

Design of buildings and their approaches to meet the needs of disabled people — Code of practice

ICS 11.180.99; 91.040.01

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee B/209, General building codes, to Subcommittee B/209/8, Access for disabled people, upon which the following bodies were represented:

- Access Association
- Adapt Trust
- British Car Parking Association
- Building Research Establishment
- Centre for Accessible Environments
- Chartered Institution of Building Services Engineers
- Construction Confederation
- Consumer Policy Committee of BSI
- Department for Education and Employment
- Department of Health — NHS Estates
- Department of the Environment for Northern Ireland
- Department of Transport, Local Government and the Regions (DTLR) — Mobility Unit
- Disabled Living Foundation
- Disability Action (Northern Ireland)
- Disability Scotland
- Disability Wales
- Fieldfare Trust
- Institute of Building Control
- Institute of Facilities Management
- Joint Committee on Mobility for the Blind
- Joint Committee on Mobility for Disabled People
- MENCAP
- National Consumer Council
- National Federation of the Blind of the United Kingdom
- National House-building Council
- Passenger Transport Executive Group
- Railtrack
- Royal Association for Disability and Rehabilitation (RADAR)
- Royal Institute of British Architects
- Royal Institution of Chartered Surveyors
- Royal National Institute for the Blind
- Royal National Institute for the Deaf
- Royal Town Planning Institute
- Scottish Office — Building Standards Division
- Spinal Injuries Association
- Sport England
- University of Reading

This British Standard, having been prepared under the direction of the Sector Policy and Strategy Committee for Building and Civil Engineering, was published under the authority of the Standards Policy and Strategy Committee on 31 October 2001

© BSI 3 October 2005

The following BSI references relate to the work on this standard:
Committee reference: B/209/8
Draft for comment: 99/105523 DC, 00/102960 DC, 00/102967 DC, 00/103879 DC, 00/106098 DC, 00/106852 DC, 00/106913 DC

Amendments issued since publication

Amd. No.	Date	Comments
15617	June 2005	See Foreword (tagging wording)
15982 Corrigendum No. 1	October 2005	Correction to 9.1.3, Floor surfaces

ISBN 0 580 38438 1

Contents

	Page
Committees responsible	Inside front cover
Foreword	v
Introduction	1
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Car parking, setting down points and garaging	4
5 Access routes to and around buildings	10
6 Entering a building	23
7 Horizontal circulation	35
8 Vertical circulation	39
9 Surfaces and communication aids	47
10 Facilities in buildings	56
11 Assembly areas	68
12 Individual rooms	85
13 Building types	130
Annex A (informative) Development of legislation on access and facilities for disabled people	144
Annex B (informative) Space allowances for people passing on an access route	145
Annex C (informative) Slip potential characteristics of tread and floor finishes	145
Annex D (informative) Reach ranges	147
Annex E (informative) Space allowances	154
Annex F (informative) Management and maintenance issues	161
Annex G (informative) Using light reflectance values (LRVs) to assess visual contrast	162
Bibliography	164
Figure 1 — Example of a designated on-street parking bay	5
Figure 2 — Access around designated off-street parking spaces	7
Figure 3 — Markings for designated off-street parking spaces	7
Figure 4 — Dimensions of an enclosed parking space for disabled motorists	8
Figure 5 — Key dimensions relating to ticket dispensing machines for use by disabled people	10
Figure 6 — The design of access routes	12
Figure 7 — Projections that need no hazard protection	14
Figure 8 — Projections that need hazard protection	15
Figure 9 — Examples of step profiles and key dimensions	20
Figure 10 — Features of a stepped approach	21
Figure 11 — Handrail design	23
Figure 12 — Manoeuvring sequences of wheelchair users negotiating a door opening towards them	27
Figure 13 — Minimum dimensions of lobbies with single leaf doors	28
Figure 14 — Effective clear width through a doorway	29
Figure 15 — Door location and side clearance	30
Figure 16 — Minimum zones of visibility	31
Figure 17 — Door opening furniture	33
Figure 18 — Dimensions and space allowances for corridors in buildings other than dwellings	36

	Page
Figure 19 — Examples of step profiles and key dimensions	41
Figure 20 — Standard public information symbols	51
Figure 21 — Location of Braille messages on a tactile signboard	53
Figure 22 — Access to storage from the front when seated	57
Figure 23 — Access to storage from the side	58
Figure 24 — Heights of window transoms to allow a view from a wheelchair or chair	61
Figure 25 — Location of window controls and reach limitations for wheelchair users	62
Figure 26 — Height of telephone controls for wheelchair users	63
Figure 27 —  Figure deleted 	64
Figure 28 — Key features of a telephone booth for wheelchair users	65
Figure 29 — Tactile telephone symbol	65
Figure 30 — Heights to the centre of outlets, switches and controls	67
Figure 31 — Distance of outlets, switches and controls from the corner of a room	67
Figure 32 — Space dimensions in front of a work surface	69
Figure 33 — Key heights of counters and reception desks	71
Figure 34 — Space needed to allow access by people with crutches	73
Figure 35 — Spaces for wheelchair users in a general seating layout	74
Figure 36 — Locations of wheelchair spaces in a lecture theatre	77
Figure 37 — Guarding to wheelchair spaces at changes of level on a raked floor	78
Figure 38 — Maintaining sight lines with seating on a raked floor	79
Figure 39 — Sight lines for unfixed seating on a level floor	80
Figure 40 — Lectern and associated equipment heights	81
Figure 41 — Recommended spaces between study tables/desks	83
Figure 42 — Minimum dimensions of an acoustic booth	84
Figure 43 — Kitchen and work surface layout in a kitchen for shared use (with dual height work surfaces)	86
Figure 44 — Work surfaces and accessories	87
Figure 45 — Layout of shared refreshment facility	89
Figure 46 — Bathroom for independent use incorporating a corner WC layout	95
Figure 47 — Bathroom allowing independent use of a corner WC and assisted use of the bath (and WC) using a mobile hoist operated by an assistant	97
Figure 48 — Grab rails and transfer facilities	98
Figure 49 — Bathroom for assisted use of a bath and peninsular WC	99
Figure 50 — Bathroom with a ceiling mounted tracked hoist for independent or assisted use	100
Figure 51 — Self-contained changing area and accessories	104
Figure 52 — Self-contained shower room for independent use	106
Figure 53 — Shower area with corner WC for independent use	108
Figure 54 — Shower area for use with a ceiling mounted tracked hoist for assisted use	109
Figure 55 — Unisex accessible corner WC layout	112
Figure 56 — Examples of techniques for transferring from a wheelchair to a WC	113
Figure 57 — Heights of fittings and fixtures on wall “A” for corner WC layout	114
Figure 58 — Location of mirrors, accessories and wash basins	115

	Page
Figure 59 — Unisex accessible peninsular WC for assisted use	116
Figure 60 — Accessible WC compartment for ambulant disabled people	117
Figure 61 — Urinals accessible to wheelchair users and ambulant disabled people	119
Figure 62 — Lobby, without inner door, accessible to wheelchair users	122
Figure 63 — Space allowances for accessible bedrooms	125
Figure 64 — Examples of accessible bed layouts	126
Figure 65 — Wheelchair access to balconies	128
Figure 66 — Location of wheelchair spaces in front of a rear aisle	137
Figure 67 — Location of wheelchair spaces at a “seatway”	138
Figure B.1 — Space allowances for people on an access route	145
Figure D.1 — Definitions of key wheelchair dimensions	148
Figure D.2 — Minimum dimensions of knee-hole profile	149
Figure D.3 — Reference planes, reach angles and definition of height/depth	151
Figure D.4 — Examples of applying reach range data to common activities	154
Figure E.1 — The manoeuvre and the space required for a 90° turn	156
Figure E.2 — The manoeuvre and the space required for an 180° turn	158
Figure G.1 — Zones of good, acceptable and poor visual contrast in relation to the LRV of two adjacent surfaces	163
Table 1 — Limits for ramp gradients	16
Table 2 — Effective clear widths of doors	29
Table 3 — Limits for ramp gradient	43
Table 4 — Minimum dimensions of a lift car with a single entrance or two opposite entrances	45
Table 5 — Text “x” heights for different types of sign	52
Table 6 — Examples of colour for general signboards	52
Table 7 — Provision of wheelchair spaces in audience seating	76
Table 8 — Maximum reading distances for lettering on television screens	82
Table 9 — Maximum reading distances for lettering as projected images on screens	84
Table C.1 — Potential for slip of dry/unpolished and wet surfaces	146
Table D.1 — Range of wheelchair-related dimensions	148
Table D.2 — Dimensions associated with comfortable and extended reach ranges	150
Table D.3 — Reach ranges associated with common activities	152
Table E.1 — Space required for a sample of self-propelled wheelchairs when stationary	155
Table E.2 — Space required for a sample of electrically propelled wheelchairs when stationary	155
Table E.3 — Space required for a sample of self-propelled and electric wheelchairs when stationary	155
Table E.4 — Space required for a sample of attendant pushed wheelchairs when stationary	156
Table E.5 — Space required for a sample of electric scooters when stationary	156
Table E.6 — Space required for users of self-propelled wheelchairs to turn through 90°	156
Table E.7 — Space required for users of electrically propelled wheelchairs to turn through 90°	157
Table E.8 — Space required for users of self-propelled and electrically propelled wheelchairs to turn through 90°	157

	Page
Table E.9 — Space required for an attendant to turn a wheelchair through 90°	157
Table E.10 — Space required for users of electric scooters to turn through 90°	157
Table E.11 — Space required for users of self-propelled wheelchairs to turn through 180°	158
Table E.12 — Space required for users of electrically propelled wheelchairs to turn through 180°	158
Table E.13 — Space required for users of self-propelled and electrically propelled wheelchairs to turn through 180°	159
Table E.14 — Space required for an attendant to turn a wheelchair through 180°	159
Table E.15 — Space required for a user to turn an electric scooter through 180°	159
Table E.16 — Width required at the side of a vehicle or between vehicles in a car park	159
Table E.17 — Widths for access at the side of a vehicle or between vehicles in a car park	160

Foreword

This British Standard has been prepared by Technical Committee B/209/8. It is a revision and amalgamation of BS 5619:1978 and BS 5810:1979, which are withdrawn.

The start and finish of text introduced or altered by Amendment No. 1 is indicated in the text by tags **A1** **A1**.

This standard provides guidance on good practice in the design of domestic and non-domestic buildings and their approaches so that they are convenient to use by disabled people. The recommendations relate not only to the elements of construction and accommodation which are common to different types of buildings, but also to those that are specific to building types.

For dwellings, however, much of the fundamental guidance in BS 5619 has now been incorporated into the 1999 edition of the Approved Document to Part M (AD M) of the Building Regulations (see Bibliography) as indicative of a basic minimum provision. Where still relevant and considered to be helpful, recommendations from BS 5619 have been incorporated into general guidance in this code of practice and are not normally separately identified as specific to dwellings, nor are dwellings included as a separate building type. Should it be considered desirable to provide new, dwellings-specific guidance for future editions of this British Standard it would be the intention to ensure, as far as practicable, that the timing of its introduction would serve to inform any future review of AD M relating to dwellings.

The design recommendations in this British Standard are, where relevant, based on user trials and validated desk studies which formed part of a research project commissioned in 1997 and 2001 by the Department of the Environment, Transport and the Regions. The scope of this research was based on recommendations included in PD 6523, which concluded that the guidance with respect to the access needs of disabled people was incomplete, in some instances contradictory and, on the whole, not based on validated research.

During the course of development of this British Standard, however, it has become clear that further research will be necessary into risks and inconvenience in buildings to people with sensory impairments. In particular, in one of the areas covered by this code of practice, i.e. visual contrast, there is insufficient authoritative information available to allow detailed guidance to be given although the nature of the problems encountered and the principles involved for indoor situations are described in Annex G and *A design guide for the use of colour contrast to improve the built environment for visually impaired people* [1].

Further research is also required to provide additional guidance on maximum permissible opening forces for door and window furniture, and for acceptable travel distances or times from workstations to accessible unisex WCs on the same floor.

Additional research is currently being undertaken on the safe design of stairs. When results are available this work will be reviewed to establish whether amendments to the recommendations in this code of practice are necessary.

The recommendations in this British Standard are accompanied by scene-setting commentary that place the recommendations in context for readers not familiar with the difficulties experienced by disabled people when approaching and using buildings. In some instances, recommendations are quite specific; in others, they include dimensional ranges. Where dimensions and/or measurements are stated, they are subject to tolerances. Dimensional ranges are intended to provide designers with some flexibility of design solution.

Information on the development of relevant legislation is given in Annex A. The Bibliography contains references which may provide additional guidance to that given in this standard.

As a code of practice, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Annex A, Annex B, Annex C, Annex D, Annex E and Annex F are informative.

This British Standard is available in other formats, e.g. on CD ROM. For information contact BSI Customer Services. Tel: 020 8996 9001. Fax: 020 8996 7001.

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

Compliance with a British Standard does not of itself confer immunity from legal obligation.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to vi, pages 1 to 166, a blank page and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

Introduction

This British Standard explains how the built environment can be designed to anticipate, and overcome, restrictions that prevent disabled people making full use of premises and their surroundings.

An accessible environment is one which a disabled person can enter and make use of independently or with help from a partner or assistant.

Some facilities may be designed in such a way as to incorporate access for disabled people. In other situations, additional features such as grab rails, touch legible signs and hearing enhancement systems may be needed.

The guidance in this standard covers a wide range of impairments and the use of the built environment by disabled people who may be residents, visitors, spectators, customers, employees, or participants in sports events, performances and conferences.

Although not strictly the subject of this code of practice, reference is made on occasion to ways in which management and maintenance can affect safe access and use of facilities by disabled people. The potentially beneficial effect of good management cannot be overemphasized.

1 Scope

This British Standard gives recommendations for the design of new buildings and their approaches to meet the needs of disabled people. It applies to car parking provision, setting down points and garaging, access routes to and around all buildings, and entrances to and interiors of new buildings. Routes to recreational facilities associated with and in the immediate vicinity of buildings, such as patios, and seating and picnic areas, are also covered.

The recommendations given in this British Standard also apply for assessing the accessibility and usability of existing buildings and, where practicable, as a basis for their improvement. The extent to which the recommendations apply to listed and historic buildings is determined on a case by case basis.

This British Standard applies to the following types of building:

- a) transport and industrial buildings, e.g. rail, road, sea and air travel buildings and associated concourses, car-parking buildings and factories;
- b) administrative and commercial buildings, e.g. courts, offices, banks, post offices, shops, department stores and shopping centres, and public service buildings, including police stations;
- c) health and welfare buildings, e.g. hospitals, health centres, surgeries and residential homes;
- d) refreshment, entertainment and recreation buildings, e.g. cafes, restaurants, public houses, concert halls, theatres, cinemas, conference buildings, community buildings, swimming pools and sports buildings;
- e) religious buildings;
- f) educational, cultural and scientific buildings, e.g. schools, universities, colleges, zoos, museums, art galleries, libraries and exhibition buildings;
- g) dwellings and other residential buildings, e.g. hostels, hotels, residential clubs, university and college halls of residence, nursing homes and prisons.

This British Standard does not apply to dwellings or residential buildings designed exclusively for use by disabled people nor does it make specific recommendations relating to the use of buildings by children.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this British Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

BS 3621, *Specification for thief resistant locks*.

BS 4787-1, *Internal and external wood doorsets, door leaves and frames — Part 1: Specification for dimensional requirements*.

BS 5395-1^[A]:2000 ^[A], *Stairs, ladders and walkways — Part 1: Code of practice for the design, construction and maintenance of straight stairs and winders.*

BS 5378 (all parts), *Specifications for safety signs and colours.*

BS 5499-1, *Fire safety signs, notices and graphic symbols — Part 1: Specification for fire safety signs.*

BS 5588-1, *Fire precautions in the design, construction and use of buildings — Part 1: Code of practice for residential buildings.*

BS 5588-8, *Fire precautions in the design, construction and use of buildings — Part 8: Code of practice for means of escape by disabled people.*

BS 5776:1996, *Specification for powered stairlifts.*

BS 6100 (all parts), *Glossary of building and civil engineering terms.*

BS 6180, *Barriers in and around buildings — Code of practice.*

BS 6262, *Code of practice for glazing for buildings.*

BS 6262-4, *Glazing for buildings — Part 4: Safety related to human impact.*

BS 6440, *Power lifting platforms for use by disabled persons — Code of practice.*

BS 6571-4, *Vehicle parking and control equipment — Part 4: Specification for barrier type control equipment.*

BS 7352, *Specification for strength and durability performance of metal hinges for side hanging applications and dimensional requirements for template drilled hinges.*

BS 7594, *Code of practice for audio-frequency induction loop systems.*

BS 8213-1, *Windows, doors and rooflights — Part 1: Code of practice for safety in use and during cleaning of windows, door and rooflights (including guidance on cleaning materials and methods).*

BS 8233, *Code of practice for sound insulation and noise reduction for buildings.*

BS EN 81-1, *Safety rules for the construction and installation of lifts — Part 1: Electric lifts.*

BS EN 81-2, *Safety rules for the construction and installation of lifts — Part 2: Hydraulic lifts.*

BS EN 115, *Safety rules for the construction and installation of escalators and passenger conveyors.*

BS EN 1154:1997, *Building hardware — Controlled door closing devices — Requirements and test methods.*

BS EN 1155, *Building hardware — Electrically powered hold-open devices for swing doors. Requirements and test methods.*

^[A] BS EN 1935, *Building hardware — Single-axis hinges — Requirements and test methods.* ^[A]

BS EN 12051, *Building hardware — Door and window bolts — Requirements and test methods.*

BS EN 12414, *Vehicle parking control equipment — Pay and display ticket machine — Technical and functional requirements.*

BS EN 60118-4, *Hearing aids — Part 4: Magnetic field strength in audio-frequency induction loops for hearing aid purposes.*

[IEC 60118-4:1981]

ISO 9386-2, *Power-operated lifting platforms for persons with impaired mobility — Rules for safety, dimensions and functional operation — Part 2: Powered stairlifts for seated, standing and wheelchair users moving in an inclined plane.*

3 Terms and definitions

For the purposes of this British Standard, the terms and definitions given in BS 6100 (some of which have been replicated for convenience) and the following apply.

3.1

access

access to, and use of, facilities and egress except in cases of emergency

3.2**accessible**

able to be accessed by disabled people

3.3**accessible route**

any route that is used to approach, or move between or within a building, and is accessible to disabled people

3.4**components of ramps, steps and stairs****3.4.1****flight**

ramp or a continuous series of steps between two landings

3.4.2**going**

horizontal distance between two consecutive nosings of a step, measured on the walk-line or the horizontal distance between the start and finish of a flight of a ramp

3.4.3**handrail**

component of stairs, steps or ramps that provides guidance and support at hand level

3.4.4**landing**

platform or part of a floor structure at the end of a flight or ramp, or to give access to a lift

3.4.5**nosing**

projecting front edge of a tread or landing that may be rounded, chamfered or otherwise shaped

3.4.6**ramp**

construction, in the form of an inclined plane 1:20 or steeper from the horizontal or a series of such planes and an intermediate landing or intermediate landings that make it possible to pass from one level to another

3.4.7**rise**

vertical distance between the upper horizontal surfaces of two consecutive treads, or of a landing and the next tread above or below it, or of a flight between two consecutive landings

3.4.8**riser**

vertical component of a step between tread or landing or the tread or landing above or below it

3.4.9**stair clear width**

unobstructed minimum distance on plan perpendicular to the walking line of a stair

3.4.10**tread**

horizontal component of a step

3.5**effective clear width**

available width measured at 90° to the plane of the doorway for passage through a door opening, clear of all obstructions, such as handles and weather boards on the face of a hinged door, when such a door is opened through 90° or more, or when a sliding or folding door is opened to its fullest extent

3.6

illuminance

amount of light falling on a surface, measured in lumens per square metre (lm/m^2) or lux (lx)

3.7

light reflectance value (LRV)

total quantity of visible light reflected by a surface at all wavelengths and directions when illuminated by a light source.

NOTE Surfaces that differ sufficiently in LRV can be distinguished from one another by people with visual impairments, see Annex G. 

3.8

principal entrance

entrance to a building which a visitor would normally expect to approach

3.9

spillover

interference within one induction loop from a signal from another induction loop nearby

3.10

types of lifts

3.10.1

stairlift

lift that travels from one level to another along a line parallel with the pitch line of the stair

3.10.2

chair stairlift

stairlift with a seat, which may be fixed or folding

3.10.3

wheelchair stairlift

stairlift with a horizontal platform which accommodates a wheelchair user

3.10.4

platform lift

lift with a platform and low walls and which travels vertically between two levels and is intended for use standing up or seated on a chair or a wheelchair

3.11

tactile paving

profiled paving surface providing guidance or warning to blind and partially sighted people

3.12

unisex

facility designed for use by either sex with or without assistance by people of the same or opposite sex

3.13

visual contrast (or contrast visually)

perception of a difference visually between one element of a building and another by reference to their light reflectance values (LRV), see Annex G 

4 Car parking, setting down points and garaging

COMMENTARY ON CLAUSE 4. *Car parking, setting down and garaging are important activities at the beginning or end of journeys. Car parks may be open or multi-storey; setting down points may be on- or off-street; journeys may end inside a garage or an enclosed car parking space.*

The driver of a vehicle (alone or accompanied) or a passenger may be disabled and may need to enter or leave the vehicle using a transfer hoist that is usually semi-permanently attached to the vehicle. Alternatively, it may be necessary for a helper to alight from a vehicle first, then assist a disabled companion to do the same. Designated parking bays are for the exclusive use of vehicles displaying the official disabled person's parking badge, providing the badge holder is accompanying the vehicle.

In some instances, a disabled person may need to drive a powered wheelchair or scooter through the rear or side entrance of a vehicle requiring a larger than normal disabled parking bay. Users of electric wheelchairs need a suitable battery charging facility, either at work or at home.

It is important that car park entry and payment equipment is accessible to, and usable by, disabled people. Many types of equipment exist that drivers, whether disabled or not, expect to use without leaving their vehicle.

When parking is associated with a non-domestic building, such as public or commercial buildings, a number of spaces need to be designated for disabled motorists, whether they are visitors or permanent staff members. The provision for disabled motorists will depend on whether the building is new or existing (where the number of disabled motorists who are employees is known).

After parking a vehicle, a disabled person needs to be made aware of the accessible route away from the car park to the principal, or alternative, accessible entrance to the building, this route being quite separate from any vehicular route.

Not all people arrive at their destinations in their own transport and, therefore, the provision of a setting-down point on a level surface, close to the principal entrance of the building, is important.

4.1 Car parking, garaging and enclosed parking

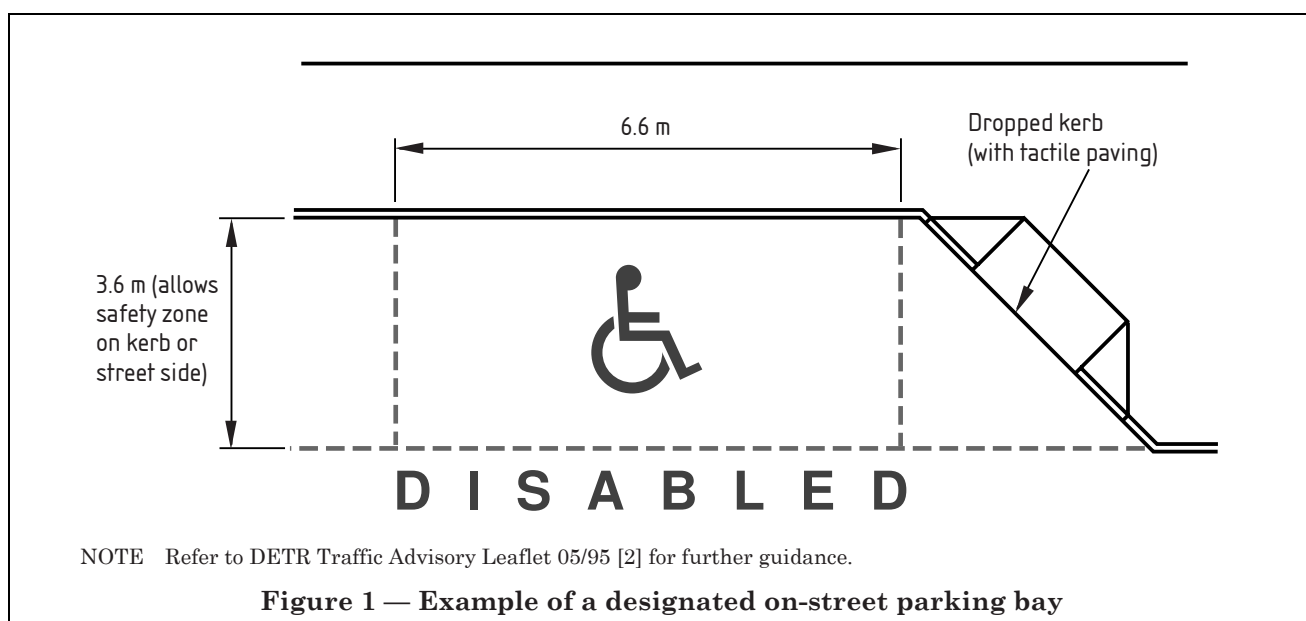
4.1.1 On-street parking bays

Designated on-street parking bays should be provided for disabled people (see DETR Traffic Advisory Leaflet TAL 05/95 — Parking for disabled people [2]).

Kerbside parking bays should be sited where road gradient and camber are reasonably level, e.g. 1:50. The dimensions of parking bays, parallel to the kerb, should be as shown in Figure 1, to permit access to the rear of a vehicle to use a ramp or tail lift and to enable the driver or passenger to alight on the side where traffic may be passing.

COMMENTARY ON 4.1.1. *Some disabled people have difficulty transferring from vehicle to wheelchair or to footway, if the pavement is above the level of the carriageway.*

If feasible, a dropped kerb (with associated tactile paving) should be provided to permit convenient access from the parking bay onto the pavement (see Figure 1).



4.1.2 Provision of designated parking spaces

4.1.2.1 General provision

Designated parking places should be provided for each employee who is a disabled motorist and for other disabled motorists visiting the building. Spaces designated for disabled employees should be differentiated from spaces designated for other users.

NOTE The use of designated parking spaces needs to be monitored regularly to limit misuse by non-disabled motorists and to confirm that the number of designated spaces remains appropriate for the number of disabled motorists using the building. In circumstances where the function of the building is to provide services to a population that includes a greater than normal proportion of disabled people, e.g. day centres and hospitals, the recommended number of designated parking places given in **Table 4.1.2.3**, should be increased, based on experience.

4.1.2.2 Workplaces

For workplaces where the number of employees who are disabled motorists is known, the minimum number of designated spaces should be one space for each employee who is a disabled motorist, plus at least one space or 2 % of the total capacity, whichever is the greater, for visiting disabled motorists, with a minimum of one space.

For workplaces where the number of employees who are disabled motorists is not known, at least one space or 5 % of the total parking capacity should be designated as parking for disabled motorists (to include both employees and visitors), whichever is the greater.

4.1.2.3 Shopping, recreation and leisure facilities

For shopping, recreation and leisure facilities, the minimum number of designated spaces should be one space for each employee who is a disabled motorist, plus 6 % of the total capacity for visiting disabled motorists.

NOTE The numbers of designated spaces may need to be greater at hotels and sports stadia that specialize in accommodating groups of disabled people.

4.1.2.4 Railway car parks

For railway car parks, the minimum number of designated spaces should be one space for each employee who is a disabled motorist, plus 5 % of the total capacity for visiting disabled motorists.

4.1.2.5 Churches

At least two parking spaces designated for use by disabled motorists should be provided in car parking facilities at churches.

4.1.2.6 Crematoria and cemetery chapels

A minimum of two parking spaces designated for use by disabled motorists should be provided as close as possible to the assembly point of a crematorium or cemetery chapel.

4.1.3 Off-street parking spaces, garaging and enclosed parking

4.1.3.1 Uncovered parking areas

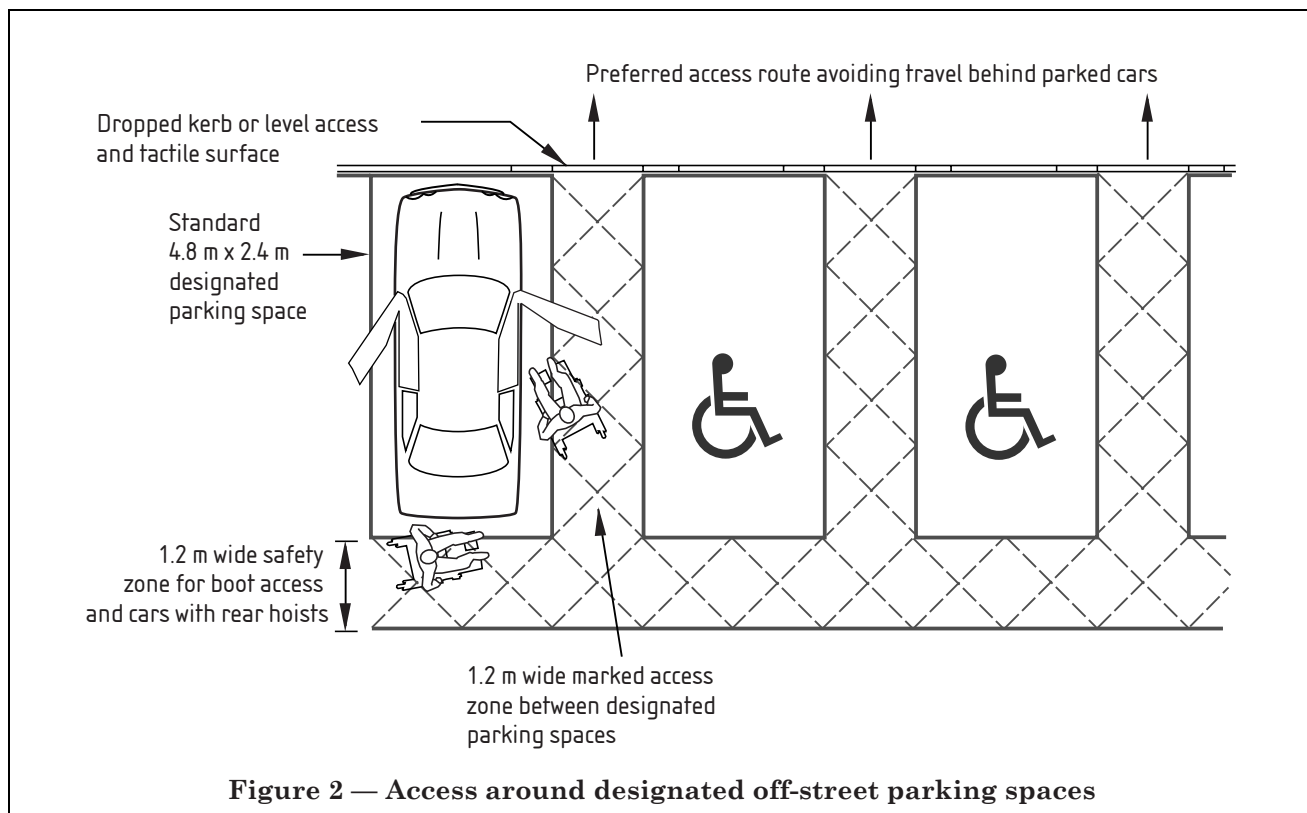
Designated parking spaces in uncovered parking areas should be located on firm and level ground, as close as is feasible to the principal, or alternative, accessible entrance to the building with which the parking spaces are associated.

NOTE In some circumstances, the most suitable location for designated parking spaces may not be near to the building entrance. Where this is the case, a covered footway and/or seating at intervals along the accessible route would make the approach to a building more manageable for disabled people.

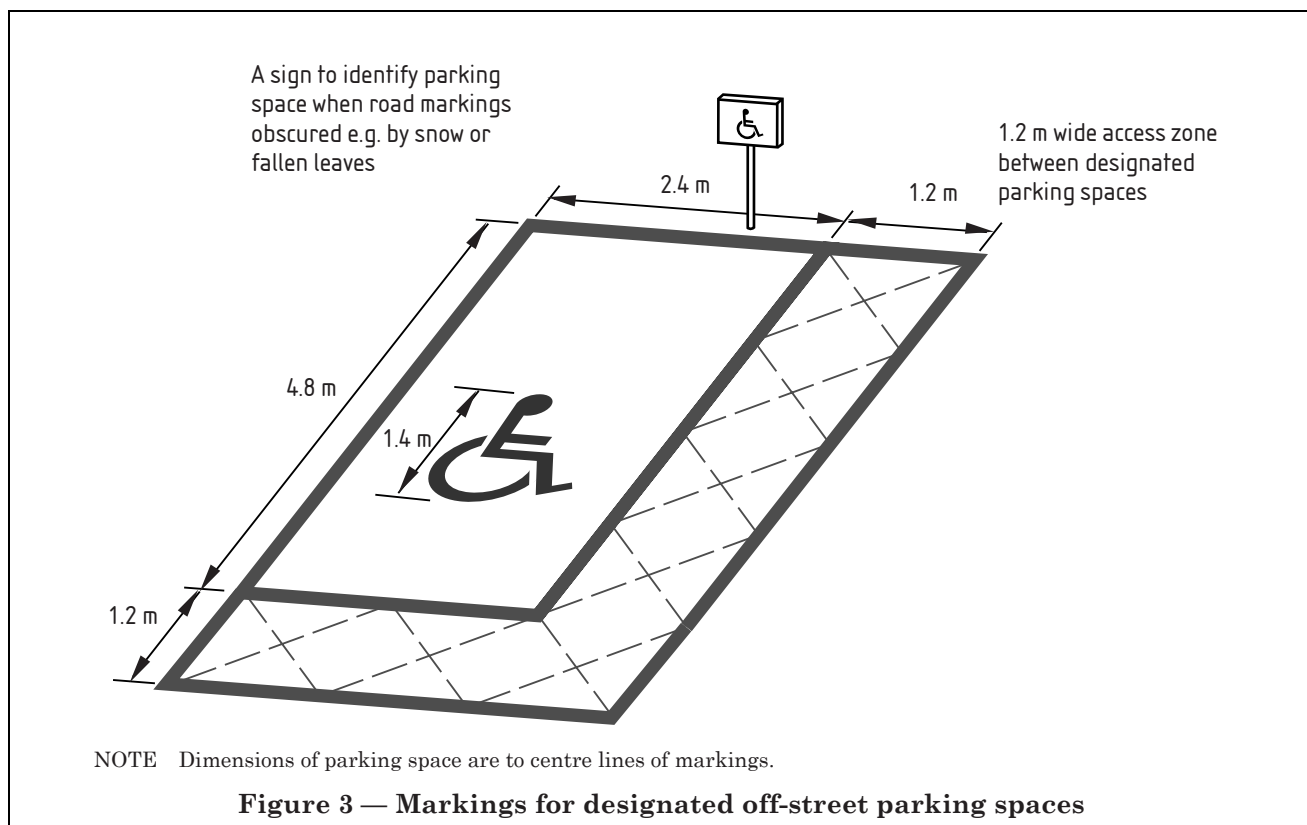
The surface of a designated parking space should be even and stable, with any variation of surface profile not exceeding 5 mm, e.g. between paving, surface features, mix of different surfaces or finishes.

4.1.3.2 Design and layout of designated off-street parking spaces

Space should be available to enable a disabled motorist or passenger to alight from a car and then to manoeuvre around parked vehicles, as shown in Figure 2.



A zone of 1 200 mm wide should be provided between designated parking spaces and between the designated spaces and a roadway to enable a disabled driver or passenger to get in or out of a vehicle. These zones should be marked as shown in Figure 3.



4.1.3.3 Multi-storey car parks

Designated parking spaces should be clearly sign-posted and at the same level as the principal, or alternative, accessible entrance to the building or the main access route to and from the car park. If that is not feasible, a suitable passenger lift or ramp should be provided, linking the different levels. Pedestrian ramps should be designed in accordance with the recommendations given in 5.8.

Signs should be provided, indicating the accessible route to the ticket machine, to the lift, to the storey and final exits and then, if appropriate, to the building being visited.

NOTE It is preferable for a disabled person not to pass behind a parked vehicle, other than his or her own vehicle, nor to use a vehicular route when approaching the principal, or alternative, accessible entrance to the building.

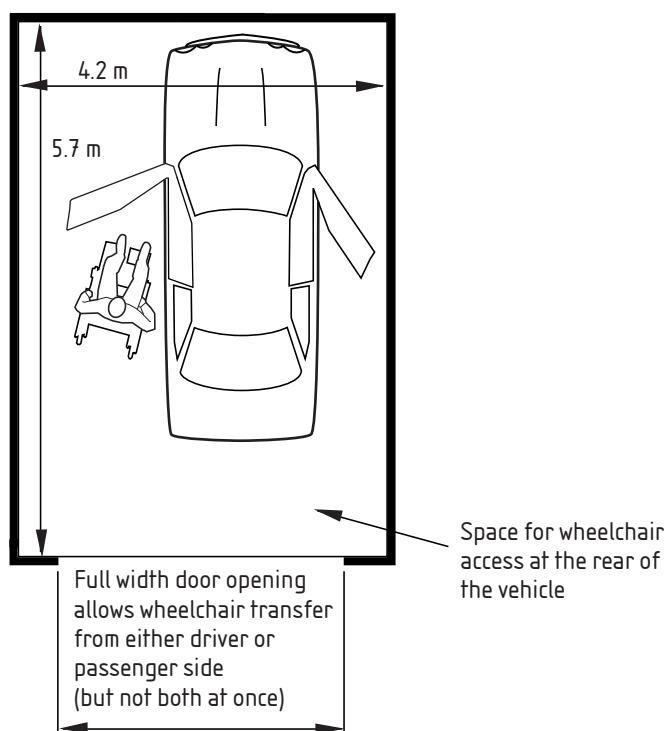
4.1.3.4 Garaging and enclosed parking

If feasible, access to enclosed parking for disabled motorists should be level and under cover.

A single enclosed parking space for use by a disabled motorist, including a wheelchair user, should be large enough to allow the wheelchair user to turn around at the side of the vehicle and to get into and out of the enclosure. The space available should also be sufficient to allow an able-bodied person to alight and then, if necessary, to assist a disabled companion to get out of the vehicle and into his or her wheelchair.

Where power operated doors are fitted to the entrance to enclosed parking or garages, they should be operable from inside the vehicle.

The dimensions of an enclosed parking space should be as shown in Figure 4.



NOTE A greater width of parking space is needed if both driver and passenger are wheelchair users.

Figure 4 — Dimensions of an enclosed parking space for disabled motorists

The clear height (see 4.1.4.3) of the vehicular entrance and the ceiling of an enclosed parking space for use by disabled motorists should permit the use of a wheelchair hoist.

NOTE It may also be necessary to accommodate a vehicle with a high-top conversion.

4.1.4 Entrances to car parks

4.1.4.1 Signs to designated parking spaces

A sign or, if appropriate, signs should be provided at the entrance to each car park and at each change in direction to direct disabled motorists to designated parking spaces.

NOTE Further guidance on signage is given in 9.2.

4.1.4.2 Barrier control systems

The height of ticket, swipe-card or key activated systems for car park barriers should conform to the requirements of BS 6571-4.

COMMENTARY ON 4.1.2.2. *Ticket, swipe card or key activated entrance barrier controls to private car parks are often difficult to reach and to manipulate by drivers with hand or reach impairments.*

When installing or upgrading car park barriers, consideration should be given to the installation of a dual technology control system that will enable disabled motorists who regularly use the car park to gain entry by activating a proximity switch.

4.1.4.3 Vehicle height barrier

Any vehicle height barrier should provide a vertical clearance of 2.6 m from the carriageway to allow the passage of a high-top conversion vehicle. Alternatively, a facility should exist whereby the user of a high-top conversion can make arrangements to pass through. The vertical clearance should be maintained from the entrance to the car park to (and including) the designated parking spaces and exits from those spaces.

If it is not feasible to maintain the recommended vertical clearance along the route to the designated parking spaces, drivers of high-top conversion vehicles should be warned about the height restrictions at a point before they begin to enter the car park, or where they might be locked in a queue from which they cannot exit. At that point, there should be directions to a suitable alternative parking space.

NOTE Ceiling heights in multi-storey car parks are generally about 2.75 m. However, if this height is not possible to achieve throughout the building a proportion of designated parking spaces may need to be provided outside the building.

4.1.5 Parking meters, controls and ticket dispensers

4.1.5.1 Information

Information, including payment terms, should be provided at the entrance to a car park to make it clear whether or not free parking is available to disabled motorists.

4.1.5.2 Pay-and-display systems

Where a pay-and-display system is in operation and free parking is not provided for disabled people, a suitably designed pre-payment machine should be provided conforming to BS EN 12414. The pre-payment machine (e.g. a ticket dispenser) should be positioned close to the designated parking space or spaces.

4.1.5.3 Ticket dispensers

The height above ground of the controls for ticket dispensers, and of slots for coins or cards that need to be operated from a wheelchair, should be at least 750 mm and not more than 1 200 mm, as shown in Figure 5.

NOTE 1 For non-wheelchair users, the height of controls may be between 1 000 mm and 1 400 mm (see BS 6571-6).

The space in front of a meter or a ticket dispenser associated with a designated parking space, or designated parking spaces, should be level, free from obstruction, and of the dimensions shown in Figure 5.

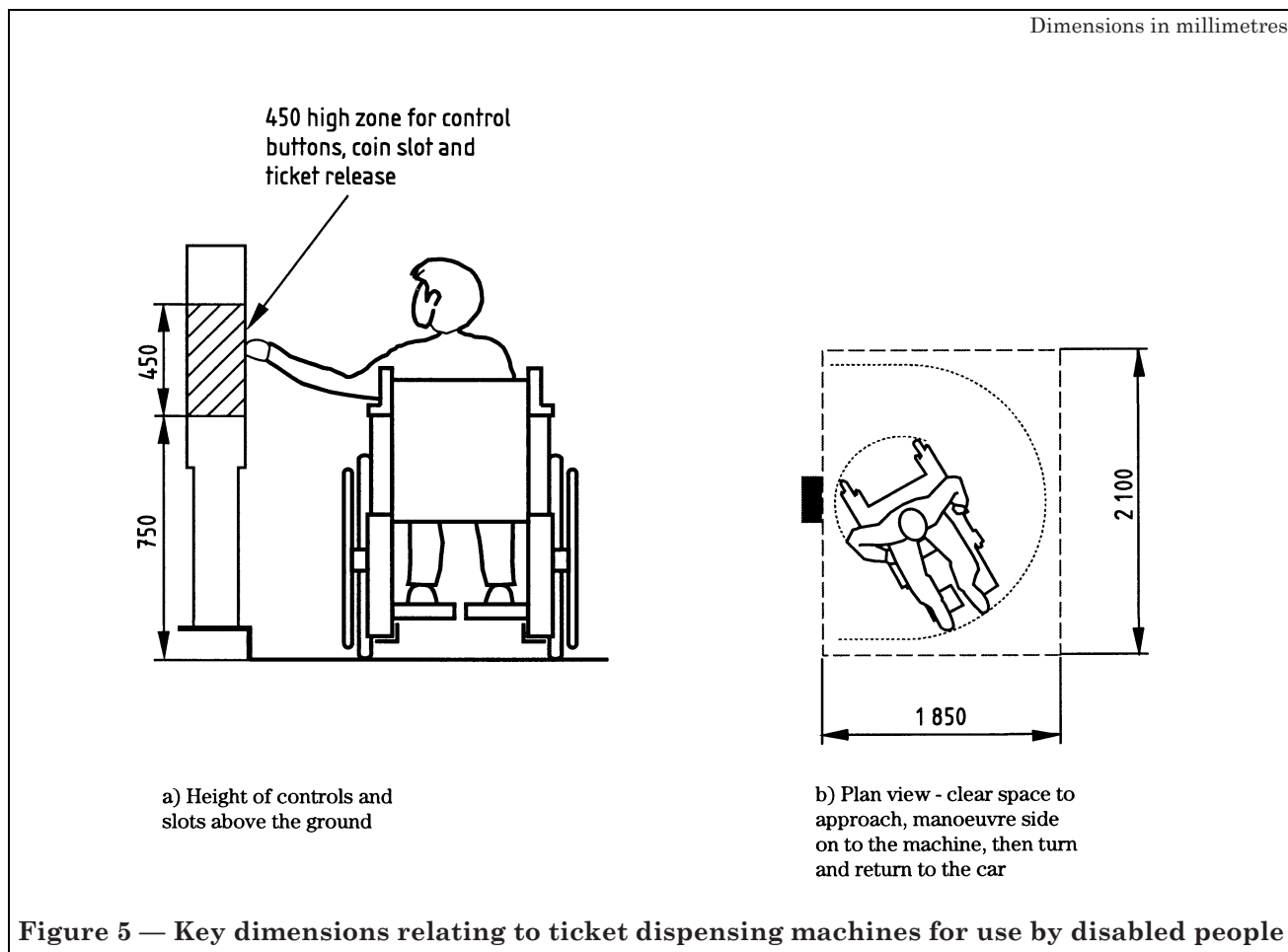


Figure 5 — Key dimensions relating to ticket dispensing machines for use by disabled people

The plinth below a ticket dispenser or car park barrier control box should not restrict the ability of a wheelchair user to operate the equipment.

NOTE 2 However, for maximum accessibility the plinth should not project beyond the face of the equipment.

4.2 Setting down points

If feasible, a designated setting-down point suitable for disabled passengers should be provided on firm and level ground, close to the principal or alternative, accessible entrance to a building. Its location should be clearly indicated. This setting down point should be provided in addition to designated parking spaces near entrances for disabled passengers in taxis or dial-a-ride vehicles.

The surface of the footway, alongside a setting-down point, should be level with the carriageway at that point, to allow convenient transfer onto and from a wheelchair.

If feasible, a setting down point should be covered to provide protection from the weather.

5 Access routes to and around buildings

COMMENTARY ON CLAUSE 5. *It is important to restrict the number of barriers, restrictions or other hazards that disabled people encounter on their approach to and from a building. Low level bollards and chain linked posts, for example, are particularly hazardous to blind and visually impaired people.*

For disabled people who need a generous amount of space when moving about, the provision of narrow approaches creates difficulties. The more frequently a specific route is used, the more often people will need to pass each other, and the wider the access route will need to be.

Uneven surfaces, surfaces of loose materials (e.g. gravel) and large gaps between paving materials cause problems for wheelchair users, people with impaired vision and people who are, generally, unsteady on their feet.

Street furniture, flower tubs, litter bins and signposts are all intended to improve the environment but, whether free-standing or projecting from a building, they are hazardous if not carefully designed and positioned. For people with impaired vision, the presence of warnings underfoot, or warnings that can be detected during the sweep of a cane, will reduce the risk of colliding with items located along the access route.

5.1 General

Continuous unobstructed access routes to and around buildings should be provided in the following locations:

- a) from the highway and designated car parking spaces to the principal, or an alternative, accessible entrance to the building;
- b) externally, between the principal entrance and any other subsidiary entrances and buildings, if external circulation is required between them;
- c) between buildings; and
- d) to and from facilities associated with, and in the immediate vicinity of, buildings.

Access routes should not contain steps, stairs, turnstiles, revolving doors, escalators or other features which constitute a barrier to disabled people unless a suitable means for bypassing the barrier has been provided close by and is always available for use.

Access routes on level ground should have resting places not more than 50 m apart for people with impaired mobility.

5.2 Width and height of an access route

To be accessible, the minimum unobstructed width of an access route should be:

- a) at least 1 800 mm, if there is intense simultaneous use in both directions by the population at large, including people in wheelchairs;
- b) at least 1 500 mm, if the route is less busy and passing places are provided for wheelchair users (see 5.3);
- c) at least 1 200 mm, in exceptional circumstances, e.g. for rarely used access routes;
- d) at least 900 mm, for paths within the curtilage of a single dwelling.

These widths should be maintained up to a height of at least 2.1 m above ground level.

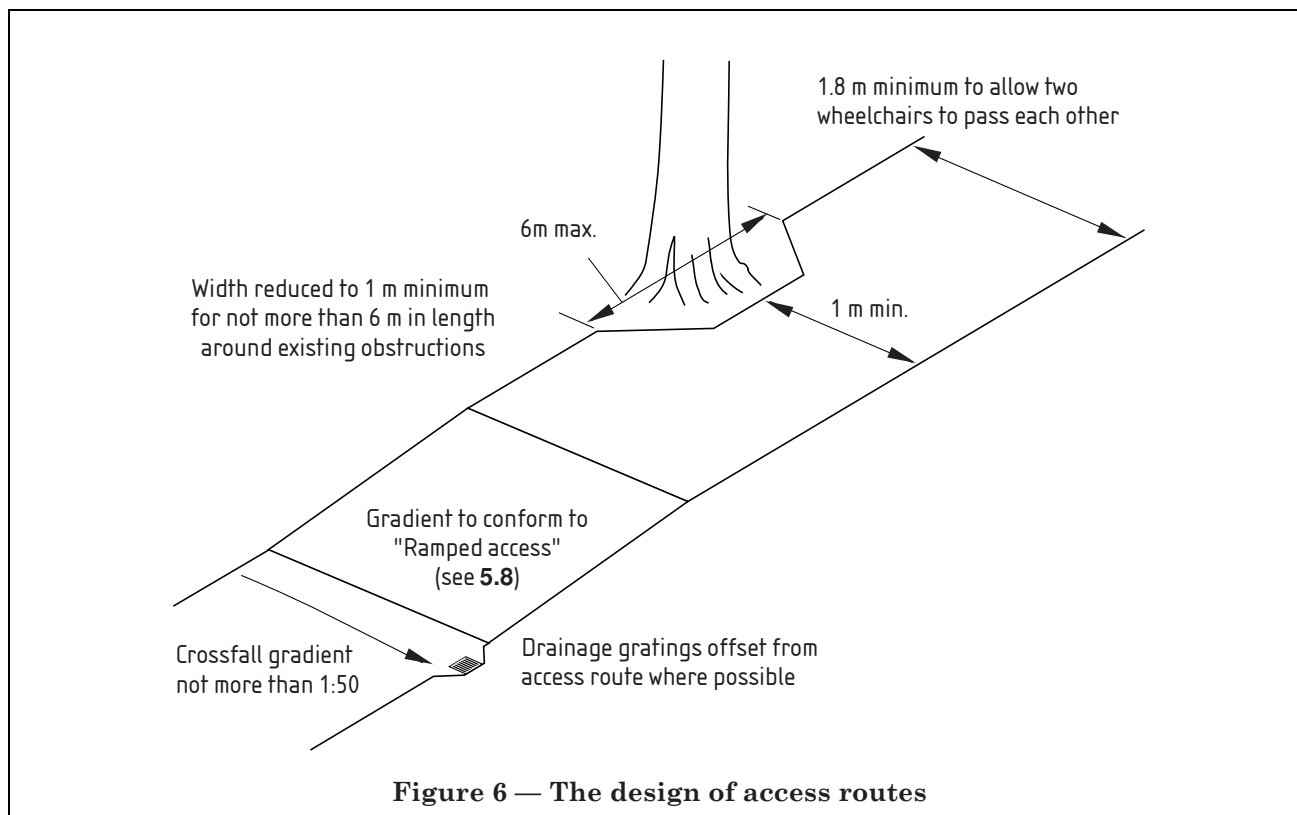
NOTE The space required for wheelchairs and people to pass each other on an access route is shown in Annex B.

5.3 Passing places

Where an access route is predominantly less than 1 800 mm wide, passing places should be provided to allow two wheelchair users to pass each other.

A passing place should be 2.0 m long and 1 800 mm wide and located within direct sight of another passing place, or at a maximum distance of 50 m from another, whichever is the closer.

Where it is necessary to introduce occasional narrowing of the access route, the restricted width should be at least 1 000 mm and should extend for not more than 6.0 m in length (see Figure 6). However, measures should be taken to prevent narrowing being a hazard (see 5.7.2).



5.4 Gradients

An access route should either be level or have the shallowest possible gradient.

Any access route, or any part of it, that has a gradient of 1:20 or steeper, should conform to the recommendations for ramped access given in 5.8.

The cross-fall gradient across a level access route should not exceed 1:50, except when associated with a dropped kerb.

NOTE While it is acknowledged that cross-fall gradients present difficulties for wheelchair users, there is the risk that surface water will form puddles then freeze unless a cross-fall gradient ensures effective drainage.

5.5 Footway and footpath surfaces

5.5.1 General

An access route should have a firm, slip-resistant and reasonably smooth surface. Cobbles, bare earth, sand and loose gravel should not be used.

NOTE BS 5395-1 contains guidance on the slip resistance of floor surfaces.

With the exception of recognized tactile paving, undulations in the surface of paving, whether paving slabs, blocks, bricks or formless materials such as concrete or asphalt, should not exceed 5 mm under a 3 m straight edge.

The difference in level between adjacent paving units or utility access covers and paving units should be no greater than 5 mm. If feasible, the joints between paving units should be flush. Otherwise, the joints should be no wider than 10 mm and no deeper than 5 mm.

5.5.2 Tactile paving

Tactile paving should be used on access routes to provide warning and guidance to blind and partially sighted people. It should be used sparingly and only after consultation with user groups representing visually impaired people (contact the RNIB¹⁾ for details).

NOTE For detailed guidance on the use and layout of tactile warning and information surfaces see *Guidance on the use of tactile paving surfaces* [3].

5.6 Drainage gratings

If feasible, drainage gratings should be positioned beyond the boundaries of the access route. Gratings within an access route should be set flush with the surrounding surface.

Slots in gratings should be not more than 13 mm wide and set at right angles to the dominant line of travel. The diameter of circular holes in gratings should be not more than 18 mm.

COMMENTARY ON 5.6. *The recommendation on the size of slots in gratings is intended to reduce the risk of trapping the ends of canes and of wheelchair wheels becoming stuck.*

Dished channels should not be incorporated within an access route as they increase the risk of tripping.

5.7 Barriers, restrictions and hazards

5.7.1 Street furniture

5.7.1.1 Location of street furniture

Street furniture, such as lighting columns, signposts, litter bins and seats, should be located at or beyond the boundaries of an access route.

If, for practical reasons, it is necessary to locate items of street furniture within an access route, their presence should be clearly apparent, for example by ensuring that they contrast $\mathbb{A}_1$ visually $\mathbb{A}_1$ with the background against which they will be seen.

NOTE 1 $\mathbb{A}_1$ Less is known about how to achieve adequate visual contrast in external environments than in internal environments $\mathbb{A}_1$ (see NOTE 2 to 9.1.1).

5.7.1.2 Free-standing posts and columns

Each free-standing post and column within an access route should incorporate a band, 150 mm high, whose bottom edge is 1 500 mm above ground level, and which contrasts $\mathbb{A}_1$ visually $\mathbb{A}_1$ with the remainder of the column or post.

NOTE 1 $\mathbb{A}_1$ Less is known about how to achieve adequate visual contrast in external environments than in internal environments $\mathbb{A}_1$ (see NOTE 2 to 9.1.1).

Free-standing columns that support an entrance canopy and low level posts, e.g. bollards, should not be positioned within the width of an access route.

Bollards should be at least 1 000 mm high and should not be linked with chains.

NOTE 2 Further guidance is available in *Guidance on best practice in meeting the needs of disabled people in the pedestrian environment and in transport related infrastructure* [4].

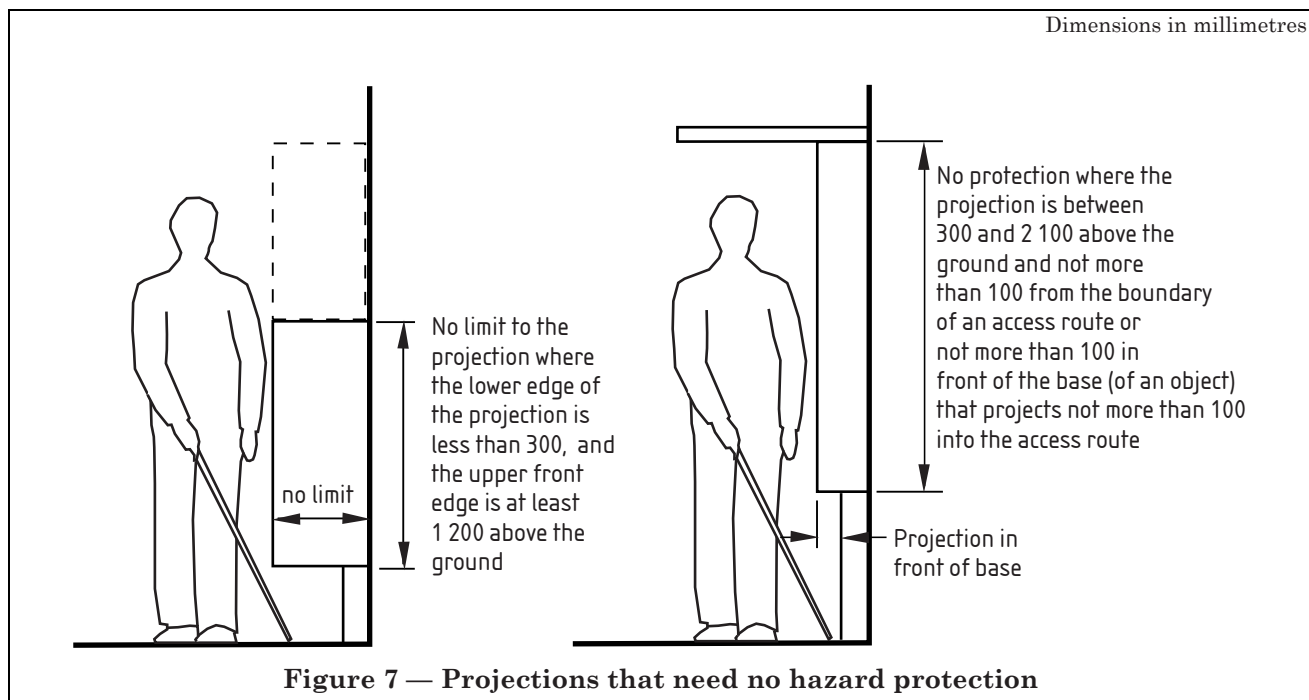
5.7.2 Provision of hazard protection within an access route

The swing of entrance and exit doors, and windows, should not extend into an access route. However, if this is unavoidable, hazard protection should be provided.

No hazard protection needs to be provided if objects (e.g. vending machines):

- a) project not more than 100 mm into an access route, or not more than 100 mm from their base if the base projects not more than 100 mm into the access route; or
- b) project more than 100 mm into an access route, but their lower edge is less than 300 mm above the ground and their upper edge is at least 1 200 mm above the ground (see Figure 7).

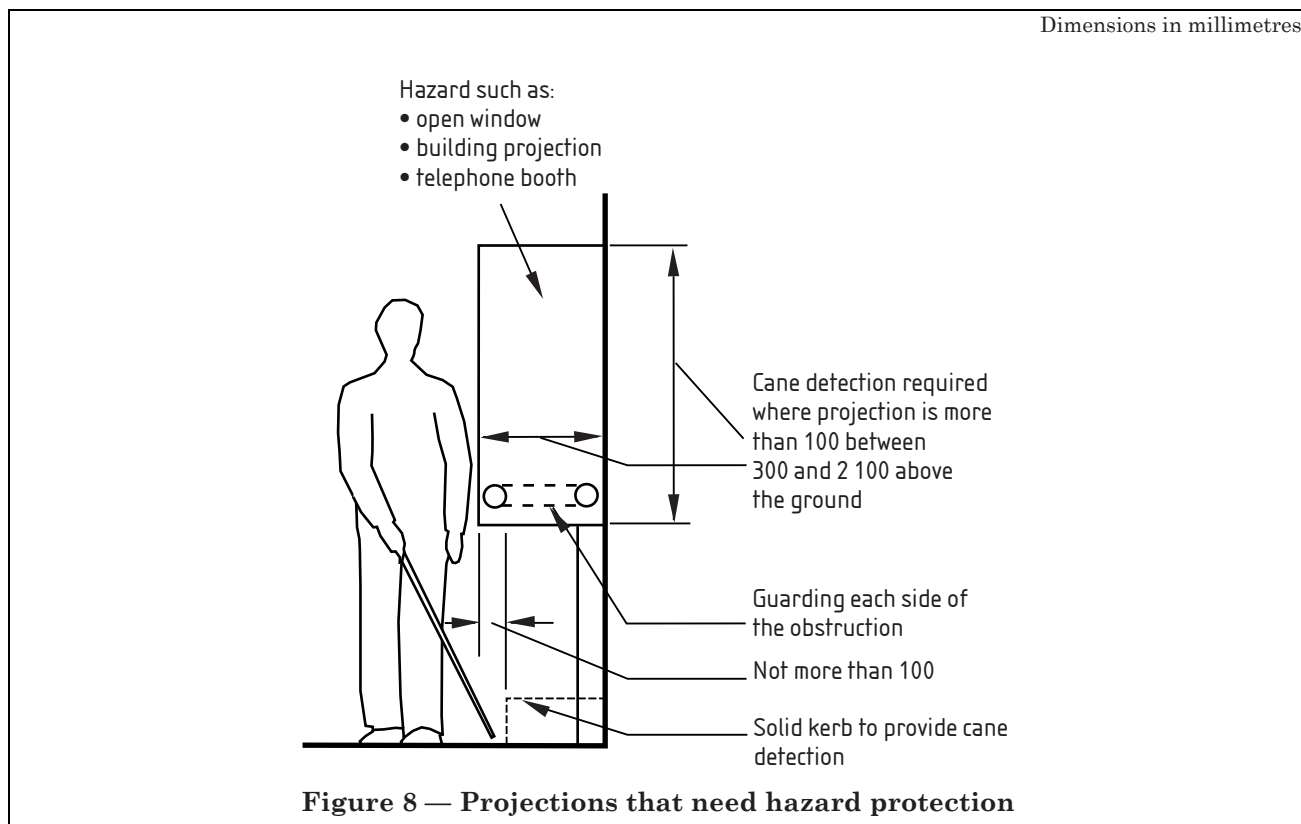
¹⁾ Royal National Institute for the Blind (RNIB), 224 Great Portland Street, London W1N 6AA.



Hazard protection should be provided if objects project more than 100 mm into an access route and their lower edge is more than 300 mm above the ground (see Figure 8).

Hazard protection associated with such objects should take the form of a kerb or other solid barrier so that a blind or partially sighted person can detect the hazard using a cane. The hazard protection should not extend beyond the front edge of the object, nor should it be set back more than 100 mm from its front edge.

In addition to a means of cane detection, guarding at a level between 900 mm and 1 100 mm from the surface of the accessible route should be installed to guide people around an obstruction.



5.7.3 Free-standing stairs and ramps

Where possible, areas below stairs or ramps should be enclosed where the soffit is less than 2.1 m from floor level.

If, at any point where the clear height is less than 2.1 m, and the area below the soffit is not enclosed, the risk of people colliding with the underside of a ramp or stair should be limited by providing:

- a) a protective guardrail and low level cane detection; or
- b) permanent raised flower beds or tubs which extend at least 900 mm above ground level.

COMMENTARY ON 5.7.3. *Tapping rails or low kerbs should not be used beneath free-standing stairs as they can be a tripping hazard.*

5.7.4 Automatic teller machines (ATMs)

If feasible, automatic teller machines situated on the outside of buildings should be protected from the weather as disabled people's interaction with powered devices may be protracted because of poor vision, lack of manual dexterity or limited reach. They should be located so that the display is screened from the sun (see also 10.2).

5.8 Ramped access

COMMENTARY ON 5.8. *This code of practice recommends that the approach to a building is level (see 5.4 and 5.8.1). If a change in level along the access route is unavoidable, it will be necessary to provide a sloped surface on which a wheelchair user can travel. However, as some ambulant disabled people have difficulty using ramps, it is undesirable for a ramp to be the only approach to a building.*

The key issues in the design of a ramped access route are the gradients of flights and the distances between landings. Where the gradient is too steep or an individual flight too long, a wheelchair user may not have sufficient strength to propel him- or herself up the slope. In the same situation, a companion who is pushing a wheelchair user is also likely to encounter the same difficulties. If the gradient is too steep, there is also the danger of a wheelchair user falling out forwards when going downhill, or of his or her wheelchair tipping over backwards when going uphill. Control and braking are also difficult on steep gradients. Excessive cross gradients present further difficulties when manoeuvring on ramps.

An existing building may need to be equipped with a portable ramp if modification of the existing structure is considered inappropriate. Alternatively, it may be appropriate to install a platform lift close to the entrance.

5.8.1 General

The relative levels of the principal entrance to the building and the entry point to the site (as well as access routes across the site) should be designed to eliminate, as far as is practicable, the need for ramped access (see 5.4).

NOTE Where the change in level is no greater than 200 mm, a ramp may be acceptable as the only means of access, avoiding the need for a step.

The existence and location of a ramp should be clearly indicated as a person approaches a building. If the beginning of the ramp cannot be located close to the principal entrance, information should be provided at that point to direct users to the correct location. The text should be in large characters, contrasting  visually  with their background, and be accompanied by the International Symbol for Access (see 9.2).

5.8.2 Gradient of a ramp

A ramp should have the lowest practical gradient. Where the access route has a gradient of 1:20 or steeper it should conform to the recommendations for ramps.

The going of an individual flight of a ramp and the maximum gradient of a ramp should conform to Table 1.

NOTE Different design solutions may be needed in transport infrastructure (see [4]).

Table 1 — Limits for ramp gradients

Going of a flight	Maximum gradient
10 m	1:20
5 m	1:15
Not exceeding 2 m	1:12
NOTE For goings between 2 m and 10 m, it is acceptable to interpolate between the maximum gradients, i.e. 1:14 for a 4 m going or 1:19 for a 9 m going.	

No individual flight of a ramp should have a going of more than 10 m or a rise of more than 500 mm. No series of ramps to a building should rise in total more than 2 m. If a series of ramp flights rise more than 2 m an alternative means of access, such as a lift, should be provided.

COMMENTARY ON 5.8.2. *Beyond a certain height, ramps become too tiring for the user, even if a number of rest landings have been provided.*

The maximum cross-fall gradient slope of a ramp should be 1:50.

5.8.3 Ramp widths

The minimum surface width of a ramp should be 1 200 mm (see 5.2).

COMMENTARY ON 5.8.3. *In practice, the choice of ramp width will relate to the intensity of use: for example, an unobstructed width of 1 800 mm is the minimum that permits two wheelchair users to pass each other.*

5.8.4 Landings

Landings should be provided at the foot and head of a ramp. They should be at least the width of the ramp and a minimum of 1 200 mm long, clear of any door swing or other obstruction.

Any intermediate landings along a series of ramps in a straight line should be at least 1 500 mm long, clear of any door swing or other obstruction. If an intermediate landing is a quarter- or half-turn landing, the width of the ramp should be maintained throughout the turn or turns.

Unless it is under cover, a landing should have a slight cross-fall gradient, not exceeding 1:50, to help drain surface water.

NOTE If there is likely to be frequent use of the ramp by people in wheelchairs, it may be advisable to increase the width of an intermediate landing to 1 800 mm so that it can serve as a passing place.

5.8.5 Handrails to ramps

If a ramp is more than 2 m long between landings, or if there is no alternative stepped access, handrails should be provided on each side. If a ramp is 2 m long or less between landings, and there is alternative stepped access, a handrail should be provided on at least one side.

COMMENTARY ON 5.8.5. *Wheelchair users do not normally need to use handrails to negotiate a ramp. However, in slippery conditions on long and/or steep ramps, handrails may help wheelchair users steady themselves. An ambulant disabled person, may be weaker on one side and, therefore, a handrail on each side of the flight is essential for support, for ascending and descending longer ramps.*

The minimum distance between handrails should be 1 000 mm.

NOTE 1 This recommendation may give rise to a ramp whose surface width exceeds the minimum of 1 200 mm, depending on the size of the handrail and the type of handrail support.

NOTE 2 Where there is no stepped access to the building and the unobstructed width (i.e. between handrails) of a ramp $\langle A_1 \rangle$ used simultaneously by a large number of people $\langle A_1 \rangle$ exceeds 2.0 m a central, continuous handrail may be used in addition to a handrail on each side.

A handrail should:

- a) be located with its top edge at least 900 mm and not more than 1 000 mm above the surface of the ramp and its landings and not more than 100 mm beyond the surface width of the ramp;
- b) be finished so as to $\langle A_1 \rangle$ provide visual $\langle A_1 \rangle$ contrast with the surroundings;
- NOTE 3 $\langle A_1 \rangle$ For recommendations on visual contrast, see 9.1.1.1. Less is known about how to achieve adequate visual contrast in external environments than in internal environments $\langle A_1 \rangle$ (see NOTE 2 to 9.1.1.1).
- c) if feasible, be continuous around intermediate landings; and
- d) be easy and comfortable to grip, and $\langle A_1 \rangle$ if situated externally, $\langle A_1 \rangle$ not cold to the touch;
- e) extend beyond the start and finish of the ramp by at least 300 mm.

NOTE 4 For detailed recommendations on handrail design, including suitable profiles, see 5.10.

$\langle A_1 \rangle$ NOTE 5 For information on the interpretation of “cold to the touch”, see NOTE 2 to 5.10.1. $\langle A_1 \rangle$

5.8.6 Surface materials

The surface materials used for a ramp should be chosen to be easy to maintain and as slip resistant as possible, especially when wet, or if spillage occurs.

NOTE BS 5395-1 contains guidance on the slip resistance of floor surfaces.

The $\langle A_1 \rangle$ $\langle A_1 \rangle$ surface of a ramp should contrast $\langle A_1 \rangle$ visually $\langle A_1 \rangle$ with that of a landing so that its presence is distinguishable by people with impaired vision.

Where different materials are used for the flights and landings of a ramp, care should be taken to ensure that their slip characteristics (e.g. coefficient of friction) are similar in order to minimize the risk of stumbling.

5.8.7 Protection against falling

Where the natural ground at the side of a ramp is at a different level from the ramp, precautions should be taken to prevent a wheelchair falling over the edge. Such precautions may include:

- a) a landscaped margin, level with the edge of the ramp for a distance of 600 mm before starting to gradually fall away;
- b) a handrail or other appropriate guarding;
- c) a kerbed upstand at least 100 mm high, $\langle A_1 \rangle$ contrasting visually with $\langle A_1 \rangle$ the ramp, $\langle A_1 \rangle$ $\langle A_1 \rangle$ where a ramp runs along the side of a building and there is no handrail on the open side.

NOTE 1 Where landscaping slopes down to a ramp, no special precautions are necessary. The use of an isolated upstand is not recommended for a ramp in open landscaping as it can be a potential hazard for ambulant people.

NOTE 2 $\langle A_1 \rangle$ Less is known about how to achieve adequate visual contrast in external environments than in internal environments $\langle A_1 \rangle$ (see NOTE 2 to 9.1.1.1).

Guarding should conform to BS 6180 (see 8.2.7).

5.8.8 Lighting

Care should be exercised in the location and orientation of a ramp (even when there is also a stepped access route) to avoid, where possible, glare and cross shadows which can prevent people with impaired vision distinguishing changes in gradient.

A ramp should be well lit artificially, with an illuminance at the top and bottom of each flight of the ramp of at least 100 lux.

5.8.9 Portable or temporary ramps

Portable or temporary ramps, which may be necessary for existing buildings if there is limited space available, e.g. if an entrance door opens directly onto the back of a footpath, should be positioned and their presence identified so that they do not constitute a hazard to passers-by.

Portable or temporary ramps should not be used as a design solution for new buildings.

Portable and temporary ramps should have a surface width of at least 800 mm, a drainable, slip-resistant surface and upstands to prevent wheelchair tyres veering off the edge.

NOTE Temporary two-channel ramps are not suitable for three-wheeled scooters.

5.9 Stepped access

COMMENTARY ON 5.9. *People with impaired sight risk tripping or losing their balance if unaware of steps in the access route to a building. For such people, the provision, underfoot, of a timely warning that there is a change in level is essential. The greatest risk of tripping is at the head of a flight of steps. The warning needs to be placed sufficiently in advance of the hazard to allow time to stop and not so narrow that it might be missed in a single stride.*

Many ambulant disabled people find it easier to negotiate a flight of steps than a ramp and, for them, the presence of handrails for support is essential.

5.9.1 Protection for stepped access routes

If feasible, stepped access routes should be protected from inclement weather.

5.9.2 Design of steps

COMMENTARY ON 5.9.2. *For steps to be comfortable to use, the rise and going need to reflect stride length while keeping within dimensional limits.*

Excessively high risers may result in excessive strain being placed on the knee and/or hip joints of ambulant disabled people, when descending flights of stairs.

When ascending a stair, people who wear callipers or who have stiffness in hip or knee joints are particularly at risk of trapping the toes of their shoes beneath projecting nosings, and of tripping as a result. In addition some visually impaired people may feel a sense of insecurity when looking through open treads.

Steps should be designed in accordance with BS 5395-1.

The sum of the going plus twice the rise ($g + 2r$) should be at least 550 mm and not more than 700 mm.

The preferred range for the rise of a step should be 150 mm to 170 mm.

NOTE 1 In exceptional circumstances, the rise could be within the minimum and maximum limits of 100 mm and 180 mm respectively (see Figure 9). A rise of 180 mm may be acceptable where it can be shown that due to constraints of plan area, it is necessary to increase the rise to accommodate a stair.

The rise of each step within a flight, and within a series of flights, should be uniform.

The going for a step should be 250 mm to 300 mm, with a preference for 300 mm. Goings within a flight should be uniform and treads slip resistant.

NOTE 2 BS 5395-1 contains guidance on the slip resistance of floor surfaces.

Preferably, a step should not overlap the one below. If there is an overlap, the nosing should not project over the tread below by more than 25 mm.

The riser should not be open and its profile should conform to the examples illustrated in Figure 9 to ensure that people who drag their feet do not trip when ascending.

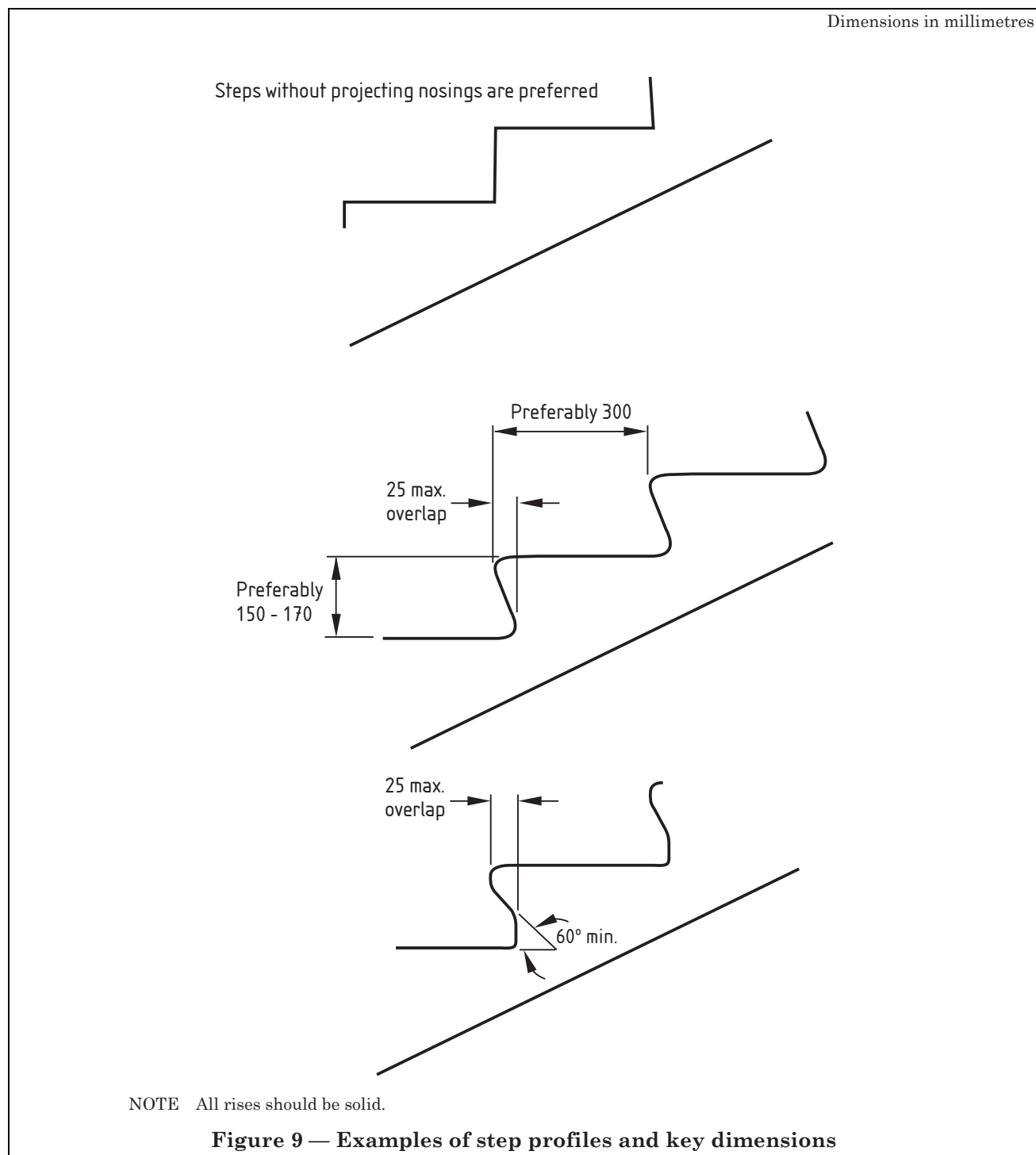
5.9.3 *Rise of a flight*

No flight in a stepped access route should contain more than 12 risers and, as far as possible, the numbers of risers in successive flights should be uniform.

The provision of isolated single steps should be avoided.

5.9.4 Width of a stepped access route

The unobstructed width (i.e. between handrails) of a stepped access route should be at least 1 000 mm.



5.9.5 Identification of nosings

Each step nosing should contrast in colour and luminance with the remainder of the respective tread.

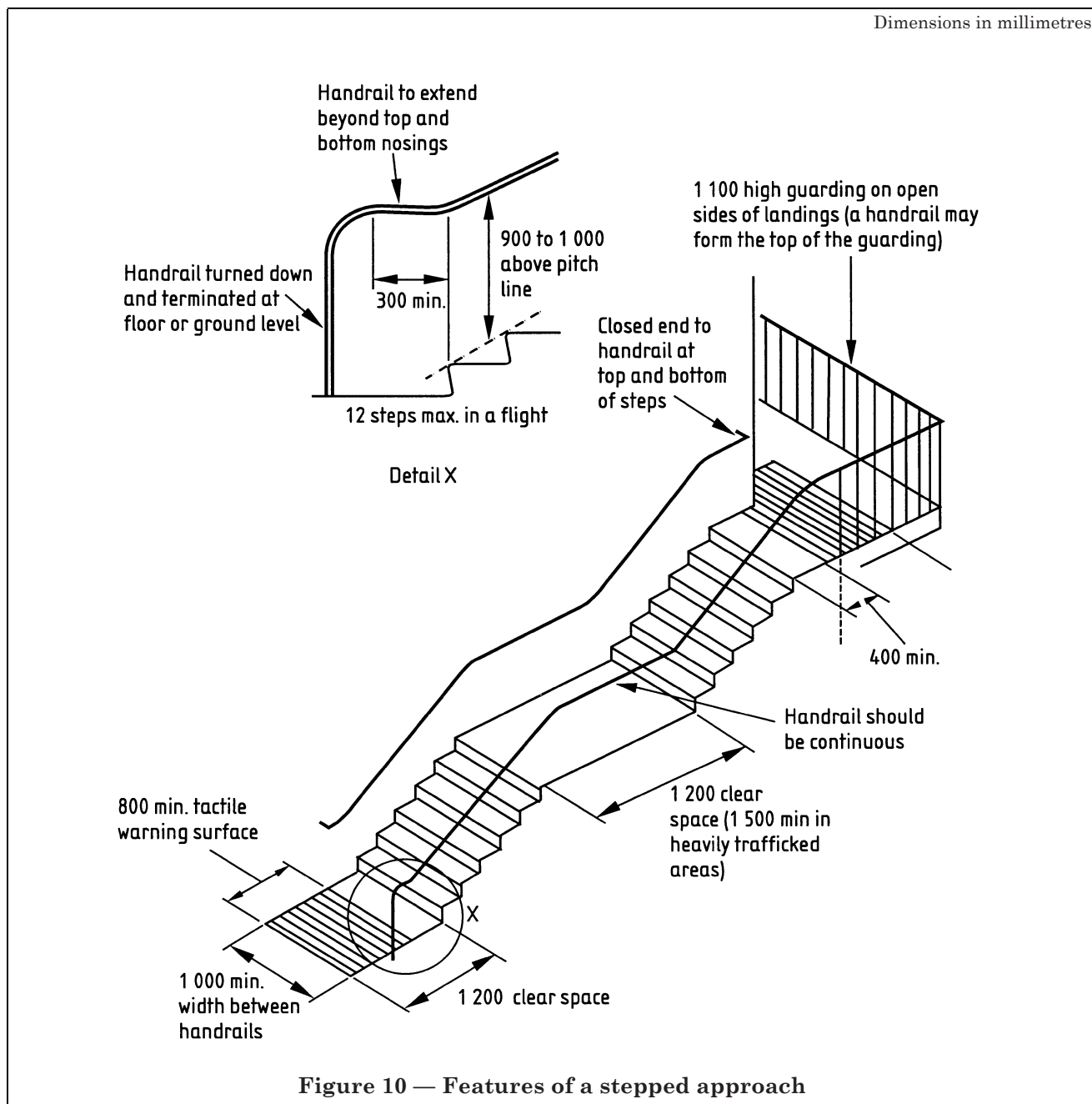
NOTE ^[A1] Less is known about how to achieve adequate visual contrast in external environments than in internal environments ^[A1] (see NOTE 2 to 9.1.1).

5.9.6 Landings

A level landing should be provided at the top and bottom of each flight of steps. Its length, clear of any door or gate swing, should be not less than the unobstructed width of the flight.

To warn of the abrupt change in level, tactile paving should be provided at the top A_1 and bottom A_1 of each flight. If practicable, the tactile surface should extend beyond the line of each edge of the flight (see Figure 10).

NOTE For detailed guidance on the use and layout of tactile warning and informative surfaces see *Guidance on the use of tactile paving surfaces* [3].



5.9.7 Handrails to steps

5.9.7.1 Handrail provision

COMMENTARY ON 5.9.7.1. *The division of wide flights into separate channels will allow an individual who may have less strength on one side or the other to be within easy reach of support. An ambulant disabled person may be weaker on one side and therefore a handrail on each side of the flight is essential for support. The division of flights into separate channels will allow an ambulant disabled person to be within easier reach of support when many other people are using the steps or stairs at the same time.*

A flight of steps that consists of two or more risers should be provided with a continuous handrail on each side. If any stairway consists of two or more flights, separated by a landing or landings, each handrail should, if feasible, be continuous throughout the series of flights.

Where a stair is used simultaneously by a large number of people, and the overall unobstructed width of steps is greater than 1 800 mm, an additional handrail or handrails, should be provided to divide the flight into separate channels. No channel should have an unobstructed width of less than 1 000 mm or more than 1 800 mm.

NOTE This precludes the use of stairs with unobstructed widths between 1 800 mm and 2 m. **NOTE**

5.9.7.2 Height and extension of handrails

The vertical height to the top of a handrail should be between 900 mm and 1 000 mm from the pitch line of a flight and between 900 mm and 1 100 mm from the surface of a landing.

Depending on its height from the pitch line of a flight or from the surface of a landing, a handrail may also serve as the top of guarding.

Each handrail should extend at least 300 mm beyond the first and last nosing. As much of the extension as possible should be horizontal. The extension should not intrude into any circulation route.

5.9.8 Artificial lighting on a stepped access route

Each flight and landing of a stepped access route should be well illuminated providing a clear distinction between each step and riser. The illuminance at tread level should be at least 100 lux.

Lighting that will cause glare (such as poorly located spotlights or floodlights) should be avoided.

5.10 Handrail design

COMMENTARY ON 5.10. *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. To avoid impeding finger grip, consideration needs to be given to the spacing of a handrail away from the adjacent wall and to the design of any system of support for the handrail. The positioning of the handrail support is important in achieving the uninterrupted use of the handrail and avoiding shock through the hand hitting the support.*

The horizontal extension of a handrail beyond the first and last steps allows an individual to steady or to brace themselves before ascending or descending. For an individual with impaired vision, the change in slope of the handrail and its return into a wall will signal the start or finish of the flight.

5.10.1 General

A handrail should be:

- of an oval or circular profile (see Figure 11);
- finished so as to provide visual contrast with the surroundings against which it is seen;

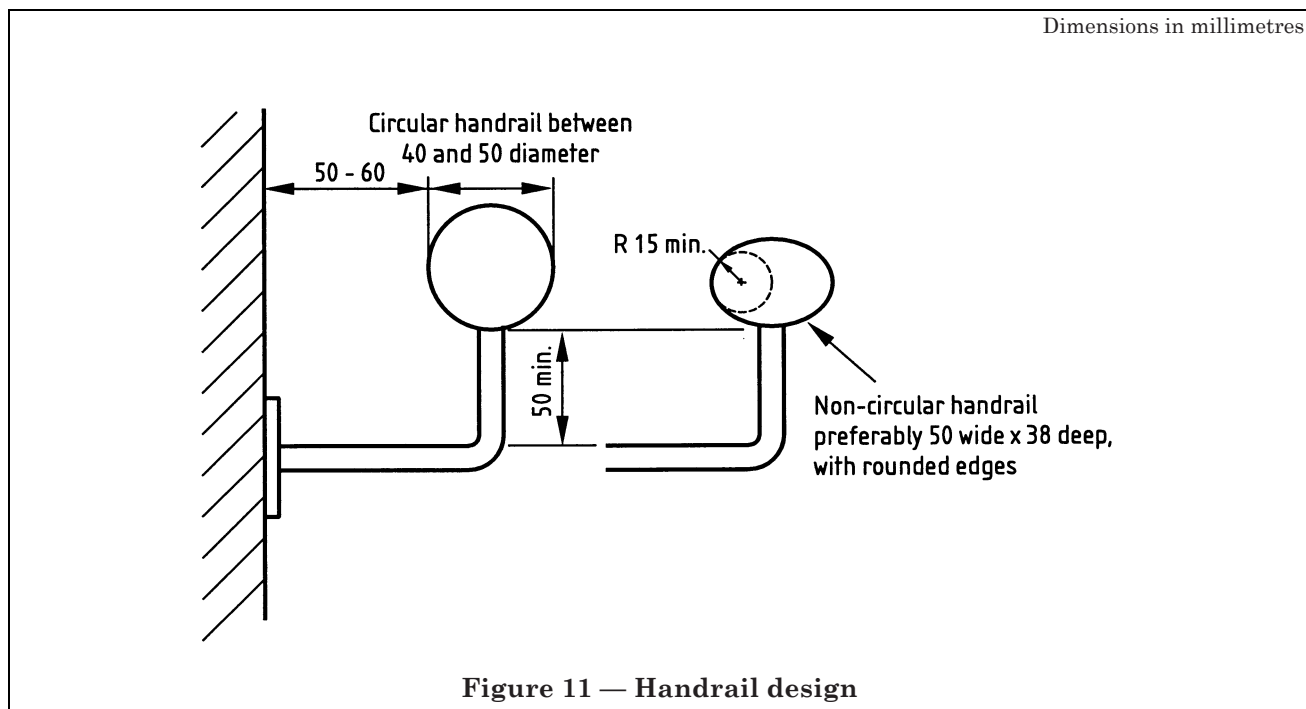
NOTE 1 For recommendations on how to achieve visual contrast, see 9.1.1. Less is known about how to achieve adequate visual contrast in external environments than in internal environments (see NOTE 2 to 9.1.1).

- easy and comfortable to grip with no sharp edges, smooth and not cold to the touch.

NOTE 2 In parts of the country subject to extremely harsh winter weather conditions, external metal handrails can become extremely cold. Since handrails are used by some people when using a ramp or stair not only for support, but also to pull themselves up and to brake themselves when going down, reluctance to use the handrail (or involuntary letting go of the handrail) if it is uncomfortably cold, presents a safety hazard. In extreme cases, a person's skin can adhere to a very cold handrail and the shock can, in some people, trigger an attack of Raynaud's disease. To minimize the effects of cold, handrails manufactured from wood, or metal coated with materials with a low thermal conductivity, such as plastics, are preferred.

At the start and finish of handrailing, the handrail should be terminated in a way that will reduce the risk of clothing being caught.

NOTE 3 This may be achieved by returning the handrail to the wall or floor or, where the handrail extends beyond balustrading, by terminating it with a scroll or similar feature.



5.10.2 Handrail dimensions

A circular handrail should have a diameter of at least 40 mm but not greater than 50 mm.

A handrail with an oval profile should have dimensions of 50 mm wide and 38 mm deep. The profile should have rounded edges with a radius of at least 15 mm.

There should be a clearance of between 50 mm and 60 mm between a handrail and any adjacent wall surface A_1 A_1 and any handrail support should meet the handrail, centrally, on its underside. The clearance between the bottom of the rail and any cranked support, or continuous balustrade, should be at least 50 mm to minimize the risk of the handrail supports interrupting the smooth running of a person's hand along the rail (see Figure 11).

A_1 NOTE Where a 40 mm diameter circular handrail is used, the maximum clearance from the wall can be provided without the handrail projecting overall more than 100 mm into the width of the stair. A_1

6 Entering a building

6.1 The principal entrance

6.1.1 General

Unless suitably designed, the principal entrance to a building can often be a barrier to access for disabled people. The following factors should be taken into consideration in the design of the principal entrance to a building:

- a) the prominence and visual relationship of the entrance with its surroundings;
- b) the type of threshold needed to allow convenient wheelchair manoeuvre;
- c) the ease of operation of the principal entrance door;
- d) the minimum effective clear width through the doorway.

6.1.2 Visual clarity

The principal entrance door should contrast **A1** visually **A1** with its immediate surroundings and should be well lit and clearly signed. It should not be of a highly polished material such as stainless steel.

Where possible, subject to the needs of security, safety and/or privacy, entrance doors and any associated windows should provide a clear view of the interior of the building, or of the entrance lobby if one is provided.

6.1.3 Weather protection

In order to provide shelter for those having to pause before entering a building other than a dwelling, the principal entrance should incorporate a form of weather protection, such as a canopy or recessed entrance, unless freely accessible automatic doors are installed.

Any part of the structure of a canopy should not present an obstruction to visually impaired people.

6.2 Threshold

The entrance threshold should either be level or, if, the provision of a raised threshold is unavoidable, of a height of not more than 15 mm. If raised, the threshold should have as few upstands and slopes as practicable. A threshold in excess of 5 mm in height should be chamfered or pencil rounded.

NOTE 1 Upstands and gradients impede access. Small variations from any point taken as level can make a threshold inaccessible and potentially dangerous. People pushing wheelchairs also find sharp upstands difficult to manage.

NOTE 2 Guidance on the design of entrance thresholds to dwellings is given in *Accessible thresholds in new buildings* [5].

At entrances to offices and buildings used by the general public, a floor surface should be provided that will remove rainwater from the soles of shoes and wheelchair wheels in order to prevent the spread of water to floor finishes whose slip resistance relies on them being dry. The surface of the entrance to a building should not present a trip hazard.

NOTE 3 Guidance on the selection, planning, installation and maintenance of entrance flooring systems is given in BS 7953.

NOTE 4 Guidance on the slip resistance of floor surfaces is given in BS 5395-1.

Thresholds to internal doors should be level at the junctions of different flooring materials.

6.3 Principal entrance **A1** doors **A1**

COMMENTARY ON 6.3. *In buildings other than dwellings, fitting a door closing device to a single swing door could greatly disadvantage people with a wide range of disabilities because it is extremely difficult for people with assistance dogs, low upper body strength, **A1** walking aids or wheelchair users to manoeuvre through the entrance against the force exerted by the device and additionally any extra resistance exerted by weather seals and/or wind pressure. **A1***

Wheelchair users also find it harder to pull a door open than to push it open.

6.3.1 General

A1 Principal entrance doors to a building should be usable by disabled people even though they **A1** might be designed to be held closed when not in use.

6.3.2 Self-closing swing single swing doors

A1 Door-closing devices fitted to hinged (single swing) or pivoted (single or double swing) doors to principal entrances should have controlled action and conform to the recommendations in 7.3.

NOTE 1 Pivoted swing refers to doors which are mounted on pivots that support the door on the head and bottom rails.

For disabled people to have independent access through single or double swing doors, the opening force, when measured at the leading edge of the door, should be not more than 30 N from 0° (the door in the closed position) to 30° open, and not more than 22.5 N from 30° to 60° of the opening cycle.

NOTE 2 For details of controlled door closers and how to measure opening forces, see NOTES to 7.3.1.

Where, in order to meet the above opening force limits, the door-closing device is insufficient to keep an entrance door closed against external conditions, consideration should be given to installing one of the following door closing systems:

- a) a power operated (automatic) door — sliding, balanced or swing;
- b) a low energy swing door;
- c) a power operated revolving door assembly;
- d) an entrance lobby or air lock system of inner and outer doors. $\langle A1 \rangle$

6.3.3 Power operated (automatic) doors

Power operated pedestrian doors for installation in existing and new construction, in domestic and non-domestic buildings should be one of the following two types:

- a) $\langle A1 \rangle$ a manually activated door controlled by a push pad, coded entry system, card swipe or remote control device; or
- b) an automatically activated door controlled, for example, by a motion sensor or a hands-free proximity reader. $\langle A1 \rangle$

NOTE 1 Power operated pedestrian doors can have a sliding, swinging or folding action.

Manual $\langle A1 \rangle$ activation $\langle A1 \rangle$ controls for power operated pedestrian doors should be located at a height of between 750 mm and 1 000 mm from the finished floor level. In order to be clearly visible, they should contrast $\langle A1 \rangle$ visually $\langle A1 \rangle$ with the surrounding background (see Clause 9).

The approach to power operated pedestrian door systems should be well defined, level and safeguarded in relation to pedestrian flow (see Clause 5). The approach should be provided with clearly visible warning signs (see Clause 9).

NOTE 2 Safeguarding in relation to the pedestrian flow may be achieved by setting the door into a recess or by guarding rails.

$\langle A1 \rangle$ Automatically activated powered entrance doors that open towards people entering a non-domestic building should incorporate clear text indicating their automatic operation and direction of swing. To ensure that an automatically activated door will open early enough, and stay open long enough, to maintain safe entry and exit, the activation device(s) should be positioned to detect traffic at a suitable distance taking account of the width, mass and operating speed of the door. Detection by presence and motion sensing devices are recommended in all installations (see 8.4 of BS 7036-1:1996).

The activation system(s) should be positioned and adjusted so that the door starts to open when a person is no closer than 1 400 mm from the leading edge of the door when open at 90°. Safety provisions should be in accordance with 8 of BS 7036-1:1996 and 5 of BS 7036-3:1996.

The door should also be capable of manual operation in the event of power failure.

NOTE 3 Guidance on the safe use of straight and curved sliding doors and prismatic and folding doors is given in BS 7036-2:1996. $\langle A1 \rangle$

6.3.4 Low energy swing door

A low energy power operated door operator should be considered for use on swing doors with relatively low levels of pedestrian usage as these doors can either work in manual mode or be set to provide powered opening assistance to users when required, either in push-and-go or power-assist modes. After a hold-open period, the swing door self-closes in the same way as a conventional door closer.

NOTE 1 The push-and-go power assist activates when the door is pushed beyond 25 mm.

NOTE 2 Guidance on the safe use of low energy swing doors is given in BS 7036-4.

6.3.5 Power operated revolving door arrangement

COMMENTARY ON 6.3.5. A power operated revolving door can be safely used by some, but not all, disabled people if it is slow moving and large enough to accommodate a wheelchair with a person pushing it. The minimum effective clear width of free passage is determined at the narrowest part of the construction.

When considering the installation of a power operated revolving door, the predicted user characteristics and precise operational requirements should be established, in order to assess the volume and type of pedestrian traffic that is likely to pass through the installation.

A risk assessment should also be carried out to ensure that the revolving door is designed, equipped, installed and used in such a way that it reduces speed or stops when subjected to any pressure or resistance in use.

NOTE 1 Guidance on the safe use of revolving doors is given in BS 7036-5.

NOTE 2 Ramped floors leading down to power operated doors are a potential hazard and should be avoided.

Where a power operated revolving door is provided, it should be accompanied by an auxiliary side-hung door conforming to the recommendations of **6.3.2**, **6.4.1** and **6.4.2**, which is available for use during the whole of the period the building is occupied.

NOTE 3 It may be beneficial for the auxiliary door to open automatically.

NOTE 4 The principle of having an auxiliary side hung door or gate also applies to turnstiles and other access control devices.

6.3.6 Entrance lobbies

6.3.6.1 General

A lobby consisting of inner and outer doors may be used:

- a) in an airlock arrangement, to reduce the effects of pressure differential between the inside and outside of a particular building to enable a lower power size door closing device to operate effectively; and/or

NOTE The air lock arrangement is only effective when one door opens in and the other door opens out.

- b) to assist entry control of strangers when residents are entering or leaving medium and high rise blocks.

Common manoeuvring sequences of wheelchair users negotiating a door opening towards them are shown in Figure 12.

6.3.6.2 Dimensions of lobbies

The dimensions and shape of a lobby should allow a wheelchair user to be able to move clear of one door swing to push open the next door or reverse the wheelchair to pull it open. A space should also be provided for an attendant assisting a wheelchair user to open a door and push (or pull) a wheelchair through.

Minimum dimensions of lobbies with single leaf doors (with and without vision panels) should be as shown in Figure 13. Vision panels in lobby doors should conform to the recommendations of **6.4.3**.

NOTE 1 Minimum lobby dimensions are related to the door size and a representative length of a wheelchair user and an attendant, having regard to the manoeuvring sequence.

Lobby dimensions should be clear of any elements that project into the lobby.

NOTE 2 These recommendations also apply to internal lobbies used as separating elements for the prevention of the spread of fire and smoke, or to shield the view of toilet facilities.

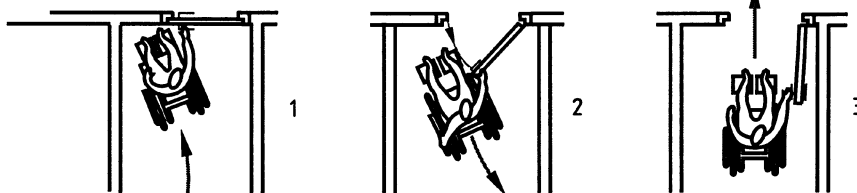
6.3.6.3 Glazing in an entrance lobby

Glazing incorporated into an entrance lobby should not create distracting reflections. It should be designed in accordance with the requirements of BS 6262-4.

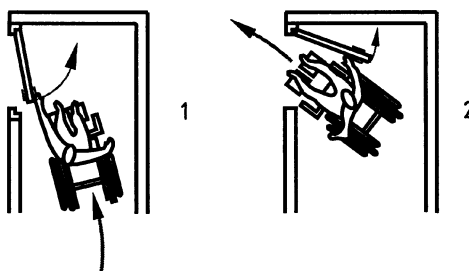
6.3.6.4 Projections

Columns, ducts and similar full height elements should not project more than 100 mm into the access route within a lobby (see Clause 5). If such projections are unavoidable, a guard rail or other hazard protection **[A]** contrasting visually against the background **[A]** should be provided to guide people with impaired sight around this type of projection **[A]** (see NOTE 2 to **9.1.1**). **[A]**

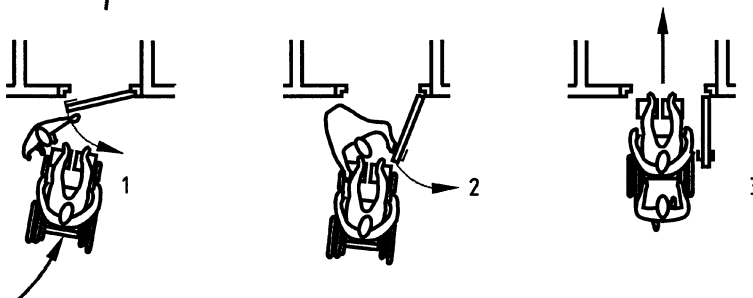
Self-propelled
wheelchair user
opening a door
from a head on
position



Self-propelled
wheelchair user
opening a door
from a side on
position



Attendant
opening a
door in a
head on position



Attendant
opening a
door in a
side on position

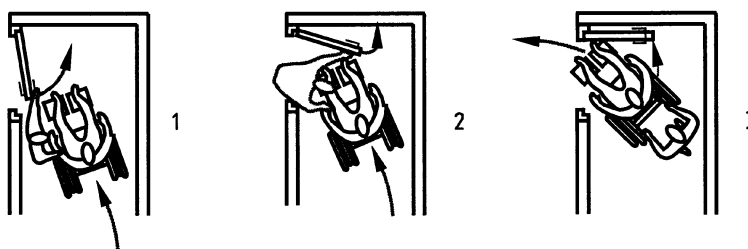
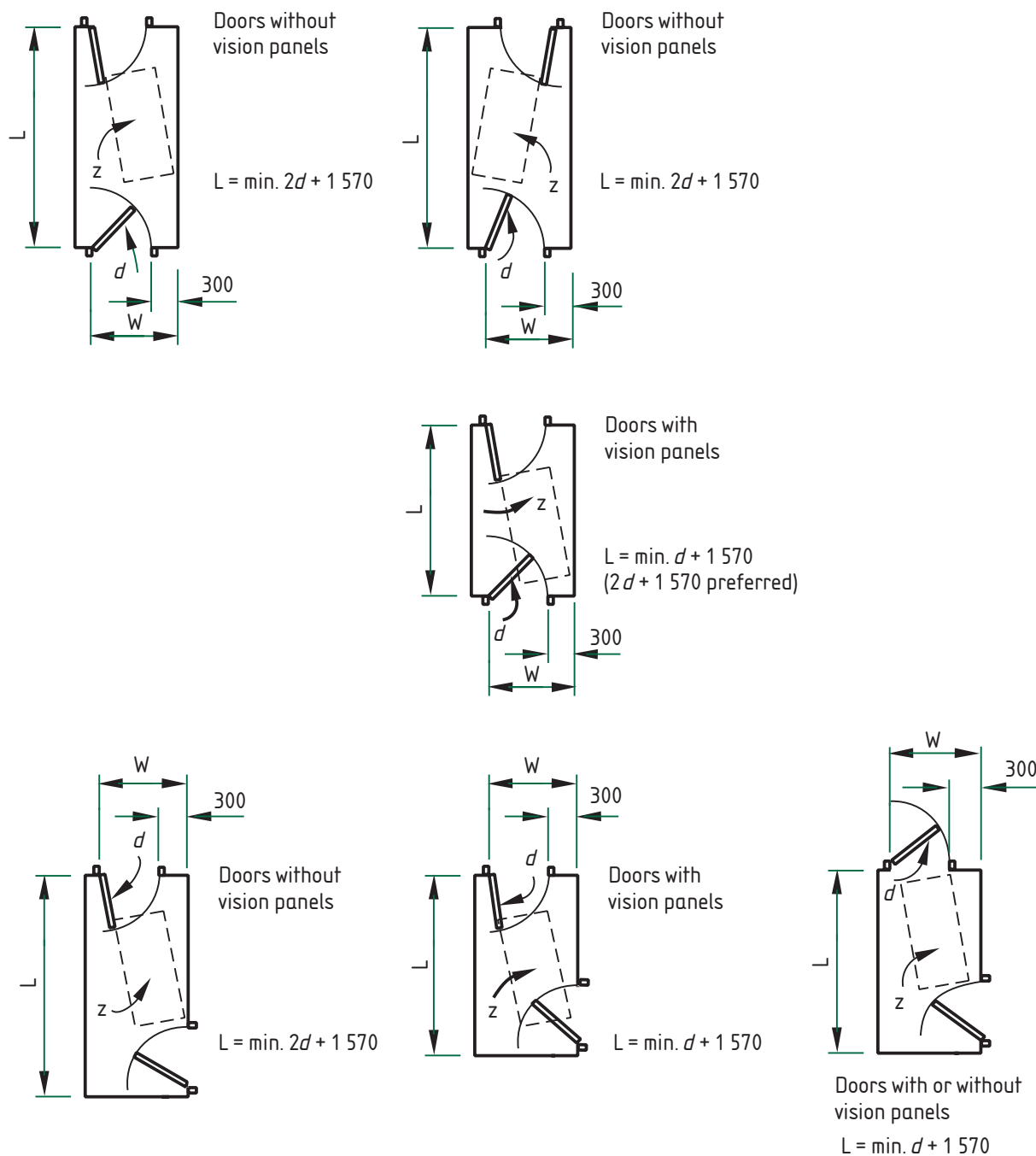


Figure 12 — Manoeuvring sequences of wheelchair users negotiating a door opening towards them

Dimensions in millimetres



L = length of lobby

d = width of door leaf

Z = 1570 mm × 750 mm zone for a wheelchair accompanied by an attendant

W = (d + 300 mm) or 1200 mm, whichever is the greater

Figure 13 — Minimum dimensions of lobbies with single leaf doors

6.4 External and internal door leaves (including lobby doors)

6.4.1 Effective clear width through a doorway

The effective clear width through a single leaf door, or one leaf of a double leaf door (clear of any projections from the face of the door such as door furniture and weather boards) should be as shown in Figure 14.

NOTE 1 The effective clear width also applies to sliding doors.

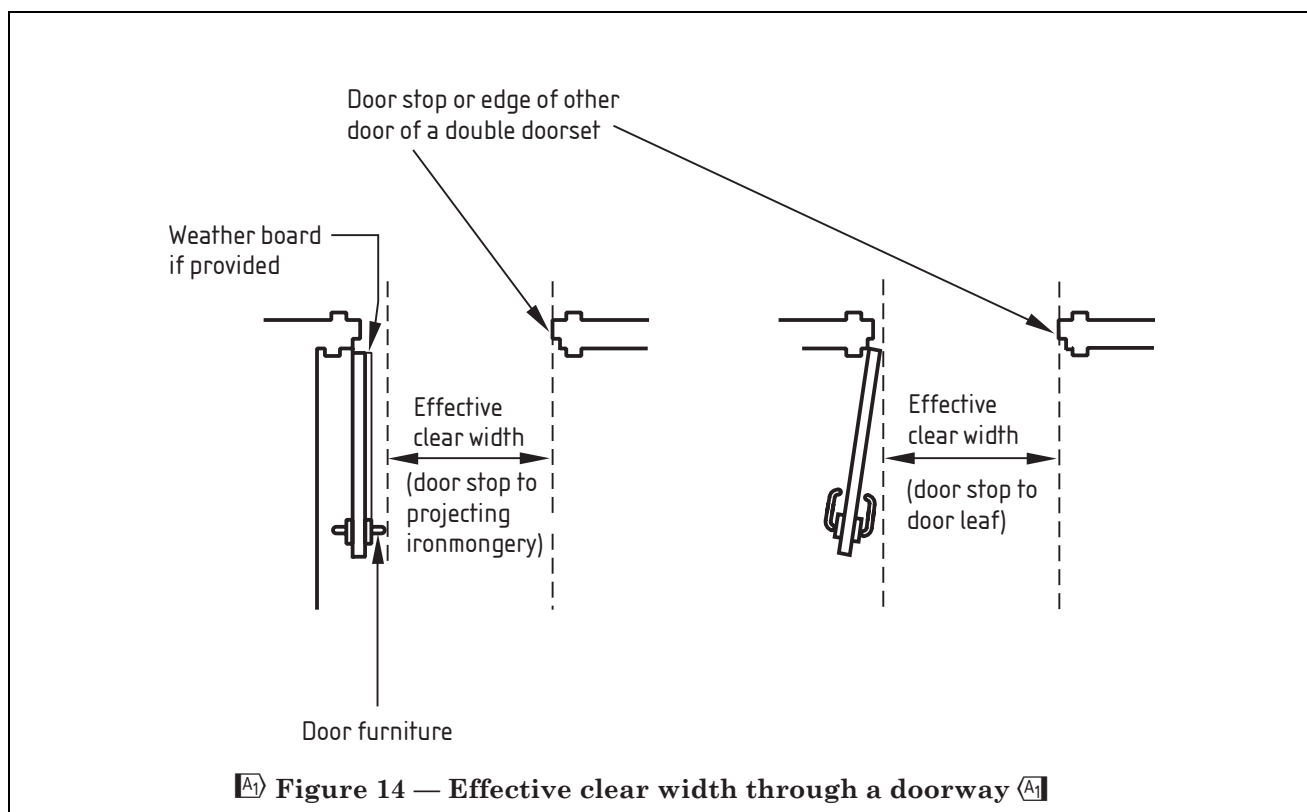


Figure 14 — Effective clear width through a doorway

The effective clear widths of doors should be as shown in Table 2.

Table 2 — Effective clear widths of doors

Direction of approach of wheelchair	Effective clear width mm	
	Preferred	Minimum ^a
Straight-on (without a turn or oblique approach)	800	750
At right angles from an access route at least 1 500 mm wide	800	750
At right angles from an access route at least 1 200 mm wide	825	775
At right angles from an access route at least 900 mm wide	850	800

^a The minimum effective clear width should only be used in unavoidable circumstances.

When specifying a door size, designers should take into account the extent to which the door may not be able to open beyond 90° allowing for the projection of the door furniture or wall configuration.

NOTE 2 Projections are likely to be greater for non-domestic buildings.

NOTE 3 The backcheck feature on door closing devices makes doors harder to open to 90° and beyond. The alternative is to fit a backstop.

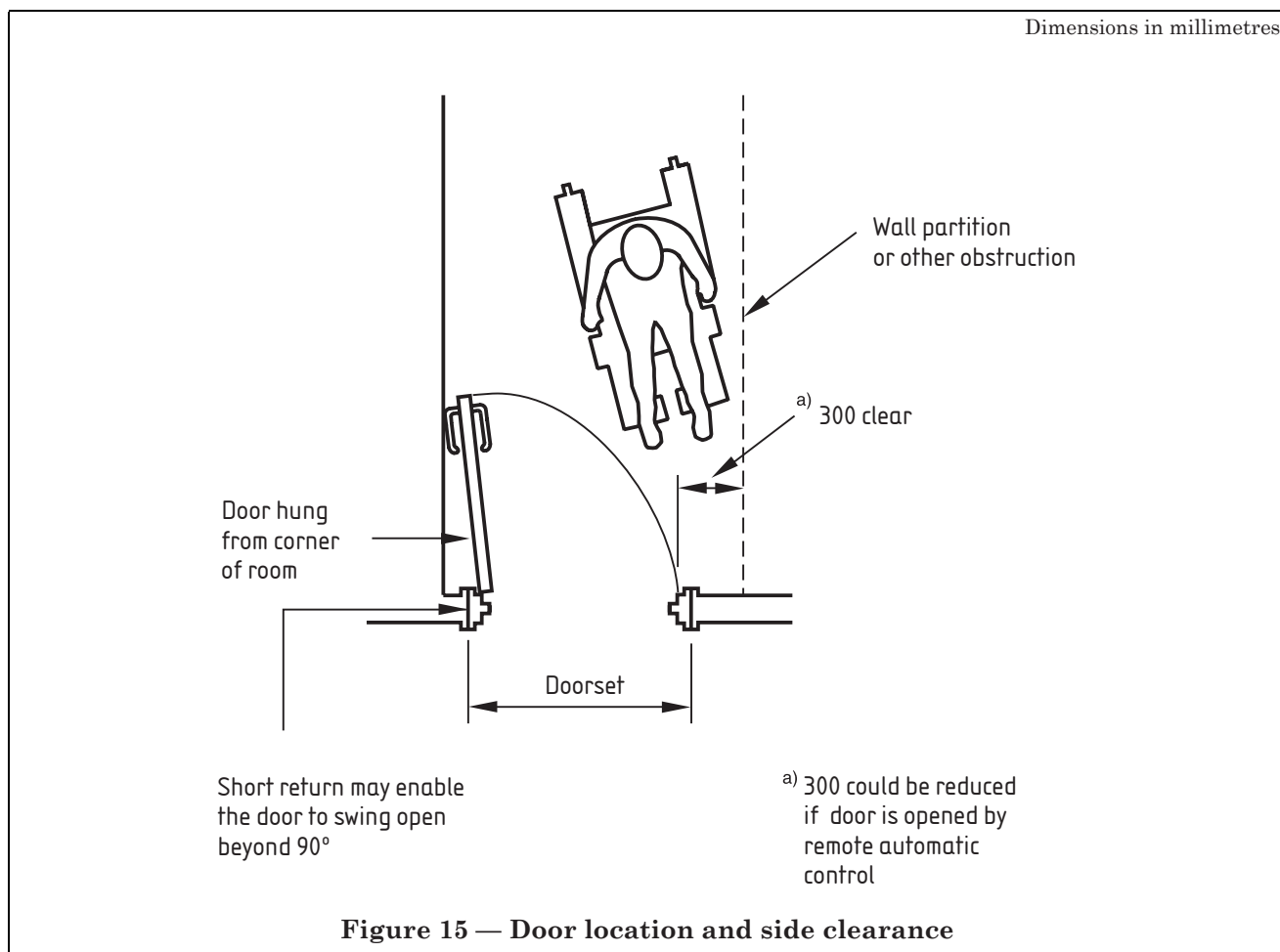
COMMENTARY ON 6.4.1. An effective clear width of less than 800 mm may result in people with poor manoeuvring ability or with large wheelchairs not being able to pass through without damage to themselves or the door. Use of the preferred effective clear width more easily accommodates people with assistance dogs and where there is heavy pedestrian traffic.

6.4.2 Location and side clearance of doors

An unobstructed space of at least 300 mm should be provided between the leading edge of a door and a return wall (see Figure 15), unless the door is opened by remote automatic control.

NOTE 1 Increasing this space to 450 mm will improve manoeuvrability, reduce the risk of wheelchairs colliding with the wall, and speed up completion of the task.

NOTE 2 This recommendation also applies to doors within the common areas of blocks of flats.



6.4.3 Vision panels

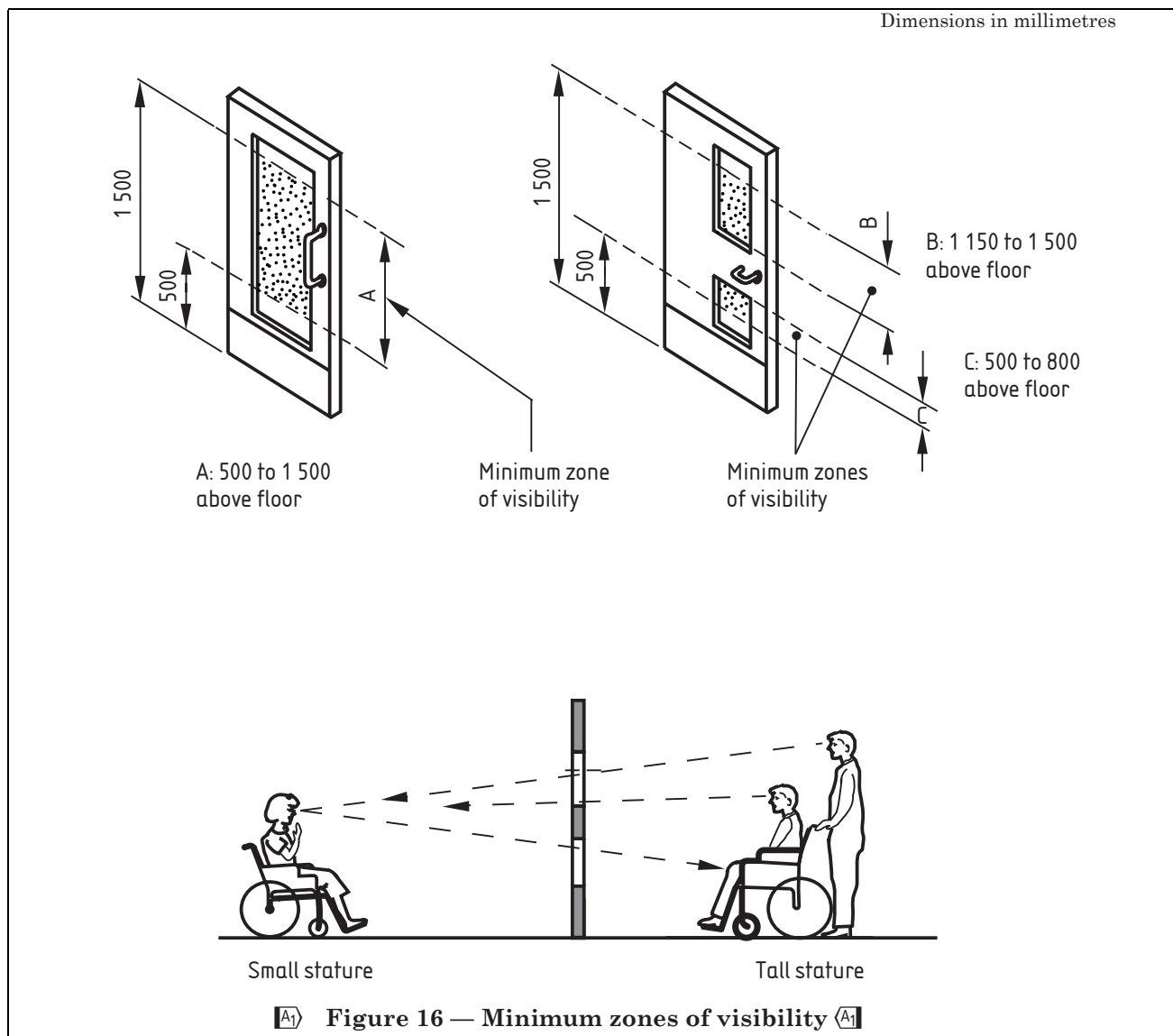
Entrance doors and lobby doors, other than those to dwellings, should have viewing panels to alert people approaching a door to the presence of another person on the other side.

If a door has a single viewing panel, the minimum zone of visibility should be between 500 mm and 1 500 mm from the floor. If a door requires an intermediate horizontal section for strength or to accommodate door furniture, the door should have two viewing panels, one accommodating a zone of visibility between 500 mm and 800 mm from the floor and the other accommodating a zone of visibility between 1 150 mm and 1 500 mm from the floor (see Figure 16).

COMMENTARY ON 6.4.3. *This enables a person of small stature or a wheelchair user (when approaching a door) to see, and be seen by, another wheelchair user or an ambulant person approaching from the other side, while allowing the possibility of having an opaque area across the door to provide strength, or to accommodate door furniture.*

NOTE 1 More than two vision panels may be provided, or may be larger than the zones of visibility, as long as the zones are accommodated within the glazing area.

NOTE 2 Vision panels may be less than the minimum size or omitted in doors to spaces that are required to be darkened for their function, e.g. cinemas and auditoria.



6.4.4 Glass doors

A1 The presence of a glass door should be made apparent, with permanent (manifestation) at two levels, within 850 mm to 1 000 mm from the floor and within 1 400 mm to 1 600 mm from the floor, contrasting visually with the background seen through the glass in all light conditions (see 9.1.1). The edges of a glass door should also be apparent when the door is open. **A1**

If a glass door is adjacent to, or is incorporated within, a fully glazed wall, the door and wall should be clearly differentiated from one another, with the door more prominent.

NOTE 1 To achieve this, the door may be framed on both sides and the top by an opaque high-contrast strip at least 25 mm wide.

NOTE 2 Guidance on the design of glazed doors is given in BS 6262.

6.5 Door furniture

COMMENTARY ON 6.5. *The smooth operation of door furniture that is easily reached, and which provides a secure grip, is of critical importance to disabled people.*

If the force required for opening doors is greater than wheelchair users and people with limited strength can manage, they will be unable to continue their journeys. If the force of the closing device is too great or its speed too fast, disabled people risk being pushed off balance.

Wheelchair users also find difficulty reaching to close doors behind them when there is no automatic closing device.

6.5.1 Door opening furniture

Wherever possible, door-opening furniture with a lever action should be  used. Door furniture with a spherical, circular or similar design is difficult to use by people with manual impairment,  arthritis or a weak grip.

It should be possible to operate door opening furniture one handed, without tightly grasping it or twisting the wrist, e.g. by using a closed fist. Care should be taken in the selection of security and fire exit fittings, such as turn buttons, release latches or locks,  with the aim of making them  manageable for all users.

 For easy identification by visually impaired people all door furniture should contrast visually with the surface of the door (see 9.1.1).

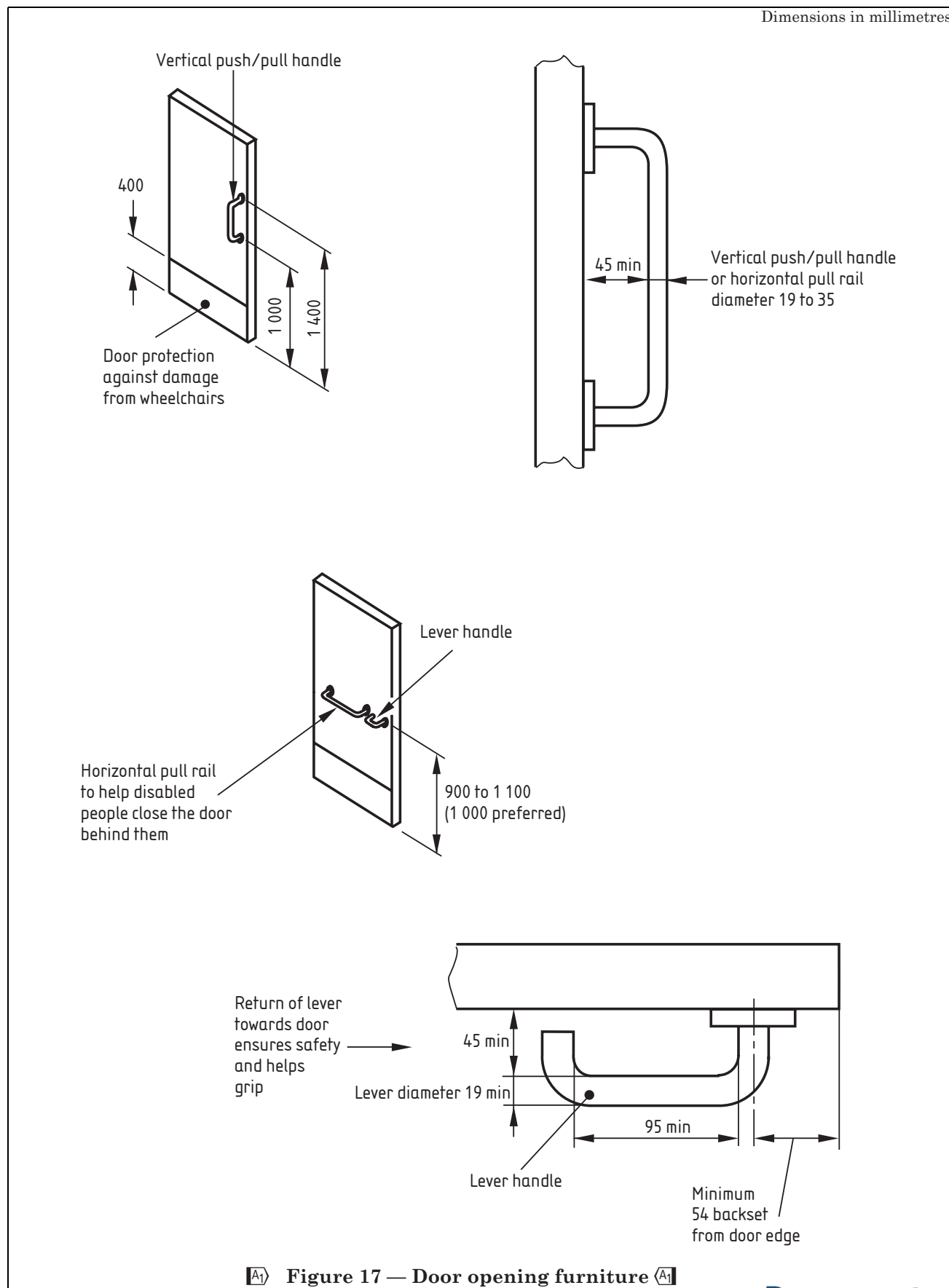
If a door opens out from a room and has no door-closing device, e.g. a door to accessible sanitary accommodation, an additional item of door furniture (such as a long horizontal pull rail) should be provided on the closing face of the door to help a disabled person close the door behind them (see Figure 17 and 12.4.7).

Preferably, external handles on entrance doors should not be cold to the touch.

NOTE 1 For information on the interpretation of “cold to the touch”, see NOTE 2 to 5.10.1.

The location and design of latch and push/pull handles should be consistent throughout a property and should be in accordance with Figure 17. 

Dimensions in millimetres



6.5.2 Hinges

Single axis hinges should conform to the requirements of A_1 BS EN 1935 A_1 .

Where it is important to minimize A_1 resistance to door opening and closing A_1 , hinges with low friction bearings should be selected to carry the appropriate mass of the door.

Fixing positions of hinges should conform to the requirements of BS 4787-1 A_1 , unless otherwise dictated by fire test reports. A_1

If the effective clear opening width does not conform to the recommendations given in Table 2 using conventional hinges, consideration should be given to fitting swing-clear hinges which allow the door to align with the doorstop when opened to 90° and thus reduce the projection of door furniture into the opening space.

6.5.3 Securing entrance doors

6.5.3.1 General

Thief resistant locks should conform to the requirements of BS 3621.

NOTE Guidance on the selection of locks/latches to secure the principal entrance door to dwellings is given in BS 8220-1.

It should be possible to operate door opening furniture one handed, without tightly grasping it or twisting the wrist, e.g. by using a closed fist.

6.5.3.2 Locks and latches

Lever handles should be used wherever possible in conjunction with an upright mortice lock/latch. To ensure that people with impaired vision and/or dexterity have unobstructed access to the keyway, the cylinder should either be above the lever handle or the minimum distance between the handle and the keyway of the locking mechanism should be 72 mm.

Care should be taken in the selection of rim nightlatches to ensure that larger deadlocking snibs and turns on cylinders are used, to assist users with impaired dexterity.

Where a multi-point locking system is used care should be taken to ensure that it is locked/unlocked simultaneously by a single turn of the key.

6.5.3.3 Keys with larger bows or fobs

Consideration should be given to the provision of a larger bow on lever and cylinder keys to give users greater control. Alternatively, a hand-grippable key fob can be added to a standard key bow, to aid manipulation of the key.

6.5.3.4 Door bolts

Door and window bolts should conform to the requirements of BS EN 12051.

Where doors are required to be bolted for security purposes, consideration should be given to using:

- knob slide flush bolts or surface bolts with a free moving slide action;
- rack and pinion mortice bolts fitted with fixed knobs to enable the user to operate them easily (i.e. without the need to locate a loose key and insert it into a restricted hole);
- a surface mounted or morticed espagnolette bolt with top and bottom shoots or side shoots operated by a single handle positioned at a height between 750 mm and 1 000 mm from the finished floor level.

6.5.4 Door entry systems

Where door entry systems are installed they should be located on the latch side of the door with the activation pad positioned within 200 mm of the door frame (or aperture where there is a glazed façade), at a height of between 750 mm and 1000 mm from the finished floor level.

6.5.5 Entryphones

Entryphone systems should be sited for approach and use from a wheelchair and where possible, should contain a light emitting diode (LED) display to enable people with impaired hearing to use them.

6.5.6 Identification of callers

If fitted to the principal entrance door of dwellings, a wide angle viewer should be installed at a height (and angle) which is convenient for the occupant.

Where fitted, an accessible robustly fixed restricting device, which limits the opening of the door to 100 mm to enable identification documents to be checked, should be installed at a height convenient for the occupant.

7 Horizontal circulation

7.1 Entrance hall and reception area

COMMENTARY ON 7.1. *An entrance hall provides the first point of contact between a visitor and the resources and activities available within a building.*

Suitable access to a reception point and clear signs indicating routes to other parts of the building are important.

7.1.1 General

A building should be planned so that its layout is easily understood by disabled people, as described in 7.1.2 and 7.1.3.

7.1.2 Identification of reception point

The reception point should be in sight of the entrance and easily identifiable by visually impaired people.

The reception point should be located in a position where the ability of a person with hearing impairment to lip read is not impaired, e.g. by the presence of windows or a glazed screen behind the reception point (see 11.1). Reception counters should not be placed in front of backgrounds which are patterned.

Signs and universally accepted symbols or pictograms, indicating lifts, stairs, circulation routes and other parts of the building should be provided. Visual signs should be self-evident and, in particular, legible to visually impaired people. Plain English and pictograms together should be used to assist people with learning difficulties (see 9.2).

7.1.3 Accessible route

The approach from the principal entrance to the reception point should be direct, free from obstructions, have a firm, slip resistant surface and allow easy manoeuvre of a wheelchair (see Annex B).

Any permanent or temporary control barriers used for waiting and queuing should allow wheelchair users to manoeuvre to the reception point, and turn to face the receptionist and leave. Temporary barriers should be clearly identified as such for the benefit of visually impaired or ambulant disabled people who might attempt to rest against them.

NOTE The bases of temporary barriers can restrict access for wheelchair users and therefore need to be taken into account when allowing space for wheelchair access.

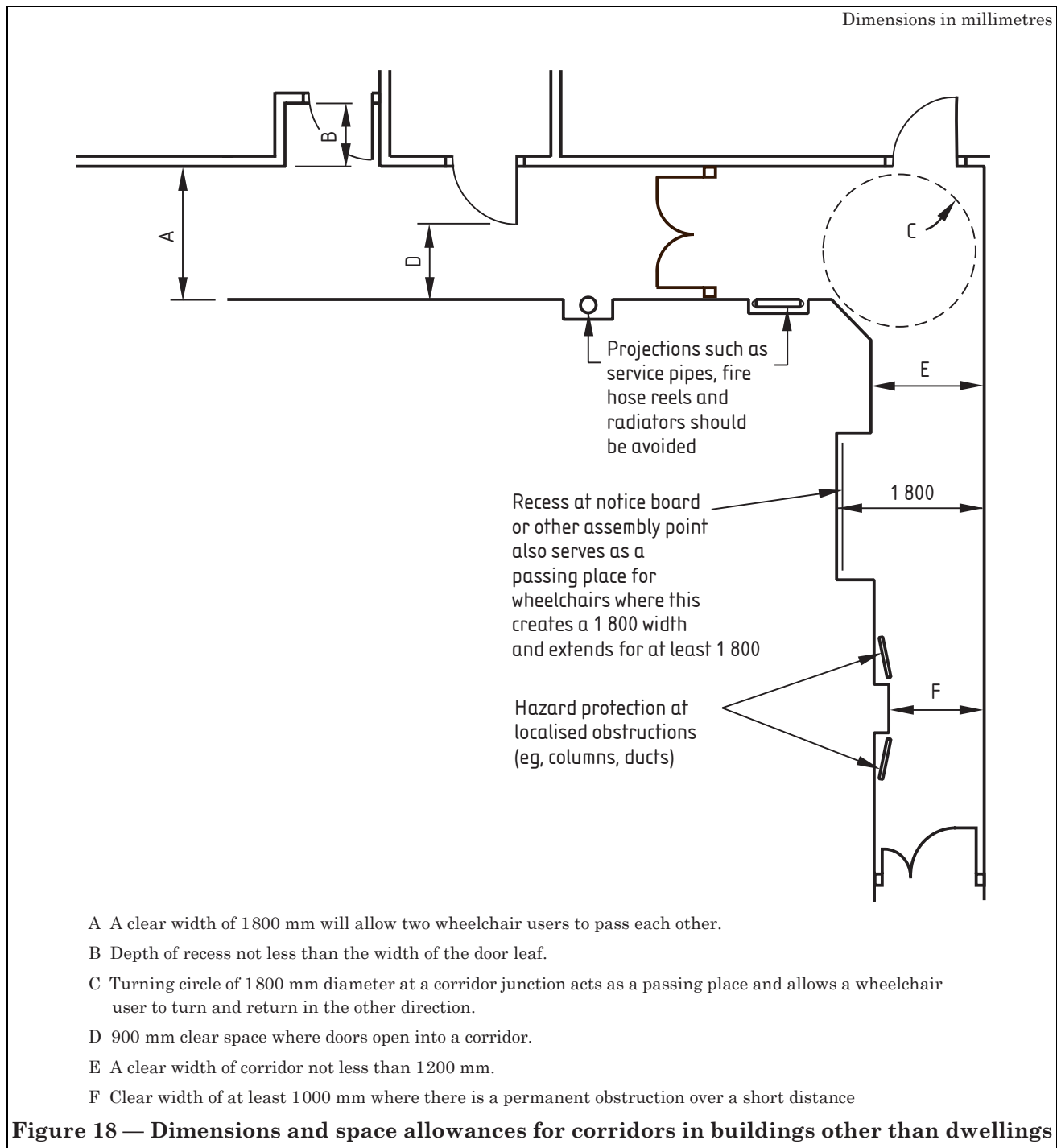
7.2 Corridors and passageways

COMMENTARY ON 7.2. *In order for disabled people to use a building independently, circulation routes need to allow easy movement and provide a sense of location and direction. Corridors and passageways need to have sufficient space to provide convenient access to rooms and, if necessary, to turn through 180°.*

Choosing appropriate floor, wall and ceiling materials  that contrast visually with adjacent surfaces  and the use of natural and artificial lighting will benefit people with impaired sight or hearing.

7.2.1 Projections into corridors and passageways

The design of a corridor or passageway should allow disabled people to find their way easily and unimpeded. Projections, such as radiators and fire hoses, into circulation routes should be avoided wherever possible but, where unavoidable, they should be guarded as described in 5.7.2 (see Figure 18).



NOTE Splayed or rounded corners at changes of corridor direction benefit wheelchair users and people with impaired vision. Projections are particularly hazardous for a visually impaired person even when using a cane.

Where there is a potential obstruction at the end of a circulation route, a clearly visible warning sign should be provided at the start of the route.

7.2.2 Dimensions of corridors

The minimum clear width of a corridor should be 900 mm for a single-family dwelling, with a preference, if practicable, for a wider corridor, and 1200 mm in every other case.

The space needed for an adequate wheelchair approach to doors in corridors of buildings other than dwellings should conform to Figure 18.

In a building in which there is likely to be significant use by wheelchair users, for instance, in a place of public assembly, a corridor should have a clear width of 1 800 mm, or be provided with passing places at least 1 800 mm in length at reasonable intervals.

7.2.3 Floors in corridors

Floor patterning that could be mistaken for steps, for example stripes, should not be used for floors in corridors.

Floors within a corridor should be level, wherever possible. If this is unavoidable, the slope of floors in corridors should be no greater than 1:20. If greater, floors should be designed as ramps and include landings, as necessary, in accordance with 8.2.

NOTE 1 If there is a slope in the corridor floor, this may be identified by using a floor covering A_1 that contrasts visually with A_1 the remainder of the floor covering.

NOTE 2 Guidance on the slip potential characteristics of floor finishes is given in Annex C.

7.2.4 Lighting in corridors

Lighting in a corridor should be even, diffused and without glare, reflections or shadows.

7.2.5 Doors leading into corridors

Doors should not open outwards from rooms directly into a frequently used corridor, with the exception of doors to A_1 unisex accessible toilets and A_1 service ducts.

Where a door opens into an infrequently used corridor, the corridor width should allow a clear space of 900 mm within the corridor when the door is open. Such doors should be located clear of any sloping floor surfaces in the corridor.

Any door that opens towards a frequently used corridor should be located in a recess at least as deep as the width of the door leaf.

The leading edge of any door that is likely to be held open should contrast A_1 visually A_1 with the remaining surfaces of the door and its surroundings to help identification by visually impaired people. The architrave should contrast A_1 visually A_1 with the wall surfaces surrounding the doorway (see NOTE A_1 1 A_1 to 9.1.1).

7.2.6 Doors across corridors

A_1 Closing devices fitted to hinged (single swing) or pivoted (single or double swing) doors across corridors and passageways, which can be pushed to open in both directions, should conform to the recommendations in 7.3.

NOTE 1 Pivoted swing refers to doors which are mounted on pivots that support the door on the head and bottom rails. A_1

Doors across corridors and passageways, other than in dwellings, should have a viewing panel that conforms to the recommendations of 6.4.3 and Figure 16.

Glass doors across corridors and passageways should be avoided, wherever possible. If they are used, they should conform to the recommendations of 6.4.4. The architrave should contrast A_1 visually A_1 with the wall surfaces surrounding the doorway (see NOTE A_1 1 A_1 to 9.1.1).

Where double doors of unequal width are used along the length of a corridor, the wider leaf should be on the same side of the corridor throughout its length.

NOTE 2 It will help visually impaired people if the principal opening leaf contrasts A_1 visually A_1 with the frame and the smaller leaf (see NOTE 2 to 9.1.1).

A_1 Cross-corridor fire-resisting doors should conform to 7.3.2. A_1

7.3 Doors fitted with a self-closing device

COMMENTARY ON 7.3. *If the force required to open doors is greater than wheelchair users, people with limited upper body strength, people using walking aids and people with assistance dogs can manage, they will be unable to continue their journeys independently. If the closing force of the device is too great or the speed of closure is too fast, disabled people risk being pushed off balance. It is for this reason that the action of door-closing devices needs to be controlled.*

7.3.1 General

Door closing devices fitted to hinged (single swing) or pivoted (single or double swing) doors should have 'controlled' action and conform to the requirements of BS EN 1154:2001.

NOTE 1 Pivoted refers to doors which are mounted on pivots that support the door on the head and bottom rails.

For disabled people to have independent access through single or double swing doors, the opening force, when measured at the leading edge of the door, should be not more than 30 N from 0° (the door in the closed position) to 30° open, and not more than 22.5 N from 30° to 60° of the opening cycle.

NOTE 1 The opening force should be checked using a plunger-type force measuring instrument. Where measurements cannot be taken at the leading edge, they may be taken at a point on the face of the door up to 60 mm from the leading edge, a position approximately in-line vertically with the spindle of a lever handle or the centre line of a pull handle or push plate, in which case the opening force limits can be increased by approximately 2 N.

NOTE 2 The accuracy of force measuring instruments available on the market varies and there are inherent difficulties in measuring forces on site. It is recognized, therefore, that any measurements are subject to a degree of imprecision which could give rise to variations of between 2 and 3 N.

NOTE 3 It is not expected that doors fitted with controlled door closing devices will be independently negotiable by all people. However, the opening force limits shown above are based on recent ergonomic research, which has determined the extent to which wheelchair users are capable of passing through doors fitted with controlled door closing devices. A comparison with earlier research whose sample was predominantly of ambulant disabled people indicates that the task of passing through such a doorway is easier for ambulant disabled people than for wheelchair users. Thus, doors suitable for independent use by wheelchair users will also be negotiable by ambulant disabled people.

NOTE 4 The ergonomic research found that people in wheelchairs use a variety of techniques to move through doors fitted with a controlled door closing device. However, irrespective of the method used, those people taking part in the research found some difficulty in opening the door against the initial force of the closer, and further difficulty when the door was opened beyond approximately 30°.

NOTE 5 The ability of a controlled door closing device to close effectively while keeping within the opening force limits depends on its efficiency and the resistances from edge seals, hinge friction, latch resistance and differential air pressure. The effect of using a low efficiency controlled door closing device is to reduce the closing force to a point where, coupled with the other resistances to closing, the door may not latch, or stay closed if unlatched. The use of high efficiency closers can reduce the force required to open the door and increase the proportion of the disabled population who can pass through independently.

NOTE 6 In some locations in a building, a controlled door closing device incorporating a backcheck is sometimes used to prevent damage to adjacent walls or furniture and to the closer mechanism if a door is flung open with some force. However, when the door is opened slowly, the resistance effect is minimal. With some controlled door closing devices, the backcheck starts to become effective when the door is open at 70°. Care should be taken to ensure that controlled door closing devices, with or without the backcheck allow the door to open to provide the required effective clear width (see Figure 14).

NOTE 7 The maximum closing force exerted by a controlled self-closing device should be within 0° and 15° of final closure. Controlled door closing devices that do not have this characteristic should be avoided.

NOTE 8 Without regular maintenance of all door fittings, the resistances to opening and closing can increase to an extent that the ability of disabled people to pass through the door may be affected. The opening force at the door opening angles described above should therefore be checked at regular intervals.

Push-and-go and power-assist low energy swing door operators should conform to the recommendations in 6.3.

7.3.2 Fire resisting doors fitted with controlled door closing devices

COMMENTARY ON 7.3.2. *The ability of fire resisting doors to perform their designated function depends on their being fully closed at the time of fire. To ensure closure, it is necessary for them to be fitted with a controlled door closing device, irrespective of whether the door is latched or unlatched.*

Self-closing fire doors are more likely to be rendered ineffective by the occupants of a building if the doors are regarded as an impediment to access.

Poorly specified controlled door closing devices can make doors virtually impassable to some disabled people. It is important, therefore, that the controlled door closing device and any latch fitted to the door are specified to provide accessibility while maintaining an adequate level of fire safety.

Where hinged or pivoted fire resisting doors need to be accessible by disabled people, the door closing devices fitted should have controlled action conforming to the requirements of BS EN 1154:1997, Annex A, be of a variable power type and conform to the recommendations in 7.3.1.

NOTE 1 BS EN 1154:1997, Annex A states that controlled door closing devices with a power size less than 3 are not considered suitable for use on fire/smoke door assemblies. This means that, in general, only high efficiency door closers mounted on doors with a width greater than 900 mm are likely to meet fire door requirements as well as the opening force limits described in 7.3.1. Controlled door closing devices of a lower power size and with relatively low efficiencies, with a lower power size and/or of a width less than 900 mm may only be suitable for non-fire resisting doors, see 7.3.3.

NOTE 2 Door closing devices whose power is adjustable by template are not suitable for this application.

Where the force required to open a fire resisting door on a circulation route exceeds the limits described in 7.3.1, an electrically powered hold open device, either stand-alone or integral in the body of the closer, which conforms to the requirements of BS EN 1155 should be installed.

NOTE 3 A stand-alone device holds a door at a fixed position. Integral devices either allow the door to be held open from the point of engagement to the fully open position, or allow the door to swing free. The interruption of the electrical supply by the following, will cause the door to close positively under the power of the controlled door closing device:

- a) a smoke/fire detection signal;
- b) manual release;
- c) fail safety operation in the event of failure of component, element, system, electricity supply or wiring.

NOTE 4 The use of "swing free" controlled door closing devices should be limited to applications where doors are located for access to rooms or similar locations and not part of a circulation route.

NOTE 5 The use of "delayed action" controlled door closing devices should similarly be avoided in circulation areas

NOTE 6 Where smoke seals are required, e.g. to protect refuges and lift lobbies, the force required to open the door can be reduced by installing an angle seal as an independent item in the door frame.

7.3.3 Non-fire resisting doors required to self-close

For non-fire resisting doors which have a requirement to self-close for reasons of privacy, acoustics or energy control, controlled door closing devices should be selected, fitted and adjusted so that the opening forces are well below the limits described in 7.3.1, consistent with the doors functioning as intended.

NOTE 1 It is emphasized that, for non-fire doors, door closing devices of a power size less than 3 will normally be acceptable. For details of controlled door closing devices, opening force limits and how to measure opening forces, see 7.3.1.

For non-fire resisting doors, consideration should be given to the use of rising butt hinges to close doors.

NOTE 2 Care should be taken when selecting and aligning rising butt hinges to ensure that they perform in accordance with the requirements and expectations dictated by the application.

7.3.4 Ironmongery related to door closing

In order to minimize hinge resistance, hinges with low friction bearings should be used (see 6.5.2).

Where doors are required to be latched, consideration should be given to the installation of a modified strike plate incorporating a gravity cam, which is tripped by the projecting latchbolt as the door shuts. This type of device enables closing forces to be kept to a minimum, secures the door firmly when fully closed and allows the door to be opened in the normal way, by turning the handle to withdraw the latchbolt.

NOTE This type of strike plate is not suitable for use with rimlocks or on external doors. (A)

8 Vertical circulation

8.1 Internal steps and stairs

COMMENTARY ON 8.1. *People with impaired sight risk tripping or losing their balance if unaware of steps or a flight of stairs. For such people, the provision, underfoot, of a timely warning, that there is a change in level, is essential. The greatest risk of tripping is at the head of a flight.*

Many ambulant disabled people find it easier to negotiate a flight of steps than a ramp and, for them, the presence of handrails for support is essential.

The horizontal extension of a handrail beyond the first and last steps allows an individual to steady or brace themselves before ascending or descending. For an individual with impaired vision, the change in slope of the handrail and its return into a wall will signal the start or finish of the flight.

8.1.1 Design of steps and stairs

COMMENTARY ON 8.1.1. *For steps to be comfortable to use, the rise and going need to reflect stride length while keeping within dimensional limits.*

Excessively high risers may result in excessive strain being placed on knee and/or hip joints of ambulant disabled people, when descending flights of stairs.

When ascending a stair, people who wear callipers or who have stiffness in hip or knee joints are particularly at risk of trapping the toes of their shoes beneath projecting nosings, and of tripping as a result. In addition some visually impaired people may feel a sense of insecurity when looking through open treads.

The design of straight and winding steps and stairs should conform to BS 5395-1.

NOTE 1 Flights of stairs of helical design are not recommended, although they may be acceptable if they meet the needs of particular employees in a workplace or residents in a private dwelling.

NOTE 2 Guidance on the design of helical and spiral stairs is given in BS 5395-2.

The sum of the going plus twice the rise ($g + 2r$) should be at least 550 mm and not more than 700 mm.

The preferred range for the rise of a step should be 150 mm to 170 mm.

NOTE 3 In exceptional circumstances, the rise could be within the minimum and maximum limits of 100 mm and 180 mm respectively (see Figure 19). A rise of 180 mm may be acceptable where it can be shown that, due to constraints of plan area, it is necessary to increase the rise to accommodate a stair.

The rise of each step within a flight and within a series of flights should be uniform.

The going for a step should be 250 mm to 300 mm, with a preference for 300 mm. Goings within a stair should be uniform and treads slip resistant.

NOTE 4 BS 5395-1 contains guidance on the slip resistance of floor surfaces.

Preferably, a step should not overlap the one below. If there is an overlap, the nosing should not project over the tread below by more than 25 mm.

The riser should not be open and its profile should conform to the examples illustrated in Figure 19 to ensure that people who drag their feet do not trip when ascending.

8.1.2 Rise of a flight

Preferably no flight of steps or stairs should contain more than 12 risers. However, in small premises where plan area is restricted, a flight of steps or stairs should contain a maximum of 16 risers. As far as possible, the number of risers in successive flights should be uniform.

The provision of isolated single steps should be avoided.

8.1.3 Stair clear width

The stair clear width of steps or stairs should be at least 1 000 mm.

8.1.4 Identification of the nosing and riser

Each step nosing should contrast  visually  with the remainder of the respective tread.

NOTE A nosing that wraps around the riser may assist people with visual impairments.

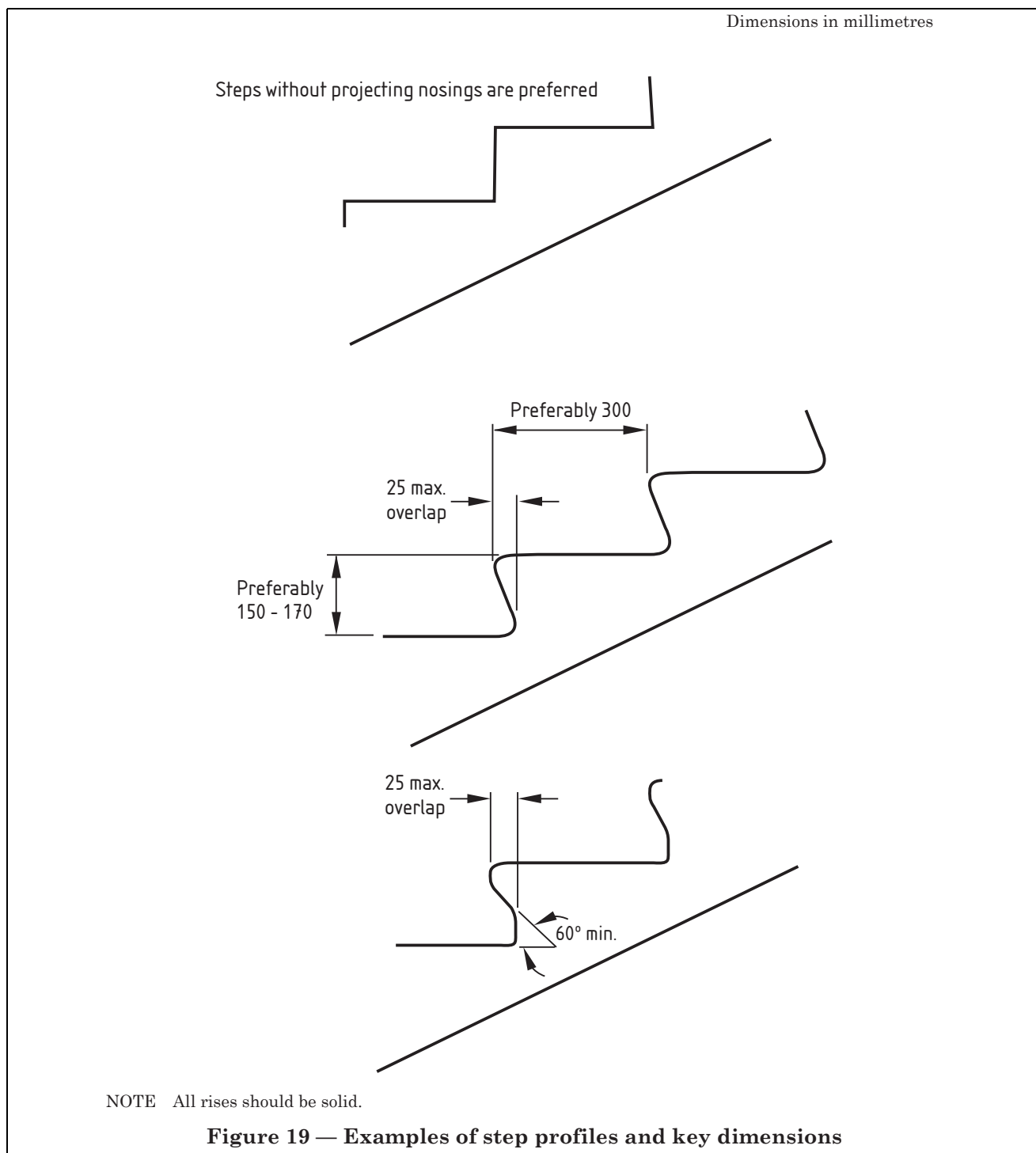
8.1.5 Landings

A level landing should be provided at the top and bottom of each flight of steps or stairs. Its length, clear of any door or gate swing, should be at least the stair clear width and for all buildings other than dwellings at least 1 200 mm.

 For buildings other than dwellings or other residential buildings, the top and bottom landing of a flight of stairs should be provided with a hazard warning surface modelled on the tactile paving detailed in *Guidance on the use of tactile paving surfaces* [3] and positioned at least 400 mm from the nosing, subject to a satisfactory risk assessment having been carried out, see 9.1.3.

Where the risk assessment indicates that such a solution is not feasible, the use of finishes which contrast visually should be considered (see 9.1.1). 

Balustrades should conform to the requirements of BS 6180 and should be strong enough to withstand inadvertent impact from an electrically powered wheelchair  or scooter  where that means of access is possible.



8.1.6 Handrails to steps and stairs

8.1.6.1 Handrail provision

COMMENTARY ON 8.1.6.1. *The division of wide flights into separate channels will allow an individual, who may have less strength on one side or the other, to be within easier reach of support.*

A flight of steps or stairs that consists of two or more risers should be provided with a continuous handrail on each side. If any stairway consists of two or more flights, separated by a landing or landings, each handrail should, if feasible, be continuous throughout the series of flights.

Where a stair is used simultaneously by a large number of people, and the overall stair clear width is greater than 1 800 mm, an additional handrail or handrails, should be provided to divide the flight into separate channels. No channel should have a stair clear width of less than 1 000 mm, or more than 1 800 mm.

NOTE This precludes the use of stairs with unobstructed widths between 1 800 mm and 2 m. **NOTE**

8.1.6.2 Height and extension of handrails

The vertical height to the top of a handrail should be between 900 mm and 1 000 mm from the pitch line of a flight of steps, and between 900 mm and 1 100 mm from the surface of a landing.

Depending on its height from the pitch line of a stair, or from the surface of a landing, a handrail may also serve as the top of guarding (see also 8.2.7).

NOTE 1 Guarding may be at a different height from the handrailing.

Each handrail should extend at least 300 mm beyond the first and last nosing. As much of the extension as possible should be horizontal. The extension should not intrude into any circulation route.

NOTE 2 For detailed recommendations on handrail design, including suitable profiles, see 8.3.

8.1.7 Artificial lighting

Each flight and landing of internal steps and stairs should be well illuminated, by means of artificial lighting, providing a clear distinction between each step and riser. The illuminance at tread level should be at least 100 lux.

Lighting that will cause glare (such as poorly located spotlights, floodlights or low level light sources) should be avoided.

8.1.8 Surface finishes

The surface materials used for internal steps and stairs should be chosen to be easy to maintain and as slip resistant as possible, especially if surfaces are likely to become wet due to location or use, or if spillage occurs.

NOTE BS 5395-1:2000, Table 4 gives guidance prepared by the Health and Safety Executive on the slip resistance of stair and floor surfaces (see also Annex C).

Where different materials are used for the flights and landings of a stair, care should be taken to ensure that their coefficients of friction are similar in order to minimize the risk of stumbling.

Deep pile carpet should not be used on stair treads.

The use of shiny, polished surface materials that cause glare should be avoided.

8.2 Internal ramps

COMMENTARY ON 8.2. *This code of practice recommends that circulation routes are level. However, if a change in level along an internal circulation route is unavoidable it will be necessary to provide an alternative means of access, i.e. a ramp, on which a wheelchair user can travel, or a platform lift, if there is insufficient space for a ramp.*

The key issues in the design of an internal ramp are the gradients of flights and the distances between landings. Where the gradient is too steep or an individual flight too long, a wheelchair user may not have sufficient strength to propel him- or herself up the slope. In the same situation, a companion who is pushing a wheelchair user is also likely to encounter the same difficulties. If the gradient is too steep, there is also the danger of a wheelchair user falling out forwards when going downhill, or of his or her wheelchair tipping over backwards when going uphill. Control and braking are also difficult on steep gradients.

8.2.1 General

Buildings should be designed to avoid, as far as is practicable, the need for ramps on internal circulation routes.

NOTE Where a change in level is no greater than 200 mm, a ramp may be acceptable, avoiding the need for a single step.

Where the change in level within a circulation route is greater than 200 mm, a ramp should be provided in addition to steps.