Airports Authority of India

The Journey of Persons with Reduced Mobility (PRM)

HANDBOOK ON BARRIER FREE SPACE STANDARDS FOR BUILT ENVIRONMENT FOR PERSONS WITH REDUCED MOBILITY

Harmonized Guidelines with Ministry of social Justice and Empowerment, Government of India as per Right with Persons with Disabilities Act,2016

MESSAGE

Accessible India Campaign is the nationwide flagship campaign of Department of Empowerment of Persons with Disabilities, Ministry of Social Justice & Empowerment, Government of India for achieving universal accessibility for all citizens including persons with disabilities.

India has shown resolve to seek inclusion of Persons with Disabilities much before the adoption of the Convention on the Rights of Persons with Disabilities UNCRPD. The Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act was enacted way back in 1995 with the main objectives of creating barrier free environment for persons with disabilities and to make special provisions for the integration of persons with disabilities into the social mainstream. India signed and ratified the UNCRPD in 2007.

The concept of inclusive design denotes that prior to constructing a building, the needs and requirements of all should be taken into consideration. This is to ensure that the finished product is completed to the specification that is suitable for all, rather than one section of society.

Passengers with restricted mobility (PRM) represent a significant demographic for airports and airlines.

The concept of barrier free environment, as spelt out clearly in the Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995, is essential to facilitate the individuals with restricted mobility. Its objective is to integrate disabled people into society.

Accessibility is mandatory as per the law, all authorities must "**Adopt, Implement and Monitor national accessibility standards and principles of Universal Design**" to provide Universal Accessibility, which benefits ALL.

I, Congratulate Department of Planning for formulating these Guidelines. The Guidelines are intended to be a reference for various aspects of planning and operations at all airports.

We at AAI will always continue its support for Accessible India Campaign and make sure that accessibility necessities are integrated into our design method and operations to ensure joyful journeys with dignity and safety.

ANUJ AGGARWAL
CHAIRMAN

FOREWORD

It is my pleasure to endorse this reference manual for designers, engineers and all operational officials to create universal design with barrier-free environment and accessible to all.

This effort aims to bring on awareness of the issues faced by the individuals with less mobility while going through their journey at airports or for that matter any public areas.
It also incorporates considerations of the old, kids and of people facing temporary quality issues.

We, as committed professionals, should take up this responsibility of addressing these challenges and demonstrate through our work the benefits of a barrier-free setting.

Access to public areas isn't solely a matter of dignity however additionally the basic right of each person in our country.

I sincerely advocate all at AAI and our stakeholders to use these simple style ways, to make journeys happier which is accessible and safe for all.

ANIL KUMAR PATHAK
MEMBER (PLANNING)

FOREWORD

The world today has become a very small place—a world with virtually no frontiers or barriers. "Disability Is A Matter of Perception" Especially after the advent of Internet and total connectivity, people have instant access to almost every imaginable service or information. A truly global village.

Aviation, like all other transport modes, needs to recognize and accommodate the growing number of persons with reduced mobility who fly.

This guidance document is intended to help airports enhance the accessibility of air travel for persons with disabilities, including those with reduced mobility and hidden disabilities.

The recommendations in this handbook will help enhance accessibility of air travel for persons with disabilities by providing guidance for the design of new facilities and the upgrade of existing ones.

AAI is confident that implementation of the recommendations will contribute significantly towards the goal of barrier-free airports, and wishes to thank all those involved in the preparation of this handbook.

I N MURTHY
MEMBER (OPERATIONS)

PREFACE

Passage of discovery: Building towards inclusive and accessible travel for all

Over the past 30 years, travel has undergone a revolution that has brought it within the reach of hundreds of millions more people. The rise of low-cost options, the ubiquity of the internet and sharing platforms have created unparalleled demand and choice.

Millions of people with accessibility needs around the world want to travel more, be better connected, and have greater variety of personalized travel services and destinations.

Above all, they want to be considered as travelers first, with the ability to plan, search, book and purchase their travel independently. The travel industry has taken important steps towards improving the offer to those with accessibility needs.

Offering accessibility services is the right thing to do, and that will continue to drive action. What might create even greater momentum is the business sense to address a growing and increasingly important demographic – it is estimated that by 2050 a fifth of the world's population will have some accessibility need.

At Department of Planning we are committed to design for accessibility. We also believe that technology can play a key role in delivering the right blend of services and options. We understand that the aviation industry can only achieve its best results by collaborating to deliver the right solutions throughout the travel process.

We have custom-built this guidelines manual with the aim of stimulating further thinking about accessibility within, and beyond, the travel and tourism industry.

We look forward to building and working together with our customers, partners and stakeholders to build a truly inclusive and accessible global travel future.

G D GUPTA

EXECUTIVE DIRECTOR (PLANNING)

Building of Guidelines

The Accessibility Architecture: Universal Design

Creating architecture for every type of user will mean increasing accessibility for those with reduced mobility. However, while designing for them is often an afterthought of the creative process, could reframing how we think about accessibility actually create better designs for all.

We at Department of Planning -Architecture Wing are committed to design to create an environment providing total freedom of movement.

The architects with these guidelines will be able to design and create with the engineering teams a “total environment” that seamlessly combines function, environmental considerations, and high aesthetics, extended throughout the site and various buildings.

With these our Airports shall promote personal safety and well-being all travelling or working there.

We shape future airports, airport cities that are resilient, informed, connected, healthy, smart, livable and inclusive. We, as committed and concerned professionals, take up this responsibility of addressing these issues and demonstrate through our work the benefits of a barrier-free environment.

Barrier-free design, therefore, is a professional obligation as well as a societal commitment of design professionals. We will as architect and professionals continue lending support for this cause and ensure that accessibility requirements are integrated into our design process.

A G JOSHI
EXECUTIVE DIRECTOR (ARCHITECTURE)

Articulated and complied by Nandita Bhatt Jt.GM Arch.

Flying with Disability – Aviation Guidelines in Airports Authority of India, India

As regards air transport in particular, ICAO use the following definition: "any person whose mobility is reduced due to a physical incapacity (sensory or locomotor), an intellectual deficiency, age, illness or any other cause of disability when using transport, and whose situation needs special attention and the adaptation to the person's needs of the services made available to all passengers".

Facilitation and airport services Aviation, like all other transport modes, needs to recognize and accommodate this growing passenger segment. Persons with disabilities and/or reduced mobility have the same international rights as other citizens, such as accessibility and the full and effective participation and inclusion in society, including freedom of movement and freedom of choice (UN Convention on the Rights of Persons with Disabilities, articles 3c and 3f). Persons with disabilities should have opportunities for air travel comparable to those available to able-bodied citizens.

Legislation
Statutory Regulation and Guidelines for PRMs

Statutory: Prescribed, enforceable, and punishable under an act of parliament. (Business dictionary)

Regulation: Principle or rule (with or without the coercive power of law) employed in controlling, directing, or managing an activity, organization, or system.

1. The Rights of Persons with Disabilities Act, 2016 (India)

2. DGCA , Civil Aviation Requirements (CAR), SECTION 3 – AIR TRANSPORT, SERIES 'M' PART I,

3.ICAO Provisions
ICAO Annex 9(14th Edition, October 2015) provides following standard in section H of Chapter 8: "Contracting States shall take the necessary steps to ensure that airport facilities and services are adapted to the needs of persons with disabilities."

PRM Categories

All PRM's mobility requirements are categorized according to the IATA definitions of passengers who require assistance:

WCHR (Wheelchair Ramp)

A passenger that can ascend and descend the aircraft steps and can move about in the aircraft cabin. Sometimes requiring additional assistance for travel to and from the aircraft steps.

WCHS (Wheelchair for Steps)

A passenger that cannot ascend and descend the aircraft steps but are able to make their own way into the cabin from the Ambulift. Sometimes requiring additional assistance for travel to and from the aircraft or aircraft cabin.

WCHC ((Wheelchair Carry) Assistance to the aircraft seat)

A passenger who is completely dependent on assistance of a mobility or human aid. They need assistance to and from their aircraft seat, with the use of an aisle chair, or if necessary, in a special seat designed to their specific needs.

BLND (passengers with impaired sight or blind, with or without guide-dog)

A passenger who is blind or visually impaired.

DEAF (passengers with impaired hearing, deaf or deaf-mute)

A passenger who is deaf, hard of hearing or without speech.

MAAS (Meet and assist: Passenger requiring collection and assistance)

A passenger who is need of little or no assistance, generally help with baggage or guidance to and from the aircraft.

DPNA (Disabled Passenger with intellectual or developmental disability needing assistance).

A passenger with intellectual or developmental difficulties, who assistance varies depending on their disability.

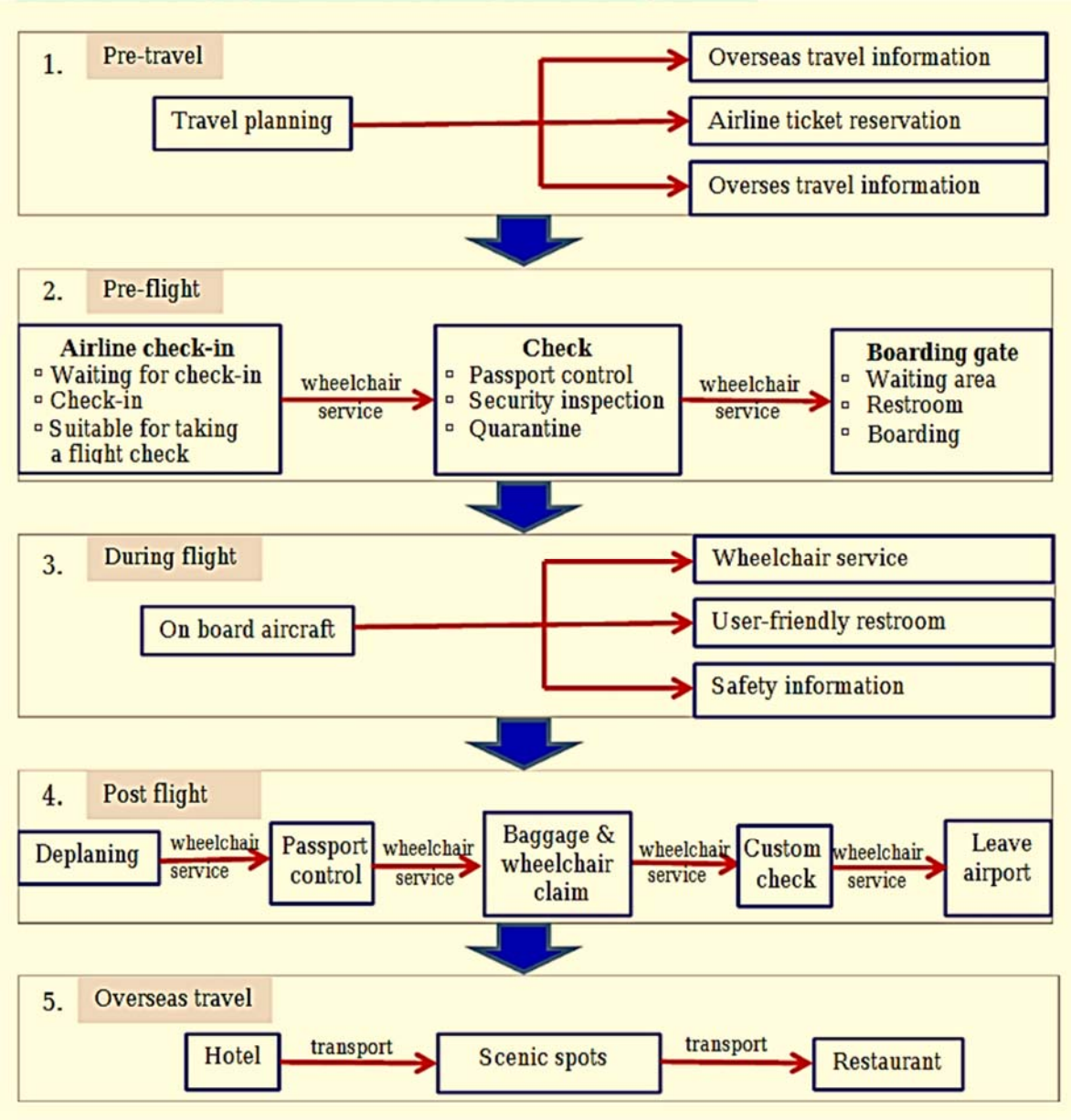
WCBD (Wheelchair with Dry Cell Battery)

A passenger who is travelling on an electric mobility aid. It is the responsibility of the staff member boarding the PRM to ensure that the mobility is safe for travel.

WCHR: Wheelchair/Passenger can walk up stairs
WCHS: Wheelchair/Passenger can walk to seat/stairs
WCHC: Wheelchair/Passenger must be carried; Carry On Passenger
WCBD: Wheelchair with Dry Cell Battery
WCBW: Wheelchair with Wet Cell Battery
WCMP: Wheelchair, manual power; Passenger Traveling With Manual Powered Wheelchair
WCOB: Wheelchair, On-board/in-flight Assistance
Blnd - Blind Passenger
Deaf - Deaf Passengers
Maas - Meet And Assist
Meda - Medical Assistance (oxygen)

Access to Air Travel for Disabled Persons and Persons with Reduced Mobility

Passenger with reduced mobility can experience problems traveling overseas. Insufficient information for PRM taking a flight, the need to wait in line, and the lack of barrier-free facilities and services can deter people with reduced mobility from traveling overseas



Persons with reduced mobility travel procedures

ICAO Provisions

ICAO Annex 9(14th Edition, October 2015) provides following standard in section H of Chapter 8:
"Contracting States shall take the necessary steps to ensure that airport facilities and services are adapted to the needs of persons with disabilities."

The Document also provides following "recommendations" regarding facilitation of the transport of persons with disabilities:

When travelling, persons with disabilities should be provided with special assistance in order to ensure that they receive services customarily available to the general public. Assistance should be provided in a manner that respects the dignity of the individual.

Contracting States should cooperate with a view to taking the necessary measures to make accessible to persons with disabilities all the elements of the chain of the person's journey, from arrival at the airport of departure to leaving the airport of destination.

Contracting States should take the necessary steps with aircraft, airport and ground handling operators to establish and publish minimum uniform standards of accessibility with respect to transportation services for persons with disabilities, from arrival at the airport of departure to leaving the airport of destination.

Contracting States should take the necessary steps with aircraft, airport and ground handling operators and travel agencies to ensure that persons with disabilities are given the information they need, in formats that are accessible to those with cognitive or sensory disabilities, and should take the necessary steps to ensure that airlines, airports and ground handling operators are in a position to give those passengers the assistance necessary for them, depending on their needs, to help them in their travel.

Contracting States should take all necessary steps to secure the cooperation of aircraft, airport and ground handling operators in order to establish and coordinate training programmes to ensure that trained personnel are available to assist persons with disabilities.

Contracting States should ensure that lifting systems or any other appropriate devices are made available in order to facilitate the movement of persons with disabilities between the aircraft and the terminal on both arrival and departure as required where telescopic passageways are not used.

Measures should be taken to ensure that the hearing and vision impaired are able to obtain flight service-related information in accessible formats.
Designated points for the pick-up and drop-off of persons with disabilities at a terminal building should be located as close as possible to main entrances and/or exits. To facilitate movement within the airport, access routes should be free of obstacles and be accessible.

Where access to public services is limited, every effort should be made to provide accessible and reasonably priced ground transportation services by adapting current and planned public transit systems or by providing special transport services for people with mobility needs.
Adequate parking facilities should be provided for people with mobility needs and appropriate measures taken to facilitate their movement between parking areas and the terminal buildings.

When assistance is provided to transfer persons with disabilities from one aircraft to another, it should be provided as efficiently as possible, with due regard for connecting flights.

This makes a series of recommendations about improving tourism services for people with disabilities. Specifically talking about airport services the document states:

Airports should have information panels both visual and audible, which will announce the arrival and departure of flights.

All the necessary steps must be taken to insure the correct use of communication services (availability of adapted telephone booths, proper identification of them with the international accessibility symbol), lavatories and mobility equipment (elevators, escalators, automatic doors).

The airport personnel (including those working for customs and immigration), must be duly informed about the terms used when talking to a passenger with a disability and know the exact location of all adapted public services inside the facility.

DGCA , Civil Aviation Requirements (CAR), SECTION 3 – AIR TRANSPORT, SERIES 'M' PART I

Air transportation today has become easier than ever. The Government policies on 'Open Sky' allowed the growth of airlines and also non- scheduled operators in the Country. The new ideas of Low Cost and no frill concept have also brought the common man with average income group to travel by air.

The provisions contained in DGCA Civil Aviation Requirements (CAR), SECTION 3 – AIR TRANSPORT, SERIES 'M' PART I, dated 28th February 2014, on the subject of "Carriage by Air Persons with Disability and/other Persons with Reduced Mobility shall be applicable to all airport operators within Indian Territory.

As per this CAR, *Person with disability means any individual who has a physical or mental impairment that, on a permanent or temporary basis, substantially limits one or more major life activities, has a record of such impairment, or is regarded as having such impairment.*

NOTE:

a. Physical or mental impairment means:

Any physiological disorder or condition, cosmetic disfigurement, or anatomical loss affecting one or more of the following body systems: neurological, musculoskeletal, special sense organs, respiratory including speech organs, cardio-vascular, reproductive, digestive, genito-urinary, hemic and lymphatic, skin, and endocrine; or

Any mental or psychological disorder, such as mental retardation, organic brain syndrome, emotional or mental illness, and specific learning disabilities.
The term physical or mental impairment includes, but is not limited to, such diseases and conditions as orthopedic, visual, speech, and hearing impairment; cerebral palsy, epilepsy, muscular dystrophy, multiple sclerosis, cancer, heart disease, diabetes, mental retardation, emotional illness, autism, drugs addiction, alcoholism and geriatric disabilities.

Major life activities mean functions such as caring for one's self, performing manual tasks, walks, seeking, hearing, speaking, breathing, learning and working.

Has a record of such impairment means has a history of, or has been classifies, or misclassified, as having a mental or physical impairment that substantially limits one or more major life activities.

A person with reduced mobility (PRM) means any person whose mobility when using transport is reduced due to any physical disability (sensory or locomotors; permanent or temporary), intellectual disability or impairment, or any other cause of disability, or age, and whose situation needs appropriate attention and the adaptation to his or her particular needs of the service made available to all passengers.

Incapacitated passengers are those with physical or mental disability or with a medical condition, who require individual attention or assistance on emplaning/deplaning, during flight and during ground handling which is normally not extended to other passengers.

Reference: GOVERNMENT OF INDIA OFFICE OF THE DIRECTOR GENERAL OF CIVIL AVIATION
TECHNICAL CENTRE, OPP SAFDURJUNG AIRPORT, NEW DELHI
CIVIL AVIATION REQUIREMENTS SECTION 3 – AIR TRANSPORT
SERIES 'M' PART I ISSUE III, 28th February 2014 EFFECTIVE: FORTHWITH
F. No.: 23-05/2010-AED

Subject: Carriage by Air - Persons with Disability and/or Persons with Reduced Mobility (DGCA: CAR)

Clauses pertaining to Airport Operator

APPLICABILITY

The provisions contained in this CAR shall be applicable to the following:

a) All Indian operators engaged in scheduled and non-scheduled air transport services both domestic and international for carriage of passengers.

b) All foreign carriers engaged in scheduled air transport operating to and from Indian Territory.

c) All airport operators within Indian Territory.

DEFINITIONS:-

Person with disability means any individual who has a physical or mental impairment that, on a permanent or temporary basis, substantially limits one or more major life activities, has a record of such impairment, or is regarded as having such impairment.

Note:

(a) Physical or mental impairment means:
(1) any physiological disorder or condition, cosmetic disfigurement, or anatomical loss affecting one or more of the following body systems: neurological, musculoskeletal, special sense organs, respiratory including speech organs, cardio-vascular, reproductive, digestive, genitourinary, hemic and lymphatic, skin, and endocrine;
or
(2) any mental or psychological disorder, such as mental retardation, organic brain syndrome, emotional or mental illness, and specific learning disabilities.
The term physical or mental impairment includes, but is not limited to, such diseases and conditions as orthopaedic, visual, speech, and hearing

Airport Operator Specific

Airport operator shall display signages throughout the airport including terminal building in a clear and unambiguous manner as per international standards. The points of arrival and departure shall be clearly indicated with basic information about airport in accessible format.

Signages for all spaces in the terminal building reserved for persons with disability or reduced mobility should be clearly indicated to discourage the use by other passengers.

Airport operator shall endeavour to ensure that parking spaces are reserved and located in the close proximity to the terminal building for persons with disability or reduced mobility.

Airport operator shall provide ramps at least at the main entrance/exit to the terminal building for easy access by persons with disability or reduced mobility.

Airport operator shall ensure that all points of access open to the public are accessible to persons with disability or reduced mobility.

Airport operator shall ensure that all points of access open to the public are accessible to persons with disability or reduced mobility. A provision of helpdesk to be made which will provide all necessary information to assist a disabled passenger.

All areas and services in the terminal building that are open to the public shall be accessible to persons with disability or reduced mobility.

All equipment provided for use by general public such as telephones, internet service, etc. should also be accessible to persons with disability or reduced mobility including those with sensory impairments.

Flight information system should be positioned in such a way to ensure its readability by people in wheelchair and those with visual impairment. Provision of audible announcements should be made for people who are not able to use visual displays such as blind and with learning disability.

Airport operator shall ensure that persons with disability or reduced mobility are transported within the airport in the same condition, comfort and safety as those available for other passengers. The airport operator should ensure that the assistive devices being used to assist a disabled passenger are as per the standards set by Ministry of Social Justice and Empowerment. Effectivity of the provision for standardization of such equipment will be from 01 Oct 2016.

The airport operator shall ensure that the facilities at the airport are accessible to persons with disability or reduced mobility during their transit through the airport.

Airport operator shall provide ambulance facility for the passenger on arrival and departure at the airport upon advance request by the passenger/representative/airline.

Airport operator shall make appropriate provision for ambulift at the airport to enable persons with disability or reduced mobility to embark/disembark the aircraft without inconvenience. Such provision may be made in coordination with Ground Handling Agencies (GHAs), if required. Airport where ambulift or aerobridge facility is not available, provision of towable ramp should be made.

Note: Though the existing practice and responsibility of providing ambulifts may vary at various airports, it will rest with the airport operator, who must ensure compliance in coordination with the airlines, GHAs, etc.

Any charge that airport operator levy the same should be displayed in conspicuous manner on their respective website and terminal building.

Training Requirements

All airlines, airport operators, security, customs, and immigration bureau organizations at airport shall conduct training program, as per the training module provided by Ministry of Social Justice and Empowerment, for all personnel engaged in passenger services for sensitization and developing awareness for assisting persons with disability or reduced mobility and to ensure that they are well briefed about their responsibilities. Effectivity of the provision for standardization of such equipment will be from 01 Oct 2016.

The contents and duration of the training program shall be in accordance with the guidelines issued by the Department of Disability Affairs, Ministry of Social Justice & Empowerment.

Note: The training may include but not limited to the following:

a) Barriers faced by persons with disability or reduced mobility, including attitude, environment and organisation, and suggestions for removing such barriers.

b) Information on the range of disabilities, including hidden or less visible disabilities.

c) Skills needed for assisting persons with disability or reduced mobility.

d) Communication and interpersonal skills for interacting with persons with disability or reduced mobility.

e) Health and safety information.

f) General awareness about relevant regulations.

The operators shall ensure that all its employees are imparted disability-related basic training and refresher training at appropriate interval.

Note: Disability related training provides practical overview and is relevant in particular to those providing assistance to persons with disability or reduced mobility. It increases understanding of the whole range of impairments so that personnel are aware of how to interact with persons with disability or reduced mobility and to tackle negative perceptions and attitudes towards such passengers.

In addition to basic training, operators should provide specific training for personnel who may be required to provide direct assistance to persons with disability and/or persons with reduced mobility.

Operators shall ensure that adequate training is provided to all its service providers, ground handling agencies and sub-contractors responsible for providing assistance services.

It shall be the responsibility of airport operator to ensure that security staff positioned at airport undergoes disability-related training.

Airlines shall ensure that cabin crew safety and emergency procedures training is combined with disability awareness training for assisting persons with disability or reduced mobility in the cabin environment.

General Requirements

Operators shall formulate a detailed procedure for carriage of persons with disability or reduced mobility and publish the same on their website. Operators including the travel agents shall ensure that web content conforms to the Web Content Accessibility Guidelines (WCAG) so as to make it more accessible to persons with disabilities. Operators shall display disability policy and guidance for persons with disability or reduced mobility on the main page of their website.

Operator shall develop in-house document on handling persons with disability or reduced mobility, which should be used for strict compliance by all employees. Such a document and the proof of its compliance shall be made available to DGCA and other enforcement agencies. Such document/manual should be readily available for reference of all personnel required in handling such persons.

Operator shall document their responsibility with regard to the travel of persons with disability or reduced mobility, and make it available on their website.

All assistive devices shall be provided without any extra cost to the persons with disability or reduced mobility within India.

Operators, both the airlines and airport, shall ensure availability of low floor accessible buses at the airports to enable easy boarding and alighting of passengers.

In case of transfer between airlines and terminals, the airlines and airport operators shall ensure smooth and hassle free transportation of persons with disability or reduced mobility.

Persons with disability or reduced mobility requiring special assistance or protection from disturbance, including their escorts, shall be permitted to stay on board during transit stops, if they so desire, subject to the observance of applicable safety and security norms.

Where wheelchairs or other mobility equipment or assistive devices are lost or damaged whilst being handled at the airport or transported on board

aircraft, the passenger to whom the equipment belongs shall be compensated by the airline/airport operator/GHA/organisation responsible for such loss or damage.

As a part of Annual Surveillance Programme (ASP), DGCA shall conduct surveillance of the operators to ensure compliance of the CAR.

Passenger Grievance Redressal

A person with disability or reduced mobility, who considers that provisions of this CAR have been infringed, may bring the matter to the attention of the airlines, airport operator, as the case may be.

The operator shall ensure speedy and proper redressal of these complaints.

Operator shall appoint a Nodal officer and Appellate Authority to settle the grievances in a stipulated time frame. In this regard, the operators shall conspicuously display the details of Nodal Officer and Appellate Authority on their respective website.

The internal grievance mechanism of operators shall be transparent with a provision of online complaint handling. All complaints registered shall be issued a unique reference number.

If the concerned operator fails to fulfill their obligations, the person with disability or reduced mobility may complain to the statutory authorities set up under relevant applicable laws such as Chief Commissioner for Persons with Disabilities/Commissioner for Persons with Disabilities in concerned state.

The Rights of Persons With Disabilities Act, 2016

Relevant clauses

The clauses relevant to this guideline are reproduced below:

i. The appropriate Government shall ensure that the persons with disabilities enjoy the right to equality, life with dignity and respect for his or her integrity equally with others.

ii. The appropriate Government shall take steps to utilise the capacity of persons with disabilities by providing appropriate environment.

iii. No person with disability shall be discriminated on the ground of disability, unless it is shown that the impugned act or omission is a proportionate means of achieving a legitimate aim.

iv. No person shall be deprived of his or her personal liberty only on the ground of disability.

v. The appropriate Government shall take necessary steps to ensure reasonable accommodation for persons with disabilities.

vi. The persons with disabilities shall have equal protection and safety in situations of risk, armed conflict, humanitarian emergencies and natural disasters.

vii. No establishment shall be granted permission to build any structure if the building plan does not adhere to the rules formulated by the Central Government under section 40.

(Section 40: The Central Government shall, in consultation with the Chief Commissioner, formulate rules for persons with disabilities laying down the standards of accessibility for the physical environment, transportation, information and communications, including appropriate technologies and systems, and other facilities and services provided to the public in urban and rural areas.)

viii. The appropriate Government shall take measures to protect persons with disabilities from being subjected to torture, cruel, inhuman or degrading treatment.

ix. The appropriate Government shall take suitable measures to provide,

a Facilities for persons with disabilities at bus stops, railway stations and airports conforming to the accessibility standards relating to parking spaces, toilets, ticketing counters and ticketing machines;

b Access to all modes of transport that conform the design standards, including retrofitting old modes of transport, wherever technically feasible and safe for persons with disabilities, economically viable and without entailing major structural changes in design;

c Accessible roads to address mobility necessary for persons with disabilities.

x. All existing public buildings shall be made accessible in accordance with the rules formulated by the Central Government within a period not exceeding five years from the date of notification of such rules:

a Provided that the Central Government may grant extension of time to the States on a case to case basis for adherence to this provision depending on their state of preparedness and other related parameters.

b The Appropriate Government and the local authorities shall formulate and publish an action plan based on prioritization, for providing accessibility in all their buildings and spaces providing essential services such as all primary health centres, civil hospitals, schools, railway stations and bus stops.

xi. The service providers whether Government or private shall provide services in accordance with the rules on accessibility formulated by the Central Government under section 40 within a period of two years from the date of notification of such rules:

a Provided that the Central Government in consultation with the Chief Commissioner may grant extension of time for providing certain category of services in accordance with the said rules.

Offences and Penalties

i. Any person who contravenes any of the provisions of this Act, or of any rule made there under shall for first contravention be punishable with fine which may extend to ten thousand rupees and for any subsequent contravention with fine which shall not be less than fifty thousand rupees but which may extend to five lakh rupees.

ii. Where an offence under this Act has been committed by a company, every person who at the time the offence was committed, was in charge of, and was responsible to, the company for the conduct of the business of the company, as well as the company, shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly:

Provided that nothing contained in this sub-section shall render any such person liable to any punishment provided in this Act, if he proves that the offence was committed without his knowledge or that he had exercised all due diligence to prevent the commission of such offence.

iii. Not with standing anything contained in sub-section (1), where an offence under this Act has been committed by a company and it is proved that the offence has been committed with the consent or connivance of, or is attributable to any neglect on the part of any director, manager, secretary or other officer of the company, such director, manager, secretary or other officer shall also be deemed to be guilty of that offence and shall be liable to be proceeded against and punished accordingly.

Explanation—For the purposes of this section—

(a) "company" means anybody corporate and includes a firm or other association of individuals; and

(b) "director", in relation to a firm, means a partner in the firm.

Infrastructure and Facilities – Kerb Side

Consideration of disable and elderly people in passenger building planning

On the face of it, it is only persons with disabilities for whom barriers become major obstacles. However, it is necessary to realize that every person, at some stage of life, face barriers. A small child, an elderly or infirm person, a pregnant lady, the temporarily disabled, all are vulnerable to barriers. Therefore, to list out people affected by barriers-

Wheelchair users
People with limited walking/ movement abilities
People with visual impairment or low vision
People with hearing impairment
Elderly and infirm persons
Pregnant ladies
Children
People with temporary disabilities.

I. As the speed and comfort of air travel is becoming more and more appealing to people who are physically challenged, the use of air transport by disabled and elderly people, including the chair bound, is likely to increase. For many, particularly the severely disabled, the most convenient method of long-distance travel is by air, provided the transition facilities match the convenience of the aircraft.

II. Both disabled and elderly passengers as well as visitors have right to safety and convenience. It should be remembered that a person with a disability is not different in all aspects of behaviour. Their special problems and different needs should be recognized so that the planner/designer may **accommodate them satisfactorily.**

III. The transition between air and surface transport needs to be improved and terminal facilities must keep pace with the convenience offered by modern aircraft. Several states have developed design standards or building codes for disabled people that can be applied for airport passenger building. The following paragraphs include planning consideration of disabled and elderly people in airport passenger building based on the best practices all over globe.

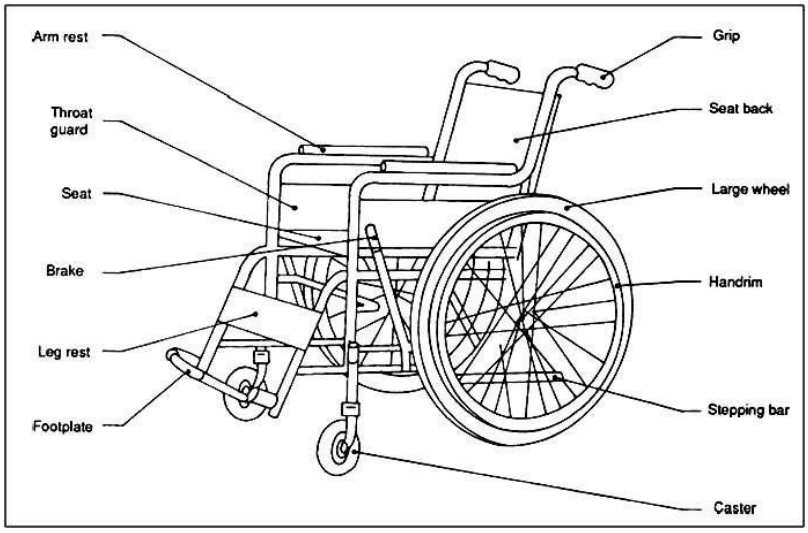
Planning Consideration for Access by PRMs

ANTHROPOMETRICS

It contains dimensions that can be used for guidance when designing facilities and equipment to be used by Persons with Disabilities. Adequate space should be allocated for persons using mobility devices, e.g. wheelchairs, crutches and walkers, white cane etc. as well as those walking with the assistance of other persons.

Mobility Devices and Space Allowances

Standard wheelchair parts are given in.



Structure of wheelchair and name of each part (standard type)

Wheel chair

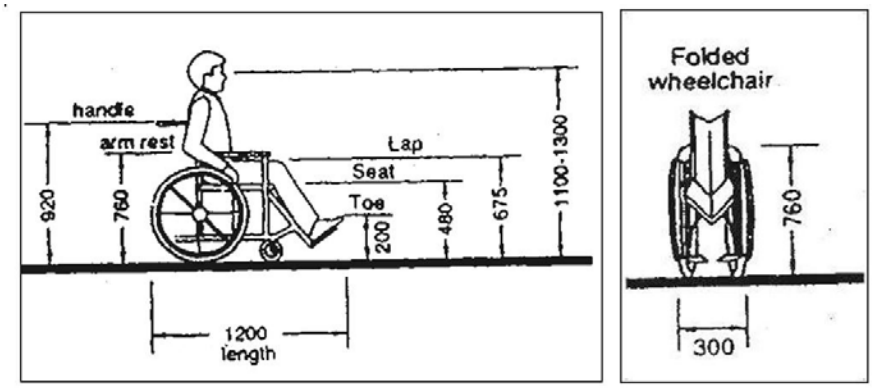
Some of the typical dimensions of a standard wheelchair are extremely important and helps to get standards for space allowance, reach range, etc. of a wheelchair user. Electric wheelchairs may be of a larger dimension, much heavier and do not have the same maneuverability/capability as manual wheelchairs.

Manual wheelchairs dimensions are as follows:

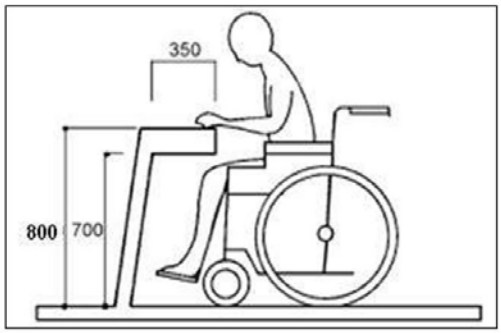
Length: 1000 - 1200 mm
Width: 650 - 720 mm
Height: 910-950mm
Wheelchair footrest: 350 mm (deep)
Wheelchair castor width: 12 mm
Seat ht.: 480mm
Arm rest ht.: 760mm
Lap ht.: 675 mm

When the wheelchair is folded

Width: 300 mm; Height of armrest: 760 mm



Dimensions of manual wheel chair in usable and folded condition A wheelchair has a footplate and leg rest attached in front of the seat. (The footplate extends about 350 mm in front of the knee). The footplate may prevent a wheelchair user from getting close enough to an object. Hence, at least 350 mm deep and 700 mm high space under a counter, stand, etc. should be given.



Knee clearance

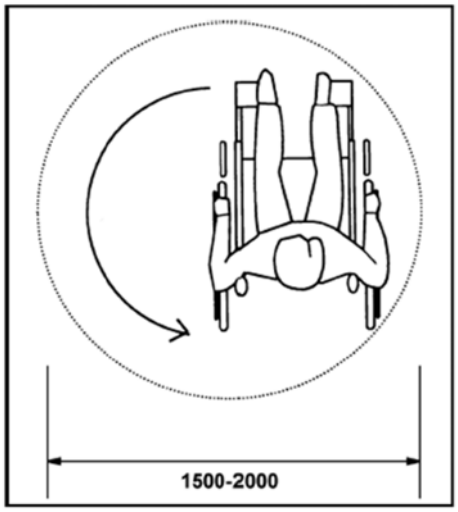
Wheelchair user

The minimum clear floor or ground area required accommodating a single, stationary wheel chair and occupant is 900 mm x 1200 mm.

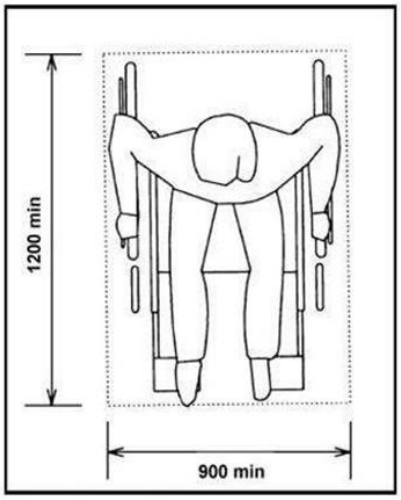
- Width: 900mm
- Length: 1200mm

Circulation dimensions

The minimum clear floor ground area for a wheelchair to turn is 1500 mm whereas it may be ideal to provide 2000 mm.



Turning radius

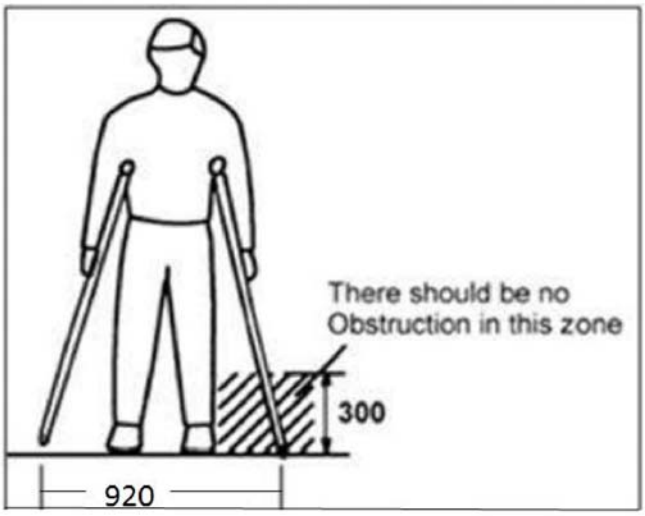


Clear floor space

Space Allowance for crutch user

Although people who use walking aids can maneuver through door openings of 900 mm clear width, they need wider passageways 920mm for comfortable gait.

Crutch tips, often extend down out at a wide angle, are a hazard in narrow passageways where they might not be seen by other pedestrians
Width: 920mm
With no obstruction up to 300mm height



Space requirement for crutch user

Space allowance for white cane users

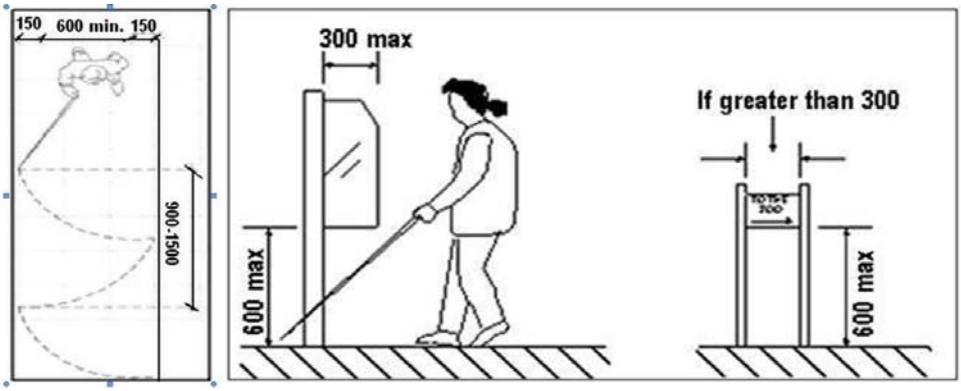
Protruding objects, such as directional signs, tree branches, wires, guy ropes, public telephone booths, benches and ornamental fixtures should be installed with consideration of the range of a person with vision impairment white cane.

A barrier to warn blind or visually impaired persons should be provided under stairways or escalators.

Walkways, halls, corridors, passageways, aisles, or other circulation spaces should have clear headroom to minimize the risk of accidents.

The radial range of the white cane is a band 900 mm wide.

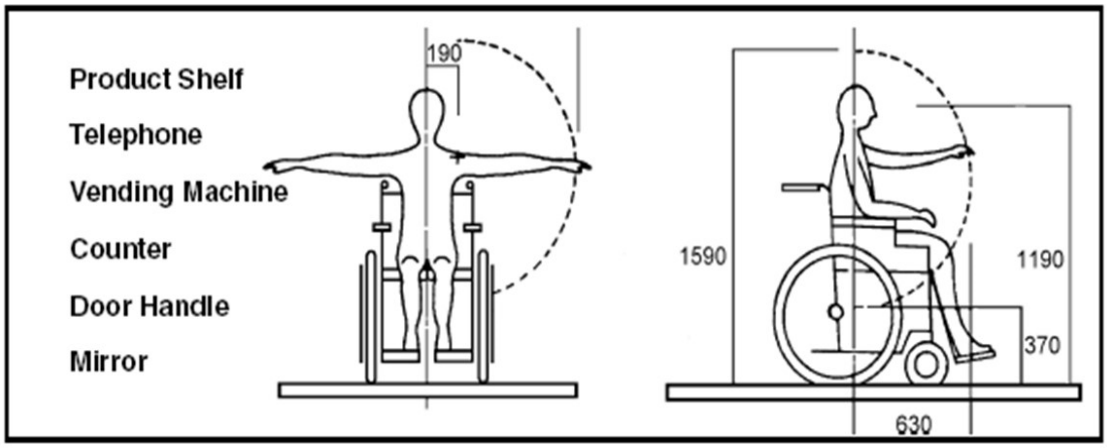
Any obstacle above 600 mm cannot be detected by the white cane. If there are projections above this height, then the projections have to be reflected at the floor level in terms of level or textural differences.



Radial range and object detection by the visually impaired

Reach Range

A wheelchair user's movement pivots around his or her shoulders.
The range of reach (forward and side; with or without obstruction) of a wheelchair user should be taken into consideration.

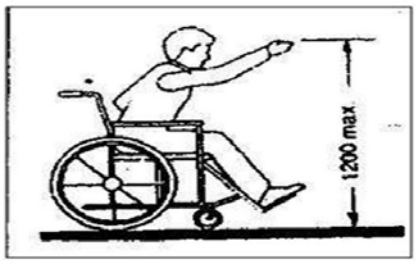


Range of reach of wheel chair user

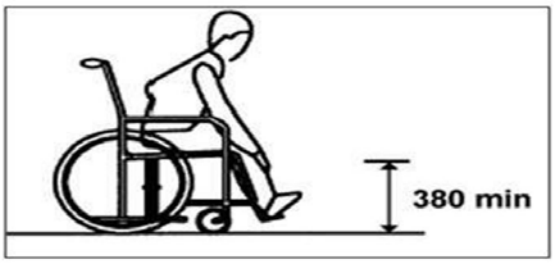
Reach without obstruction

The maximum forward reach is 1200 mm from the floor and the minimum forward reach is 380 mm from the floor
Max. forward upper reach:1200 mm
Min. forward lower reach: 380 mm

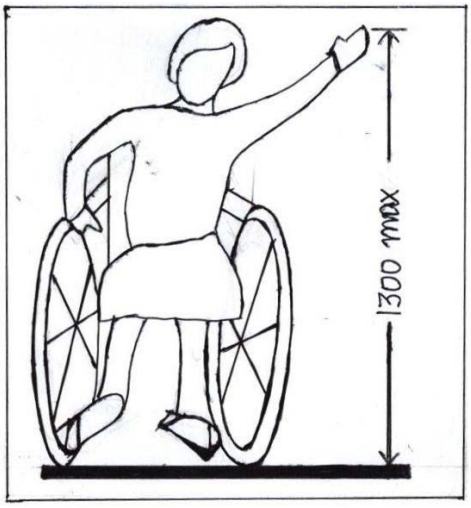
The maximum side reach without obstruction is 1300 mm from the floor and the minimum side reach is 250 mm from the floor as shown
Max. side reach (upper level): 1300 mm
Min. side reach (lower level): 250 mm



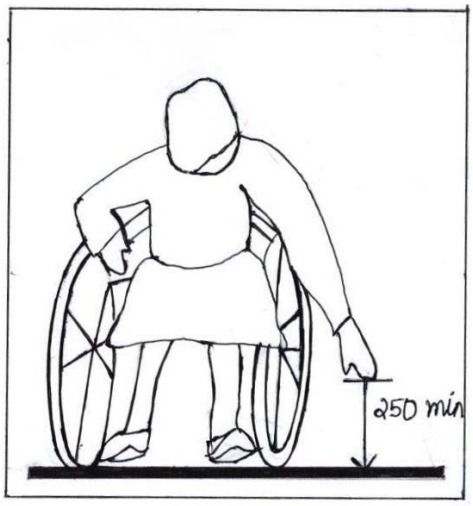
Max. Forward upper reach



Mini. Forward lower reach



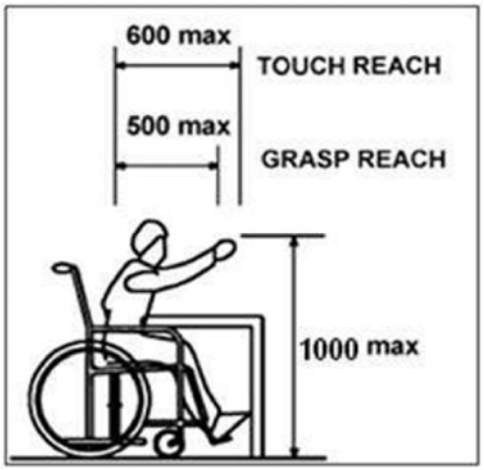
Max. side reach (upper level)

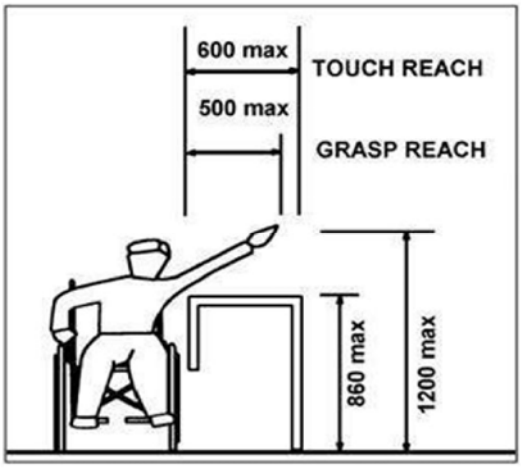


Max. side reach (lower level)

Reach over obstruction (Max. 500mm deep)

The maximum forward reach over an obstruction is 1000mm from the floor





Forward and side reach over obstruction

The maximum side-reach over an obstruction 860mm high x 500mm deep is 1200mm

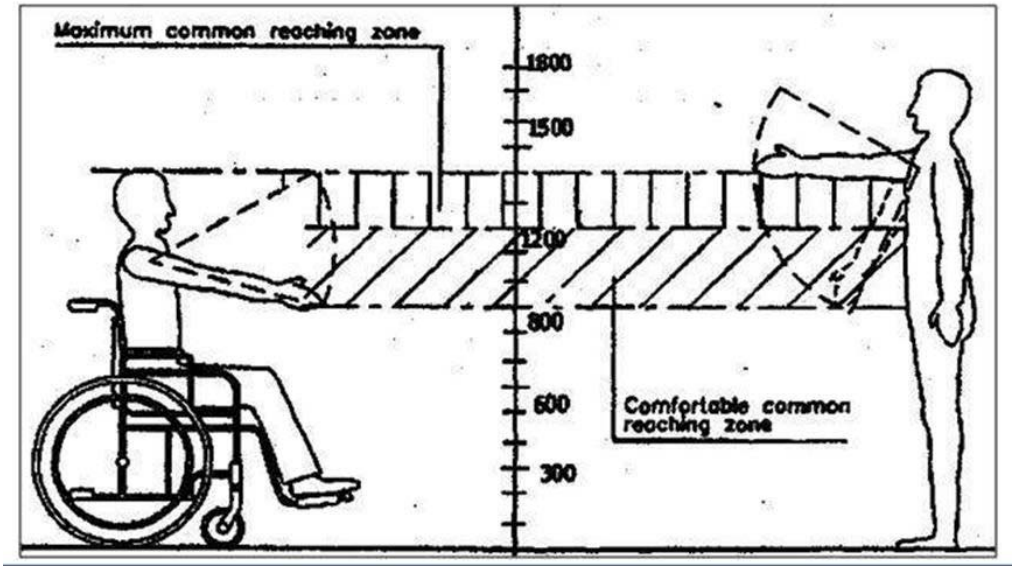
Max. Side reach over obstruction (upper) – 1200 mm from floor level

Max. Side reach over obstruction (lower) – 500 mm

Common reach zone

The comfortable reach zone when seated on a wheelchair is between 900 mm and 1200 mm.

The maximum reach zone is between 1200 mm and 1400 mm.

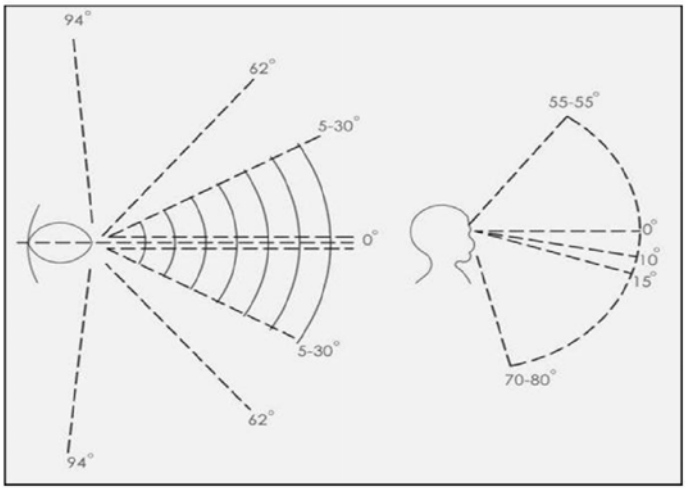


Common reach zone

Vision Zone

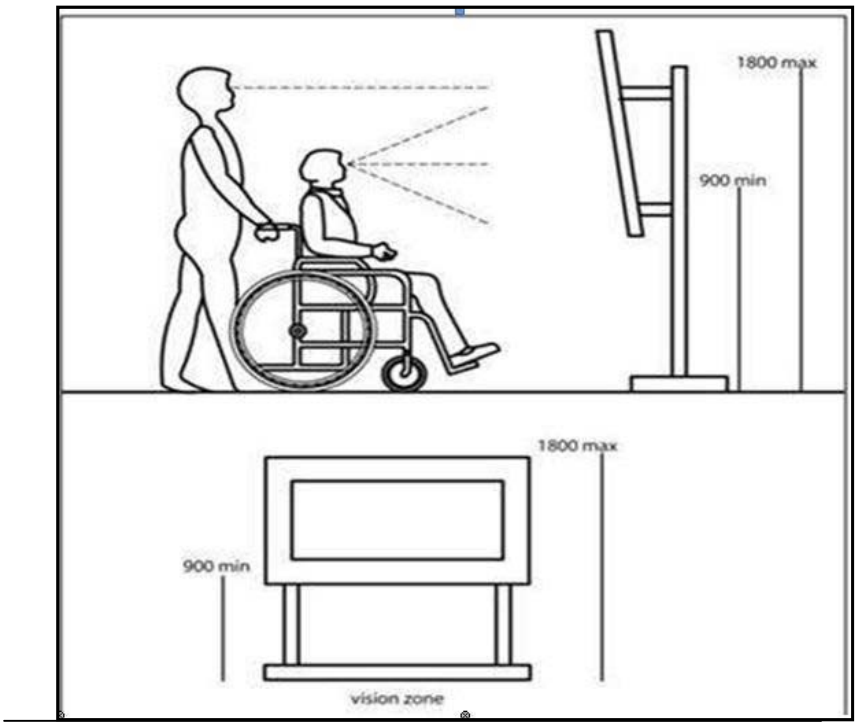
Different fields of vision are given in. All signage should be designed based upon these dimensions.

Vision zone: 900 - 1800 mm



Field of Vision

The smallest letter should not be less than 15 mm. Map and information panels along pathways should be placed at a height between 900 mm and 1800 mm



Vision Zone

Heights and widths

Wheelchair Users
The average height of a person seated on a wheelchair is generally less than 1200 mm.

Standing Person
The average height of a standing person is generally less than 2000 mm.

Height of controls
Height of controls from floor level : 400 – 1200 mm
Height for switches (power) : 400 - 500 mm
Height for switches (light) : 900 –1200 mm
Height of doors handles : 900 – 1000 mm Opening controls for windows : 900 – 1000 mm
Space required under the counter for wheelchair footrest : 350 mm deep

Entrance/ exit door

Min. width of entrance/ exit door : 900 mm Min. front approach doorways space : 600 mm
Min. Latch approach doorways space : 1250 mm

Arrival at Airport

Land Transport

Buses, trams, taxis, mini-buses and three-wheelers should be designed as far as practicable to include facilities that can accommodate people with disabilities.

Accessible buses

Accessible buses should have the following features:

PRM moves out of the bus through foldable ramp installed in the doorway for mobility aided users/ prams.

Wheelchair spaces - The location of that space should be as indicated, inside and outside the bus, using the standard symbol for wheelchair accessibility.

Low floor bus boarding from road level and bus stand platform

Taxi, Rail & Water Transport

PRMs arriving at airport through Taxi, Train and Water transport must be able to use foldable ramps to get in and out of them while remaining seated in the wheel chairs.

Accessible taxi

Retrofitting of ramp for sub-urban rail

Accessible ferry
Alighting and boarding areas

Car Parking - There shall be reserved parking for persons with disability within 30m of accessible entrances.

Location

Accessible parking lots that serve a building should be located nearest to an accessible entrance and / or lift lobby within 30 meters. In case the access is through lift, the parking shall be located within 30 meters.

The accessible route of 1200 mm width is required for wheelchair users to pass behind vehicle that may be backing out.

The car park entrance should have a height clearance of at least 2400 mm.

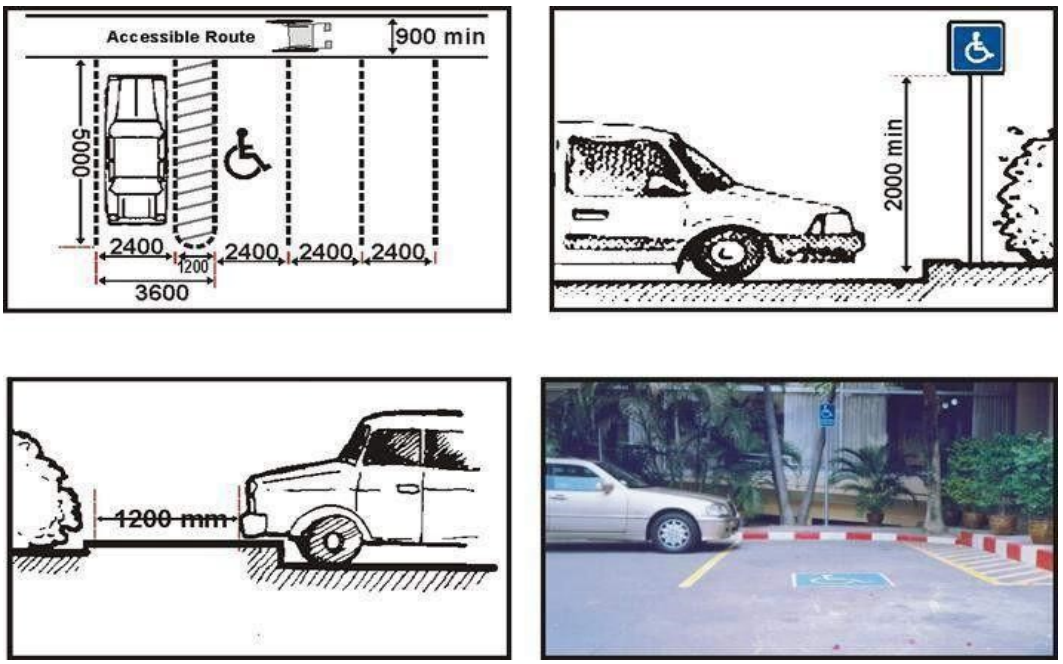
Accessible Car Parking Lot

The accessible car parking lot should: -

Have minimum dimensions 5000 mm×3600 mm; Have a firm, level surface without aeration slabs; and Wherever possible, be sheltered.

Where there are two accessible parking bays adjoining each other, then the 1200mm side transfer bay may be shared by the two parking bays. The transfer zones, both on the side and the rear should have yellow or white cross-hatch road markings.

Consideration should be given to the distribution of spaces for use by the Persons with Disabilities in accordance with the frequency and persistency of parking needs. Two accessible parking lot should be provided for every 25 car parking spaces.



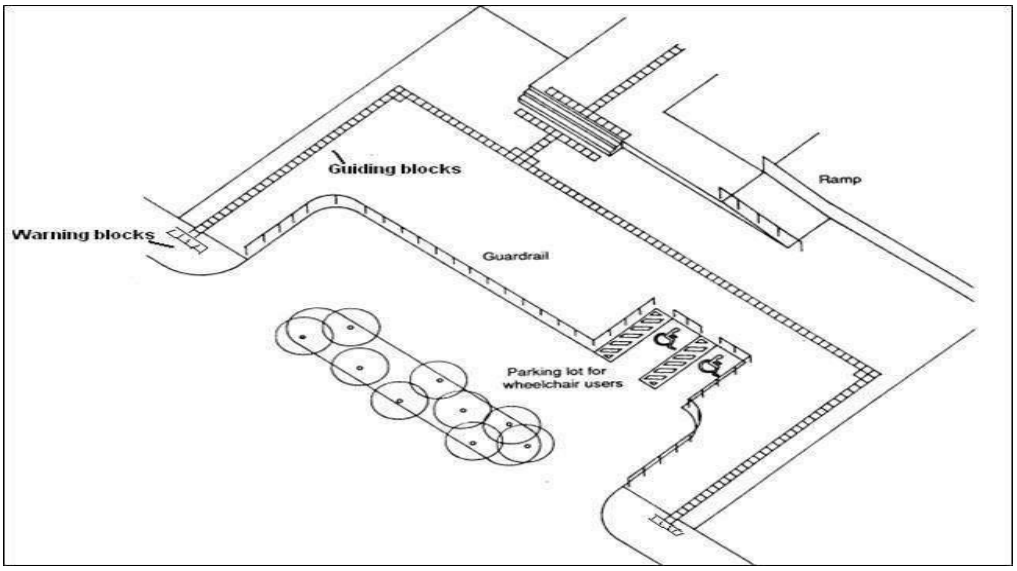
Accessible parking standards

Taxi/Auto Rickshaw Stands

General

At least one accessible route should be provided from the alighting and boarding point of the taxi stand to the walkway that leads to the accessible building entrance.
Directional signs should be installed to direct Persons with Disabilities to an accessible entrance.
Guiding blocks should be provided along the accessible walkway from the taxi stand to the building entrance for the aid of persons with vision impairments.

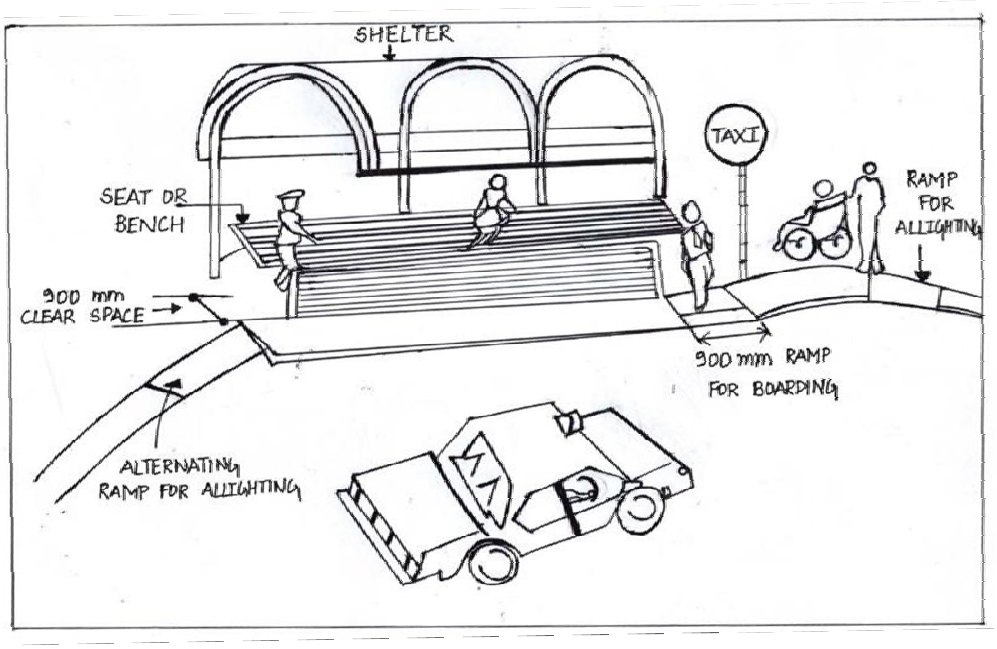
The sign indicating the presence of a Taxi/Auto Rickshaw Stand shall be on a vertical pole and the sign should be visible after dark (35 – 40 Lux).
A taxi bay should, where possible be provided at the level of approach or Persons with Disabilities to alight and to board the vehicle.
Where transfer has to be made from a vehicular surface to a pedestrian surface, the driveway, pathway or walkway should be blended to a common level or be ramped.



General plan of parking

Passage Way

Continuity of the pedestrian pathway shall be maintained to a minimum width of 1200mm behind the taxi stand.



Layout for accessible taxi/car boarding

Signage

International symbol of accessibility (wheelchair sign) should be displayed at approaches and entrances to car parks to indicate the provision of accessible parking lot for Persons with Disabilities within the vicinity.

Directional signs shall be displayed at points where there is a change of direction to direct Persons with Disabilities to the accessible parking lot.

Where the location of the accessible parking lot is not obvious or is distant from the approach viewpoints, the directional signs shall be placed along the route leading to the accessible parking lot.

Accessible parking lot should be identifiable by the International Symbol of Accessibility in accordance to the Section. The signs should not be obscured by a vehicle parked in the designated lot.

Vertical signs shall be provided, to make it easily visible, the sign should be at a minimum height of 2000 mm.

Walks and paths

Walks should be smooth, hard and have levelled surface suitable for walking and wheeling. Irregular surfaces as cobble stones coarsely exposed aggregate concrete, bricks etc. often cause bumpy rides and should be avoided

Minimum walk way width for two-way traffic should be 1800mm. However, in exceptional cases (such as around trees/poles etc.); the width could be 1500mm.

The walkway should not have a gradient exceeding 1:20. It also refers to cross slope.

When walks exceed 60 meter in length it is desirable to provide rest area adjacent to the walk at convenient intervals of 30 meter for bench/ resting seats. For comfort, seat height should be between 450 mm-500 mm, have a backrest and hand rests at 700 mm height.

Texture change should be provided for persons with vision impairment in walkways adjacent to seating by means of warning tactile pavers.
Avoid gratings and manholes in walks.

Levels, grooves and gratings

Passing over different levels and grooves, vertical level changes up to 6 mm may not need edge treatment. Changes in level between 6 mm and 12 mm should be leveled off with a slope no greater than.

To prevent a wheelchair from getting its casters caught in a drainage ditch or grating cover, install grating with a narrow slot not more than 10mm wide, perpendicular to the direction of movement.
Grating should be flushed with finished ground level.
Treat the grating with a non-slip finish.

Tactile pavers: guiding & warning blocks

Tactile guiding blocks (Line-type)

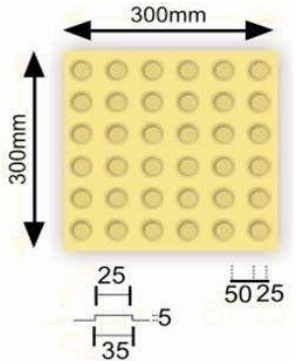
This block indicates a correct path/route to follow for a person with visual impairment. It is recommended to install one/two rows of tactile guidance tiles along the entire length of the proposed accessible route (Care must be taken to ensure that there are no obstacles, such as trees, poles or uneven surfaces, along the route traversed

by the guidance blocks. Also, there should be clear headroom of at least meters height above the tactile guidance blocks, free of protruding objects such as overhanging tree branches and signage, along the entire length of the walk.

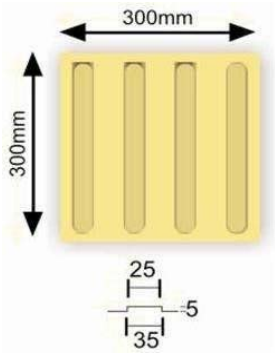
Tactile warning blocks (Dot-type)

This block indicates an approaching potential hazard or a change in direction of the walkway, and serve as a warning of the approaching danger to persons with visual impairments, preparing them to tread cautiously and expect obstacles along the travel path, traffic intersections, doorways, etc. They are used to screen off obstacles, drop-offs or other hazards, to discourage movement in an incorrect direction, and to warn of a corner or junction. Two rows of tactile warning tiles should be installed across the entire width of the designated accessible pathway, before intersections, building entrances, obstacles such as trees, and each time the walkway changes direction. Warning blocks should be placed 300mm at the beginning and end of the ramps & stairs, at landings and entrance to any door.

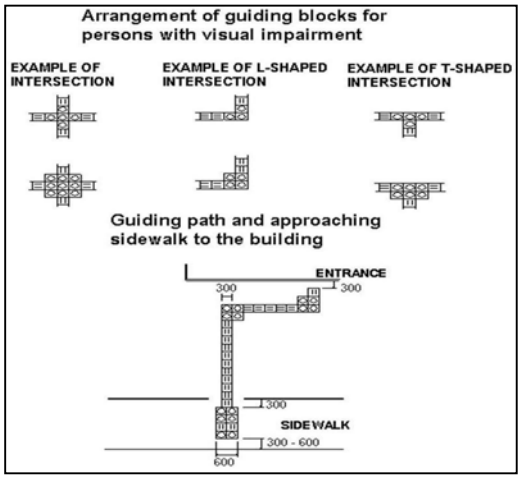
Chequered tile on footpath



Warning blocks



Guiding blocks



Configuration and layout of tactile pavers: guiding and warning

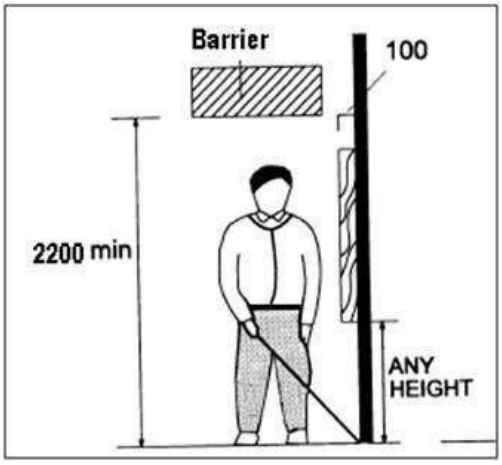
Figure: Bollards with spacing for wheelchair users/prams

Protruding objects

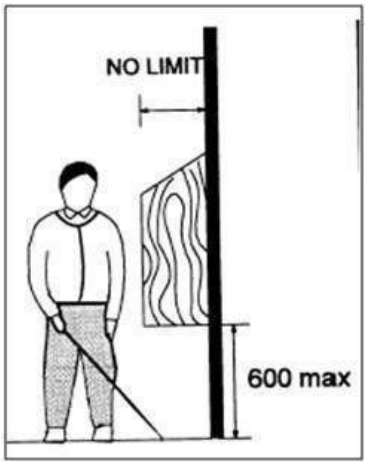
Objects projecting with the lower edge of the projection at or below 300 mm and upper edge of the projection minimally 1200 mm above the finished walk surface are detectable by the white cane, and these may protrude into the walks to an extent that allows wheelchair passage.

Objects mounted with their leading edges between 300 mm and 2200 mm above the finished walk surface should not protrude more than 100 mm into the walks.

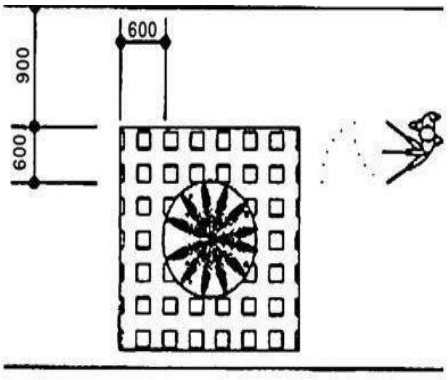
Hazard protection should be provided if objects project more than 100 mm into an access route and their lower edge is more than 300 mm above the ground. Hazard protection associated with such objects should take the form of a kerb or other solid barrier so that person with visual impairment can detect the hazard using a cane. The hazard protection should not extend beyond the front edge of the object, nor should it be set back more than 100 mm from its front edge.



Protruding obstacles placed in a niche



Clearance from protruding obstacles



Placement of obstacles outside path of travel

Transport and road planning

Sidewalks / Footpaths Sidewalk should:

Have non-slip floor surface;
Be along the entire length of the road;
Be not more than 150mm high;
Be at least 1800 mm wide;
Have tactile guiding blocks for persons with visual impairments;
Preferably have well defined edges of paths and routes by use of different colors and textures;
Have no obstacles or projections along the pathway. If this is unavoidable, there should be clear headroom of at least 2000 mm from the floor level;
Have tactile warning blocks installed next to all entry and exit points from the pathway.

Road Intersections

Pedestrian crossings should be equipped with traffic control signal;
Constructing traffic islands to reduce the length of the crossing is recommended
Guide strips should be constructed to indicate the position of pedestrian crossings for the benefit of people with visual impairments;

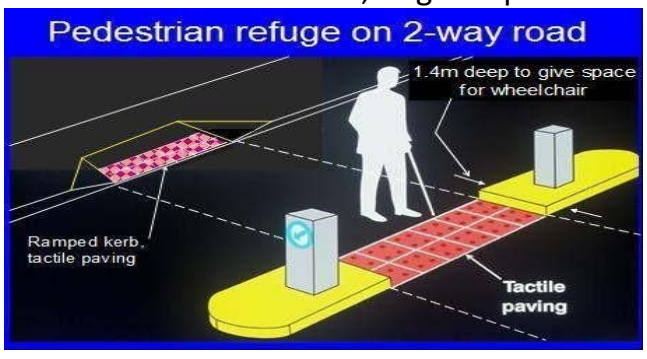
Road bumps are helpful in reducing the speed of traffic approaching the intersection.

Median Refuge/Islands

Raised islands in crossings should: -

Be cut through and level with the street have kerb ramps, complying with Norms at both the sides and have a level area of not less than 1500 mm long in the middle.

A colored tactile marking strip at least 600 mm wide should mark the beginning and the end of a traffic island, to guide pedestrian with visual impairments to its location



Median refuge/island

Traffic signals

Pedestrian traffic lights should be provided with clearly audible signals for the benefit of pedestrians with visual impairments.
Acoustic devices should be installed on a pole at the point of origin of crossing and not at the point of destination.

The installation of two adjacent acoustic devices such as beepers is not recommended in order to avoid disorientation.
The time interval allowed for crossing should be programmed according to the slowest crossing persons.
Acoustical signals encourage safer crossing behavior among children as well.

Kerb ramp

Inaccessible routes due to differences in level.
Inaccessible building entrances due to difference between indoor and outdoor levels
Very steep and/or long ramps with no resting landings.

Design Considerations

An exterior location is preferred for ramps to provide wheelchair access to different floors.
Indoor ramps are not recommended because they take up a great deal of space. Ideally, the entrance to a ramp should be immediately adjacent to the stairs.

Ramp configuration

Ramps can have one of the following configurations:
Straight run 90 turn
Switch back or 180 turn

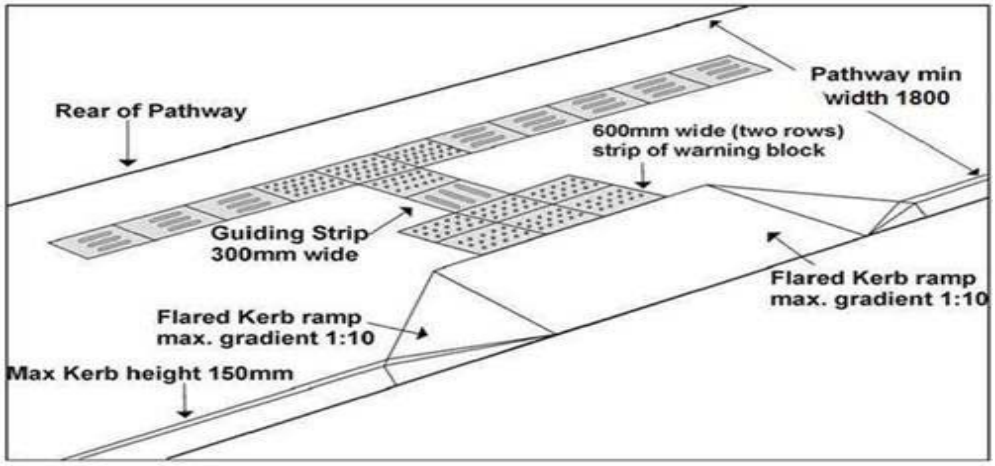
Where pathways meet the road a kerb ramp is required. The kerb ramp should conform to specification given in. Where pathways meet the road / a kerb ramp is provided and any crossing involved, a tactile pathway along the road crossing shall be provided for persons with visual impairments.

Level changes

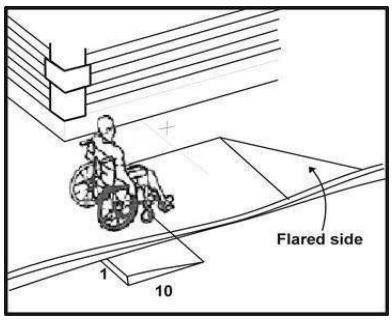
Kerb ramps

are provided where the vertical rise is less than 150 mm;
should have a slip-resistant surface;
should be designed not to allow water accumulating on the walking surface;

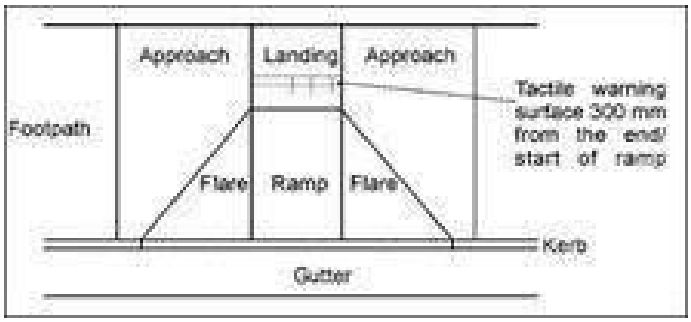
do not require handrails;
should not project into the road surface;
should be located or protected to prevent obstruction by parked vehicles; and should be free from any obstruction such as signposts, traffic lights, etc.



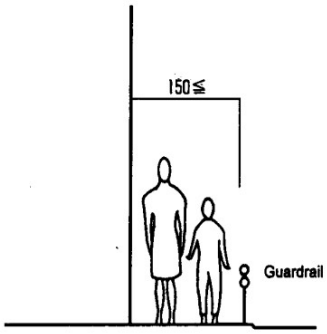
Kerb ramp detail

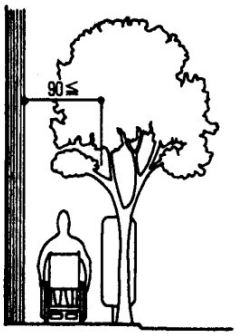


Kerb extension at street



Typical Curb Ramp Requirements intersection





Sidewalk width

LEVELS AND GROOVES

(Passing over different levels and grooves)

* The casters on a wheelchair are about 180 mm in diameter. Therefore, a wheelchair can only get over a small level difference.
* Use a method that can reduce the height of the level difference, in addition to the methods shown here.

Difference in level

Shape of level difference

* It can be difficult to move a wheelchair if a caster is caught in a groove.

a. It is desirable that there is no difference in level. (If a difference is unavoidable, limit it to 20 mm or less.)

b. Round off or bevel the edge.

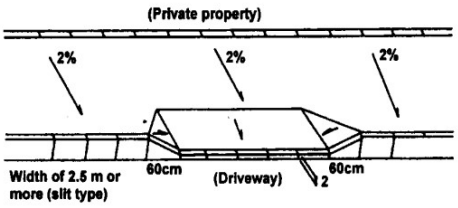
c. To prevent a wheelchair from getting its casters caught in a drainage ditch or other cover.

   a. Install grating with narrow slots in the direction of movement.

   b. Treat the grating with a non-slip finish.

   c. Reduce the gap between an elevator floor and the landing.

KERB RAMP



Levels & Grooves

Gradient

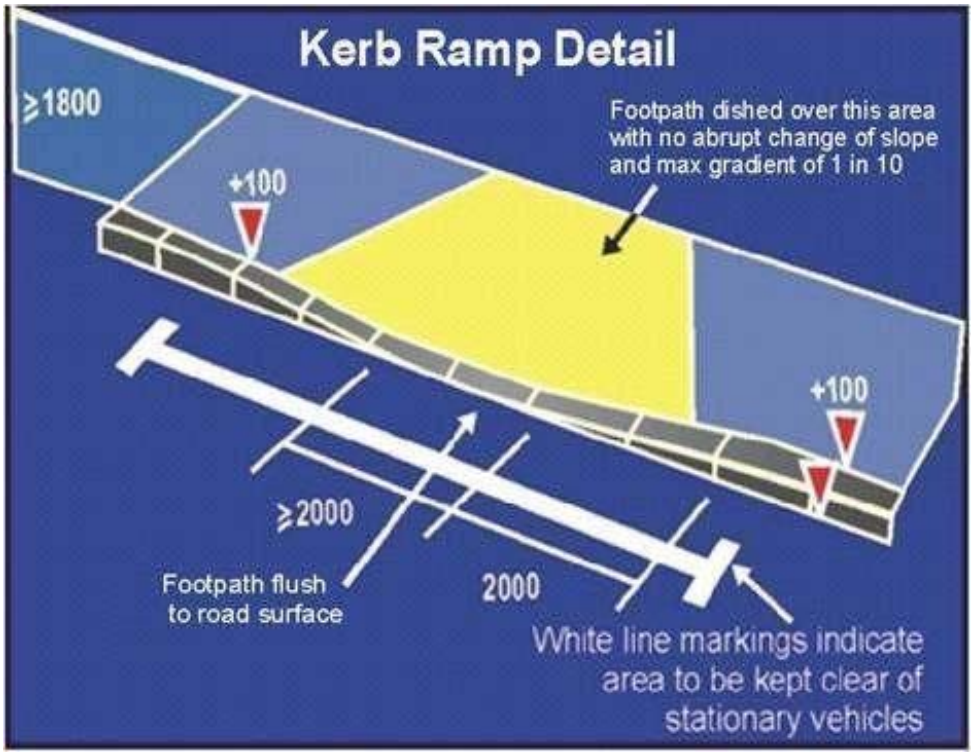
The gradient of a kerb ramp should not be steeper than the flared sides should not be more than 1:10.

Width

The width should not be less than 900mm min.

Flared Sides

Kerb ramps should have flared sides where pedestrians are likely to walk across them as shown in the figures.
The gradient of the flared side should not be steeper than 1:10.



Kerb ramp detail

Ramps

General

Ramps allow persons in wheelchair to move from one level to another. However, many ambulant Persons with Disabilities negotiate steps more easily and safely. Hence, it is preferable to provide accessibility by both steps and ramps.
Where the horizontal run of the approach ramp exceeds 9000 mm length, an alternative stepped approach in addition to the ramp approach, should be provided for people with ambulatory disabilities.

Where there is a large change in elevation that requires multiple ramps and landing combination, other solutions such as elevators should be considered.
Single row of tactile warning blocks should be placed at beginning and end of each ramp at also at the beginning and end of each run.

Gradient

It should be noted that the gradient should be constant between landings. The recommended gradients for ramps are given in the Table.

Level difference	Minimum gradient of Ramp	Ramp Width	Handrail on both sides	Comments
≥150 mm ≤300 mm	1:12	1200 mm	√	
≥ 300 mm ≤750 mm	1:12	1500 mm	√	Landings every 5 meters of ramp run.
≥750 mm ≤3000mm	1:15	1800 mm	√	Landings every 9 meters of ramp run.
≥ 3000 mm	1:20	1800 mm	√	Landings every 9 meters of ramp run.

Width

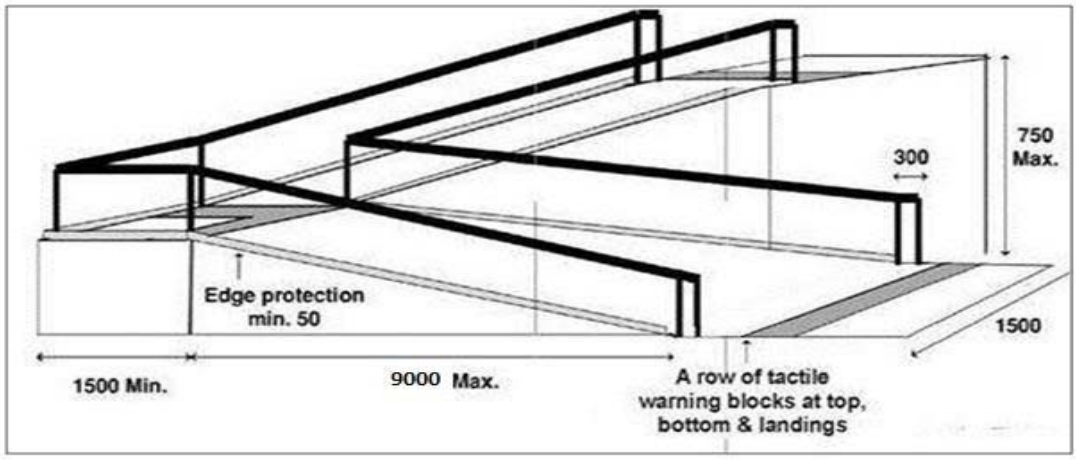
The minimum clear width of a ramp should be 1200 mm.

Surface

Ramps and landing surfaces should be slip resistant as described in the and
Outdoor ramps and their surface should be designed to prevent water from accumulating on the walking surfaces.

Landings

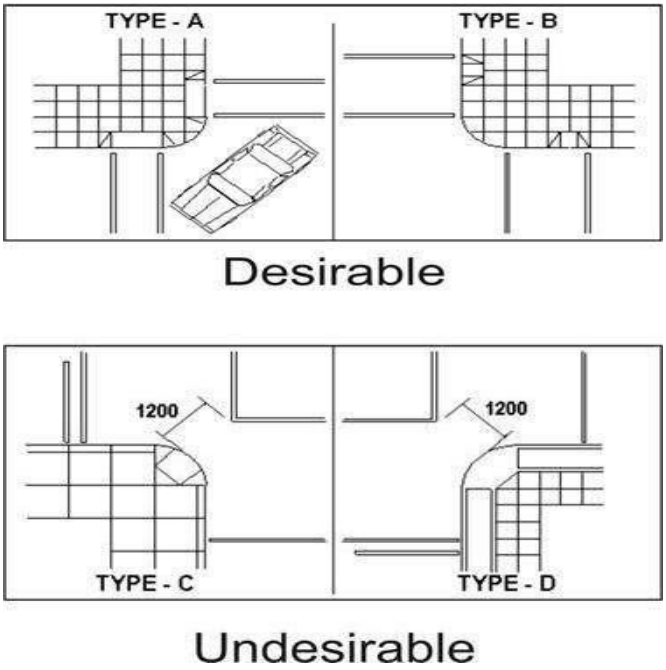
Ramps should have a level landing at the top and bottom of each run and also where the run changes direction as shown in the figure.
Landings should:-
Be provided at regular intervals of not more than 9000 mm of every horizontal run as shown in the figure.
Have a level platform of not less than 1500 mm.



L-shape ramp with landing

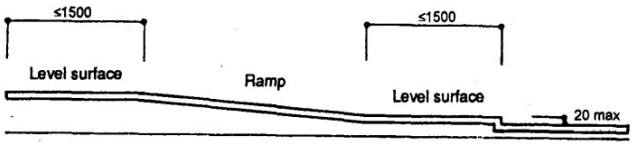
Kerb Ramps at Walkways and Pedestrian Crossings

Kerb ramp at pedestrian crossing should be wholly contained in the area designated for pedestrians use figure. At the pedestrian crossings, i.e. for the kerb ramps, tactile floor guidance should be provided. Zebra crossings should be in 3D texture to be easily detectable by persons with visual impairments.

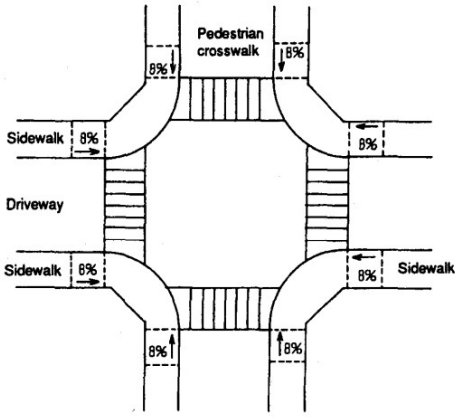


Kerb ramp placements at turnings

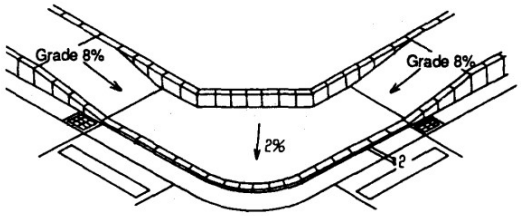
Road Crossing



Cross section of graded level differences



Sidewalk grading (at intersection)



Sidewalk Fences

Ramps & Road Crossing details

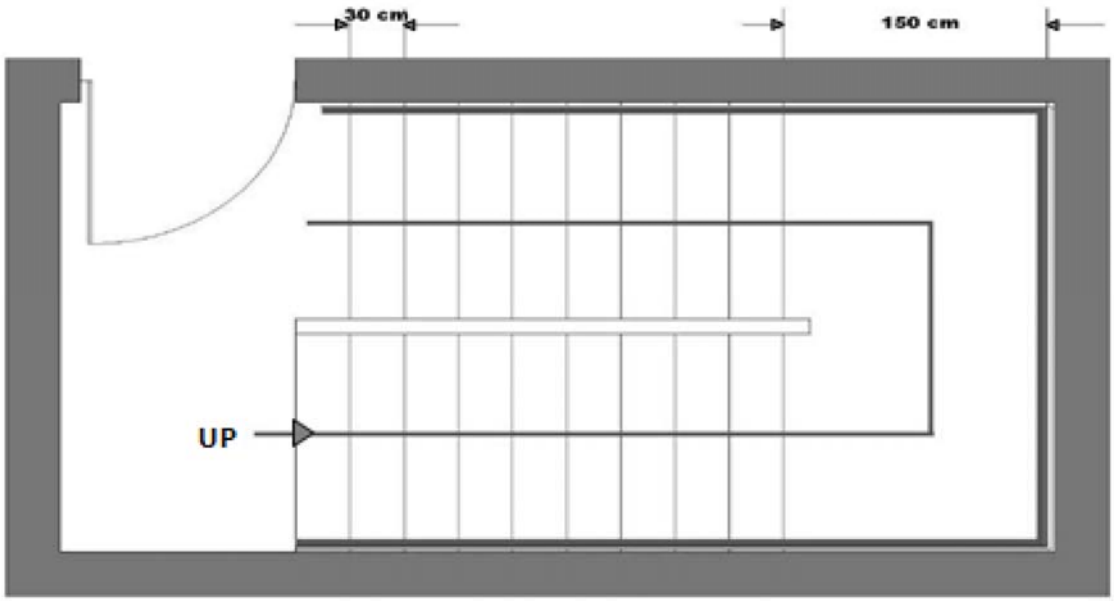
Stairs

Stairs should not be the only means of moving between floors. They should be supplemented by lifts/or ramps.

Treads should be 300 mm deep and risers not higher than 150 mm.
There should be no more than 12 risers in one flight run.
The stairs landing should be minimally 1200mm deep.
The stairs should have minimum 1500mm clear width.
Steps should be of a consistent height and depth throughout the staircase.
Projecting nosing and open stairs should not be provided to minimize the risk of stumbling. Also, spiral stairs should be avoided.

Handrail for stairs should: o Comply with Section.

Extend not less than 300 mm beyond the top and bottom step

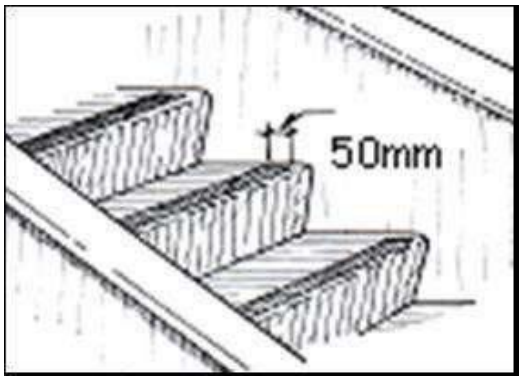


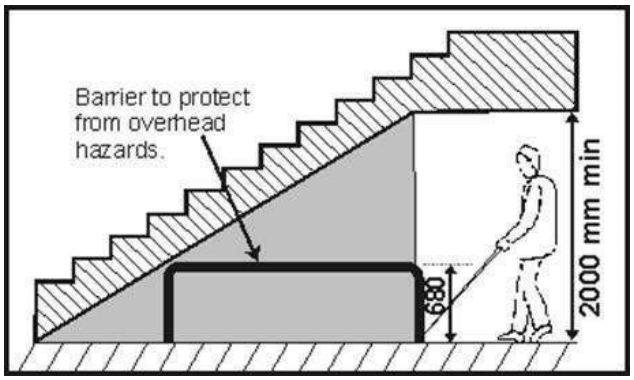
Continuous and extended handrail

Warning blocks should be installed 300 mm before the beginning and 300 mm after the end of each flight of steps to aid people with visual impairments complying.

There should be colour contrast between landings, and the steps.
Step edges must contrast in colour to the risers and the treads. Contrast colour bands 50 mm wide should be provided on edge of the tread.

Placement of warning blocks for steps **Warning blocks at landings**





Colour contrast for step edges **Guard rail under soffit**

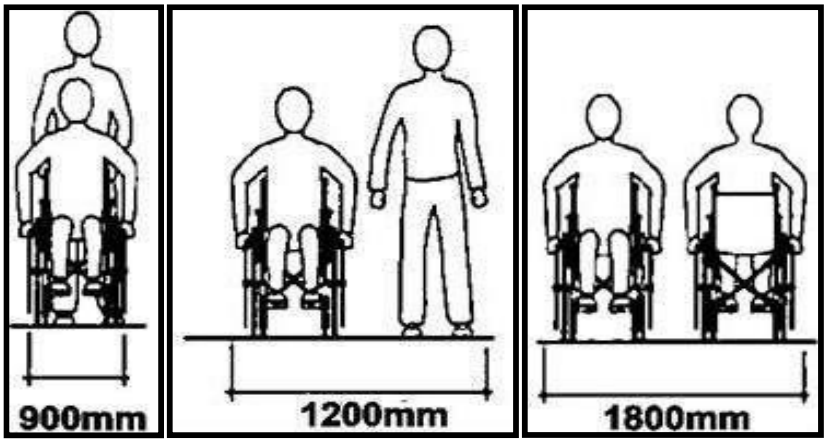
Typical detail of walkway

Minimum width of the walkway should be 900mm to 1800mm.

Walkway should be constructed with a non-slip material and surface should be different from rest of the area.

The walkway should be cross vehicular traffic.

Warning blocks at 300mm before and after finishing of the walkway should be provided.



Minimum width of a clear walkway

Lighting for walkways

Lighting should illuminate the walkway lighting fixtures not exceeding a height of 4m from ground level should be provided.

Lighting must be provided every 20 – 30m, focusing light not on the car lanes, but on the walkways.

A whiter light source, for example high-pressure sodium, is preferable in city and town centers for the aesthetic effect and for better colour definition, which benefits those with poor sight.

White lighting at average 35-40 lux is recommended to ensure colour contrast of tactile pavers and visible at night to persons with low vision.

Under no circumstances the lighting pole should interfere with the clearance of the walkway.

Light pole may preferably be located within the tree-planting zone.

Lower level light poles are preferred to avoid shadow where there are high trees.

Handrails / Grab Bars

General

Handrails/ grab bars are extremely important features and must be designed to be easy to grasp and to provide a firm and comfortable grip so that the hand can slide along the rail without obstruction.

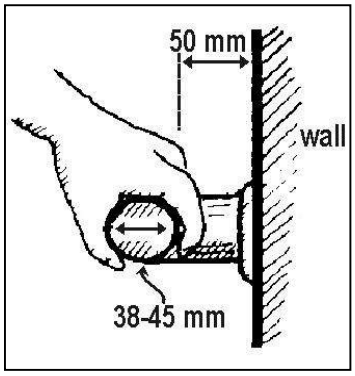
Many Persons with Disabilities and elderly rely upon handrails/ grab bars to maintain balance or prevent serious falls.

Handrails may be provided with Braille/ tactile markings at the beginning and the end to give information to people with visual impairment.

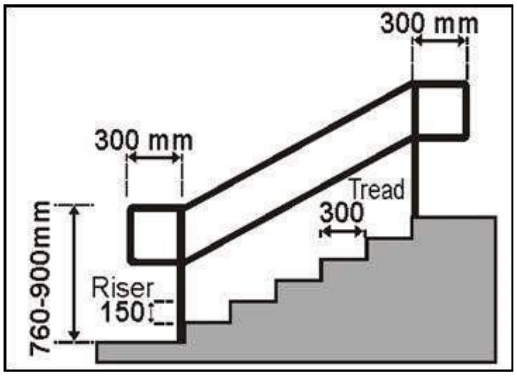
Handrail with Braille Information Panel

Handrail should:

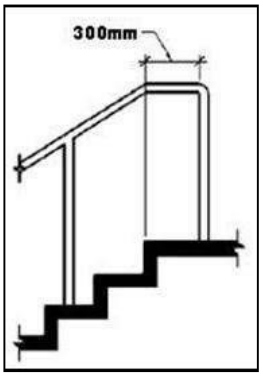
i. Be slip-resistant with round ends.
ii. have a circular section of 38-45 mm in diameter.
iii. have a minimum clear space of 50 mm from the walls.
iv. be free of any sharp or abrasive elements.
v. have continuous gripping surfaces, without interruptions or obstructions that can break a hand hold.



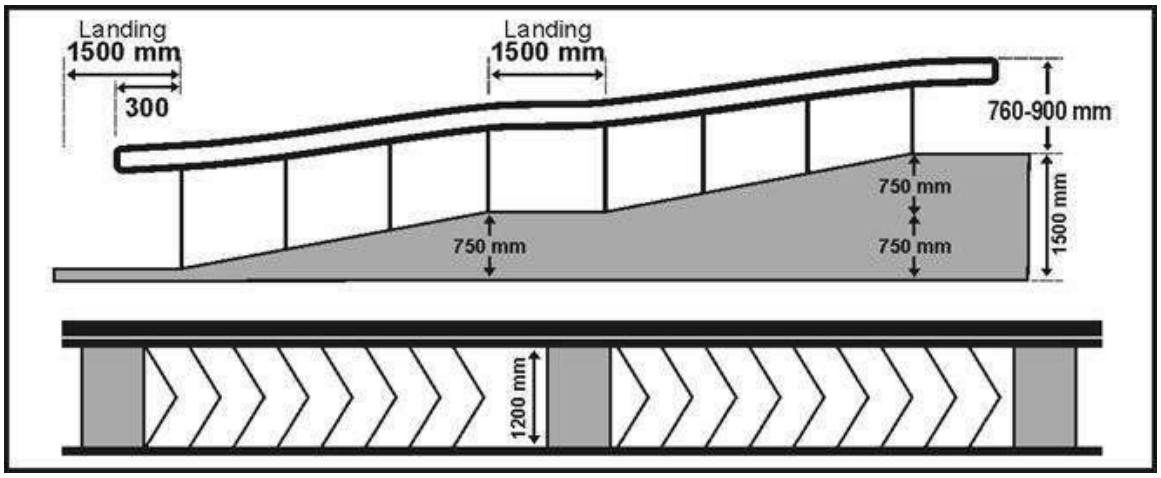
Grab bar details



Handrails for steps



Handrails for extension



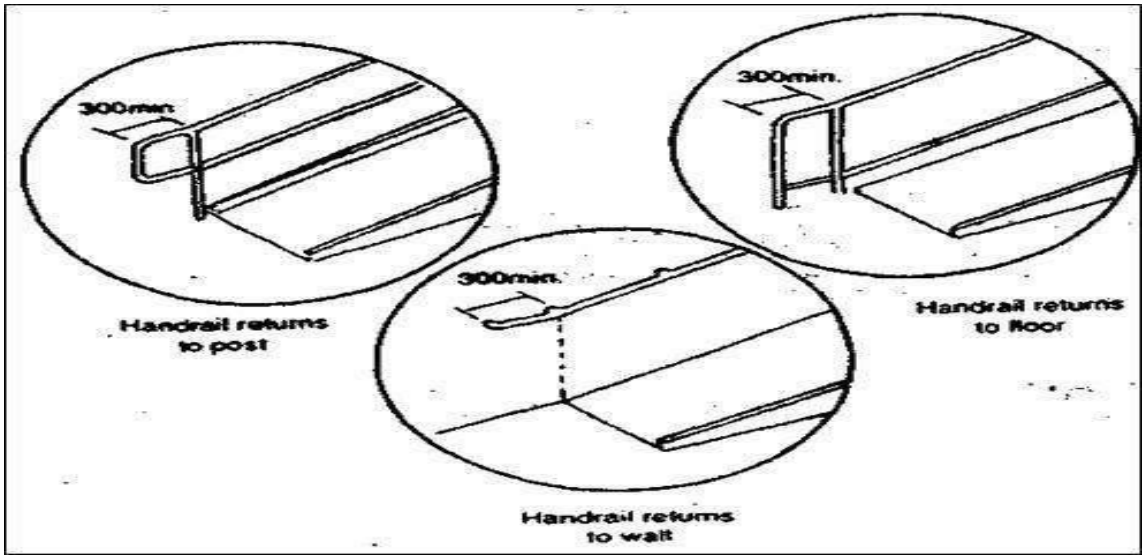
Handrails for ramps

Handrails Standards

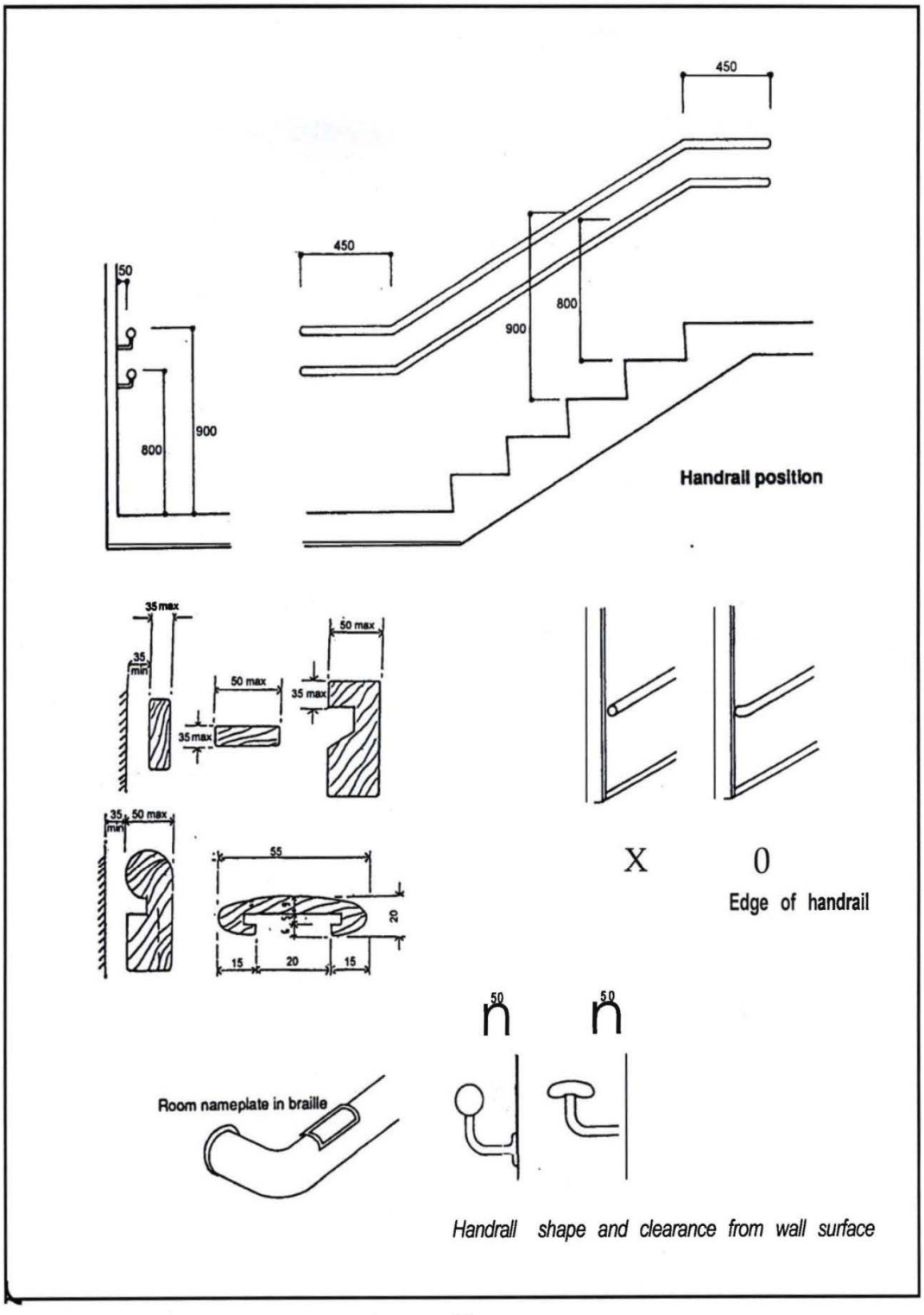
A ramp run with a vertical rise greater than 150 mm should have handrails that:
are on both the sides are placed at a height of between 760 mm and 900 mm above the floor level handrails must be continuous on both sides & even at landings.

Handrail extensions as shown in the Figures.

Extend horizontally for a distance of not less than 300 mm beyond the top and bottom of the ramp to provide support for persons who may need help to negotiate the ramp not project into another path of travel



Typical handrail extensions


450
450
50
800
900
800
900
Handrail position
35 max
35 min
50 max
35 max
50 max
35 max
35 min
50 max
55
20
15
20
15
X
0
Edge of handrail
50
50
Room nameplate in braille
Handrail shape and clearance from wall surface

Grab Bar

Grab bars/ rails should be manufactured from a material which contrasts with the wall finish
(or use dark tiles behind light coloured rails), be not too warm/cold to the touch and provide
good grip. It is essential that all grab rails are adequately fixed, since considerable pressure will be placed on the rail during maneuvering. In rural areas, indigenous materials such as bamboo/ wood/ other can be used for making grab bars in toilets.

Grab bars should: -

a. Be slip-resistant with round ends.
b. Preferably have knurled surfaces.
c. Have a circular section of 38-45 mm in diameter.
d. Be free of any sharp or abrasive elements.
e. Have a minimum clear space of 50 mm from the wall be installed at a height of 760 mm to 900 mm be able to bear a weight of 250 kg.

Infrastructure and Facilities – Terminal Building

Approaches

Approach to building

A passenger alighting and boarding point complying with
should be provided at the level of approach for Persons with Disabilities to alight from and board a vehicle.
Where transfers have to be made from a vehicular surface to a pedestrian surface, the driveway and the pavement or footpath surfaces should be blended to a common level or ramped.
Difference in level between the driveway and footpath level surface should be avoided. Where the difference is unavoidable, such drop shall have a kerb ramp

Passenger alighting and drop off points

A passenger alighting and boarding point as illustrated in the figure should:
provide an access aisle of at least 1500mm wide by 6000mm long adjacent and parallel to the vehicle pull-up space the accessible aisle must be at the same level as the vehicle have a kerb ramp complying with Norms.

Tactile floor guidance be provided from the building drop off area leading up to entrance of the building.

Access to building

An access route should be provided connecting all major entrances & exits of the building from the alighting and boarding point of taxi stands and car park lots for Persons with Disabilities.

In multi storey buildings, the accessible entrance must have an accessible route leading to the elevators.

The accessible entrance, if different from the main entrance, should be located adjacent to the main entrance and not at the rear of the building. The accessible entrance should be clearly signed and easy to locate.

Symbol should be displayed at all other non-accessible entrances to direct Persons with Disabilities to the accessible entrance.

A clear, firm and level landing of at least 1800mm x 1800mm should be provided on either side of the entrance door.

The clear width of the accessible entrance door should not be less than 900mm, preferable 1m and the width of the corridors or passageways leading to and from such access door should not be less than 1200mm.

Internal floor surfaces should be anti-skid/ non-slip and of materials that do not impede the movement of wheelchairs/other mobility aids. If mat is provided it should be flushed with the floor finish.

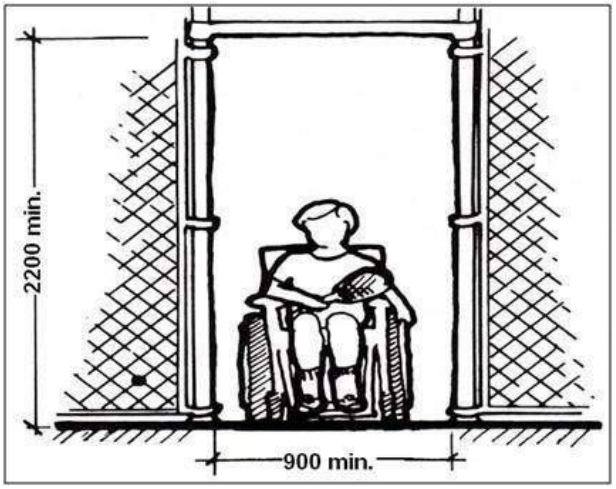
Persons with visual impairments find it easier to locate doors if there is a texture difference in the floor around the doorway from the rest of the flooring. It is generally good practice to recess foot mats in the floor on either side of the door but care must be taken to ensure that the top end of the mats are flush with the rest of the flooring.

In addition to tactile pavers leading to the main entrances, beepers may be put at all main entrances to enable people with visual impairments to locate them.

A tactile layout plan of the building along with Braille and audio systems should be provided at the entrance for people with visual impairments.

Glazed entrance doors must have manifestations on the glass preferably at two levels i.e. one between 800 to 1000mm and another between 1400 to 1600mm above the floor.

The manifestation should be contrasting in colour from the immediate background and be minimally 1500 mm high.



Space allowances

For persons using mobility aids/ white cane, space allowance complying with Section should be provided.

Floor surfaces

Floor surface should be stable, firm, level and slip-resistant and preferably matt finish and should not have any projections, drops, or unexpected variation in level.

Also:

Complex patterns should be avoided.
Floor patterns that could be mistaken for steps, for example stripes, should not be used for floors in corridors.
Floors should be levelled. If this is unavoidable, the slope of floors should be no greater than 1:20. If greater, floor should be designed as ramp.
For people with low vision, lines of brightly coloured tape may be placed on the floor surface to assist mobility in poorly lighted areas.
Where carpets are used in circulation area, they should:
Be securely fixed

Have firm cushion, pad or backing; and
Have exposed edges of carpets fastened to floor surface and trim along the entire length of the exposed edge.

Internal Corridors and Accessible Routes

The minimum clear width of an accessible route should be1500mm minimum to allow both a wheelchair and a walking person to pass except when additional manoeuvring space is required at doorways.

Where space is required for two wheelchairs to pass, the minimum clear width should be 1800mm.

Resting benches/seats

In long paths of travel resting areas should be provided at frequent intervals not exceeding 30 meters complying with norms

Protruding objects

Obstacles, projections or other protrusions should be avoided in pedestrian areas such as walkways, halls, corridors, passageways or aisles

Floor surfaces in corridors

Avoid carpeting. If carpet is used, it should be fixed firmly with a pile not higher than 12mm

Doors leading into corridors

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

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

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

The leading edge of any door that is likely to be held open should “contrast visually” with the remaining surfaces of the door and its surroundings to help

identification by visually impaired people. The architrave should contrast visually with the wall surfaces surrounding the doorway.

Tactile guidance Path along the internal corridors and accessible routes

Along the accessible corridor and route connecting the entire building, a tactile floor guidance path for independent movement of persons with visual impairments should be provided. Tactile guidance path have to be laid out in the entire building premises connecting all the public utilities and locations and building entrance and exits.

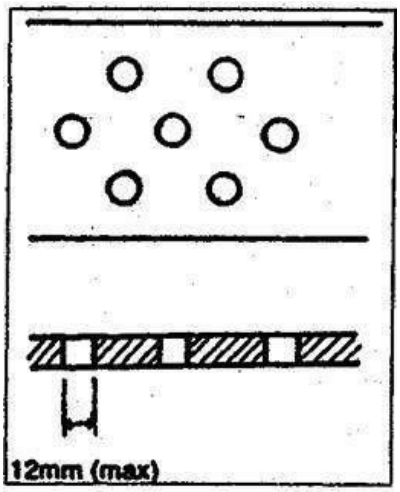
Gratings

Grating located along the exterior circulation should:

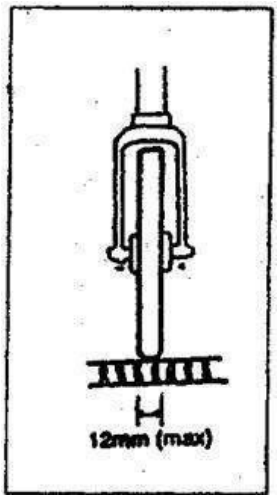
Preferably be covered;

Have spaces not greater than 12 mm wide in one direction and

Have long dimension across the dominant direction of travel as illustrated in the figure

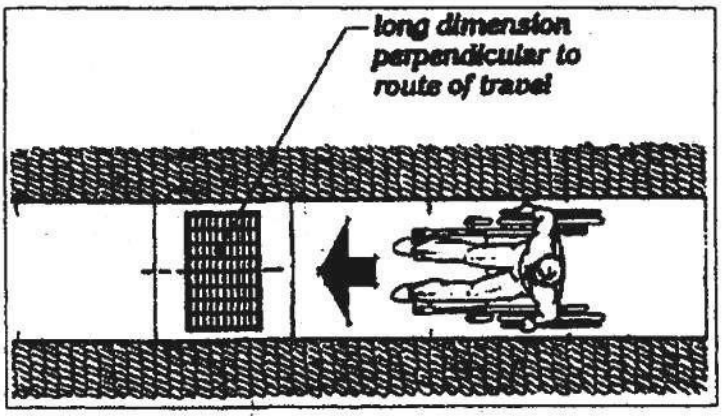


Grating Width
Width



Wheelchair Castor

Preferred design of gratings



Installation Guide

Doors

General

Doorways should be levelled.

Wherever revolving doors or turnstiles are installed they should be supplemented with an auxiliary side-hung (swing type) door with 900mm minimum clear opening width.

Bathroom (toilets/washroom) doors should swing out/ should be two way opening type so that the person inside does not fall against the door and block it.

In case there is not much space available, consideration should be given to the use of sliding or folding doors, which are easier to operate and require less wheelchair manoeuvring space.

Door should not be too heavy to operate and should not require a force of more than 20 N to operate.

Automatic doors should have a push button system to open them.
All external doors should have warning blocks installed 300mm before entrances.

Clear width

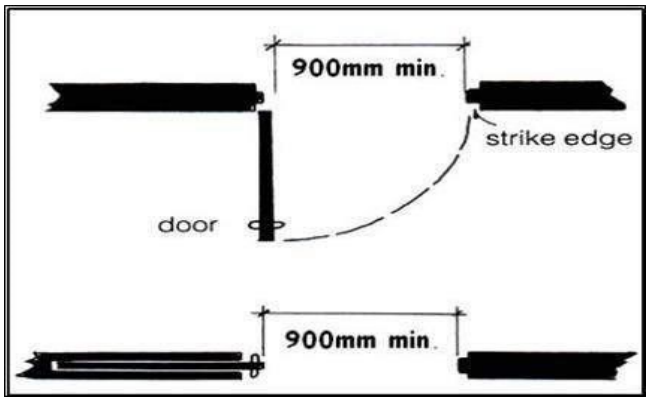
The minimum clear opening of doorways should be 900mm, measured between the face of the door and the face of the door stop with the door open at 90^{0}.

Thresholds

There should be no thresholds. If thresholds are unavoidable, they should not exceed 12 mm and those exceeding 5 mm should be bevelled.

Double-leaf doors

In case the door has two independently operated door leaves, at least one active leaf should comply with required norms



Clear door width

Manoeuvring space at doors

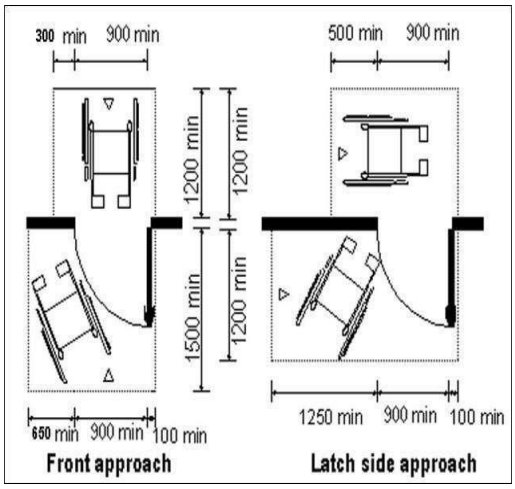
A distance of 650 mm should be provided beyond the leading edge of door to enable a wheelchair user to maneuver and to reach the handle.

Wheelchair manoeuvring spaces should be free of any obstructions and space should be provided on the side of the door handle in the following manner:

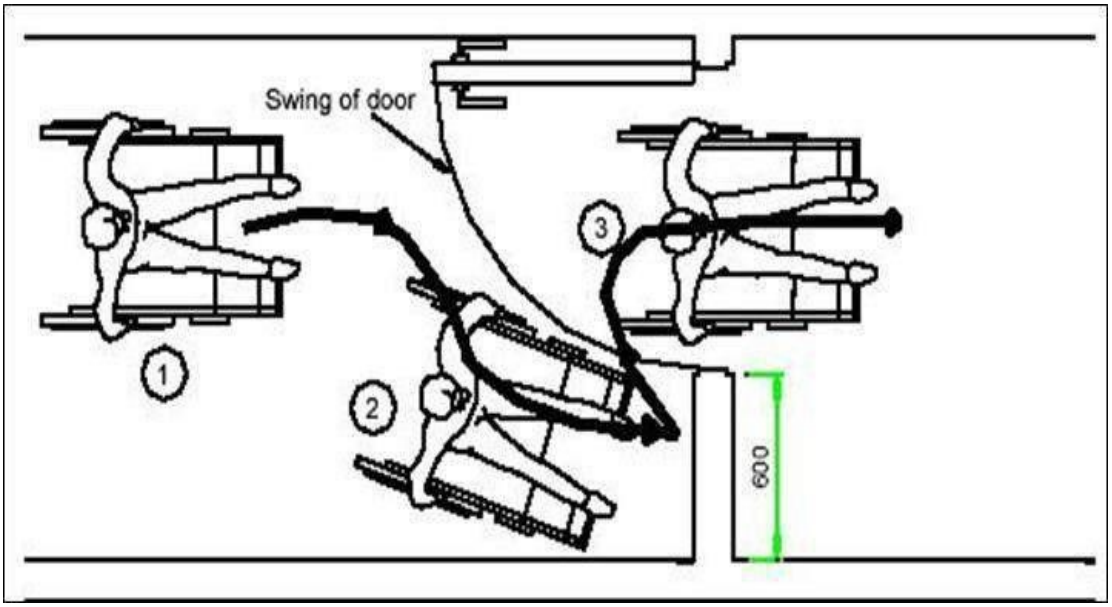
On the pull side, a minimum space of 650 mm;

On the push side, a minimum space of 300 mm; -

For two-way swing door, a minimum space of 300mm.



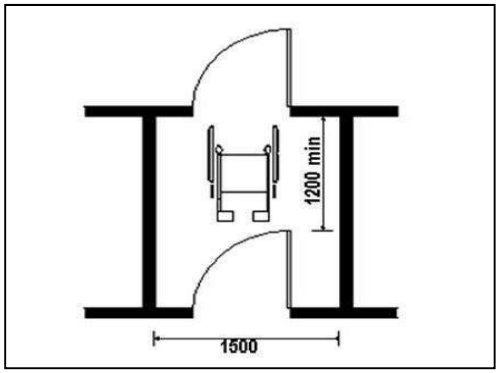
Maneuvering space needed for wheelchair users to approach doors



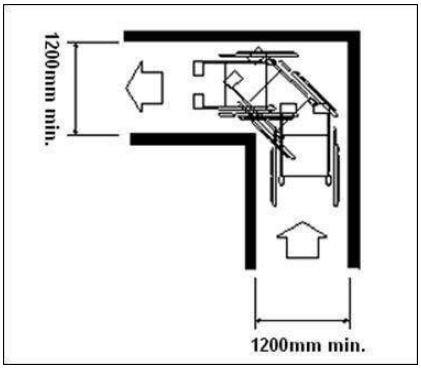
Position taken by wheelchair when negotiating door in passageway

Two doors in series

The minimum space between two hinged or pivoted doors in series should be 1200 mm plus the width of the door swinging into that space.



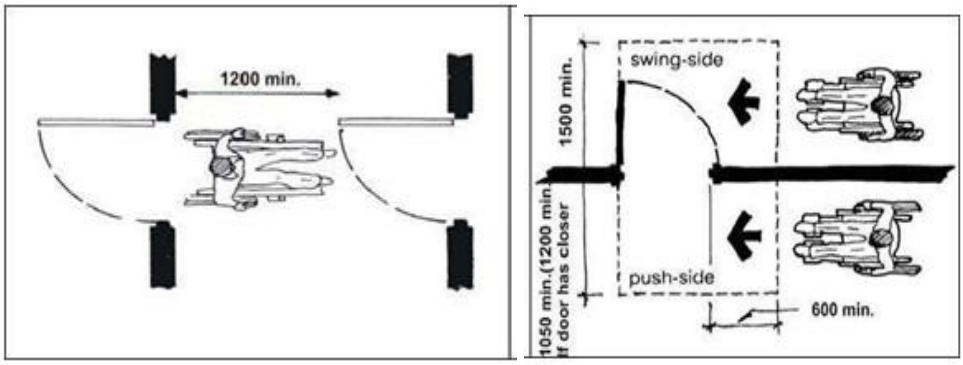
Space between two doors



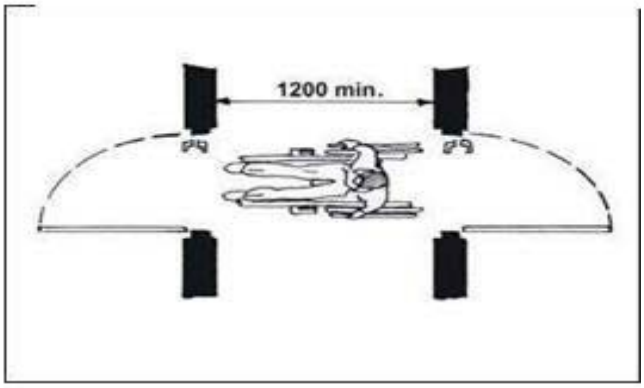
Space for wheelchair in 90^0 turn

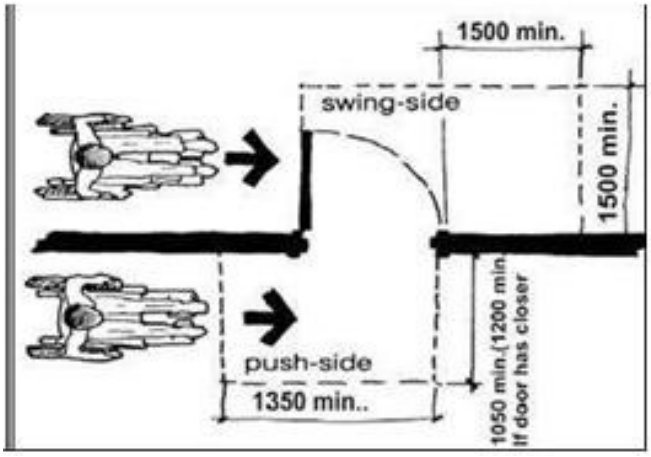
Wheelchair maneouvering space

To enable wheelchair users to approach doors maneouvering space is needed Corridor should have a width of at least 1200 mm to allow a 90° turn to be made through a door. In narrow spaces sliding doors may be preferable.



Maneuvering space needed for wheelchair users to approach doors





Maneuvering space needed for approach doors

Door hardware

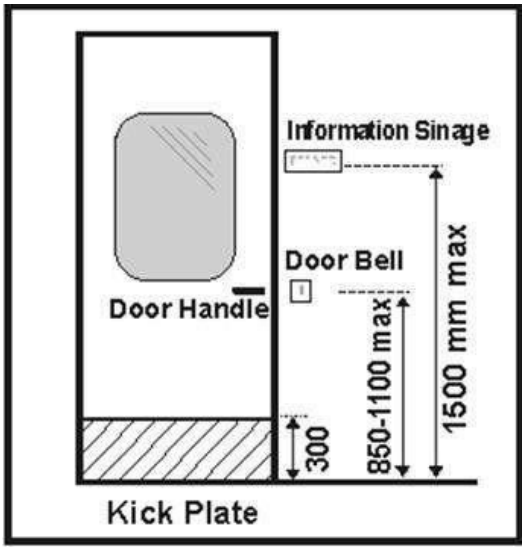
Operable devices such as handles, pulls, latches and locks should:-

Be operable by one hand;

Not require fine finger control, tight grasping, pinching or twisting to operate; and Be mounted at a height of 850 mm to 1100mm from the floor.

For easy identification by persons with visual impairment all door furniture should contrast visually with the surface of the door.

The location and design of latch and push/pull handles should be consistent throughout a building.
To facilitate the closing of a door by wheelchair users (for example, a water- closet compartment, that does not have a self-closing mechanism), the door should have a horizontal handle, provided on the closing face of the door, approximately 760 mm from the floor.

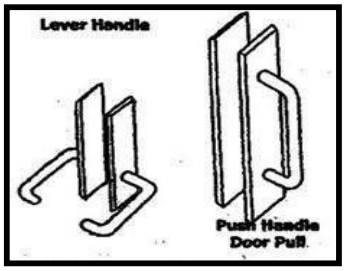


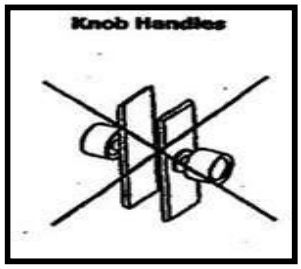
Door hardware location

Door handles

The following characteristics are recommended:

Push –pull mechanisms that require no grasping;
Lever handles to be preferred on latched doors;
It is safer to use D shaped handles as they reduce the risk of catching on clothing, or injuring from the exposed lever end.
Doorknob is not recommended, as it does not provide adequate grip for persons with impaired





hand f unctions.

Sliding/folding doors

Operating hardware should be exposed and usable from both the sides when the door is fully open.

Door opening force

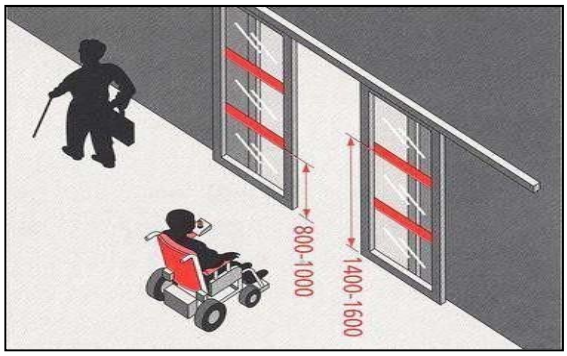
The maximum force for pushing or pulling or sliding a door should be 20N.

Door closure

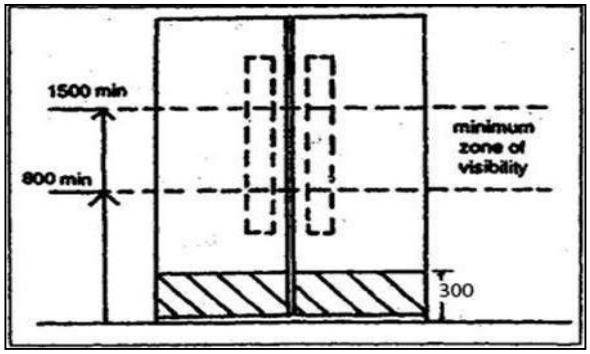
The sweep period of the door should be adjusted, so that from an open position of 90degrees the door does not take less than 3 seconds to move to a semi-closed position.

Vision panel

All two-way swing doors or doors in general circulation areas should be provided with vision panels giving a visibility from a height of 800 mm to 1500 mm. This will enable both the wheelchair user and the ambulatory disabled to be noticed by a person on the opposite side in order to prevent him/her from being accidentally struck by the door.



Glass door markings



Recommended visibility zone

Kick-plate

Kick- plates of 300-400 mm height are recommended for doors in high- use in order to protect the push side of doors from damage.

Door identification

To help people with impaired sight to see doors, the door and frame should be in a colour which contrasts with the adjoining wall.

The door should not be of a highly polished/ reflective material such as stainless steel.

Glass doors

The presence of a glass door should be made apparent, with permanent manifestation at two levels, within 800 mm to 1000 mm from the floor and within 1400 mm to 1600 mm from the floor contrasting visually with the background seen through the glass in all light conditions. The edges of a glass door should also be apparent when the door is open.

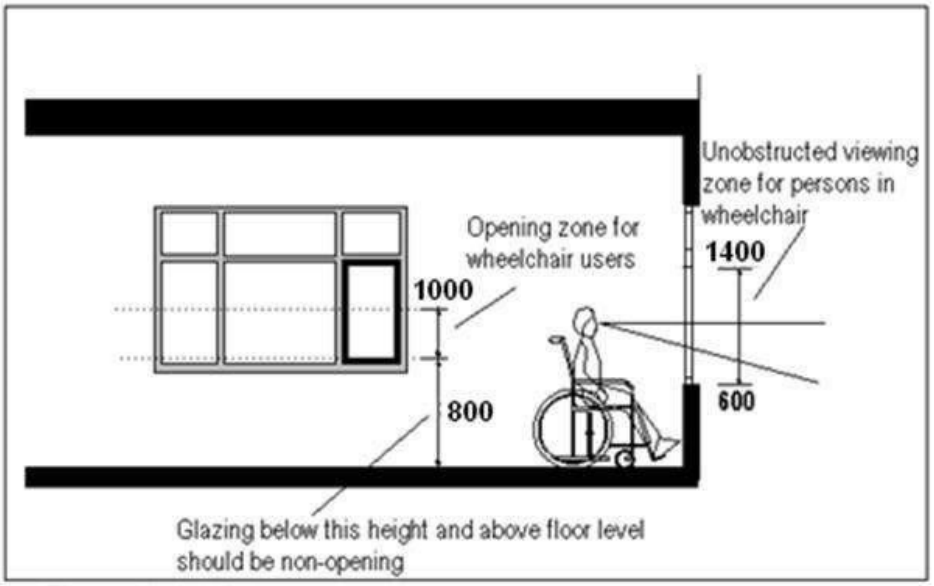
Note: If a glass door is adjacent to, or is incorporated within, a fully glazed wall, the door and wall should be clearly differentiated from one another, with the door more prominent. To achieve this, the door may be framed on both sides and the top by an opaque high-contrast strip at least 25 mm wide.

Windows

Windows should have handles/ controls in accordance.

Should provide an unobstructed viewing zone for wheelchair users between 600mm and 1400mm.

Curtain or Venetian blind controls/ropes should be at 800-1000 mm height from the finished floor level for wheelchair users/short stature persons.



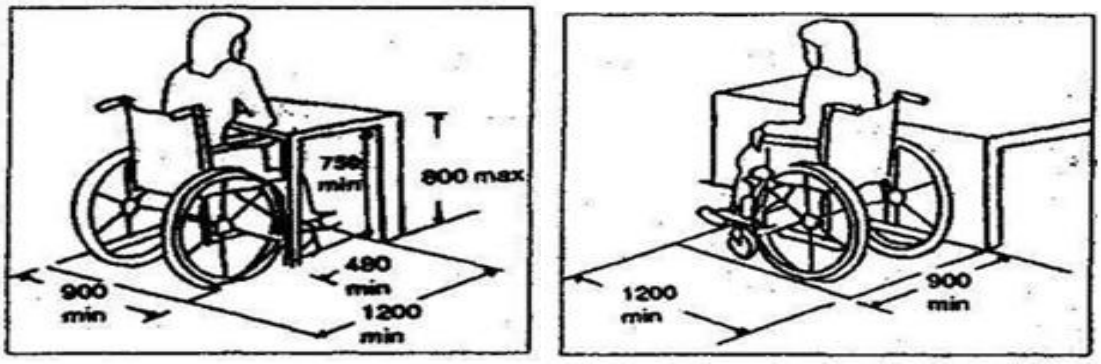
Standards for accessible window

Controls and Operating Mechanism

Clear Floor Space

A clear and level floor space of at least 900 mm x 1200 mm should be provided at controls and operating mechanisms designated for use by Persons with Disabilities.

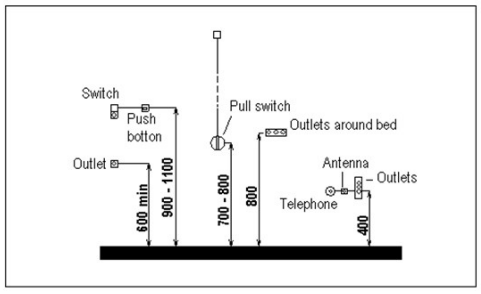
Where a forward approach is used, a clear knee space of at least 900 mm wide, 480 mm deep and 650 mm high should be provided, which may overlap the clear floor space by a maximum of 480 mm.



Space clearance for control operations

Electrical points, Controls and Outlets

The operable part of controls such as vending machines, electrical switches, wall sockets and intercom buttons should be:
located adjacent to the clear floor space;
located at a height of between 600 mm to 1100 mm from the floor with the exception of vending machines where the upper limit is relax- able by a maximum of 100 mm;
to cater for wheelchair users, controls should be placed not less than 400 mm from room corners.;
operable by one hand;
of a type that does not require tight grasping, pinching or twisting of the wrist; and operable with a force less than 22N.



Location of Electricals Sockets, Controls, etc.

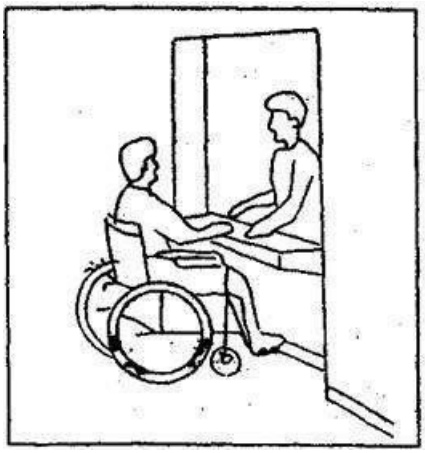
Reservation and Information Counters

Should have clear floor space of at least 900 mm x 1200 mm in front of the counters;

There should be at least one low counter at a height of 750 mm to 800 mm from the floor with clear knee space of 750 mm high by 900 mm wide by 480 mm deep.

At least one of the counters should have an induction loop unit to aid people with hearing impairments; and

The counters should have pictographic maps indicating all the services offered at the counter and at least one of the counter staff should be sign language literate.



Reservation and Information Counters

Ticket Gates

At least one of the ticket gates should: -

Be minimum 900 mm wide to allow a wheelchair user through; and
Have a continuous line of guiding blocks for people with visual impairments.

Lifts

Lift signage

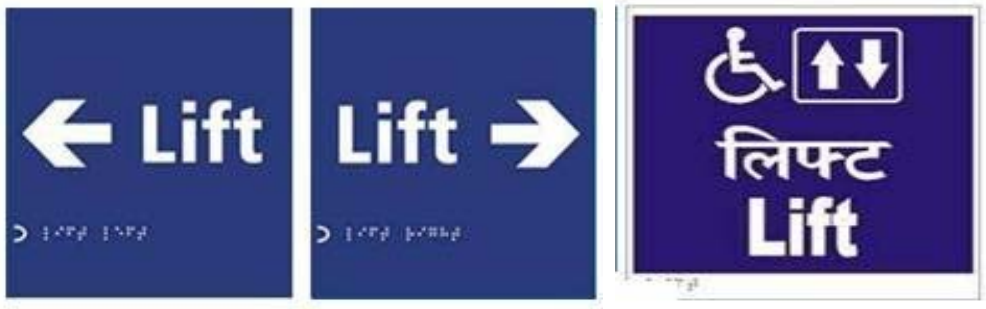
Where lifts are provided in a building they shall be accessible to and usable by Persons with Disabilities at all levels used by the general public or staff. Lifts should be marked with the symbol of accessibility and directional signs be provided to the lifts.

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

The sign should incorporate a representation of the International Symbol for Access).

A sign indicating the number of the floor should be provided on each lift landing on the wall opposite the lift. It is also recommended to install a floor directory of the

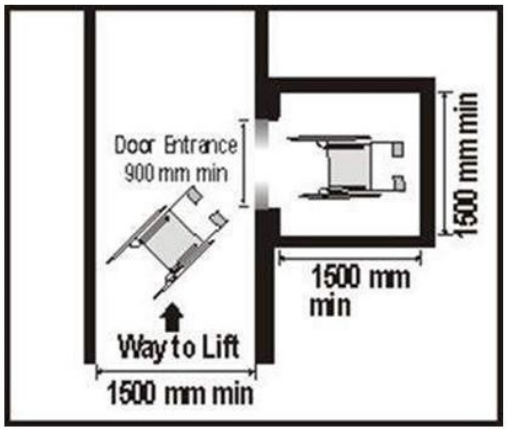
main facilities and services available on the lift landing, along with an accessible emergency egress route that clearly indicates the location of nearest refuge areas for Persons with Disabilities.



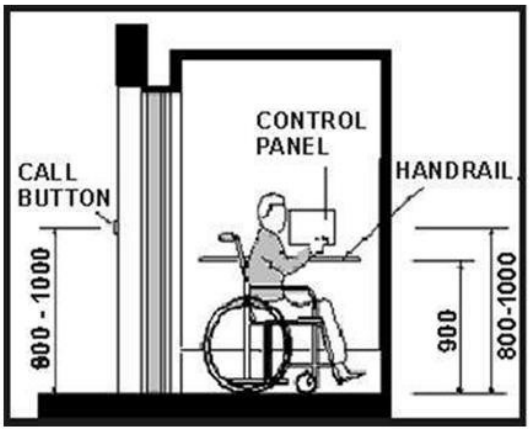
Way finding signage for lift location

Lift Size

The minimum size of the lift should be 1500 mm wide by 1500mm deep wherever possible, 13 passenger lift to be provided, which allows easy maneuverability of wheelchair user.



Size of Lift



Placement of Lift accessories

Door

The lift door should have a clear opening of not less than 900 mm and contrasting in colour from the adjoining wall.

There should be no difference in level between the lift door and the floor surface at each level. The gap between the lift door and building floor should not be more than 12 mm.

Time of closing of an automatic door should be more than 5 seconds and the closing speed should not exceed 0.25 meters per second.

Call Button

The call button located outside the lift should:

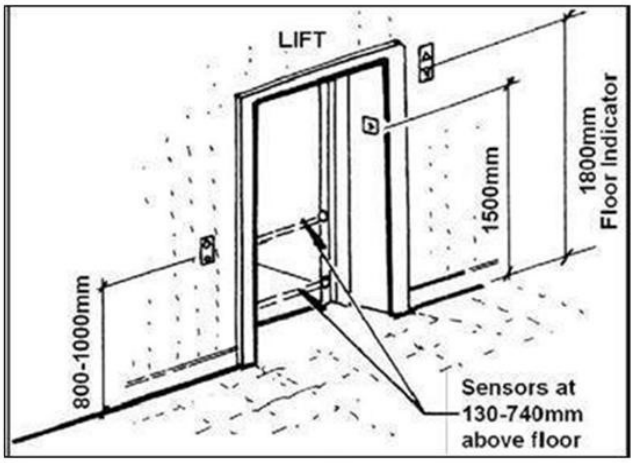
Have a clear floor space of at least 900 mm x 1200 mm with no obstruction placed to prevent a wheelchair user from reaching the call button; and
Be installed at a height between 800 mm and 1000 mm).

Control Panel

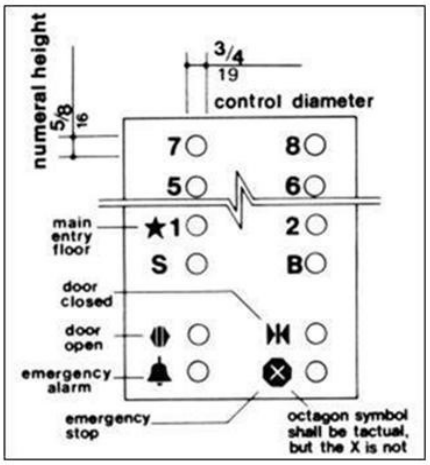
The control panel should:

Have a clear floor space of at least 900 mm x 1200 mm with no obstruction placed to prevent a wheelchair user from reaching it;
Be placed at a height of between 800 mm and 1000 mm from the floor level

Have buttons with Braille/ raised letters and in sharp contrast from the background to aid people with visual impairments.



Specification of Lift



Controls Layout of Lift Control panel

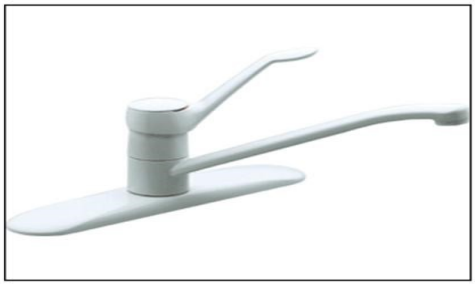
Faucets/taps

Faucets and other controls designated for use by Persons with Disabilities should be hand operated or electronically controlled.

Hand-operated controls should:

be operable by one hand;

require no tight grasping, pinching or twisting of the wrist; require a force less than 22 N to activate; and have handles of lever type (not self-closing) operable with a closed fist



Lever handle tap

Long handle tap

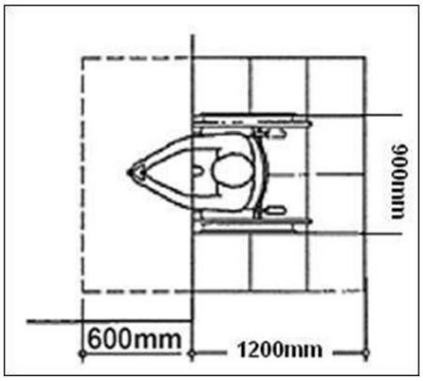
To cater for visually impaired people, controls should be colour-contrasted with the surrounding face plate panel and the face plate should similarly contrast with the background wall on which it is mounted. Information should preferably be in relief (embossed letters/ symbols accompanied with Braille information) for tactile reading.

To aid operation for people with impaired co-ordination or impaired sight, switches, etc, should have large push plates, operable by one hand.

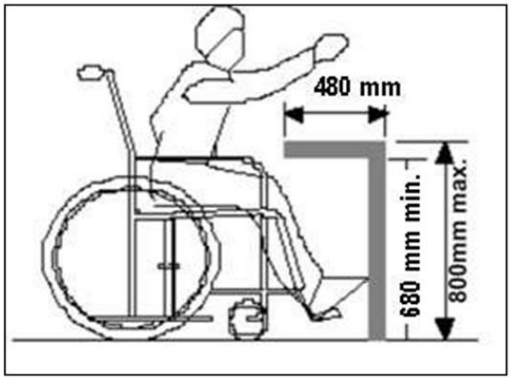
Seating Spaces

Clear Floor Space

Seating space, such as those provided at counters, tables, or work surfaces for persons in wheelchairs should have a clear and level floor space of not less than 900 mm x 1200 mm.



Clean Floor Space for wheelchair



Counter tops/table height

Clear Knee Space

Where a forward approach is used, a clear knee space of at least 900 mm wide, 480 mm deep and 650 mm high should be provided, which may overlap the clear floor space by a maximum of 480 mm.

Counter Tops

Writing surfaces or service counters should not be more than 800 mm from the floor and have clear knee space of 680mm.

Other Facilities

Drinking Water Fountain

Drinking water fountain/unit should have:
drinking water coolers or taps should:

have a clear floor space of at least 900mm x 1200mm

have a clear knee space between the bottom of the apron and floor or ground of at least 750mm wide, 200mm deep and 680mm high

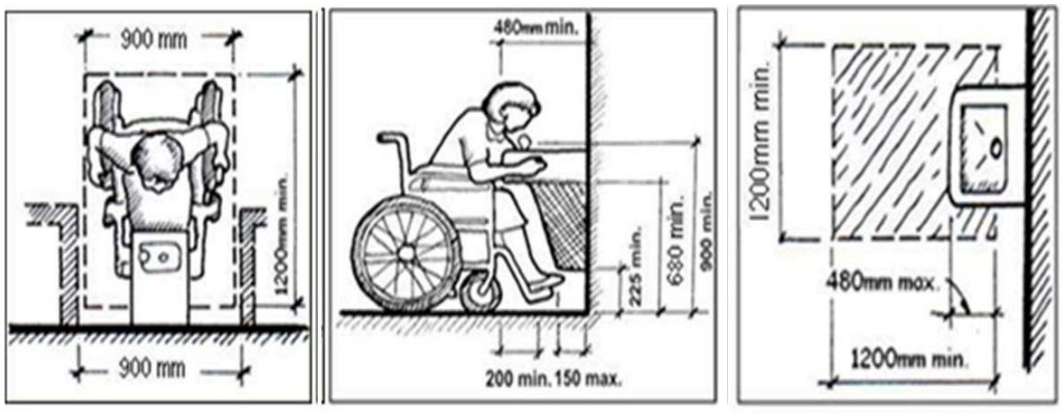
have a toe space not less than 750mm wide, 230mm high o have a water glass provision;

free standing or built -in-drinking water coolers or taps not having a knee space should have a clear floor space of at least 1200mm wide x 1200mm in front of the unit

All wall-mounted drinking water provision in an alcove is preferred, because it does not create a hazard for persons with visual impairments.

The provision of two drinking facilities at different heights is very convenient for standing adults, people in wheelchairs and children.

The 100mm high water flow is to allow for the insertion of a cup or glass.



Front approach | Accessible drinking water unit | Space required for front approach

Drinking water fountain

Public Telephone

General

Where payphones are provided, at least one payphone should be made accessible.

Clear Space

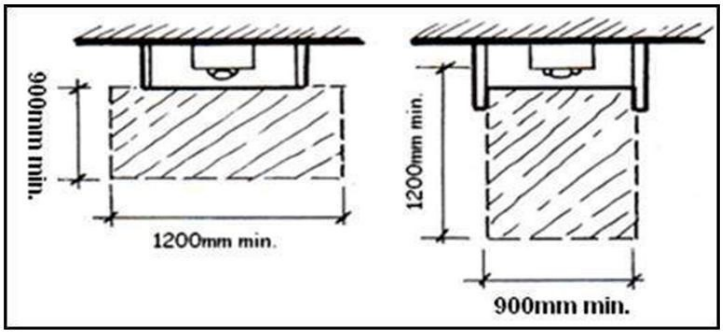
A clear space of not less than 900mm by 1200mm should be provided in front of the telephone booth or counter.

Counter Top

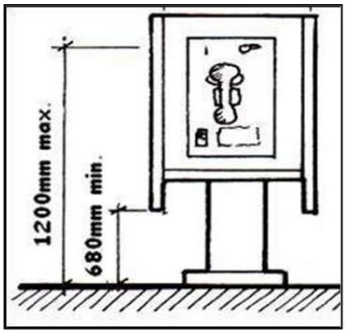
Counter tops, where provided, should be between 650mm and 800mm from the floor and have a minimum clear knee space of 680mmhigh.
The depth of the counter top should be not less than 480mm**.**

Telephone Booth

The opening of the telephone booth should have a clear width of at least 900mm.
The enclosed space should have dimensions of at least 900mm by 1200mm that should not be restricted by fixed seats.



Space allowance for telephone counter



Telephone height

Height

The height of all operable parts of the telephone should be between 800mm and 1200mm

Telephone Cord

The minimum length of the cord should be 900mm

Signage

The International Symbol of Access should be displayed to identify the location of such telephones

Accessible public telephone

Mailbox / Feedback Dropbox

The mail / drop box slot should be located at the height of maximum 1200mm.
It should have a clear floor space of 900 X 1200mm.

Vending Machine

The coin slot must be located at height of 1200mm or less It should have a clear floor space of 900 X 1200 mm.
Operating buttons should be in raised numbers and in contrasting colors.

ATM- Money Machine

It should have a clear floor space of 1200X 1200 mm.
Control buttons should be between 800mm and 1000mm height from the floor.
Control buttons should be in raised numbers/ Braille and in contrasting colors.

Access to Toilet Facility

General

Signage at accessible toilet entrance should be clearly visible and should comply with the International Symbol of Accessibility complying with norms.
Where urinals are provided, at least one should comply with norms, to cater to the ambulant disabled.

Unisex Accessible Toilets (multi-use)

Unisex accessible toilet allows Persons with Disabilities to be assisted by attendant of the same or opposite gender. In all public buildings, one unisex accessible toilet should be provided in each toilet block on each floor. Apart from this all toilet blocks must have one cubicle suitable for use by persons with ambulatory disabilities.

The unisex toilet should have: -
Minimum internal dimensions of 2200 X 2000 mm minimum.
The layout of the fixtures in the toilet should be such that there is a clear maneuvering space of 1800mm x 1800mm in front of the water closet and wash basin in the accessible toilet unit.
All fixtures and utilities should provide a clear space of 900mm x 1200 mm for wheelchair users to access them
Have clear space of not less than 900 mm wide next to the water closet
Be equipped with a door, water closet, Grab bars, Wash basin and all washroom accessories complying with Norms.

Have the toilet roll dispenser and hand water faucet mounted below the grab bars and at not more than 300 mm from the front edge of the seat and at a height between 50 mm and 200 mm from the top of the water closet seat
Be equipped with a cloth hook mounted on a side wall not more than 1200 mm from the floor and projecting not more than 40 mm from the wall; and
Where possible, be equipped with a shelf of dimensions 400 mm x 200 mm fixed at a height of between 900 mm and 1000 mm from the floor.

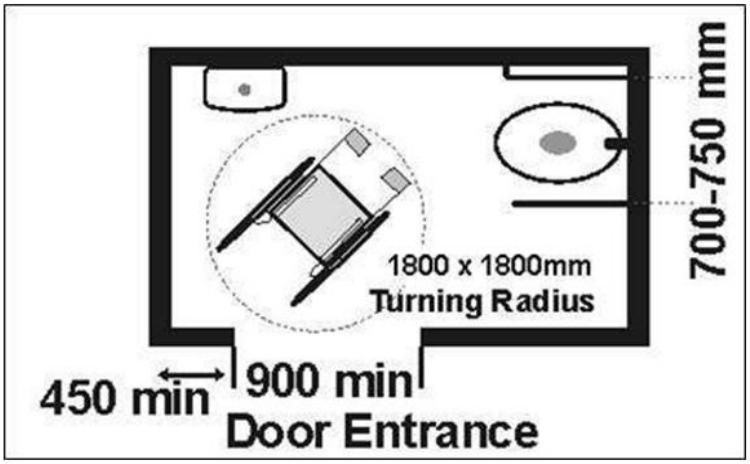
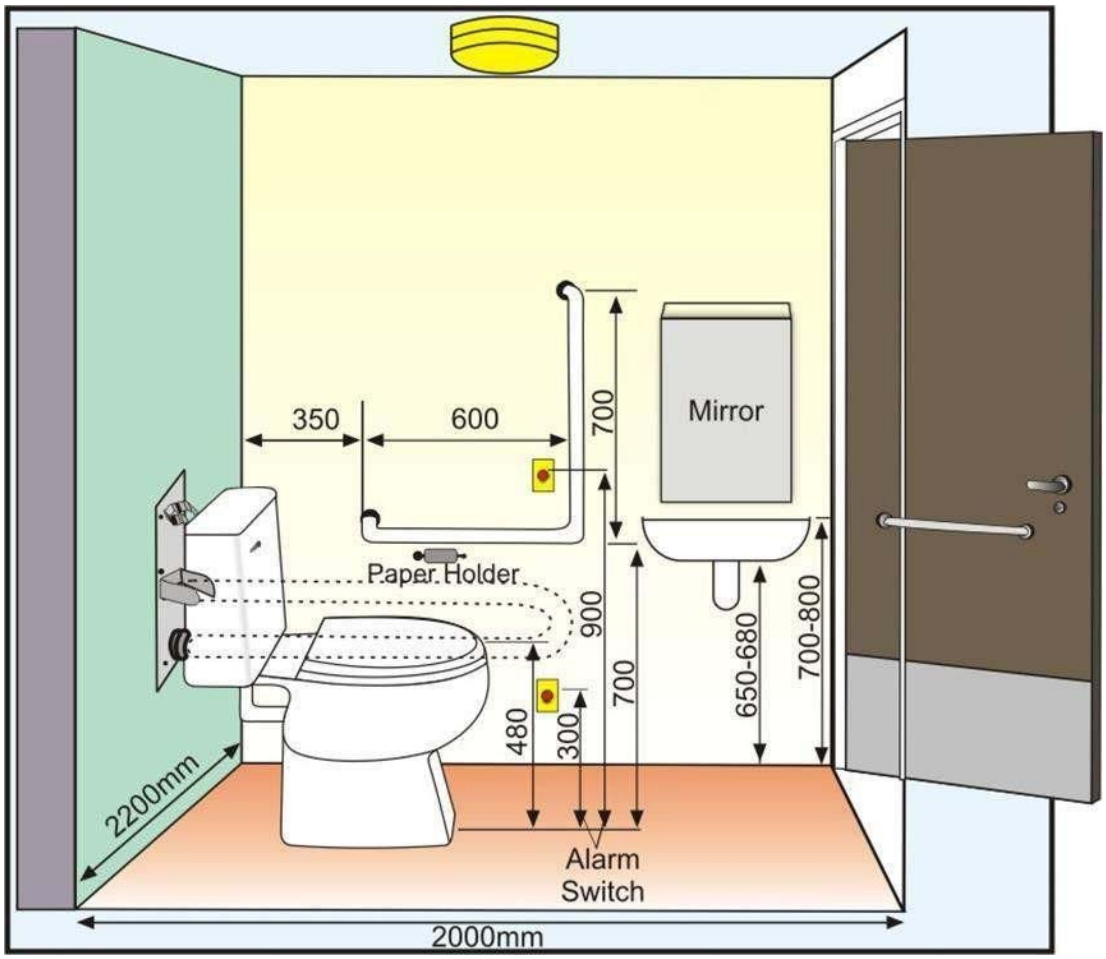


Figure 5-1: Wheelchair maneouvering space in toilet



Layout plan of unisex accessible toilet

Toilet Cubicle for Wheelchair Users

Where a toilet cubicle for the wheelchair user is provided, it should conform to the dimensions.

Toilet cubicle for Ambulatory Disabled

In a set of toilets (for ladies or for gents), there shall be one WC for the use of the ambulant disabled persons.

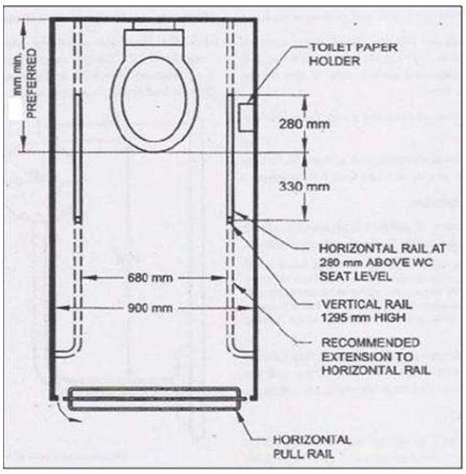
Toilet Doors

Essential requirements for toilet door

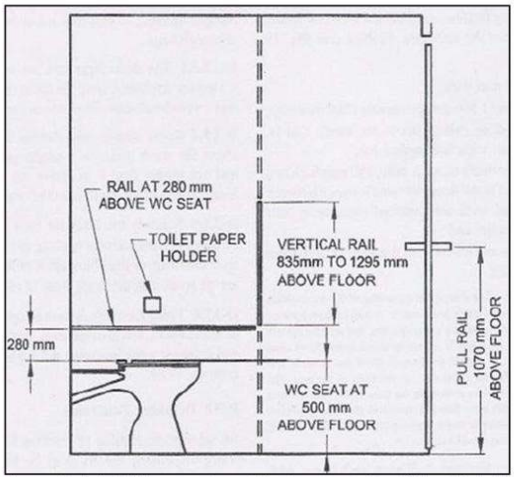
The toilet door should be either an outward opening door or two-way opening door or a sliding type and should provide a clear opening width of at least 900 mm.

Be provided with a horizontal pull-bar, at least 600 mm long, on the inside of the door, located so that it is 130 mm from the hinged side of the door and at a height of 1000 mm.

Be capable of being locked from the inside by a device that is operable by one hand, activated by a force not more than 22N and which does not require fine finger control, tight grasping, pinching or twisting of the wrist.



WC Compartment for the Ambulant Disabled (Plan)



Compartment for the Ambulant Disabled (Section)

Water Closet

Be located between 460 mm to 480 mm from the centreline of the water closet to the adjacent wall.

It should have a clear dimension of 750 mm from the front edge of the water closet to the rear wall to facilitate side transfer.

The top of the water closet seat should be 450 to 480 mm from the floor when the water closet does not have the required height, the necessary height may be obtained by providing a circular base under the water closet. The base so provided must not protrude beyond the circumference of the base of the water closet.

There should be an adequate clear floor space of at least 1350 mm depth and 900 mm width, both in front and on the transfer side, adjacent to the water closet.

Have a suitable back support to reduce the chance of imbalance or injury caused by leaning against exposed valves or pipes.

Preferably be of wall-hung or corbel type as it provides additional space at the toe level.

Where water cistern is used, the cover should be securely attached.

The flush control should either be lever type or automatic, and located on the transfer side of the water closet. The flush control should not be located more than 1000 mm from the floor.

Where more than one accessible toilet is provided, a left and right hand transfer option should be made available.

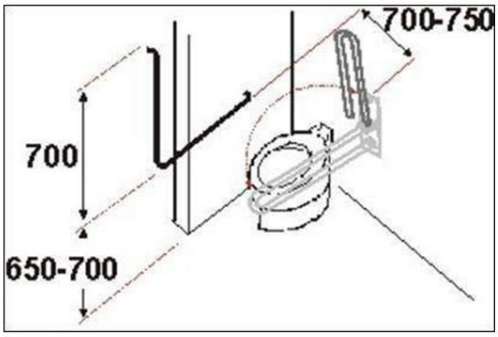
Water Closet Grab Bars

Water closets should be provided with grab bars, be mounted at a height between 200 mm and 250 mm from the water closet seat.

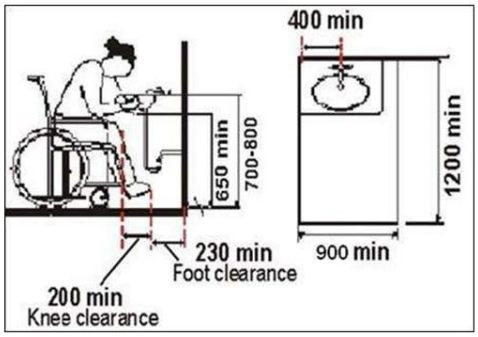
One L-shape grab bar: 600mm long horizontal and 700mm long vertical should be mounted on the side wall closest to the water closet.

A hinged type horizontal grab bar should be installed adjacent to the water closet at a distance of 320mm from the center-line of the WC, between heights of 200 mm - 250 mm from the top of the water closet seat and extending 100 to 150 mm beyond the front of the water closet.

An emergency alarm cum call switch should be provided within easy reach on the wall near water closet at two levels: at 300mm and 900mm from the floor level to allow user to call for help in case of an emergency.



Grab bars specifications



Washbasin Specifications

Washroom Accessories

Washroom accessories should comprise the following:

A mirror installed in a way to have the bottom edge at a height of not more than 1000 mm from the floor and mirror should be tilted at an angle of 300 for better visibility of wheelchair user Towel and soap dispensers, hand dryer and waste bin positioned such that the operable parts and controls are between 800 mm and 1000 mm from the floor.

Accessories should be placed in close proximity to the basin, to avoid a person with wet hands wheeling a chair.

Wash basin should comply with specifications.

Additional Considerations

There should be adequate colour and tonal contrast between the fixtures, walls and the flooring. This is to enable easy recognition by persons with visual impairments.

There should be a visual emergency alarm in the toilet.

Urinals

At least one of the urinals in the Gents toilets on each floor should have grab bars installed on each side and in the front of the urinal to support ambulant Persons with Disabilities (for example, crutch users).

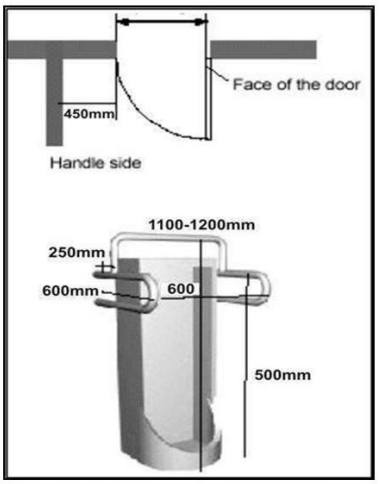
The front bar is to provide chest support the sidebars are for the user to hold on to while standing.

Urinals shall be stall-type or wall-hung, with an elongated rim at a maximum of 430 mm above the finish floor.

A clear floor space 760 mm by 1220 mm should be provided in front of urinals to allow forward approach. Urinal shields (that do not extend beyond the front edge of the urinal rim) may be provided with 735 mm clearance between them.

Flush controls should be located not more than 1200 mm from the floor.

Where urinals for the ambulatory disabled are provided, they should comply with the following as illustrated.



Urinal with chest support grab bar

Signage of accessible toilets

All unisex accessible toilets should have signage.

For individual accessible cubicles in Ladies and Gents toilets are provided signage as per Figure below.

Signage for Unisex toilet, Gents and Ladies

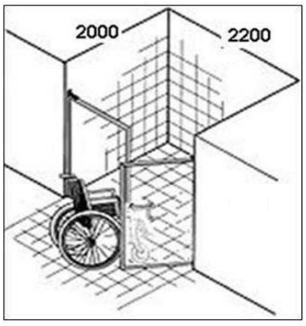
For the benefit of the persons with vision impairment, all general toilets should have male pictogram in triangle or female pictogram in circle, marked on plates with raised alphabets and Braille put on wall next to door latch. Additional signage can be provided on the door as well.
A distinct audio sound (beeper/clapper) may be installed above the entrance door for identification of the toilets.

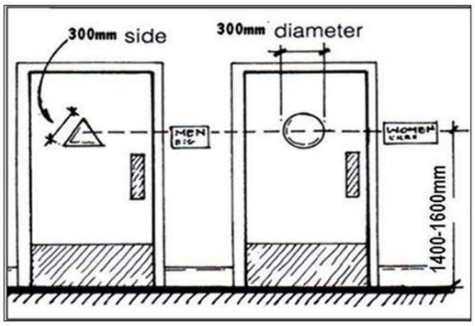
A clear floor space 760 mm by 1220 mm should be provided in front of urinals to allow forward approach. Urinal shields (that do not extend beyond the front edge of the urinal rim) may be provided with 735 mm clearance between them.

Shower Cubicles

Size

Shower cubicles should have minimum interior dimensions of 2000 mm x 2200 mm.
A toilet cum shower room will have minimum interior dimensions of 2400mm x 2500mm
The minimum clear floor space in front of the shower entrance should be 1350mm x 900 mm with the 1350 mm dimension parallel to the shower entrance.
The floor of the shower should be slip-resistant.





Shower Cubicle **Placement of signage**

Grab bars for the shower cubicle should:

Have one L-shaped bar or two grab bars in L-shaped configuration between 700 mm and 800 mm from the shower floor as shown in the Figure.
Have one grab bar at least 750 mm long installed vertically with another at least 900 mm long mounted horizontally as shown in the Figure.

Roll in shower cubicle

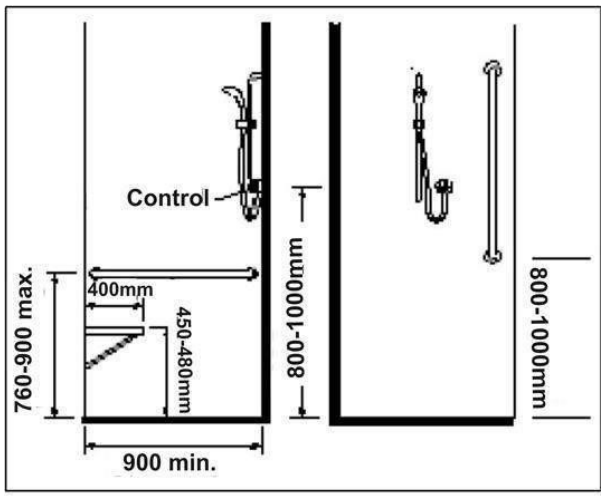
Stationary, Fittings and Accessories

A shelf should be provided for toiletries between 400-800 mm
All shower controls should be at a distance of 500 mm from the rear wall
Shower controls should be installed between 750 mm to 1000 mm from the floor
The adjustable and detachable shower head (telephone shower/ hand-held shower), with a minimally 1500 mm long hose, should be installed between 800 mm and 1200 mm from the floor.
Where the shower head is mounted on a vertical bar, the bar should be installed so as not to obstruct the use of grab bars.
Curbs for the roll-in shower cubicle should not be more than 10 mm high, beveled at a slope of 1:2.
Enclosures for the shower cubicle should not obstruct transfer from wheelchair onto shower seat

Shower seat

A wall mounted shower seat, preferably fold up kind.
The shower seat should be positioned such that the distance between the centerline of the water closet and the adjacent wall is 450 mm to 480 mm, and the distance between front edge of the water closet and the rear wall is 650 mm. The top of the shower seat should be at a height of 450 - 480 mm from the floor.
There should be an adequate clear floor space of at least 1350 mm depth and 900 mm width, both in front and on the transfer side, adjacent to the water closet.
Be self-draining, non-slip and with rounded edge;

Be on the wall nearest to the controls;
Have a minimum dimension of 400 mm wide extending the full depth of the cubicle, excluding space required for the shower curtain.



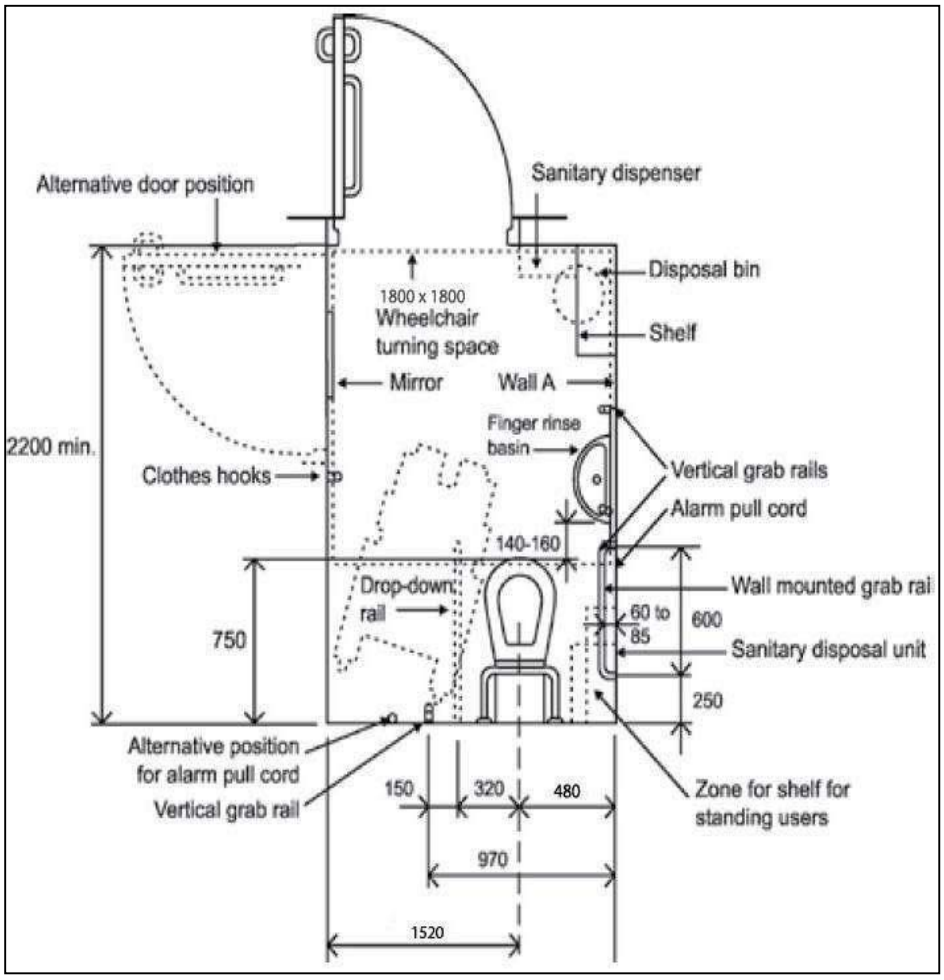
Placement of shower accessories

Public toilets

Unisex accessible public (multi-use) toilets should be provided.
Accessible toilets should have the international symbol of accessibility displayed outside for wheelchair access.
The toilet door should be an outward opening door or two way opening or a sliding type and should provide a clear opening width of at least 900mm. It should have a horizontal pull-bar, at least 600mm long, on the inside of the door, located so that it is 130mm from the hinged side of the door and at a height of 1000mm.

Standardization in toilet design

Many persons with visual impairments find it convenient to use the toilets where internal dimensions, accessories and fixtures placements are standardized. A tactile layout of the toilet should be provided on the wall, near the latch side at 900mm height.



Unisex public toilet

Signage

Signs are important to people who are unfamiliar with their surroundings. They are to provide information. They can inform the user of a route, a hazard, or a facility. Signs also communicate an identity for the building or environment they serve. Signage contributes greatly to the aesthetics and first impression of a building. Signs must be clear, concise, and consistent.

A signage system also increases person's awareness of their surroundings and aids orientation within the environment. The location of signs should ideally be part of the process of planning the building and environment. A good and successful sign system should minimize anxiety and confusion. It must be easy to understand and not place Persons with Disabilities at a disadvantage. Universal signage cuts across the regional/cultural and language barriers as even a common lay man can understand the symbols and pictograms.

People need clear information about the purpose and layout of spaces to maintain a sense of direction and independent use of a building. Often visual and tactile

information is reinforced by audible information. Information may take the form of visual information (e.g. signs, notice boards), audible

information (e.g. public address and security systems, induction loops, telephones, and infrared devices), or tactile information (e.g. signs with embossed lettering or Braille).

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

the location, accessibility, layout and height of signs;
the size of lettering, symbols and their reading distances;
the use of tactile letters and symbols;
visual contrast and lighting;
the finished surfaces of materials used for signs and symbols;
the simultaneous use of audible cues;
integration with any other communication systems.

Signage Provisions

Information and direction signs should be provided at junctions of circulation routes and key destinations such as doorways, at reception points, at facilities such as telephones, drinking water facility, toilets, and in areas where hearing enhancement systems are fitted.

Directional signs should readily identify and provide a logical sequence from a starting point to a point of destination and a clear indication of return routes to named exits. The names of destinations should be consistent throughout the signing system.

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

Signs to facilities for Persons with Disabilities should incorporate the International Symbol for Accessibility.

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

Universally recognized symbols/pictograms should be used to replace text, wherever possible. Other symbols should supplement text, but should not be used in isolation. Symbols are an essential aid for people with learning difficulties.

A wall mounted or ceiling hung information board should be provided at lift landings, floor level landings of staircases, and at other major decision points (junctions/intersections) in main circulation routes.

Types of Signage's

According to the purposes it serves, Signage can be of following types:
Directional
Information
Identification
Instructive
Health & Safety

Directional Signage

(For Way-finding- with arrows along travel routes) are usually wall mounted or overhead signs and include directional arrows to direct users to specific areas or elements within an area. This can incorporate provision of signage at navigational decision points.

Directional signage

Directional signage for ramp

Information

Provide detailed info- including maps & directories with 'You are here' labels. Inform users about the features and facilities of a place or space. Information signs include directions, maps, building identification signs, notices and interpretative signs.

Information signage

Destination signage

Identification

(To signify arrival. Also called Destination Sign) usually identify entrances, street addresses, buildings, rooms, facilities, places and spaces.

Instructive

(To give instruction for operating a device, way finding, etc.)

Health & Safety

(Provide lifesaving directives and/ or mandatory rules to be followed)

Instructive signage

Health & Safety signage

Location

Signs should be provided at all sites, campus, developments and buildings in appropriate locations including approach to building / facility / service, entrance / exit, main lobby or reception, public facilities such as library, toilets etc., departments and offices, fire exits and parking and garages.

A good signage scheme should cover all public buildings, spaces, and facilities including transportation infrastructure and should include locations such as :

Approach to building / facility / service
Entrance / exit
Main lobby or reception

Public facilities such as library, toilets etc.
Departments and offices
Fire exits
Parking and garage

Universal Signage

To make signage universally usable, following components must be kept in mind:

Colour contrast Signs
Character, Content and Layout
Pictograms and accessibility symbols
Positioning
Viewing Distance
Lighting (measured in lux)
Material and surface finish
Alternative formats etc. embossed letters with Braille (Audio/ Visual information, Maps and models)

Signage with embossed letters and Pictogram

Colour Contrast Signs

Contrasting colours should be used to differentiate the figures from the background on the signboard. The commonly employed colours are white for the figure and blue for the background. The colours of signboard should also contrast with the surrounding surface so as to be clearly distinguishable.

The colour combinations red/green and yellow/blue should not be used in order to avoid confusing persons who are colour blind. Avoid using shades of the same colour in the sign and avoid using same colours as safety signs.

The recommended colour contrast between the letters and background is a 70 point LRV difference.

Information from signs can be conveyed by the colour of lettering and brightness differentials between the letter and background colours. Safety signs use primarily red, yellow and green as information colours. For other signs it is preferable to use Blue and White Colours.

Contrast

Visual contrast is defined as the difference in Light Reflectance Value (LRV) between two contiguous surfaces. Light Reflectance Value is measure on a scale of 0 to 100 where 0 equals black and there is total light absorption and white = 100 and there is total light reflection. In most circumstances, a difference in these values of 30% is considered adequate. However, research suggests that signs are more legible for the visually impaired when characters contrast with their background by at least 70%.

A simple formula for Visual Contrast is given below:

Visual Contrast = [(B1-B2)/B1] x 100 %

where B1 is LRV of the lighter area

and B2 is LRV of the darker area

Basic principles for Colour Contrast:

Text should contrast with sign background
Sign should contrast with environment
Light levels (measured in Lux)
70% contrast between wall and sign panel
Avoid shades of colours
Avoid using same colours as safety signs
Maximum 5 colours
Non-reflective surface

Schedule of Colour Contrast for Signs

Schedule for colour contrast with sign background is given in

Background	Sign Board	Legend
Red Brick or Dark Stone	White	Black, dark green or dark blue
Light brick or light stone	Black/dark	White or Yellow
Whitewashed walls	Black/Dark	White/Yellow
Green Vegetation	White	Black, dark green or dark blue
Back-lit sign	Black	White or yellow

Typical Schedule of Colour Contrast for Signs

Character, Content and Layout

Signage- Preferred colour contrast

Signage Typeface and Style

Sign typefaces must be standard, legible and clearly discernible. Only Sans serif family of fonts are recommended such as Arial, Helvetica Medium, Futura etc. Usage of too many type sizes on any one sign should be avoided. Also italics or script texts should be avoided.

Typeface and Style

Basic principles

Sans serif font (A sans serif font is a family of fonts that does not have the small feature called "serifs" at the end of strokes. Pixilation makes sans-serif fonts appear cleaner than serif fonts and they are therefore widely used for on-screen text. Common sans serif fonts include: Microsoft Arial, Arial Black, Trebuchet MS, Verdana, etc. Be aware that in some sans-serif fonts capital "I" and lower case "l" will appear exactly identical (e.g. Arial). Thus use them with caution.)

Should be mix of Upper and lower case
Should be Left justified
Should be Tactile embossed with Braille
Minimal use of bold
Consistent font stem widths
Avoid italics, condensed text, light stems

Upper and Lower Case Lettering

Signs are more effective when they employ both upper and lower case lettering. This is because people recognize „word shapes" rather than literally reading every letter to build up the word and must be left justified.

The height and boldness of the lettering can be used to indicate the nature of the information that the sign imparts.

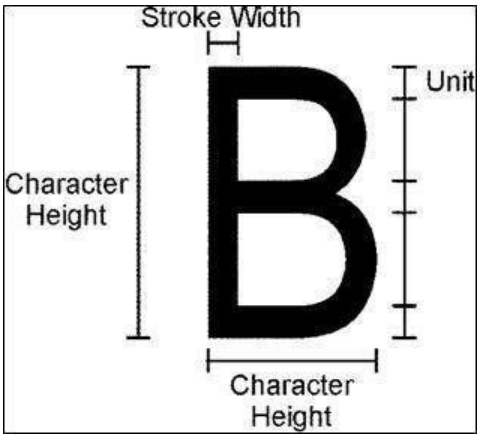
Signage in upper and lower case

Line spacing

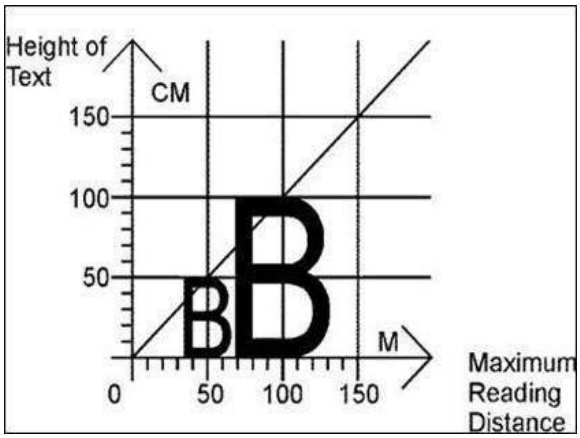
The spacing between lines should be 50% of the line height. The diagram below indicates what is meant by "line height" and from where the measurement of 50% should be taken.

A style should be chosen because based on a character width-to-height ratio within 3:5 and 1:1 and the stroke width-to-height ratio between 1:5 and 1:10.
It should be consistent for each sign.

Spacing between Lines



Character Proportion



Character Height

Pictograms

Ideally any signage should incorporate a combination of lettering and symbols.
This will empower persons with Autism, intellectual disabilities and multiple disabilities as well as those with language barriers.

Access symbols

Information signage

Positioning the Signage

Signs should be located where they are clearly visible. A person with low vision may be able to read a sign if they can approach the sign for close up viewing.

Wall-mounted signs that contain detailed information; timetables, maps or diagrams, should be centered around 1400mm from the ground, with the bottom edge not less than 900mm from the finished floor level and the top edge up to 1800mm from the finished floor level

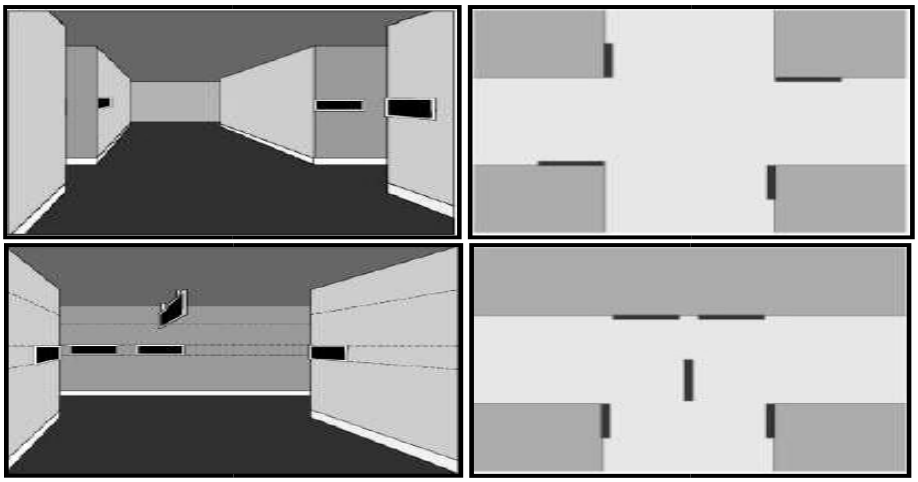
Braille and tactile signage should be placed at a height between 900 mm to 1500 mm (ideal location at 1050 mm) above the finished floor level

Duplicating detailed signs and instructions, especially safety notices, should be located at high and low levels, i.e. at 1600 to 1700mm and at 1000 to 1100mm to allow convenient close viewing by wheelchair users.

Signs should be positioned in way that the reader does not obstruct circulation paths. Position projecting or ceiling suspended signs above head height at 2300mm from floor level. Although it is important that the sign does not create a head height obstacle, it is equally important that the size of the lettering increase in proportion to the distance from the reader.

Sign Location inside the Building

Signs should be located where they are clearly visible

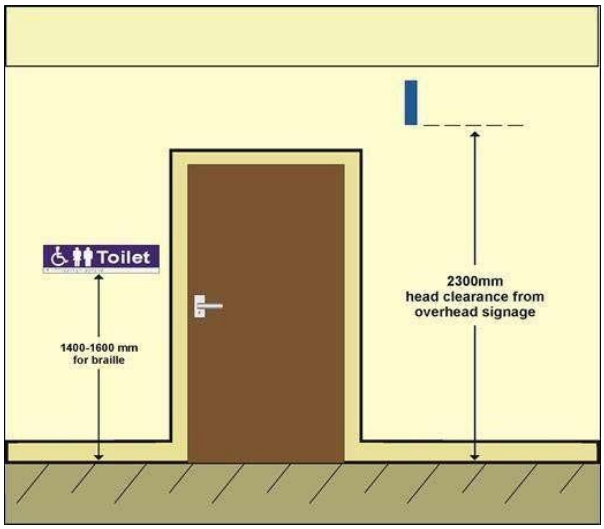


Preferred location of signage

Top of building directory signage, building direction signage and bulletin board signs should be 1800mm from the finished floor level.

Room number and identification signage to be at 1400mm from the finished floor level to bottom of the sign, and 50mm from the door frame. In case of tile wall, the closest horizontal joint should be used.

Detailed signs and instructions, especially safety notices, should be located at both high and low levels, i.e. at 1600-1700mm and at 1000-1100mm to allow convenient close viewing by wheelchair users.



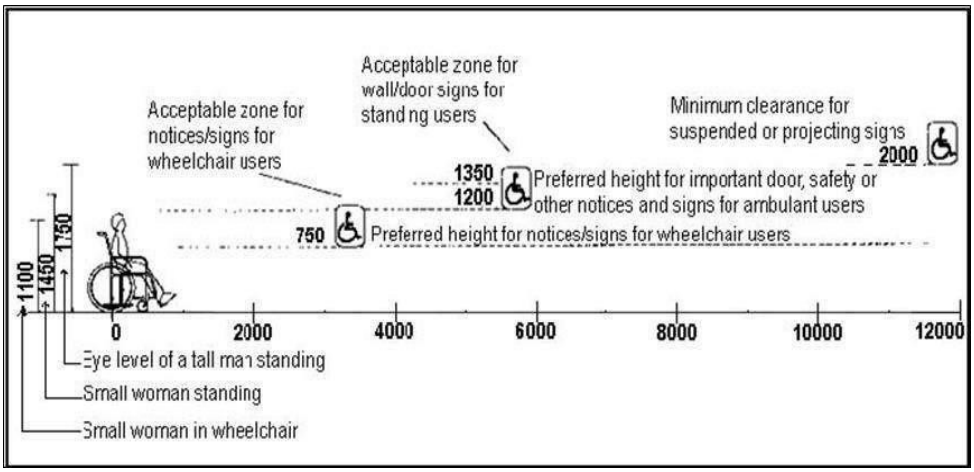
Height and placement of signage

Viewing Distances for signage

Long distance signage includes fascia signs, external location, external direction, house numbers.

Medium range includes location + direction, identification signage.

Close range would include room signs, directories, wall mounted information etc.



Viewing distance for signage

Size of Signage

The width for signage should be standardized. Viewing distance and size of signage is given in Table

Viewing Distance	Size of signage
Upto 7 meters	60 mm x 60 mm
7 -8 meters	100 mm x 100 mm
Exceeding 8 meters	200 mm x 200 mm to 450 mm x 450 mm

Size of Signage

Size of Letters in Signage

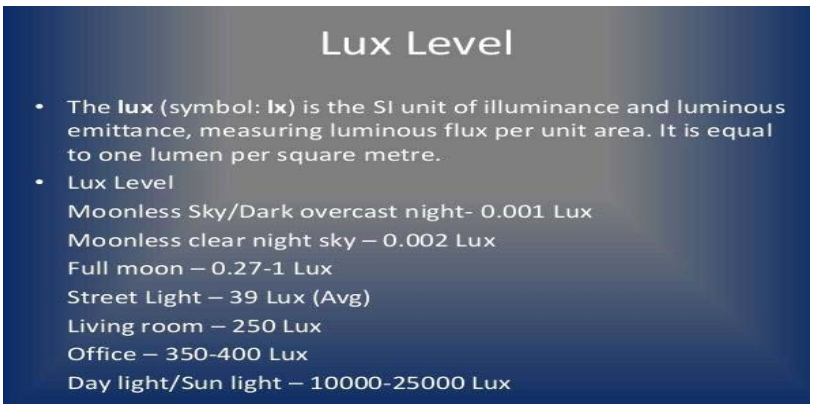
In Table viewing distance and height of letters are given.

Viewing Distance	Height of letters
2-3 meters	15 mm
6 meters	20 mm
8 meters	25 mm
12 meters	40 mm
15 meters	50 mm
25 meters	80 mm
35 meters	100 mm
40 meters	130 mm
50 meters	150 mm

Size of Letters in Signage

Lighting/ Signage Illumination

Signs should be well and evenly lit with uniform lighting over the surface of the sign of between 100 and 300 lux. Minimum acceptable level of lighting for directional signage, maps and text panel is 200 lux.



Signage material

Signage Material should be non-reflective, preferably matt finish. It should have non glary and non-glossy surface. Natural and artificial light should be such so as not to produce glare on the signage surface.
The material of all signage should be chosen so as to reduce wear and tear and possible damage by vandalism and at the same time easy to maintain. Some suggested materials for signage are wood, acrylic, Aluminum Composite Panel (ACP).

Alternative formats-tactile signs

Common alternative formats can be used to assist people with visual impairments who are best able to interpret information through hearing or touch. Embossed letters, raised pictograms and raised arrows are tactile features that can be incorporated into signs, which can be particularly helpful to persons with visual impairment. It is important to provide both Braille and audio inputs to signage for persons with visual impairments. Providing only Braille does not make the signage accessible, as a large number may not use Braille.

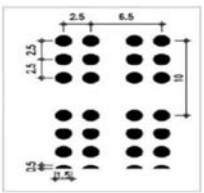
Embossed letters – tactile signs

Braille locator -tactile signs

Braille specification

A system of touch reading for people who are blind or vision impaired that employs raised dots, evenly arranged in quadrangular letter spaces or cells. Braille symbols are formed within units of space known as Braille cells. A full Braille cell consists of six raised dots arranged in two parallel rows each having three dots The dot positions are identified by numbers from one through six. Sixty-four combinations are possible using one or more of these six dots. A single cell can be used to represent an alphabet letter, number, punctuation mark, or a whole word.

Dot Spacing:	2.5 mm	Character Spacing:	6.5 mm
Dot Height:	0.5 mm	Line Spacing:	10.0 mm
Dot Base Diameter:	1.5 mm		



Maps & Models

A map or model can be particularly helpful, especially to visually impaired people who may be unable to read signs, and to people with hearing impairments who may not be able to understand verbal directions. A tactile map or model is a useful way of providing information to visually impaired people and people with hearing impairments who wish to navigate around a building.

Tactile map

Tactile and Audio map

Audio Signs/Audio information

Audible announcements are helpful to most people but particularly to those with visual impairment. It is essential that there is a significant difference between the level of background noise and the level of the signal or announcement.

The higher the signal to noise ratio (the difference in decibels dB. between signal and ambient) the better for communication.

People with hearing impairment require at least a +5dB S/N ratio.

In environments that are noisy, any spoken information should be repeated at least once.

Audible alarm systems should operate at least 15dB over the prevailing sound level, with a maximum of 120dB

Audio visual signage

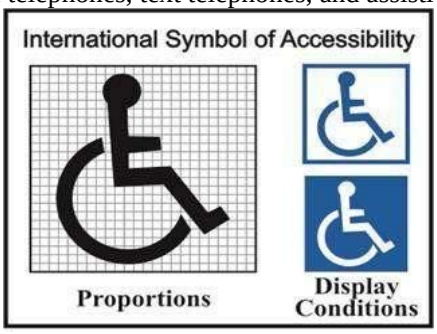
Audio signs – which can play a recorded message when touched or activated by a person's movement or presence. Information can be provided in various formats, languages or methods of transmission. For e.g. Tactile map at Hong Kong Wetland Park also has an option of audio output in local and English language.

Talking signs

Speaker and buttons in talking signs

International Symbol of Accessibility

The International Symbol of Accessibility must be displayed at all accessible entrances. If an entrance is not accessible, directions to an accessible route, including the symbol, must be provided. Similar guidelines refer to elevators, evacuation and refuge areas, restrooms and bathing facilities. Symbols of accessibility are also required to identify volume control telephones, text telephones, and assistive listening systems.



International Symbol of Accessibility

Colour to be Navy Blue with White lettering, Symbols and Border and size to be 200mm x 200mm square with 1.25mm border. The specific pictograms shown in figure, are required in certain signage situations.

Figure 6-28: Signage for accessible Access

Figure 6-29: Signage for Accessible Facilities

Pictograms for Accessible Facilities

Fire evacuation needs

Emergency Egress

Provision of accessible means of egress from all public use areas and facilities is as vital a component as accessible ingress.

Alarm Panels

Placement (accessibility) and visibility of alerting devices is very important.
Fire alarm boxes, emergency call buttons and lighted panels should be installed between heights of 800mm and 1000 mm from the finished floor surface.
These should be adequately contrasted in colour and tone from the background wall and should be labelled with raised letters and also in Braille.

Alerting Systems

In emergency situations, it is critical that people are quickly alerted to the situation at hand, for persons with disability the following needs to be considered.
Audible alarms with „Voice Instructions should be installed that can help guide them to the nearest emergency exit. As an alternative to the pre-recorded messages, these alarms may be connected to central control room for on-the- spot broadcasts.
Non – auditory alarms (visual or sensory) to alert persons with hearing impairments should be installed at visible locations in all areas that the building users may visit (including toilet areas, storerooms etc.). Non-auditory alarms include flashing beacons.

Evacuation Plans

Evacuation plans that clearly indicate the designated emergency evacuation routes as well as location of refuge areas should be displayed at all public areas of the building.
These should contrast strongly against the background. Where possible, these should incorporate raised letters and tactile routes, and Braille for benefit of persons with visual impairments.

Emergency Evacuation Routes

In buildings or facilities, or portions of buildings or facilities, required to be accessible, accessible means of egress shall be provided in the same number as required for exits by local building/fire safety regulations (National Disability Authority, 1998).

Designating evacuation routes shall be at least 1500 mm wide, to ensure a wheelchair user and an able bodied person are able to pass each other along the route. The route should be free of any steps or sudden changes in level and should be kept free from obstacles such as bins and flower pots etc.

An exit stairway to be considered part of an accessible means of egress shall have a minimum clear width of 1500 mm between handrails and shall either incorporate an area of refuge complying with norms an enlarged floor-level landing or a horizontal exit.
Orientation and direction signs should be installed frequently along the evacuation route and these should preferably be internally illuminated.

Whilst the emergency lighting provided by traditional overhead emergency lighting luminaries, conforming to the Indian Standard IS: 9583-1981: Emergency Lighting Units, is acceptable for people who are visually impaired.

Exit signs shall be in accordance with IS: 4878-1968. Exit signage should also be available in tactile format in the evacuation route.

Along the emergency route, tactile floor guidance for persons with visual impairments should be provided.

Note: Fireproof doors along circulation paths that are not exclusively egress routes generally require a force greater than 25 N to operate, rendering several disabled people dependents on others to negotiate these doors. While it is essential to cater safety measures for unpredictable emergencies, it is also important to provide an accessible environment to disabled persons. Consider holding the doors open with magnetic catches or “floor springs” that are connected with the fire alarm system

Provision of Refuge Areas

A refuge area, also known as an area of rescue assistance, is a place of relative safety where persons who may not be able to negotiate inaccessible egress routes may await rescue assistance.
Where a required exit from an occupiable level above or below a level of accessible exit discharge is not accessible, refuge areas shall be provided on each such level (in a number equal to that of inaccessible required exits).
Every required area of refuge is to be accessible from the space it serves by an accessible egress route.

Every area of refuge shall have direct access to an exit stairway.

Each area of refuge must be separated from the remainder of the story by a smoke barrier having minimally one-hour fire resistance rating. Each area of refuge is to be designed to minimize the intrusion of smoke. The size of the refuge to provide at least two accessible areas each being not less 750 mm by 1200 mm. The area of rescue assistance shall not encroach on any required exit width. The total number of such areas per story shall be not less than one for every 200 persons of calculated occupant load served by the area of rescue assistance.
All stairs next to the refuge should have a clear width of 1500mm between the handrails.
A method of two-way communication, with both visible and audible signals, shall be provided between each area of rescue assistance and the primary entry.

Signage

Each area of rescue assistance shall be identified by a sign, which states "REFUGE AREA" and displays the international symbol of accessibility.
The sign should be illuminated when exit sign illumination is required.
Signage should also be installed at all inaccessible exits and where otherwise necessary to clearly indicate the direction to areas of rescue assistance.
In each area of rescue assistance, instructions on the use of the area under emergency conditions shall be posted adjoining the two-way communication.

Pre-commissioning check

A comprehensive checklist is given below to review the accessibility of infrastructure and facilities created, before commencement of operations, for ready reference.

Building/ Area Name
Date of inspection
Inspection done by

1. MAIN ENTRANCE	YES	NO	NOT APPLICABLE	REMARKS
▪ Is the main entrance of the building accessible?				
▪ Are there any steps at the entrance?				
▪ Do the steps have a handrail?				
▪ Are there handrails on both the sides?				
▪ Is there a ramp?				
▪ Does the ramp have a railing?				
▪ Are there handrails on both the sides?				
▪ Is the clear door width at least 1000 mm?				

▪ Can the entrance door be operated independently?				
▪ Is the height of the door handle between 800 mm and 1000 mm?				
2. RAMPS				
▪ Is there a ramp next to the stairs?				
▪ Is the location of the ramp clearly identifiable?				
▪ Is the ramp gradient no steeper than 1:12?				
▪ Is there a landing of at least 1500 mm x 1500mm, at 9m intervals provided?				
▪ Is there a landing at every change in direction?				
▪ Is there landing at the top and bottom of every ramp?				
▪ Is the minimum width of the ramp 1500 mm?				
▪ Are there continuous handrails, on both sides, at a height between 760 mm – 900 mm?				
▪ Is the surface of the ramp non-slip?				
▪ Is there an edge protection on both sides of the ramp?				
3. PARKING				
▪ Are there accessible parking facilities?				
▪ Is the number of accessible parking spaces sufficient?				
▪ Are the designated spaces wide enough 3600mm x 5m?				
▪ Are accessible parking spaces marked by the international symbol of accessibility?				
▪ Accessible parking spaces are not misused or used by non-disabled people?				

▪ If the drop-off area has a kerb, is there a kerb ramp leading to the pathway?				
▪ Is the drop-off area marked by signage?				
▪ Is there an accessible path of travel form the drop-off area to the main entrance?				
▪ Does the accessible entrance permit access to an elevator?				
▪ Is the accessible entrance clearly identifiable?				
▪ Is the landing surface non-slippery?				

4. RECEPTION & INFORMATION COUNTERS	YES	NO	NOT APPLICABLE	REMARKS
▪ Are the counters easily indefinable?				
▪ Is the counter at two height?				
▪ Is a part of the counter lowered to accessible height of 800 mm?				
▪ Is a loop induction unit installed at the counter?				
▪ Are there tactile pictographic maps of the building near the counter?				
▪ Is the counter well illuminated?				

5. DOORS	YES	NO	NOT APPLICABLE	REMARKS
▪ Are there any automatic doors at the entrance?				
▪ Can the doors be operated without much effort?				
▪ Do automatic doors have sufficient long opening intervals?				
▪ Are push buttons for automatic doors located at a maximum height of 1m?				

▪ Is there sufficient space beside the latch side of the doors (450-600mm)?				
▪ Are accessible door placed adjacent to the revolving doors and turnstiles?				
▪ Are glazed doors marked with a colour band at eye level?				
▪ For double leaf doors, is the width of one of the leaves at least 1m?				
▪ Do doors fitted with spring closers have an extra pull handle?				
▪ Ismanual door accessories/hardware (handle, lock pull etc.) lower than 800mm?				

6. CORRIDORS	**YES**	**NO**	**NOT APPLICABLE**	**REMARKS**
▪ Is the minimum unobstructed width of corridors at least 1500 mm?				
▪ Does the corridors width allow maneuvering through doors located along its length?				
▪ Are differences in level, bridged with by ramps or lifts?				
▪ Can a sightless person with a cane detect all protruding objects with in the corridor?				
▪ Are all over hanging obstructions mounted above a minimum height of 2200mm?				
▪ Can a person with low vision, identify all obstacles in the corridor?				

7. LIFTS	**YES**	**NO**	**NOT APPLICABLE**	**REMARKS**
▪ Is there an accessible path leading to the elevator?				
▪ Is the clear door opening width 1m or more?				

▪ Are the minimum internal dimensions of the elevator 1500 mm x1500 mm minimum or having 13 persons capacity?				
▪ Is the height of the call button (outside the lift) between 800 mm – 1m, from the floor level?				
▪ Is the control panel placed at a height between 800 mm – 1m, from the floor level?				
▪ Is there an audio and video system installed in the lift indicating arrival at a floor?				
▪ Are there Braille/raised numbers on the control panel?				
▪ Is the elevator provided with a handrail on the three sides?				
▪ Are the handrails mounted at a height between 800 mm and 1m?				
▪ Is the elevator door easy to identify?				
▪ Is the emergency intercom provided inside the elevator?				
▪ Are there tactile or Braille instructions for the communication system?				
▪ Is the emergency intercom usable without the voice communication?				
▪ Is the door opening/closing interval long enough?				
▪ Is the finish of the elevator floor skid-resistant?				

8. STAIRS	**YES**	**NO**	**NOT APPLICABLE**	**REMARKS**
▪ Is the minimum width of the stairs 1200mm?				
▪ Are there continuous handrails, on both sides, at a height between 760mm-900mm?				

▪ Is the handrails installed in the centre of the stair width, which is more than 3m wide?				
▪ Is the landing length not less than 1200mm?				
▪ Are the step edges of a different colour or texture easily identifiable by low-vision & vision impaired persons?				
▪ Are there warning blocks installed at the beginning and end of all flights?				
▪ Is the location of emergency (fire escape) stairs clearly identifiable?				
▪ Does the height of the risers is 150 mm maximum & tread 300 mm minimum?				
▪ Do treads have a non-slip surface?				
▪ Are the risers having open gaps in the steps?				

9. HANDRAILS	**YES**	**NO**	**NOT APPLICABLE**	**REMARKS**
▪ Are handrails mounted at a height between 760mm – 900 mm?				
▪ Are handrails easy to grip?				
▪ Are handrails securely attached?				
▪ Do handrails extend horizontally 300 mm at the top and bottom of every staircase or ramp?				
▪ Are the ending of the handrails grouted in the ground or turn downward?				
▪ Is the space between the handrails and the wall no less than 50mm?				
▪ Are the handrails painted in contrast colours to be easily indefinable?				

▪ Are there tactile strip/ Braille plates identifications on the handrails for emergency stairs & floor levels?				
10. TOILETS	**YES**	**NO**	**NOT APPLICABLE**	**REMARKS**
▪ Are there accessible toilets for Persons with Disabilities?				
▪ Are the toilets easily identifiable?				
▪ Is there sufficient space of 2m x 2.2m inside the toilets to manoeuvre a wheelchair?				
▪ Are water closet (WC) and bidets mounted at a height between 450mm – 480mm?				
▪ Is the space between the WC and the closest adjacent wall, fitted with a grab bar is between 450 mm – 500mm?				
▪ Is the accessible washbasin mounted at a height between 750mm – 850mm?				
▪ Is the lower edge of the mirror positioned at a height not exceeding 1m?				
▪ Are the accessible showers provided with a folding seat?				
▪ Are the grab bars installed near WC and showers at a height between 750 – 850 mm?				
▪ Do grab bars have a diameter of 38 mm?				
▪ Do wall mounted grab bars have knuckle space 50 mm?				
▪ Are grab bar non slippery?				
▪ Can the grab bars withstand the load of 200kg minimum?				
▪ Are faucets easy to grip and operate with one hand?				
▪ Are shower fixtures with at least 1500 mm long hoses?				
▪ Are hot water pipes insulated or covered?				
▪ Is the toilet equipped with an emergency alarm system?				

▪ Can doors be locked from inside and releasable form outside under emergency situations?				
▪ Are flushing arrangements, dispensers and toilet paper mounted between 300mm and 800mm?				
▪ Are flushing equipments easy to operate?				
▪ Is the floor material skid proof, well drained and waterproof?				
▪ Do pivoted doors open outwards?				

11. CANTEEN	YES	NO	NOT APPLICABLE	REMARKS
▪ Is the eating outlet accessible for PwD‟s?				
▪ Is there a circulation path of at least 900 mm wide to allow a wheelchair user to move around the eating outlet?				
▪ Are the cash and service counter height below 800mm?				
▪ Is the table accessible with a height of 750mm to 850mm and knee space of 750mm wide and 480mm deep?				
▪ Do the table with fixed stools have accessible spaces for wheelchairs?				

12. DRINKING WATER	YES	NO	NOT APPLICABLE	REMARKS
▪ Is the Water tap accessible?				
▪ Can it be easily manoeuvred by a person with poor hand function?				
▪ Is the area dry?				
▪ Are glasses provided?				

13. SIGNAGES	YES	NO	NOT APPLICABLE	REMARKS
▪ Are accessible spaces identified by the international symbol of accessibility?				
▪ Are there directional signs indicating the location of accessible facilities?				
▪ Are maps, information panels and wall-mounted signs placed at a height between 900mm and 1800mm?				
▪ Are signs clear, simple and easy to read?				
▪ Is the colour of signs clearly distinguishable?				
▪ Is the surface of the sign processed so as to prevent glare?				
▪ Is the sign supplement by a text in embossed letters or in Braille available next to information signs?				
▪ Is the lettering size proportional to the reading distance?				

14. EMERGENCY EXITS	YES	NO	NOT APPLICABLE	REMARKS
▪ Are emergency exits clearly marked with directional arrow signs?				

15. PUBLIC TELEPHONES	YES	NO		REMARKS
▪ Are there public telephones accessible to wheel chair users?				
▪ Is there at least one telephone in the building equipped with a loop induction unit?				
▪ Are the numerals on the telephone raised to allow identification by touch?				

▪ Is there proper signage directing to the public telephone?				
▪ Are the heights of the operable parts of the telephone between 800mm and 1m?				
▪ Is there a clear knee space of 750mm?				

16. RESTING FACILITIES	**YES**	**NO**		**REMARKS**
▪ Where there are large spaces, are resting facilities provided at 30 meters of intervals?				
▪ Is there an adjoining space for a wheelchair next to benches and public seats?				
▪ Are public seats with height of 450-480mm?				
▪ Are knee spaces at accessible tables with a height of 750mm and knee space of 750mm wide and 480mm deep?				

International practices in barrier free standards

International best practices were compared with the guidelines to give a ready reference for design standards applicable across the world. This ensures that any revision or review of standards can be effected with ease.

S. No		Topic	Barrier Free Guidelines by MoUD	Disability Discrimination Act, European Union	Barrier Free Guidelines Toronto, Canada	Barrier Free Guidelines USA
		Forward	1200 mm High	1000 mm (comfortable) 1100mm (extended)	Not Specified	1220 mm High
		Reach	380 mm Low	650 mm (comfortable) 650mm (extended)	Not Specified	380 mm Low
			1300 mm Max	1060mm (comfortable) 1160mm (extended)	1370 mm	1370 mm High
			250 mm Low	665 mm (comfortable) 630mm (extended)	460 mm	230 mm Low
		Forward	1000 mm High with 500 max arm stretch	Not Specified	Not Specified	1220 mm
		obstruction	1100 mm High with 600 max arm stretch	Not Specified	1220 mm	1170 mm
		Clear floor space for one wheelchair	1000w x 1200d	1000mm clear min. width	760 mm X 1220 mm	760w x 1220d
		Clear space for passing two wheelchairs	1800	2000 mm	Not Specified	1525 mm
2	Space Allowance	For Rotating one wheel chair	1500 x 2000	1500 x 1500	Not Specified	1525 x 1525
		For right angle turning the corridor	Not Specified	1200 x 1200	Not Specified	1525 x 1525

S. No		Topic	Barrier Free Guidelines by MoUD	Disability Discrimination Act, European Union	Barrier Free Guidelines Toronto, Canada	Barrier Free Guidelines USA
		180 degree turn	Not Specified	1600 x 2000	Not Specified	Not Specified
		Doors handles,	Shall not be higher than 1000 mm	Height of all the controls shall not be less than 50mm and not be more than 1200mm above ground level.	Shall not be higher than 1200 mm	Not Specified
3	Controls	lift buttons, Handrails switches, etc	Shall be placed between 900-1000		Shall be provided at 915 mm	Not Specified
			Power points shall be between 600-1100 from finished floor level.		Not Specified	Not Specified
		Maximum Gradient	1:12	1:12	1:12	1:12
		Min. Width	900mm	2000 mm	1670 mm	915
		Maximum length of ramp in one go	9 Meter	2 Meter	9 Meter	9 Meter
4	Levels & Ramps	Height of Handrail	between 760-900mm	between 550 - 1100mm	Not Specified	between 865 - 965mm
		Minimum Gap between Handrail and wall	50 mm	50-60 mm	40 mm	38 mm
		Diameter of Handrail	38-45 mm	40 - 50 mm	30 - 50 mm	32 - 38 mm
		Minimum Clear Openings	900 mm	900 mm	915 mm	815 mm
5	Entrance & Exit Doors	threshold level difference	not more than 12 mm	Not Specified	Not Specified	not more than 19mm
		Height of Door Handle from Floor lvl	850 mm - 1100 mm	900 mm	915 mm -1065 mm	Not higher than 1220 mm.

S. No		Topic	Barrier Free Guidelines by MoUD	Disability Discrimination Act, European Union	Barrier Free Guidelines Toronto, Canada	Barrier Free Guidelines USA
		Door Handle Length	100 mm	120 mm	Not Specified	Not Specified
		Diameter of Door Handle	Not Specified	30-35 mm	Not Specified	Not Specified
		Clearance of door handle from door	Not Specified	45 mm	Not Specified	Not Specified
		Door Closer	Not Specified	Automatic	Not Specified	Sweep period of closer with a closing time of 3 second
		Car	Not specified	Not Specified	Not Specified	For 2 Accessible Vans
6	Parking	Parking Bay	2400 mm wide	Not Specified	3600 mm	2440 mm wide
		Unloading Platform	1200 mm	Not Specified	1500	1525 mm
		No. of Lifts	One Lift is provided	Not Specified	Not Specified	Not Specified
7	Lifts	Clear Internal Dimensions	1500 mm X 1500 mm	1400 mm X 2000 mm	1725 mm X 2286 mm	Not Specified
		Entrance Door Widths	900 mm	900 mm	915 mm	Not Specified
		Lift control heights	800-1000 mm High	1100 mm	Not Specified	Not Specified
		Size of Toilet	2200 X 2000 mm	2200 X 1500 mm	1500 X 1675 mm	2134 X 1575 mm
8	Toilet	Flooring Material	Non Slip Surface without level difference	Matt or Mid-sheen finishes are recommended	Not Specified	Not Specified
		Door Shutter	Light Weight door shutter	Not Specified	Not Specified	Push and pull type door not more than 22.2 N weight. Grab

S. No		Topic	Barrier Free Guidelines by MoUD	Disability Discrimination Act, European Union	Barrier Free Guidelines Toronto, Canada	Barrier Free Guidelines USA
						bars are not mounted above 1219 mm.
		Door Shutter Opening	900 mm	925 mm	810 mm	813 mm
		Grab Bars	40 mm dia vertical grab bar up to 700-800	38 mm dia vertical grab bar up to 1280 high	Vertical Grab bar L type Height is not Specified	Horizontal Grab bars 1321 mm width along WC
		WC Height	450-480 mm	480 mm	430 mm -460 mm	356-483 mm
		Wash Basin Height	Not specified	720-740 mm	Not Specified	686 mm
		Urinal Height	430	Rim height shall be 380mm from floor lvl	Not Specified	Not Specified
		Faucets	Not Specified	Not Specified	Automatic Type	Self closing faucet valves
		Signage	Braille Signage at 1400 mm along with illuminated symbol for disabled at 1500 mm	Not Specified	Not Specified	Not Specified
9	Signages	Height of Letters	Depends on Viewing distance (2m. To 50m) ranges from 6 mm - 150 mm	Depends on Viewing distance (1 % of distance at which the message read) Minimum shall be 22 mm	Depends on Viewing distance Minimum shall be 25 mm along with Braille lettering below	Depends on Viewing distance Minimum shall be 75 mm
		Height for Notices/ signs for wheelchair users	750 mm	Not Specified	Not Specified	Not Specified
		Height for	1200 mm	1400 mm with	Between 1370	Not Specified

S. No		Topic	Barrier Free Guidelines by MoUD	Disability Discrimination Act, European Union	Barrier Free Guidelines Toronto, Canada	Barrier Free Guidelines USA
		door, safety or other notices for ambulant users		bottom edge not less than 900 mm	mm - 1525 mm	
		Minimum Clearance for suspended or projected signs	2000 mm	2300 mm	Not Specified	2030 mm

GLOSSARY

Access Aisle- An accessible pedestrian space between elements, such as parking spaces, seating and desks that provides clearances appropriate for use of the elements.

Accessible- A site, building, facility, or portion thereof that complies with these Guidelines and that can be approached, entered and used by all people.

Accessible Route- A continuous unobstructed path connecting all accessible elements and spaces in a building or facility that can be negotiated by a severely disabled person using a wheelchair and that is also safe for and usable by people with other disabilities. Exterior accessible routes may include parking, access aisles, curb ramps, walkways and ramps. Interior accessible routes may include corridors, ramps, elevators, lifts, and dear floor space at fixtures.

Accessible Signage- Any visual way finding system incorporates architecture, landscape design, lighting, landmarks and orientation points. Signage is one key element of an effective way finding system and should be accessible to all users including people with disabilities.

Ambulatory Disabled- A person who is able, either with or without personal assistance, and who may depend on prostheses (artificial limbs), orthotics (calipers), sticks, crutches or walking aids to walk on level or negotiate suitably graded steps provided that convenient handrails are available.

Automatic Door- A door equipped with a power operated mechanism and controls that open and close the door automatically upon receipt of a momentary signal. The switch that begins the automatic cycle may be photoelectrical device, floor mat, sensing device, or manual switch mounted on or near the door itself.

Beveled- Smooth, slanted angle between two surfaces; for example, a slant or inclination between two uneven surfaces to allow easier passage of a wheelchair.
Braille Signage(Ron Apelt, John Crawford and Dennis Hogan, 2007)- Is a specialist way finding device that incorporates Braille as a primary source of information for people who are vision impaired and maybe aided with raised tactile lettering, maps or pictorial images.

Braille- The Braille system is a method that is widely used by blind people to read and write.

Circulation Path-An exterior or interior way of passage from one place to another for pedestrians, including walkways, hallways, courtyards, stairways and stair landings.

Clear - Unobstructed

Colour Contrast- The basic guidelines for making effective colour choices are based on the hue value of the colours. The most commonly used methods of achieving colour contrast incorporate either „harmonising‟ or „contrasting‟ colour combinations.

Cross Slope- Cross slope or camber is a geometric feature of pavement surfaces: the transverse slope with respect to the horizon. It is a very important safety factor. Cross slope is provided to provide a drainage gradient so that water will run off the surface to a drainage system such as a street gutter or ditch.

Disability- is an umbrella term for impairments (WHO, 2004), activity limitations, and participation restrictions, denoting the negative aspects of the interaction between an individual (with a health condition) and that individual‟s contextual factors (environmental and personal factors). Disability is neither simply a biological nor a social phenomenon but arises from the relationship between health condition and context.

Grab Bars- A bar used to give a steadying or stabilizing assistance to a person engaged in a particular function.

Handrails- A rail used in circulation areas such as corridors, passageways, ramps and stairways to assist in continuous movement.

Hue - Hue is the perceptual attribute associated with elementary colour names. Hue enables us to identify basic colour categories such as blue, green, yellow, red and purple. People with normal colour vision report that hues follow a natural sequence based on their similarity to one another. With most colour deficits, the ability to discriminate between colours on the basis of hue is diminished.
Individual Washrooms-A compartment having the basic requirements of a water closet compartment, washbasin and other essential washroom accessories as required by people with disabilities.

Induction loop - An induction or inductive loop is an electromagnetic communication or detection system which uses a moving magnet to induce an electric current in a nearby wire. Induction loops are used for transmission and reception of communication signals, or for detection of metal objects in metal detectors or vehicle presence indicators. A common modern use for induction loops is to provide hearing assistance to hearing-aid users.

International Symbol of Access- Also known as the (International) Wheelchair Symbol, the International Symbol of Access consists square overlaid with a stylized image of a person using a wheelchair. The symbol is often seen where access has been improved, particularly for wheelchair users and other mobility impaired persons. The symbol denotes a barrier free environmental, such as steps, to help
also older people, parents with prams, and travellers with luggage. The wheelchair symbol is "International" and therefore not accompanied by Braille in any particular language.
Specific uses of the ISA include:

Kerb - A side barrier to a trafficable surface or is the edge where a raised sidewalk/footpath, road median, or road shoulder meets an unraised street or other roadway.

Kerb Ramp- A short ramp cutting through a curb or built up to it or a Kerb is a drop, with walk way, at a gradient no greater than 1:10 on both sides of necessary and convenient crossing points Width should not be less than 1200mm. If width (X) is less than 1200mm, then slope of the flared side shall not exceed 1:12.

Knurled Surface- Roughened area, often in a crisscross pattern; used on either doorknobs or grab bars. On doorknobs, it is used to provide tactile clues to visually impaired persons to indicate that passage leads to an area of danger. On grab bars it is used to improve grasp and to prevent slipping.
LRV- Light reflectance value (LRV) is the total quantity of visible light reflected by a surface at all wavelengths and directions when illuminated by a light source.

Luminosity Contrast- Also known as tonal contrast is the most important element that assists people with vision impairments to distinguish between two different surfaces. A minimum difference of 26
points in the Light Reflectance Value of colours of two architectural surfaces produces an adequate luminosity contrast that is perceivable by persons with vision impairments.

- Marking a parking space reserved for vehicles used by Persons with Disabilities
- Marking a public lavatory with facilities designed for wheelchair users

Lux - Is the standard unit of illumination. It is used as a measure of perceived intensity of light.
Operable Parts- A part of a piece of equipment or appliance used to insert or withdraw objects, or to activate, deactivate, or adjust the equipment or appliance (for example coin slot, pushbutton, handle).

Passing places- a space on footpath, single track road or one lane road that permits two ways travels when it is not wide enough to allow wheelchairs/vehicles to pass one another.

Persons with Disabilities- A Person with Disability is a person with any physical, mental, intellectual or sensory impairment which in interaction with various barriers may hinder full and effective participation in society on an equal basis with others. The term “Persons with Disabilities”, consistent with the terminology used in the

Public Areas - Interior and exterior rooms or spaces that are made available to the general public. Public use may be provided at a building or facility that is privately or publicly owned.
Public Use- Describes interior and exterior rooms or spaces that are made available to the general public. Public use may be provided at a building or facility that is privately or publicly owned.

Ramp- An inclined way connecting one level with another.

Signage- Any room number, name tag, building directory, or similar object containing a printed message and/or symbol. Signage and signs are used synonymously in this document.
Space- A definable area (for example, toilet room, hall, assembly area, entrance, storage, room alcove, courtyard, or lobby).

Table Top- road raised to footpath/footway level at crossing or with leveled.

Tactile(CRC, 2007)- Tactile means information and interpretations derived from the sense of touch. This involves sensory transfer through physical contact of the hands or feet with other surfaces, as well as sensory transfers received by contact with non-physical elements such as pressure, wind and temperature.

Tactile paving/tiles- (also called Tactile Ground Surface Indicators) provide a distinctive surface pattern of “strips” and "truncated domes" or cones (which are small domes or cones that have had their tops cut off, or truncated) detectable by long cane or underfoot which are used to guide/alert persons with vision impairments of their approach to facilities, streets and hazardous drop-offs. People who are blind or visually impaired are alerted of impending danger from vehicle impact or a grade change.

Tactile signs (Refer also to Braille Signage)-Tactile signage incorporates raised text or symbols to enable touch reading by people who are blind, and touch enhancement of visual perception for people who are vision impaired.

Tactile Guiding Blocks - These are 300 x 300 mm tiles that incorporate bars that are 5mm (± 0.5mm) high, 20mm wide and spaced 50mm from the centre of one bar to the centre of the next. These flat topped bars that are easily detectable underfoot by people with visual impairments. They are used

externally to guide people with visual impairments along the circulation path. They may also be used internally in large busy areas such as railway stations and airports.

Tactile Warning Blocks - In order to warn persons with visual impairments of the approaching danger, it is recommended to incorporate Tactile Ground Surface

Indicators (TGSI) along the approach path to unavoidable obstacles and hazards. TGSI, also commonly known as „Tactile Warning Blocks‟, are 300 mm x 300 mm tiles that incorporate rows of 5 mm (± 0.5 mm) high flat-topped blister like domes that are easily detectable underfoot by persons with visual impairments. These tactile warning blocks are recognized internationally as a sign of approaching hazards.

Traffic island- can be a median strip, a strip in the middle of a road. It can also be a narrow strip between roads that intersect at an acute angle. Some traffic islands may serve as refuge islands for pedestrians.

Universal Design- Defined as “the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design”.
Vision impairment- Vision impairment is any significant loss of sight.

Water Closet Compartment/Toilet Cubicle- A compartment having a water closet with grab bars installed to assist people with physical disabilities

Wheelchair User -A person who depends on a wheelchair for mobility

White Cane - A white cane is a long rod-like device used by blind or visually impaired travelers to give them information about the environment they are traveling through.