 1;
- (g) membranes;
- (h) seals, gaskets, fixings, sealants and backer rods;
- (ha) components associated with a solar shading device, excluding components whose primary function is to provide shade or deflect sunlight, such as the awning curtain or slats;
- (i) thermal break materials where the inclusion of the materials is necessary to meet the thermal bridging requirements of Part L of Schedule 1;
- (j) window frames and glass; or
- (k) materials which form the top horizontal floor layer of a balcony which are of European Classification A1fl or A2fl-s1 (classified in accordance with the reaction to fire classification) provided that the entire layer has an impermeate substrate under it.

(4) In this regulation—

- (a) a “relevant building” means a building with a storey (not including roof-top plant areas or any storey consisting exclusively of plant rooms) at least 18 metres above ground level and which—
 - (i) contains one or more dwellings;
 - (ii) contains an institution; or
 - (iii) contains a room for residential purposes; and
- (b) “above ground level” in relation to a storey means above ground level when measured from the lowest ground level adjoining the outside of a building to the top of the floor surface of the storey.

Intention

Resisting fire spread over external walls

The external envelope of a **building** should not contribute to undue fire spread from one part of a **building** to another part. This intention can be met by constructing **external walls** so that both of the following are satisfied.

- a. The risk of ignition by an external source to the outside surface of the **building** and spread of fire over the outside surface is restricted.
- b. The materials used to construct **external walls**, and attachments to them, and how they are assembled do not contribute to the rate of fire spread up the outside of the **building**.

The extent to which this is necessary depends on the **height** and use of the **building**.

Resisting fire spread from one building to another

The external envelope of a **building** should not provide a medium for undue fire spread to adjacent **buildings** or be readily ignited by fires in adjacent **buildings**. This intention can be met by constructing **external walls** so that all of the following are satisfied.

- a. The risk of ignition by an external source to the outside surface of the **building** is restricted.
- b. The amount of thermal radiation that falls on a neighbouring **building** from window openings and other **unprotected areas** in the **building** on fire is not enough to start a fire in the other **building**.
- c. Flame spread over the roof and/or fire penetration from external sources through the roof is restricted.

The extent to which this is necessary depends on the use of the **building** and its position in relation to adjacent **buildings** and therefore the **site boundary**.

Section 10: Resisting fire spread over external walls

Introduction

10.1 The **external wall** of a **building** should not provide a medium for fire spread if that is likely to be a risk to health and safety. Combustible materials and **cavities** in **external walls** and attachments to them can present such a risk, particularly in tall **buildings**. The guidance in this section is designed to reduce the risk of fire spread as well as the risk of ignition from flames coming from adjacent **buildings**.

Fire resistance

10.2 This section provides guidance on resisting fire spread over **external walls**; however, it does not deal with **fire resistance** of **external walls**. An **external wall** may need **fire resistance** to meet the provisions of Section 3 (Means of escape – flats), Section 6 (Loadbearing elements of structure – flats), Section 11 (Resisting fire spread from one building to another) or Section 15 (Access to buildings for firefighting personnel – flats).

Combustibility of external walls

- 10.3** The **external walls** of **buildings** other than those described in regulation 7(4) of the Building Regulations should achieve either of the following.
- a. Follow the provisions given in paragraphs 10.5 to 10.9, which provide guidance on all of the following.
 - i. External surfaces.
 - ii. Materials and products.
 - iii. **Cavities** and **cavity barriers**.
 - b. Meet the performance criteria given in BRE report BR 135 for **external walls** using full-scale test data from **BS 8414-1** or **BS 8414-2**.
- 10.4** In relation to **buildings** of any **height** or use, consideration should be given to the choice of materials (including their extent and arrangement) used for the **external wall**, or attachments to the wall (e.g. balconies, etc.), to reduce the risk of fire spread over the wall.

External surfaces

10.5 The external surfaces (i.e. outermost external material) of **external walls** should comply with the provisions in Table 10.1. The provisions in Table 10.1 apply to each wall individually in relation to its proximity to the **relevant boundary**.

Table 10.1 Reaction to fire performance of external surface of walls

Building type	Building height	Less than 1000mm from the relevant boundary	1000mm or more from the relevant boundary
'Relevant buildings' as defined in regulation 7(4) (see paragraph 10.14)		Class A2-s1, d0 ⁽¹⁾ or better	Class A2-s1, d0 ⁽¹⁾ or better
All 'residential' purpose groups (purpose groups 1 and 2)	More than 11m	Class A2-s1, d0 ⁽²⁾ or better	Class A2-s1, d0 ⁽²⁾ or better
	11m or less	Class B-s3, d2 ⁽²⁾ or better	No provisions
Assembly and recreation	More than 18m	Class B-s3, d2 ⁽²⁾ or better	From ground level to 18m: class C-s3, d2 ⁽³⁾ or better From 18m in height and above: class B-s3, d2 ⁽²⁾ or better
	18m or less	Class B-s3, d2 ⁽²⁾ or better	Up to 10m above ground level: class C-s3, d2 ⁽³⁾ or better Up to 10m above a roof or any part of the building to which the public have access: class C-s3, d2 ⁽³⁾ or better ⁽⁴⁾ From 10m in height and above: no minimum performance
Any other building	More than 18m	Class B-s3, d2 ⁽²⁾ or better	From ground level to 18m: class C-s3, d2 ⁽³⁾ or better From 18m in height and above: class B-s3, d2 ⁽²⁾ or better
	18m or less	Class B-s3, d2 ⁽²⁾ or better	No provisions

NOTES:

In all cases all the following provisions apply.

- Regulation 7(1A) prohibits the use of relevant metal composite materials in the external walls, and specified attachments, of all buildings of any height (see paragraphs 10.11 and 10.12).
- The advice in paragraph 10.4 should always be followed.

In addition to the provisions within this table, buildings with a storey 18m or more above ground level should also meet the provisions of paragraph 10.6.

In addition to the provisions within this table, buildings with a storey 11m or more above ground level should also meet the provisions of paragraph 10.7.

1. The restrictions for these buildings apply to all the materials used in the external wall and specified attachments (see paragraphs 10.13 to 10.16 for further guidance).
2. Profiled or flat steel sheet at least 0.5mm thick with an organic coating of no more than 0.2mm thickness is also acceptable.
3. Timber cladding at least 9mm thick is also acceptable.
4. 10m is measured from the top surface of the roof.

Materials and products

- 10.6** In a building with a storey 18m or more in height (see Diagram D6 in Appendix D) any insulation product, filler material (such as the core materials of metal composite panels, sandwich panels and window spandrel panels but not including gaskets, sealants and similar) etc. used in the construction of an external wall should be class A2-s3, d2 or better (see Appendix B). This restriction does not apply to masonry cavity wall construction which complies with Diagram 8.2 in Section 8. Where regulation 7(2) applies, that regulation prevails over all the provisions in this paragraph.
- 10.7** In buildings that include a 'residential' purpose (purpose groups 1 and 2) with a storey 11m or more in height (see Diagram D6 in Appendix D) any insulation product, filler material (such as the core materials of metal composite panels, sandwich panels and window spandrel panels but not including gaskets, sealants and similar) etc. used in the construction of an external wall should be class A2-s1, d0 or better (see Appendix B). This restriction does not apply to masonry cavity wall construction which complies with Diagram 8.2 in Section 8. Where regulation 7(2) applies, that regulation prevails over all the provisions in this paragraph.
- 10.8** Best practice guidance for green walls (also called living walls) can be found in *Fire Performance of Green Roofs and Walls*, published by the Department for Communities and Local Government. Where regulation 7(2) applies, that regulation prevails over all the provisions in this paragraph.

Cavities and cavity barriers

- 10.9** Cavity barriers should be provided in accordance with Section 5 in dwellings and Section 8 in flats.

Balconies

- 10.10** In buildings that include a 'residential' purpose (purpose groups 1 and 2) with a storey 11m or more in height (see Diagram D6 in Appendix D) balconies should meet either of the following conditions.
- a. Only contain materials achieving class A1 or A2-s1, d0, except for any of the following.
 - i. Cavity trays when used between two leaves of masonry.
 - ii. Intumescent and fire-stopping materials where the inclusion of the materials is necessary to meet the requirements of Part B of Schedule 1 to the Building Regulations 2010.
 - iii. Membranes.
 - iv. Seals, gaskets, fixings, sealants and backer rods.
 - v. Thermal break materials where the inclusion of the materials is necessary to meet the thermal bridging requirements of Part L of Schedule 1 to the Building Regulations 2010.
 - vi. Any material achieving class A1fl or A2fl-s1 when it forms the top horizontal floor layer of a balcony and is provided with an imperforate substrate under it which extends to the full size of the class A1fl or A2fl-s1 material.
 - vii. Electrical installations.
 - viii. Fibre optic cables.
 - b. Achieve both of the following conditions.
 - i. Have an imperforate soffit which extends to the full area of the balcony, achieves a minimum REI 30 rating and is constructed of materials achieving class A2-s1, d0 or better.

- ii. Materials achieving class B-s1, d0 or worse extending beyond the boundary of a single compartment should include a band of material rated class A2-s1, d0 or better, a minimum of 300mm in width centred on that boundary line.

Where regulation 7(2) applies, that regulation prevails over all the provisions in this paragraph.

Metal composite materials

- 10.11** Regulation 7(1A) prohibits the use of relevant metal composite materials in the **external walls**, and **specified attachments**, of all **buildings** of any **height**.
- 10.12** Relevant metal composite materials are defined (in regulation 2(6)(c)) as any panel or sheet, having a thickness of no more than 10mm which is composed of a number of layers two or more of which are made of metal, alloy or metal compound and one or more of which is a substantial layer made of a material having a gross calorific value of more than 35MJ/kg when tested in accordance with **BS EN ISO 1716**. A substantial layer is defined as a layer which is at least 1mm thick or has a mass per unit area of at least 1kg/m².

Regulation 7(2) and requirement B4

Materials

- 10.13** Regulation 7(1)(a) requires that materials used in building work are appropriate for the circumstances in which they are used. Regulation 7(2) sets requirements in respect of **external walls** and **specified attachments** in relevant **buildings**.

NOTE: Further guidance on regulation 7(1) can be found in HM Government's *Manual to the Building Regulations*.

- 10.14** Regulation 7(2) applies to any **building** with a **storey** at least 18m above ground level (as measured in accordance with Diagram D6 in Appendix D) and which contains one or more **dwellings**; an institution; or a **room** for residential purposes. It requires that all materials which become part of an **external wall** or **specified attachment** achieve class A2-s1, d0 or class A1 in accordance with **BS EN 13501-1**, other than those exempted by regulation 7(3).

NOTE: The above includes student accommodation, care homes, **sheltered housing**, hospitals, dormitories in boarding **schools**, hotels, hostels and boarding houses. See regulation 7(4) for the definition of relevant **buildings**.

NOTE: Transposition to a national class (Table B1) does not apply to the classification in this paragraph.

- 10.15** **External walls** and **specified attachments** are defined in regulation 2(6) and these definitions include any parts of the **external wall** as well as balconies, solar panels and solar shading.
- 10.16** Regulation 7(3) provides an exemption for certain components found in **external walls** and **specified attachments**.

Material change of use

10.17 Regulations 5(k) and 6(3) provide that, where the use of a **building** is changed such that the **building** becomes a **building** described in regulation 7(4), the construction of the **external walls**, and **specified attachments**, must be investigated and, where necessary, work must be carried out to ensure they only contain materials achieving class A2-s1, d0 or class A1, other than those exempted by regulation 7(3).

Solar shading devices

10.18 Regulation 7(2) requires that the **curtain** and or slats of **solar shading devices** in a relevant **building** (as defined in regulation 7(4)) achieve class A1 or A2-s1, d0. The **curtain** of **solar shading devices** cannot be classified as a membrane in accordance with regulation 7(3).

10.19 **Solar shading devices** installed up to 4.5m above ground level are not required to meet the requirements of regulation 7(2).

Additional considerations

10.20 The provisions of regulation 7 apply in addition to requirement B4. Therefore, for **buildings** described in regulation 7(4), the potential impact of any products incorporated into or onto the **external walls** and **specified attachments** should be carefully considered with regard to their number, size, orientation and position.

10.21 Particular attention is drawn to the following points.

- a. Membranes used as part of the **external wall** construction above ground level should achieve a minimum of class B-s3, d0. Roofing membranes do not need to achieve a minimum of class A2-s1, d0 when used as part of a roof connecting to an **external wall**.
- b. Internal linings should comply with the guidance provided in Section 4.
- c. Any part of a roof should achieve the minimum performance as detailed in Section 12.
- d. As per regulation 7(3), window frames and glass (including laminated glass) are exempted from regulation 7(2). Window spandrel panels and infill panels must comply with regulation 7(2).
- e. Thermal breaks are small elements used as part of the **external wall** construction to restrict thermal bridging. There is no minimum performance for these materials. However, they should not span two **compartments** and should be limited in size to the minimum required to restrict the thermal bridging (the principal insulation layer is not to be regarded as a thermal break).
- f. Regulation 7(2) only applies to **specified attachments**. Shop front signs and similar attachments are not covered by the requirements of regulation 7(2), although attention is drawn to paragraph 10.21g.
- g. While regulation 7(2) applies to materials which become part of an **external wall** or **specified attachment**, consideration should be given to other attachments to the wall which could impact on the risk of fire spread over the wall.
- h. Any material achieving class A1fl or A2fl-s1 in accordance with **BS EN 13501-1** is exempted when it meets both of the following conditions.
 - i. It forms the top horizontal floor layer of a balcony.
 - ii. It is provided with an imperforate substrate under it which extends to the full size of the class A1fl or A2fl-s1 material.

Section 11: Resisting fire spread from one building to another

Introduction

- 11.1** The following assumptions enable a reasonable standard of resistance to the spread of fire to be specified.
- The size of a fire depends on the compartmentation within the **building**. A fire may involve a complete **compartment**, but will not spread to other **compartments**.
 - The intensity of a fire is related to the building use, but can be moderated by a sprinkler system.
 - Fires in 'residential' and 'assembly and recreation' **buildings** (**purpose groups** 1, 2 and 5) represent a greater risk to life.
 - A **building** on the far side of the **relevant boundary** meets both of the following conditions.
 - Has a similar elevation to the one in question.
 - Is the same distance as the one in question from the common **boundary**.
 - The radiated heat passing through any part of the **fire resisting external wall** may be discounted.
- 11.2** Where regulation 7(2) applies, that regulation prevails over the provisions within this section.
- 11.3** If a reduced separation distance between **buildings**, or increased amount of **unprotected area**, is required, smaller **compartments** should be considered.

Boundaries

- 11.4** The **fire resistance** of a wall depends on its distance from the **relevant boundary** (see Diagram 11.1). Separation distances are measured to boundaries to ensure that the location and design of **buildings** on adjoining **sites** have no influence on the **building** under consideration.
- 11.5** The **boundary** that a wall faces is the **relevant boundary** (Diagram 11.2). It may be one of the following.
- The site **boundary**.
 - The centre line of a space where further development is unlikely, such as a road, railway, canal or river.
 - An assumed **notional boundary** between two **buildings** on the same site (Diagram 11.3) where either of the following conditions is met.
 - One or both of the **buildings** are in the 'residential' or 'assembly and recreation' **purpose groups** (**purpose group** 1, 2 or 5).
 - The buildings will be operated/managed by different organisations.

See para 11.4

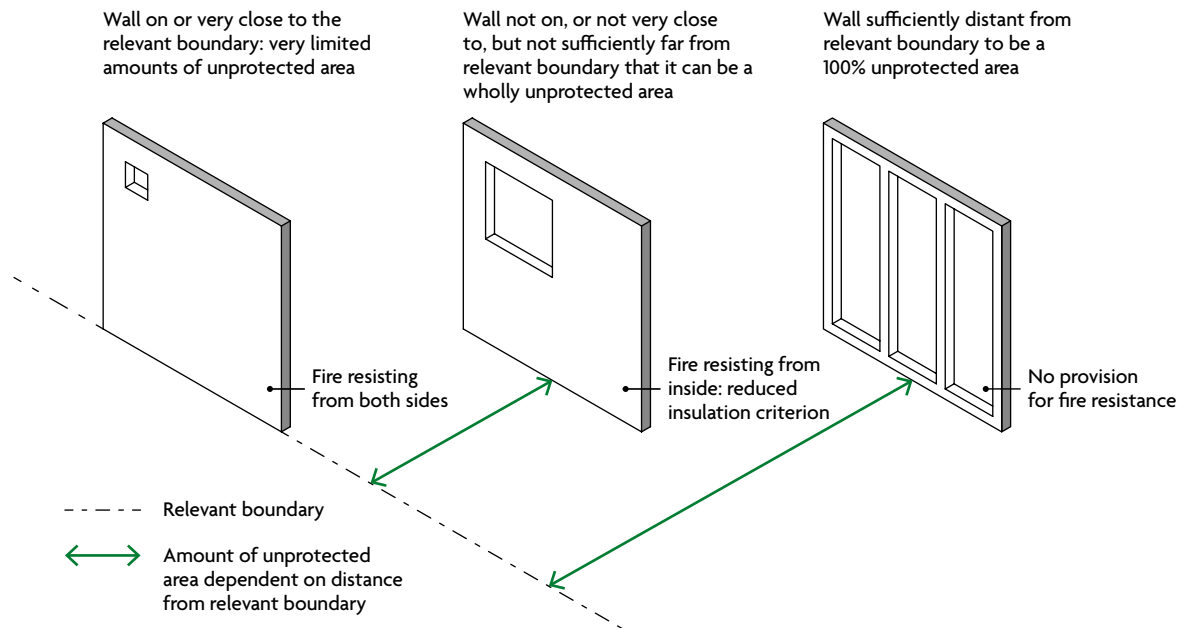
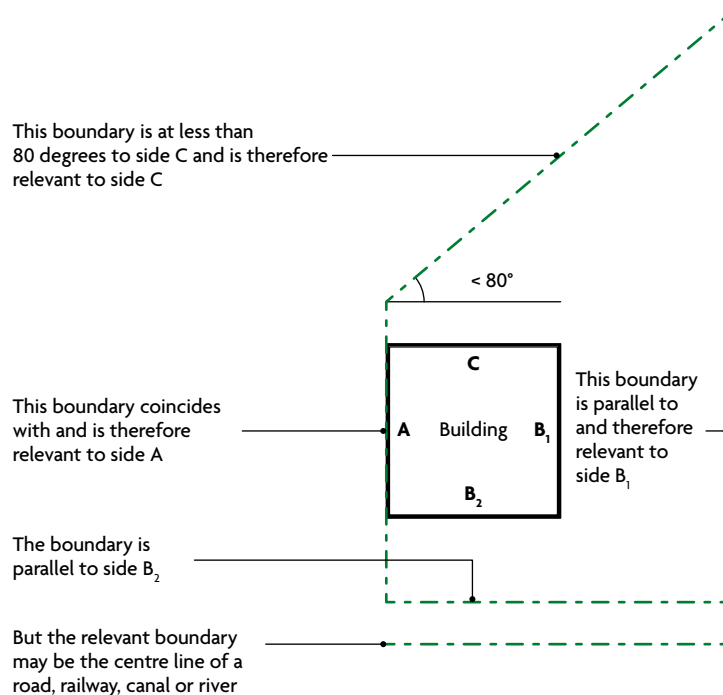


Diagram 11.1 Principles of space separation

See para 11.5



NOTES:

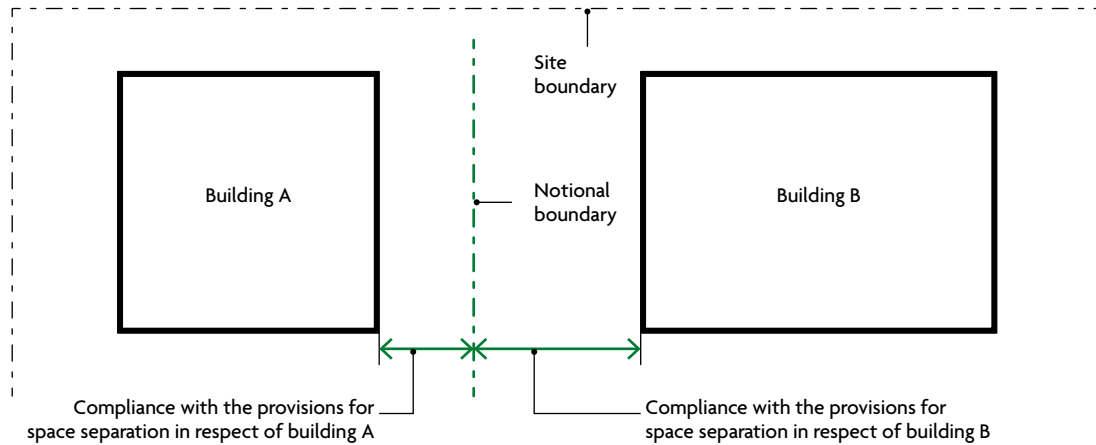
This diagram sets out the rules that apply in respect of a boundary for it to be considered as a relevant boundary.

For a boundary to be relevant it should comply with one of the following:

- Coincide with the side of the building (A).
- Be parallel to the side of the building (B₁ or B₂).
- Be at an angle of maximum 80 degrees to the side of the building (C).

Diagram 11.2 Relevant boundary

See para 11.5



NOTES:

The notional boundary should be set in the area between the two buildings using the following rules:

1. The notional boundary is assumed to exist in the space between the buildings and is positioned so that one of the buildings would comply with the provisions for space separation having regard to the amount of its unprotected area. In practice, if one of the buildings is existing, the position of the boundary will be set by the space separation factors for that building.
2. The siting of the new building, or the second building if both are new, can then be checked to see that it also complies, using the notional boundary as the relevant boundary for the second building.

Diagram 11.3 Notional boundary

Unprotected areas and fire resistance

- 11.6** Parts of an **external wall** with less **fire resistance** than the appropriate amount given in Appendix B, Table B4, are called **unprotected areas**.
- 11.7** Where a **fire resisting external wall** has an external surface material that is worse than class B-s3, d2 and is more than 1mm thick, that part of the wall should be classified as an **unprotected area** equating to half its area (Diagram 11.4).

External walls on, and within 1000mm of, the relevant boundary

- 11.8** **Unprotected areas** should meet the conditions in Diagram 11.5, and the rest of the wall should be **fire resisting** from both sides.

External surface materials facing the **boundary** should be class B-s3, d2 or better.

External walls 1000mm or more from the relevant boundary

- 11.9** **Unprotected areas** should not exceed the result given by one of the methods in paragraph 11.16, and the rest of the wall (if any) should be **fire resisting** but only from the inside of the **building**.

External walls of protected stairways

- 11.10** Exclude **external walls** of stairways in a **protected shaft** when assessing **unprotected areas** (see Diagram 11.5).

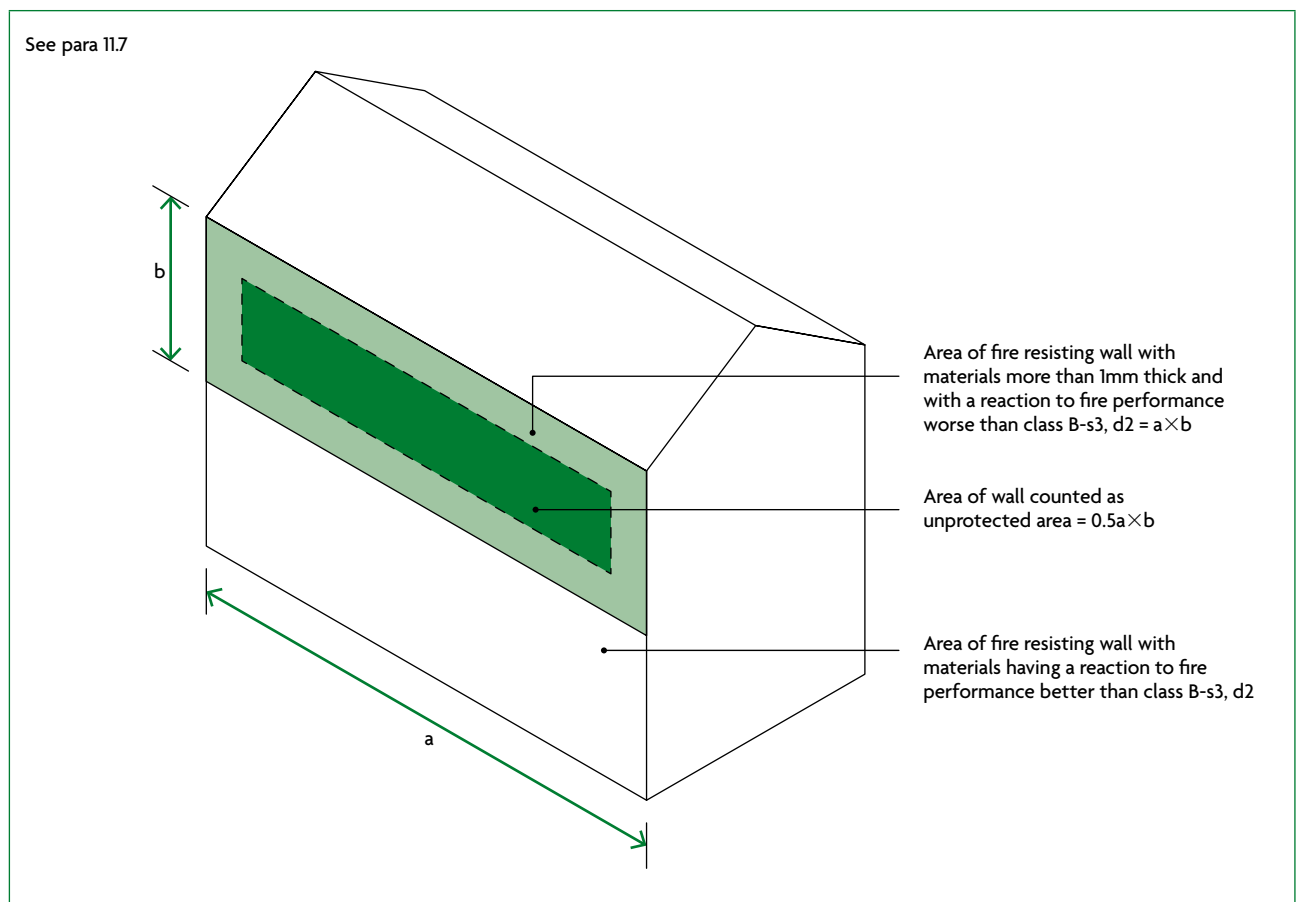
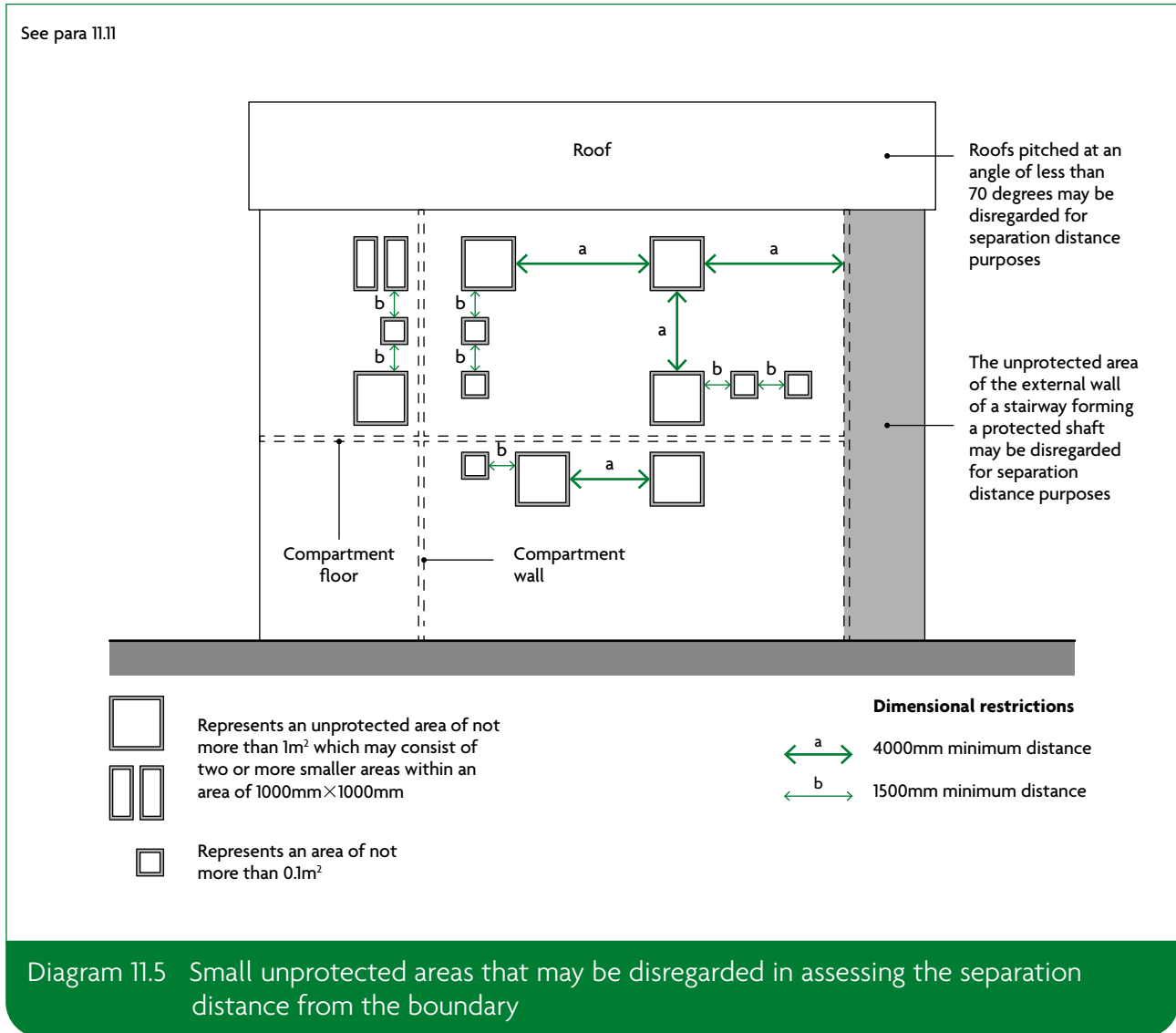


Diagram 11.4 Status of materials achieving class B-s3, d2 or worse as unprotected area

Small unprotected areas

11.11 In an otherwise protected wall, small **unprotected areas** may be ignored where they meet the conditions in Diagram 11.5.



Canopies

11.12 Where both of the following apply, separation distances may be determined from the wall rather than from the edge of the canopy (Diagram 11.6).

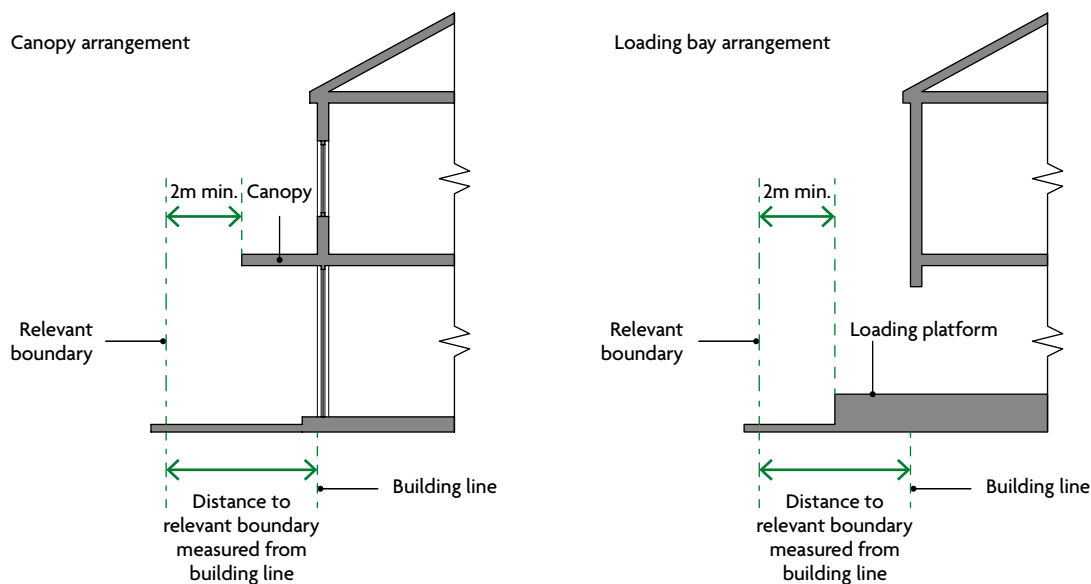
- The canopy is attached to the side of a **building**.
- The edges of the canopy are a minimum of 2m from the **relevant boundary**.

Canopies that fall within class 6 or class 7 of Schedule 2 to the regulations (Exempt Buildings and Work) are exempt from the Building Regulations.

11.13 Space separation may be disregarded if a canopy is all of the following.

- Free-standing.
- Above a limited risk or controlled hazard.
- A minimum of 1000mm from the **relevant boundary**.

See para 11.12



NOTE: Projections from the building line, such as a canopy or a loading platform, can be ignored when assessing separation distance. This does not apply where the canopy is enclosed by side walls.

Diagram 11.6 The effect of a canopy on separation distance

Roofs

11.14 Roofs with a pitch of more than 70 degrees to the horizontal should be assessed in accordance with this section. Vertical parts of a pitched roof, such as dormer windows, should be included *only* if the slope of the roof exceeds 70 degrees.

It is a matter of judgement whether a continuous run of dormer windows that occupies most of a steeply pitched roof should be treated as a wall rather than a roof.

Portal frames

11.15 Portal frames are often used in single storey industrial and commercial buildings where there may be no need for fire resistance of the structure (requirement B3). However, where a portal framed building is near a relevant boundary, the external wall near the boundary may need fire resistance to restrict the spread of fire between buildings. It is generally accepted that a portal frame acts as a single structural element because of the moment-resisting connections used, especially at the column/rafter joints. Thus, in cases where the external wall of the building cannot be wholly unprotected, the rafter members of the frame, as well as the column members, may need to be fire protected. The design method for this is set out in SCI Publication P313.

NOTE: The recommendations in the SCI publication for designing the foundation to resist overturning do not need to be followed if the building is fitted with a sprinkler system in accordance with Appendix E.

NOTE: Normally, portal frames of reinforced concrete can support external walls requiring a similar degree of fire resistance without specific provision at the base to resist overturning.

NOTE: Existing buildings may have been designed to comply with all of the following guidance, which is also acceptable.

- The column members are fixed rigidly to a base of sufficient size and depth to resist overturning.
- There is brick, block or concrete protection to the columns up to a protected ring beam providing lateral support.
- There is some form of roof venting to give early heat release. (The roof venting could be, for example, PVC rooflights covering some 10% of the floor area and evenly spaced over the floor area.)

Methods for calculating acceptable unprotected area

11.16 Two simple methods are given for calculating the acceptable amount of **unprotected area** in an **external wall** that is a minimum of 1000mm from any point on the **relevant boundary**. More precise methods are described in BRE report BR 187 and may be used instead. When using BR 187 the following radiation intensity at each **unprotected area** should be assumed.

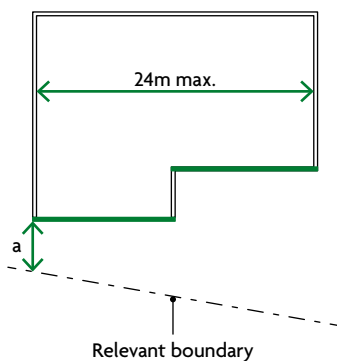
- 84kW/m² if the **purpose group** of the **building** is 'residential' (**purpose groups** 1 or 2), 'office' (**purpose group** 3) or 'assembly and recreation' (**purpose group** 5) or if the **building** is an open-sided multi-storey car park (**purpose group** 7(b)).
- 168kW/m² if the **purpose group** of the **building** is 'shop and commercial' (**purpose group** 4), 'industrial' (**purpose group** 6) or 'storage and other non-residential' (**purpose group** 7(a)).

Method 1

11.17 This method applies to small **buildings** intended to be used for blocks of **flats** or **dwellinghouses**.

11.18 The **building** should not exceed three **storeys** in **height** (excluding basements) or 24m in length. Each side of the **building** should meet the limits stated in Diagram 11.7. Any small **unprotected areas** falling within the limits shown in Diagram 11.5 can be ignored.

See para 11.18



Minimum distance (a) between side of building and relevant boundary (m)	Maximum total area of unprotected areas (m ²)
1	5.6
2	12
3	18
4	24
5	30
6	No limit

Diagram 11.7 Permitted unprotected areas in small residential buildings

Method 2

11.19 This method may be used for **buildings** or **compartments** for which method 1 is not appropriate.

11.20 The **building** should not exceed 10m in **height**. Each side of the **building** should meet the limits stated in Table 11.1. Any areas falling within the limits shown in Diagram 11.5 can be ignored.

Table 11.1 Permitted unprotected areas in small buildings or compartments

Minimum distance between side of building and relevant boundary (m)	Maximum total percentage of unprotected area (%) ⁽¹⁾
Not applicable	4
1	8
2.5	20
5	40
7.5	60
10	80
12.5	100

NOTES:
Intermediate values may be obtained by interpolation.
1. The total percentage of unprotected area is found by dividing the total unprotected area by the area of a rectangle that encloses all the unprotected areas, and multiplying the result by 100.

Sprinkler systems

11.21 If a **building** is fitted throughout with a sprinkler system in accordance with Appendix E, either of the following is permitted.

- The **boundary** distance can be halved, to a minimum distance of 1m.
- The amount of **unprotected area** can be doubled.

Section 12: Resisting fire spread over roof coverings

Introduction

- 12.1** 'Roof covering' describes one or more layers of material, but not the roof structure as a whole.
- 12.2** Provisions for the fire properties of roofs are given in other parts of this document.
- a. Requirement B1 – for roofs that are part of a **means of escape**.
 - b. Requirement B2 – for the internal surfaces of **rooflights** as part of internal linings.
 - c. Requirement B3 – for roofs that are used as a floor and for roofs passing over a **compartment wall**.
 - d. Section 11 – the circumstances in which a roof is subject to the provisions for space separation.

Separation distances

- 12.3** Separation distance is the minimum distance from the roof, or part of the roof, to the **relevant boundary** (paragraph 11.4). Table 12.1 sets out separation distances by the type of roof covering and the size and use of the **building**.

In addition, roof covering products (and/or materials) defined in Commission Decision 2000/553/EC of 6 September 2000, implementing Council Directive 89/106/EEC, can be considered to fulfil all of the requirements for the performance characteristic 'external fire performance' without the need for testing, *provided that any national provisions on the design and execution of works are fulfilled*, and can be used without restriction.

- 12.4** The performance of **rooflights** is specified in a similar way to the performance of roof coverings. Plastic **rooflights** may also be used.

Plastic rooflights

- 12.5** Table 12.2 and Diagram 12.1 set the limitations for using plastic **rooflights** whose lower surface has a minimum class D-s3, d2 rating.
- 12.6** Table 12.3 sets the limitations for using **thermoplastic materials** with a TP(a) rigid or TP(b) (see also Diagram 12.1) classification. The method of classifying **thermoplastic materials** is given in Appendix B.
- 12.7** Other than for the purposes of Diagram 5.2, polycarbonate or uPVC **rooflights** achieving a minimum rating of class C-s3, d2 can be regarded as having a $B_{\text{ROOF}}(t4)$ classification.

Unwired glass in rooflights

12.8 When used in rooflights, unwired glass a minimum of 4mm thick can be regarded as having a $B_{ROOF}(t4)$ classification.

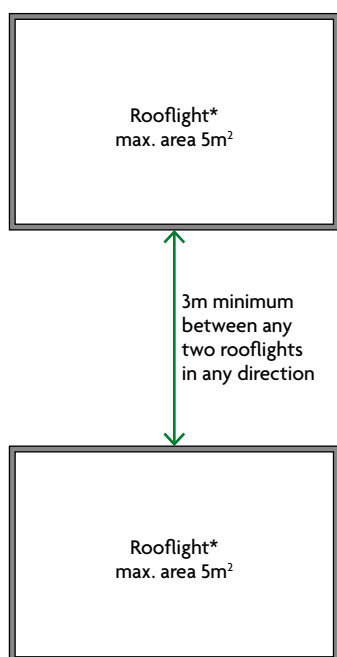
Thatch and wood shingles

12.9 If the performance of thatch or wood shingles cannot be established, they should be regarded as having an $E_{ROOF}(t4)$ classification in Table 12.1.

NOTE: Consideration can be given to thatched roofs being closer to the relevant boundary than shown in Table 12.1 if, for example, all of the following precautions (based on the LABC publication *Thatched Buildings (the Dorset Model): New Properties and Extensions*) are incorporated in the design.

- The rafters are overdrawn with construction having not less than 30 minutes' fire resistance.
- The guidance given in Approved Document J is followed.
- The smoke alarm installation (see Section 1) extends to the roof spaces.

See paras 12.5 and 12.6



* Or group of rooflights amounting to no more than 5m²

NOTES:

- There are restrictions on the use of plastic rooflights in the guidance to requirement B2 in Section 4.
- Surrounding roof covering to be a material of class A2-s3, d3 or better for at least 3m distance.
- Where Diagram 5.2a or 5.2b applies, rooflights should be at least 1500mm from the compartment wall.

Diagram 12.1 Limitations on spacing and size of plastic rooflights that have a class D-s3, d2 or TP(b) lower surface

Table 12.1 Limitations on roof coverings

Designation ⁽¹⁾ of covering of roof or part of roof	Distance from any point on relevant boundary			
	Less than 6m	At least 6m	At least 12m	At least 20m
B _{ROOF} (t4)	●	●	●	●
C _{ROOF} (t4)	○	●	●	●
D _{ROOF} (t4)	○	● ⁽²⁾⁽³⁾	● ⁽²⁾	●
E _{ROOF} (t4)	○	● ⁽²⁾⁽³⁾	● ⁽²⁾	● ⁽²⁾
F _{ROOF} (t4)	○	○	○	● ⁽²⁾⁽³⁾

● Acceptable.

○ Not acceptable.

NOTES:

Separation distances do not apply to the boundary between roofs of a pair of semi-detached dwellinghouses and to enclosed/covered walkways. However, see Diagram 5.2 if the roof passes over the top of a compartment wall.

Polycarbonate and uPVC rooflights that achieve a class C-s3, d2 rating by test may be regarded as having a B_{ROOF}(t4) designation.

1. The designation of external roof surfaces is explained in Appendix B.

2. Not acceptable on any of the following buildings.

- a. Dwellinghouses in terraces of three or more dwellinghouses.
- b. Any other buildings with a cubic capacity of more than 1500m³.

3. Acceptable on buildings not listed in (2) if both of the following apply.

- a. Part of the roof has a maximum area of 3m² and is a minimum of 1500mm from any similar part.
- b. The roof between the parts is covered with a material rated class A2-s3, d2 or better.

Table 12.2 Class D-s3, d2 plastic rooflights: limitations on use and boundary distance

Minimum classification on lower surface ⁽¹⁾	Space that rooflight can serve	Minimum distance from any point on relevant boundary to rooflight with an external designation ⁽²⁾ of:	
		$E_{\text{ROOF}}(t4)$ or $D_{\text{ROOF}}(t4)$	$F_{\text{ROOF}}(t4)$
Class D-s3, d2	a. Balcony, verandah, carport, covered way or loading bay with at least one longer side wholly or permanently open	6m	20m
	b. Detached swimming pool		
	c. Conservatory, garage or outbuilding, with a maximum floor area of 40m ²		
	d. Circulation space ⁽³⁾ (except a protected stairway)	6m ⁽⁴⁾	20m ⁽⁴⁾
	e. Room ⁽³⁾		

NOTES:

None of the above designations are suitable for protected stairways.

Polycarbonate and uPVC rooflights that achieve a class C-s3, d2 rating by test (see paragraph 12.7) may be regarded as having a $B_{\text{ROOF}}(t4)$ classification.

Where Diagram 5.2a or 5.2b applies, rooflights should be a minimum of 1500mm from the compartment wall.

If double-skinned or laminate products have upper and lower surfaces of different materials, the greater distance applies.

1. See also the guidance to requirement B2 in Section 4.
2. The designation of external roof surfaces is explained in Appendix B.
3. Single-skinned rooflight only, in the case of non-thermoplastic material.
4. The rooflight should also meet the provisions of Diagram 12.1.

Table 12.3 TP(a) and TP(b) thermoplastic rooflights: limitations on use and boundary distance

Minimum classification on lower surface ⁽¹⁾	Space that rooflight can serve	Minimum distance from any point on relevant boundary to rooflight with an external designation ⁽¹⁾ of:	
		TP(a)	TP(b)
1. TP(a) rigid	Any space except a protected stairway	6m ⁽²⁾	Not applicable
2. TP(b)	a. Balcony, verandah, carport, covered way or loading bay with at least one longer side wholly or permanently open	Not applicable	6m
	b. Detached swimming pool		
	c. Conservatory, garage or outbuilding, with a maximum floor area of 40m ²		
	d. Circulation space ⁽³⁾ (except a protected stairway)	Not applicable	6m ⁽⁴⁾
	e. Room ⁽³⁾		

NOTES:

None of the above designations are suitable for protected stairways.

Polycarbonate and uPVC rooflights that achieve a class C-s3, d2 rating by test (paragraph 12.7) may be regarded as having a B_{ROOF}(t4) classification.

Where Diagram 5.2a or 5.2b applies, rooflights should be a minimum of 1500mm from the compartment wall.

If double-skinned or laminate products have upper and lower surfaces of different materials, the greater distance applies.

1. See also the guidance to requirement B2 in section 4.
2. No limit in the case of any space described in 2a, b and c.
3. Single-skinned rooflight only, in the case of non-thermoplastic material.
4. The rooflight should also meet the provisions of diagram 12.1.

Requirement B5: Access and facilities for the fire service

These sections deal with the following requirement from Part B of Schedule 1 to the Building Regulations 2010.

Requirement	
<i>Requirement</i>	<i>Limits on application</i>
Access and facilities for the fire service	
B5. (1) The building shall be designed and constructed so as to provide reasonable facilities to assist fire fighters in the protection of life. (2) Reasonable provision shall be made within the site of the building to enable fire appliances to gain access to the building.	

Intention

Provisions covering access and facilities for the fire service are to safeguard the health and safety of people in and around the **building**. Their extent depends on the size and use of the **building**. Most firefighting is carried out within the **building**. In the Secretary of State's view, requirement B5 is met by achieving all of the following.

- a. External access enabling fire appliances to be used near the **building**.
- b. Access into and within the **building** for firefighting personnel to both:
 - i. search for and rescue people
 - ii. fight fire.
- c. Provision for internal fire facilities for firefighters to complete their tasks.
- d. Ventilation of heat and smoke from a fire in a basement.
- e. A facility to store building information for firefighters to complete their tasks.

If an alternative approach is taken to providing the **means of escape**, outside the scope of this approved document, additional provisions for firefighting access may be required. Where deviating from the general guidance, it is advisable to seek advice from the fire and rescue service as early as possible (even if there is no statutory duty to consult).

Section 13: Vehicle access

Provision and design of access routes and hardstandings

13.1 For **dwellinghouses**, access for a pumping appliance should be provided to within 45m of all points inside the **dwellinghouse**.

Every elevation to which vehicle access is provided should have a suitable door(s), not less than 750mm wide, giving access to the interior of the **building**.

13.2 For **flats**, either of the following provisions should be made.

- a. Provide access for a pumping appliance to within 45m of all points inside each **flat** of a block, measured along the route of the hose. Every elevation to which vehicle access is provided should have a suitable door(s), not less than 750mm wide, giving access to the interior of the **building**. Door(s) should be provided such that there is no more than 60m between each door and/or the end of that elevation (e.g. a 150m elevation would need at least two doors).
- b. Provide fire mains in accordance with paragraphs 13.5 and 13.6.

13.3 Access routes and hardstandings should comply with the guidance in Table 13.1.

13.4 Dead-end access routes longer than 20m require turning facilities, as in Diagram 13.1. Turning facilities should comply with the guidance in Table 13.1.

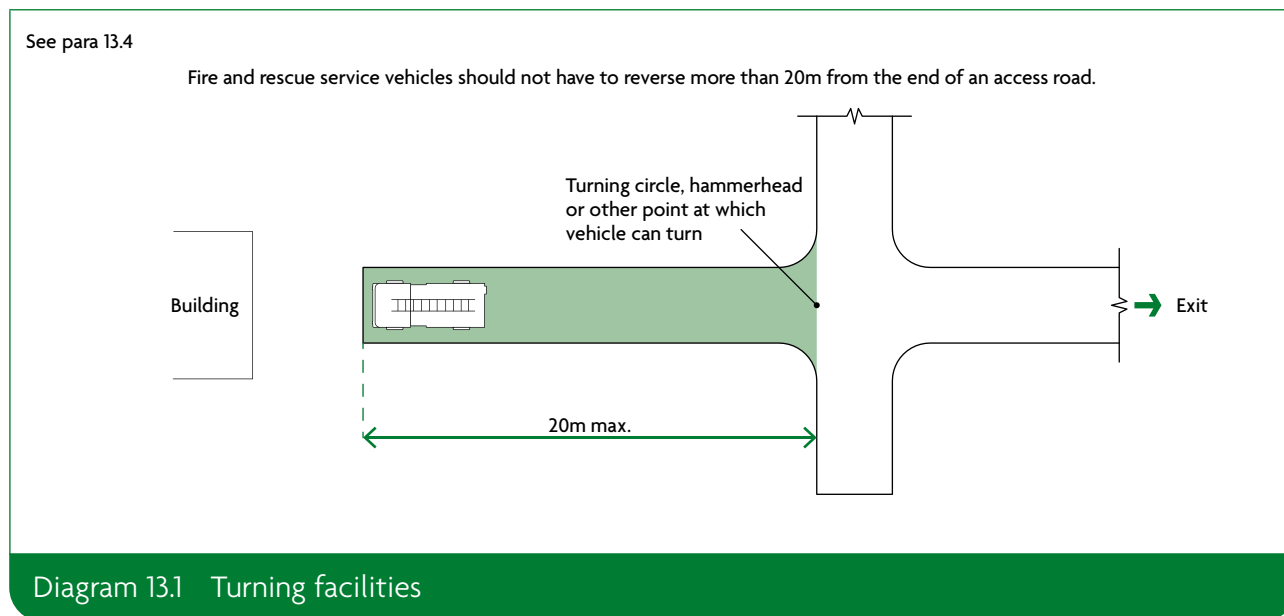


Table 13.1 Typical fire and rescue service vehicle access route specification

Appliance type	Minimum width of road between kerbs (m)	Minimum width of gateways (m)	Minimum turning circle between kerbs (m)	Minimum turning circle between walls (m)	Minimum clearance height (m)	Minimum carrying capacity (tonnes)
Pump	3.7	3.1	16.8	19.2	3.7	12.5
High reach	3.7	3.1	26.0	29.0	4.0	17.0

NOTES:

1. Fire appliances are not standardised. The building control body may, in consultation with the local fire and rescue service, use other dimensions.
2. The roadbase can be designed to 12.5 tonne capacity. Structures such as bridges should have the full 17-tonne capacity. The weight of high reach appliances is distributed over a number of axles, so infrequent use of a route designed to accommodate 12.5 tonnes should not cause damage.

Blocks of flats fitted with fire mains

13.5 For **buildings** fitted with dry fire mains, both of the following apply.

- a. Access should be provided for a pumping appliance to within 18m of each fire main inlet connection point. Inlets should be on the face of the **building**.
- b. The fire main inlet connection point should be visible from the parking position of the appliance, and meet the provisions in Section 8 of **BS 9990**.

13.6 For **buildings** fitted with wet fire mains, access for a pumping appliance should comply with both of the following.

- a. Within 18m, and within sight, of an entrance giving access to the fire main.
- b. Within sight of the inlet to replenish the suction tank for the fire main in an emergency.

Section 14: Fire mains and hydrants – flats

Introduction

14.1 Fire mains are installed for the fire and rescue service to connect hoses for water. They may be either of the following.

- a. The 'dry' type, which are both of the following.
 - i. Normally kept empty.
 - ii. Supplied through a hose from a fire and rescue service pumping appliance.
- b. The 'wet' type, which are both of the following.
 - i. Kept full of water.
 - ii. Supplied by pumps from tanks in the building.

There should be a facility to replenish a wet system from a pumping appliance in an emergency.

Provision of fire mains

14.2 Buildings with firefighting shafts should have fire mains provided in both of the following.

- a. The firefighting stairs.
- b. Where necessary, in protected stairways.

The criteria for providing firefighting shafts and fire mains are given in Section 15.

14.3 Buildings without firefighting shafts should be provided with fire mains where fire service vehicle access is not provided in accordance with paragraph 13.2(a). In these cases, the fire mains should be located within the protected stairway enclosure, with a maximum hose distance of 45m from the fire main outlet to the furthest point inside each flat, measured on a route suitable for laying a hose.

Design and construction of fire mains

14.4 The outlets from fire mains should be located within the protected stairway enclosure (see Diagram 15.1).

14.5 Guidance on the design and construction of fire mains is given in BS 9990.

14.6 Buildings with a storey more than 50m above fire service vehicle access level should be provided with wet fire mains. In all other buildings where fire mains are provided, either wet or dry fire mains are suitable.

14.7 Fire service vehicle access to fire mains should be provided as described in paragraphs 13.5 and 13.6.

Provision of private hydrants

14.8 A **building** requires additional fire hydrants if both of the following apply.

- a. It has a **compartment** with an area of more than 280m².
- b. It is being erected more than 100m from an existing fire hydrant.

14.9 If additional hydrants are required, these should be provided in accordance with the following.

- a. For **buildings** provided with fire mains – within 90m of dry fire main inlets.
- b. For **buildings** not provided with fire mains – hydrants should be both of the following.
 - i. Within 90m of an entrance to the **building**.
 - ii. A maximum of 90m apart.

14.10 Each fire hydrant should be clearly indicated by a plate, fixed nearby in a conspicuous position, in accordance with **BS 3251**.

14.11 Guidance on aspects of the provision and siting of private fire hydrants is given in **BS 9990**.

Alternative supply of water

14.12 An alternative source of water should be supplied where any of the following apply.

- a. No piped water supply is available.
- b. Pressure and flow in the water main are insufficient.
- c. An alternative source of supply is proposed.

14.13 The alternative source of water supply should be one of the following, subject to consultation with the local fire and rescue service.

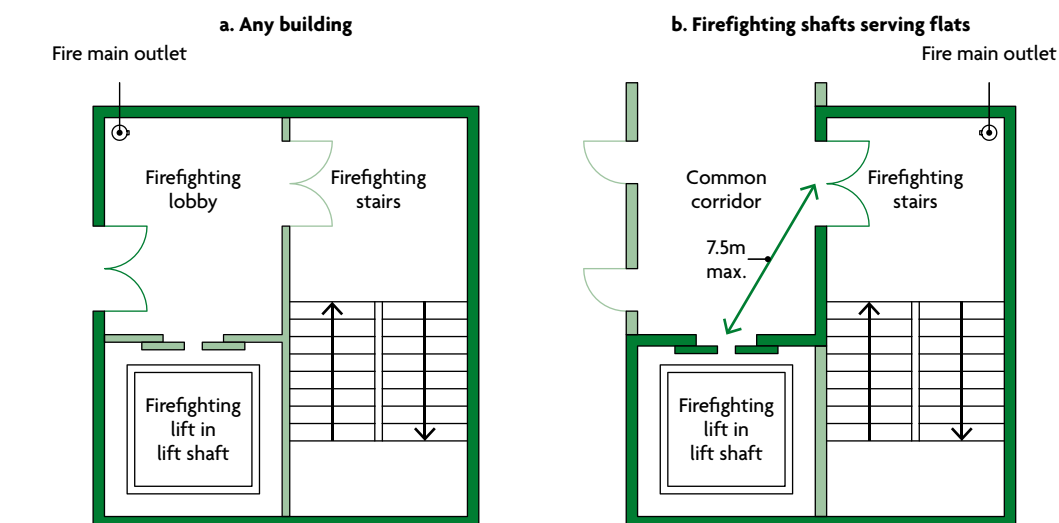
- a. A charged static water tank with a minimum capacity of 45,000 litres.
- b. A spring, river, canal or pond that is capable of fulfilling both of the following conditions.
 - i. Providing or storing a minimum of 45,000 litres of water at all times.
 - ii. Providing access, space and a hardstanding for a pumping appliance.
- c. Any other water supply that the local fire and rescue service considers appropriate.

Section 15: Access to buildings for firefighting personnel – flats

Provision of firefighting shafts

- 15.1** In low rise buildings without deep basements, access for firefighting personnel is typically achieved by providing measures for fire service vehicle access in Section 13 and means of escape.
- 15.2** A building with a storey more than 18m above the fire and rescue service vehicle access level should have one or more firefighting shafts, each containing a firefighting lift (Diagram 15.1). The number and location of firefighting shafts should comply with paragraphs 15.4 to 15.7. Firefighting shafts are not required to serve a basement that is not large or deep enough to need one (see paragraph 15.3 and Diagram 15.2).

See paras 15.2, 15.8 and 15.9



- Minimum fire resistance REI 120 from accommodation side and REI 60 from inside the shaft with E 60 S_a fire doors
- Minimum fire resistance REI 60 from both sides with E 30 S_a fire doors

NOTES:

1. Outlets from a fire main should be located in the firefighting lobby or, in the case of a shaft serving flats, in the firefighting stairway (see Diagram b).
2. Smoke control should be provided in accordance with BS 9999 or, where the firefighting shaft only serves flats, the provisions for smoke control given in paragraph 3.49 may be followed instead.
3. A firefighting lift is required if the building has a floor more than 18m above, or more than 10m below, fire service vehicle access level.
4. This diagram is only to illustrate the basic components and is not meant to represent the only acceptable layout. The firefighting shaft should be constructed generally in accordance with section 6 of BS 9999.
5. For the minimum fire resistance of lift doors see Table C1.

Diagram 15.1 Components of a firefighting shaft

See para 15.2

**Buildings in which firefighting shafts should be provided,
showing which storeys need to be served**

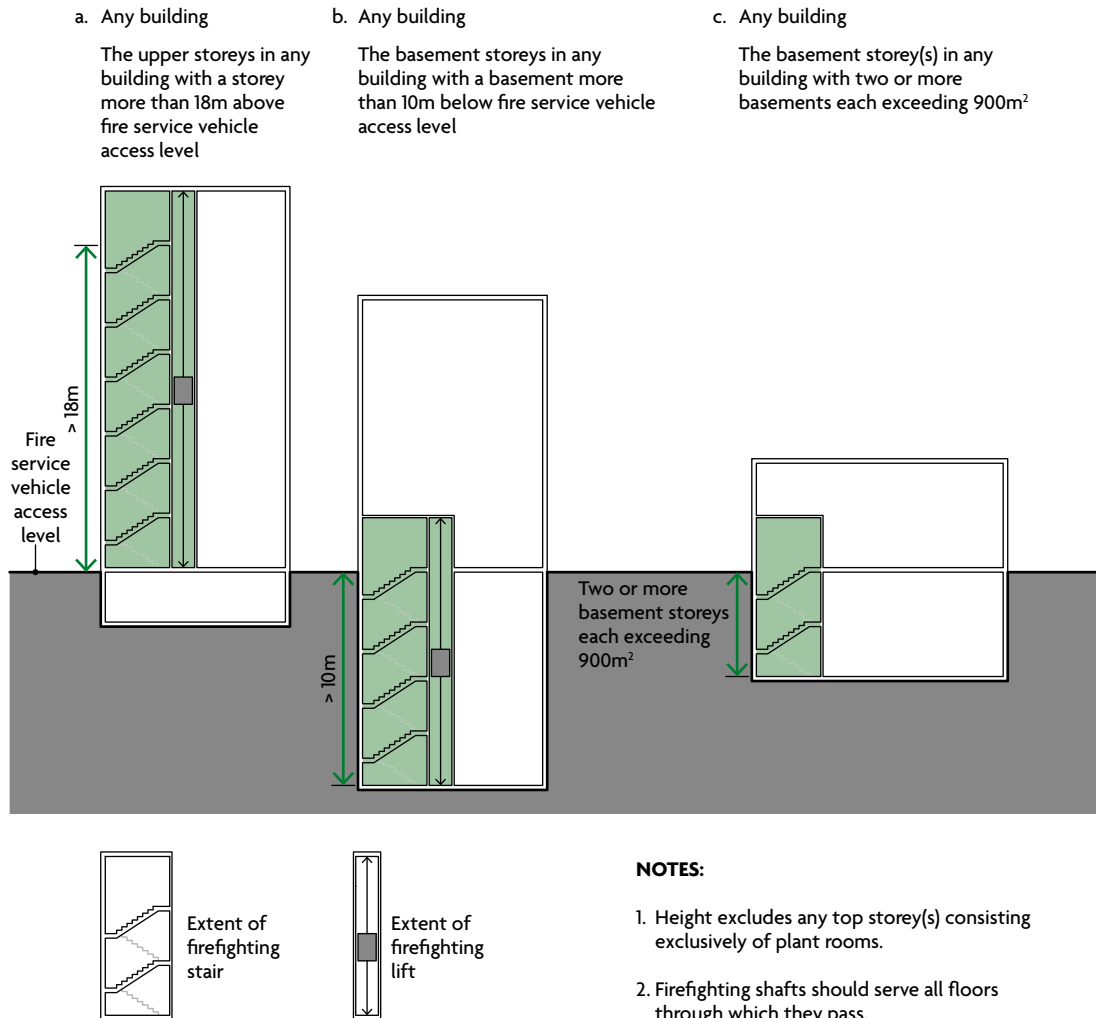
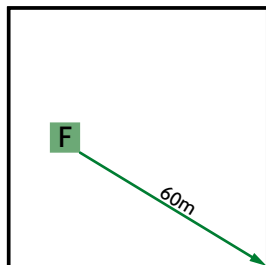


Diagram 15.2 Provision of firefighting shafts

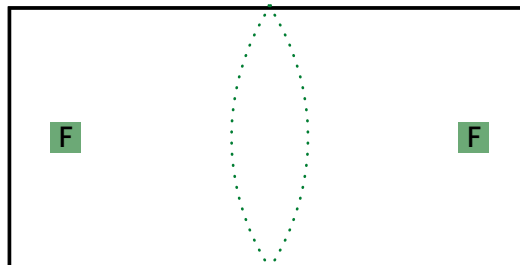
See para 15.7

With sprinklers

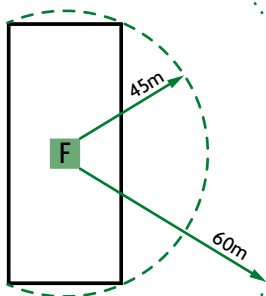
a.



b.

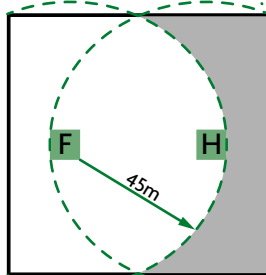
**Without sprinklers**

c.

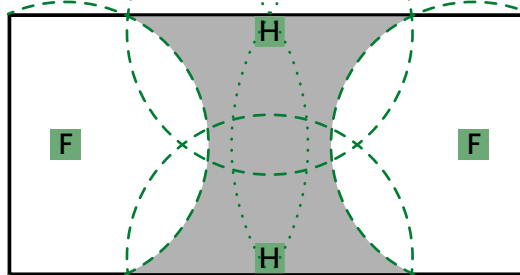


- Floor plan within 60m hose laying distance of fire main outlet
- Floor plan within 45m hose laying distance of fire main outlet
- Hose reach
- F** Fire main outlet in firefighting shaft
- H** Dry or wet fire main
- Additional hose coverage required

d.



e.

**NOTES:**

1. Hose laying distance should be measured from the fire main outlet along the route suitable for laying hose. If this route is not known, the distance should be taken at two-thirds of the direct distance
2. The fire main outlet should be located according to Section 14.

Diagram 15.3 Location of firefighting shafts: hose laying distances

15.3 A building with basement storeys should have firefighting shafts in accordance with the following.

- There is a basement more than 10m below the fire and rescue service vehicle access level. The firefighting shafts should contain firefighting lifts.

- There are two or more basement storeys, each with a minimum area of 900m². The firefighting shafts do not need to include firefighting lifts.

The building's height and size determine whether firefighting shafts also serve upper storeys.

15.4 Firefighting shafts should serve all storeys through which they pass.

15.5 In buildings where a firefighting shaft is required, a minimum of two firefighting shafts should be provided to buildings with a storey that has both of the following.

- A floor area of 900m² or more.

- A floor level 18m or more above the fire and rescue service vehicle access level.

15.6 Firefighting shafts and protected stairways should be positioned such that every part of each storey more than 18m above the fire and rescue service vehicle access level complies with the maximum distances given in paragraph 15.7. Distances should be measured from the fire main outlet on a route suitable for laying a hose.

NOTE: If the internal layout is not known, the distance should be measured at two-thirds of the direct distance.

15.7 In any building, the hose laying distance should meet all of the following conditions.

- A maximum of 60m from the fire main outlet in a firefighting shaft (see Diagram 15.3).

- Additionally, where sprinklers have not been provided in accordance with Appendix E, the hose laying distance should be a maximum of 45m from a fire main outlet in a protected stairway (although this does not imply that the protected stairway needs to be designed as a firefighting shaft (see Diagram 15.3)).

Design and construction of firefighting shafts

15.8 Firefighting stairs and firefighting lifts should be approached from either of the following.

- A firefighting lobby.

- A protected corridor or protected lobby that complies with the following guidance.

- Means of escape (Section 3).

- Compartmentation (Section 7).

Both the stair and lobby of the firefighting shaft should be provided with a means of venting smoke and heat (see clause 27.1 of **BS 9999**).

Only services associated with the firefighting shaft, such as ventilation systems and lighting for the firefighting shafts, should pass through or be contained within the firefighting shaft.

Doors of a firefighting lift landing should be a maximum of 7.5m from the door to the firefighting stair (Diagram 15.1).

- 15.9** Firefighting shafts should achieve a minimum fire resistance of REI 120. A minimum of REI 60 is acceptable for either of the following (see Diagram 15.1).
- Constructions separating the firefighting shaft from the rest of the building.
 - Constructions separating the firefighting stair, firefighting lift shaft and firefighting lobby.
- 15.10** All firefighting shafts should have fire mains with outlet connections and valves at every storey.
- 15.11** A firefighting lift installation includes all of the following.
- Lift car.
 - Lift well.
 - Lift machinery space.
 - Lift control system.
 - Lift communications system.

The lift shaft should be constructed in accordance with Section 6 of **BS 9999**.

Firefighting lift installations should conform to **BS EN 81-72** and **BS EN 81-20**.

Rolling shutters in compartment walls

- 15.12** The fire and rescue service should be able to manually open and close rolling shutters without the use of a ladder.

Wayfinding signage for the fire service

- 15.13** To assist the fire service to identify each floor in a block of flats with a top storey more than 11m above ground level (see Diagram D6), floor identification signs and flat indicator signs should be provided.
- 15.14** The floor identification signs should meet all of the following conditions.
- The signs should be located on every landing of a protected stairway and every protected corridor/lobby (or open access balcony) into which a firefighting lift opens.
 - The text should be in sans serif typeface with a letter height of at least 50mm. The height of the numeral that designates the floor number should be at least 75mm.
 - The signs should be visible from the top step of a firefighting stair and, where possible, from inside a firefighting lift when the lift car doors open.
 - The signs should be mounted between 1.7m and 2m above floor level and, as far as practicable, all the signs should be mounted at the same height.
 - The text should be on a contrasting background, easily legible and readable in low level lighting conditions or when illuminated with a torch.

- 15.15** The wording used on each floor identification sign should take the form Floor X, with X designating the number of the **storey**, as intended for reference by residents. The floor number designations should meet all of the following conditions.
- The floor closest to the mean ground level (see Diagram D4) should be designated as either Floor 0 or Ground Floor.
 - Each floor above the ground floor should be numbered sequentially beginning with Floor 1.
 - A lower ground floor should be designated as either Floor –1 or Lower Ground Floor.
 - Each floor below the ground floor should be numbered sequentially beginning with Floor –1 or Basement 1.
- 15.16** All floor identification signs should be supplemented by **flat** indicator signs, which provide information relating to the **flats** accessed on each **storey**. The **flat** indicator signs should meet all of the following conditions.
- The signs should be sited immediately below the floor identification signs, such that the top edge of the sign is no more than 50mm below the bottom edge of the floor identification sign.
 - The wording should take the form Flats X–Y, with the lowest **flat** number first.
 - The text should be in sans serif typeface with a letter height of at least half that of the floor indicator sign.
 - The wording should be supplemented by arrows when **flats** are in more than one direction.
 - The text and arrows should be on a contrasting background, easily legible and readable in low level lighting conditions or when illuminated with a torch.
- NOTE:** In the case of multi-storey **flats** with two or more entrances, the **flat** number should only be indicated on the normal access **storey**.

Evacuation alert systems

- 15.17** In blocks of **flats** (**purpose group** 1(a)) with a top **storey** over 18m above ground level (see Diagram D6 in Appendix D) an evacuation alert system should be provided in accordance with **BS 8629**.

Secure information boxes

- 15.18** A secure information box provides a secure facility to store information about a **building** for use by the fire service during an incident.
- 15.19** Blocks of **flats** (**purpose group** 1(a)) with a top **storey** more than 11m above ground level (see Diagram D6 in Appendix D) should be provided with a secure information box.
- NOTE:** Consideration should also be given to other **buildings** with large, complex or uncommon layouts where the provision of a secure information box may be beneficial.
- 15.20** The box should meet all of the following conditions.
- Sized to accommodate all necessary information.
 - Easily located and identified by firefighters.
 - Secured to resist unauthorised access but readily accessible by firefighters.
 - Protected from the weather.
- 15.21** Best practice guidance can be found in Sections 2 to 4 of the *Code of Practice for the Provision of Premises Information Boxes in Residential Buildings* published by the Fire Industry Association (FIA).

Section 16: Venting of heat and smoke from basements – flats

Provision of smoke outlets

- 16.1** Heat and smoke from basement fires vented via stairs can inhibit access for firefighting personnel. This may be reduced by providing smoke outlets, or smoke vents, which allow heat and smoke to escape from the basement levels to the open air. They can also be used by the fire and rescue service to let cooler air into the basements (Diagram 16.1).
- 16.2** Each basement space should have one or more smoke outlets.
- Where this is not practicable (for example, the plan area is deep and the amount of **external wall** is restricted by adjoining **buildings**), the perimeter basement spaces may be vented, with other spaces vented indirectly by opening connecting doors. This does not apply for **places of special fire hazard** (see paragraph 16.7).
- If a basement is compartmented, each **compartment** should have one or more smoke outlets, rather than indirect venting.
- A **basement storey** or **compartment** containing **rooms** with doors or windows does not need smoke outlets.
- 16.3** Smoke outlets connecting directly to the open air should be provided from every **basement storey**, except for any **basement storey** that has both of the following.
- A maximum floor area of 200m².
 - A floor a maximum of 3m below the adjacent ground level.
- 16.4** Strong **rooms** do not need to be provided with smoke outlets.

Natural smoke outlets

- 16.5** Smoke outlets should be both of the following.
- Sited at high level in either the **ceiling** or wall of the space they serve.
 - Evenly distributed around the **perimeter**, to discharge to the open air.
- 16.6** The combined clear cross-sectional area of all smoke outlets should be a minimum of 1/40 of the area of the floor of the **storey** they serve.
- 16.7** Separate outlets should be provided from **places of special fire hazard**.
- 16.8** If the smoke outlet terminates at a point that is not readily accessible, it should be kept unobstructed and covered only with a class A1 grille or louvre.
- 16.9** If the smoke outlet terminates in a readily accessible position, it may be covered by a panel, stallboard or pavement light that can be broken out or opened. The position of covered smoke outlets should be suitably indicated.
- 16.10** Outlets should not be placed where they prevent the use of **escape routes** from the **building**.

Mechanical smoke extract

16.11 If **basement storeys** are fitted with a sprinkler system in accordance with Appendix E, a mechanical smoke extraction system may be provided as an alternative to natural venting. Sprinklers do not need to be installed on the other **storeys** unless needed for other reasons.

Car parks are not normally expected to be fitted with sprinklers (see Section 11 of Approved Document B Volume 2).

16.12 The air extraction system should comply with all of the following.

- a. It should give at least 10 air changes per hour.
- b. It should be capable of handling gas temperatures of 300°C for not less than one hour.
- c. It should do either of the following.
 - i. Be activated automatically if the sprinkler system activates.
 - ii. Be activated by an automatic fire detection system that conforms to **BS 5839-1** (minimum L3 standard).

Further information on equipment for removing hot smoke is given in **BS EN 12101-3**.

See paras 16.1 and 16.13

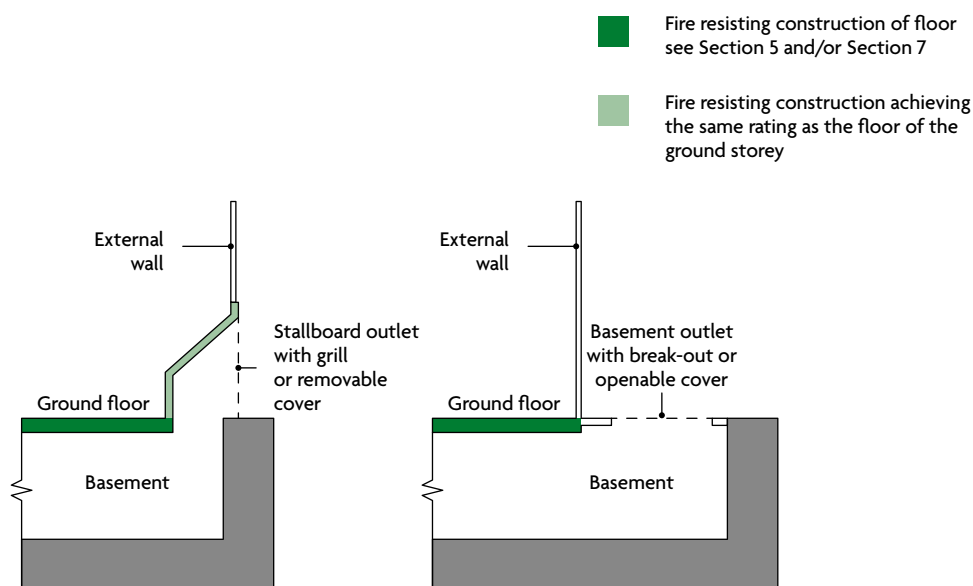


Diagram 16.1 Fire resisting construction for smoke outlet shafts

Construction of outlet ducts or shafts

- 16.13** Outlet ducts or shafts, including any bulkheads over them (see Diagram 16.1), should be enclosed in construction of class A1 rating and **fire resistance** at least equal to that of the element through which they pass.
- 16.14** Natural smoke outlet shafts should be separated from each other using construction of class A1 rating and **fire resistance** at least equal to that of the **storeys** they serve, where the shafts are either of the following.
- From different **compartments** of the same **basement storey**.
 - From different **basement storeys**.

Regulation 38: Fire safety information

This section deals with the following regulation of the Building Regulations 2010.

Fire safety information

- 38.** (1) This regulation applies where building work—
- (a) consists of or includes the erection or extension of a relevant building; or
 - (b) is carried out in connection with a relevant change of use of a building,
- and Part B of Schedule 1 imposes a requirement in relation to the work.
- (2) The person carrying out the work shall give fire safety information to the responsible person not later than the date of completion of the work, or the date of occupation of the building or extension, whichever is the earlier.
- (3) In this regulation—
- (a) “fire safety information” means information relating to the design and construction of the building or extension, and the services, fittings and equipment provided in or in connection with the building or extension which will assist the responsible person to operate and maintain the building or extension with reasonable safety;
 - (b) a “relevant building” is a building to which the Regulatory Reform (Fire Safety) Order 2005 applies, or will apply after the completion of building work;
 - (c) a “relevant change of use” is a material change of use where, after the change of use takes place, the Regulatory Reform (Fire Safety) Order 2005 will apply, or continue to apply, to the building; and
 - (d) “responsible person” has the meaning given by article 3 of the Regulatory Reform (Fire Safety) Order 2005.

Intention

The aim of this regulation is to ensure that the person responsible for the **building** has sufficient information relating to fire safety to enable them to manage the **building** effectively. The aim of regulation 38 will be achieved when the person responsible for the **building** has all the information to enable them to do all of the following.

- a. Understand and implement the fire safety strategy of the **building**.
- b. Maintain any fire safety system provided in the **building**.
- c. Carry out an effective fire risk assessment of the **building**.

Section 17: Fire safety information

- 17.1** For building work involving the erection or extension of a relevant **building** (i.e. a **building** to which the Regulatory Reform (Fire Safety) Order 2005 applies, or will apply), or the relevant change of use of a **building**, fire safety information should be given to the responsible person at one of the following times.
- When the project is complete.
 - When the **building** or extension is first occupied.
- 17.2** This section is a guide to the information that should be provided. Guidance is in terms of essential information and additional information for complex **buildings**; however, the level of detail required should be considered on a case-by-case basis.

Essential information

- 17.3** Basic information on the location of fire protection measures may be sufficient. An as-built plan of the **building** should be provided showing all of the following.
- Escape routes** – this should include exit capacity (i.e. the maximum allowable number of people for each **storey** and for the **building**).
 - Location of **fire-separating elements** (including **cavity barriers** in walk-in spaces).
 - Fire doorsets**, **fire doorsets** fitted with a **self-closing device** and other doors equipped with relevant hardware.
 - Locations of fire and/or smoke detector heads, alarm call points, detection/alarm control boxes, alarm sounders, fire safety signage, **emergency lighting**, fire extinguishers, dry or wet fire mains and other firefighting equipment, and hydrants outside the **building**.
 - Any sprinkler systems, including isolating valves and control equipment.
 - Any smoke control systems, or ventilation systems with a smoke control function, including mode of operation and control systems.
 - Any high risk areas (e.g. heating machinery).
- 17.4** Details should be provided of all of the following.
- Specifications of fire safety equipment provided, including routine maintenance schedules.
 - Any assumptions regarding the management of the **building** in the design of the fire safety arrangements.
 - Any provision enabling the evacuation of disabled people, which can be used when designing personal emergency evacuation plans.