

ACCESS AUDIT IN THE BUILT ENVIRONMENT 2016

MS 1184 : 2014 UNIVERSAL DESIGN AND ACCESSIBILITY IN THE BUILT ENVIRONMENT - CODE OF PRACTICE (SECOND REVISION)

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**MALAYSIAN
STANDARD**

MS 1184:2014

Universal design and accessibility in the built
environment - Code of practice
(Second revision)

ICS: 25.060.10

Description: universal design, disabled person, ambulant disabled, access, landscape, sign and symbol,
facility, lift, requirement

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MS 1184 : 2014 UNIVERSAL DESIGN AND ACCESSIBILITY IN THE BUILT ENVIRONMENT –

CODE OF PRACTICE (SECOND REVISION)

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SCOPE

- This MS provides a range of requirements and recommendations for many of the elements of construction, assemblies, components and fittings which comprise the built environment. These requirements relate to the constructional aspects of access to buildings, to circulation within buildings, to egress from buildings in the normal course of events and evacuation in the event of an emergency.

This standard applies to buildings which the public has access to, including the followings:

- a) residential buildings (landed properties are excluded);
- b) offices, banks, post offices, shops, department stores, supermarkets, hotels and other administrative and commercial buildings;
- c) rail, road, sea and air travel buildings and associated concourses, car-parking building and factories;
- d) hospitals, medical centres, clinics and other health and welfare buildings;
- e) restaurants, concert halls, theatres, cinemas, conference buildings, community buildings, swimming pools, sports buildings and other refreshment, entertainment and recreation buildings;
- f) religious buildings;
- g) schools, hostels, colleges, universities, zoos, museums, art galleries, libraries, exhibition buildings and, other educational, cultural and scientific buildings; and any other buildings or any part thereof to which members of the general public has access, as visitors/ occupants or for the purposes of the employment; and h) historical buildings, heritage, sport and government buildings.

Table 1. Accessibility for PWDs, the elderly and children in different types of buildings

Types of buildings	Accessible areas
1. Residential buildings:	
1.1 Existing buildings:	
(a) 4-storeys and below (without lift access);	All communal areas and facilities at ground floor.
(b) 4-storeys and below (with lift access); and	All communal areas and facilities.
(c) 5-storeys and above.	All communal areas and facilities.
1.2 New buildings shall be provided with lift.	All communal areas and facilities.
2. Office buildings.	All areas intended for access by employees or public.
3. Shophouses.	All areas intended for access by employees or public.
4. Shopping complexes and multipurpose complexes.	All areas intended for access by employees or public.
5. Hotels, boarding houses and chalets.	All areas intended for access by employees or public.
6. Places of public resort.	All areas intended for access by employees or public.
7. Parks and open spaces including zoo, civic plaza, etc.	All areas intended for access by employees or public.
8. Schools, colleges, universities or institutions of learning.	All areas intended for access by staff, students or public.
9. Hostels, halls of residence or dormitories.	All areas intended for access by staff, students or public.

Table 1. Accessibility for PWDs, the elderly and children in different types of buildings
(continued)

Types of buildings	Accessible areas
10. Sports complexes and public swimming pools.	All areas intended for access by employees or public.
11. Restaurants and eating establishments.	All areas intended for access by employees or public.
12. Markets and hawker or food centres.	All areas intended for public access
13. Hospitals, clinics, dispensaries, nursing homes, homes for the aged and welfare homes.	All areas intended for access by staff, patients, inmates or public.
14. Factories, workshops, industrial buildings and office/showroom areas in warehouses.	All areas intended for access by employees or public.
15. Transport stations, interchanges, passenger terminals, administration buildings in depots, taxi and bus shelters.	All areas intended for access by employees or public.
16. Vehicle parks (surface parking or vehicle parking buildings).	Prescribed areas. For vehicle parking buildings, carpark decks to be made accessible.
17. Heritage building.	Prescribed areas intended for access by employees or public.

General Design Consideration

- The requirements in this standard relate to the principal human abilities that should be considered when designing, constructing and managing the built environment. These abilities are described in Annex B which gives an overview of design considerations that should be taken into account for each of the different abilities.

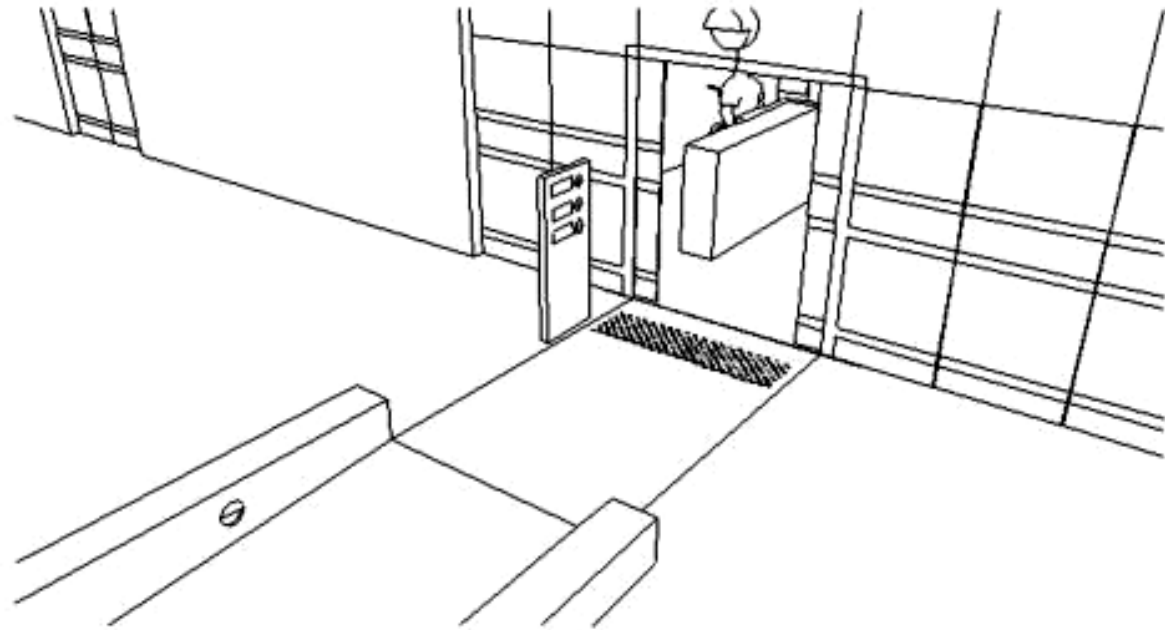
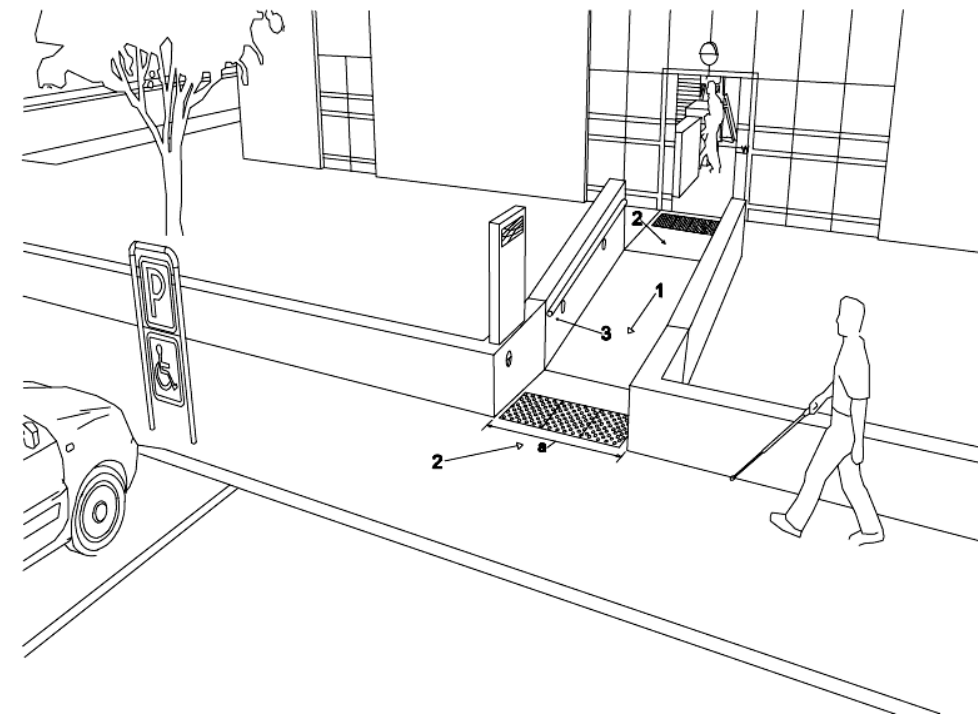
4.2 Design requirements according to human abilities

When fully implemented, this standard is expected to be of benefit to all people, including:

- a) people with hearing impairments;
- b) people with visual impairments;
- c) people with mobility impairments;
- d) people with cognitive/ learning impairments;
- e) people with hidden (such as strength, stamina, mental, dexterity and allergy) impairments; and
- f) people with diversities in age and stature (including frail persons).

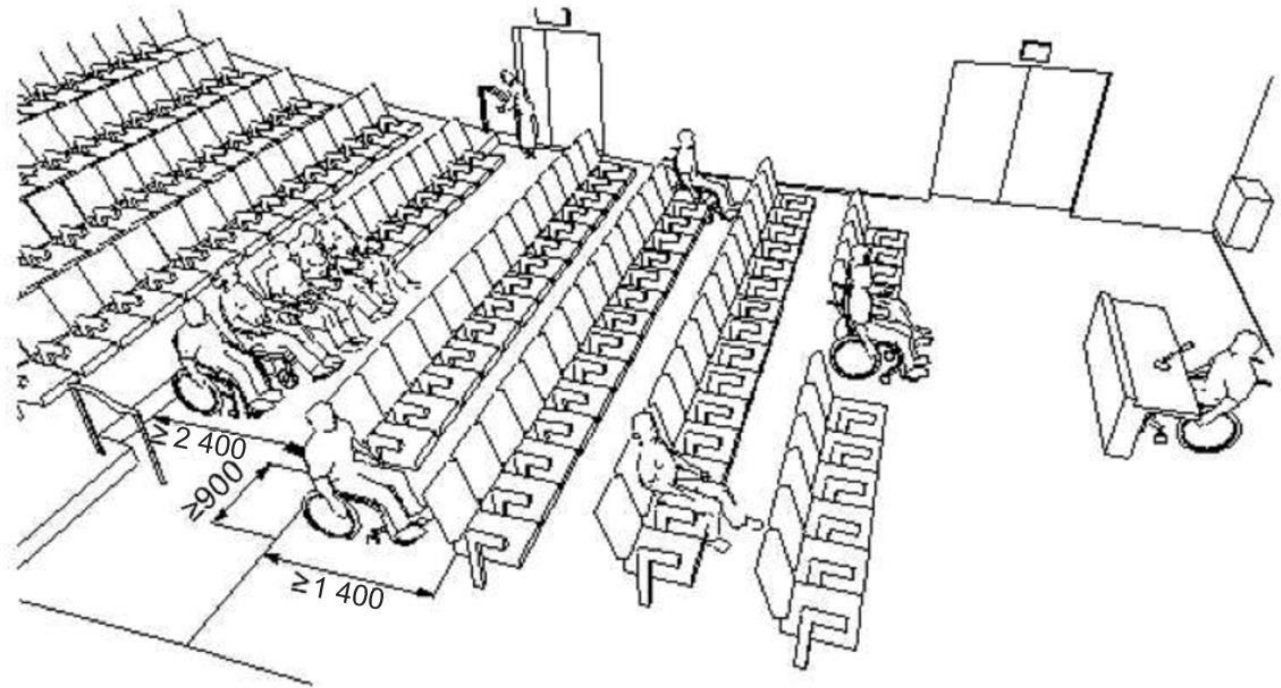
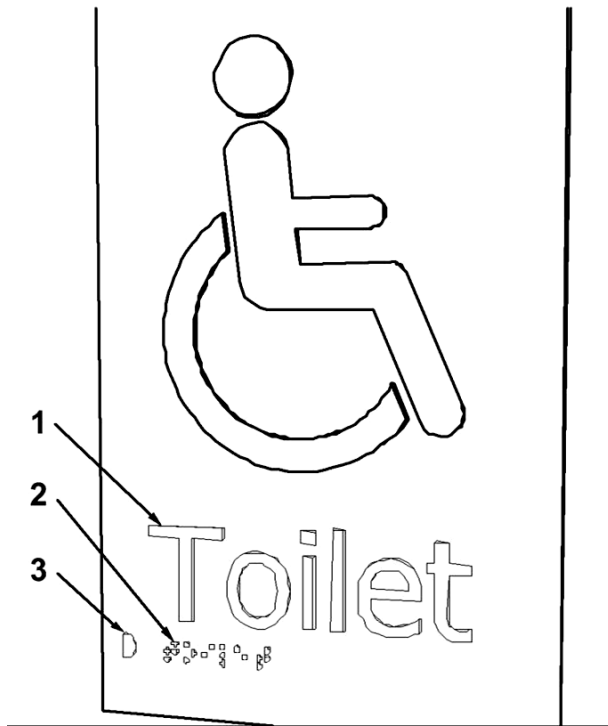
Key accessibility issues in early stage of planning

- Equitable approach to a building, e.g. designated parking, clear pedestrian routes separate from vehicles and cyclists, no steps or obstacles, short distances from parking and public transport, good signage, good lighting and good contrast.



Key accessibility issues in early stage of planning

- Equitable use of the same rooms, e.g. ample circulation space and different seating possibilities, good acoustics and hearing enhancement systems, good lighting and good visual contrast.



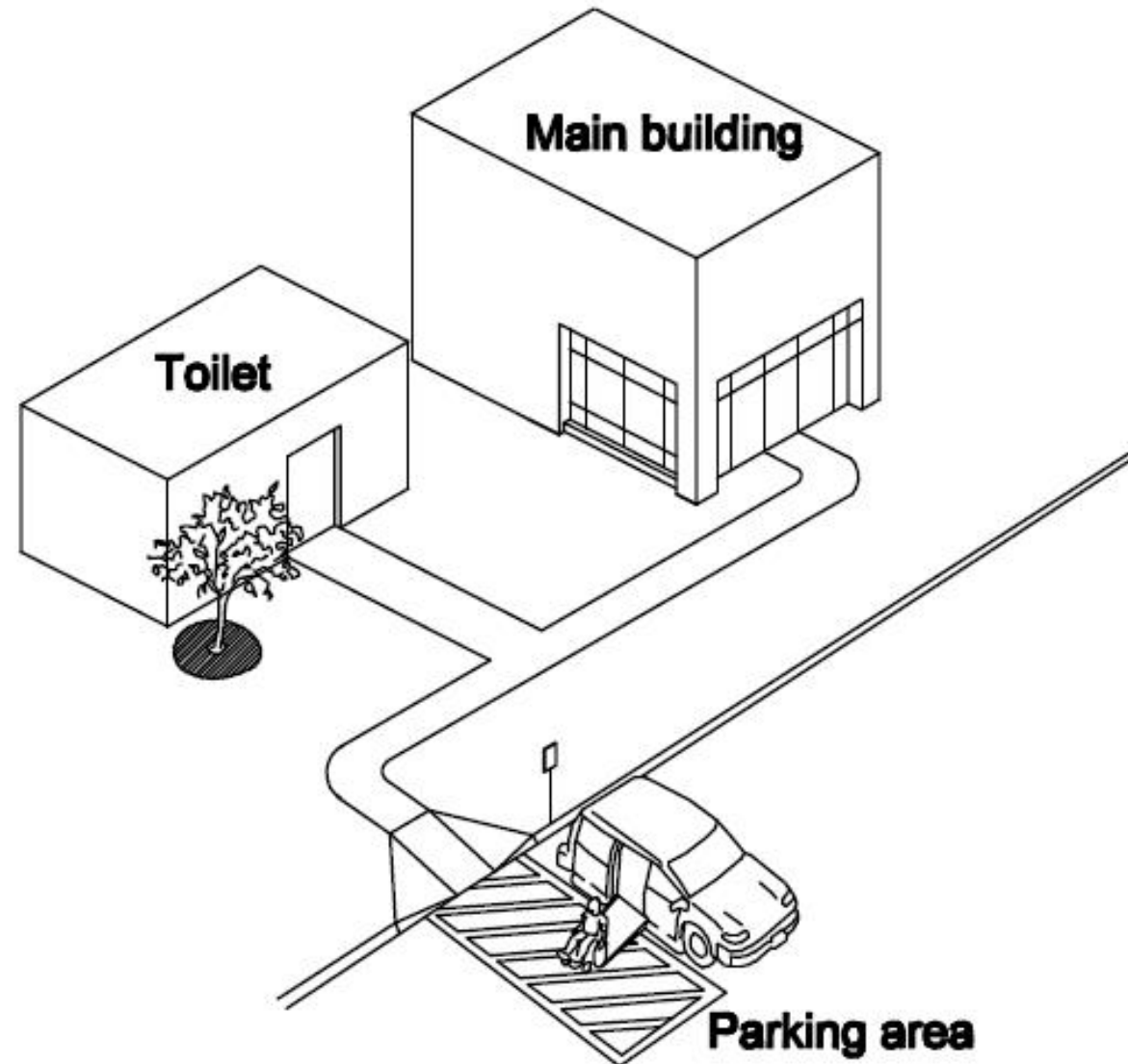
- Important information via two senses or more, e.g. visual, audible and tactile.

Approach to the Building

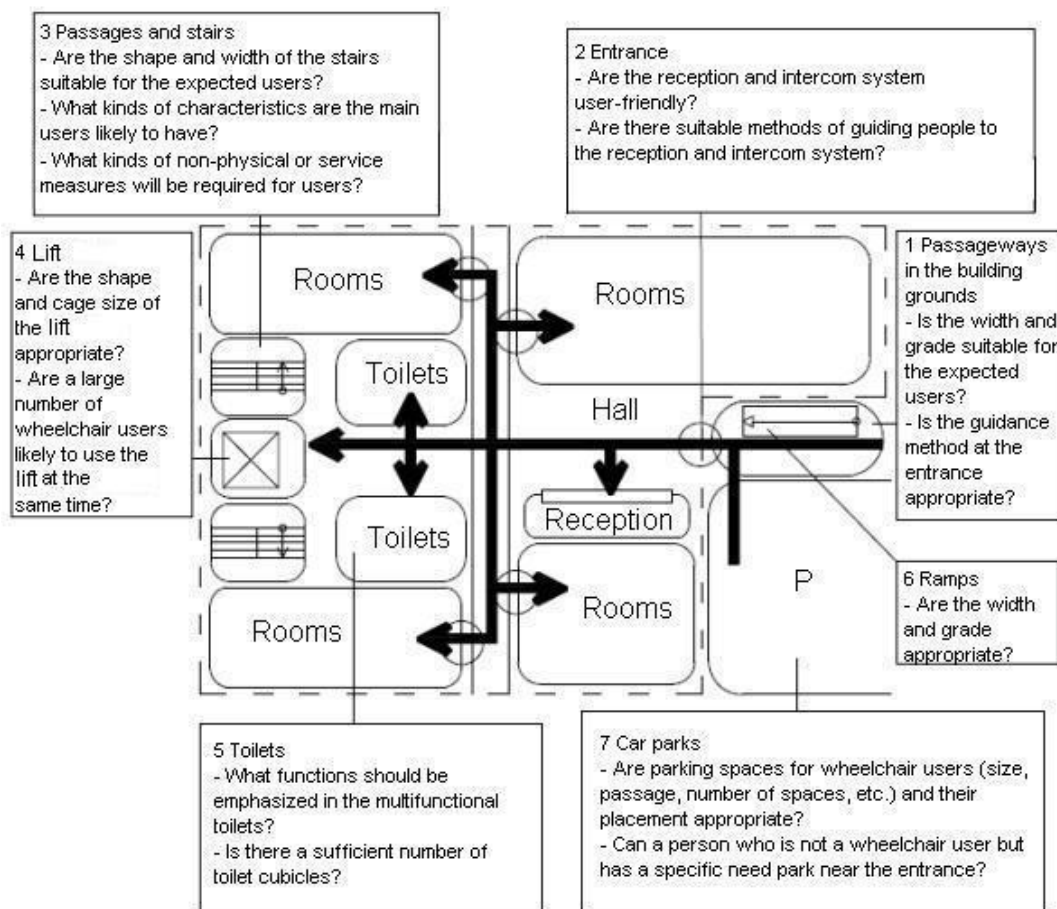
5 Approach to the building

5.1 Access route

- At least one route from the road adjacent to the building leading to the public rooms and at least one route from public rooms to toilet cubicles and parking spaces for wheelchair users should be easily accessible by wheelchair users. Examples of access route are as shown in Figure 1.



Approach in the Building

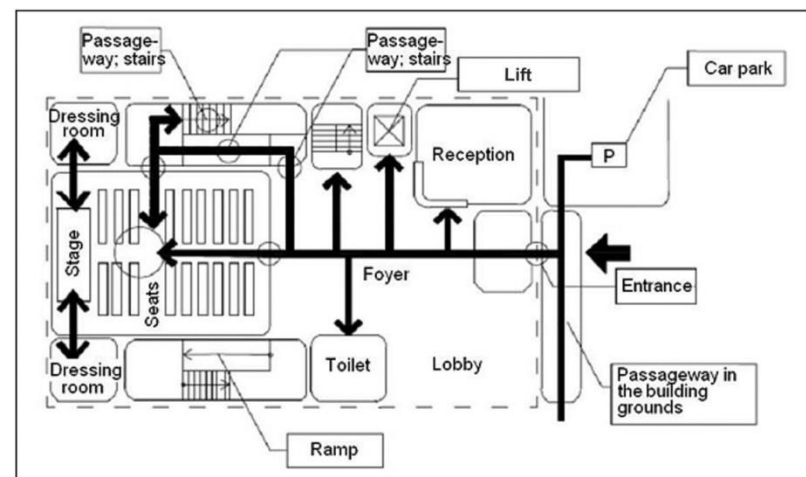


5.3 Building plan checkpoints

5.3.1 Overall checkpoints

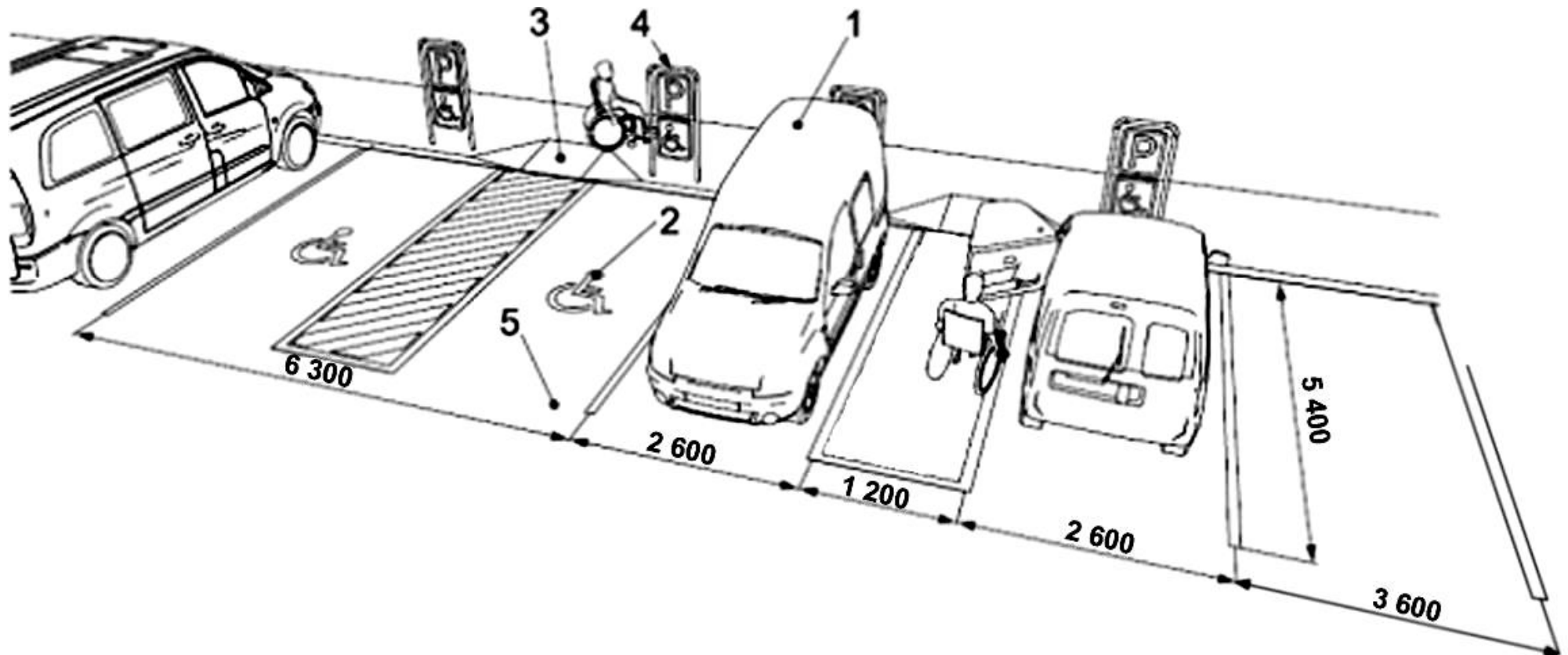
The objective of having overall checkpoints is for designers to ensure seamless accessibility to those areas by persons with disabilities. The checkpoints are:

- Is the flow plan easy to understand and compact?
- Is information and sign (sound, text, pictographs, guiding tiles, etc.) placement suitable, and easy to understand and see.



6.3 Car parking

The minimum width of the parking space for a car shall be 3 600 mm and the minimum length shall be 5 400 mm. This minimum width includes the transfer area beside the car with a minimum of 1 200 mm. Figure 4 shows one single parking bay and aisle.



6.3 Car parking – Signage & Kerb Ramp from Parking Area

It is important that the locations of the designated parking spaces are clearly signposted at the entrance to the building site or car park with information providing direction to designated parking spaces and to other accessible facilities. Therefore, directional arrows combined with the international symbol of access (see Figure 89) shall be used.

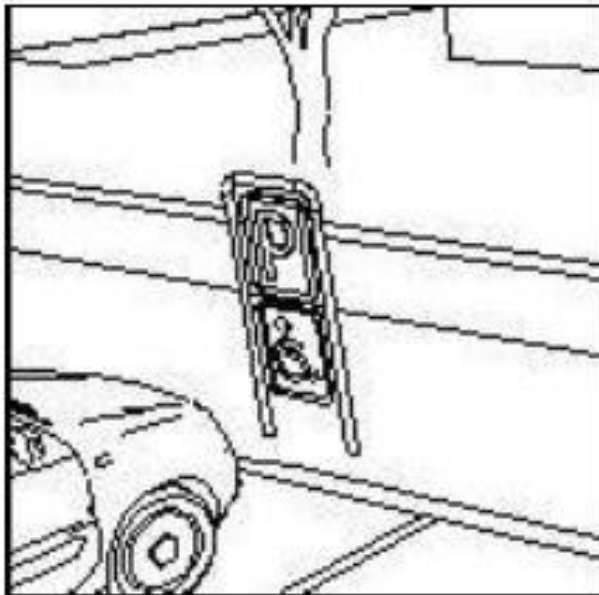


Figure 6. Example of vertical signage

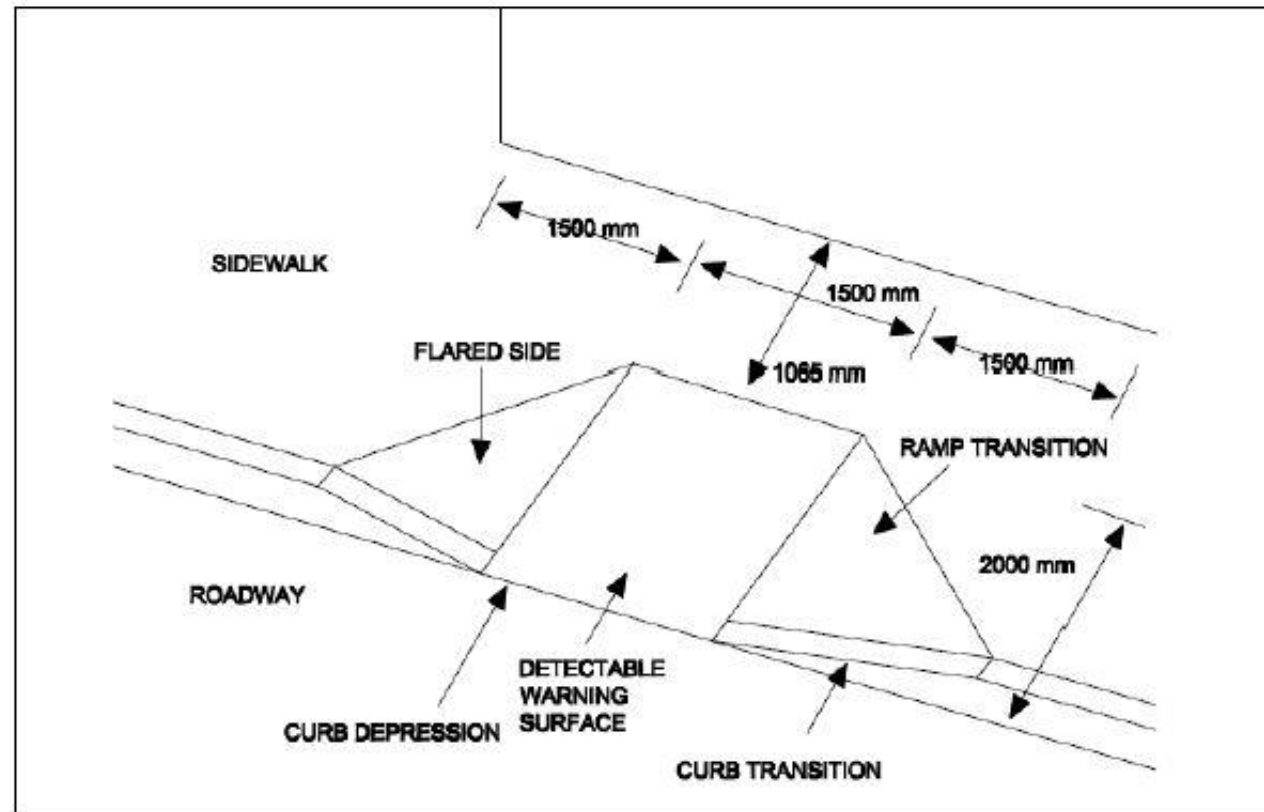
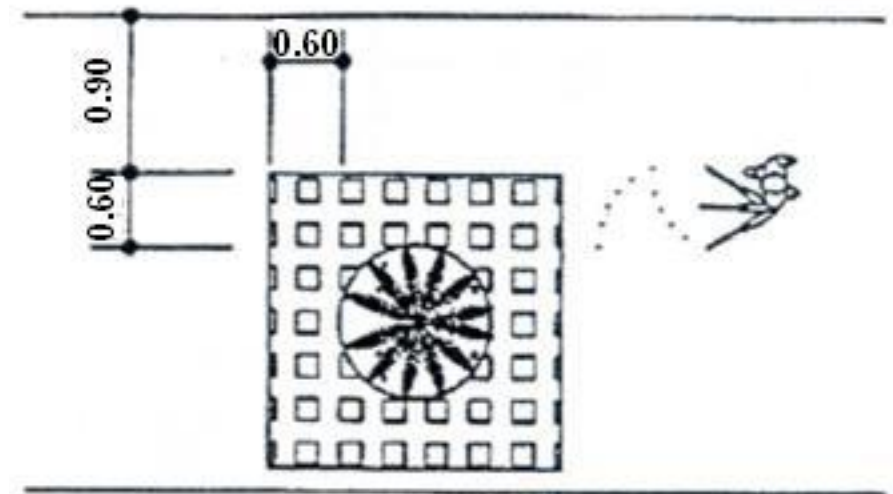
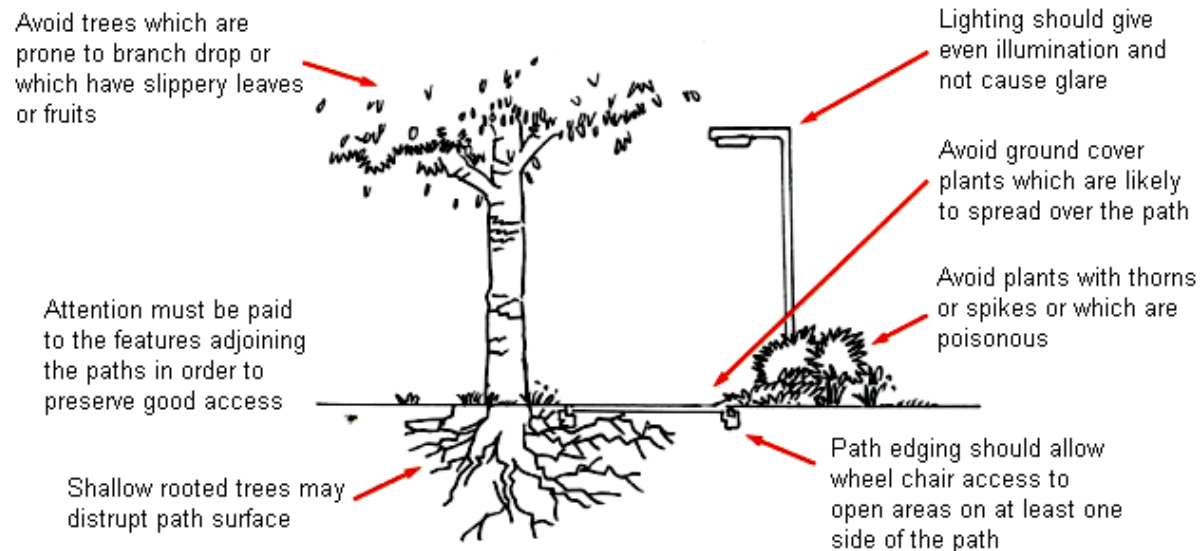


Figure 7. Kerb ramp

7.4 Width of the path

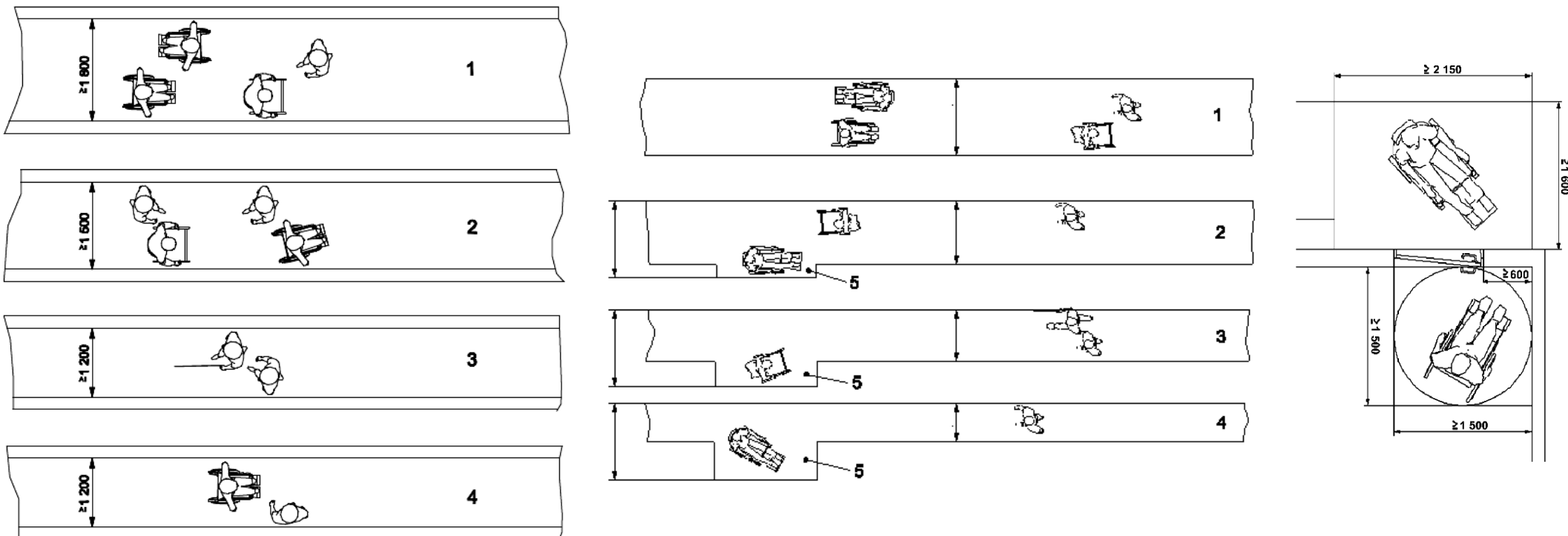
The unobstructed width of the path shall be (see Figure 11):

- a) not less than 1 800 mm for constant two-way traffic;
- b) not less than 1 500 mm for frequent two-way traffic, provided that passing places are included at intervals of maximum 25 m;
- c) not less than 1 200 mm for infrequent two-way traffic; a passing and turning space of at least 1 800 mm × 2 000 mm should be provided for every 25 m (see 7.5); and
- d) not less than 900 mm when it is unlikely that people will have to pass one another; a turning space of at least 1 500 mm × 1 500 mm should be provided for every 25 m (see 7.6).



7.5 Passing space for wheelchair users

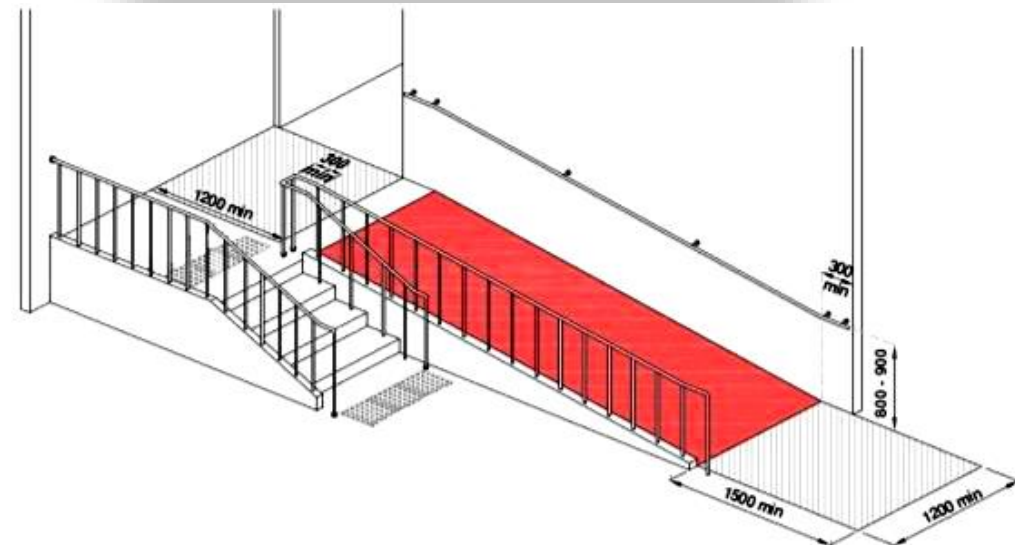
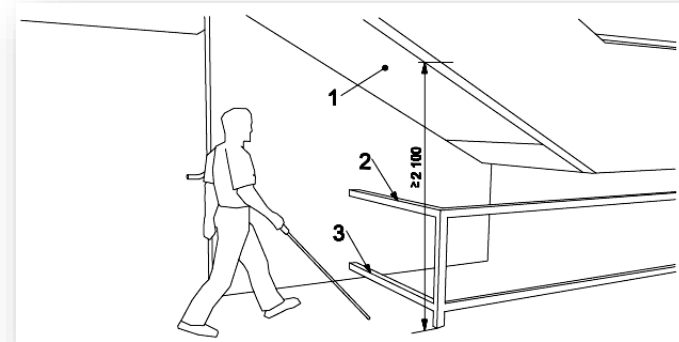
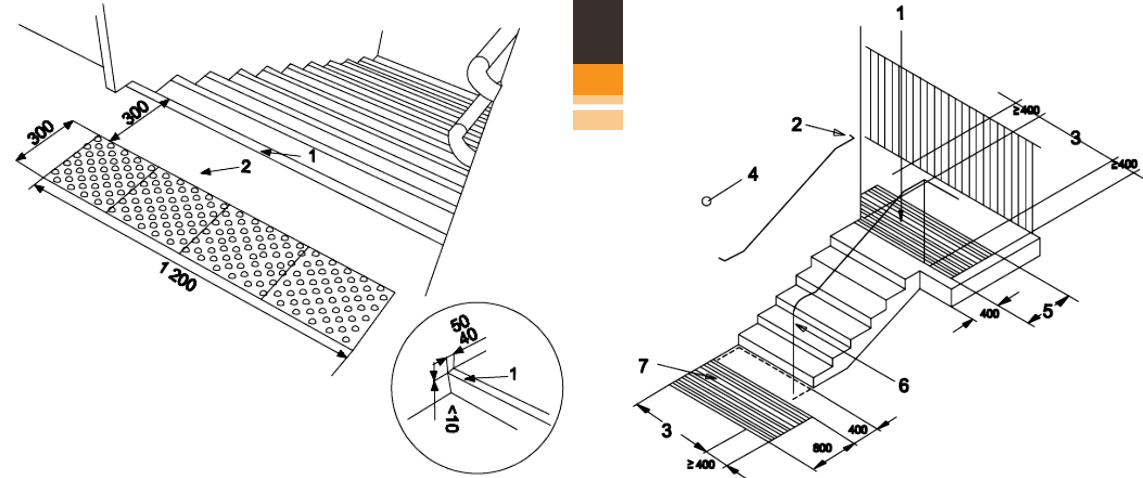
- A path whose surface width is less than 1 800 mm (see 7.4) and whose overall length is more than 50 m shall be provided with a passing place or places. Passing places should be a maximum of 25 m apart. This does not apply to a landing forming part of a sloped path, a ramp, steps or a stair.
- Passing place for two people using wheelchairs shall be a minimum width of 1 800 mm for a minimum length of 2 000 mm (see examples in Figure 12).
- NOTE. Passage widening can be associated with intersections, turns and doorways so as to appear as integrated design features or enhancements.

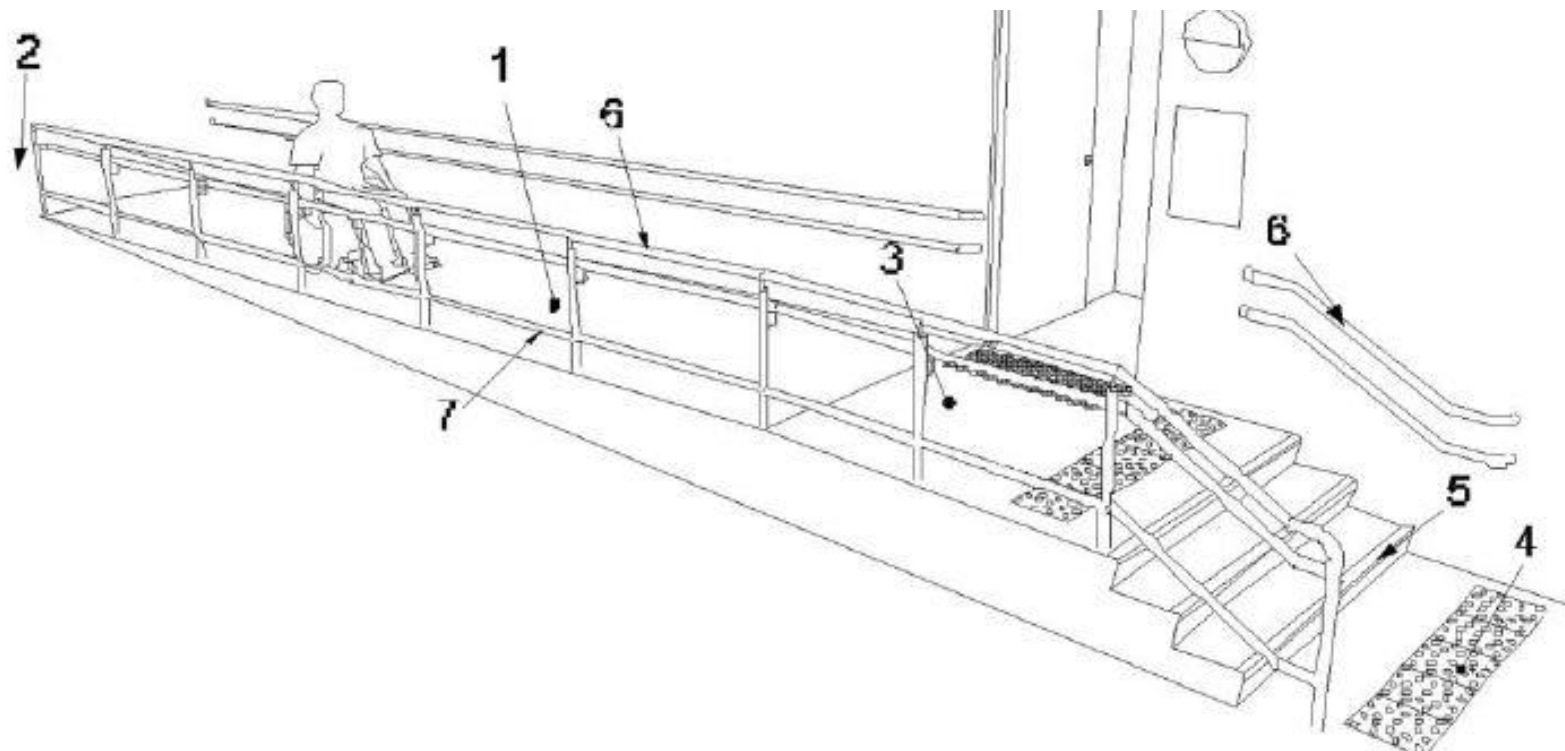


8 Ramps / stairs

8.1 General

- Ramps provide an accessible route between changes of level. A ramp with the appropriate slope can provide accessibility without requiring reliance on a mechanical device.
- Ramps may be the only practical solution for people who cannot use steps or stairs, but other people may prefer to use stairs.
- In addition to a ramp, a flight of steps should be provided if the change in level is more than 300 mm (see Figure 16).
- In buildings of more than one storey, a lift should be provided (see 15.1).
- Where required on a continuous accessible path of travel, tactile warning indicators should be located at both the top and bottom of ramps. See further detailed measures in 13.5.





Key

- 1 ramp surface (see Table 3 for maximum slope and length)
- 2 horizontal landing
- 3 horizontal landing
- 4 tactile walking surface indicator (TWSI) in front of stairs
- 5 complementary stairs with markings
- 6 handrails on both sides of ramp and stairs
- 7 upstand, minimum 150 mm

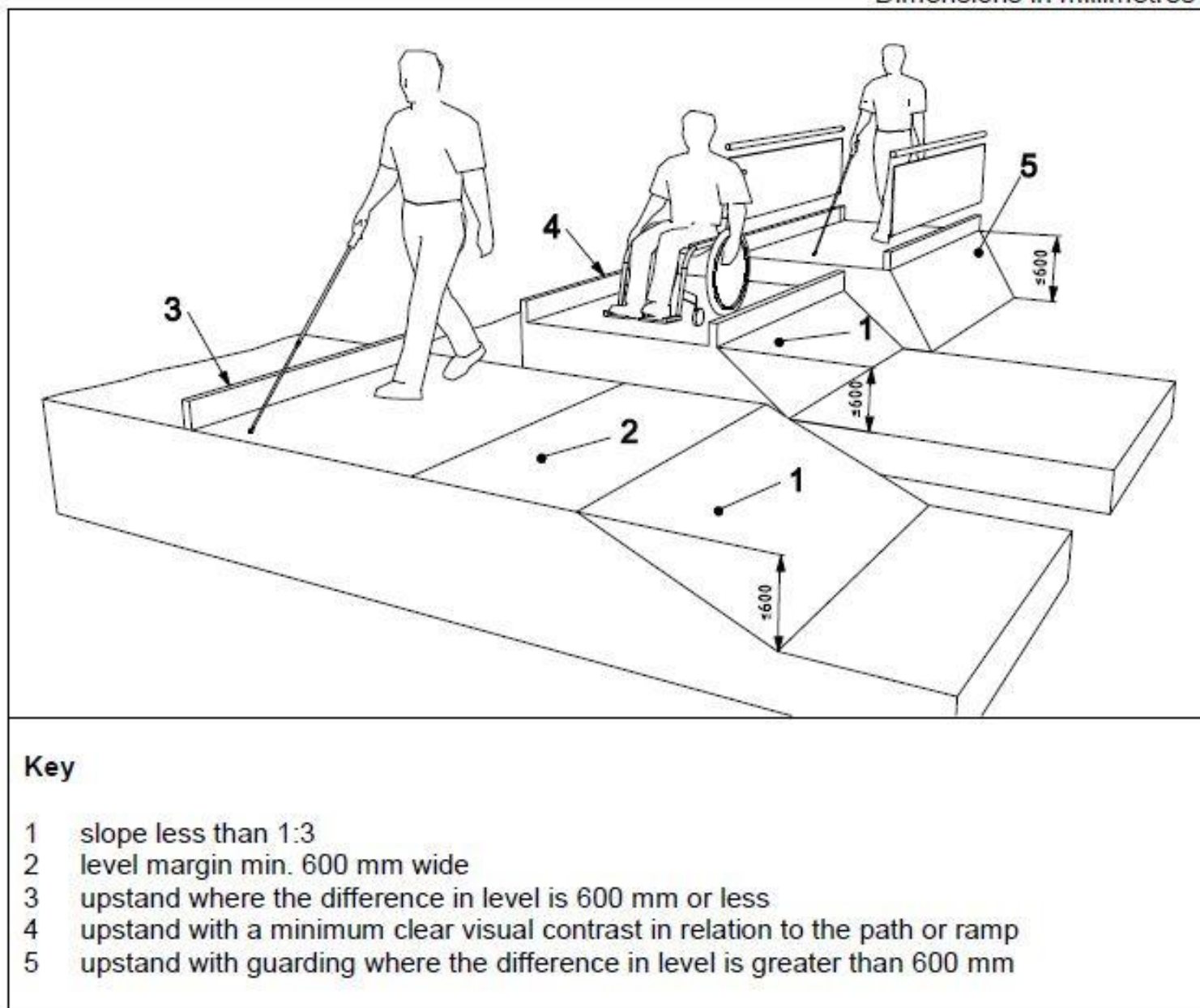
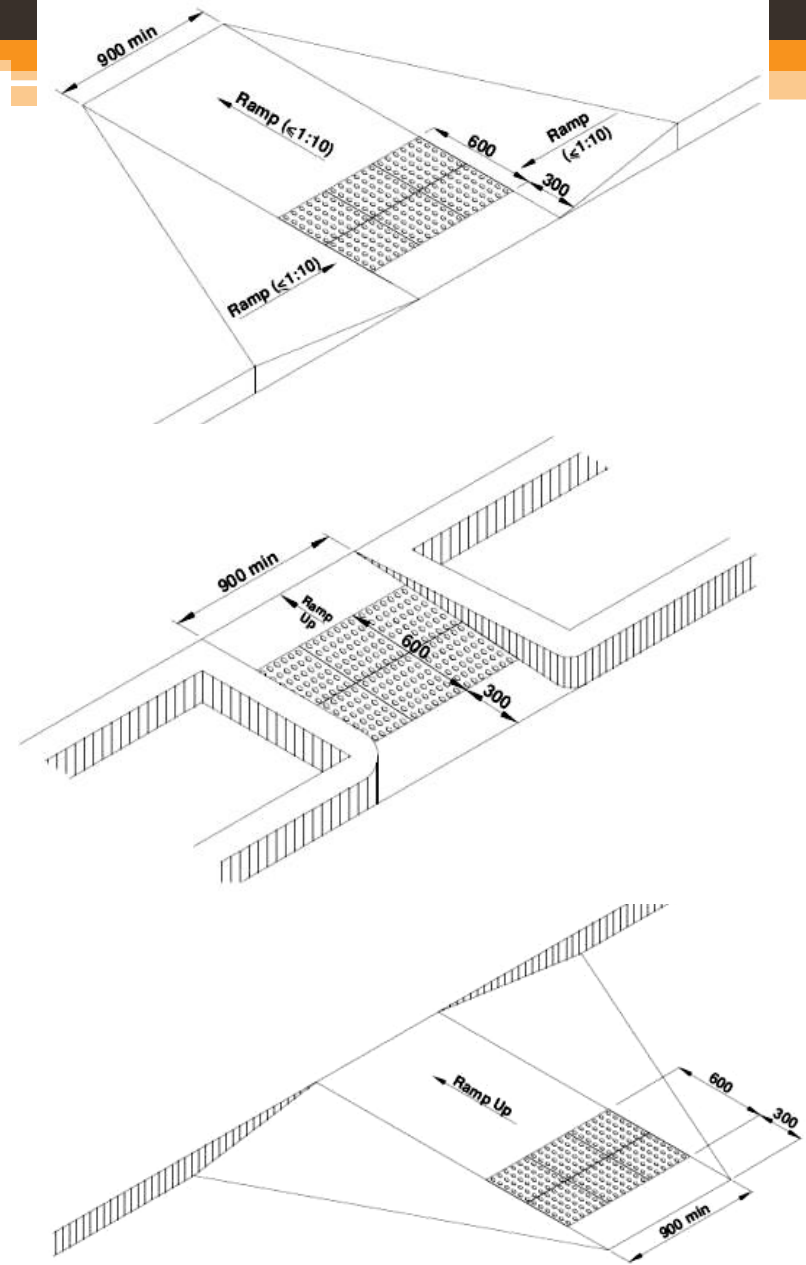


Figure 18. Examples of protection against falling

13.5 Visual and tactile warnings

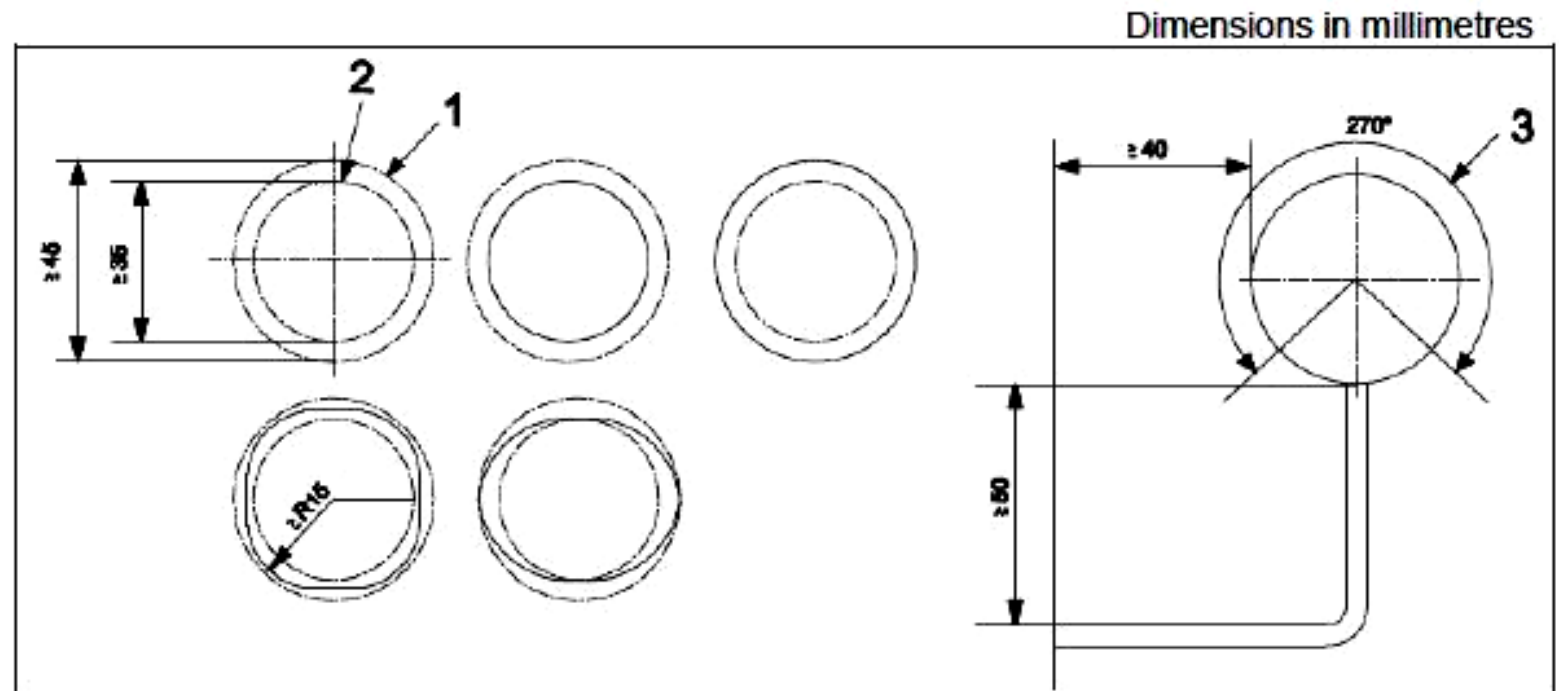
- There shall be a clear visual contrast between landings and the top and bottom step of a flight of stairs. Preferably, a visual warning line with a single strip of 40 mm to 50 mm without a break shall be provided on the front edge of the tread and may return down the riser for a maximum of 10 mm. The visual indicator on the tread may be set back a maximum of 15 mm from the front of the nosing. As an alternative solution, a visual warning line with a width between 50 mm and 100 mm shall be provided on the tread of the first and the last step of the flight. See Figure 29.



• 14.3 Profile of a handrail

- a) have a rounded profile that can be inscribed into a 45 mm circle, and subscribed to a 35 mm diameter circle. The radius of the rounded edges shall be minimum 15 mm;
- b) be located to provide a minimum clear space of 40 mm from an adjacent wall or other obstruction;
- c) have an overall projection from any side obstruction of not more than 100 mm;
- d) have the top 270° arc of the handrail clear along its full length;
- e) have a minimum of 50 mm clearance under the 270° arc along the full length of the handrail for finger indentation; and
- f) have a surface that is smooth but provides adequate resistance to hand slippage.

A wide and relatively flat-topped surface on a handrail provides better support than a regularly curved one. Grasability is better on a handrail that does not require significant hand and finger joint movement. For these reasons, the use of a handrail that is elliptical is preferred.



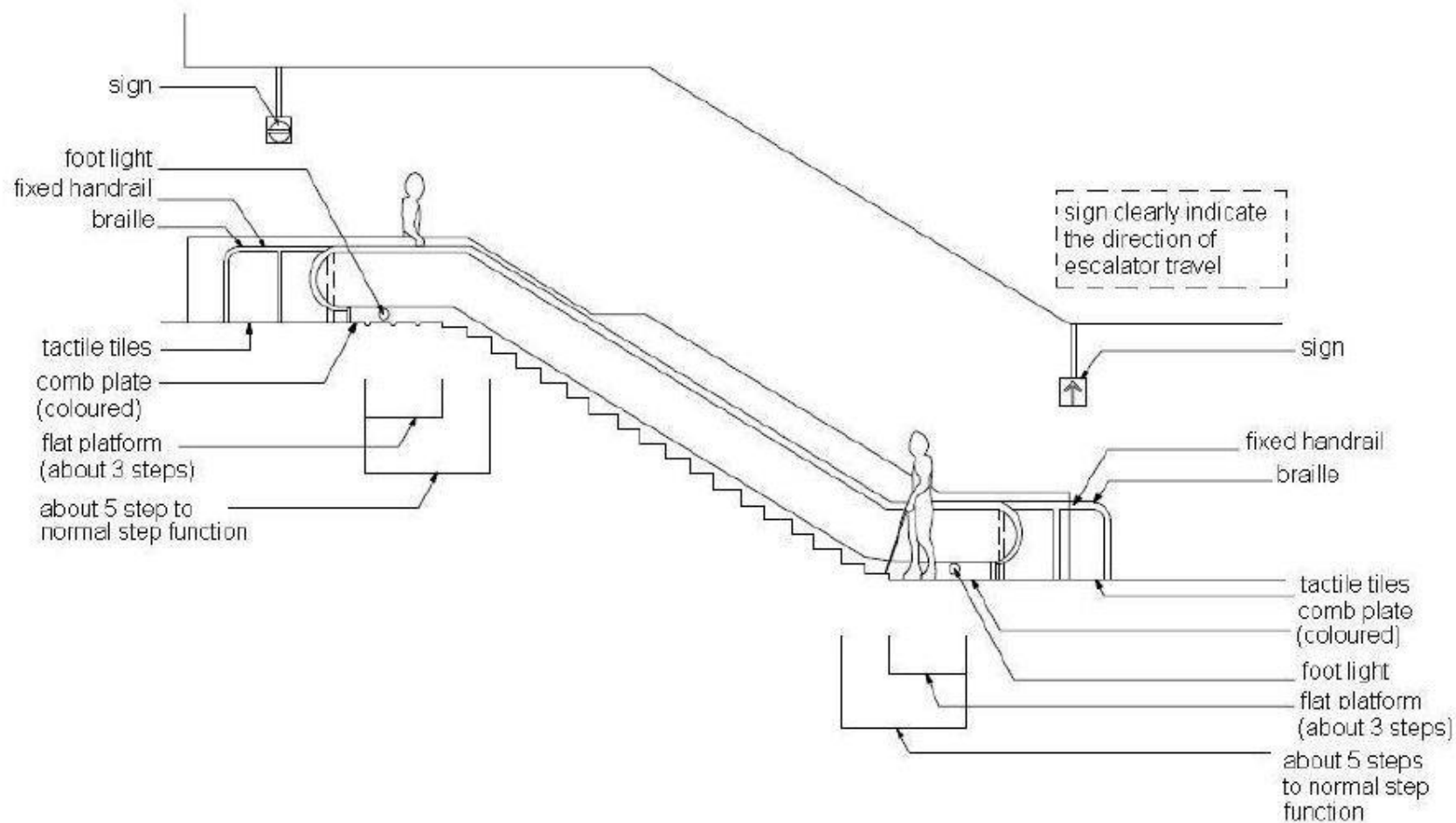


Figure 14. Fixed handrail for escalators

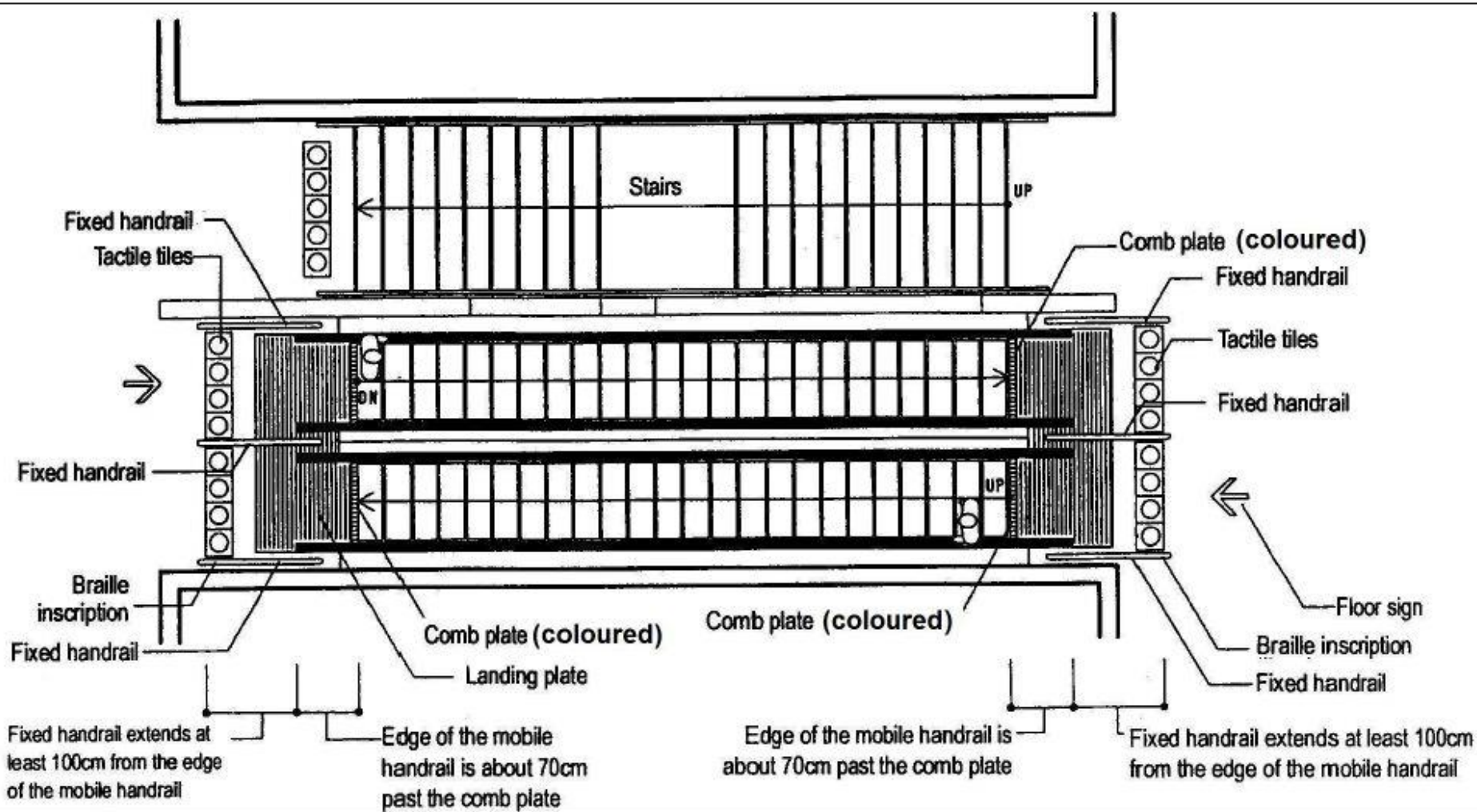
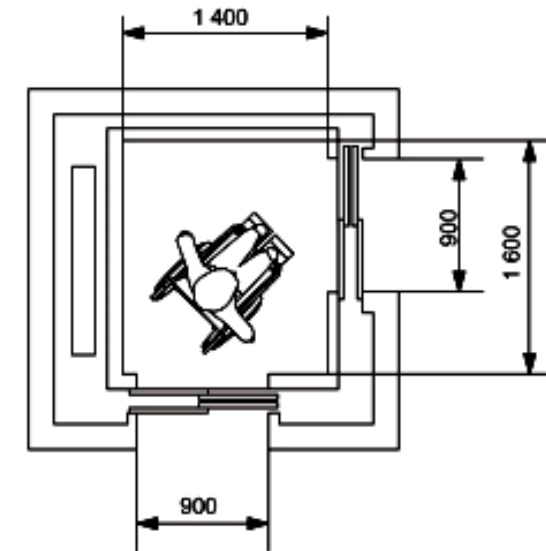
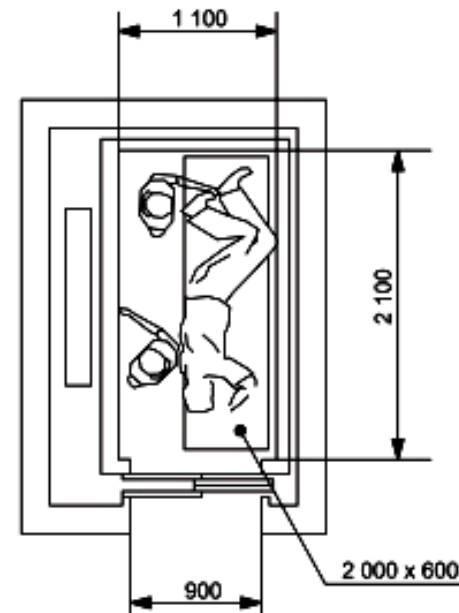
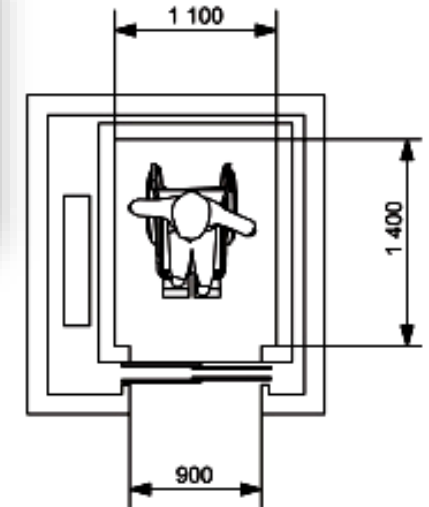
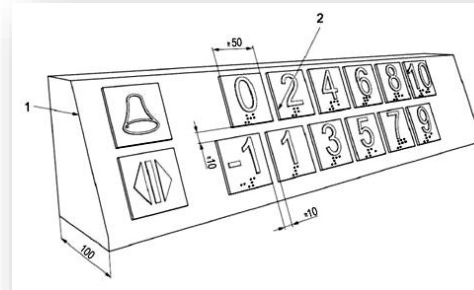


Figure 42. Example of design standards for escalators (plan view)

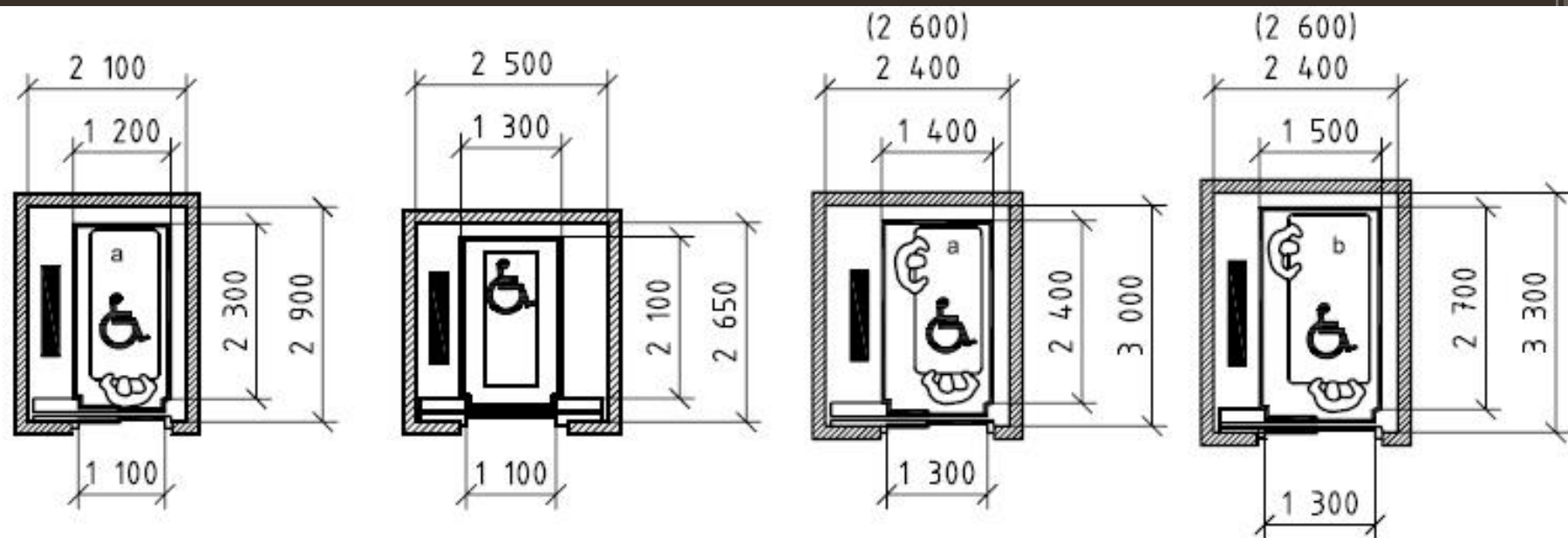
15 Lifts

15.1 General comments

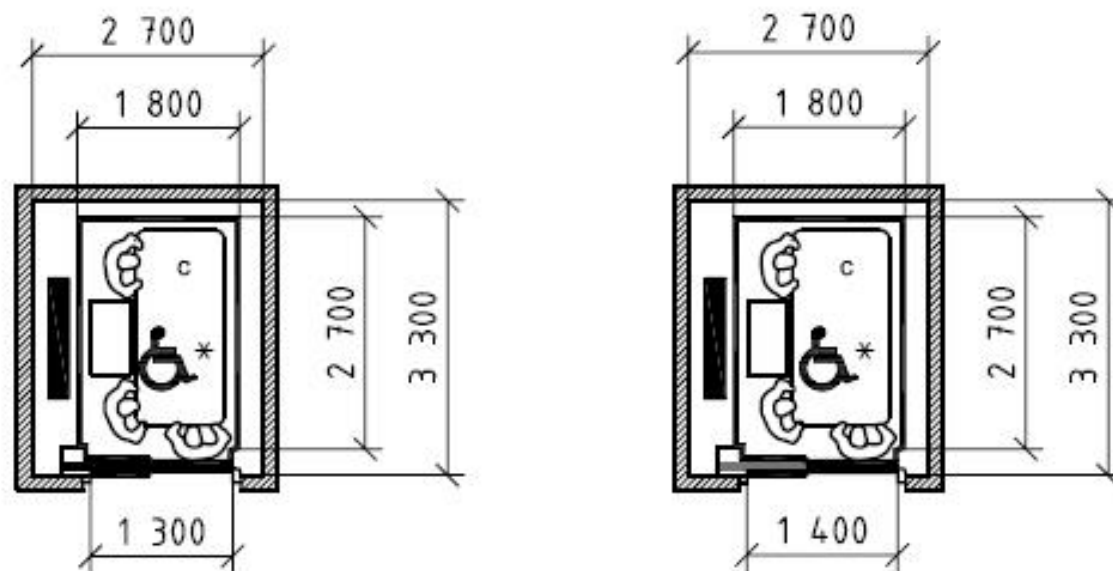
- All accessible levels of a building shall be accessible with ramps or lifts. Lifts are preferable, and shall be accessible for all people, including people with disabilities. The minimum inner dimensions of cars are given in 15.2.
- A space for an accessible lift with a minimum internal lift car size of 1 100 mm × 1 400 mm of 630 kg with a mirror located in the opposite of the lift door should be provided for later adaptation.
- There is a wide range of accessible lifts for persons in different lift classes, such as general purpose lifts, health care lifts, including hospitals and nursing homes and intensive use lifts for high-rise buildings.



15 Lifts



2 500 kg



16 Vertical and inclined lifting platforms

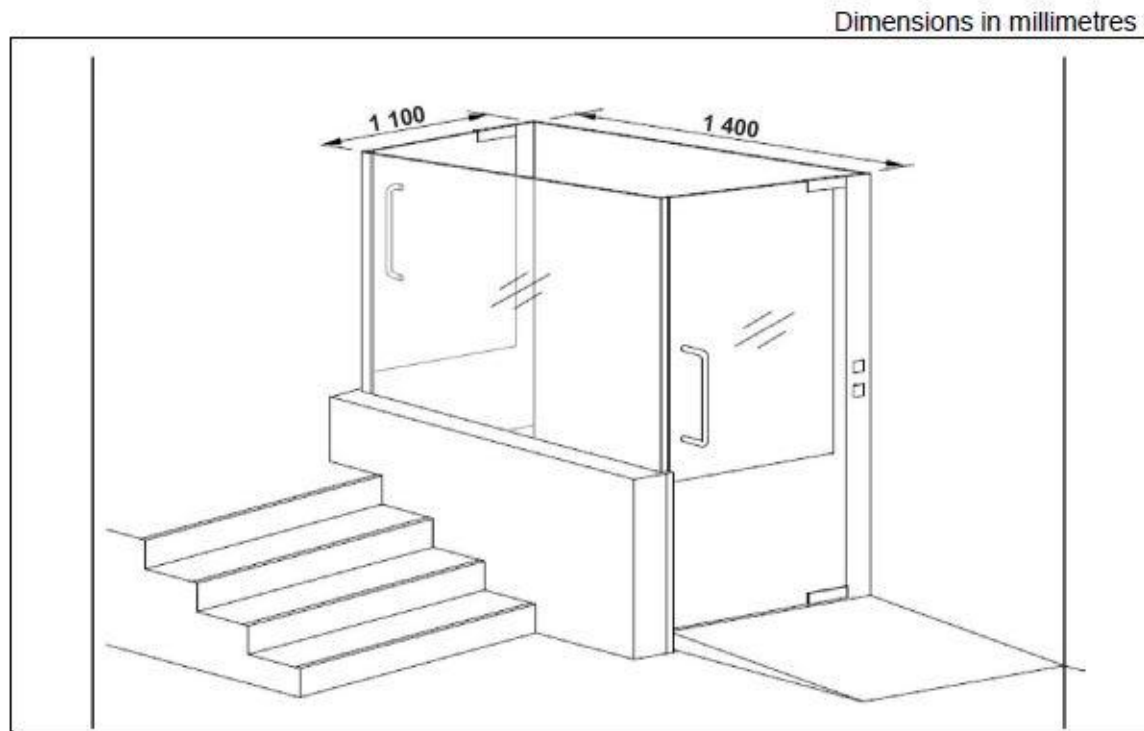


Figure 40. Platform lift

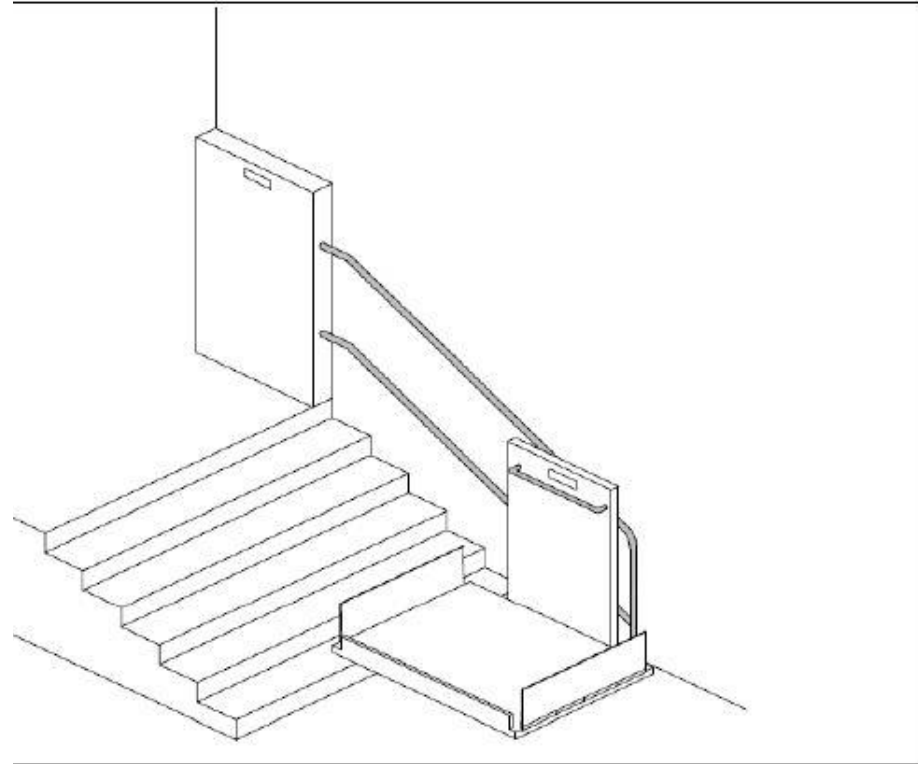


Figure 41. Wheelchair stairlift

• 18.1.6 Viewing panels in doors

If viewing panels are provided, they shall comply with the following requirements (see also Figure 46, examples of doors with glazed viewing panels):

- the lower edge of the glazed panel shall be not more than 600 mm above the finished floor;
- the upper edge of the glazed panel shall be not less than 1 600 mm above the finished floor;
- in width, the glazed panel shall start not more than 200 mm from the latch edge of the door, and the glazing shall be not less than 150 mm wide;
- the glazed panel may be subdivided by narrow construction cross-sections of a maximum width of 200 mm.

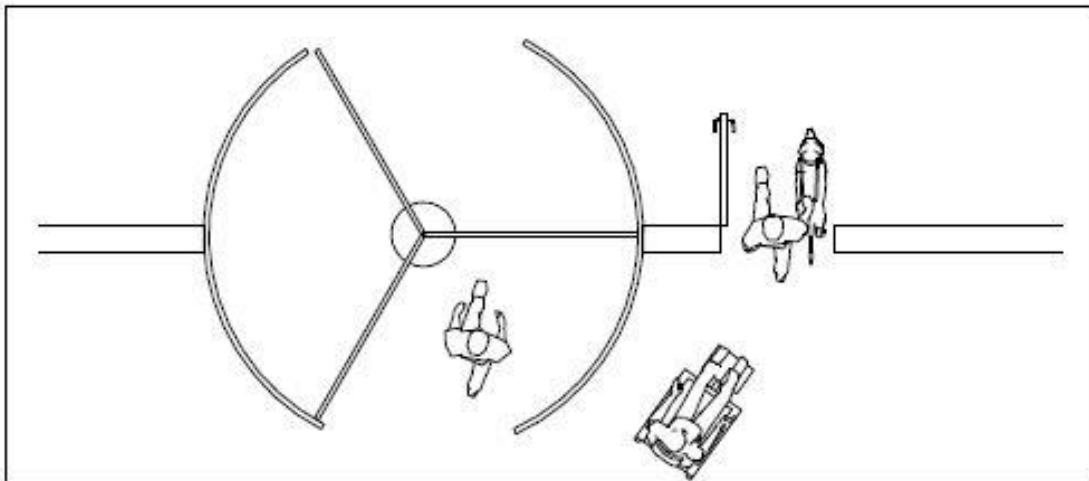


Figure 49. Revolving door accompanied by door suitable for people who walk slowly, use a wheelchair or visual impaired

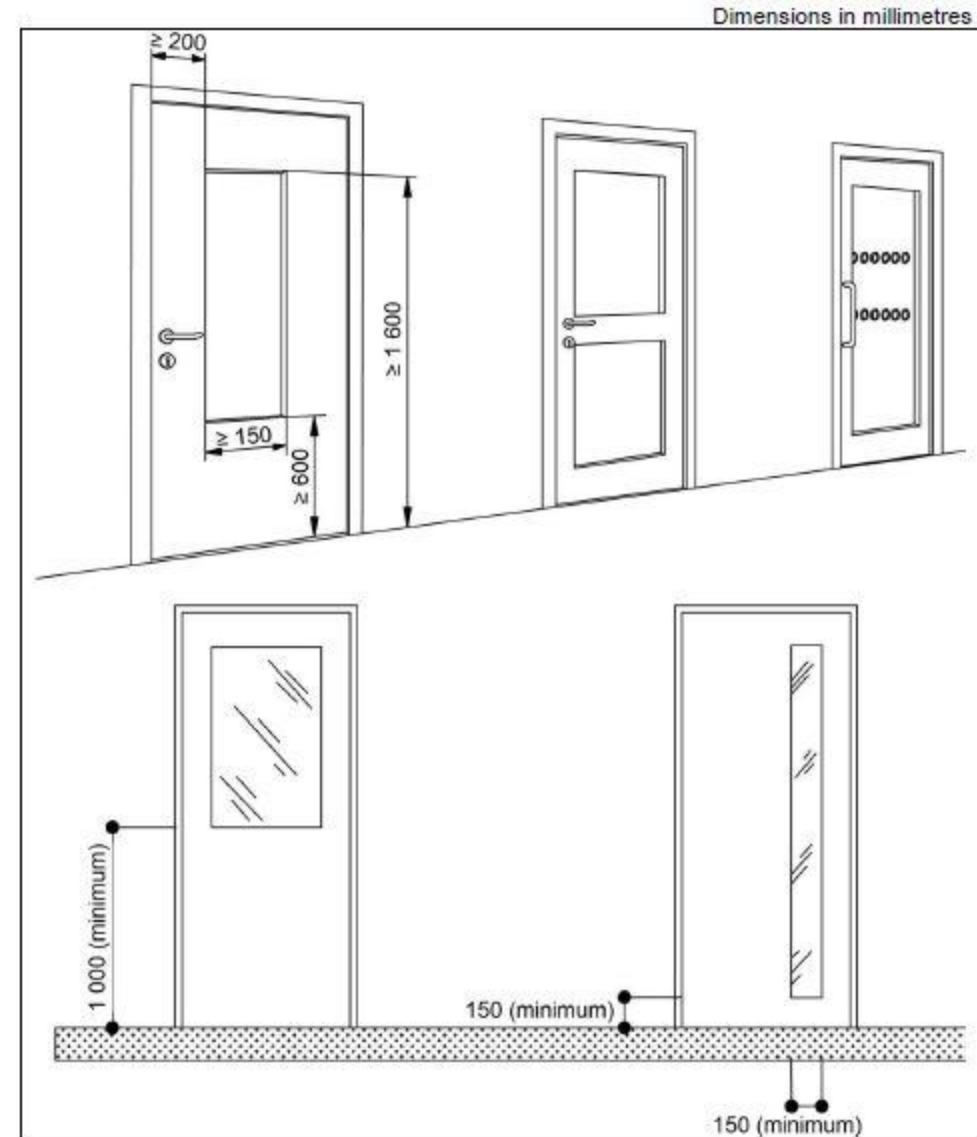
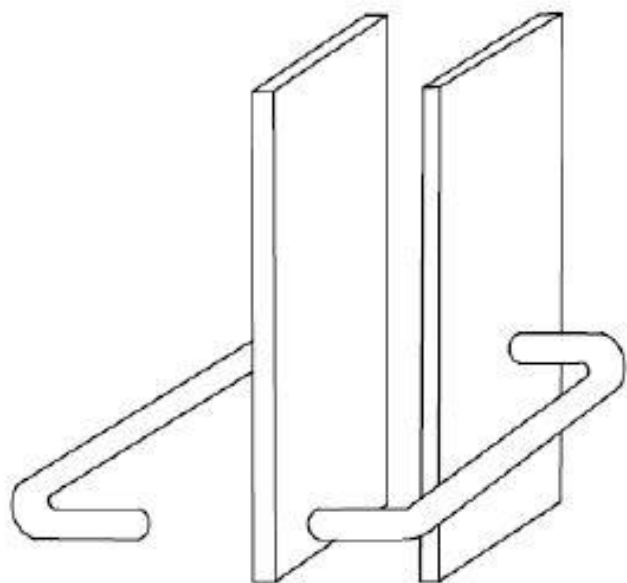
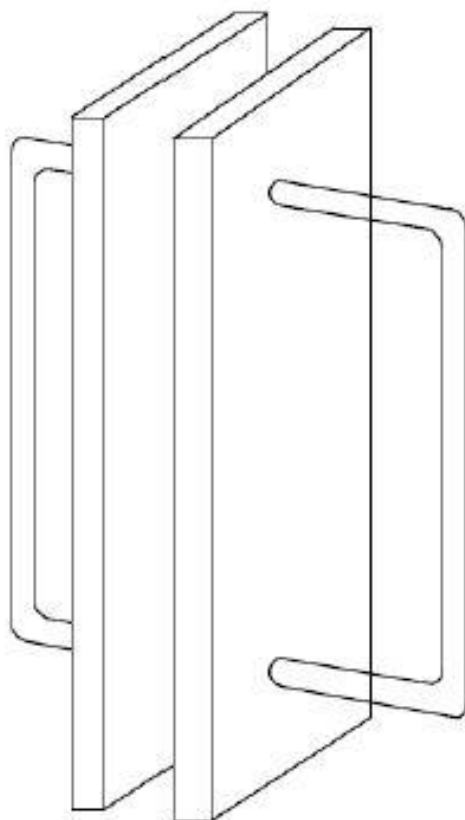


Figure 46. Examples of doors with glazed viewing panels

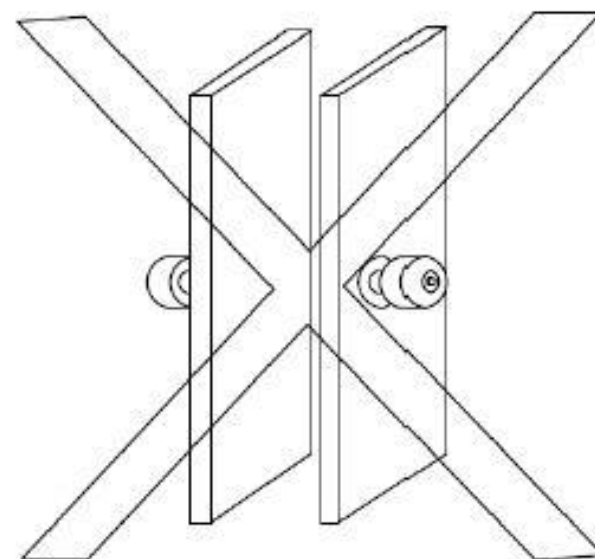


Lever handles

a) Recommended



Push plate door pull



Knob handles

b) Not recommended

Figure 77. Examples of handles

34.3 Location of controls from walls, corners and opening doors

The minimum distance of the centre of switches and devices to control doors or windows, etc., shall be 600 mm from any internal corner or any projecting element (see Figure 78) and the recommended distance is 700 mm.

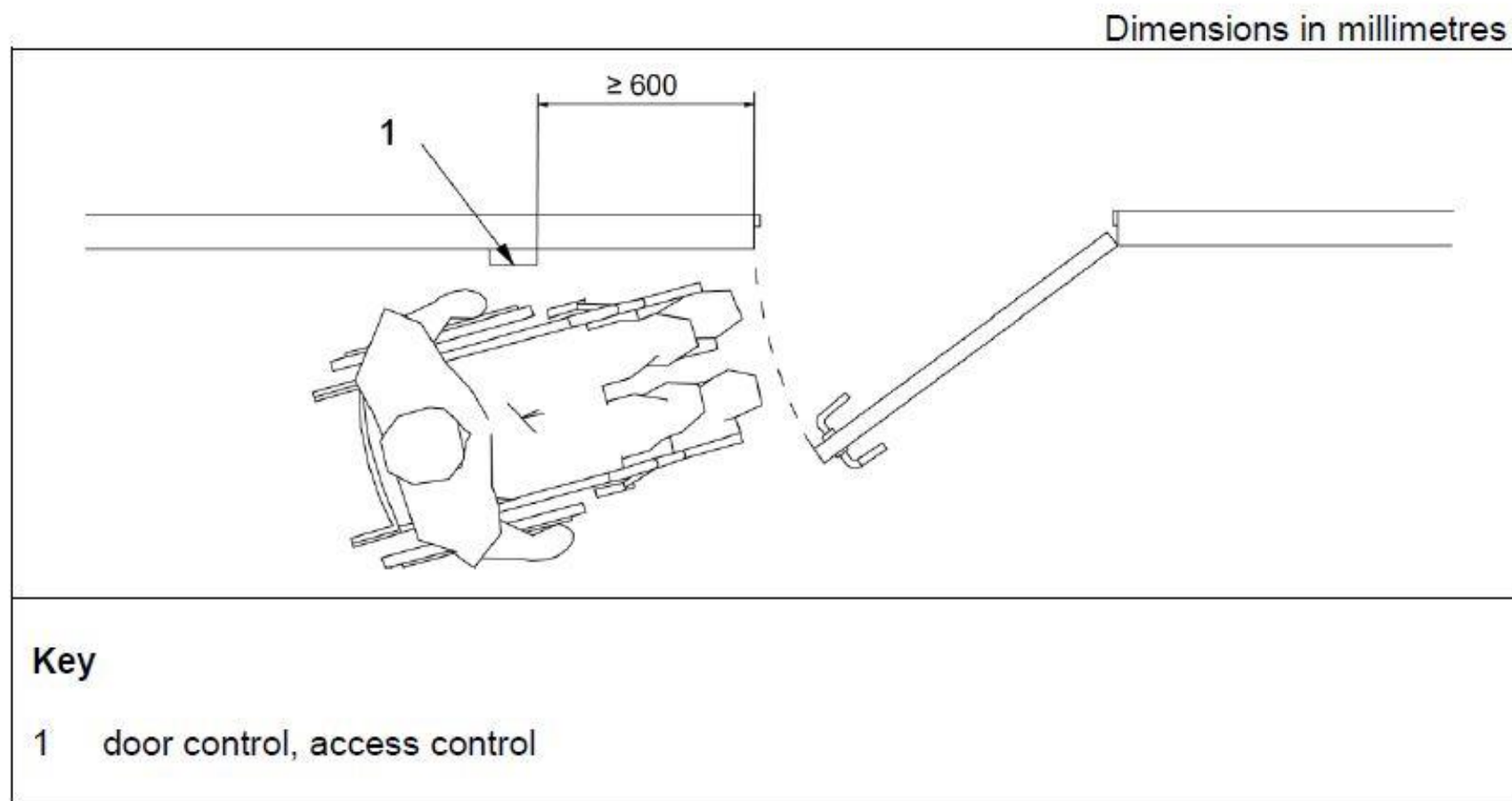
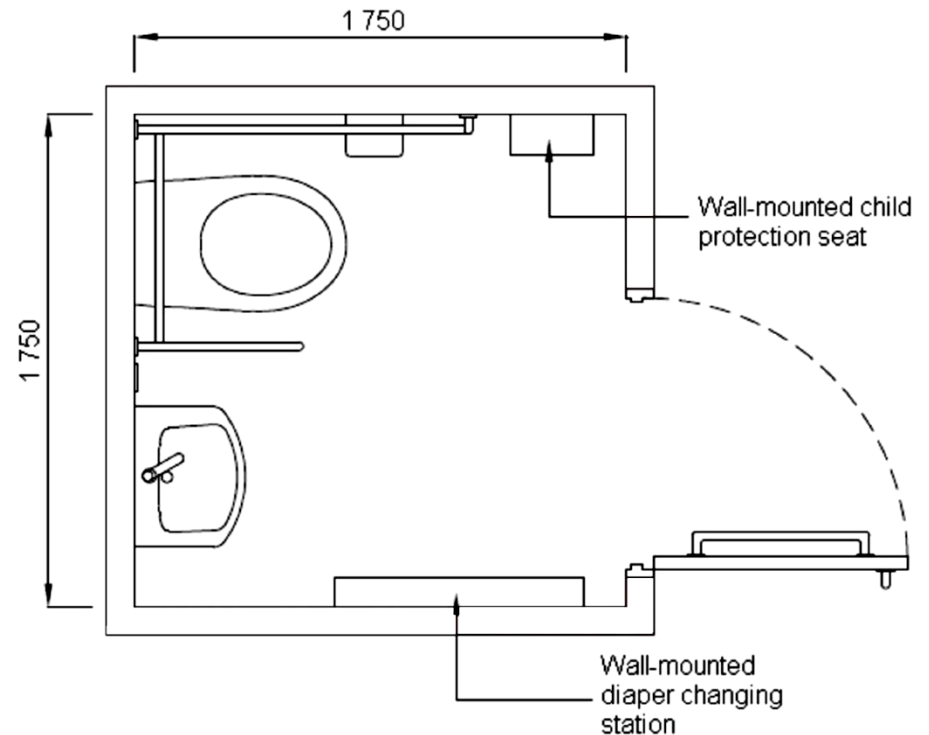
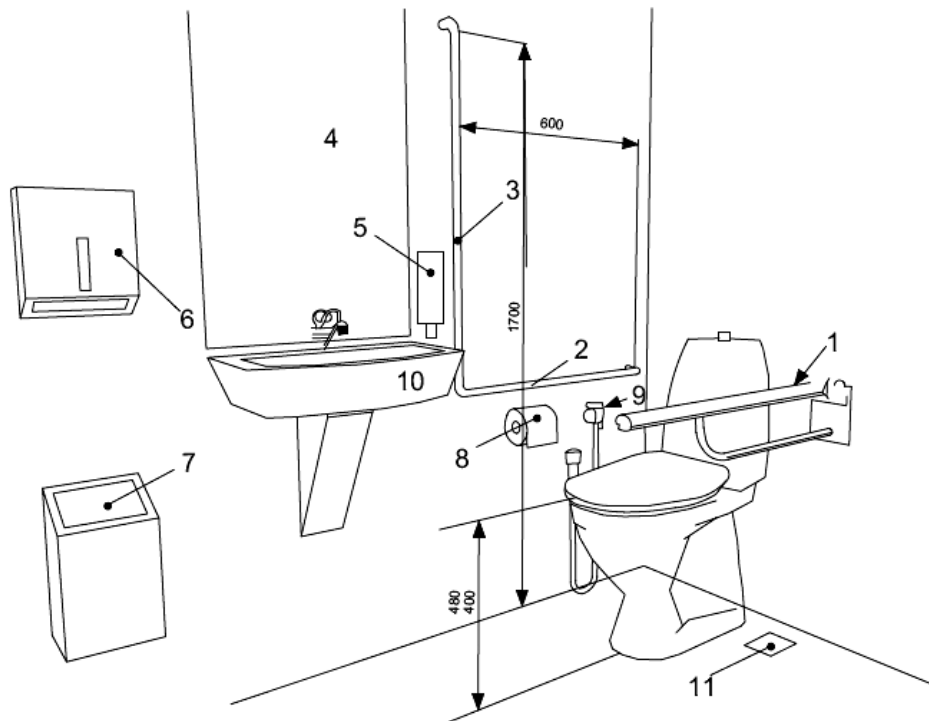


Figure 78. Position of door and access controls

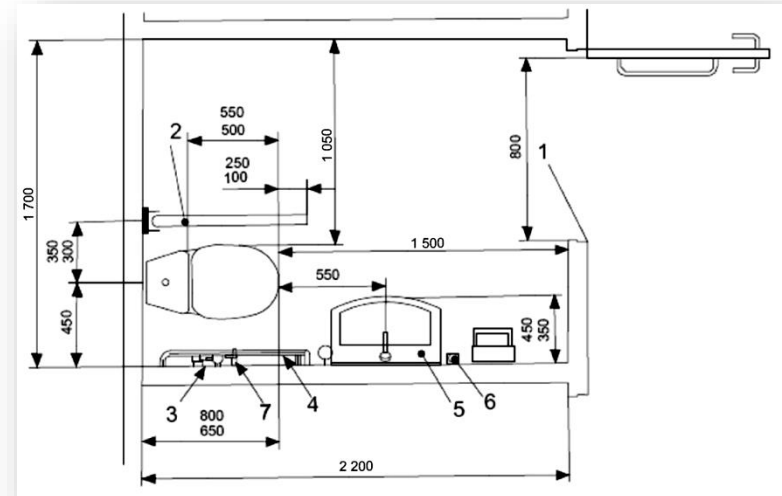
25 Toilet

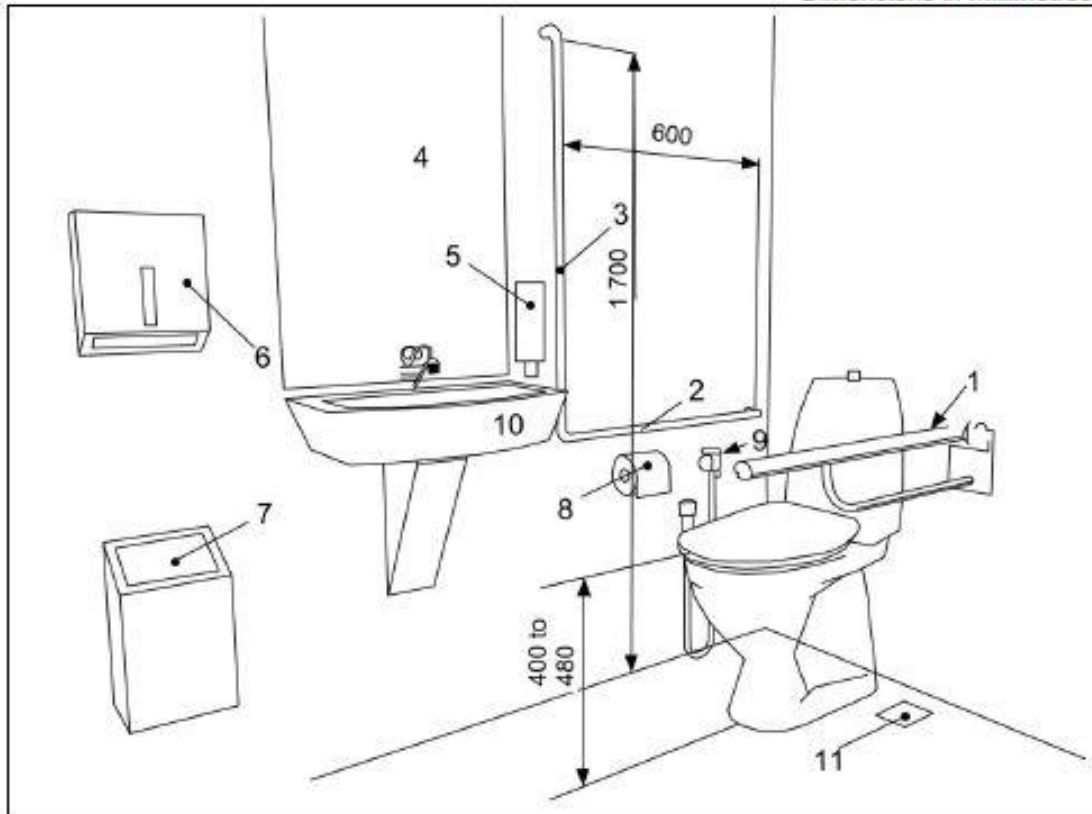
25.1 General

- The requirements contained in this clause apply to buildings in use by the public, for example hotels, work places, public buildings and buildings used for sport and recreation activities.
- Toilet rooms and sanitary facilities shall be designed to accommodate a variety of users (See Figure 53). Public toilet facilities shall provide for the needs of people of all genders, for parents and children, for people with disabilities and their carers in all gender combinations. Refer to MS 2015: Part 1.



25 Toilet

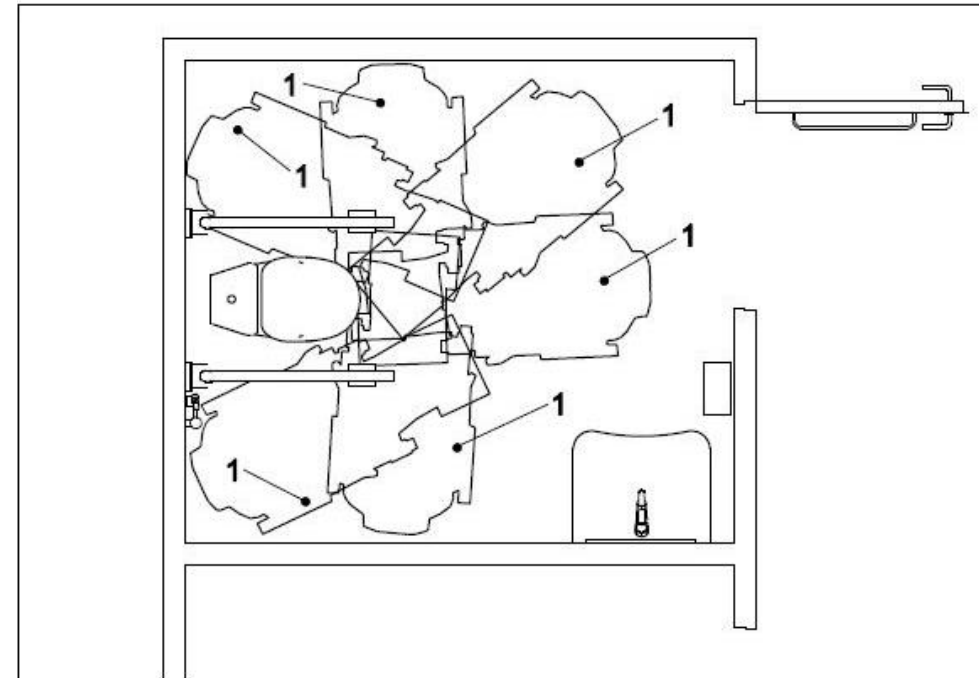




Key

- 1 drop down support rail at seat height plus 200 mm to 300 mm
- 2 wall mounted horizontal grab rail at seat height plus 200 mm to 300 mm
- 3 wall mounted vertical grab rail
- 4 mirror, top height minimum 1 900 mm, bottom height max. 900 mm above floor
- 5 soap dispenser 800 mm to 1 100 mm above floor
- 6 towels or dryer 800 mm to 1 100 mm above floor
- 7 waste bin
- 8 toilet paper dispenser 600 mm to 700 mm above floor
- 9 independent water supply
- 10 small finger rinse basin maximum 350 mm projection
- 11 floor trap

Figure 62. Positioning of grab rails, water supply and toilet paper in Type C corner toilet



Key

- 1 possible transfer positions

Figure 57. Type A toilet room transfer options

Feet and inches			Nominal conversion based on 1 inch: 25 mm, 6 inch: 150 mm, 12 inch: 300 mm
			More exact conversion based on 1 inch: 25.2 mm
	(mm)	(mm)	
7 ft 0 inch	2100	2132	
			2040: Standard door heights
6 ft 6 inch		1981	1981:
6 ft 0 inch	1800	1828	
5 ft 6 inch	1650	1663	
5 ft 0 inch	1500	1524	1500: Nominal wheelchair turning circle - 180°/360°
4 ft 6 inch	1350	1361	1400: Max. controls height
4 ft 0 inch	1200	1219	1200: Nominal wheelchair turning - 90°
3 ft 9 inch	1125	1134	
3 ft 6 inch	1050	1060	
3 ft 3 inch	1000	982	1000: General controls height
3 ft 0 inch	900	914	
2 ft 9 inch	825	832	800: Clear opening widths of doorways
2 ft 6 inch	750	762	750:
2 ft 3 inch	675	680	
2 ft 0 inch	600	610	
1 ft 9 inch	525	529	
1 ft 6 inch	450	454	
1 ft 3 inch	375	378	
1 ft 0 inch	300	304	
9 inch	225	228	
6 inch	150	152	
3 inch	75	76	

Figure 55. The anthropometric height for wheelchair users

36 Fire safety, protection and evacuation for all

In order to adequately protect people with activity limitations and/or people with impaired senses in a fire emergency, e.g. frail older people, people with disabilities, children and women in the later stages of pregnancy, fire engineering design objectives should be developed. The two critical design objectives are:

- a) Protect people from fire in any of the following locations, when relevant:
 - i) in a place of safety, located a safe distance from a building, or a place of relative safety within a building, for example, an area of rescue assistance adjoining a vertical evacuation route;
 - ii) during independent or assisted evacuation to a place of safety or a place of relative safety; and
 - iii) in situ when no evacuation is possible, for example, in the case of health facilities, using small fire compartments;

The principles of fire evacuation for all are as follows:

- a) protection and evacuation for all should be incorporated at a sufficiently early stage in the architectural design process;
- b) vertical evacuation or evacuation to a place of safety, which will tend to be further away than a place of relative safety, is more stressful than horizontal evacuation of areas as needed, particularly for people with mobility impairments;
- c) the fire engineering strategy needs to specify which occupants, based on abilities and other characteristics, are to be evacuated to a 'place of safety' and which to a 'place of relative safety';
- d) the fire engineering strategy needs to specify, based on fire size, location and rate of growth, which areas are to be evacuated and when vertical evacuation is necessary;
- e) designated lifts in new buildings should be capable of being used for people evacuation in a fire situation; and
- f) designated lifts in existing buildings, when being replaced or undergoing a major overhaul, should be made capable of being used for people evacuation in a fire situation

36.3.2 Areas of rescue assistance (Refuge Area)

An area of rescue assistance in a building should:

- a) be provided on every floor of a building;
- b) adjoin every evacuation staircase;
- c) include space for persons in wheelchairs;
- d) have good lighting and be clearly indicated with good signage;
- e) be fitted with an accessible and reliable independent communication system fitted at a height of 800 mm to 1 100 mm above floor level, facilitating direct contact with a person in the designated control room for the building;
- f) be of sufficient size for the storage of an evacuation chair and a manual fire alarm call point, a fire evacuation supply kit containing, for example, smoke hoods, suitable gloves to protect a person's hands from debris when pushing his/her manual wheelchair, etc.; and
- g) be marked with good signage.

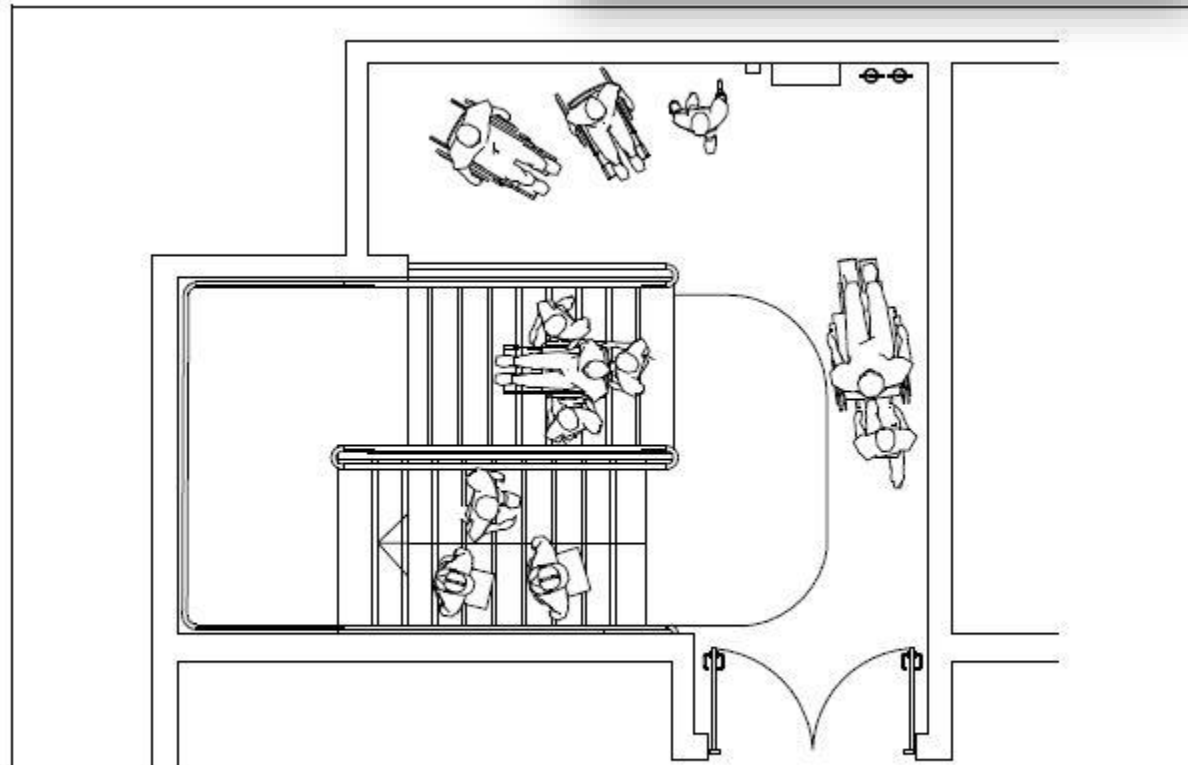
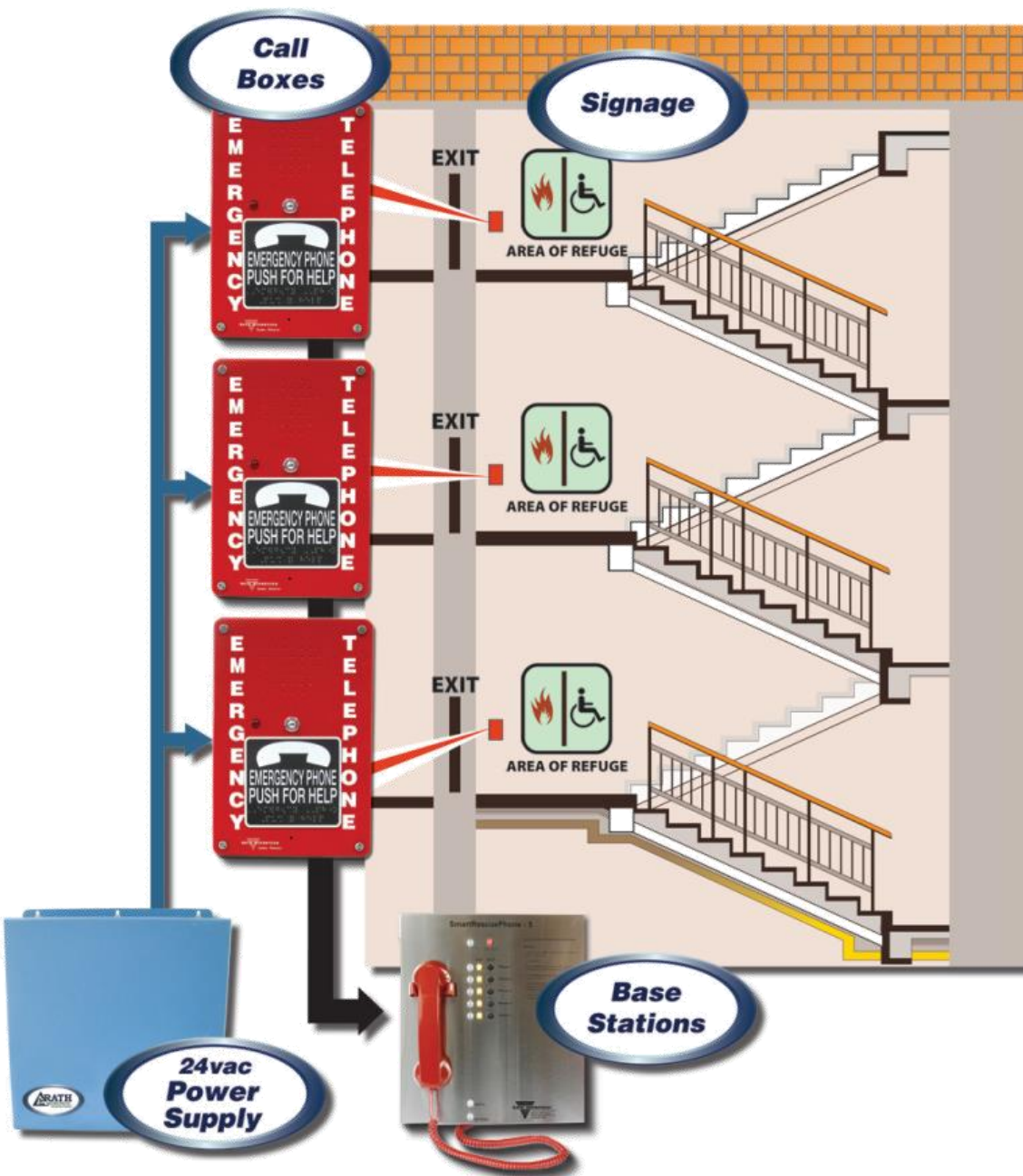


Figure 85. Example of fire evacuation staircase with an adjoining area of rescue assistance



- 39 Graphical symbols

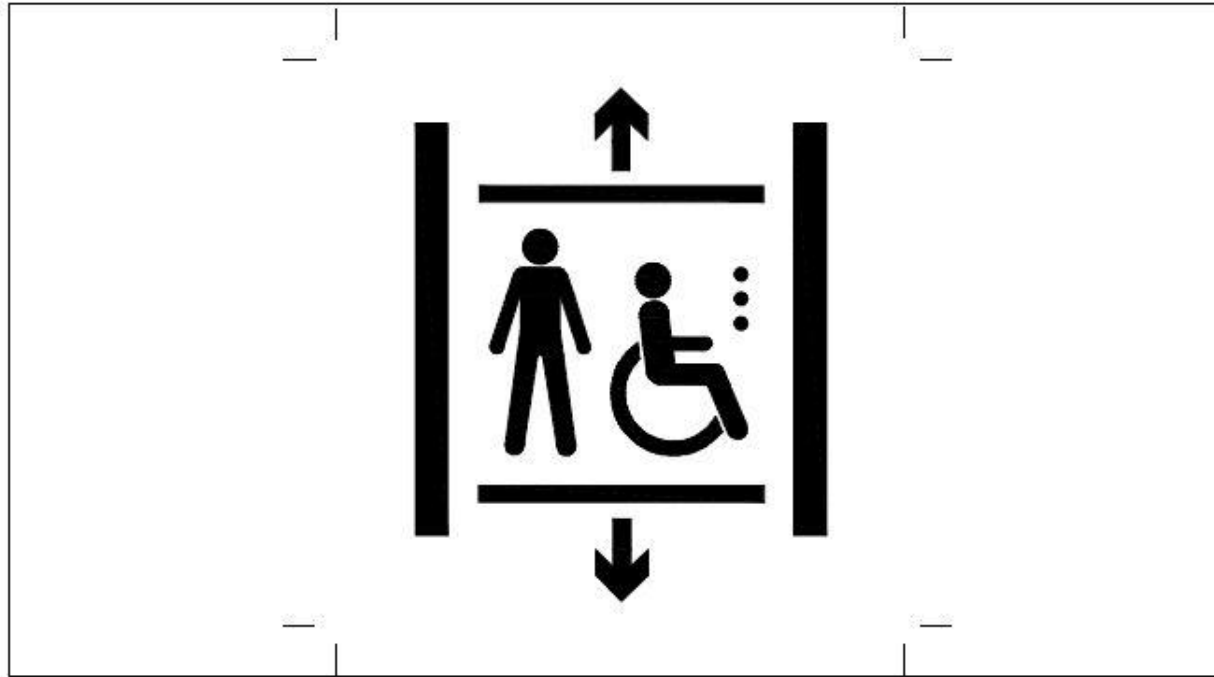


Figure 94. Accessible lift



Figure 95. Accessible emergency exit route



Figure 89. Accessible facility or entrance



Figure 90. Sloped or ramped access



Figure 91. Toilets - Accessible female and male

Annex A (normative)

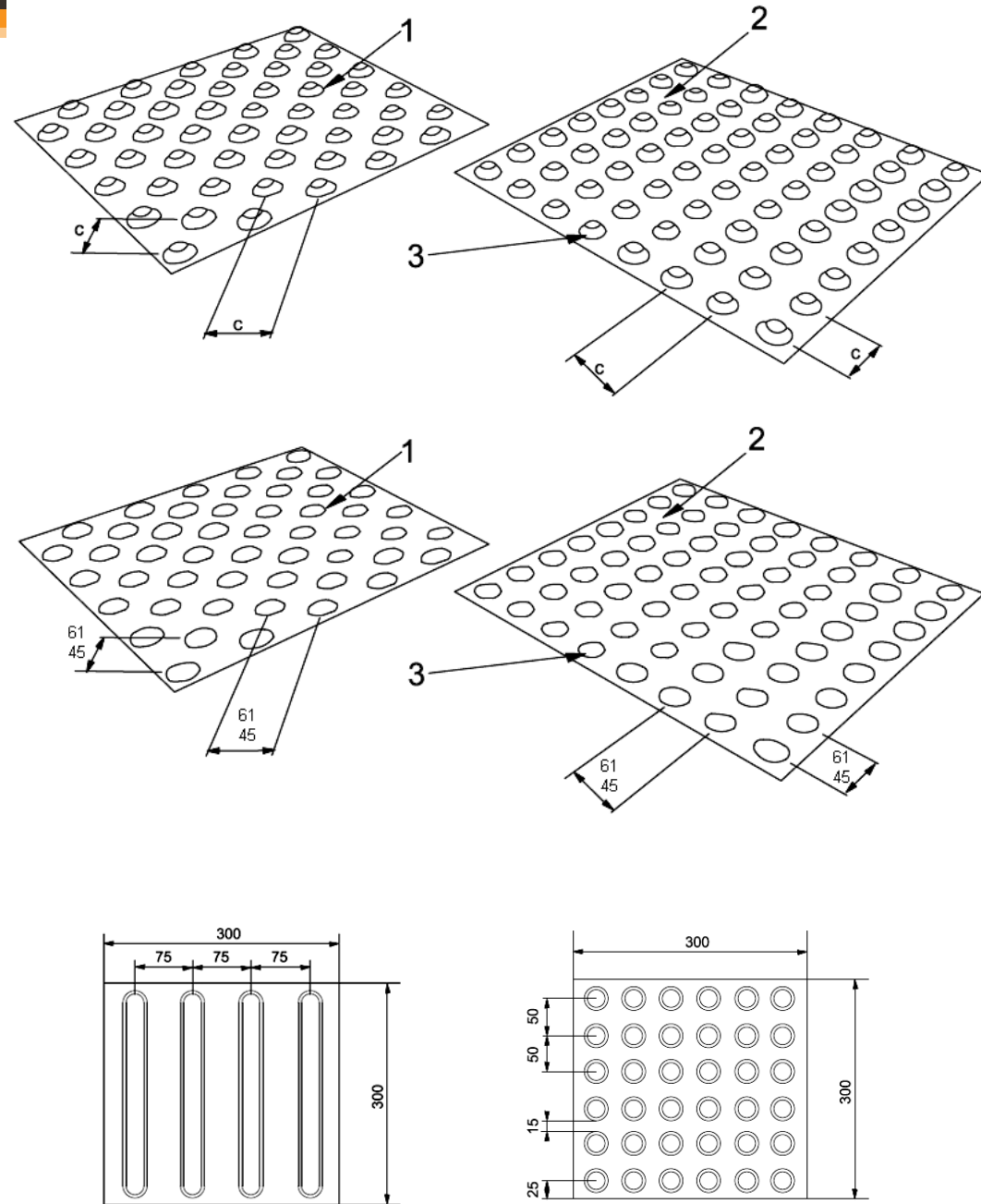
Tactile walking surface indicators (TWSIs)

1. General
2. Application
3. Detection and Discrimination
 - a) Tactile contrast
 - b) Visual contrast
 - c) Prevention of tripping
4. Requirements for attention / warning patterns
 - a) Arrangement
 - b) Height
 - c) Specification for truncated cones
 - d) Specifications for domes
5. Requirements for guiding patterns
6. Materials
7. Installation

A.3 Detection and discrimination

A.3.1 Tactile contrast

- Tactile walking surface indicators (TWSIs) shall be detectable from surrounding or adjacent surfaces through the soles of the shoes and/or by the long white cane. Adjoining surfaces shall be smooth, to enable detection and discrimination of tactile walking surface indicators (TWSIs).
- When attention/warning patterns and guiding patterns are combined, it is necessary that persons with visual impairment be able to clearly identify both of them.



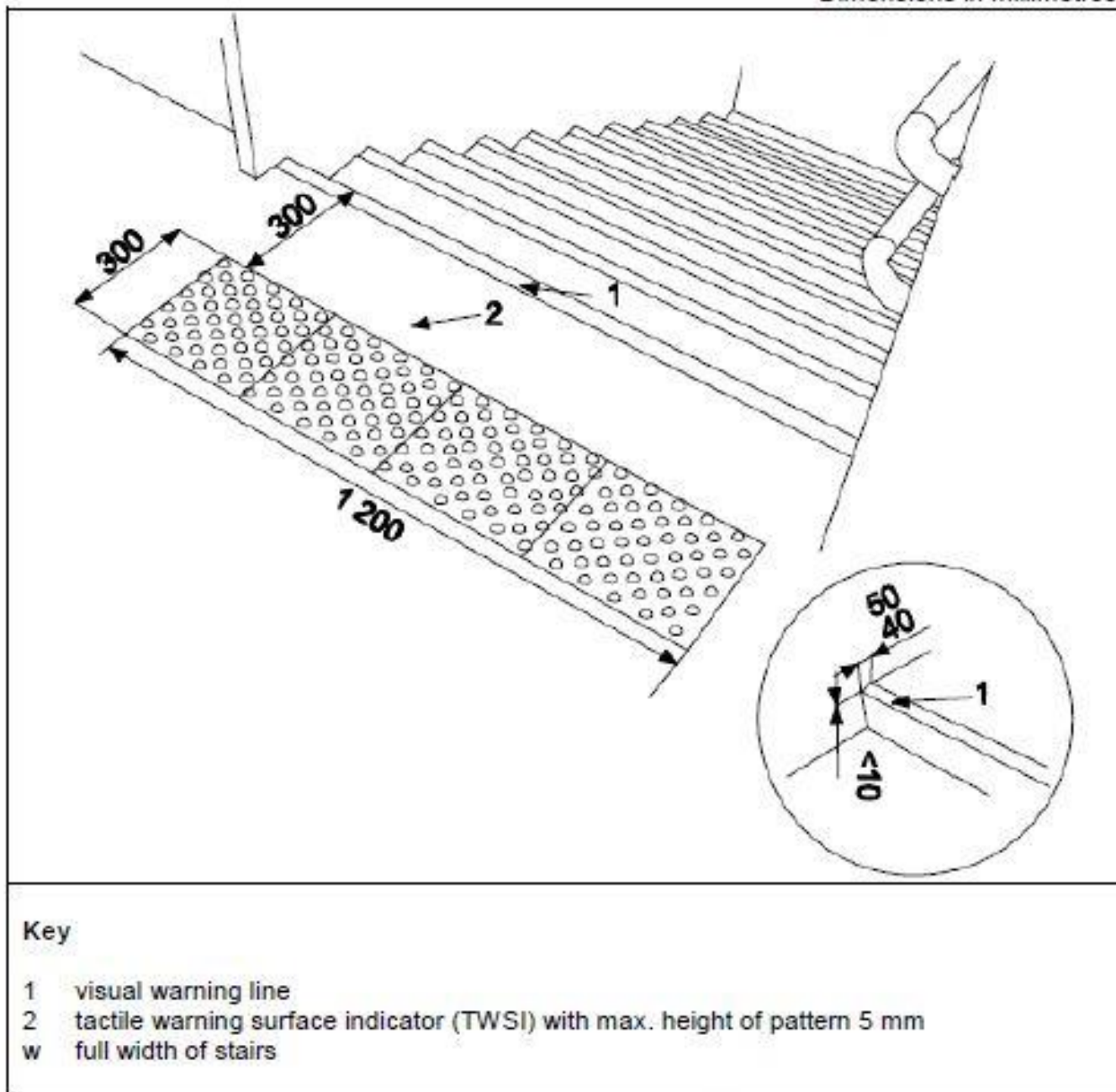


Figure 29. Tactile walking surface indicator (TWSI) and visual indicator

Annex B

(normative)

Human abilities and associated design considerations

1. General
2. Physical Abilities
 - a) General
 - b) Walking
 - c) Balance
 - d) Handling
 - e) Strength and endurance
 - f) Lifting
 - g) Reaching
 - h) Speech
3. Sensory Abilities
 - a) General
 - b) Sight
 - c) Hearing
 - d) Touch
4. Mental Abilities
 - a) General
 - b) Sight
 - c) Cognition
 - d) Intellect
 - e) Interpretation
 - f) Learning
 - g) Memory
 - h) Design considerations that take account of mental abilities
5. Additional factors
6. General design consideration for wheelchair users
7. Visual contrast
8. Indoor air quality (IAQ)
9. Allergy related materials

Annex C
(informative)

Circulation spaces at doorways

Annex D
(normative)

Fire safety and assisted evacuation for all in buildings

Annex E
(normative)

Management and maintenance issues

Annex F

(informative)

Design guidelines for children with disabilities

1. Application
2. Interpretation
3. Handrails / Grab bars
4. Seating space
5. Drinking fountain
6. Sanitary provision
7. Children's reach range
8. Lift
9. Public telephone
10. Tuckshop/canteen
11. Computer room
12. Library

Annex G

(informative)

Design guidelines for person with visual impairment

1. Introduction
2. Visual contrast in building interiors
3. Tactile ground surface indicators
4. Application of Tactile ground surface indicators
5. Stairs, steps, escalators and passenger conveyors
6. Flush pedestrian vehicular way

Annex H
(informative)

Design guidelines for elderly

1. General
2. Ageing and Safety
3. Falls in Home
4. Advantages of considerate design
5. Mobility
6. Design Consideration
 - a) Barrier free and level floors
 - b) Floor surfaces
 - c) Control and operating mechanisms
 - d) Lighting and services
 - e) Design to prevent accidents
 - f) Space standards
7. Top ten design points

Design guidelines for family friendly facilities

1. Application
2. Recommended facilities
3. Design considerations
 - a) Child-friendly sanitary facilities
 - b) Water closet
 - c) Urinal
 - d) Wash basin
 - e) Floor finish
 - f) Child protection seat
 - g) Family room
 - h) Breastfeeding area
 - i) Diaper-changing station
 - j) Seating or resting area
 - k) Children's activity corner or playroom
 - l) Locker provision
 - m) Pram / wheelchair rental
 - n) Flexible arrangement of table and chairs
 - o) Baby chairs

Annex K

(informative)

Design guidelines for parks and open spaces

1. General
2. Graduated difficulty of access
3. Outdoor steps
4. Parks furniture
5. Kerb cuts
6. Parks vegetation
7. Accessible parking lots
8. Amenities

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THANK YOU

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