BS 8300:2009

BSI British Standards

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

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ISBN 978 0 580 57419 1

ICS 11.080.99; 91.040.01

The following BSI references relate to the work on this standard:
Committee reference B/559
Draft for comment 08/30153845 DC and 08/30182649 DC

Publication history
First published October 2001
Second (present) edition, February 2009

Amendments issued since publication

Date	Text affected

Contents

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Summary of pages
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Foreword

Publishing information

This British Standard is published by BSI and came into effect on 28 February 2009. It was prepared by Technical Committee B/559, *Access for disabled people* (previously B/209/8). A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This British Standard supersedes BS 8300:2001, which is withdrawn.

Information about this document

This is a full revision of the standard. The principal changes are to consolidate the changes made in Amendment 1 (2005), and to incorporate changes thought necessary by the Technical Committee following consideration of comments submitted by disability groups and constructional professionals since 2005. The following specific changes have been made.

- The recommendations on steps, stairs and handrails reflect those in BS 5395-1.
- There has been a relaxation of the recommendations on the provision of vision panels in doors, and more detailed information is given on the location and design of door opening and closing furniture.
- More information is now provided on means of escape and references are made to BS 9999.
- An increased percentage of accessible bedrooms is now recommended.
- New subclauses have been included on accessible baby changing facilities and Changing Places sanitary accommodation.
- Information on achieving sufficient visual contrast has been revised and included in a new annex that makes reference to BS 8493 on the measurement of light reflectance values.
- A new annex on slip resistance has been included, drawing on guidance issued by BRE and CIRIA.

Issues that require further research will be covered in a subsequent revision.

This standard provides guidance on good practice in the design of 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 individual building types.

For dwellings, much of the fundamental guidance in BS 5619 was incorporated into the 1999 edition of the Building Regulations 2000, Approved Document M as indicative of a basic minimum provision. This has now been superseded by the 2004 edition [1]. Where still relevant and considered to be helpful, recommendations from BS 5619 were incorporated into general guidance in the 2001 edition of BS 8300.

As a result of proposals in the Department of Communities and Local Government's consultations on the *Code for sustainable homes* [2], and the national strategy for housing in an ageing society *Lifetime homes, lifetime neighbourhoods* [3] for a gradual adoption of lifetime homes standards in both public and private-sector housing, recommendations on the design of dwellings to meet this standard have been published in a Draft for Development, DD 266. If formally adopted as a British Standard in due course, this will replace the current standards originated by the Joseph Rowntree Foundation.

The present edition of BS 8300 no longer gives guidance on individual dwellings, which are now covered in DD 266. However, some of the recommendations given in BS 8300 could be used to supplement guidance on the design of dwellings where appropriate.

The design recommendations in the 2001 edition of this British Standard were, 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.

In 2005, as a result of concerns within the industry and among building control professionals on the application of a number of recommendations, previous research was revisited and revised guidance incorporated in Amendment 1. The principal amendments related to door closing forces and visual contrast. In the present revision of BS 8300, information on visual contrast has been developed further.

Use of this document

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.

Any user claiming compliance with this British Standard is expected to be able to justify any course of action that deviates from its recommendations.

The recommendations in this British Standard are accompanied by scene-setting commentary that places 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.

Presentational conventions

The provisions in this standard are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is "should".

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

Contractual and legal considerations

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 cannot confer immunity from legal obligations.

Attention is particularly drawn to:

- the Disability Discrimination Act 1995 [4];
- the Disability Rights Commission Act 1999 [5];
- the Planning and Compulsory Purchase Act 2004 [6];
- the Disability Discrimination Act 2005 [7];
- the Equality Act 2006 [8].

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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, including being able to escape in the event of fire or other emergency.

Some facilities can 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 might be needed.

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

Reference is made on occasions 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.

It is advisable for the recommendations given in this standard to be applied at the earliest possible stage in the design process. It is also advisable for checks to be made before handover of a building to ensure that the recommended facilities have been correctly installed.

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. The recommendations also apply to routes to facilities associated with and in the immediate vicinity of buildings.

NOTE 1 The recommendations in this British Standard mainly cover access to buildings. The standard makes reference to egress in the event of fire or other emergency, but the main recommendations for means of escape are given in BS 9999.

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, dental practices, surgeries and residential homes;

d) refreshment, entertainment and recreation buildings, e.g. cafés, restaurants, public houses, concert halls, theatres, cinemas, conference buildings, community buildings, swimming pools and sports buildings;

e) religious buildings and associated facilities, e.g. church halls;

f) educational, cultural and scientific buildings, e.g. schools, universities, colleges, zoos, museums, art galleries, libraries and exhibition buildings;

g) residential buildings, e.g. hostels and hotels, residential clubs, university and college halls of residence, nursing homes and prisons, as well as the common parts of multi-occupancy residential buildings.

This British Standard does not apply to individual dwellings, to residential buildings designed specifically to meet the needs of severely disabled people, or to temporary structures.

NOTE 2 This British Standard does not give recommendations for management and maintenance in occupied buildings, but a list of issues to be considered is given in Annex A.

Although this British Standard is aimed specifically at the design of buildings to meet the needs of disabled people, its recommendations are also likely to benefit the population in general, e.g. elderly people, people with children in pushchairs and those carrying heavy luggage.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 3621, *Thief resistant lock assembly – Key egress*

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

BS 5499-4, *Safety signs, including fire safety signs – Part 4: Code of practice for escape route signing*

BS 5499-5, *Graphical symbols and signs – Safety signs, including fire safety signs – Part 5: Signs with specific safety meanings*

BS 5839-1, *Fire detection and fire alarm systems for buildings – Part 1: Code of practice for system design, installation, commissioning and maintenance*

BS 6180:1999, *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: Code of practice for safety related to human impact*

BS 6399-1, *Loading for buildings – Part 1: Code of practice for dead and imposed loads*

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 7036-1:1996, *Code of practice for safety at powered doors for pedestrian use – Part 1: General*

BS 7036-2, *Code of practice for safety at powered doors for pedestrian use – Part 2: Straight and curved sliding doors and prismatic and folding doors*

BS 7036-3:1996, *Code of practice for safety at powered doors for pedestrian use – Part 3: Swing doors and balanced doors*

BS 7036-4, *Code of practice for safety at powered doors for pedestrian use – Part 4: Low energy swing doors*

BS 7036-5, *Code of practice for safety at powered doors for pedestrian use – Part 5: Revolving doors*

BS 7594, *Code of practice for audio-frequency induction loop systems (AFILS)*

BS 7953, *Entrance flooring systems – Selection, installation and maintenance*

BS 8213-1, *Windows, doors and rooflights – Part 1: Design for safety in use and during cleaning of windows, including door-height windows and roof windows – Code of practice*

BS 8233, *Sound insulation and noise reduction for buildings – Code of practice*

BS 8621, *Thief resistant lock assembly – Keyless egress*

BS 9999:2008, *Code of practice for fire safety in the design, management and use of buildings*

BS 10621, *Thief resistant dual-mode lock assembly*

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 81-28, *Safety rules for the construction and installation of lifts – Part 28: Remote alarm on passenger and goods passenger lifts*

BS EN 81-70, *Safety rules for the construction and installation of lifts – Part 70: Particular applications for passenger and good passenger lifts – Accessibility to lifts for persons including persons with disability*

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

BS EN 179:2008, *Building hardware – Emergency exit devices operated by a lever handle or push pad, for use on escape routes – Requirements and test methods*

BS EN 1125:2008, *Building hardware – Panic exit devices operated by a horizontal bar, for use on escape routes – Requirements and test methods*

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*

BS EN 1303, *Building hardware – Cylinders for locks – Requirements and test methods*

BS EN 1935, *Building hardware – Single-axis hinges – Requirements and test methods*

BS EN 10535, *Hoists for the transfer of disabled persons – Requirements and test methods*

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

BS EN 12209, *Building hardware – Locks and latches – Mechanically operated locks, latches and locking plates – Requirements and test methods*

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

BS EN 60118-4, *Electroacoustics – Hearing aids – Part 4: Induction loop systems for hearing aid purposes. Magnetic field strength*

ISO 9386-1, *Power-operated lifting platforms for persons with impaired mobility – Rules for safety, dimensions and functional operation – Part 1: Vertical lifting platforms*

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 following terms and definitions apply.

3.1 access
approach, entry, internal circulation or exit, including in cases of emergency

3.2 accessible
capable of being accessed and used by disabled people

3.3 accessible bedroom
bedroom with en-suite sanitary facilities (shower room or bathroom) designed for the convenience and safety of people with a wide range of disabilities, including not only wheelchair users, but also people with limited dexterity or mobility, blind or partially sighted people, or people who are deaf or hard of hearing

NOTE In larger premises, an accessible bedroom might also be provided with a hoist to transfer a person from the bed to the sanitary facilities.

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

3.5 access statement
explanation of philosophy and approach to inclusive design adopted in the design and construction of a building

3.6 blister pedestrian crossing surface
form of tactile paving whose surface has parallel rows of flat-topped blisters (domes) to warn blind and partially sighted people of the proximity of a carriageway at pedestrian crossing points and other access points to a carriageway

NOTE The paving is installed at the dropped kerbs of both controlled and uncontrolled crossings. The colour of the paving is red for controlled crossings (e.g. crossings associated with traffic lights) and generally buff at other crossings.

3.7 components of ramps, steps and stairs

3.7.1 flight
continuous series of steps or ramp between two levels

3.7.2 going
horizontal distance between two consecutive nosings, measured along the walking line; horizontal distance between each end of a ramp

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

NOTE A handrail may form the top rail of guarding (balustrading), be supported independently from guarding or be supported from a wall.

3.7.4 landing
level platform or part of a floor at the end of a flight, ramp or floor

3.7.5 nosing
front edge portion of a tread or landing

3.7.6 ramp
length of inclined surface that provides access between two levels

NOTE An access route that has a gradient of 1:20 or steeper is assumed to be a ramp.

3.7.7 rise
vertical distance between the horizontal upper surfaces of two consecutive treads, or between a tread and a floor or a tread and a landing; vertical distance between each end of a ramp flight

3.7.8 riser
vertical component of a step between one tread and another or a landing above or below it

3.7.9 stair width
surface width of a stair on plan perpendicular to the walking line of a stair

NOTE Measured to the face of the enclosing wall, string, balustrade or upstand, whichever is closer to the walking line.

3.7.10 tread
horizontal component of a step

3.8 controlled door closing device
device that is capable of closing a door from any angle and against any latch fitted to the door

NOTE Rising butt hinges that do not meet these criteria are acceptable where the door is in a cavity barrier.

3.9 exit devices

3.9.1 emergency exit device
exit device intended for use in situations where people are familiar with the emergency exit and its hardware, having prior knowledge of its operation, and therefore a panic situation is unlikely to develop

3.9.2 panic exit device
exit device intended for use where panic situations might arise in public areas where the public are admitted and are not familiar with the surroundings

3.10 corduroy hazard warning surface
form of tactile paving whose surface that has raised ribs to warn blind and partially sighted people of a potential hazard ahead

NOTE The ribs, spaced at 50 mm centres, are installed at right angles to the direction of travel.

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

3.12 lifts

3.12.1 conventional passenger lift
lift designed to meet the requirements of the Lifts Regulations 1997 [9], operating at speeds greater than 0.15 m/s, for any travel distance, and able to transport passengers and goods without the need for instructions in its safe use

NOTE Such lifts are normally designed in accordance with BS EN 81.

3.12.2 evacuation lift
lift used as part of the evacuation sequence for people requiring assistance, which has appropriate structural, electrical and fire protection and is capable of being taken under control by an authorized person

3.12.3 fire-fighting lift
lift with fire protection measures, including controls that enable it to be used under the direct control of the fire and rescue service in fighting a fire

3.12.4 stairlift
appliance for transporting a person, either seated, standing or in a wheelchair, between two or more landings by means of a guided carriage moving in an inclined plane

3.12.5 chair stairlift
stairlift with a seat, which can be fixed or folding

3.12.6 wheelchair stairlift
stairlift with a horizontal platform which accommodates a wheelchair user

3.12.7 vertical lifting platform
device permanently installed to serve fixed landings comprising a guided platform whose dimensions and means of construction are primarily intended to permit the access of persons with limited mobility

NOTE This is also known as a platform lift.

3.13 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 blind and partially sighted people (see Annex B).

3.14 manifestation
permanent markings or features within areas of full-height transparent glazing, glazed walls or screens, fully glazed doors or glass doors, which help to prevent collisions by making the glazing more visible to building users

3.15 refuge
area that is both separated from a fire by fire-resisting construction and provided with a safe route to a storey exit, thus constituting a temporarily safe space

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

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

*NOTE The most common forms of tactile paving are blister pedestrian crossing surface (see **3.6**) and corduroy hazard warning surface (see **3.10**).*

3.18 unisex
<of sanitary accommodation> designed for use by either sex with or without assistance by people of the same or opposite sex

3.19 visual contrast (or contrast visually)
perception of a difference visually between one surface or element of a building and another by reference to their light reflectance values (LRV)

NOTE See Annex B.

4 Car parking, garaging, and setting-down and picking-up points

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

The driver of a vehicle (alone or accompanied) or a passenger might be disabled and might need to enter or leave the vehicle using a transfer hoist that is usually semi-permanently attached to the vehicle. Alternatively, it might be necessary for an assistant to alight from a vehicle first, then assist a disabled companion to do the same. When picking up, an assistant might need to park temporarily to escort disabled people who are waiting inside premises back to their vehicle.

Designated parking bays are for the exclusive use of vehicles displaying an official disabled person's parking badge (e.g. blue badge), providing the badge holder is either a driver or a passenger in the vehicle.

In some instances, a disabled person might need to drive a powered wheelchair or scooter through the rear or side entrance of a vehicle, requiring a larger than standard designated 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.

Drivers, whether disabled or not, expect to use many types of equipment 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 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 entrance of the building, is important.

4.1 Designated on-street parking

*COMMENTARY ON **4.1**.*
Some disabled people have difficulty transferring from vehicle to wheelchair or to footway, if the pavement is above the level of the carriageway. However, wheelchair-accessible taxis and other rear- and side-entry vehicles are easier to access from a raised kerb.

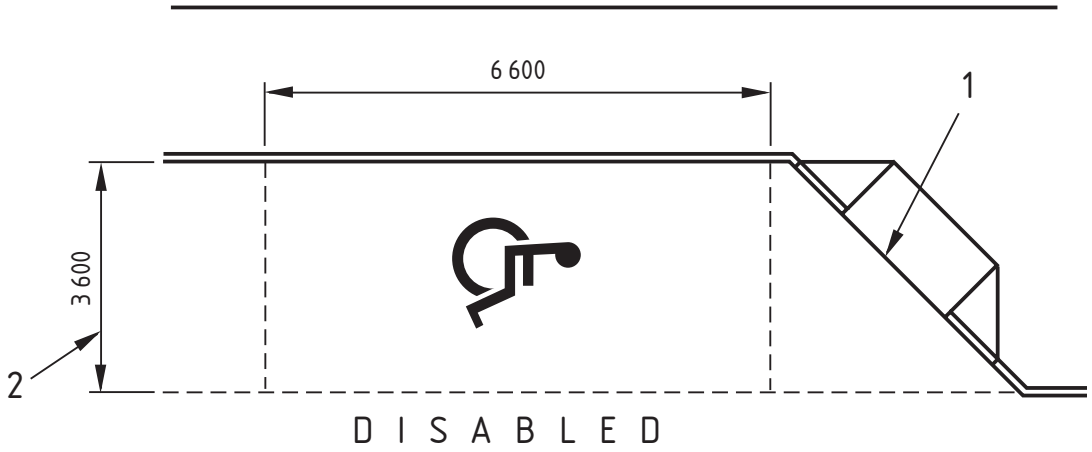
Where designated on-street parking bays are provided, they should be sited where road gradient and camber are reasonably level, e.g. 1:50. A dropped kerb (with associated blister paving) (see Figure 1) or level

surface should be provided to permit convenient access from the parking bay onto the pavement.

The dimensions of such 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 might be passing.

NOTE Further guidance is given in Inclusive mobility – A guide to best practice on access to pedestrian and transport infrastructure *[10].*

Figure 1 **Example of a designated on-street parking bay**
Dimensions in millimetres



Key

1 Dropped kerb (with blister tactile paving)

2 Allows safety zone on kerb or street side

NOTE Refer to Inclusive mobility – A guide to best practice on access to pedestrian and transport infrastructure *[10] for further guidance.*

4.2 Designated off-street parking

4.2.1 Provision of designated parking spaces

4.2.1.1 General provision

Designated parking spaces should be provided for each employee who is a disabled motorist (driver or passenger) and for other disabled motorists visiting the building. Spaces designated for disabled employees should be differentiated from spaces designated for other users. In addition, a number of enlarged standard spaces of 3 m wide × 6 m long that could be adapted to be designated parking spaces should be provided to reflect changes in local population needs and allow for flexibility of provision in the future. Initially, these spaces will benefit non-blue badge holders who need extra width to enter, or exit from, their vehicles.

Where space permits, at least one large designated parking space, 4 800 mm wide × 8 000 mm long, should be provided to cater for commercial vehicles converted for side or rear access using hoists or ramps. Such spaces should follow the recommendations in **4.2.2** and **4.2.3**.

NOTE 1 See Annex C for information on the space required to access different sized vehicles in different ways.

NOTE 2 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, the number of designated parking places needs to be increased above the minimum provision, based on experience.

4.2.1.2 Workplaces

For workplaces, 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. A further 5% of the total capacity should be enlarged standard spaces (see **4.2.1.1**).

4.2.1.3 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. A further 4% of the total capacity should be enlarged standard spaces (see **4.2.1.1**).

Hotels should have at least one designated car parking space per accessible bedroom.

NOTE The numbers of designated spaces might need to be greater at venues that specialize in accommodating groups of disabled people.

4.2.1.4 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. A further 5% of the total capacity should be enlarged standard spaces (see **4.2.1.1**).

Where car parking is split into short and long stay, all designated parking bays and enlarged standard spaces should be located together, as near as feasible to the station entrance.

4.2.1.5 Religious buildings and crematoria

For religious buildings, such as places of worship, and for crematoria, the minimum number of designated spaces should be two spaces or 6% of the total capacity, whichever is the greater. A further 4% of the total capacity should be enlarged standard spaces (see **4.2.1.1**).

4.2.1.6 Sports facilities

Designated parking provision for sports facilities should be determined according to the usage of the sports facility.

NOTE A simple percentage provision is not relevant to sports facilities. Detailed guidance on parking provision for sports facilities can be found in the Sport England publication Accessible sports facilities *[11].*

4.2.2 Access to, and location of, designated off-street parking spaces

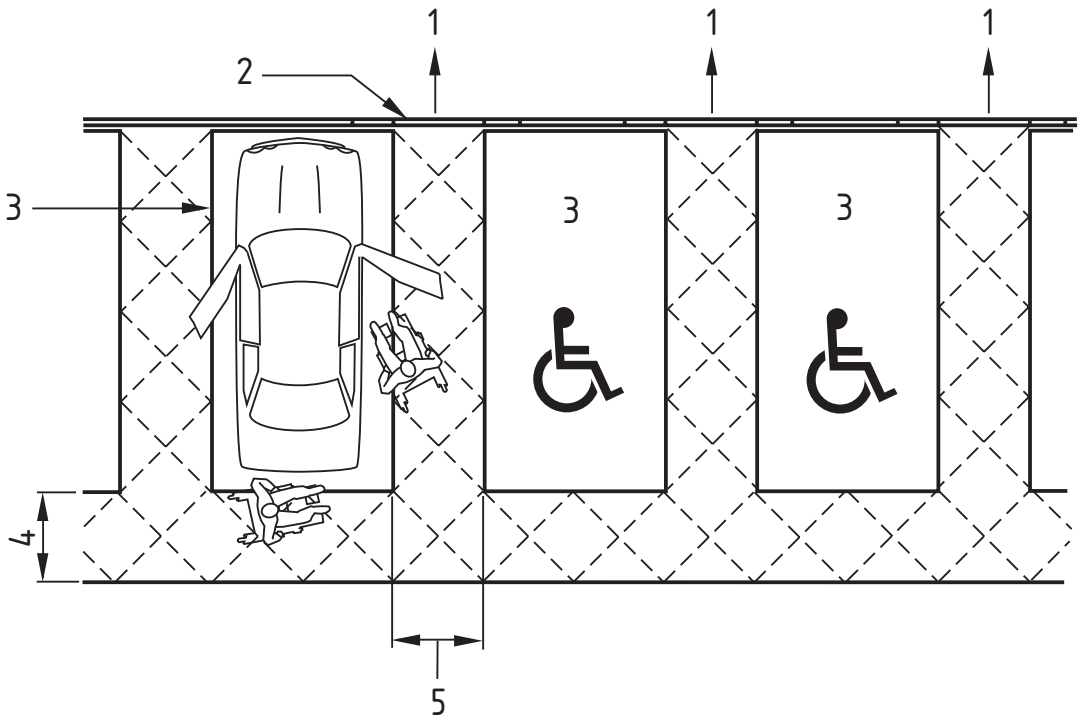
Designated parking spaces in uncovered parking areas should be located on firm and level ground, as close as is feasible to the accessible entrance to the building with which the parking spaces are associated.

NOTE In some circumstances, the most suitable location for designated parking spaces might 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.

4.2.3 Design and layout of designated off-street parking spaces

Space should be available to enable a disabled motorist or passenger to open the car door fully, to get in or out of the vehicle, and to manoeuvre around vehicles that are parked perpendicular to the carriageway, as shown in Figure 2.

Figure 2 **Access around designated off-street parking spaces**



Key

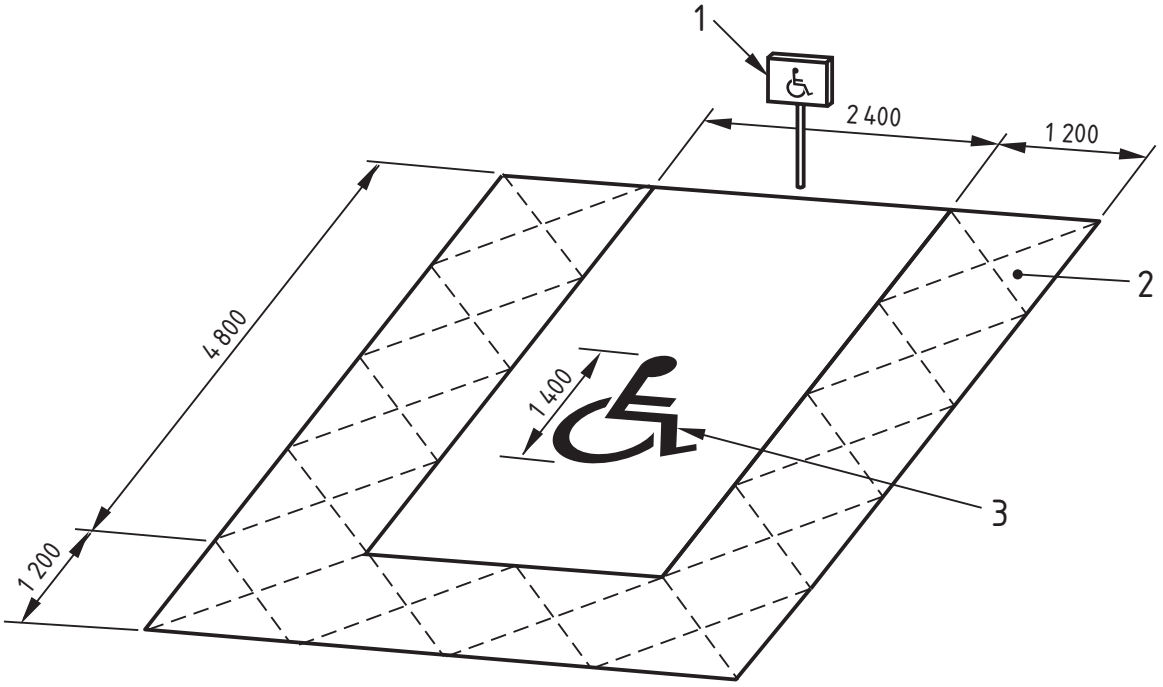
1 Preferred access route avoiding travel behind parked cars
2 Dropped kerb or level access
3 Standard 2 400 mm × 4 800 mm designated parking space
4 1 200 mm wide safety zone for boot access and cars with rear hoists, outside the traffic zone
5 1 200 mm wide marked access zone between designated parking spaces

A zone of 1 200 mm wide should be provided between designated parking spaces and between the designated spaces and a roadway (without reducing the width of the roadway) to enable a disabled driver or passenger to get in or out of a vehicle and access safely the boot or rear hoist. These zones should be marked as shown in

Figure 3, with the markings contrasting visually with the surface to which they are applied.

*NOTE Access to the rear or side of a vehicle by hoist or ramp will require extra space. The provision of a large designated parking space 4 800 mm wide and 6 000 mm long will benefit people using hoists or ramps to access their vehicles (see **4.2.1.1** and Table C.17).*

Figure 3 **Markings for multiple designated off-street parking spaces**
Dimensions in millimetres



Key

1 Sign, with its lower edge 1 000 mm above the ground, to identify parking space when road markings obscured e.g. by snow or fallen leaves, with the words "Blue badge holders only"

2 1 200 mm wide access zone between designated parking spaces

3 International Symbol for Access

NOTE Dimensions of parking space are to centre lines of markings.

The surface of the access and safety zones of a designated off-street parking space should conform to **5.5.1**.

If designated parking places are required parallel to the carriageway, they should have the dimensions and markings shown in Figure 1.

Designated parking spaces and any access routes from such spaces to the building entrance should be lit artificially to achieve a minimum illuminance of 20 lux, but with an illuminance of 100 lux on ramps or steps.

4.2.4 Multi-storey car parks

Designated parking spaces should be clearly signposted and at the same level as the 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 accessible entrance to the building.

4.3 Garaging and enclosed parking spaces

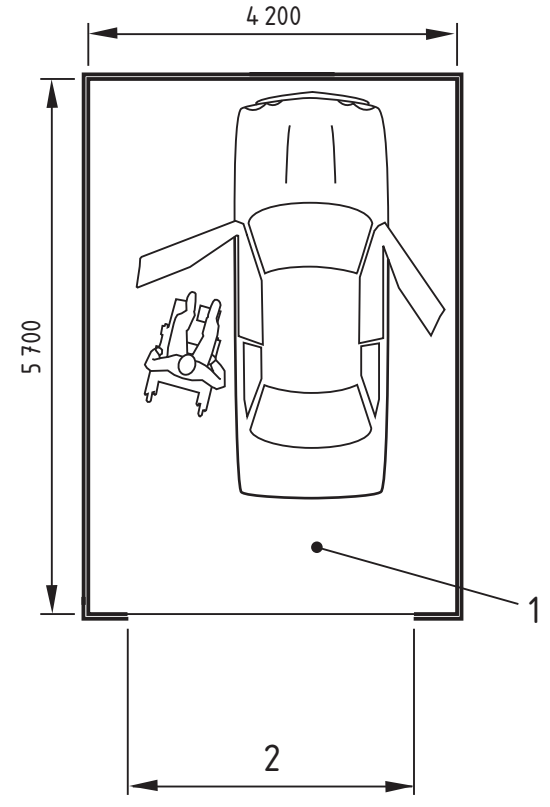
If feasible, access to garages and individual enclosed parking spaces for disabled motorists should be level and under cover. The access to the spaces, including the vehicular entrance and the ceiling level, should permit the use of a wheelchair hoist and have a vertical clearance of not less than 2.6 m.

A single garage or enclosed parking space for use by a motorist who is a wheelchair user should be large enough to allow the wheelchair user to turn around at the side of the vehicle, to access the rear of the vehicle and to get into and out of the space. The space available should also be sufficient to allow a non-disabled 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 of a garage or enclosed parking space, they should be operable from inside the vehicle.

The dimensions of a garage or enclosed parking space for use by a wheelchair user and an ambulant driver should be as shown in Figure 4.

Figure 4 **A garage designed for a wheelchair user and an ambulant driver**
Dimensions in millimetres



Key

1 Space for wheelchair access at the rear of the vehicle

2 Full width door opening provides flexibility in positioning the car within the space and therefore allows wheelchair transfer from either driver or passenger side

NOTE An increase in width of 750 mm is needed if both driver and passenger are wheelchair users.

4.4 Entrances to car parks, and parking controls

4.4.1 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**.*

4.4.2 Barrier control systems

*COMMENTARY ON **4.4.2**.*
Ticket, swipe card or key-activated entrance barrier controls to private car parks are often difficult to reach and to manipulate by drivers with limited dexterity. Dual control systems, i.e. having barrier control panels at two different heights, can assist such people; remote control systems are another option for regular users.

The height of ticket, swipe-card or key-activated systems for car park barriers should conform to the requirements of BS 6571-4, with the lower edge of the instructions and control area being between 1 000 mm and 1 100 mm above the carriageway. No plinth should extend into the carriageway by more than 50 mm beyond a line taken vertically from the front face of the control panel.

Means of calling for assistance should be provided, e.g. a call button located on the barrier control panel. An emergency telephone number should also be displayed at the barrier. For the benefit of people who are deaf or hard of hearing, the phone system at the security control point should be capable of receiving texts, or a mobile phone number should also be displayed and permanently manned, as an alternative method of receiving a texted call for assistance.

*NOTE Information on the use of LED displays is given in **6.6.2**.*

4.4.3 Height restriction

Any vehicle height barrier should provide a vertical clearance on level ground 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 barrier.

The vertical clearance of 2.6 m should be maintained from the entrance of the car park to (and including) the designated parking spaces and exits from those spaces. The effect of driving a long wheelbase vehicle over any humps or onto a slope should be taken into account when checking the effective vertical clearance.

Height restrictions should be clearly signposted, at a point before drivers begin to enter the car park. For existing car parks, if it is not feasible to maintain the recommended vertical clearance along the route, there should be directions to suitable alternative designated parking spaces.

4.4.4 Parking meters, controls and ticket dispensers

4.4.4.1 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.

4.4.4.2 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.

4.4.4.3 Ticket dispensers

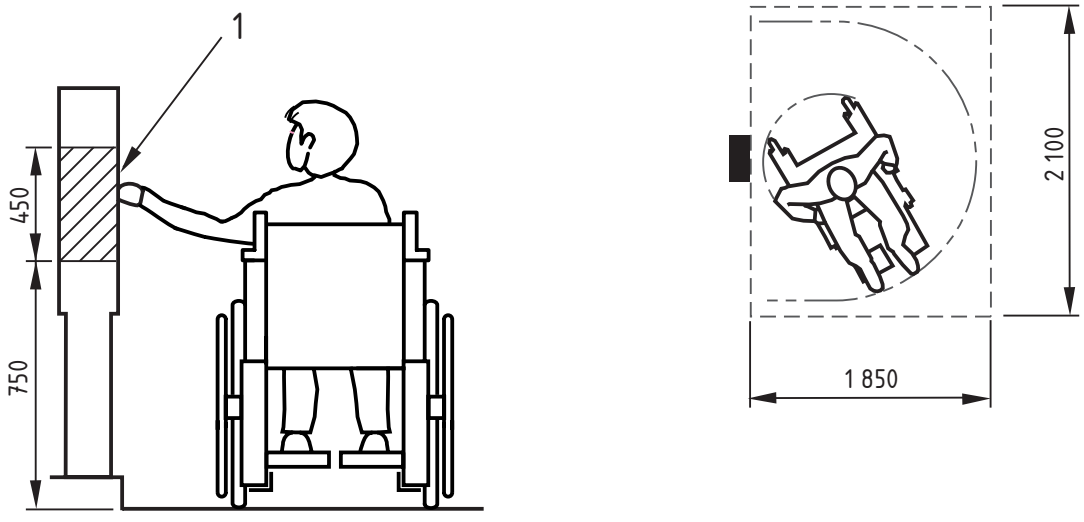
Where there is a charging system for designated parking spaces and only one ticket dispenser is provided, the height above ground of the controls, and of slots for coins or cards, should be at least 750 mm and not more than 1 200 mm, as shown in Figure 5. The dispenser should be located as close as possible to the designated spaces, on a route that is clear of obstructions, and in such a position as to allow clear access to the dispenser by a wheelchair user.

Where more than one ticket dispenser is provided, the height of the controls on the additional dispensers may be between 1 000 mm and 1 400 mm (see BS 6571-6), for use by non-wheelchair users. However, at least one ticket dispenser for use by wheelchair users should always be provided.

NOTE Where there is no charging system for designated parking spaces, a low-level ticket dispenser would still be of assistance to those people of short stature who do not have a blue badge.

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 wheelchair users**
Dimensions in millimetres



a) Height of controls and slots above the ground

b) Plan view – clear space to approach, manoeuvre side on to the machine, then turn and return to the car

Key

1 450 mm high zone for control buttons, coin slot and ticket release

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, and should not project beyond the face of the equipment in a way which prevents convenient access.

4.5 Setting-down and picking-up points

A designated setting-down point suitable for disabled passengers should be provided on firm and level ground, close to the 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. If feasible, a short-term waiting area for drivers of vehicles picking up disabled passengers or a disabled driver waiting for passengers should also be provided in addition to the setting-down point.

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

In addition, an area of the footway with a kerb should be assigned as a setting-down/picking-up point for people using taxis and other vehicles that have ramps designed to transfer directly to the footway.

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 partially sighted people.

For disabled people who need a generous amount of space when moving about, the provision of narrow approaches creates difficulties.

Uneven surfaces, surfaces of loose materials (e.g. unbonded gravel) and large gaps between paving materials cause problems for wheelchair users, blind and partially sighted people 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 blind and partially sighted people, the presence of warnings that can be detected during the sweep of a cane, the absence of projections and overhangs, and good visual contrast with the background, will reduce the risk of colliding with items located along the access route.

5.1 General

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

a) from public transport stops and designated car parking spaces to the accessible entrance to the building;

b) to and from facilities associated with, and in the immediate vicinity of, buildings, including emergency egress assembly points (see BS 9999);

c) externally, between the accessible entrance and any other subsidiary entrances and buildings, if external circulation is provided between them;

d) between 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.

The location of emergency egress points should not cause difficulties for disabled people, particularly those people with limited mobility.

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

Seating in resting places should meet the following recommendations.

1) There should be a variety of seat heights, ranging from 380 mm to 580 mm, within which a height of 480 mm is suitable for wheelchair users.

2) Armrests should be provided to help people lower themselves onto the seat and stand up.

3) Where the seat is set at a height suitable for wheelchair users, armrests should not be at the extreme end of the seat but set in so as not to restrict the lateral transfer from a wheelchair to the seating. They should also not restrict front or oblique transfer.

4) A supportive back-rest should be incorporated for at least 50% of the length of the seat.

5.2 Width and height of an access route

To be accessible, the minimum surface width of an access route (i.e. between walls, kerbs or path edgings) should be:

a) at least 1 800 mm for general routes (see Note 1);

NOTE 1 The minimum space required for wheelchairs and people to pass each other on an access route is 1 800 mm, as shown in Annex D. However, a width of 2 000 mm is preferable.

b) at least 1 500 mm, if passing places are provided (see **5.3**);

c) at least 1 200 mm in existing developments, subject to a case being made in an access statement.

These widths should be maintained up to a height of at least 2.1 m above ground level, subject to the recommendations regarding hazard protection set out in **5.7.2**.

NOTE 2 Sports facilities have their own requirements for widths of access routes (see Accessible sports facilities *[11]).*

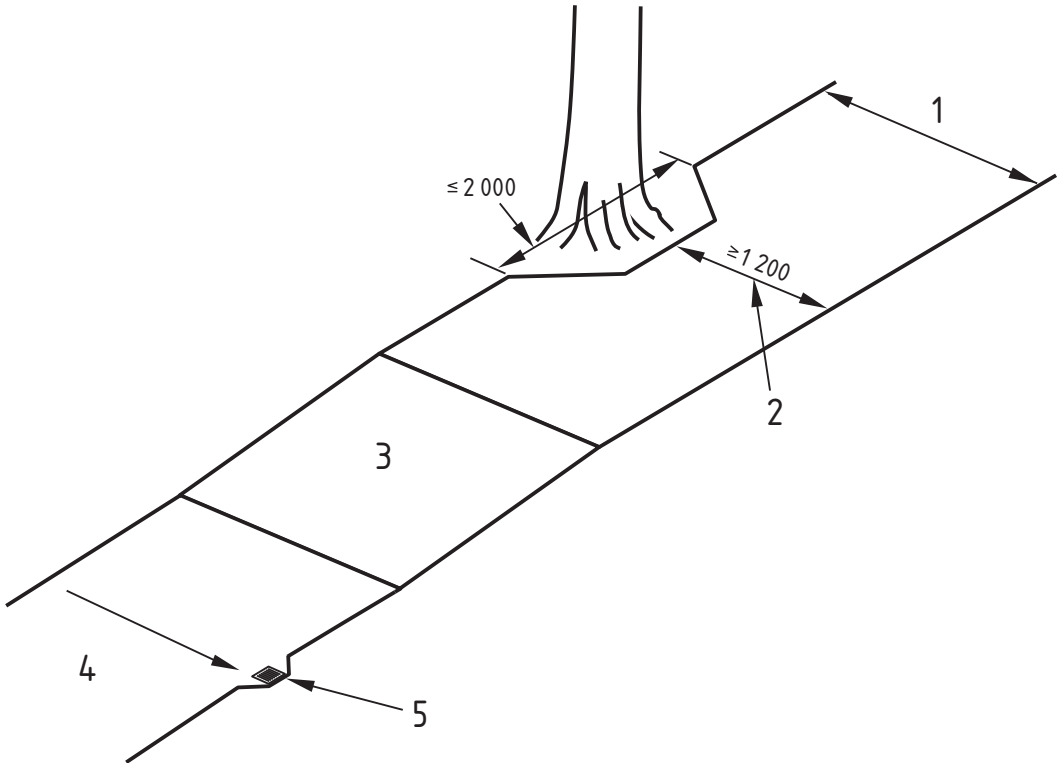
5.3 Passing places on access routes

Where the surface width of an access route is less than 1 800 mm, passing places should be provided to allow two wheelchair users to pass each other. Passing places should also be provided at junctions (e.g. corners) along an access route.

A passing place should be 2 000 mm long and 1 800 mm wide and located within direct sight of another passing place, or at a maximum distance of 25 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 1 200 mm and should extend for not more than 2 m in length (see Figure 6). However, measures should be taken to prevent narrowing being a hazard (see **5.7.2**).

Figure 6 **The design of access routes**
Dimensions in millimetres



Key

1 1 800 mm minimum to allow two wheelchairs to pass each other
2 Width reduced to 1 200 mm minimum for not more than 2 m in length around existing obstructions
3 Gradient to conform to **5.4**
4 Crossfall gradient not more than 1:50
5 Drainage gratings offset from access route where possible

5.4 Gradients on access routes

An access route should either be level along its length or (where the topography of the land prevents this) should be gently sloping or incorporate a ramp or ramps in accordance with **5.8**. Where the change in level is sufficient to avoid a single step, a stepped approach should also be provided (see **5.9**).

NOTE 1 It is assumed that a gradient of 1:60 or less steep is level; steeper than 1:60 (but less steep than 1:20) is gently sloping; and 1:20 or steeper is a ramp.

Where an access route has a gradient steeper than 1:60, but not as steep as 1:20, it should have a level landing for each 500 mm rise of the access route. A level landing should also be provided wherever a change of direction occurs.

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

NOTE 2 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 unbonded gravel should not be used.

NOTE For guidance on slip resistance, see Annex E.

With the exception of recognized tactile paving surfaces, undulations in the surface of paving, whether paving slabs, split York stone, blocks, bricks or formless materials such as concrete or asphalt, should not exceed 3 mm under a 1 m straight edge.

The joints between adjacent paving units or utility access covers and paving units should be finished using any of the following techniques.

a) Where joints are filled to the surface, the difference in level between adjacent units should be no more than twice the joint width, subject to a maximum difference in level of 5 mm.

b) Where the joints are filled but recessed below the surface, the difference in level between adjacent units should be no greater than 2 mm, with the joints no wider than 10 mm and the recess no deeper than 5 mm.

c) Where the joints are unfilled, the difference in level between adjacent units should be no greater than 2 mm, with the joints no wider than 5 mm.

5.5.2 Tactile paving

Tactile paving with blister surface (see **3.6**) should be used, where necessary, on access routes to provide blind and partially sighted people with an indication of pedestrian crossing points etc.

NOTE For detailed guidance on the use and layout of tactile warning and information surfaces see the DTRL publication Guidance on the use of tactile paving surfaces *[12].*

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 should be set at right angles to the dominant line of travel.

The diameter of circular holes in gratings should be not more than 18 mm.

NOTE This 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 Hazards on an access route

5.7.1.1 Location of street furniture

Street furniture, such as 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, e.g. by ensuring that they contrast visually with the background against which they will be seen (see Annex B).

5.7.1.2 Free-standing posts and columns

Each free-standing post, e.g. a lighting column, within an access route should contrast visually with the background against which it is seen (it is desirable also to incorporate a band, 150 mm high, whose bottom edge is 1 500 mm above ground level, and which contrasts visually with the remainder of the column or post) (see Annex B).

Free-standing columns that support an entrance canopy should not be positioned within the width of an access route.

Low-level posts, e.g. bollards, should not be located within an access route. They should be at least 1 000 mm high and should contrast visually with the background against which they are seen (it is desirable also to incorporate a 150 mm deep contrasting strip at the top). They should not be linked with chains and should have no horizontal projections; they may taper towards the top but should not taper towards the ground.

NOTE Further guidance is available in Inclusive mobility – A guide to best practice on access to pedestrian and transport infrastructure *[10].*

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 front edge is less than 300 mm above the ground and their upper front edge is at least 1 200 mm above the ground (see Figure 7).

Visual contrast should be provided regardless of whether or not hazard protection is needed.

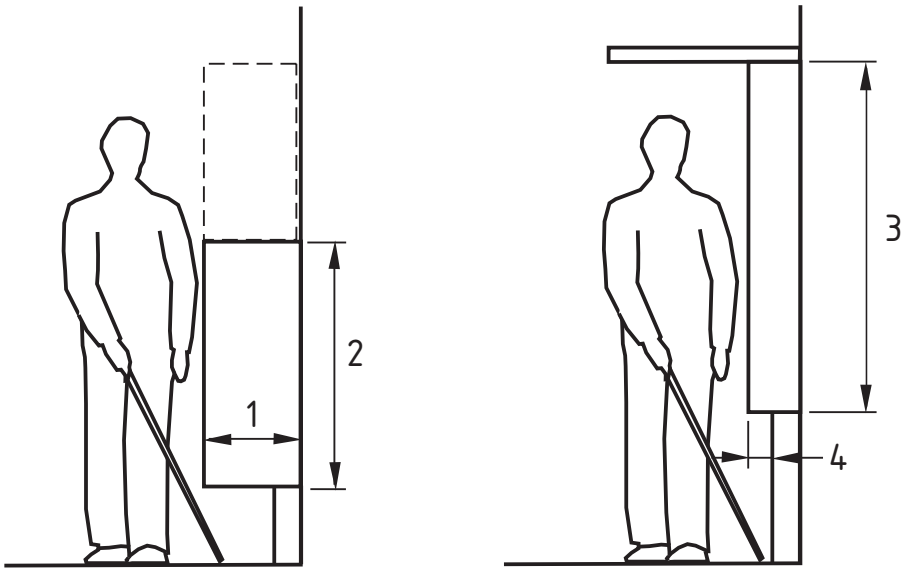
Hazard protection should be provided if objects project more than 100 mm into an access route and their lower front edge is more than 300 mm above the ground (see Figure 8).

Hazard protection associated with such objects should take the form of a tapping rail, with its underside no higher than 150 mm above

floor level, or similar 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. It should contrast visually with the background.

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 each side of the obstruction (see Figure 8).

Figure 7 **Projections into an access route that do not need hazard protection**



Key

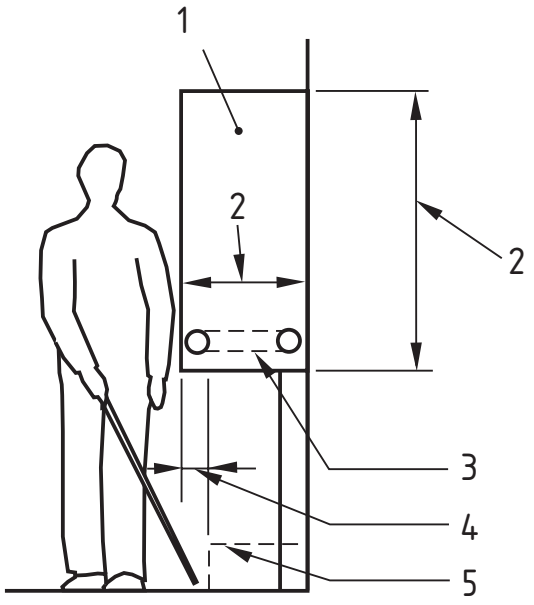
1 Object projecting into an access route

2 No hazard protection required where the lower front edge of a projecting object is less than 300 mm, and the upper front edge of the object is at least 1 200 mm, above the ground

3 No hazard protection required where an object projects into an access route between 300 mm and 2 100 mm above the ground by not more than 100 mm, or by not more than 100 mm in front of its base where the base projects not more than 100 mm into the access route

4 Projection of an object in front of its base

Figure 8 **Projections into an access route that need hazard protection**



Key

1 Hazard such as:
- open window;
- building projection;
- telephone booth

2 Cane detection required where an object projects into an access route between 300 mm and 2 100 mm above the ground by more than 100 mm, or by more than 100 mm in front of its base

3 Guarding each side of the obstruction in addition to cane detection

4 Not more than 100 mm between the front face of an object and the tapping rail

5 Tapping rail, with its underside no higher than 150 mm above floor level, to provide cane detection

5.7.3 Hazard protection beneath 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.

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) a continuous barrier, e.g. a raised flower bed which extends at least 900 mm above ground level.

NOTE Tapping rails or low kerbs can be a tripping hazard and are to be avoided beneath free-standing stairs.

5.8 External ramped access

*COMMENTARY ON **5.8**.*
*This British Standard 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 might 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 a 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 might need to be equipped with a portable ramp if modification of the existing structure is considered inappropriate. Alternatively, it might be appropriate to install a vertical lifting platform close to the entrance.

5.8.1 General

The relative levels of the accessible 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**). Where the change in level is such that a portion of the access route needs to have a gradient of 1:20 or steeper, the access should be ramped.

*NOTE Where the change in level is less than 300 mm, a ramp is the only viable means of access, as it avoids the need for a single step (see **5.9.3**).*

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 accessible 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 **9.2.1.4**).

5.8.2 Gradient of a ramp

A ramp should have the lowest practical gradient within the range 1:20 to 1:12.

The gradient of a ramp flight in relation to its going should be no steeper than that shown in Table 1.

NOTE Different design solutions might be needed in transport infrastructure (see [10]).

Table 1 **Limits for ramp gradients**

Going of a flight	Maximum gradient	Maximum rise
10 m	1:20	500 mm
9 m	1:19	473 mm
8 m	1:18	444 mm
7 m	1:17	411 mm
6 m	1:16	375 mm
5 m	1:15	333 mm
4 m	1:14	285 mm
3 m	1:13	230 mm
Not exceeding 2 m	1:12	166 mm

No individual flight of a ramp should have a going of more than 10 m or a rise of more than 500 mm.

If a series of ramp flights rises more than 2 m, an alternative means of step-free access, such as an enclosed lift, protected from the weather, should be provided.

The cross-fall gradient of a ramp should be not more than 1:50.

5.8.3 Ramp widths

The surface width of a ramp, between walls, upstands or kerbs, should be not less than 1 500 mm (see **5.2**).

Where the width between the handrails of a ramp exceeds 2.5 m, the ramp should be divided into two or more channels, with a distance between handrails of not less than 1 m and not more than 2 m, to ensure that all users have access to a handrail. Where a ramp is divided into channels, at least one channel should have a surface width not less than 1 500 mm.

NOTE 1 A surface width of 1 800 mm is the minimum that permits two wheelchair users to pass each other.

NOTE 2 Sports facilities have their own requirements for ramp widths (see Accessible sports facilities *[11]).*

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 not less than 1 500 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-turn 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 It is advisable to increase the surface width of an intermediate landing to 1 800 mm so that it can serve as a passing place.

Balustrades should conform to the recommendations of BS 6180.

5.8.5 Handrails to ramps

Handrails to external ramps should conform to the recommendations given in **5.10**.

5.8.6 Edge protection to ramps

A continuous upstand at least 100 mm high, or an equivalent barrier, should be provided at any open edge of a ramp, in conjunction with a barrier (including a handrail component) positioned directly over the upstand. The upstand should contrast visually with the surface of the ramp (see Annex B).

NOTE 1 The upstand is intended to prevent a wheelchair user falling over the edge of the ramp and provide for cane detection. A permanent design feature (e.g. a planting box) can give additional protection.

NOTE 2 Further guidance on barriers is given in BS 6180.

5.8.7 Surface materials

The surface materials used for an external ramp should be chosen to be durable and easy to maintain, and should be slip-resistant when wet, to allow for rain and other environmental factors.

NOTE 1 Where weather or low temperature results in surfaces being covered in snow or ice, the slip resistance of a surface ceases to be effective. It is therefore important that external ramp surfaces are kept free of snow or ice as part of the management regime of a building.

The surface of a ramp should contrast visually with that of a landing and of the edge protection so that its presence is distinguishable by blind and partially sighted people (see Annex B).

To maintain traction, a sloping surface should have a higher slip resistance than an equivalent level surface. The steeper the slope, the greater the friction needed to maintain contact with the ground without slipping.

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

NOTE 2 Advice and further references on slip resistance of surfaces is given in Annex E.

5.8.8 Lighting

Care should be exercised in the location and orientation of a ramp to avoid, where possible, glare and cross-shadows which can prevent blind and partially sighted people distinguishing changes in gradient.

Artificial lighting to a ramp should be evenly distributed, with an illuminance at ramp and landing level of at least 100 lux.

5.8.9 Temporary ramps

Temporary ramps that are fixed in place to provide a temporary solution until it is possible to provide a permanent ramp, e.g. during building works, should be designed in accordance with **5.8.1** to **5.8.8**.

5.8.10 Portable ramps

Portable ramps should be used only in exceptional circumstances for existing buildings, e.g. if an entrance door opens directly onto the back of a footpath. They should be positioned and their presence identified so that they do not constitute a hazard to passers-by.

Portable ramps should have a surface width of at least 800 mm, a drainable, slip-resistant surface and upstands at least 100 mm high to prevent wheelchair tyres veering off the edge.

Gradients of portable ramps should conform as closely as practicable to **5.8.2** and Table 1.

NOTE Portable two-channel ramps are not suitable.

5.9 External stepped access

*COMMENTARY ON **5.9**.*
Blind and partially sighted people risk tripping or losing their balance if unaware of steps. 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.

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 and stairs

*COMMENTARY ON **5.9.2**.*
Slips on steps and stairs occur in both ascent and descent, but a slip on descent is more likely to lead to a fall and an injury. Research has shown that slips while descending stairs are more likely to occur when the user oversteps, placing only 50% to 60% of their foot on the tread. The likelihood of an overstep decreases significantly with increased going size, and beyond 300 mm, is very rare. Beyond 350 mm, it is unlikely that a large overstep will occur within the lifetime of the building, even with 2 000 users per day.

Excessively high risers can 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 partially sighted people can feel a sense of insecurity when looking through open treads, and assistance dogs might refuse to proceed.

The preferred dimensional ranges for steps and stairs are between 150 mm and 180 mm for the rise and between 300 mm and 450 mm for the going.

NOTE There is now compelling research evidence to indicate that a larger going helps to avoid accidents on a stair, particularly in descent, as it allows a person to place more of their foot on the step. Larger goings can also benefit people who wish to pause mid-flight to rest.

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

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 ensure that people who drag their feet do not trip when ascending.

5.9.3 Rise of a flight

No flight on an external stepped access route should contain more than 20 risers and, as far as possible, the numbers of risers in successive flights should be uniform.

NOTE 1 In determining the number of risers in a flight, designers need to strike a balance between minimizing the number of risers between landings so as to create more frequent resting points, and maximizing the number between landings so that the number of potential accident danger spots (when moving from a landing to a flight) is minimized. The former approach is likely to benefit people with restricted mobility and the latter approach is likely to help blind or partially sighted people.

Single steps should be avoided as, even when highlighted using visual contrast, they present a significant trip hazard. Thus, where there is a change in level of two steps or more, it should be treated as a stair and should include handrails each side and all other features of a stair. A stair should always be provided in addition to a ramp, unless the change in level is less than 300 mm, where it would otherwise be necessary to have a single step (see also **5.8.1**).

NOTE 2 The 300 mm dimension assumes a minimum step rise of 150 mm.

5.9.4 Stair width

The surface width of a stair, between enclosing walls, strings, balustrades or upstands, should be not less than 1 200 mm, and the width between handrails should be not less than 1 000 mm.

Where the width between handrails exceeds 2.0 m, the stair should be divided into two or more channels with a distance between handrails of not less than 1 m, or not more than 2 m, to ensure that all users have access to a handrail.

5.9.5 Identification and slip resistance of nosings

Each step nosing should incorporate a permanently contrasting continuous material for the full width of the stair on both the tread and the riser to help blind and partially sighted people appreciate the extent of the stair and identify individual treads. The material should be 50 mm to 65 mm wide on the tread and 30 mm to 55 mm on the riser, and should contrast visually with the remainder of the tread and riser (see Annex B).

NOTE 1 A nosing that wraps around the riser might assist blind or partially sighted people.

NOTE 2 A proprietary nosing can provide a durable solution that satisfies both visual contrast and slip resistance criteria (see BRE IP 15/03 [13]).

The whole tread or the nosing should incorporate a slip-resistant material, starting as close as practicable to the front edge of the nosing and extending the full width of the tread.

NOTE 3 Guidance on slip resistance of surfaces is given in Annex E.

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 surface width of the flight.

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

To give advance warning of a step, tactile paving with a corduroy hazard warning surface (see **3.10**) should be provided at the top and bottom of each flight. Where the approach to the stair is wider than the flight, the tactile surface should extend beyond the line of each edge of the flight (see Figure 9).

NOTE Further information on the correct choice of tactile warning surface can be found in the DTLR publication Guidance on the use of tactile paving surfaces *[12].*

5.9.7 Handrails to steps and stairs

Handrails to external steps and stairs should conform to the recommendations given in **5.10**.

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 wall lights, spotlights, floodlights or low-level light sources) should be avoided.

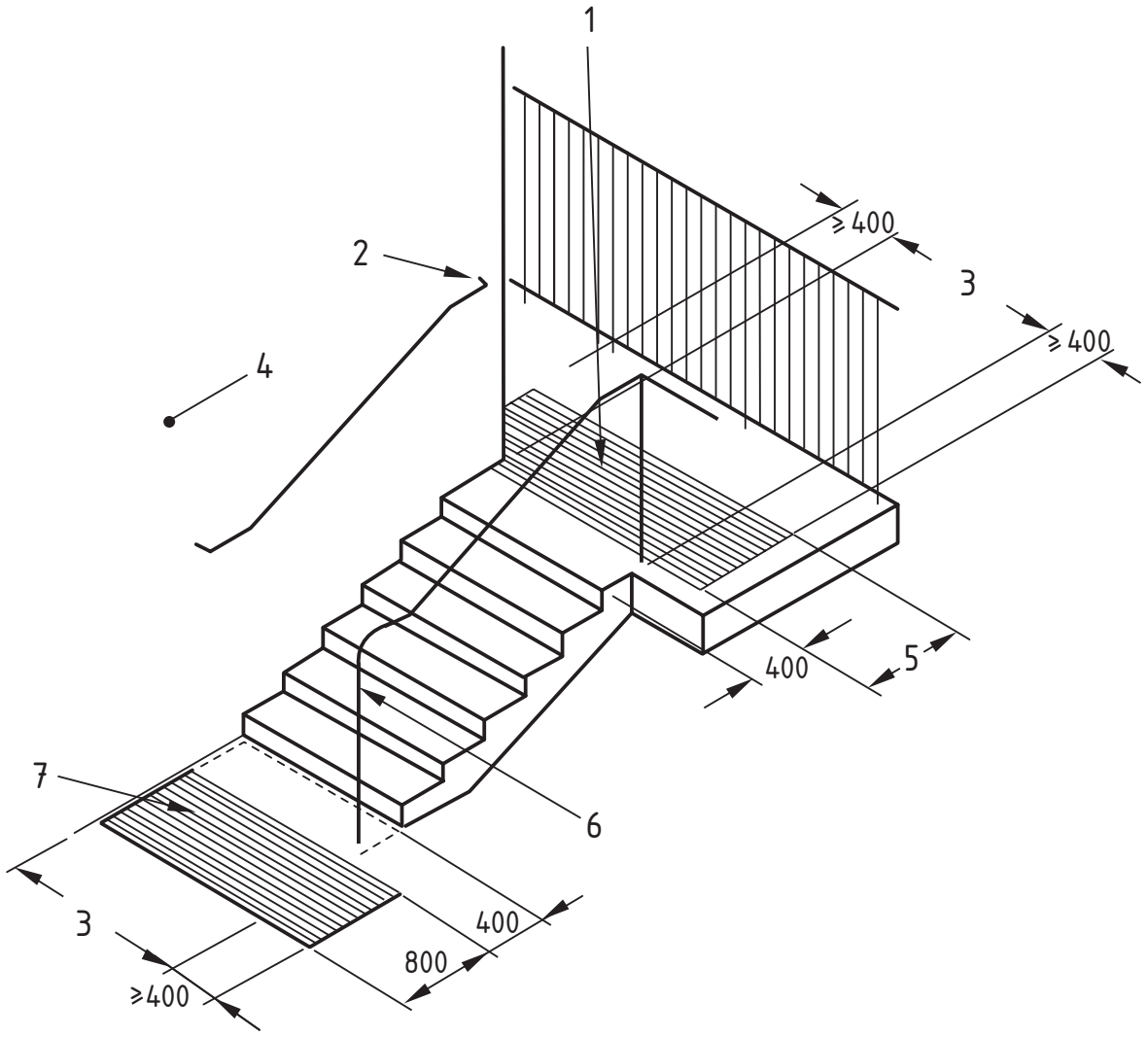
5.10 Handrails to ramped and stepped access

*COMMENTARY ON **5.10**.*
Wheelchair users do not normally need to use handrails to negotiate a ramp. However, in slippery conditions on long and/or steep ramps, handrails can help wheelchair users to steady themselves. An ambulant disabled person might 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.

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 division of wide flights of ramps or steps into separate channels will allow an individual who might have less strength on one side or the other to be within easy reach of support. This is particularly important when many other people are using the steps or stairs at the same time.

Figure 9 **Use of a corduroy hazard warning surface and handrails on an external stepped access**
Dimensions in millimetres



Key

1 Corduroy hazard warning surface at top of stairs to extend at least 400 mm at each side of stairs and to stop 400 mm from nosing
2 Handrail fixed to side wall and terminated with a closed end at top and bottom
3 Surface width of stair, at least 1 200 mm wide
4 Side wall to staircase
5 800 mm when the approach is straight on and 400 mm when a conscious turn is needed to reach the step
6 Handrail to be terminated in a way that reduces the risk of clothing being caught
7 Corduroy hazard warning surface at bottom of stairs

5.10.1 Handrail provision

A handrail should be provided on each side of a ramp or stair flight, throughout its length (including intermediate landings where this does not obstruct the use of adjoining access routes). The top surface of the handrail should be between 900 mm and 1 000 mm from the surface of the ramp or pitch line of a stair and between 900 mm and 1 100 mm from the landing.

NOTE 1 The height of 1 100 mm above landings allows for a situation where the handrail is the top rail of balustrading and forms part of guarding. Alternatively, the handrail may be separate from but supported from the guarding.

For all buildings used by the general public and buildings designed principally for children, a second handrail should be installed with its top surface 600 mm from the ramp surface or pitch line. Where necessary, structural guarding should be provided of sufficient height to prevent a child falling if they climb on the handrail.

NOTE 2 A lower handrail will also benefit people of short stature.

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.

5.10.2 Handrail design

*COMMENTARY ON **5.10.2**.*
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. The spacing of the handrail from the adjacent wall and the positioning of the handrail support are 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.

A handrail should be:

a) easy and comfortable to grip with no sharp edges, but able to provide adequate resistance to hand slippage;

   NOTE 1 An external perimeter of between 100 mm and 140 mm is the optimum size to provide a power grip around a handrail. Suitable profiles include circular or oval. A flatter profile gives better forearm support.

b) continuously graspable along its entire length without obstruction;

   *NOTE 2 Well-spaced handrail supports are not considered an obstruction (see **5.10.3**).*

c) finished so as to provide visual contrast with the surroundings against which it is seen;

   NOTE 3 For recommendations on how to achieve visual contrast, see Annex B. Less is known about how to achieve adequate visual contrast in external environments than in internal environments, but the same principles as for the internal environment are thought to apply (see Annex B).

d) terminated horizontally at least 300 mm beyond the start and finish of the ramp or the last nosing of a stair, at both top and bottom;

e) terminated in a way that will reduce the risk of clothing being caught;

   NOTE 4 This can 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.

f) strong enough to support users and fixed to the structure in a way that will support the required loading.

5.10.3 Handrail dimensions and spacings

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.

Any circular handrail should have a diameter of between 32 mm and 45 mm.

There should be a clearance of between 60 mm and 75 mm between a handrail and any adjacent wall surface, 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.

NOTE Where a 40 mm diameter circular handrail is used, a 60 mm spacing from a wall allows the handrail to project no more than 100 mm into the width of the stair.

The inside edge of the handrail (the edge nearest to the walking line) should be not more than 50 mm outside the surface width of the stair.

5.10.4 Handrail fixings

Handrail fixings should be designed to meet the loading recommendations of BS 6399-1. Care should be taken to ensure that the strength of fixings, attachments or anchorages that secure the handrail to the substrate are adequate for the required loading, taking into account the material of the substrate, the spacing between fixings and, where the substrate is concrete, the position of the reinforcement. If there is any uncertainty as to the strength of any component in the fixing system, the design load should be increased by 50%. Reliance on the pull-out capacity of a single fixing should be avoided (see BS 6180:1999, **6.5**).

NOTE It is advisable to discuss suitable fixings with a specialist fixings supplier.

5.10.5 Handrail materials

In locations subject to extremely cold or hot temperatures, handrails should not become excessively cold or hot to touch, while being of a material that, if necessary, is sufficiently robust to resist vandalism or misuse.

NOTE 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 reduce the speed of descent when going down, reluctance to use the handrail (or involuntary letting go of the handrail) if it is uncomfortably cold or hot, presents a safety hazard. In extremes of cold, 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. Handrails whose surface is of a low thermal conductivity, such as timber or nylon-sleeved steel tube, are the most comfortable to touch in extremes of temperature. Handrails fabricated from metals with a relatively low thermal conductivity, such as stainless steel, are more suitable in locations where resistance to vandalism and/or low maintenance are key factors.

6 Entering a building

6.1 The entrance

6.1.1 General

Unless suitably designed, the entrance to a building can often be a barrier to access for disabled people. The following factors should be addressed in the design of the 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 entrance door;

d) the minimum effective clear width through the doorway.

6.1.2 Visual clarity

The entrance door should contrast visually with its immediate surroundings and should be well lit and clearly signed. It should not have a mirrored finish.

*NOTE For glazed doors, see **6.4.4**.*

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, the entrance should incorporate a form of weather protection, such as a canopy or recessed entrance, unless freely accessible automatic doors are installed.

No part of the structure of a canopy should present an obstruction to blind and partially sighted people.

6.2 Threshold

*COMMENTARY ON **6.2**.*
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.

The entrance threshold should either be level or, if the provision of a raised threshold is unavoidable, e.g. to prevent water ingress, should have one or more upstands, provided the cumulative height of such upstands is not more than 15 mm. If raised, the threshold should have as few upstands and slopes as practicable. Any upstand more than 5 mm high should have exposed edges chamfered or pencil rounded.

NOTE Guidance on the design of entrance thresholds is given in Accessible thresholds in new buildings [14].

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

6.3 Entrance doors and lobbies

6.3.1 Entrance doors

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

6.3.2 Self-closing swing doors

*COMMENTARY ON **6.3.2**.*
Fitting a door closing device to a single swing door could greatly disadvantage people, including children, with a wide range of disabilities. It is extremely difficult for wheelchair users, and for people with assistance dogs, low upper body strength or walking aids, 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.

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 independently. If the force of the closing device is too great or its speed too fast, disabled people risk being pushed off balance.

Any self-closing hinged (single swing) or pivoted (single or double swing) entrance doors should have controlled door closing devices and allow independent use by disabled people by conforming to the recommendations in **6.5.2**.

*NOTE For details of door leaves, including effective clear widths, side clearance, vision panels and glass doors, see **6.4**. For details of door fittings, including manual door opening and closing furniture, controlled door closing devices, hinges, locks and latches, as well as panic and emergency exit devices, see **6.5**.*

Where it is not possible for a controlled door closing device to close an entrance door and keep it closed against external conditions without exceeding the opening force limits set out in **6.5.2**, one of the following systems should be used:

a) a power-operated door – sliding, folding, balanced or swing (**6.3.3**);

b) a low energy swing door (**6.3.4**);

c) a power-operated revolving door with an adjacent accessible door (**6.3.5**);

d) an entrance lobby or airlock system of inner and outer doors (**6.3.6**).

6.3.3 Power-operated doors

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

a) 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.

The provision and installation of power-operated doors should be in accordance with BS 7036-1.

Manual activation 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 visually with the surrounding background (see Clause **9**). They

should be located as close to the door as possible without causing a safety hazard (e.g. risk of collision with blind and partially sighted people and wheelchair users) when the door opens.

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 1 Safeguarding in relation to the pedestrian flow can be achieved by setting the door into a recess or by guarding rails.

NOTE 2 Audible warning systems are not recommended due to the possibility of confusion about the direction of opening and direction of approach.

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

Automatically activated powered entrance doors that open towards people entering a 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 should be incorporated into all installations (see BS 7036-1:1996, **8.4**).

Any activation system 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 fully open which, in the case of swing doors, will normally be when the door is open at 90°.

Safety provisions should conform generally to BS 7036-1:1996, Clause **8**, and specifically to BS 7036-2 for straight and curved sliding doors as well as prismatic and folding doors, to BS 7036-3:1996, Clause **5** for swing and balanced doors, and to BS 7036-4 for low energy doors.

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

6.3.4 Low energy swing door

A low energy power-operated door operator may be used 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.

NOTE After a hold-open period, the swing door self-closes in the same way as a conventional door closer. The push-and-go power assist activates when the door is pushed beyond 25 mm.

If low energy swing doors are used, safety provisions for the doors should conform to BS 7036-4.

6.3.5 Power-operated revolving door

*COMMENTARY ON **6.3.5**.*
Revolving doors are not considered accessible and present particular difficulties to ambulant disabled people, blind and partially sighted people, people with assistance dogs and people with young children

*or pushchairs. Large-diameter revolving doors, which are increasingly common in large stores, offer greater space in each compartment and are relatively slow-moving, but still present risks to disabled users. The use of glass panels enclosing and adjacent to revolving doors can be confusing, particularly to partially sighted people. In such situations, it is essential that the presence of the glass is clearly identified (see **9.1.5**).*

Where a revolving door is used, a complementary accessible door should be provided immediately adjacent to the revolving door and available for use at all times. The accessible door could be a swing, sliding or folding door, and be automatic, manual or power-operated. It should be clearly identified and signed to show that it is accessible.

Safety provisions for revolving doors should be in accordance with BS 7036-5.

NOTE It can be beneficial for the complementary door to open automatically.

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 controlled 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.

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 assistant helping a wheelchair user to open a door and push (or pull) a wheelchair through.

Lobbies with single leaf doors should be avoided wherever possible. Where they are used, the minimum dimensions of such lobbies should be as shown in Figure 10. Vision panels in lobby doors should conform to the recommendations in **6.4.3**. Where double doors are used for a lobby, the length of the lobby should be at least the projection of the door or doors, if swinging into the lobby, plus 1 570 mm.

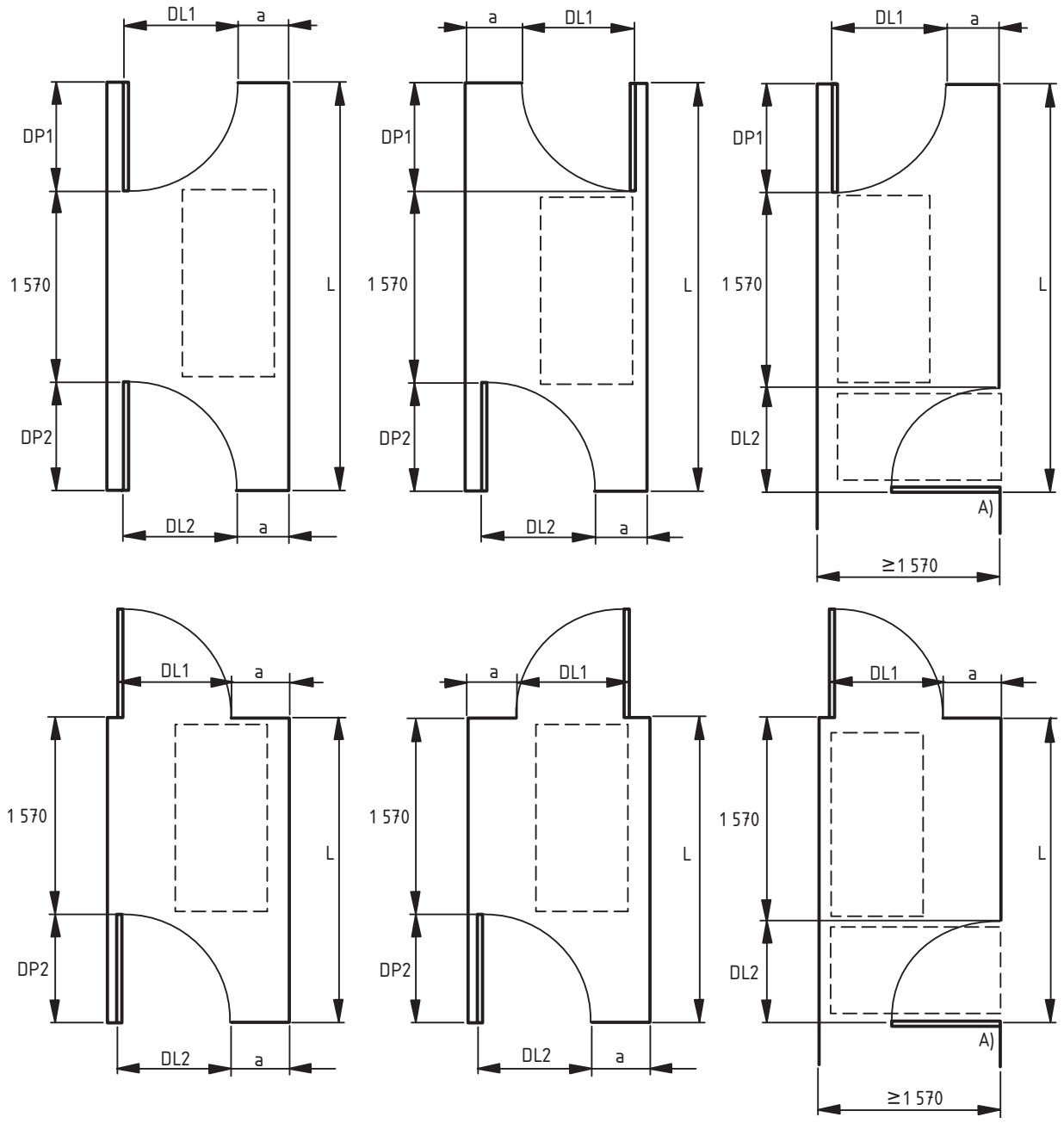
NOTE 1 Double swing doors with vision panels are preferable because they are easier to negotiate in both directions.

NOTE 2 Minimum lobby dimensions are related to the door size and a representative length of a wheelchair user and an assistant, having regard to the manoeuvring sequence.

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

NOTE 3 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.

Figure 10 **Minimum dimensions of lobbies with single leaf doors**
Dimensions in millimetres



Key

a	At least 300 mm wheelchair access space (can be increased to reduce L)
DL1/DL2	Door leaf dimensions of the doors to the lobby
DP1/DP2	Door projection into the lobby (normally the door leaf size)
L	Minimum length of lobby, or length up to door leaf for side entry lobby

A) No return wall within 600 mm of the doorway to enable a wheelchair user to manoeuvre into a position straight on to the door.

NOTE 1 For every 100 mm increase above 300 mm in the dimension a (which gives a greater overlap of the wheelchair footprint over the door swing), there can be a corresponding reduction of 100 mm in the dimension L, up to a maximum of 600 mm reduction.

NOTE 2 The 1 570 mm dimension represents the length of an occupied wheelchair with a companion or assistant pushing (or a large scooter).

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 BS 6262-4.

Areas of full height glazing, glazed curtain walling or glazed screens surrounding a lobby should display the correct manifestations as stated in **9.1.5**, to ensure that all glazing is as visible as possible for as many people as possible.

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 contrasting visually against the background should be provided to guide blind and partially sighted people around this type of projection (see Annex B).

6.4 External and internal door leaves (including lobby doors)

6.4.1 Effective clear width through a doorway

The minimum effective clear width of a single leaf door, or one leaf (the primary 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 Table 2. The method of measuring the effective clear width is shown in Figure 11.

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

NOTE 2 There are no restrictions on the width of the secondary leaf of an unequal double leaf door.

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

NOTE 3 The extent to which the effective clear width is reduced by projecting door furniture is dependent on the opening angle of the door.

NOTE 4 The backcheck feature on door closing devices makes doors harder to open to 90° and beyond. The alternative is to fit a backstop.

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 (when it opens towards you) and a return wall (see Figure 12), 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 enable wheelchair users to pass through the door more easily.

NOTE 2 It might also be beneficial to have the 300 mm clear space on the push side of the door.

NOTE 3 This recommendation also applies to doors within the common areas of blocks of flats.

Table 2 **Effective clear widths of doors**

Direction of approach of wheelchair	**Minimum effective clear width of door leaf** (mm)	
	New buildings	**Existing buildings**
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	N/A	800
External doors and internal lobby doors at the entrance of buildings used by the general public	1 000	775 [A)]

NOTE 1 An effective clear width of less than 800 mm might result in people with poor manoeuvring ability or with large wheelchairs not being able to pass through without damage to themselves or the door or frame. Use of the 1 000 mm effective clear width more easily accommodates people with assistance dogs and where there is heavy pedestrian traffic. For buildings used by the general public, the greater effective clear width is likely to be best achieved using power-assisted doors.

NOTE 2 For new buildings, effective clear widths of 800 mm and 825 mm are achievable using a 926 mm door leaf, provided the door opens beyond 90° and the projection of door furniture does not reduce the effective clear width.

NOTE 3 Sports facilities have their own requirements for the effective width of doors, e.g. tennis sports wheelchairs require a doorway with an effective clear width of 1 000 mm for convenient access (see Accessible sports facilities *[11]).*

[A)] Where the entire frontage is being replaced, the width for a new building should be used.

Figure 11 **Effective clear width through a doorway**

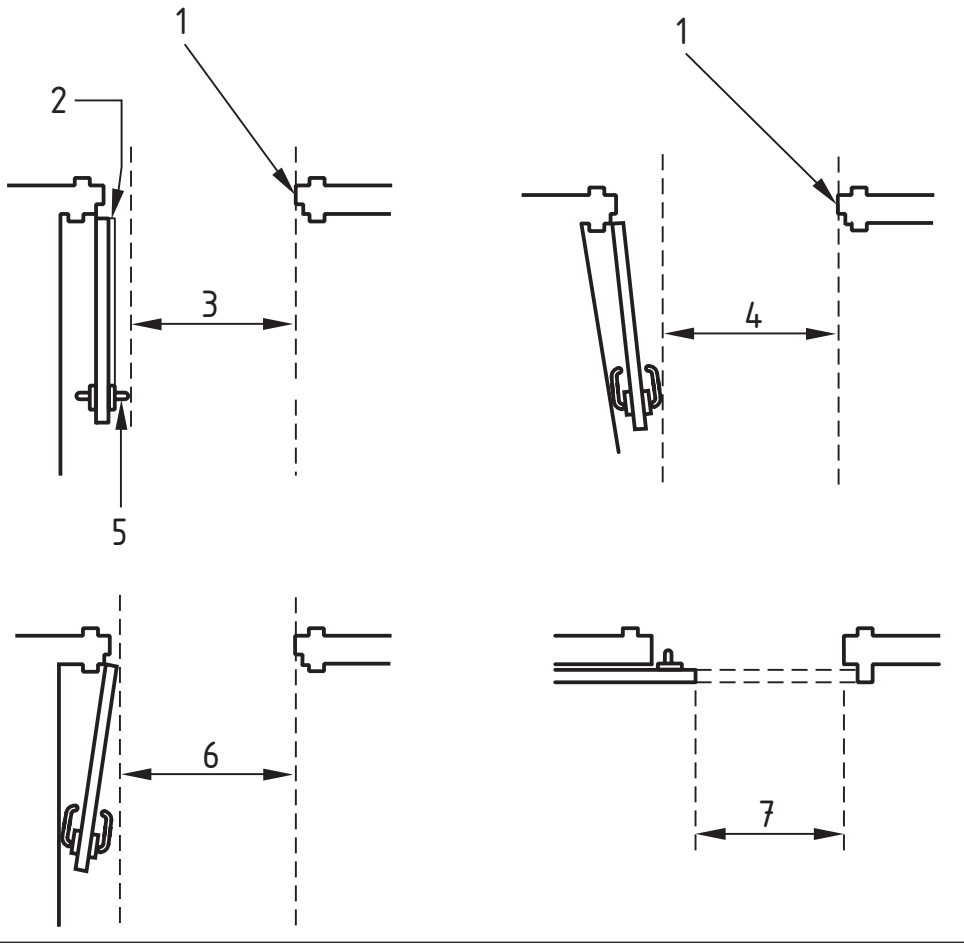
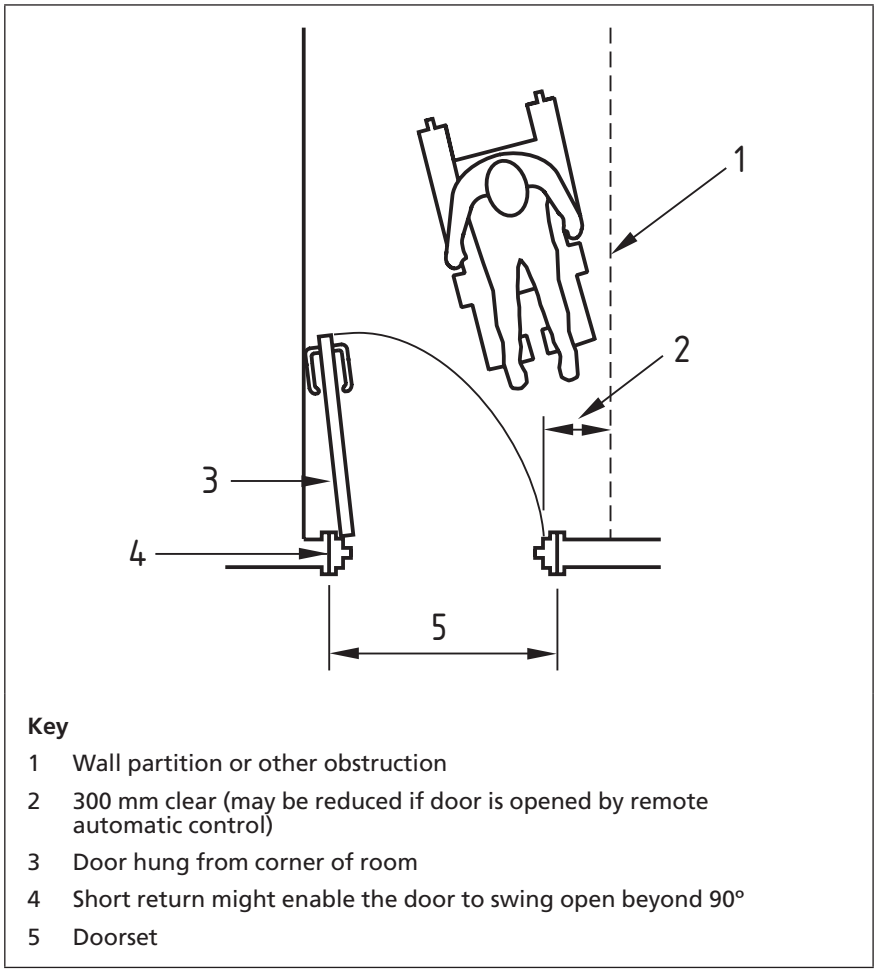


Figure 12 **Door location and side clearance**



Key

1 Wall partition or other obstruction

2 300 mm clear (may be reduced if door is opened by remote automatic control)

3 Door hung from corner of room

4 Short return might enable the door to swing open beyond 90°

5 Doorset

6.4.3 Vision panels

*COMMENTARY ON **6.4.3**.*
The recommendations in this subclause are intended to enable 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.

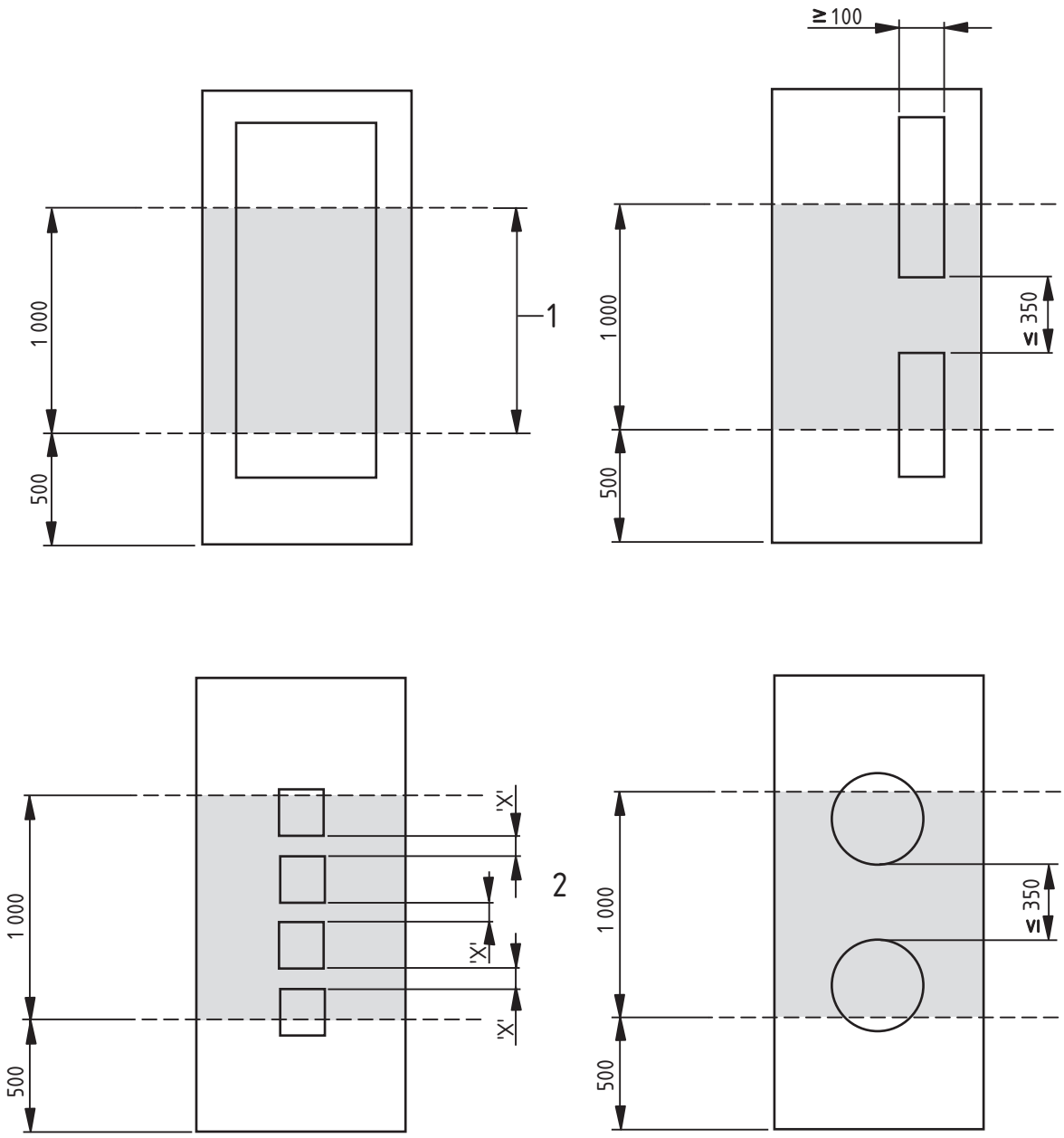
Entrance doors and lobby doors should have viewing panels to alert people approaching a door to the presence of another person on the other side.

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 has multiple viewing panels, the minimum zone of visibility should not be interrupted by opaque areas that obstruct more than 350 mm of the vertical height of the zone. Where the minimum zone of visibility is interrupted, there should be a vision panel at both the top and bottom of the zone. Vision panels should be positioned centrally on the door or offset towards its leading edge (see Figure 13). Each individual viewing panel should be not less than 100 mm in width.

NOTE 1 Vision panels can extend beyond the minimum zone of visibility limits as long as the recommendations for within the zone are met.

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, or in doors to rooms where privacy is required, e.g. sanitary accommodation and changing areas, or for security purposes.

Figure 13 **Minimum zone of visibility and examples of acceptable vision panel configurations**
Dimensions in millimetres



Key

1 Minimum zone of visibility between 500 mm and 1 500 mm above floor level, with maximum interruption of 350 mm vertically within the zone

2 Maximum obstruction (X + X + X) no more than 350 mm

6.4.4 Glass doors

The presence of a glass door, or a fully glazed door with a narrow stile, should be made apparent, with permanent manifestation within two zones, from 850 mm to 1 000 mm from the floor and from 1 400 mm to 1 600 mm from the floor (see **9.1.5**), 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.

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.

*NOTE 3 For recommendations on glazed walls and screens, see **9.1.5**.*

6.5 Door fittings

*COMMENTARY ON **6.5**.*
Door opening furniture that is easily reached, and which provides a secure grip, is of critical importance to disabled people, including disabled children.

Wheelchair users can also find it difficult to open and close doors when door operation is not power-assisted.

6.5.1 Manual door opening and closing furniture

It should be possible to operate all door opening furniture one-handed, without the need to grasp or twist. Care should be taken in the selection of security and fire exit fittings, such as short lever turn buttons, bolts, latches or locks, with the aim of making them manageable for all users.

Wherever possible, door opening furniture used in conjunction with locks and latches should have a lever action. Knobs with a spherical, circular or similar design, as well as small symmetrical turn buttons, are difficult to use by people with limited dexterity, arthritis or a weak grip. The torque force required to operate keys and cylinder turns should not exceed 0.5 N·m.

NOTE 1 Turnable pad handles may be selected for use with multi-point locking systems.

For easy identification by blind and partially sighted people, all door opening furniture should contrast visually with the surface of the door (see Annex B).

NOTE 2 It is considered that a difference in LRV between the door opening furniture and the door of at least 15 points is acceptable.

As a principle, pull handles should not be fitted to the push side of doors.

The location and design of lever furniture and pull handles for both external and internal doors should be in accordance with Figure 14 and Figure 15 and, preferably, consistent throughout a property.

Where lever furniture intercepts viewing panels, any projecting glazing beads should not interfere with the operation of the lever or reduce the effective clearance behind it.

6.5.2 Controlled door closing devices

*COMMENTARY ON **6.5.2**.*
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 in this subclause 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 are also expected to be negotiable by ambulant disabled people.

The ergonomic research found that wheelchair users 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°.

For most 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.

The opening force should be checked using a plunger-type force measuring instrument.

NOTE 1 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 can be affected.

NOTE 2 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. 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 N and 3 N.

The choice of controlled door closing devices should take account of the efficiency of the closer, as well as the resistances from edge seals, hinge friction, latch resistance and differential air pressure.

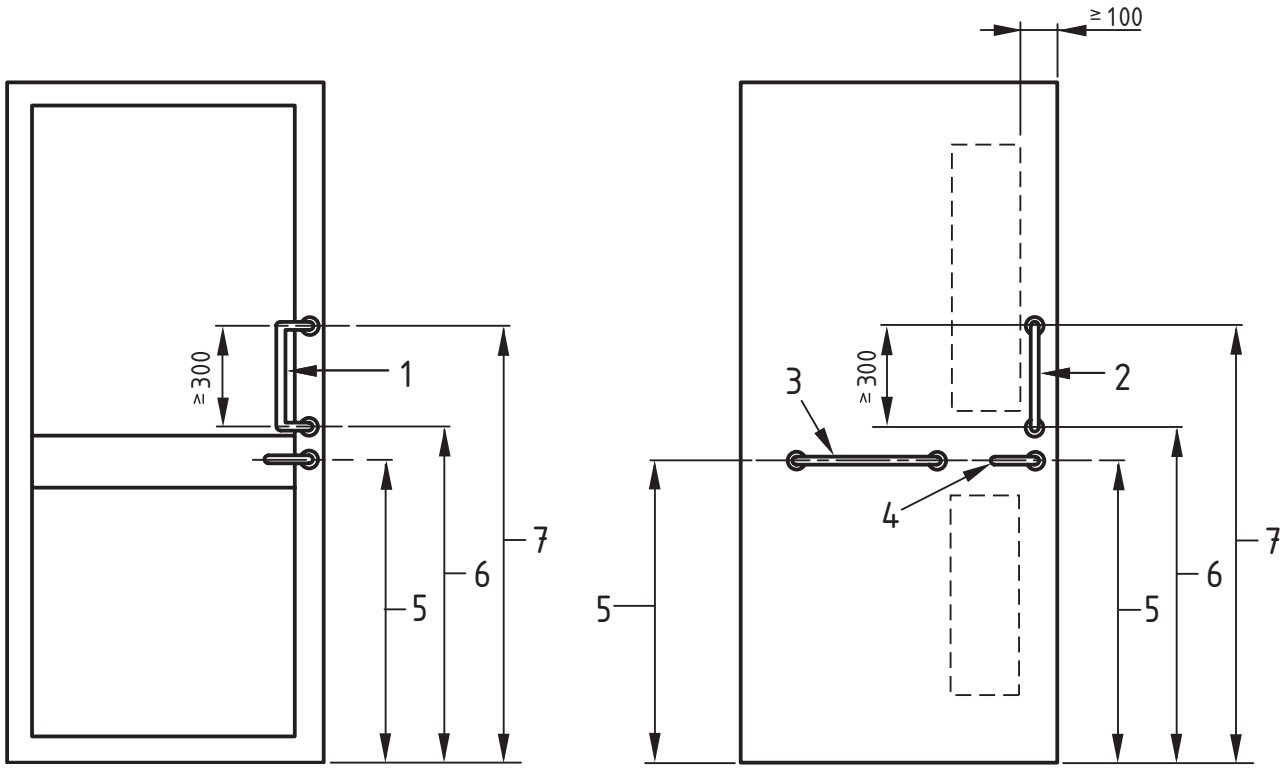
NOTE 3 The effect of using a low efficiency controlled door closing device is to reduce the closing force to a point where, coupled with the other resistances to closing, the door might not latch, or stay closed if unlatched. The use of high efficiency closers can reduce the force required to open the door and increase the proportion of the disabled population who can pass through independently.

A controlled door closing device, with or without a backcheck, should allow the door to open sufficiently to provide the required effective clear width.

NOTE 4 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°.

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

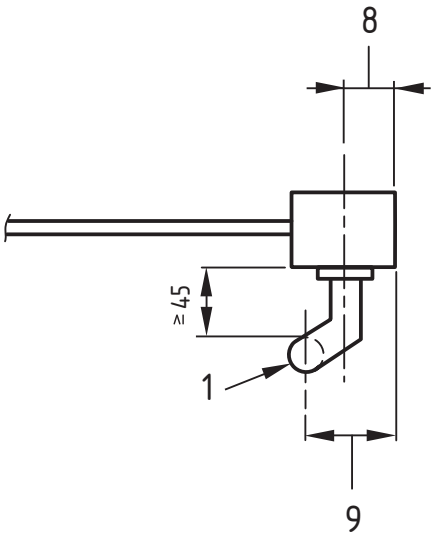
Figure 14 **Location of door opening and closing furniture**
Dimensions in millimetres



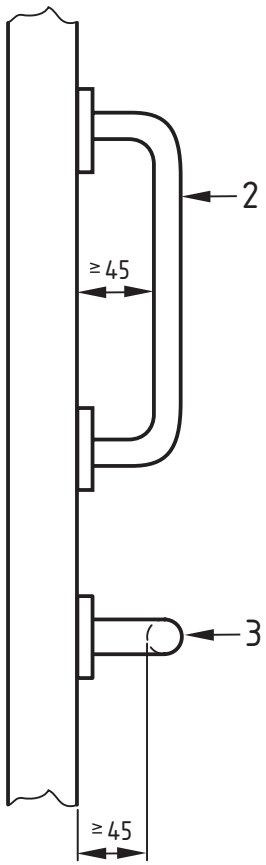
a) Glazed or panelled doors with narrow stiles less than 100 mm wide

b) Solid doors and doors with vision panels having side margins of 100 mm or more

Figure 14 **Location of door opening and closing furniture** *(continued)*
Dimensions in millimetres



c) Plan/section of cranked pull handle on a narrow style



d) Vertical section showing a pull handle and horizontal pull rail

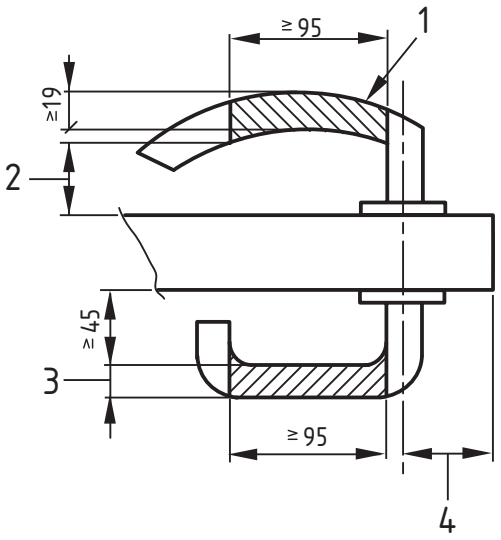
Key

1 Cranked pull handle, 19 mm to 35 mm diameter
2 Vertical pull handle, 19 mm to 35 mm diameter
3 Horizontal pull rail to help people close the door behind them
4 Lever handle
5 800 mm to 1 050 mm (900 mm preferred)
6 Bottom end of pull handle no lower than 700 mm and no higher than 1 000 mm above the floor
7 Top end of pull handle no lower than 1 300 mm above the floor
8 Fixing centres close to door edge
9 Doors with narrow stiles require cranked pull handles with an offset of not less than 50 mm from the door edge

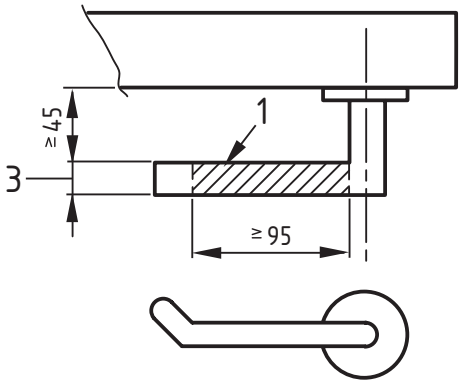
NOTE 1 The lever handles and pull handles shown on this drawing will not necessarily be used on the same face of a door.

NOTE 2 Although the conventional "D" pull handle is shown in the figure, other patterns of pull handle are acceptable, provided they conform to the dimensional critera.

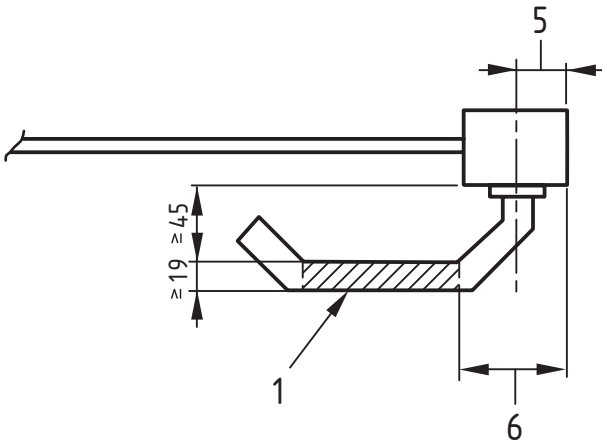
Figure 15 **Examples of lever furniture showing key dimensions**
Dimensions in millimetres



a) Lever handles returned towards the door for solid doors and those with side margins 100 mm or wider



b) Cranked lever handle for solid doors and those with side margins 100 mm or wider



c) Lever handle designed for use with a door having a narrow stile less than 100 mm wide

Key

1 Hand grip zone (shaded) of at least 95 mm (applies to all types of lever handle)
2 Hand grip zone at least 45 mm from face of door
3 Lever diameter at least 19 mm
4 Lock/latch backset at least 54 mm from door edge
5 Reduced lock/latch backset to suit narrow stile
6 Start of hand grip zone at least 63.5 mm set back from door edge

NOTE Lever designs are indicative only.

6.5.3 Hinges

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

Where it is important to minimize resistance to door opening and closing, 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, unless otherwise dictated by fire test reports.

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

6.5.4 Locks and latches

Locks and latches should conform to BS EN 12209. Cylinders, if required, should conform to BS EN 1303.

Locks for providing security should conform to the requirements of BS 3621, BS 8621 or BS 10621, as appropriate.

NOTE 1 Guidance on the selection of locks/latches to secure doors is given in BS 8220-2 and BS 8220-3.

NOTE 2 The provision of a larger bow on lever and cylinder keys gives users greater control. Alternatively, a hand-grippable key fob can be added to a standard key bow, to aid manipulation of the key.

Where an upright mortice lock/latch is used, to ensure that blind and partially sighted people and/or people with limited dexterity have unobstructed access to the keyway, either the cylinder should be above the lever handle where it is more visible and accessible or, if the cylinder is below the handle, the minimum distance between the handle and the keyway of the locking mechanism should be 72 mm.

Certain mortice locks include a night latch bolt and deadbolt whereby the latch bolt is withdrawn using a key on the outside and a lever handle on the inside. In these circumstances, the height of the lever handle should be in accordance with Figure 14.

Rim nightlatches with larger deadlocking snibs and turns on cylinders should be selected to assist users with limited dexterity.

Where a multi-point locking system is used, it should be capable of being locked/unlocked simultaneously by a single turn of the key. The operating height of the lever/pad handle should be that of the lever handle in Figure 14.

6.5.5 Door bolts

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

Where doors are required to be bolted for security purposes, one of the following types of door bolt should be used:

a) knob slide flush bolts or surface bolts with a free moving slide action;

b) 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);

c) 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 900 mm and 1 050 mm from the finished floor level;

d) lever-action flush bolts.

Sunk slide bolts (both flush and surface-mounted) should be avoided.

6.5.6 Panic and emergency exit devices

6.5.6.1 Panic exit devices

Release forces for panic exit devices operated by a horizontal bar for use on escape routes should conform to BS EN 1125:2008, **4.2.1.2**, requiring an operating force no greater than 220 N.

6.5.6.2 Emergency exit devices

Release forces for emergency exit devices operated by a lever handle (type A device) should conform to BS EN 179:2008, **4.2.1.1**, with an operating force no greater than 70 N.

Release forces for emergency exit devices operated by a push pad (type B) should conform to BS EN 179:2008, **4.2.1.2**, with an operating force no greater than 150 N.

6.6 Access control systems

6.6.1 Door entry systems

Where door entry systems are installed, they should, where practicable, be located on the latch edge of the door, either on the door face or on the adjacent wall. The activation pad should be positioned within 200 mm of the door frame (or aperture where there is a glazed façade), at a height of between 900 mm and 1 050 mm from the finished floor level.

6.6.2 Entryphones

Entryphone systems should be sited for approach and use from a wheelchair and should contain a light emitting diode (LED) display to enable people who are deaf and hard of hearing to use them. The means of indicating that the call is acknowledged and that the lock has been released (if permitted) should be both audible and visible. The entryphone system should contrast visually with the background.

NOTE Video entryphone systems provide additional benefits for the person answering the call, as well as for the person wishing to gain entry.

6.6.3 Digital locks

Digital locks, when installed for access control, should be positioned with the operating handle, preferably a lever pattern, between 900 mm and 1 050 mm from the floor.

6.6.4 Turnstiles

Where turnstiles or other similar forms of access control, e.g. those with rotating arms, are used, a complementary side-hung gate should be installed to provide access for wheelchair users and people with limited mobility.

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 Entrance flooring systems

At entrances to commercial buildings and buildings used by the general public, an entrance flooring system to remove water and debris from the soles of shoes and wheelchair wheels should be provided.

Matting and other floor surfaces should conform to the recommendations in **9.1.3**.

NOTE 1 Guidance on the selection, planning, installation and maintenance of entrance flooring systems is given in BS 7953.

NOTE 2 Guidance on the slip resistance of floor surfaces is given in Annex E.

7.1.2 Reception area

The reception point (see **11.1**) should be in sight of the entrance and easily identifiable by blind and partially sighted people.

The reception point should be located in a position where the ability of a person who is deaf or hard of hearing to lip read is not adversely affected, e.g. by the presence of windows, glazed screens or mirrors behind the reception point. Reception counters should not be placed in front of backgrounds which are patterned.

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

*NOTE 1 More detailed guidance on surface finishes is given in **9.1**.*

Seating should be provided in reception areas (see **11.2**).

The spacing of permanent or temporary control barriers used for waiting and queuing should allow wheelchair users to manoeuvre to the reception point, turn to face the receptionist and leave. Such barriers should contrast visually with the background against which they are seen.

The space between any queuing barriers and multiple reception or serving points should be at least 1 800 mm wide where a knee recess is incorporated into the reception or serving point, or 2 200 mm where no such recess is provided, to allow a wheelchair user to pass behind another wheelchair user who is being served.

If permanent, barriers should have rigid rails top and bottom, the top one ensuring stability if anybody attempts to rest on it, and the lower one being usable as a tapping rail with its underside no higher than 150 mm above floor level.

NOTE 2 For management information on temporary control barriers, see Annex A.

NOTE 3 The bases of control barriers can restrict access for wheelchair users and therefore need to be taken into account when allowing space for wheelchair access.

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

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°. Doors from rooms into corridors and door across corridors also need to be accessible.

Choosing appropriate floor, wall and ceiling materials that contrast visually with adjacent surfaces and the use of natural and artificial lighting will benefit blind and partially sighted people.

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. Localized obstructions, such as radiators and fire hoses, in circulation routes should be avoided wherever possible but, where unavoidable, they should be guarded as described in **5.7.2** (see Figure 16).

NOTE 1 Continuous surface-mounted damage protection on walls is not considered to be an obstruction.

NOTE 2 Splayed or rounded corners at changes of corridor direction benefit wheelchair users and blind and partially sighted people. Projections are particularly hazardous for a blind or partially sighted 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 space allowed for an adequate wheelchair approach to doors in corridors of buildings should conform to Figure 16.

A corridor should either have a surface width of not less than 1 800 mm or, if less, be provided with passing places, 1 800 mm wide and at least 1 800 mm in length at reasonable intervals. With the exception of permanent obstructions over a short distance (see Figure 16), in no case should the surface width of a corridor be less than 1 200 mm.

7.2.3 Floors in corridors

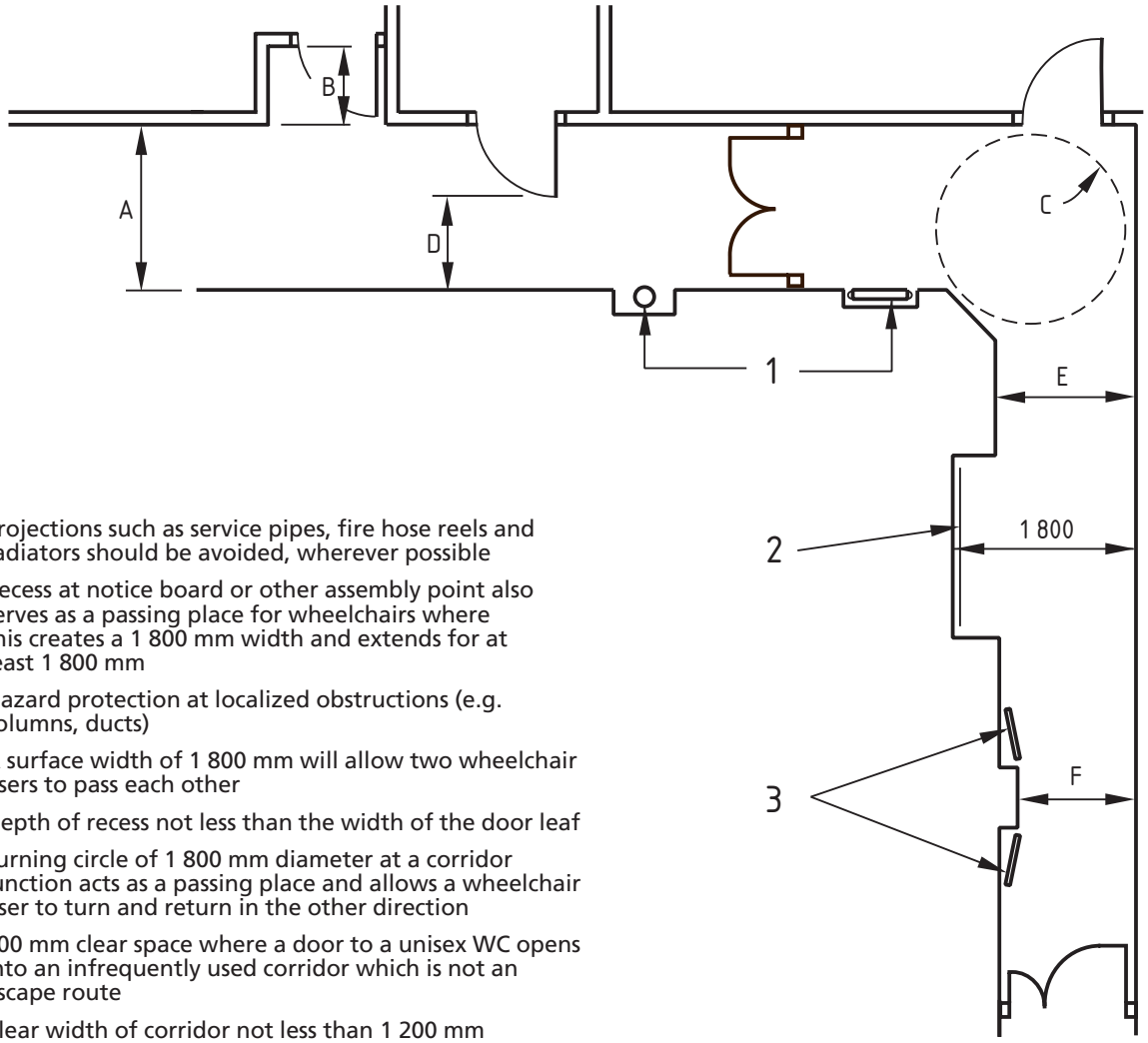
Floor patterning that could be mistaken for steps, e.g. stripes, should not be used for floors in corridors.

Floors within a corridor should be level, wherever possible. If this is unavoidable, the slope of floors in corridors should be less steep than 1:20, unless the floor is designed as a ramp and includes 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 that contrasts visually with the remainder of the floor covering.

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

Figure 16 **Dimensions and space allowances for corridors**
Dimensions in millimetres



Key

1 Projections such as service pipes, fire hose reels and radiators should be avoided, wherever possible

2 Recess at notice board or other assembly point also serves as a passing place for wheelchairs where this creates a 1 800 mm width and extends for at least 1 800 mm

3 Hazard protection at localized obstructions (e.g. columns, ducts)

A A surface width of 1 800 mm will allow two wheelchair users to pass each other

B Depth of recess not less than the width of the door leaf

C Turning circle of 1 800 mm diameter at a corridor junction acts as a passing place and allows a wheelchair user to turn and return in the other direction

D 900 mm clear space where a door to a unisex WC opens into an infrequently used corridor which is not an escape route

E Clear width of corridor not less than 1 200 mm

F Clear width of at least 1 000 mm where there is a permanent obstruction over a short distance

7.2.4 Lighting in corridors

Lighting in a corridor should be even, diffused and without glare, reflections or shadows. Artificial lighting for corridors that receive no daylight should be designed to achieve an illuminance at floor level of at least 100 lux.

NOTE The Thomas Pocklington guide Housing for people with sight loss *[15] makes recommendations for lighting levels that are suitable for blind and partially sighted people.*

7.2.5 Doors leading into corridors

If a door opens out from a room and has no controlled door closing device, e.g. a door to accessible sanitary accommodation, an additional item of door furniture (such as a horizontal pull rail) should be provided on the closing, or interior, face of the door, in line with the door locking mechanism, to help people close the door behind them (see Figure 14 and **12.2.6**).

NOTE 1 The door to a unisex accessible WC can open into a corridor which is used infrequently and is not an escape route, provided there is a clear space of 900 mm within the corridor when the door is open and provided the surface of the floor in the corridor is level at that point.

NOTE 2 The use of reduced-swing doorsets, which have a sliding/folding action, reduces the extent to which the door swings into the room and corridor and thus facilitates manoeuvring in and out of rooms such as WCs and bathrooms. From the safety perspective, designers need to be aware that approximately one third of the door leaf projects into the outside circulation space when the door is open.

The leading edge of any door that is likely to be held open should contrast visually with the remaining surfaces of the door and its surroundings to help identification by blind and partially sighted people. The architrave, or frame where no architrave is present, should contrast visually with the wall surfaces surrounding the doorway (see Notes 2 and 3 to **9.1.1**).

NOTE 3 The inclusion of a visually contrasting intumescent seal, a minimum 15 mm wide, in the edge of the door for the full height of the leaf (excluding any locks), or a contrasting self-adhesive strip positioned on the edge of the door for a height of 1 000 mm from 500 mm to 1 500 mm above the floor, and covering at least 60% of the door thickness, are two examples of how a visually contrasting leading edge might be achieved.

7.2.6 Doors across corridors

Doors across corridors should conform to **6.4.1** and Table 2.

Self-closing 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 **6.3.2** and, if on escape routes, to BS 9999.

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

Doors across corridors and passageways should have a viewing panel, or panels, that conform to the recommendations in **6.4.3** and Figure 13.

Glass doors across corridors and passageways should be avoided wherever possible. If they are used, they should conform to the

recommendations in **6.4.4**. The architrave, or frame where no architrave is present, should contrast visually with the wall surfaces surrounding the doorway (see Notes 2 and 3 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.

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

7.2.7 Fire escape routes via horizontal circulation

The unobstructed width of an escape route should be not less than 1 200 mm, with the final escape route having an unobstructed width at least as great as the stair leading to it. Fire escape routes should conform to BS 9999.

7.3 Doors fitted with controlled door closing devices

*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

Controlled door closing devices should only be fitted to doors if absolutely necessary, e.g. for reasons of fire safety, security, acoustics or energy control. For details of the opening force limits to allow disabled people to have independent access through such doors and how to measure them, see **6.5.2**.

The choice of controlled door closing devices should take account of the efficiency of the closer, as well as the resistances from edge seals, hinge friction, latch resistance and differential air pressure, e.g. from pressurized spaces.

If used internally, push-and-go and power-assist low energy swing door operators should conform to the recommendations in **6.3.4**.

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, 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 **6.3.2**.

*NOTE 1 BS EN 1154:1997, Annex A states that controlled door closing devices of less than power size 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 **6.5.2**. Controlled door closing devices of a lower power size and with relatively low efficiency, with a lower power size and/or of a width less than 900 mm, might 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 usually suitable for this application.

Where the force required to open a fire-resisting door on a circulation route exceeds the limits described in **6.5.2**, 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 one or more of 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.

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

NOTE 4 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.

NOTE 5 It is important to ensure that disabled people do not become trapped in areas of the building once any electrically powered hold-open devices have de-activated. It is essential that verification is part of standard evacuation drills.

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 security, privacy, acoustics or energy control, controlled door closing devices should be selected, fitted and adjusted so that the opening forces are as low as practicable, consistent with the doors functioning as intended.

*NOTE It is emphasized that, for non-fire-resisting doors, door closing devices of less than power size 3 will normally be acceptable. For details of controlled door closing devices, opening force limits and how to measure opening forces, see **6.3.2**.*

For non-fire-resisting doors, rising butt hinges can be used to close doors where controlled door closers are not suitable.

7.3.4 Door fittings related to self-closing doors

In order to minimize hinge resistance, hinges with low friction bearings should be used (see **6.5.3**). Where self-closing doors are required to be latched, the installation of a modified strike plate incorporating a gravity cam, which is tripped by the projecting latchbolt as the door shuts, can reduce the latch resistance.

NOTE 1 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 2 This type of strike plate is not suitable for use with rimlocks or on external doors.

8 Vertical circulation

8.1 Internal steps and stairs

*COMMENTARY ON **8.1**.*
*Many of the recommendations for internal steps and stairs are the same as those for external steps and stairs. Thus, the issues relevant to disabled people can be found in the commentaries to **5.9** and **5.9.2**.*

8.1.1 Design of steps and stairs

The design of steps and stairs, the rise of a flight, the stair width and the identification of nosings should conform to **5.9.2** to **5.9.5**.

NOTE 1 It is preferred that a stair comprises straight flights, with any change of direction made on a landing. Information on the safety aspects of internal steps and stairs is given in BS 5395-1.

NOTE 2 Flights of stairs of helical or spiral design are not recommended as it is difficult to achieve the required dimensions to ensure that the staircase is suitable for use by ambulant disabled people. However, they might be acceptable if they meet the needs of particular employees in a workplace. Guidance on the design of helical and spiral stairs is given in BS 5395-2.

8.1.2 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 surface width of the flight.

8.1.3 Handrails to steps and stairs

Handrails to internal steps and stairs should conform to the recommendations given in **5.10.1** to **5.10.4** and, where relevant, **5.10.5**.

8.1.4 Artificial lighting

Each flight and landing of internal steps and stairs should be well illuminated in accordance with **5.9.8**.

8.1.5 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 Advice and further references on slip resistance of surfaces is given in Annex E.

Where different materials are used for the flights and landings of a stair, care should be taken to ensure that their frictional characteristics 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.

8.1.6 Refuges

Refuges, whether within a protected stair lobby, corridor or protected room adjacent to a stairway, should be provided in accordance with BS 9999.

NOTE A refuge is a place of relative safety where people whose abilities or impairments might result in delayed evacuation can await assistance from building management with the next part of their movement to a place of ultimate safety.

8.2 Internal ramps

*COMMENTARY ON **8.2**.*
*This British Standard 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 vertical lifting platform, if there is insufficient space for a ramp. See the commentary on **5.8** for key design issues.*

8.2.1 General

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

Where the change in level within a circulation route is greater than 300 mm, steps should be provided in addition to a ramp.

NOTE Where a change in level is less than 300 mm, a ramp is the only viable means of access as it avoids the need for a single step. This assumes a minimum rise of 150 mm.

The gradient, width and landings dimensions of internal ramps should conform to **5.8.2** to **5.8.4**.

8.2.2 Handrails to ramps

Handrails to internal ramps should conform to the recommendations given in **5.10.1** to **5.10.4** and, where relevant, **5.10.5**.

8.2.3 Edge protection to ramps

Precautions to prevent a wheelchair user from falling over the edge of a ramp should be taken in accordance with **5.8.6**.

8.2.4 Surface materials

The surface materials used for internal ramps should be chosen to be easy to maintain and as slip-resistant as possible, especially if surfaces are likely to become wet.

*NOTE 1 Advice and further references on slip resistance of surfaces is given in Annex E. More detailed guidance on surface finishes is given in **9.1**.*

Recommendations on the differential slip characteristics of the ramp and the landing, as well as visual contrast, are given in **5.8.7**.

Deep pile carpet should not be used for the surface of a ramp.

NOTE 2 The resistance of deep pile carpet increases the effort needed to propel a wheelchair.

8.2.5 Lighting

Lighting of internal ramps should be in accordance with **5.8.8**.

8.3 Lifts

*COMMENTARY ON **8.3**.*
Lifts are an essential amenity for disabled people in multi-storey buildings. Lifts may be conventional passenger lifts, vertical lifting platforms or stairlifts.

Non-enclosed lifting platforms are used mainly to transfer wheelchair users or ambulant disabled people on a guarded platform vertically from one level to another (often a mezzanine level) in a public building. Enclosed vertical lifting platforms can serve a number of storeys. They are not equivalent in service to a conventional passenger lift and can only be considered as an alternative to a passenger lift in an existing building. Lifting platforms travel slowly between landings and therefore might not be suitable for lone users with certain disabilities, e.g. those easily fatigued. Lifting platforms are operated by continuous pressure controls, e.g. push buttons.

Stairlifts travel up the pitch line of a stair and can be in the form of either a platform or a chair. Chair stairlifts can be used to take disabled employees with limited mobility from the ground floor to an upper floor in a workplace. Wheelchair users need to transfer from their own chair to a chair stairlift and then to another wheelchair when at another level. Wheelchair stairlifts, which allow an individual to travel up and down stairs seated in their wheelchair, are installed in existing public buildings where vertical lifting platforms cannot be installed.

Care is needed to ensure that, where stairlifts are used, there is no conflict with the requirements for means of escape given in the Building Regulations 2000, Approved Document B [16] and its equivalents in Scotland [17] and Northern Ireland [18].

8.3.1 Provision of lifts

Multi-storey buildings should have at least one conventional passenger lift that is of sufficient size to be accessible by wheelchair users and people with limited mobility. Accessible lifts should serve all floors, including any below ground level.

NOTE 1 Allowing space for the future installation of an additional lift will provide greater flexibility.

A conventional passenger lift should be the preferred solution to provide comprehensive access for all users to different levels in a building. However, in existing buildings where the installation of

such a lift might not be possible, an enclosed vertical lifting platform should be provided.

If neither of the other types of lift can be installed, a stairlift (preferably a wheelchair stairlift) should be chosen as the final option for existing buildings.

NOTE 2 If no lift access can be provided in an existing building, it might be necessary to duplicate essential services and facilities on different floors.

NOTE 3 Guidance on the selection and installation of new lifts is given in BS 5655-6.

8.3.2 Access to lifts

Signs indicating the location of accessible lifts should be provided in a location that is clearly visible from the building entrance.

In a building where not every lift is accessible, the accessible lift(s) should be identified by a sign incorporating a representation of the International Symbol for Access (see **9.2.1.4**).

*NOTE 1 Further guidance on signs and signage is given in **9.2**.*

An accessible lift should be at the same level as at least one entrance door to the building or be accessible by means of a ramp.

A clear level manoeuvring space of 1 500 mm × 1 500 mm should be provided in front of the entrance to all types of lift. If the lift has a swing door, this space should be measured clear of the swing. This landing area should be well lit artificially with an illuminance of at least 100 lux at floor level.

NOTE 2 It is preferable for the manoeuvring space to be outside any circulation route and not directly opposite stair circulation.

8.3.3 Conventional passenger lifts

8.3.3.1 General

Conventional passenger lifts should conform to the requirements of BS EN 81-1, BS EN 81-2 and BS EN 81-70.

NOTE Attention is drawn to the Lifts Regulations 1997 [9].

8.3.3.2 Passenger lift sizes

Lift sizes should be chosen to suit the anticipated intensity of use of the lifts and the needs of disabled users.

NOTE 1 Sports facilities have their own requirements for lift sizes (see Accessible sports facilities *[11]).*

The minimum dimensions of a lift car with a single entrance or two opposite entrances should be chosen according to the anticipated use as shown in Table 3.

NOTE 2 Lifts with opposite doors (dual-entry lifts) can be used to avoid the necessity for a wheelchair user to reverse out or turn around in the lift car.

Table 3 **Minimum dimensions of a lift car with a single entrance or two opposite entrances**

Minimum car dimensions [A)]	Users accommodated
1 100 mm wide × 1 400 mm deep	One user of a manual or electrically powered wheelchair, and one accompanying person. There is insufficient space for wheelchair users to turn conveniently.
2 000 mm wide × 1 400 mm deep	One user of any type of wheelchair, together with several other passengers. There is sufficient space for wheelchair users and people with walking aids to turn through 180°.

NOTE A lift car 1 000 mm wide × 1 250 mm deep will accommodate one user of a manual or small electrically powered wheelchair, but not with an accompanying person, and is therefore not recommended. A larger lift size (2 000 mm × 1 400 mm) would more conveniently accommodate Type C outdoor mobility scooters.

[A)] Dimensions are measured between the structural walls of the car, with any decorative finishes being not more than 15 mm thick.

8.3.3.3 Lift call buttons and signs in the lift lobby

All visual indicators and lift call buttons should be clearly visible from within the lift lobby.

Lift call controls in the lift lobby should be mounted between 900 mm and 1 100 mm from floor level, and at least 400 mm from any return wall to allow reach from wheelchairs. Lift call buttons, if provided, should have symbols in relief (embossed) to enable tactile reading. Call buttons should also contrast visually with the surrounding face plate and the face plate should similarly contrast with the wall on which it is mounted.

Signs indicating the location of a lift that is about to arrive should be visible from a wide angle of vision in order to give a warning from any location in a lift lobby. A lift arrival indicator should not be mounted within the reveal of a lift doorway.

For the benefit of blind and partially sighted users, there should be an audible announcement of lift arrival and direction of travel. A sign indicating the number of the floor should be provided in each lift lobby on the wall opposite all the lift landing doors.

NOTE 1 Such signs are not normally provided by the lift contractor.

*NOTE 2 For information on signs, see **9.2**.*

8.3.3.4 Features of the lift car

A lift door should contrast visually with the adjoining wall of the lift lobby. Lift doors should have an effective clear width of at least 800 mm, but at least 900 mm for buildings used by the general public.

The use of visually and acoustically reflective wall surfaces should be minimized within the lift car, as visual reflections can cause discomfort and affect the visual acuity of blind and partially sighted people. Where a lift has only one door and has dimensions of 1 100 mm × 1 400 mm, a mirror should be provided on the wall of the lift car opposite the lift door to enable wheelchair users to reverse out more safely. It also allows the wheelchair user to see if anyone is

behind them and to see the floor indicator panel. The mirror should not extend below 900 mm from the lift floor to avoid confusing blind and partially sighted people.

NOTE 1 Acoustic reverberation can affect the ability of people who are deaf or hard of hearing to distinguish speech and other sounds.

The floor of the lift car should be slip-resistant and have similar frictional qualities to the floor of the lift landing to decrease the risk of slips, trips and falls.

NOTE 2 It is an advantage if the lift floor has a high light reflectance value to reassure blind and partially sighted people that they are not stepping into an open lift shaft.

Areas of glass in lifts, particularly glass doors, should be easily identifiable to blind and partially sighted people (see **9.1.5**). Glass floors to lifts should be avoided as they can cause vertigo.

The illumination of the lift car should not cause glare, reflection, confusing shadows or pools of light and dark.

NOTE 3 BS EN 81-1 and BS EN 81-2 specify a requirement of 50 lux at the landing and car sill.

In large lifts (2 000 mm wide × 1 400 mm deep), a duplicate set of controls should be provided on the opposite side of the lift car in accordance with BS EN 81-70.

NOTE 4 Mounting an additional low-level control panel within the lift car at an angle will ensure that it can be seen clearly from a sitting position.

Within the lift car, there should be a visual indication and an audible announcement of the level reached.

Passenger lifts should be fitted with an emergency communication system that conforms to BS EN 81-28.

NOTE 5 The addition of an induction coupler and the ability to alter the volume of the microphone and speaker will benefit people who wear hearing aids. BS EN 81-70 requires a visual indicator that provides confirmation that an emergency call has been received and is being acted upon.

NOTE 6 The addition of an emergency call device at low level will enable someone who has fallen to the floor to call for help.

NOTE 7 BS EN 81-28 deals only with entrapments and not with general emergency assistance.

8.3.4 Lifts for emergency evacuation

Lifts that are provided to evacuate disabled people in an emergency, whether fire-fighting lifts or evacuation lifts, should conform to the relevant recommendations in BS 9999.

NOTE 1 Lifts can be used to assist in the evacuation of disabled building users if they are encased within a fire-protected shaft and have their own independent electrical supply, control panel and other features described in BS 9999.

NOTE 2 Lifts not designed for evacuation can be used for evacuation in certain circumstances, provided a fire risk assessment has evaluated that the lift is able to function as an evacuation lift (see BS 9999).

NOTE 3 Guidance on fire safety risk assessments for a variety of building types is available from the Department for Communities and Local Government.

NOTE 4 BS 9999 refers to BS EN 81-72 for fire-fighting lifts.

8.3.5 Vertical lifting platforms

8.3.5.1 General

Vertical lifting platforms for public use by disabled people should be provided with easily accessed and clear instructions for use and fitted with an emergency alarm control device (a two-way voice communication system) in case users get into difficulty.

NOTE BS EN 81-28 covers the design of alarms for passenger lifts and, whilst the alarms described therein are not specifically intended for use on vertical lifting platforms, they are considered beneficial.

All users, including wheelchair users, should be able to reach and use the controls that summon and direct the lifting platform.

The lifting platform should provide audible and visual information to tell users, when waiting, that the platform has arrived at their level and, when using the platform, which floor it has reached.

8.3.5.2 Enclosed vertical lifting platforms

Enclosed vertical lifting platforms should conform to ISO 9386-1.

NOTE 1 Attention is drawn to the Supply of Machinery (Safety) Regulations 2008 [19].

NOTE 2 A harmonized European standard for enclosed lifting platforms, prEN 81-41, is in preparation.

NOTE 3 All enclosed vertical lifting platforms with a travel exceeding 3 m need to have a product certificate issued by a notified body.

The minimum clear dimensions of an enclosed lifting platform for use by an unaccompanied wheelchair user should be 900 mm wide × 1 400 mm deep. Where provision is also made for a companion or where two doors are located at 90° relative to each other, the platform should be 1 100 mm wide × 1 400 mm deep to allow more space for turning.

NOTE 4 A lift that does not require a wheelchair user to turn through 90° to exit is preferred.

Doors should have an effective clear width of at least 800 mm for a 900 mm wide lift, and at least 900 mm for a lift that is 1 100 mm wide or larger and where door openings are at 90° relative to each other. Doors should contrast visually with the adjacent surfaces (see Annex B).

8.3.5.3 Non-enclosed vertical lifting platforms

Non-enclosed vertical lifting platforms should conform to BS 6440.

NOTE Non-enclosed vertical lifting platforms are used to transfer people between levels within a storey commonly where the difference in level is not more than 2 m, but they can be used to travel a greater distance with additional platform protection.

The minimum clear dimensions of a non-enclosed lifting platform should be large enough to allow the user ease of movement (see recommended dimensions in **8.3.5.2**).

8.3.6 Stairlifts

Stairlifts should not be installed in new buildings. Stairlifts for existing buildings should only be installed where it is not possible to install a conventional passenger lift or a vertical lifting platform.

NOTE 1 Prior to the installation of a stairlift in a public building, the building control authority and the fire authority should be consulted to ensure that means of escape are not compromised.

Stairlifts, whether for seated, standing or wheelchair users, should conform to ISO 9386-2.

NOTE 2 BS 5776:1996, Annex A gives information on the use of stairlifts in buildings other than dwellings. A European standard for stairlifts, prEN 81-40, is in preparation.

Chair stairlifts should only be installed where it is not practical to install a wheelchair stairlift.

NOTE 3 Chair stairlifts might not be suitable for many people with impaired mobility. On the other hand, wheelchair stairlifts with lowering guard rails or flip-up seats do not suit all people who have difficulty walking.

NOTE 4 Where, in an existing building, a stairlift is required for a known person, e.g. a member of staff, the type of stairlift needs to be chosen to suit their particular needs.

Stairlifts for public buildings should ideally be located in sight of a receptionist or another member of staff in case users get into difficulty, and should be fitted with an alarm that conforms to the requirements of ISO 9386-2.

The controls of a stairlift should be designed to prevent unauthorized use (see ISO 9386-2).

For a building with a single stairway, the clear stairway width for means of escape should be maintained between the carriage rail of the stairlift and the handrail opposite.

For a building with two or more stairways between storeys, a stairlift should only be installed on a stairway that is not intended to be used as a means of escape.

When in a parked position, a stairlift should not obstruct the required clear width of a stairway, or cause a potential hazard for blind and partially sighted people using the stairway or the adjoining landings.

There should be a minimum clear width of 600 mm between the folded down platform of a wheelchair stairlift and the handrail opposite.

NOTE 5 In some buildings, the requirements for means of escape given in the Building Regulations 2000, Approved Document B [16] and its equivalents in Scotland [17] and Northern Ireland [18] might demand a greater minimum clear width.

8.4 Escalators and moving walks (passenger conveyors)

Escalators and moving walks should conform to BS EN 115.

Wherever an escalator or moving walk is installed, a clearly signposted alternative accessible route, e.g. a lift, should be provided close by.

The location and direction of travel of any escalator or moving walk should be clearly indicated by signs.

A clear, well lit approach at least 2.5 m long should be provided, where practicable, at the top and bottom of an escalator to ensure that users can board and alight safely.

NOTE 1 It is useful for blind and partially sighted people if the surface of the escalator contrasts visually with the approach and if audible signals or pre-recorded messages indicate the start and finish of the escalator. Such signals or recording are not normally provided by the escalator manufacturer.

Handrails should contrast visually with the surroundings and incorporate a visual means of indicating that they are moving for the benefit of blind and partially sighted people.

Where an escalator or moving walk is within a pedestrian access route, guarding should be provided alongside and at each end for the safety of blind and partially sighted people. Any side panels to guarding should have a non-reflective finish.

NOTE 2 Without guarding, blind and partially sighted people can inadvertently walk into an escalator or moving walk or be pulled over by accidental contact with moving handrails.

The steps of escalators should have a nosing that contrasts visually with the tread and riser.

NOTE 3 Guidance on the selection, installation and location of escalators and moving walks is given in BS 5656-2.

9 Surfaces and communication aids

9.1 Surface finishes

*COMMENTARY ON **9.1**.*
Floor, wall, door and ceiling surfaces can help or hinder the use of buildings by disabled people. For example, blind and partially sighted people, and people who are deaf and hard of hearing, might have difficulty finding their way around spaces if they cannot respond to visual cues or if they find it difficult to distinguish sounds in an acoustically reverberant environment. The movement of wheelchair users and ambulant disabled people can be unnecessarily restricted by the choice of a high-resistance floor covering such as a deep pile carpet.

The extent to which floor, wall, door and ceiling surfaces enable disabled people to find their bearings and maintain their independent use of a building is influenced by:

- *the colour, pattern, light reflectance value (LRV) and texture of the surfaces;*
- *the treatment of components and finishing elements, such as doors, architraves, skirtings, handrails, etc. which define, or are contained within, these surfaces;*
- *the appropriate use of surfaces to clarify location and direction and to identify objects;*
- *the acoustic environment;*
- *the grip of floor surfaces, particularly at changes of level.*

9.1.1 Visual characteristics

*COMMENTARY ON **9.1.1**.*
Blind and partially sighted people will be confused by reflections and glare from shiny surfaces if those surfaces are large in area. Glare and reflections also make it more difficult for people to lip read.

The ceiling is often the least cluttered area of a space and can give partially sighted people a good impression of the size of the space that they have entered. However, as most people concentrate their vision below 1 200 mm from the floor, the contrast between the floor and the wall is critical for wayfinding.

Mirrored, high gloss or very shiny surface finishes should be avoided for large areas, e.g. floor, wall, door and ceiling surfaces.

Differences in LRV should be used to assess the degree of visual contrast between surfaces such as floors, walls, doors and ceilings and between key fittings/fixtures and surrounding surfaces.

NOTE 1 Relevant LRV differentials and methods of LRV measurement are provided in Annex B.

The LRV of a wall should be 30 points different from that of the ceiling and of the floor. To avoid giving the wrong impression about the size of a room, skirtings should have the same LRV as the wall so that the junction between the skirting and the floor marks the extent of the room.

NOTE 2 If the architrave has the same LRV as the door but a different LRV from the surrounding wall, it can outline the opening for some partially sighted users when the door is open.

NOTE 3 Colours for use in buildings can be specified using BS 4800, which gives a schedule of 100 colours for building purposes, in conjunction with BS 5252, which gives a framework for colour coordination and has available a colour matching fan. BS 8493 gives the LRV measurements of selected BS 4800 colours.

9.1.2 Materials and acoustic design

*COMMENTARY ON **9.1.2**.*
Hard materials used for ceilings, walls and particularly floors, reflect sound and create a noisy environment in which a person who is deaf or hard of hearing might have difficulty in understanding what is being said. Similarly, a blind or partially sighted person, relying on the character and quality of reflected sounds, might become confused because of extended reverberation times, or an echo effect. The use of materials with very high absorbencies can give rise to spaces that have a muffled, lifeless character.

Ceiling, wall and floor materials should contribute to an acoustic environment that helps orientation and enables audible information to be clearly heard. The recommendations for acoustic design given in BS 8233 should be followed in order to choose an appropriate acoustic absorbency for each surface.

9.1.3 Floor surfaces

Very shiny finishes should be avoided due to problems with glare and the fact that they are perceived as being slippery even when they have a slip-resistant surface.

Large, repeating patterns that incorporate bold contrasting colours or simulate steps should not be used for any floor surface.

NOTE 1 Blind and partially sighted people can be confused by bold patterns used in floor coverings and might read them as changes in level.

Floor surfaces should offer a level of slip resistance that provides a firm foothold and good wheel grip under normal conditions of use. Adjacent floor surfaces should have similar levels of slip resistance.

NOTE 2 For guidance on slip resistance, see Annex E.

The ingress of soil and surface moisture to buildings, or their transfer between adjacent internal areas, should be reduced to the lowest practicable level, e.g. through the use of appropriate entrance flooring systems, conforming to BS 7953 (see also **7.1.1**).

Any matting should either have its surface level with the adjacent floor finish or, if surface laid, be of a type that has a rubber backing and chamfered edges. If, in exceptional circumstances other types of surface laid mats are used, they should be securely fixed to the floor at their edges and at any joints, to avoid the risk of tripping or slipping.

At wheelchair turning points and other heavily used areas other than at entrances where entrance flooring systems are in use, carpet should be securely fixed on a firm backing. Carpet construction, pile height and underlay type should be taken into account when assessing the suitability for wheelchair users and for people using walking sticks or frames.

Deep pile carpets and coir matting on the surface of the floor or within a mat well should not be used.

9.1.4 Wall surfaces

*COMMENTARY ON **9.1.4**.*
People who are deaf and hard of hearing, and who lip read, might be distracted by patterned wall surfaces located behind enquiry desks, speakers' rostrums and similar spaces. Blind and partially sighted people might be confused by bold patterns used in wall coverings, as they distort the perception of distance.

Large, repeating patterns that incorporate bold, contrasting colours should not be used for the wall surfaces in parts of a building where visual acuity is critical.

Service outlets, light switches, and other functional elements on the surface of walls should be distinguishable from the wall, using visual and textural contrast (see also **10.5**).

9.1.5 Glazed walls and screens

*COMMENTARY ON **9.1.5**.*
Glazed screens, which give the illusion that there is unimpeded access at these points, can be hazardous and confusing for blind and partially sighted people.

Glazed walls should conform to BS 6262.

The surface of glazed walls and screens that are adjacent to doors, or form part of an enclosure, should be clearly highlighted with a manifestation which contrasts visually with the surface behind it under both natural and artificial lighting conditions. This manifestation should be located within two zones, from 850 mm to 1 000 mm from the floor and from 1 400 mm to 1 600 mm from the floor.

NOTE 1 Suitable manifestation is likely to take the form of a continuous or broken line, sign, logo or patterning on the glass that covers at least 10% of the glazing area within each zone.

Glazed screens at counters and reception points should be constructed from glass with a low light reflectance and located so that they do not affect the ability of people who are deaf and hard of hearing to lip read through them. Glass that is silvered or highly reflective should be avoided.

NOTE 2 This is important where glazed screens are used in banks and other locations where customers might need to lip read. However, the specification of the glass in relation to security also needs to be taken into account.

Any free-standing edges of glazed screens should have a strip contrasting visually with the surroundings against which they are seen.

9.2 Signs and information

*COMMENTARY ON **9.2**.*
People need clear information about the purpose and layout of spaces if they are to maintain a clear sense of direction and independent use of a building. Often visual and tactile information is reinforced by audible information. As no single medium can communicate information to all those who need to receive it, some duplication is essential.

Information may take the form of visual information (e.g. signs, notice boards), audible information (e.g. public address and security systems, induction loops, telephones, and infrared devices), or tactile information (e.g. signs with embossed lettering or Braille). Visual and tactile forms of information are often used in combination, complemented by audible information.

Clear signs and information are essential for people who are deaf and hard of hearing who might be unable to ask, or feel uncomfortable about asking, for directions.

The effectiveness of information on the use of a building is determined by:

a) the location, accessibility, layout and height of signs;

b) the size of lettering, symbols and their reading distances;

c) the use of tactile letters and symbols;

d) visual contrast and lighting;

e) the finished surfaces of materials used for signs and symbols;

f) the simultaneous use of audible and visible cues;

g) integration with any other communication systems.

9.2.1 Provision of signs and information

*COMMENTARY ON **9.2.1**.*
Information to help orientation is most usefully provided at junctions of circulation routes. A plan or model may supplement written or audible instructions or signs in a large, complex building. Taped spoken messages can also help blind and partially sighted people comprehend a complex building.

For some blind and partially sighted people, tactile plans and models can also be helpful in understanding the interior layout of a public building.

Clear directions indicating the facilities on each floor of a building are essential on landings and stairs to help ensure that people do not visit the wrong floor.

9.2.1.1 General

Signs should form part of an integrated communication scheme that gives clear directions, information and instructions for the use of a building. They should support a wayfinding strategy that takes into account the needs of different types of building users as well as the complexity of the building layout.

NOTE Detailed design guidance on the provision and design of signs is available in the Sign design guide *[20] and the NHS wayfinding guide [21]. Guidance on signage and wayfinding for people with learning difficulties is given in Building Research Technical Report 6/2005 [22].*

Information and direction signs should be provided at each point where they are required, e.g. at junctions of circulation routes and key destinations such as doorways, at reception points, at facilities such as telephones, buffets and toilets, and in rooms, spaces and counters where hearing enhancement systems are fitted.

The colour, design and typeface of signs should be consistent throughout a building.

9.2.1.2 Location information

All key location information, such as sign directories, orientation signs, maps and plans, should be both visual and in tactile form where low enough to be touched. Where practicable, audible information should also be provided.

Orientation ("you are here") information should be provided in accessible places. It should be clearly signposted and located alongside the main accessible route within a building, or clearly visible from the entrance to a building, so that it can be examined without restricting the access route. The orientation of maps and plans should match that of the building.

NOTE As there is no standardized way of presenting plans and maps in tactile form, people who regularly use a building might obtain more benefit than occasional visitors as they will become familiar with the tactile techniques used.

9.2.1.3 Directional signs

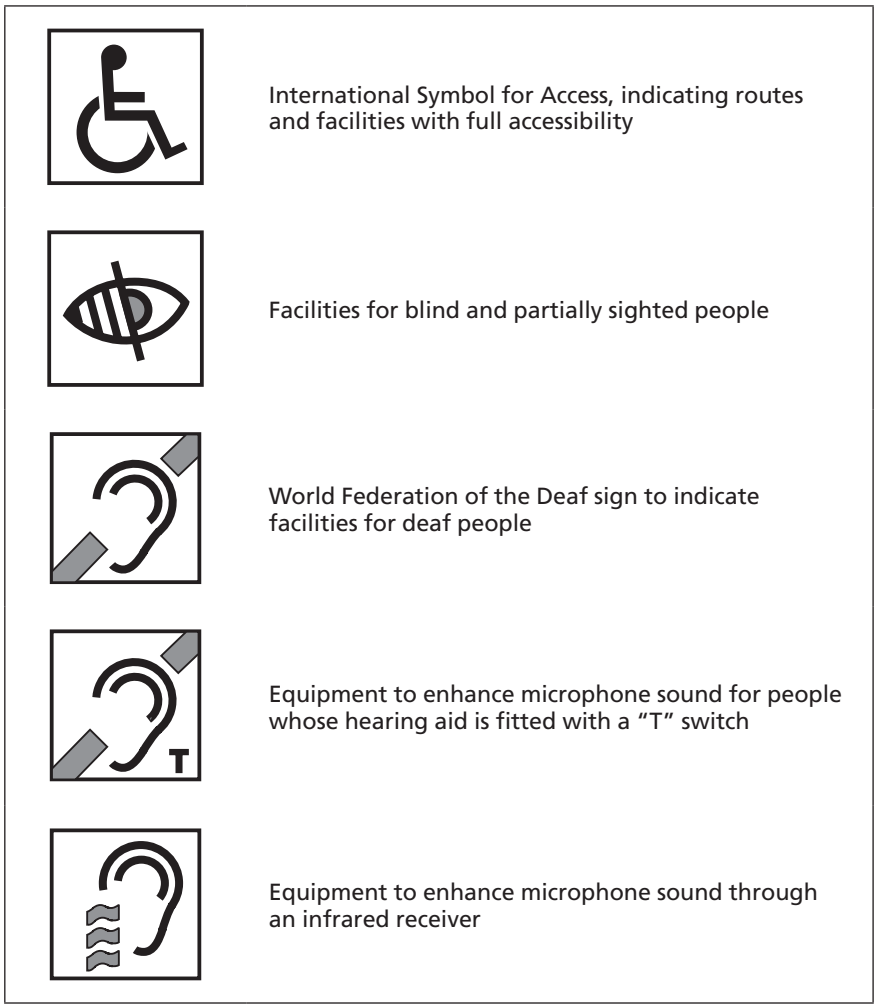
Directional signs should readily identify and easily distinguish accessible routes, including escape routes, from each other, providing a logical sequence from a starting point to a point of destination and providing a clear indication of return routes to named exits. The names of destinations should be consistent throughout the signing system.

A clear indication of the existence of steps or ramps on a route should be provided at both ends of the route.

9.2.1.4 Universally recognized signs and symbols

Signs to facilities for disabled people should incorporate the International Symbol for Access (see Figure 17). Examples of such facilities include accessible entrances and accessible toilets.

Figure 17 **Standard public information symbols**



A building should include spaces where announcements can be transmitted through a hearing enhancement system. Signs should be provided to inform people who are deaf and hard of hearing of locations in the building where these systems are fitted, and where they can obtain the necessary equipment for hearing enhancement systems.

Universally recognized public information symbols (see Note 2) should be used to replace text, wherever possible. Any other symbols should be used in conjunction with text.

NOTE 1 Symbols are an essential aid for people with learning difficulties.

NOTE 2 Examples of symbols indicating the availability of services and facilities in buildings are shown in Figure 17. Further information on public information symbols can be found in BS 8501.

Safety signs, including fire safety and fire escape signs, should conform to BS 5499-4 and BS 5499-5. Universally accepted colour coding should be used for the background or text of warning signs, as appropriate, i.e. blue for mandatory instructions, green for safety, yellow for hazard and red for danger/emergency.

9.2.1.5 Information signs and boards

A wall-mounted information board should be provided at lift landings, at floor level landings of staircases, and at other major decision points in main circulation routes.

*NOTE There might be occasions where notices need to be positioned at different heights to enable information to be read by sight or touch (see **9.2.2**).*

9.2.2 Location and design of signs and information

Directional signs should indicate the route to a destination, paying particular attention to potential points of uncertainty.

Directional signs should be placed only on fixed parts of the building such as walls, posts and floors. Where such signs would not be visible in large crowds, they should be suspended from the ceiling.

The headroom of directional signs suspended from ceilings or posts, or projected from walls, should where practicable be not less than 2 300 mm.

NOTE 1 In exceptional circumstances a lower headroom may be provided subject to a minimum of 2 100 mm.

NOTE 2 It can be helpful to duplicate detailed signs or instructions, especially safety notices, at high and low level, so that they can be read equally by a standing person or a wheelchair user. The inclusion of tactile information, where practicable, will assist blind and partially sighted people.

Signs to rooms should generally not be placed on doors but on the wall to the leading edge side of the door, as the sign might not be visible when the door is open. However, there are some situations where a sign will need to be placed on a door, e.g. signs to toilets, pull/push signs, hazard warnings on plant room doors, etc.

Signs should be positioned to avoid reflections from daylight and artificial lighting.

Signs other than universally recognized signs should include Plain English text and pictograms together to assist people with learning difficulties.

9.2.3 Visual signs

9.2.3.1 Design and size of lettering and symbols

*COMMENTARY ON **9.2.3.1**.*
Short sentences are easy to understand and remember. Abbreviations, words placed closely together, and very long words are all hard to read.

Visual signs should comprise simple words, clearly separated from one another, in short sentences. Sentences or single word messages should begin with an upper case letter and continue with lower case letters. Words entirely in upper case type (capitals) should not be used. Any sans serif typeface with a relatively large x-height (lower case letter height) to capital height should be used.

NOTE 1 Typefaces that are commonly used include Helvetica, Arial, Futura and Avant Garde.

The dimensions of safety signs, including fire safety signs, and the size of any associated text, should conform to BS 5499-5.

The text height for non-safety visual signs should be chosen to suit the application in accordance with Table 4.

Table 4 **Text x-heights for different types of sign**

Viewing distance	Type of sign	x-height
Long distance	Signs seen when approaching a building	150 mm min.
Medium distance	Directional signs	50 mm to 100 mm
Short distance	Room signs	15 mm to 25 mm

NOTE 1 Directional signs often have arrows to indicate the direction of travel.

NOTE 2 Location and identification signs are positioned at the destination.

NOTE 3 As a rule of thumb, a blind or partially sighted person is likely to be able to read text on a signboard when the x-height is aproximately 5.7% of the viewing distance.

Lines of text should be ranged left from a vertical line (unjustified).

NOTE 2 This is particularly important for blind and partially sighted people if they are to locate and establish the extent of text.

The size of symbols or pictograms used on visual signs should be as large as the location will allow, subject to design constraints. Where space permits, symbols should be at least 100 mm in overall height.

9.2.3.2 Visual contrast

For signs other than safety signs (for which there are prescribed colours), letters, symbols and pictograms should contrast visually with the signboard. Signboards should contrast visually with their backgrounds (see **9.1.1** and Annex B).

NOTE 1 A difference in LRV of 70 points between the letters, symbols or pictograms and the signboard, and between the signboard and the background, ensures good visual contrast.

NOTE 2 Light coloured text and symbols or pictograms on a dark background are preferred.

NOTE 3 Information on the LRV of specific colours is given in Annex B.

Where the LRV of a required signboard colour matches that of the background wall colour and neither can be changed, a visually contrasting border should be placed around the sign, equal in width to at least half the x-height of the text used for the sign.

9.2.4 Tactile signs and symbols

*COMMENTARY ON **9.2.4**.*
The use of well-contrasted tactile text and symbols can cater for both sighted and blind/partially sighted users. Blind and partially sighted people who do not read Braille can still identify, or be aided by, tactile information.

Directional signs and signs identifying functions or activities within a building should incorporate embossed letters in a sans serif type face with a depth of 1.25 mm ± 0.25 mm, a stroke of 1.75 mm ± 0.25 mm, and the edges slightly rounded but not half round in section.

NOTE 1 Embossed letters are easier to read than indented or engraved letters, especially if their leading edges (left and upper) are sharp and as well-defined as possible.

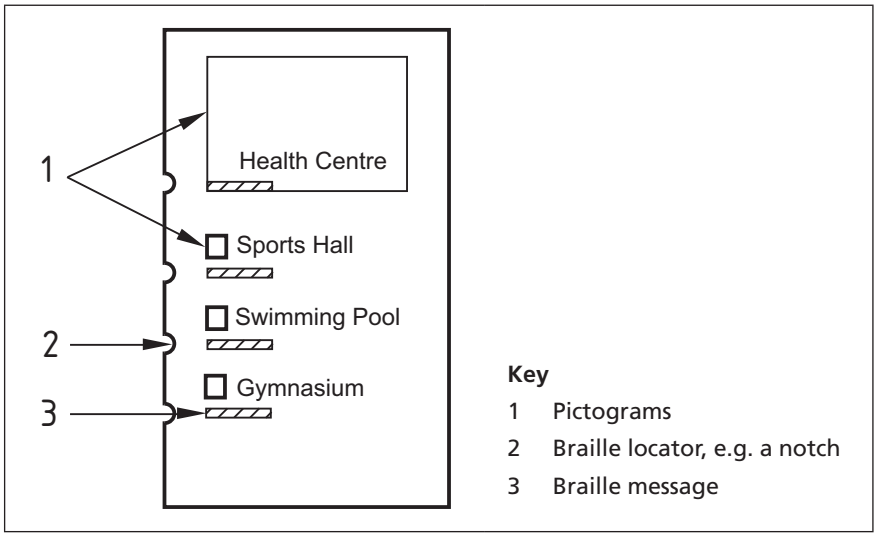
Where Braille is to be provided the following recommendations apply.

- Grade 1 Braille should be used for single word or short multiple word signs (e.g. "Special Baby Care Unit").
- Grade 2 contracted Braille should be used to reduce the length of signs incorporating a paragraph of text (e.g. an interpretation sign in a museum).

Where Braille forms part of a sign, a marker (e.g. a notch or tactile shape) should be located at the left-hand edge of the sign to help locate the Braille message (see Figure 18).

NOTE 2 Further information on tactile and Braille signs, including their size and location, can be found in the Sign design guide *[20].*

Figure 18 **Location of Braille messages on a tactile signboard**



9.2.5 Complementary audible information

*COMMENTARY ON **9.2.5**.*
Infrared audible systems exist that give a spoken personal message. Systems with electronic radio frequency receivers that become activated only when approached by a person carrying a special card are also available. These receivers are programmed with information on desired location and an electronic map of a building so that they can provide both guidance and information to the user. Because this reduces the number of audible announcements produced, noise nuisance is reduced. Invasive audible announcements can be stressful for hearing aid users who rely on additional visual support such as lip reading to understand a message.

Preferably, tactile signs should be complemented by audible information for blind and partially sighted people.

9.3 Audible communication systems

*COMMENTARY ON **9.3**.*
In public buildings and in other buildings where services are provided, people who are deaf and hard of hearing will benefit from an audible communication system in those parts of the building where they are not able to lip read or where distance or acoustics prevents speech being understood. Such systems can be designed to enhance the sound through the user's hearing aid or by the use of separate headsets.

9.3.1 Public address and other communication systems

Public address (PA) systems should be clearly audible and, whenever practicable, supplemented by visual information.

Public address systems for performances and announcements should be amplified in a form that is suitable for people who are deaf and hard of hearing.

Where possible, systems should be tested by user trials.

9.3.2 Hearing enhancement systems

*COMMENTARY ON **9.3.2**.*
Hearing enhancement systems enable sound signals to be transmitted to people who are deaf and hard of hearing, without interference from background noise or excessive reverberation.

A hearing enhancement system, using induction loop, infrared or radio transmission, should be installed in rooms and spaces used for meetings, lectures, classes, performances, spectator sport or films, and at service or reception counters where the background noise level is high or where glazed screens are used. Where a soundfield system/speech reinforcement system is fitted, this should be linked to the induction loop, infra-red or radio sound enhancement system so that the same microphones can be used with both systems in operation simultaneously.

The type and quality of microphones used for hearing enhancement systems, and their placement and proper maintenance, should be established at an early stage in the design of the building.

NOTE If chosen correctly, microphones may be those used to feed other sound systems such as PA systems.

Rooms or spaces used for presentations should have line input sockets in accessible locations so that audio sound, or the speech dedicated channel of films, presentations or video soundtracks, can be fed into the transmitting equipment.

Where possible, all hearing enhancement systems should be tested by user trials.

9.3.3 Induction loop systems

*COMMENTARY ON **9.3.3**.*
An induction loop system consists of a microphone and an amplifier/transmitter with the output connected to a continuous loop of wire that acts as an aerial and encircles the space. The system transmits the sound signal to a person's hearing aid. The signal can be received when the induction pick-up facility has been selected (generally by moving a switch on the hearing aid to a position marked "T") or by programming the aid to pick up the signal.

An induction loop system should be used (subject to specialist advice) in rooms or spaces where:

a) a relatively simple, economical system benefiting any user of a suitable hearing aid is required;

b) there is no magnetic interference from electrical equipment in or near the room or space;

c) confidentiality or spillover of the loop signal to adjoining spaces is not an issue;

d) issue/retrieval/maintenance/security of transmitters and receivers is not viable due to the function of the space or absence of on-site management.

A building should be designed to ensure that any spillover from one loop does not affect another loop, or compromise confidentiality.

NOTE 1 Because induction loops are based on magnetic fields, transmissions can be picked up by other hearing aid users in adjacent rooms or spaces either side of a room, or on floors immediately above or below the space in which the induction loop is being used. This can be a problem in multi-screen cinemas and in locations where confidentiality is required, such as council chambers or courtrooms. Induction loops will only benefit people whose hearing aids have induction pick-up or who have a listening aid with this facility.

NOTE 2 The performance of induction loop systems can be affected by the following:

a) reduction of field strength due to large areas of metal in the construction, such as steel reinforcement, metal stud partitioning, suspended ceiling systems and raised computer flooring;

b) interference that can be picked up by a hearing aid from high power cabling, electricity substations, air conditioning, refrigeration plant, lighting dimmer switches and other electrical equipment, tube screen televisions and visual display units (VDU), and some types of fluorescent lighting.

Induction loop systems should conform to BS 7594 and BS EN 60118-4. The presence of an induction loop system should be clearly indicated for each looped area by the symbol shown in Figure 17 both at the approach to, and inside, the room or space in which the system is fitted. The same symbol should be shown on signs or instructions associated with the system, and on any illuminated sign that is provided to show users that the system is switched on and ready for use.

Public induction loop hearing enhancement systems that are not driven by sound feeds from other fixed PA or loudspeaker systems should have a supplementary monitor or sound reinforcement loudspeaker so that temporary microphone faults can be detected by those holding meetings or managing performances or presentations.

Care should be taken when locating electrical or electronic equipment, as a hearing aid is affected by electrical interference when switched to the "T" position (or the program equivalent).

9.3.4 Infrared systems

*COMMENTARY ON **9.3.4**.*
Infrared systems are commonly used in multi-screen cinemas, theatres and lecture rooms where it is convenient for visitors to borrow headsets from a central source. The binaural sound can approach hi-fi quality if correctly installed and transmitted.

A person who is deaf or hard of hearing or someone who wishes to benefit from simultaneous voice-over, such as translation or audio description, can use an infrared system by wearing an infrared headset. Alternatively, the infrared receiver can be coupled to a person's own hearing aid by means of a small induction loop worn around the neck. This is particularly useful for people who are more severely hard of hearing who require higher levels of sound.

Designers need to make the building owner aware that management resources need to be made available for the issue, retrieval, maintenance, hygiene and security of the system. The building owner also needs to provide equal numbers of headsets and neck loop receivers proportional to the seating capacity of the room. The required numbers need to be regularly monitored, but 2% to 3% of capacity of each type is a reasonable starting point.

Infrared systems should be used (subject to specialist advice) in rooms or spaces where:

a) confidentiality or containment of transmitted sound is required;

b) more than one channel is required for audio description or translation on a second channel;

c) it is feasible to provide receivers for the number of people requiring the service;

d) local interference is likely to prevent an induction loop system being used.

Infrared systems should not operate at frequencies that are low enough to be affected by other infrared sources, such as high frequency fluorescent tubes.

NOTE Because infrared systems are based on light and operate at different frequencies, sound cannot be picked up outside the room in which the infrared signals are generated.

The availability of infrared systems should be indicated by the symbol shown in Figure 17.

Public infrared sound aids that are not driven by sound feeds from other fixed PA or loudspeaker systems should have a supplementary sound monitor or sound-enhancing loudspeaker, so that temporary microphone faults can be readily detected by those holding meetings or managing performances or presentations.

9.3.5 Radio systems

*COMMENTARY ON **9.3.5**.*
Radio systems can be completely portable and are commonly used in schools, colleges and staff training centres where students are moving between a number of classes or lecture rooms, or in art galleries where the tour guide wears a transmitter and moves around the space describing exhibits to visitors wearing receivers. The radio signal can usually be received up to a distance of 60 m. Radio receiver hearing enhancement systems that allow transmitters and receivers to be switched between different channels can be used in adjacent rooms without picking up overspill sound. They can be susceptible to electromagnetic interference and radio signals from other sources on the same waveband.

Designers need to make the building owner aware that management resources need to be made available for the issue, retrieval, maintenance and security of the system.

Radio receiver hearing enhancement systems should be used (subject to specialist advice) in rooms or spaces where:

a) confidentiality is not an issue;

b) users carry personal receivers for use in different locations;

c) more than one channel is required for audio description or translation on a second channel or on several channels;

d) the number of people requiring the service can be matched by the number of receivers available.

Large lecture rooms, classrooms and training rooms that are fitted with sound amplifying or sound reinforcement loudspeakers should have microphones that provide output to radio sound aid transmitters.

9.3.6 Inductive couplers

An inductive coupler and additional volume control to adjust amplification should be fitted into the circuitry of all public or visitor payphones, entryphones and emergency telephones in lifts.

NOTE The inductive coupler is for people who wear a hearing aid that has an inductive pick-up, and the volume control is to adjust amplification for people who do not wear an aid but have a significant hearing loss.

Telephones that are suitable for use by hearing aid users should be identified by the symbol shown in Figure 17.

9.3.7 Alarm/alerting systems

9.3.7.1 Fire alarm systems

Fire alarm systems should be designed and installed in accordance with BS 5839-1.

A fire alarm should be visible as well as audible to all users.

NOTE 1 This is particularly important for blind and partially sighted people and people who are deaf and hard of hearing.

In areas where people are likely to be in relative isolation (e.g. toilets, bathrooms and isolated offices) or in noisy environments, alarm/alerting systems for people who are deaf and hard of hearing, such as flashing beacons and vibrating devices, should be installed in conjunction with proprietary or conventional fire alarm systems.

NOTE 2 Vibrating devices can take the form of wearable paging units.

*NOTE 3 See **12.8.10** for additional guidance on fire alarm systems in bedrooms.*

NOTE 4 Certain frequencies in flashing/stroboscopic light systems can cause confusion, disorientation, and in some people, epileptic seizures, migraines and nausea.

9.3.7.2 Emergency assistance alarm systems

Visual and audible feedback should be provided to indicate that, when the alarm has been operated, the emergency assistance call has been acknowledged and is being actioned.

NOTE 1 An indication that assistance is on its way will reassure those in distress.

An emergency assistance alarm system, where provided, should be designed so that it is not confused visually or audibly with a fire alarm.

An emergency assistance pull cord, coloured red, should be provided with two red bangles of 50 mm diameter, one set at a height between 800 mm and 1 000 mm and the other set at 100 mm above floor level.

NOTE 2 An additional pull cord or, preferably, a low-level alarm (above the skirting up to a maximum of 200 mm from floor level) would benefit somebody who has fallen onto the main floor area, particularly in larger rooms.

The emergency assistance alarm indicator outside the room or compartment should be located so that it is easily seen and heard by people able to give assistance and indicates where help is required.

NOTE 3 An additional alarm indicator may also be sited remotely, e.g. in a permanently staffed area of the building.

The reset control for the emergency assistance alarm should be clearly marked as such and should be reachable from a wheelchair and, where relevant, from the WC, the tip-up seat in a shower facility, or the bed in an accessible bedroom. The reset control should be easy to operate and located with its bottom edge between 800 mm and 1 000 mm above floor level. The marking of the reset control should be both visible and tactile.

9.4 Lighting

*COMMENTARY ON **9.4**.*
Good lighting is crucial in ensuring that partially sighted people are able to use buildings conveniently and safely. The illuminance on interior surfaces, the quality of the lighting, good colour rendering and the avoidance of glare are key factors to be considered.

9.4.1 General principles of lighting

*COMMENTARY ON **9.4.1**.*
The reflectance of walls, floors and ceilings influences the flow of light within a room or space. The flow of light affects the view of objects within the space and also the appearance of the human face. People who are deaf and hard of hearing need to see and understand the movement of lips for lip reading, and hands when signing.

Artificial lighting systems should be designed to maintain a level of illumination that is suitable for blind and partially sighted people and is compatible with electronic and radio frequency installations. Where artificial lighting is provided, it should use high frequency electronic ballasts to avoid any perception of flicker.

NOTE 1 The SLL Code for lighting [23] gives general guidance for a wide range of interiors.

NOTE 2 Natural lighting or daylight has many useful properties including daily and seasonal changes; good colour rendering and daylight are also linked to health benefits. Care is required in the control of daylight to avoid glare and the risk of excessive solar heat gain. Recommendations on daylight design can be found in BS 8206-2.

9.4.2 Avoiding glare and shadows

*COMMENTARY ON **9.4.2**.*
Blind and partially sighted people are particularly distracted by glare from bright patches of light within their field of view and prefer an even illuminance across a room or space.

Both natural and artificial sources of lighting should be designed to avoid creating glare, pools of bright light and strong shadows.

Uplighters with a light source at floor or low level should not be used as they cause glare and obscure vision.

9.4.3 Colour rendering

*COMMENTARY ON **9.4.3**.*
The effectiveness of light reflectance value differentials will be reduced if artificial light sources give poor colour rendering. The colour rendering of surfaces can be enhanced by the correct choice of lamp as indicated in the SLL Code for lighting *[23].*

Artificial lighting should give good colour rendering of all surfaces.

NOTE Around 5% of the population are colour blind, particularly in the red/green region, and this should be considered when designing colour schemes.

9.4.4 Illumination for lip reading

Where one-to-one communication is important, e.g. between a public official and a member of the public, lighting should illuminate the face of the person speaking to make it easier for a person lip reading.

10 Facilities in buildings

10.1 Storage facilities

*COMMENTARY ON **10.1**.*
Storage facilities that might be used by disabled people at work or when visiting buildings include cupboards, shelves and drawers. They might be used by disabled people as personal storage or as part of the general storage provision of a building, such as a hotel.

10.1.1 Provision of storage facilities

Wherever storage facilities are available for use by the general public, at least one fully accessible storage unit for disabled people should be provided. The demand for fully accessible storage units should be regularly monitored and the following factors should be taken into account:

- the importance of storage to the user;
- the frequency of use;
- the number of people with access needs using the storage; and
- the availability of assistance.

10.1.2 Access to storage facilities

Storage facilities should be clearly indicated, and access to them should be direct and unobstructed. Wherever feasible, storage facilities should include some knee spaces to allow the option of either frontal or sideways use from a sitting position.

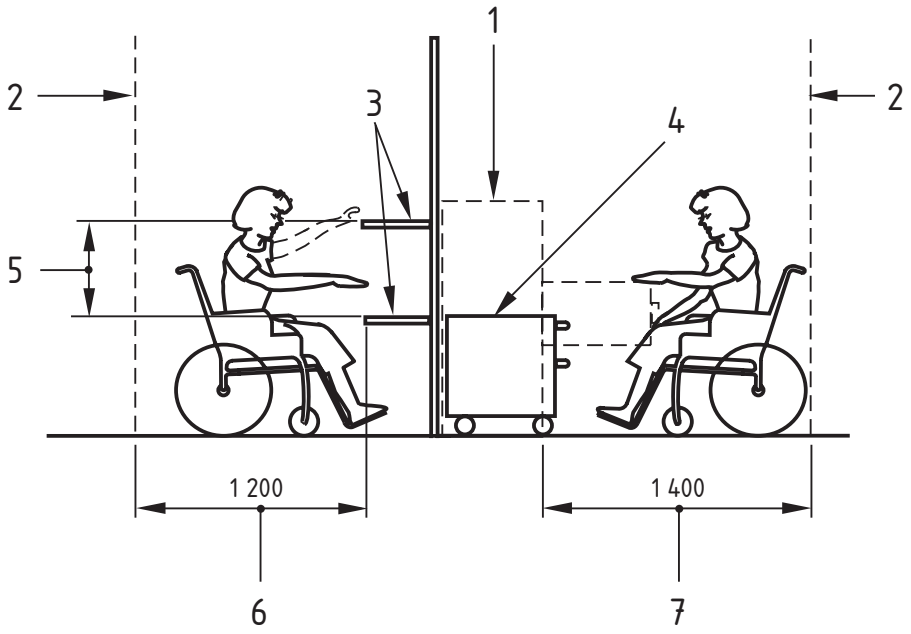
NOTE It might be necessary to provide seating at storage facilities for use by some ambulant disabled people.

The distance between opposing banks of storage facilities (e.g. shelving, storage units, filing cabinets or lockers) should be at least:

a) 1 200 mm if some knee spaces are provided;

b) 1 400 mm if no knee spaces are provided (see Figure 19).

Figure 19 **Access to storage from the front when seated**
Dimensions in millimetres



Key

1 Locker/filing cabinet

2 Line of obstruction (e.g. wall or storage)

3 Shelving

4 Mobile storage unit

5 Comfortable reach range above floor level – 650 mm for low shelf to 1 000 mm for high shelf (1 150 mm for high shelf when use is infrequent)

6 Clear space from obstruction to front of shelf where a knee space is provided

7 Clear space in front of cabinet where there is no knee space [A)]

[A)] Use of lower drawer will require access from side. Mobile storage units increase flexibility of use.

10.1.3 Height of shelving or surfaces within storage units

Wherever practicable, shelving should be positioned so that it can be reached independently by disabled people, taking into account the type and frequency of the activity being carried out; see Figure 19, Figure 20, and Annex F.

Where storage facilities are intended for use by a particular person, e.g. in a place of employment, they should be customized according to the individual's needs.

NOTE 1 Where a wheelchair user or a seated person is accessing storage from the front, shelving is best positioned:

a) no higher than 1 150 mm, and no lower than 650 mm, if use is infrequent; and

b) no higher than 1 000 mm and no lower than 650 mm, if use is frequent (see Figure 19).

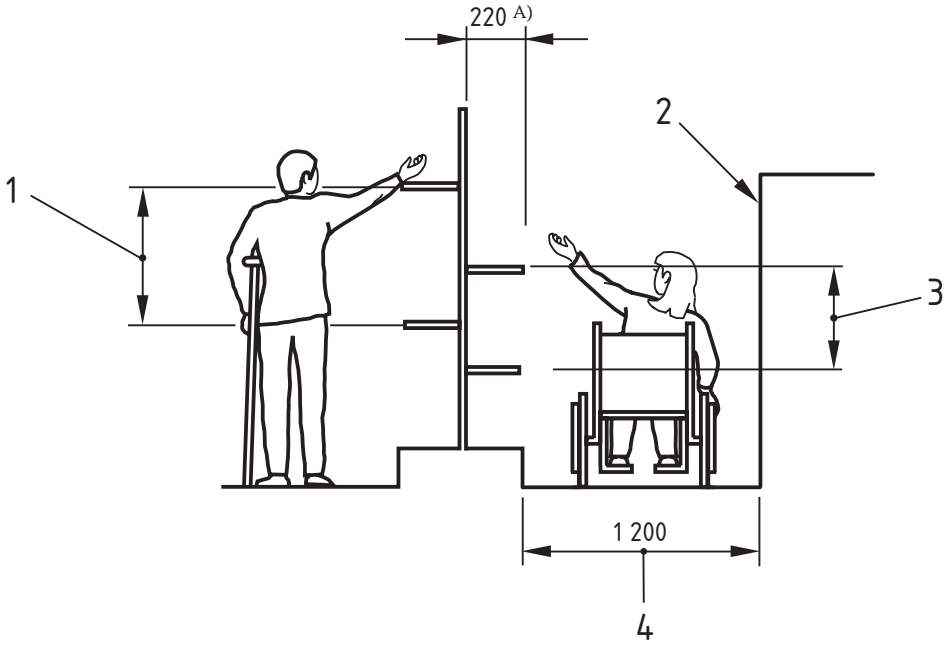
NOTE 2 Where a wheelchair user or a seated person is accessing storage from the side, shelving is best positioned:

a) no higher than 1 170 mm, and no lower than 630 mm, if use is infrequent; and

b) no higher than 1 060 mm and no lower than 665 mm, if use is frequent (see Figure 20).

Bookshelves or drawer pulls for use by wheelchair users should be no lower than 400 mm from the floor. Shelving for use by people who can stand but have reach difficulties and difficulties bending should be no higher than 1 500 mm and no lower than 750 mm from the floor where use is frequent and no higher than 1 625 mm and no lower than 700 mm from the floor where use is infrequent, so that stored items can be seen clearly and reached comfortably (see Figure 20 and Annex F).

Figure 20 **Access to shelves from the side**
Dimensions in millimetres



Key

1 Reach range to the side for a standing person who has difficulty reaching and bending – 750 mm to 1 500 mm for frequent use and 700 mm to 1 625 mm for infrequent use

2 Storage facilities or wall opposite

3 Reach range to the side from a wheelchair – 665 mm to 1 060 mm for frequent use and 630 mm to 1 170 mm for infrequent use

4 Sideways access

A) Maximum shelf depth to allow reach to back of shelf from a sideways position when arm is horizontal.

10.1.4 Fittings for storage facilities

Adjustable fixtures and fittings should be used as part of storage and shelving systems if facilities are being customized to meet the needs of a particular disabled person.

NOTE 1 The use of mobile storage units (e.g. those on castors) can assist greatly in meeting accessibility needs.

In the interests of safety, projecting door and drawer hardware should contrast visually with its associated storage facilities and have no sharp edges.

*NOTE 2 Guidance on keys is given in **6.5.4**.*

Handles on hinged and sliding doors should be easy to grip and manipulate and should conform to the recommendations in **6.5**.

Sliding door and drawer gear should have a positive action and be easy to operate with limited force.

Side-hung doors of storage systems should open through 180° to avoid the risk of collision by a passer-by when open.

10.1.5 Visibility of storage facilities

The location and appearance of storage facilities should be suitable for blind and partially sighted people. Cupboards and shelves should contrast visually with their immediate surroundings and should not have highly reflective surfaces (see Clause **9**).

Lighting should be provided within walk-in cupboards.

10.2 ATMs and other coin and card operated devices

*COMMENTARY ON **10.2**.*
It is important that people of varying stature, people with varying degrees of flexibility, manual dexterity and sensory perception, and wheelchair users can use, reach and interact with coin and card operated devices, such as food and drink dispensers, car park controls and automatic teller machines (ATMs).

Access to coin and card operated devices is restricted by the ability to reach from a sitting or standing position, and by the wheels of a wheelchair and its footrest extension.

10.2.1 Location of devices

Routes to coin and card operated devices should be direct and unobstructed.

The location of coin and card operated devices should be clearly signposted and easily identifiable. Card and coin operated devices, in particular ATMs, should be located in areas that are overlooked by people, and well lit at all times.

Display screens should be carefully shielded from ambient lighting, including sunlight, to prevent glare and reflection, thus ensuring that a sharp image is visible by both standing and seated users.

Signs indicating the location of coin and card operated devices should be clearly visible and conform to the recommendations in **9.2**. The overall size and height of signs and the size of text and symbols should conform to the recommendations in **9.2**.

Signs should be located above coin and card operated devices and be visible from the side as well as the front. Signs over coin and card operated devices should have integral illumination that is activated at night and during overcast days.

If feasible, ATMs situated on the outside of buildings should be protected from the weather as disabled people's interaction with

powered devices can be protracted because of poor vision, lack of manual dexterity or limited reach.

10.2.2 Access to ATMs

*COMMENTARY ON **10.2.2**.*
Wheelchair users and people of short stature are especially vulnerable to other people seeing keyboard operations and information on screen. A defined privacy area, within which people waiting are discouraged from standing, is an important design element that helps private transactions remain confidential.

Areas that are well lit, and also overlooked by other activities, provide a measure of protection from attack and intimidation for people using ATMs.

NOTE 1 For the design and installation of ATMs, including dimensions and illumination, see Access to ATMs *[24].*

In all but exceptional circumstances, an ATM should be positioned clear of the adjacent circulation route, but in view of it.

NOTE 2 It can be beneficial if the area in front of the ATM is treated as a privacy area and, to help blind and partially sighted people, provided with a tactile information surface. See Guidance on the use of tactile paving surfaces *[12] and* Access to ATMs *[24] for detailed guidance.*

10.2.3 Operation of devices

*COMMENTARY ON **10.2.3**.*
For security and privacy reasons, many wheelchair users might not wish to use a device such as an ATM while reaching from the side.

Unless there are exceptional circumstances due to the particular construction of a building, a knee recess at least 500 mm deep and 700 mm high should be provided at the front of a coin or card operated device to allow any user to operate it from the front.

10.2.4 Operating instructions

Instructions for using coin or card operated devices should have a clear, large typeface. Text should be clear and easy to understand (see also **9.2**).

Universally recognized pictograms (see **9.2.1.4**) should be used, as well as text.

10.2.5 Card operated door entry systems

Where practicable, a proximity smart card system should be used to release the door lock.

A door entry system which uses a card should be clearly indicated and located on the latch side of a door at a height of between 900 mm and 1 100 mm above floor level, within 200 mm of the door frame or aperture, where there is a glazed façade, and adequately illuminated.

Controls should be in accordance with the recommendations in **10.5.1**.

Card swiping mechanisms should be orientated vertically. They should be within a height range of 900 mm to 1 100 mm, but between 950 mm and 1 000 mm where practicable.

10.3 Windows and window controls

*COMMENTARY ON **10.3**.*
Ease of access to, and use of, windows and window controls are important considerations in window design. The view through windows from a seated position is also an important consideration for wheelchair users and others who might spend much of their time sitting down.

The position of window controls and the forces needed to operate them need to be taken into account if wheelchair users and ambulant disabled people are to have easy access to windows. It is also important that furniture, both fixed and loose, does not obstruct access to the controls.

Window furniture needs to be easy to find, reach and use by people who have sight, hearing, movement and dexterity difficulties.

Powered window systems eliminate the need for people to open and close windows manually. Such controls can be fitted to the following types of window:

- *casement: side, top and bottom hung;*
- *pivoting: vertical or horizontal;*
- *sliding sash: vertical or horizontal;*
- *tilt and turn.*

The use of remote activators can eliminate the need to reach windows that are inconveniently placed, such as above kitchen sinks.

10.3.1 Heights of window sills and transoms

To allow wheelchair users and seated people to enjoy a reasonable view below eye level (see Figure 21), any fixed glazing above a solid wall or opaque infill panel should start no higher than 800 mm above floor level and any glazing in a openable light should start as close as practicable to 800 mm.

NOTE Statutory requirements for guarding dictate the lowest level for the opening part of a window. Where a statutory requirement or risk assessment recommends a minimum guarding height that conflicts with the provision of unobstructed glazing, guarding to ensure the safety of occupants needs to take priority.

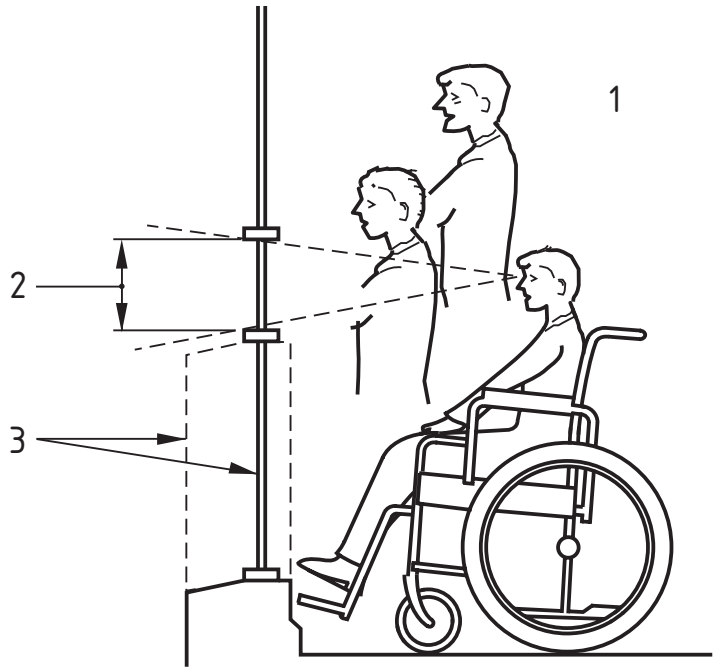
For safety reasons, any glazing below 800 mm from the floor should be safety glazing and should follow the recommendations in BS 6262-4 in respect of impact resistance.

No transoms should be positioned between 800 mm and 1 200 mm above floor level (see Figure 21).

Where a window opens directly on to a pedestrian access route, either precautions should be taken to limit the projection to less than 100 mm, or barriers should be provided to avoid the risk of people, particularly blind and partially sighted people, colliding with the open window (see also **5.7**).

On upper floors, top hung or horizontal pivot windows should be fitted with a restrictor stay, conforming to BS 8213-1, that prevents the window being opened more than 100 mm, so that people who are unsteady on their feet, or who are blind and partially sighted, are not put at risk when reaching for the handle, and children are unable to put themselves at risk by opening the window. The restrictor stay should be capable of being disengaged in an emergency or for window cleaning and maintenance.

Figure 21 **Heights of window transoms to allow a view from a wheelchair or chair**



Key

1 Transom height chosen to allow a view through window
2 No transom between 800 and 1 200 above floor level
3 Wall or opaque infill panel

10.3.2 Window controls

*COMMENTARY ON **10.3.2**.*
Controls that have to be gripped to be operated present difficulties for many people with limited dexterity.

Buildings should have easy accessible fastenings for opening and closing windows, located between 800 mm and 1 000 mm above floor level (see Figure 22).

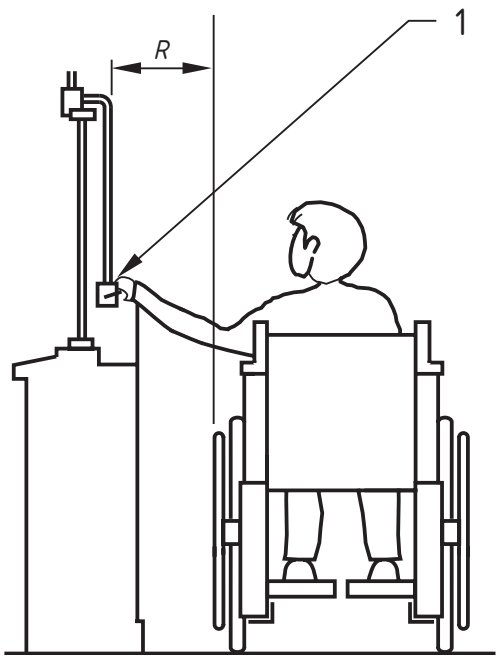
Preferably, window controls should be designed so that they can be operated by someone with a clenched fist or with the side of a wrist or arm. They should not require the simultaneous use of both hands as a person might need to use the other hand for support and balance.

NOTE 1 To remain effective, window controls need to be checked, cleaned, repaired or replaced on a regular basis. Torque force characteristics also need to be monitored on a regular basis.

The type and location of controls for opening and fastening windows should be chosen to meet the reach and dexterity capabilities of potential users, without compromising security. Lever handles should be used in preference to knobs.

Horizontal sliding windows should be capable of being opened and shut using limited force.

Figure 22 **Location of window controls and reach limitations for wheelchair users**



Key

1 Manual or powered controls between 800 mm and 1 000 mm above floor level

Max. reach *R*:

- 400 mm at 90° to window
- 360 mm at 60° to window

The torque force required to operate a lever handle should not exceed:

a) 8 N·m to depress and 5.5 N·m to lift a handle with an oval cross-section;

b) 4 N·m to both depress and lift a handle with a rectangular cross-section.

NOTE 2 Torque force (in newton metres) is the force (in newtons) exerted over a distance of 1 m.

NOTE 3 Powered window controls eliminate the need to move towards a fixed mounted switch.

The following aspects should be taken into account if powered window controls are to be installed in a building:

1) the type of activator;

2) the location of a wall-mounted keypad;

3) the design of a remote control device;

4) the type of operation, e.g. by continuous pressure or a single press.

NOTE 4 Further guidance on power-operated controls is given in BRE Report BR334 [25].

Window controls should contrast visually with their background for the benefit of partially sighted people.

10.4 Public telephones

10.4.1 Provision and location of accessible telephones

In buildings in which telephones for public use are provided, at least one accessible telephone mounted at a height suitable for use by a wheelchair user should be provided in an accessible location, preferably in the entrance space.

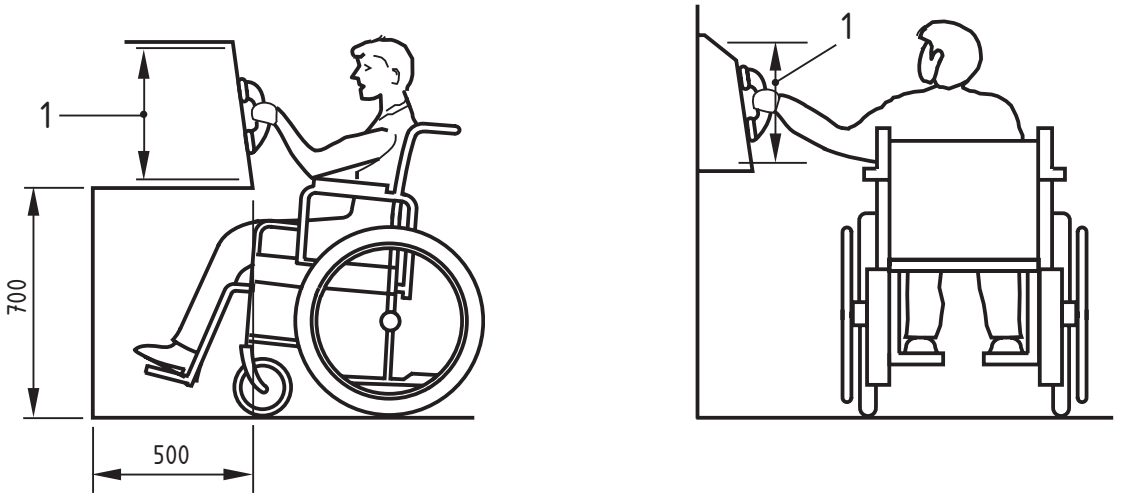
Where several accessible telephones are provided, they should be positioned at different heights to suit ambulant disabled people and wheelchair users.

A fold-down seat (450 mm to 520 mm high) or a perch seat (650 mm to 800 mm high) should be provided for the convenience of ambulant disabled people. Drop-down arms should be provided for each seat.

Preferably, telephones for use by disabled people should be located to enable wheelchair users to approach and use the telephone from both the front and the side.

Where it is only possible to approach a telephone from the front, a knee hole at least 500 mm deep and 700 mm high should be provided (see Figure 23).

Figure 23 **Height of telephone controls for wheelchair users**
Dimensions in millimetres



a) Frontal approach with kneehole

b) Sideways approach, wall-mounted

Key

1 Controls between 750 mm and 1 000 mm above floor level

Directions to accessible telephones should be clearly marked by combining the International Symbol of Access (ISA) with a telephone symbol. Markings on directions should be both visual and tactile (see **9.2**).

NOTE 1 Text telephones at reception desks can assist people who are deaf and hard of hearing.

Where acoustic hoods are provided, they should be designed and mounted in such a way that they are not a hazard to disabled people, i.e. by ensuring that they are located outside the width of the access route or by means of a hazard warning (see **5.7**).

NOTE 2 Items projecting into a circulation space, particularly if they have sharp edges, can cause injury to wheelchair users and blind and partially sighted people.

NOTE 3 Warning of a hood projection or the presence of a shelf can be achieved by a solid plinth providing cane detection and guarding.

A shelf should be associated with all public telephones to enable people who are deaf and hard of hearing to use a portable text phone.

10.4.2 Telephone controls

Telephone controls on accessible telephones for wheelchair users should be angled so that they can be used by people when seated or when using a perch seat.

Telephone controls should be located between 750 mm and 1 000 mm above the floor (see Figure 23).

To benefit blind and partially sighted people, telephones should be selected which have well lit keypads, large embossed or raised numerals that contrast visually with their background and a raised dot on the number 5.

Instructions for using telephones should be clear. They should be displayed in a large easy-to-read typeface (see **9.2**).

10.4.3 Telephone booths

A clear floor space of at least 1 850 mm × 1 200 mm should be provided within a telephone booth with accessible phones for use by wheelchair users (see Figure 24). Doors should not obstruct the clear space (i.e. outward opening doors should be installed wherever possible).

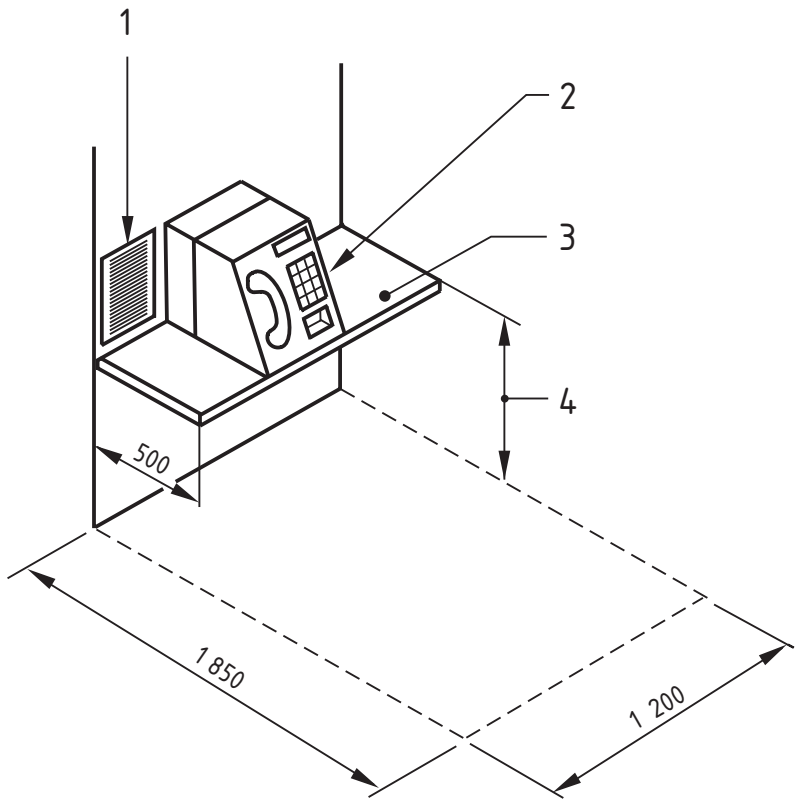
Any doorway to a telephone booth should have a minimum clear width of 800 mm (the minimum clear width should be 900 mm where practicable).

Support rails should be provided adjacent to any seating in accessible telephone booths.

Telephone booths and fittings should contrast visually with the surrounding walls (see **9.1.1**).

A tactile telephone symbol should be placed outside an accessible telephone booth (see Figure 25).

Figure 24 **Key features of a telephone booth for wheelchair users**
Dimensions in millimetres



Key

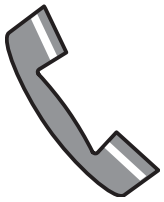
1 Instructions

2 Telephone positioned centrally to be suitable for left- and right-handed people

3 Shelf

4 Top surface 760 mm above floor level; 700 mm min. clear vertical kneehole space below

Figure 25 **Tactile telephone symbol**



Embossed telephone symbol between 1 400 mm and 1 700 mm from the floor and within 150 mm of the door or booth opening

10.5 Building services (outlets, switches and controls)

*COMMENTARY ON **10.5**.*
Ease of operation, visibility, height and freedom from obstruction are key factors that affect the use of building services by disabled people.

It is important that outlets, switches and controls are positioned consistently within a building and meet the needs of a variety of disabled people, e.g. wheelchair users, blind and partially sighted people, people who are deaf and hard of hearing, or people who have limited dexterity.

In public buildings, disabled staff are likely to be more frequent users of controls than disabled visitors.

The height of outlets and controls may differ according to the frequency of use or the force needed to operate them.

All users need to be able to locate a control, know which setting it is on and use it without inadvertently changing its setting.

10.5.1 General

Controls that need to be used by disabled people should not require the simultaneous use of both hands.

To cater for blind and partially sighted people, controls should contrast visually with backgrounds, with information associated with them embossed to aid tactile reading (see **9.2**).

Electrical socket outlets should be switched. Rocker switches that indicate clearly whether they are on or off should be used for ease of operation by blind and partially sighted people or those with limited dexterity. Rocker switches should be postioned on the outside of the socket outlet.

Individual switches on panels, including the control of multiple outlets, should be separated to allow the correct selection of the required control and avoid the inadvertent selection of an adjacent control.

NOTE The ability of blind and partially sighted people and those with limited dexterity to detect switches and controls is helped by the use of large touch plates.

Mains and individual circuit isolator switches should be clearly identified and their on/off status should be immediately apparent.

The use of red and green as indicators of "ON" and "OFF" on switches and controls should not be used without clarification by text or pictogram as they are the most commonly confused colours for partially sighted/colour blind people.

10.5.2 Location of outlets, switches, controls and meters

All outlets, switches and controls, including two-way switching, should be positioned consistently in relation to doorways and corners within a building and in a logical sequence to suit passage through the building.

NOTE 1 By using vertical strips as switches, instead of single height switches, users can operate the switch at whichever height is convenient for them.

Preferably, light switches should align horizontally with door handles for ease of location when entering a room.

Electrical wall socket outlets, telephone points and TV sockets should be located at least 400 mm but not more than 1 000 mm above the floor. Socket outlets whose plugs are likely to be removed

and replaced frequently should be located at the top of the range (see Figure 26).

NOTE 2 Switches close to the floor or skirting are difficult and dangerous because they require users to stoop or kneel to operate them. The higher the socket outlet, the easier it is to push in or pull out the plug. However, there might be circumstances in which floor sockets are required (e.g. in commercial developments for health and safety reasons, to avoid trailing cables), in which case additional measures will be needed to ensure access.

Switches for permanently wired appliances (e.g. fused spurs or reset switches for alarm calls) should be mounted within the range between 750 mm and 1 200 mm (see Figure 26).

Meters should be mounted between 1 200 mm and 1 400 mm from the floor so that the readings can be viewed by a person standing or sitting. Pre-pay meters should be accessible, but protected so children cannot tamper with them.

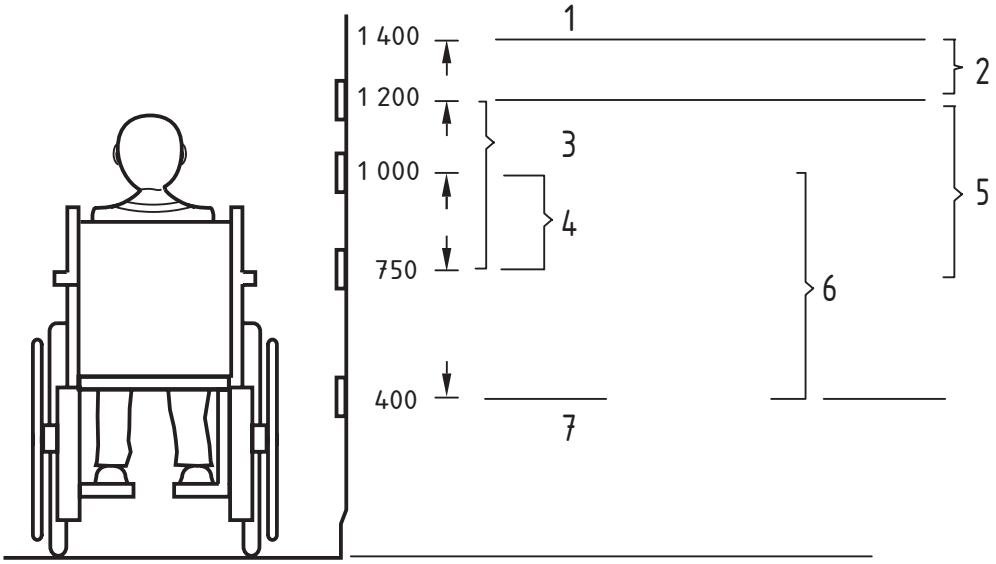
All switches and controls that require precise hand movement/ dexterity, e.g. for heating installations, ventilation etc., should be in a zone 750 mm to 1 000 mm from the floor (see Figure 26) so that wheelchair users and those standing can operate them.

The maximum height of simple push button controls, including isolator switches and circuit breakers, that require limited dexterity should be 1 200 mm (see Figure 26).

Emergency "break glass" panels and door releases should be mounted between 1 000 mm and 1 200 mm from the floor.

Outlets, switches and controls should be at least 350 mm from room corners (see Figure 27).

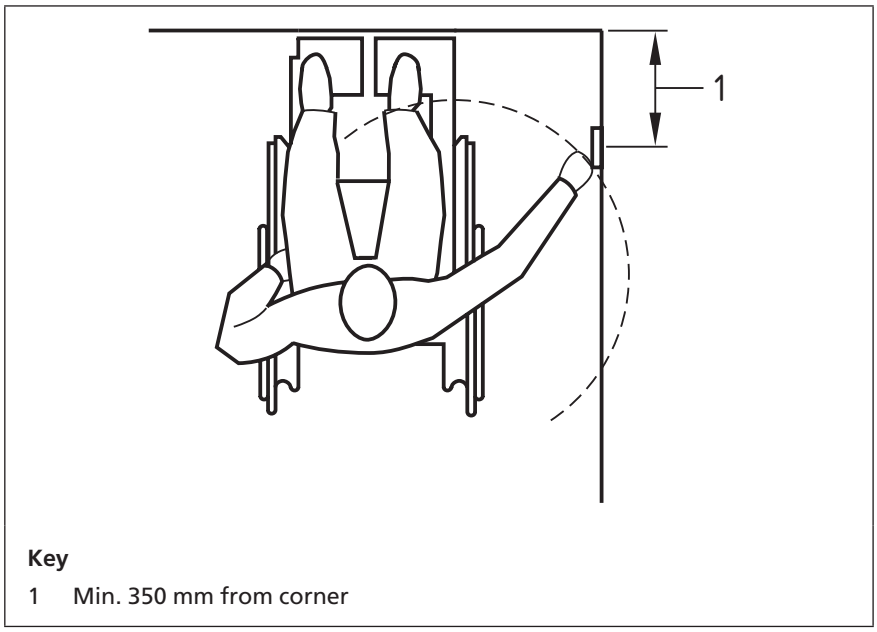
Figure 26 **Heights to the centre of outlets, switches and controls**
Dimensions in millimetres



Key

1 Upper limit for all controls/outlets
2 Range for meter indicators
3 Range for light switches
4 Range for controls needing precise hand movement
5 Range for permanently wired switches
6 Range for socket outlets
7 Lower limit for telephone and TV sockets

Figure 27 **Distance of outlets, switches and controls from the corner of a room**



11 Assembly areas

*COMMENTARY ON CLAUSE **11**.*
Convenient access to counters and reception desks is essential for disabled people if they are to make full use of a building, whether as a visitor or as a member of staff providing a service.

Wheelchair users and ambulant disabled people might need space to manoeuvre up to a counter, then move closer to it, e.g. to complete a form or make a booking.

This clause applies to commercial buildings, as well as the work and service areas of public buildings including hotels, shops, banks, restaurants, public houses, dentists' and doctors' surgeries, airports, railway stations and theatres. The recommendations in this clause may also be applied to educational establishments and to common rooms in residential buildings.

11.1 Counters and reception desks

11.1.1 Location and access for visitors and customers

Counters or reception desks should be located so that they are easily identifiable from a building entrance by blind and partially sighted people (see **7.1.2**).

Where external noise might be a problem, reception areas should be located away from entrances.

*NOTE 1 People who are deaf and hard of hearing might have difficulty understanding speech if the noise level in the reception area is too high. See also **11.1.10**.*

Signs associated with counters and reception desks that are located in busy areas such as shops and theatres should be large enough to be read at a distance and placed at a height that is convenient for wheelchair users to read. Text should be in a clear and uncomplicated typeface with a consistent thickness of stem, using upper case for the

first letter and lower case for the rest of the sentence in accordance with the recommendations in **9.2**.

The approach to the edge of a counter or desk should be direct and unobstructed.

Where waiting and queuing is the normal pattern of use, permanent or temporary control barriers should allow for wheelchairs to turn towards the counter or desk, to pass behind a person already in position at another window or desk, or to turn around and leave. A place should also be provided where one wheelchair can pass another.

NOTE 2 The provision of seating in a reception area can be beneficial to people who are unable to stand for long periods.

11.1.2 Space in front of a counter or reception desk

*COMMENTARY ON **11.1.2**.*
A knee recess accommodates the feet of wheelchair users and the footplates of their wheelchairs.

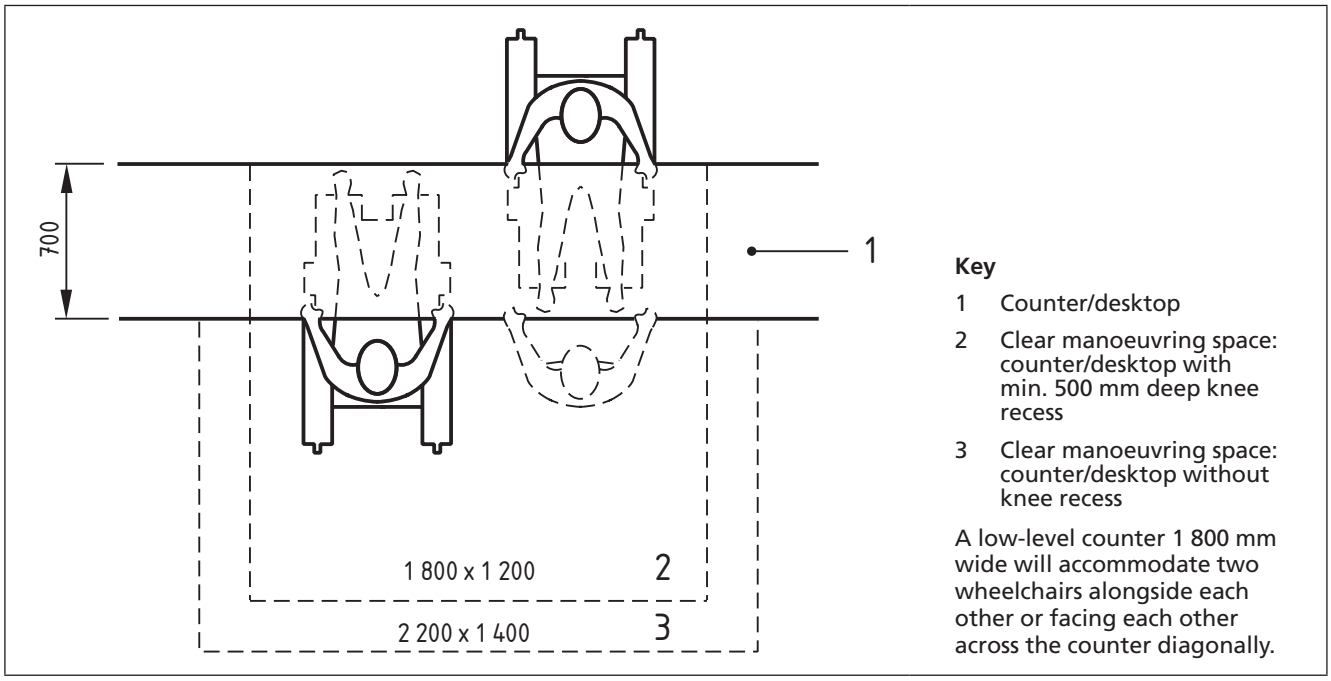
The clear manoeuvring space in front of a counter or reception desk, outside of any circulation route, should be:

a) 1 200 mm deep and 1 800 mm wide when there is a knee recess of at least 500 mm deep;

b) 1 400 mm deep and 2 200 mm wide when there is no knee recess (see Figure 28).

NOTE For details of reach ranges, including the dimensions of knee recesses, see Annex F.

Figure 28 **Space dimensions in front of a work surface**
Dimensions in millimetres



11.1.3 Counter and reception desk heights for visitors/customers

Where practicable, two work surface heights should be provided to accommodate customers or visitors standing and sitting (including wheelchair users), as appropriate to the circumstance (see Figure 29).

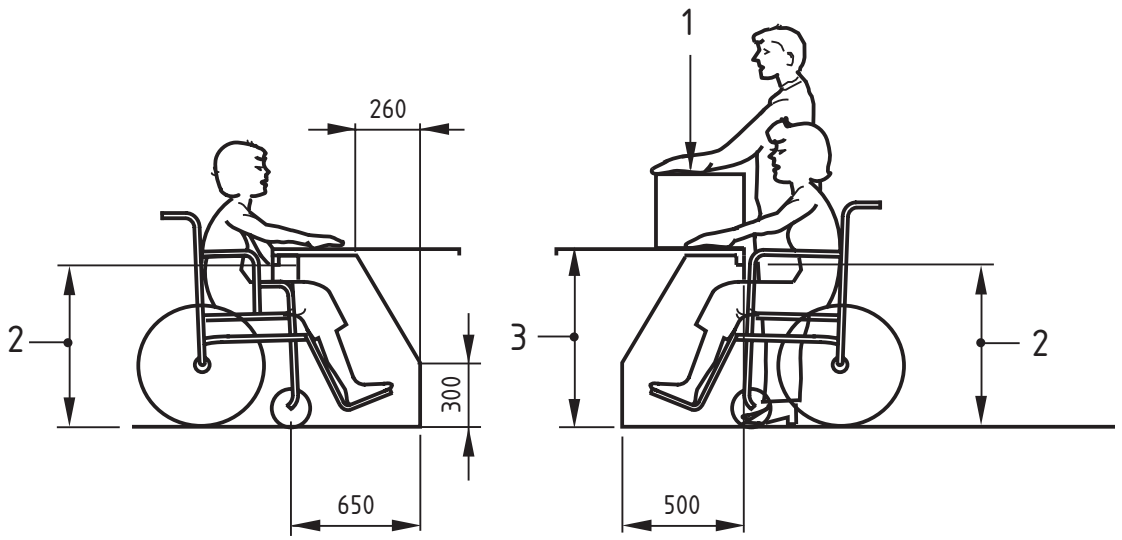
The lower level counter should extend for a distance of at least 1 500 mm, but 1 800 mm wherever practicable, to allow for two wheelchair users to be positioned side by side.

The level of reception desk and counter surfaces should be kept as low as practicable to avoid creating an undue barrier between the visitor and the receptionist.

NOTE 1 Possible options include a writing surface that slides out from a desk at a lower level than the counter or desk itself, a folding surface, or a counter whose height can be varied.

NOTE 2 To maximize accessibility, the floor level each side of the counter is the same. However, where the provision of security devices makes this difficult to achieve, alternative solutions might need to be adopted.

Figure 29 **Key heights of counters and reception desks**
Dimensions in millimetres



Receptionist side

The dimensions allow a receptionist using a wheelchair with desk armrests to sit close to a counter at normal desk height

Visitor/customer side

The dimensions allow a visitor in a wheelchair to bring the arms of their wheelchair to the edge of the counter in order to read and sign a paper

NOTE Profiling the space below a counter will allow a number of structural support solutions.

Key

1 Upper writing surface for standing visitors/customers at 950 mm to 1 100 mm above the floor
2 Height of knee recess 700 mm min. above the floor
3 Counter top at 760 mm max. above the floor

11.1.4 Counters or reception desks staffed by wheelchair users

A counter or reception desk should be capable of being staffed by a wheelchair user (see Figure 29).

Where it is desirable for the floor on the receptionist's side of a counter to be at a higher level than on the visitor's side, and sufficient floor space is available, a ramp with a gradient no greater

than 1:12 (see **8.2**) should be provided to allow a receptionist in a wheelchair to gain access.

NOTE 1 It is often desirable, e.g. in the case of a theatre box office, for the eye level of the receptionist, when seated, to be roughly equivalent to that of a standing visitor or customer.

NOTE 2 Where there is insufficient plan area to accommodate a ramp of the recommended gradient, a steeper ramp might be necessary on the understanding that the wheelchair user might need assistance.

11.1.5 Space below a counter or desk

The clear height from the floor surface to the underside of the counter or its support rail should be at least 700 mm, in circumstances where the activity can be carried out without the need for the armrest of a wheelchair to be under the work surface, or where a person is likely to have a wheelchair with desk arms (see Annex F).

The profile of the space beneath a counter or reception desk should be as shown in Figure 29 to accommodate footrests and knees and, where appropriate, armrests of wheelchairs (see also Annex F).

11.1.6 Height of work surface

A reception desk or counter should have a working surface height at two heights:

a) between 950 mm and 1 100 mm to accommodate people who are standing;

b) 760 mm to accommodate wheelchair users (see Figure 29).

NOTE Where there is sufficient space for a long reception counter, two different heights for standing people can be provided.

A high seat or stool should be provided so that people with limited standing ability can use both hands for a transaction.

11.1.7 Depth of work surface

Where a customer and a receptionist are opposite each other (and one is in a wheelchair), a minimum work surface depth of 700 mm should be provided (see Figure 28).

NOTE To avoid excessive depths of work surfaces, knee spaces for customers and receptionists, both wheelchair users, should not be arranged opposite each other.

11.1.8 Profile of work surface

Where tickets or coins are involved in transactions, an upward sloping leading edge should be provided at the front of a counter to help people with limited dexterity to grip coins.

11.1.9 Width of work surface at wheelchair user level

The width of low-level counters should be not less than 1 500 mm. Where practicable, the width of a low-level counter or reception desk work surface should be at least 1 800 mm to cater for wheelchair users.

NOTE This width allows space for a companion to sit beside a wheelchair user. It also allows wheelchair users on different sides of the counter to sit diagonally opposite each other when there are knee recesses.

11.1.10 Communication

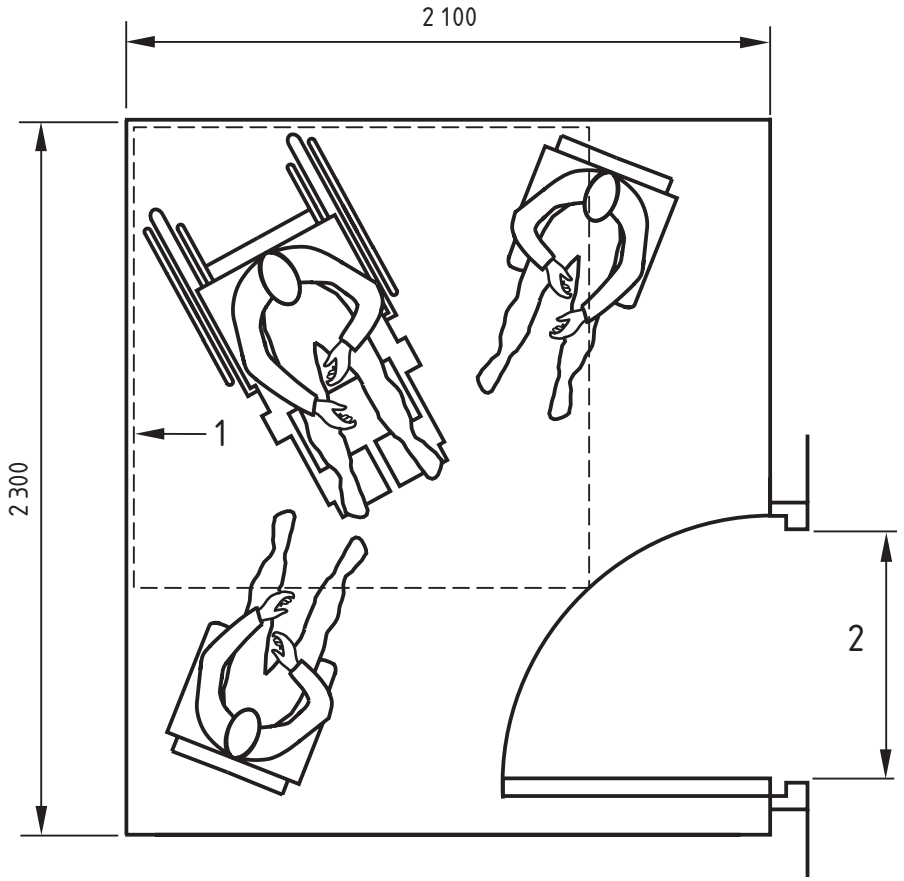
Where a glazed security screen is used above a counter or reception desk, an induction loop system, conforming to BS 7594 and the recommendations in **9.3.3**, should be provided in addition to standard amplification. It should be clearly indicated with the standard "T" switch symbol (see Figure 17). If multi-positions are appropriate, the induction loops should be spaced sufficiently apart so that there is no overlap of communication that could compromise confidentiality.

Where background noise is excessive, alternative communication aids (such as headsets and VDUs) should be made available.

A quiet area or interview room adjacent to the reception area will benefit visitors who are deaf or hard of hearing. This should be of sufficient size to accommodate an interpreter or communication support worker, and for a wheelchair user to manoeuvre in and out. The minimum dimensions of such a room should be as shown in Figure 30; these will need to be increased if a table is to be accommodated.

To facilitate lip reading, lighting design should ensure that both the receptionist's and the customer's faces are evenly lit. Security screens should be designed to ensure that reflections are avoided.

Figure 30 **Minimum dimensions of an interview room**
Dimensions in millimetres



Key

1 Wheelchair turning space (1 500 × 1 500) mm

2 Effective clear width (see **6.4.1**)

11.1.11 Acoustics

Where public address systems are installed near counters or reception desks, suitable ceiling, wall and floor materials should be used in accordance with the recommendations in **9.1.2**.

11.2 Seating in general waiting areas

*COMMENTARY ON **11.2**.*
The provision of sufficient space to manoeuvre and the design of individual chairs or seating are important factors to consider in the design of a building, if disabled people are to use the building independently. These factors are particularly important if the seating is used for long periods, e.g. at airports or in outpatients departments.

If a seat is too high or too low, or if there are no armrests or side supports, a person can experience considerable discomfort as a result of poor posture. A person might also have difficulty rising from a seated position if the seat is set too low, or if it has no armrests. Sitting on a slight slope can be very uncomfortable for wheelchair users.

*This subclause applies to general waiting areas on a level floor in public and commercial buildings, including reception areas, but excludes closely seated auditoria, e.g. theatres and cinemas, which are covered in Clause **13**.*

11.2.1 Provision of spaces for wheelchair users

The provision of space for wheelchairs, and increased spacing between rows in seating in general waiting areas, should reflect the numbers of wheelchair users and ambulant disabled people likely to use the building.

The floor of wheelchair spaces should be level.

11.2.2 Access

Access to seating in general waiting areas should be direct and unobstructed.

Seating areas should be located so that they are easily identifiable by blind and partially sighted people.

The clear space for access to seating designated for disabled people should be:

a) 900 mm minimum in front of a row of seats (1 200 mm where practicable), to allow access by people with crutches along a cross-aisle (see Figure 31);

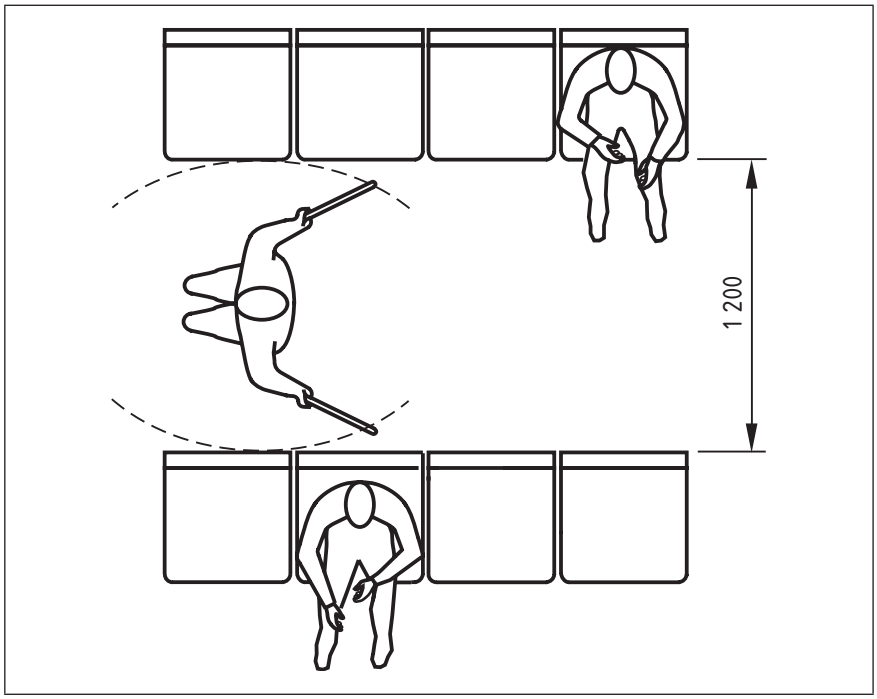
b) 1 050 mm wide by 2 300 mm deep to allow for manoeuvring a wheelchair into a designated space from a circulation route at right angles (e.g. between rows of seats) (see Figure 32).

NOTE 1 The clear space may be part of the general circulation/access route.

NOTE 2 These spaces for access may either be permanently allocated, e.g. if required for means of escape from fire, or created by means of easily removable seating, when required.

NOTE 3 The clear space allowance for a wheelchair user once in a parked position is 900 mm wide × 1 400 mm deep. The wheelchair spaces in Figure 32 are set out so that the person in the wheelchair and the person seated alongside are in line with each other.

Figure 31 **Space needed to allow access by people using crutches**
Dimensions in millimetres



11.2.3 Seating layouts

Seating layouts should allow the option of two wheelchair users sitting next to each other, or a wheelchair user sitting next to a user of standard seating, as a wheelchair user's companion might or might not be disabled.

One space (the size of a standard seat) within or at the end of a block of seating should be provided for an assistance dog to rest.

NOTE 1 Assistance dogs include guide dogs and hearing dogs.

A mixture of fixed and removable seats should be provided to accommodate different seating layouts and numbers of disabled people.

NOTE 2 The fire or licensing authorities might need to be consulted before providing removable seating.

11.2.4 Types of seating

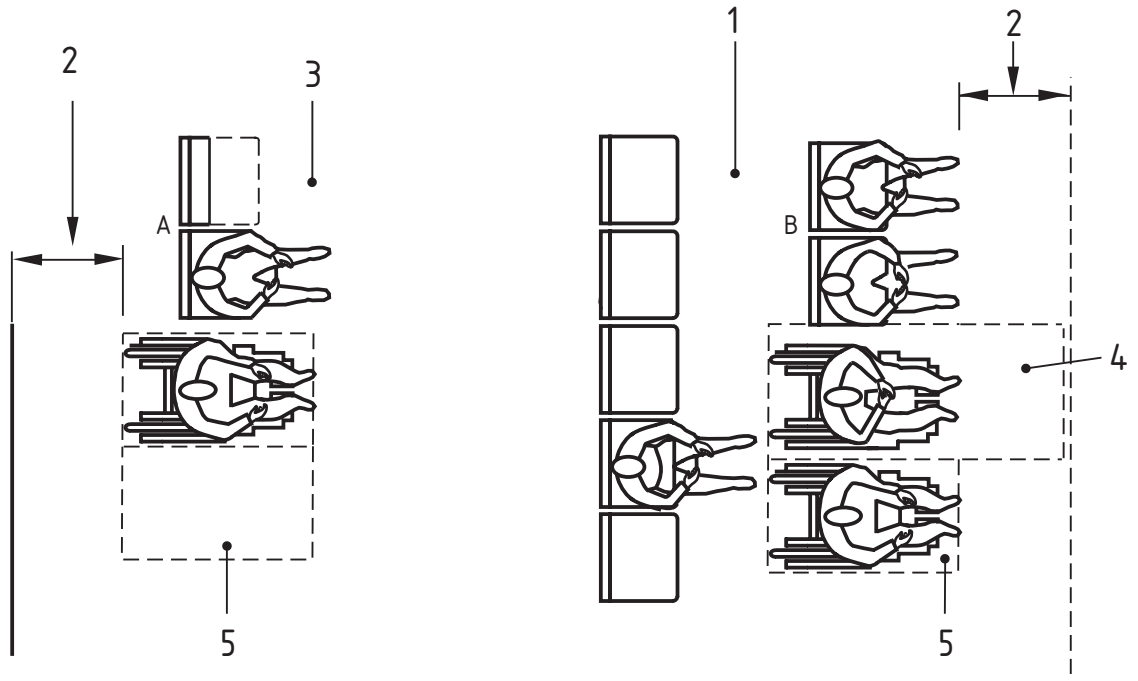
A mixture of seating options, e.g. fixed or removable, with or without arms, should be provided for customers or visitors to a building. Whenever feasible, seating should have cushions.

NOTE 1 Arm rests give additional support and help when standing and sitting. If some seats have fold-down arms, the needs of a greater number of people will be met.

The seat height, or the compressed cushion height, for fixed seating should be between 450 mm and 475 mm.

NOTE 2 Seat surface heights are crucial to the comfort of individuals if chairs are to be used for prolonged periods. A seat height slightly greater than the normal 450 mm is more convenient for people with restricted mobility.

Figure 32 **Spaces for wheelchair users in a general seating layout**
Dimensions in millimetres



a) Rear of seating area

b) Front of seating area

NOTE To achieve a more direct relationship between a wheelchair user and a person in adjacent standard seats, the seats at "A" have been moved back and seats at "B" have been moved forward. The wider access between rows will provide greater leg room.

Key

1 Greater leg room for people in standard seating
2 Unobstructed access of 900 mm min. (1 200 mm if practicable)
3 Space for assistance dog (with seat folded up)
4 2 300 mm × 1 050 mm wheelchair manoeuvring space where a wheelchair user needs to pass in front of other wheelchair users or seated people
5 900 mm wide × 1 400 mm deep space allowance for a wheelchair when parked

Where possible, seats of varied height and width, i.e. higher and/or wider than standard seating, should be provided for people of large stature or those with restricted leg movements.

NOTE 3 Perching seats, either fixed or pull-down, with and without backs, can be used as casual rest places in long circulation routes or in short stay waiting areas, as an alternative to standard seating.

If a perching seat is situated in a designated fire evacuation route, it should not reduce the effective width of the escape route.

11.2.5 Visual clarity and orientation

Seating should contrast visually with the surrounding surfaces (see Annex B).

Signs and public display screens in seating areas should conform to the recommendations in **11.4.8** and **9.2** for correct reading distances and text sizes.

If large rooms or spaces used as public waiting areas need to be broken down into smaller units, this should be done by an appropriate combination of physical division, lighting, furniture arrangements and floor coverings. Clear signs to the different areas or functions should be provided.

NOTE This approach is particularly appropriate in, for instance, a large outpatients department in a hospital with several reception desks, or a waiting area within a transport interchange.

11.2.6 Acoustics

In seating areas where public address systems are installed, suitable ceiling, wall and floor materials should be used in accordance with the recommendations in **9.1.2**.

11.2.7 Audible communication systems

Audible information given out by a public address system should also be available in visual form.

NOTE This is particularly important in, for example, transport termini, but it would also be of benefit in a doctor's surgery.

Where background noise is likely to be a prominent feature of a seated waiting area, an induction loop system, conforming to BS 7594 and the recommendations in **9.3.3**, should be provided and indicated by the standard "T" switch symbol (see Figure 17).

11.3 Audience seating

*COMMENTARY ON **11.3**.*
Good sight lines and lighting are especially important for people who are deaf and hard of hearing to interpret sign language adequately within a group setting. The conditions for lip reading are even more demanding.

*This subclause applies to audience seating, lecture theatres and conference facilities, on either flat or raked floors. It also includes small teaching spaces such as seminar rooms. It does not include recommendations on audience seating in closely seated auditoria, such as theatres. This is covered in Clause **13**.*

11.3.1 Provision of wheelchair spaces in audience seating

*COMMENTARY ON **11.3.1**.*
The provision of wheelchair spaces reflects the ability to use removable seating in small premises and the concept of reducing the proportion of wheelchair spaces to the total seats as seating capacity increases.

The provision of wheelchair spaces in audience seating should be as shown in Table 5.

*NOTE 1 For guidance on the provision of wheelchair spaces in sports stadia, see **13.7**.*

Designated wheelchair spaces should, where possible, be paired to enable a wheelchair user to be accompanied by another wheelchair user (see **11.2.3**). Where practicable, wheelchair spaces should be located next to standard seating to allow a companion who is not a wheelchair user to sit beside a wheelchair user.

NOTE 2 In fixed seating layouts, loose chairs may be used in these spaces when not occupied by wheelchairs, subject to means of escape requirements.

Table 5 **Provision of wheelchair spaces in audience seating**

Seating capacity	Provision of spaces for wheelchairs	
	Permanent	**Removable**
Up to 600	1% of total seating capacity	Remainder to make a total of 6
Over 600 but less than 10 000	1% of total seating capacity	Additional provision, if desired

NOTE Percentages need to be rounded up to determine the recommended number of spaces. For seating capacities of 10 000 or more, guidance is given in Accessible stadia: a good practice guide to the design of facilities to meet the needs of disabled spectators and other users *[26]. Specific guidance for sports facilities is given in* Accessible sports facilities *[11].*

Wheelchair spaces should be located in different parts of the auditorium to provide a range of vantage points, provided that view is unobstructed.

When the room is on a level floor and seating is not fixed, all parts of the room should be accessible to wheelchair users.

11.3.2 Access to audience seating

Seating allocated to disabled people should be on a direct route, free from obstructions and located so that it is easily identifiable by blind and partially sighted people. In new buildings, space should be provided nearby for storage of a wheelchair, for use if a wheelchair user wishes to transfer from their wheelchair to a seat.

Seating for disabled people should not obstruct participants, or other members of the audience.

The space for access to seating, including manoeuvring space for wheelchair users and ambulant disabled people, should conform to the recommendations in **11.2.2**.

Any ramp to a podium should be designed in accordance with **8.2**.

Where a podium is high, and there is no alternative, a lifting platform, visually and acoustically screened, should be provided.

11.3.3 Visual clarity and orientation

Seating should contrast visually with the surrounding surfaces in accordance with the recommendations in **9.1**.

11.4 Lecture and conference facilities

*COMMENTARY ON **11.4**.*
The accessibility and disposition of seating areas and related facilities is of critical importance for the effective interaction of teachers, trainers and performers with students and audiences.

Lecture and conference facilities, including their seating, that are difficult to reach and inconvenient to use, can be frustrating for people with restricted mobility. For example, the poor location and design of allocated seats or spaces can prevent participants obtaining the full benefit from an event.

As for audience seating, good sight lines and lighting are especially important for people who are deaf and hard of hearing to interpret sign language adequately within a group setting or to lip read.

Foreign language learning might require complete acoustic privacy in a self-contained booth.

11.4.1 Provision of wheelchair spaces in lecture and conference facilities

The provision of wheelchair spaces in lecture and conference facilities should conform to the recommendations in **11.3.1**.

11.4.2 Access to lecture and conference facilities

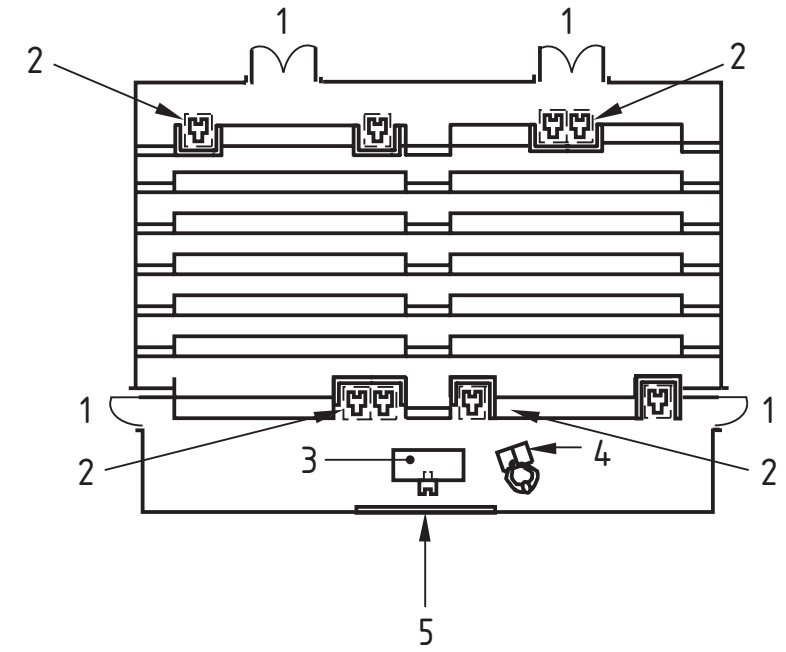
Access to seating in lecture and conference facilities should conform to the recommendations in **11.3.2**.

The routes between the main conference facilities and ancillary accommodation such as toilets, dining rooms, and bedroom suites (used for an extended stay at conference venues) should be fully accessible to wheelchair users and ambulant disabled people (see Clause **7**).

11.4.3 Design for raked floors

Where practicable, in a lecture or conference room with a raked floor, a choice of spaces for wheelchair users (or seating with extra space for people with limited mobility) should be provided. It should be ensured that disabled people are not segregated into special areas. An example of a lecture theatre layout is shown in Figure 33.

Figure 33 **Example of locations of wheelchair spaces in a lecture theatre**



Plan of a lecture theatre with a raked floor, showing eight wheelchair spaces

Key

1 In and out
2 Wheelchair spaces
3 Demonstration table
4 Lectern
5 Wall-mounted projection screen

With fixed but removable seating layouts, spaces for wheelchair users should either be permanently kept clear, or created by removing seats, when required.

NOTE 1 If retractable seating is used on a raked floor, it might be feasible only to provide accessible spaces on the lowest or highest tier. The provision of space on the lower tier is preferred in case people who are deaf and hard of hearing need to lip read.

NOTE 2 Seating layouts using loose seating give greater flexibility in accommodating spaces for wheelchair users, people of large stature, or people with restricted leg movements.

NOTE 3 Where permanent access needs to be maintained along all cross-aisles, and between rows of seats in fixed seating, it might not be possible for a wheelchair user to sit in line with a person in the adjacent standard seat.

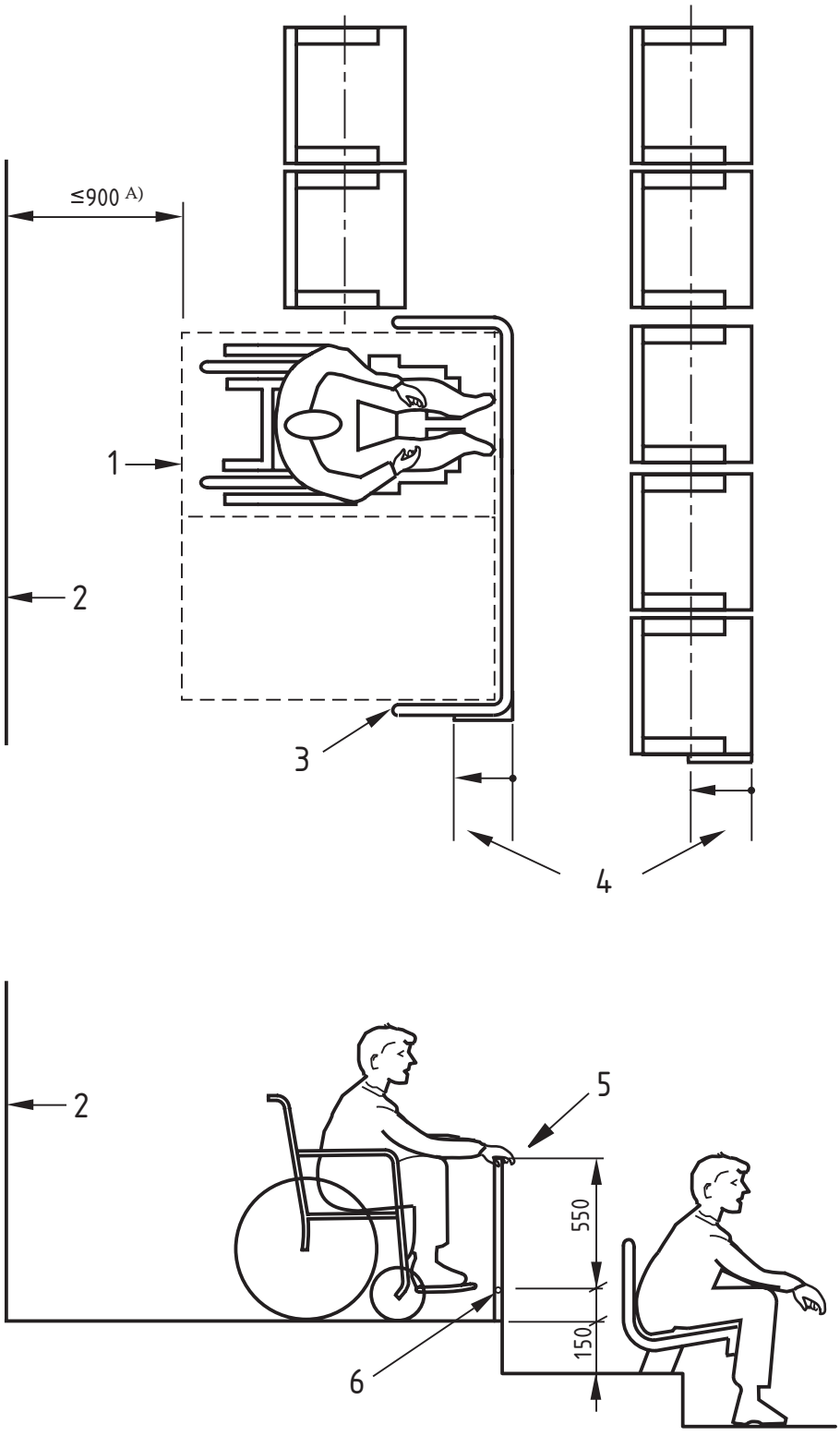
In lecture theatres and similar auditoria with raked floors, wheelchair spaces should have a handrail and toeboard located at any change of level where no barrier is provided by other means, such as other seating (see Figure 34).

Access routes on raked floors should have fixed handrails on adjacent walls.

NOTE 4 Where steps lead to raked seating, a handrail is needed only on the wall side, so as not to obstruct access to the seating.

The floor where wheelchair spaces are located should be level, as sitting on a slight slope can be very uncomfortable for wheelchair users.

Figure 34 **Guarding to wheelchair spaces at changes of level on a raked floor**
Dimensions in millimetres



NOTE The details shown relate to the plan arrangement in Figure 33.

Key

1 Wheelchair space allowance 1 400 mm × 900 mm
2 Wall or balustrading
3 Handrail and crash bar at change of level
4 Steps
5 Handrail
6 Toeboard at 150 mm above wheelchair floor level

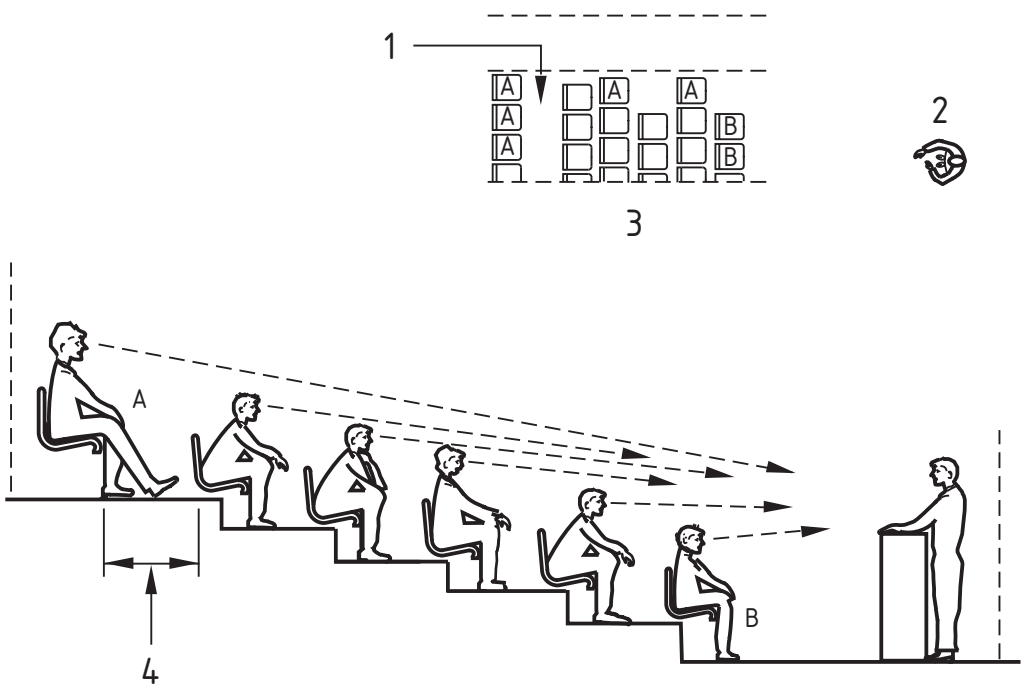
A) 1 200 mm preferred.

11.4.4 Sight lines

Sight lines should allow people to view projection screens and high-level electronic text devices, as well as people assisting with sign language.

The provision of adequate sight lines for people in fixed seating on a raked floor should be as shown in Figure 35.

Figure 35 **Maintaining sight lines with seating on a raked floor**



Key

1 Row with wider access [A)]

2 Speaker

3 Part plan of seating

4 Wider access [A)]

A Seating with wider access at rear of lecture room/auditorium/provides more leg space for people of large stature, or those with restricted leg movements. With several seats removed, the location is also suitable for wheelchair users. Seats with extra leg room can also be accommodated at the end of rows.

B Seating in the front row is preferred by people relying on lip reading or sign language, although distance is not so critical for the latter. People of small stature will benefit from sight lines being unobstructed by larger people. This location is also suitable for wheelchair users.

[A)] 1 200 mm will provide crutch users with easier access (see **11.2**).

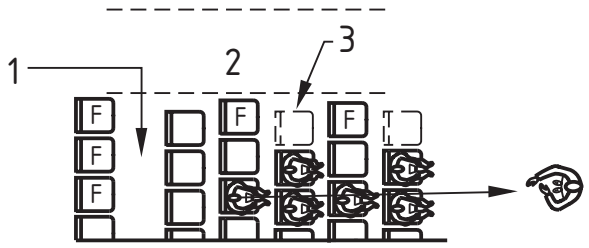
The provision of adequate sight lines for people in unfixed seating on a level floor should conform to Figure 36.

NOTE 1 In rooms with level floors that are used for entertainment, lectures or meetings, people who rely on lip reading or sign language are disadvantaged if they cannot see either the person who is addressing the audience, or the face and hands of a sign interpreter. A person of small stature, or a wheelchair user, might also be disadvantaged if they are not allocated spaces with clear views.

NOTE 2 For reading sign language, the viewer is best positioned in front of and within 45° either side of the direction the person is signing.

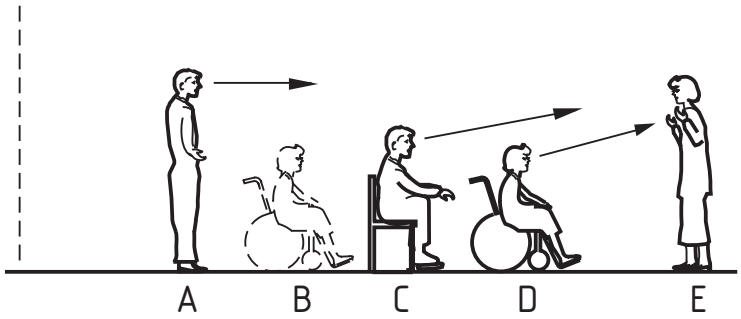
NOTE 3 For lip reading, the most effective distance between the speaker and the reader is between 900 mm and 1 800 mm.

Figure 36 **Sight lines for unfixed seating on a level floor**



Staggered seating offers more opportunity for positions with better sight lines. Seats marked "F" offer more leg room for tall people or those with restricted leg movements. (These seats could also be higher and wider.)

a) Part plan of seating



b) Sight lines for people standing and sitting

Key

1 Row with wider access
2 Side aisle
3 Seats removed
A Person standing
B Small person seated or a wheelchair user – in this position their view is likely to be restricted
C Person seated
D Seating in the front row is convenient for wheelchair users and people who rely on lip reading
E Sign language interpreter – face and hands should be clearly illuminated

11.4.5 Types of seating in lecture and conference facilities

The types of seating used in lecture and conference facilities should be in accordance with the recommendations in **11.2.4**.

11.4.6 Ancillary equipment in lecture and conference facilities

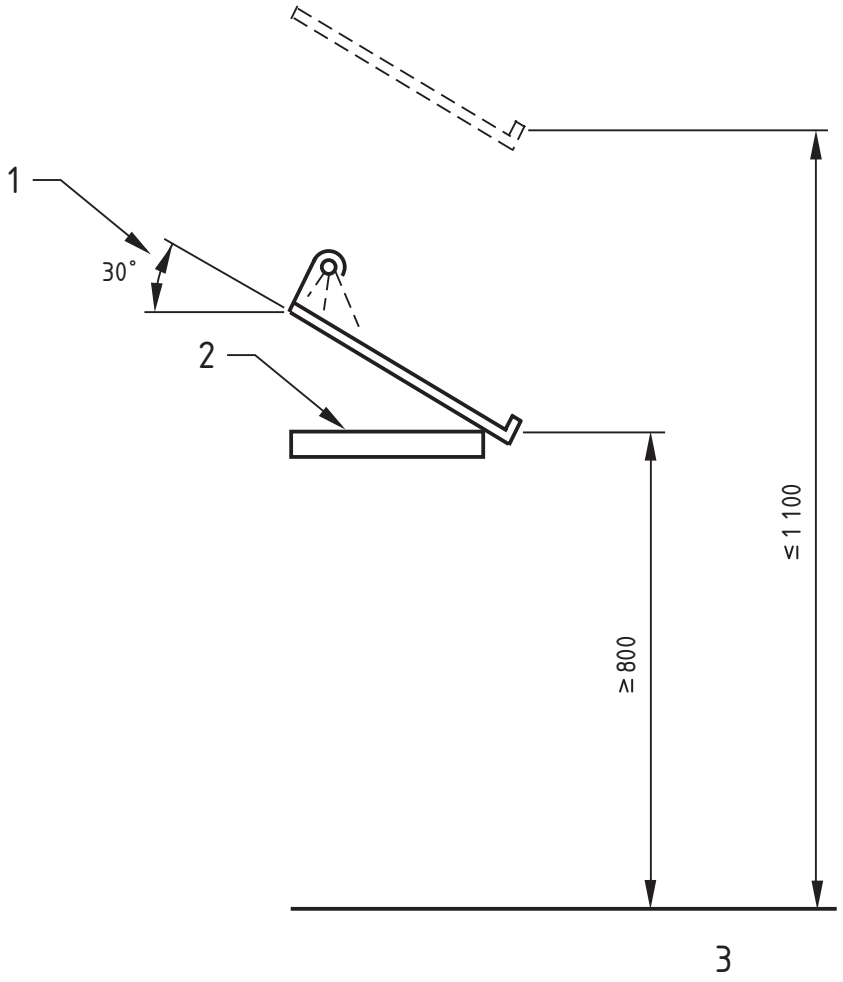
Lecterns should have a stable base, and should be designed such that the height of the reading surface is adjustable to enable participation by a wheelchair user or a person standing (see Figure 37).

A local light should be provided to illuminate the lectern's reading surface. Where appropriate, the speaker's face should be lit for the benefit of lip readers in the audience.

When the lights in lecture and conference facilities are low, any sign language interpreter should be separately lit.

The height of the top surface of an overhead projector, or the height of a keyboard when a computer is used for image projection, should be no higher than 800 mm above the floor (see Figure 37).

Figure 37 **Lectern and associated equipment heights**
Dimensions in millimetres



Key

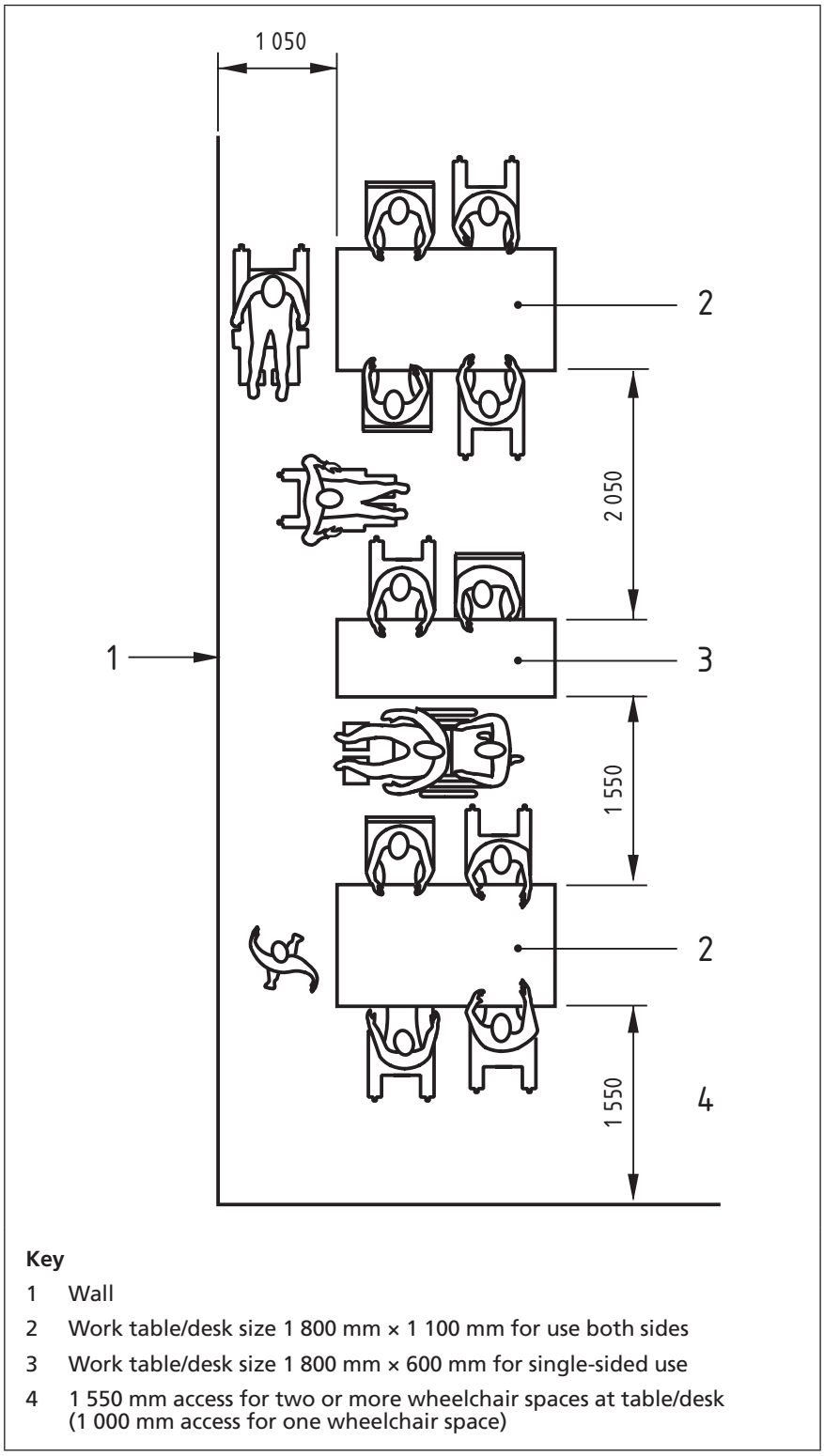
1 Angle of lectern surface
2 OHP surface or computer keyboard to be no higher than 800 mm
3 Lectern to be adjustable across the range 800 mm to 1 100 mm

11.4.7 Study spaces

The minimum space between rows of desks to accommodate wheelchair users should be as shown in Figure 38.

The height of a fixed desk surface should be between 730 mm and 750 mm, with the clear height under the desk of at least 700 mm. Where feasible, adjustable height desks should be provided.

Figure 38 **Recommended spaces between study tables/desks**
Dimensions in millimetres



Key

1 Wall
2 Work table/desk size 1 800 mm × 1 100 mm for use both sides
3 Work table/desk size 1 800 mm × 600 mm for single-sided use
4 1 550 mm access for two or more wheelchair spaces at table/desk (1 000 mm access for one wheelchair space)

11.4.8 Reading distance and size of lettering

Seating areas in lecture and conference facilities and their relationship to signs should conform to the recommendations in **9.2** with regard to reading distances and text sizes.

Where projected images are used in lecture and conference facilities, seating layouts should be flexible enough to allow people who have sight problems to sit close to the screen.

11.4.9 Visual clarity and orientation

Seating in lecture and conference facilities should contrast visually with the surrounding surfaces in accordance with the recommendations in **9.1**.

11.4.10 Acoustics

Where public address systems are installed in the seating areas of lecture and conference facilities, materials for the ceiling, wall and floor should be chosen having regard to their sound absorption characteristics (see **9.1.2**).

12 Individual rooms

12.1 Kitchen areas

*COMMENTARY ON **12.1**. Bringing food preparation, cooking areas and appliances within the reach of most people with restricted movement is the key factor to consider in the arrangement of kitchen areas and their fittings.*

It is particularly difficult to cater for users with a wide range of needs in kitchen areas. Compromise and care in the choice and design of facilities are crucial. If appropriate, two sets of facilities, e.g. two adjacent sinks, at heights suitable for wheelchair users and ambulant disabled people, provide maximum versatility.

As the height, depth and extent of the clear space below a work surface affect reach, they have a major impact on how easily a wheelchair user can use a kitchen. The clear space below a work surface also influences how much unobstructed main floor space is needed for wheelchair users to move easily from one task area to another.

Carefully chosen lighting and finishes, as well as kitchen fittings and appliances chosen to contrast in colour with their backgrounds, not only create a safe environment for partially sighted people but also one that is attractive for all users.

The recommendations given in this subclause apply to self-catering kitchen facilities in non-residential buildings (such as shared refreshment facilities in commercial buildings or offices, community buildings and community centres, self-catering accommodation or hospital accommodation for relatives of in-patients, premises for hire and day centres), and to catering facilities in residential buildings, such as university and college halls of residence and nursing or residential homes. The recommendations also apply to existing buildings where practicable.

The recommendations do not apply to commercial kitchens.

12.1.1 Accessible routes

Where a kitchen area suitable for wheelchair users and ambulant disabled people is provided in a building, it should be located on an accessible route that is direct and obstruction-free.

12.1.2 Floor space and knee recesses for wheelchair users

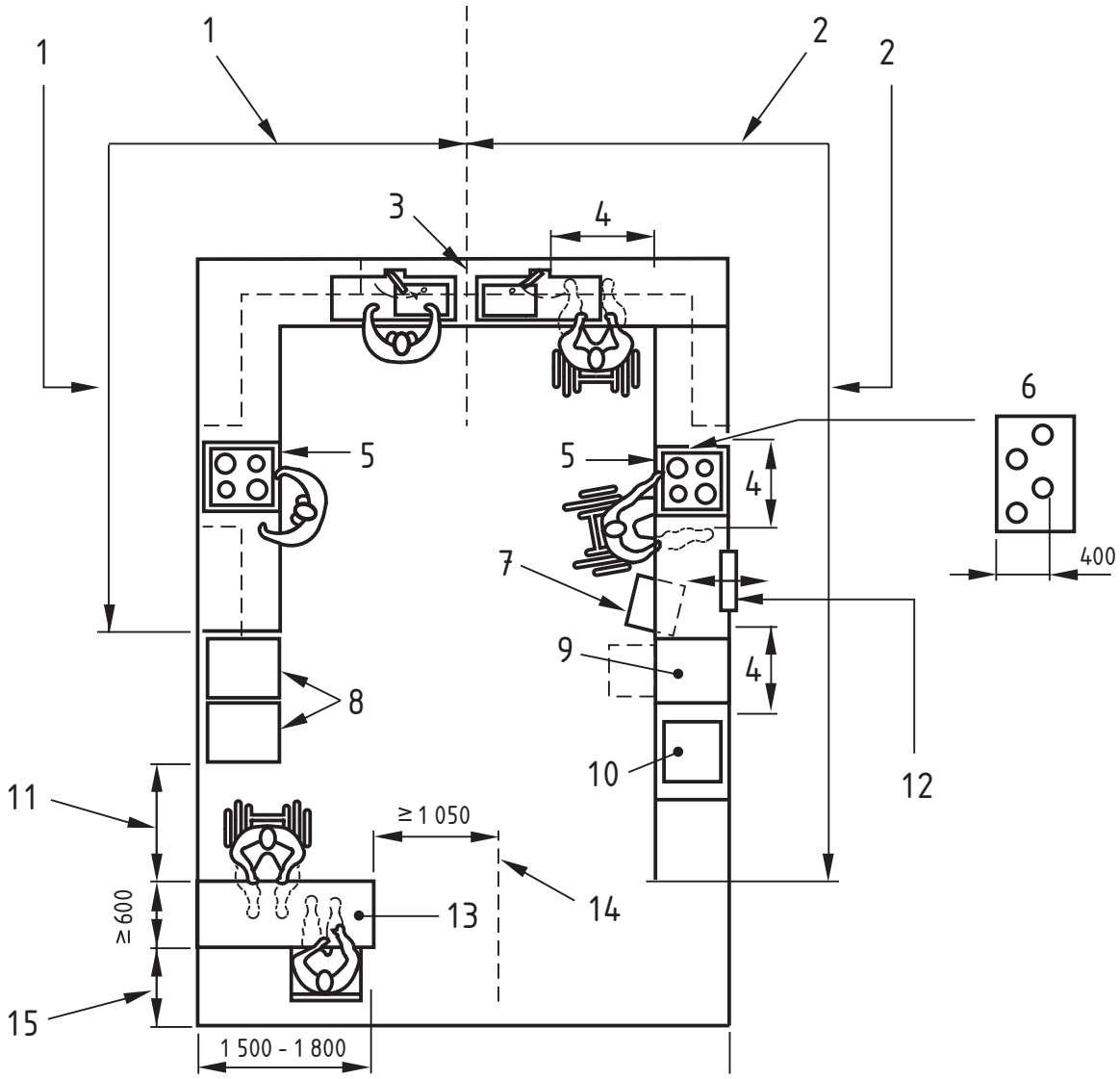
A kitchen area should have an unobstructed floor space of at least 1 500 mm × 1 500 mm between facing floor units or between floor units and a wall.

Where possible, an unobstructed space or knee recess, at least 600 mm wide, should be provided to one side of kitchen appliances such as refrigerators, washing machines, freezers or ovens.

A knee recess the depth of the work surface and at least 800 mm wide should be provided below or adjacent to each key task area, such as hobs, sinks and preparation spaces, as shown in Figure 39 and Figure 40. Where a knee recess is provided under a hob, its underside should be insulated to avoid harm to a person who has little or no feeling in their legs.

NOTE The extent to which knee recesses can be provided will depend on the amount of floor-mounted cupboard space required. The side on which a knee recess is located is determined by the handing of the appliance doors and controls.

Figure 39 **Kitchen and work surface layout in a kitchen for shared use (with dual height work surfaces)**
Dimensions in millimetres



Key

1 Work space suitable for ambulant people: 900 mm height work surface with cupboard units below and wall units over

2 Work space suitable for wheelchair users: 760 mm height work surface with clear space below (wall units optional)

3 Change of level

4 Knee recess with 800 mm min. width to be used between floor-mounted cupboards

5 Hob

6 Alternative hob arrangement reduces reach needed, and allows safer pan removal

7 Mobile storage unit

8 Separate refrigerator and freezer, both on plinths

9 Oven

10 Microwave oven

11 1 050 mm min. for wheelchair user to manoeuvre into position

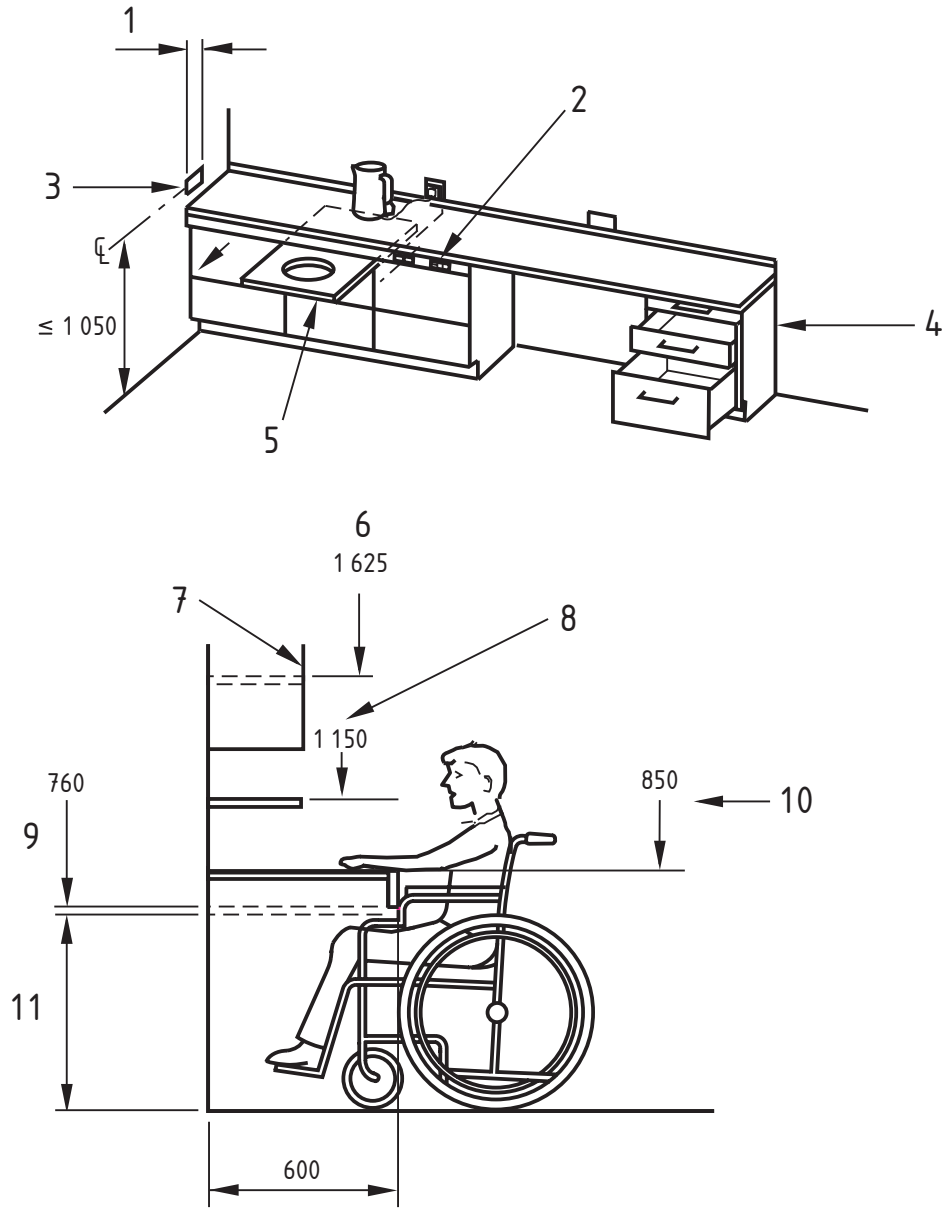
12 Serving hatch to a separate dining room

13 Table

14 Obstruction (e.g. wall, kitchen unit or appliance)

15 800 mm min. for ambulant disabled person to be able to sit at a table

Figure 40 **Work surfaces and accessories**
Dimensions in millimetres



NOTE The drawing shows the use of a wheelchair with desk arms.

Key

1 Power sockets on side wall 150 mm max. back from the front of worktop
2 Isolating switches controlling sockets on rear wall above knee recess
3 Switched socket outlets 150 mm above work surface on side wall
4 Cabinet with deep pan drawers
5 Pull-out board above floor-mounted cupboard unit
6 Max. height reachable by ambulant disabled people
7 Standard location of wall cupboards
8 Maximum shelf height to allow reach from a wheelchair
9 Height of work surface specifically for wheelchair users
10 Height of work surface for a shared refreshment facility
11 Clear height 700 mm min. for knee recess

12.1.3 Work surfaces

12.1.3.1 Work surface layout and work sequence

*COMMENTARY ON **12.1.3.1**.*
A logical work sequence and efficient use of space are important considerations for people with restricted movement, as they prevent fatigue caused by unnecessary travel between areas for food storage and preparation, cooking, and utensil cleaning.

A work surface should be continuous where possible, and designed so that travel is minimized, for wheelchair users in particular, between the sink, hob/oven, refrigerator and other appliances or task areas. There should be a smooth transition between the work surface, hob and drainer so that wheelchair users or anyone with a poor grip can slide rather than carry objects from one task area to another

NOTE An L or U shaped worktop layout allows for a more compact working sequence than an in-line (galley) or parallel worktop layout.

12.1.3.2 Dual height work surfaces for a self-catering kitchen used by wheelchair users and people standing

Where space is available, and the kitchen is intended for use by wheelchair users and ambulant disabled people who occupy the same residential accommodation and cater for themselves, work surfaces, sinks and, if possible, hobs should be provided at different levels, as follows:

a) 900 mm for people standing;

b) 760 mm for wheelchair users (see Figure 39 and Figure 40).

NOTE The use of an adjustable height work surface gives greater flexibility.

12.1.3.3 Single height work surface for a kitchenette or refreshment area shared by wheelchair users and people standing

Where a facility is provided for making refreshments and heating pre-cooked meals only, e.g. in employment buildings and catering facilities for hire by the general public or catering firms, a single work surface height of 850 mm, which allows use by both wheelchair users and ambulant people, should be provided (see Figure 40 and Figure 41).

NOTE In multi-storey buildings, it is preferable for the layout of such facilities to be handed on alternate floors.

12.1.3.4 Variable height work surfaces for self-contained self-catering accommodation designated for disabled people

For self-contained self-catering residential accommodation (e.g. hostels or chalets in leisure parks), which is designated for ambulant disabled people and wheelchair users, and where occupancy changes on a regular basis, work surfaces should be provided at heights of between 750 mm and 900 mm. This can be achieved in various ways, including:

a) designing a range of different work surface heights across the stock of designated accommodation;

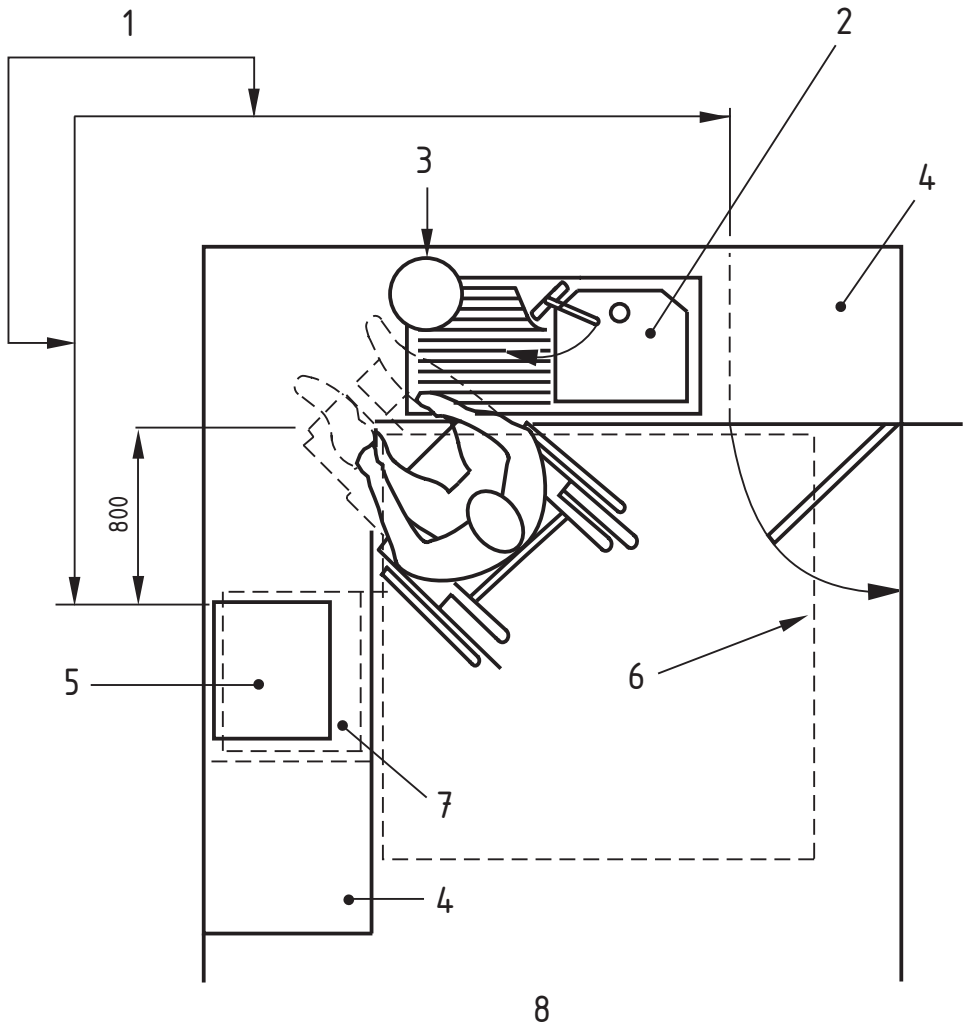
NOTE 1 Where a range of different heights of work surface is provided, it is the responsibility of management to match users to the most appropriate accommodation.

b) using a system of easily adjustable work surfaces to accommodate the specific requirements of a disabled person.

NOTE 2 Work surfaces can be readily adjusted electrically or manually or changed without excessive disruption between tenancies or ownership.

Storage units and services to sinks should also be adjustable, with storage units provided as mobile units.

Figure 41 **Layout of shared refreshment facility**



Key

1 Clear space under worktop
2 150 mm deep sink bowl
3 Water heater (may be freestanding subject to safety requirements)
4 Floor unit
5 Microwave oven
6 Wheelchair turning space (1 500 × 1 500) mm
7 Refrigerator under worktop
8 Work surface 850 mm above floor level

12.1.3.5 Work surface depth

*COMMENTARY ON **12.1.3.5**.*
A wheelchair user's knees and feet are accommodated when the space below the work surface is kept clear of floor-mounted cupboard units, equipment, support brackets and legs.

A work surface should be not more than 600 mm deep as shown in Figure 40, with occasional knee recesses with reduced work surface depth to allow wheelchair users to reach as far as possible over the work surface in the preparation area and to reach switched socket outlets on the back wall. The front edge of the work surface should have a rounded profile.

12.1.3.6 Work surface accessories

*COMMENTARY ON **12.1.3.6**.*
Where circulation space and floor-mounted cupboard space is at a premium, and an accessible work surface for all kitchen tasks is not possible, pull-out boards provide supplementary accessible work surfaces for wheelchair users. Pull-out boards may be usefully located adjacent to a hob, oven or refrigerator.

If pull-out boards are required when floor-mounted cupboard units restrict access for wheelchair users over the work surface, they should be fitted immediately below the work surface (see Figure 40).

If fitted, at least one pull-out board should be provided with a circular cut-out, finished with rubber beading, so that people with poor grip or coordination can secure an object, such as a mixing bowl, that normally requires steadying with one hand.

A pull-out board should be accessible by a person with limited grip, and should contrast visually with the background against which it is seen to ensure that it can be seen by a blind or partially sighted person if it is left in the "out" position

12.1.4 Storage units accessible to wheelchair users

A number of floor-mounted cupboard units, with banks of drawers, should be provided as they enable side access for wheelchair users if a kitchen area is limited and base units are required to maintain storage at an acceptable volume.

NOTE 1 A floor-mounted cupboard unit used at a corner return may be fitted with a carousel mechanism for gaining easy access to items stored out of reach.

NOTE 2 Where space is limited, a moveable trolley consisting of drawers or open containers can be useful for wheelchair users, providing flexible and accessible storage in place of a fixed floor-mounted cupboard unit. A moveable trolley provides supplementary storage space accessible from all sides from a seated position. When not in use, it can be stored under a work surface. When access to the work surface is required, the trolley is temporarily wheeled aside.

To be fully accessible by a wheelchair user, any shelving above a work surface should be no higher than 1 150 mm above the floor as shown in Figure 40.

12.1.5 Cupboard unit door and drawer hardware

Cupboard unit door and drawer handles should be easy to grip.

NOTE 1 In a shared kitchen facility, it is an advantage if door pulls of high-level wall cupboards are positioned towards the bottom of the door.

Sliding doors and drawers should be capable of being operated with limited force when operated from the front or side.

Cupboard unit doors should swing open through 180°.

NOTE 2 A cupboard door with a 90° opening is a hazard, especially for blind and partially sighted people. A door with a 180° opening is not a hazard, and does not restrict access in front of it.

12.1.6 Kitchen sink and taps

*COMMENTARY ON **12.1.6**.*
A wheelchair user or ambulant disabled person with a poor grip will be able to operate a lever tap by using the flat of the hand, a closed fist or the wrist. A swivel neck allows the outlet to be located over an adjacent work surface or drainer that supports pans and kettles while filling. It is difficult for many wheelchair users to operate a mixer tap safely if it is located centrally behind the sink bowl.

A sink bowl to be used by a wheelchair user should preferably be 150 mm deep to enable easy reach of immersed items.

NOTE 1 When used in conjunction with a work surface shared by ambulant disabled people and wheelchair users, the shallow sink provides clearance for a wheelchair user's knees.

The underside of an exposed sink bowl and any exposed hot water pipes and wastes should be heat insulated to avoid the possibility of knee and leg injuries caused by hot surfaces.

Taps should have clear markings to indicate hot and cold settings, and should have a lever operation. They should be fitted to the sink within easy reach of wheelchair users, if necessary at the side of the sink bowl.

In a kitchen where water can be emitted at a temperature greater than 43 °C, a warning notice should be displayed clearly.

Where particular care is needed for people who are insensitive to temperature and who are therefore at risk of being scalded, a control mechanism should be provided to limit water temperature to 43 °C.

NOTE 2 The temperature of water circulating in the pipework needs to be at least 60 °C to avoid the risk of legionella.

12.1.7 Kitchen appliances

12.1.7.1 Hobs and individual cooking rings

A hob should:

a) be located near the oven, with a preparation area between it and the oven;

b) have a heat-resistant work surface on at least one side, but preferably both sides, to provide a support surface for pans;

c) be insulated on the underside if located above a knee recess;

d) have a means of indicating (if electric) that the rings are hot;

e) have controls that are either at the front of the burners, or mounted in a deep fascia at the front edge of the work surface.

A hob's controls should be easy to locate and the settings should be easy to identify and operate.

Where necessary to cater for people with severely restricted reach, an alternative arrangement of individual cooking rings, with the furthest edge of the cooking ring not more than 400 mm from the front edge of the work surface, should be provided, as shown in Figure 39.

NOTE Cooking rings that are located behind others are of limited use to people with limited reach.

Where gas rings are used, they should be self-igniting.

12.1.7.2 Oven units

*COMMENTARY ON **12.1.7.2**.*
A drop-down oven door or a pull-out shelf eases the transfer of items from the oven to a trolley or wheelchair tray and then, if required, to the work surface.

Some wheelchair users prefer an oven with a drop-down door. Others find an oven with a side-hung door more acceptable. A knee space below an oven can be beneficial for some wheelchair users.

Some wheelchair users might prefer the level of the drop-down door to be at a lower level than the work surface, e.g. with the mid shelf of the oven at work surface level.

Where an oven unit with a side-hung door is used, slide-out shelves or a pull-out board, directly beneath the oven, are generally strong enough to support a heavy cooking vessel. Oven units with slide-out shelves that are capable of carrying the weight of cooking vessels are beneficial for wheelchair users and ambulant disabled people.

Oven units in a kitchen to be used by wheelchair users and ambulant disabled people should be chosen to facilitate easy transfer of cooking vessels from the oven to an adjacent work surface.

If an oven unit has side-hung doors, they should open to 180°. The swing of an oven door should not impede access by wheelchair users (see Note 2 to **12.1.5**).

Oven units intended for use by wheelchair users should be located so that either the level of the drop-down door or the surface of the pull-out board is at 760 mm above the floor. Oven units intended for use by ambulant disabled people with back impairments should be installed with the base of the oven interior no lower than 850 mm.

Controls for an oven and grill intended for use by wheelchair users should be no higher than 1 050 mm and no lower than 700 mm from the floor, with display panels no higher than 1 200 mm from the floor.

The markings of the controls should be clear and easy to understand and their design should enable them to be operated by people with limited dexterity.

Microwave ovens should either be located on a work surface or mounted so that the base of the oven is no higher than 850 mm from the floor and its controls no higher than 1 150 mm from the floor.

12.1.7.3 Other kitchen and laundry appliances

Where a refrigerator and/or freezer (excluding chest freezers) are intended for use by wheelchair users, they should be fitted as separate units on a plinth approximately 200 mm high. The swing of a side-hung door should not impede access by wheelchair users.

NOTE The highest and lowest shelves of a standard floor-standing combination fridge-freezer will not be accessible for most wheelchair users.

Where a front-loading washing machine and front-loading tumble dryer are intended for use by wheelchair users, they should be installed on a plinth with their bases set at 200 mm above floor level.

If a dishwasher is intended for use by wheelchair users, it should be installed on a plinth with its base set at approximately 200 mm above floor level.

A water heater should, wherever possible, be installed as a free-standing unit with controls no higher than 1 200 mm from the floor. If installation of a water heater above a work surface is unavoidable, it should be located so that the controls are no higher than 1 150 mm from the floor.

If ironing facilities are intended for use by wheelchair users, a folding wall-mounted ironing board, with height adjustment, should be provided in conjunction with an adjacent socket outlet.

12.1.8 Switches, sockets and controls

*COMMENTARY ON **12.1.8**.*
Switches can be arranged to operate moveable appliances plugged into sockets located at the back edge of a work surface, and to operate fixed appliances such as washing machines, ovens and cooker hoods.

Where a clear space has been provided beneath a work surface, switched socket outlets should be positioned on the wall at the back of the worktop, with their centre line no higher than 1 050 mm from floor level. This maximum height relates to the maximum height standard work surface of 900 mm and will be proportionally lower for a lower work surface.

Where no space has been provided beneath a work surface, switched socket outlets should be positioned on a return wall at the end of the work surface at 150 mm above the work surface and not more than 150 mm back from the front edge of the work surface. Isolating switches controlling socket outlets should be positioned on a fascia, as shown in Figure 40. Only switches should be located on a front fascia.

Switches and controls in kitchens, where mounted on a wall without an intervening work surface or counter, should be fully accessible to wheelchair users and be mounted with their centre lines between 750 mm and 1 200 mm from floor level.

Work surface light switches should be located on a wall remote from the light fittings for easy access by those with limited reach, e.g. adjacent to the main light switch.

Controls for general kitchen appliances other than ovens should be no higher than 1 200 mm, or 1 150 mm if it is necessary to reach across a work surface to operate them.

12.1.9 Heat emitters

Heat emitters should not restrict the recommended circulation spaces in a kitchen (see **12.1.2**).

Surfaces of heat emitters should either be screened to prevent burns, or kept at a temperature not exceeding 43 °C.

12.1.10 Alarm systems

The signal emitted by a fire alarm should be both visible and audible to warn blind and partially sighted people, and people who are deaf and hard of hearing.

Where an emergency assistance alarm system is installed in a kitchen, it should conform to the recommendations in **9.3.7.2**.

12.1.11 Refreshment and dining areas – Dining spaces for wheelchair users

*COMMENTARY ON **12.1.11**.*
Wheelchair users need easy access to take their cooked meals from the kitchen area to a shared dining area.

Priority seating should be provided for disabled people in all refreshment and dining areas in buildings visited by the general public. In large dining areas, the table layouts should provide for more than one accessible location to give people choice. Routes to collect food and dispose of waste should also be accessible.

Wheelchair access should be provided to the full length of self-service counters and till areas.

Fixed seating at tables and table supports should not impede access to the table or prevent its use by one or more wheelchair users without removing footrests.

The provision of dining spaces associated with kitchens should be as follows.

a) When a dining area is designed to be part of a kitchen, it should accommodate all potential users.

b) When a dining area is designed to be separate from a kitchen, space should be provided for two people to eat together informally in the kitchen from a table whose surface is no higher than 760 mm and whose vertical knee hole space is no less than 700 mm.

c) A serving hatch should be provided at the rear of a wheelchair work surface, and level with the work surface, to link directly with any separate dining area.

12.1.12 Finishes for kitchen and dining space surfaces

Cupboard units and work surfaces should contrast visually with background finishes to help blind and partially sighted people identify the differences between them.

Flooring should be slip-resistant and contrast visually with wall surfaces.

NOTE Guidance on the slip resistance of different floor finishes is available in Annex E.

Shiny floor and wall surfaces should be avoided as they can produce reflections and glare that confuse blind and partially sighted people.

Bold patterns should not be used on floors and walls, as they are confusing for blind and partially sighted people.

12.1.13 Lighting of kitchens

The maintained illuminance (or general lighting level) of a kitchen should be in the range 200 lux to 300 lux, at work surface level, without giving rise to glare, reflections, or shadows on the work surfaces and sink.

Room lighting and task lighting should be designed to provide a clear definition between work surfaces and manoeuvring spaces, with task lighting at work surfaces having a higher illuminance than the ambient room lighting.

When designing daylit kitchen areas, appliances should be located so as to avoid reflections due to bright sunlight from polished stainless steel sinks, drainers, splashbacks and cookers.

Fluorescent lights with electronic ballasts should be used on low ceilings and on walls, as inductive chokes can cause interference to hearing aids. Electronic ballasts should be high frequency to avoid any perception of flicker.

12.2 General recommendations for sanitary accommodation

*COMMENTARY ON **12.2**.*
Within bathrooms, showers, changing areas and toilet accommodation, there are a number of common features that contribute to the accessibility of these spaces to disabled people. To avoid repetition, details of these are described in this subclause.

12.2.1 Accessible routes and minimum room spaces

Sanitary accommodation for disabled people should be located on accessible routes that are direct and obstruction-free. The minimum room spaces shown in the figures associated with sanitary accommodation should not be encroached upon by building services and service ducts.

12.2.2 Provision

Where only one en-suite bathroom, shower room, changing room or WC compartment can be provided, it should be a unisex type, preferably designed for right-hand transfer. Where more than one unisex facility can be accommodated, a choice of left-hand and right-hand transfer layouts should be provided. For more detail on the provision and location of toilet accommodation, see **12.6.1**.

The following fittings and amenities should be provided in sanitary accommodation where indicated in **12.3** to **12.6** and the associated figures.

12.2.3 Washbasins, taps and hot water supply

Large washbasins should not have a pedestal and should be of a size that allows washing and rinsing of hair.

NOTE 1 Such a size is suitable for a person to use from a wheelchair.

NOTE 2 A height-adjustable washbasin will allow more flexible use.

Taps should either be mixer taps with a single lever action to control water flow or individual, clearly marked, hot and cold lever-operated taps with not more than a quarter turn from off to full flow. The markings on taps, shower controls etc. should be logical and clear to blind and partially sighted people.

NOTE 3 A disabled person with a poor grip will be able to operate a single lever action mixer tap or an individual lever action tap by using the flat of the hand or the wrist.

NOTE 4 A water supply activated automatically by placing hands under the tap is an alternative solution.

Hot water from individual bath and basin taps should be thermostatically controlled so that it does not exceed 43 °C at the outlet. Hot water pipes and wastes should not be exposed, in order to avoid the possibility of injuries caused by hot surfaces. If they are boxed in, the boxing should not impinge upon the recommended reach and circulation spaces.

NOTE 5 The temperature of water circulating in the pipework needs to be at least 60 °C to avoid risks of legionella.

Access to the washbasin should not be restricted by mixer valves and waste pipes.

NOTE 6 It might be necessary for pipework to be concealed behind panelling, provided it does not impinge upon the minimum room dimensions.

12.2.4 Fixed grab rails and drop-down support rails

Fixed grab rails, whether vertical or horizontal, should be 32 mm to 35 mm in diameter fixed, with a clearance between the bar and the wall of 50 mm to 60 mm, with a surface that provides a good grip when wet.

Drop-down support rails should be held securely when in a upright postion. They should also be capable of being released easily when required in a horizontal position. Preferably, drop-down support rails should not be fitted with support struts as they can impede access. If support struts are used, they should be set back from the front edge of the rail by at least half its projection from the wall so as not to impede wheelchair access.

The wall construction and the fixings used to support drop-down support rails and fixed grab rails should be capable of resisting the vertical and horizontal loads exerted by users when they raise or lower themselves or when they pull themselves to a standing position.

NOTE 1 The Good loo design guide *[27] recommends that drop-down rails be capable of supporting a load of 171 kg applied both vertically and at 45°.*

The wall construction should allow a secure fixing of grab rails in any position on the wall if it is necessary to change their original position to suit the changing needs or the specific requirements of an individual.

NOTE 2 Suitable fixings need to be chosen carefully, in conjunction with the specialist grab rail supplier and fixings manufacturer, according to the nature of the background wall construction.

*NOTE 3 For details of support rails and grab rails associated with WCs, see **12.6.3.5**.*

12.2.5 Clothes hooks and towel rails

Clothes hooks should be located at a height of 1 400 mm and 1 050 mm to allow use by ambulant disabled people and wheelchair users respectively.

Where a non-heated towel rail is required, a grab rail should be used for the purpose so that it can be used also for support. If a towel rail is heated, its surface should be kept at a temperature not exceeding 43 °C.

12.2.6 Doors to sanitary accommodation

*COMMENTARY ON **12.2.6**.*
An outward-opening door is particularly useful for people with limited mobility or impaired balance. Also, a person in distress or someone who has collapsed against the door within the compartment can more easily and quickly receive assistance if the door opens outwards.

Rising butt hinges can assist wheelchair users to close the door behind them as they enter the compartment.

The use of reduced-swing doorsets, which have a sliding/folding action, reduces the extent to which the door swings into the room and corridor and thus facilitates manoeuvring in and out of WCs and bathrooms. From a safety perspective, designers need to be aware that approximately one third of the door leaf projects into the outside circulation space when the door is open.

Sliding doors are an alternative where it is not possible for a side-hung door to swing either in or out or for a reduced-swing doorset to be used.

The effective clear width of doorways to sanitary accommodation should conform to the recommendations in **6.4** and Table 2.

Door handles and other hardware should conform to the recommendations in **6.5**.

To help people close the door when inside a room or compartment, outward-opening doors to sanitary accommodation should have a horizontal pull rail fixed to the closing, or interior, face where no door closing device is fitted. The door should be of a robust construction to which such door furniture can be securely fixed.

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.

NOTE 1 If a reduced-swing doorset is used, the depth of the recess can be minimized.

If an inward opening door is the only solution for a cubicle that is accessible to a wheelchair user, a clear minimum space (on plan) of 700 mm × 1 100 mm should be provided between the door swing

and any sanitary fittings to enable a wheelchair user to enter and close the door behind them.

Any door to sanitary accommodation, whether opening inwards or outwards, should be capable of being opened in an emergency if a person inside has fallen against it and is unable to move.

NOTE 2 The use of pivot hinges, in conjunction with an emergency release door stop and bathroom lock openable from the outside, can provide this facility.

A door fitted with a privacy lock should have an emergency release openable from the outside and, if not sliding or opening outwards, should have an alternative means of gaining access in an emergency.

A means of indicating whether or not a compartment is in use should be provided, preferably with the words "vacant" or "occupied" clearly visible and with a change in the colour of the indicator.

NOTE 3 This provision can be usefully combined with an emergency release mechanism.

Doors to accessible WCs should be labelled with a sign incorporating the International Symbol for Access (see **9.2.1.4**).

12.2.7 Surface finishes

To help blind and partially sighted people identify key objects within sanitary accommodation, support rails and grab rails should contrast visually with the wall, the WC seat and cover should contrast visually with the WC pan and cistern, and sanitary fittings and accessories should contrast visually with the background against which they are seen (see Annex B).

Large areas of shiny floor and wall surface should not be used as they can produce reflections and glare that confuse partially sighted people.

Floors should be slip-resistant, especially when wet.

NOTE Information and guidance on slip resistance is given in Annex E.

12.2.8 Emergency assistance alarm

Emergency assistance alarm systems should be in accordance with **9.3.7.2**. A pull cord should be reachable from changing or shower seats, from the WC and from the floor. A reset control should be provided for use if the alarm is activated by mistake. An alarm reset control should be positioned on the wall adjacent to the WC or, if there is no WC, the shower seat or changing seat. For the mounting height of a reset control and its location relative to a corner WC, see **12.6.3.1** and associated figures.

12.2.9 Heat emitters

A radiator or similar heating device should not be sited in a position that reduces the wheelchair manoeuvring space or the space needed to transfer to the shower seat, changing seat or WC pan. Such a heating device should not impinge on the minimum dimensions of the room or area.

Exposed surfaces of heating equipment should either be screened to protect users of sanitary accommodation from burns, or maintained at a temperature below 43 °C.

12.2.10 Lighting

Where lighting can be individually controlled within a sanitary compartment, a pull cord, if provided instead of a wall switch, should be set between 900 mm and 1 000 mm above the floor, and located within 150 mm of the leading edge of the door and the surface of the adjacent wall. The pull cord and the pull cord end should contrast visually with the wall, but should not be red as this colour is reserved for emergency assistance alarms.

12.3 Shower rooms and bathrooms

*COMMENTARY ON **12.3**.*
The correct relationship of a shower and/or bath to a wheelchair manoeuvring space, and to other sanitary fittings, is critical in allowing disabled people to wash or bathe either independently or with assistance from others, when necessary.

Where mobile or fixed hoists operated by an assistant are used for transfer, additional floor area within the bathroom is needed.

Unfortunately, there is no single design/layout that will suit all disabled people, but the needs of many disabled people will be met if a building can offer a choice of shower room and bathroom layout, with an integral WC, allowing for alternative transfer directions.

The recommendations given in this subclause apply to buildings that require bathing facilities, such as hotels, motels, nursing or residential homes, hostels, halls of residence, day centres, hospitals (relatives' accommodation), and sports buildings where baths are provided as an alternative, or as a supplement to, showers.

12.3.1 En-suite shower room with a corner WC for independent use

The minimum overall dimensions, as well as the location of sanitary and other fittings, for a shower area that incorporates a corner WC layout for independent use should be as shown in Figure 42.

When more than one shower area incorporating a corner WC layout for wheelchair users is planned, a choice of left-hand and right-hand transfer layouts should be provided. However, where only one such shower area is provided, it should be designed, preferably, for right-hand transfer.

NOTE Right-hand transfer is shown in Figure 42.

12.3.2 En-suite shower room or bathroom with a ceiling-mounted full room cover tracked hoist system

*COMMENTARY ON **12.3.2**.*
A full room cover tracked hoist system gives the greatest flexibility of use. It makes the best use of the available space and improves a person's privacy/independence by allowing transfers to be made totally within the shower room, if required. It is used in conjunction with slings of which there are a number of types. Guidance on the choice of hoists and slings is given in Annex G. Other systems are also acceptable, provided they give similar access to all sanitary fittings.

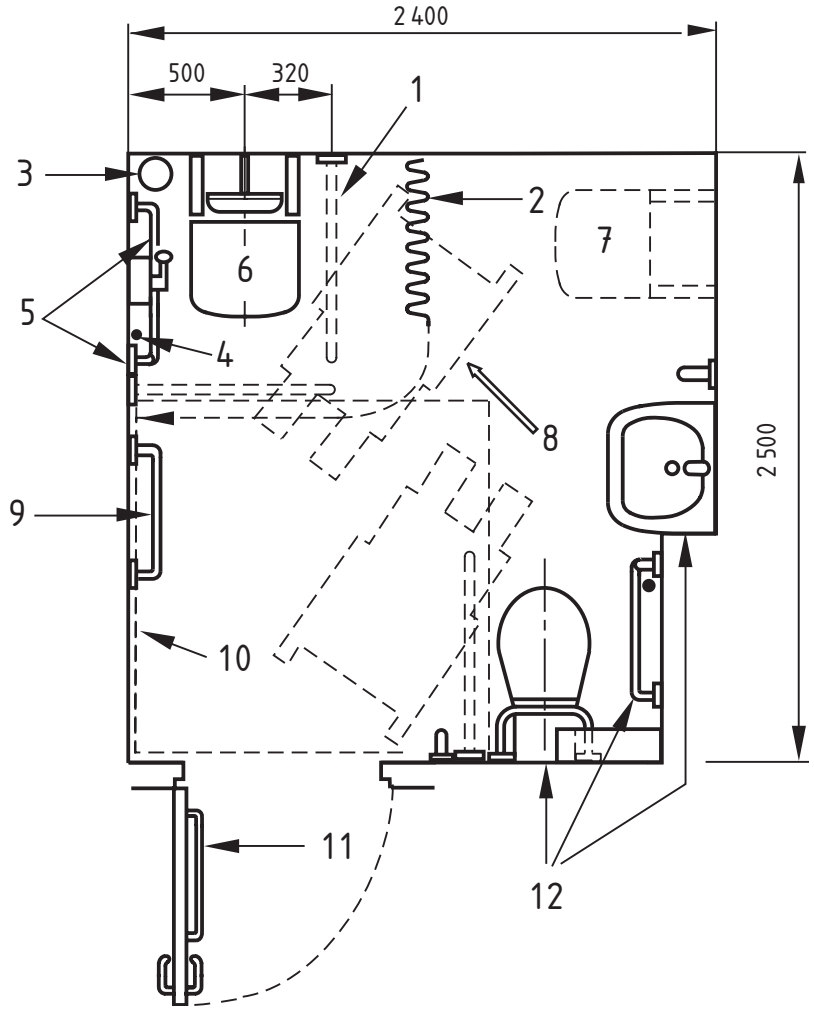
If a ceiling-mounted tracked hoist is fitted in an existing building, the implications of the additional loading need to be checked.

The minimum overall dimensions, as well as the location of sanitary and other fittings, of an en-suite shower area for use with a

ceiling-mounted full room cover tracked hoist system for assisted use should be as shown in Figure 43. The tracked hoist system should be compatible with the hoist system in any adjacent room where hoist provision is required.

A shower room with a tracked hoist system should be an additional provision to the basic self-contained shower room for independent use from a wheelchair.

Figure 42 **En-suite shower room with corner WC for independent use**
Dimensions in millimetres



NOTE 1 Example shown is for right-hand transfer to shower seat and WC.

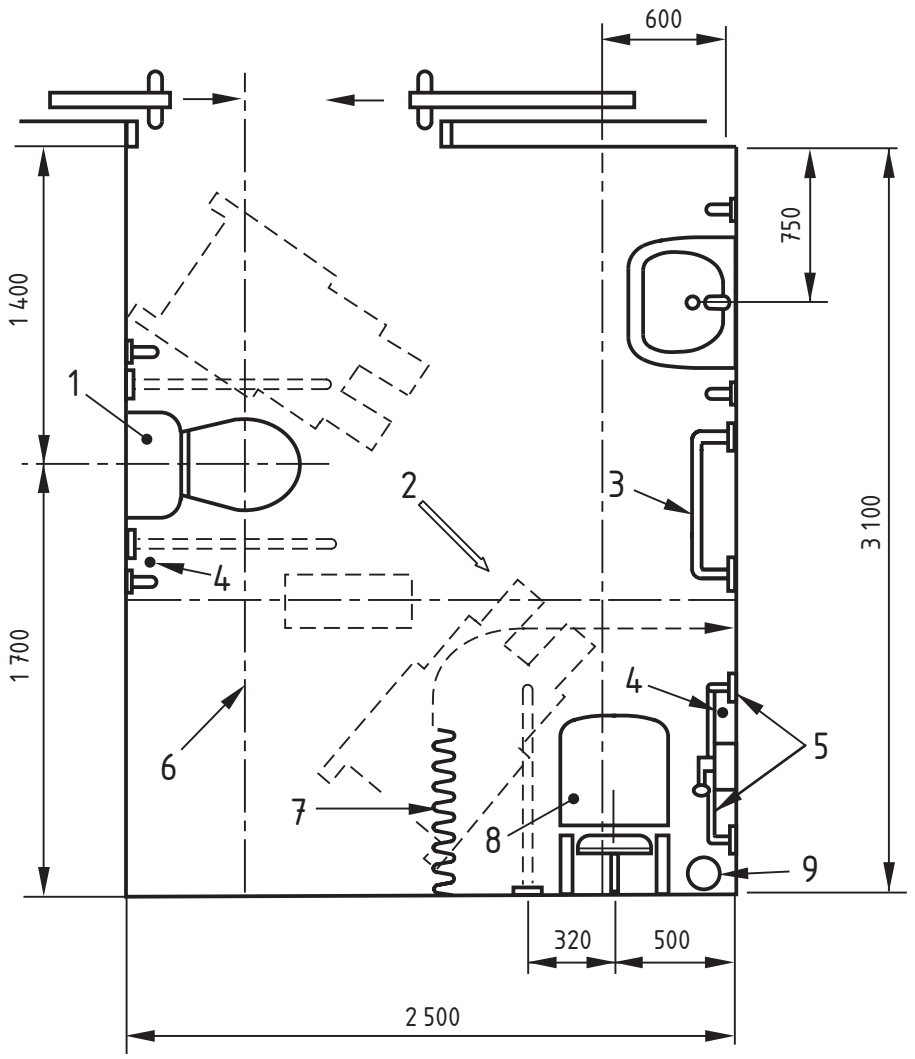
NOTE 2 For details of fittings associated with the shower, see Figure 50.

NOTE 3 The overall dimensions shown exclude such items as heat emitters and boxing in of pipework, and adjustments in room size will be needed to accommodate these items.

Key

1 Drop-down support rail
2 Shower curtain
3 Floor drain
4 Alarm pull cord
5 Vertical and horizontal grab rails
6 Tip-up shower seat
7 Optional tip-up seat for use when drying
8 Fall to floor drain no steeper than 1:50
9 Towel rail
10 Wheelchair turning space (1 500 × 1 500) mm
11 Horizontal pull rail to help close the door from a wheelchair
12 See Figure 45 for details of WC, basin and associated fittings

Figure 43 **En-suite shower room for use with a ceiling-mounted full room cover tracked hoist system for assisted use**
Dimensions in millimetres



NOTE 1 Example shown is for right-hand transfer to shower seat.

NOTE 2 For details of fittings associated with the shower, see Figure 50, and with the peninsular WC, see Figure 55.

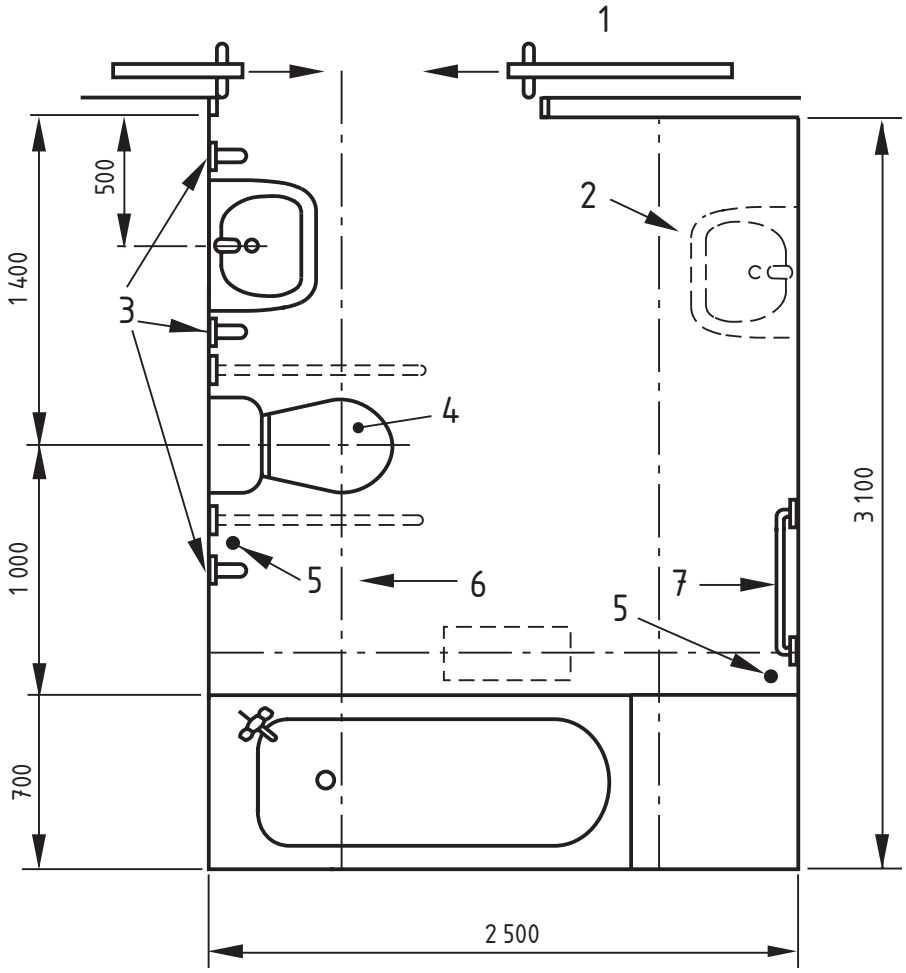
NOTE 3 The overall dimensions shown exclude such items as heat emitters and boxing in of pipework, and adjustments in room size will be needed to accommodate these items.

Key

1 Peninsular WC with close-coupled cistern
2 Fall to floor drain no steeper than 1:50
3 Towel rail
4 Alarm pull cord
5 Vertical and horizontal grab rails
6 Full room cover tracked hoist system (or alternative system giving similar access to all sanitary fittings)
7 Shower curtain
8 Tip-up shower seat
9 Floor drain

The minimum overall dimensions, as well as the location of sanitary and other fittings, for an en-suite bathroom provided with a ceiling-mounted full room cover tracked hoist system for assisted use should be as shown in Figure 44. The tracked hoist system should be compatible with the hoist system in any adjacent room where hoist provision is required.

Figure 44 **En-suite bathroom with a ceiling-mounted full room cover tracked hoist system for assisted use**
Dimensions in millimetres



NOTE 1 Example shown is for left-hand transfer to bath.

NOTE 2 For details of accessories associated with the bath, see Figure 47 and with the peninsular WC, see Figure 55.

NOTE 3 The overall dimensions shown exclude such items as heat emitters and boxing in of pipework, and adjustments in room size will be needed to accommodate these items.

Key

1 Sliding doors
2 Alternative washbasin position
3 Vertical grab rails
4 Peninsular WC with close-coupled cistern
5 Alarm pull cord
6 Full room cover tracked hoist system (or alternative system giving similar access to all sanitary fittings)
7 Towel rail

12.3.3 Bathroom for independent use incorporating a corner WC

The minimum overall dimensions, as well as the location of sanitary and other fittings, for a bathroom intended principally for independent use incorporating a corner WC and a large washbasin (not a hand rinse basin) should be as shown in Figure 45.

*NOTE The washbasin in a bathroom is usually large enough for hair washing or full body washing, although it can also be used for hand rinsing. The position of the basin in relation to the WC is the same as for the unisex corner WC compartment (see **12.6.3.1**). With a large basin, it is likely that users will fill the basin with water before sitting on the WC pan, as the taps might be out of reach.*

In bathrooms with a WC that are intended for independent use, the direction of transfer to both bath and WC should be consistent.

When more than one bathroom for independent use incorporating a corner WC is planned, a choice of left-hand and right-hand transfer layouts should be provided.

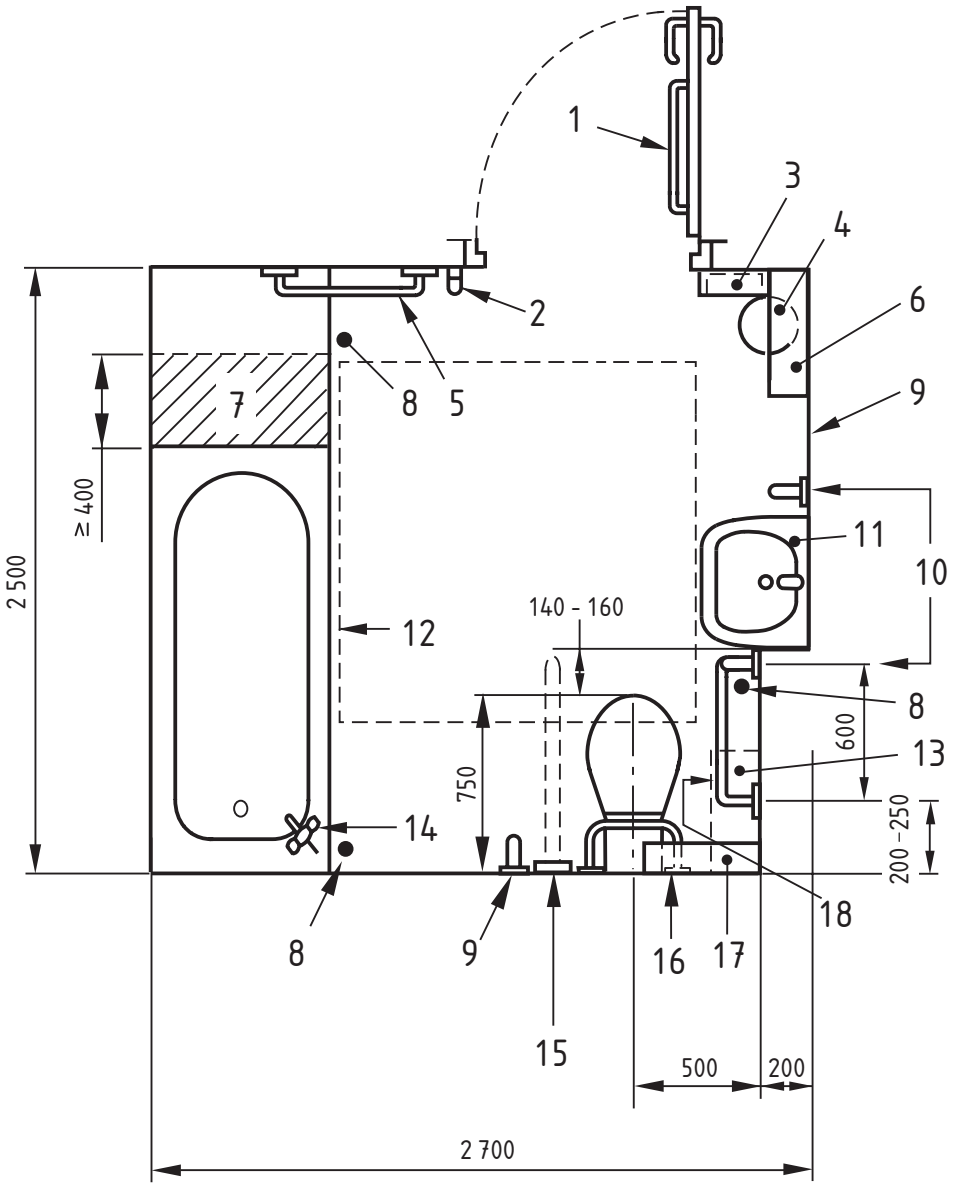
12.3.4 Bathroom allowing assisted use of a bath (without hoist) and a peninsular WC

The minimum overall dimensions, as well as the location of sanitary and other fittings, for a bathroom for assisted use of a bath and a peninsular WC should be as shown in Figure 46 and Figure 47. (For recommendations on peninsular WCs, see **12.6.3.2**.)

When more than one bathroom allowing assisted use of a bath and a peninsular WC is planned, a choice of left-hand and right-hand bath transfer layouts should be provided.

A bathroom that incorporates a peninsular WC should not be the only type of bathroom in a building. Where, in addition to a shower room, there is only one accessible bathroom in a building, a bathroom with a corner WC, which can be used either independently or with assistance, should be provided (see Figure 45).

Figure 45 **Bathroom for independent use incorporating a corner WC layout**
Dimensions in millimetres



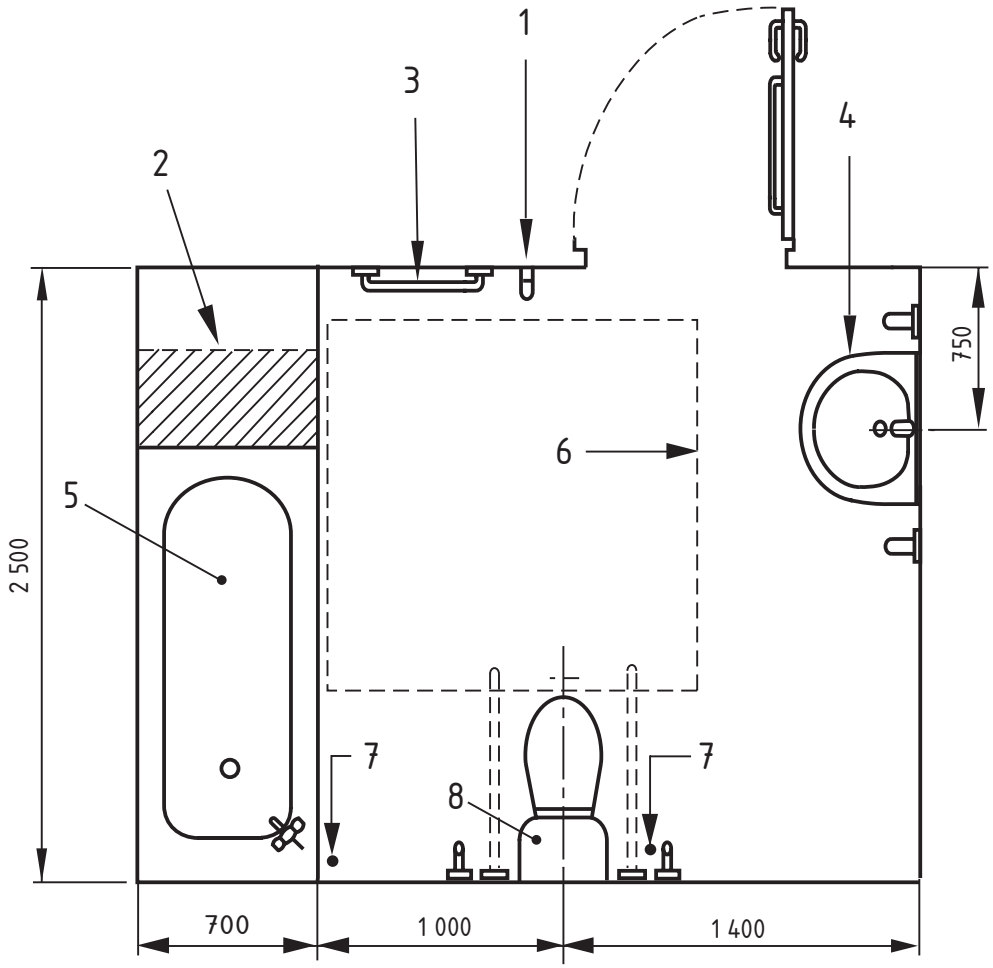
NOTE 1 Example shown is for right-hand transfer to bath and WC.

NOTE 2 The overall dimensions shown exclude such items as heat emitters and boxing in of pipework, and adjustments in room size will be needed to accommodate these items.

Key

1 Horizontal pull rail to help close the door from a wheelchair
2 Two clothes hooks, one at 1 050 mm and the other at 1 400 mm above the floor
3 Sanitary dispenser
4 Disposal bin
5 Towel rail
6 Shelf
7 Bath transfer seat
8 Alarm pull cord
9 See Figure 52 for details of fittings on this wall
10 Vertical grab rails
11 Large washbasin with depth (front to back) no greater than 450 mm
12 Wheelchair turning space (1 500 × 1 500) mm
13 Sanitary disposal unit
14 Bath mixer tap
15 Drop-down support rail
16 Rail with padded back rest, where cistern is not close-coupled
17 Colostomy changing shelf for standing users, 125 mm to 150 mm deep – width up to 400 mm, depending on location of cistern
18 Horizontal grab rail mounted on cranked wall

Figure 46 **Bathroom for assisted use of a bath and peninsular WC**
Dimensions in millimetres



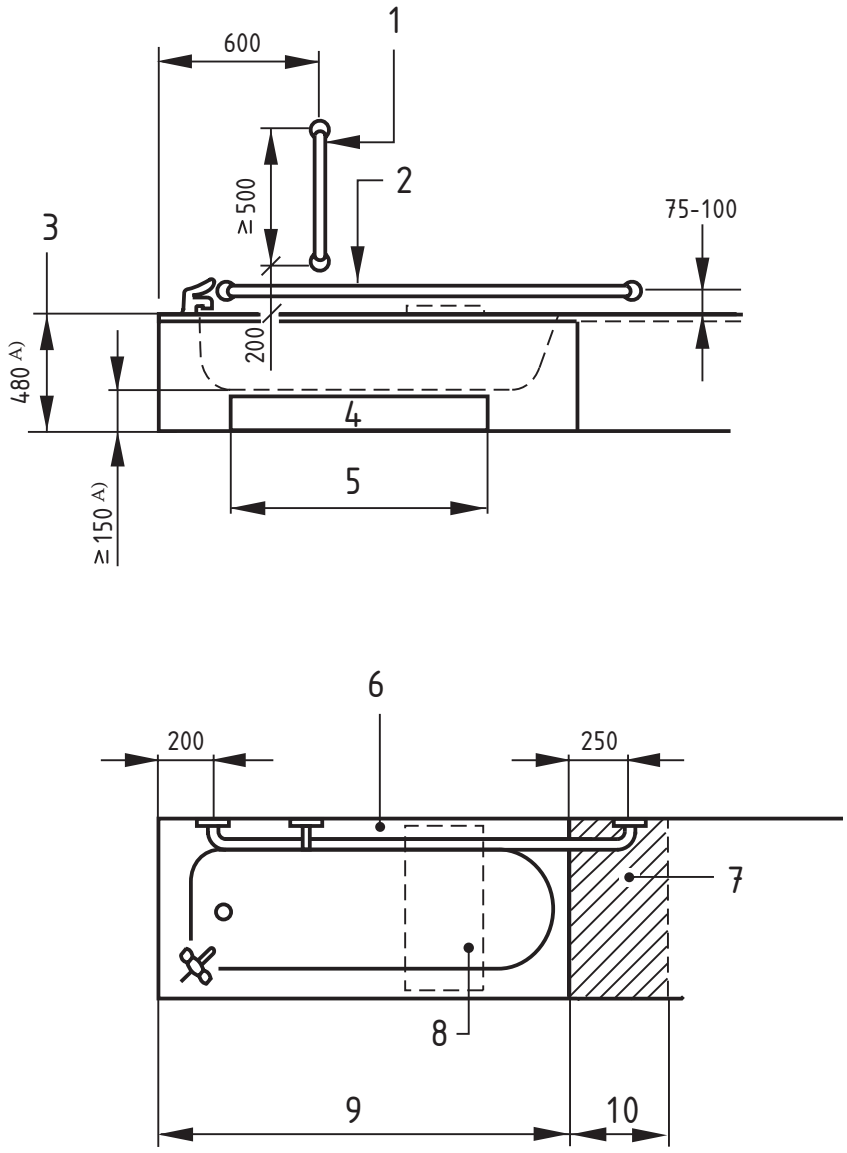
NOTE 1 Example shown is for right-hand transfer to bath.

NOTE 2 The overall dimensions shown exclude such items as heat emitters and boxing in of pipework, and adjustments in room size will be needed to accommodate these items.

Key

1 Two clothes hooks, one at 1 050 mm and the other at 1 400 mm above the floor
2 Bath transfer seat
3 Towel rail
4 See Figure 53a) for details of fittings associated with this large washbasin
5 See Figure 47 for details of the bath and its associated grab rails
6 Wheelchair turning space (1 500 × 1 500) mm
7 Alarm pull cord
8 See Figure 55 for details of fittings associated with the peninsular WC

Figure 47 **Grab rails where bath adjoins a wall, and transfer facilities**
Dimensions in millimetres



Key

1 Vertical grab rail
2 Horizontal grab rail
3 Bath rim may be higher if solely for assisted use
4 Gap for hoist feet
5 Gap clear of bath supports
6 Clearance 50 mm to 60 mm
7 Purpose-made transfer seat at head of bath for independent use
8 Proprietary transfer seat supported on bath rim
9 Bath length
10 Depth of transfer seat 400 mm min.

A) To meet these recommendations, a shallower than normal bath might be necessary.

12.3.5 Bathroom allowing assisted use of a peninsular bath (with hoist) and a peninsular WC

*COMMENTARY ON **12.3.5**.*
Because of the specialized nature of this type of use, this layout is used mainly in registered nursing homes or other specific building types.

The minimum overall dimensions, as well as the location of sanitary and other fittings, for a bathroom that allows assisted use of the bath and WC, with space for a mobile hoist operated by an assistant, should be as shown in Figure 48.

A vertical gap 150 mm high should be provided at the base of the bath panel to accommodate the chassis of a mobile hoist, as shown in Figure 47. The bath should be chosen and fixed to ensure that the 150 mm gap can be achieved.

NOTE 1 A shallower bath might be needed (see Figure 47).

NOTE 2 For the benefit of assistants' manual handling, it might be useful for the bath to have its rim at 560 mm above the floor. However, this height is too high for independent transfer from a wheelchair.

12.3.6 Bath and taps

The bath in an accessible bathroom should be either 1 600 mm or 1 700 mm long × 700 mm wide with a slip-resistant, flat base.

Taps should be located so that they are easily reached from a wheelchair but do not impede access to the bath. Taps mounted on the wall side of the bath will be difficult to reach and should be avoided.

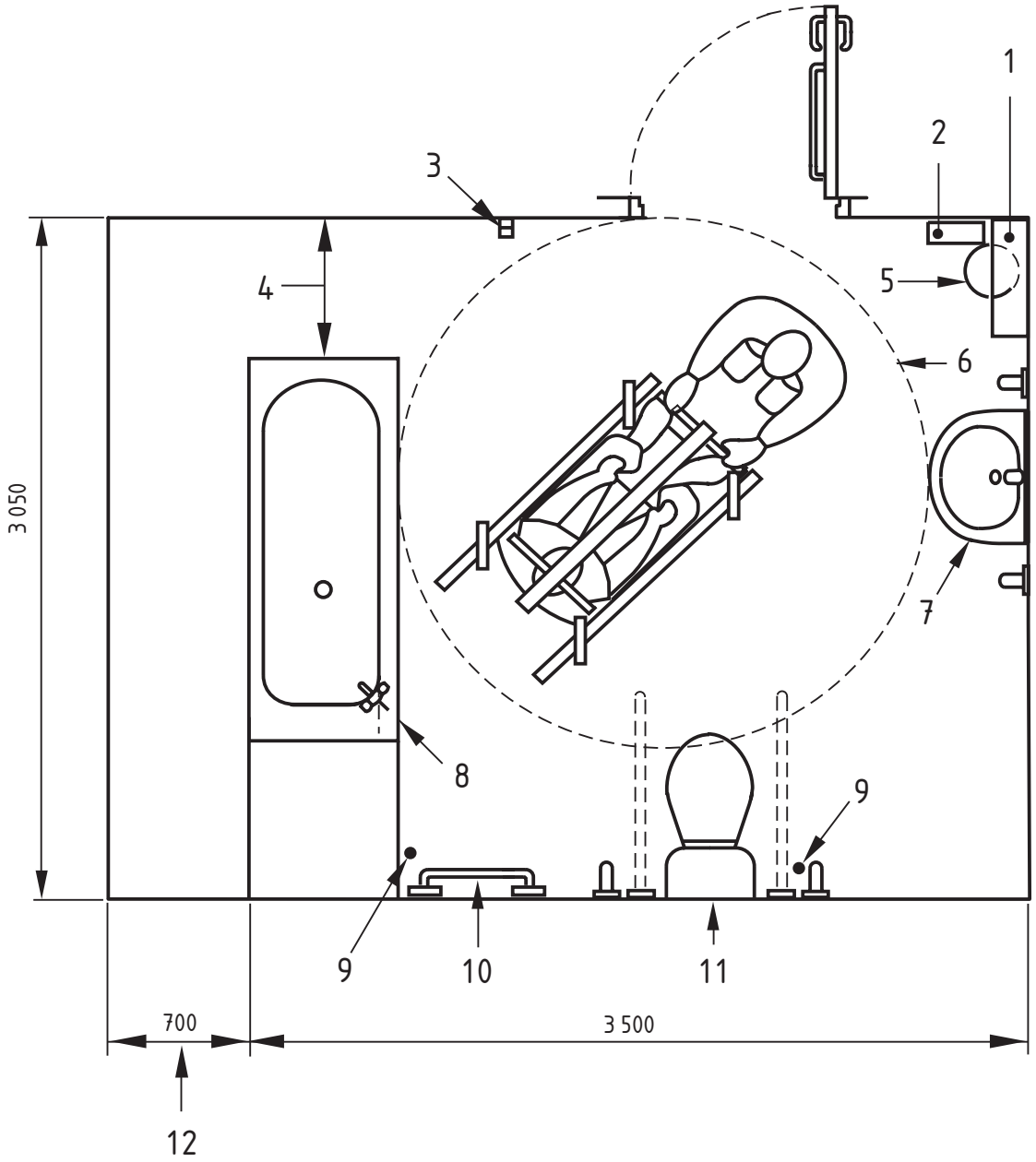
NOTE Some proprietary types of plug (e.g. spring-loaded) avoid a chain or a pop-up waste and are more suitable for people with limited hand dexterity.

12.3.7 Bath rim height

*COMMENTARY ON **12.3.7**.*
A bath rim at the same height as the majority of wheelchair seats will aid a disabled person's independent transfer from wheelchair to bath via a transfer seat.

The rim of a bath for independent use should be 480 mm above floor level at the transfer end (see Figure 47). Any grab rails fitted to the rim should not project above this height.

Figure 48 **Bathroom allowing assisted use of the bath (and WC) using a mobile hoist operated by an assistant**
Dimensions in millimetres



NOTE The overall dimensions shown exclude such items as heat emitters and boxing in of pipework, and adjustments in room size will be needed to accommodate these items.

Key

1 Shelf
2 Sanitary dispenser
3 Two clothes hooks, one at 1 050 mm and the other at 1 400 mm above the floor
4 Access, 700 mm wide, around peninsular bath for an assistant
5 Disposal bin
6 2 300 mm turning circle of mobile hoist
7 See Figure 53a) for details of fittings associated with this large washbasin
8 Mixer tap
9 Alarm pull cord
10 Towel rail
11 See Figure 55 for details of peninsular WC and associated fittings
12 Extra space for an assistant to help on other side of peninsular bath

12.3.8 Bath transfer seat

*COMMENTARY ON **12.3.8**.*
In refurbishment projects, it can be difficult to provide enough space at the head of a bath for the installation of a fixed transfer seat. However, many disabled people might prefer to use a moveable transfer seat.

A proprietary transfer seat can be used in conjunction with a separate, lower seat that is supported on the base and/or sides of the bath. A substantial amount of the bath rim needs to be available on the wall side of a bath for some bath boards to be fitted safely.

Where space is available, a securely fixed transfer seat the same width as the bath and extending beyond the head of the bath by at least 400 mm should be provided for ambulant disabled users and wheelchair users with the top surface set at bath rim height, as shown in Figure 47.

NOTE The preferred option is for the room to be large enough to have a distance of 800 mm between the bath and the wall to allow a wheelchair to be positioned within the room.

Where it is not possible to provide a fixed transfer seat at the head of a bath, a proprietary transfer seat or board may be provided. This is normally supported on the rim of the bath as shown in Figure 47.

12.3.9 Size and location of bath grab rails

Bath grab rails should be located as shown in Figure 47.

12.3.10 Type and location of other sanitary fittings and accessories

WCs, mirrors and other associated toilet accessories used in a bathroom, should be chosen and located in accordance with **12.6**.

Medicine cabinets and similar storage items should be located in accordance with **10.1**.

12.3.11 Lighting and lighting accessories

The maintained illuminance (or general lighting level) of a bathroom should be between 200 lux and 300 lux (see the SLL *Code for lighting* [23]).

12.4 Changing and shower areas

*COMMENTARY ON **12.4**.*
All buildings will be more accessible and convenient for disabled people if they provide different relationships between changing areas and shower areas, while offering a choice between private and communal changing and showering.

The needs of many disabled people will be met if a building offers a choice of shower layout (e.g. for both right-and left-hand transfer) and includes a shower with a WC, as well as one without a WC (if a WC facility is provided elsewhere).

*Many people are prepared to use open changing areas, but some require the privacy of a self-contained cubicle or compartment. For recommendations on changing cubicles (fitting rooms) in retail premises, see **13.3.3**.*

The recommendations given in this subclause apply to buildings that require changing and shower facilities, such as hotels, motels, nursing or residential homes, and relatives' accommodation in hospitals.

12.4.1 Provision of changing and shower areas

The provision of changing and shower areas, whether self-contained unisex or communal, designated as suitable for use by disabled people, should reflect the numbers of disabled people likely to require such facilities.

NOTE Sports facilities have their own requirements for team changing and showering (see Accessible sports facilities *[11]).*

12.4.2 Self-contained unisex changing area

Self-contained unisex changing facilities with space for a companion or assistant of either sex to help should always be provided, with communal separate-sex changing facilities as an additional provision.

The minimum overall dimensions, as well as the location of sanitary and other fittings, for a self-contained changing area accessible to a wheelchair user should be as shown in Figure 49.

NOTE 1 Wheelchair users need sufficient space for dressing and undressing while seated or lying down. Space might also be required for one or two assistants and/or for a shower chair to transfer into before showering or entering a swimming pool.

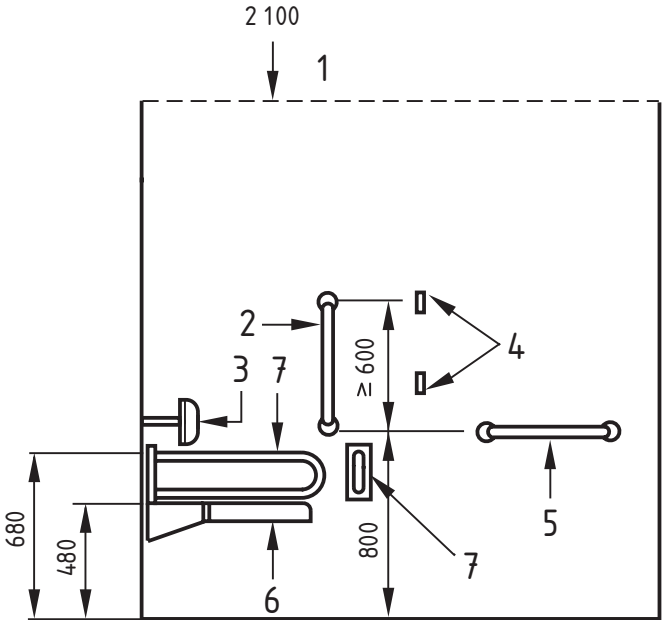
Vertical support struts from the seat to the floor should not be installed. A padded tip-up seat should be securely fixed to the wall, as shown in Figure 49.

NOTE 2 Struts fitted at the front of the seat impede wheelchair access.

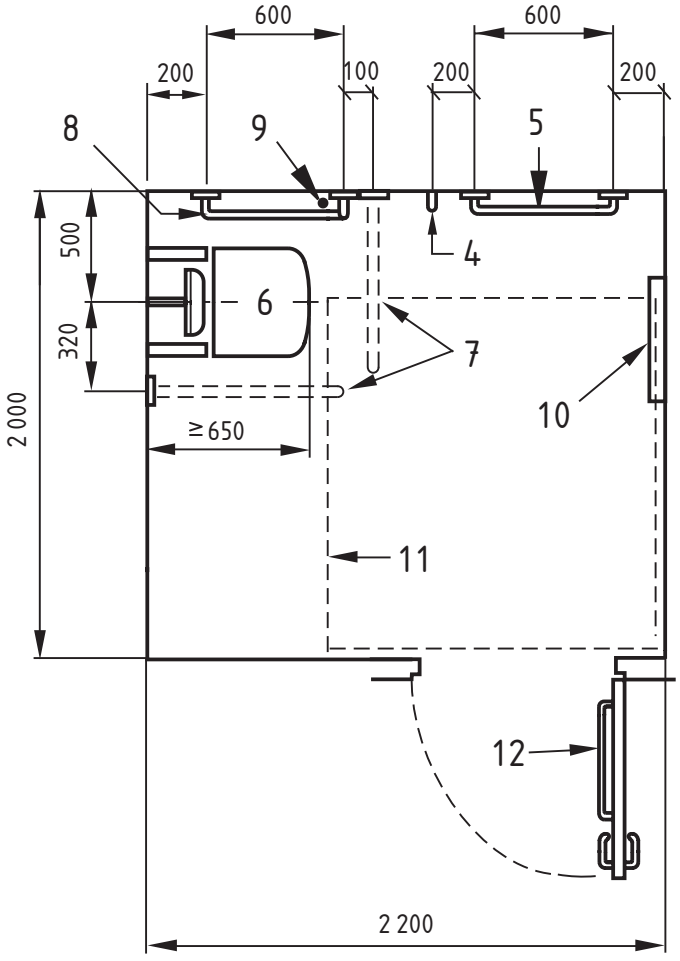
Drop-down support rails and grab rails for a self-contained changing area should be located as shown in Figure 49.

NOTE 3 Drop-down support rails at right angles to each other can help prevent a disabled person falling forward or sideways.

Figure 49 **Self-contained changing area and accessories**
Dimensions in millimetres



a) Elevation



b) Plan

Key

1 Minimum unobstructed room height
2 Vertical grab rail
3 Back rest
4 Two clothes hooks, one at 1 050 mm and the other at 1 400 mm above the floor
5 Towel rail
6 Tip-up seat
7 Drop-down support rails on side and far wall
8 Horizontal grab rail
9 Alarm pull cord
10 Mirror
11 Wheelchair turning space (1 500 × 1 500) mm
12 Horizontal pull rail to help close the door from a wheelchair

NOTE 1 Example shown is for left-hand transfer to changing seat.

NOTE 2 The overall dimensions shown exclude such items as heat emitters and boxing in of pipework, and adjustments in room size will be needed to accommodate these items.

12.4.3 Communal changing area

Where changing facilities suitable for disabled people are provided communally, each changing subdivision should have the same configuration of space, seat, drop-down support rails and grab rails as for a self-contained unisex changing area.

12.4.4 Lockers for self-contained or communal changing areas

Lockers suitable for wheelchair users should be at least 300 mm wide, not more than 600 mm deep, and with their bases set between 400 mm and 800 mm above floor level.

Lockers intended to store crutches, callipers, or artificial limbs should be at least 1 200 mm high. Lockers that are intended to store walking frames should be 800 mm × 600 mm in plan.

Locks for lockers should be located no higher than 1 150 mm and should be easy to use, one-handed, by a person with poor dexterity or limited strength in the hand or arm.

Lockers should be securely constructed, and located in a dry place, preferably outside the changing area.

Wheelchair manoeuvring space in front of a locker should be in accordance with the recommendations in **10.1**.

12.4.5 Self-contained unisex shower area, controls and accessories

The minimum overall dimensions, as well as the location of sanitary and other fittings, for a self-contained unisex shower area accessible for independent use by a wheelchair user should be as shown in Figure 50.

NOTE 1 There is often a need for two tip-up seats, one "wet" and the other "dry".

Floors should be slip-resistant, and as level as possible subject to the minimum fall for draining water to a floor drain that is located away from the circulation area (1:50).

NOTE 2 If the outlet grating is recessed, a weir effect will be created and water flow increased.

The shower head should be mounted on a vertical rod so that its height can be adjustable between high and low level (see Figure 50).

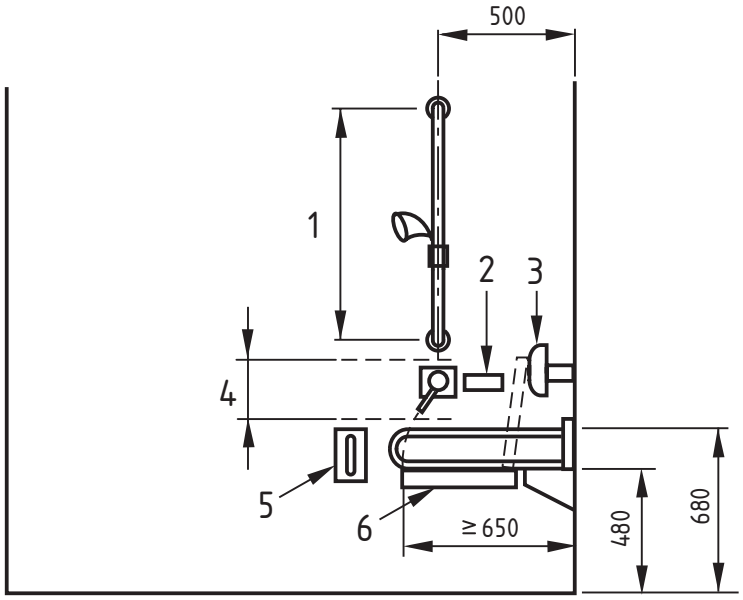
A shower fitting should be controlled by a lever operated, thermostatic mixer that delivers water at a temperature not exceeding 43 °C. The markings on the shower control should be logical and clear to blind and partially sighted people.

NOTE 3 The temperature of water circulating in the pipework needs to be at least 60 °C to avoid risks of legionella.

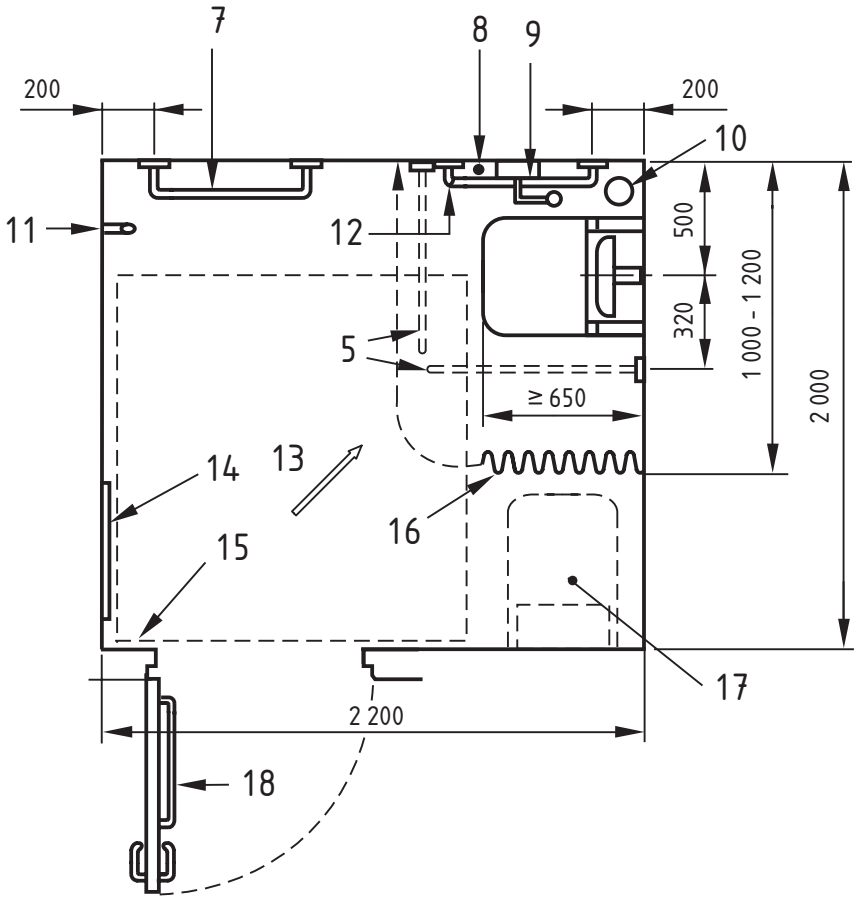
A tip-up plastic shower seat with a slip-resistant finish should be provided as shown in Figure 50.

NOTE 4 An adjustable height padded shower seat with back rest and a central hole can be beneficial to people with a wide range of disabilities. Folding armrests or safety rails attached either side of the shower seat can help to prevent somebody sliding off a wet slippery seat.

Figure 50 **Self-contained unisex shower room for independent use**
Dimensions in millimetres



a) Elevation (for clarity excluding fixed grab rails on rear wall with shower fitting)



b) Plan

Key

1 Vertical rod to carry a detachable shower head, adjustable within a range 1 050 mm to 1 850 mm above the floor
2 Soap tray
3 Back rest
4 Height range for shower controls 750 mm to 1 000 mm above the floor
5 Drop-down support rails on side and rear walls
6 Tip-up shower seat
7 Towel rail
8 Alarm pull cord
9 Horizontal grab rail
10 Floor drain
11 Two clothes hooks, one at 1 400 mm and the other at 1 050 mm above the floor
12 Vertical grab rail
13 Fall to floor drain no steeper than 1:50
14 Tall mirror
15 Wheelchair turning space (1 500 × 1 500) mm
16 Shower curtain
17 Additional optional tip-up seat for users when drying (mainly for ambulant users)
18 Horizontal pull rail to help close the door from a wheelchair

NOTE 1 Example shown is for right-hand transfer to shower seat.

NOTE 2 The overall dimensions shown exclude such items as heat emitters and boxing in of pipework, and adjustments in room size will be needed to accommodate these items.

Drop-down support rails and grab rails for a self-contained shower area should be located as shown in Figure 50.

NOTE 5 Drop-down support rails that are at right angles to each other help prevent a disabled person from falling forward.

A shower curtain, operated from a shower seat, should enclose the seat and the rails when they are in a horizontal position.

NOTE 6 After transferring from a wheelchair to a shower seat, the wheelchair can only be pushed away within arm's reach for subsequent retrieval. A shower curtain can help prevent the chair getting wet during showering.

12.4.6 Communal shower area, controls and accessories

Where shower facilities suitable for disabled people are provided communally, each shower subdivision should have the same configuration of space, seat, drop-down support rails and grab rails as for a self-contained unisex shower area.

12.4.7 Sanitary fittings and accessories

The type of WC pan and washbasin, and the range of associated accessories, should be chosen and, where appropriate, located in accordance with **12.6**.

A shelf should be provided for toiletries in a position that can be reached by a person sitting on the shower seat or from the wheelchair before or after transfer.

12.4.8 Doors

Where doors are provided in self-contained unisex or communal changing and shower areas, door furniture and door opening directions should be in accordance with **12.2.6**.

12.4.9 Lighting and lighting accessories

The maintained illuminance (or general lighting level) of a changing area or shower area should be in the range 100 lux to 300 lux at floor level.

NOTE In nursing and residential homes, or similar health care buildings, the lighting level needs can vary as follows:

a) between 100 lux and 150 lux for changing areas;

b) between 100 lux and 300 lux for shower areas.

The location and appearance of lighting pull cords should be in accordance with **12.2.10**.

12.5 Accessible baby changing facilities

Where baby changing facilities are provided, they should be accessible to disabled people.

An accessible baby changing facility should not be incorporated in a unisex accessible WC but should be provided in a separate room. The facility should conform to the relevant recommendations in **12.2**.

The room should be at least 2 m × 2 m in size and should include the following items:

a) a baby changing table set against the wall, either permanently fixed at 750 mm above floor level or adjustable in height;

b) a washbasin, with its rim at 720 mm to 740 mm above floor level;

c) a soap dispenser and an automatic hand dryer, with their undersides set between 800 mm and 1 000 mm above floor level;

d) a full length mirror, with its lower edge located at 600 mm above floor level;

e) a nappy vending machine with the controls no higher than 1 000 mm above floor level;

f) a sanitary disposal bin, preferably recessed into the wall;

g) a chair, if a fixed changing table is installed.

NOTE The correct use of an electrically powered adjustable changing table allows the surface to be set at the optimal height, thus reducing strain on the user's back.

12.6 Toilet accommodation

*COMMENTARY ON **12.6**.*
Disabled people should be able to find and use suitable toilet accommodation no less easily than non-disabled people. The space requirements for suitable toilet accommodation are generally driven by the needs of wheelchair users, although the facilities might also be used by people with other disabilities, such as blind and partially sighted people with assistance dogs.

The suitability of toilet accommodation depends on the extent to which wheelchair users and ambulant disabled people are able to approach, transfer to and use sanitary facilities. Toilet accommodation normally takes the form of a unisex accessible toilet or an enlarged cubicle in a separate-sex toilet washroom.

Sometimes a WC compartment is provided specifically for ambulant disabled people.

The correct relationship of WC to basin and other accessories, and to the space required for manoeuvring, is critical in enabling disabled people to adopt various transfer techniques that allow independent or assisted use of sanitary facilities. These transfer techniques include:

- *lateral transfer to WC using grab rails, with one or both rear wheels of the wheelchair backed up to the rear wall;*
- *oblique transfer using grab rails and grasping the WC, or just grasping the WC for full support;*
- *frontal transfer using grab rails that enable some people to pivot round and others to slide forward on to the WC from their wheelchair and use the WC in a forward facing position;*

  NOTE This might or might not involve standing as part of the transfer process. With this transfer technique, the WC can be used as a urinal.

- *transfer with the wheelchair at the front of the WC and at right angles to it.*

The recommendations in this subclause apply to all buildings used by the general public.

12.6.1 Provision and location of toilet accommodation

*COMMENTARY ON **12.6.1**.*
A unisex facility enables one or two assistants of either sex to assist a disabled person.

Where space is limited, e.g. in small business premises, the provision of a single accessible WC compartment of unisex design instead of separate-sex facilities caters for all needs with less demand on space.

Unisex compartments are more easily identified than single-sex compartments and are more likely to be available when needed. Some disabled people need to use a toilet more frequently than other users, making it desirable that, generally, accessible toilets are not made available to the general public.

The time taken to reach a toilet is an essential element to be taken into account in siting toilet accommodation.

Where there is only one accessible WC in a building, it should be of unisex corner design, suitable for both wheelchair users and ambulant disabled people (see **12.6.3.1**).

At least one unisex accessible WC should be provided at each location where toilet accommodation is provided for the use of customers, employees or visitors. In residential buildings such as hotels and hostels, where no toilet accommodation is provided outside bedrooms, at least one unisex accessible WC should be provided for visitors at entrance level.

NOTE 1 Sports facilities have their own requirements for unisex and other accessible toilet accommodation (see Accessible sports facilities *[11]).*

Where there is only one WC available in a building, it should be of unisex accessible corner design, but enlarged to accommodate a standing-user height washbasin, with its rim 780 mm to 800 mm above the floor, in addition to the hand rinse basin. An enlarged unisex accessible WC should also be provided where full washing facilities are required.

When more than one unisex accessible corner WC compartment is planned, a choice of layouts suitable for left-hand and right-hand transfer should be provided to cater for people who are paralysed or have limited mobility on one side or the other, preferably with the handing indicated by a touch-legible pictogram.

NOTE 2 For multi-storey buildings, a corner WC design provides a choice of transfer options if the layout is handed on alternate floors.

At least one cubicle suitable for use by ambulant disabled people (see **12.6.3.3**) should be provided and identified within each range of WC cubicles in separate-sex toilet washrooms, irrespective of whether a wheelchair-accessible cubicle has been provided in the same range.

In existing buildings where space constraints make it impossible to provide a unisex accessible WC at entrance level, and on any other storey that is accessible to wheelchair users, separate-sex toilet washrooms should contain a WC cubicle and accessories, accessible to both wheelchair users and ambulant disabled people, or separate cubicles for wheelchair users and ambulant disabled people.

A unisex accessible WC should be located as close as possible to the entrance and/or waiting area of a building.

Unisex accessible toilet accommodation should be provided near to bedrooms designed for wheelchair users if the general sanitary arrangement for standard bedrooms in a hotel or motel is not en-suite.

The location of toilet accommodation in a multi-storey building should preferably be in a similar place on each floor.

12.6.2 Accessible routes

Doors from toilet accommodation, when open, should not obstruct emergency escape routes.

A disabled employee should not have to travel more than 40 m on the same floor from their workstation to a unisex accessible WC or a separate-sex toilet with an accessible washroom, or more than 40 m combined horizontal travel distance where toilet accommodation is accessible by lift on another floor of the building.

12.6.3 WC compartments

12.6.3.1 Unisex accessible corner WC

Minimum room dimensions, as well as the location of sanitary and other fittings, for the standard unisex accessible corner WC should be as shown in Figure 51a). The layout of the enlarged unisex WC should be as shown in Figure 51b). The location of fixtures and fittings should be as shown in Figure 52, and the location of independent mirrors, accessories and washbasins should be as shown in Figure 53. For examples of transfer techniques, see Figure 54.

NOTE 1 A unisex accessible corner WC is equipped so that it is also suitable for use by ambulant disabled people.

NOTE 2 It is generally possible to use a 926 mm single-swing door for a unisex WC compartment, provided that the door is able to open beyond 90° and that when it does, the projection of door fittings (e.g. the horizontal pull rail) does not reduce the potential effective clear width for that door size.

The minimum clear overall dimensions of a unisex accessible corner WC compartment should allow the hand rinse basin to be used both from a wheelchair and while a person is seated on the WC, and should allow space for somebody to assist the disabled person. The tap to the basin should be positioned on the side nearest to the WC pan.

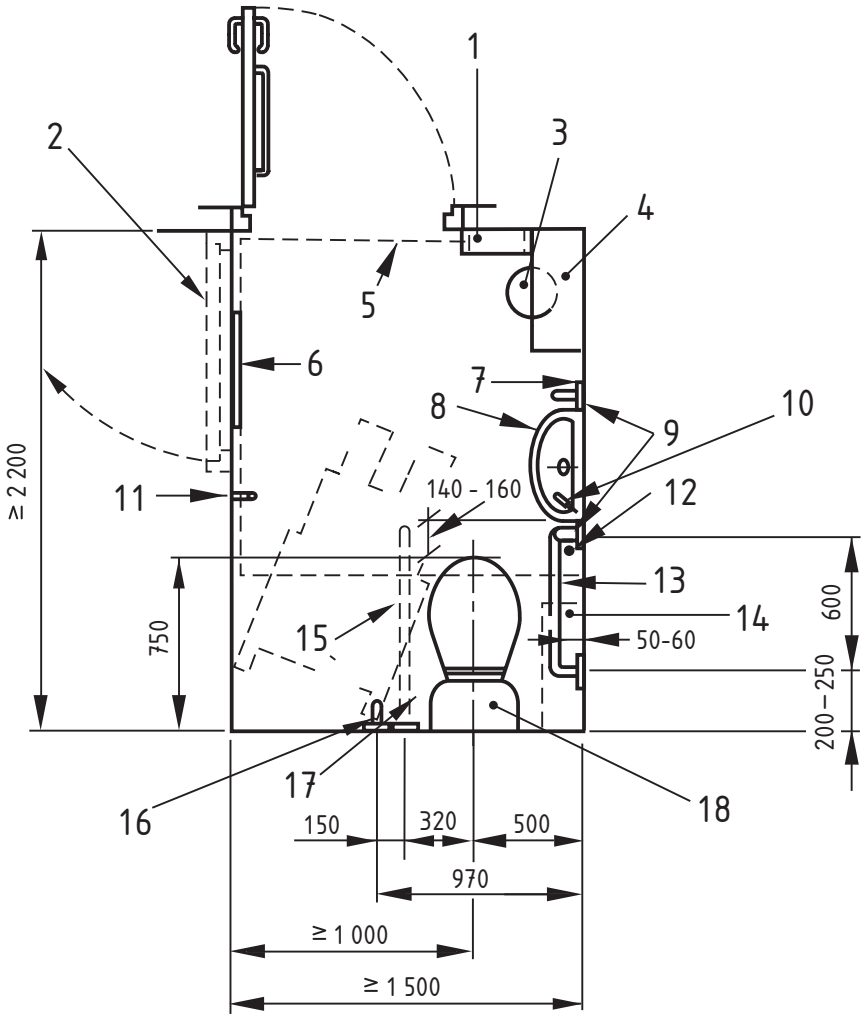
NOTE 3 It is important for reasons of personal hygiene that a person seated on the WC can reach the basin to rinse their hands before adjusting their dress.

The hand rinse basin within a unisex accessible WC compartment should be set with the rim height at 720 mm to 740 mm above the floor (see Figure 52) to allow use for hand washing by people standing as well as seated.

NOTE 4 The hand rinse basin next to the WC can be at a lower level for use from the WC, provided there is a separate washbasin for ambulant disabled people to use (see Figure 53).

NOTE 5 The use of adjustable height washbasins can accommodate a greater range of people.

Figure 51 **Unisex accessible corner WC layouts**
Dimensions in millimetres



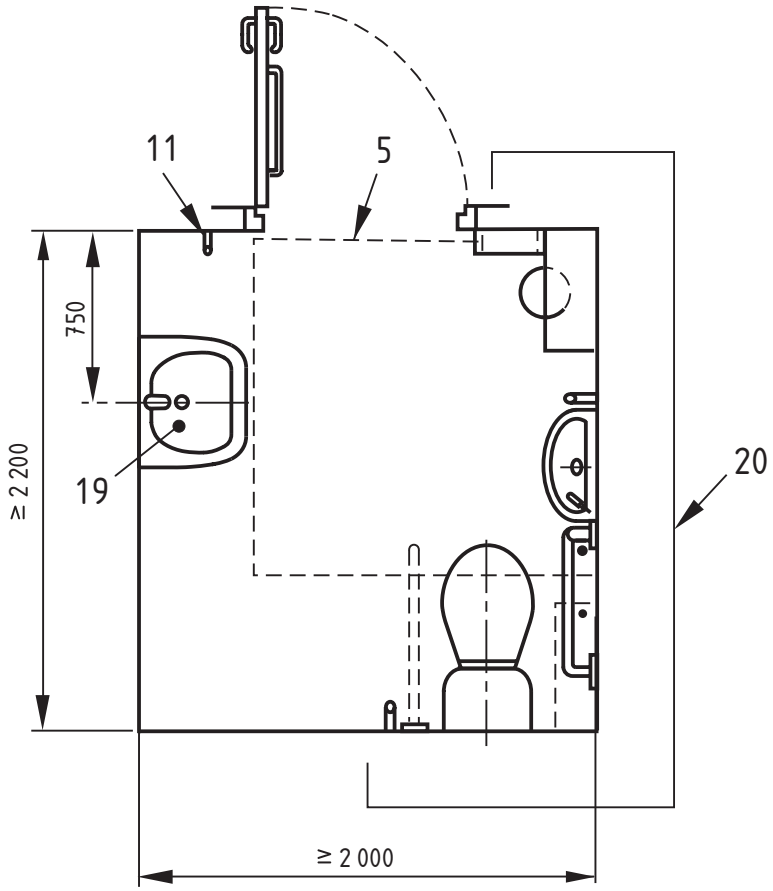
a) Unisex WC where other toilet accommodation is available

Key to Figure 51a)

1 Sanitary dispenser
2 Alternative door position
3 Disposal bin
4 Shelf
5 Wheelchair turning space (1 500 × 1 500) mm
6 Long mirror
7 Wall A (see Figure 52)
8 Hand rinse basin
9 Vertical grab rails
10 Tap on side of basin nearest to WC
11 Two clothes hooks, one at 1 050 mm and the other at 1 400 mm above the floor
12 Alarm pull cord
13 Horizontal grab rail
14 Sanitary disposal unit
15 Drop-down support rail
16 Vertical grab rail
17 Flush mechanism on this side of WC pan
18 Flat-topped close-coupled cistern providing a back rest and a colostomy changing surface for standing users (where high or low level cisterns are used, a rail with a padded back rest and a separate colostomy changing shelf 125 mm to 150 mm deep and preferably 400 mm wide, with its surface 950 mm above floor level, should be provided)

For part b) of this figure, and the accompanying notes, please see overleaf.

Figure 51 **Unisex accessible corner WC layouts** *(continued)*
Dimensions in millimetres



b) Enlarged unisex WC where the only WC in a building

NOTE 1 Examples shown are for right-hand transfer to WC.

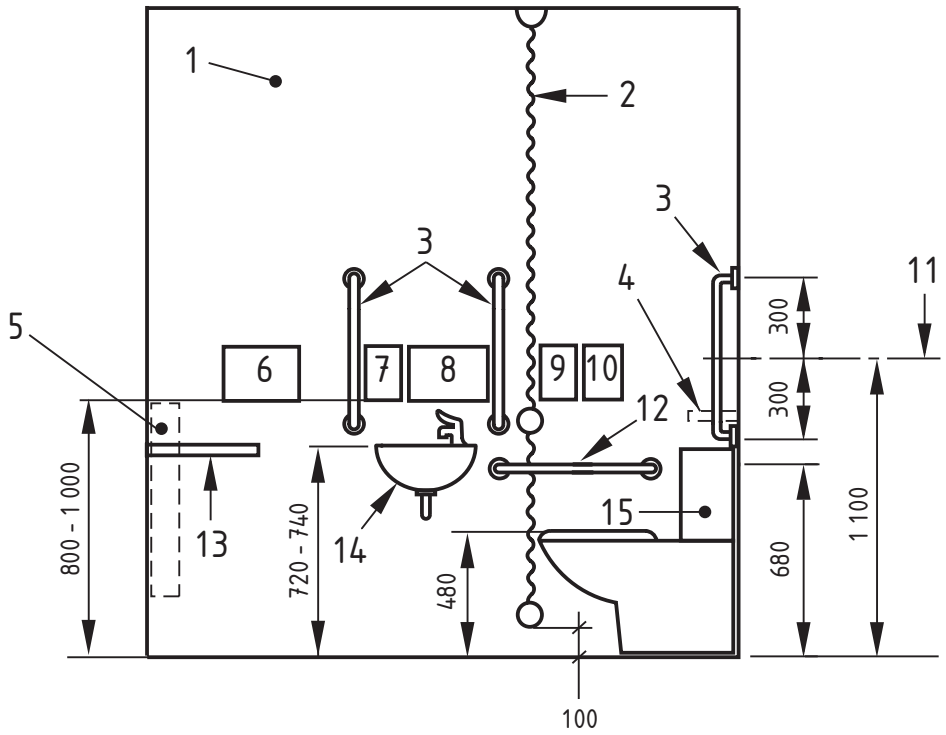
NOTE 2 Figure 52 shows the location of fixtures and fittings. For the location of the mirror and associated fittings, see Figure 53. Figure 54 gives further details of transfer techniques. For door widths, see Table 2.

NOTE 3 The overall dimensions shown exclude such items as heat emitters and boxing in of pipework, and adjustments in room size will be needed to accommodate these items.

Key to whole figure

1 Sanitary dispenser
2 Alternative door position
3 Disposal bin
4 Shelf
5 Wheelchair turning space (1 500 × 1 500) mm
6 Long mirror
7 Wall A (see Figure 52)
8 Hand rinse basin
9 Vertical grab rails
10 Tap on side of basin nearest to WC
11 Two clothes hooks, one at 1 050 mm and the other at 1 400 mm above the floor
12 Alarm pull cord
13 Horizontal grab rail
14 Sanitary disposal unit
15 Drop-down support rail
16 Vertical grab rail
17 Flush mechanism on this side of WC pan
18 Flat-topped close-coupled cistern providing a back rest and a colostomy changing surface for standing users (where high or low level cisterns are used, a rail with a padded back rest and a separate colostomy changing shelf 125 mm to 150 mm deep and preferably 400 mm wide, with its surface 950 mm above floor level, should be provided)
19 Large washbasin with its rim at 780 mm to 800 mm above floor level, with a mirror above and a paper towel dispenser and a soap dispenser alongside
20 See Figure 51a) for details of fittings on this side of the room

Figure 52 **Heights of fixtures and fittings for corner WC layout**
Dimensions in millimetres

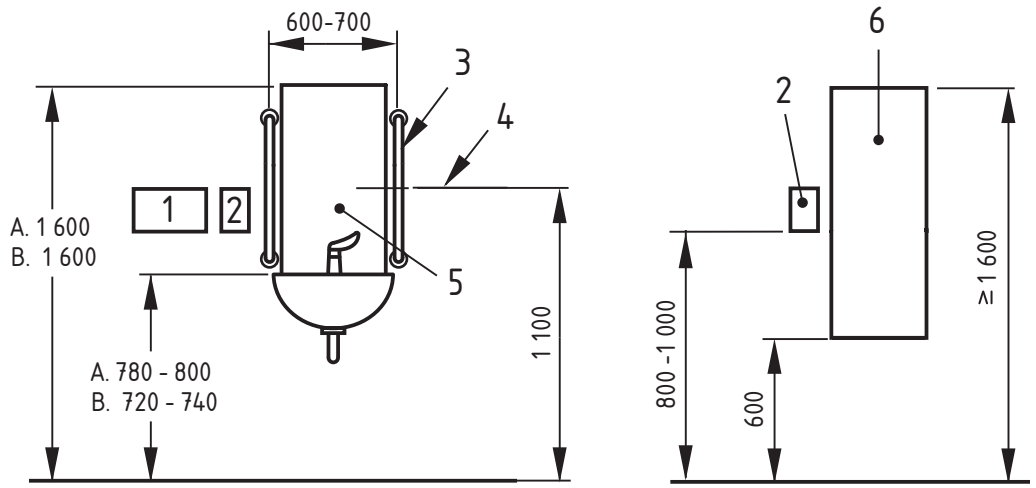


Height of drop-down support rails to be the same as the other horizontal grab rails.

Key

1 Wall A (see Figure 51)
2 Alarm pull cord with two red bangles
3 Vertical grab rails (those above the hand rise basin should be set 500 mm to 700 mm apart centred on the basin)
4 Colostomy changing shelf at 950 mm above floor level, where a high or low level cistern is used
5 Sanitary dispenser, on wall adjacent to door, with coin slot between 750 mm and 1 000 mm above the floor
6 Automatic hand dryer
7 Soap dispenser
8 Paper towel dispenser
9 Toilet paper dispenser
10 Alarm reset button
11 Centre line of vertical grab rails
12 Horizontal grab rail
13 Shelf
14 Hand rinse basin with tap on side of basin close to the WC pan
15 Flat-topped close-coupled cistern providing a back rest and a colostomy changing surface for standing users (where high or low level cisterns are used, a rail with a padded back rest should be provided)

Figure 53 **Location of independent mirrors, accessories and washbasins**
Dimensions in millimetres



a) In bathrooms and shower rooms

Location of independent washbasin, mirror and grab rails (not associated with a corner WC), for wheelchair users and ambulant disabled people

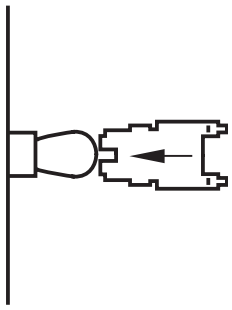
b) In a unisex accessible WC

Long mirror located away from washbasin suitable for wheelchair users and ambulant disabled people (mirror and associated fittings used within a unisex accessible WC compartment or within a separate-sex facility serving a range of compartments)

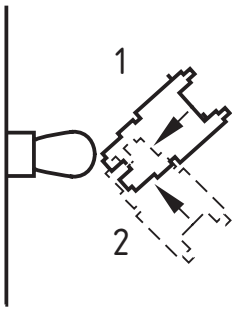
Key

1 Automatic hand dryer
2 Shaver point (where relevant)
3 600 mm vertical grab rail each side of mirror
4 Centre line of vertical grab rail
5 Mirror above basin, with base corresponding with top of washbasin
6 Tall mirror
A For ambulant disabled people only
B For both ambulant disabled people and wheelchair users

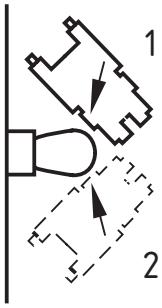
Figure 54 **Examples of techniques for transferring from a wheelchair to a WC**



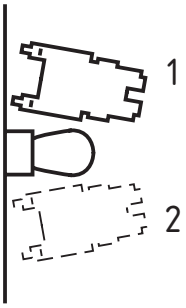
a) Frontal transfer, using grab rails to move from wheelchair to WC



b) Oblique transfer, using grab rails and/or grasping WC



c) Lateral transfer, using grab rails and/or grasping WC, with one wheel backed up to rear wall and the wheelchair at an angle to WC



d) Lateral transfer, using grab rails and/or grasping WC, with both wheels backed up to rear wall and the wheelchair roughly parallel to WC

Key

1 Right-handed

2 Left-handed

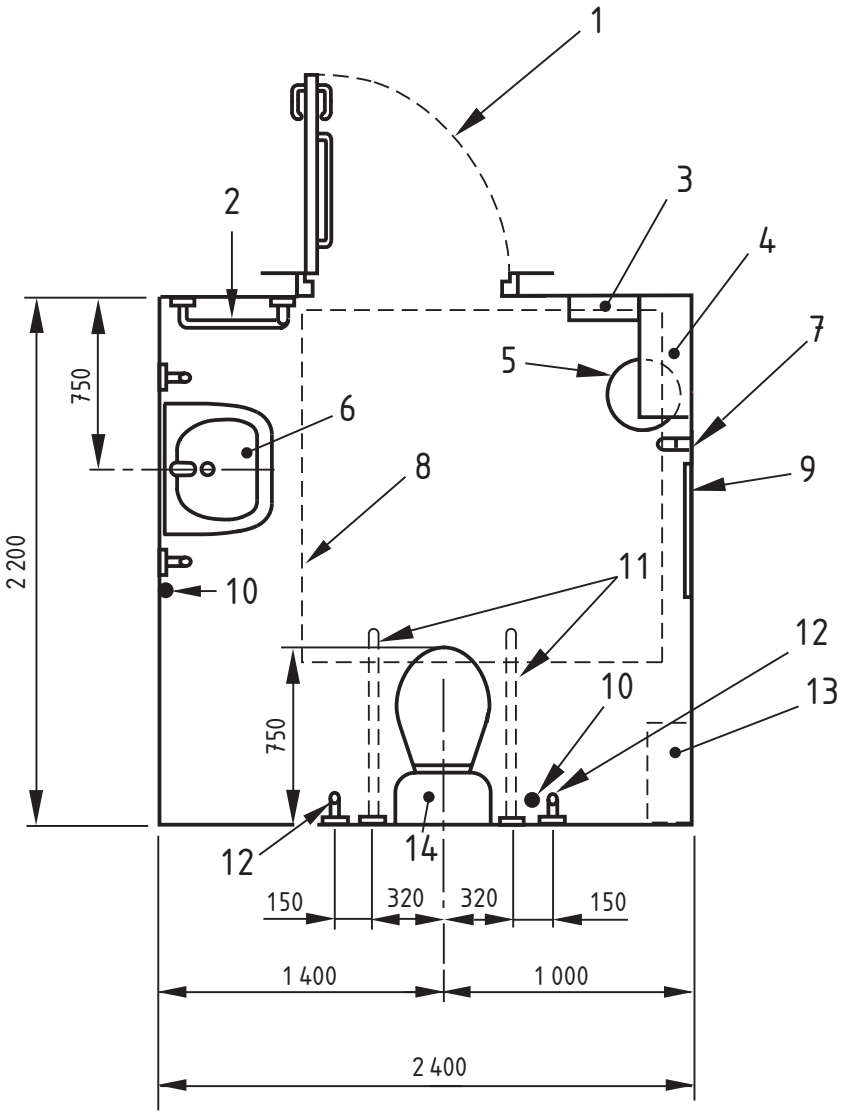
12.6.3.2 Unisex accessible peninsular WC for assisted use

The minimum clear overall dimensions, as well as the location of sanitary and other fittings, of a unisex accessible peninsular WC compartment should be as shown in Figure 55. (See Figure 54 for examples of transfer techniques.)

NOTE A peninsular WC layout is only appropriate when an assistant is available, because drop-down support rails are not considered to give sufficient support for independent transfer and it is not possible to rinse hands when seated on the WC. Furthermore, the absence of a side wall can give rise to feelings of insecurity.

A single unisex accessible WC with a peninsular layout should not be provided as a substitute for two separate unisex accessible WCs with handed corner layouts, but as an additional facility.

Figure 55 **Unisex accessible peninsular WC for assisted use**
Dimensions in millimetres



NOTE The overall dimensions shown exclude such items as heat emitters and boxing in of pipework, and adjustments in room size will be needed to accommodate these items.

Key

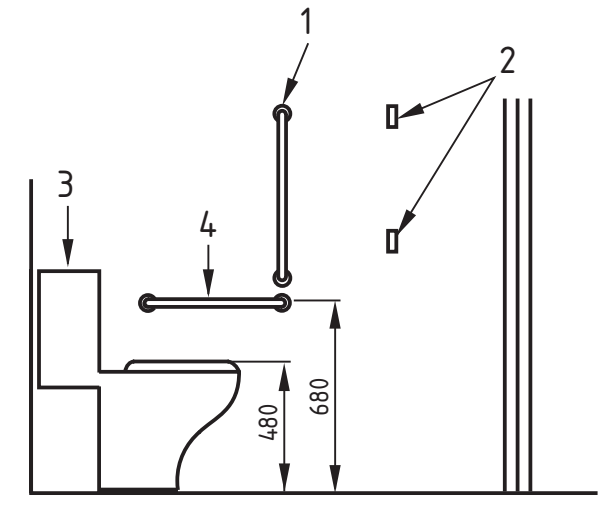
1 This door may be in any position along the wall but the leading edge should be not less than 300 mm from a return wall
2 Towel rail
3 Sanitary dispenser
4 Shelf
5 Disposal bin
6 Large washbasin with vertical grab rails either side and mirror over (see Figure 53)
7 Two clothes hooks, one at 1 050 mm and the other at 1 400 mm above the floor
8 Wheelchair turning space (1 500 × 1 500) mm
9 Independent tall mirror
10 Alarm pull cord
11 Drop-down support rails, one with a toilet roll holder
12 Vertical grab rail
13 Sanitary disposal unit
14 Flat-topped close-coupled cistern providing a back rest and a colostomy changing surface for standing users (where high or low level cisterns are used, a rail with a padded back rest and a separate colostomy changing shelf 125 mm to 150 mm deep and preferably 400 mm wide, with its surface 950 mm above floor level, should be provided)

12.6.3.3 WC compartment accessible by ambulant disabled people

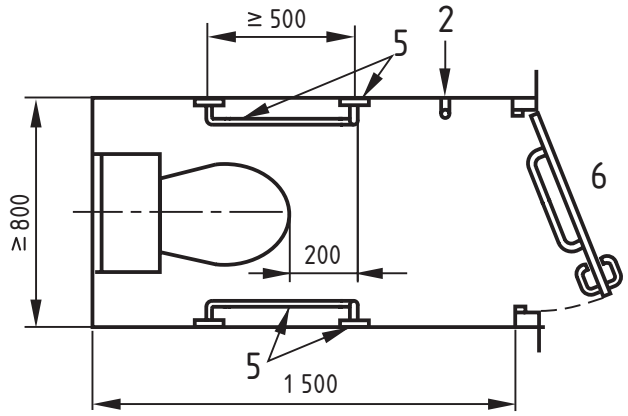
The minimum clear overall dimensions of a WC compartment accessible by ambulant disabled people, as well as the location of sanitary and other fittings, should be as shown in Figure 56.

Where the compartment has an inward-opening door, it should be fitted with a double action pivot set and an emergency release mechanism operated from the outside. Inward-opening compartment doors should be used only in existing buildings where there is no alternative.

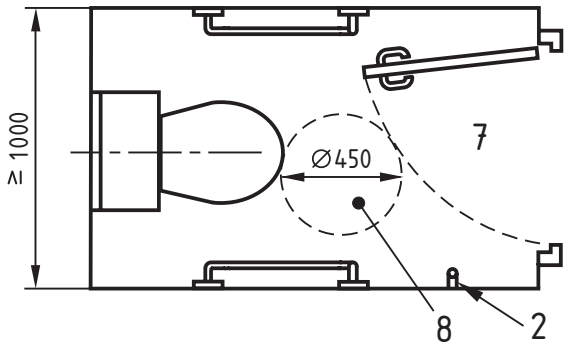
Figure 56 **Accessible WC compartment for ambulant disabled people**
Dimensions in millimetres



a) Elevation



b) Plan (new buildings)



c) Plan (existing buildings)

Key

1 600 mm long vertical grab rail
2 Two clothes hooks, one at 1 050 mm and the other at 1 400 mm above the floor
3 Flat-topped close-coupled cistern providing a back rest and a colostomy changing surface for standing users (where high or low level cisterns are used, a rail with a padded back rest and a separate colostomy changing shelf 125 mm to 150 mm deep and preferably 400 mm wide, with its surface 950 mm above floor level, should be provided)
4 Horizontal grab rail
5 Vertical and horizontal grab rails
6 Outward-opening door with horizontal pull rail
7 Inward-opening door with effective clear width of at least 800 mm (existing buildings only)
8 Door swing clear of 450 mm diameter space on plan between fittings

NOTE The overall dimensions shown exclude such items as heat emitters and boxing in of pipework, and adjustments in room size will be needed to accommodate these items.

12.6.3.4 WC pan and cistern

Where practicable, the flush should be operated manually by a spatula type lever and, for a corner arrangement, positioned on the open or transfer side of the pan for ease of access.

NOTE 1 This applies irrespective of whether the cistern is external or located within a duct. Care is needed in the selection of a cistern, as not all cisterns are dual-handed.

Alternatively, it should be operated by sensor activation (e.g. infra-red), with the sensor located in the same place as a lever.

Where a chain pull from a high level cistern is used in a corner WC arrangement, it should be positioned on the open side and terminated with a ring handle of 50 mm diameter at a height of between 800 mm to 1 000 mm above the floor. These should be used only in existing buildings.

The top surface of a WC seat (neither the cover nor the sanitary ware) should be set at a height of 480 mm above the finished floor level (see Figure 52).

NOTE 2 A height of 480 mm is the same as the seat height of the majority of wheelchairs.

Where a plinth is used to achieve the required seat height, it should not obstruct access to, or the use of, the WC by wheelchair users and ambulant disabled people.

The WC seat in an accessible unisex toilet should be designed for heavy duty use and securely fixed with metal (preferably stainless steel) fittings from the top into the rim of the WC, as a wheelchair user transferring from a wheelchair imposes high lateral stresses on the seat and seat fixings.

NOTE 3 Retaining buffers (lugs that hold the sides of the seat in place on the pan) can offer greater lateral stability for the seat.

If seat covers are used, they should not impede transfer when raised.

NOTE 4 A strong seat cover designed to act as a back rest when lifted might be suitable for use with a close-coupled WC.

Gap-front seats should not be used.

12.6.3.5 Size and location of support rails and grab rails around a WC

The height of all horizontal, fixed grab rails or drop-down support rails should be set at 680 mm above the floor (see Figure 52).

The lateral position of horizontal support rails and grab rails should be set as follows [see Figure 51a) and Figure 55].

a) A hinged drop-down support rail, located on the open side [Figure 51a)] or on both sides (Figure 55), should be fixed with its centre line 320 mm from the centre line of the WC and should extend 50 mm to 100 mm beyond the front of the WC.

b) A fixed horizontal grab rail should be located on the side wall [Figure 51a) and Figure 52] with a 50 mm to 60 mm clearance between the rail and the wall.

c) A fixed horizontal rail, with a padded backrest, should be located behind, and centred on, the WC pan when the cistern is in a duct, when there is sufficient space below a low-level cistern (not close-coupled) or when the cistern is at high level, provided the rail's projection allows the seat to tilt beyond the vertical and remain raised so that the WC is comfortable and safe to use and can be used as a urinal.

NOTE 1 The satisfactory performance of grab/support rails is dependent on the provision of a suitable supporting structure and fixings.

NOTE 2 A fixed horizontal grab rail behind the WC pan cannot be accommodated in conjunction with a close-coupled cistern. In this circumstance, a close-coupled cistern with a screw-down cover designed to give support provides an alternative solution.

The operation of drop-down support rails, and the nature of supporting walls and fixings, should follow the recommendations in **12.2.4**.

Vertical grab rails, at least 600 mm in length, should be fixed where possible with their centre line set at 1 100 mm above the floor (see Figure 52).

The lateral position of vertical grab rails should be set 470 mm from the centre line of the WC [see Figure 51a) and Figure 55].

12.6.4 Urinals accessible to wheelchair users and ambulant disabled people

*COMMENTARY ON **12.6.4**.*
Wheelchair users might be able to pull themselves to a standing position to use a urinal, or they might be able to use a urinal from their wheelchair. The lower urinal position shown in Figure 57 is also beneficial to a person of restricted stature or a child.

The wheelchair space in front of a urinal should be level (see Figure 57).

Vertical grab rails for the benefit of a disabled person who is standing should be provided on each side of a urinal where stall privacy dividers are not fitted.

The rim height of a urinal should be 500 mm above floor level for a standing person and 380 mm above floor level for a wheelchair user. In both instances, the urinal rim should project at least 360 mm from the wall face (see Figure 57).

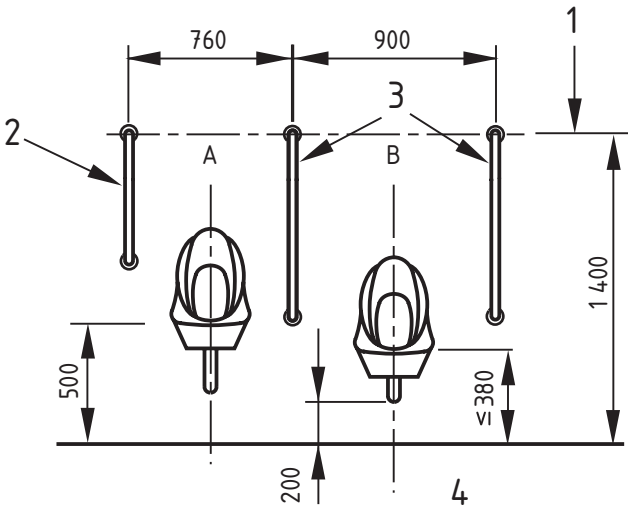
NOTE A tapering urinal, possibly extending more than 360 mm from the wall, allows closer access, without the wheelchair touching the wall or any pipework.

An unobstructed space of at least 900 mm wide by 1 400 mm deep should be provided in front of a urinal to allow access by a wheelchair user (see Figure 57).

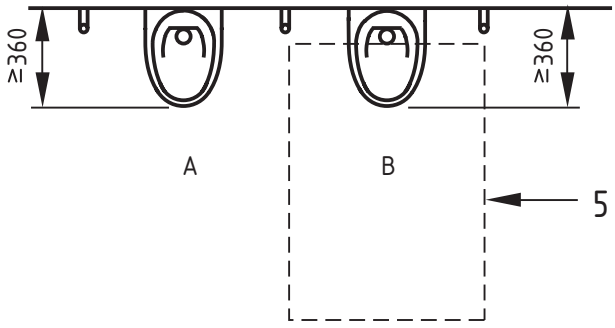
Urinals should contrast visually with the wall to which they are attached (see Annex B).

Where a urinal suitable for a wheelchair user is situated in a wheelchair-accessible male washroom, one washbasin with its rim between 680 mm and 700 mm should also be provided.

Figure 57 **Urinals accessible to wheelchair users and ambulant disabled people**
Dimensions in millimetres



a) Elevation



b) Plan

Key

1 Line of top fixing for vertical grab rails
2 600 mm long grab rail for standing users
3 900 mm long grab rail for wheelchair users
4 Wall space kept free of pipework to 200 mm above floor unless urinal projects more than the minimum 360 mm from the wall
5 900 mm wide × 1 400 mm deep wheelchair access space
A Suitable for ambulant disabled people
B Suitable for wheelchair users

12.6.5 Washbasins

12.6.5.1 Hand rinse basin and tap

A wall-mounted hand rinse basin should be provided in a unisex WC cubicle to allow closer access for wheelchair users and to enable feet and footrests to move under the washbasin when the wheelchair is turned. The height of the washbasin rim should be as shown in Figure 53.

The hand rinse basin should have a mixer tap fitted to the side of the basin nearest to the WC to allow easy reach from the WC.

NOTE Some proprietary types of plug (e.g. spring-loaded or flip-over) avoid a chain or a pop-up waste and are more suitable for people with limited hand dexterity.

12.6.5.2 Independent washbasins accessible to ambulant disabled people

The unobstructed space provided at washbasins for ambulant disabled people should be 800 mm wide × 1 100 mm deep.

A basin rim should be set between 780 mm and 800 mm above floor level as shown in Figure 53.

Where possible, vertical support bars at least 600 mm long should be fixed each side of the washbasin, with their mid-point at 1 100 mm above the floor (see Figure 53).

12.6.6 Toilet accessories

12.6.6.1 General

Toilet accessories, such as dispensers for soap, toilet paper and paper towels, should be suitable for single-handed use and for use by people with weak arm movements. They should be readily accessible to a person in a wheelchair or seated on the WC, and to a person when standing (see Figure 52).

NOTE 1 Single-sheet toilet paper dispensers are more suitable for single-handed use than most toilet roll holders.

Electric hand dryers with an automatic timed duration should be provided in addition to a paper towel dispenser, and should be located on the door side of the washbasin so as not to obstruct access to the WC. They should be operated either by a movement sensor or by an easily operated push button. Hand dryers that require the user to insert their hands in the top of the dryer should not be installed.

If a shaver point is provided, it should be located at the side of a mirror, between 800 mm and 1 000 mm above the floor (see Figure 53).

Sanitary towel and incontinence pad dispensers, and sealed containers for their disposal, as well as disposal bins for other items, should be incorporated into the design of the WC compartment so as not to obstruct transfer from a wheelchair to the WC pan. They should not be placed within the manoeuvring area for wheelchairs.

NOTE 2 In areas of high usage, it might be preferable to install built-in macerator units.

Where a high or low level cistern is used, a shelf, 125 mm to 150 mm deep and preferably 400 mm wide, for use by ambulant disabled people when changing colostomy bags, should be provided adjacent to the WC pan. The top surface of the shelf should be at 950 mm above the floor [see Figure 51a) and Figure 52]. Where a cistern is close-coupled, the same function can be provided by its top surface, provided it is flat.

Wall-mounted vending machines, where used, should not reduce the clear width of door openings.

A shelf, approximately 400 mm wide and 200 mm deep, set at 700 mm above the floor, should be provided adjacent to the washbasin and away from the wheelchair manoeuvring area.

NOTE 3 A shelf is useful for keeping items such as equipment or bags off a floor that might be wet, or for helping an ambulant disabled person find personal effects without the need to stoop.

12.6.6.2 Mirrors

Mirrors should be positioned as shown in Figure 53.

When a mirror is located away from a washbasin, e.g. within an individual unisex accessible WC compartment, or when it is serving a range of compartments or other sanitary facilities, it should be at least 1 000 mm tall and have its bottom edge set at 600 mm above the floor (see Figure 53).

NOTE 1 A mirror fixed between these heights and located away from a washbasin is suitable for use by ambulant disabled people and wheelchair users.

Any mirror that is located above a large washbasin (not the hand rinse basin associated with a corner unisex WC layout) should be fixed as closely as possible to the top of the basin and extend to at least 1 600 mm above the floor, as shown in Figure 53. Mirrors that cannot be extended down to the upper edge of the washbasin, e.g. because of the presence of a soap dispenser, should be tilted forward.

NOTE 2 A tilting mirror is suitable for use by most people and can enable a smaller size of mirror to be used.

Large expanses of mirror in a compartment should be avoided as they can cause difficulties for blind and partially sighted people.

12.6.7 Lighting and lighting accessories

*NOTE General recommendations for lighting are given in **9.4**.*

The maintained illuminance (or general lighting level) of toilet accommodation should be not less than 100 lux at floor level.

Where automatic lighting is used, back-up switched lighting should be provided in addition to a motion sensor. Where an accessible WC cubicle is provided in a range of single sex cubicles, a motion sensor to activate the lighting should be installed in both the accessible cubicle and the general area adjacent to the washbasins.

12.6.8 Emergency assistance

Emergency assistance alarm systems in toilet accommodation should conform to **9.3.7.2** and **12.2.8**.

The emergency assistance pull cord should be sited so that it can be operated from the WC and from an adjacent floor area.

12.6.9 Heat emitters

In a unisex accessible WC, heat emitters should not be located in the following positions:

a) on the same wall as the WC or adjacent to it;

b) on the wall directly opposite the washbasin, unless the width of the room is increased to accommodate it;

c) underneath, or immediately adjacent to, the washbasin or hand dryer.

12.7 Changing Places sanitary accommodation

*COMMENTARY ON **12.7**.*
A Changing Places (CP) facility is a combined toilet, shower and changing room for use by people with complex and multiple disabilities who require the help of up to two assistants. The space needs to be fitted with a fixed tracked hoist system so that assistants can fit the user's slings to the hoist and move the person to the various items in the facility.

Any larger building where the public have access in numbers or where visitors might be expected to spend longer periods of time is a suitable venue for a CP facility. Such facilities are particularly important in buildings that might offer the only suitable sanitary accommodation within a locality, or in buildings where public services are provided, such as those operated by local authorities.

CP facilities require extended space to accommodate disabled people, often with large complex wheelchairs with elevated leg rests, a reclining facility or integral oxygen cylinders, and space to fit slings for use with the hoist. It also needs to be possible for a wheelchair to be parked within the facility when not in use without compromising the safe access and use of the equipment.

As CP facilities are not designed for the use of independent wheelchair users, or to be used as baby changing facilities, it is desirable for facility providers to indicate the location of the nearest unisex accessible WC and the nearest baby changing facility.

Further advice on the design and installation of CP facilities, including a suitable logo to identify such facilities, can be obtained by contacting the Changing Places Consortium (see Bibliography under Information sources). It would be of benefit to the Changing Places Consortium to receive notification of any new CP facilities being built.

A CP facility should be provided in larger buildings and complexes, such as:

a) major transport termini or interchanges, e.g. large railway stations and airports;

b) motorway services;

c) sport and leisure facilities, including large hotels;

d) cultural centres, such as museums, concert halls and art galleries;

e) stadia and large auditoria;

f) shopping centres and shopmobility centres;

g) key buildings within town centres, e.g. town halls, civic centres and main public libraries;

h) educational establishments;

i) health facilities, such as hospitals, health centres and community practices.

Where possible, a CP facility should be located close to other managed facilities in a development. If remote from the reception/management point, the facility should be lockable by a universal key system (e.g. the RADAR National Key Scheme).

The CP facility should be in addition to, not instead of, the provision of unisex accessible WCs. A sign should be provided at the entrance to the CP facility indicating the location of the nearest unisex accessible WC and any baby changing facilities.

The CP facility should be at least 3 m wide and 4 m long, with a ceiling height of 2.4 m.

The doorway should have a minimum effective clear width of 1 000 mm, with a level threshold. Single-leaf single-swing doors should open out and be fitted with a horizontal pull rail on the interior face of the door.

NOTE 1 If the access route is restricted, it might be necessary for the door to open into the room. In this case, it might be more convenient to achieve the required effective clear width using a reduced-swing doorset, rather than a single leaf door.

CP toilets should have a full room cover overhead tracked hoist system (either ceiling- or wall-mounted) conforming to BS EN 10535. The room structure and the track should be capable of supporting a safe working load of 200 kg. All ceiling fittings and fixtures should be flush, recessed or shallow fittings to allow free movement of the moving rail of the tracked hoist. Manufacturers' instructions should be clearly displayed.

NOTE 2 The use of a mobile hoist might restrict the flexibility and long-term use of the facility. However, a full room cover system provides greater flexibility by being able to reach all areas of the room. Written instructions on the use of equipment needs to be displayed beside each item (see Annex G). It is expected that the premises management will provide information to prospective users on the type of sling connector and the types of sling that are compatible with their installed hoist and track.

NOTE 3 The loop type of connector is preferred by the vast majority of private users, whereas the clip type is more common in healthcare buildings. More information on slings is available in Annex G.

The room should have either a mobile or fixed changing bench, in each case height-adjustable, capable of operating at a safe working load of 125 kg. The covering of the bench should be suitable for use when a person is showering as well as changing.

NOTE 4 It can be beneficial to use a shower seat in conjunction with a movable changing bench. A mobile changing bench has the advantage that assistants can give support from both sides when the bench is moved away from the wall (see Annex G). Attention is drawn to the Lifting Operations and Lifting Equipment Regulations 1998 [28]. Useful guidance is also available in Guide to the handling of people *[29].*

Large sanitary disposal bins and waste disposal bins should, where practicable, be recessed into the wall to avoid being an obstacle to assistants moving alongside the WC.

NOTE 5 Sanitary disposal bins should be large enough to accommodate adult-sized pads.

A power-operated, height-adjustable washbasin should be provided to accommodate use by both wheelchair users and assistants.

A peninsular WC layout should be provided, with drop-down support rails either side.

NOTE 6 It is an advantage if the support rails are height-adjustable.

A retractable privacy screen (not ceiling-mounted) should be provided to allow the disabled person to maintain their dignity when using the WC, as an assistant will always be present.

NOTE 7 The screen will also benefit assistants who require to use the WC without leaving the disabled person unattended.

Ventilation extract fans should be as quiet as possible in operation as their noise can cause distress to some people and can be a barrier to communication.

The CP facility should be heated, as users might be undressed and in the facility for a long period.

The illuminance in the room should be maintained at 300 lux at changing bench level. Timed lighting should not be used as, if the lighting switches off, the assistant has to leave the disabled person unattended to re-activate the lighting.

NOTE 8 It is not appropriate to install ultra-violet light in this type of facility, as it reduces the ability of blind and partially sighted people to appreciate visual contrast and might trigger seizures in people with epilepsy.

A CP facility should contain, as a minimum, the fittings and accessories shown in the example layout of Figure 58.

12.8 Accessible bedrooms

*COMMENTARY ON **12.8**.*
Many disabled people find it more convenient to dress and undress on a bed. Some disabled people have continence problems and therefore need to be near toilet accommodation. For disabled people who take a long time to dress and undress, it can be an advantage to have washing and toilet facilities together in the same room.

A ceiling-mounted tracked hoist system operable by a disabled person, for transfers between wheelchair, bed, shower or bath, and WC pan, helps maintain that person's independence.

Disabled people, particularly wheelchair users, need sufficient space to be able to move around a bedroom with ease and to use the facilities available. Disabled users might also need to bring assistance dogs into the room.

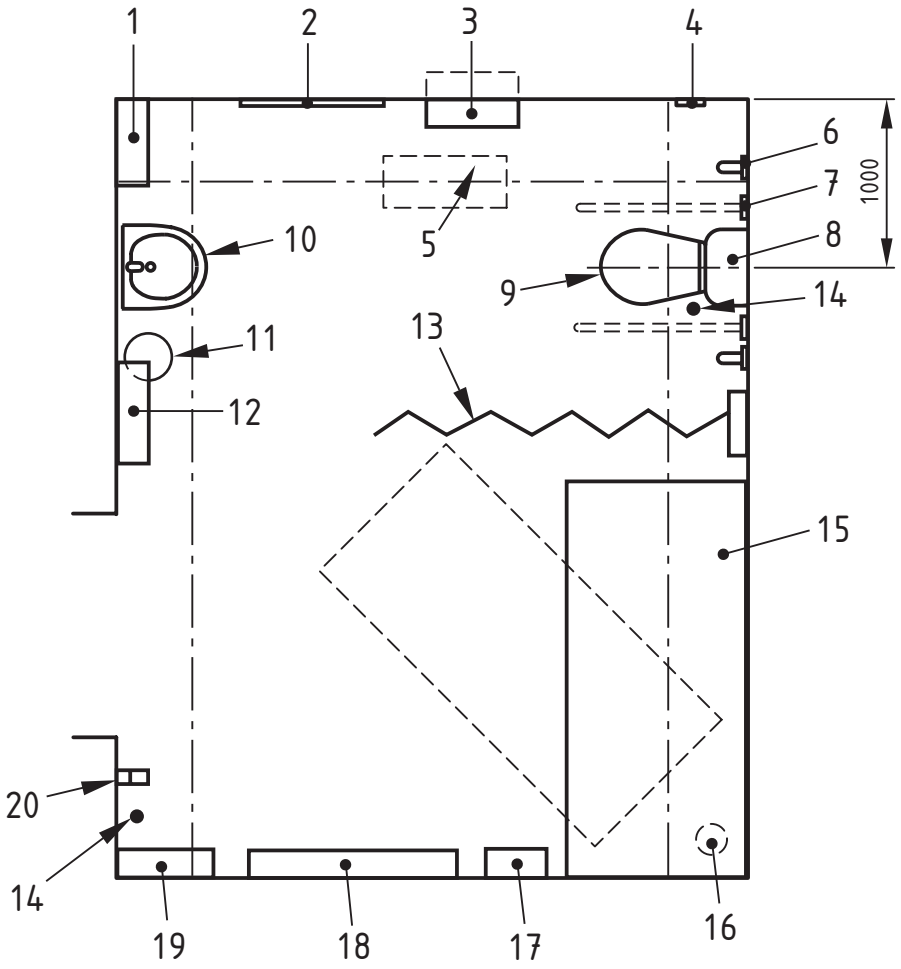
Even if there is sufficient space to move around the bedroom, wheelchair users can be constrained by being unable to reach from a sitting position in order to use items such as wardrobes or to operate equipment.

Ambulant disabled people are also constrained by their inability to reach.

Carefully chosen lighting and finishes, and windows with an interesting outlook, create a safe and welcoming environment for all users. This can be especially important for people who find themselves in unfamiliar surroundings such as when attending a conference or a study course, or when on holiday.

The recommendations given in this subclause apply to all building types that require permanent sleeping accommodation for disabled people, including hotels, motels, nursing and residential homes, university and college halls of residence, and relatives' accommodation in hospitals.

Figure 58 **Example of fittings and accessories in a Changing Places facility**



Key

1 Paper towel dispenser
2 Full length mirror
3 Large sanitary disposal bin, if possible recessed into the wall
4 Alarm reset button
5 Full room cover tracked hoist system
6 Vertical grab rail
7 Drop-down support rails, one with a toilet roll holder
8 Flat-topped close-coupled cistern providing a back rest and a colostomy changing surface for standing users (where high or low level cisterns are used, a rail with a padded back rest and a separate colostomy changing shelf 125 mm to 150 mm deep and preferably 400 mm wide, with its surface 950 mm above floor level, should be provided)
9 Peninsular WC (see Figure 55 for the location of associated fittings)
10 Large power-assisted height-adjustable washbasin
11 Waste disposal bin
12 Manually-operated hand dryer
13 Retractable privacy curtain/screen
14 Alarm pull cord
15 Height-adjustable showering/changing bench, min. 1 800 mm long
16 Floor drain
17 Shower unit
18 Wide paper roll dispenser for use on the changing bench
19 Sanitary towel dispenser
20 Two clothes hooks, one at 1 050 mm and the other at 1 400 mm above the floor

*NOTE Details of common features of sanitary accommodation are described in **12.2** and accessories related to toilets in **12.6.6**. Advice on particular products is available from the Changing Places Consortium (see Bibliography, under Information sources).*

12.8.1 Provision of accessible bedrooms

An accessible bedroom should cater for as wide a range of disabilities as possible (see the definition in **3.3**).

Accessible bedrooms should always be provided with en-suite sanitary facilities if the general sanitary arrangement in a hotel, motel, student accommodation, nursing or residential home adopts an en-suite approach for any other standard bedrooms, and should be the preferred solution where there is no such approach as disabled people might have difficulty moving from one compartment to another. If an en-suite solution is not possible, the sanitary facility and the bedroom should provide separately the same degree of accessibility and be located close to one another.

NOTE 1 It can be advantageous for some accessible bedrooms to have a connecting door to an adjoining room for use by an assistant or family member.

For new buildings, the minimum provision of accessible bedrooms as a percentage of the total number of bedrooms should be:

- 5% without a fixed tracked-hoist system (see example in Figure 59);
- 5% with a fixed tracked-hoist system or similar system giving the same degree of convenience and safety;
- 5% capable of being adapted in the future to accessibility standards (i.e. with more space to allow the use of a mobile hoist, wider doors, provision for services and with enclosing walls capable of supporting the required fittings, e.g. grab rails and drop-down support rails).

Individual organizations should assess the level of further provision they require.

NOTE 2 In large cities with high visitor volumes, e.g. for conferences and sports events, it could be a commercial advantage to increase the proportion substantially.

If only one accessible bedroom is provided, it should include an accessible shower room, rather than a bathroom, since many disabled and elderly people can only use a shower. If practicable, it should have a right-hand transfer layout (see Figure 42). If more than one en-suite accessible bedroom is provided, a choice of shower or bath and a choice of left-hand or right-hand transfer to the WC and shower or bath should be provided. A choice of sanitary facilities for independent and assisted use should be made available.

NOTE 3 Right-hand transfer is taken to mean transfer to the right when a person is seated in their wheelchair.

NOTE 4 The preferred solution is a level-access shower, with a shower chair/tip-up seat being provided, if required.

All sanitary facilities in accessible bedrooms should contain a WC.

12.8.2 Location of accessible bedrooms

Accessible bedrooms should be located on accessible routes that are direct and obstruction-free. Suitable means of escape should be provided in accordance with BS 9999.

Accessible bedrooms should be situated so that they have equal access to views enjoyed from standard bedrooms, as well as access to all available amenities of the building. Those accessible bedrooms located on upper floors should be located close to lifts; those on the ground floor should be located close to the reception area.

NOTE Provided that accessible routes and suitable means of escape are available, accessible bedrooms (i.e. those designated for use by disabled people) do not need to be located on the ground floor, where views might be limited.

12.8.3 Space around beds

12.8.3.1 Space for independent transfer at the side of a bed

The clear minimum space to allow a wheelchair user to gain access to one side of a bed and also to turn should not be less than 1 500 mm × 1 500 mm (see Figure 59 and Figure 60).

NOTE 1 The 1 500 mm square space allows a 45° (oblique) transfer, or front facing transfer, from wheelchair to bed, with a wheelchair user needing to reverse at some point during the manoeuvre.

NOTE 2 The use of beds with toe/footrest space beneath them maximizes manoeuvring space.

The clear space to allow wheelchair users access to one side of a bed and also to turn through 180° should be at least 2 100 mm wide × 2 250 mm deep (see Figure 59 and Figure 60).

The bed and bedside table should not be fixed to the wall so that they can be moved to suit a person's preferred mode of transfer to the bed.

12.8.3.2 Space at the side of a bed for an assistant

A clear space should be provided on one side of a bed, to allow a person to assist with transfer undertaken from the other side. This space should be at least 700 mm wide (see Figure 59 and Figure 60).

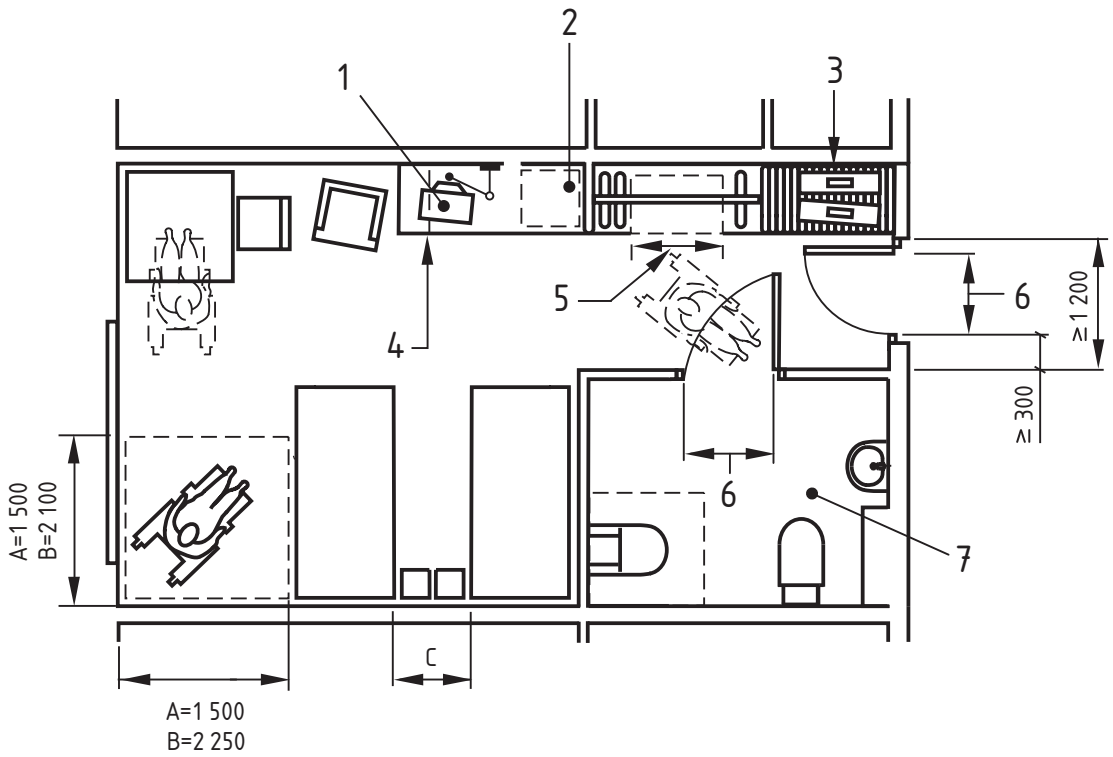
12.8.3.3 Space at the side of a bed for an assistant to operate a mobile hoist

*COMMENTARY ON **12.8.3.3**.*
An assistant-operated mobile hoist is useful in special schools, hostels, hotels, holiday facilities, residential and nursing homes, hospitals and medical centres.

A clear space should be provided to allow transfer with the aid of an assistant-operated mobile hoist turning through 180°. This space should be at least 2 250 mm wide × 2 100 mm deep (see Figure 59 and Figure 60).

NOTE The space needed to accommodate a mobile hoist in a bedroom is likely to be greater than that of an accessible en-suite bedroom with a fixed hoist system installed.

Figure 59 **Example of an accessible bedroom with en-suite sanitary facilities**
Dimensions in millimetres

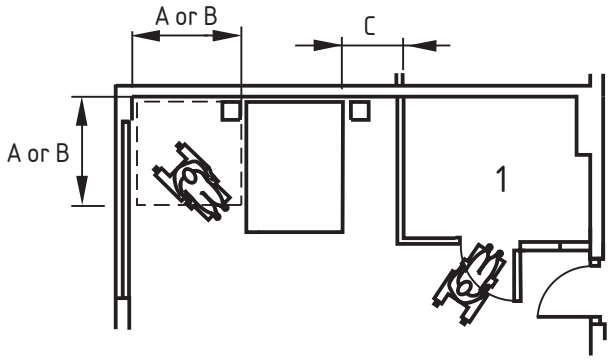


NOTE The example shown is for right-hand transfer to the shower seat and WC.

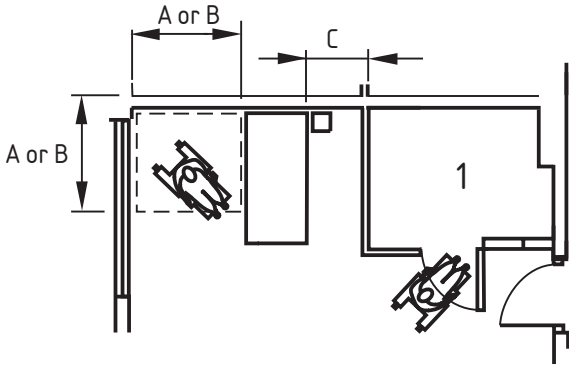
Key

1 Television
2 Refrigerator
3 Luggage rack
4 Drawer unit and clear space under
5 800 mm min. unobstructed knee recess in wardrobe, with no plinth
6 Effective clear width (see Table 2)
7 See Figure 42 for details of a shower room with corner WC for independent use, Figure 44 for details of a bathroom with a tracked hoist system and Figure 46 for details of a bathroom with a peninsular WC for assisted use
A (1 500 × 1 500) mm min. allows front facing or 45° oblique transfer by wheelchair user
B (2 250 × 2 100) mm min. allows transfer methods used in A and also space for a mobile hoist to be turned through 180°
C 700 mm min. allows an assistant to help with the transfer from the other side of a bed

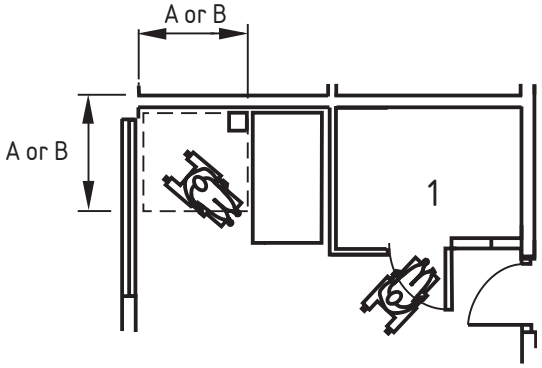
Figure 60 **Examples of accessible bed layouts**
Dimensions in millimetres



a) Double bedroom (with space for an assistant beside the bed)



b) Single bedroom (with space for an assistant beside the bed)



c) Single bedroom (without space for an assistant)

Key

1 Bathroom or shower room
A (1 500 × 1 500) mm min. (see Figure 59)
B (2 250 × 2 100) mm min. (see Figure 59)
C 700 mm min. (see Figure 59)

12.8.4 Doors

12.8.4.1 Clear widths of door openings

The effective clear width of door openings to all bedrooms should conform to the recommendations in **6.4.1**.

NOTE 1 External doors to bedrooms that are not designed as accessible bedrooms need to have the same effective clear width, so that wheelchair users can visit guests in those rooms. However, door openings, spaces and facilities within such rooms do not need to be fully accessible.

Doors of wardrobes and other storage systems should swing open through 180°.

NOTE 2 A door that has a restricted swing presents a hazard, especially for blind and partially sighted people. A door that swings through 180° presents no such hazard, nor does it restrict access in front of it. The approach to storage facilities is also made easier for wheelchair users.

12.8.4.2 Door fittings

Door handles on hinged and sliding doors in accessible bedrooms should be easy to grip and operate by a wheelchair user or ambulant disabled person (see **6.5.1**), and should contrast visually with the door (see Annex B).

Handles fixed to hinged and sliding doors of furniture and fittings in bedrooms should be easy to grip and manipulate. They should conform to the recommendations in **6.5** for dimensions and location, and the minimum force required to manipulate them.

Electronic card-activated locks or electrically powered openers for bedroom entrance doors should be used where practicable.

NOTE Disabled people with a weak hand grip or poor coordination find that using a card to open a door lock is easier than turning a key. It is helpful for there to be a visible and audible indication (e.g. an LED and a click) that the lock has been activated or deactivated.

A wide angle viewer should be provided in doors to accessible bedrooms at two heights, 1 050 mm and 1 500 mm above floor level, to allow viewing by a person from a seated position and a person standing.

12.8.5 Balconies

*COMMENTARY ON **12.8.5**.*
Access to a balcony is as important as the space on the balcony itself.

Where an adjoining balcony to a bedroom is provided, wheelchair users should have access to it, preferably with space for a companion, as shown in Figure 61.

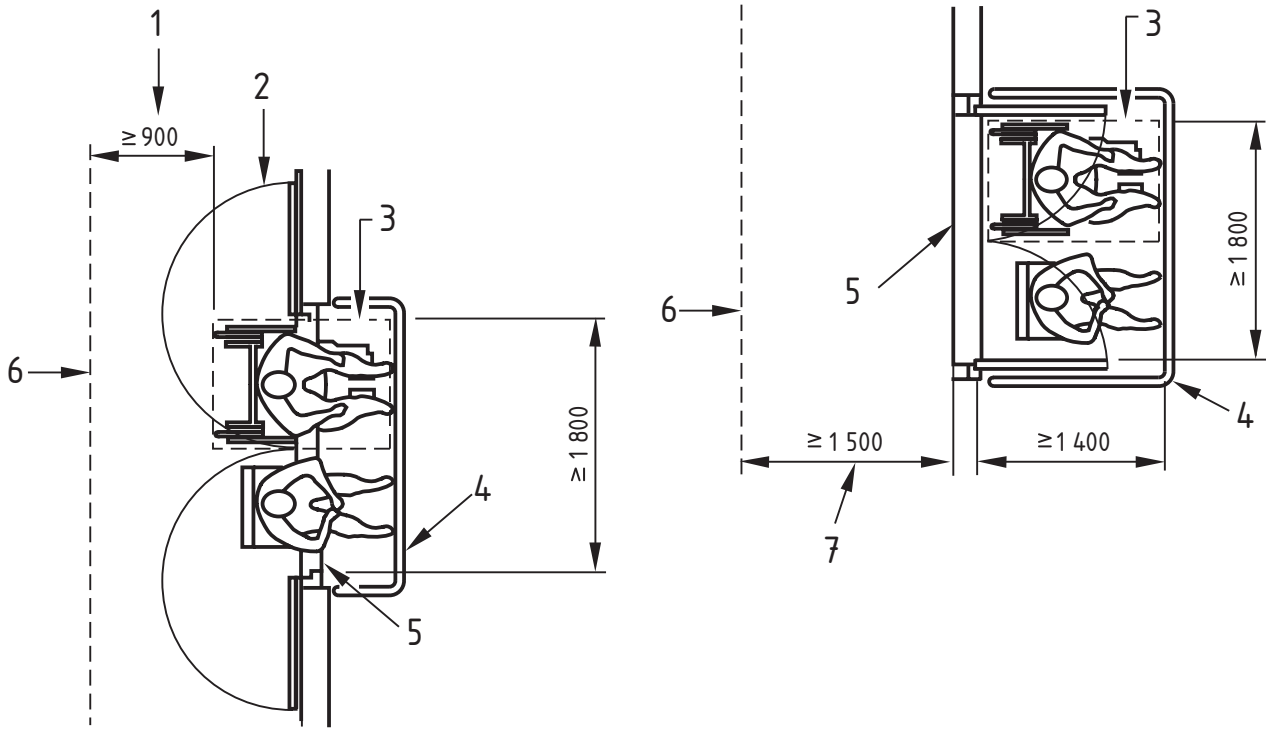
The external threshold should conform to the recommendations in **6.2**.

Balcony doors should conform to the recommendations in **6.4** and **6.5**.

The heights of centre rails and transoms incorporated into balcony access doors should not obstruct the view of a wheelchair user or a seated ambulant disabled person (see **10.3**).

The balcony balustrade and/or guarding should conform to the recommendations in BS 6180.

Figure 61 **Examples of wheelchair access to balconies**
Dimensions in millimetres



a) Doors opening in from partial balcony

b) Doors opening out onto deeper balcony

Key

1 Minimum 900 mm wide circulation zone from a wheelchair space to any obstruction
2 Doors to swing back to wall where, if open at 90°, they would impinge into the minimum circulation zone
3 900 mm wide × 1 400 mm deep wheelchair space
4 Guarding
5 Level threshold
6 Line beyond which there should be no obstructions
7 Minimum transfer zone at the side of a bed (see A in Figure 59)

12.8.6 Windows

*COMMENTARY ON **12.8.6**.*
Views from windows uninterrupted by sills and transoms and easy use of window controls are important considerations in the design of accessible bedrooms for wheelchair users and ambulant disabled people.

Window design in accessible bedrooms should conform to the recommendations in **10.3**.

12.8.7 Room furniture and fittings

12.8.7.1 Beds

The top surface of a bed mattress should be 480 mm from floor level. The mattress should be firm enough to support a disabled person transferring from a wheelchair. A clearance under the bed of at

least 150 mm should be provided to accommodate the supports of a mobile hoist. Beds in accessible bedrooms should not have extra legs midway between the corner legs as they prevent use of a mobile hoist.

12.8.7.2 Wardrobes and storage systems

Where possible, the design of a wardrobe should incorporate open-fronted access for ease of access for wheelchair users.

NOTE 1 An open-fronted space provides a disabled person with the option of a front approach. The open-fronted space may be formed by the omission of shelving or drawers below a height of 725 mm from floor level. However, this might result in the loss of some storage space.

NOTE 2 If the space in front of the open-fronted access to the wardrobe forms part of the wheelchair-to-bed transfer space, the room area is more economically utilized.

The clear space for a wheelchair user in front of a wardrobe with an open front should be at least 1 100 mm.

Wherever possible, adjustable fixtures and fittings should be used as part of the shelving and hanging system within a wardrobe. Alternatively, one low and one high rail should be provided at heights that conform to the height recommendations for clothes hooks (see **12.2.5**).

Where possible, stored items at the rear of the highest shelf in a storage system should be visible to wheelchair users and ambulant disabled people, as they can be grasped safely and securely when viewed (see **10.1**).

12.8.7.3 Other furniture and fittings

A table or desk used for writing should conform to the recommendations in **11.1**.

The height of coat hooks should conform to the recommendations in **12.2.5**.

12.8.8 Switches, sockets and controls

Switches, sockets and controls for heating, lighting, radio and television should be safe and fully accessible to wheelchair users and to people with limited dexterity, blind and partially sighted people, and people who are deaf and hard of hearing (see **10.5**).

Wherever possible, safe and accessible controls for opening and closing curtains automatically or by other means of remote control should be provided for use by disabled people.

NOTE Rods or pull cords for manually opening and closing curtains are acceptable.

Main lights, bedside lights and telephones should be easily operated from a prone position on both sides of a double bed, or from both beds if twin beds are provided, and should also be reachable from a wheelchair.

A telephone with volume control that can be used by a person who is deaf or hard of hearing should be available in all bedrooms, and should be reachable from a wheelchair and from the bed (see **10.4**) in accessible bedrooms.

12.8.9 Heat emitters

Heat emitters should be located so that they do not restrict the recommended circulation space in an accessible bedroom (see Figure 60).

Exposed surfaces of heat emitters should either be screened or kept at a temperature not exceeding 43 °C.

NOTE This is particularly important for people with little or no feeling in their limbs or torso, who would initially be unaware of burns.

12.8.10 Alarm systems

A fire alarm, which emits a visual and audible signal to warn blind and partially sighted people, and people who are deaf or hard of hearing, should be provided in accordance with **9.3.7.1**.

NOTE 1 Individual under-pillow vibrating units or vibrating under-mattress pads that plug into the fire alarm system are designed to wake people who are deaf or hard of hearing from sleep in an emergency.

NOTE 2 Information on the management of a building, in particular emergency escape procedures, can be made available in audio form via radio and/or television.

An emergency assistance alarm in accordance with **9.3.7.2** should be provided in an accessible bedroom and activated by a pull cord sited so that it can be operated both from the bed and from an adjacent floor area.

The reset control for the emergency assistance alarm should be reachable from both a wheelchair and the bed.

12.8.11 Lighting and lighting accessories

The maintained illuminance (or general lighting level) for an accessible bedroom should not be less than 100 lux at floor level.

Lighting controls should be accessible from the bed (see **12.8.8**).

12.8.12 Finishes

Furniture and fittings should contrast visually with their surroundings to help partially sighted people avoid them (see Annex B).

13 Building types

13.1 Transport-related buildings

*COMMENTARY ON **13.1**.*
Journeys on public transport involve passengers transferring between different modes of public transport, as well as being set down or collected by another means of transport, e.g. a car. The accessibility of the spaces and information systems that form the interchange facilities is a fundamental consideration in the location and planning of a transport building.

As information systems play a crucial role in any transport-related building, it is important that disabled people are able to distinguish these systems quickly and effectively and, wherever possible, use the facilities independently, i.e. without depending on other people for assistance.

This subclause deals with access issues that apply to a range of transport-related buildings, including:

- *railway, bus and coach stations;*
- *underground railway and rapid transit stations;*
- *airports and terminals;*
- *sea terminals;*
- *motorway services.*

13.1.1 General

Parking and the approach to transport-related buildings should conform to the recommendations in Clause **4** and Clause **5**. Accessible internal spaces, services and equipment common to most buildings should conform to the general recommendations in Clauses **6** to **12**.

NOTE Further guidance on accessible transport-related buildings is given in Inclusive mobility *[10] and* Train and station services for disabled passengers *[30].*

13.1.2 Location and accessible routes

Resting places should be provided for people with limited mobility. The distance on level ground between resting places should be not more than 50 m.

Wherever possible, accessible routes between different transport services should be under cover.

A designated setting-down point, wherever possible protected from the elements, should be provided close to a transport building entrance for the benefit of disabled passengers. Where security restrictions prevent it being close to the building entrance, a route protected from the weather should be provided from the setting-down point to the building entrance. Short- and long-term parking close to the building entrance should be provided for disabled motorists. Short-term parking should also be provided adjacent to setting-down points for use by a person helping a disabled person to or from their vehicle or by a disabled driver waiting for passengers (see **4.2**).

At least one clearly signed route within the site boundary, accessible for wheelchair users, should link transport stops, setting-down points, parking, passenger boarding points and public pavements to the transport building they serve, preferably coinciding with the route for the general public. Signs indicating the accessible route should conform to the recommendations in **9.2**.

13.1.3 Ticket sales and information points

Ticket sales and information points that are located in noisy environments or that have security screens should have at least one position fitted with a hearing enhancement (induction loop) system to assist hearing aid users. Where more than one position with a hearing enhancement system is provided, these positions should be spaced apart sufficiently so that there is no spillover between positions (see **9.3**).

Furthermore, one of the positions fitted with an induction loop system should also be suitable for wheelchair users.

NOTE It might not be possible for an induction loop system to be fitted to adjacent positions without spillover and therefore loss of privacy.

Glass screens should be non-reflective and any walls behind the ticket salesperson finished in a solid colour to aid lip-reading (see also **9.1.5**).

At least one ticket sales and information point should be suitable for wheelchair users (see **11.1**). Where there is only one ticket sales and information point, the counter should be at a height that is suitable for both wheelchair users and people standing.

Queuing lanes to ticket sales and information points defined by barriers should always be wide enough for a wheelchair user to turn (see Annex C). Wherever possible, they should include a zone where one wheelchair user can pass another.

13.1.4 Location and operating space for ticket machines

The location and operating space for ticket machines should be fully accessible to people with limited mobility and should conform to the recommendations in **10.2**.

13.1.5 Obstructions

Free-standing litter bins and isolated barriers such as bollards should be sited outside the main pedestrian access routes and contrast visually with the surroundings (see **5.7**).

Telephones, vending machines, ticket machines and seating areas should be located so that people using them do not obstruct the main pedestrian flow.

13.1.6 Waiting areas and seating

Seating should be provided at all key waiting points in a transport-related building (see **11.2**).

One space within or at the end of a block of seating should be provided for an assistance dog to rest. This space should be underneath or at the side of the allocated seat and clear of pedestrian routes. Labelling that indicates priority use of strategically placed seats for people with limited mobility should be clearly visible.

NOTE Assistance dogs include guide dogs and hearing dogs.

Waiting areas for long distance coach and rail services should be located close to information points, toilets and refreshment facilities.

Any waiting areas that are segregated from coach or rail boarding areas, to give protection from noise and/or fumes, should have visual and audible information regarding boarding.

13.1.7 Ticket barriers and gates

At least one permanently available passing gate should be provided as a means of access to wheelchair users, people with assistance dogs, and others with limited mobility.

13.1.8 Boarding points and platforms

The layout and location of bus, coach and tram boarding points, railway platforms, and concourses, should be designed so that passengers can quickly identify the service they want.

In bus, coach and tram stations, passengers should not have to cross the paths of other moving vehicles.

Where trains are not provided with on-board ramps, portable ramps should be available on station platforms to allow a wheelchair user access between platform and train, with staff assistance.

The surface of rail, bus, coach and tram platforms should be even, non-slip and with a drainage slope not exceeding 1:50 from the front edge. Parts of a platform where drainage is not essential, e.g. at the rear, should be level to assist disabled people travelling along its length.

NOTE Examples of convenient access to buses and coaches, and further guidance on rail platform design, are given in Inclusive mobility *[10] and* Train and station services for disabled passengers *[30]. Guidance on tactile paving, which is needed on railway platforms, is given in* Guidance on the use of tactile paving surfaces *[12].*

13.1.9 Toilet accommodation

*COMMENTARY ON **13.1.9**.*
Many disabled people are unable to use on-board toilet facilities on coaches, trains, ships and aircraft.

Wheelchair-accessible unisex toilet accommodation should be provided as near as possible to departure and arrival points, i.e. in a location in which it can be used as late as possible before departure from the building and immediately on arrival at the destination. Toilet accommodation should conform to the recommendations in **12.6**.

At major transport terminals, a mix of differently handed unisex WC designs (left-hand and right-hand transfer) should be provided to accommodate as wide a possible range of assisted and independent disabled users.

WCs should be provided with repeater speakers from the public address system so that people using unisex WC facilities do not miss important information.

*NOTE If a transport terminal is large enough, it can be beneficial to provide a Changing Places (CP) facility with a peninsular WC layout. Such a facility includes a changing bench for the benefit of severely disabled people and their assistants. CP facilities are not considered to be suitable for independent use by wheelchair users (see **12.7**).*

13.1.10 Escalators and moving walks

Any escalator or moving walk in a transport building should conform to the recommendations in **8.4**.

NOTE Escalators and moving walks are unsuitable for many disabled people, particularly wheelchair users and other people with limited mobility.

13.2 Industrial buildings

*COMMENTARY ON **13.2**.*
This subclause deals with access issues that apply to a range of industrial buildings, including factories and warehouses. The recommendations given in this subclause do not apply to certain specialist areas such as access to plant and machinery for maintenance purposes.

13.2.1 General

Parking and the approach to industrial buildings should conform to the recommendations in Clause **4** and Clause **5**. Accessible internal spaces, services and equipment common to most buildings should conform to the general recommendations in Clauses **6** to **12**.

13.2.2 Access routes in industrial buildings

Access routes for wheelchair users and ambulant disabled people between equipment and machinery should not be reduced in width by safety guarding or by people performing their work.

Access routes used by vehicles inside an industrial building should be clearly marked on the floor using colours that provide visual contrast. Pedestrian and vehicle tracks should be separated with their markings contrasting visually to assist blind and partially sighted people (see **9.1.1**).

13.2.3 Toilet accommodation

Toilet accommodation should be in accordance with **12.6**.

13.2.4 Storage of hazardous materials in industrial buildings

Hazardous materials should be identified in a way that ensures that they can be easily seen from a seated position, e.g. from a wheelchair.

13.2.5 Equipment in industrial buildings

Wherever possible, equipment in industrial buildings should be accessible and usable by disabled people (see **10.5**).

13.3 Administrative and commercial buildings

*COMMENTARY ON **13.3**.*
Disabled people need access to all spaces and fittings in administrative and commercial buildings, whether as members of the public or as members of staff. Access to all public and private areas in office and retail spaces is also necessary if disabled people are to function independently in the building. Disabled children will also visit these types of buildings to varying degrees. Where access is on a regular basis, it is necessary to design to meet their needs.

This subclause deals with access issues that apply to a range of administrative and commercial buildings, including:

- *central and local government administrative offices;*
- *employment offices;*
- *other offices providing a service to the public;*
- *private offices;*
- *shopping centres, supermarkets and department stores;*
- *specialist shops and showrooms;*
- *crown, magistrates' and coroners' courts;*
- *police stations.*

13.3.1 General

Parking and the approach to administrative and commercial buildings should conform to the recommendations in Clause **4** and Clause **5**. Accessible internal spaces, services and equipment common to most buildings should conform to the general recommendations in Clauses **6** to **12**.

13.3.2 Offices and commercial buildings

Disabled people should have access to offices and commercial buildings so that they can carry out their work independently.

NOTE 1 Detailed information is available in Accessible offices *[31] and* Designing for accessibility – An essential guide for public buildings *[32].*

A combination of general and task lighting should be provided in offices and commercial buildings.

NOTE 2 Guidance is given in the SLL Code for lighting *[23] and the SLL lighting guide LG7 [33].*

Toilet accommodation should be provided in accordance with **12.6**.

13.3.3 Shops, supermarkets and shopping malls

*COMMENTARY ON **13.3.3**.*
Good signage is essential to assist in orientation, in locating goods and services within shops, and in way-finding to exits and car parks when inside larger shops and malls.

13.3.3.1 General

Shops, supermarkets and shopping malls should be accessible to disabled shoppers and provision should be made for disabled staff to be employed in all areas. Fire safety arrangements, including means of escape, should conform to BS 9999:2008, Annex E.

13.3.3.2 Arrival

Setting-down points should be provided close to the entrance(s) for buses, minibuses and taxis. A setting-down bay should have a dropped kerb and bay width in accordance with **4.1**. An area of raised kerb should be provided alongside the bay for passengers to use a ramp to board a taxi or bus, or to climb the steps into a high-floor minibus.

Designated parking spaces should be provided for disabled motorists close to all shop and shopping mall entrances and to the lifts and walkways from adjoining multi-storey car parks.

13.3.3.3 Service points

All counters, checkouts and service points should be accessible to disabled people. A clear space should be provided in front of them, and writing surfaces for seated and standing customers should be provided in accordance with the recommendations in **11.1**. Where feasible, hearing enhancement systems should be fitted in accordance with the recommendations in **9.3** and **11.1.10**.

13.3.3.4 Fitting rooms

One unisex accessible clothes-fitting cubicle, suitable for an ambulant disabled person or a wheelchair user and an assistant, should be provided for each fitting room or suite of fitting cubicles.

The unisex clothes-fitting cubicle should contain:

a) a mirror in the centre of one wall at least 1 200 mm tall whose bottom edge is 600 mm above the floor;

b) a fixed or tip-up seat at a height of 480 mm in a corner with fixed grab rails, in accordance with Figure 49, beside it; and

c) clothes hooks at 1 050 mm and 1 400 mm above the floor.

A call bell to request staff advice should be positioned no higher than 1 200 mm above the floor. An outward opening or sliding door or curtain should be provided near the corner diagonally opposite the fixed seat.

The unisex clothes-fitting cubicle should have minimum dimensions of 2 000 mm deep × 2 200 mm wide, and should have a minimum clear space inside, clear of the fixed seat or the fixed part of the tip-up seat, of 1 500 mm × 1 500 mm.

13.3.4 Law courts, tribunal buildings, police stations and prisons

Accessible toilets and facilities should be available for a person being interviewed or being held in custody, as well as in all areas used by employees and members of the public.

Where cells are on a level which is inaccessible or cell doors are narrow, arrangements should be made for the person to be held in an accessible secure room.

13.4 Health and welfare buildings

*COMMENTARY ON **13.4**.*
This subclause deals with access issues that apply to a range of health and welfare buildings, including:

- *hospitals;*
- *health centres;*
- *doctors' and dentists' surgeries;*
- *opticians;*
- *older persons' day centres.*

13.4.1 General

Parking and the approach to health and welfare buildings should conform to the recommendations in Clause **4** and Clause **5**. Accessible internal spaces, services and equipment common to most buildings should conform to the general recommendations in Clauses **6** to **12**.

13.4.2 Accessibility in health and welfare buildings

Health and welfare buildings should be fully accessible to disabled people.

NOTE Detailed guidance on design issues is given in the NHS wayfinding guide [21], Doubly disabled – Equality for disabled people in the new NHS *[34] and the NHS access audit template [35]. General information is given in* Disabled people using hospitals – A charter and guidelines *[36]. Requirements for nursing homes are covered in the Registered Homes Act 1984 [37], and the Registered Homes (Amendment) Act 1991 [38].*

Accommodation for relatives staying overnight in hospitals should include facilities for disabled people.

13.5 Refreshment buildings, including public houses, restaurants and cafés

13.5.1 General

Parking and the approach to refreshment buildings should conform to the recommendations in Clause **4** and Clause **5**. Accessible internal spaces, services and equipment common to most buildings should conform to the general recommendations in Clauses **6** to **12**.

13.5.2 Accessibility in refreshment buildings

Refreshment buildings should be fully accessible to disabled people, including disabled children.

13.5.3 Recommendations

All refreshment areas in the same storey should be on the same level, wherever possible. Any split levels should be linked by ramps (see **8.2**).

A self-service area should have a continuous counter at a height of 850 mm to allow a disabled person to manoeuvre a tray, and a suitable table should be provided within close proximity of the till.

The clear height from the floor surface to the underside of the table should generally be 700 mm. Some tables should be provided with a clear height of 750 mm to accommodate wheelchairs with armrests.

NOTE 1 Some tables provided solely for drinks and for use by children may be of a lower height.

The clearance between fixed tables should be sufficient to allow wheelchair users a choice of seating location.

Chairs should be freely movable. At least some chairs should have armrests.

NOTE 2 If tables and chairs are bolted to the floor, many disabled people are unable to use them.

13.6 Entertainment-related buildings

*COMMENTARY ON **13.6**.*
In entertainment-related buildings, it is vital that the concourse provides clear directions to all facilities within the building.

This subclause deals with access issues that apply to theatres, cinemas, and concert halls where the seating is more closely packed than otherwise would be the case in order to provide an intimate atmosphere.

*Recommendations on audience seating in lecture theatres, conference facilities and teaching spaces, on either flat or raked floors, are given in **11.3**. Recommendations for refreshment areas are given in **13.5**.*

Further detailed guidance is available from the Association of British Theatre Technicians (see Bibliography under Information sources).

13.6.1 General

Parking and the approach to entertainment-related buildings should conform to the recommendations in Clause **4** and Clause **5**. Accessible internal spaces, services and equipment common to most buildings should conform to the general recommendations in Clauses **6** to **12**.

13.6.2 Accessibility in entertainment-related buildings

13.6.2.1 Access for members of the audience

*COMMENTARY ON **13.6.2.1**.*
Full use by disabled people of an entertainment space is limited by raked floors and lack of removable seating. Also, some disabled people might need to sit in a particular location in order to see or hear in comfort.

Accessible seating should be provided for wheelchair users. It should provide wheelchair users with the option of being able to sit next to a disabled or non-disabled companion. Accessible seating for disabled people should be provided in a range of vantage points in the building, where this is provided for non-disabled members of an audience. Fire safety arrangements, including means of escape, should conform to BS 9999:2008, Annex D.

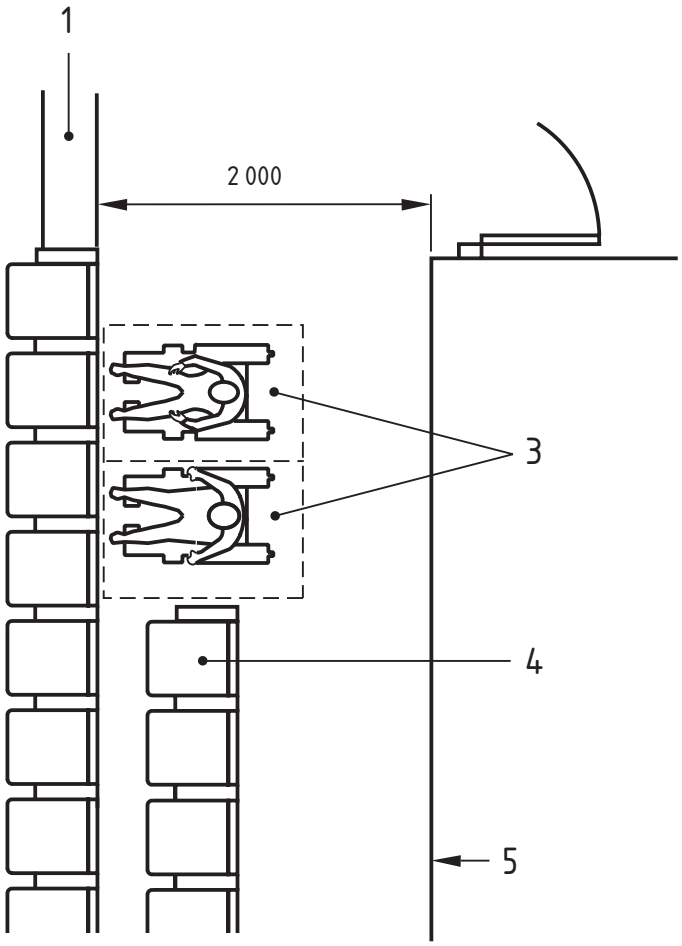
The viewing distance in theatres and similar venues should be minimized by carefully designing the access routes and access to spaces for wheelchair users.

NOTE Spaces for wheelchairs are best accommodated in relation to either a cross-aisle (usually the means of escape at the front or rear of the auditorium) or a seatway, which gives local access to a row of seats from one side only. Examples are shown in Figure 62 and Figure 63.

Space adjacent to some seats should be provided, large enough for an assistance dog to rest away from the main circulation route.

The number of spaces in entertainment buildings designated for wheelchair users should be in accordance with the recommendations in **11.3.1**.

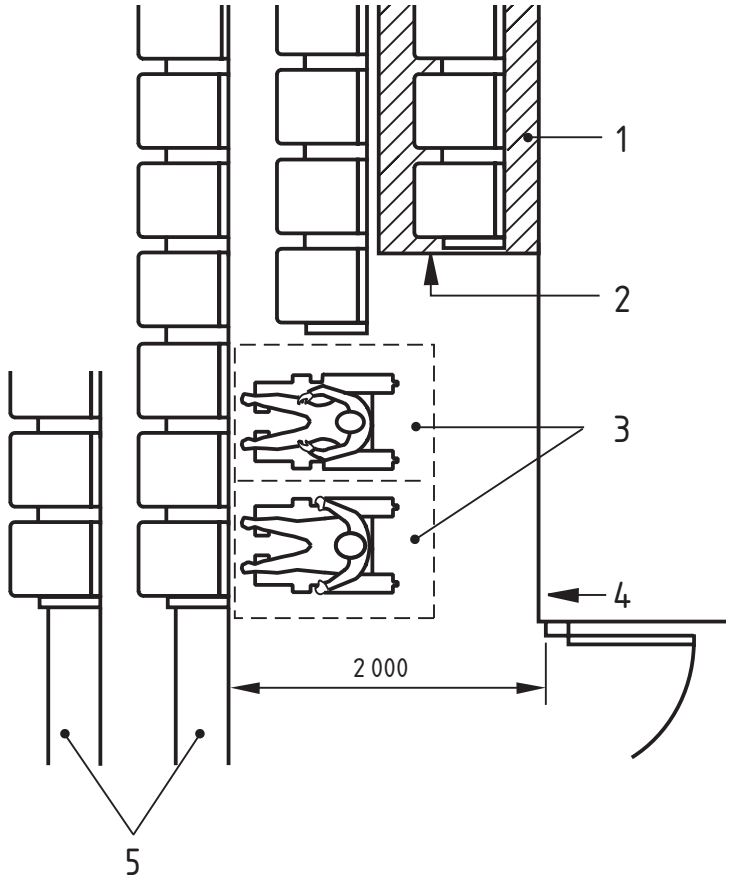
Figure 62 **Location of wheelchair spaces in front of a rear aisle**
Dimensions in millimetres



Key

1 Steps
2 Aisle
3 (1 400 × 900) mm nominal wheelchair spaces
4 More seats can be removed if necessary to create more wheelchair spaces
5 Rear wall

Figure 63 **Location of wheelchair spaces at a seatway**
Dimensions in millimetres



Key

1 Rostrum
2 The rostrum as well as seats on the rostrum and seats in the next row can be removed to create more wheelchair spaces
3 (1 400 × 900) mm nominal wheelchair spaces
4 Rear wall
5 Aisle
6 Steps

13.6.2.2 Access for performers

A level or accessible route should be provided to the main foyer entrance, the performers' entrance, the auditorium and the backstage area. If direct access between the auditorium and the backstage area is provided, it should be fully accessible to disabled people.

A level or accessible route should be provided between the backstage area and dressing rooms, storage areas, toilets, showers, and means of escape routes.

Office accommodation (including sound control/editing rooms etc.), where provided, should be accessible to disabled people.

Dressing rooms should be accessible to disabled performers.

13.6.3 Toilet accommodation

Each wheelchair seating area should have access to an accessible unisex toilet.

The provision of accessible unisex toilets should accommodate use by a number of people during a performance interval (see **12.6**).

13.6.4 Box office counters

Box office counters should be accessible to wheelchair users and other disabled people.

They should conform to the recommendations in **11.1**.

13.6.5 Hearing enhancement systems

Systems for hearing enhancement should be installed in entertainment buildings and should conform to the recommendations in **9.3**.

Wherever possible, electric cables carrying current in which the waveform has been modified (dimmed) should be routed to avoid, as far as is practicable, any interference to hearing aids.

NOTE 1 Cables generate large magnetic fields that cause a loud hum in hearing aids.

Equipment, such as computers or slide projectors, that uses fans, should be carefully sited to reduce background noise for people who are deaf or hard of hearing. Fluorescent fittings should be selected to ensure that they do not cause interference to hearing aids.

An acoustic booth for the provision of audio description should be provided with full view of the stage or screen in theatres and cinemas.

*NOTE 2 Blind and partially sighted people benefit from a description of live or recorded performances being relayed to them through audio description. Infra-red systems and radio often have more than one channel, which can be used to provide hearing enhancement for hearing aid users as well as for audio description (see **9.3**).*

13.7 Sports-related buildings

*COMMENTARY ON **13.7**.*
Disabled people, including disabled children, need to be able to access and use sports-related buildings, whether large or small, as spectators, participants, coaches, officials or part of a management team.

Wheelchair users often transfer into their sports wheelchairs at the vehicle setting-down point when they arrive at a sports-related building in order to take part in sporting activities. Whilst in competition mode, wheelchair athletes often change into their day chair between matches. Other disabled people borrow sports wheelchairs from the sports building management. Additional circulation and storage space is needed for sports wheelchairs because of their large wheel camber.

Swimming is an important activity for many disabled people and provides a high degree of independence and freedom. However, disabled swimmers might feel more self-conscious in a pool setting; as they are without their aids, they are physically exposed and they might require assistance into and out of the pool. Disabled swimmers are often at their most vulnerable when they are making their way to the pool or back to the changing area/room.

Sports-related buildings become more accessible and attractive for disabled people if a choice of changing and showering facilities, i.e. unisex facilities, or cubicle or accessible facilities within a separate-sex communal changing arrangement, is provided. If these facilities are not properly designed, they can become a significant barrier to use and active participation in sport by disabled people of all ages.

This subclause deals with access issues that apply to a range of sports-related buildings, including:

- *stadia;*
- *sports centres including tennis centres, indoor bowls halls, gymnastic centres etc.;*
- *sports club houses and pavilions;*
- *swimming pools;*
- *fitness suites and exercise studios.*

Further guidance is given in Accessible sports facilities *[11],* Guide to safety in sports grounds *[39] and* Accessible stadia *[26].*

13.7.1 General

Parking and the approach to sports-related buildings should conform to the recommendations in Clause **4** and Clause **5**. Accessible internal spaces, services and equipment common to most buildings should conform to the general recommendations in Clauses **6** to **12**.

13.7.2 Access for disabled spectators

Disabled spectators should be provided with a choice of vantage points, distributed around the sports-related building, where this is provided for non-disabled spectactors.

Wheelchair users should be provided with wheelchair seating areas in all sports buildings where recreational activities require the provision of spectator facilities.

NOTE 1 Detailed guidance on spectator provision is available from the Guide to safety in sports grounds *[39] and* Accessible stadia *[26]. For guidance on provision in smaller scale facilities, see **11.3**.*

Any wheelchair seating area should be designed so that spectators in wheelchairs can still see the event when located behind standing accommodation or where people in front might stand up.

Each wheelchair seating area should have access to an accessible unisex toilet.

The provision of accessible unisex toilets should accommodate use by a number of disabled people during a performance interval (see **12.6**).

The needs of assistance dogs should be taken into account.

NOTE 2 Guidance is available in the Guide Dogs for the Blind publication Access to sports stadia *[40].*

A means of sound enhancement should be provided for people who are deaf and hard of hearing in designated areas of a stadium. Hearing enhancement systems should conform to the recommendations in **9.3**.

*NOTE 3 Infra red systems are unlikely to be suitable in open stadia as they are affected if the user faces direct sunshine or floodlights. Detailed recommendations on the use of different hearing enhancement systems are given in **9.3**.*

13.7.3 Access for disabled people who are participants or competitors in sports events

Facilities should be provided for disabled people to participate in all the sports available at a sports venue and at all levels of competition. All circulation routes should be designed to accommodate sports wheelchairs so that disabled people can gain access to all associated facilities, e.g. refreshment and social areas. As sports wheelchairs are generally longer and wider than conventional wheelchairs, circulation routes, doorways, lift lobbies and lifts should be larger than the minimum recommendations in Clause **7** and Clause **8**, e.g. tennis sports wheelchairs require a doorway with an effective clear width of 1 000 mm for convenient access.

NOTE Guidance on the specific requirements for sports buildings is given in Accessible sports facilities *[11].*

Where disabled people participate in competitive sports, secure and convenient storage areas should be provided for artificial limbs and sports wheelchairs, which are generally not collapsible.

All sports facilities should provide unisex accessible changing and showering facilities. In all but the smallest sports facility, these should be supplemented with accessible communal and private changing/showering facilities.

13.7.4 Swimming pools

Level access should be provided from changing areas to pool areas.

A number of access options should be provided to a pool in a variety of locations, e.g. a hoist allows a wheelchair user to transfer from wheelchair to pool or jacuzzi, or between the two; a leisure pool in which the water is level with a surrounding wall at wheelchair transfer height enables a person to transfer to the wall, then directly to the pool.

NOTE 1 Detailed guidance on the design of swimming pools for disabled people is given in Accessible sports facilities *[11].*

NOTE 2 The provision of attachments for pool hoists in addition to the normal provision will allow horizontal transfers in and out of the swimming pool for severely disabled people.

*NOTE 3 Increasing the size of lettering on direction and information signs in swimming pools can benefit users whose vision might be poor due to their inability to wear their normal glasses (see **9.2**).*

Unisex changing facilities should be designed to allow for assisted changing and for a wheelchair user to transfer to a shower chair in accordance with **12.4**.

13.7.5 Fitness and exercise areas

Disabled people should have the same access to all fitness and exercise areas, and types of equipment, as non-disabled people.

To assist people who are deaf and hard of hearing, exercise studios and fitness and exercise areas should be provided with a sound enhancement system so that these people can receive instructions and any music related to the exercise activity. Hearing enhancement systems should conform to the recommendations in **9.3.2**.

NOTE Further detailed guidance on the design of fitness suites and exercise studios is given in Accessible sports facilities *[11].*

13.8 Religious buildings and crematoria

*COMMENTARY ON **13.8**.*
Irrespective of their religious faith, or their reason for visiting a religious building or crematorium, disabled people require the same degree of access as non-disabled people.

This subclause deals with access issues that apply to a range of religious buildings and associated spaces, including:

- *places of worship and meeting rooms;*
- *crematoria;*
- *cemetery chapels.*

Further detailed guidance on access to, and the use of, religious buildings is available in the Roofbreaker guides [41] and in Widening the eye of the needle *[42].*

13.8.1 General

Parking and the approach to religious buildings and crematoria should conform to the recommendations in Clause **4** and Clause **5**. Accessible internal spaces, services and equipment common to most buildings should conform to the general recommendations in Clauses **6** to **12**.

13.8.2 Places of worship

Removable seating should be provided at various locations in places of worship so that wheelchair users can be accommodated amongst the general congregation. (See also **11.2.2** and **11.2.4**.)

A hearing enhancement system, conforming to the recommendations in **9.3.2**, should be provided for people who are deaf and hard of hearing.

13.8.3 Crematoria and cemetery chapels

A covered assembly area should be provided at crematoria.

Both entry to, and exit from, the crematorium should be accessible to disabled people, whether they are officials, family members or friends.

A crematorium should be provided with at least one accessible unisex toilet (see **12.6**).

Wheelchair users who are visitors (and who are not family members) should have a choice of seating positions inside the building.

NOTE Wheelchair users are often placed inappropriately at the front of the building close to the coffin, even when they are not family members.

A hearing enhancement system, conforming to the recommendations in **9.3.2**, should be provided for people who are deaf and hard of hearing.

13.9 Educational, cultural and scientific buildings

*COMMENTARY ON **13.9**.*
This subclause deals with access issues that apply to a range of educational and scientific buildings, including:

- *universities, colleges and schools;*
- *public libraries, university, college and company libraries, scientific and research libraries;*

- *laboratories;*
- *museums and art galleries;*
- *exhibition centres;*
- *research, scientific and professional institutes.*

13.9.1 General

Parking and the approach to educational, cultural and scientific buildings should conform to the recommendations in Clause **4** and Clause **5**. Accessible internal spaces, services and equipment common to most buildings should conform to the general recommendations in Clauses **6** to **12**.

NOTE Recommendations on the design of schools for disabled children are given in Building Bulletin 102 [43] (in preparation). Guidance on achieving a satisfactory hearing environment for students who are deaf and hard of hearing is given in Building Bulletin 93 [44].

13.9.2 Accessible routes and spaces

All display areas in museums, art galleries, exhibition and visitor centres should be accessible to wheelchair users and ambulant disabled people.

Restaurants, bars, shops and similar public amenities in museums, art galleries, exhibition and visitor centres should be accessible to disabled people.

Common rooms, refreshment rooms, recreation rooms and offices associated with educational and scientific buildings should be accessible to disabled people.

Archive materials held by museums, galleries, libraries, and institutes should be accessible to disabled users who are members of staff or the general public.

NOTE The use of electronic archive retrieval could enhance the convenience of the facility. Further guidance is available from the Museums, Libraries and Archives Council (see Bibliography under Information sources).

13.9.3 Display cases

*COMMENTARY ON **13.9.3**.*
A matt surface eliminates glare and reflected images, which are particularly distracting for partially sighted people. Labels positioned horizontally inside display cases are difficult to read from a seated position.

Glass with a reflective surface should not be used to enclose exhibits.

Labels on display cases should be set at 45°, preferably at the eye level of a seated person, and located at the front of the case.

NOTE 1 The provision of an additional label at a higher level and in a larger text size will benefit blind and partially sighted people.

NOTE 2 Further information is available from the Museums, Libraries and Archives Council (see Bibliography under Information sources).

Labelling should contrast visually with the immediate surroundings (see **9.2**).

13.9.4 Reading and studying in libraries

Where reading carrels are provided in libraries, at least one should be large enough to accommodate a wheelchair user (see Annex C). Either desks in libraries should conform to the recommendations in **11.1**, or adjustable desks or tables should be provided.

NOTE Tables whose height can be altered with raisers are suitable.

13.9.5 Seating

Fixed seating should be provided throughout display spaces, for resting, viewing exhibits and reading guidebooks. Seating should be easy to find and located in a prominent position, but it should not be located within main access routes or escape routes.

Seating should be provided with armrests and back supports whenever possible (see **11.2.4**).

NOTE Resting rails/perch seats can augment seating provision where their installation is practicable.

Some seating, with wheelchair spaces alongside, should be provided in external courtyards or gardens.

13.9.6 Obstructions and way finding

*COMMENTARY ON **13.9.6**.*
Locating exhibits away from internal corners of viewing areas avoids congestion and provides a more attractive and usable space for all, especially for disabled people.

Overhanging barriers on display cases and low rails, intended to prevent too close access to paintings, present hazards for blind and partially sighted people and should be protected in accordance with the recommendations in **5.7**.

A minimum clear passageway should be maintained adjacent to people viewing objects in cases or on walls (see **7.2**).

Floor textures should be used to indicate the location of individual exhibits or the route to follow. They can also be used to reflect the nature of the exhibits and so add to the overall experience of the objects and spaces.

13.9.7 Audible communication

A hearing enhancement system, conforming to the recommendations of **9.3**, should be provided for people who are deaf and hard of hearing (see **13.6.5**).

13.10 Historic buildings

Historic buildings should be made accessible to disabled people, wherever possible, without compromising conservation and heritage issues.

NOTE It is often possible to make a historic building more accessible by re-planning the use of spaces and adopting temporary rather than permanent solutions, including the provision of audio descriptions for use by blind and partially sighted people, or photographs of areas that cannot be made accessible to wheelchair users.

13.11 Travel and tourism-related buildings

*COMMENTARY ON **13.11**.*
Many disabled people need to travel and stay away from home on business. Time away from a familiar, perhaps difficult, home environment can be an important period of enjoyment and a welcome break in routine in any person's life. However, finding suitable accommodation for a disabled person travelling independently or with friends or family is often a difficult task. This problem is exacerbated for disabled people attending conferences or similar events when a much greater concentration of accessible accommodation might be needed for numbers of disabled attendees.

Access issues apply to facilities such as:

- *hotels, motels, hostels and residential clubs;*
- *bed and breakfast guest accommodation;*
- *self-catering holiday accommodation;*
- *accommodation providing holiday care.*

13.11.1 General

Parking and the approach to travel and tourism-related buildings should conform to the recommendations in Clause **4** and Clause **5**. Accessible internal spaces, services and equipment common to most buildings should conform to the general recommendations in Clauses **6** to **12**.

13.11.2 Accessibility to travel and tourism-related buildings

Travel and tourism-related buildings should be accessible to disabled people, particularly in respect of accessible bedrooms (in particular see **12.8**).

NOTE Further guidance on access to, and the use of residential facilities other than dwellings is given in Planning – The architects handbook *[45].*

Annex A (informative)

Management and maintenance issues

The following management and maintenance issues are important factors in ensuring that a building is easily accessed and used by disabled people:

a) external issues:

   1) keeping external routes, including steps and ramps, clean, unobstructed and free of surface water, snow, ice, dead leaves, lichen, debris etc.;

   2) in car parking areas, ensuring that designated spaces are not being used by non-disabled motorists;

   3) where possible, allocating specific designated parking spaces to individual employees, marked by name or number;

   4) checking side-hung doors accompanying revolving doors to ensure they are not kept locked;

   5) making available auxiliary aids such as portable ramps, and removing them when not in use;

b) internal issues:

   1) ensuring that wheelchair spaces are available in seating areas;

   2) ensuring that staff understand the management issues relating to disabled people, including emergency procedures;

   3) ensuring that storage, planters, bins etc. do not obstruct circulation space, WCs or lift call buttons;

   4) ensuring that cleaning and polishing does not produce a slippery surface;

   5) ensuring that trip hazards such as at junctions between floor surfaces are removed;

   6) ensuring access between moveable tables in refreshment areas;

   7) ensuring that a RADAR National Key Scheme (NKS) key to sanitary accommodation is available to lend to disabled people when such locks are installed;

   8) ensuring, in Changing Places (CP) facilities, that written instructions on the use of equipment is displayed beside each item;

   9) ensuring, in CP facilities, that information is available on the type of sling connector and the types of sling that are compatible with their installed hoist and track;

   10) ensuring that a procedure is set up to respond to alarm calls from sanitary accommodation;

   11) ensuring that waterproof mattress covers can be made available for use in accessible bedrooms;

   12) ensuring that, where floor sockets are provided (e.g. in meeting rooms), access to sockets is also available at desk level;

   13) ensuring that any temporary barriers that are used to channel customers to reception or serving points, and whose configuration needs to be changed frequently, have a semi-rigid top barrier (e.g. a spring-loaded band) which contrasts visually with the background against which it is seen;

14) ensuring that assistance is made available to carry trays where needed in refreshment areas;

15) ensuring that suitable arrangements are made for assistance dogs while their owners are using leisure facilities;

c) maintenance issues:

1) maintaining doors, door closers and building hardware, including checking that the opening forces of self-closing doors are within acceptable limits;

2) maintaining access control systems;

3) checking floor surfaces, matting, surface-mounted carpets etc., re-fixing to the floor where necessary, and replacing where damaged or worn (particularly at entrances to buildings);

4) maintaining hearing enhancement systems;

5) maintaining sanitary fittings, including checking that toilet seats are securely fixed, cleaning tap nozzles to ensure correct water flow, emptying and cleaning bins, and keeping equipment clean;

6) ensuring that adjustable shower heads are lowered to be ready for the next user;

7) ensuring that emergency assistance pull cords are kept fully extended and in working order at all times;

8) checking the mountings of all grab rails, and the mechanism of drop-down rails, re-fixing or replacing where necessary;

9) servicing of all types of lifts and hoists;

10) ensuring that facilities, such as lifts, hoists etc., are in working order between servicing schedules, and providing alternative arrangements in case of facilities being out of order;

11) maintaining ventilation and heating equipment;

12) replacing defunct light bulbs and flickering fluorescent tubes quickly;

13) keeping windows, lamps and blinds clean to maximize lighting;

d) communication issues:

1) providing information on strobe lighting prior to entry;

2) removing and/or changing signage as necessary, e.g. when departments relocate;

3) providing accurate information on facilities prior to arrival;

4) providing audio description services;

5) providing all relevant literature, and reviewing/revising it when necessary;

6) ensuring that a permanently manned position is available for the emergency lift telephone communications;

7) updating maps of buildings following changes;

8) replacing signs correctly after decoration;

e) policy issues:

1) allocating and reviewing parking spaces;

2) changing signs when departments move;

3) reviewing the number of disabled people attending and needing facilities;
4) establishing and running user groups;
5) reviewing the number of instruments supporting infra red systems;
6) adopting a signage policy;
7) having the loop position always manned in branches;
8) providing portable ramps;
9) arranging audits of journeys made by visitors;
10) instructing access audits;
11) ensuring that services are provided when facilities such as lifts break down;
12) ensuring that responsibilities are defined within the organization;
13) ensuring that access improvements are picked up whenever possible during maintenance and refurbishment work;
14) reviewing and improving evacuation procedures;
15) training of staff;
16) reviewing all policies, procedures and practices;
17) reviewing the provision of auxiliary aids;
18) considering the impact of background noise (e.g. music) on people who are deaf and hard of hearing, particularly in reception areas;

f) fire safety issues (see BS 9999).

Annex B (informative) Using light reflectance values (LRVs) to assess visual contrast

B.1 LRVs and visual contrast

For people with good vision, differences in hue (the nature of the colour) or chroma (the intensity of the colour) provide adequate visual contrast. Unfortunately, this is not the case for all blind and partially sighted people. The main feature of a surface, which appears to be strongly correlated with the ability of blind and partially sighted people to identify differences in colour, is the amount of light the surface reflects, or its light reflectance value (LRV).

The LRV scale runs from 0, which is a perfectly absorbing surface that could be assumed to be totally black, up to 100, which is a perfectly reflective surface that could be considered to be the perfect white. Because of practical influences in any application, black is always greater than 0 and white never equals 100. For a definition of light reflectance value, see **3.13**.

The evidence-based research available to date allows a degree of variability concerning the minimum LRV difference that is required to provide adequate visual contrast for blind and partially sighted people [46]. That variability is shown in Figure B.1. With the axes representing the LRV of two adjacent surfaces, the zones on the graph give an indication of where visual contrast is likely to be good, acceptable or poor. Whilst there is considerable confidence in recommending a difference in LRV of 30 points or more (the good zone), there is also some evidence to suggest that a difference of around 20 points might still be acceptable, provided the illuminance on the surfaces is 200 lux or more. Differences less than about 20 points might not give adequate contrast, even with an illuminance of 200 lux on the surfaces.

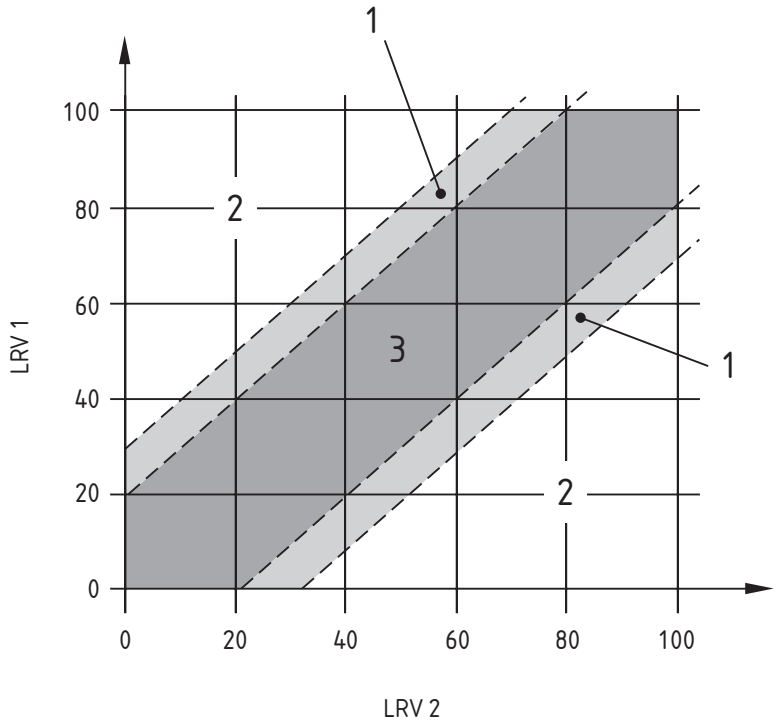
In the case of door opening furniture, the ease with which blind and partially sighted people are able to distinguish furniture against its background is influenced by its 3-D form (giving light and shade) and the shiny nature of the finish, whether metallic or non-metallic. For such products, it is considered that a difference in LRV between the product and its background of at least 15 points is acceptable.

NOTE For flat surfaces, it is thought that LRV differences are less important between two large areas, e.g. between wall and floor, than between a small object on a larger background surface, e.g. a light switch on a wall.

It is for reasons of weathering, plus variations in lighting levels (e.g. in strong sunlight or after dark) that, externally, differences in LRV will not always be appreciated in the same way as they would be under controlled internal conditions. However, it is still considered good practice to aim for the recommended LRV differences in the external environment.

Additional information on the provision of colour and contrast can be found in *Colour, contrast and perception* [47].

Figure B.1 **Zones of good, acceptable and poor visual contrast in relation to the LRV of two adjacent surfaces**
Dimensions in millimetres



Key
1 Acceptable for large areas
2 Good
3 Poor
LRV1 Light Reflectance Value of surface 1 [points]
LRV2 Light Reflectance Value of surface 2 [points]

B.2 Methods of measuring LRVs

B.2.1 The BS 8493 test method

A test method for measuring the LRV of flat surfaces with opaque paint systems or coverings, flat opaque materials, including those coated with non-opaque coatings, or coverings and multi-coloured surfaces, is described in BS 8493.

NOTE This test method is suitable for manufacturers, researchers and those requiring accurate standard measurements.

The method is suitable to determine the LRVs of products for which visual contrast is an issue, including paints and coatings, carpets, veneered doors and finished metals.

As a guide for designers, the LRVs of the 100 colours in the BS 4800 range have been determined in accordance with BS 8493 and are set out in Table B.1. It is emphasized, however, that the LRVs of any colour range can be determined using the BS 8493 test method. It is expected, therefore, that product manufacturers will use the standard to prepare LRV data for their own particular colour ranges.

The LRVs determined using BS 8493 are applicable to surfaces of products or materials as they leave the factory gate. There is no inference or specification within BS 8493 to take account of the ageing effects of wear and tear, maintenance, cleaning or any other events which might affect the nature of the surface, including weathering. It is recognized that further research is required into these factors before authoritative guidance can be provided on the effect of ageing on LRVs.

Table B.1 **Light reflectance values associated with the BS 4800[A)] range of colours**

Code from BS 4800	LRV	Code from BS 4800	LRV
00A01	66	10D43	39
00A05	44	10D45	22
00A09	23	10E49	74
00A13	10	10E50	65
02C33	59	10E53	57
02C37	22	12B15	77
02C39	10	12B17	58
02C40	7	12B21	32
04B15	75	12B25	14
04B17	59	12B29	7
04B21	31	12C33	58
04C33	57	12C39	9
04C37	21	12D43	29
04C39	10	12D45	14
04D44	14	12E51	55
04D45	9	12E53	40
04E49	76	14C31	76
04E51	30	14C35	43
04E53	16	14C39	10
06C33	57	14C40	7
06C37	21	14E51	34
06C39	10	14E53	22
06D43	29	16C33	58
06D45	14	16C37	22
06E50	57	16D45	10
06E51	40	16E53	23
06E56	20	18B17	60
08B15	83	18B21	33
08B17	60	18B25	16
08B21	31	18B29	6
08B25	15	18C31	81
08B29	7	18C35	42
08C31	77	18C39	10
08C35	42	18D43	22
08C37	21	18E49	77
08C39	10	18E50	62
08E51	45	18E51	33
10A03	56	18E53	16
10A07	31	20C33	60
10A11	14	20C37	23
10B15	81	20D45	11
10B17	59	20E51	34
10B21	33	22B15	78
10B25	15	22B17	57
10B29	6	22C37	21
10C31	76	22D45	10
10C33	67	24C33	57
10C35	42	24C39	10
10C39	10		

NOTE The LRV has been determined in accordance with BS 8493.

[A)] BS 4800 comprises a schedule of 100 colours for paints, and their available surface finishes. It includes, within a folder, an explanatory text, and a mask for use in conjunction with BS 5252 which illustrates the colours specified in BS 4800. BS 4800 is to be read in conjunction with BS 5252.

B.2.2 Hand-held colorimeter

The LRV of a surface can also be determined using a hand-held colorimeter or reflectometer of 0°/45°geometry. Two methods are possible. In the first method, the hand-held colorimeter is used in conjunction with a white, high reflectance standard surface. Since the reflectance of the white standard surface is known, it is possible to calculate the reflectance of the surface of interest by measuring the luminance of both surfaces under the same lighting conditions, where luminance is amount of light emitted from a surface. This is commonly termed the brightness of the surface. The LRVs measured in this way are dependent on the ambient lighting, which needs to be quoted in relation to any measurements taken.

In the second method, the hand-held colorimeter is placed on the surface and configured to read CIE Y, x y or a reflectometer calibrated to a colour reference sample with a known LRV.

Neither of these methods are suitable for curved or metallic surfaces, nor are they suitable for glossy surfaces. Whilst the LRVs determined by this method are useful, they are not as accurate as those obtained by using the test method in BS 8493.

NOTE This method of measurement is suitable for on-site measurements where an approximation of LRV is sufficient.

B.2.3 Approximate method using colour swatches

The LRV of a surface can be approximated by reference to colour swatches or panels of colour samples. The LRV of the various colours can be obtained from the manufacturer of the colour swatches or samples, who is able to determine the LRV of each colour using the method described in BS 8493. In some cases, the colour notation on the sample includes the LRV. By placing the colour swatch against the coloured surface of interest, a reasonable match can be identified. The LRV of the nearest colour match from the swatch can then be assumed to be the LRV of the surface of interest. The LRVs measured in this way are also dependent on the ambient lighting, which needs to be quoted in relation to any measurements taken. This approximate measurement method is also not able to accurately assess the influence of gloss on LRV.

NOTE This very approximate method can be used for the initial selection of colours for design purposes and for preliminary site assessments.

Annex C (informative) Space allowances for wheelchair manoeuvring and access to vehicles

NOTE The measurements given in this annex are based on ergonomic research commissioned by the Department of the Environment, Transport and the Regions (DETR) in 1999. This research, which involved user trials and computer-aided design (CAD) analysis, was used to establish ranges of dimensions that can be applied to common activities for users of wheelchairs and scooters, such as turning and manoeuvring in corridors, in access routes and in car parking areas.

C.1 User trials on space requirements

During the trials, the research team first measured the space required when occupied and unoccupied wheelchairs were stationary, then they measured the space required when wheelchair users turned their wheelchairs through 90° and 180°. CAD and trials data were also used to determine the space required for wheelchair users to manoeuvre at the side of vehicles.

The results are tabulated for each type of wheelchair and each type of movement as follows:

a) in a stationary position (see Table C.1, Table C.2, Table C.3, Table C.4 and Table C.5);

b) when turning through 90° (see Table C.6, Table C.7, Table C.8, Table C.9 and Table C.10);

c) when turning through 180° (see Table C.11, Table C.12, Table C.13, Table C.14 and Table C.15);

d) manoeuvring at the side of vehicles (see Table C.16 and Table C.17).

C.2 Wheelchairs in a stationary position

For Table C.1, Table C.2, Table C.3, Table C.4 and Table C.5, the differences in occupied and unoccupied length reflect the projection of the feet beyond the footrests, and bags or other items hanging from the back of the wheelchair.

The differences in occupied and unoccupied width reflect the projection of the upper limbs, sometimes with bulky clothing, beyond the armrests or wheels.

Table C.1 **Space required for a sample of self-propelled wheelchairs when stationary** [A)]

Percentage of self-propelled wheelchair users accommodated	Occupied		Unoccupied	
	Length	Width	Length	Width
	mm	mm	mm	mm
80%	1 150	696	1 090	680
90%	1 190	720	1 124	697
Complete range	860 to 1 250	560 to 800	700 to 1 200	560 to 750

[A)] Sample size = 54.

Table C.2 **Space required for a sample of electrically propelled wheelchairs when stationary** [A)]

Percentage of electric wheelchair users accommodated	Occupied		Unoccupied	
	Length	Width	Length	Width
	mm	mm	mm	mm
80%	1 292	750	1 160	700
90%	1 384	760	1 190	715
Complete range	860 to 1 520	560 to 800	700 to 1 400	560 to 750

[A)] Sample size = 27.

Table C.3 **Space required for a sample of self-propelled and electric wheelchairs when stationary** [A)]

Percentage of wheelchair users accommodated	Occupied		Unoccupied	
	Length	Width	Length	Width
	mm	mm	mm	mm
80%	1 200	720	1 110	700
90%	1 250	750	1 170	700
Complete range	860 to 1 520	560 to 800	700 to 1 400	560 to 750

[A)] Sample size = 81.

Table C.4 **Space required for a sample of attendant pushed wheelchairs when stationary** [A)]

Percentage of attendant pushed wheelchair users accommodated	Occupied		Unoccupied	
	Length	Width	Length	Width
	mm	mm	mm	mm
Complete range	1 200 to 1 570	580 to 700	800 to 1 350	550 to 660

NOTE The measurements were taken with the attendant standing behind the occupied wheelchair.

[A)] Sample size = 6.

Table C.5 **Space required for a sample of electric scooters when stationary** [A)]

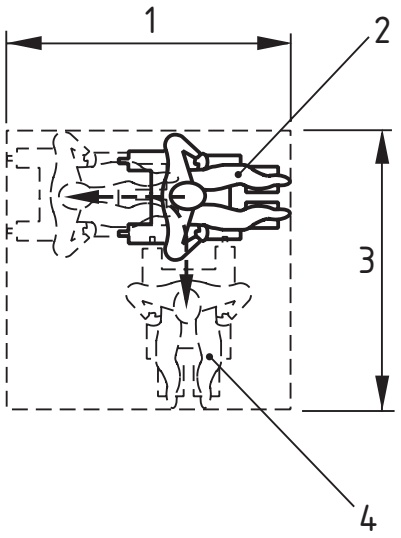
Percentage of scooter users accommodated	Occupied		Unoccupied	
	Length	Width	Length	Width
	mm	mm	mm	mm
Complete range	1 170 to 1 600	630 to 700	1 170 to 1 500	620 to 640

[A)] Sample size = 5.

C.3 Wheelchair users performing a 90° turn

The dimensions of length and width in Table C.6, Table C.7, Table C.8, Table C.9 and Table C.10 relate to the manoeuvre within a rectangle defined in Figure C.1.

Figure C.1 **The manoeuvre and the space required for a 90° turn**
Dimensions in millimetres



Key
1 Length
2 Starting position
3 Width
4 Final position

NOTE The manoeuvre involved reversing back then turning through 90°.

Table C.6 **Space required for users of self-propelled wheelchairs to turn through 90°** [A)]

Percentage of self-propelled wheelchair users accommodated	Turning space	
	Length	Width
	mm	mm
80%	1 300	1 400
85%	1 300	1 450
90%	1 345	1 450

[A)] Sample size = 54.

Table C.7 **Space required for users of electrically propelled wheelchairs to turn through 90°** [A)]

Percentage of electric wheelchair users accommodated	Turning space	
	Length	Width
	mm	mm
80%	1 430	1 550
85%	1 500	1 600
90%	1 600	1 625

[A)] Sample size = 27.

Table C.8 **Space required for users of self-propelled and electrically propelled wheelchairs to turn through 90°** [A)]

Percentage of self-propelled and electric wheelchair users accommodated	Turning space	
	Length	Width
	mm	mm
80%	1 420	1 500
85%	1 500	1 500
90%	1 550	1 550

[A)] Sample size = 81.

Table C.9 **Space required for an attendant to turn a wheelchair through 90°** [A)]

Percentage of attendant pushed wheelchair users accommodated	Turning space	
	Length	Width
	mm	mm
Complete range	1 200 to 1 800	1 500 to 1 800

[A)] Sample size = 6.

Table C.10 **Space required for users of electric scooters to turn through 90°** [A)]

Percentage of scooter users accommodated	Turning space	
	Length	Width
	mm	mm
Complete range	1 400 to 2 500	1 300 to 2 500

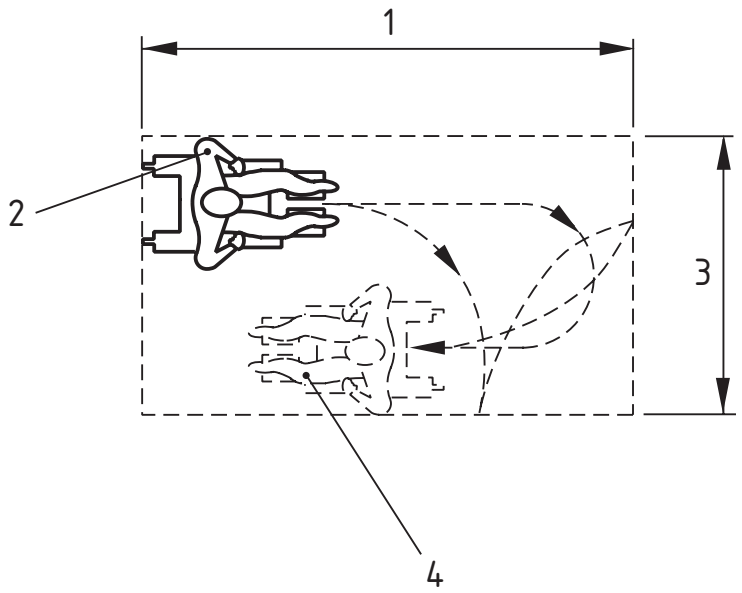
[A)] Sample size = 5.

C.4 Wheelchair users performing an 180° turn

The dimensions of length and width in Table C.11, Table C.12, Table C.13, Table C.14 and Table C.15 relate to the manoeuvre within a rectangle defined in Figure C.2.

NOTE The manoeuvre involved either a single 180° turn or a three-point turn.

Figure C.2 **The manoeuvre and the space required for a 180° turn**
Dimensions in millimetres



Key
1 Length
2 Starting position
3 Width
4 Final position

Table C.11 **Space required for users of self-propelled wheelchairs to turn through 180°** [A)]

Percentage of self-propelled wheelchair users accommodated	Turning space	
	Length	Width
	mm	mm
80%	1 800	1 450
85%	1 910	1 450
90%	1 950	1 500

[A)] Sample size = 54.

Table C.12 **Space required for users of electrically propelled wheelchairs to turn through 180°** [A)]

Percentage of electric wheelchair users accommodated	Turning space	
	Length	Width
	mm	mm
80%	2 190	1 600
85%	2 213	1 600
90%	2 275	1 625

[A)] Sample size = 27.

Table C.13 **Space required for users of self-propelled and electrically propelled wheelchairs to turn through 180°** [A)]

Percentage of self-propelled and electric wheelchair users accommodated	Turning space	
	Length	Width
	mm	mm
80%	2 000	1 500
85%	2 000	1 550
90%	2 150	1 600

[A)] Sample size = 81.

Table C.14 **Space required for an attendant to turn a wheelchair through 180°** [A)]

Percentage of attendant pushed wheelchair users accommodated	Turning space	
	Length	Width
	mm	mm
Complete range	1 600 to 2 000	1 500 to 1 800

[A)] Sample size = 6.

Table C.15 **Space required for a user to turn an electric scooter through 180°** [A)]

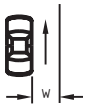
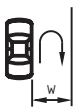
Percentage of scooter users accommodated	Turning space	
	Length	Width
	mm	mm
Complete range	2 000 to 2 800	1 300 to 2 200

[A)] Sample size = 5.

C.5 Space at the side of a vehicle

Table C.16 illustrates the space necessary at the side of a vehicle, or between vehicles, e.g. in a car park applying the trials measurements previously outlined.

Table C.16 **Width required at the side of a vehicle or between vehicles in a car park**

Activity (90% of users accommodated)		Self propelled wheelchair [A)]	Electrically propelled wheelchair [A)]	Attendant pushed wheelchair [A)]	Electric scooter [A)]
		mm	mm	mm	mm
Moving in a straight line, e.g. going to the front of the vehicle after alighting		1 050	950	950 [B)]	1 000 [B)]
Turning 180° at the side of a vehicle, e.g. to gain access to the boot		1 500	1 625	1 800 [B)]	2 200 [B)]

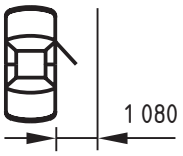
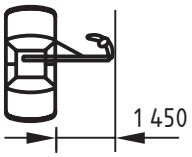
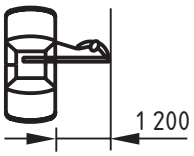
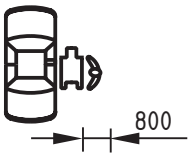
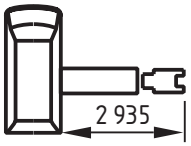
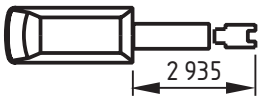
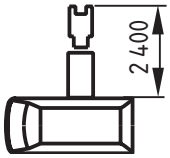
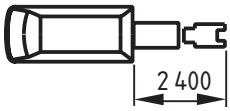
[A)] Based on trial measurements.

[B)] These widths, which relate to the small samples of scooters (n = 5) and attendant pushed wheelchairs (n = 6), are those needed to accommodate the whole sample.

C.6 CAD analysis

Table C.17 indicates the width requirements for various activities performed at the side of a vehicle or between vehicles in a car park, using CAD (computer-aided design) analysis.

Table C.17 **Widths for access at the side and the rear of a vehicle or between vehicles in a car park**

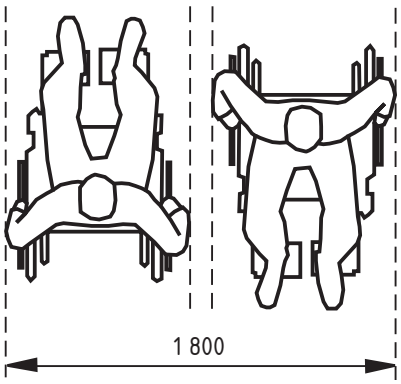
Activity by a person in a self-propelled wheelchair	Space required [A] mm
a) Opening a vehicle door (two-door vehicle)	
b) Using a roof hoist with an assistant	
c) Using an internal hoist with an assistant	
d) Being helped by an assistant (width for the assistant) (see Table C.1, Table C.2, Table C.3, Table C.4 and Table C.5 for widths of chairs and scooters)	
e) Using a ramp at the side of a vehicle (max.) (height from ground to vehicle floor = 560 mm)	
f) Using a ramp at the rear of a vehicle (height from ground to vehicle floor = 560 mm)	
g) Using a lift at the side of a vehicle (perpendicular)	
h) Using a lift at the rear of a vehicle (parallel)	

[A] Based on CAD measurements.

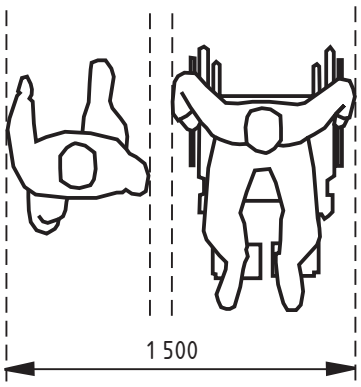
Annex D (informative) Space allowances for people passing on an access route

Figure D.1 shows the recommended space allowances for people passing on an access route.

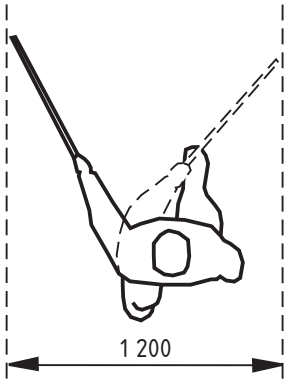
Figure D.1 **Space allowances for people on an access route**
Dimensions in millimetres



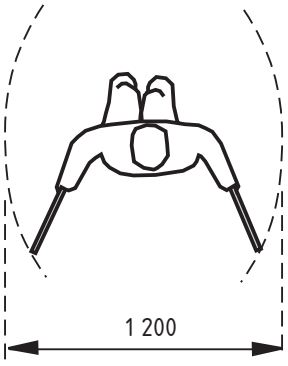
a) Two wheelchair users



b) A wheelchair user and an ambulant person



c) Blind person with cane



d) Person on crutches

Annex E (informative) Slip potential characteristics of treads, ramp surfaces and floor finishes

COMMENTARY ON ANNEX E.
Many products used for tread and floor finishes will change significantly, merely on installation. Wear, anticipated usage, potential contamination, cleaning and maintenance regimes, will all have an impact on the performance of a tread or floor finish over its lifetime.

NOTE Further guidance can be obtained from the following publications.

- *Information to assist in assessment of the slip resistance of floor surfaces is given in HSE information sheet* Assessing the slip resistance of flooring *[48].*
- *Comprehensive advice on reducing the risk of slipping on surfaces is given in CIRIA publication C652 [49].*
- *General advice on floor finishes as they relate to inclusive design, including slip resistance, can be found in the CAE specifiers' handbook on internal floor finishes [50].*

E.1 Background

Floor surfaces for walking or wheeled traffic need to be selected to ensure, as far as is possible, that traction between the foot or wheel can be maintained under normal conditions of use. This entails specifying materials that have an appropriate coefficient of friction, offering a surface that will reduce the potential for slips whilst also allowing passage without undue effort due to levels of friction being too great.

Excessive levels of traction can themselves be a barrier to use, particularly to wheeled traffic or where the foot remains in contact with the surface during walking. Very rough surfaces or materials such as deep pile carpets or brush matting need to be avoided where possible. This will help ensure that passage along such surfaces is more comfortable and requires less effort and control.

Sudden changes in the frictional characteristics of a floor surface can cause a person to stumble and fall or otherwise lose control. Where there is a change in the characteristics of materials on a circulation route, such as from a tile to carpet finish, transition needs to be level and to offer similar frictional characteristics. Where this is not practical, differing surfaces need to contrast visually to identify the change in material and reduce the potential for an incident.

E.2 Slip resistance

The following indices are used to indicate the slipperiness of surfaces:

a) pendulum test values (PTVs) obtained using a pendulum tester in line with BS 7976-2;

b) surface micro-roughness (Rz) measurements using a stylus instrument in accordance with BS 1134-1.

Detailed information on assessing slip resistance, together with a table illustrating common surface materials and their dry and wet slip resistance values (SRV), also known as pendulum test values (PTV), can be found in BS 5395-1:2009[1)], Clause **7**.

NOTE Depending on the precise nature of the wearing surface, seemingly similar products made from the same material can be totally different in terms of their slip potential characteristics.

1) In preparation.

E.3 External surfaces

Where weather and low temperature results in surfaces being covered in snow or ice, the slip resistance of a surface ceases to be effective. It is therefore important that external pathways and ramp surfaces are kept free of snow or ice as part of the management regime of a building.

On a level surface, a material that gives a wet PTV greater than 36 is considered to be suitable where the surface is likely to become wet. However, a material with a wet PTV greater than 40 is considered to be more appropriate for a surface when a user is likely to be turning or pushing (e.g. when pushing a person in a wheelchair).

E.4 Ramps and sloping surfaces

On a sloping surface, the lateral component of the force in contact with the surface increases as the gradient of that surface increases. To compensate for this, a sloping surface needs to have a higher coefficient of friction than an equivalent level surface to maintain the same degree of traction.

The additional slip resistance can be approximated for the gradients recommended for ramps by expressing the gradient as a percentage and adding this to the SRV for an equivalent level surface. For example, for a 1:20 slope, the gradient is 5% and the required SRV is increased by 5. For a 1:12 slope, the gradient is 8.3% and the SRV needs to be increased by 8.3.

Where a ramp is likely to become wet, the recommended wet PTVs for ramps of different gradients are, therefore, increased from 40 to 45 for shallow ramps of 1:20 and to 49 for the steepest recommended gradient of 1:12.

Materials that are likely to achieve such wet PTVs include floated concrete, acid-etched ceramic tiles and some epoxy coatings with granular aggregate.

E.5 Step nosings

Where slip resistance is required for nosings and treads, the slip resistance needs to be equivalent to that expected for level surfaces. A PTV greater than 36 is considered to be suitable, as pushing and turning are unlikely on stairs. On existing nosings, the slip resistance of step nosings are generally expressed by their Rz roughness value as PTV is difficult to measure. In such cases a roughness Rz value of 20 μm is recommended.

Annex F (informative) Reach ranges

NOTE The measurements given in this annex are based on ergonomic research trials commissioned by the Department of the Environment, Transport and the Regions (DETR) in 1999. This research was used to establish ranges of dimensions that can be applied to common activities. These dimensions affect the accessibility of such facilities as telephones, reception desks, tables and kitchen work surfaces.

F.1 Key dimensions relating to wheelchair users

Table F.1 gives the following key dimensions, the definitions of which are illustrated in Figure F.1:

a) armrest height (an unoccupied dimension), which is a measurement of the wheelchair only;

b) knee height (an occupied dimension), measured from the floor to the top of the knee;

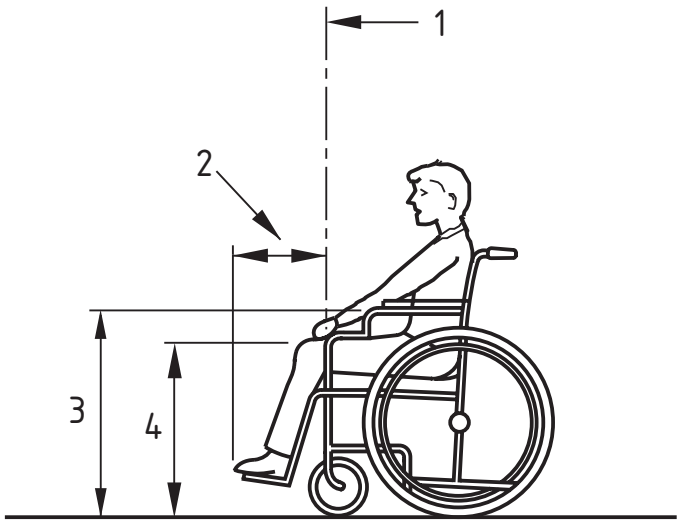
c) footrest depth (an occupied dimension), which includes a person's feet and is measured from the front of the wheelchair seat to the front of the toes.

NOTE Figure F.1 shows a wheelchair with a desk armrest, which is fitted in place of standard armrests by some wheelchair users when in an office or similar work environment.

Table F.1 **Range of wheelchair-related dimensions**

Percentage of wheelchair users accommodated	Armrest height	Knee height	Footrest depth
	mm	mm	mm
80%	713	661	445
90%	751	674	473
95%	794	691	490

Figure F.1 **Definitions of key wheelchair dimensions**

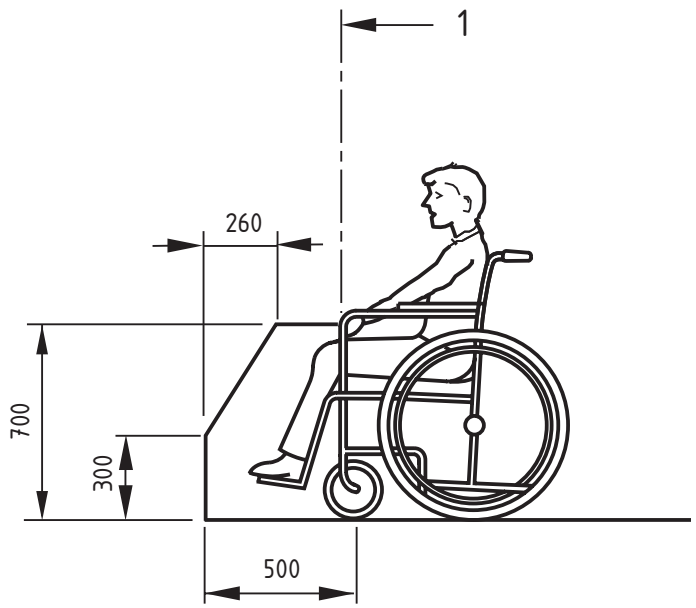


Key
1 Vertical reference plane for reach data
2 Footrest depth (from toes to front of seat)
3 Armrest height
4 Knee height

NOTE The wheelchair shown has desk armrests.

Based on these data, a kneehole profile can be determined which will satisfy the vast majority of wheelchairs and wheelchair users. This profile is shown in Figure F.2, which shows a typical standard wheelchair armrest.

Figure F.2 **Minimum dimensions of kneehole profile**
Dimensions in millimetres



Key
1 Vertical reference plane for reach data

NOTE The wheelchair shown has standard armrests.

F.2 Reach ranges

The research team obtained results for the following two reach ranges, which are intended to relate to the physical demands of an activity or action in terms of its precision or how often it is normally carried out.

a) *Comfortable reach range*. This range is determined by the capability of a person to reach in a comfortable and relaxed manner without stretching or bending from the waist and is appropriate for an activity that requires precision in its execution and is frequently performed.

b) *Extended reach range*. This range is determined by the capability of a person to reach when stretching and/or bending the body and is appropriate for an activity that does not require precision and is infrequently performed.

Table F.2 gives the data from the research trials for comfortable and extended reach for wheelchair users and ambulant disabled people at different angles above and below the horizontal plane. The dimensions, which are for reach at right angles to the vertical reference plane, are for height and the associated depth from the horizontal reference plane (see Figure F.3). The dimensions shown in the table represent

the reach capabilities of 90% of the sample of wheelchair users and ambulant disabled people who took part in the trials.

In practice, some actions or activities are normally performed outside the range of angles used for the research, e.g. reaching down to switch a low-level socket outlet, or reaching into the back or bottom of a drawer in a kitchen. Recommendations in this British Standard on these reach dimensions are based on a separate research study.

Table F.2 **Dimensions associated with comfortable and extended reach ranges**

Person	Access	Reach angle	Height (H)		Depth (D)	
			Comfortable	Extended	Comfortable	Extended
			mm	mm	mm	mm
Wheelchair user	Front	+70°	1 000	1 150	90	120
		horizontal	(750)	(750)	180	230
		–24°	650	650	120	200
	Side	+70°	1 060	1 170	100	135
		horizontal	(750)	(750)	220	310
		–24°	665	630	165	230
Ambulant disabled	Front	+70°	1 500	1 625	200	250
		horizontal	(850)	(850)	280	450
		–24°	750	700	180	310

NOTE 1 Dimensions have been rounded to the nearest 5 mm.

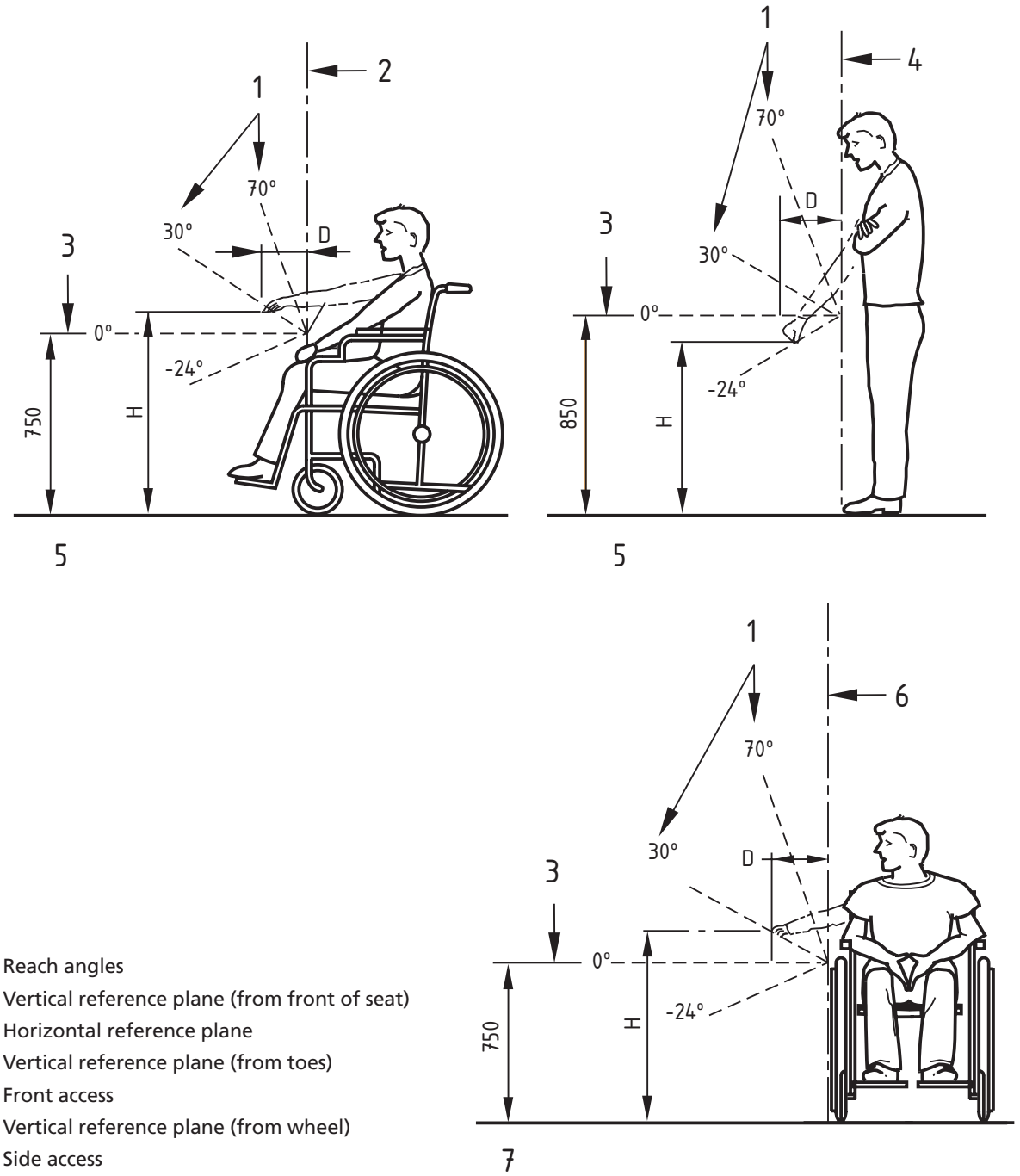
NOTE 2 Dimensions in brackets are for the horizontal reference plane.

NOTE 3 It is assumed that any kneehole allows full reach capabilities.

NOTE 4 Maximum heights are measured from the 70° line; minimum heights from the –24° line (see Figure F.3).

NOTE 5 For some activities, the recommended dimensions in the standard are extended beyond those resulting from the research trials on the basis of accepted practice.

Figure F.3 **Reference planes, reach angles and definition of height/depth**
Dimensions in millimetres



Key

1 Reach angles
2 Vertical reference plane (from front of seat)
3 Horizontal reference plane
4 Vertical reference plane (from toes)
5 Front access
6 Vertical reference plane (from wheel)
7 Side access

NOTE 1 Horizontal and vertical dimensions are measured from where the fist passes through each reach angle.

NOTE 2 Maximum heights in Table F.2 are measured from the 70° line; minimum heights, from the –24° line.

F.3 Activities and associated reach ranges

Table F.3 lists commonly encountered actions or activities and gives guidance on which reach ranges are appropriate when designing facilities within buildings.

Table F.3 **Reach ranges associated with common activities**

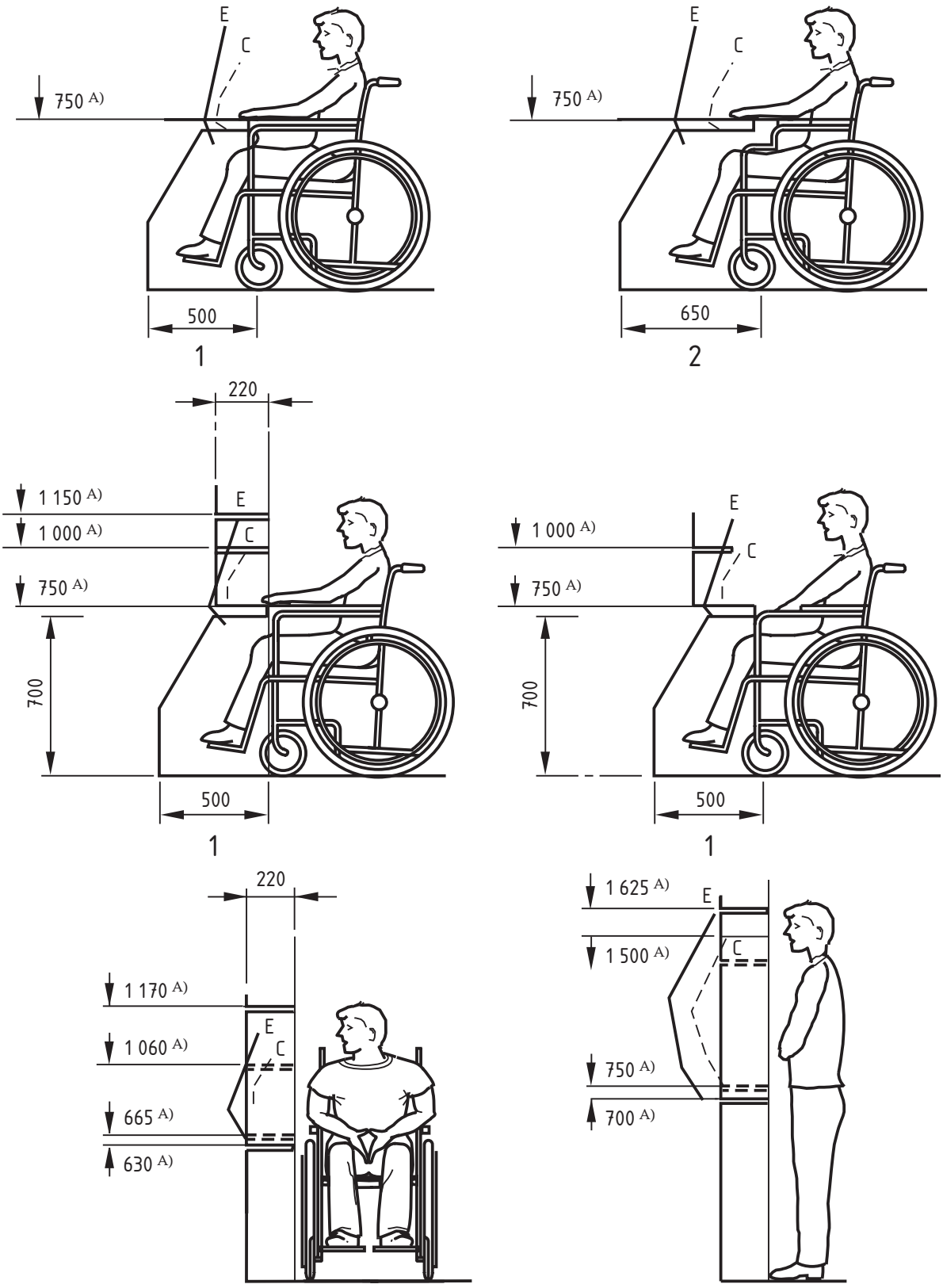
Type of action or activity	Reach range	
	Comfortable	Extended
Operating light switches, heating controls	✓	—
Using shower controls	✓	—
Holding onto support rails	✓	—
Operating sink/basin taps	✓	—
Preparing food/using kitchen equipment	✓	—
Removing and replacing items from shelving	✓ [A)]	✓ [A)]
Lifting telephone receiver and operating key pad	✓	—
Operating window controls	✓	—
Operating wall-mounted alarm buttons	✓	—
Operating lift call buttons	—	✓
Operating computer keyboard/mouse	✓	—
Touching interactive screens/displays	✓	✓
Dispensed items, e.g. toilet paper/towels/soap	✓ [B)]	✓ [B)]
Buying items/tickets from counter	—	✓
Filling out forms/signing documents	—	✓
Operating cash/ticket machines:		
Insertion/withdrawal of plastic card into slot	✓	✓
Ticket/cash withdrawal	✓	—
Pressing control buttons	✓	—
Coin insertion into slot	✓	—
Envelope insertion/withdrawal	—	—
Using lecture facilities (lecterns/projectors)	—	✓ [B)]

[A)] Depends on the use of the building.

[B)] The design of the equipment or fittings will affect the need for precision in operation.

Figure F.4 shows examples of how the reach contours for comfortable and extended reach relate to different activities associated with access to counters and shelving for both wheelchair users and ambulant disabled people. The dimensions of the top two examples differ because of the use of desk arms in the right-hand example.

Figure F.4 **Examples of applying reach range data to common activities**
Dimensions in millimetres



Key

1 Knee space for a wheelchair without desk arms
2 Knee space for a wheelchair with desk arms
C Comfortable reach (broken line contour)
E Extended reach (solid contour)

A) Heights above floor level

Annex G (informative) Guidance on the choice of hoists, associated slings and showering/changing benches

G.1 Provision of personal hoisting equipment

Apart from healthcare buildings or adaptation of facilities to suit an individual, the use of personal hoisting equipment is generally associated with accessible sanitary accommodation (particularly Changing Places facilities) and accessible sleeping accommodation, e.g. in hotels and residential buildings. It is in these areas that provision of a hoist will offer the greatest benefit, extending the range of people that a facility can accommodate.

The provision of hoists within accessible accommodation can further enable independent use, and greatly improve assisted use, of facilities by people with more complex and/or multiple disabilities. It is an advantage if the design and structure of a building allows the simple installation of hoisting equipment at a later date, if not initially possible.

Where a means of lifting is provided, there are four components essential to safe and comfortable use of that equipment:

a) there needs to be sufficient space for efficient use;

b) assistants need to be familiar both with the moving and handling requirements of the person in their care and with the operation of equipment in question. To assist in this, written instructions need to be provided with the equipment;

c) personal equipment (such as slings) or supplied equipment (chairs, stretchers) needs to be compatible with the hoisting equipment;

d) any equipment provided needs to be properly maintained.

G.2 Types of hoist system

There are three types of hoist system in general use.

a) An overhead full room cover tracked hoist allows transfers to be carried out in any part of the room and use of all the equipment/facilities. Due to its travelling track, it provides flexibility in the use of the space and can be ceiling-fixed or wall supported, which is an advantage if retrofitting.

b) A single overhead tracked hoist is a common, lower-cost installation which enables use of identified facilities on a fixed route. It requires a robust ceiling structure for mounting and is not as flexible as a full room cover system in terms of flexibility of use or accommodating changes to the future use of a space.

c) A mobile hoist is intended for use only with assistance, and requires the assistant to move both the hoist and the person around the room. Additional space is needed within the facility for manoeuvring the hoist. It can become a trip hazard and, not being a fixture, might not be available when needed (e.g. it might have been removed). However, it does allow flexibility of use in a managed environment, where adequate space is provided.

All hoist equipment needs to be installed to manufacturers' instructions and to be serviced and maintained in line with the Lifting Operations and Lifting Equipment Regulations 1998 [28]. This is the responsibility of the management of the facility.

G.3 Slings

There are many different types of hoists, manufactured to provide for a range of weights and heights of people and use situations. Similarly, there is more than one system for connecting personal equipment, such as slings, to such devices.

In the majority of hoisting situations, a personal sling will be used to allow transfer of a person via a hoist. There are two main methods of attaching the sling to the hoist: loop attachments, which potentially provide the greatest compatibility, and clip attachments, which can only be used with a limited number of specific sling types.

It is important to ensure that the correct sling is used. The assistant needs to carry out an assessment before the hoist and sling is used to ensure that they have sufficient knowledge and experience of the equipment in order to use it safely. Each disabled person will have been risk assessed and their assistant(s) trained in the use of their specific sling for use at home.

Slings are intended to be used by one person only and then washed, to avoid risk of cross-infection. Additionally, on account of the difficulty ensuring appropriate sizing of slings for each individual, it is suggested that slings are not provided by the management of the facility.

Users are expected to bring their own slings to enable them to use the hoists. It is expected that the type of hoist facility offered will be advertised by the management, and that information will be made available to potential users to help ensure that the type of sling brought is compatible with the installed hoist.

Manufacturers commonly recommend using their own slings. However, hoist manufacturers are expected to provide guidelines and instructions on the compatibility of their equipment with different slings. The type of hoist installed is expected to provide the widest choice of compatibility of different types and makes of slings. For this reason, it is advisable to seek specialist advice, e.g. from occupational therapists or the Changing Places Consortium, regarding the type of hoist to be installed.

The provider is expected to ensure that the overhead track hoist has instructions for use displayed within the facility, is safe to operate and is in good working order.

Assistants have a responsibility to read, understand and follow the instructions. If the equipment is not working properly, or assistants are unfamiliar with the equipment, they have a responsibility to alert the management of the facility, and to ensure that the hoist is not used.

G.4 Height-adjustable changing benches

Wall-mounted height-adjustable benches fold against the wall when not in use and therefore provide for flexibility in the use of space. They are fixed in place for security.

Mobile height-adjustable benches can be moved to provide access by an assistant on either side, but can be removed.

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