

APPROVED
DOCUMENT

K

Protection from falling, collision and impact

Stairs, ladders and ramps

Protection from falling

Vehicle barriers and loading bays

Protection against impact with glazing

Additional provisions for glazing in buildings other than dwellings

Protection against impact from and trapping by doors

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Introduction

What is an Approved Document?

- 0.1 This Approved Document, which takes effect on 1 April 2013, is one of a series of documents that the Secretary of State has issued to give practical guidance about the requirements of Schedule 1 to and Regulation 7 of the Building Regulations 2010 for England and Wales.
- 0.2 The intention of issuing Approved Documents is to provide guidance about compliance with specific aspects of the Building Regulations in some of the more common building situations. They set out what, in ordinary circumstances, may be accepted as reasonable provision for compliance with the relevant requirement(s) of the Building Regulations to which they refer.
- 0.3 If guidance in an Approved Document is followed there will be a presumption of compliance with the requirement(s) covered by the guidance. However, this presumption can be overturned, so simply following guidance does not guarantee compliance; for example, if the particular case is unusual in some way, then 'normal' guidance may not be applicable. It is also important to note that there may well be other ways of achieving compliance with the requirements. **There is therefore no obligation to adopt any particular solution contained in this Approved Document if you would prefer to meet the relevant requirement in some other way.**
- 0.4 The guidance contained in this Approved Document relates only to the particular requirements of the Building Regulations that the document addresses. However, building work may be subject to more than one requirement of the Building Regulations. In such cases the work will also have to comply with any other applicable requirements of the Building Regulations.
- 0.5 There are Approved Documents that give guidance on each of the parts of Schedule 1 and on Regulation 7.

Responsibility for compliance

- 0.6 It is important to remember that if you are the person (e.g. designer, builder, installer) carrying out building work to which any requirement of the Building Regulations applies you have a responsibility to ensure that the work complies with any such requirement. The building owner may also have a responsibility for ensuring compliance with the Building Regulations requirements and could be served with an enforcement notice in cases of non-compliance.

Materials and workmanship

- 0.7 Any building work which is subject to the requirements imposed by Schedule 1 to the Building Regulations should be carried out in accordance with Regulation 7. Guidance on meeting these requirements on materials and workmanship is contained in the Approved Document to Regulation 7.

How to use this Approved Document

- 0.8 In this document the following conventions have been adopted to assist understanding and interpretation:
- Passages of text shown against a green background are extracts from the Building Regulations (SI 2010/2214) or Building (Approved Inspectors etc.) Regulations 2010 (SI 2010/2215), both as amended, and set out the legal requirements of the Building Regulations. There is no flexibility in respect of such passages; they define legal requirements, not guidance for typical situations.
 - Key terms are defined in this introduction and are printed in green text.
 - Third-party publications that you must refer to to comply with the Building Regulations are highlighted in **black bold text**. Appendix A contains a list of all these references. When an Approved Document refers to a named standard or other reference, the relevant version of the standard is listed at the end of the publication. However, if the issuing body has revised or updated the listed version of the standard, the new version, if it continues to address the relevant requirements of the Building Regulations, may be used as guidance.

Building Regulations are made for specific purposes: to promote health and safety, energy conservation and the welfare and needs of disabled people. Standards and technical approvals are relevant guidance in that they relate to these considerations. However, they may also address other aspects of performance such as serviceability, or aspects which although they relate to health and safety are not covered by the Building Regulations.

Where you can get further help

- 0.9 If you do not understand the technical guidance or other information set out in this Approved Document and the additional detailed technical references to which it directs you, there are a number of routes through which you can seek further assistance:
- a. the DCLG website: www.communities.gov.uk
 - b. the Planning Portal website: www.planningportal.gov.uk
 - c. if you are the person undertaking the building work you can seek assistance either from your local authority building control service or from your approved inspector (depending on which building control service you are using)
 - d. persons registered with a competent person self-certification scheme may be able to get technical advice from their scheme operator
 - e. if your query is of a highly technical nature you may wish to seek the advice of a specialist, or of an industry technical body for the relevant subject.

Key terms

- 0.10 The following meanings apply to terms throughout this Approved Document.

Alternating tread stair A stair with paddle-shaped treads where the wide portion is on alternate sides on consecutive treads (see paragraphs 1.26 and 1.27).

Barrier A structure – either a raised rail or a solid wall – that denies access to another area.

Common Serving more than one dwelling.

Flight A continuous series of steps or a continuous slope (ramp) between landings. (For the widths and lengths of flights see paragraphs 1.11–1.15.)

Going For stairs: the depth from front to back of a tread, less any overlap with the next tread above (see paragraphs 1.1 and 1.2). (For the measurement of the going on tapered treads see paragraphs 1.22–1.24.)

For ramps: the length of the ramp between landings.

Guarding A **barrier** that denies pedestrians or vehicles access to another area, for example the floor below (see Diagrams 16 and 17).

Handrail A rail, at hand height or a little higher, for people to hold for support. (For **handrails** for stairs, see paragraphs 1.31–1.36; for **handrails** for ramps, see paragraphs 2.10–2.13.)

Helical stair A stair in a helix around a central void (see paragraph 1.25).

Ladder A means of access to another level, formed by a series of rungs or narrow treads. People normally ascend or descend facing the ladder. (See paragraphs 1.28–1.30.)

Nosing The leading edge of a stair tread.

Pitch The angle of inclination (slope) between the horizontal and a line connecting the nosings of a stair.

Ramp A slope steeper than 1:20, on which a pedestrian or wheelchair user can move from one level to another (see Section 2).

Rise The height between consecutive treads (see paragraphs 1.1 and 1.2).

Spiral stair A stair in a helix around a central column (see paragraph 1.25).

Tapered tread A step in which the going reduces from one side to the other (see paragraphs 1.22–1.24).

K1 Stairs, ladders and ramps

The requirement

This Approved Document deals with the following requirement from Part K of Schedule 1 to the Building Regulations 2010.

Requirements

Requirement

Stairs, ladders and ramps

K1. Stairs, ladders and ramps shall be so designed, constructed and installed as to be safe for people moving between different levels in or about the building.

Limits on application

Requirement K1 applies only to stairs, ladders and ramps which form part of the building.

Where necessary, refer to AD B, Fire safety, and AD M, Access to and use of buildings.

NOTE: Your attention is drawn to the Workplace (Health, Safety and Welfare) Regulations 1992.

If building work complies with Building Regulations requirement K1, it prevents, in accordance with Section 23(3) of the Health and Safety at Work etc. Act 1974, the serving of an improvement notice relating to the design of stairs, ladders and ramps under Regulation 17 of the Workplace (Health, Safety and Welfare) Regulations 1992. (Regulation 17 relates to permanent stairs, ladders and ramps on pedestrian routes within the workplace premises, including those used to give access for maintenance to parts of the workplace premises.)

Guidance

Performance

In the Secretary of State's view, you can meet the requirements of K1 by the use of stairs, ladders and ramps in appropriate circumstances to afford reasonable safety between levels in the following buildings:

- a. dwellings where the difference between levels is more than 600mm
- b. buildings other than dwellings where the difference between levels is two or more risers (or 300mm if not part of a stair).

The standard of provision needed to give an acceptable level of safety depends on the circumstances. For example:

- a. The standard of provision may need to be higher in a public building than in a dwelling, because people may be less familiar with the building and there may be more users.
- b. A lower standard of provision may be acceptable where access is required only for maintenance, because greater care can be expected from people.

Introduction

This document describes some ways in which you can meet requirement K1:

- **Section 1** gives guidance on aspects of the geometry of stairs, special stairs and **guarding** of stairs.
- **Section 2** gives guidance on **ramps** and **guarding** of ramps.

Requirement K1 applies to means of access outside a building *only when* the access is part of the building. For example, requirement K1 *does not* apply to steps on land leading to a building, but *does* apply to entrance steps which are part of the building.

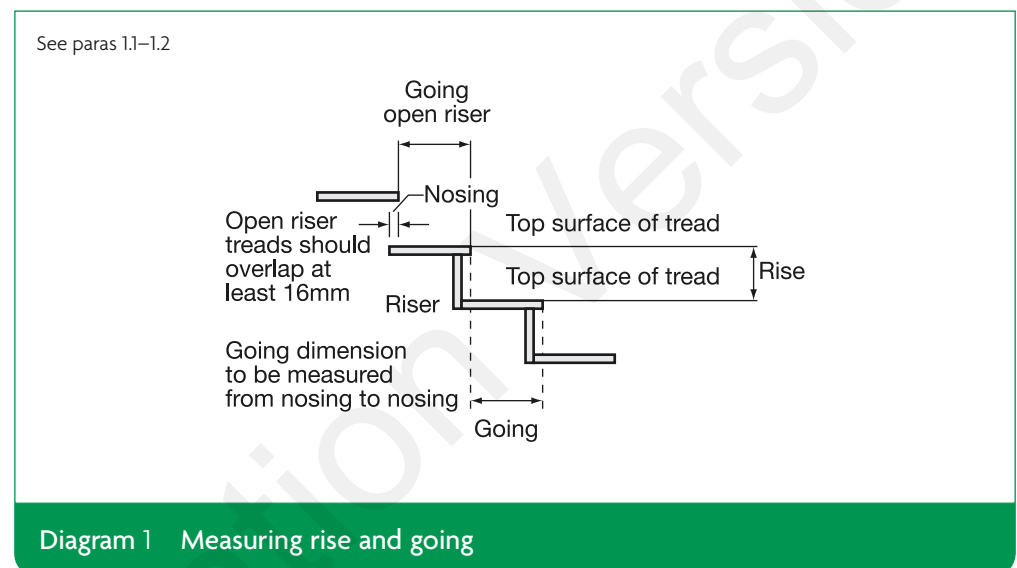
Regarding access routes:

- **Where access routes form part of a means of escape in case of fire**, refer to AD B, Fire safety, Volume 1 – Dwellinghouses, and Volume 2 – Buildings other than dwellinghouses.
- **Where access routes are intended as a means of access for disabled people**, refer to AD M, Access to and use of buildings.

Stairs and ladders

Steepness of stairs – rise and going

- 1.1 Measure the **rise** and **going** as shown in Diagram 1. (For steps with **tapered treads**, see also paragraphs 1.22–1.24.)



- 1.2 In a **flight** of steps, for all steps use the measurements for **rise** and **going** given for the four stair categories in Table 1 below. Use any **rise** between the minimum and maximum with any **going** between the minimum and maximum.

Table 1 Rise and going

	Rise		Going	
	Minimum (mm)	Maximum (mm)	Minimum (mm)	Maximum (mm)
Private stair	150	220†	245	260
	165	200†	223	300
Institutional and assembly stair	135	180	280*	340
Utility stair	150	190	250	320
Easy access stair	150	170	250**	320

Private: Intended to be used for only one dwelling.

Institutional and assembly: Serving a place where many people gather.

Utility: Used for escape, access for maintenance, or purposes other than as the usual route for moving between levels on a day-to-day basis.

Easy access: Used by a broad range of users, and on a day-to-day-basis, as the usual route between levels.

Note:

† The maximum pitch for a private stair is 42°.

* If the area of a floor of the building is less than 100m², you may reduce the going to 250mm.

**For school buildings, the minimum going is 280mm.

The normal relationship between the dimensions of the rise and going is: twice the rise plus the going (2R + G) equals 550–700mm.

Stepped gangways in assembly buildings

- 1.3 For a stair or **ramp** that forms part of the means of access within an assembly building such as a sports stadium, theatre or cinema, conform to the guidance in this Approved Document.

However, if steps are part of the gangways to areas for spectators, the gangways may need to be at different **pitches** to maintain sightlines for spectators, and this may affect the main stairs. Apply the following guidance:

- Ensure that the maximum **pitch** for gangways to seating areas for spectators is 35°.
- Align the ends of all rows of seats so that the width of the gangway remains the same.
- Provide transverse gangways to give access from the side to storey exits (vomitory exits) within the body of a seating layout.

- d. Ensure that transverse and radial gangways in auditoria with tiered seating do not cross. Offset the connections between transverse and radial gangways so that the flow of people to the exits is smooth.
- e. In stepped tiers, use the following measurements for each step in the gangway:
 - minimum height, 100mm
 - maximum height, 190mm

If there are two or more rises to each row of seats, make each step an equal height.
- f. In a tier that is uninterrupted by cross-gangways, and where the **pitch** exceeds 25°, use a maximum number of steps of 40.
- g. Where an exit is approached from a stepped gangway, place a landing the width of the exit and a minimum of 1100mm deep immediately in front of the exit doors.
- h. For stepped side gangways, provide a **handrail** in accordance with paragraph 1.32.
- i. In stepped tiers, maintain the same level between the seatway and the nearest step.

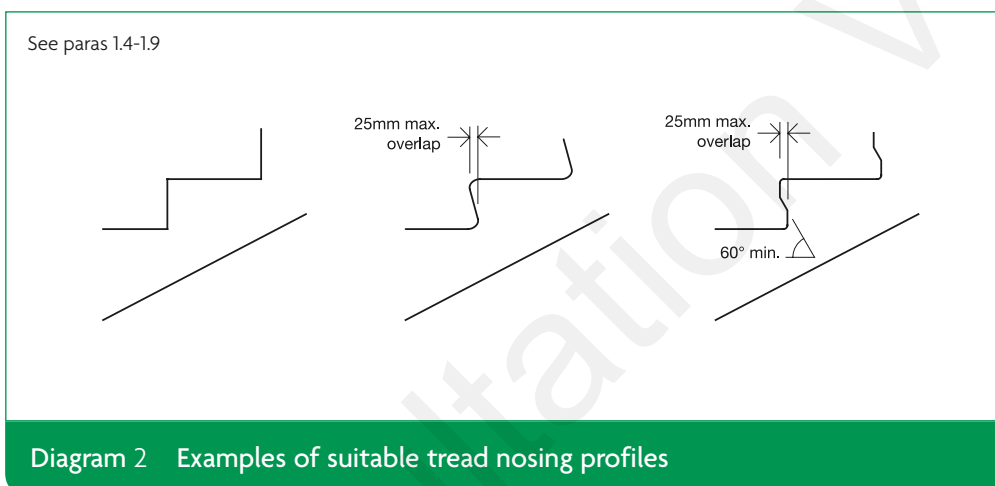
Construction of steps

- 1.4 Have level treads on steps.
- 1.5 In buildings other than dwellings, use solid risers.

NOTE: The benefits of a solid riser are that it:

 - a. removes the possibility of the front of a foot or a walking aid being caught underneath a tread during ascent, and possibly causing a fall
 - b. avoids people feeling insecure when looking through open rises on a stair.
- 1.6 In dwellings, steps may have open risers if you:
 - a. overlap treads by a minimum of 16mm
 - b. construct the steps so that a 100mm diameter sphere cannot pass through the open risers.

- 1.7 In buildings that contain flats and do not have passenger lifts, provide stairs with steps as follows:
- Make step nosings apparent: use a permanent contrasting material on both the tread and the riser.
 - Use a suitable tread nosing profile as shown in Diagram 2.
 - Make the rise of each step both:
 - uniform, and
 - no more than 170mm.
 - Make the rise and going of each step consistent throughout a flight of steps.

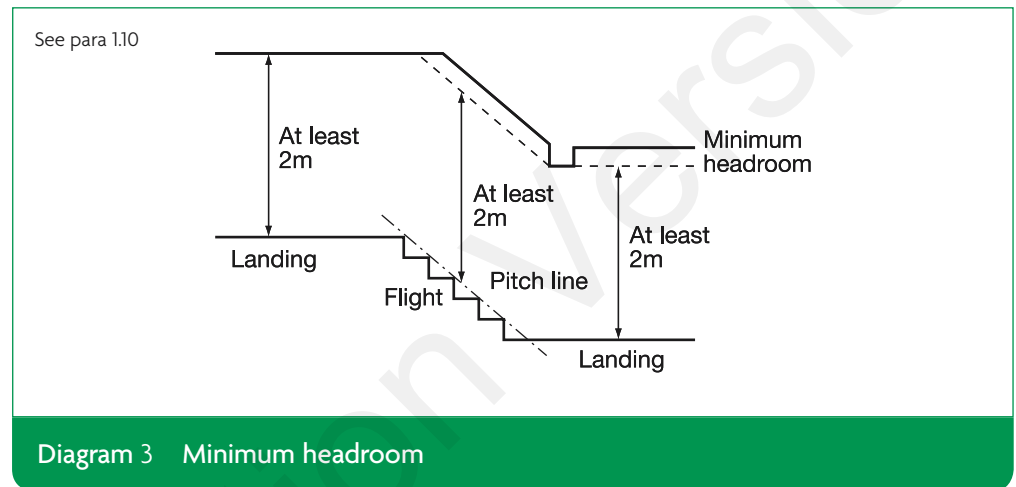


- 1.8 In buildings other than dwellings, for steps:
- Make step nosings apparent: use a permanent contrasting material, 55mm wide, on both the tread and the riser.
 - Avoid, if possible, step nosings that protrude over the tread below. If the nosing protrudes, ensure that this is by no more than 25mm (see Diagram 2).
 - Make the rise and going of each step consistent throughout a flight of steps.
- 1.9 If the soffit is less than 2.1m above floor level, protect the area beneath a stair with either:
- guarding and low level cane detection, or
 - a barrier giving the same degree of protection.

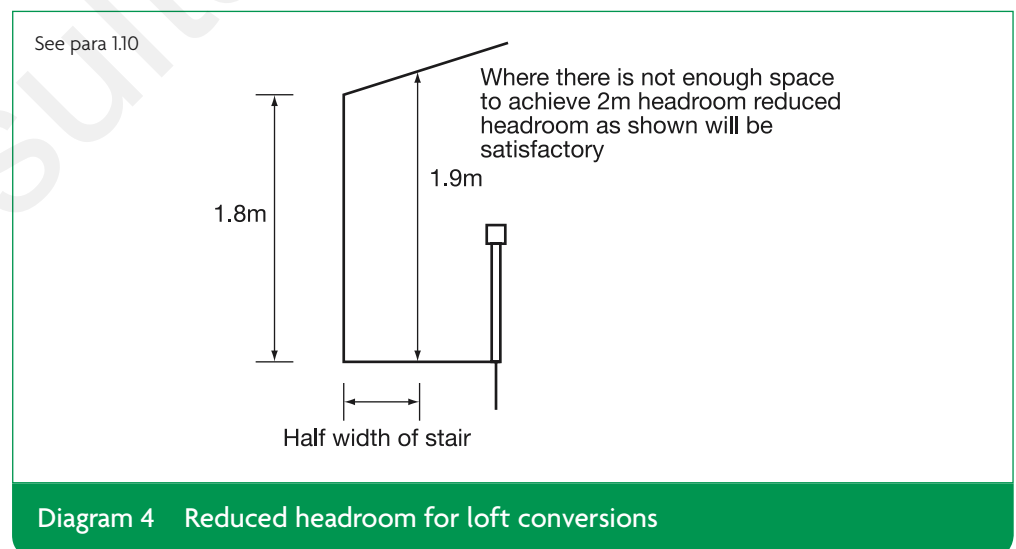
Headroom for stairs

1.10 Provide headroom as follows:

- a. On the access between levels, provide the minimum headroom shown in Diagram 3.



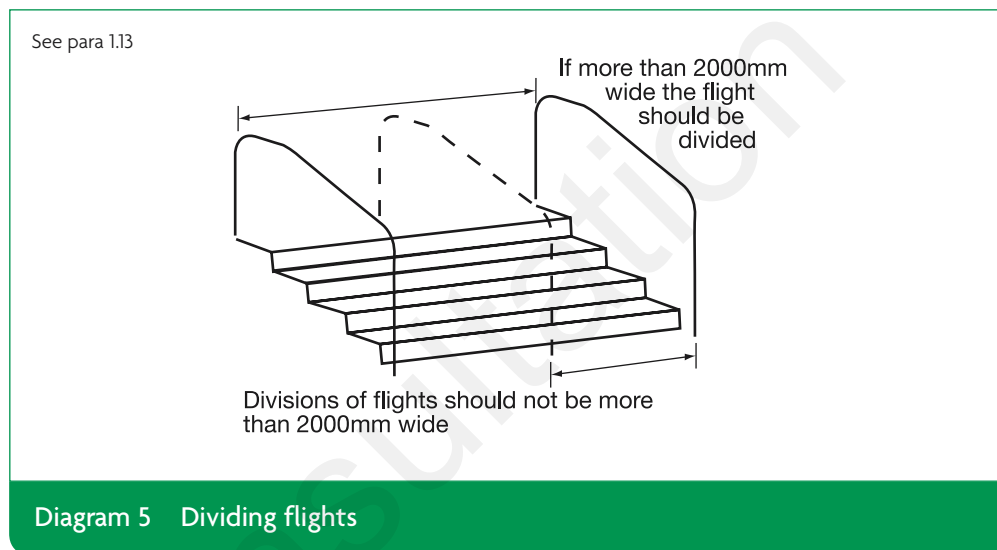
- b. For loft conversions where there is not enough space to achieve the height shown in Diagram 3, provide the reduced headroom shown in Diagram 4.



- c. For buildings other than dwellings, provide all escape routes with a minimum clear headroom of 2m, except in doorways.

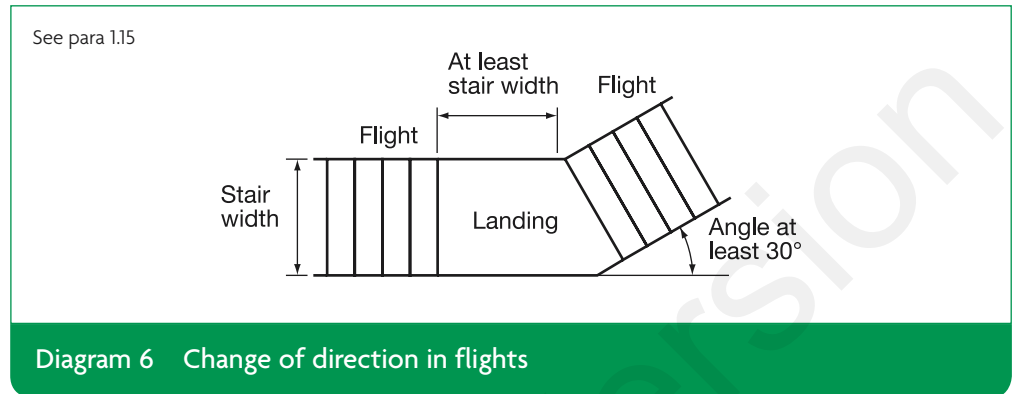
Width of flights of stairs

- 1.11 For stairs that form part of means of escape, refer to AD B, Fire safety, Volume 2 – Buildings other than dwellinghouses.
- 1.12 For stairs within the entrance storey of a dwelling, have flights with minimum clear widths of 900mm.
- 1.13 For flights of stairs in buildings other than dwellings:
- Have a minimum width between enclosing walls, strings or upstands of 1200mm.
 - Have a minimum width between handrails of 1000mm.
 - If the flight is more than 2000mm wide, divide it into flights a minimum of 1000mm wide, as shown in Diagram 5.



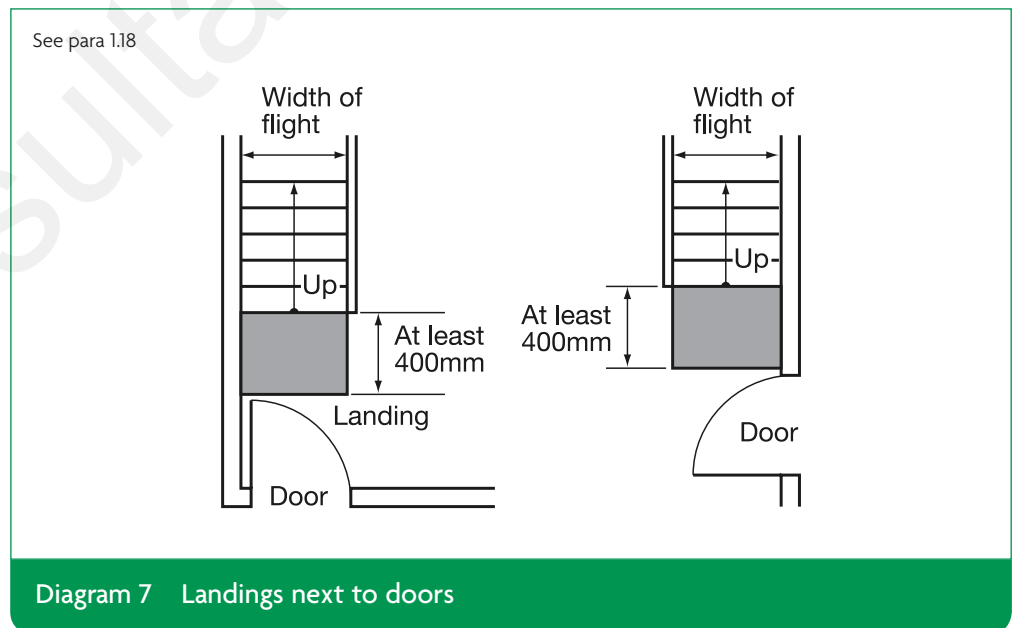
Length of flights of stairs

- 1.14 In buildings other than dwellings:
- Do not have single steps.
 - For flights between landings the number of risers should be a maximum of:
 - institutional and assembly stairs – 16 risers
 - utility stairs – 16 risers
 - easy access stairs – 12 risers.
- 1.15 If stairs have more than 36 risers in consecutive flights, make a minimum of one change of direction between flights, as shown in Diagram 6.



Landings for stairs

- 1.16 At the top and bottom of every flight, provide landings as shown in Diagram 6. The landing may include part of the floor of the building.
- 1.17 In all buildings, keep landings clear of permanent obstructions.
- 1.18 In dwellings:
- A door may swing across a landing at the bottom of a flight, but only as shown in Diagram 7.



- Doors to cupboards and ducts may open over a landing at the top of a flight, as shown in Diagram 8.

See para 1.18

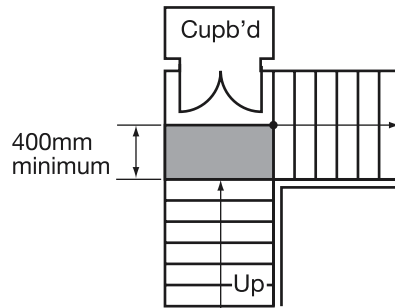


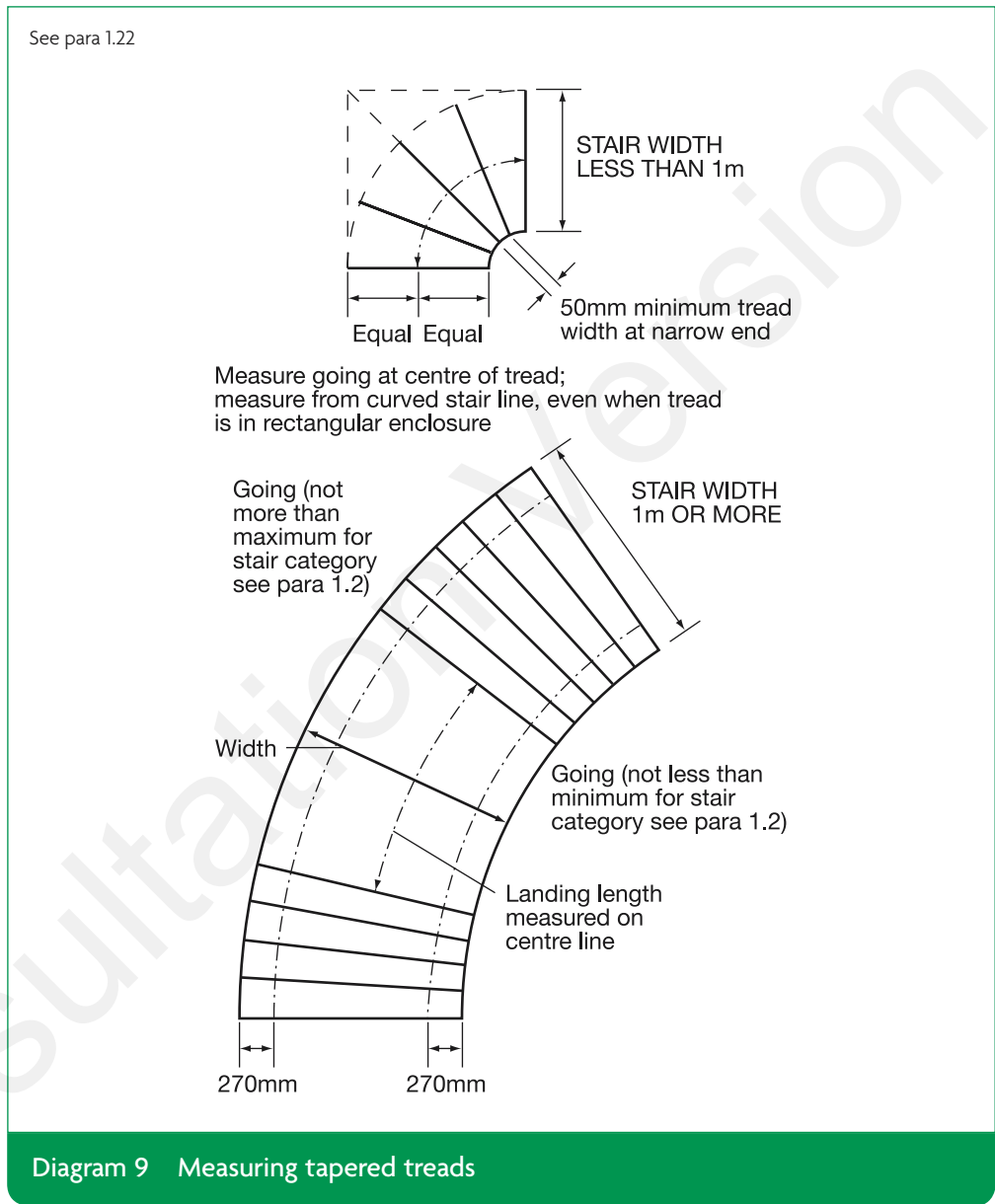
Diagram 8 Cupboard onto landing

- 1.19 In buildings other than dwellings:
- Ensure that the unobstructed length of each landing is a minimum of 1200mm.
 - Do not have doors that swing across landings.
- 1.20 For means of escape, refer to AD B, Fire safety, Volume 1 – Dwellinghouses, and Volume 2 – Buildings other than dwellinghouses.
- 1.21 Make landings level, *with the following exception*.
- If a landing is formed by the ground at the top or bottom of a flight:
- Ensure a maximum slope of 1:20.
 - Pave the ground or otherwise make it firm.

Special stairs

Tapered treads

- 1.22 For the **rise** and **going**, comply with paragraphs 1.1 and 1.2. For the **going** of **tapered treads**, use the measurements shown in Diagram 9.



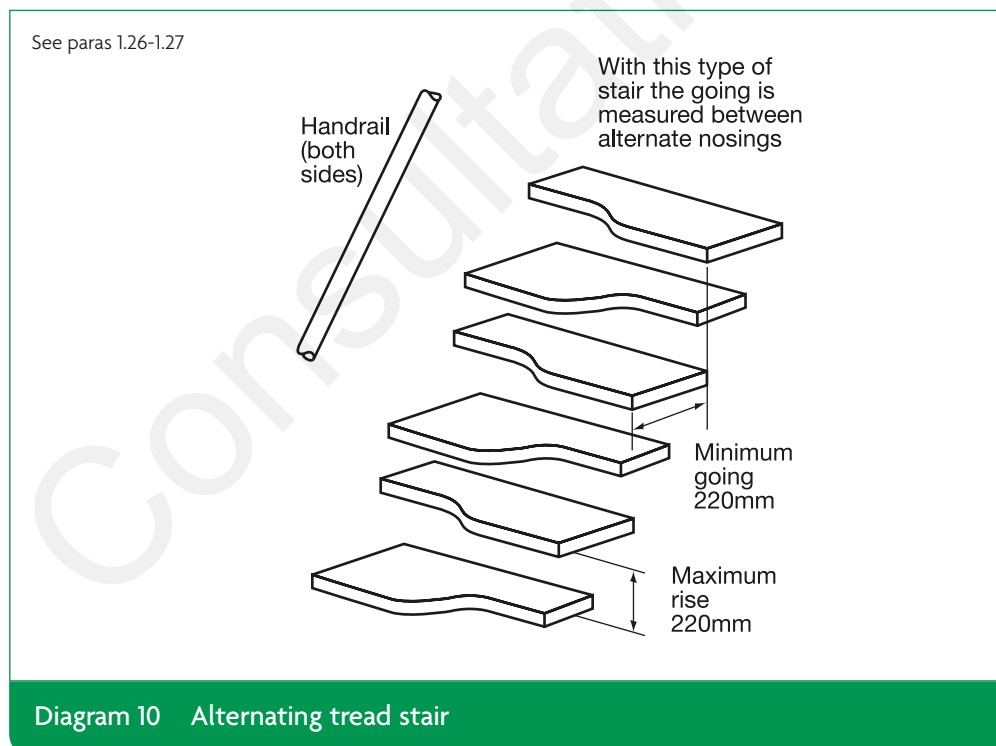
- 1.23 For consecutive **tapered treads**, use the same **going**.
- 1.24 If a stair consists of straight and **tapered treads**, ensure that the **going** of the **tapered treads** is not less than the **going** of the straight treads.

Spiral and helical stairs

- 1.25 Design stairs in accordance with **BS 5395-2**.

Alternating tread stairs

- 1.26 You may use **alternating tread stairs** – in one or more straight **flights** – only in a loft conversion, and only in the following situation:
- there is not enough space for a stair that satisfies paragraphs 1.1–1.21, and
 - the stair is for access to only one habitable room and, if desired, a bathroom and/or a WC (although this must not be the only WC in the dwelling).
- 1.27 Regarding the construction of an **alternating tread stair**:
- Comply with Diagram 10.



- b. Make steps uniform with parallel nosings.
- c. Have slip-resistant surfaces on treads.
- d. Ensure that the tread sizes over the wider part of the step are in line with the dimensions in Table 1.
- e. Comply with paragraph 1.6.
- f. Provide a minimum clear headroom of 2m.

Fixed ladders

- 1.28 You may use a fixed ladder – with fixed handrails on both sides – only for access in a loft conversion, and only in the following situation:
 - a. there is not enough space without alteration to the existing space for a stair that satisfies paragraphs 1.1–1.21, and
 - b. for access to only one habitable room.
- 1.29 Do not use retractable ladders as means of escape. Refer to AD B1 and AD B2, Fire safety.
- 1.30 In industrial buildings, design and construct stairs, ladders and walkways, as appropriate, in accordance with **BS 5395-3** or **BS 4211**.

Handrails for stairs

- 1.31 Within the entrance storey of a dwelling: if a flight comprises three or more risers, provide a suitable continuous handrail:
 - a. on each side of the flight, and
 - b. on each side of any intermediate landings.
- 1.32 In buildings other than dwellings and in buildings that contain flats and do not have passenger lifts: on the common stairs, if they comprise two or more risers, provide suitable continuous handrails, as shown in Diagram 11:
 - a. on each side of the flights, and
 - b. on each side of the landings.

See para 1.32

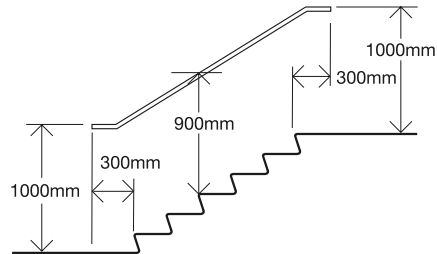
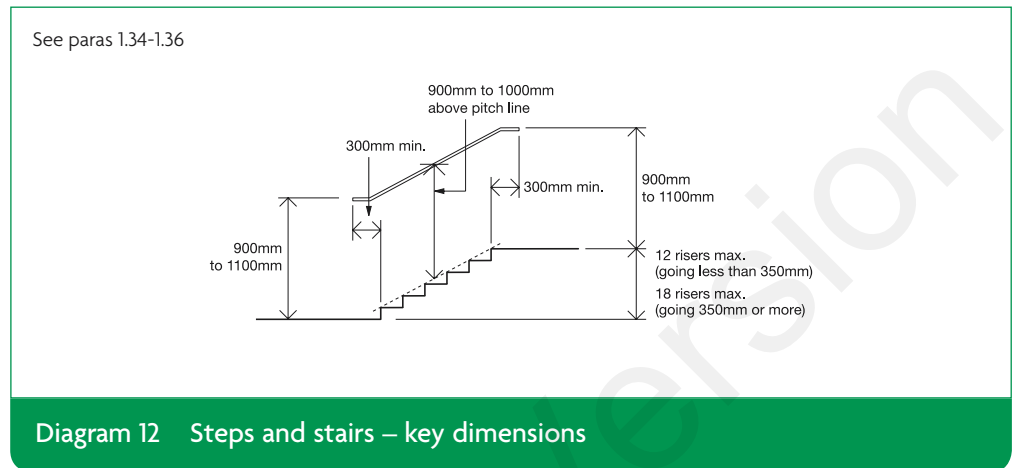


Diagram 11 Suitable handrails for common stairs in blocks of flats

- 1.33 In situations other than those described in paragraphs 1.31 and 1.32 above:
- If the stairs are less than 1m wide: provide a **handrail** on one or both sides.
 - If the stairs are 1m wider: provide a handrail on both sides.
- 1.34 In public buildings and in any building where stairs are intended for use by people with disabilities: provide **handrails** beside the two bottom steps.
- 1.35 In all buildings, design **handrails** as follows:
- Position the top of the **handrail** 900–1000mm from the **pitch** line or floor.
 - The **handrail** may form the top of a **guarding** if you can match the heights.
- 1.36 In buildings other than dwellings, design **handrails** as follows:
- Use the dimensions shown in Diagram 12.



- b. Where there is full-height structural **guarding**, if you provide a second (lower) **handrail**, ensure that the vertical height from the **pitch line** of the steps or the surface of the **ramp** to the top of the second (lower) **handrail** is 600mm.
- c. Use a continuous **handrail** along the **flights** and landings of a **ramped** or stepped **flight**.
- d. Ensure that **handrails** do not project into an access route.
- e. Ensure that the **handrail** contrasts visually with the background against which it is seen, without being highly reflective.
- f. Use a surface for the **handrail** that is slip-resistant and not cold to touch.
- g. Finish the end of the **handrail** in a way that reduces the risk of clothing being caught.
- h. Use the **handrail** profile shown in Diagram 13.

See para 1.36

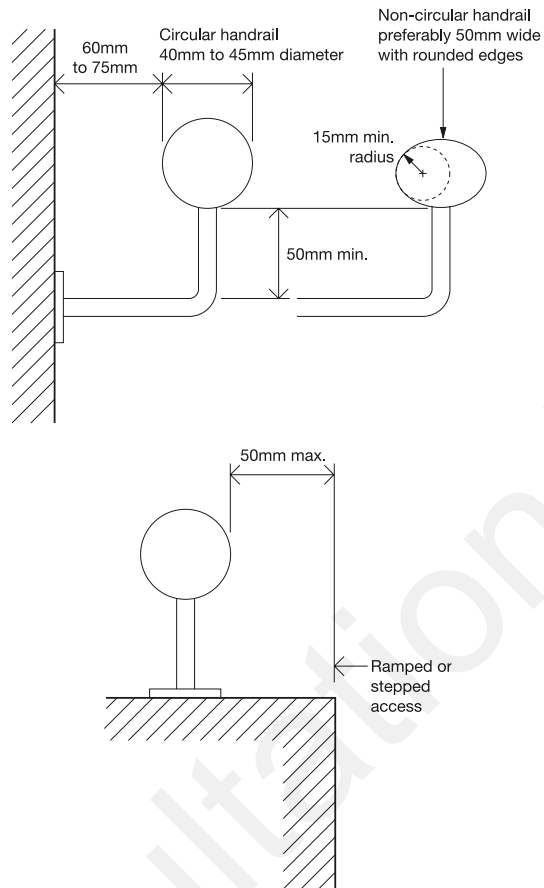


Diagram 13 Handrail design

Guarding of stairs

- 1.37 In dwellings, provide **guarding** at the sides of **flights** and landings when there is a drop of more than 600mm.
- 1.38 In buildings other than dwellings, provide **guarding** at the sides of **flights** and landings when there are two or more risers.
- 1.39 In a building that may be used by children under five years of age, construct the **guarding** to a **flight** of stairs to:
- prevent children being held fast by the **guarding**: ensure that a 100mm sphere cannot pass through any openings in the **guarding**, and
 - prevent children from readily being able to climb the **guarding**.
- 1.40 Design the **guarding** to be the height shown in Diagram 16.

Access for maintenance

- 1.41 Where people will use the stairs or **ladders** to access areas for maintenance:
- If access will be required a minimum of once per month: follow provisions such as those:
 - for private stairs in dwellings, or
 - for industrial stairs and **ladders**: in **BS 5395-3**.
 - If access will be required less frequently than once a month: it may be appropriate, for example, to use portable **ladders**. The Construction (Design and Management) Regulations 2007 give provisions for safe use of temporary means of access.

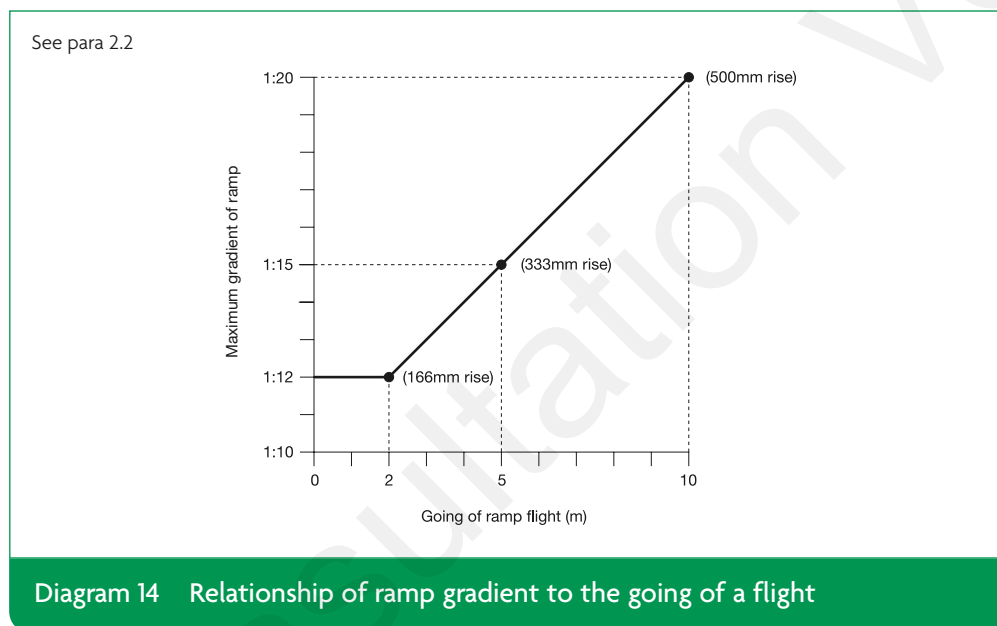
Ramps

Appearance of ramps

2.1 Ensure that ramps are readily apparent or clearly signposted.

Steepness of ramps

2.2 Ensure that the relationship between the gradient of a ramp and its going between landings is as shown in Diagram 14.



Construction of ramps

2.3 Select a ramp surface as follows:

a. Use a ramp surface that is:

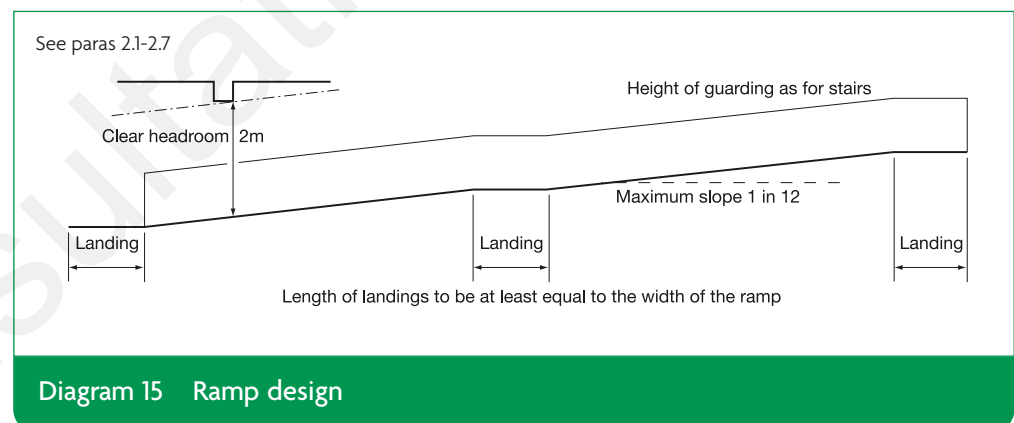
- slip resistant, especially when wet, and
- a colour that contrasts visually with that of the landings.

b. Ensure that the frictional characteristics of the ramp and landing surfaces are similar.

- 2.4 On the open side of any ramp or landing, in addition to any guarding, provide a kerb that:
- is a minimum of 100mm high, and
 - contrasts visually with the ramp or landing.
- 2.5 Where the change of level is:
- 300mm or more: in addition to the ramp, provide two or more clearly signposted steps
 - less than 300mm: provide a ramp instead of a single step.
- 2.6 If the soffit is less than 2.1m above floor level, protect the area beneath a ramp with either:
- guarding and low level cane detection, or
 - a barrier giving the same degree of protection.

Design of ramps

- 2.7 Design all ramps and landings in accordance with Diagram 15.



Width of ramps

- 2.8 Regarding the width of a ramp:
- For ramps that provide access for disabled people: ensure you have a minimum width between walls, upstands or kerbs of 1.5m.
 - For ramps that form a means of escape: see AD B2, Fire safety, Part B1, Section 5.

Obstruction of ramps

2.9 Keep ramps clear of permanent obstructions.

Handrails for ramps

2.10 In dwellings:

- a. For ramps that are less than 1m wide: provide a handrail on one or both sides.
- b. For ramps that are 1m or more wide: provide a handrail on both sides.
- c. For ramps that are 600mm or less in height: you do not need to provide handrails.

2.11 In buildings other than dwellings, provide a handrail on both sides of the ramp.

2.12 In dwellings:

- a. Position the top of the handrails at a height of 900–1000mm above the surface of the ramp.
- b. Choose handrails that give firm support and allow a firm grip.
- c. The handrails may form the top of the guarding if you can match the heights.

2.13 In buildings other than dwellings, design handrails for ramps to comply with paragraph 1.36.

Landings for ramps

2.14 For dwellings, provide landings for ramps, as described for stairs in paragraphs 1.16–1.21.

2.15 In buildings other than dwellings:

- a. At the foot and head of the ramp, provide landings which are:
 - a minimum of 1.2m long, and
 - clear of any door swings or other obstructions.
- b. Ensure that any intermediate landings are:
 - a minimum of 1.5m long, and
 - clear of any door swings or other obstructions.

- c. If either:
- a wheelchair user cannot see from one end of the ramp to the other, or
 - the ramp has three flights or more,
- then provide intermediate landings as passing places that are:
- a minimum of 1800mm wide, and
 - a minimum of 1800mm long.
- d. Make all landings level or with a maximum gradient of 1:60 along their length.

Guarding of ramps

- 2.16 Guard ramps and their landings at their sides in the same way as stairs (see paragraphs 1.38–1.40).

K2 Protection from falling

The requirement

This Approved Document deals with the following requirement from Part K of Schedule 1 to the Building Regulations 2010.

Requirements

Requirement

Protection from falling

- K2.** a) Any stairs, ramps, floors and balconies and any roof to which people have access, and
- b) any light well, basement area or similar sunken area connected to a building,

shall be provided with **barriers** where it is necessary to protect people in or about the building from falling.

Limits on application

Requirement K2(a) applies only to stairs and ramps which form part of the building.

NOTE: Your attention is drawn to the Workplace (Health, Safety and Welfare) Regulations 1992.

If building work complies with Building Regulations requirement K2, it prevents, in accordance with Section 23(3) of the Health and Safety at Work, etc. Act 1974, the serving of an improvement notice relating to **guarding** with regard to the requirements for protection from the risk of falling a distance likely to cause personal injury in Regulation 13 of the Workplace (Health, Safety and Welfare) Regulations 1992.

Guidance

Performance

In the Secretary of State's view, you can meet the requirements of K2 if, in order to reduce the risk to the safety of people in and around buildings, you:

- a. in dwellings: provide pedestrian **guarding** which is capable of preventing people from being injured by falling from a height of more than 600mm
- b. in buildings other than dwellings: provide pedestrian **guarding** which is capable of preventing people from falling more than the height of two risers (or 300mm, if not part of a stair).

The standard of provision for **guarding** needed to give an acceptable level of safety depends on the circumstances. For example, in a public building the standard of provision may need to be higher than in a dwelling, because people may be less familiar with the building and there may be more users.

For areas where access is required only for maintenance, greater care can be expected from people and therefore a lower standard of provision may be acceptable.

Protection from falling

Siting of pedestrian guarding

3.1 Provide **guarding**:

- a. where it is reasonably necessary for safety to guard the edges of any part of a floor (including the edge below an opening window), gallery, balcony, roof (including roof lights and other openings), any other place to which people have access, and any light well, basement or similar sunken area next to a building
- b. in vehicle parks.

You *do not* need to provide **guarding**:

- a. on **ramps** used only for vehicle access
- b. in places such as loading bays where it would obstruct normal use.

Design of guarding

3.2 Construct **guarding** as follows:

- a. You can use any wall, parapet, balustrade or similar obstruction as **guarding**.
- b. Ensure that **guarding** is, as a minimum, the height shown in Diagram 16.
- c. Ensure that **guarding** can resist, as a minimum, the horizontal force given in **PD 6688-1-1**.
- d. Where glazing is used in the **guarding**, refer to Section 5, Protection against impact with glazing, in this Approved Document.

For further guidance on the design of **barriers** and infill panels, refer to BS 6180.

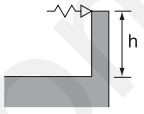
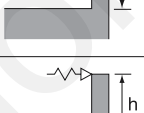
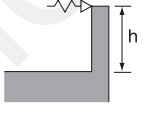
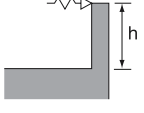
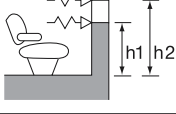
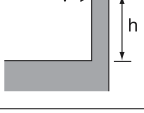
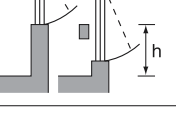
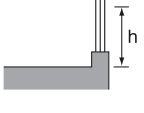
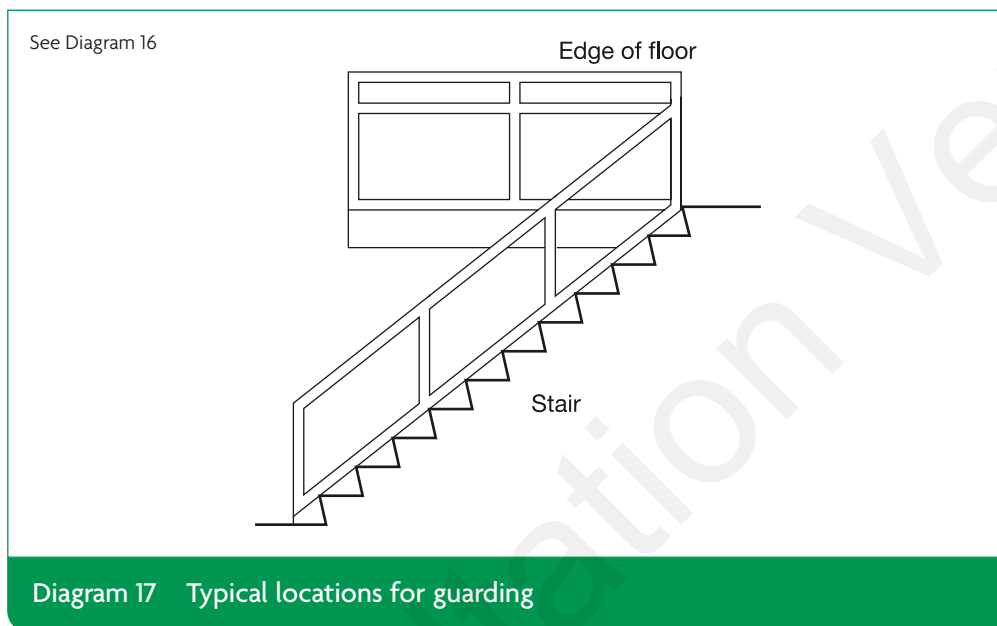
Building category and location		Height (h)	
Single family dwellings	Stairs, landings, ramps, edges of internal floors	900mm for all elements	
	External balconies and edges of roof	1100mm	
Factories and warehouses (light traffic)	Stairs, ramps	900mm	
	Landings and edges of floor	1100mm	
Residential, institutional, educational, office, and public buildings	All locations	900mm for flights otherwise 1100mm	
Assembly	530mm in front of fixed seating	800mm (h1)	
	All other locations	900mm for flights elsewhere 1100mm (h2)	
Retail	All locations	900mm for flights otherwise 1100mm	
Glazing in all buildings	At opening windows except roof windows in loft extensions, see Approved Document B1	800mm	
	At glazing to changes of level to provide containment (see Diagram 17)	Below 800mm	

Diagram 16 Guarding design

- 3.3 In a building that may be used by children under five years of age, construct the **guarding** to:
- prevent children being held fast by the **guarding**: ensure that a 100mm sphere cannot pass through any openings in the **guarding**, and
 - prevent children from readily being able to climb the **guarding**: avoid horizontal rails.

Guarding of areas used for maintenance

- 3.4 Where people will use the stairs or ladders to access areas for maintenance:
- If access will be required frequently (for example, a minimum of once per month): follow provisions such as those suggested for dwellings in this Approved Document (see Diagram 17).



- If access will be required less frequently than once a month: it may be appropriate to use temporary guarding or warning notices. The Construction (Design and Management) Regulations 2007 give provisions for such measures.
- 3.5 Use signs as specified in the Health and Safety (Safety Signs and Signals) Regulations 1996.

K3 Vehicle barriers and loading bays

The requirement

This Approved Document deals with the following requirement from Part K of Schedule 1 to the Building Regulations 2010.

Requirements

Requirement

Limits on application

Vehicle barriers and loading bays

- K3.** (1) Vehicle ramps and any levels in a building to which vehicles have access, shall be provided with **barriers** where it is necessary to protect people in or about the building.
- (2) Vehicle loading bays shall be constructed in such a way, or be provided with such features, as may be necessary to protect people in them from collision with vehicles.

Note: **Your attention is drawn to the Workplace (Health, Safety and Welfare) Regulations 1992.**

If building work complies with Building Regulations requirement K3, it prevents, in accordance with Section 23(3) of the Health and Safety at Work, etc. Act 1974, the serving of an improvement notice relating to the design of vehicle **barriers** and loading bays under Regulation 17 of the Workplace (Health, Safety and Welfare) Regulations 1992.

Guidance

Performance

In the Secretary of State's view, you can meet the requirements of K3 if, in order to reduce the risk to the safety of people in and about buildings, you:

- a. provide vehicle **barriers** which are capable of resisting or deflecting the impact of vehicles
- b. provide loading bays that have an adequate number of exits or refuges which enable people to avoid being struck or crushed by vehicles.

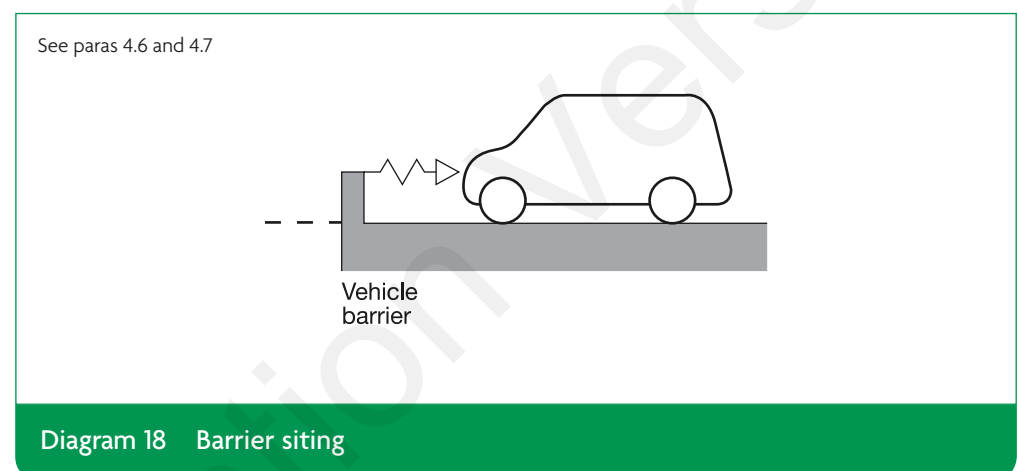
The standard of provision for **guarding** needed to give an acceptable level of safety depends on the circumstances. For example, in a public building the standard of provision may need to be higher than in a dwelling, because people may be less familiar with the building, and there may be more users.

For areas where access is required only for maintenance, greater care can be expected from people, and therefore a lower standard of provision may be acceptable.

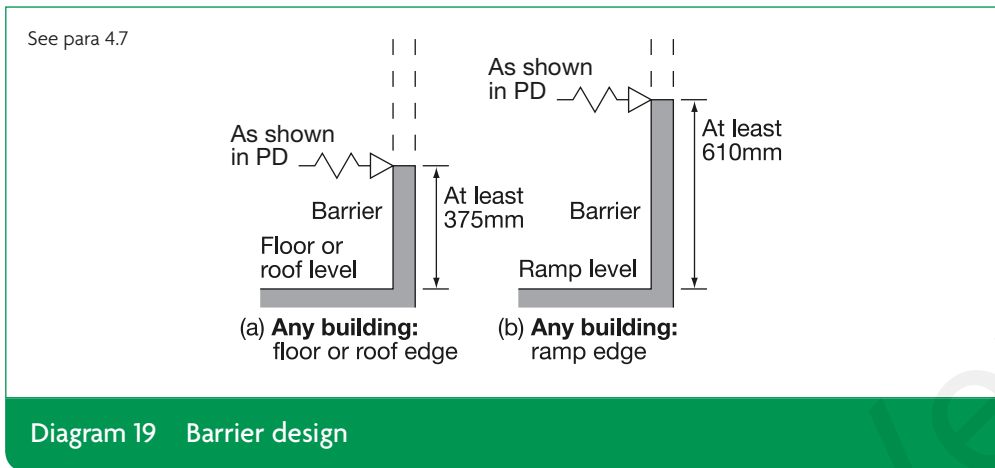
Vehicle barriers and loading bays

Vehicle barriers

- 4.6 If vehicles have access to a floor, roof or ramp which forms part of a building, provide barriers at any edges which are level with or above the floor or ground or any other route for vehicles (see Diagram 18).



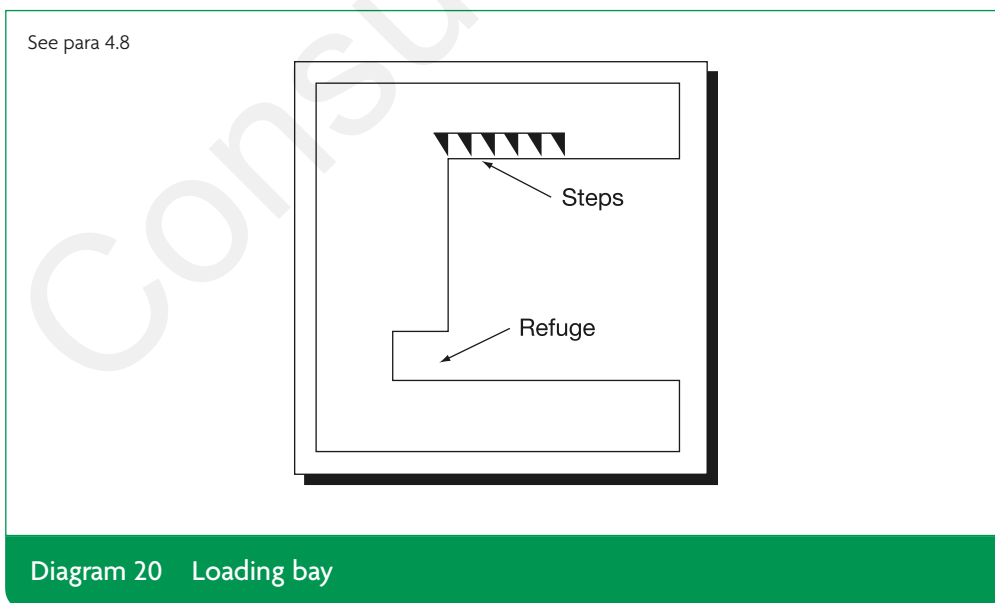
- 4.7 Design barriers as follows:
- You can use any wall, parapet, balustrade or similar obstacle as a barrier.
 - Construct barriers to be, as a minimum, the height shown in Diagram 19.



- c. Ensure that barriers can resist the forces set out in **PD 6688-1-1**.

Loading bays

- 4.8 Construct loading bays with exit points as follows:
- Provide loading bays with a minimum of one exit point from the lower level, preferably near the centre of the rear wall.
 - For wide loading bays (for three or more vehicles), provide a minimum of two exit points, one on each side, or provide a refuge where people can avoid the path of a vehicle (see Diagram 20).



K4 Protection against impact with glazing

The requirement

This Approved Document deals with the following requirement from Part K of Schedule 1 to the Building Regulations 2010.

Requirements

Requirement

Limits on application

Protection against impact

K4. Glazing, with which people are likely to come into contact whilst moving in or about the building shall:

- (a) if broken on impact, break in a way which is unlikely to cause injury; or
- (b) resist impact without breaking; or
- (c) be shielded or protected from impact.

NOTE: **Your attention is drawn to the following:**

Regulation 3 of the Building Regulations defines building work such that:

- a. glazing which is installed in a location where there was none previously as part of the erection, extension or material alteration of a building, other than an exempt building, is building work and is subject to requirement K4, and
- b. the installation of replacement windows or glazing (for example, as a repair) is not building work, but the supply of the windows or glazing may be subject to consumer protection legislation.

NOTE: Your attention is drawn to the Workplace (Health, Safety and Welfare) Regulations 1992

If building work complies with Building Regulations requirement K4, it prevents, in accordance with Section 23(3) of the Health and Safety at Work, etc. Act 1974, the serving of an improvement notice relating to the requirements for the prevention of personal injury covered by Regulation 14(1)(a) of the Workplace (Health, Safety and Welfare) Regulations 1992.

Guidance

Performance

In the Secretary of State's view, you can meet requirement K4 if you:

- a. adopt, in critical locations, measures to limit the risk of cutting and piercing injuries, or
- b. use glazing that is sufficiently robust to ensure that the risk of breakage is low, or
- c. take steps to limit the risk of contact with the glazing.

The most likely impacts leading to cutting and piercing injuries are with glazing in doors and door side panels, and at low level in walls and partitions. For doors and door side panels, the risk is at its greatest for glazing between floor and shoulder level, when near to door handles and push plates, especially when normal building movement causes doors to stick.

Hands, wrists and arms are particularly vulnerable.

An initial impact between waist and shoulder level may be followed by a fall through the glazing, resulting in additional injury to the face and body.

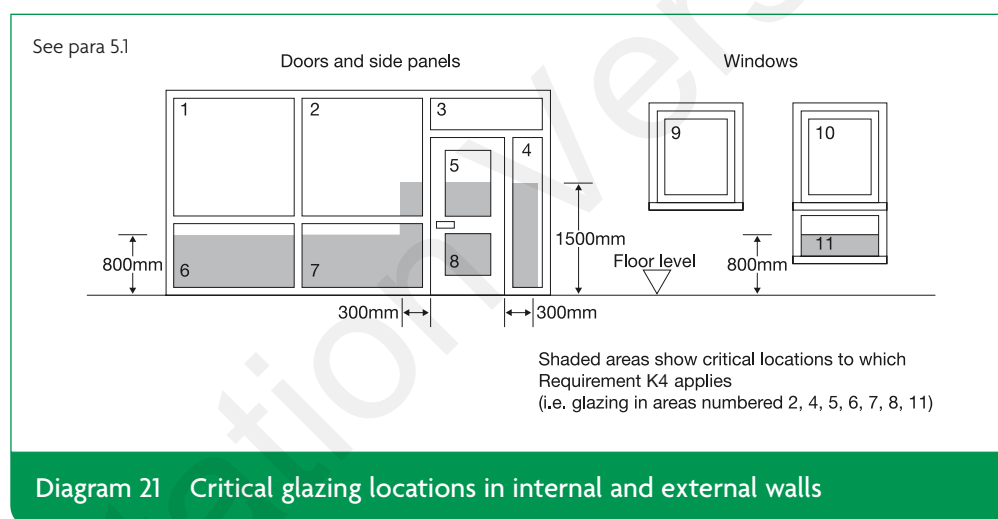
In walls and partitions, away from doors, the risks relate predominantly to glazing at low level. At that level, children are especially vulnerable.

Glazing in critical locations is considered reasonably safe if, should it break, any particles are relatively harmless.

Protection against impact with glazing

Glazing in critical locations

5.1 Diagram 21 shows critical locations in terms of safety.



5.2 In critical locations, comply with *one* of the following:

- Ensure that glazing, if it breaks, will break safely (see paragraph 5.3).
- Choose glazing that is either:
 - robust (see paragraphs 5.4) or
 - in small panes (see paragraphs 5.5 and 5.6).
- Permanently protect glazing (see paragraph 5.7).

Safe breakage (see paragraph 5.2)

- 5.3 Safe breakage is defined in BS 6206, clause 5.3. In an impact test, a breakage is safe if it creates one of the following:
- a small clear opening only, with detached particles no larger than the specified maximum size
 - disintegration, with small detached particles
 - broken glazing in separate pieces that are not sharp or pointed.

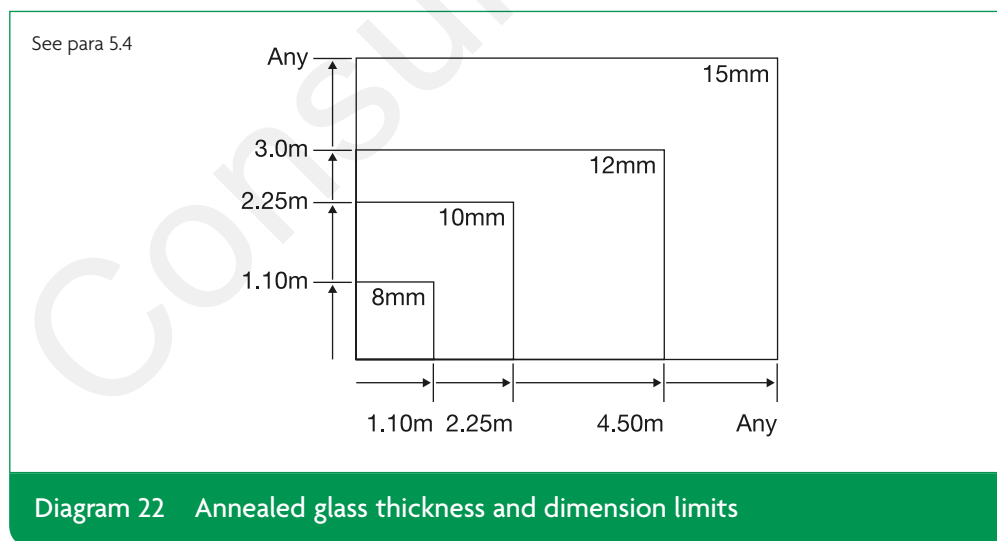
A glazing material would be suitable for a critical location, if:

- it satisfies the requirements of Class C of **BS 6206**, or
- it is installed in a door or in a door side panel and has a pane width exceeding 900mm, and it satisfies the requirements of Class B of **BS 6206**.

Robustness (see paragraph 5.2)

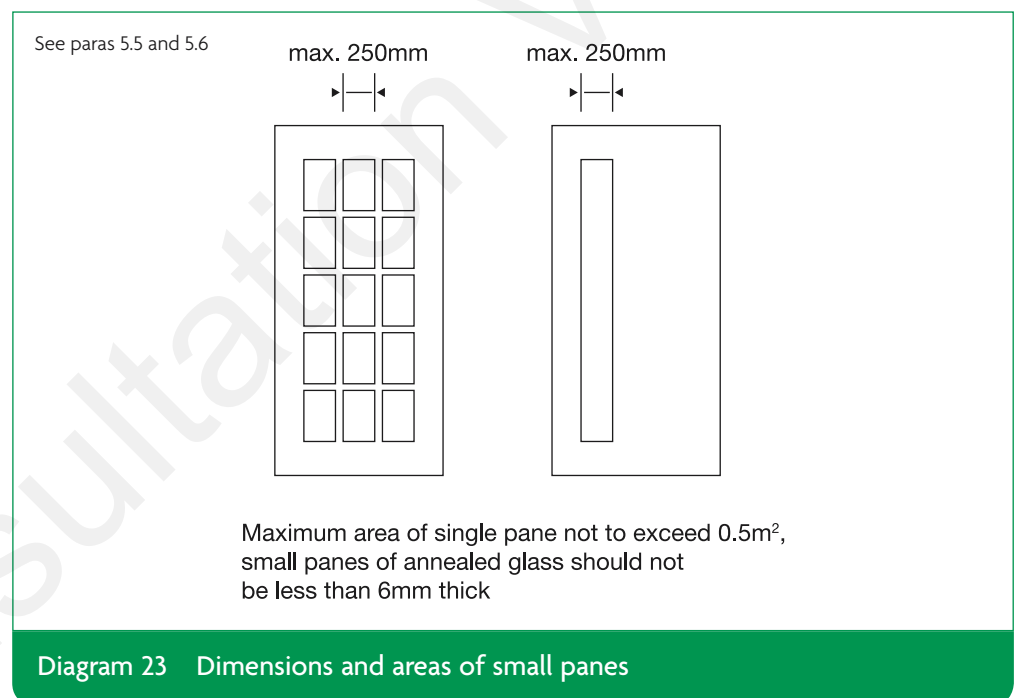
- 5.4 Some glazing materials such as annealed glass gain strength through thickness; others such as polycarbonates or glass blocks are inherently strong.

The maximum dimensions for annealed glass of different thicknesses for use in large areas forming fronts to shops, showrooms, offices, factories and public buildings are shown in Diagram 22 (see also paragraph 7.1).



Glazing in small panes (see paragraph 5.2)

- 5.5 In the context of this Approved Document, a 'small pane' is an isolated pane or one of a number of panes held in glazing bars, traditional leaded lights or copper lights (see Diagram 23).
- 5.6 Design small panes as follows:
- In a small annealed glass pane, use glass with a minimum 6mm nominal thickness *except in the situation described in b.*
 - In traditional leaded or copper lights, when fire resistance is not important, you may use 4mm glass.
 - Use the dimensions and areas shown in Diagram 23.



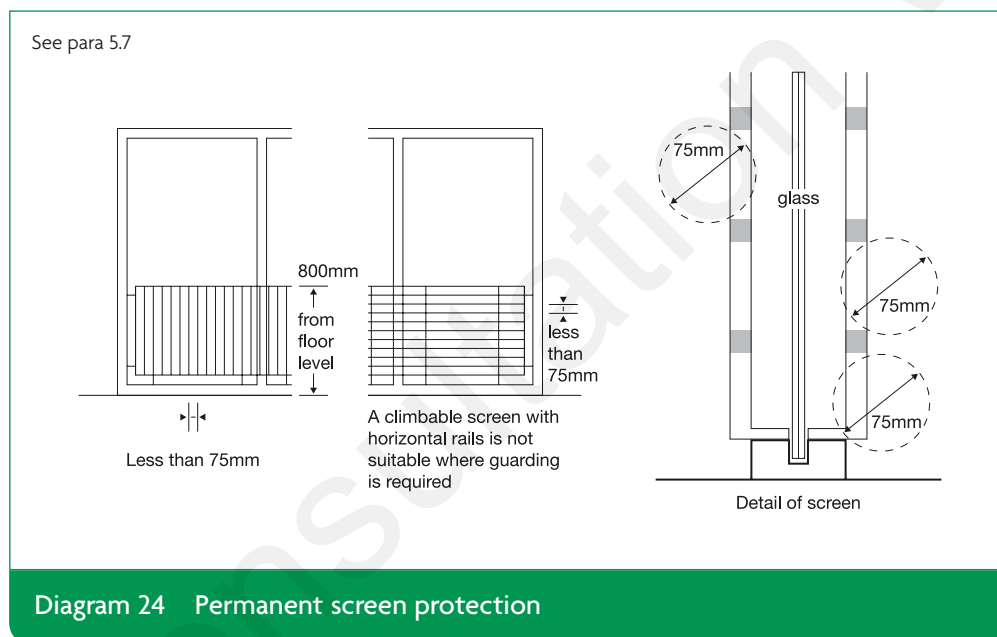
Permanent screen protection (see paragraph 5.2)

5.7 If glazing in a critical location is protected by a permanent screen then the glazing itself does not need to comply with requirement K4.

The permanent screen should:

- prevent a sphere of 75mm from coming into contact with the glazing
- be robust, and
- if it protects glazing installed to help prevent people from falling, be difficult to climb.

See Diagram 24.



K5(1) Protection from collision with open windows, etc.

The requirement

This Approved Document deals with the following requirement from Part K of Schedule 1 to the Building Regulations 2010.

Requirements

Requirement

Protection from collision with open windows, etc.

K5(1). Provision shall be made to prevent people moving in or about the building from colliding with open windows, skylights or ventilators.

Limits on application

Requirement K5(1) does not apply to dwellings.

Where necessary, refer to AD B, Fire safety, for guidance on clear dimensions of escape routes, and AD M, Access to and use of buildings, for guidance on hazards on access routes.

NOTE: Your attention is drawn to the Workplace (Health, Safety and Welfare) Regulations 1992.

If building work complies with Building Regulations requirement K5(1), it prevents, in accordance with Section 23(3) of the Health and Safety at Work, etc. Act 1974, the service of an improvement notice relating to the requirements for projecting windows, skylights and ventilators covered by Regulation 15(2) of the Workplace (Health, Safety and Welfare) Regulations 1992.

Guidance

Performance

In the Secretary of State's view, you can meet requirement K5(1) if windows, skylights and ventilators can be left open without danger of people colliding with them. This can be achieved by:

- a. installing windows, skylights and ventilators so that projecting parts cannot come into contact with people moving in and around the building, or
- b. installing features which guide people moving in or around the building away from any open window, skylight or ventilator.

In special cases, such as in spaces where access is required only for maintenance, greater care can be expected from people, and therefore a lower standard of provision may be acceptable.

Protection from collision with open windows, etc.

Projecting parts

- 6.1 Where parts of windows, skylights and ventilators project inside or outside a building, indicate this as shown in Diagram 25 or Diagram 26 (but see also paragraph 6.2).

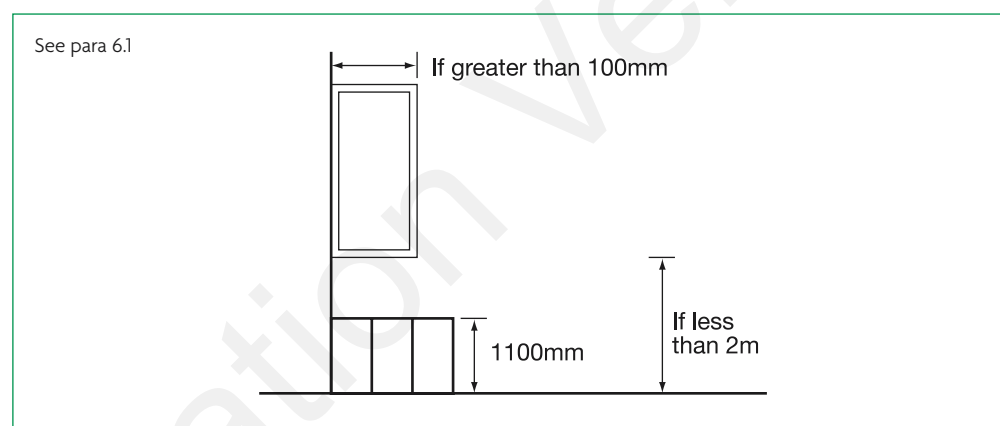


Diagram 25 Marking by a barrier

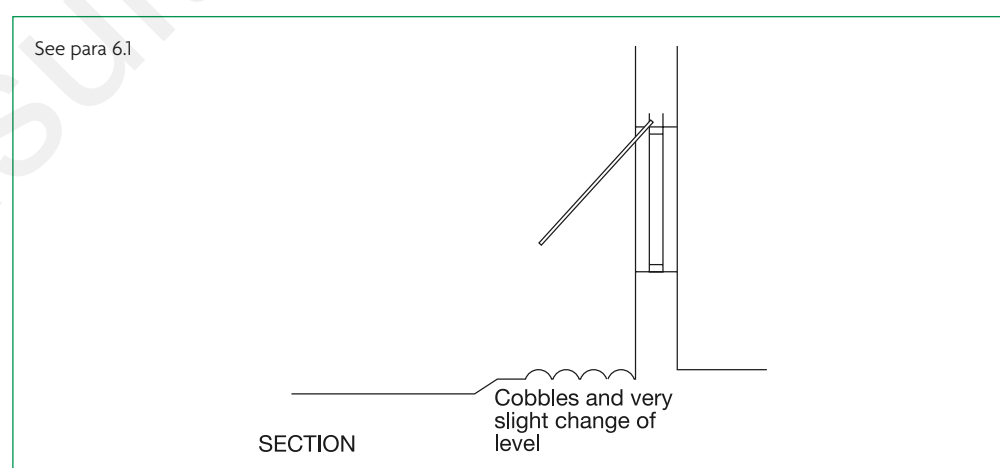


Diagram 26 Marking by a surface

Spaces used only for maintenance

- 6.2 In spaces which are:
- a. used infrequently, and
 - b. used only for maintenance
- you can, for example, mark the projecting part clearly to make it easy to see.

K5(2) Manifestation of glazing

The requirement

This Approved Document deals with the following requirement from Part K of Schedule 1 to the Building Regulations 2010.

Requirements

Requirement

Manifestation of glazing

K5(2). Transparent glazing, with which people are likely to come into contact while moving in or about the building, shall incorporate features which make it apparent.

Limits on application

Requirement K5(2) does not apply to dwellings.

NOTE: **Your attention is drawn to the following:**

Regulation 3 of the Building Regulations defines building work such that:

- a. glazing which is installed in a location where there was none previously as part of the erection, extension or material alteration of a building, other than an exempt building, is building work and is subject to requirement K5(2), and
- b. the installation of replacement windows or glazing (for example, as a repair) is not building work, but the supply of the windows or glazing may be subject to consumer protection legislation.

NOTE: **Your attention is drawn to the Workplace (Health, Safety and Welfare) Regulations 1992.**

If building work complies with Building Regulations requirement K5(2), it prevents, in accordance with Section 23(3) of the Health and Safety at Work, etc. Act 1974, the serving of an improvement notice relating to the requirements for marking windows, transparent or translucent doors, gates and walls covered by Regulation 14(1)(b) of the Workplace (Health, Safety and Welfare) Regulations 1992.

Guidance

Performance

In the Secretary of State's view, you can meet requirement K5(2) by including, in critical locations, permanent means of indicating the presence of large uninterrupted areas of transparent glazing.

You may also meet requirement K5(2) if the glazing is sufficiently robust to ensure that the risk of breakage is low, or if steps are taken to limit the risk of contact with the glazing.

Manifestation of glazing

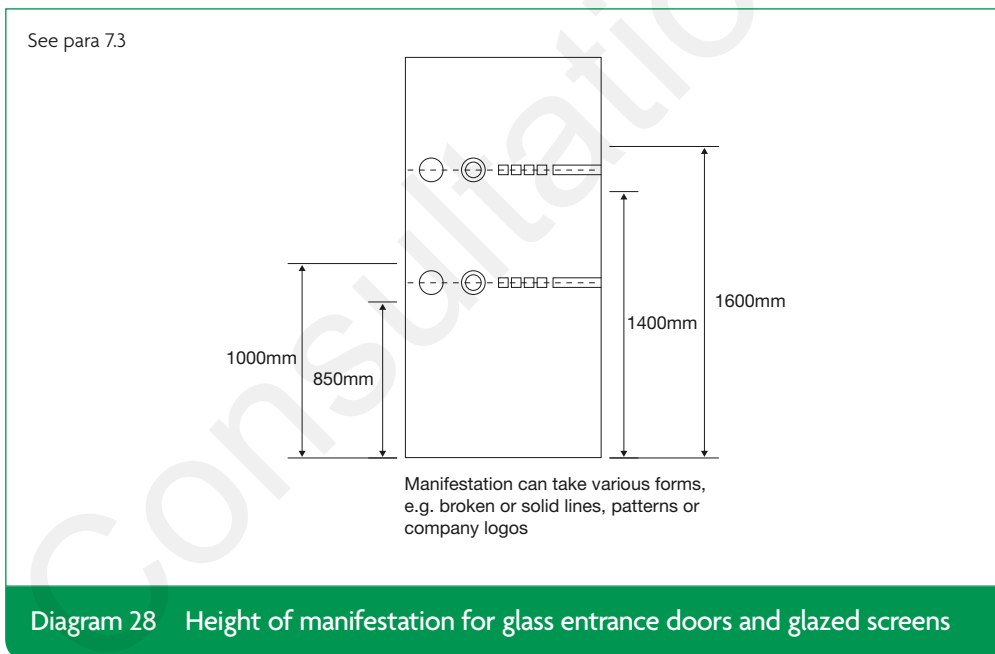
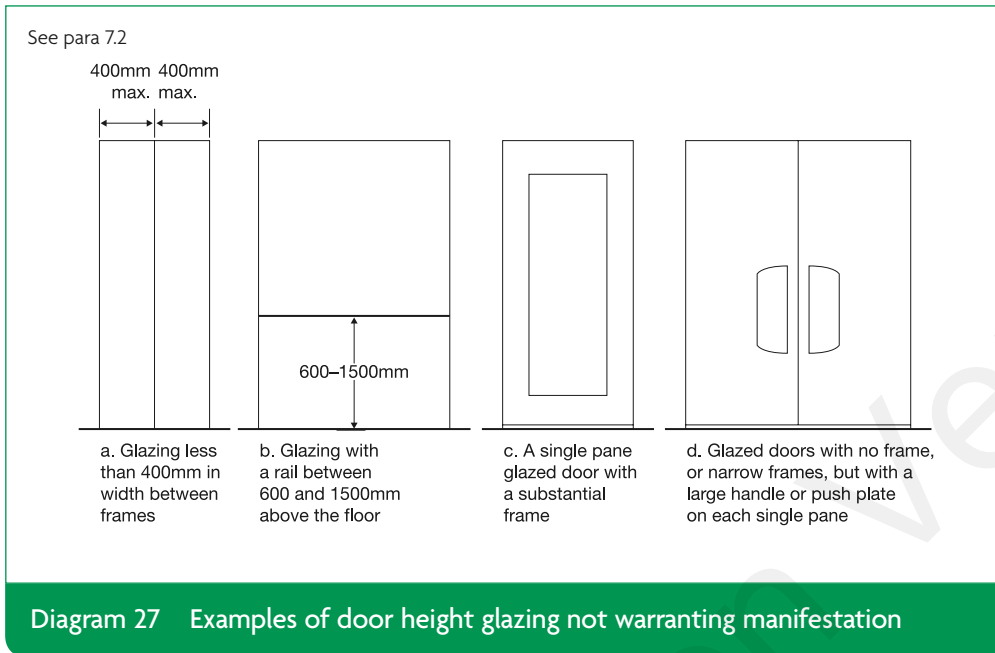
Critical locations

- 7.1 Critical locations include large uninterrupted areas of transparent glazing which form, or are part of, the internal or external walls and doors of shops, showrooms, offices, factories, public or other non-domestic buildings.

The risk of collision is greatest when two parts of the building, or the building and its immediate surroundings, are at the same level but separated by transparent glazing and people may think they can walk from one part to the other.

Permanent methods to indicate glazing, and alternative methods

- 7.2 In critical locations where people moving in or around a building might not see the glazing and can collide with it, either:
- use permanent manifestation to make glazing apparent (see paragraph 7.3), or
 - use alternative indications of glazing, such as mullions, transoms, door framing or large pull or push handles (see Diagram 27).
- 7.3 For glass entrance doors and glazed screens:
- At two levels, as shown in Diagram 28, provide manifestation which:
 - contrasts with the background seen through the glass, both from inside and outside, in all lighting conditions, and
 - is in the form of a logo or sign, a minimum of 150mm high (repeated if on a glazed screen), or a decorative feature such as broken lines or continuous bands, a minimum of 50mm high.



- b. Where glazed entrance doors are beside or part of a glazed screen, clearly mark them with a high-contrast strip at the top and on both sides.
- c. Where glass entrance doors may be held open, protect them with guarding to prevent people colliding with the leading edge.

K5(3) Safe opening and closing of windows, etc.

The requirement

This Approved Document deals with the following requirement from Part K5(3) of Schedule 1 to the Building Regulations 2010.

Requirements	
<i>Requirement</i>	<i>Limits on application</i>
<p>Safe opening and closing of windows, etc.</p> <p>K5(3). Windows, skylights and ventilators which can be opened by people in or about the building shall be so constructed or equipped that they may be opened, closed or adjusted safely.</p>	<p>Requirement K5(3) does not apply to dwellings.</p>

NOTE: Your attention is drawn to the Workplace (Health, Safety and Welfare) Regulations 1992

If building work complies with Building Regulations requirement K5(3), it prevents, in accordance with Section 23(3) of the Health and Safety at Work, etc. Act 1974, the serving of an improvement notice relating to the requirements for opening, closing or adjusting windows, skylights and ventilators in Regulation 15(1) of the Workplace (Health, Safety and Welfare) Regulations 1992.

Guidance

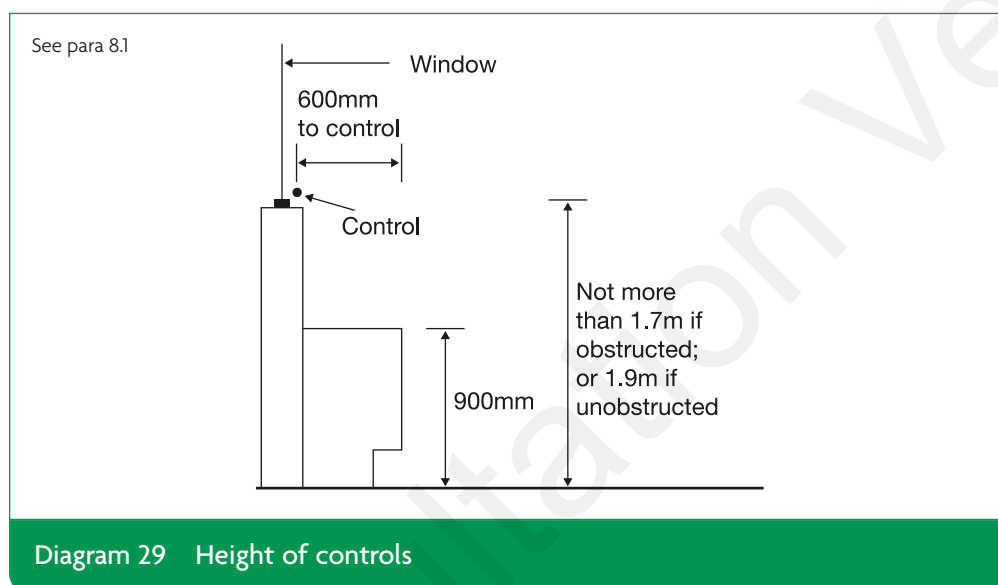
Performance

In the Secretary of State's view, you can meet requirement K5(3) if people can safely operate windows, skylights and ventilators that open.

Safe opening and closing of windows, etc.

Location of controls

- 8.1 Regarding the controls to operate windows, skylights and ventilators, either:
- position controls as shown in Diagram 29, or



- if you cannot place controls within safe reach of a permanent stable surface, provide a safe manual or electrical means of remote operation.

Prevention of falls

- 8.2 Where a person may fall through a window above ground floor level, provide suitable opening limiters or **guarding**.

K5(4) Safe access for cleaning windows, etc.

The requirement

This Approved Document deals with the following requirement from Part K5(4) of Schedule 1 to the Building Regulations 2010.

Requirements

Requirement

Safe access for cleaning windows etc.

K5(4). Provision shall be made for any windows, skylights, or any transparent or translucent walls, ceilings or roofs to be safely accessible for cleaning.

Limits on application

Requirement K5(4) does not apply to:

- (a) dwellings, or
- (b) any transparent or translucent elements whose surfaces are not intended to be cleaned.

NOTE: Your attention is drawn to the Workplace (Health, Safety and Welfare) Regulations 1992.

If building work complies with Building Regulations requirement K5(4), it prevents, in accordance with Section 23(3) of the Health and Safety at Work, etc. Act 1974, the serving of an improvement notice relating to the requirements for cleaning windows and skylights, etc. in Regulation 16 of the Workplace (Health, Safety and Welfare) Regulations 1992.

Guidance

Performance

In the Secretary of State's view, you can meet requirement K5(4) if, where a person may fall more than 2m from a window, you provide safe means of access for cleaning both sides of the glass. This Approved Document sets out some ways of complying with the requirement.

Safe access for cleaning windows, etc.

Safe access methods

- 9.1 Where a person standing on the ground, a floor or other permanent stable surface cannot safely clean a glazed surface, use, for example, one of the following methods:
- Provide windows of a size and design that allow people to clean the outside safely from inside the building (see Diagram 30).

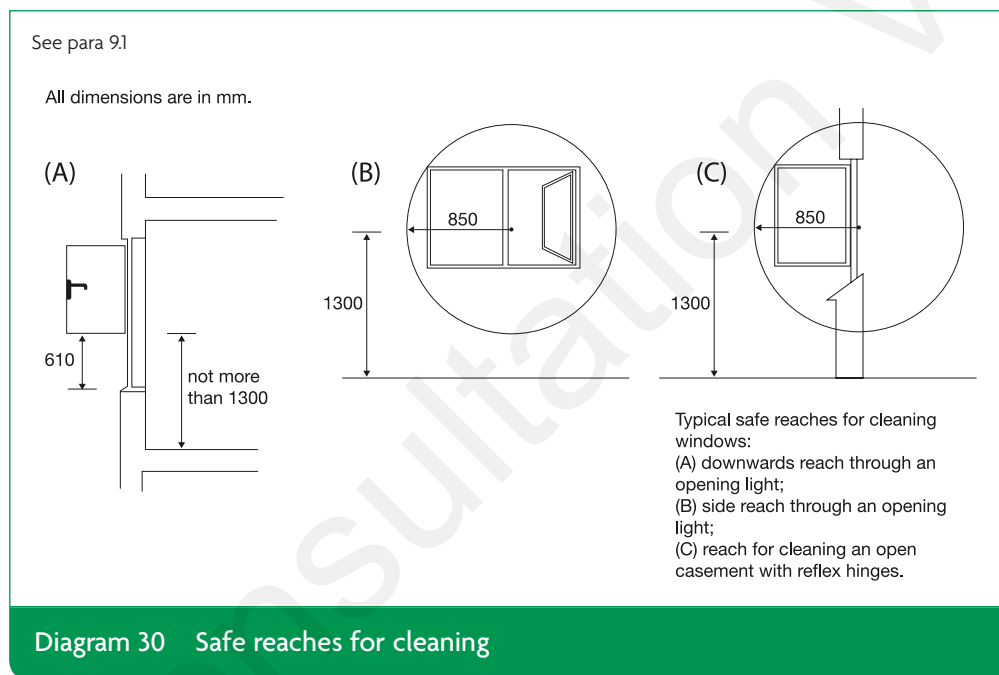
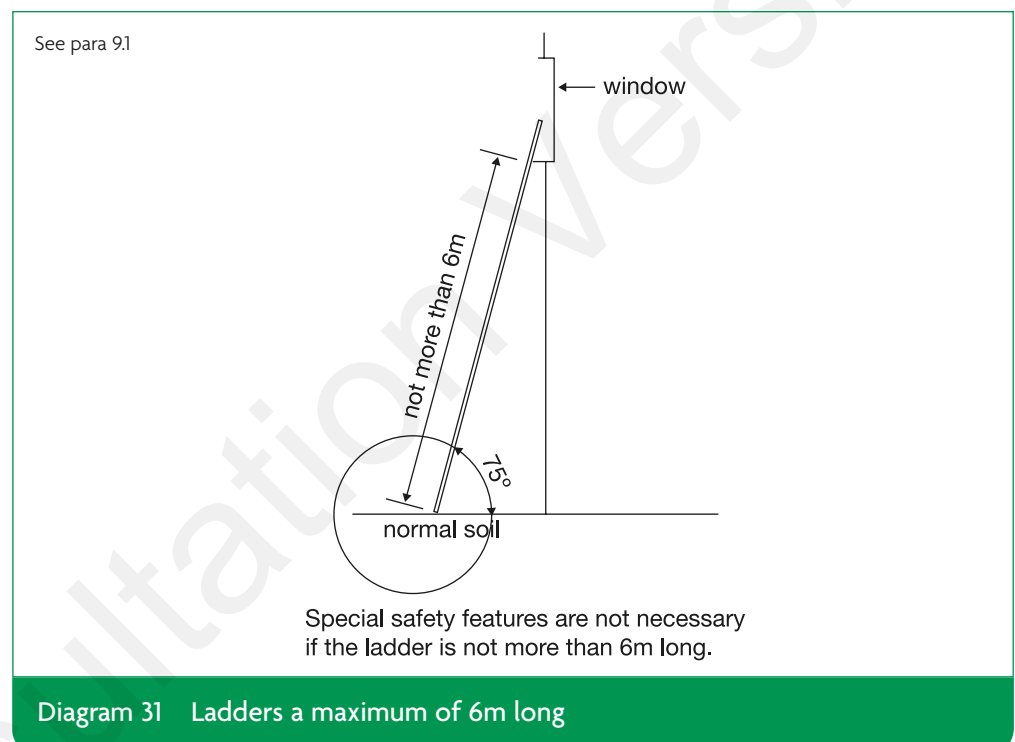


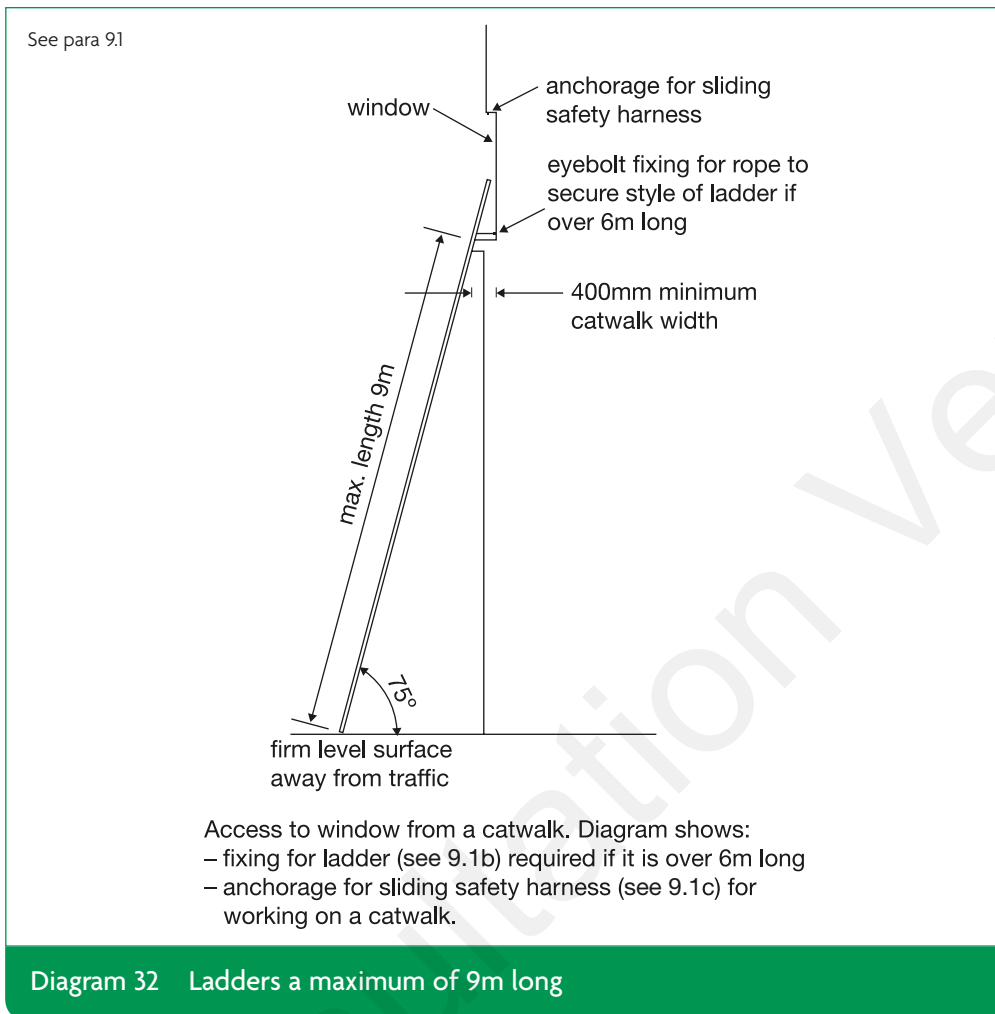
Diagram 30 Safe reaches for cleaning

If windows reverse for cleaning, fit a mechanism to hold the window in the reversed position. For additional guidance, see BS 8213-1.

b. Provide ladders:

- up to 6m long, as shown in Diagram 31, or
- between 6m and 9m long, with safety features, as shown in Diagram 32.





- Provide access equipment such as suspended cradles or travelling ladders, with attachments for safety harnesses (see Diagram 32).
- Provide suitable anchorage points for safety harnesses (see Diagram 32) or abseiling hooks.
- If the methods described in a–d are not possible, provide space for scaffold towers from which glazed surfaces can be cleaned.

K6 Protection against impact from and trapping by doors

The requirement

This Approved Document deals with the following requirement from Part K of Schedule 1 to the Building Regulations 2010.

Requirements	
<i>Requirement</i>	<i>Limits on application</i>
Protection against impact from and trapping by doors	
<p>K6. (1) Provision shall be made to prevent any door or gate:</p> <p>(a) which slides or opens upwards, from falling onto any person; and</p> <p>(b) which is powered, from trapping any person.</p> <p>(2) Provision shall be made for powered doors and gates to be opened in the event of a power failure.</p> <p>(3) Provision shall be made to ensure a clear view of the space on either side of a swing door or gate.</p>	<p>Requirement K6 does not apply to:</p> <p>(a) dwellings, or</p> <p>(b) any door or gate which is part of a lift.</p>

Where necessary, refer to AD B2, Fire safety (Part B1, Means of escape, has additional guidance for doors on escape routes) and AD M, Access to and use of buildings (Part M1, Access and use, has additional guidance on the design of internal and external doors).

NOTE: Your attention is drawn to the Workplace (Health, Safety and Welfare) Regulations 1992

If building work complies with Building Regulations requirement K6, it prevents, in accordance with Section 23(3) of the Health and Safety at Work, etc. Act 1974, the serving of an improvement notice relating to the requirements for doors and gates in Regulation 18 of the Workplace (Health, Safety and Welfare) Regulations 1992.

Guidance

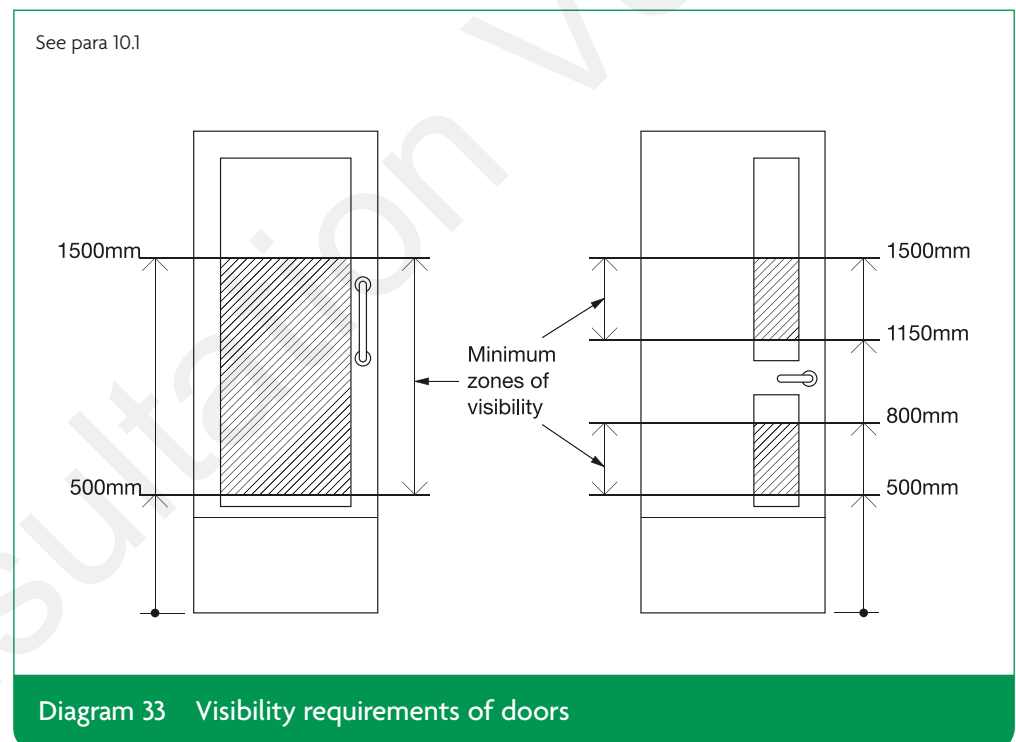
Performance

In the Secretary of State's view, you can meet requirement K6 if you take measures to prevent the opening and closing of doors and gates presenting a safety hazard. This Approved Document sets out some ways of complying with the requirement for suitable construction of doors and gates.

Protection against impact from and trapping by doors

Safety features

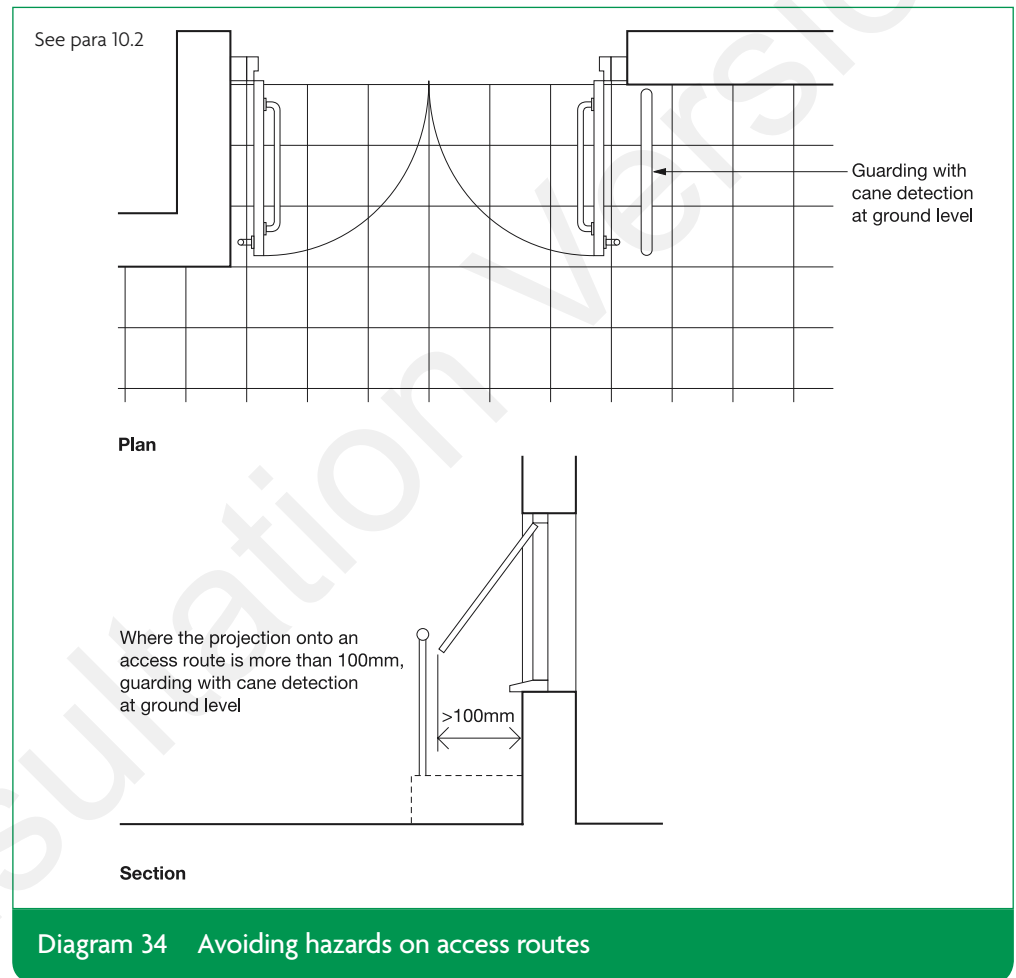
- 10.1 You can, for example, construct doors and gates as follows:
- In door leaves and side panels wider than 450mm, include vision panels towards the leading edge of the door to provide, as a minimum, the zone or zones of visibility shown in Diagram 33.



- b. For sliding doors and gates, provide:
- a stop or other effective means to prevent them coming off the end of the track
 - a retaining rail to prevent doors and gates falling if the suspension system fails or the rollers leave the track.
- c. On upward-opening doors and gates, fit a device to stop them falling in a way that may cause injury.
- d. For power-operated doors and gates, provide:
- safety features (such as a pressure-sensitive door edge which operates the power switch) to prevent injury to people who are struck or trapped
 - a readily identifiable and accessible stop switch
 - the ability for manual or automatic opening if there is a power failure, when necessary for health or safety.

Hazards on access routes

- 10.2 If, during normal use, windows, doors (excluding fire escape doors) or other features swing out by more than 100mm towards an access route, protect them as shown in Diagram 34.



Appendix A: British Standards

For compliance

BS 4211 Specification for permanently fixed ladders. (2005 + AMD A1, Corrigenda C1, C2)

BS 5395 Stairs, ladders and walkways.

BS 5395-2 Code of practice for the design of helical and spiral stairs. (1984 + AMD 6076, Corrigenda July 2008, C2, C3)

BS 5395-3 Code of practice for the design of industrial type stairs, permanent ladders and walkways. (1985 + AMD 14247)

BS 6206 Specification for impact performance requirements for flat safety glass and safety plastics for use in buildings. (1981 + AMDs 4580, 5189, 7589, 8156, 8693)

PD 6688-1-1 Recommendations for the design of structures to BS EN 1991-1-1. (2011)

For further reading

BS 585 Wood stairs.

BS 585-1 Specification for stairs with closed risers for domestic use, including straight and winder flights and quarter and half landings. (1989 + AMD 6510)

BS 6180 Barriers in and about buildings. Code of practice. (2011)

BS 8213 Windows, doors and rooflights.

BS 8213-1 Design for safety in use and during cleaning of windows, including door-height windows and roof windows. Code of practice. (2004)