



# THE UNIVERSAL STANDARDS GUIDE FOR PERSONS WITH DISABILITIES

universal standards for persons with disabilities

WDU ACCREDITATION CENTER  
İSTANBUL



[ustad.worlddisabilityunion.org](http://ustad.worlddisabilityunion.org)





## INTENT

The United Nations Convention on the Rights of Persons with Disabilities was issued to promote, protect and ensure the full and equal enjoyment of all human rights and fundamental freedoms by all persons with disabilities, and to promote respect for their inherent dignity.

The World Disability Union (WDU) was formed to fulfill the purpose of the Convention. Toward this end the WDU has purposed that guidelines for the design, planning and implementation of accessibility would be required to enable persons with disabilities to live independently and participate fully in all aspects of life.

The Accessibility Guidelines for the Built Environment was written to provide guidelines for the design for accessibility in the built environment – including transportation - to ensure persons with disabilities access on an equal basis with others. This document was originally intended to be a regulation but it was recognised that this would make it difficult for jurisdictions – urban or rural – to implement due to existing regulations, limited resources or attitudinal barriers. However, as a guideline, it would allow jurisdictions the flexibility to adopt the Accessibility Guideline in its entirety as a regulation or to adopt a portion of it or use it as a reference document.

The technical requirements within this document are referenced from regulations and guidelines from jurisdictions who design and implement accessibility as minimum best practices for buildings, roads, transportation and other indoor and outdoor facilities, including schools, housing, medical facilities and workplaces.



THE UNIVERSAL STANDARDS GUIDE FOR PERSONS WITH DISABILITIES



**Coordination:**

Necdet Öztürk – *Vice Chairman WDF&WDU*

**PREPARED BY**

**WORLD DISABILITY FOUNDATION (WDF)**

Necdet Öztürk – *Vice Chairman WDF&WDU “Coordination”*

Prof. Dr. Hakkı Önel – *Architect / Yıldız Technical University*

Prof. Dr. Mehmet Şener Küçükdoğu – *Architect / İstanbul Kültür University*

Prof. John Brown – *Architect / UK*

İlyas Hızır Eryüzlü – *Architect PhD / TMMOB*

Linnie Tse – *Environment and Urban Planner / Canada Standard Center*

Assc Prof Dr Hicran Özalp – *Interior Architect*

Canan Koca – *Urban Planner*

Burcu Parlak – *Architect*

Şeniz Öztürk – *Architect*

**SUPPORTERS**

Prof. Dr. Mensur Akgün / *President of Main Branch of Science in International Relations*

Prof. Dr. Akile Gürsoy / *President of Main Branch of Science in Antropology*

Prof. Dr. H. Fehim Üçışık / *Law Dean*

Prof. Dr. Mustafa Güler / *President of Main Branch of Science in Physiotherapy and Rehabilitation*

Prof. Dr. Roy Hannes / *President of Main Branch of Science in Education - Charlton University/Canada*

Ass.Prof. Sylvia Tiryaki / *Master of European Law*

Prof. Urbano Stenta / *Master of Law for Disabled Persons*

**DESIGN & APPLICATION**

Creative Director: İbrahim Yeşilirmak

Art Director: Mustafa H. Akgül

Graphic Design: Şahin Yıldız

Illustration: Şahin Yıldız, Dr. Mim. Mona Paşapur (*University of Muğla*)



**WORLD DISABILITY FOUNDATION “WDF”**

[www.wdf.org.tr](http://www.wdf.org.tr)

**WORLD DISABILITY UNION “WDU”**

[www.worlddisabilityunion.org](http://www.worlddisabilityunion.org)



---

# THE UNIVERSAL STANDARDS GUIDE FOR PERSONS WITH DISABILITIES

---



## SECTION ONE







## ■ INTRODUCTION

### ■ The Universal Standards Guide for Persons with Disabilities

Universal Standards has been planned for basic principles, procedures and basis under the leadership of the World Disability Foundation WDF and regulated by 120 World Disability Union WDU member authority and institutions from 65 countries of 6 continents following a three year effort.

Introduced on September 9, 2011 and September 13, 2012 in New York, within side events to the 4. and 5. sessions of the Conference of the State Parties to the Convention of the Rights of Persons with Disabilities and requested to be applied all over the world.

## ■ GENERAL TERMS

### ■ Article 1 – Purpose

Acts, regulations, guides, instructions, development plans as well as scientific, healthy, sanitar and environmental executions of such within the inhabited areas, open, semi – open and closed public places within the boundaries of metropolitan, urban, county or town municipalities and public foundations shall all be based upon Universal Standards Guide for Persons with Disabilities that intends to serve, to base, to promote, to project and to ensure the full and equal enjoyment and contribution to the society for the persons with disabilities and the elderly.

### ■ Article 2 – Content

Universal Standards Guide for Persons with Disabilities are to be applied within the boundaries of metropolitan municipalities, urban, town or county municipalities and public foundations;

Universal Standards Guide for Persons with Disabilities covers areas and locations which are regulated by the Construction Rules in accordance with Construction Law and under jurisdiction of municipalities and public offices.

### ■ Article 3 – Legal Basis

Universal Standards Guide for Persons with Disabilities, recognizes and regards the standards which are based on needs possibilities and local legal principals of various areas and territories such as ADA (American Disability Alliance), PACIFIC, EUROPE, CANADA and TSE (Turkish Standards Institute) ;

This regulation is drafted on the basis of the UN Convention on the Rights of Persons with Disabilities (Law No. 5825, clause 9) enacted in 2008 and the European Urban Charter-1 and the European Urban Charter-2 decisions adopted by the Council of Europe in 1996 and 2008, and based on Metropolitan Municipalities' and other Municipalities' development regulations as well as the construction and service regulations of Public Offices.

### ■ Article 4 – General Principles

**4.1** All plannings under legal obligations, strategic plannings, constructional execution plannings and plan notes within boundaries of Metropolitan Municipalities and other Municipalities shall be aimed to match to “Universal Standards Guide for Persons with Disabilities”.

**4.2** All public or private open, semi-open and closed areas of urban and constructional scale shall be aimed to be planned, programmed, projected and implemented in accordance with Universal Standards Guide for Persons with Disabilities and their appendices.



## ■ Article 5 – Exceptions

**5.1** Hierarchical priority is expected to be given to provisions of the Universal Standards Guide for Persons with Disabilities in such cases where any conflict may occur with provisions of any other regulation, except cases of special laws and their regulations.

**5.2** For all constructions in accordance with the Constructional Bylaws of Metropolitan Municipalities and other Municipalities, related regulations, convictions, interpretations, decisions and circulars of Public offices;

it is mandatory to follow the plan, science, sanitar, safety structure, esthetic and environmental context, Official Standards Institute's published standards and other related laws, regulations, codes and the Universal Standards Guide for Persons with Disabilities in regard with the accepted legal rights and needs of the disabled people.

## ■ Article 6 – Actions to be Taken For Public Benefit

**6.1** All and any kind of construction for urban and architectural scale under the responsibility of Metropolitan Municipalities, other Municipalities and Public Offices (roads, sidewalks, pedestrian walks, substructure, infrastructure, open, closed, semi-open public areas and constructions etc) shall be structured and based on the related criteria of the Universal Standards Guide for Persons with Disabilities.

**6.2** In all kind of new construction within the boundaries of Metropolitan Municipalities, other Municipalities and Public Offices;

World Disability Union WDU will propose, demand, track and follow up in an insisting way for the favor of the disabled that, a 10 % of all the residential buildings and sites, the whole of the constructions for public offices, 10% of the buildings for special purpose greater than 1.000 sqm shall be planned, constructed and made convenient for the use of the disabled people

(Calculation for 10% will be based on whole numbers.)

## ■ Article 7 – Matters Not Provided for Constructional Plan and Accessible Urban Standards

**7.1** For all matters that are not covered within constructional plans or explained within the Universal Standards Guide for Persons with Disabilities the institutions in charge should ask World Disability Union's opinion or advice for techniques to be implemented.

In addition no decision or principle decision conflicting to Universal Standards Guide for Persons with Disabilities should be taken or implemented.

**7.2** Municipalities are obliged to obey and implement all provisions and decisions related to the disabled.

In addition Municipalities and Related Public Offices shall regard local and environmental circumstances and shall take measurements for the disabled in accordance with UN Convention on the Rights of Persons w/ Disabilities' written documents and World Disability Union's advice for matters that are not included in Universal Standards Guide for Persons with Disabilities

## ■ Article 8 – Hierarchical Order of the Plans

According to law in act plans follow the hierarchical order of constructional plan, territory plan, environmental plan, urban environmental plan, regulatory and implementory constructional plan and each lower scale plan follows its upper scale whereas every superior directs its inferior.

Minor scale plans are bound to follow the main principles, strategies and decisions of the major scale plans. Matters which are not specified or limited in superior plans shall be in accordance with inferior plans. In all hierarchical plans the compatibility to the Universal Standards Guide for Persons with Disabilities should be clearly visible.





### ■ Article 9 – Plan Notes

Constructional Plans are completed as a whole with Plan Notes that are explanatory to the provisions for implementation. Studies intended for the disabled people should be added to these plan notes.

Plan Notes are an inseparable integral part of the Construction Plan. Provisions brought by Constructional Plan Notes are mandatory processes as Development Plan itself. 5

### ■ Article 10 – Social Relevancy Visa (Licence)

On the basis of UN Convention on the Rights of Persons with Disabilities, World Disability Union is kindly asking all municipalities to put this licence into place.

Any licence application for any project shall only then be approved by the relevant authority when it gets compatible to the terms and provisions of the Universal Standards Guide for Persons with Disabilities.

In contrary situation, no licence shall be granted unless the licence and its appendices are made compatible to the terms and provisions of the Universal Standards Guide for Persons with Disabilities.

In addition, residency permit, alteration, maintenance, repair and renovation applications should also be compatible to the terms and provisions of the Universal Standards Guide for Persons with Disabilities.

Any construction in the open, semi-open and closed areas shall not be continued unless the non-compatibilities to the terms and provisions of the Universal Standards Guide for Persons with Disabilities in the plan and/or project, licence and appendices are eliminated.

In case of modification of a single independent unit in an established condominium is required to provide compatibility to the Universal Standards Guide for Persons with Disabilities, such modification shall be implemented in compliance with only technical provisions in case such modification is non-compatible with the plan, licence and its appendices.

### ■ Article 11 – Inspection, Certification and Penal Provisions

**11.1** Implementation of criteria and provisions of the Universal Standards Guide for Persons with Disabilities is monitored and audited by the relevant Municipalities.

**11.2** Municipalities in charge of controlling the implementation of the Universal Standards Guide for Persons with Disabilities shall set up a special inspection administration office / unit, also an employment ground for people with / without disabilities and shall claim technical consultancy from World Disability Union WDU.

**11.3** World Disability Union WDU is authorized to issue the Universal Standards Certification USTAD once compliance is determined upon engagement of the World Disability Union WDU Accreditation System.

#### 11.4 Penal Provisions

State Parties who undersigned and approved the United Nations Convention on the Rights of Persons w/ Disabilities- Law No 5825 are liable through their internal law with respect to international law principles. World Disability Union WDU as a global and comprising institution will warn those states, who fail to fulfill this liability on time with respect to universal standards, in favor for the disabled, demand and follow their rights, in cases of negligence, abuse or infringement of their rights, will notify the related units of United Nations about those states and proclaim necessary transactions and follow.

### ■ Article 12 – Validity and Construction Standards and Forms to Follow

**12.1** World Disability Union WDU Accreditation system; criteria and provisions of the Universal Standards Guide for Persons with Disabilities; Universal Standards for Persons with Disabilities Certification USTAD; has been introduced on 13 September 2012 in a parallel event at the 5. convention of the State Parties who



undersigned and approved the United Nations Convention on the Rights of Persons w/ Disabilities Law and internalised by United Nations with the demand to be enforced in the whole world and took effect following the approval of the common declaration by all the members of WDU on 7 April 2013.

**12.2** Standards and forms included in the Universal Standards Guide for Persons with Disabilities;

are prepared based on Technical Handbook of Accessibility Basics for Local Governments by TC Ministry of Family and Social Politics, updated standards (2011) for accessibility for persons with disabilities from Alberta (Canada) and TSE and is an appendix to Universal Standards Guide for Persons with Disabilities.

**12.3** These related institutions are authorised for completing, correcting and updating the articles Universal Standards Guide for Persons with Disabilities.



---

# THE UNIVERSAL STANDARDS GUIDE FOR PERSONS WITH DISABILITIES

---



## SECTION TWO







## ■ A – STANDARDS FOR ACCESSIBLE ENVIRONMENT

### ■ Article 13

#### ■ 13.1 Walkways and Pavements

13.1.1. Width of Walkways

13.1.2. Slope of Walkways

13.1.3. Surface /Cover of the Walkways

13.1.4. Drainage of the Walkways

13.1.5. Trees, Urban Furniture on the Walkways

13.1.6. Safety on the Walkways

#### ■ 13.2 Ramps

13.2.1. Ramp Size

13.2.2. Slopes of the Ramps

13.2.3. Surfaces of the Ramps

13.2.4. Safety and Comfort of the Ramps

13.2.5. Types of the Ramps

#### ■ 13.3 Stairs

13.3.1. Size of the Stair

13.3.2 Surfaces of the Stairways

13.3.3. Treads of the Stairs and Color Selection

13.3.4. Landing on the Path with Stairs

13.3.5. Railings Safety and Warnings

13.3.6. Tactile Surfaces on Stairs

#### ■ 13.4 Crosswalks

13.4.1. Types of the Crosswalks

13.4.2. Slope of the Crosswalks

13.4.3. Surfaces of the Crosswalks

13.4.4. Stripe and Floor Marks on the Crosswalks

13.4.5. Safety of the Crosswalks

#### ■ 13.5 Parking lots for persons with disabilities

13.5.1. Parking Place Locations for Persons With Disabilities

13.5.2. Sizes of Parking Stalls



**13.5.3.** Signage and Notifications

**13.5.4.** Types of the Parking Lots

■ **13.6 Open and green areas**

13.6.1. Main and pathways in open and green areas

13.6.2. Urban furniture

■ **B – STANDARDS FOR ACCESSIBLE BUILDINGS**

■ **13.7 Regulations for buildings**

**13.7.1.** Basic Accessibility Themes

**13.7.2.** Accessible Route In Residential Areas

**13.7.3.** Building Entrances

**13.7.4.** Main Entrances for Commercial Buildings, Residential Buildings and Administrative Public Buildings

**13.7.5.** Ramps at Entrance

**13.7.6.** Ramps on Walkway Route

**13.7.7.** Slope of the Building Entrance Ramps

**13.7.8.** Level Differences ( Doormats)

**13.7.9.** Handrails

**13.7.10.** Kerbs

**13.7.11.** Doormats

**13.7.12.** Mailbox

**13.7.13.** Entrance Door

**13.7.14.** Interior Doors and Features

**13.7.15.** Entrance Configurations ( Types of Doors)

**13.7.16.** Windows

**13.7.17.** Surface Texture

**13.7.18.** Interior Building Horizontal Circulation

**13.7.19.** Interior Building Vertical Circulation

**13.7.20.** Exits

**13.7.21.** Rules for Environment Arrangements

**13.7.22.** Corridors and Halls

**13.7.23.** Kitchens

**13.7.24.** Toilets



- 13.7.25. Urinals
- 13.7.26. Sinks
- 13.7.27. Mirrors
- 13.7.28. Bathrooms
- 13.7.29. Rooms
- 13.7.30. Balcony and Terraces
- 13.7.31. Signs at Buildings
- **13.8 Special Design Rules for Buildings with Features**
  - 13.8.1. Health Buildings
  - 13.8.2. Commercial Areas and Sales Units
  - 13.8.3. Libraries
  - 13.8.4. Temporary Accommodation Venues
  - 13.8.5. Transport Structures
  - 13.8.6. Sample of Design for Parts of Buildings with Features
- **13.9 Existing Buildings**
  - 13.9.1. Design Rules for Nearby Environment of Existing Buildings
  - 13.9.2. Design Rules for Main Entrance of Existing Buildings
  - 13.9.3. Existing Circulation Areas
- **13.10 Mass Transport Service**
  - 13.10.1. Vehicles
  - 13.10.2. Waiting, Transfer, Getting on/off, Spots
  - 13.10.3. Railed Transportation Stops
- **13.11 Information, Sign and Tactile Surfaces**
  - 13.11.1. Information and Warning Signs
  - 13.11.2. Sign of the Maintenance of the Road
  - 13.11.3. Design in Vertical Signs at Pavement
  - 13.11.4. Information Symbols
  - 13.11.5. Tactile and visible Information Signs and Symbols
  - 13.11.6. Information Signs and Symbols at Mass Transit Stops
  - 13.11.7. Tactile Surfaces
  - 13.11.8. Design Guidelines for Routing







## 13.1 WALKWAYS AND PAVEMENTS

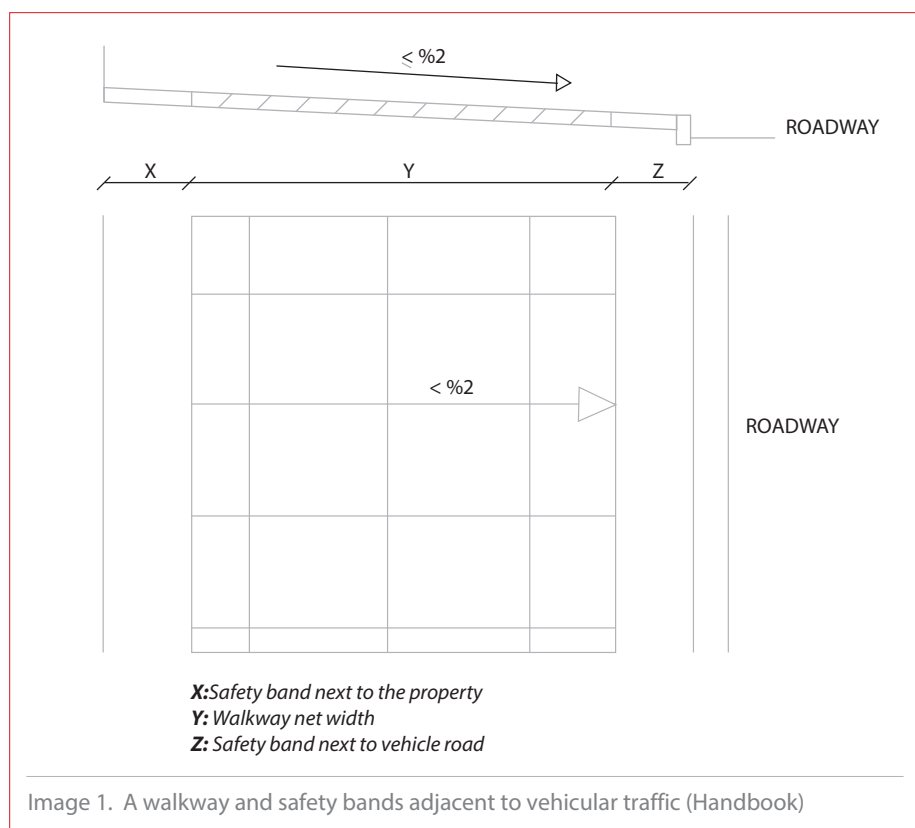
The main purpose of walkways and crosswalks is to provide a connection to different structures, activities and spaces in the built environment. The thoughtful design and planning of walkways and crosswalks provide for unimpeded movement that will allow ease of access and safety for all people including people with disabilities.

This includes all pedestrian paths, walkways, ramps, squares and crosswalks in open areas such as parks and recreation areas and sporting fields.

### 13.1.1 Width of a Walkways

A walkway should be a 1.5 meter to 2.0 meters in width. Walkway width should be minimum 3.0 meter at bus stops and 3.5 meter at storefronts (OZIDA, 2008).

All pedestrians may move freely and safely where the width of the walkway shall be 1.5 m and unobstructed. The width of the pedestrian walkway shall also include a safety band of 25 – 50 cm adjacent to traffic areas (if real estate permits) and bordering both sides of pathways in open areas, such as a bicycle path, to warn of potential danger. (TS 12576)(Image 1) The safety band or border shall be of a different texture and be contrasting in colour to the main walkway to ensure that people who are visually impaired or blind will be able to move safely in pedestrian traffic. (See 13.1.3 Surface of Walkways.)



*Note:* Width of walkways may be resized according to usage frequency, road class and group.<sup>1</sup> (See Table 1 for calculation of pedestrian usage.) However, a wheelchair or another mobility device will still require a minimum of 1.5 m of turning ability so if the width of a walkway must be reduced than the safety band may be included as a part of the 1.5 m.

<sup>1</sup> Width of the walkways should be constructed appropriate with TS 7937.



D(Pedestrian/ m2)	X	Y	Z
0.3	25	150	50
0.6	25	200	50
1.0	50	250	50
1.5	50	300	120

Table 1. Pedestrian intensity – walkway width table (cm)

### 13.1.2 Slope of the Walkways

On the walkways, especially for preventing any problems for wheel chair users, the slope of the walkway cutaway shall be no greater than 6%. Directional elements shall be located on the cutaway to orient visually disabled people across a roadway safely.

### 13.1.3 Surface / Cover of the Walkways

The surface of the Walkway must be non-slippery and the path surface should not be uneven such as a protruding manhole cover or have sudden changes in level such as a step so as to remain level and continuous. (TS 12576)

The route of the path should be easy to follow for visually impaired or blind individuals who use a cane to find and detect natural or constructed guide lines and feel and/or hear the different surfaces.

The guidelines should eliminate the uncertainty of the path or the direction of a path for people with visual disabilities when there are gaps, such as at an intersection (BM, 2004).

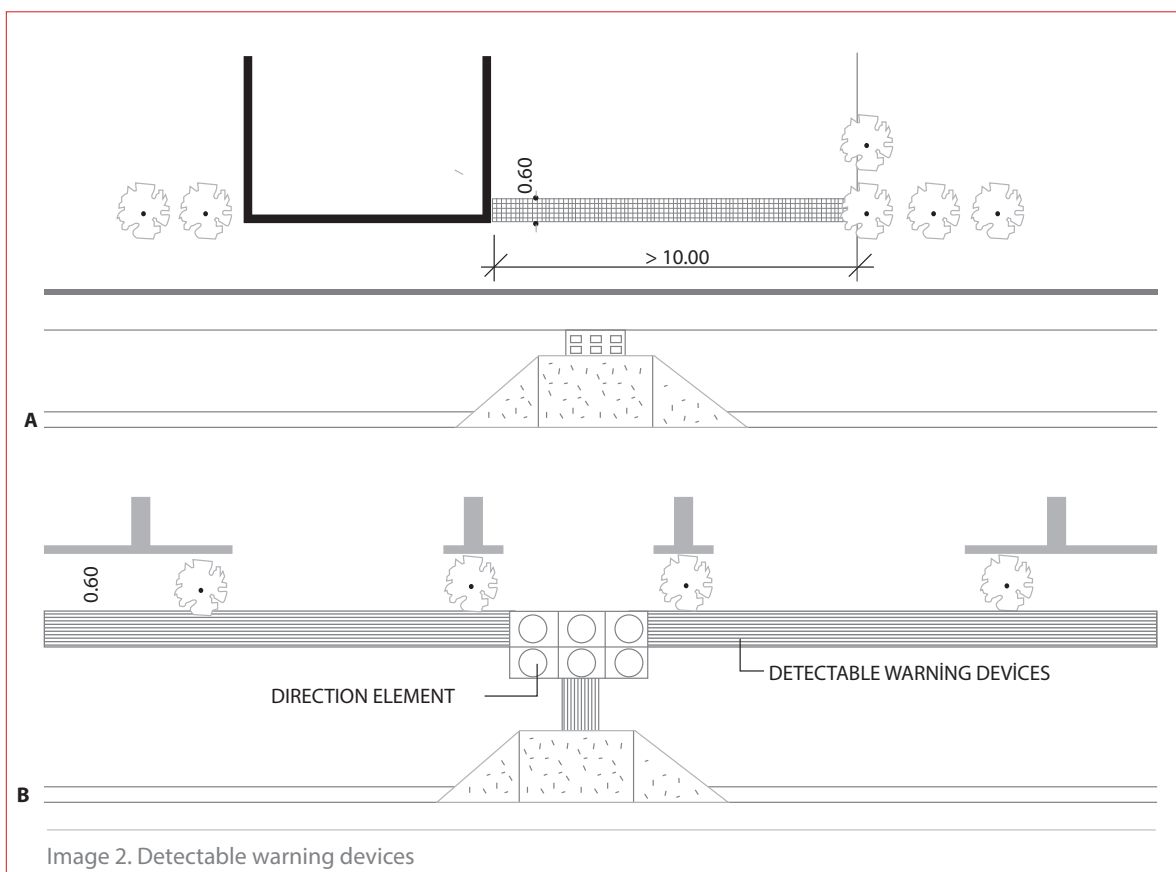


Image 2. Detectable warning devices



Main principles that will be taken into consideration in the design of guide lines that are used for walkways are as follows;

- Guide signs should be simple
- They should be parallel to the main pedestrian movement or flow,
- Guide signs should be 0.60 width
- They should be far away from manholes or drainage canals to prevent any danger or confusion for sight disabled individuals.

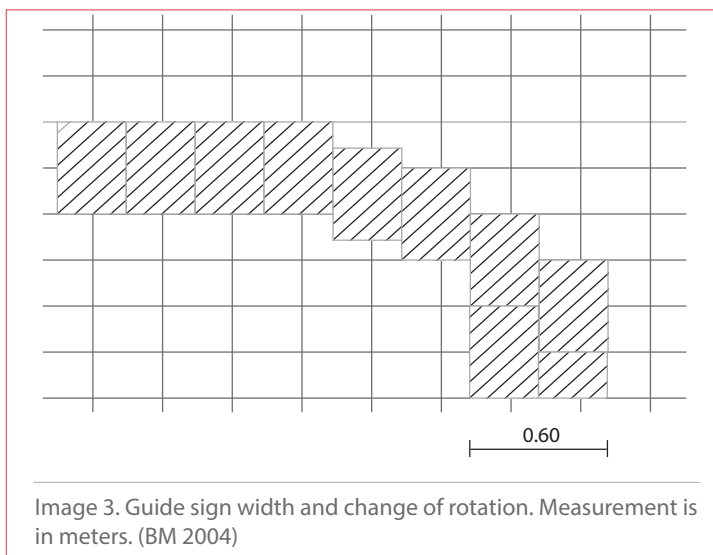


Image 3. Guide sign width and change of rotation. Measurement is in meters. (BM 2004)

Colours should be chosen so that they contrast with the surface of their environment. The height of the material used in the guide sign should not cause any obstacles for the wheelchair users.<sup>2</sup>

Standards for border stones on walkway sides are explained in TS 12576 as follows:

On a crosswalk, border stone heights should be “+0” or “+3 cm” and the slope of the ramp shall be no greater than 8% and be 90 cm in width for the wheelchair user when built at both ends of a crosswalk.

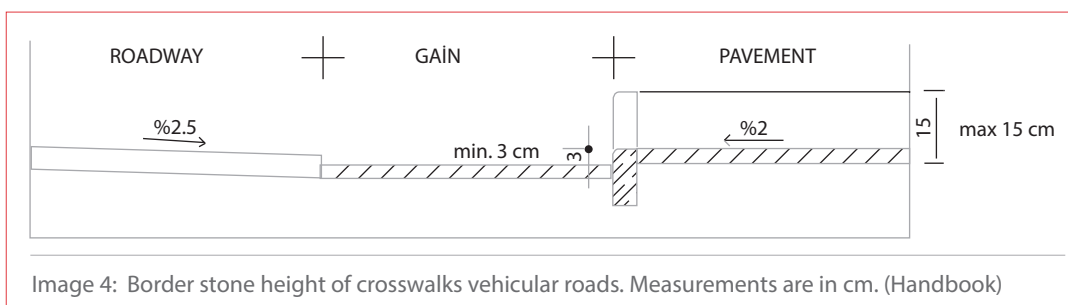
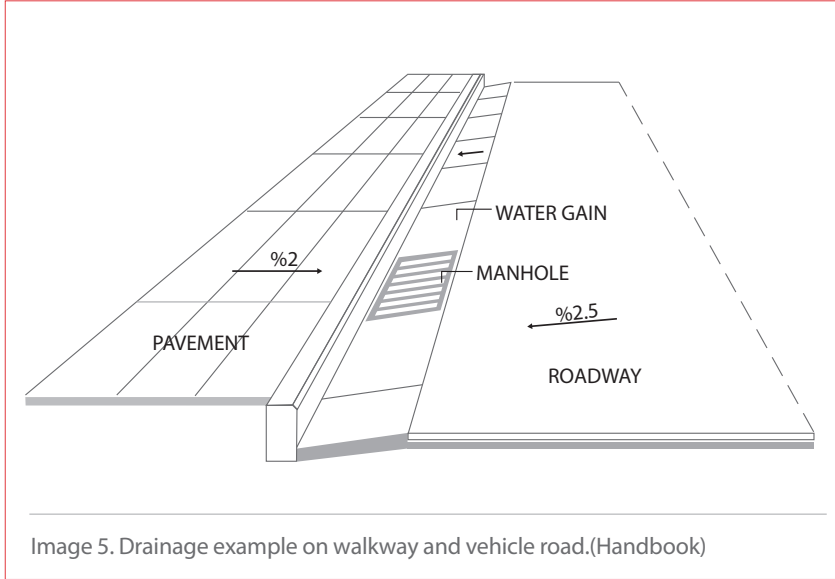


Image 4: Border stone height of crosswalks vehicular roads. Measurements are in cm. (Handbook)

#### 13.1.4 Drainage on the Walkways

Rain or any other moisture should be drained immediately to prevent discomfort and provide safety for all pedestrians. Where the border stone on a walkway meets with the vehicle road, a necessary slope should be given on the longitudinal and transverse lines so that the surface water is provided with the necessary drainage at the manholes. (TS 12576)

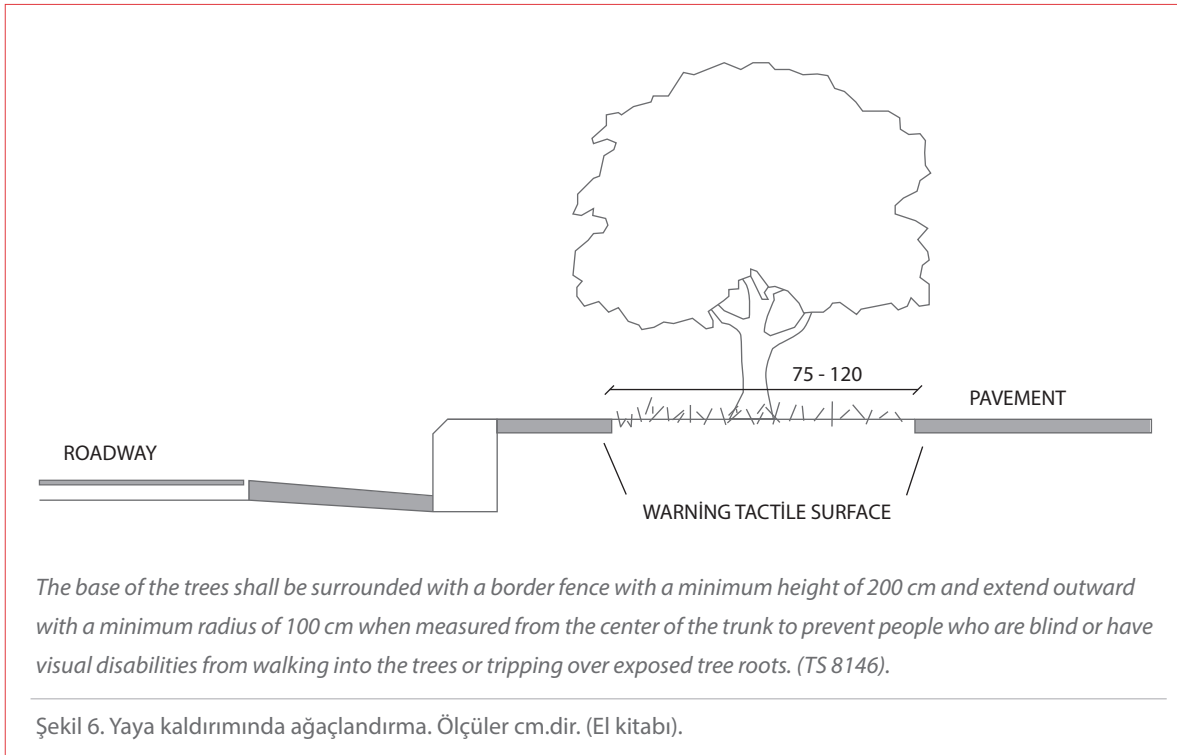
<sup>2</sup> Details of surface design can be found in 3.4.2 of the Hand Book.



At crossroads and crosswalks, water grooves should be designed safely so as not to become an obstacle for all pedestrians including disabled individuals. (TS 12576).

### 13.1.5 Trees and Urban Furniture on Walkways

Walkways shall be unobstructed by trees electrical standards, traffic signal standards, planters, furniture, sign boards, pedestrian railings and so on. And, therefore, shall be placed as one continuous line at a minimum of 75 cm and a maximum of 120 cm width that includes the border stone<sup>3</sup> (Image 7).



<sup>3</sup> Depending on the width of the walkway, trees that will be put next to the vehicle road and walkways should be appropriate to the TS 8146.

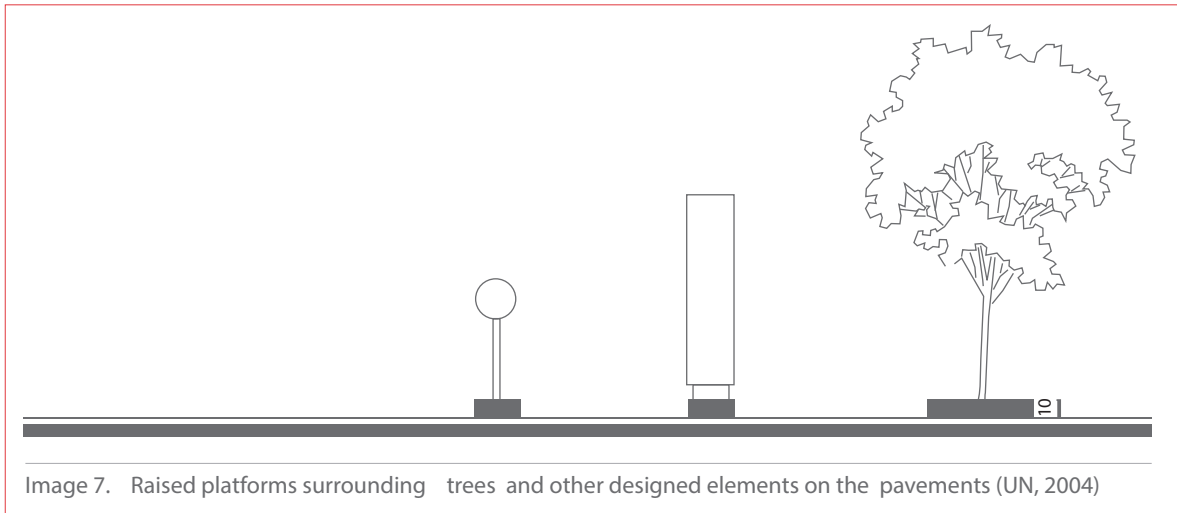


Image 7. Raised platforms surrounding trees and other designed elements on the pavements (UN, 2004)

A tactile surface of 60 cm should also be added from the outer edge around all the tree surrounds and other design elements like planters and street furniture to act as a warning against walking into or tripping over these larger objects. ((BM 2004)

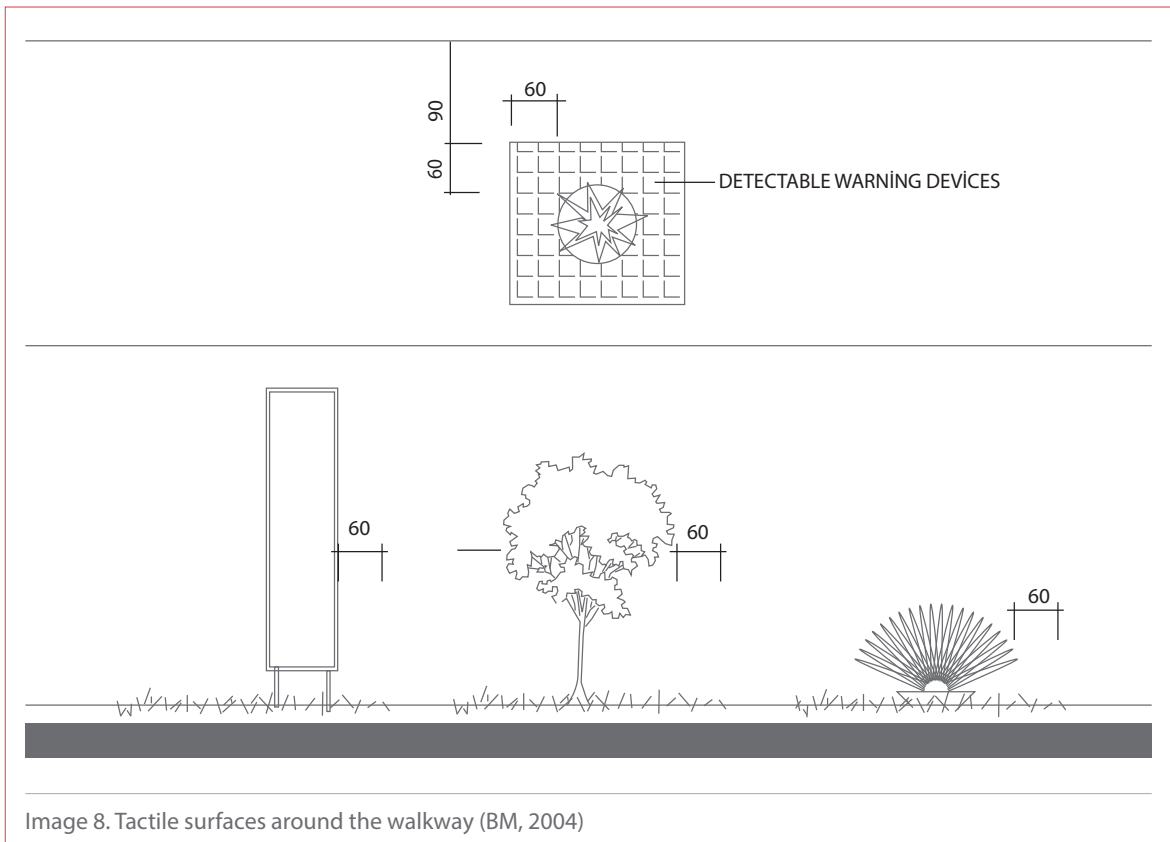


Image 8. Tactile surfaces around the walkway (BM, 2004)



### 13.1.6 Safety on the Walkways

The walkway surface should be even and free of obstacles like grates, floor mushrooms and parking lot chains to ensure that all pedestrians can travel safely. (TS 12576).

If grates must be located on pedestrian walkways, the bars on grates shall be perpendicular to the flow of pedestrian traffic and the opening between the bars shall be no more than 13 mm in width to prevent the wheels from wheelchairs or the tip of canes and crutches from sliding through. The open grillwork is hazardous to people wearing heels so foot plates should be placed across the surface to act as a solid surface to facilitate safe pedestrian movement along the walkway.

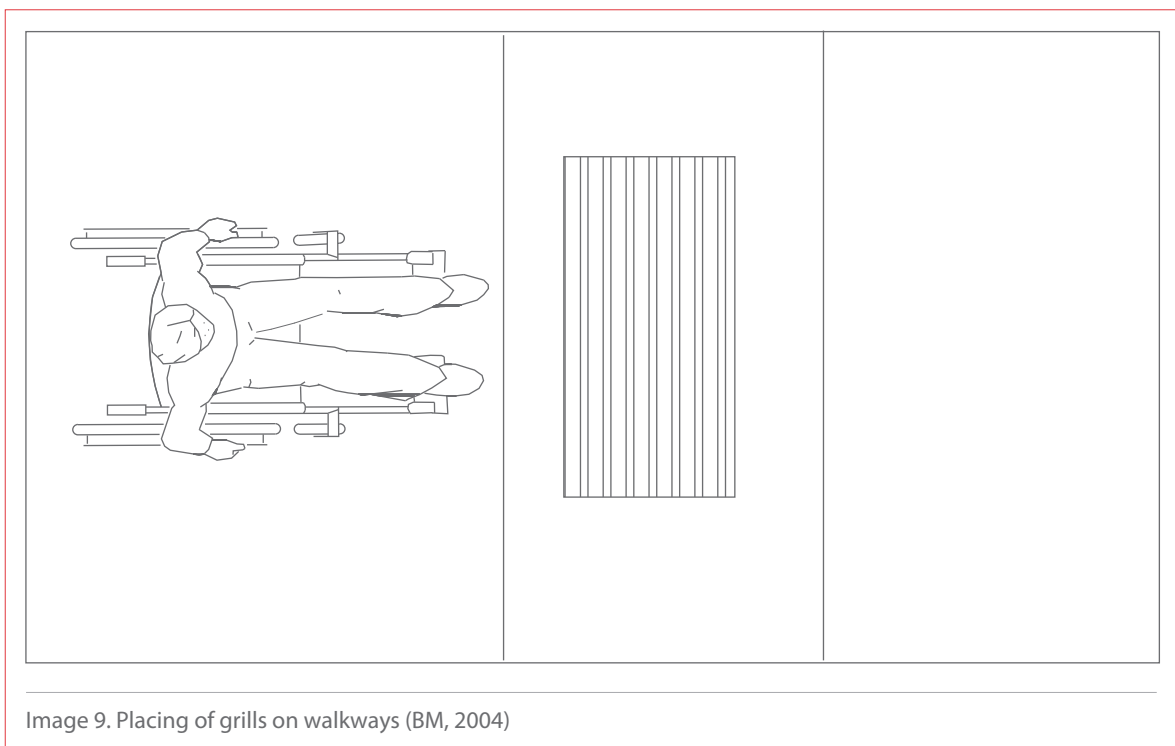
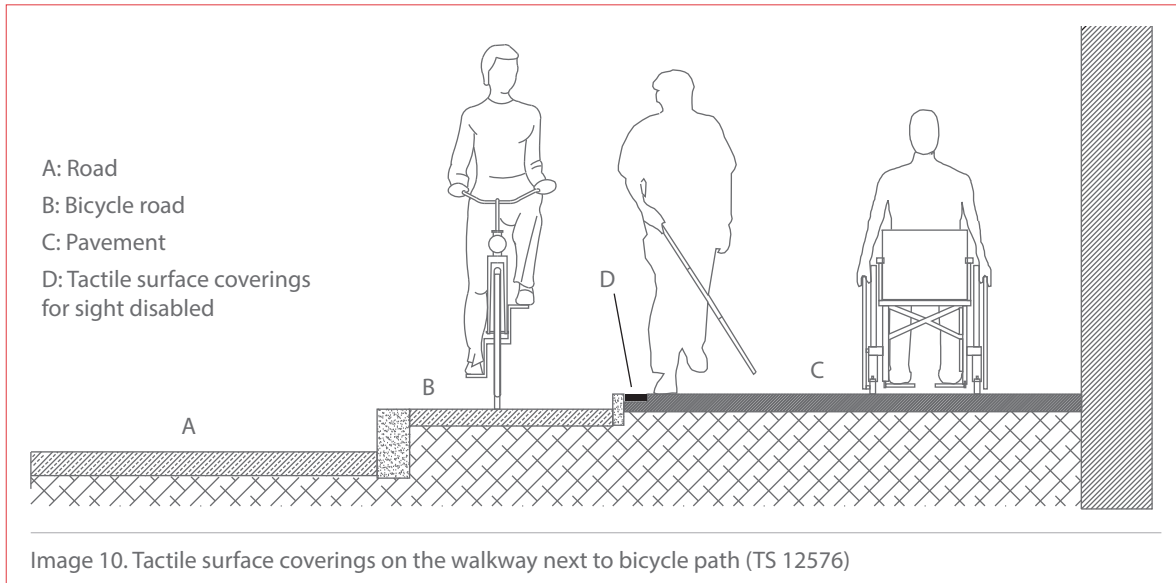


Image 9. Placing of grills on walkways (BM, 2004)

Walkway renewal or repairs, repair sites can be problematic for people with visual disabilities. These work sites should be circled with barricades that are at least 1 meter above the floor of the original pavement. The barricades shall also have barrier sticks or other cane detectable barrier with a maximum height of 250 mm. Audible and visual warning signals should be installed when it is necessary. A sufficient width should be allowed for wheelchairs to pass by the site and when temporary walkways that are required due to repairs or construction should not be less than 1.5 meters. (OZIDA, 2008).

Scaffolds or other temporary structures should have signs that are surrounded by a band of contrasting colour at least 15 mm in width and warning signals to alert sight disabled individuals when they are placed on or adjacent to a walkway. A scaffold that is placed on or adjacent to the walkway should be at least 1.5 meters in width to allow for all people to pass through easily and safely. Protective coverings should surround the corners of the scaffolds. Signage should be secured from 1.5 to 1.7 meter above the surface (OZIDA, 2008).

*Note: Vehicles should not occupy walkways. If a bicycle path is organized next to a walkway, trees and/or structural design features should block the passage of bicycles from accessing the walkway.*



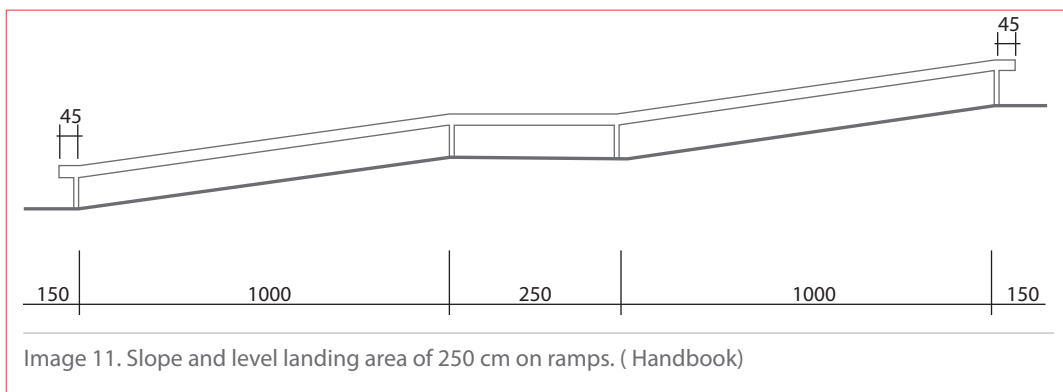
## 13.2 RAMPS

Ramps are incorporated into walkways, crosswalks, building entrance to create an easier travel experience for all pedestrians, including people with disabilities, specifically by eliminating differences in height. Ramps should be ergonomic (gentle slopes) in design for the comfortable and safe passage of people with visual disabilities along with wheelchairs, strollers, handcarts and other devices used for movement on walkways to compensate for differences in height. (TS 12576).

### 13.2.1. Ramp Size

Ramp size will vary depending on frequency of use and the maximum height difference that needs to be eliminated. In high pedestrian traffic areas, like a transportation station, ramps should be designed with a minimum 180 cm width to allow the passage of two wheelchairs traveling in opposite directions.(TS 12576)

- Ramps that are longer than 10 m and higher than 50 cm or if there is a connecting ramp, a landing area of 250 cm in length to act as a rest area shall be incorporated into the design and construction of the ramp (Image 10).
- Where there is less pedestrian traffic, ramps may be designed with a minimum width of 90 cm on ramps with a straight run. Ramps with a 90 degree turn shall be 140 cm in width and ramps with a 180 degree turn may have a minimum width of 90 cm (as defined by the UN 2004).



- If the ramp is 10 m or more, a level platform is required to act as a rest area.

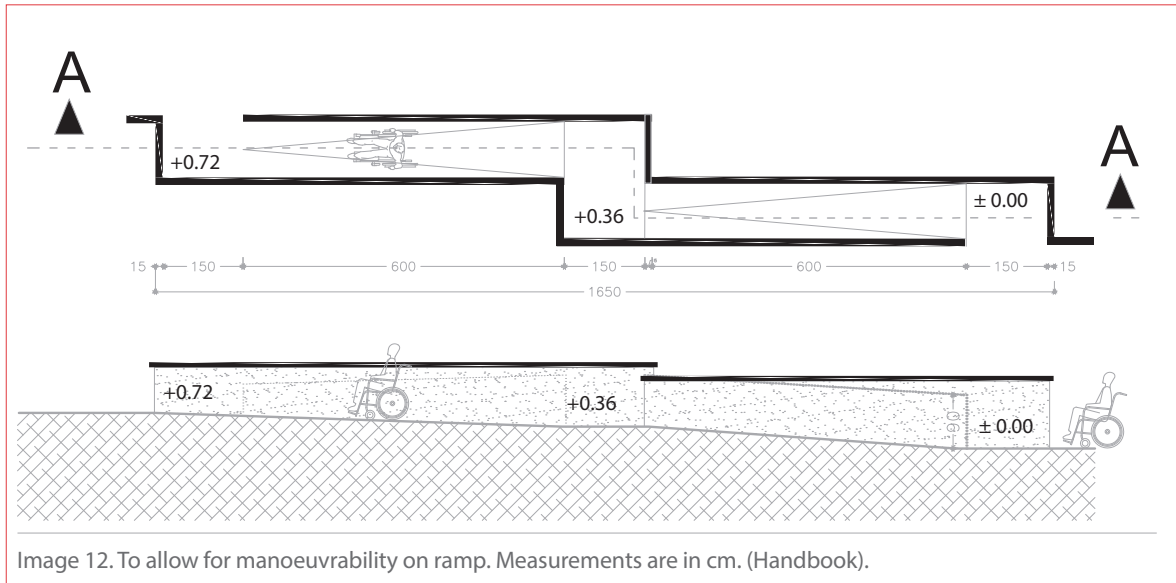


Image 12. To allow for manoeuvrability on ramp. Measurements are in cm. (Handbook).

### 13.2.2. Slope of the Ramps

Slope of the ramp will define the safety of pedestrians with disabilities. Ideally, a vertical obstacle of 20 mm or more, measured from the finished floor, shall have a slope no greater than 8% or 1:12 with landing platforms, if appropriate. However, if an 8% slope is not possible due to lack of appropriate area, then see Table 2 for the appropriate slope as defined by the UN.

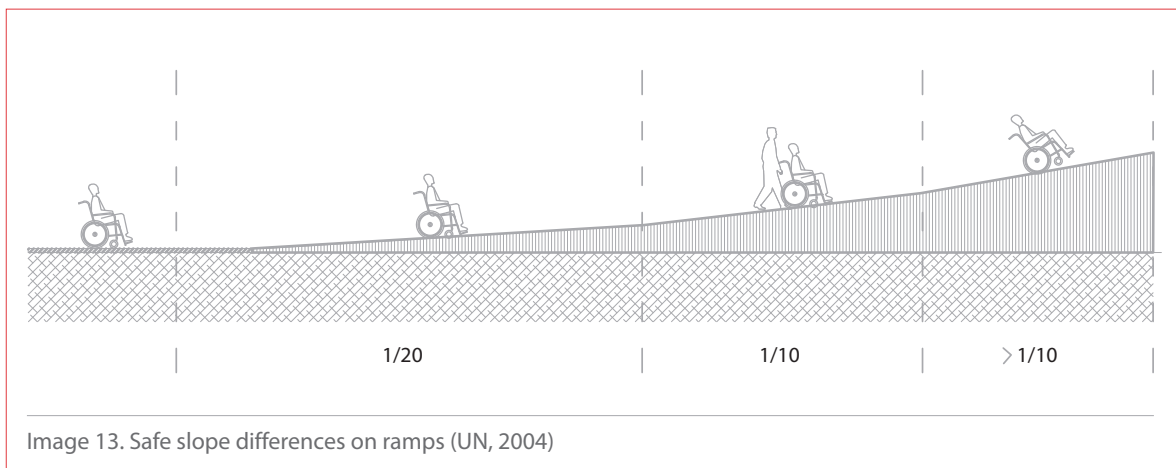


Image 13. Safe slope differences on ramps (UN, 2004)

Maximum Slope	Maximum Length	Maximum Height
1:20 (% 5)	-	-
1:16 (%6)	8.00 m	0.50 m
1:14 (%7)	5.00 m	0.35 m
1:12 (%8)	2.00 m	0.15 m
1:10 (%10)	1.2 m	0.12 m
1:8 (%12)	0.50 m	0.06 m

Table 2. Ramp Slope, Length and Height Rate (UN 2004)

### 13.2.3. Surface of the Ramps

Characteristics of ramp surfaces and materials should be as follows;

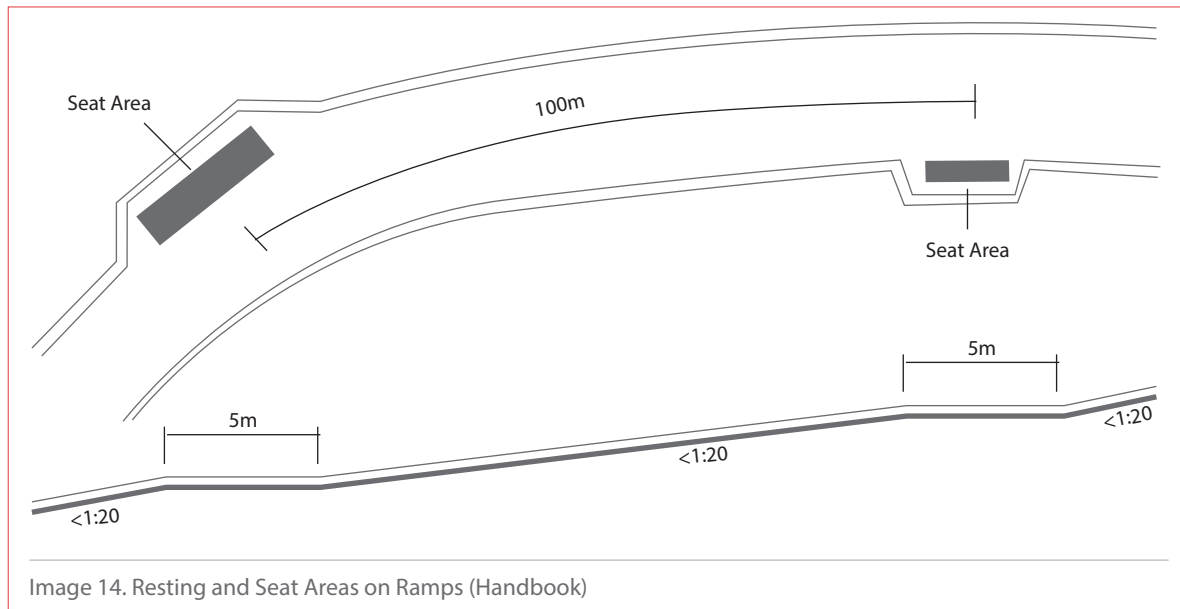
- Ramp surfaces should be covered with hard, stable, non-slip material or the surface may be lightly roughened. (TS 12576).
- Ramps shall use a different material at the top of the ramp to signal a change of elevation for sight disabled individuals. The material shall be set 15 cm back from the edge and have a 150 cm surface area (TS 12576).





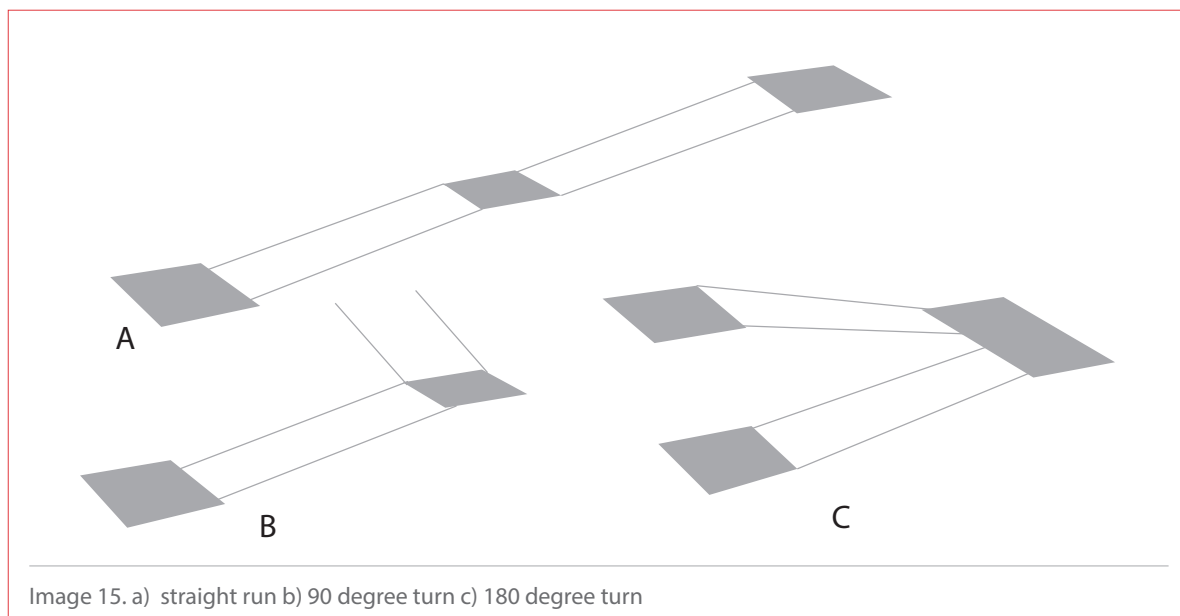
### 13.2.4. Safety and Comfort of the Ramps

Ramps shall be designed with railings and borders or guard on the unprotected side(s) of the ramp. The railing should extend 45 cm at the top and bottom of the ramp to signal one's approach to a change in elevation. The railing should continue toward the ground or curve into wall to prevent articles of clothing and bags from catching. The railing should be designed with horizontal or vertical slats to prevent people from accidentally falling through. Guard or border on the side of the ramp will prevent wheels of wheelchairs, strollers and other mobility devices from slipping off the ramp.



### 13.2.5. Types of the ramps

There are three-way sloped rampon an walking route ; straight run , 90 degree turn, 180 degree turn.



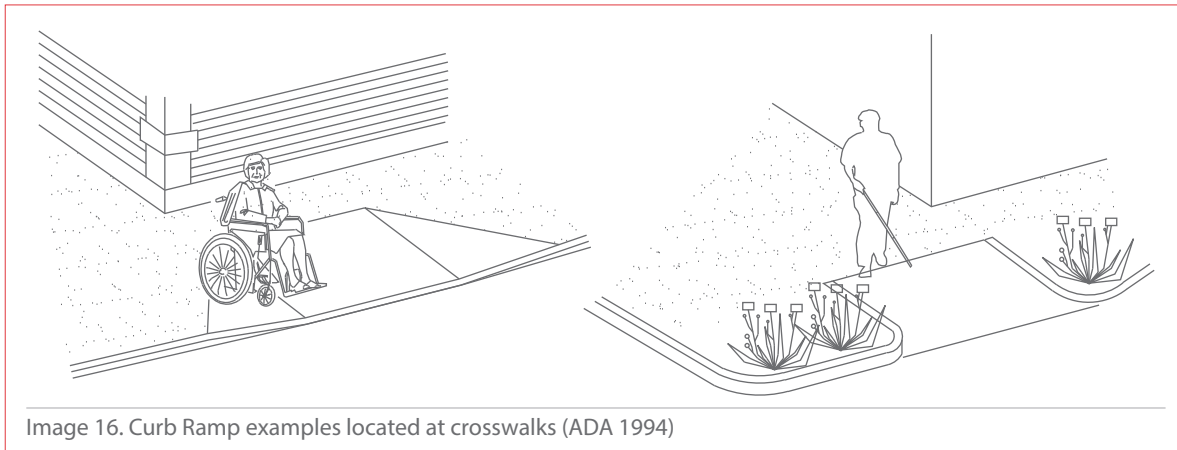


Image 16. Curb Ramp examples located at crosswalks (ADA 1994)

### 13.3 STAIRS

Since the stairs can disturb disabled people's mobility, it is important for achieving the accessibility. However, if stair-building is inevitable, then railing should be implemented on both sides

#### 13.3.1 Size of the Stairs

With the condition of max. riser height to be 15 cm, the formula of  $2 \times \text{riser height} + 1 \times \text{stair width} = 63 \text{ cm}$  must be used and it should be in accordance with TS 9111 (TS 12576).

#### 13.3.2. Surface of the Stairs

On the walking surfaces of the stairs, ragged and non-slippery coating should be used. If necessary, the surface of the stair should be covered to be protected from weather effects (TS 12576).

#### 13.3.3. Treads of the Stairs and Color Selection

Treads and risers should be in different colors. Non-slippery border should be put on the end of the tread into 2.5 cm width, coating material must be plane with the surface of tread in order to prevent from tripping on. (TS 12576) (Image 17).

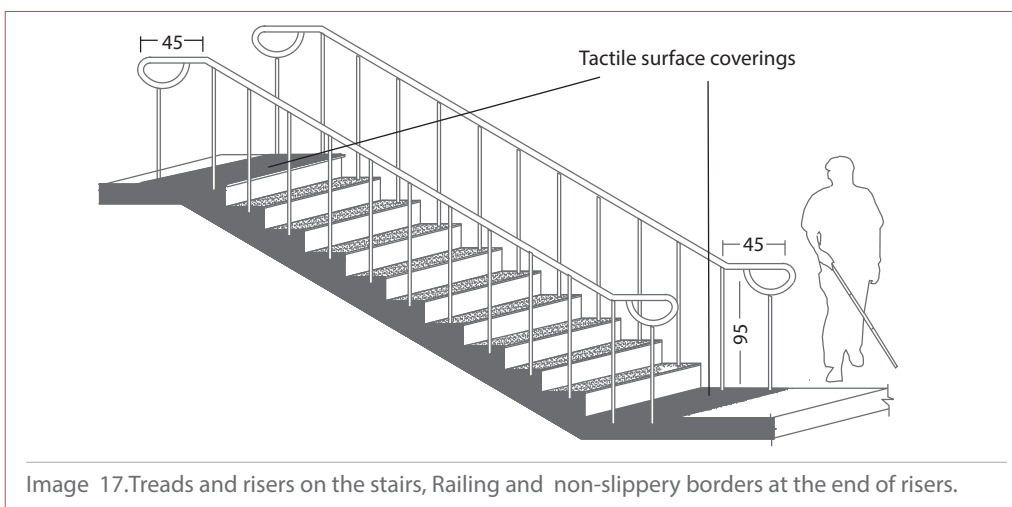


Image 17. Treads and risers on the stairs, Railing and non-slippery borders at the end of risers.

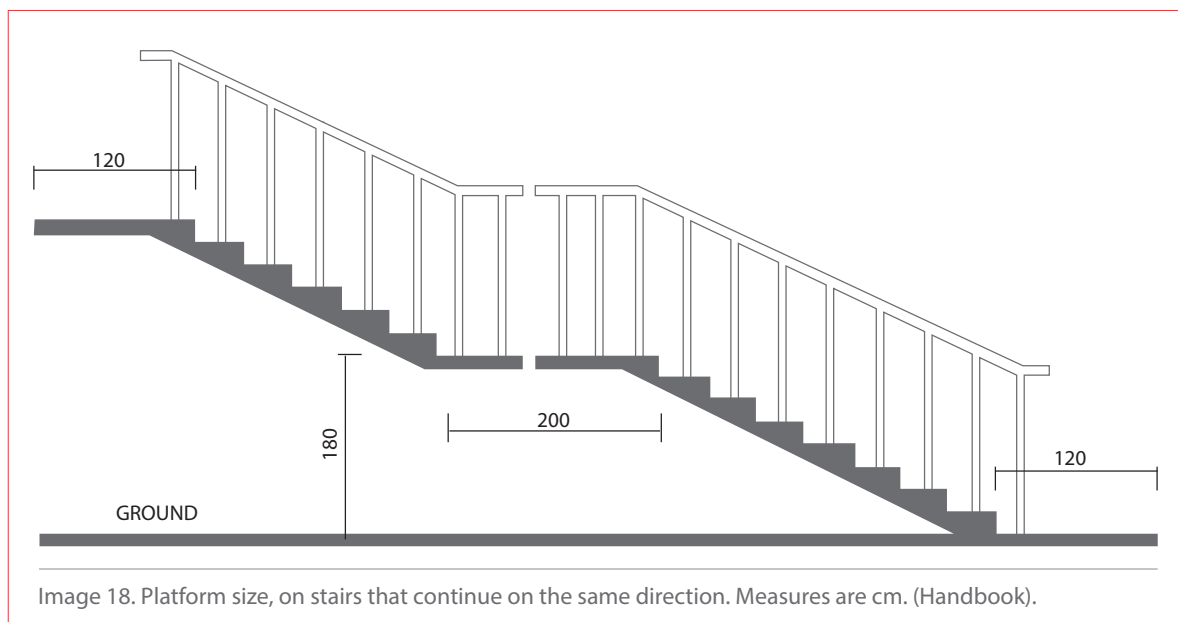
DIN 18024, all stairs with three risers must be covered with non-slippery borders. On the stairs with more than 3 risers; the non-slippery borders can be placed on to the first and last risers.



#### 13.3.4. Landing on Path with Stairs

A stair system that travels in the same direction should have a 120 cm platform between every set of stairs 180 cm in height. At the top of the stairs system, there should be a 60 cm tactile and contrasting material to indicate that a person, including people with visual disabilities, is approaching a change in level.

If the stair system changes direction, the platform area should be at least 180 cm x 180 cm. Clear width at the stairs from the railing to railing should be at least 180 cm. Water drainage gutters should be placed on the sides of the stairs (TS 12576).

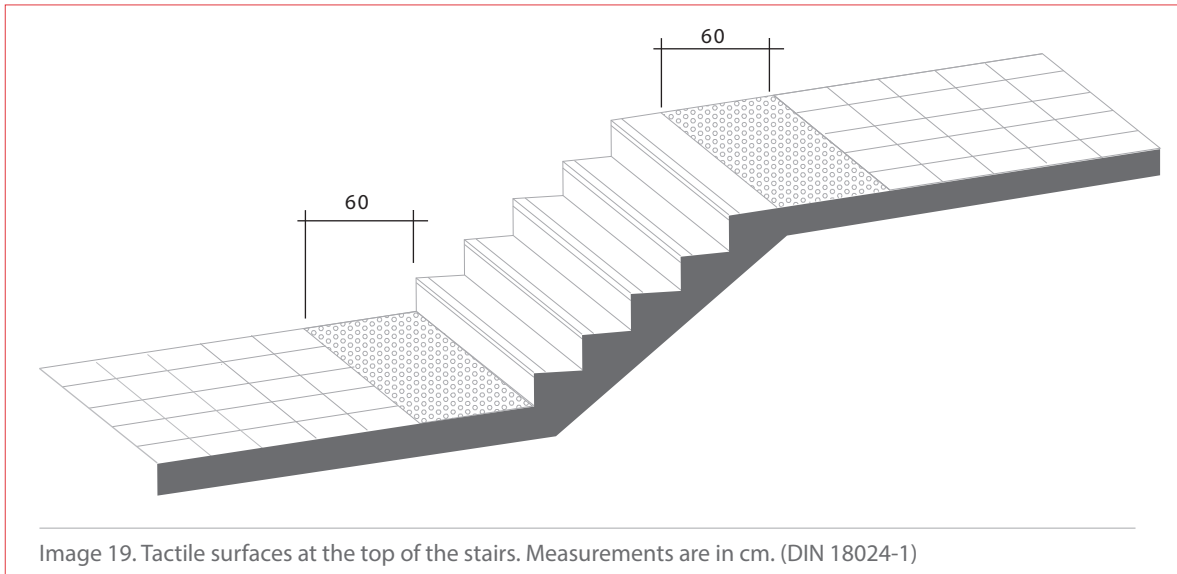


#### 13.3.5. Railings Safety and Warning

The railings on the two side of stairs and the tactile surfaces placed on the begining to end of the stairs are critically important to all users. Also the sense of pattern differentiation and tactile surfaces on stairs should be provided to the users.

#### 13.3.6. Tactile Surfaces on Stairs

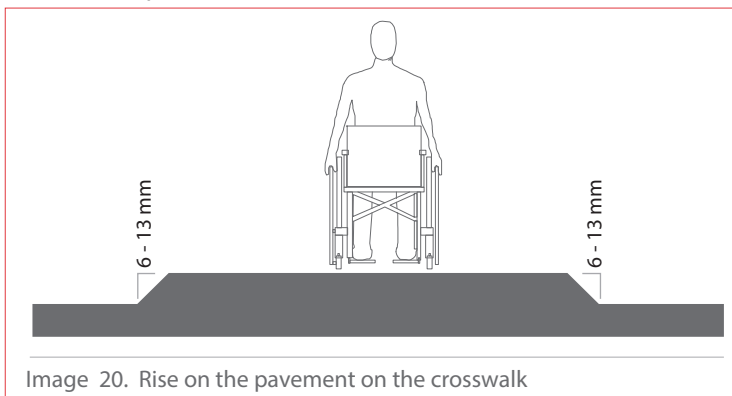
A stair system that travels in the same direction should have a 120 cm platform between every set of stairs 180 cm in height. At the top of the stairs system, there should be a 60 cm tactile and contrasting material to indicate that a person, including people with visual disabilities, is approaching a change in level.



### ■ 13.4 Crosswalks

Crosswalks are designed to move pedestrian traffic safely across vehicular roadways. A level surface will eliminate obstacles and a tactile surface will assist all pedestrians, including people with visual disabilities, to cross the road safely. This design should provide to all of users the sense, that it is the crosswalk beginning. This user can be people with visual disabilities, wheelchairs, strollers and handcarts.

On the crosswalks if the surface of the road and pavement are same level, persons with wheelchair do not need to pass that elevation difference.



General principles about crosswalks ;

- Obstacles like flowerbeds and flowerpots, mushrooms, symbols, signposts, poles (electric, light, traffic etc.) should not be placed on the crosswalks. This may impede the movement of persons with disabilities.
- All posts or information boards on walkways and intersections should not be placed on the corner as they may be obscure the person from the driver's line of sight.
- Surface markings such as clearly defined zebra lines are required to further demarcate the crosswalk as the proper place to cross in front of traffic.

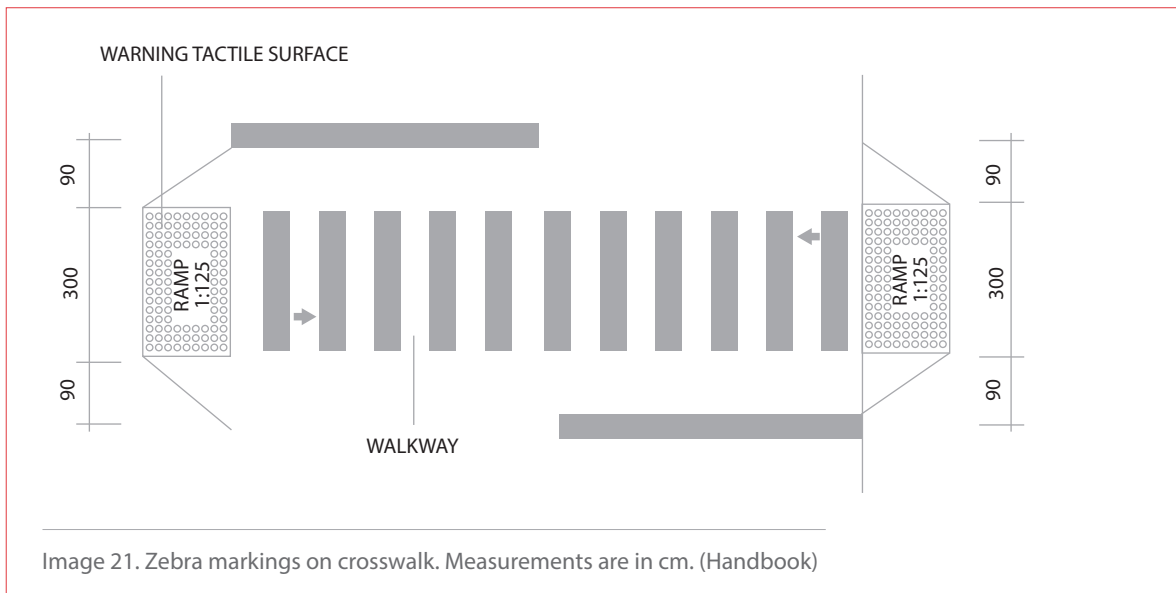


Image 21. Zebra markings on crosswalk. Measurements are in cm. (Handbook)

Walkways at intersections should be wide enough to accommodate the passage of pedestrians, including persons with disabilities, in both directions

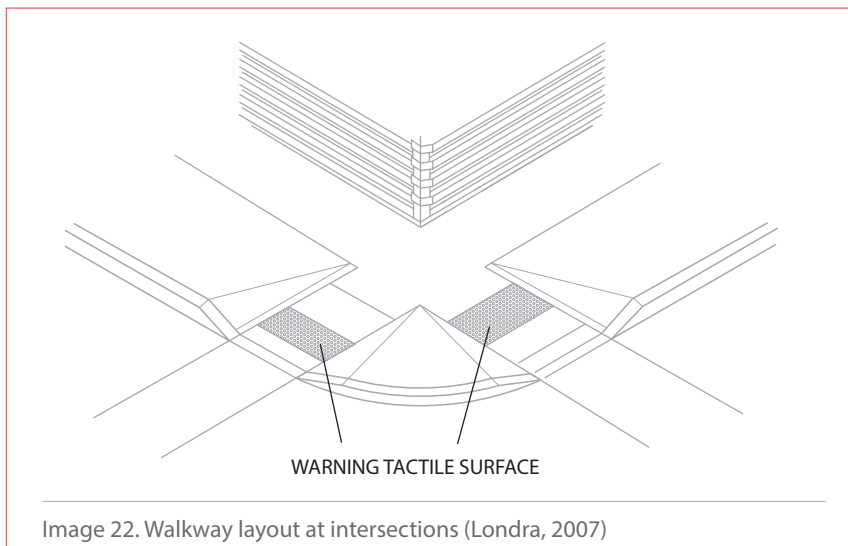


Image 22. Walkway layout at intersections (Londra, 2007)

### 13.4.1. Types of the Crosswalks

#### 1- Uncontrolled Crosswalks

Uncontrolled crosswalks are usually located in areas such as residential and in areas where traffic naturally slows or must yield such as a school zone. Uncontrolled means no signalling devices or flashing lights. Instead, signage is used to notify drivers of an existing crosswalk 20 m ahead and exercise caution when approaching. Additional signage is placed 1 m from the crosswalk so that it will not obscure the pedestrian from the drivers view, and it will also notify pedestrians of its location.

The signage should be phosphorescent or “glow in the dark” to increase its visibility for drivers when there is minimal to no street lighting.



## 2- Controlled Crosswalk

Controlled crosswalks are generally located in high traffic areas, including intersections, to control pedestrian and vehicular traffic. Controlled crosswalks mainly use electronic signalling devices such as traffic signals and flashing pedestrian crossing signals.

Traffic signals will display a brightly lit pedestrian “in motion” figure or symbol that will notify pedestrians when it is safe to cross the street. Audible signals should be synchronised with the lit figure to notify persons with visual disabilities when it is safe to cross. The signal should emit a continuous sound until the “Do Not Walk” symbol appears. There should be 2 distinct audible signals to indicate whether to cross North-South or East-West.

Controlled crosswalks should have the crossing signal linked to the traffic signal that will automatically activate so physical activation is not required. If this is not the norm then a button may be required to activate the crossing signal. This is also known as a pelican crossing where a button can be located on a standard set of traffic light standards or on free-standing poles walks with the button set at a maximum height of 120 cm. This would also allow pedestrians, including persons with disabilities to activate the crossing signal. (TS 12576)

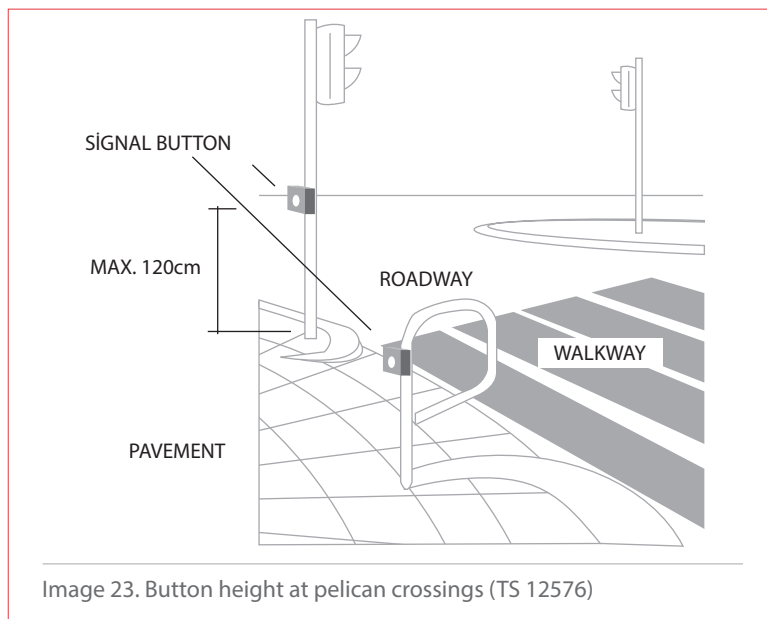


Image 23. Button height at pelican crossings (TS 12576)



Refuge or traffic island crosswalks are located where there are 3 or more lanes of traffic flow for each direction and are controlled with crossing signals. The crossing signal posts may be located on the protected traffic islands if the time required by a pedestrian to ensure that the symbols are easily seen and heard, with or without a disability, to cross 6 lanes or more of traffic is too great to achieve safely. Therefore, there are guidelines for designing these protective refuge areas.

- The refuge area within the crosswalk is protected by traffic islands that should be 160 – 250 cm in width and situated on the outer edge of the crosswalk which is 300 – 400 cm in width. The protected refuge area should have a different material or texture from the road surface as an indicator for persons with visual disabilities of the safe standing area when the audible signal ends. To further aide with the safety of all pedestrians, protective islands should be equipped with visual and audible traffic signals or warning plates.
- The refuge area should be level with the road surface. If not, there should be a ramp of 90 cm in width with an 8% slope on both sides of the traffic island to allow for the safe passage of persons who use wheelchairs or other mobility devices.
- Protective islands or traffic islands should be 3 cm in height. (TS 12576)

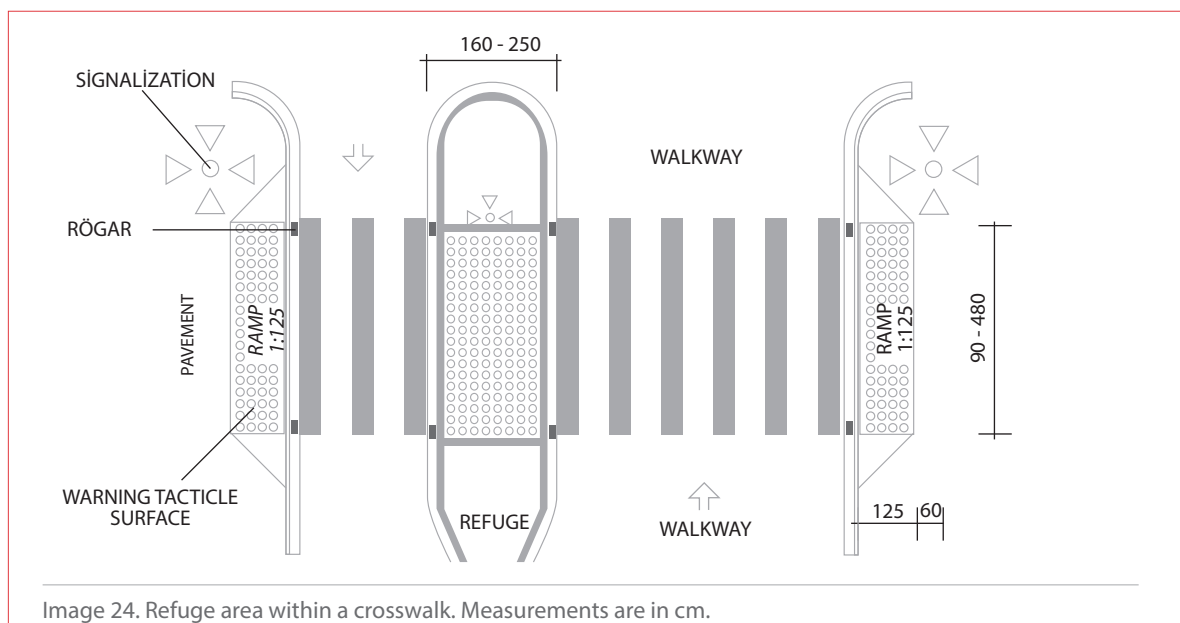


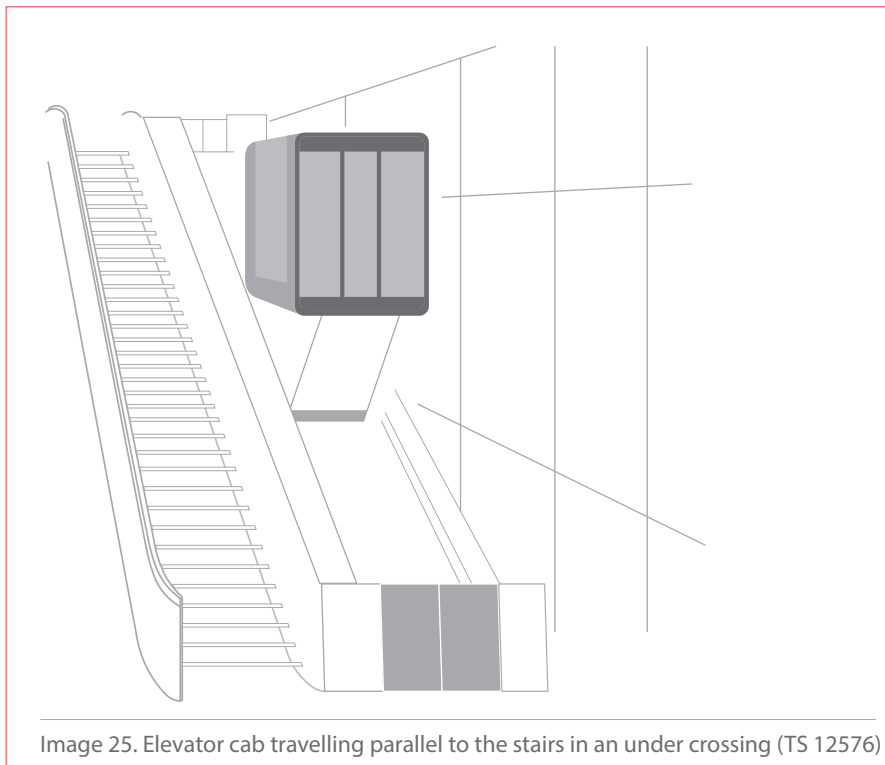
Image 24. Refuge area within a crosswalk. Measurements are in cm.



### 3-Under and Over Crossings for Pedestrians

Under and over crossings are a necessary solution where the vehicular traffic is too intense for a safe crossing at street level for pedestrians. Principles for designing under and over crossings for pedestrians, including persons who require the use of mobility devices are as follows (TS 12576):

- If there is sufficient real estate to install a ramp from ground-level to ground-level, the ramp shall be designed with a 5 – 8% grade (should not cause fatigue) with a non-slip surface that could replace stairs or an escalator. If a ramp is not feasible then it may become necessary to install an elevator cab or a platform lift that should operate safely on an incline parallel with the stairs. The elevator cab should have the capacity to carry 2 wheelchairs simultaneously. (Image 26)
- Or an elevator (capacity to carry 2 wheelchairs) with a vertical incline to and from street level may be installed.
- The international symbol for disability should be visible at entrances and on the ramps or other transportation devices to indicate accessibility for all persons with disabilities and seniors.
- Under crossings and under crossing entrances should be well-lit and visible from one side of the crossing to the other side (if possible) in an attempt to provide safety from criminal activity and other activities for all pedestrians.
- If escalators are required, escalators should have the sides and back of each step demarcated to make them visible to all pedestrians, including people with visual disabilities.
- Stairs should not have a steep incline or be curved to eliminate the possibility of fatigue or disorientation of pedestrians with visual disabilities and lit.
- (TS 9111), resting platforms should be placed.
- Stairs should have railings on both sides, the treads should be non-slip, the nosing of each tread should be demarcated to create easy identification of each step and the stairs should be well-lit.







Please note: Pedestrians prefer to use under crossings as opposed to over crossings because they feel less fatigued and safer crossing beneath traffic.

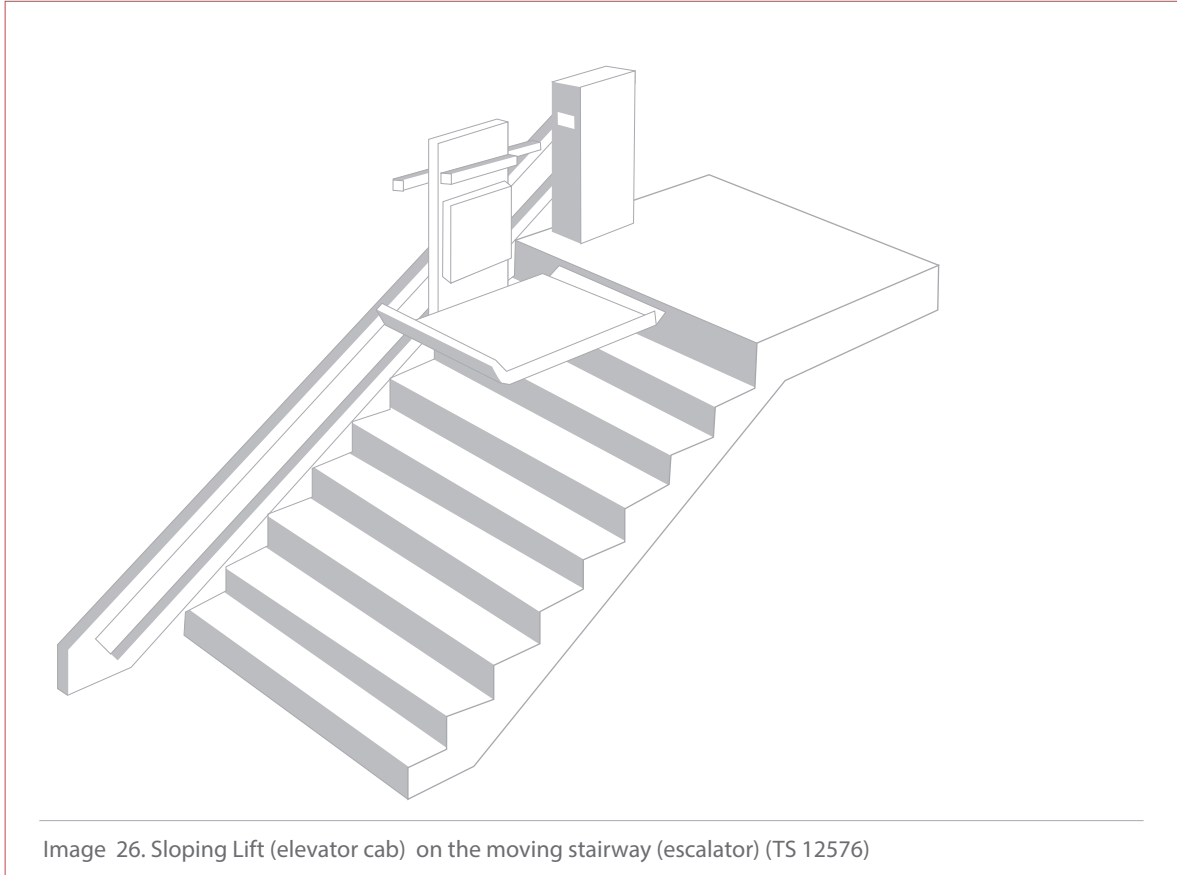


Image 26. Sloping Lift (elevator cab) on the moving stairway (escalator) (TS 12576)

### 13.4.2. Slope of the Crosswalks

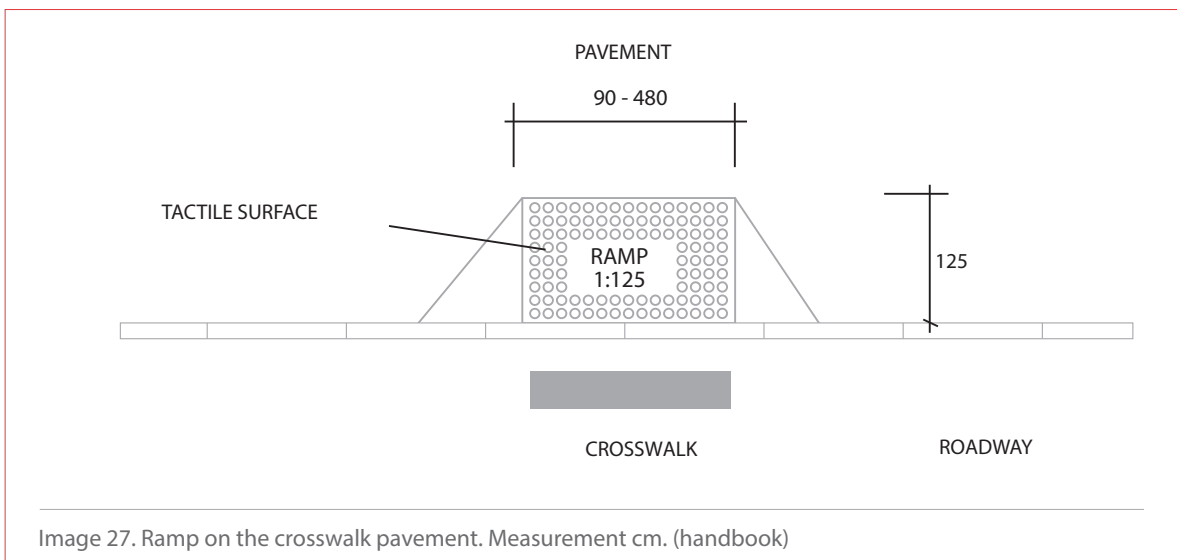


Image 27. Ramp on the crosswalk pavement. Measurement cm. (handbook)



### 13.4.3. Surface of the Crosswalks

The surface coverings materials which are being used on the crosswalks should necessarily be non-slipping, and high strength to fire, damage etc.

### 13.4.4. Stripe Sand Floor Marks on the Crosswalks

Accordingly to the traffic level, the crosswalks and walkways on the roads should include the stripes on the crossings. It is needed to put horizontal and vertical signage on crosswalks. The stripes are better to be stable and have high strength to damage

### 13.4.5. Safety of the Crosswalks

The principle element of crosswalk design is to ensure that all pedestrians, including persons with disabilities, are visible to the approaching vehicular traffic. The common design elements when it comes to providing safety within crosswalk use are:

- Crosswalks, with the exception of intersections, should be located where the driver can see it from a safe distance.
- Crosswalks should be highlighted from above by an amber or other coloured light that will flash upon activation to warn approaching drivers to use caution.
- Crosswalks that use traffic lights to notify pedestrians when it is safe to proceed, should also be accompanied by distinctive auditory notification.
- Crosswalks with surface markings such as zebra lines should be well defined.

In addition to the safety provided by cane detectable and other sensory surfaces, the use of metal railings can notify the person with a visual disability that an intersection or crosswalk is nearby.

The metal railings should always be placed parallel to the road, and be at least 1500 mm in length and ending at the edge of the crosswalk to indicate the location of the crosswalk to a person with a visual disability. (TS 12576) (Image 29).

The metal railings are cane detectable and would safely aide persons with visual disabilities to locate uncontrolled crosswalks.

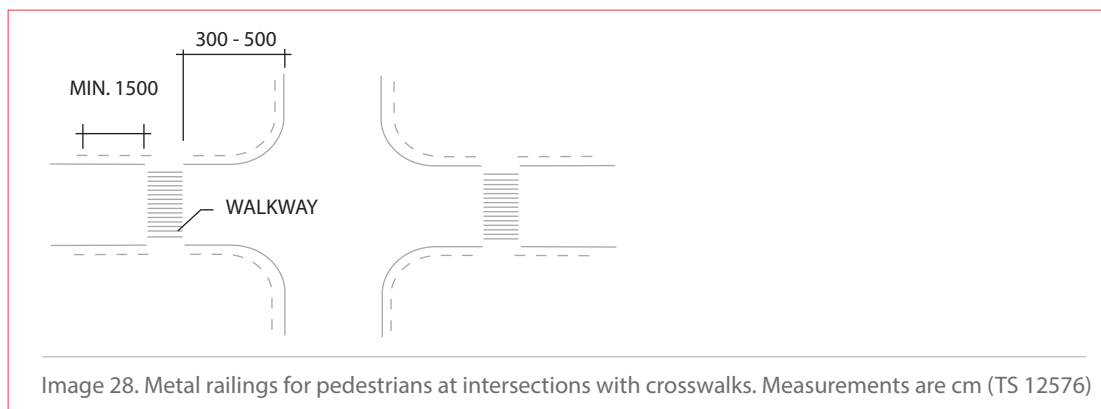
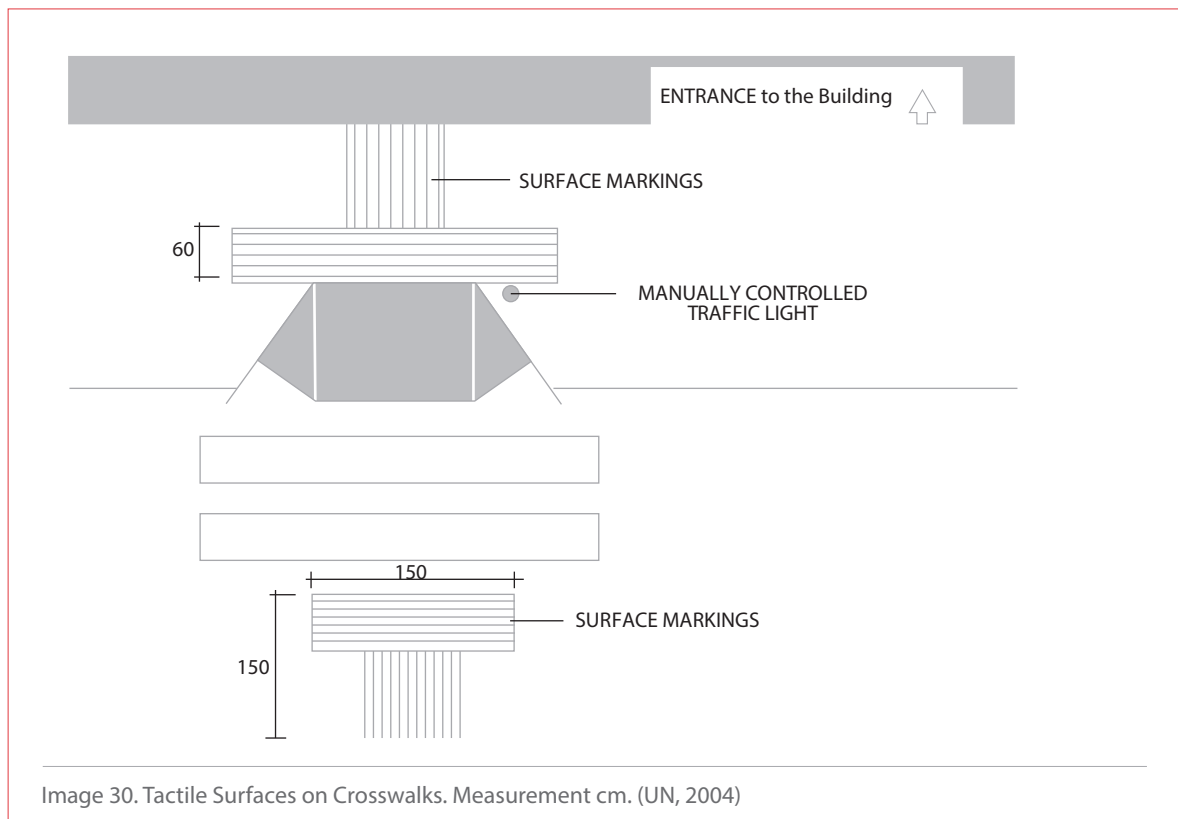


Image 28. Metal railings for pedestrians at intersections with crosswalks. Measurements are cm (TS 12576)



### ■ 13.5 PARKING STALLS FOR PERSONS WITH DISABILITIES

Persons with disabilities require more space to park their vehicles for 2 reasons: 1) people who use wheelchairs require the necessary space to transfer into or from the vehicle to or from their wheelchair or other mobility device; or 2) the vehicle may be fitted with a ramp or lift and will require the extra space to enter into or exit the vehicle to/from their wheelchair or other mobility device. Designated parking spaces for persons with disabilities should be provided in parking lots and on the streets. (TS 12576).

The Parking Lot Code states that 5% of the total number of parking spaces should be designated for use by persons with disabilities as being not less than one parking stall at public buildings, district parking lots and general parking lots. Designated accessible parking stalls should be located on roads, exterior parking lots and within enclosed or covered parking structures at each barrier-free level. Each designated stall shall be marked with an international symbol for disability on the ground surface and mounted vertically on a post or the wall at a maximum height of 2.0 m.

In UN 2004, it is stated that if the total number of parking stalls is less than 50 vehicles, 1 parking space should be reserved as parking for persons with disabilities. The total number of parking stalls from 50 – 400, 1 stall shall be reserved as accessible for every 50 or part thereof. If the total number of parking stalls are 401 – 800, at least 8 parking stalls shall be reserved and for each additional 100 parking stalls or part thereof after 800 shall designate 1 accessible parking stall for persons with disabilities.



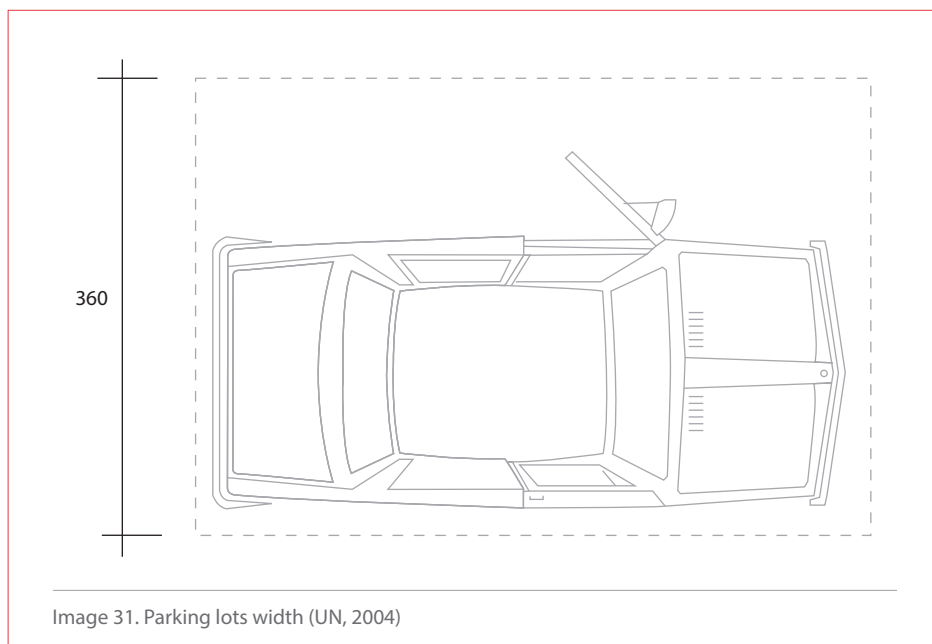
### 13.5.1. Parking place locations for persons with disabilities

- Designated parking stalls should be located near the closest entrance/exit of public buildings, such as, hospitals, malls, train stations etc., as well, open and closed parking facilities should designate stalls for the disabled near elevators and the building entry/egress.
- Distances should be 10 m - 25 m maximum from the parking stalls to the entry. This would minimise the number of potential encounters with vehicles or other obstacles that may impede the safe progress of persons with disabilities to the intended destination.
- If there are walkways, these should be lowered to have “0” or “+3” cm with an acceptable slope or curb ramp no greater than 8° to create safe access to the intended destination.

### 13.5.2. Sizes of Parking Stalls

The design of an accessible parking stall is important to a person who uses a wheelchair. If the space is too small or in a poor location, then the parking stall is not functional. The following 3 configurations are the most acceptable designs for accessible parking.

First design, is the parking area should be no less than 3.60 m width, recommended width is 3.90 m (UN, 2004)





Second design, is to create or add an access corridor no less than 1.20 m in width between two standard size parking stalls. This would easily accommodate a person who use a wheelchair to transfer in/out of the vehicle.

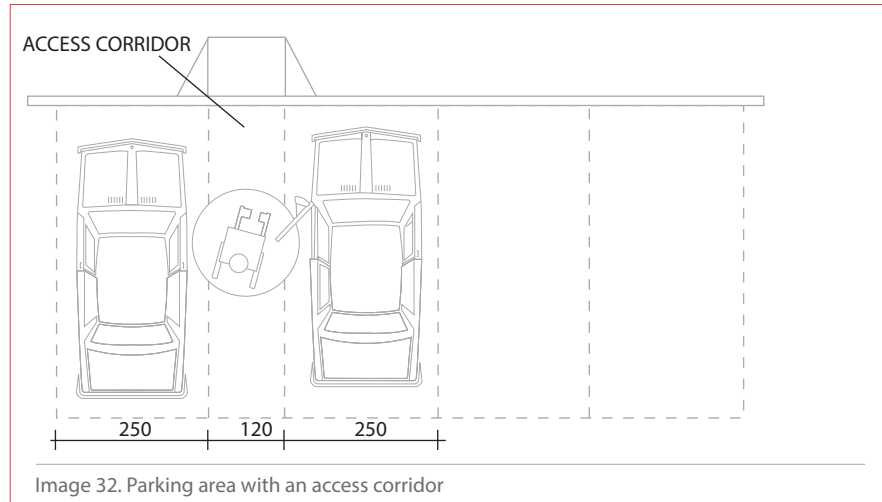


Image 32. Parking area with an access corridor

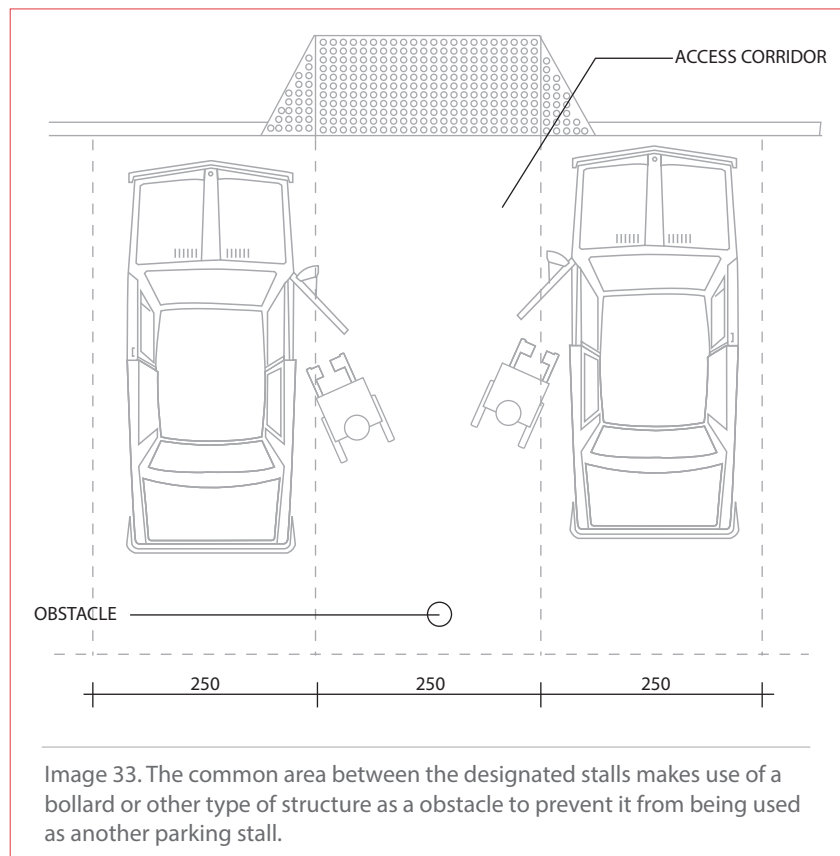


Image 33. The common area between the designated stalls makes use of a bollard or other type of structure as a obstacle to prevent it from being used as another parking stall.

Other countries, have chosen to make the access corridor the same width as a standard parkingstall size to accommodate much larger vehicles that may have a lift or ramp on the side of that vehicle and it allows that person to turn onto or off of the lift or ramp with ease

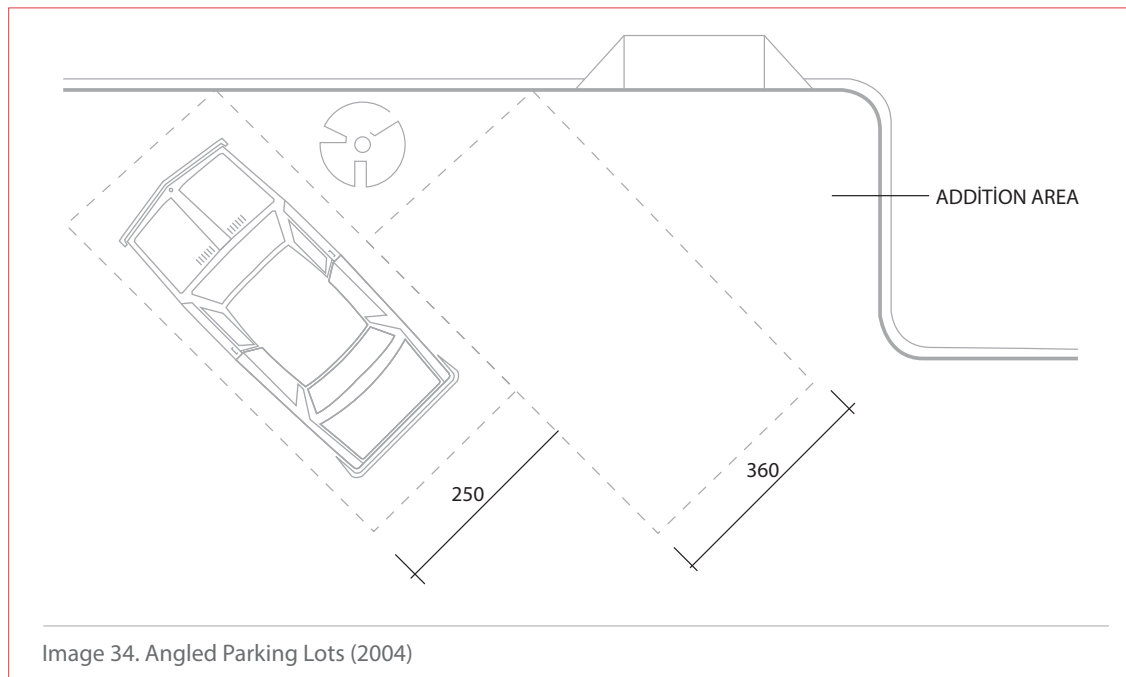


Image 34. Angled Parking Lots (2004)

Third design is for angled parking. In a parking structure or on the street, the end of a row is the ideal location for an accessible parking stall in an angled parking configuration. The accessible parking stall should be at least 3.6 m with an additional 2.5 m adjacent to the stall to act as an access aisle. (UN 2004) (Image 33).

### 13.5.3. Signage and Notifications

International symbol for disability should be displayed so that it will be visible from a distance, easy to read and illuminated.

Furthermore, directional signage can be used to guide persons with disabilities to the locations of the designated parking for both indoor and outdoor parking lots.

The signs should be mounted vertically on a post or the wall at a maximum height of 2.0 m and the International symbol should be phosphorescent for visibility and, therefore, the recognition of where the designated parking is located from a distance.

### 13.5.4. Types of Parking Lots

There are two group of parking area ; alongside the road and open and closed parking lots .

#### A- Parking Lots Nearby the Vehicular Road

- a. If parking is allowed on the vehicular road, near the pavement, then, it is necessary to keep enough space for disabled people to park, to get on and off to the car.
- b. Parking place should be signed with the international symbol
- c. Symbol for parking should be easily seen, read and lightened
- d. Parking place should be covered with non-slippery surface
- e. Ramps to pavements and border stone with 3cm height should exist
- f. Ticket machines at parking lots/structures and parkingmeters on streets should be between the 100-120 cm in height

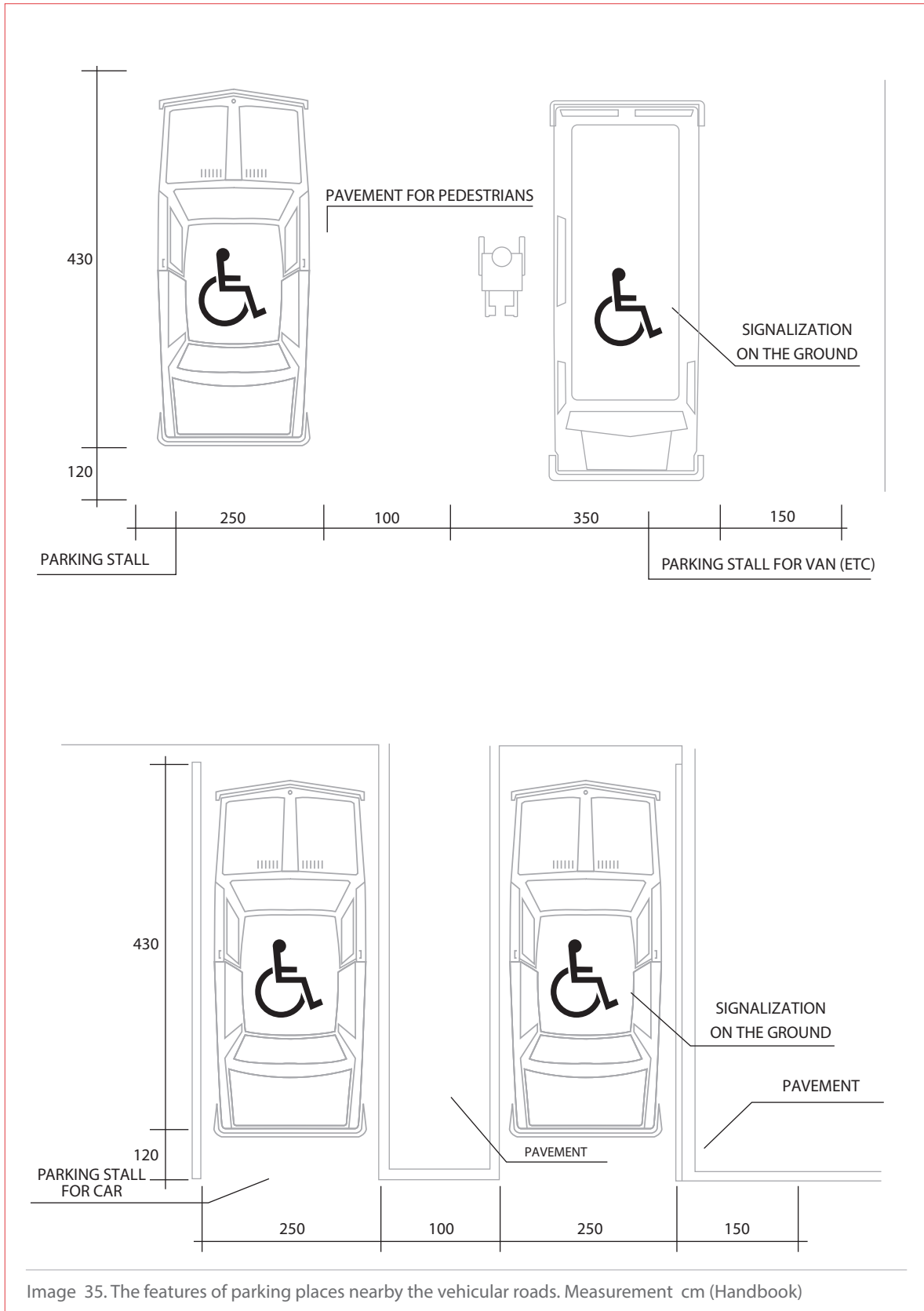


Image 35. The features of parking places nearby the vehicular roads. Measurement cm (Handbook)

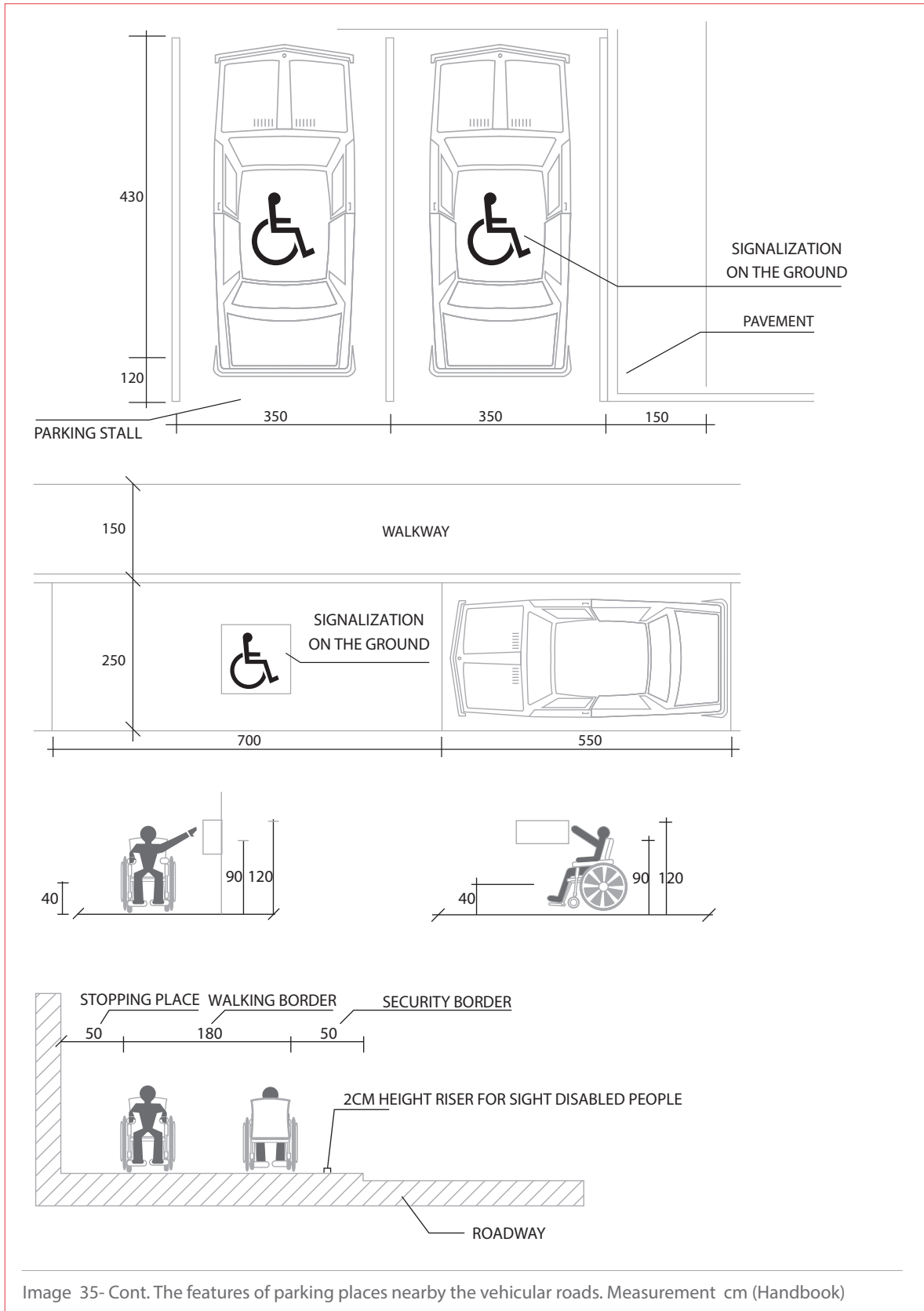
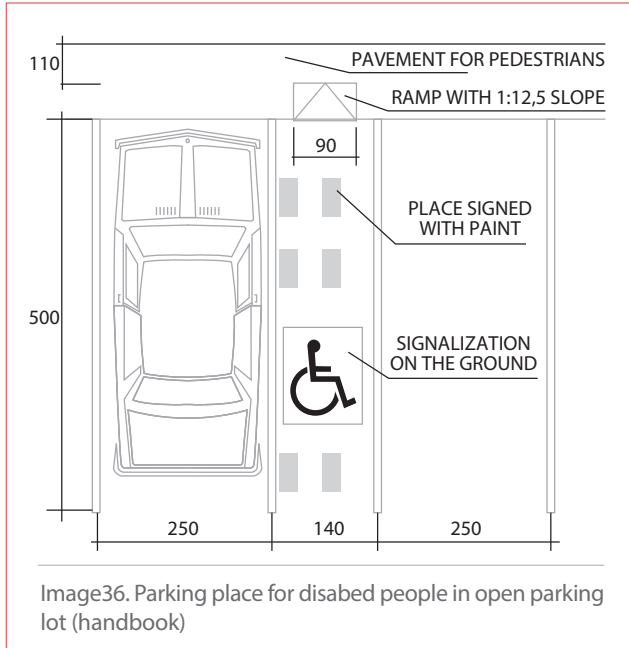


Image 35- Cont. The features of parking places nearby the vehicular roads. Measurement cm (Handbook)





## B- Open and Closed Parking Lots

### Open Parking Lots

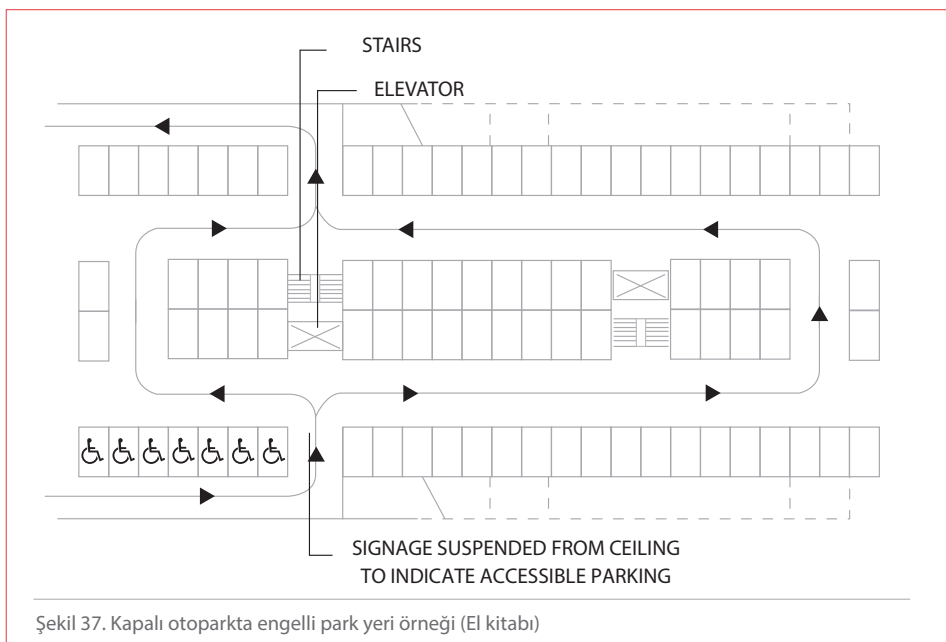
- Traffic signals and symbols to prevent misuse
- Coverings with non-slippery material in the road level, well organized on/off space
- Markings on ground and girders
- Ramps and parking symbol for disabled should exist in the parking places for disabled people

### CLOSED PARKING LOTS

Indoor or covered parking structures should be designed to accommodate all vehicles that may be used to transport people who use wheelchairs or other mobility devices.

The minimum clearance height should be 2.40 m to allow for larger vehicles equipped with a hydraulic lift (UN, 2004) to access the parking structure. Parking places reserved for persons with disabilities should be close to the exit/entrance and/or the elevator, for all parking stall configurations.

Directional signage should be visible. It may be mounted on the ceiling, if it does not interfere with a person's ability to move their vehicle through the structure. Direction boards secured to columns should display a map/plan of the parking floor and note any designated parking.



When restoring a parking place, putting an obstacle helps to change the parking stall for disabled people parking place



City information boards and/or maps should also note the locations of the designated parking, in particular street parking or parking of outdoor venues. The parking lot shall also indicate if it has designated parking stalls available by displaying the international symbol.

### ■ 13.6 OPEN AND GREEN AREAS

Open and green areas should be enjoyed by everyone. Green areas include city parks, neighborhood parks, childrens' playgrounds and recreation areas like sporting fields and swimming pools. Open areas like city squares and pedestrian sections and the surrounding environment should be accessible and available for everyone. The hard-surface should be slip-resistant and durable but the materials used should not cause discomfort (jarring) for the person who uses a wheelchair.

Pedestrian pathways from the entrance onward should be designed with a hard, slip-resistant surface and borders to define the edge of a walkway, especially when there is a downward slope, perhaps a contrasting colour of a textured surface differing from the surrounding areas. Seating, planters, trash containers and other urban furniture could be placed along the pathway or other rest areas along with good lighting would increase the enjoyment of the outdoors with family and friends. All activity areas should be accessible and tactile, if possible.

#### **Design principles:**

##### **13.6.1. Main and pathways in open and green areas**

- The main paths should be stable, slip-resistant and well-lit with a light profile of 150 cm circumference and 230 cm in height for the safety of all people, including people with disabilities and; along side paths, the light profile of the lit area should have a minimum 90 cm circumference and 230 cm height.
- Path should have a minimum of 120 cm and a maximum of 200 cm to allow 1 wheelchair to easily pass an ambulatory person.
- Longitudinal slope of the main paths inside a park area should be at most 4%, transverse slope should be 2% and, should a landing be required it should be placed at maximum of 18 m distant from the start of the incline; however, if the longitudinal slope of the path is planned between in 4% - 6%, landings/resting areas should be placed at a maximum of 10 m.
- Seating or resting benches should be placed every 100 m all along the main path.

##### **13.6.2. Urban Furniture**

Urban furniture can act as a natural barrier to canalize the movement of pedestrians and as an obstacle to prevent vehicular and other unwanted traffic from the walkways. Urban furniture like phone booths, kiosks/vendors, newspaper boxes, planters, flower carts, fire hydrants, trash containers, mailboxes, seating benches, light and traffic standards, bus shelters, signs and information boards and so on.

The placement of the urban furniture should be to the sides of the pedestrian pathways so that it does not impede the flow of pedestrian traffic. In addition to urban furniture, sidewalk cafés and seating areas should be surrounded by fencing that can be detected with a cane or by a contrasting colour to prevent people with a visual disability from tripping over the furniture and/or patrons. Sidewalk eating areas may also have overhead hazards such as umbrellas for people with visual disabilities. The umbrellas need to be within the barrier and be contrasting in colour.

Other overhead hazards may be storefront awnings, overhead signs, lighting and tree branches. All of the possible overhead hazards should be a minimum of 220 cm measured from finished surface to the underside of the object. If the object such as exterior staircases cannot be higher than 220 cm, they shall have a barrier beneath to prevent people, including people with visual disabilities from walking into the staircase.

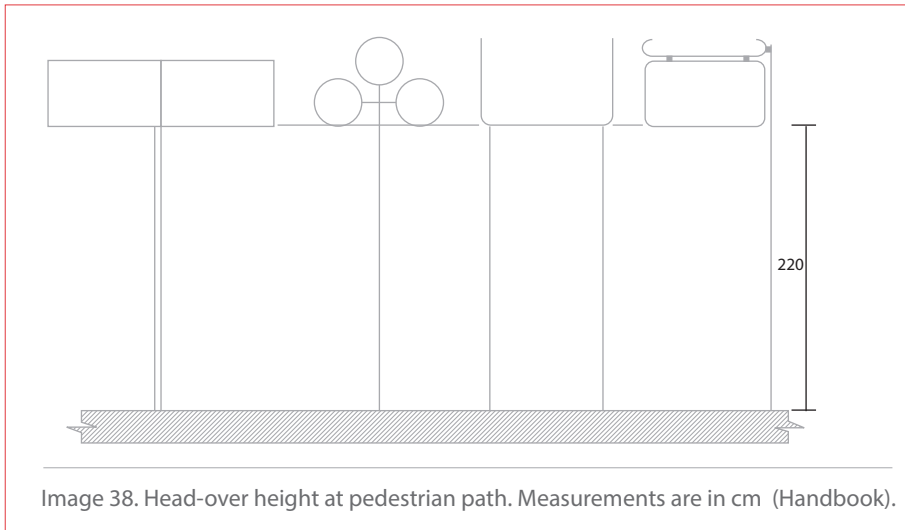


Image 38. Head-over height at pedestrian path. Measurements are in cm (Handbook).

Whenever possible the urban furniture should be in colour contrast to the surrounding environment to communicate the placement of objects and the path of travel to persons with visual disabilities. A different texture may be used on the ground to surround the object as another method of detection. There is nothing with applying redundancy to ensure the independence and safety of people, including people with disabilities.

Urban furniture, if possible, should have rounded or chamfered edges and corners to prevent injury.

### A- Resting Areas

Rest areas should be located alongside the pedestrian path and the area should be designed with a stable, hard and slip-resistant surface. The area should accommodate the entire bench with a minimum of 1.20 m adjacent the bench to allow for a wheelchair or other mobility device to rest and enjoy the green or open spaces.

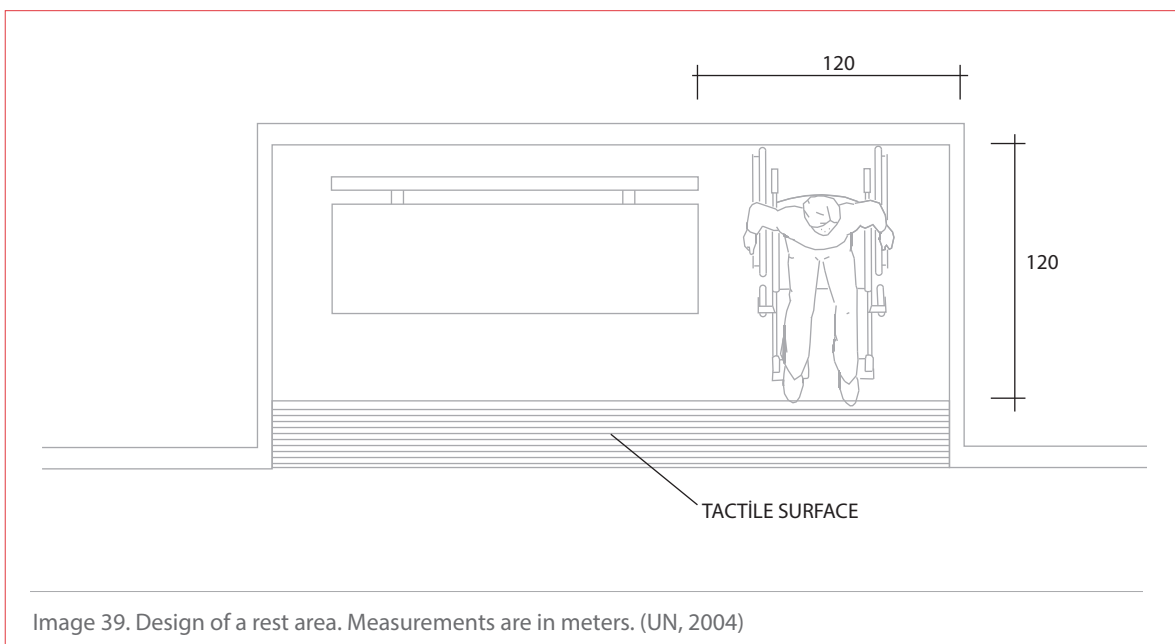


Image 39. Design of a rest area. Measurements are in meters. (UN, 2004)

The rest areas should be placed 100 – 200 m apart. (UN, 2004)

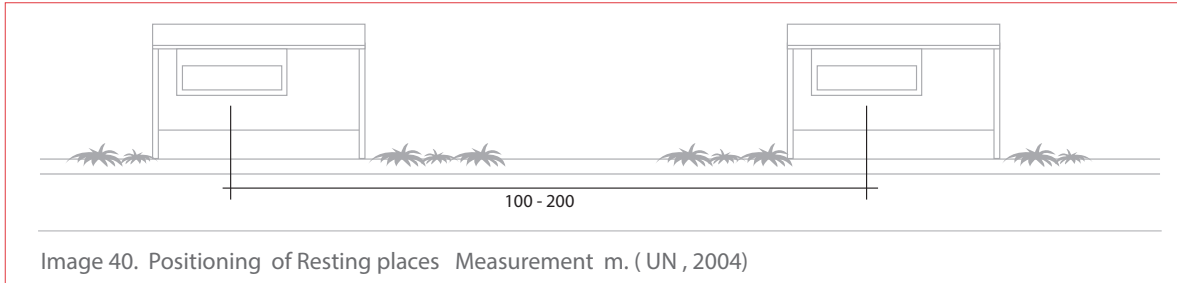


Image 40. Positioning of Resting places Measurement m. ( UN , 2004)

The bench should be with 45 cm height from to ground with, 70 cm height at the backrest

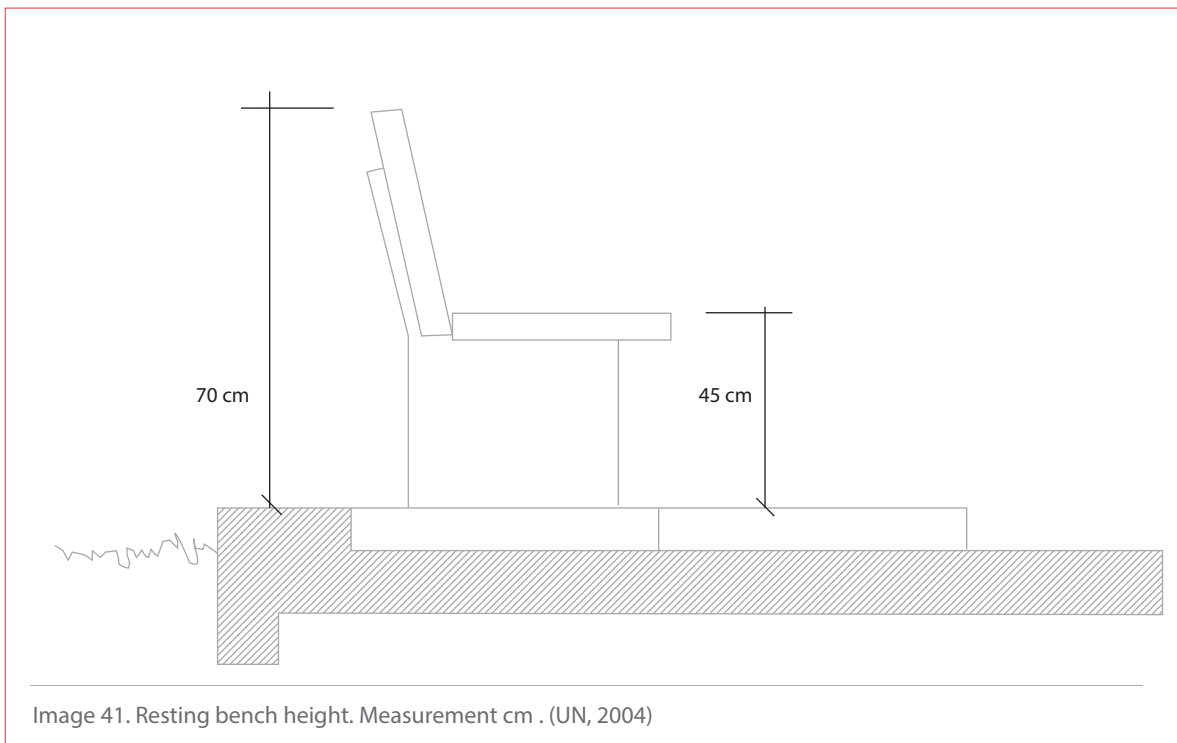
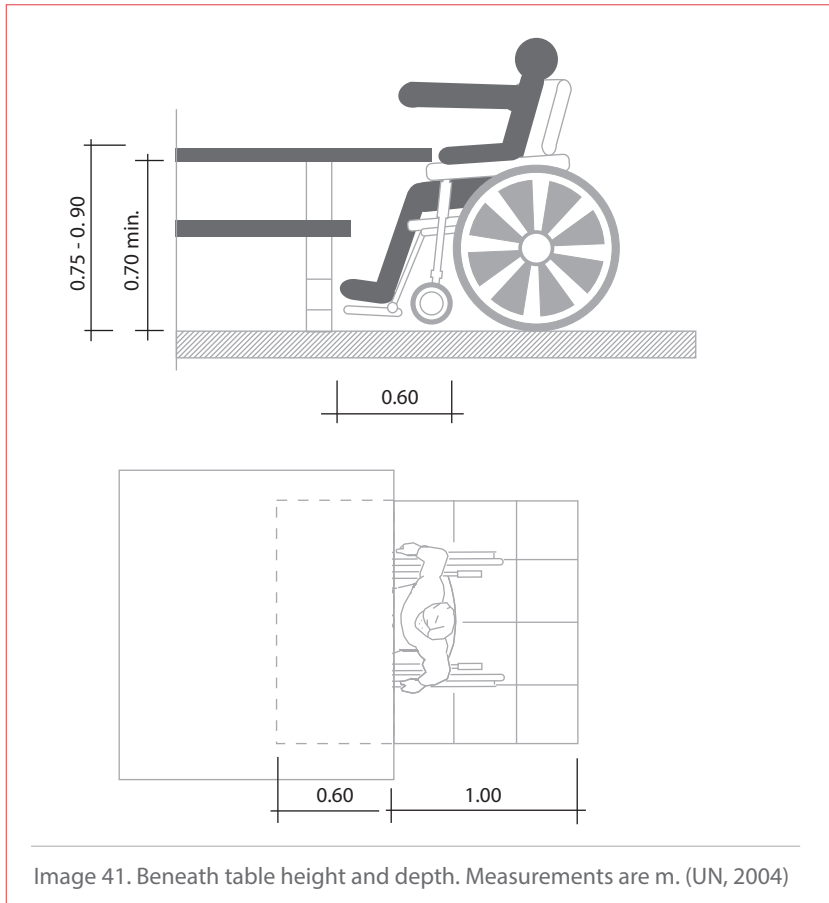


Image 41. Resting bench height. Measurement cm . (UN, 2004)

Height of the tables at rest areas should be between 0.75 m and 0.90 m, with a minimum depth of .60 m beneath the table to allow a person who uses a wheelchair the opportunity to access the table for their comfort and enjoyment.



## B- Public Telephones

Public telephones are still necessary for people, including people with disabilities, to contact family, friends and emergency services because not everyone can afford a mobile phone plan. Public telephones should be designed as open or enclosed and located in an area visible to pedestrians and drivers for reasons of safety as well as minimizing or eliminating criminal activity. Reflective or lit signage will indicate the location of the public telephones for persons with disabilities.

Open phone booths should be designed with an area of 120 cm x 85 cm to allow for either a frontal or parallel approach and usage in front of the telephone booth. The area should be a level and hard surface to provide ease of access and stability for a person who uses a wheelchair.

Enclosed phone booths should be designed with an area of 120 cm x 140 cm with a 90 cm door width to allow a wheelchair access to the telephone. A TTY telephone could be installed in the booth because it will be protected from the inclement weather. This booth should be well-lit from within and the interior shall be visible to a passer-by for reasons of safety. A sign announcing a TTY telephone shall be included with the signage.

The telephone booth shelf should have a minimum height of 75 cm when measured from the underside to the finished surface. The coin deposit slot and/or telephone card insert should be at an accessible height between 90 cm and 120 cm when measured from the mid-line to the finished surface. The dial pad on the telephone should have raised numbers and lettering, and the handset cord shall have a minimum length of 75 cm so that it will extend to a person seated in a wheelchair.

If there is a bank of public telephones, at least one of the open or enclosed booths shall be accessible to a person with a disability, including a person with an auditory disability.

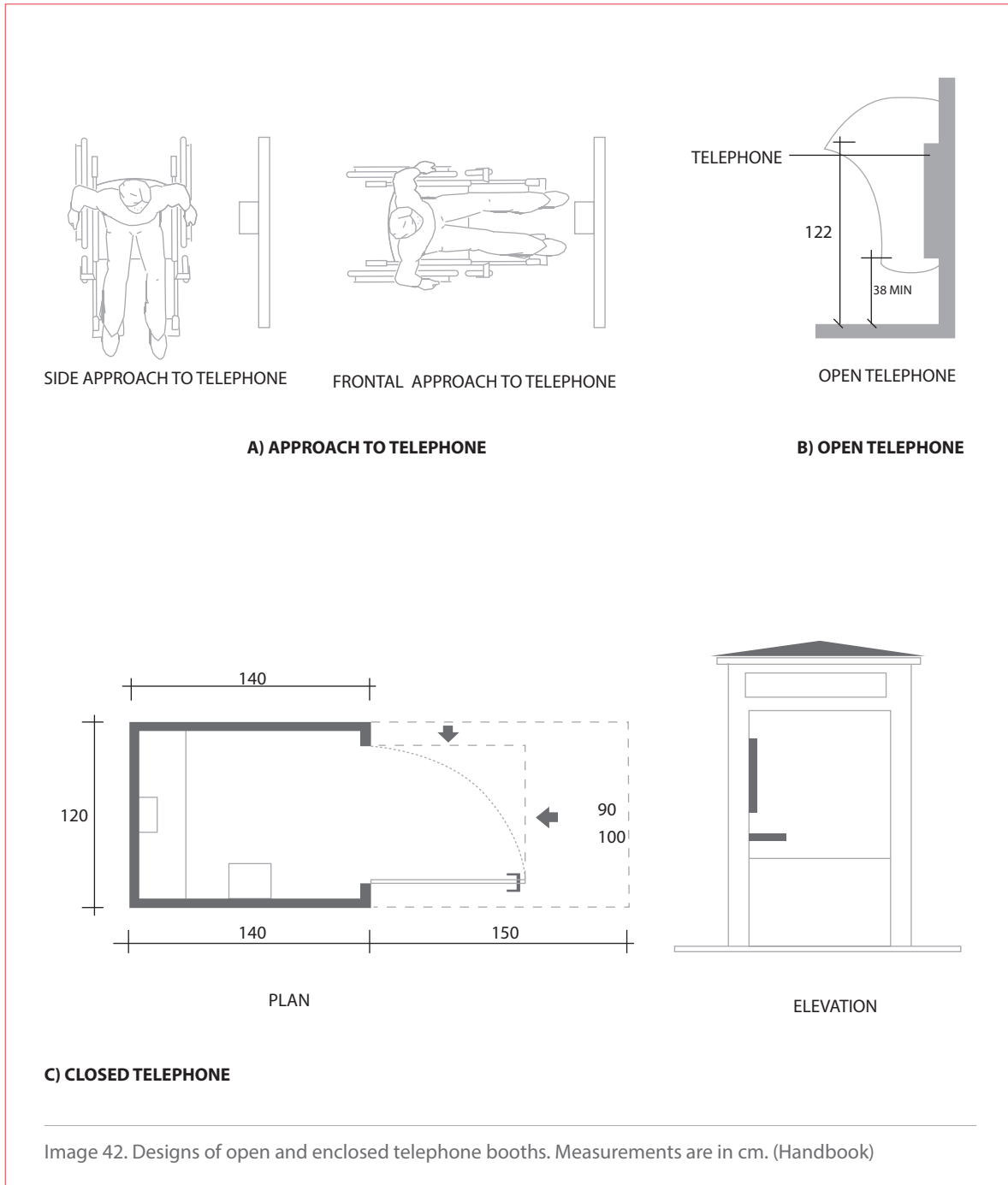


Image 42. Designs of open and enclosed telephone booths. Measurements are in cm. (Handbook)

### C- Trash Containers

Trash containers should be mounted at a minimum height of 90 cm and a maximum height 120 cm when measured from the finished surface to the opening. It should be located between 40 and 50 cm from the pathway when measured from the edge to the midline of the container. (TS 12576)

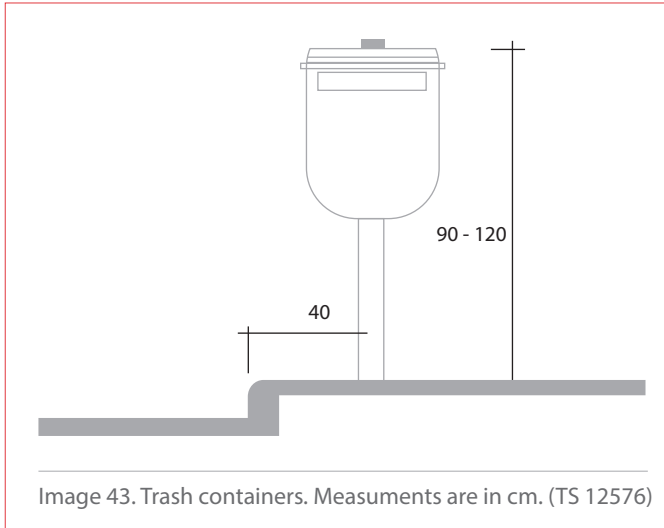


Image 43. Trash containers. Measurements are in cm. (TS 12576)

#### D- Mail Boxes

Mail boxes should be mounted at a height between 0.90 m and 1.20 m when measured from the opening or handle of the mail slot to the finished surface. (UN, 2004)

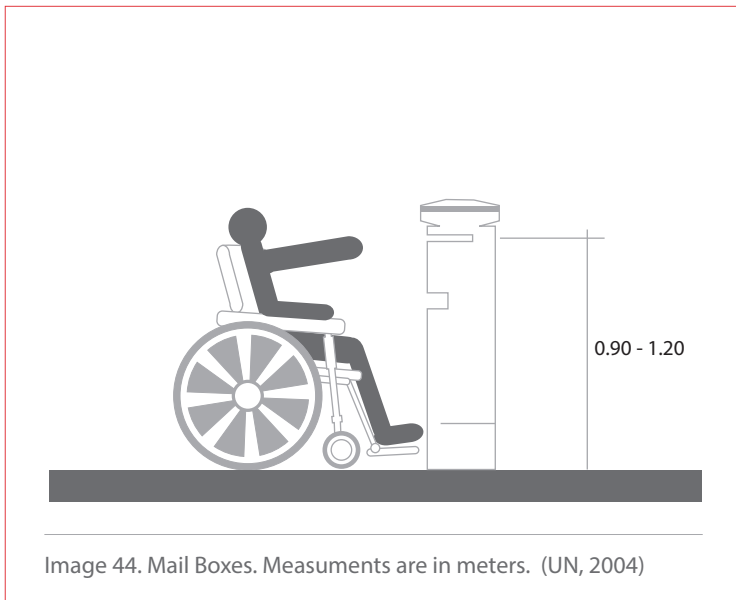


Image 44. Mail Boxes. Measurements are in meters. (UN, 2004)



## E- Drinking Fountains

Drinking fountains should be approachable by a user in wheelchair, therefore, the basin should extend over a lap with no obstacle for the knees and legs of the person seated. At the same time, the fountain would need to be cane-detectable - with a possible barrier - before a person with a visual disability walks into it. The basin should not be lower than 71.5 cm when measured from beneath the basin to the finished surface. The area or hard surface around the drinking fountain should be 137 cm in depth and 76 cm wide to provide the necessary access for persons who use a wheelchair.

Drinking fountains should be equipped with controls that are easily operable from a wheelchair using one hand with minimal force. Drinking fountains are available with two spouts at varying heights that make it well-suited for people who use wheelchairs and people who find it difficult to bend low. The lower spout should not be lower than 85 cm and 90 cm in height when measured from the midline of the spout to the finished surface. This will now be accessible to people who use wheelchairs. (UN, 2004)

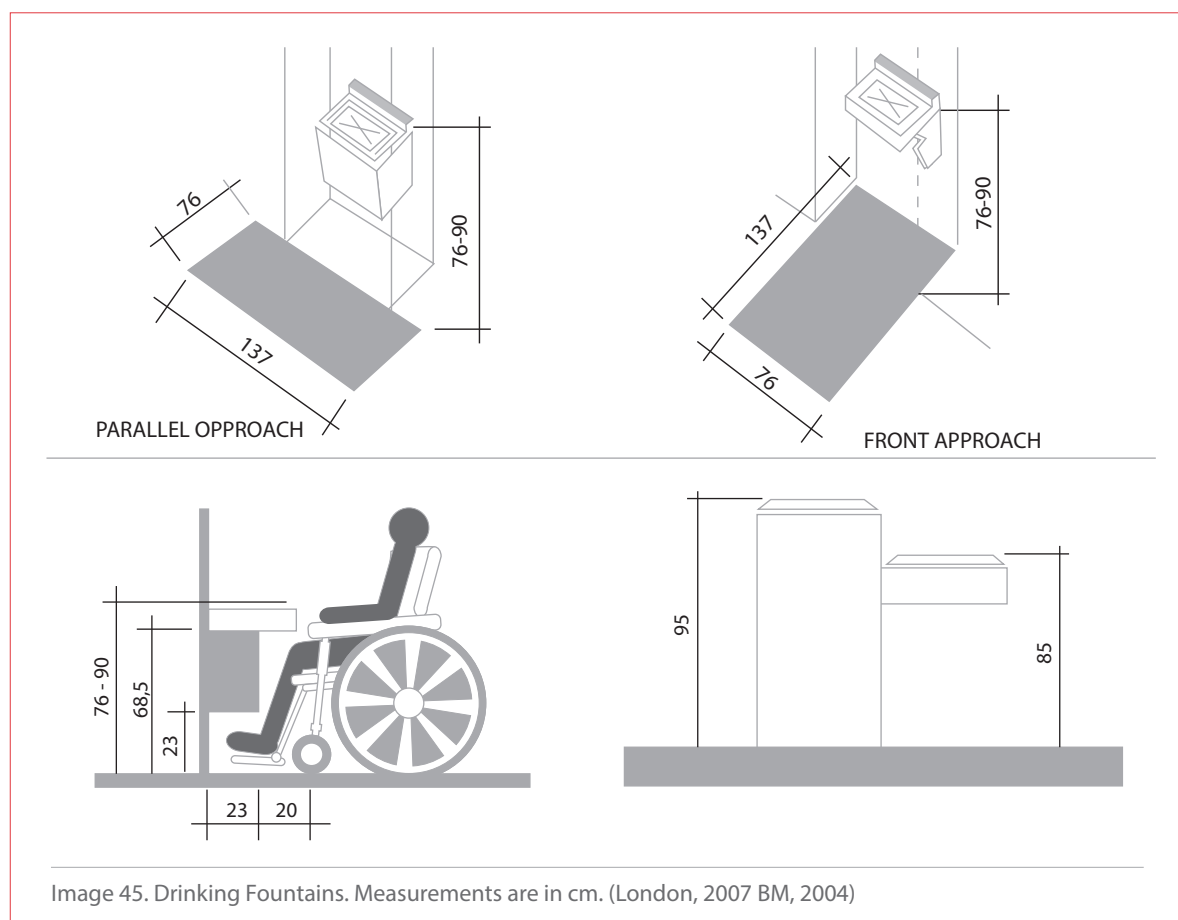


Image 45. Drinking Fountains. Measurements are in cm. (London, 2007 BM, 2004)

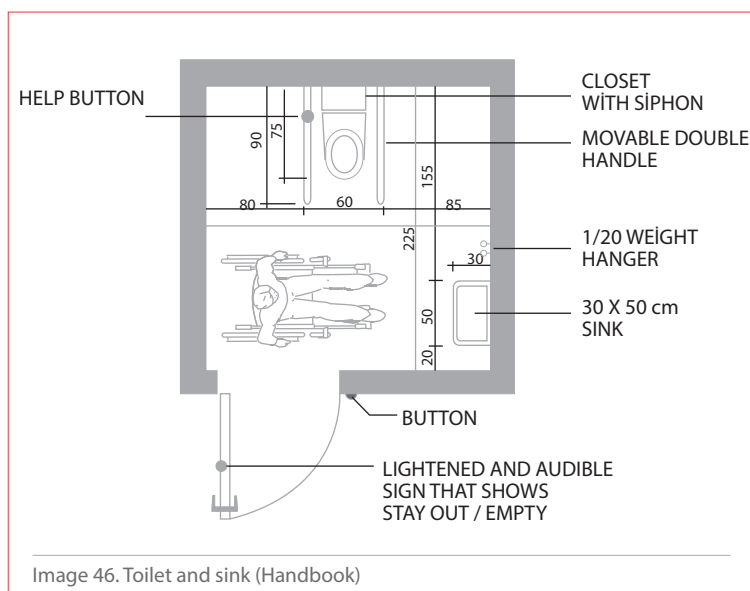
## F- Public Restrooms

Public restrooms should be designed to include accessible restrooms for the physically disabled. The universal restroom and accessible restroom stall should be no less than 230 cm X 230 cm to allow for ease of manoeuvrability. The space should be designed with a water closet and transfer areas on both sides of at least 85 cm to accommodate a left- or right-side wheelchair transfer. Any other fixtures like a lavatory or change table should be outside of this area so that access is not inhibited. The lavatory (even if it is wall-mounted) and other fixtures may not overlap the necessary turning diameter of 150 cm located in front of the toilet and lavatory.



**Other considerations for the restroom include a:**

- Slip-resistant flooring.
- Moveable grabbar or handle on both sides of the toilet, mounted at a height of 30 cm – 33 cm when measured from the seat of the water closet to the mid-line of the grabbar, extend at least 20 cm beyond the front surface of the water closet, and be capable of supporting a maximum weight of 160 kg.
- Wall-mounted lavatory at a height of 85 – 90 cm when measured from the surface of the lavatory to the floor.
- The plumbing should be offset to allow for maximum leg room beneath the lavatory and any exposed plumbing should be insulated or guarded to prevent leg burns, and the temperature of the water, in public restrooms, should be regulated to prevent scalding of persons with lessened sensation or slower to react to extreme temperatures.
- Single-lever faucets are preferable to separate hot and cold lever faucets, however, automatic water controls are best for health reasons.
- Dispensers, such as paper towel and feminine protection, should be located at a maximum height of 120 cm when measured from the mid-line of the handles/controls to the finished floor surface, and soap dispensers should be mounted near the front and to the side of the lavatory for ease of use.
- Light controls should be mounted at a height of 110 – 120 cm when measured from the mid-line of the switch to the finished floor.
- Power-assist doors may be provided with a locking mechanism on the door for privacy; and the button or plate required to activate the power-assist should be located at least 65 cm behind the swing of the door.
- A fold-down change table may be mounted at 90 – 100 cm when measured from the table surface when in the open position to the finished floor.
- A mirror may be mounted with a vertical tilt at 8% to be useable by a person in a wheelchair.
- The international disability symbol that is brailled and may be lit and should be mounted outside the restroom to identify accessibility within the facility.
- A “HELP” button should be installed to request assistance should the need arise to ask help from outside in case any help is needed inside.



According to TS 8357 and reconstruction regulations for disabled individuals, there should be at least two barrier-free restrooms for both women and men.



## ■ B-STANDARDS FOR ACCESSIBLE BUILDINGS

### ■ 13.7. DESIGN RULES FOR BUILDINGS

#### 13.7.1 Basic Accessibility Themes

The main design features for creating necessary means of access to and within buildings described in TS 9111 are:

- Accessible parking stalls should be located near the main or primary entrance
- A barrier-free path of travel from the accessible parking to the building entrance
- Zero-level entry and egress
- Wider door openings, sufficient space for wheelchairs outside the arc swing of the door and automatic or power-assist doors
- Hard and slip-resistant surfaces
- Level paths of travel with no steps or other barriers to overcome on all floor areas
- Sufficient space for wheelchairs to manoeuvre
- Clearly marked barrier-free evacuation routes
- Ensure that the building is designed to accommodate 2 or more disabilities, i.e., physical, auditory
- Good visual contrast between floors, walls, and doors and doorways
- Easy access to information desk, elevators and restrooms for the disabled
- Good signage: visual and auditory (includes quality communication system)
- Good lighting and decreased acoustic sound and ambient noise
- Elevators that are large enough to accommodate a full-size stretcher and emergency personnel
- Control butts and keys within elevators and throughout the building should be located at a height easily reached from a seated position
- Safe stairs with a comfortable and safe usage during an emergency

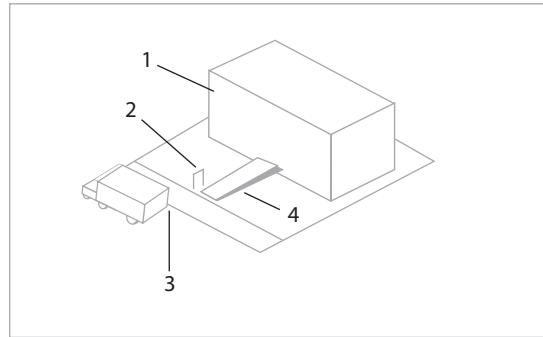
It is necessary to ensure that all buildings have easy access and safe egress in an evacuation and that people, persons with disabilities and the elderly, may be able to use the space with dignity and comfort.



Basic accessibility subjects for buildings can be summarized as follows;

**Everyone should use same routes, entrances, appliances and so on of a building. This considers the principle of equality.**

Equal approach to the building includes all parking areas (public & private), no stairs or other barriers, close to building entrances from parking areas, paths that are separated from vehicle and bike roads, and mass transit stops, as well as, providing good signage, proper lightning and contrasting textures and colour.

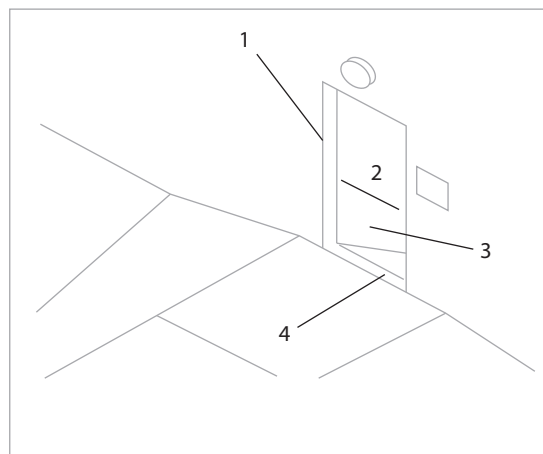


**EXPLANATION**

- 1 - Lightning, contrast color
- 2 - Sign
- 3 - Short distance for mass transport and paking lots
- 4 - Accessible pass whithout step

**Entering the building equally with the same entrance.**

Well-defined main entrances, wider doorways, power-assist doors, good signage and lightning with good visual colour contrast and a barrier-free path of travel with no stairs or other barriers.



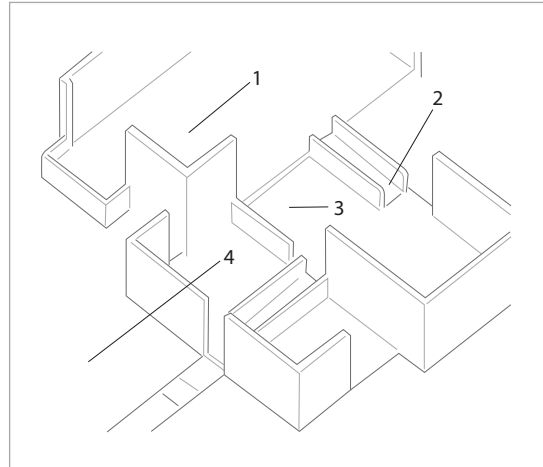
**EXPLANATION**

- 1 - Lightning can be founded easy, sign, contrast
- 2 - Wide pass
- 3 - Doors can be used easy
- 4 - Enrance without step and treshold



**Using the same route for horizontal circulation.**

No stairs or other barriers, manoeuvring space, wider doorways, power-assist or lighter doors, rest areas, good signage, lightning and visual contrast.

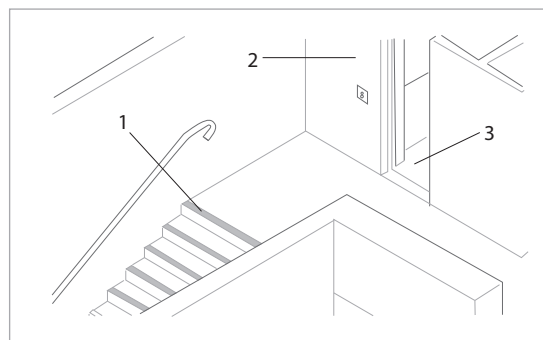


**EXPLANATION**

- 1 Enough manoeuvre area
- 2 Accessible pass without step
- 3 Clear residential arrangement
- 4 Quality sign, lightening and visual contrast

**Using the same route for vertical circulation.**

Wider landing areas in front of stairs to allow for manoeuvrability and safety, wider doorways and passages, power-assist doors or lighter doors for the ease of opening and closing, good signage, lightning and visual contrast.



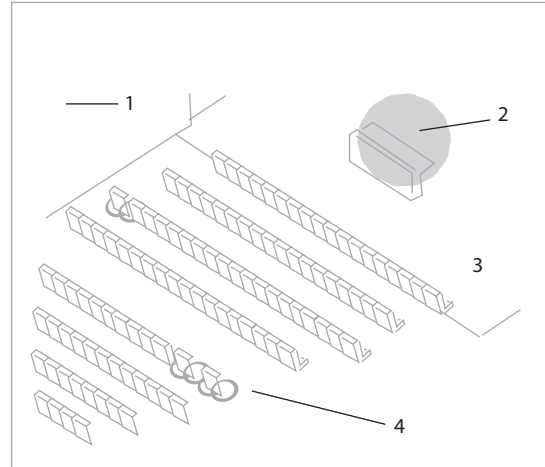
**EXPLANATION**

- 1 Safety stairs, quality lightening, visual contrast
- 2 Easy Usage
- 3 Wide elevator



**Equal usage of the same area by everyone.**

Seating choice, adequate aisle width, sufficient manoeuvring spaces, good acoustics and audio enhancement systems, good lightning and visual contrast.

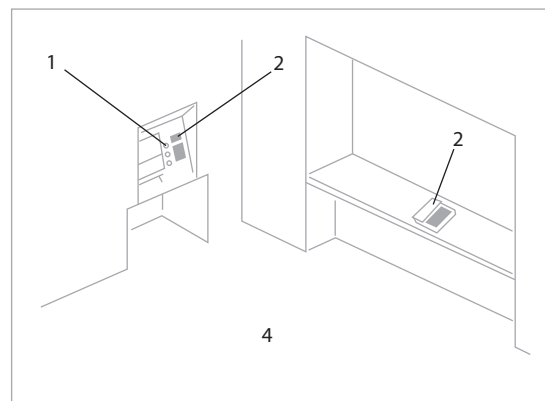


**EXPLANATION**

- 1 Quality audible, volume higher system
- 2 Quality lightening
- 3 Enough manoeuvre area
- 4 Alternative seating places

**Equal usage of same equipment and appliances.**

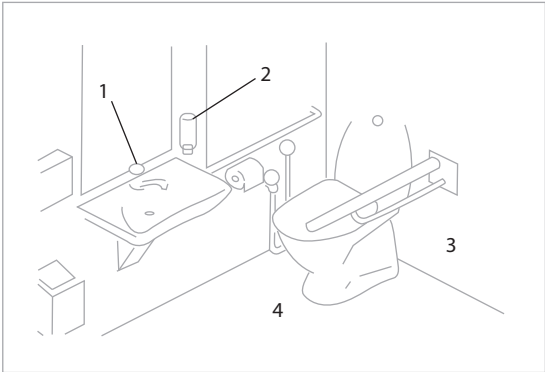
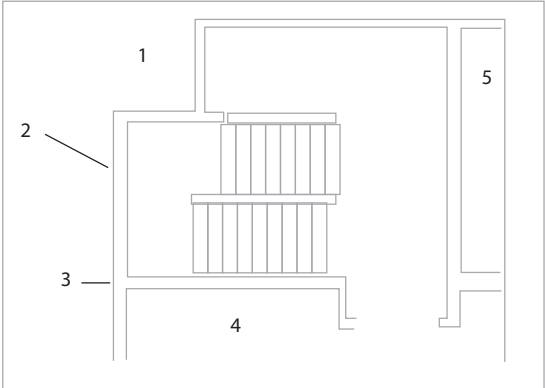
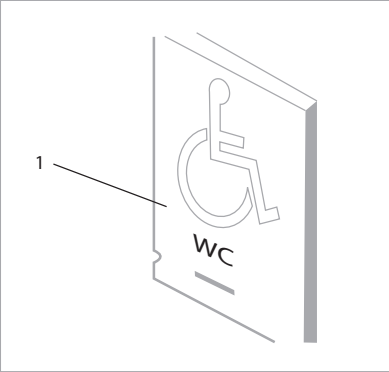
Ease of usage may require knee space below, ease of reach, information access by people with sensory disabilities and sufficient room to manoeuvre, for example, banking machines.



**EXPLANATION**

- 1 Easy usage
- 2 Information for two senses
- 3 Proper usage height
- 4 Enough manoeuvre area



<p><b>Equality in usage of restrooms and other hygienic fixtures.</b></p> <p>Designed for ease of use with grabbars, transfer space adjacent to waterclosets, manoeuvring space, dispensers within easy reach, knee space beneath lavatory, tilted mirrors, emergency call system, good lighting and proper signage indicating location.</p>	 <p><b>EXPLANATION</b></p> <ul style="list-style-type: none"><li>1 Easy usage</li><li>2 Well located equipment</li><li>3 Alternative transfer</li><li>4 Enough manoeuvre area</li></ul>
<p><b>Equal exiting and evacuation routes, designed to facilitate movement in emergencies.</b></p> <p>No stairs or other barriers, sprinklered, areas of refuge where elevators are unprotected against fire, good signage, lighting, visual contrast for safety of all people, including people with disabilities.</p>	 <p><b>EXPLANATION</b></p> <ul style="list-style-type: none"><li>1 Fire safety, protection and discharge</li><li>2 Safety stairs</li><li>3 Elevators for discharge</li><li>4 Accessible pass without step</li><li>5 Quality lightening and sign</li></ul>
<p><b>Accessible signage for two or more senses.</b></p> <p>Braille or raised lettering, lit signage, graphics or easy to read font.</p>	<p><b>EXPLANATION</b></p> <ul style="list-style-type: none"><li>1 Information for two or more than two senses</li></ul> 



### 13.7.2. Accessible Route in Residential Areas

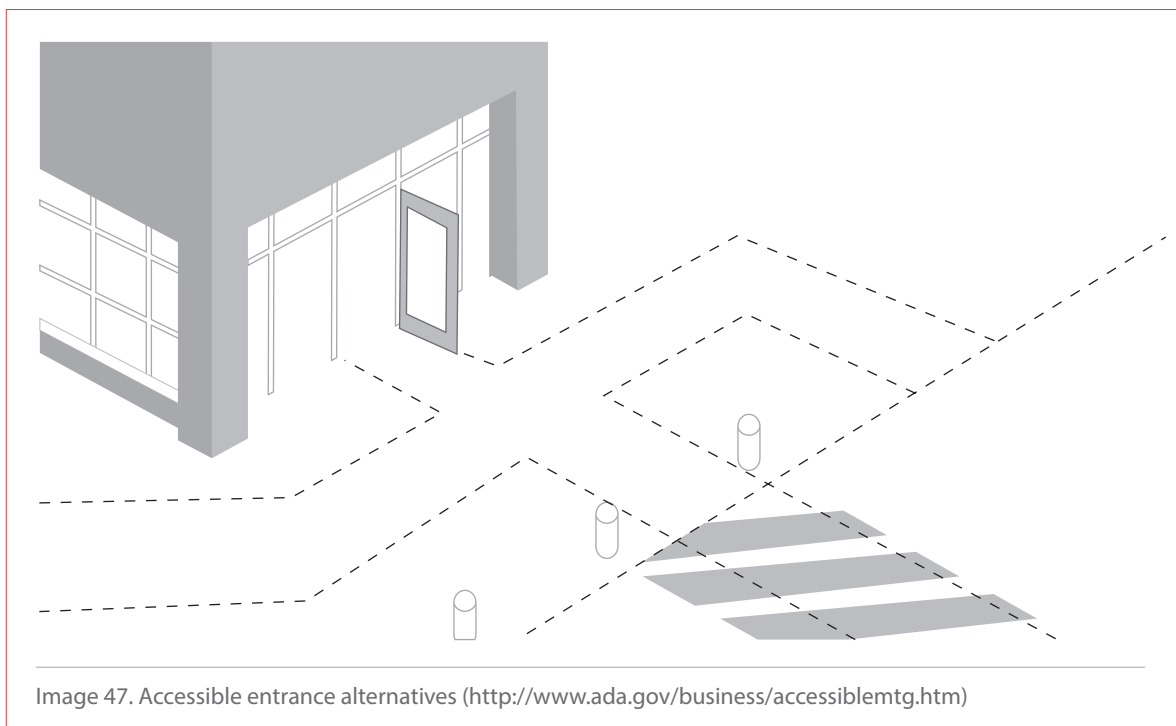
In a residential area, accessible routes should be provided to safely connect pedestrians, including pedestrians with disabilities, to the accessible building entrances from parking lots, passenger (un)loading areas or zones, mass transit stops, streets and walkways. The pedestrian path of travel is designed to be free of obstacles and is wide with a slip-resistant surface.

#### General principles

- At least one accessible route should be provided in residential areas leading from accessible mass transit stops, parking lots, passenger (un)loading areas or zones, streets or walkways to accessible building entrances.
- At least one accessible route should connect accessible buildings (schools, retail, etc), parks, facilities, and services in each residential area.
- An accessible route should connect inner and outer places and elements that serve an accessible residential unit to every other accessible residential unit.
- Accessible routes should overlap as much as possible with common routes. If an alternative accessible route is necessary, the difference to/from the common route should be at the most economical travel distance. Proper and sufficient signage should be strategically located along the path to indicate direction. (TS 9111)

### 13.7.3. Building Entrances

The primary building entrance and at least one other entrance should be accessible. The accessible route should be at least 92 cm wide and the slope of the ramp should not be greater than 1:12 (8%). Railings should be arranged on both sides of the ramps when the highest point of the ramp exceeds 15 cm. Railings should be 90 cm in height when measured from the surface. Edge protection at the side of the ramps should be considered be at least 5 cm in height (ADA,1994) (Image 48).

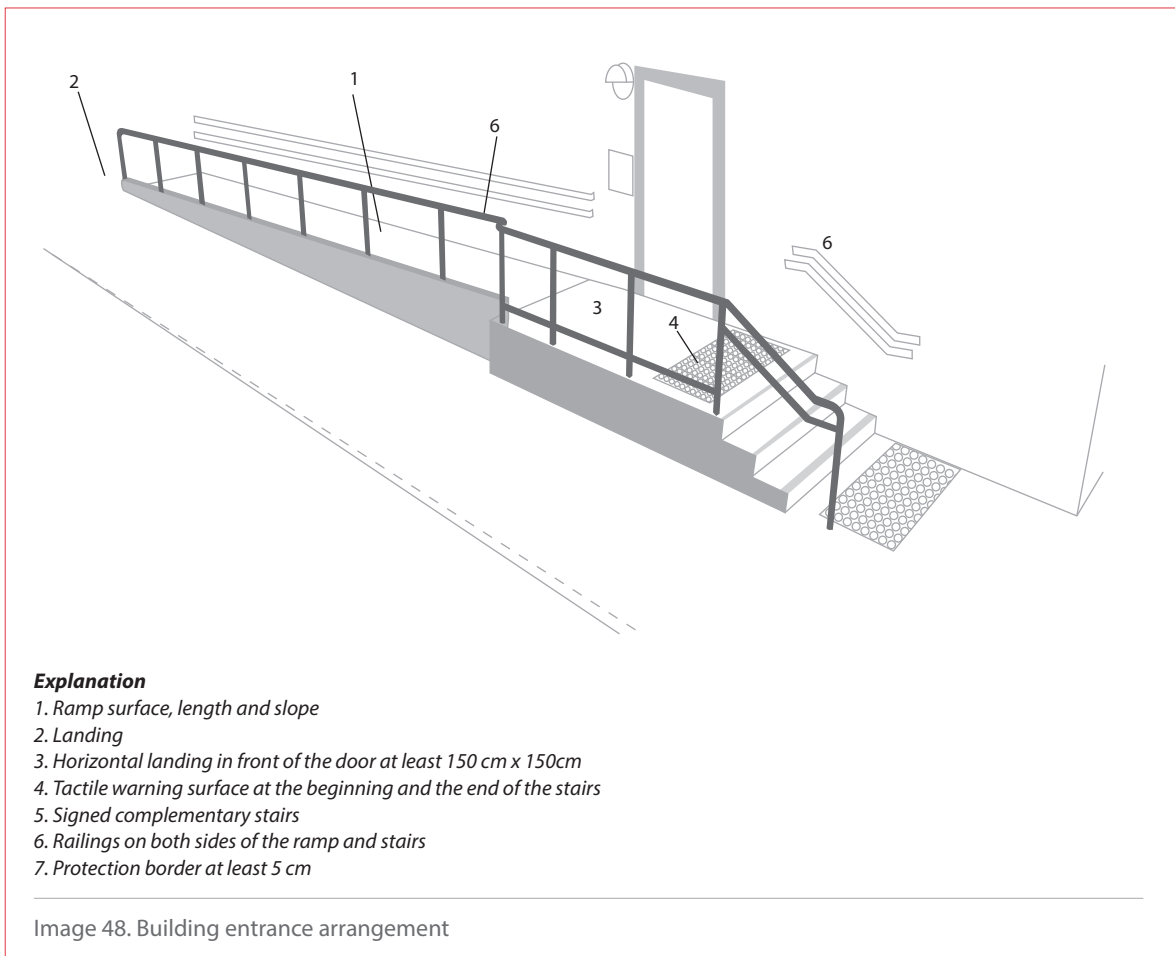




If the accessible entrance is not the primary entrance, these entrances should be marked with directional signage along the barrier-free route. There should be a sufficient area for safe manoeuvrability in front of the entry/exit and the door should be equipped with power-assist for ease of access. (ADA,1994)

Principles for building entrance design (TS12576):

- The primary entrance from the walkway to the buildings should be at grade, if the building borders (meets) the pedestrian path.
- The area immediately surrounding the entrance may have a textured surface of 125 cm X 125 cm that differs from the rest of the walkway to identify the entry for the visually disabled.
- The pathway should include borders that are cane detectable.
- At places where walkways meet with building garage entrances, the vehicle pathway should be slope at least 3 cm to identify the path, especially, for the safety of people with visual disabilities.



The path leading to/from the entrance should be kept clear of overhead hazards to prevent people, including people with visual disabilities, from making contact. Therefore lighting, signage, flora planters, other fixtures and overhanging tree branches and foliage should not be less than 203 cm when measured from the finished surface to the bottom of the fixture and/or tree. Railings should be part of stair and ramp systems. The ramp should have a width no less than 91.5 cm (ADA,1994) (Image 50).



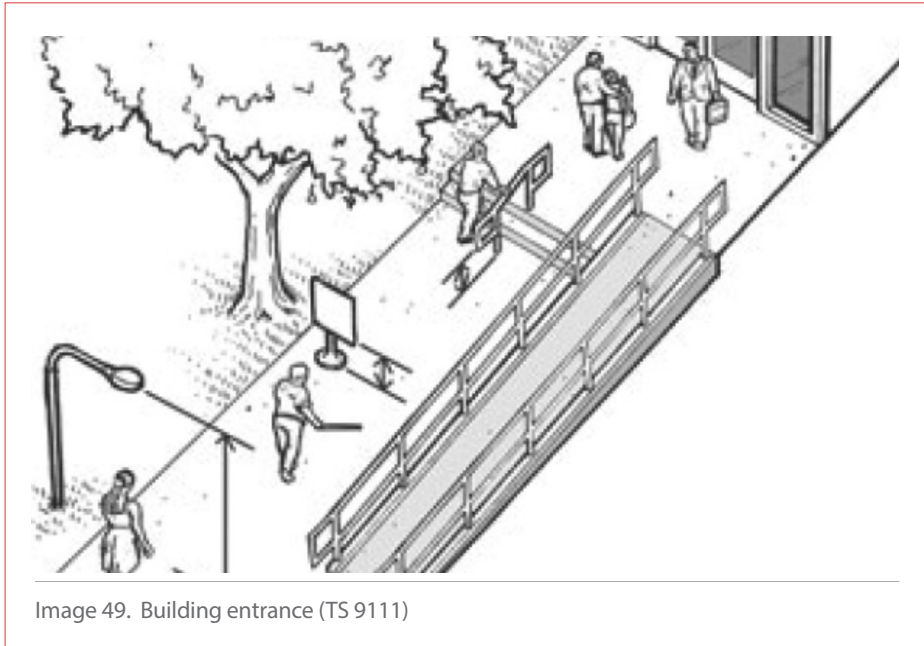


Image 49. Building entrance (TS 9111)

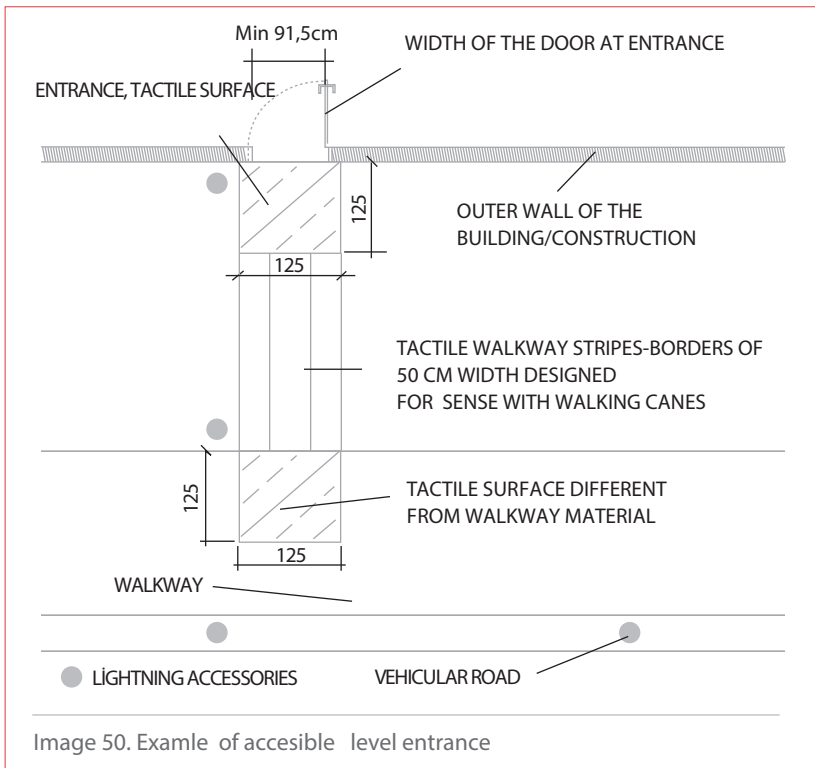
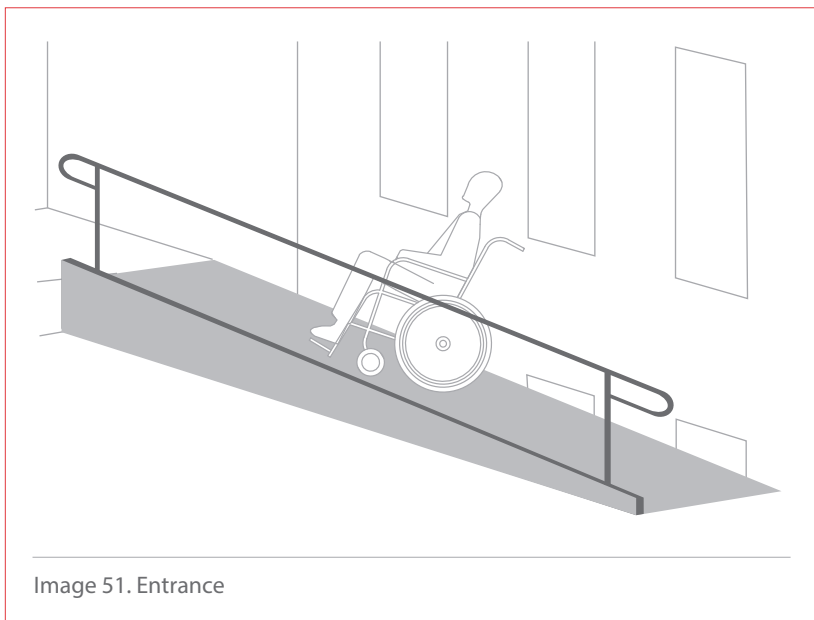


Image 50. Example of accessible level entrance



#### 13.7.4. Main Entrance for Commercial Buildings, Residential Buildings and Administrative Public Buildings

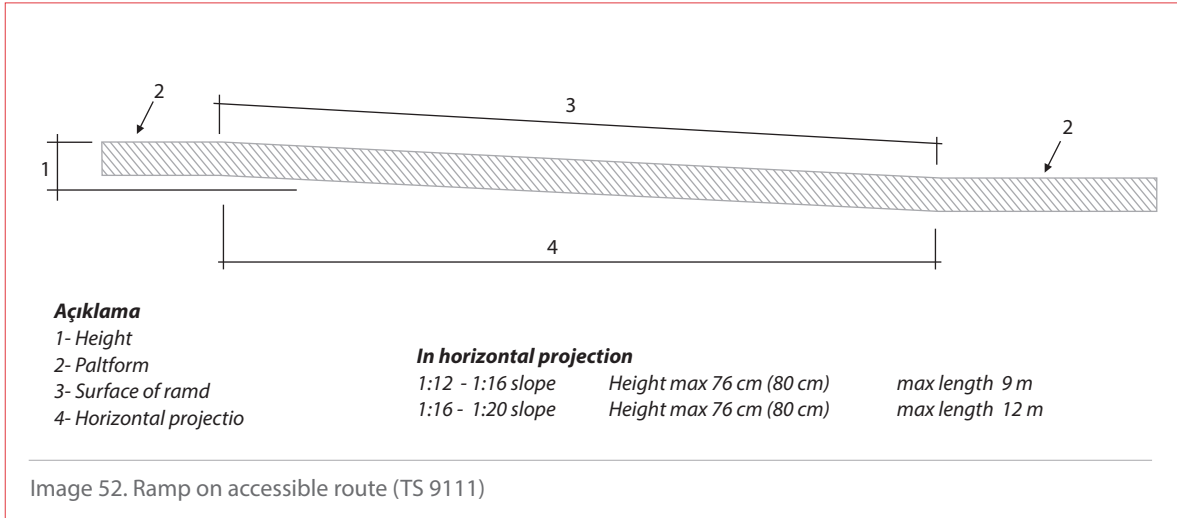
All main entrances at commercial, administrative public buildings and residence buildings should be barrier-free starting from the walkways. A wide entrance landing should be presented in front of the building entrance. Building entrance should be made by non-slippery hard material and it should be well lit. At least one entrance should be usable by persons with disabilities. In case of the entrances of public and commercial building entrance being with stairs, a ramp with the proper slope should be done for usage of persons with disabilities. A landing with different texture should be present at the beginnings and the ends of the ramps. Entrance and exits that will be used by persons with disabilities should be defined with proper signs and symbols at the entrances of public and commercial buildings (TS 12576 ) (Image 53).



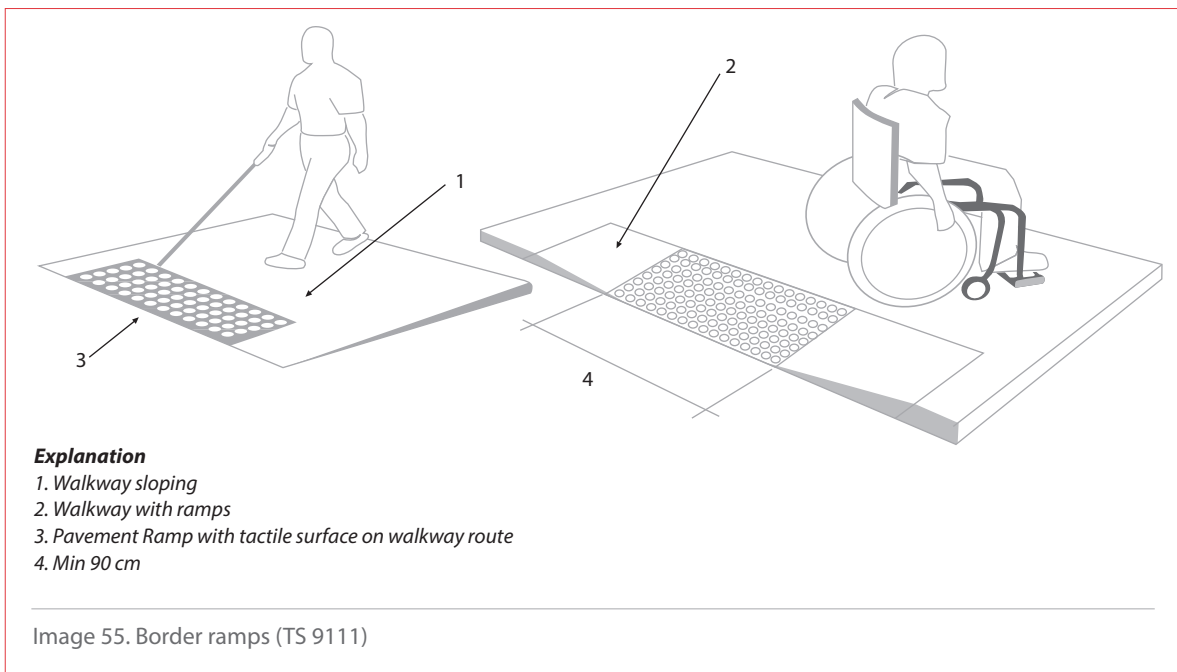
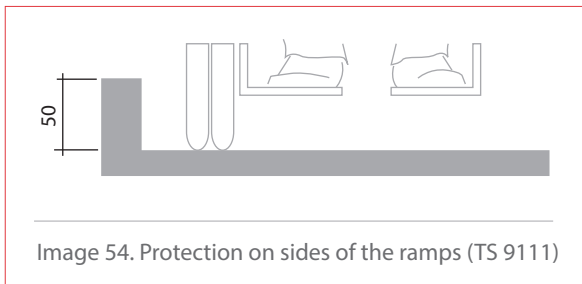
#### 13.7.5. Ramps at entrance

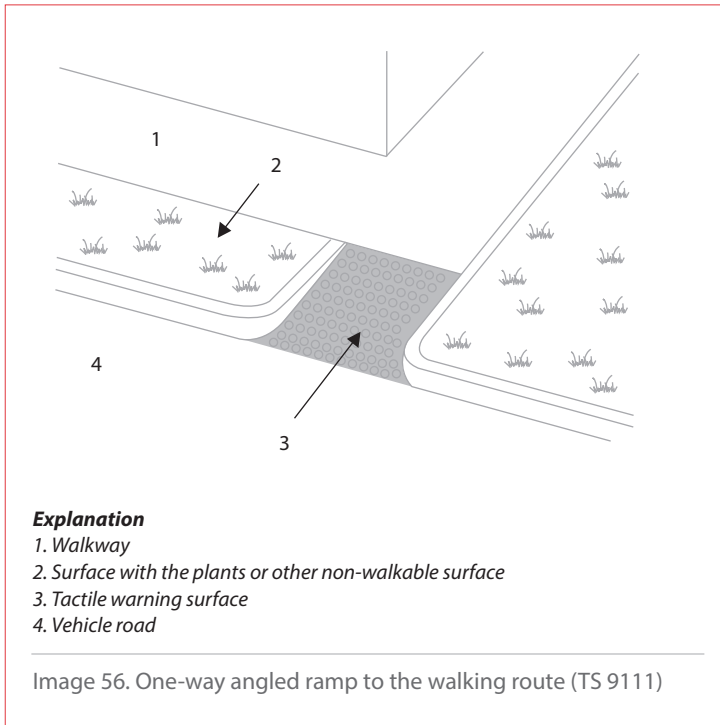
Ramps at building entrance should include the following design features (TS 9111):

- Building entrances with different levels on the same property should be connected to each other with ramps.
- Ramp surfaces should be hard and slip-resistant. The ramp should be designed to prevent the accumulation of water and/or snow.
- Ramps should not be steeper than 1/12 (5°) or 1/15 (4°) with a preferred length of 6 m – 10 m.
- A minimum height of 50 mm height protection border should be laid down on the unprotected side of the ramps for persons with wheel chair user (Image 55).
- There should be sufficient landing areas at the top of the ramps and designed as the same width of the ramp.
- If the ramp changes direction at the landing, the landing should be at least 1525 mm x 1525 mm.



- Platforms may be in a contrast colour to accommodate individuals with impaired sight.
- Border ramps should be at least 90 cm width and its slope should be no greater than 8%.
- One way sloped ramps are only applied to walkways with green areas. (Image 57)



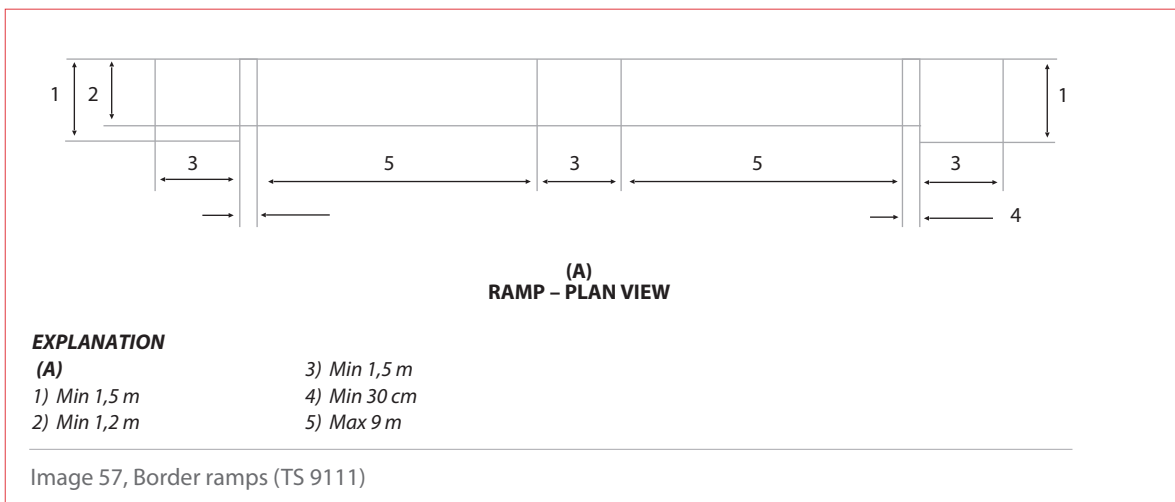


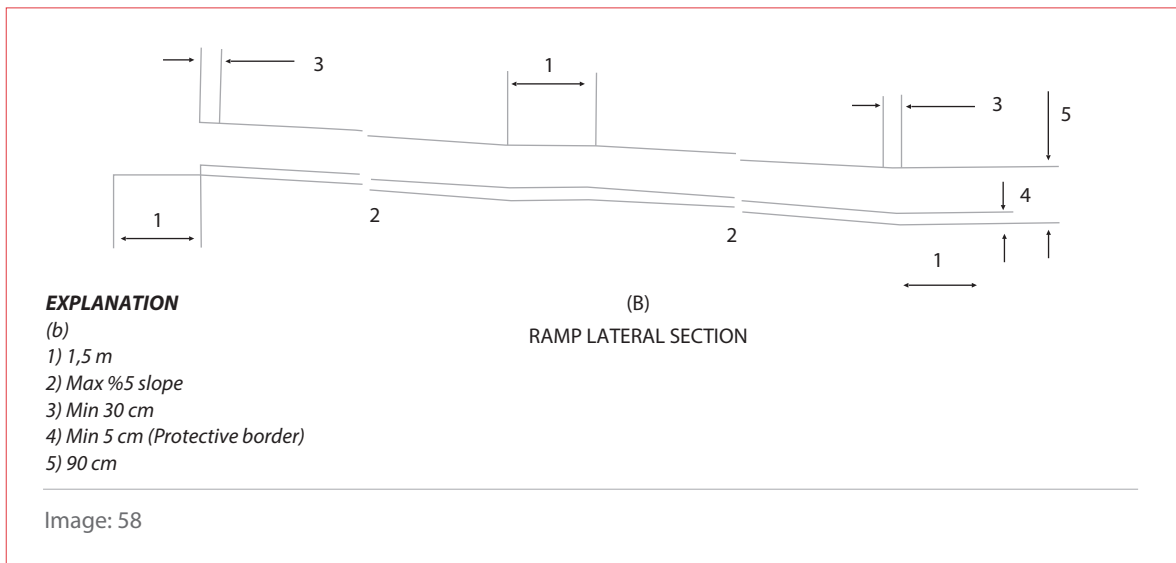
### 13.7.6. Ramps on Walkway Route

Ramps are used to overcome the difference between levels on a walkway if the difference is greater than 2 cm. Otherwise, if the height difference between levels is less than 2 cm then the difference can be overcome by beveling the edge to provide smoother transition for mobility devices with wheels.

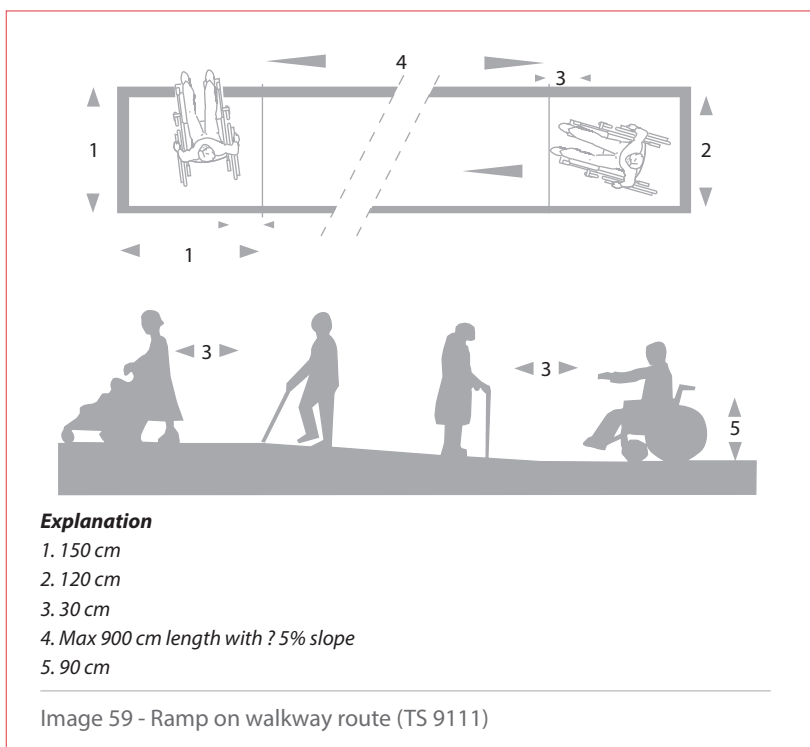
Ramps should be designed as hard, stable and slip-resistant surface, and free of drainage or sewer grates. The length of the ramp should be no greater than 900 cm with a slope no greater than 5%.

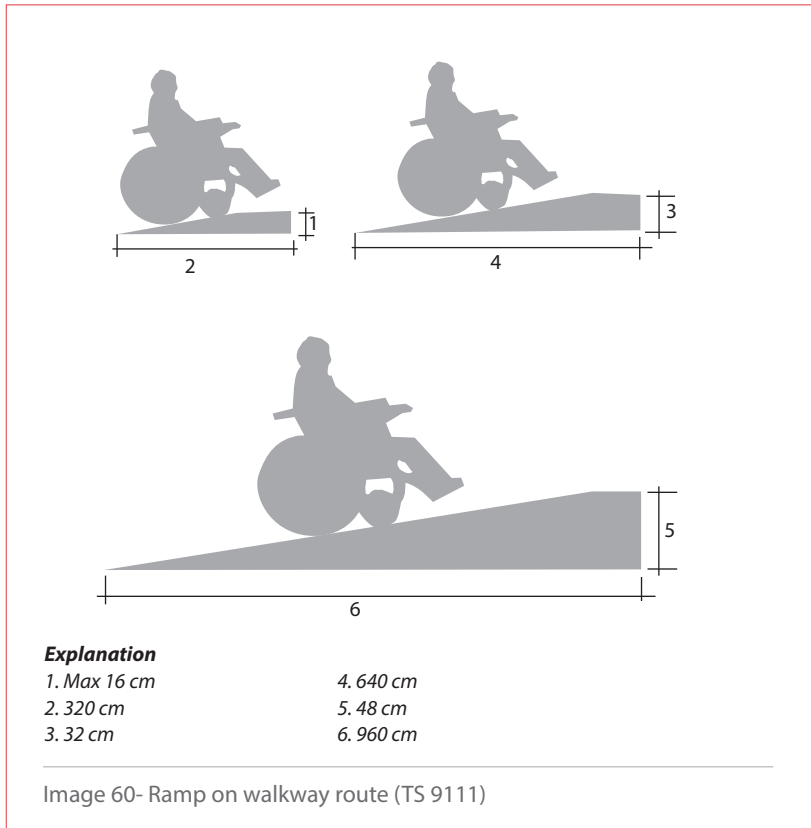
Railings should be installed on both sides of the ramp if it is greater than 200 cm in length or the top of the ramp has a height greater than 15 cm when measured from ground level to the surface of the ramp.





Measures and measurements about ramps should be made as shown in Images 60 and 61.





### 13.7.7. Slope of the entrance ramps

Slope of the building entrance ramps should be as follows:

Table 3. Slope of the building entrance ramps (TS 9111)

Max height	Max slope
15 cm and less	1:12 or 8%
Between 16 - 50cm	1:14 or 7%
Between 51 - 100cm	1:16 or 6%
More than 100 cm	1:20 or 5%

Clear width of the building entrance ramps should be at least 90 cm and preferably 100 cm. At the buildings that are open for public use this width should be at least 100 cm.

The ramp should have railings on both sides, if the horizontal length of the ramp is greater than 200 cm or the height of the ramp is greater than 15 cm.

Ramps should have a stable and slip-resistant surface with no embedded obstacles like a drainage grate.

There should be tactile surfaces in colour contrast to the ramp at the beginning and end of it to act as a warning in change of level, especially, to people with visual disabilities

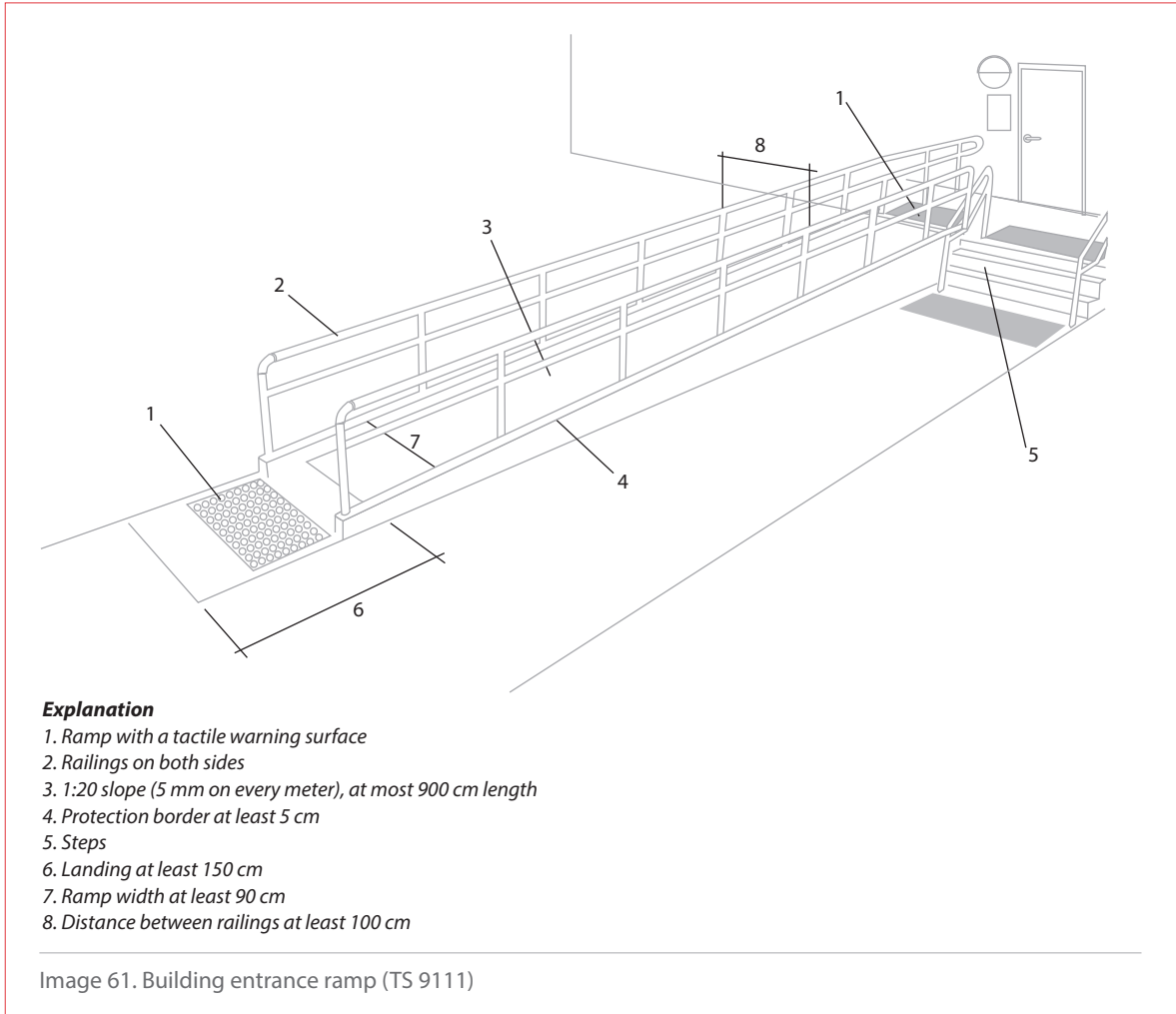


Image 61. Building entrance ramp (TS 9111)

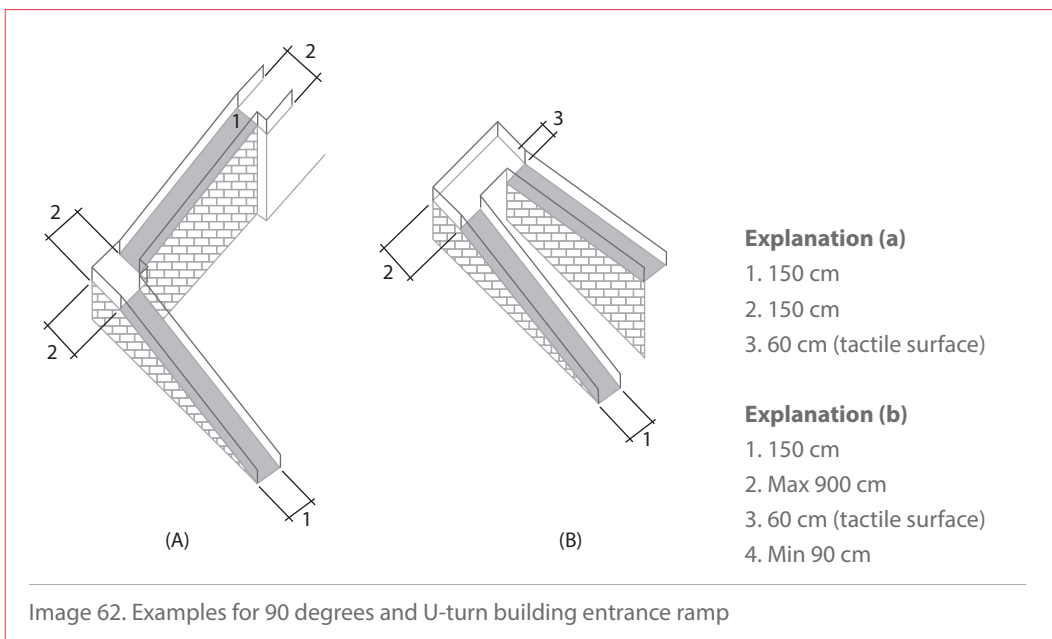
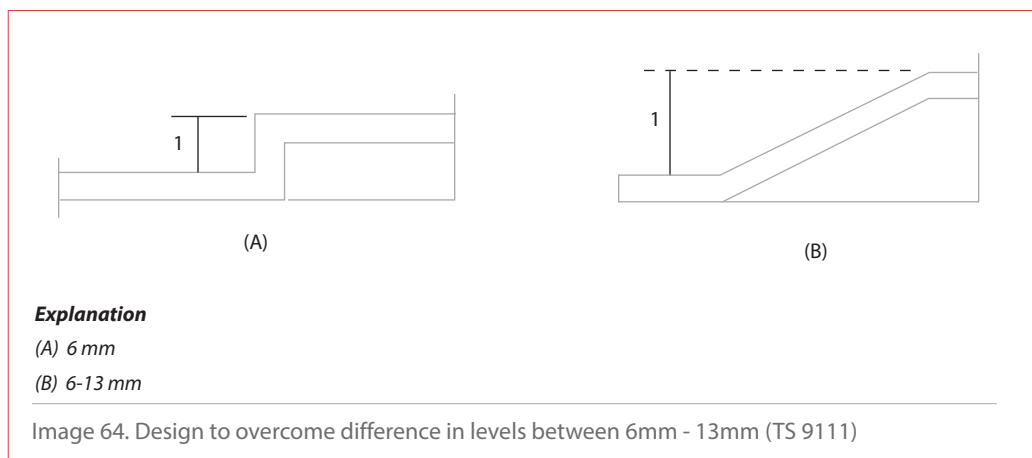


Image 62. Examples for 90 degrees and U-turn building entrance ramp



### 13.7.8. Level Differences (TS 9111)

A special border design is not needed for level differences till 6mm. Level differences between 6mm- 13mm can be arranged with a slope not more than 1:2. For the level differences more than 13 mm, a proper ramp should be placed (Image 64).



Carpet should not be used as a slip-resistant surface or to overcome levels  $\geq 6$  mm. However, if it must be used, the nap or pile will be no higher than 13 mm and the carpet must be secured to the surface with glue or nails to make it safe to travel over.

### 13.7.9. Handrails

Each open side of a stair system shall have railings that extend 30 cm at the top and bottom of the stair and, either curve into the wall or extend to the surface of the landing or ground.

The railing should be of a contrasting colour and a tactile surface on the railing at the top of the stair would also act as another indicator of a change in level. are important for the safety of all users, including people with visual disabilities.

#### Railing features are described as follows (TS 9111):

- Railings should be on both sides of the ramp if the height is greater than 150 mm or the length is greater than 1830 mm.
- Railings should extend at least 300 cm at the top and bottom of the ramp.
- Distance between the wall and the railing should be 38 – 65 mm.
- If a railing must be located within an alcove, the alcove should be 75 mm in depth and be at least 455 mm above the top of the railing surface.
- The grabbing surface of the railing should be continuous to prevent injury to all people including people with visual disabilities.
- Radius or width of hand railing should be between 32 mm and 38 mm.
- The height of the railing should be between 760 mm and 865 mm when measured from the finished surface of the ramp to the top surface of the handrail.
- The colour of the railing should be in contrast with the wall to allow for differentiation by people with impaired visual acuity.
- Railings that are to be mounted on a wall should be securely anchored for the safety of individuals who may need to rely heavily upon it.
- On the sides of the ramp and landings without any protection a 5 cm high protection border should be added.