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Building Regulations (Northern Ireland) 2011

Proposed Guidance Edition

of

Technical Booklet H

Stairs, ramps, guarding and protection from impact (draft for consultation)

July 2010

Note

1. **Proposed new text is marked in red.**

2. **Existing text to be deleted is struck through.**

3. **Page numbers in the Contents have not been inserted at this stage.**

Contents

Introduction

The Technical Booklets

This Technical Booklet is one of a series that has been prepared by the Department of Finance and Personnel for the purpose of providing practical guidance with respect to the technical requirements of the Building Regulations (Northern Ireland) 2011 (“the Building Regulations”).

Technical Booklets are intended to provide guidance for some of the more common building situations. However, there may well be alternative ways of meeting the requirements of the Building Regulations. There is no obligation to follow the methods or comply with the standards set out in this Technical Booklet if you perfer to meet the requirements in some other way.

Other requirements

The guidance contained in this Technical Booklet relates only to the requirements of regulation H3, H4, H5, H6 and H7. The work will also have to comply with all other requirements of the relevant Building Regulations.

Diagrams

The diagrams in this Technical Booklet supplement the text. They do not show all the details of construction and are not intended to illustrate compliance with any other requirement of the Building Regulations. They are not necessarily to scale and should not be used as working details.

British Standards and European Technical Specifications

The Building Regulations are made for the following specific purposes, securing the health, safety, welfare and convenience of people, furthering the conservation of fuel and power, furthering the protection and enhancement of the environment and promoting sustainable development. Standards and technical approvals are relevant guidance to the extent that they relate to these purposes. 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.

In this introduction and throughout this Technical Booklet any reference to a British Standard shall be construed as a reference to–

(a) a British Standard or British Standard Code of Practice;

(b) a harmonised standard or other relevant standard of a national standards body of any Member State of the European Economic Area;

(c) an international standard recognised for use in any Member State of the European Economic Area;

(d) any appropriate, traditional procedure of manufacture of a Member State of the European Economic Area which has a technical description sufficiently detailed to permit an assessment of the goods or materials for the use specified; or

(e) a European Technical Approval issued in accordance with the Construction Products Directive,

provided that the proposed standard, code of practice, specification, technical description or European Technical Approval provides, in use, equivalent levels of safety, suitability and fitness for purpose as that provided by the British Standard.

The Department intends from time to time to review the guidance in its Technical Booklets to reflect emerging European harmonised standards. Where a national standard is to be replaced by a European harmonised standard, there will be a co-existence period during which either standard may be referred to. At the end of the co-existence period the national standard will be withdrawn.

Products conforming with a European Council Directive

Any product designed and manufactured to comply with the requirements of a European Council Directive does not have to comply with any other standard or part of a standard, whether British, International or other, which relates to the same characteristic or specific purpose as the EC Directive.

CE marked construction products

Any construction product (within the meaning of the Construction Products Directive) which bears a CE marking shall be treated as if it satisfied the requirements of any appropriate British Board of Agrément Certificate, British Standard or British Standard Code of Practice relating to such a product, where the CE marking relates to the same characteristic or specific purpose as the Certificate, Standard or Code of Practice.

Named standards

Where this Technical Booklet makes reference to a named standard, the relevant version of the standard is the one listed in the Appendix. However, if this version has been replaced or updated by the issuing standards body, the new version may be used as a source of guidance provided that it continues to address the relevant requirements of the Building Regulations.

References

~~Any reference in this Technical Booklet to a publication shall, unless otherwise stated, be construed as a reference to the edition quoted, together with any amendments, supplements or addenda thereto current at 30 June 2006.~~

Materials and workmanship

Any work to which a requirement of the Building Regulations applies must, in accordance with Part B of the Building Regulations, be carried out with suitable materials and in a workmanlike manner. ~~You can comply with the requirements of Part B by following an appropriate British Standard or you may demonstrate that you have complied with those requirements by other suitable means, such as an acceptable British Board of Agrément Certificate, Quality Assurance Scheme, Independent Certification Scheme or Accredited Laboratory Test Certificate.~~

You may show that you have complied with the requirements of Part B (Materials and workmanship) by the appropriate use of –

(a) a product bearing CE marking in accordance with the Construction Products Directive (89/106/EEC)[1] as amended by the CE Marking Directive (93/68/EC)[2], the Low Voltage Directive (2006/95/EC)[3] and the EMC Directive (2004/108/EC)[4];

(b) a product complying with an appropriate technical specification (as defined in those Directives mentioned above), a British Standard, or an alternative national technical specification of a Member State of the European Union or Turkey[5], or of another State signatory to the Agreement on the European Economic Area (EEA) that provides an equivalent level of safety and protection, or

(c) a product covered by a national or European certificate issued by a European Technical Approval Issuing body, provided the conditions of use are in accordance with the terms of the certificate.

You will find further guidance in Technical Booklet B (Materials and workmanship.)

Testing of materials and construction

Where for the purposes of this Technical Booklet testing is carried out it shall be carried out by an appropriate organisation offering suitable and satisfactory evidence of technical and professional competence and independence. This condition shall be satisfied where the testing organisation is accredited in a Member State of the European Economic Area in accordance with the relevant parts of the EN 45000 series of standards for the tests carried out.

1 As implemented by the Construction Products Regulations 1991 (SI 1991 No 1620).
2 As implemented by the Construction Products (Amendment) Regulations 1994 (SI 1994 No 3051).
3 As implemented by the Electrical Equipment (Safety) Regulations 1994 (SI 1994 No 3260).
4 As implemented by the Electromagnetic Compatibiliy Regulations 2006 (SI 2006 No 3418).
5 Decision No. 1/95 of the EC-Turkey Association Council of 22 December 1995.

Independent Certification Schemes

There are many UK product certification schemes. Such schemes certify compliance with the requirements of a recognised document which is appropriate to the purpose for which the material is to be used. Materials which are not so certified may still conform to a revelant standard.

Many certification bodies which approve such schemes are accrediated by UKAS.

Interaction with other legislation

The Workplace (Health, Safety and Welfare) Regulations (Northern Ireland) 1993

The Workplace (Health, Safety and Welfare) Regulations (Northern Ireland) 1993 contain some requirements which affect building design. The main requirements are now covered by the Building Regulations, but for further information see – The Workplace (Health, Safety and Welfare) Regulations (Northern Ireland) 1993 SR 1993 No.37 and the Workplace Health, Safety and Welfare Approved Code of Practice and Guidance (ISBN 0-33711222-3) published by TSO.

The Workplace (Health, Safety and Welfare) Regulations (Northern Ireland) 1993 apply to the common parts of flats and similar buildings if people such as cleaners, wardens and caretakers are employed to work in these common parts. Where the requirements of the Building Regulations that are covered by this Part do not apply to dwellings, the provisions may still be required in the situations described above in order to satisfy the Workplace Regulations.

Part H Regulations

It should be noted that the following regulations are the requirements of Part H of the Building Regulations (Northern Ireland) 20xx. All parts of the regulations must be read in conjunction with Part A: Interpretation and general of those regulations.

PART H

Stairs, ramps, guarding and protection from impact

H1 Application and interpretation

(1) Subject to paragraphs (2), (3), (4) and (5) this Part shall apply to any building or part of a building.

(2) The requirements of regulation H4(1) shall not apply—

(a) to the extent that compliance therewith would unreasonably obstruct normal movement into, out of or within any building;

(b) in relation to the two steps at the bottom of a stair where the landing from which the stair rises does not require guarding in accordance with that paragraph;

(c) in relation to a flight within a stair with a total rise of less than 600 mm;

(d) in relation to a sunken area less than 600 mm in depth; and

(e) in relation to a roof or other place to which access is solely for maintenance purposes provided that either—

(i) access is infrequent; or

(ii) any fall would be—

(A) less than 2000 mm; or

(B) to an area which does not present a hazard.

(3) The requirements of regulation H4(2) shall not apply in relation to a car showroom, a garage within the boundary of a dwelling, or a single storey building comprising two or more garages each of which has an area not exceeding 40 m^2.

(4) The requirements of regulation H6 shall not apply to—

(a) a dwelling; and

(b) a door or gate which is part of a lift.

(5) Insofar as they relate to a dwelling, the requirements of regulation H7 shall only apply to a window, skylight or ventilator which opens over a public route of travel.

(6) For the purposes of this Part access to any place is infrequent if it takes place on average on less than one occasion a month during the course of a year.

(7) In this Part—

BALCONY includes a gallery;

BARRIER includes a wall or screen;

FLIGHT means that part of a stair or ladder between landings that has a step or a continuous series of steps;

LADDER means a fixed ladder having a flight with a pitch greater than 55º;

LANDING means a platform situated—

(a) at the top or bottom of a stair, ladder or ramp; and

(b) between consecutive flights of stairs;

RAMP means an inclined surface which provides a route of travel; and

STAIR means a flight or flights (other than a ladder) and landings that make it possible to pass on foot to another level or levels.

H2 Provision of stairs in dwellings

Within every dwelling of more than one storey there shall be provided between such storeys access by means of a stair complying with the relevant provisions of this Part:

Provided that nothing in this regulation shall require the provision of a stair to any storey within a dwelling if that storey is used only as general storage accommodation.

H3 Stairs, ladders, ramps and landings

A stair, ladder and a ramp and its landings, shall offer reasonable safety to people using them to move between—

(a) levels within the building; and

(b) an entrance or exit of the building and the general ground level immediately outside that entrance or exit.

H4 Guarding

(1) A stair, ladder, ramp, floor, balcony, landing, platform and any roof or other place to which people normally have access (including access for the purpose of maintenance) and a sunken area next to a building, shall, where it is necessary to protect people in or about the building from the risk of falling, be adequately guarded with a barrier which does not present a hazard.

(2) Any part of a building which is a vehicle ramp, floor or roof to which vehicles have access shall, where it is necessary to protect people, be adequately guarded with a barrier which does not present a hazard.

H5 Vehicle loading bays

A vehicle loading bay shall be designed and constructed to minimise the risk of people in it from being struck by a vehicle.

H6 Protection against impact from and trapping by doors

(1) In any building a door or gate which is across a main route of travel and can be pushed open from either side, shall have a means to ensure that people approaching it have a clear view of the space on the opposite side.

(2) In any building a door or gate which slides or opens upwards shall have a means to prevent it from sliding into or falling on any person.

(3) In any building a powered door or gate shall have a means to prevent it trapping any person and a means to open it in the event of a power failure.

H7 Protection from collision with open windows, skylights or ventilators

Reasonable provision shall be made to minimise the risk of people colliding with an open window, skylight or ventilator when moving in or about a building.

Guidance - Performance and introduction to provisions

Stairs, ladders, ramps and their landings

Performance

0.1 It is the Department's view the requirements of regulation H3 wil be met when a stair, ladder, ramp and its landings afford reasonable safety to people who use them.

A stair and a ramp and its landings should provide appropriate levels of safety and conveniences for all users who would have a reasonable expectation to use them.

An appropriate level of safety can be achieved by different standards of provision, depending on the circumstances; for example, in a public building the standard of provision may be higher than in a dwelling, to reflect the lesser familiarity and greater number of users.

Where access is required only for the purpose of maintenance, greater care can be expected from those gaining access, and it would be reasonable that less demanding provisions could satisfy the requirement.

Introduction to provisions in Sections 2 and 3

0.2 The guidance in Section 2 is concerned with various aspects of the geometry and safety of stairs and certain ladders. This includes common provisions for all stairs and additional provisions for —

(a) private stairs

(b) common stairs in blocks of flats; and

(c) stairs in buildings other than dwellings.

Provisions are also given for spiral and helical stairs in a dwelling and stairs and ladders used solely for the purpose of providing access for maintenance in buildings other than dwellings.

The guidance in Section 3 deals with various aspects of the geometry and safety features of ramps and their landings.

Guarding

Performance

0.3 It is the Department's view the requirements of regulation H4 wil be met if, in order to reduce the risk to the safety of people in or about buildings —

(a) pedestrian guarding is provided in buildings which is capable of preventing people from being injured by falling from a height

(b) vehicle barriers are provided which are capable of resisting or deflecting the impact of vehicles;

An appropriate level of safety can be achieved by different standards of provision for guarding, depending on the circumstances; for example, in a public building the standard of provision may be higher than in a dwelling, to reflect the lesser familiarity and greater number of users.

Where access is required only for the purpose of maintenance, greater care can be expected from those gaining access, and it would be reasonable that less demanding provisions could satisfy the requirement.

Introduction to provisions in Section 4

0.4 The guidance in Section 4 is concerned with reducing the risk of people falling from a height. This includes provisions for guarding flights, ramps, landings and raised floors. This Section also contains guidance in relation to protecting people whenever vehicles have access to a building.

Vehicle loading bays

Performance

0.5 It is the Department's view the requirements of regulation H5 wil be met if, in order to reduce the risk to the safety of people in or about buildings – loading bays are provided with an adequate number of exits or refuges which enable people to avoid being struck or crushed by vehicles.

Introduction to provisions in Section 5

0.6 The guidance in Section 5 deals specifically with reducing the risk to the safety of people in loading bays. This includes the provision of suitable exits or refuges which enable people to avoid being struck or crushed by vehicles.

Protection against impact from and trapping by doors

Performance

0.7 It is the Department's view the requirements of regulation H6 wil be met if, measures are taken to prevent the opening and closing of doors and gates presenting a safety hazard.

Introduction to provisions in Section 6

0.8 The guidance in Section 6 deals with reducing the risk of people being struck by, or trapped by, doors or gates when they are opening or closing.

Protection from collision with open windows, skylights or ventilators

Performance

0.9 It is the Department's view the requirements of regulation H7 wil be met if windows, skylights or ventilators can be left open without the danger of people colliding with them. This could be achieved by —

(a) installing windows, skylights or ventilators. so that projecting parts are kept away from people moving in or about a building; or

(b) installing features which guide people moving in or about a building away from any open window, skylight or ventilator.

An appropriate level of safety can be achieved by different standards of provision, depending on the circumstances; for example, in a public building the standard of provision may be higher than in a dwelling, to reflect the lesser familiarity and greater number of users.

Where access is required only for the purpose of maintenance, greater care can be expected from those gaining access, and it would be reasonable that less demanding provisions could satisfy the requirement.

Introduction to provisions in Section 7

0.10 The guidance in Section 7 is specifically concerned with reducing the risk of people colliding with open windows, skylights or ventilators.

Section 1 General

Definitions

1.1 In this Technical Booklet the following definitions apply –

Going (in relation to a step) – the depth of the tread less any overlap with the next tread (see Diagram 1.1).

Private stair – a stair in or intended to be used by only one dwelling.

Retail building – shop, department store, supermarket, public house, restaurant with or without assembly area, cafe, hairdresser, wholesale self-selection trading, public area of a bank, building society, betting shop.

Rise (in relation to a step) – the height, including the thickness of the tread (see Diagram 1.1).

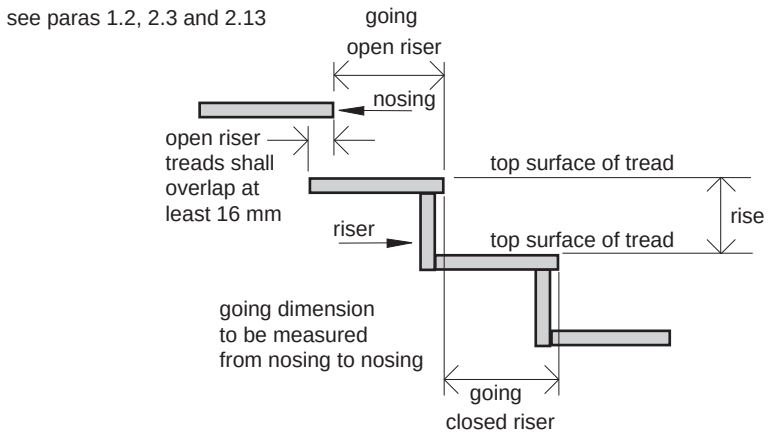
Small room – any room in a dwelling having a floor area not exceeding 4 m^2.

Step – in a dwelling, does not include any threshold which has a height not exceeding 40 mm in the case of an internal doorway or 75 mm in the case of an external doorway.

Surface width – the width of a stair or ramp, measured at the tread of a step or the surface of a ramp, between any enclosing walls, strings, upstands, kerbs or guarding.

Tapered tread – a tread which has a greater width at one side than at the other and a going which changes at a constant rate throughout its length.

Diagram 1.1 Measuring rise and going



Visual contrast

1.2 Visual contrast is the perception of a difference visually between one element of a building and another by reference to their light reflectance values.

Light reflectance value (LRV) is the total quantity of visible light reflected by a surface at all wavelengths and directions when illuminated by a light source.

For people with adequate vision, differences in the nature or the intensity of colour provide adequate visual contrast. Unfortunately, this is not the case for all people who are visually impaired. The main feature of a surface, which appears to be strongly correlated with the ability of visually impaired people to identify differences in colour, is the LRV. Differences in LRV can be used to assess the degree of visual contrast between the surfaces of elements such as handrails, step nosings etc..

The LRV scale runs from 0, which is a perfectly absorbing surface that could be assumed to be totally black, up to 100, which is a perfectly reflective surface that could be considered to be the perfect white. Because of practical influences in any application, black is always greater than 0 and white never equals 100.

A difference in LRV of 30 points or more allows a degree of variability that is required to provide reasonable visual contrast.

Section 2 Stairs and ladders

Common provisions for all stairs

2.1 A private stair or a common stair in a block of dwellings, should comply with the provisions of paragraphs 2.3 to 2.26.

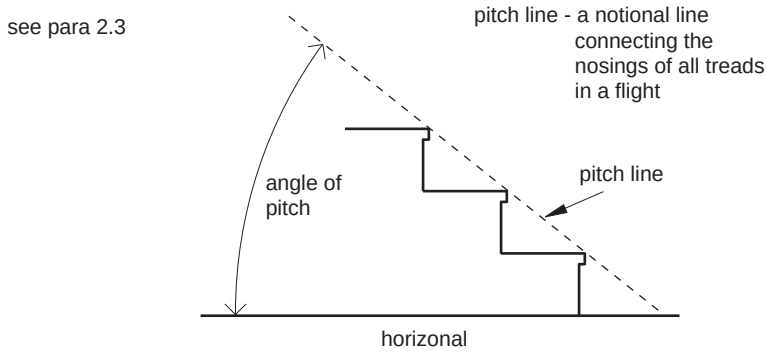
2.2 A stair in a building other than a dwelling or a common stair in a block of dwellings, should comply with the provisions of paragraphs 2.3 to 2.10 and 2.27 to 2.40.

Pitch

2.3 The pitch of a flight is controlled by limiting the rise and the going.

Diagram 2.1 shows how to measure the pitch and what is meant by the pitch line. Diagram 1.1 shows how to measure the rise and going (for steps with tapered treads see also paragraph 2.19).

Diagram 2.1 Measuring angle of pitch



2.4 Subject to paragraph 2.11 the relationship between the dimensions of the rise and going is that twice the rise (R) plus the going (G) i.e. (2R + G) should be between 550 mm and 700 mm. The rise and the going are given in Table 2.1.

Table 2.1 Rise and going

Category		Rise		Going
		minimum (mm)	maximum (mm)	minimum (mm)
1	Private stair	75	220*	220*
2	A common stair in a block of dwellings	75	170	250
3	A stair in any building (other than a private stair or a common stair in a block of dwellings)	150	170	250

Note A stair within more than one category shall be constructed to the more onerous standard

* see also paragraph 2.11

2.5 In a flight, the steps should all have the same rise and they shall all have the same going.

2.6 Where the landing of a stair is formed by the ground and slopes across the width of the flight, then the rise of the step should be measured at the mid-point of the width of the flight (see paragraph 2.10).

2.7 Steps should have level treads which extend for the full width of the flight.

Headroom

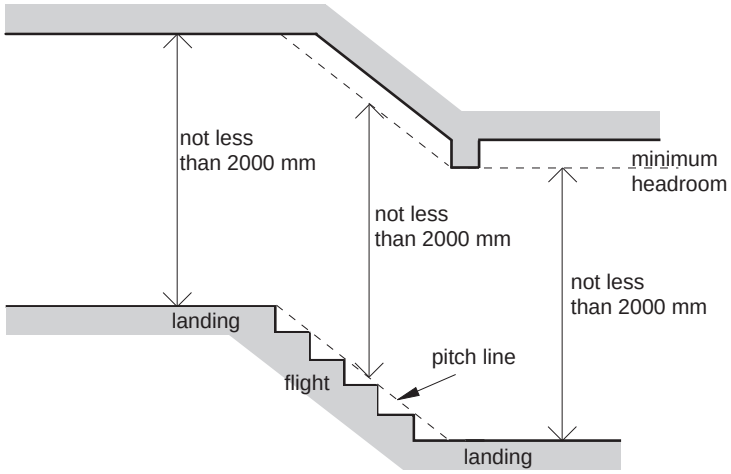
2.8 A stair should have a clear headroom of not less than 2000 mm over its full length and width.

Headroom is measured vertically from the pitch line of the flight and the level of the landing (see Diagram 2.2(a)).

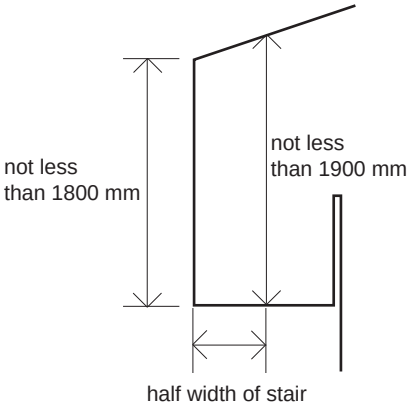
For roofspace conversions in a dwelling, where it can be demonstrated that there is not enough space to achieve the height given in paragraph 2.8 it would be reasonable for a stair to have headroom as shown in Diagram 2.2(b).

Diagram 2.2 Measuring headroom

see para 2.8



(a) headroom to be achieved under normal circumstances



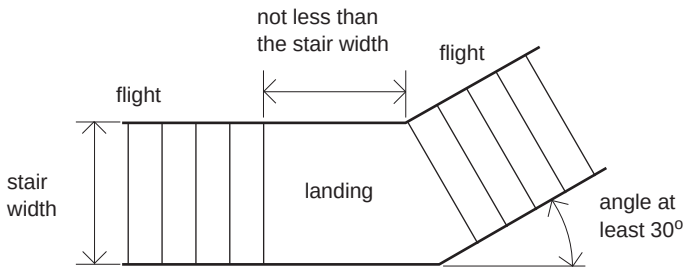
(b) reduced headroom for roofspace conversions

Change of direction

2.9 A stair of more than 36 rises in consecutive flights should have at least one change in direction between flights of at least 30° (see Diagram 2.3).

Diagram 2.3 Change of direction

see para 2.9



Landings

2.10 Landings should be level unless they are formed by the ground at the top or bottom of a flight where they may have a gradient not greater than –

(a) 1 in 20 in the case of a private stair; or

(b) 1 in 60 for all other stairs.

Landings formed by the ground should be paved or otherwise made firm.

Additional provisions for private stairs and common stairs in blocks of dwellings

Pitch

2.11 The pitch of a private stair should not exceed 42°, therefore it is not possible to combine a maximum rise with a minimum going.

The rise and the going are given in Table 2.1.

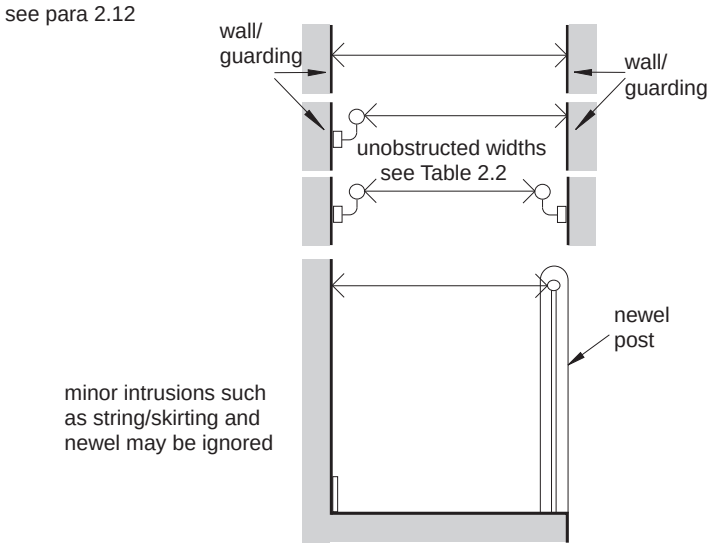
Width of flights

2.12 The minimum unobstructed widths for a flight, in a private stair and a common stair in a block of dwellings, are given in Table 2.2 and should be measured in accordance with Diagram 2.4.

Table 2.2 Widths of flights in a private stair and a common stair in a block of dwellings

Category	Minimum unobstructed width (mm)
1 Private stair -	
(a) providing access to one room only (not being a kitchen or living room) or to a bathroom and a water closet	600
(b) other than (a) above	800
2 A common stair in a block of dwellings	1000

Diagram 2.4 Measuring the width of a private stair and a common stair in a block of dwellings



Construction of steps

2.13 A private stair may have steps with open rises, but the treads should then overlap each other by at least 16 mm (see Diagram 1.1).

A private stair which has open rises, should be constructed so that a 100 mm diameter sphere cannot pass through the open rises.

2.14 A common stair in a block of dwellings should have steps with rises that are not open and have a suitable profile such that the risk of tripping is reduced (see Diagram 2.9 (b)).

2.15 The number of rises in a flight should be a maximum of 16 and a minimum of 2. However, notwithstanding the provisions of paragraph 2.18, a single step may be provided –

(a) at the bottom of a stair in a dwelling;

(b) at an entrance to a dwelling;

(c) between any enclosed porch, outhouse or conservatory and the remainder of a dwelling;

(d) where it provides access to a small room; and

(e) between a garage and a dwelling.

Landings

2.16 A landing should be provided at the top and bottom of every flight.

The width of a landing should be not less than the width of the stair.

The going of a landing should be not less than the width of the flight.

Part of a floor may be considered as a landing.

2.17 To afford safe passage a landing should be clear of any obstruction. However, in a private stair –

(a) a door may swing across a landing at the bottom of a flight but only where it will leave a clear space of at least 400 mm across the full width of the flight (see Diagram 2.5); and

(b) a door to a cupboard or duct may swing across a landing at –

(i) the bottom of a flight; and

(ii) the top of a flight where it will leave a clear space of 400 mm across the full width of the flight (see Diagram 2.6).

Diagram 2.5 Landings next to doors

see para 2.17(a)

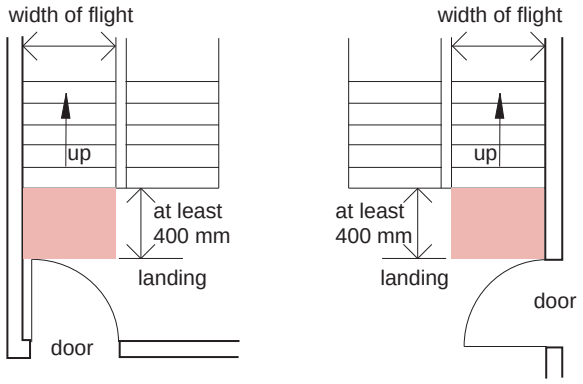
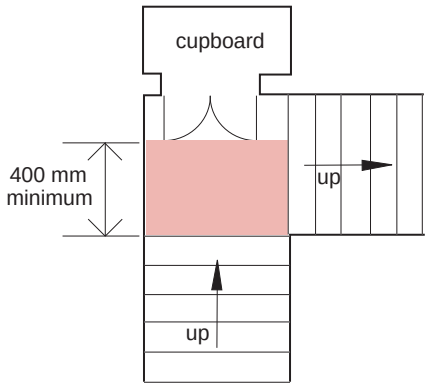


Diagram 2.6 Cupboards onto landings

see para 2.17(b)(ii)



2.18 A landing need not be provided between an external flight and a doorway if the rise of the flight is not more than 600 mm and the door slides or opens away from the steps.

Where there is a single step between a garage and a dwelling, a door may open out over the step when the door, in the closed position, has some part of its thickness in line with the riser of the step.

Steps with tapered treads

2.19 Where steps have tapered treads, the going should be measured as follows –

(a) if the width of the flight is less than 1000 mm, measure in the middle or;

(b) if the width of the flight is 1000 mm or more, measure 270 mm from each side.

(See Diagram 2.7.)

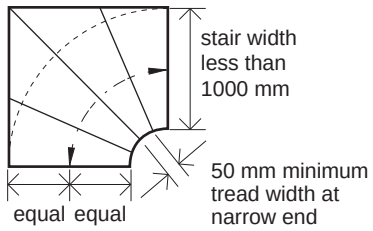
2.20 The narrow ends of consecutive treads should be on the same side of the stair and have a going of not less than 50 mm (see Diagram 2.7).

2.21 The rise and the going measured at the positions, in paragraph 2.19 (a) or (b) whichever is appropriate should be within the limits given in paragraphs 2.4 and 2.11 and Table 2.1.

2.22 Where a stair consists of straight and tapered treads, the going of the tapered treads should be not less than the going of the treads on the straight flight.

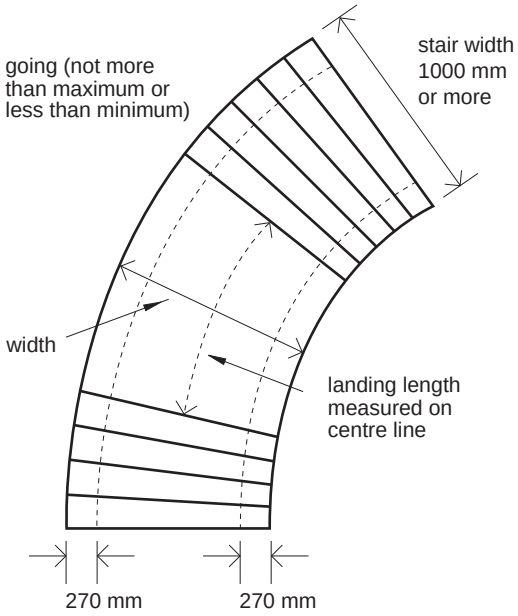
Diagram 2.7 Measuring tapered treads

see paras 2.19 and 2.20



measure going at centre of tread
measure from curved stair line, even when tread is in rectangular enclosure

Stair width less than 1000 mm



Stair width 1000 mm or more

Handrails

2.23 Flights in a private stair with a total rise of more than 600 mm and a common stair in a block of dwellings, should have a continuous handrail that gives firm support and a firm grip and be located –

(a) on at least one side where they are 1000 mm wide or less; or

(b) on both sides where they are more than 1000 mm wide.

Where only one handrail is required on a flight with tapered treads, it should be located on the outer side of the flight.

2.24 Handrails are not required beside the two steps at the bottom of a private stair.

2.25 Handrails should be at a height measured vertically of between 900 mm and 1000 mm above the pitch line.

Handrails may form the top of guarding.

2.26 To give warning of a change in level the handrail to a common stair in a block of dwellings, should extend horizontally for a distance of not less than 300 mm, along the top and bottom landings.

Additional provisions for stairs in buildings other than dwellings

2.27 Paragraphs 2.3 to 2.10 and 2.27 to 2.40 apply to a stair which is not a private stair or a common stair in a block of dwellings.

Pitch

2.28 The rise and the going are given in Table 2.1.

2.29 There should be not less than 2 rises and not more than 12 rises in each flight.

There may be exceptional circumstances where a different rise or greater number of rises in a flight is more appropriate e.g. where there are dimensional constraints imposed by an existing building.

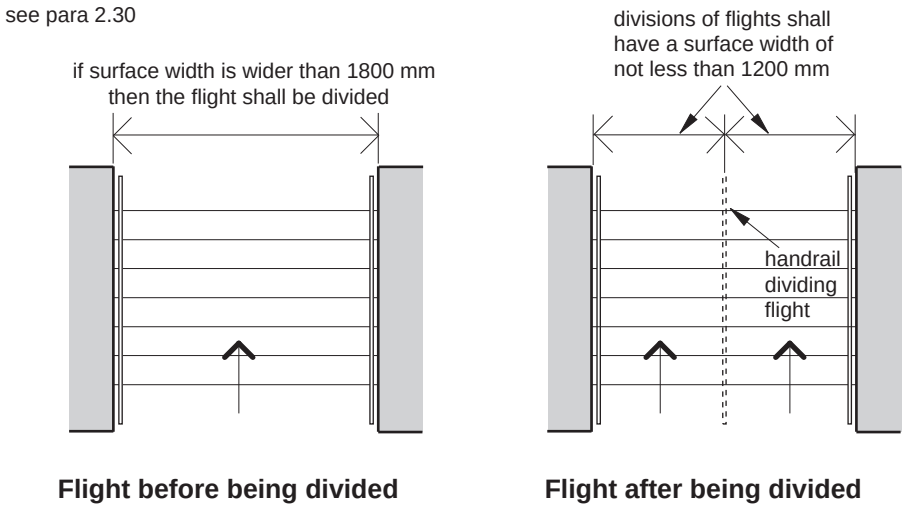
Width of flights

2.30 A flight should have a surface width of not less than 1200 mm.

Where a handrail protrudes into the surface width of a flight by more than 100 mm, the surface width should be increased accordingly. In any case, the maximum protrusion of a handrail into the surface width of a flight should be 110 mm.

A flight of steps which has a surface width wider than 1800 mm, should be divided into flights which are not wider than 1800 mm. The minimum surface width of 1200 mm then applies to each flight (see Diagram 2.8).

Diagram 2.8 Dividing wide flights



Construction of steps

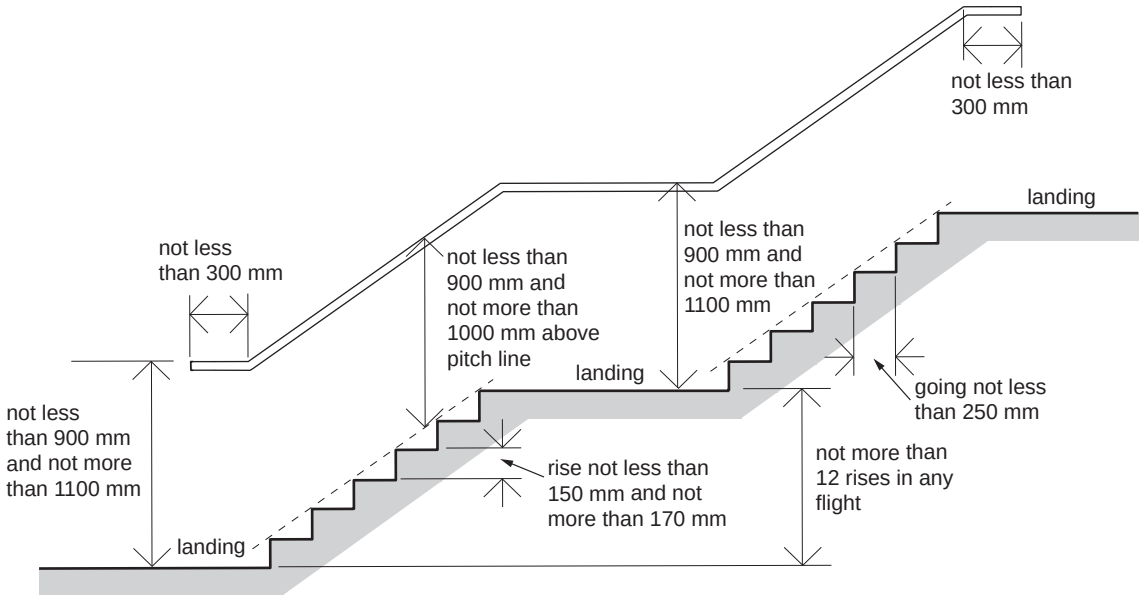
2.31 For people to appreciate easily where to place their feet, steps should have step nosings which are distinguishable through suitable permanent visual contrast. The width of this permanent visual contrast should be not less than 50 mm and not more than 60 mm to all treads and risers.

2.32 Anything fixed or fitted to a tread or riser should not create a trip hazard.

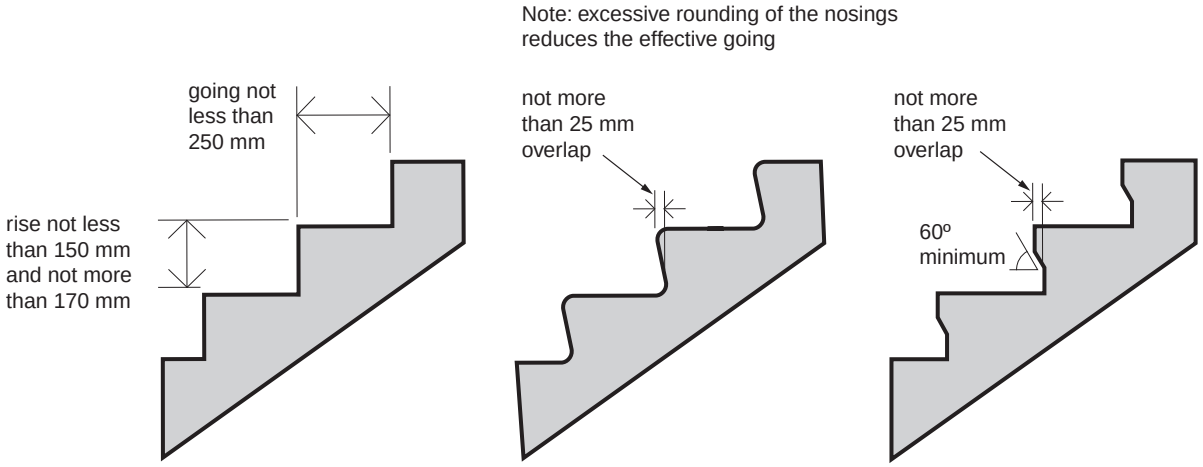
2.33 Steps should have rises that are not open and have a suitable profile such that the risk of tripping or people catching their feet beneath the nosing, is reduced (see Diagram 2.9).

Diagram 2.9 Details of stairs

see paras 2.14, 2.33, 2.36 and 2.37



(a) Stairs and handrails



(b) Examples of suitable step profiles

Landings

2.34 A landing should be provided at the top and bottom of every flight.

The width of the landing should be not less than the width of the stair.

To afford safe passage, the unobstructed length of each landing should be not less than 1200 mm clear of any door swing onto it.

Part of a floor may be considered as a landing.

Handrails

A suitably designed handrail can help prevent people losing their balance when on the stair and can also assist users to ascend by pulling themselves up the stairs.

2.35 A stair should have a suitable continuous handrail on each side.

2.36 A handrail should be at a height measured vertically of –

(a) not less than 900 mm and not more than 1000 mm, above the pitch of a flight; and

(b) not less than 900 mm and not more than 1100 mm, above the surface of a landing.

(See Diagram 2.9.)

Where it is decided to provide a second lower handrail, for use by children and people who are short in stature, that handrail should be 600 mm above the pitch of the flight. However, this second lower handrail must not impinge on the protection against falling provided by any necessary guarding.

2.37 To give warning of a change in level each end of a handrail should extend horizontally for a distance of not less than 300 mm, along the top and bottom landings of a stair, be closed and terminate in a suitable way so that –

(a) it does not project into a route of travel; and

(b) it reduces the risk of clothing being caught.

(See Diagram 2.9.)

2.38 Handrails should be rigidly supported in a way that avoids impeding the users grip.

A handrail should be –

(a) not less than 50 mm and not more than 60 mm clear of any adjacent side or enclosing surface wall, or guarding etc.;

(b) not less than 50 mm clear from the underside of the handrail to any cranked support; and

(c) not more than 50 mm beyond the outer edge of a flight of steps, to the inner side of the handrail.

(See Diagram 2.10.)

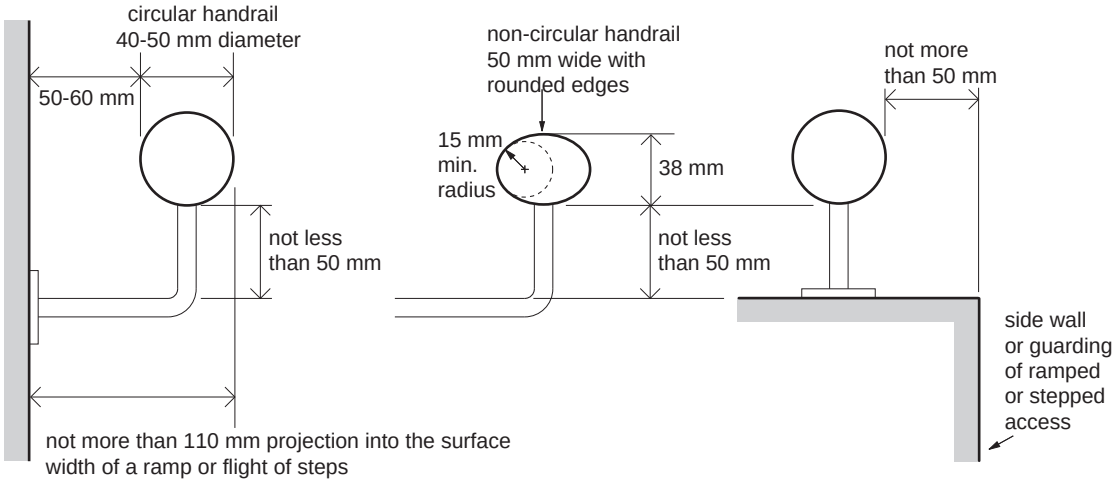
2.39 The surface of a handrail should be distinguishable through suitable visual contrast from the background against which it is seen.

2.40 Handrails should allow users to make a power grip around the whole handrail. A non-circular handrail with a broad horizontal face is as easy to grip as a circular handrail and gives better hand and forearm support.

A handrail should have a suitable profile that is gripped easily. Suitable handrail profiles include circular and oval. (see Diagram 2.10).

Diagram 2.10 Examples of suitable handrails

see paras 2.38 and 2.40



Note: To be suitable for all to use, the profile of a handrail shall incorporate the above features

Spiral or helical stairs in a dwelling

2.41 In a dwelling, a spiral or helical stair should be designed and constructed in accordance with BS 5395-2: Stairs, ladders and walkways. Code of practice for the design of helical and spiral stairs.

Stairs and fixed ladders providing access for maintenance

2.42 A stair or a fixed ladder in a building other than a dwelling, providing access solely for the purpose of maintenance should be designed and constructed in accordance with either BS 5395-3: Stairs, ladders and walkways. Code of practice for the design of industrial type stairs, permanent ladders or walkways or BS 4211: Specification for permanently fixed ladders

Section 3 Ramps

Ramps in dwellings

Gradient

3.1 A ramp should have a gradient not steeper than 1 in 12 and should be uniform throughout its length (see Diagram 3.1).

Width of ramps

3.2 The minimum width for a ramp should be the same as that for a flight in a private stair (see paragraph 2.12 and Table 2.2).

3.3 The length of a ramp measured on plan, should not exceed 10 m (see Diagram 3.1).

Landings

3.4 Landings should be level and be provided at the top and bottom of a ramp (see Diagram 3.1).

The width and going of a landing should be not less than the width of the ramp. Part of a floor may be considered as a landing.

3.5 Ramps should should be clear of obstructions and landings should be clear of obstructions other than those described in paragraph 2.17.

Headroom

3.6 Ramps and associated landings should have a clear headroom of not less than 2000 mm over the length and width of the ramp.

Headroom is measured vertically from the slope of the ramp and the level of the landing.

(See Diagram 3.1.)

Handrails

3.7 A ramp or a series of ramps with a total rise of more than 600 mm should have a continuous handrail that gives firm support and a firm grip –

(a) on at least one side where they are 1000 mm wide or less; or

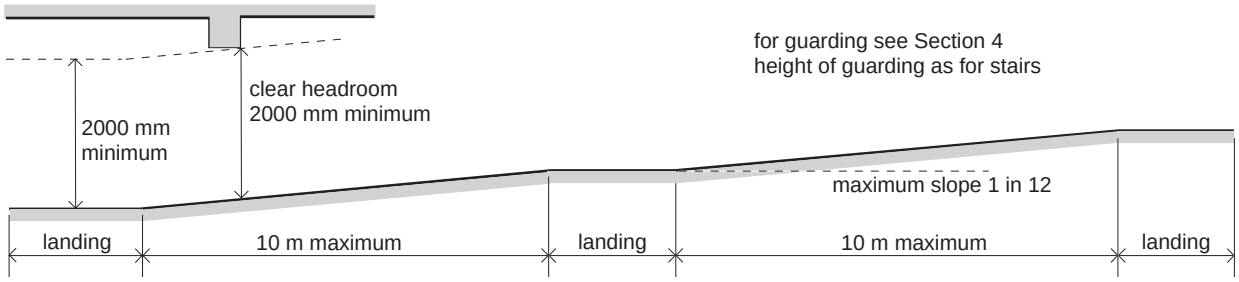
(b) on both sides where they are more than 1000 mm wide.

Handrails should be at a height measured vertically of between 900 mm and 1000 mm above the surface of the ramp.

Handrails may form the top of guarding.

Diagram 3.1 Ramp design

see paras 3.1, 3.3, 3.4, 3.6, 3.11 and 3.21



length of landings to be at least equal to the width of the ramp

Ramps within common areas of a block of dwellings

Length and gradient

3.8 A ramp should be not more than –

(a) 10 m in length where the gradient of the ramp does not exceed 1 in 15; or

(b) 5 m in length where the gradient of the ramp does not exceed 1 in 12.

Width of ramps

3.9 A ramp should have a surface width of not less than 1200 mm. Where a handrail is provided, the width at handrail level may be reduced to not less than 1000 mm.

Landings

3.10 Landings should be level with an unobstructed length of not less than 1200 mm.

Headroom

3.11 Ramps and associated landings should have a clear headroom of not less than 2000 mm over the length and width of the ramp.

Headroom is measured vertically from the slope of the ramp and the level of the landing (see Diagram 3.1).

Handrails

3.12 A ramp should have a suitable continuous handrail on each side if the horizontal length of the ramp is more than 2000 mm.

Handrails should be at a height measured vertically of between 900 mm and 1000 mm above the surface of the ramp, give firm support and allow a firm grip.

Ramps in buildings other than dwellings

3.13 Gradients of ramps should be as shallow as practicable as steep gradients may not be safe or convenient for all people.

The following provisions apply to a ramp which is not in a dwelling or in a block of dwellings.

Length and gradient

3.14 The maximum length of a ramp is dependent upon its gradient. Table 3.1 gives the maximum length of a ramp for a given gradient.

There may be exceptional circumstances where a different gradient of ramp to that shown in Table 3.1 over a short distance is more appropriate e.g. where there are physical constraints imposed by an existing building.

Table 3.1 Maximum length of ramps

Gradient of ramp	Maximum length of ramp (m)
1:20	10
1:19	9
1:18	8
1:17	7
1:16	6
1:15	5
1:14	4
1:13	3
1:12	2

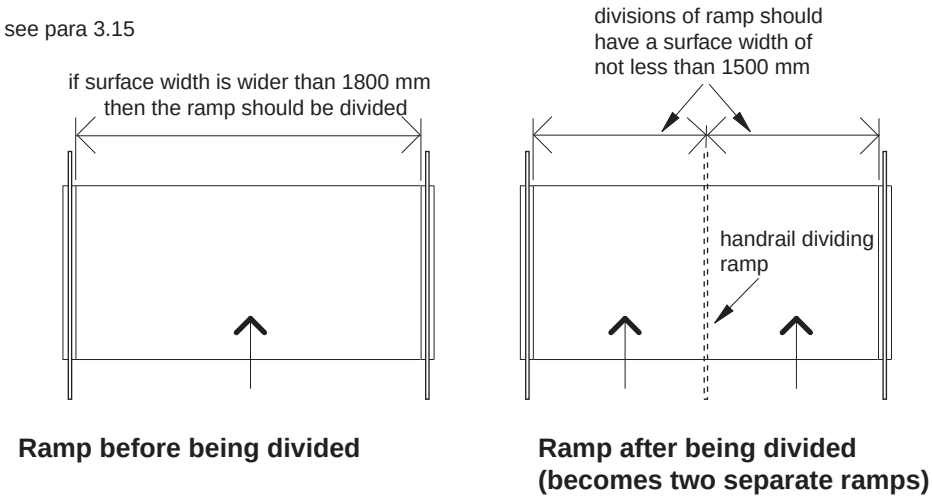
Width of ramps

3.15 A ramp or ramps and landings should have a surface width of not less than 1500 mm.

Where a handrail protrudes into the surface width of a ramp by more than 100 mm the surface width should be increased accordingly. In any case the maximum protrusion of a handrail into the surface width of a ramp should be 110 mm.

A ramp which has a surface width wider than 1800 mm, should be divided into ramps which are not wider than 1800 mm. The minimum surface width of 1500 mm then applies to each ramp (see Diagram 3.2).

Diagram 3.2 Dividing wide ramps



Construction of ramps

3.16 The surface of a ramp should –

(a) be firm;

(b) reduce the risk of slipping; and

(c) be distinguishable, through suitable visual contrast, from that of its landings.

A ramp and its landings should have similar surface frictional characteristics.

3.17 A ramp should have a raised kerb on any open side (except where it would obstruct normal use). The raised kerb should –

(a) be not less than 100 mm high; and

(b) be distinguishable, through suitable visual contrast, from that of the surface of the ramp and landings.

Landings

3.18 A landing should be provided at the top and bottom of a ramp.

A landing should be level, however, it may have a gradient along its length not steeper than 1 in 60.

The unobstructed length of a landing should be not less than 1200 mm. Where a landing is between two ramps, it should have an unobstructed length of not less than 1500 mm.

3.19 Where the ramped access or circulation route consists of three or more ramps, the intermediate landings between each ramp should have an unobstructed length of not less than 1800 mm and a surface width of not less than 1800 mm.

3.20 Where a ramp does not have a clear line of sight between its top and bottom landings, it should be divided into two ramps such that there is a clear line of sight between the intermediate landing and the top and bottom landings. The intermediate landing should have an unobstructed length of not less than 1800 mm, and a surface width of not less than 1800 mm. This will allow enlarged landings to be used as passing places.

Headroom

3.21 Ramps and associated landings should have a clear headroom of not less than 2000 mm over the length and width of the ramp.

Headroom is measured vertically from the slope of the ramp and the level of the landing (see Diagram 3.1).

Handrails

3.22 A ramp or ramps and landings should have a suitable continuous handrail on each side complying with the provisions of paragraphs 2.37 to 2.40.

3.23 A handrail should be at a height measured vertically of –

(a) not less than 900 mm and not more than 1000 mm above the surface of a ramp; and

(b) not less than 900 mm and not more than 1100 mm above the level of a landing.

3.24 To give warning of the presence of a change in level a handrail should extend horizontally for a distance of not less than 300 mm along the top and bottom landings of a ramp except at an intermediate landing that is not more than 1800 mm in length where it should extend the full length of the landing.

Section 4 Guarding

General provisions

Paragraphs 4.1 to 4.5 do not apply to –

(a) guarding to a spiral or helical stair in a dwelling;

(b) guarding to a stair or a fixed ladder, in a building other than a dwelling, providing access solely for the purpose of maintenance; and

(c) a vehicle barrier.

Design of guarding

4.1 The design of guarding should be such as to minimise the risk of people falling, and of rolling, sliding or slipping through gaps in a barrier.

A wall, glazing, parapet, balustrade or similar construction may serve as guarding.

A sunken area next to a building is an area adjoining the building and includes a light well, access to a basement and similar areas. Guarding should be provided to that part of a sunken area which is within 3 m of the building.

4.2 The height of guarding should be measured vertically from the level of a floor or landing, the surface of a ramp or the pitch line of a flight.

However, the top of a portion of any balustrade guarding a landing at the top of a flight or ramp may be continuous with, and at the same angle as, the top of a balustrade guarding that flight or ramp.

4.3 Guarding which is provided at the locations given in Table 4.1 column (1) should be –

(a) of a height not less than that given in column (2); and

(b) capable of resisting the horizontal force given in column (3) applied at a height of 1100 mm irrespective of the actual height of the guarding (see Diagram 4.1).

Diagram 4.1 Guarding

see para 4.3

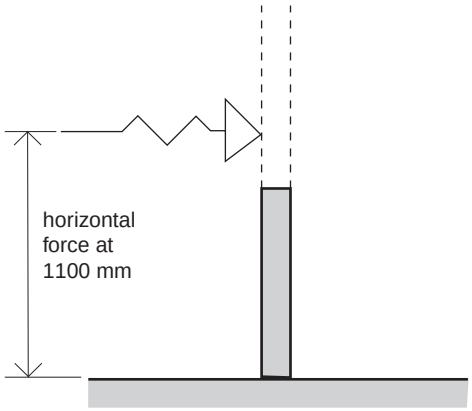


Table 4.1 Minimum height and strength of guarding

Location of guarding (1)	Minimum height+ (mm) (2)	Minimum horizontal force/metre run (kN/m) (3)
1 Dwellings		
(a) guarding a flight, ramp, landing or floor within a dwelling	900*	0.36
(b) guarding an external flight or ramp	900	0.74
(c) guarding a level for the purpose of maintenance	1100	0.36
(d) guarding not described in (a) to (c)	1100	0.74
2 Retail buildings		
(a) guarding a flight or ramp	900	1.50
(b) guarding a level for the purpose of maintenance	1100	0.36
(c) guarding not described in (a) or (b)	1100*	1.50
3 Other buildings		
(a) guarding a flight or ramp where crowd loading will not occur	900	0.74
(b) guarding a flight or ramp where crowd loading† will occur	900	3.00
(c) guarding not described in (b) where crowd loading† will occur	1100 *	3.00
(d) guarding a floor immediately in front of fixed seating	800	1.50
(e) guarding a level for the purpose of maintenance	1100	0.36
(f) guarding not described in (a) to (e)	1100 *	0.74

Notes

\+ In the case of a flight or ramp the height shall be measured from the pitch line of a flight or the surface of a ramp.

* This may be reduced to 800mm at openable windows or glazing at changes of level. The glazing may be designed to act as guarding, in which case separate guarding would not be required.

† Crowd loading will occur in parts of buildings where people assemble in large numbers such as theatres, discotheques, cinemas, sports halls, assembly halls, shopping malls and similar areas.

Infill panels

4.4 Where infill panels are provided they should be designed and constructed in accordance with the relevant clauses of BS 6180:1999.

4.5 Where a building or part of a building is likely to be used by children under 5 years of age the guarding should be constructed so that a 100 mm diameter sphere cannot pass through any opening in it other than a triangular opening formed by a tread, a rise and the bottom edge of the guarding if that bottom edge is not more than 50 mm above the pitch line. The guarding shall should also be constructed so that a child cannot readily climb up it.

Guarding of spiral or helical stairs in a dwelling

4.6 In a dwelling, guarding to a spiral or helical stair should be designed and constructed in accordance with BS 5395-2: Stairs, ladders and walkways. Code of practice for the design of helical and spiral stairs.

Stair or fixed ladders

4.7 Guarding to a stair or a fixed ladder in a building other than a dwelling providing access solely for the purpose of maintenance should be designed and constructed in accordance with either BS 5395-3: Stairs, ladders and walkways. Code of practice for the design of industrial type stairs, permanent ladders and walkways or BS 4211: Specification for permanently fixed ladders

Vehicle barriers

4.8 In a building where vehicles have access to a floor, roof or circulation ramp, guarding should be provided to any edge of such area that is above the level of any adjacent floor, ground or route for vehicles.

Such guarding should –

(a) not present a hazard e.g. by containing projections on the impact face of the barrier; and

(b) be designed and constructed in accordance with Annex B of BS EN 1991-1-1:2002.

Section 5 Vehicle loading bays

General provisions

Loading bays

5.1 A loading bay should be provided with at least one exit point from the lower level (preferably near the centre of the rear wall).

5.2 A wide loading bay (with space for 3 or more vehicles) should be provided with at least –

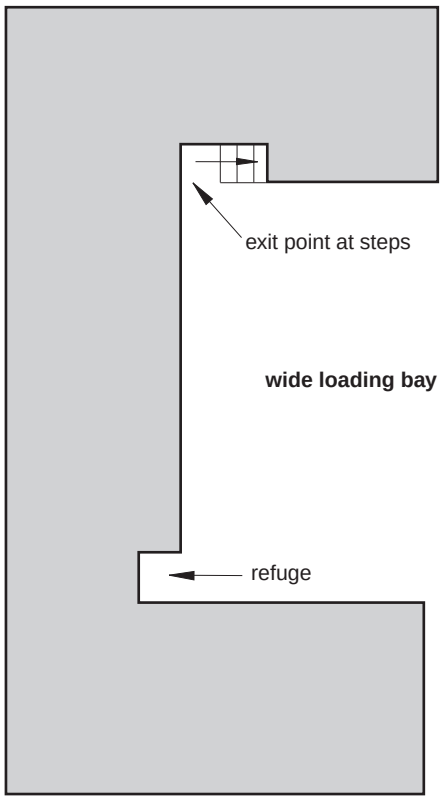
(a) two exit points, one at each side; or

(b) an exit point and a refuge,

which people can use to avoid being struck or crushed by a vehicle (see Diagram 5.1).

Diagram 5.1 Wide loading bays

see para 5.2



Section 6 Protection against impact from and trapping by doors

General provisions

6.1 A door or gate –

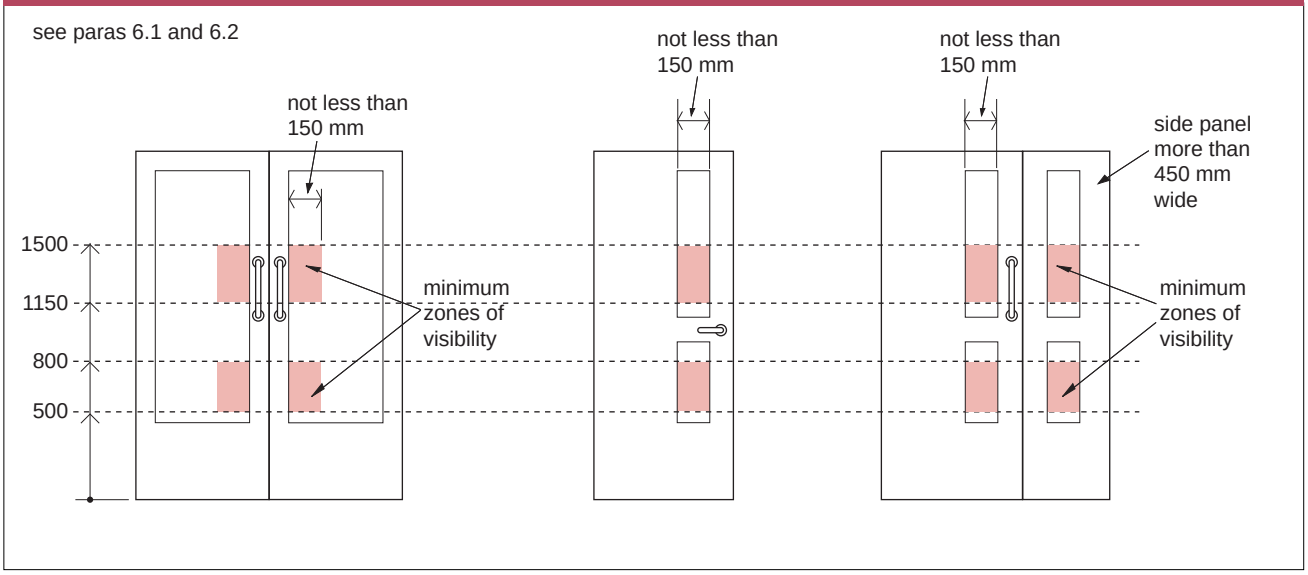
(a) across a main route of travel; or

(b) which can be pushed open from either side,

should have, towards the leading edge of the door leaf, zones of visibility as shown in Diagram 6.1.

6.2 Any side panel that is more than 450 mm wide and is adjacent to a door or gate, that is required by paragraph 6.1 to have zones of visibility, should also have zones of visibility (see Diagram 6.1).

Diagram 6.1 Zones of visibility



6.3 A door or gate that slides or opens upwards shall should have a device to stop it falling in a way that may cause injury.

6.4 A power operated door or gate designed and constructed for vehicular traffic shall should have –

(a) a pressure sensitive edge or other suitable device, which operates the power switch to prevent users being caught or trapped;

(b) a readily identifiable and accessible stop switch; and

(c) provision for manual or automatic opening in the event of a power failure.

6.5 A power operated door or gate designed and constructed for pedestrian use shall should –

(a) incorporate a safety stop or door re-activating device to prevent the door striking a person passing through if the door begins to close; and

(b) revert to manual control or fail safe in the open position in the event of a power failure.

Section 7 Protection from collision with open windows, skylights or ventilators

General provisions

7.1 Where any part of a window, skylight or ventilator, when open, could project more than 100 mm horizontally into a space less than 2000 mm above the ground or floor it should be –

(a) fitted with a suitable device to restrict the projection in normal use to not more than 100 mm; or

(b) marked by a suitable feature such as –

(i) a barrier or rail not less than 1100 mm high;

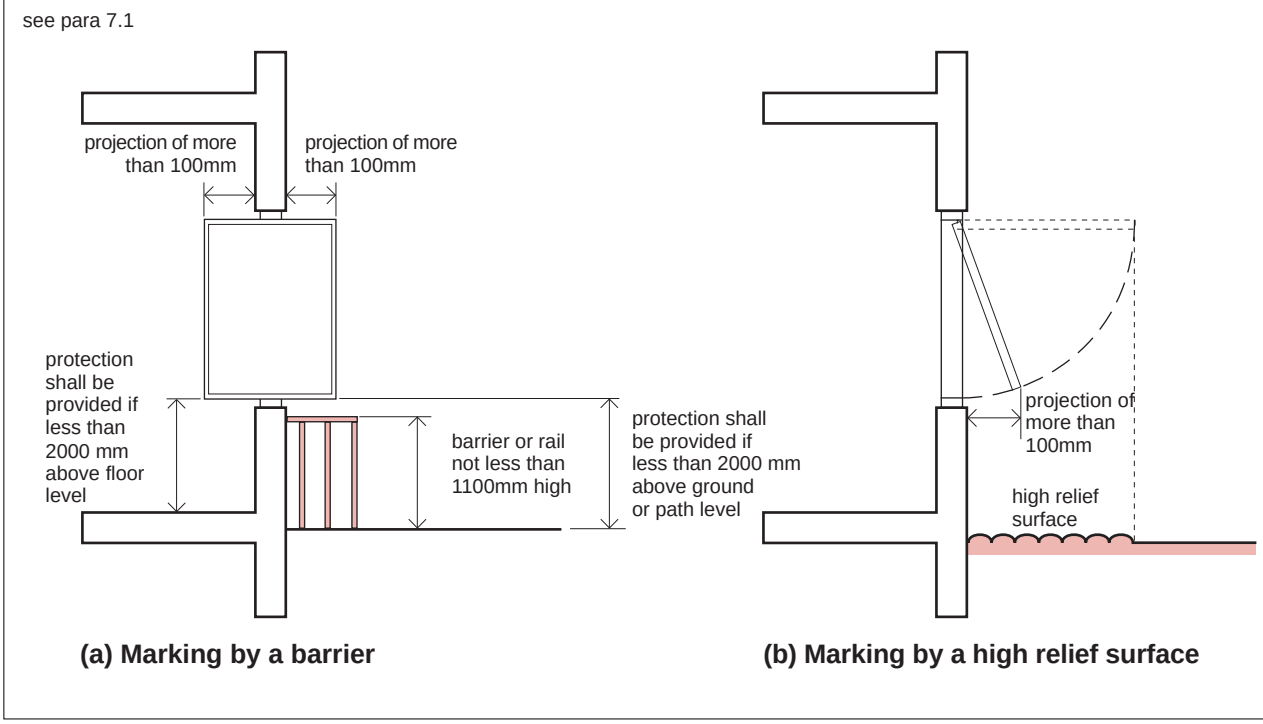
(ii) a high relief surface; or

(iii) a landscape feature,

which extends to at least the maximum projection of the window, skylight or ventilator (see Diagram 7.1).

7.2 In rooms or spaces used solely for maintenance of the building and access to those rooms or spaces is infrequent, it may be appropriate only to highlight any projecting part of a window, skylight or ventilator to make it easier to see.

Diagram 7.1 Marking by a barrier or high relief surface



Appendix Publications referred to

BS EN 1991 Eurocode 1: Actions on structures

Part 1-1: 2002 General actions - Densities, self-weight, imposed loads for buildings

BS 4211: 2005 Specification for permanently fixed ladders

BS 5395 Stairs

Part 2: 1984 Code of practice for the design of helical and spiral stairs

AMD 6076

Part 3: 1985 Stairs, ladders and walkways. Code of practice for the design of industrial type stairs

AMD 14247