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Guide to the design of balconies and terraces

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Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 31 August 2020. It was prepared by Technical Committee B/209, *General building codes*. A list of organizations represented on this committee can be obtained on request to its committee manager.

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Use of this document

As a guide, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification or a code of practice.

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The guidance in this standard is presented in roman (i.e. upright) type. Any recommendations are expressed in sentences in which the principal auxiliary verb is “should”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. “organization” rather than “organisation”).

The word “should” is used to express recommendations of this standard. The word “may” is used in the text to express permissibility, e.g. as an alternative to the primary recommendation of the clause. The word “can” is used to express possibility, e.g. a consequence of an action or an event.

Contractual and legal considerations

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

Compliance with a British Standard cannot confer immunity from legal obligations.

Introduction

The UK has seen an increase in medium and high-rise residential development in cities. The need to provide outdoor amenity space for occupants in apartments gives rise to the proliferation of balconies and roof terraces. Industry is frequently divided in opinion about the design of balconies and terraces. The need for a guide has therefore been identified to provide better guidance for harmonizing the drivers of safety, longevity, inclusive access and weathering.

This British Standard aims to set a benchmark for quality and functionality in the design of balconies and terraces.

1 Scope

This British Standard gives guidance on the design of balconies and terraces and their component parts.

Balconies and terraces covered within this British Standard can be at any height above lowest ground level, unless stated otherwise.

This British Standard defines Juliet guardings but covers their guarding elements only.

Certain aspects of this British Standard are not applicable to walkways, roofs, pedestrian surfaces and balconies intended for access only for maintenance. These include enclosure of balconies, arrangement of balconies, wind effects, inclusive design, safety (other standards apply), ventilation outlets and acoustic design. This British Standard is not specifically intended to cover internal balconies, such as within a building atrium or covered courtyard, but relevant guidance herein can be used in the absence of guidance specific to such balconies.

Asset protection other than service life is not included within the scope of this British Standard.

Raised timber structures on support posts built into the ground and serving ground floor accommodation are considered raised pedestrian surfaces and outside the scope of this British Standard.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions of this document¹⁾. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Standard publications

[BS 6229](#), *Flat roofs with continuously supported coverings – Code of practice*

[BS 6180](#), *Barriers in and about buildings – Code of practice*

[BS 7976](#), *Pendulum testers*

[BS 8610](#), *Personal fall protection equipment – Anchor systems – Specification*

[BS 9991](#), *Fire safety in the design, management and use of residential buildings – Code of practice*

[BS 9999](#), *Fire safety in the design, management and use of buildings – Code of practice*²⁾

BS EN 1253 (all parts), *Gullies for buildings*

¹⁾ Documents that are referred to solely in an informative manner are listed in the Bibliography.

²⁾ This standard also gives an informative reference to BS 9999:2017.

BS EN 1990, *Eurocode – Basis of structural design*
 BS EN 1991 (all parts), *Eurocode 1 – Actions on structures*
 BS EN 1992 (all parts), *Eurocode 2 – Design of concrete structures*
 BS EN 1993 (all parts), *Eurocode 3 – Design of steel structures*
 BS EN 1994 (all parts), *Eurocode 4 – Design of composite steel and concrete structures*
 BS EN 1995 (all parts), *Eurocode 5 – Design of timber structures*
 BS EN 1999 (all parts), *Eurocode 9 – Design of aluminium structures*
 BS EN 1090 (all parts), *Execution of steel and aluminium structures*
 BS EN 12056 (all parts), *Gravity drainage systems inside buildings*
 BS EN 12056-3, *Gravity drainage systems inside buildings – Part 3: Roof drainage, layout and calculation*³⁾

[BS EN 13501-1:2018](#), *Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests*

[BS EN 13501-5:2016](#), *Fire classification of construction products and building elements – Part 5: Classification using data from external fire exposure to roofs tests*

[BS EN 16612](#), *Glass in building – Determination of the lateral load resistance of glass panes by calculation*

BS EN ISO 13789, *Thermal performance of buildings – Transmission heat loss coefficient – Calculation method*

NA to BS EN 1990, *UK National Annex for Eurocode – Basis of structural design*

NA to BS EN 1991 (all parts), *UK National Annex to Eurocode 1*

NA to BS EN 1992 (all parts), *UK National Annex to Eurocode 2*

NA to BS EN 1993 (all parts), *UK National Annex to Eurocode 3*

NA to BS EN 1994 (all parts), *UK National Annex to Eurocode 4*

NA to BS EN 1995 (all parts), *UK National Annex to Eurocode 5*

NA to BS EN 1999 (all parts), *UK National Annex to Eurocode 9*

PD 6688-1-4, *Background information to the National Annex to BS EN 1991-1-4 and additional guidance*

Other publications

[N1] IStructE. Structural use of glass in buildings, 2014. Available from <https://www.istructe.org/resources/guidance/structural-use-glass-buildings/>

3 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply.

NOTE [Figure 1](#) illustrates some of the terms and definitions given in this clause.

3.1 access deck

exterior passage affording access and escape to unit(s) of accommodation above ground level

³⁾ This standard also gives informative references to BS EN 12056-3:2016.

NOTE 1 This can take the form of an access balcony or access terrace.

NOTE 2 This can sometimes be referred to as a walkway, common balcony or external approach.

3.2 balcony

accessible external amenity platform above ground level exterior to and with direct access from a building

NOTE 1 A balcony is formed above an external space that is not a habitable room. See [3.9](#) for the definition of terrace.

NOTE 2 A balcony is not regarded or designed as storage space.

NOTE 3 For the purposes of fire, a balcony is not a roof.

3.2.1 enclosed balcony

balcony that is protected from rain ingress by a roof or balcony above and a wall(s) or weather screen to the sides

NOTE 1 The envelope of the balcony is deemed rain resistant, but not part of the thermal, acoustic, fire separation or airtightness envelope of the building, and therefore an enclosed balcony is not considered in this document a habitable room, except for assessment of escape from fire. An enclosed balcony is sometimes referred to as a "winter garden".

NOTE 2 [BS 9991](#) and [BS 9999](#) give guidance on open and enclosed balconies that helps give a more precise definition in terms of fire. These standards do not cover weather protection and therefore the definition of enclosure might be different.

NOTE 3 Attention is drawn to regulations regarding combustibility for the outer weather screen.

3.2.2 free-standing balcony

balcony with support(s) independent of the adjacent building structure

3.2.3 inset balcony

balcony that is recessed inwards from the external wall line of a building but not above a habitable internal space

3.2.4 open balcony

balcony that has guarding and does not provide protection to the occupants from weather

NOTE [BS 9991](#) and [BS 9999](#) give guidance on open and enclosed balconies that helps give a more precise definition in terms of fire.

3.2.5 projecting balcony

balcony that cantilevers outwards from the external wall line of a building

3.3 drainage

3.3.1 controlled drainage

drainage from a balcony that prevents water ingress to the interior and staining of the exterior of a building and nuisance to persons under or around the balcony or damage to the landscaping below

3.3.2 edge drainage

drainage of a water collecting surface via the edge of a balcony

3.3.3 edge overflow

point in a vertical upstand to a horizontal waterproof surface where the uppermost level is reduced to allow overspill to a non-critical point on the edge

3.3.4 freeboard

difference between the spillover level ([3.3.12](#)) and the ingress level ([3.3.8](#))

3.3.5 non-piped drainage

means of conveying rainwater from a horizontal surface other than piped drainage ([3.3.6](#))

3.3.6 piped drainage

drainage of a water collecting surface via downpipe(s)

NOTE Sometimes referred to as "positive drainage".

3.3.7 principal water collecting surface

surface on which water is primarily collected for dispersal to an outlet, edge or overflow

3.3.8 ingress level

lowest level around the perimeter of a balcony or terrace at which water can leak into the building if an outlet route is blocked or surcharged

NOTE This is usually the lowest level of the impervious membrane upstands against the bounding walls. It usually occurs at a door threshold between a balcony/terrace and the interior of the building.

3.3.9 outlet

primary conveyance for transferring water from a balcony or terrace to piped drainage ([3.3.6](#))

NOTE An outlet may be vertical or side draining.

3.3.10 outlet overflow

outlet above a waterproof horizontal surface set below the spillover level to allow overspill into a pipe

3.3.11 overflow

secondary conveyance for the discharge of water where an outlet has become blocked

NOTE An overflow could also be a means to warn of drainage problems/blockage. An overflow may take the form of an edge overflow or an outlet overflow.

3.3.12 spillover level

level at which water discharges via an overflow if an outlet is blocked or surcharged

3.3.13 spout

rainwater outlet or overflow that projects laterally from a balcony

3.3.14 warning pipe

pipe set at a level and location solely to warn of rising water levels

NOTE A warning pipe cannot be an overflow due to insufficient capacity.

3.3.15 water flow reducing layer

robust vapour permeable layer to restrict the flow of water in an inverted roof system

NOTE It also prevents fines from being washed below the insulation, which can damage the waterproofing system or block the roof drainage system.

[SOURCE: BS 6229:2018, 3.6.3]

3.4 drip

projecting profile at the base of a vertical, horizontal or sloping surface that prevents water from tracking onto the wall, fascia or soffit below

3.5 fire resistance

ability of a component or construction of a building to meet for a stated period of time some or all of the appropriate criteria specified in the relevant part of BS 476 (all parts) or [BS EN 13501](#)

NOTE 1 These criteria include one or more of the following: load-bearing capacity (R); integrity (E); and insulation (I).

NOTE 2 The fire-resistance classification periods are not a measure of the actual time for which an element will function in a real fire.

[SOURCE: BS 9999:2017, 3.47]

3.6 guarding

physical barrier that restricts access to a significant hazard, e.g. falling from height

NOTE This can be provided by balustrading.

3.7 Juliet guarding

external guarding to openable doors without an associated external floor

NOTE Also known as balconet or balconette.

3.8 pedestrian surface

uppermost trafficked surface of a balcony or terrace

3.9 terrace

external accessible surface above an internal space above ground level exterior to and with direct access from a building to occupants for purposes other than exclusively maintenance

NOTE 1 A terrace is a roof for the purposes of fire and waterproofing. Additionally, for fire purposes, a terrace can also perform the function of a floor.

NOTE 2 Certain spaces might incorporate features of both a balcony and terrace.

3.10 thermal envelope

envelope of a building that controls the unwanted transfer of heat and air in and out of the building

NOTE This might be different from the weather screen.

3.11 weather screen

screen that, in combination with a roof or balcony above, prevents rain ingress into an enclosed balcony

NOTE 1 This might be different from the thermal envelope.

NOTE 2 A weather screen can act as guarding.

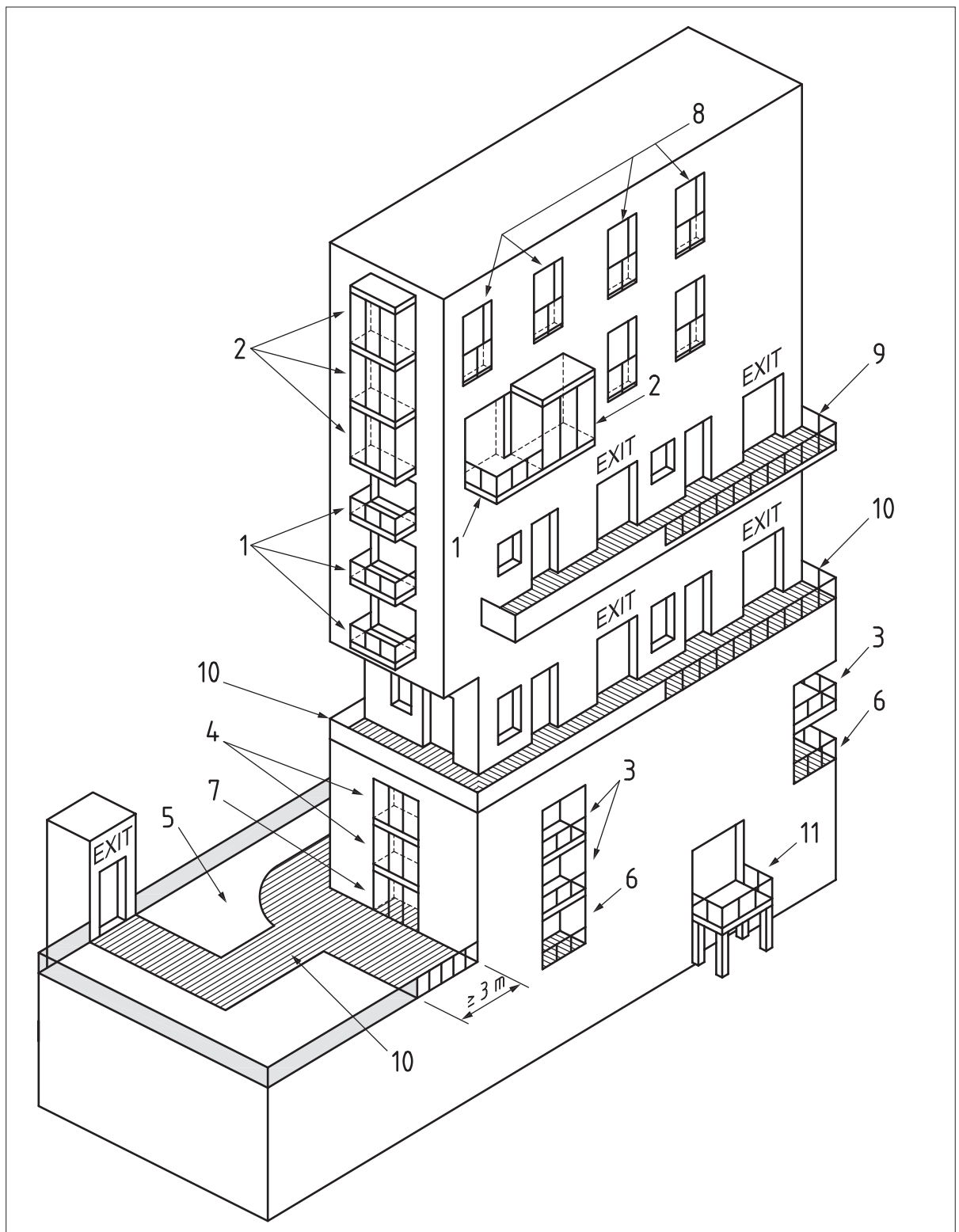
Figure 1 — *Balconies and terraces*

Figure 1 (continued)

Key			
1	Projecting open balcony	9	Access balcony [can be referred to as “access deck” (see 3.1) or “walkway”]
2	Projecting enclosed balcony	10	Access terrace [can be referred to as “access deck” (see 3.1) or “walkway”]
3	Recessed open balcony	11	Free-standing balcony
4	Recessed enclosed balcony		Terrace, access terrace and access balcony surfaces with fire performance B _{ROOF} (t4) or better (see Clause 12).
5	Terrace		Imperforate (as BS 9991) guarding materials reaction to fire class as in Clause 12
6	Recessed open terrace		Other guarding materials reaction to fire class as in Clause 12
7	Recessed enclosed terrace		Other guarding
8	Juliet guarding		
<i>NOTE National regulations might cover roof performance in relation to relevant boundaries.</i>			

4 General principles

4.1 General

Balconies, terraces and access decks should be designed to provide amenity for the building users and should be sized appropriately for the intended use. Balconies form a significant feature on the facade of many buildings, very often forming part of the character of the building. High-quality design is therefore important to maintain the quality of cities and building stock. Design can be separated into two aspects: aesthetic and functional.

NOTE This British Standard does not cover the former as the drivers are numerous and guidance can be found in other documents.

Good functionality is vital to the long-term and safe enjoyment of a balcony. The design should aim to leave a legacy of quality and functionality, without nuisance to building occupants or the public, with adequate provision for maintenance.

4.2 Relationship of balconies to the building

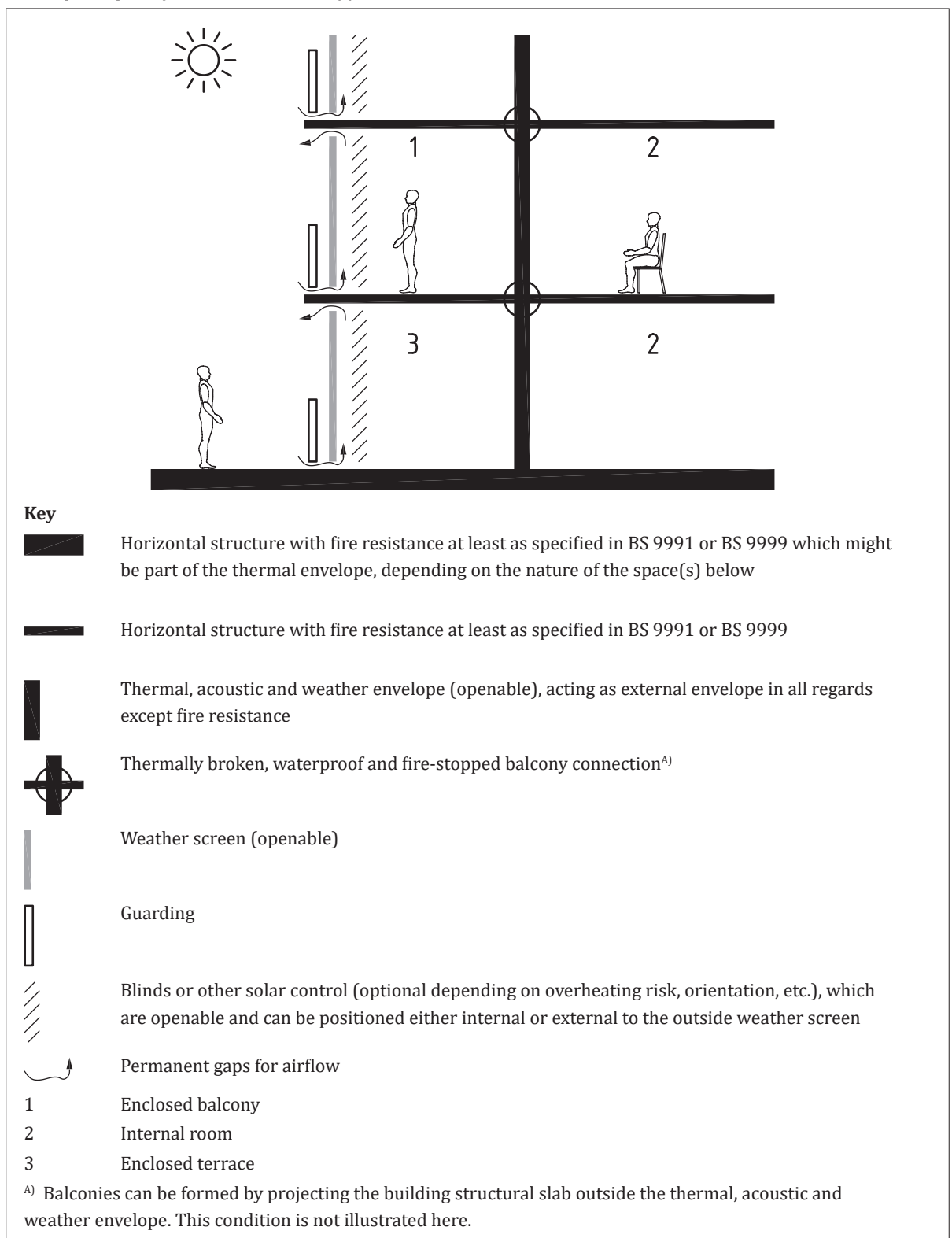
A balcony can be one of several types, or even a combination. A balcony can project beyond the walls of a building; it can be formed within a recess of a building; or it can be a hybrid of both. It can be formed upon a single wall or at a corner between walls on different planes.

5 Enclosure of balconies and small terraces

5.1 General

A balcony or small terrace can be open, wholly or partly covered by another balcony or roof above, or it can be enclosed by a weather screen on one or more sides and a roof or balcony above, thus creating an enclosed balcony.

[Figure 2](#) illustrates the typical features of an enclosed balcony. Mechanical ventilation should be ducted past the balcony from the interior to outside of the weather screen.

Figure 2 — Basic principles of an enclosed balcony/terrace

Where a weather screen is required to form an enclosed balcony or enclosed small terrace, it can be formed from full or part-height components which are either fixed, sliding, louvred or hinged to form openings. Opening components can be formed in a weather screen above, in front of or behind the fixed guarding.

Factors to be considered in the design include:

- a) safety where the enclosure is acting as a guarding;
- b) the effects of wind on any opening components;
- c) the potential for water penetrating the balcony with and without the screen open;
- d) the effects of enclosure on fire and smoke transmission (see [Clause 12](#) for performance in fire);
- e) the effects of enclosure on acoustics into and between apartments (see [Clause 17](#)); and
- f) cleaning and maintenance.

5.2 Daylight, thermal, ventilation and acoustic considerations

In a temperate climate such as the UK, balconies in proximity to windows have environmental effects upon the interior of the building. These include:

- a) providing beneficial shading on certain facade orientations from detrimental high and medium angle sunlight in summer, thus offering an aid to passive cooling of the interior spaces;
- b) providing too much shading on certain facade orientations that would benefit from low angle solar gain in winter;
- c) providing too much shading from beneficial daylight to the interior spaces; and
- d) providing beneficial acoustic buffering to the internal spaces (see [Clause 17](#)).

Enclosure of balconies can result in the following additional environmental effects upon the interior of the building:

- 1) detrimental overheating in the internal occupied space connected to an enclosed balcony on certain facade orientations due to the restriction of ventilation to the adjacent interior space and entrapment of incident heat;
- 2) beneficial passive insulation of adjacent interior space by the thermal buffering effect of the enclosed balcony space in cold weather; and
- 3) detrimental condensation forming on the inside of a single glazed outer weather screen.

The design of the facade, windows, balconies and weather screens should take these factors into account in reaching an optimum balance for interior comfort and energy efficiency.

A well-designed enclosure to a balcony can facilitate its use by occupants for a greater period of time during the year than an open balcony, due to the weather protection it affords.

An enclosed balcony should not be designed as an internal room for full occupation, which is not the role of a balcony. The important exception to this is classification for fire purposes, where the volume of an enclosed balcony is considered as an inner room and, therefore, occupied. Therefore, targets for airtightness and thermal transfer performance for the outer weather screen should not be set. Targets for acoustic separation from adjacent balconies through the party wall may be set to reduce the risk of acoustic nuisance from neighbouring spaces. Targets for acoustic reduction from exterior to the balcony through the weather screen may be set, but should not be as stringent as those for internal living areas. The buffering effect of the outer weather screen can be taken into account in both thermal and acoustic calculations for the thermal envelope of the building.

Where a balcony is enclosed, the outer weather screen should incorporate both controllable openings for purge-type ventilation (such as openable windows) and uncontrollable fixed openings for background-type ventilation. The controllable openings in the outer weather screen for purge-type ventilation should have effective free area calculated based upon the requisite percentage of the combined areas of the balcony pedestrian surface and the inner rooms being ventilated.

The fixed openings in the outer weather screen for permanent background-type ventilation of enclosed balconies should have effective free area to external air of at least 8 000 mm². This would ideally be distributed evenly along the external perimeter at the base and top of the weather screen by continual gaps of a minimum 4 mm. Other arrangements for fixed ventilation can be adopted but might require greater free area.

NOTE 1 This ensures that an enclosed balcony remains a sheltered exterior amenity space, not to be confused with habitable space. If the space occupied by the balcony is to be sealed from exterior air, it is not classed as a balcony and therefore does not fall within the scope of this British Standard.

NOTE 2 An enclosed balcony is not to be confused with a conservatory, which can be fully closed from outside.

Where an adjacent interior room relies upon trickle ventilators for background ventilation via the enclosed balcony, the fixed openings in the outer weather screen providing permanent background-type ventilation should provide at least 5% more effective free area than the trickle ventilators serving the room.

In addition to self-shading and ventilation, overheating can be controlled by coatings on the glass. Alternatively, either fixed or moveable shading devices, such as blinds, louvres or shutters, can be used. Detrimental solar gain can be controlled by moveable shading devices with little effect on beneficial daylight, if well designed and operated. The use of shading devices on the inside near the glazed weather screen creates a layer of hot air which, if fixed ventilation openings are provided at the base and top of the glazing, can create a convection current that expels hot air at the upper opening and draws fresh cool air in to replace it at the lower opening. This is the basic principle of a double-skin facade. Glass coatings and fixed blinds are less adaptable than moveable shading and care should be taken to ensure a balanced solution for ensuring interior thermal comfort in all seasons.

5.3 Drainage considerations

The design of an enclosed balcony should prevent ingress of water into any adjacent internal spaces or structure. An enclosed balcony requires a drainage strategy, as the weather screen is likely to be left open by the occupant during hot weather. An assessment should be carried out to determine risk and the amount of rain ingress and effect when windows in the weather screen are open. Piped or edge drainage should be provided with sufficient capacity. See [Clause 15](#) for further guidance on weathering and hydraulic design.

5.4 Fire considerations

The enclosure of balconies triggers additional risks relating to fire, smoke and means of escape. Where balconies are enclosed on buildings containing dwellings, residential units or specialized housing, the guidance in [BS 9991](#) should be followed. See also guidance related to fire in [Clause 12](#).

5.5 Finishes and equipment

No active heating, cooling or mechanical ventilation, including MVHR (mechanical ventilations with heat recovery) should be connected to the volume of an enclosed balcony which, as a sheltered exterior space, should rely on natural ventilation only. Electrical fittings should be suitable for use in exterior locations. Surface finishes to an enclosed balcony should be exterior-grade materials that do not discolour or degrade in moist external air.

6 Arrangement of balconies

6.1 Proximity and organization of multiple balconies

The arrangement of balconies on a facade can take one of several forms:

- a) stacked – arrayed vertically one above the other;
- b) staggered – arrayed vertically, but alternately; or
- c) random – at different locations across a facade.

The vertical organization of balconies can affect daylight/overheating, drainage pipes, rainwater run-off, and influence balconies below, including cleaning and maintenance strategies.

6.2 Level above ground

The design should take account of the elevation of a balcony above ground. Persons occupying a balcony which is significantly above ground level might experience vertigo (acrophobia). This might be more pronounced on projecting balconies than recessed ones or terraces. Designers should consider ways of mitigating this to make occupants feel safe while using balconies. See [Clause 7](#) on wind effects.

6.3 Privacy

The design should take into account overlooking and the effect this might have on amenity. This can influence the transparency and degree of enclosure selected. Where balconies are horizontally adjacent, dividing screens should be used to enhance privacy.

7 Wind effects

7.1 General

Wind can have a significant effect on a balcony or terrace, its occupants and objects placed on the balcony or terrace. The design of a balcony or terrace, its guarding and/or weather screens should mitigate nuisance effects of wind to its occupants and the occupants of other balconies, terraces and areas of the building.

Wind is more likely to create uncomfortable or unsafe conditions for occupants if a balcony or terrace is:

- a) at a higher elevation than the roof height of the neighbouring buildings;
- b) exposed to the prevailing wind direction;
- c) located close to a building corner; and/or
- d) in close proximity to other buildings or blocks, such that the wind might accelerate as it flows between them.

Areas about corners are especially susceptible to adverse wind conditions, due to the way in which wind accelerates around the corners of a building. Where possible, balconies should be located away from building corners to avoid these effects. Designers should consider conducting a detailed wind microclimate assessment (using wind tunnel testing or computational fluid dynamics) to develop appropriate wind mitigation measures (see [7.2](#)).

The interaction of buildings in close proximity to each other can result in complex aerodynamic effects, some of which could be beneficial (such as by providing increased shelter to occupied areas), while others are adverse (such as by causing the wind to accelerate as it is “funnelled” between