

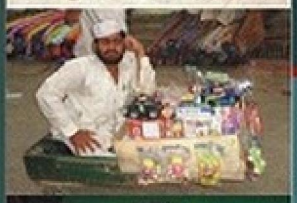
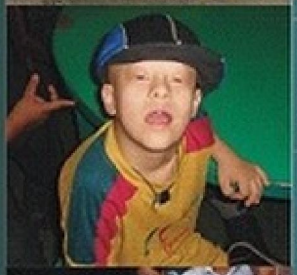

Design Manual & Guidelines for Accessibility

FOR CREATION OF BARRIER FREE ENVIRONMENTS
TO MAKE BUILDINGS AND FACILITIES
ACCESSIBLE TO PEOPLE WITH DISABILITIES

Government of Pakistan
Ministry of Social Welfare & Special Education
Directorate General of Special Education, Islamabad

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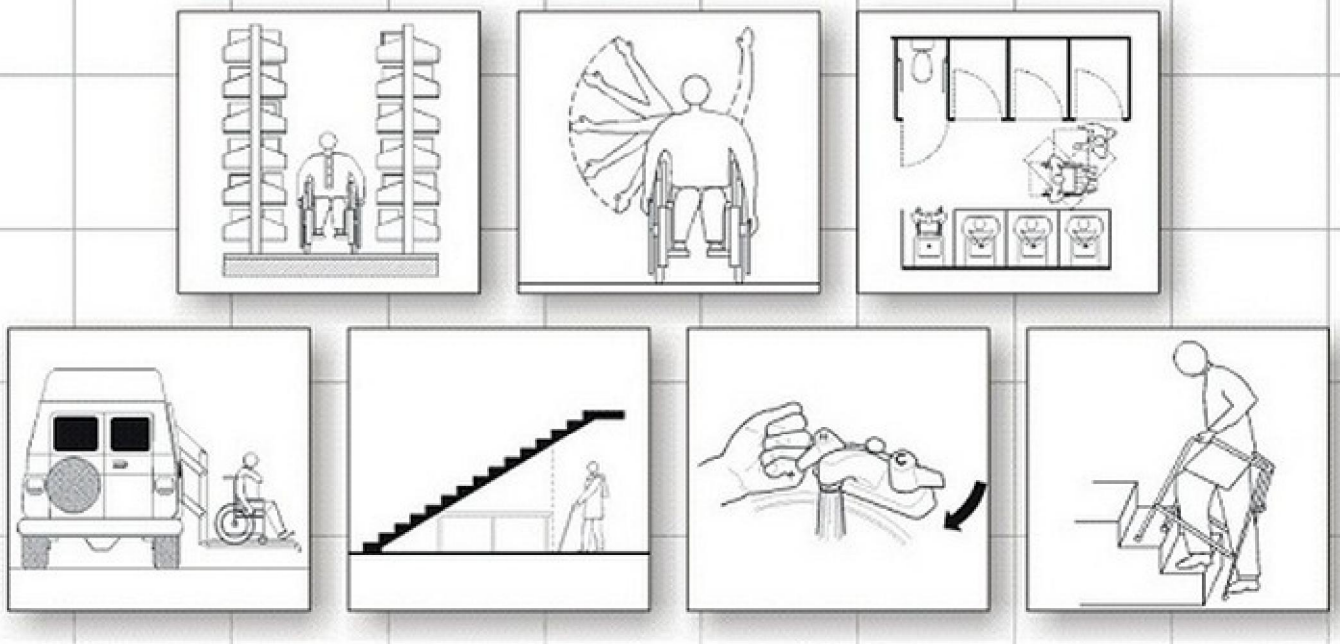

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Design Manual & Guidelines for Accessibility
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Islamabad

For and on behalf of
Directorate General of Special Education
Ministry of Social Welfare and Special Education
Government of Pakistan
Islamabad

FOREWORD

In the context of the United Nations Standard Rules' preconditions, required to ensure equal participation of persons with disabilities, the National Policy for Persons with Disabilities – 2002 strongly addresses the need to raise awareness, ensure rehabilitation of special persons and provide support services to them. Also in line with the implementation measures suggested by the UN Standard Rules, the National Plan of Action – 2006 stresses access, inclusion and equalization of opportunities for Persons with Disabilities.

The Design Manual and Guidelines for Accessibility – 2006 is cast in the long term perspective of National Policy for Persons with Disabilities – 2002, and the National Plan of Action – 2006 to implement the same, strategically positioned in the objective conditions prevailing in the country, with a premise of promoting a paradigm shift from welfare-based to a right-based approach towards disability. It provides a set of overarching principles and guidelines for professionals like planners, architects, engineers, developers and building managers for creating safe and accessible physical environments; removing physical barriers in public buildings.

Preparation of codes of practice for the design of new public buildings and for the adaptation of existing premises to ensure safe and easy access of persons with disabilities is a step forward in the implementation of one of the core areas of National Policy for Persons with Disabilities. Enactment of the Accessibility Code will ensure that henceforth, all public use buildings and areas are planned, designed, built and maintained in a manner that those are fully accessible to, and usable by people with disabilities; the infirm; and the elderly.

This document packages our desire and commitment towards an Inclusive, Barrier-free and Rights-based Society for Persons with Disabilities in the country; and I implore all sections of our society to lend support in this task as its accomplishment is contingent upon the efforts of the entire nation. It is my prayer and hope that this Design Manual for Accessibility becomes a precursor of a process that cultivates inclusive mainstreaming of Persons with Disabilities.

February 10, 2007

ZOBAIDA JALAL
Minister
Social Welfare and Special Education

PREFACE

Accessibility is inextricably linked with and Fundamental to Social Inclusion. It is a basic right of all human beings and should be enjoyed equally and appropriately by persons with disabilities; and they must have access to the same range of services, opportunities and facilities as others at no additional cost. With this end in view the National Policy for Persons with Disabilities - 2002 envisions the preparation of Codes of Practice for the design of new buildings and for the adaptation of existing premises with a view to ensuring safe and easy access of Persons with Disabilities in public places and buildings. Provision of Barrier-free Physical Environment involving all stakeholders is one of the major thrust areas of the National Plan of Action launched in March, 2006.

The Design Manual and Guidelines reflects the consummation of extensive deliberations which the Directorate General of Special Education and Pakistan Environmental Planning and Architectural Consultants Limited carried out with a cross-section of stakeholders in a series of regional conferences held at the Provincial Capitals and in Muzaffarabad, AJ&K. The recommendations put forward during the course of these consultative conferences were consolidated and presented in a National Conference held at Islamabad in August, 2006. This document, in its present final form, represents reviews and suggestions obtained from all the stakeholders through these proceedings. It attempts to ensure that Accessibility standards are met while designing all new buildings, parks, open places, housing estates, pedestrian walkways and public comfort places.

The Design Manual and Guidelines has been devised indigenously. It is a home-grown initiative and meant for nation-wide application by planners, designers, builders and regulators of public buildings and facilities with a view to ensuring that all new construction meant for public use is made in such a way that it is without physical barriers, and that already existing buildings and facilities are modified appropriately to make barrier-free. This document sets out design standards and parameters with special reference to local geographic and socio-economic conditions to facilitate the planners and builders alike in meeting the requirements of the law; outlined in the Accessibility Code which establishes minimum requirements and regulations for building enclosures and systems.

On behalf of the Directorate General of Special Education and on my own behalf I acknowledge the most valuable contribution of the Consultants, the guidance, assistance and input provided by the line Ministries, Provincial Governments and AJK, implementing and regulatory authorities which made this document focused, purposeful and far more readable. I appreciate the efforts of my colleagues in the Department in meeting all requirements against all odds to accomplish this task.

February 10, 2007

SARFRAZ AHMED SYED
Director General
Directorate General of Special Education
Islamabad

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PREAMBLE

1. The contents of the "Design Manual & Guidelines for Accessibility," contain design guidelines, dimensional standards and specifications for making new as well as existing buildings, facilities, spaces and areas accessible to people with disabilities within the provisions of The Accessibility Code of Pakistan.

2. The Design Manual & Guidelines for Accessibility supplements the accessibility code by explaining, with graphic examples, the technical requirements for implementation of the code. It gives sufficient latitude in implementation standards, out of which the most appropriate could be selected to suit any case. Contrary to The Accessibility Code of Pakistan, the provisions of the Design Manual are not binding, but serve as guidelines for making and creating accessible environments.

3. These guidelines are meant to be followed and interpreted in conjunction with the accessibility code. The contents of the Design Manual & Guidelines for Accessibility, therefore follow, more or less, the same order as that used for the accessibility code. The first chapter sets the context for scoping requirements and interpretation of conventions and terms as used in this manual and as given in the accessibility code. This is followed by a chapter describing details of disability types for their implication on the physical design of built environment. It may be noted here that this document is not a vehicle or tool to determine types of disabilities, or categorize people into disability types. It only outlines the broader parameters of implications of disability types on provision of physical features into the built environment to make it accessible to people with disabilities, the infirm and the elderly.

4. These are followed by a chapter covering basic dimensional standards and anthropometrics for defining limits of maneuverability, reach ranges, accessible spaces, and clearance of obstructions from paths of travel of people using different aids for mobility. A variety of these aids have been considered to give a larger coverage to the application of these guidelines.

5. The subsequent chapters deal with requirements of accessible design for external environments: dealing with issues of accessible route, pedestrian crossings, curb ramps, vehicular parking and street furniture. Accessible design requirements for internal environments; building components and elements; and means of emergency egress follow on the same lines as those given in the accessibility code. However, elements of specific usages like kitchen and work counters, doors and hardware etc., have been given special and detailed attention in their description. Requirements for public transport and signage design have been described under separate chapters.

6. The dimensional standards and space clearances specified in the guidelines are based upon adult dimensions and anthropometrics. Similarly, although the locally available wheelchairs are of a great variety of sizes and shapes, the international wheelchair dimensional standards have been followed in determining space requirements, clearances and reach limits of people using a wheelchair.

7. The imperial system of measurements has been used in the preparation of this manual, however close equivalent in SI units have also been given. The imperial system has been employed, as it is the most commonly and widely used system in the local architecture and engineering professions; building and construction industry; and building regulatory legislations. It is also understood by the common man.

8. At the end a reference checklist for making an audit of accessibility provisions of already existing buildings, facilities and areas, has been provided, which is equally applicable to designed but not yet built buildings and facilities. This checklist is for reference purposes and can easily be adapted to suit particular requirements of a project or audit assignment.

9. Design guidelines and specifications contained in this document are based upon international standards of accessibility, a list of which is given at the far end under reference bibliography, to give the user of this manual an opportunity, if so desired, to refer to the detailed codes and standards followed by people the world over.

REFERENCE CHART

S. No.	Accessible Element	Dimensional Standards	Ref. Page	Ref. Code
1	Basic Dimensions			
	▪ Standard Wheelchair Space	36 in. x 48 in.	7.1	[7.2.1]
	▪ Space for turn	60 in. dia. min.	7.2	[7.2.1]
	▪ Clear range for person with white cane/ walker/crutches	48 in. across	7.3	[7.2.2]
2	Circulation Space			
	▪ External Accessible route/path/steps	48 in. min.	5.11	[5.2.1]
	▪ Clear pathway at obstructions	36 in. min.	5.11	[5.2.7]
	▪ Internal Accessible route/passage	48 in. min.	6.1	[6.2.1]
	▪ Headroom of an accessible route	80 in. min.	6.1	[6.2.1]
	▪ Threshold of an accessible entrance.	0.75 in. max.	6.4	[6.2.2]
3	Staircases & Lifts			
	▪ Clear width	42 in. min.	6.4	[6.2.3]
	▪ Tread	11 in. min.	6.6	[6.2.3]
	▪ Riser	7 in. max.	6.6	[6.2.3]
	▪ Lift cab clear (min.)	42 in. x 54 in.	7.28	

S. No.	Accessible Element	Dimensional Standards	Ref. Page	Ref. Code
4	Ramp			
	▪ Clear width	36 in. min.	6.8	[6.2.3]
	▪ Gradient	1: 12 max.	6.8	[6.2.3]
	▪ Max. run	48 ft.	6.8	[6.2.3]
5	Clear Door Dimensions (min.)	33 in. x 80 in.	7.17	[7.6.6]
6	Toilet Door (min.)	30 in. x 80 in.	7.18	[7.6.6]
7	Public Toilet Dimensions			
	▪ Unobstructed clear space	60 in. dia.	7.5	[7.3.2]
	▪ Top of shelf/basin	34 in. max.	7.5	
	▪ Underside of basin	29 in. min.	7.5	
	▪ Top of WC seat	18 in. to 20 in.	7.7	[7.3.4]
	▪ Grab bar height	30 in. to 38 in.	7.26	
8	Level of Controls/Switches	42 in.	7.32	[7.9.1]
9	Hand Rails			
	▪ Height	30 in. to 48 in.	7.23	[7.7.3]
	▪ Diameter	2 in. max.	7.24	[7.7.4]
	▪ Extend beyond level changes	12 in. min.	7.24	[7.7.4]
	▪ Extend from walls	1.5 in. min.	7.24	[7.7.4]
10	Signage			
	▪ Characters External	3 in. min.	9.6	
	▪ Characters Internal	3 in. min.	9.6	[6.2.6]
	▪ Emergency	6 in. min.	9.10	
11	Parking Stall Width			
	▪ For cars/vans	12 ft. min.	5.16	[5.2.10]
	▪ For adapted tricycle/motorcycle	6 ft. min.	5.16	[5.2.10]

1 CONVENTIONS AND DEFINITIONS

Miscellaneous Instructions:

The Accessibility Code: The accessibility code wherever referred to in this document means The Accessibility Code of Pakistan – 2006, as enforced by the Government of Pakistan. This document sets guidelines for accessibility to public places and areas by persons with disabilities. These guidelines are to be applied during the design, construction, and alteration of such buildings and facilities to the extent as required by the law or to exceed the minimum requirements for provision of facility.

Code References: The section or clause of The Accessibility Code of Pakistan relevant to the description or specification given in the design guidelines is indicated in the text by the parenthesis [ ].

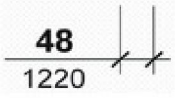
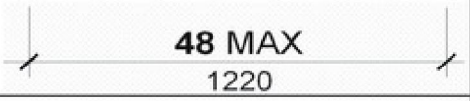
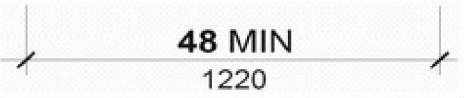
Provisions for Adults: The dimensional standards and space clearances specified in these guidelines are based on adult dimensions and anthropometrics unless specifically noted otherwise.

Dimensional Tolerances: All dimensions are subject to conventional building and construction industry tolerances for field conditions.

Equivalent Facilitation: The departure from the particular technical or scoping requirements of the accessibility code or these design guidelines by the use of other design or constructional parameters is permitted provided that the alternative design or constructional proposals provide substantially equivalent or greater access to and usability of the building or facility.

Graphic Conventions:

Graphic conventions employed for the figures and illustrations used in this document are as described below:

Convention	Description
	Typical dimension line showing dimension in inches above the line and in equivalent SI units (millimeters rounded off to the nearest multiple of five) below the line
	Dimensions for short distances indicated on extended line
	Maximum dimension permitted
	Minimum dimension permitted
	Dimension showing a range of minimum to maximum
	Centre line
	Direction of travel or approach
<	Less than
≤	Less than or equal to
>	More than
≥	More than or equal to
[8.1.2]	Refers to the relevant clause or section of The Accessibility Code of Pakistan

Definitions: [2.1]

For the purpose of this document, the terms defined below shall have the meaning assigned, unless such meaning be inconsistent with or repugnant to the context of the subject matter in which such words or expressions occur.

Words, terms and expressions used in the singular include the plural, and vice versa.

Words imparting the masculine gender include the feminine gender as well.

The meaning of the terms not specifically defined hereinafter shall be as defined by the respective standards, or in case where no definitions exist in the respective standards either, shall be as defined by the collegiate dictionaries in the sense that the context implies.

General Terminology: [2.2]

The following expressions when used in this document shall have the meanings as defined.

Comply with	meet one or more specifications of this document.
If, if ... then	denotes a situation which applies only when the conditions described therein are present.
May	denotes an option or alternative.
Shall	denotes a mandatory requirement.
Should	denotes an advisory specification or a recommendation.

Defined Terms: [2.3]

The following words and terms shall for the purpose of this document have the meaning as shown herein.

Access	approach to, reach and use of, facilities and egress except in cases of emergency, without assistance and undue difficulties.
Accessible	a site, building, facility or portion thereof that complies with this code, and that can readily be accessed by persons with disabilities and infirmities.
Accessibility	means to make the built environment accessible.
Accessibility Code	The Accessibility Code of Pakistan - 2006.
Accessible Route	a continuous route that connects all the accessible spaces and elements of a building or facility and is accessible to persons with disabilities.
Addition	an expansion, extension or increase in the gross floor area or height of a building or facility.
ALS	assistive listening system: a sound amplification system bypassing the acoustical space between a sound source and a listener, utilizing transmitters, receivers and coupling devices etc. by means of induction loop, radio frequency, infrared or direct-wired equipment.

Alteration	a change, addition or modification in construction or occupancy.
Approved	as approved in writing by the regulatory authority.
Area of Refuge	an area which has direct access to an exit and is designated for rescue assistance purposes.
Assembly Area	a room or space, accommodating a group of persons, for some specific purpose.
Basement	a storey wholly or partially below ground level.
Braille	a system of writing for the blind using patterns of raised dots as characters.
Building	any structure or enclosure, and its appurtenances, used and intended for supporting or sheltering any use or occupancy.
Common Use Area	room, space or element inside or outside the building that is made available for the use of residents or guests of the building.
Completion Certificate	a certificate issued in conjunction with, or without the occupancy certificate by the regulatory authority, certifying that the permitted construction has been completed in compliance with approved drawings.
Covered Area	the maximum horizontal area within the inside perimeter of the external walls of the space under consideration.

Covered Facility	within the scoping requirements of the accessibility code.
Cross Slope	the slope that is perpendicular to the direction of travel.
Curb	a definable side edge to a pavement intended for traffic.
Curb Ramp	a short ramp cutting through a curb, or built up to it.
Detectable Warning	a special surface feature built in or applied to walking surfaces or other elements to warn of hazards on a circulation path.
Disability	a condition, temporary or permanent, which limits a person's ability to move around in, and use the built environment.
Dwelling Unit	a building or portion thereof that contains a single unit used, intended or designed to be used, rented, leased, let or hired out to be occupied for residential purposes.
Egress	an exit, or way out.
Element	a structural or mechanical component of a building, facility, space or site.
Elevator	a lift.
Existing	that already exist on ground, or for which a building permit or permission has been granted prior to the enforcement of the accessibility code.

Exit	a passage or a door to leave a building or portion thereof to an outside area or public thoroughfare.
Facility	all or any portion of buildings, structures, site improvements, elements and routes located on a site.
Floor	a storey, or a horizontal portion thereof.
Floor Area	the usable covered area of a building or portion thereof at any floor.
Fire-protected	the assembly of materials designed and applied to the object to restrict the spread of fire for a designated period of time.
Freight Elevator	a lift intended primarily for the transportation of goods.
Ft.	foot, feet.
Gross Floor Area	the total floor area within the outside perimeter of external walls of the building or portion thereof under consideration, and which may be determined as defined by the regulatory authority having jurisdiction.
Ground Floor	the srorey or storeys nearest to the ground level and used as the principal entry from ground level.
Handrail	a horizontal or sloping rail intended to provide guidance and support at hand level.
In.	inch (es).

Jurisdiction	the extent of, or territory under the administrative control of regulatory authority.
Knurl	a small projecting knob, ridge or etching usually applied to door handles as a sign of warning.
Landing	platform or a part of the floor structure at the end of a ramp or flight of steps, or to give access to a lift.
Lift	an appliance for transporting persons or goods between two or more levels by means of a guided car moving in a substantially vertical direction and travelling the same path in both upward and downward directions.
Low-rise	a building or structure having two to four storeys.
M.	metre (s).
Max.	maximum.
Min.	minimum.
Mm	millimeter (s).
Multi-family Dwelling	more than four dwelling units, each occupied by a separate family or household.
Multi-storey	a building or structure having more than four storeys.

Occupancy	the purpose for which a building or facility or a portion thereof is used and occupied.
Occupancy Certificate	a certificate issued by the regulatory authority stating that the building or facility has been completed in accordance with approved drawings and is fit for occupation for the permitted use.
Occupant Load	the maximum number of persons for which a building or a facility has been designed or built.
Pictogram	a pictorial symbol, usually used in signage, representing activities, facilities or concepts.
Public Agency	includes a person or body of persons, or an autonomous body appointed by or under the authority of the Federal, Provincial or local government.
Public Place	any building, premise or area to which the public have access.
Public Use Area	interior or exterior portions, rooms, spaces or elements of a building, whether owned publicly or privately, that are made available to the general public.
Premises	a site, with its buildings and appurtenances.
Ramp	a sloped or inclined walking surface including intermediate landings.
Reachable	within reachable limits of a wheelchair bound person.

Regulatory Authority	a government or public agency that adopts or enforces regulations for the design or construction of buildings and facilities.
Relevant Regulations	the provisions of any Federal, Provincial or local laws, or any law other than the accessibility code affecting the design, construction, maintenance, use or occupancy of buildings or facilities, currently in force or to be enforced in future.
Rescue Assistance	the operation or activity of providing assisted evacuation to people who, because of their disability are unable to use the stairs in cases of emergencies.
Riser	vertical component of a step between two treads, or the tread or landing above or below it.
Running Slope	the slope that is parallel to the direction of travel.
Service Entrance	an entrance intended primarily for delivery of goods or services.
Sft.	square feet.
Signage	displayed pictorial, verbal, symbolic and tactile information.
Single-storey	a building or structure having only one storey above ground level.
Site	a parcel of land bounded by a property line or a designated public right of way, housing one or more buildings or facilities.

Space	a definable area.
Storey	the portion of a building included between the upper surface of a floor and the upper surface of a floor or roof above.
Structure	the whole constructed unit of a building or facility.
Tactile	a profiled or textured surface, that can be perceived using the sense of touch.
TDD	telecommunication display devices or telecommunication devices for deaf persons.
Tread	horizontal component of a step.
TTY	an abbreviation for teletypewriter or text telephone employing interactive text-based communication telephone network. TTY may include devices such as TDD or computers with special modems.
Uncoupled	an assembly in which the flushing cistern is not integrally joined with the water closet.
Unisex	a facility intended for use by either sex with or without the assistance by people of the same or opposite sex.
Use	the purpose for which a site or building, or a portion thereof is authorized or permitted under relevant regulations.
Usable	which can be used for the purpose the object is meant for.
Winder	a tread of unequal width.

2 ACCESSIBILITY AND TARGET GROUPS

In the context of making buildings and facilities accessible to people with disabilities, the word 'Disability' may be defined as a condition, whether temporary or permanent, which limits a person's ability to move around in and use the built environment.

There are numerous different disabilities, and they may manifest themselves in varying degrees. A person may be afflicted by multiple disabilities at one time, or may have a disability whose symptoms fluctuate. The types of disabilities, and the target groups for which these design guidelines cater include the following: [**4.2.1**]

Types of Disabilities and Implications for Design

Locomotory Impairment: affecting mobility due to impairment of the trunk and/or lower limbs including manipulatory impairment. [**4.2.1.a**]

There may be two groups of people under this category.

i) Ambulant:

Walk with difficulty; have affected gait; have partial use of arms and hands; lack coordination.

May use walking sticks, walkers, crutches or other aids for mobility.

Activities that may be difficult include:

- walking,
- overcoming differences in level,
- passing over thresholds,
- climbing steps or inclined surfaces,
- moving over rough or uneven surfaces,
- standing up from a sitting position,
- standing for extended periods of time,
- reaching for objects,
- maneuvering in toilets and bath rooms,
- fine finger manipulation, and
- maneuvering in situations requiring speed.

Affected Gait

Walking Stick

Single Axillary Crutch

Axillary Crutch & Grab Bar

Axillary Crutches

Nonaxillary Crutches

Walker

EXAMPLES OF USE OF MOBILITY AIDS BY AMBULANT LOCOMOTORY IMPAIRED PERSONS

Some of the design measures required to be incorporated into built environment include:

- Provision of sufficiently wide door openings.
- Provision of easy to operate doors.
- Provision of lever type door handles and extra pull bars.
- Elimination or minimization of thresholds and level differences in walking surfaces.
- Provision of ramps, curb ramps, elevators, or platform lifts.
- Provision of handrails and grab bars.
- Provision of sufficiently wide toilets.
- Provision of lever handle or push button type faucets.
- Increase in the pedestrian crossing time interval.
- Increase in the opening time interval for elevators and automatic doors.

i) Wheelchair bound:

With severe mobility disabilities; use manually operated or power driven wheelchair, or adapted personal vehicle.

Manually Operated Wheelchair

Attendant Operated Wheelchair

Power Driven Wheelchair

EXAMPLES OF MOST COMMON WHEELCHAIR TYPES

Wheeled Platform

Adapted Tricycle

Adapted Motorcycle

EXAMPLES OF ADAPTED PERSONAL VEHICLES

Access problems include among others:

- negotiating level changes,
- bridging great differences in height usually achieved through stairs,
- maneuvering narrow spaces,
- maneuvering rough and uneven surfaces,
- making use of toilet facilities,
- getting closer to front closed counters and work surfaces,
- reaching higher placed controls and objects, and
- seeing items placed at conventional heights.

Design measures needed to be considered for incorporation into built environment include:

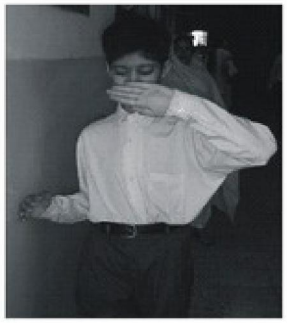
- Installation of curb ramps.
- Provision of ramps.
- Provision of elevators with wide doors, and/or platform lifts.
- Provision of wide enough routes, corridors and spaces.
- Provision of wide enough door openings and minimization of threshold level differences.
- Provision of easy to operate doors.
- Provision of lever type door handles and extra pull bars.

- Provision of sufficiently wide toilets with space for wheelchair maneuverability.
- Installations of grab bars and shower seats in bath rooms.
- Provision of lever handle or push button type faucets.
- Provision of reachable controls.
- Provision of low level counters with knee space.

Sensory Impairment: affecting vision, wholly or partially; having partial vision or total vision loss. [**4.2.1.b**]

Encounter difficulties in

- Visual communication,
- perceiving the environment,
- maintaining orientation,
- locating destinations,
- reading the information,
- identifying obstructions in the path of travel,
- crossing roads and traffic areas,
- maneuvering control buttons,
- recognizing emergency situations,
- negotiating dimly lit areas, and
- tolerating high glare.



Mobility Stance

Use of Dark Glasses & White Cane

EXAMPLES OF USE OF MOBILITY AIDS BY PERSONS WITH IMPAIRED VISION

Require higher illumination levels; depend upon senses of touch and hearing to perceive environment; may use cane, dark glasses and/or service animals like seeing eye dogs.

Measures required to counter the difficulties include:

- Provision of higher levels of illumination especially at information reading locations.
- Elimination of glare from objects containing information material.
- Use of bright and contrasting colours to separate surfaces and areas.
- Provision of guiding blocks and other detectable elements along the path of travel.
- Provision of detectable warning strips at changes in level, stairs, ramps and obstructions.
- Provision of tactile markings at door handles and handrails of exits.
- Provision of audile signals and information material.
- Provision of larger text, legible lettering styles and larger dimensions for information material.
- Provision of tactile and Braille messages.
- Provision of audile alarm signals.

Sensory Impairment: affecting hearing and speech. [**4.2.1.c**]

Encounter difficulty in understanding oral and auditory communication; and use of communication equipment that is exclusively voice based such as telephones, public address system, fire alarms etc.

Whereas persons belonging to the other target groups may be easily identifiable because of overt signs of impairment, this group has the most invisible impairment not easily recognizable unless engaged in oral communication.

Problems encountered in maneuvering the built environment include:

- managing situations involving use of speech and verbal interaction,
- not hearing warning signs, impending threats or emergency calls,
- crossing roads,
- communicating through voice based electronic equipment, and
- asking for help in emergency situations.

USE OF SIGN LANGUAGE FOR COMMUNICATION

Use combination speech reading and hearing aids, sign language; require higher lighting levels for lip reading purposes; avoid echo, reverberation and extraneous background noise, and auditory notifications and warnings.

Measures required to counter the difficulties in the built environment include:

- Provision of visual signage and information material.
- Provision of flashing light emergency alarms.
- Use of clearly written messages and instructions, especially for emergency situations.
- Provision of telecommunication display devices (TDD), text telephones (TTY) and computers with special modems for communication in public service areas, and in public accommodations.
- Provision of assistive listening devices (ALS) based on induction loop system, radio frequency, infrared or direct-wired equipment in public address environments.

Cognitive Impairment: affecting mobility, comprehension and maneuverability. [4.2.1.d]

The condition usually results from cognitive and learning disabilities; multiple locomotory and sensory disabilities; and emotional and neurological diseases.

Afflicted persons require easy to comprehend environmental clues; frequent rest due to lack of stamina; sturdy and maneuverable controls mechanisms; and lack muscular coordination and fine finger manipulation. Hazardous and unfriendly environments should be avoided.

Measures required to counter the difficulties in the built environment include:

- Create easy to maneuver and simplified built environments.
- Provide sufficiently larger spaces for maneuverability.
- Avoid multi-level or complex elements.
- Provide sturdy door handles, pulls and fixtures.
- Provide lever handle type faucets and movable controls.
- Avoid glare-producing surfaces.
- Avoid sharp edges and objects, which might snag on dresses.
- Provide plenty of grab bars and resting places.
- Provide easy to comprehend and legible signs and information material.

Disease and Bodily Condition

In addition to people with permanent physical or mental disabilities, there are conditions, which may affect usual abilities of an individual.

Diseases of the heart, lungs, kidneys, certain neurological diseases, arthritis, rheumatism, emotional illness, drug addiction, bodily deformity, frail health etc. may reduce physical or mental abilities, stamina or capacity of a person to bear stress while negotiating features of built environment.

Ageing also causes reduction in overall ability of elderly persons. Women during pregnancy, or when carrying infants, also somewhat lose their overall capability to maneuver in the built environment. Similarly people who are of extreme size or weight may also need special considerations to move about in and use the features of the built environment.

Most of the design considerations for needs of the four groups of people mentioned earlier would suffice for most of the situations descried under this category. However for individual cases having particular needs, establishment of needs and provision of customized facilities should be considered on case by case basis.









3 BASIC DIMENSIONAL STANDARDS

Standard Dimensions of Mobility Aids

A variety of mobility aids help challenged people become mobile. These aids come in different sizes to suit the particular needs of an individual. Some may be adjustable while some are of fixed sizes. Custom built aids are also used. The manufactured items also vary in their dimensional standards depending upon the source of manufacture. The dimensional standards given in this manual, thus, give a range of sizes for these aids.

These mobility aids may comprise any of the following, but are not limited to:

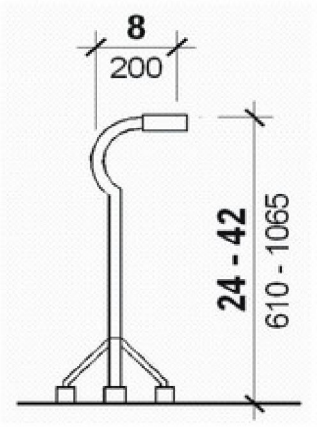
Ambulant Canes/Walking Sticks: Canes and sticks provide support by shifting some body weight to the user's arm and shoulder and by helping to maintain balance.

Grabbers and reachers are used to increase the reach for people who are on wheelchair or otherwise seated, are short in stature, or have limited reach range.

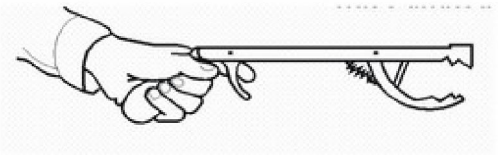
White/Long Canes: White canes identify and assist people with vision loss to detect obstructions in their path of travel. Long canes are typically 36 to 48 in. (915 to 1220 mm) long, and may fold, telescope or be rigid.

Canes may be used by moving them from side to side, touching the floor surface (touch technique), or held stationary in an angled position with the tip just above the ground surface (diagonal technique).

AMBULATING CANE



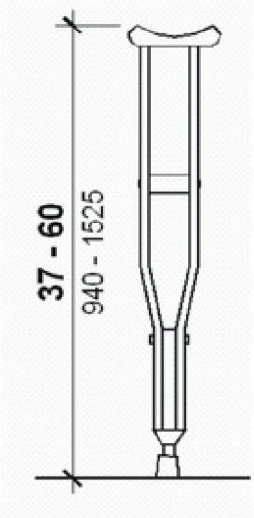
TRIPOD WALKING AID



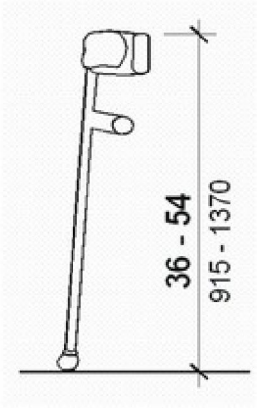
REACHER/GRABBER

Crutches: Crutches reduce body weight stress on lower extremities by transferring load to the shoulders or forearms.

Axillary crutches have an underarm support to transmit weight to the shoulder. Nonaxillary crutches have handgrips and a forearm or upper-arm cuff to distribute weight to the forearm.

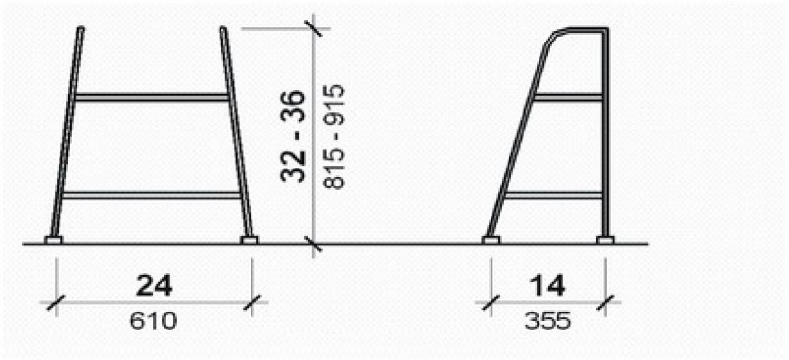


AXILLARY CRUTCH

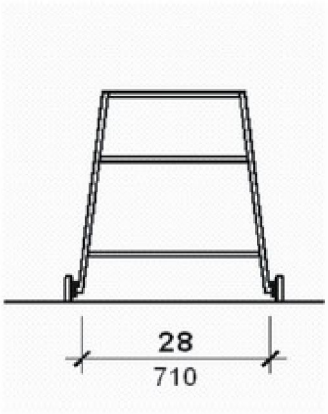


NONAXILLARY CRUTCH

Walkers: Walkers may provide some support to the body, but primarily are used to help maintain balance. Walkers may be folding and adjustable, rolling or rigid with three or four wheels. Folding walkers are usually of light weight construction, while rolling, or basket walkers are wider of up to 28 in. (710 mm) widths.

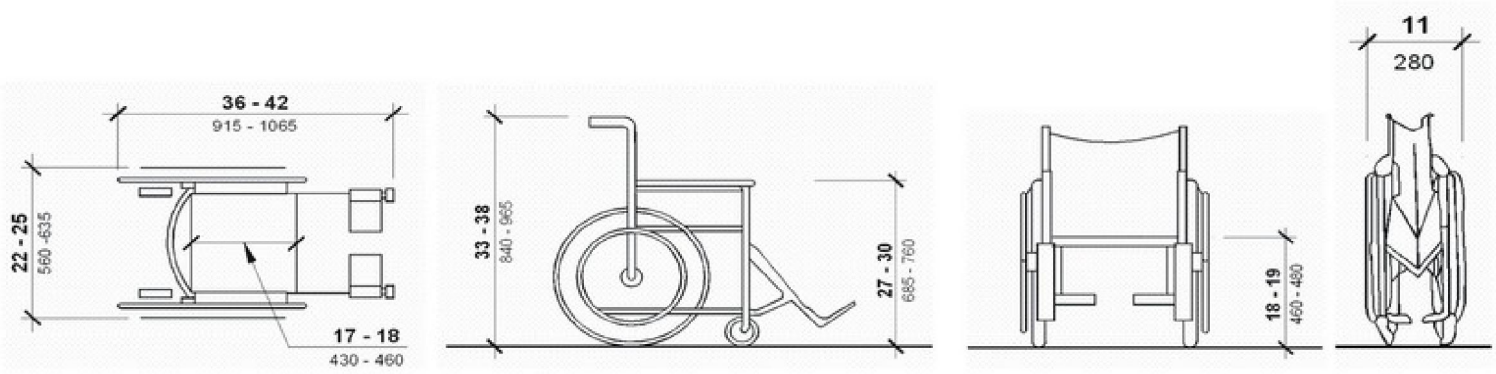


WALKER



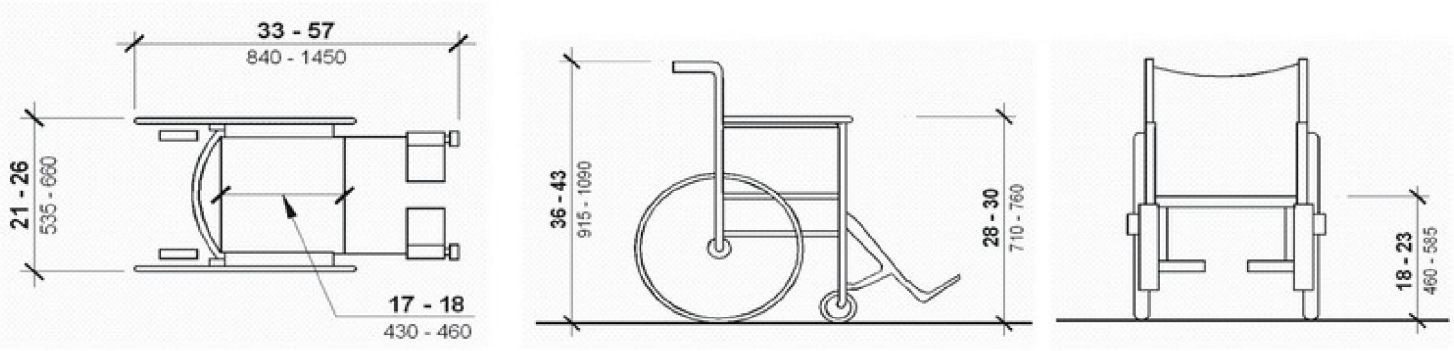
ROLLING WALKER

Manual Wheelchairs: Manually operated wheelchairs are hand propelled, either self or by attendant. Self propelled wheelchairs use rims mounted on large front or rear drive wheels. Armrests are usually cut back to allow closer access under tables or counters. Wheelchairs can either be foldable or rigid. Specialized or adapted chairs and wheelchairs are available for daily activities like bathing, toilet functions and for sports like basketball or athletics.

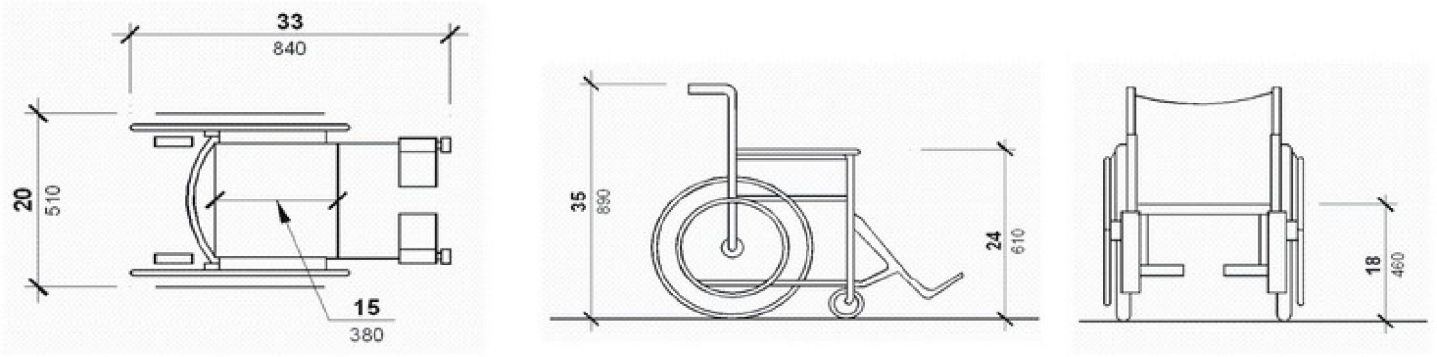


STANDARD DIMENSIONS FOR SELF PROPELLED MANUAL WHEELCHAIR

Dimensions for wheelchairs to be operated solely by attendant or children vary slightly from those for standard self propelled wheelchairs.



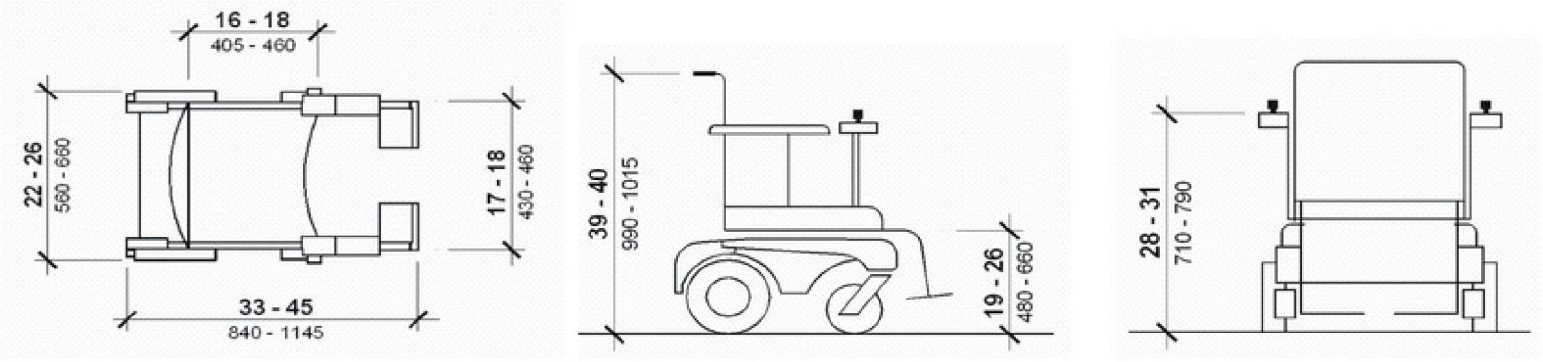
STANDARD DIMENSIONS FOR ATTENDANT PROPELLED MANUAL WHEELCHAIR



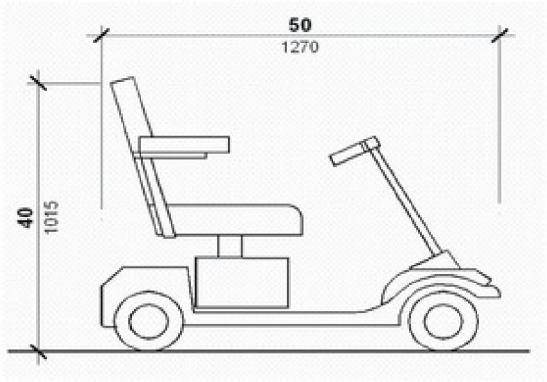
STANDARD DIMENSIONS FOR SELF PROPELLED WHEELCHAIR FOR CHILDREN

Motorized Wheelchairs & Electric Scooters: Motorized wheelchairs are usually controlled by hand mechanism, or joy stick, mounted on the chair arm. They are similar to manual chairs in overall size but are heavier and generally less maneuverable. The frames are not collapsible, although they can be partially disassembled.

Three or four wheeled electric scooters are some times used by individuals with impaired mobility or stamina insufficiency to travel relatively long distances. When operated indoors these are often used differently than motorized wheelchairs, due to their larger turning radii.

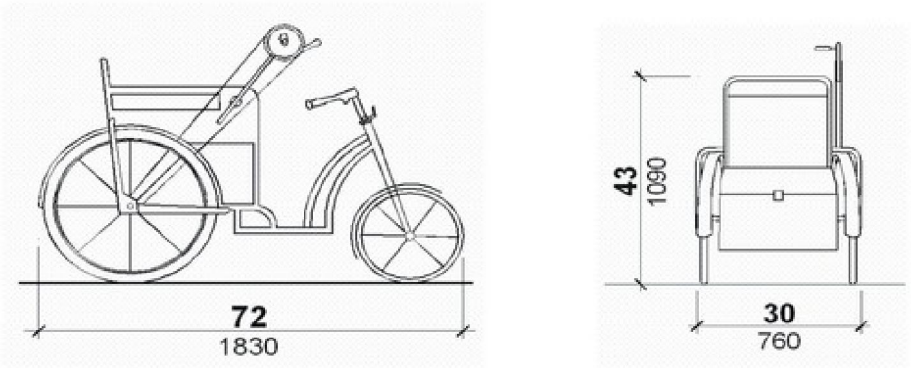


MOTORIZED WHEELCHAIR

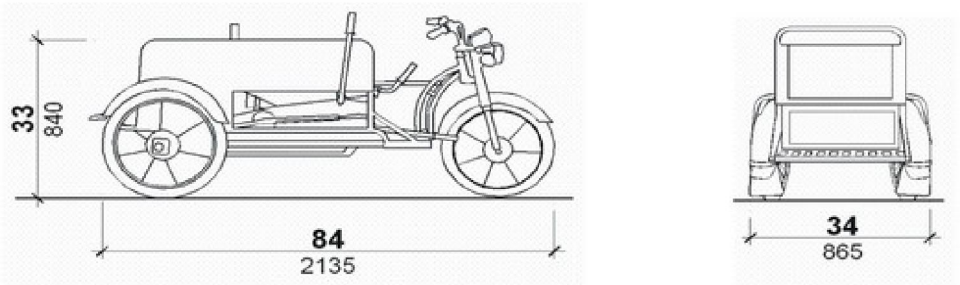


FOUR-WHEELED ELECTRIC SCOOTER

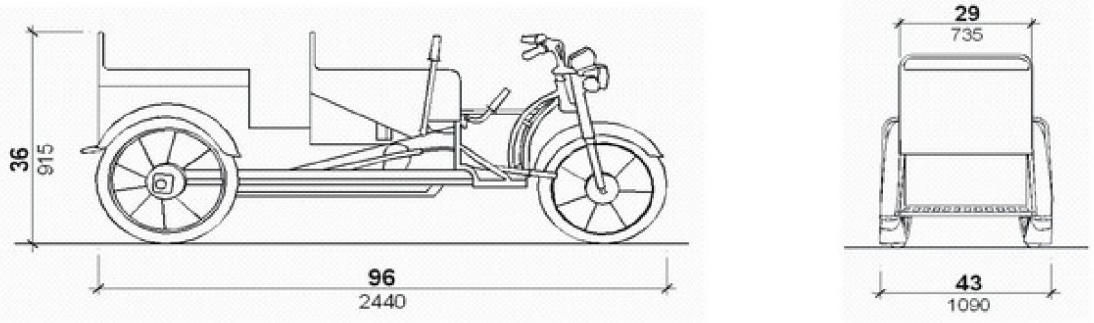
Adapted Motorcycles/Tricycles: Three wheeled adapted cycles, motorcycles and low-level platform seats with wheels are often custom made and used for outdoor environments. Usually made of rudimentary technology adapting regular motorcycles or bicycle components, they are often used in combination with crutches for indoor use, and have small storage compartments. The handles used for steering are also adapted to meet individual's capacities, and are often an efficient and affordable means of personal transportation.



ADAPTED TRICYCLE



THREE WHEELED ADAPTED MOTORCYCLE WITH BACK TO BACK SEATING



THREE WHEELED ADAPTED MOTORCYCLE WITH TWO-ROWED SEATING

Service Animals: Trained animals known as service animals also serve people with varying degrees of disabilities. Guide dogs, signal dogs and other animals are specifically trained to do work or perform tasks for the benefit of an individual with disability. The tasks perform by these service animals include but are not limited to guiding individuals with vision impairment, alerting individuals with impaired hearing to intruders or sounds, providing some protection or rescue work, pulling a wheelchair or fetching dropped items.

Development of robotics to be used as aids for persons with disabilities is still in experimental stages.

Anthropometrics and Basic Dimensional Standards

The discipline of science dealing specifically with the measurement of human body to determine differences in individuals, groups, etc., is termed anthropometry. For the purpose of design, however, the thrust of the anthropometric data and information is to determine space, reach and other human factors to create a stimulating but non-stressful environment for human use.

Age, gender, ethnic and socio-economic factors impact significantly on body dimensions, and consequent spatial requirements. The appropriateness of the applicability of anthropometric data depends, among other things upon the statistical accuracy of the defined target users, and their functional capacities. In the absence of a scientific data base the general anthropometric considerations within the normal range had to be relied upon for preparation of this document.

The range of equipment and aids employed for mobility and reach by people with disabilities also affect the dimensional standards for space design. The working dimensions of these gadgets vary by manufacture, origin and personal needs. And with the advancement of technology the shape, sizes and performance of these aids continue to change. To meet the spatial requirements of the highest number of such a diverse target group, internationally accepted dimensional standards have been employed in the preparation of this manual.

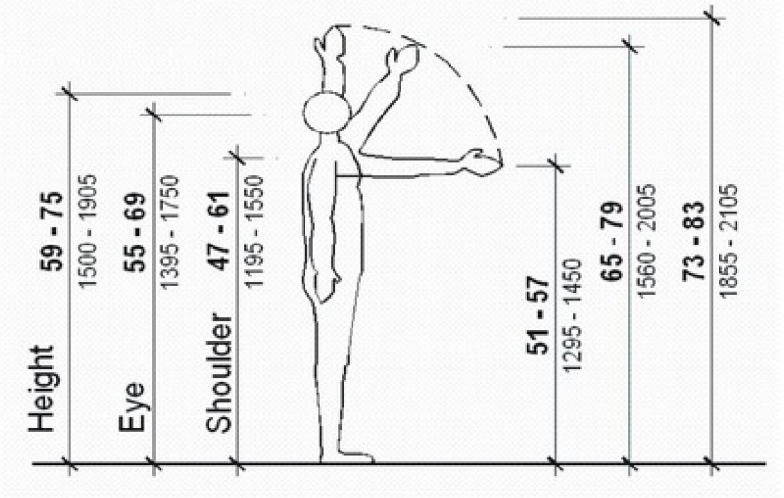
The variables in anthropometry also change with 'static' or 'dynamic' measures, requiring data taken in stationary position or while performing activities for which dimensions are desired. Ergonomics, or the application of human factors data to design, also depends considerably on the human behaviour attributable to the five senses and learned cultural attributes. Each person has a unique innate capacity to gather sensual information, but how that information is understood is determined by personal and cultural experience. It has been found that in case of challenged people, where part of sensual capability is affected, the remaining of the faculties tend to take up the shortcoming, making each person unique in one's endeavour to deal with one's environment.

'Accessible design' addresses the requirements of one user group i.e. people with disabilities, defined as target group for the purpose of the application of the accessibility code. By limiting the user group description, accessible design can be exclusive and can segregate people with disabilities from others. Good design that can work with respect to human factors issues will result in 'universal design,' which functions equally well for as inclusive a group of users as is possible.

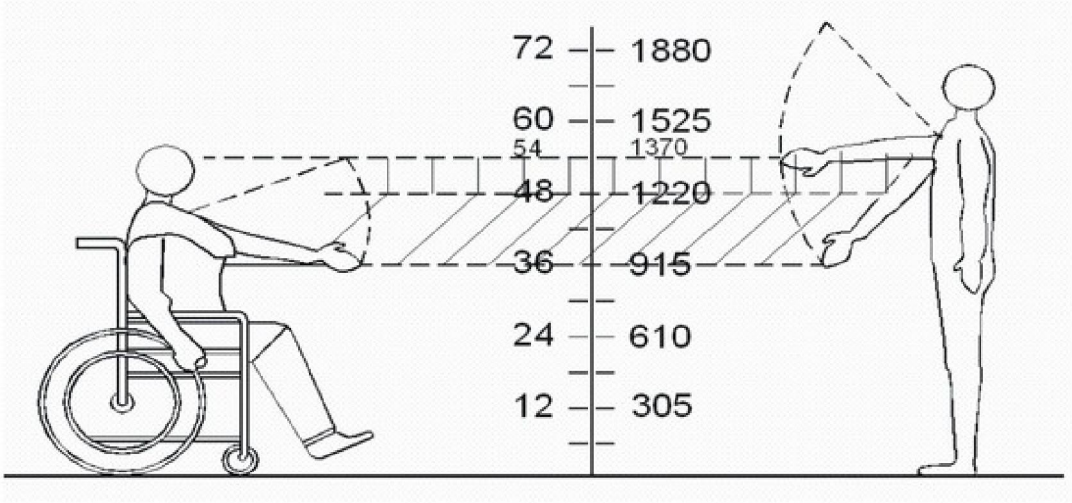
Principles of universal design may be summarized as:

- Equitable use
- Perceptible information
- Flexibility
- Tolerance of error
- Simple and intuitive use
- Low physical effort.

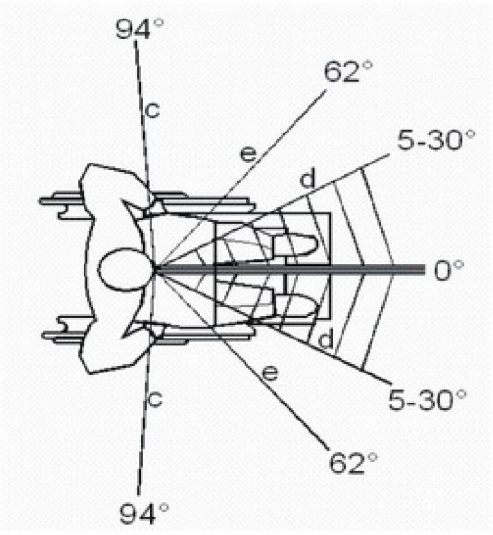
Whereas the purpose of this document is to provide design guidelines for accessible design with special reference to the provisions of the accessibility code, the intention in designing buildings and facilities should be such that by meeting the requirements of the code, objectives of a universal design are achieved.

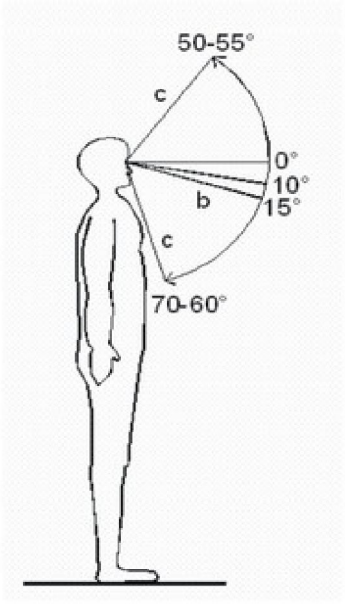


BASIC HUMAN DIMENSIONS WHILE STANDING



FIELD OF VISION AND FORWARD REACH LIMITS OF A PERSON STANDING AND ON WHEELCHAIR

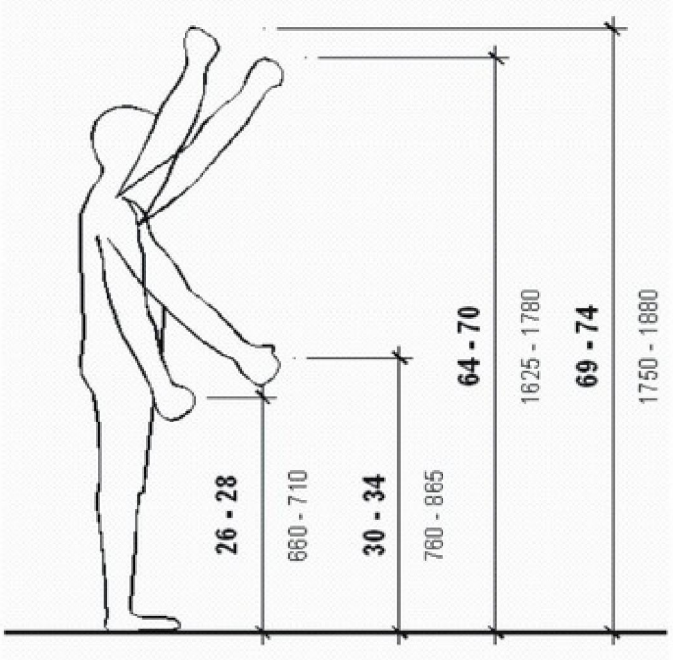




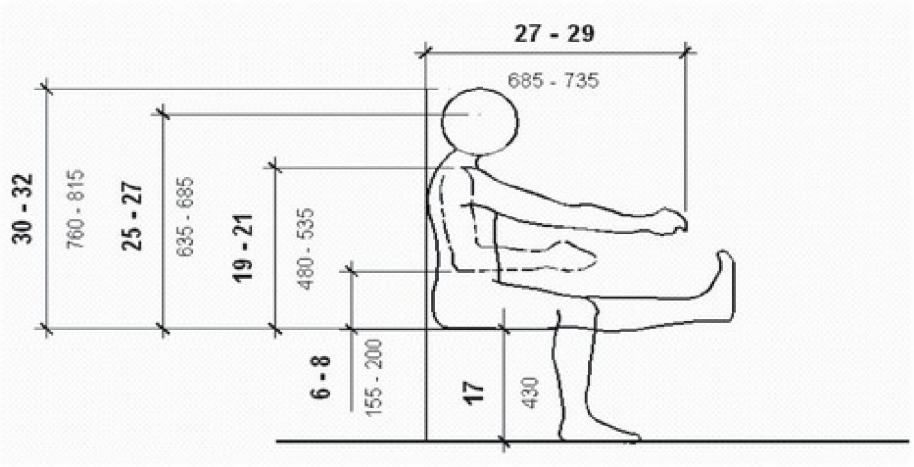
FIELD OF VISION

a. Normal optical axis – standing position
b. Normal optical axis – sitting position
c. Limits of field of vision
d. Normal angle of vision
e. Maximum angle of vision

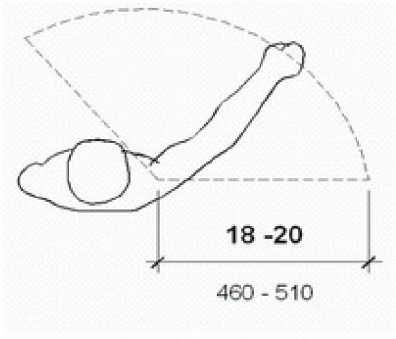
FIELD OF VISION IN PLAN AND SIDE ELEVATION



Reach Ranges While Standing

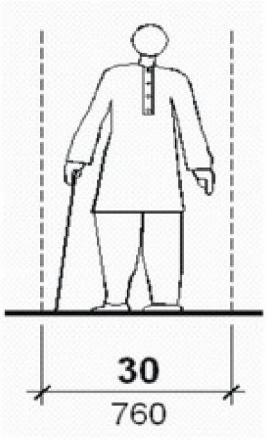


Basic Dimensions While Sitting
on a 17 in. (430 mm) Seat

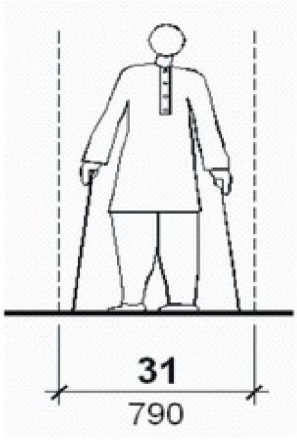


Outstretched Hand Reach

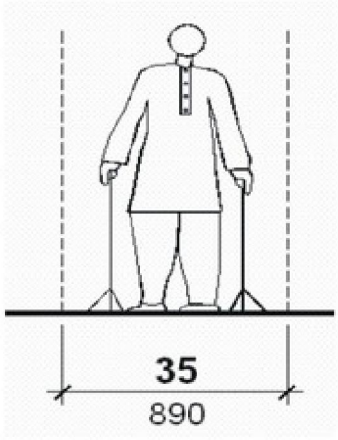
ANTHROPOMETRIC DATA FOR ELDERLY PERSONS



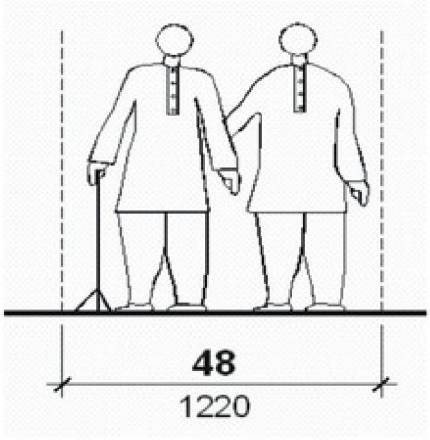
Person with walking stick



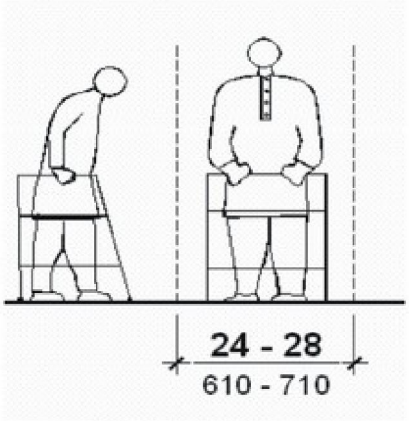
Person with two sticks



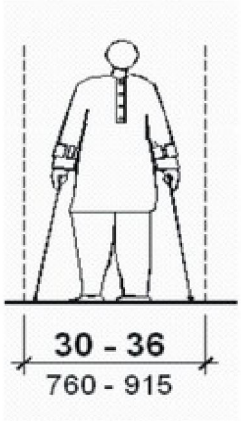
Person with two tripod sticks



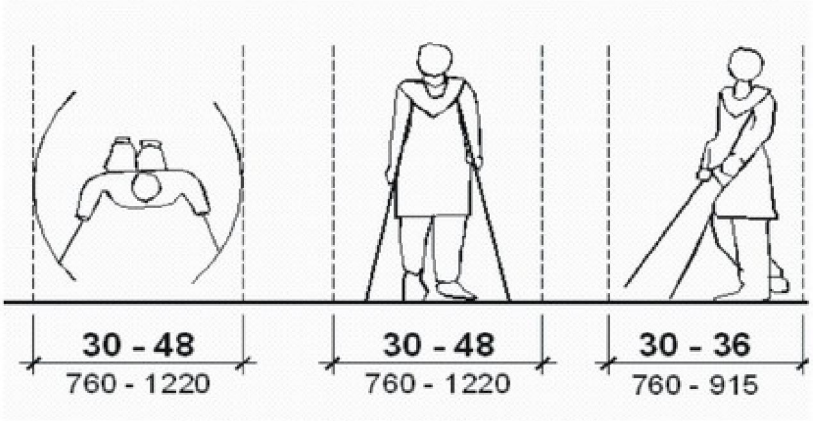
Person with stick and attendant



Person with Walker

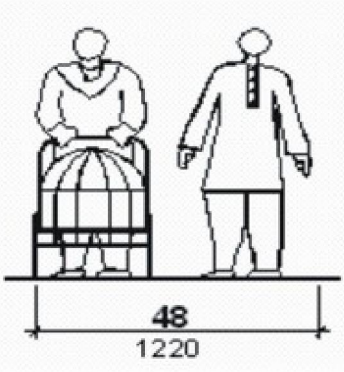


Person with nonaxillary crutches

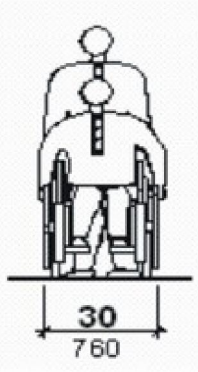


Person with axillary crutches

Person with stroller



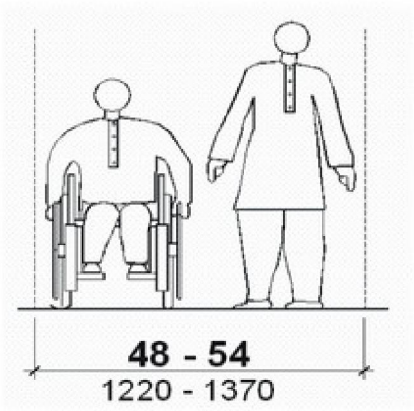
Two persons with stroller

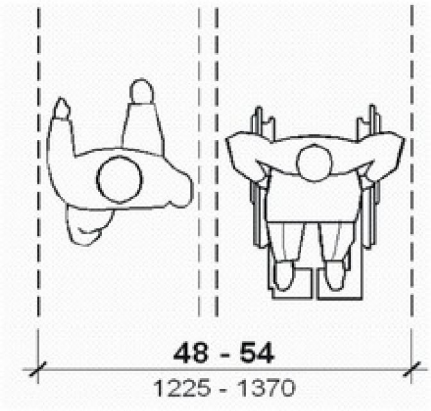


Attendant with wheelchair

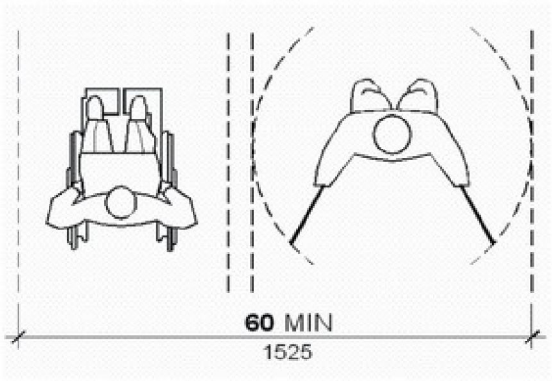
DIMENSIONAL STANDARDS FOR MOVEMENT OF PERSONS

Access Clearances

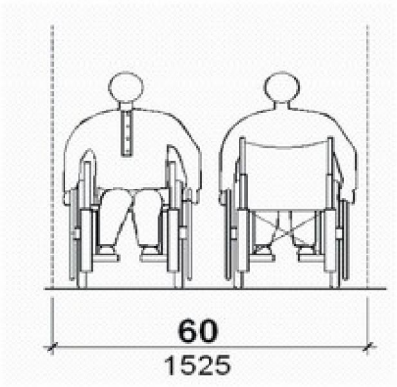


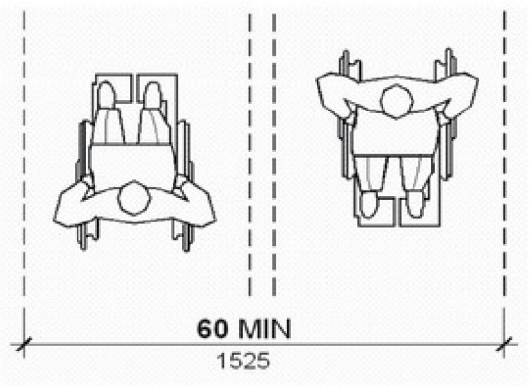


PERSON PASSING WHEELCHAIR

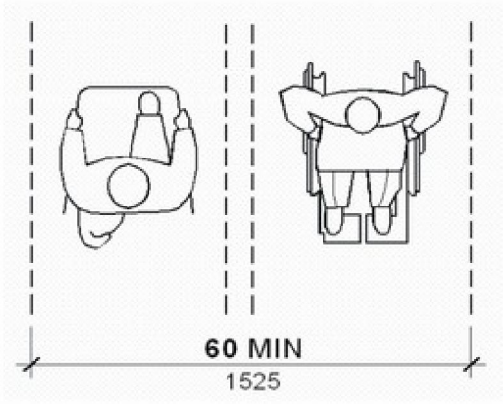


PERSON ON CRUTCHES
PASSING WHEELCHAIR

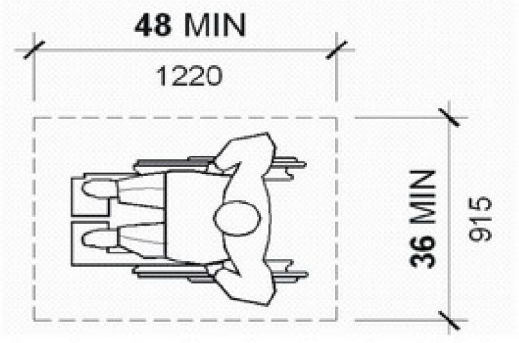




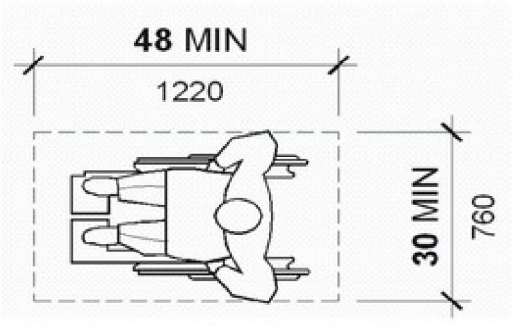
TWO WHEELCHAIRS PASSING



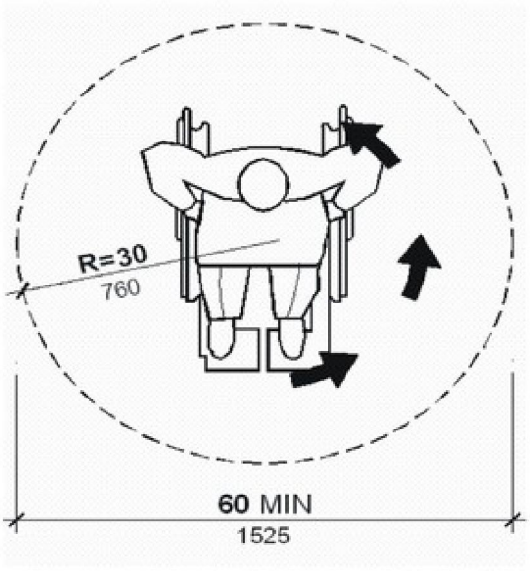
PERSON WITH WALKER
PASSING WHEELCHAIR

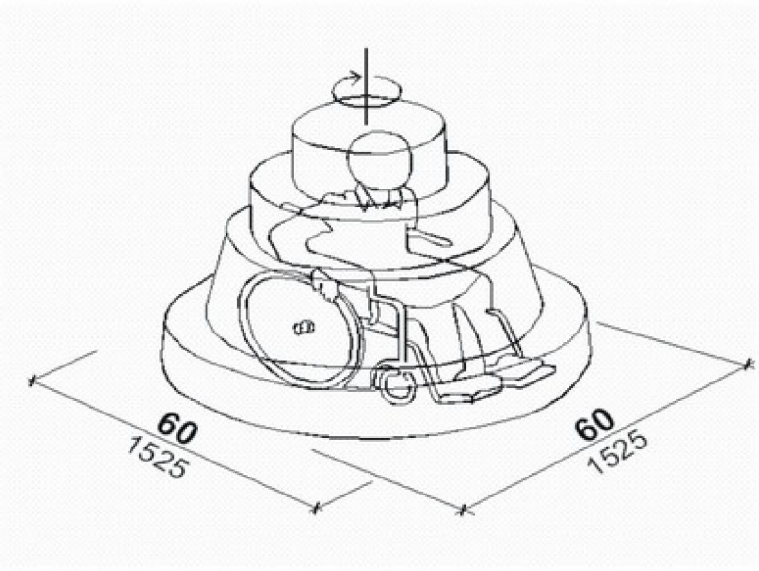


STANDARD WHEELCHAIR SPACE

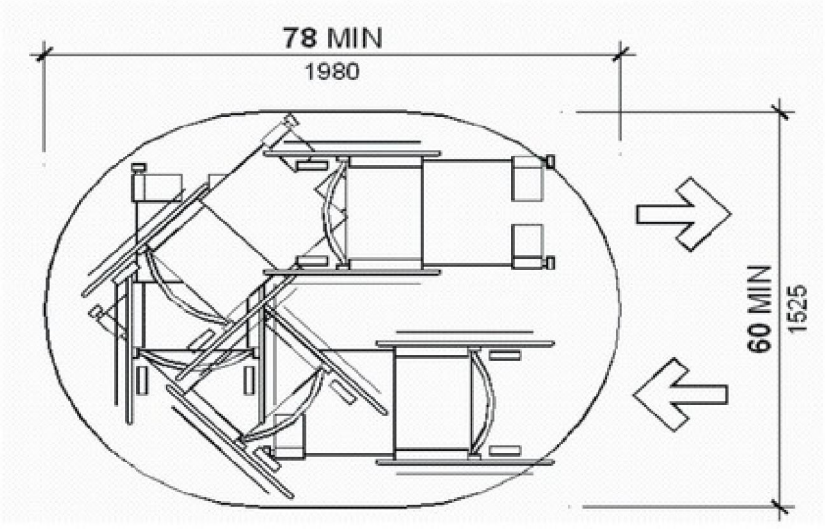


FLOOR SPACE OCCUPIED BY
WHEELCHAIR WITH OCCUPANT

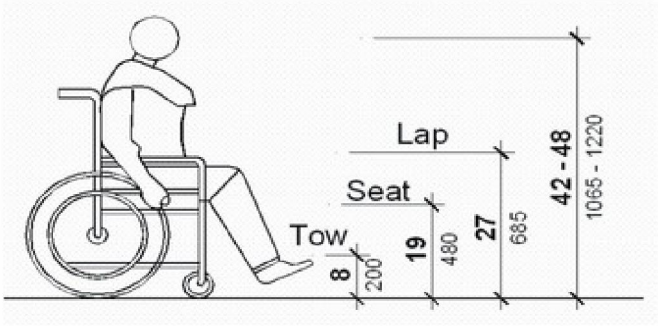




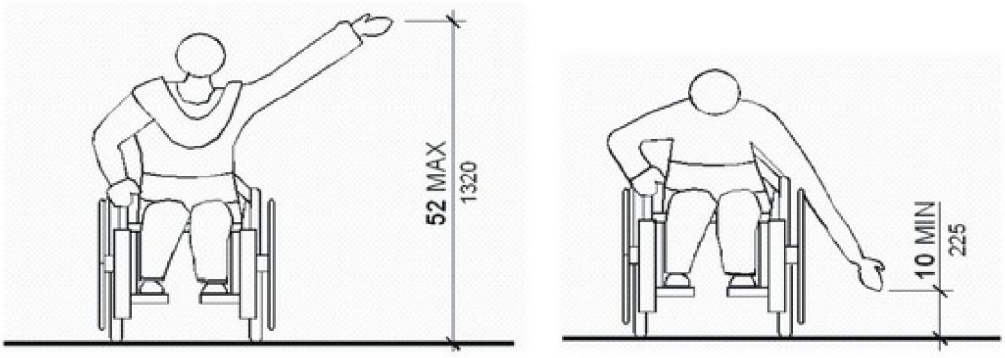
CLEAR SPACE REQUIREMENT FOR WHEELCHAIR OCCUPANT TO TURN IN ANY DIRECTION



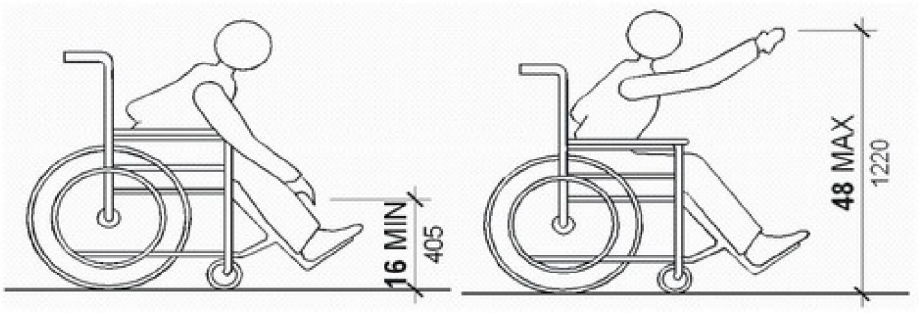
SPACE REQUIRED FOR U-TURN BY ATTENDANT PROPELLED WHEELCHAIR



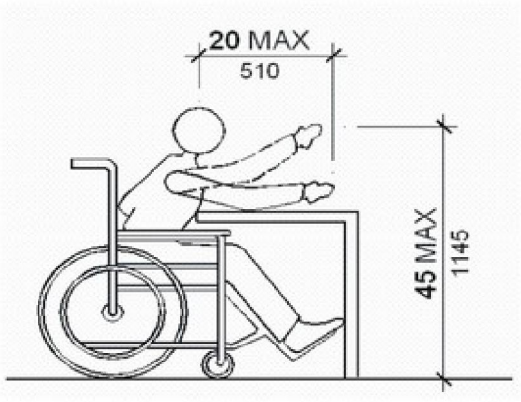
DIMENSIONAL STANDARDS FOR WHEELCHAIR OCCUPANT



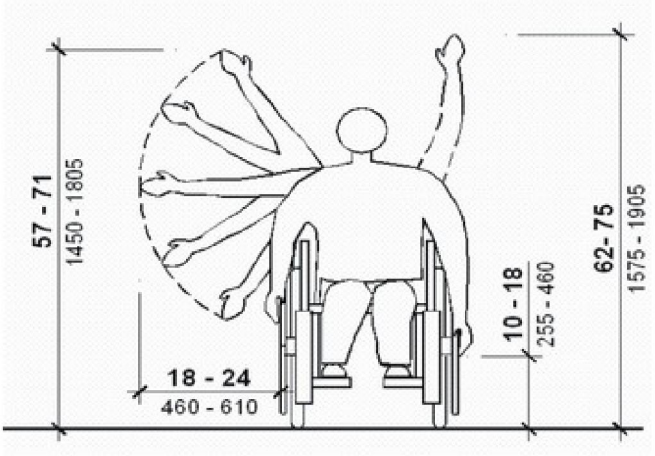
SIDE REACH LIMITS OF WHEELCHAIR BOUND PERSON



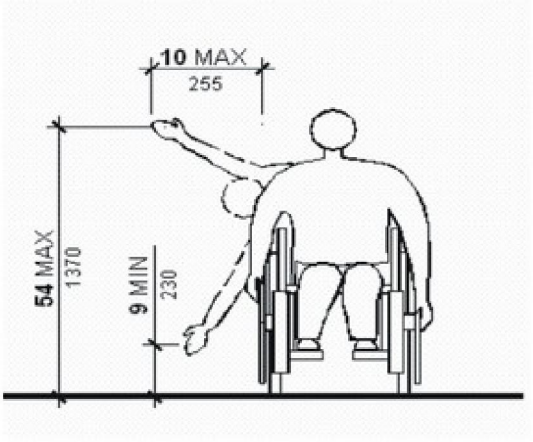
FORWARD REACH LIMITS OF WHEELCHAIR BOUND PERSON

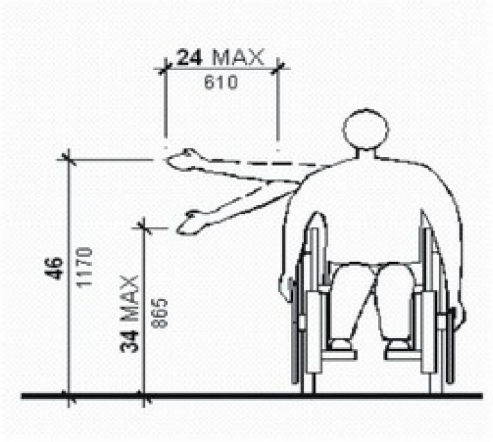


FORWARD REACH LIMIT OVER WORK SURFACE

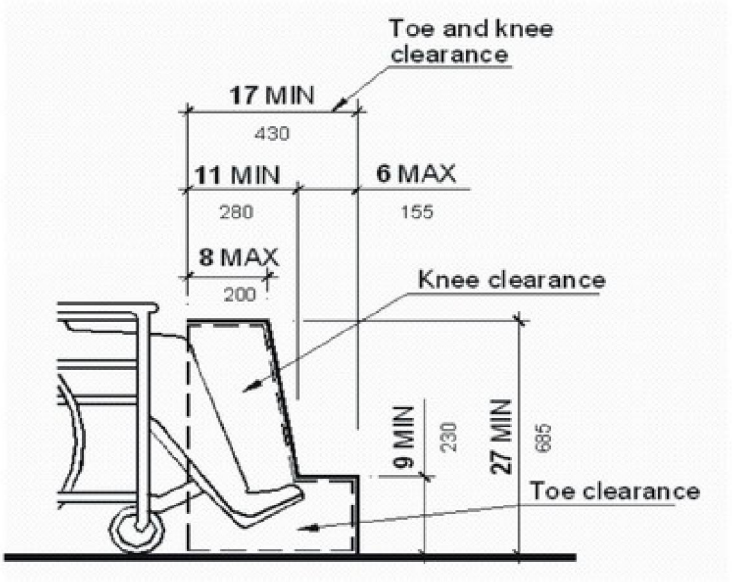


REACH RANGE OF WHEELCHAIR BOUND PERSON

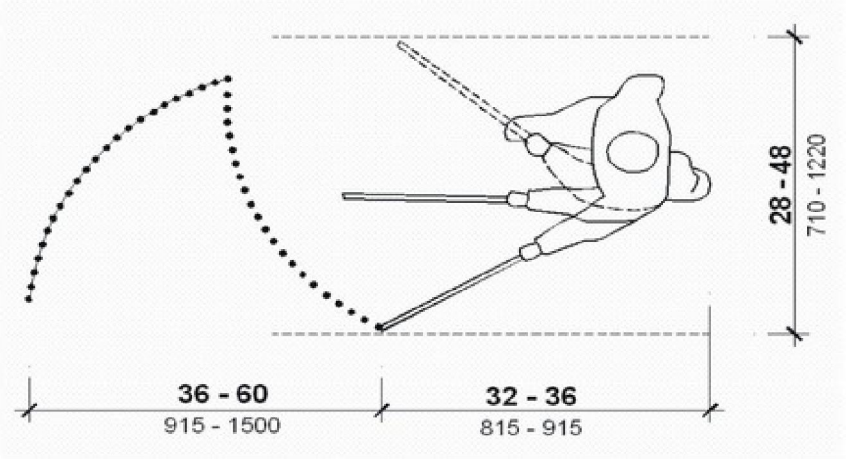




REACH RANGES OF WHEELCHAIR BOUND PERSON

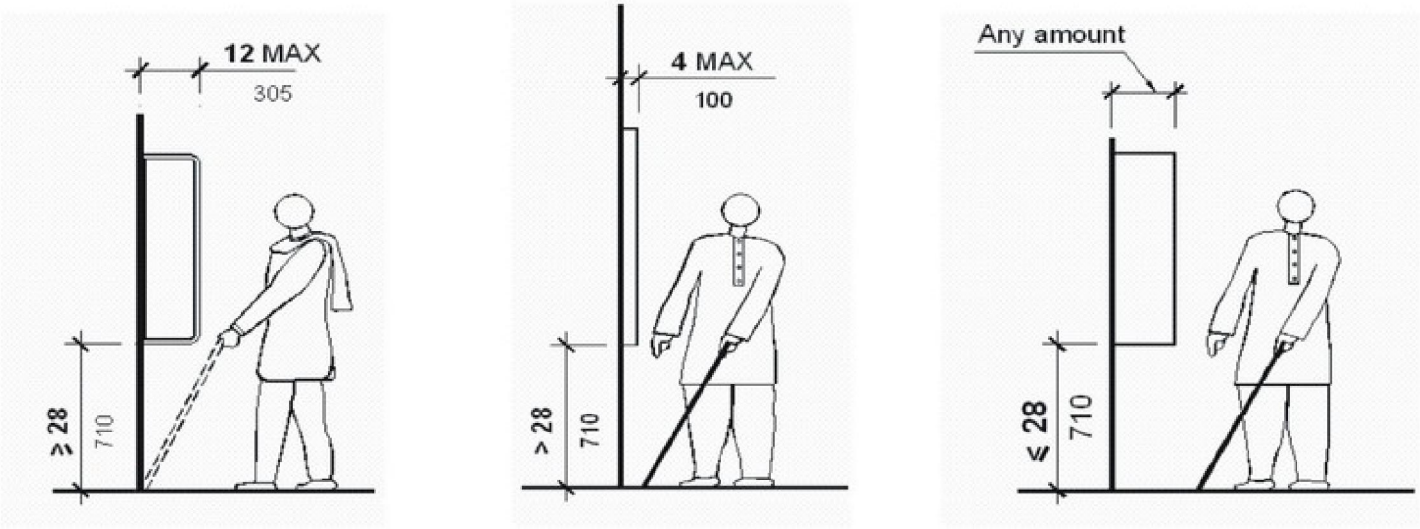


TOE AND KNEE CLEARANCES OF WHEELCHAIR BOUND PERSON

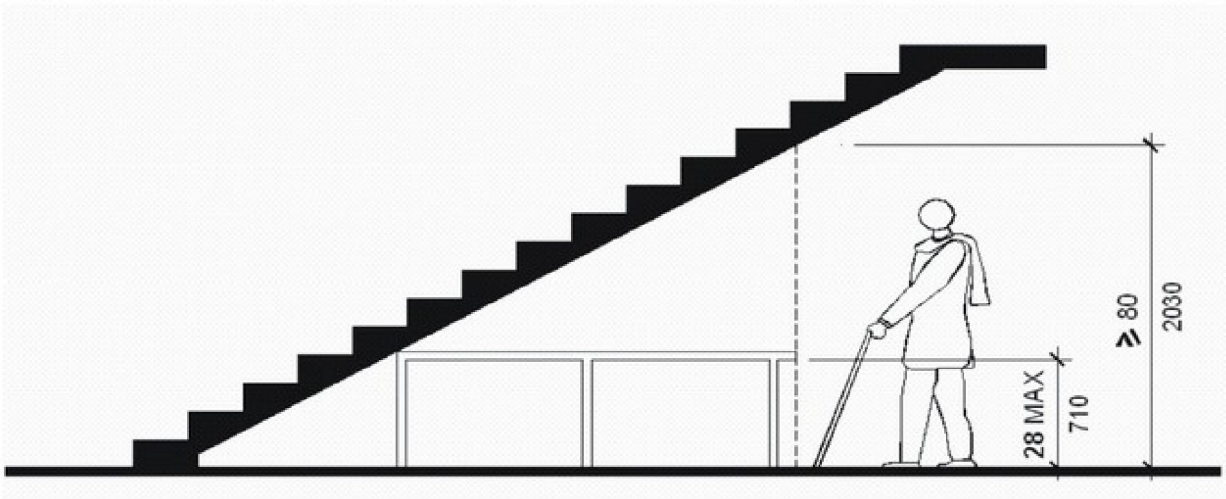


MOVEMENT ZONE OF WHITE CANE USER

Protruding objects pose hazard to people with impaired vision and all accessible routes and spaces should be designed so that these objects and obstructions are detectable by a cane user.



DIMENSIONAL CLEARANCES OF PROTRUDING OBJECTS



DIMENSIONAL CLEARANCES UNDER STAIRS AND OTHER LOCATIONS WITH DECLINING HEAD ROOM

4 SCOPING REQUIREMENTS

This chapter provides the mandatory requirements and the extent of application of these guidelines to provide an accessible physical environment meeting the needs of people with disabilities for their independence, convenience and safety in all public buildings and areas.

Scope [4.2]

Target Group: [4.2.1] The accessibility requirements under these guidelines shall cater to people with following disabilities, temporary or permanent:

a) Locomotory Impairment: affecting mobility due to impairment of the trunk and/or lower limbs including manipulatory impairment.

b) Sensory Impairment: affecting vision, wholly or partially.

c) Sensory Impairment: affecting hearing and speech.

d) Cognitive Impairment: affecting mobility, comprehension and maneuverability.

Extent: [**4.2.2**] The application of the accessibility requirements is recommended to be carried out at the following two levels:

a) *Mandatory Requirements*:
Requiring total compliance for new constructions and achievable compliance for existing buildings and facilities in accordance with the accessibility code and relevant regulations.

b) *Preferred Standards*:
Suggesting voluntary adoption of standards and facilities by the building owners or users beyond the basic minimum necessary as required under mandatory requirements.

Application [**4.3**]

The accessibility requirements affecting the design, layout and construction of sites, areas, buildings, facilities and other aspects of built environment apply to the following types of buildings, areas and usages.

Government Buildings: [**3.2.1**]

i) All buildings; irrespective of their size, location or use, owned by any form or level of Government, are covered by the provisions of the accessibility code.
ii) All buildings occupied by any form or level of Government establishment, are covered by the provisions of the accessibility code for the duration of such occupation.
iii) All public use areas, whether developed publicly or privately, are governed by the provisions of these regulations.

Private Buildings: [3.2.2]

All sites, area developments, buildings and facilities; existing or new constructions, owned, designed, developed, built and maintained for public use by a private individual or entity are covered under the provisions of the accessibility code.

Exemptions: [3.2.4]

The provisions of the accessibility code exempt the following types of buildings, facilities, areas and usages:

i) Privately owned buildings not meant for public use.
ii) Private dwellings and residences.
iii) Existing privately owned buildings of size smaller than 2,500 sft. of gross floor area.
iv) Any building or usage specifically notified for exemption by the Government.

Extent of Application

The extent of application of these guidelines is described under the following three categories of built environment: [4.3]

- Outdoor areas: covering roads, streets, parks and open spaces.
- Vicinity of Buildings: covering outdoor areas within a site containing one or more buildings.
- Interior of Buildings: covering building types and uses described under ten groups, besides considerations for existing buildings.

Outdoor Areas [4.3.1]

Roads & Streets: Features of the built environment, which are required to be accessible, include:

- Sidewalks.
- Street intersections.
- Street crossings.
- On-Street vehicular parking.
- Street furniture, including bus shelters, benches, mailboxes, sign boards, kiosks, public toilets, planters, garbage cans, utility poles and other street side appurtenances installed for public convenience and movement.

Open Spaces and Public Parks: Public parks and open areas other than roads and streets are required to be made accessible to the extent of:

- Shelters and rest areas, in parks, playgrounds and open spaces.
- Walkways within the parks and grounds.
- Refreshment and dining facilities, both in parks and in open spaces.
- Public toilets.
- Ablution facilities and areas.
- Park furniture including benches, fixtures, and appurtenances.

The preferred standards desired to be applied to this category of built environment include making the following facilities accessible to persons with disabilities.

- The whole of the park, ground and play area.
- All recreational facilities offered at the park.
- All play areas, parks or grounds meant for the exclusive use of children or women.

Vicinity of Buildings [4.3.2]

Outdoors areas within a site including open areas, common and public use areas whether open or semi-open, and restricted access areas meant for the exclusive use of occupants of the site are covered under this category.

The components to be covered for accessibility requirements include:

- Site entrances.
- Parking areas, inclusive of both outdoor on-grade parking; and indoor parking within buildings.
- All areas allowing public use.
- Entrances to buildings and structures located on the site.
- All routes, passages, paths connecting site entrance with all the accessible entrances to buildings and facilities located on the site.

The accessibility standards preferred to be provided in addition to the regulatory requirements should include:

- All paths and walkways.
- Open areas meant for play or rest.
- Employee work areas where employees are required to work in connection with the primary activity of the establishment housed at the site.

Interior of Buildings [4.3.3]

Interior environments within the buildings are required to comply with the accessibility provisions under the accessibility code to the extent as described hereunder. The types and uses of buildings thus covered are described under eleven groups of seven usage categories.

These seven building usage or type categories comprise of:

- Residential uses: which are developed commercially and grouped into low-rise; multi-storey; and temporary lodging places.
- Commercial and non-residential uses: comprising two groups of public places relating to commerce, trade, institutional, public service, educational, entertainment and cultural activities.
- Public transport uses: comprising terminal buildings.
- Specialized uses for persons with disabilities: comprising exclusive residential, health care, welfare, educational, training or other facilities.
- Industrial uses: including manufacturing, warehousing and related activities.
- Religious buildings.
- Existing buildings: including historic buildings which are protected under the law and comprise any of the building or usage types; and other existing buildings in general, both in government and private ownership.

Residential Uses:

Private residences, houses and residential buildings having up to four separate residential units are not covered under the provisions of the accessibility code. Dwelling units and residential developments having more than four residential units, which are developed commercially for sale or rental purposes, and places of temporary lodgings maintained as public places on commercial basis are grouped under this usage.

Group I: Low-rise Buildings [**4.3.3.i**]
The group includes low-rise residential buildings of up to four storeys in height and comprising dwelling units, flats, apartments and similar establishments for multi-family dwelling.

The areas covered under this building type include:

- Entrances.
- Common use areas at ground floor.
- Half of the residential units located at ground floor.
- Staircases, and other means of vertical movement.

The preferred standards would require additional facilities including but not limited to the following:

- All residential units located at ground floor level.
- All common use areas at all floors which are outside a single residential units and are made available to residents and guests like lobbies, waiting areas, hallways, corridors, areas accommodating public utilities and services, and refuse rooms etc.

Group II: Multi-storey Buildings **[4.3.3.ii]**

The group includes multi-storey residential buildings having more than four storeys and comprising dwelling units, flats, apartments and similar establishments for multi-family dwelling.

The spaces and areas covered under this building type include:

- Entrances to buildings and individual units.
- All common use areas at all floors.
- All means of vertical movement including staircases, lifts, ramps or any other form of vertical circulatuin.
- All means of horizontal circulation including corridors, passageways, lobbies etc.
- Ten percent of the total residential units.

The preferred standards require that all of the residential units be made in such a way, so that those are accessible to and usable by persons with any disability.

Group III: Places of Temporary Lodging [**4.3.3.iii**]
This group includes establishments, which provide lodging facilities on short term rental basis. The types of places under this group include among others hotels; motels; serviced residential apartments maintained and run as an hotel establishment; guest houses, residential clubs; hostels for students, trainees or staff of establishments; and similar places of primarily temporary lodgings operated and maintained under some form of central organized management.

The mandatory requirements for accessibility provision include:

- Entrances to buildings and accessible spaces.
- Main facility areas, including lounges, dining areas, waiting and rest areas, and areas providing public conveniences and facilities including public toilets for guests or lodgers.
- All common use areas at all floors.
- Information counters/offices, reception or front desk.
- All means of vertical and horizontal circulation including corridors, passages, hallways, stairs, lifts and the like.
- Ten percent of the total lodging accommodation, in all categories of accommodation e.g. beds, guest rooms, etc. Some form of eligibility criteria should be established to let out these special lodging facilities.

The preferred standards of facility provision would require that the following additional areas also be included in the accessibility provisions:

- Total lodging accommodations.
- Service areas, which contain facilities for the service staff of the lodging establishment.
- Employee work areas meant for the primary use of the staff employed to run the establishment.

Commercial & Non-Residential Uses:

Places and buildings accommodating operations related to uses other than for residential purposes; and affecting commerce and trade, institutional, public service, cultural and recreational activities are grouped under this category.

Group IV: Commercial, Administrative & Public Service: [**4.3.3.iv**]
Buildings, facilities and places, whose operations affect any of the activities listed below:

- Mercantile and trade, including shopping, wholesale and retail marketing, sale etc. of goods, and personal service activities like laundering, cleaning, tailoring, hair-dressing, fuel filling stations, etc. and related activities.
- Administrative and business office accommodations, for both governmental and private purpose, such as offices, missions, courts, development institutions, legal, financial and other professional consulting services and the like.
- Public service activities, in government as well as private sectors, like postal, telecommunication, public utilities, police, social welfare, day care facilities, counseling services etc.
- Educational activities including all level of imparting formal education, schooling, training, vocational training, short-term imparting of knowledge and places housing these activities.
- Health care facilities, covering provision of medical, dental and psychiatric services in both residential and non-residential environments.
- Multi-use and composite activities comprising any or all of the above types taking place at the same premises.

The spaces and areas covered under this group include:

- Entrances to the buildings and accessible components thereof.
- Areas accommodating all primary functions and main facilities of public use taking place at the premises.

- All means of horizontal and vertical circulation connecting various parts and components of the building at all floors.
- All common use areas.
- All public toilets and comfort places.
- Means of emergency egress.

The preferred standards for providing accessible facilities include the following in addition to the above:

- All areas accommodating administrative functions of the facility.
- All areas accommodating services concerning functioning of the facility at the premises.

Group V: Recreation, Entertainment and Cultural Places: **[4.3.3.v]**
This group caters to places accommodating activities related to recreation, public entertainment, public gathering, refreshment, and public participation and viewing of cultural; sports; and exhibition activities, and functions related to them. The building types would include places like cafes, restaurants, concert halls, theatres, cinemas, auditorium, stadium, gymnasium, swimming pools, sports buildings and arenas, museums and galleries, zoos, exhibition halls, conference buildings, libraries, banquet halls and similar places of public assembly.

The requirements of the accessibility code to make these building types accessible to people with disabilities cover the following aspects:

- Entrances to the buildings and its accessible components.
- Areas accommodating all primary functions and main facilities taking place at the premises.
- Areas meant for public assembly.
- All means of horizontal and vertical circulation connecting various parts and components of the building at all floors.
- All common use areas.
- All public toilets and comfort places.
- Means of emergency egress.

The preferred standards of facility provision would require that the following additional areas be included in the accessibility provisions:

- Areas accommodating administrative offices of the facility.
- Ticketing booths and counters, including sale points for merchandise or services offered for sale at the premises.
- All areas accommodating services concerning functioning of the activity at the premises.
- Employee work areas primarily meant for the use of the staff employed to run the establishment.

Public Transportation Facilities:

Group VI: Transportation Terminals: [**4.3.3.vi**]
Buildings, facilities and places accommodating functions for public transportation by road, rail, or any other means of transportation, including public use areas of ground facilities for air and water transportation, providing services to the general public with general or specific services on a regular and continuing basis are covered under this group of building types. Transportation terminals, short stops, shelters, concourses and facilities relating to the functioning of these buildings and facilities are covered. All modes of public land and rail transport including buses, vans, coaches, taxis, trains and other modes available for hire are included in this group.

The regulations demand the following areas to be fully accessible to persons with disabilities:

- Entrances to buildings.
- Counters for information, booking, ticketing and other related functions and services.
- Public concourse, and all the services located within, including refreshment and other public conveniences.
- Waiting and resting areas, halls and lounges.
- Alighting and boarding areas.
- Public toilets.

The preferred standards require that the following areas be also made accessible in addition to the above:

- All administrative offices located at transport terminals.
- All areas occupied by the service staff of the establishment.
- Goods and cargo handling areas.

Specialized Uses:

Group VII: Specialized Buildings for Persons with Disabilities: [**4.3.3.vii**]
All building types and uses accommodating functions, activities and facilities for the specific use of persons with disabilities or for elderly people, like special schools, rehabilitation centres, vocational training centres, clinics, hospital units and other specialized health care facilities, day care centers, nursing homes, convalescent homes, dwelling units for the disabled or elderly persons, and the like, require additional accessibility provisions beyond those minimum required under the accessibility code for public places.

Designing and planning of buildings and facilities for the specific and exclusive use of persons with disabilities or for elderly persons need special consideration beyond those discussed in these guidelines, and should be employed on case by case depending upon the particular needs and requirements of the user groups and of individuals for whom the facility is intended.

Industrial Uses:

Group VIII: Industrial Uses: [**4.3.3.viii**]
Buildings and places accommodating activities related to manufacturing, production, fabrication, assembling, storage, warehousing, and similar small or large scale industrial activities are covered to the extent that depending upon the user needs and requirements the place may, upon demand of the users, be made accessible on case by case basis.

Other building uses associated with places of industrial accommodations like administrative offices, cafeteria, housing, religious buildings etc. if in public use, are covered. However, under the accessibility code all work related areas are required to be made accessible to employees with disabilities, in accordance with their needs and demands on case by case basis.

Religious Buildings:

Group IX: Religious Buildings: [**4.3.3.ix**]
All buildings and places accommodating functions and activities relating to worship and allied activities, belonging to any of the religions or sects are covered under this category. The buildings include all categories of places of worship, mosques, jamia mosques, eidgahs, janazgahs, imam bargahs, jamat khanas, tombs sacred to any religious entity, churches, cathedrals, temples, gurdawaras, dharamasalas, cemeteries, burial places, places of religious gatherings and services, and the like.

The law requires that the following areas be made fully accessible to the persons with disabilities:

- Entrances to the places of public assembly.
- All common use areas within the religious buildings, including means of horizontal and vertical circulation.
- All areas, which are meant for praying, worship or religious service.
- Areas of public assembly.
- All means of emergency egress.
- Ablution areas, and other ante places required for preparation of religious services.
- All public toilets, and other comfort places.
- In addition, any educational institutions attached to the religious buildings, imparting religious or secular education, including residential facilities for the staff or students of such facility are covered areas under the provision of the accessibility code.

The preferred standards for creation of barrier free environments require that any private residential accommodations attached to the religious buildings, including private offices of the clergy are made accessible.

Existing Buildings:

Existing buildings that are covered under the accessibility code include all types of buildings, but are categorized into three groups: historic buildings; government buildings; and private buildings. Historic buildings are protected under various relevant regulations and demand special attention. Government or private ownership determines the extent of application of accessibility provisions on existing buildings, hence requiring separate consideration.

Group X: Historic Buildings: [**4.3.3.x**]

Those buildings, places and areas which are protected for their historic, cultural or architectural merit under relevant regulations for their preservation as objects of cultural heritage are required to be left unaltered in their best possible original configurations. Some times this consideration makes it difficult for people at large in general, and persons with disabilities in particular, to move around in and appreciate these buildings and environments. However without requiring to make permanent or obtrusive interventions to the historic structure or fabric, these building types are required to be made accessible to the maximum possible extent. Therefore each building, area or place has to be made accessible on case by case basis.

Apart from the historically sensitive portions of these buildings and premises, the following categories of places within the protected historic premises are required to be made accessible.

- Information counters, ticketing booths and areas.
- Hospitality and refreshment areas, eating and dining places.
- Public toilets and related facilities.
- Open areas and grounds to the full extent.
- Buildings of national importance, but not of historic construction are totally covered.

Group XI: Existing Buildings: [**4.3.3.xi**]

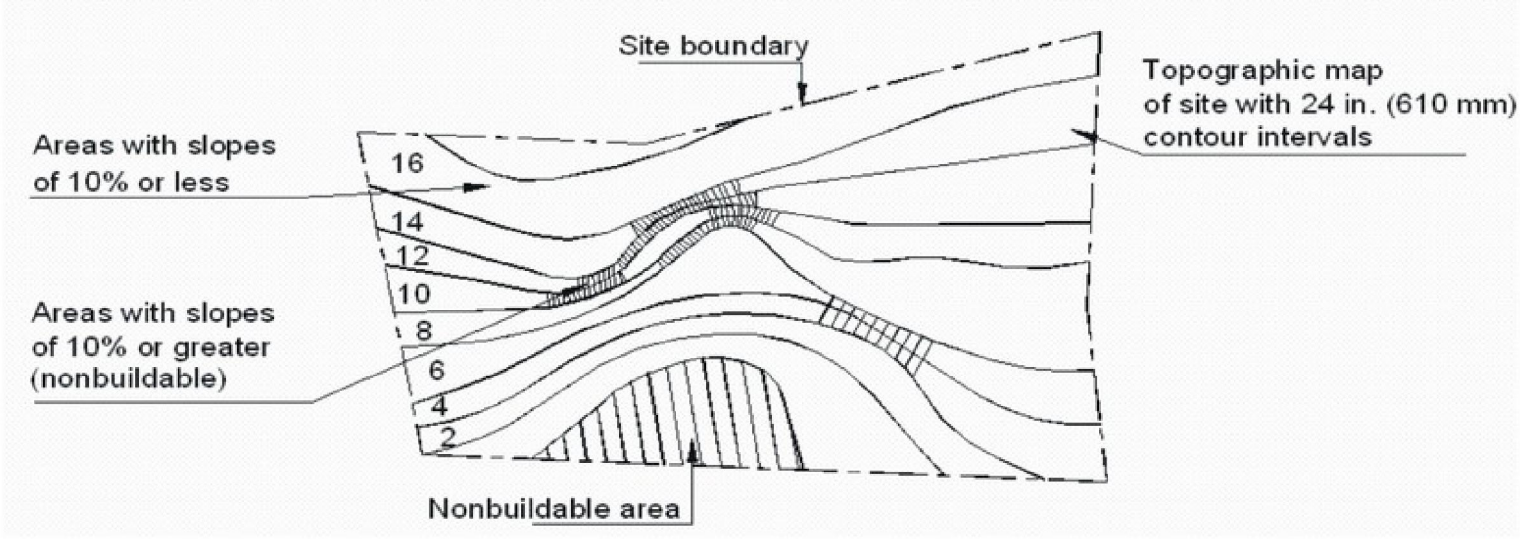
It is mandatory that all government owned or occupied existing buildings and premises are modified to the maximum achievable extent to make those accessible and barrier free within the provisions of the accessibility code. The extent is determined by the particular building type or use as described earlier.

All existing sites, area developments, buildings and facilities; owned and maintained for public use by a private individual or entity are covered under the provisions of the accessibility code. Individual private commercial buildings having a gross floor area less than 2,500 sft. erected on independent plots are exempt. However public uses facilities including health care, educational, sports, public entertainment, refreshment, banking, hotels, dwellings for commercial purposes and public gathering like banquet halls etc. are covered to the full achievable extent.

5
DESIGN REQUIREMENTS FOR EXTERNAL ENVIRONMENT

Site Selection & Planning

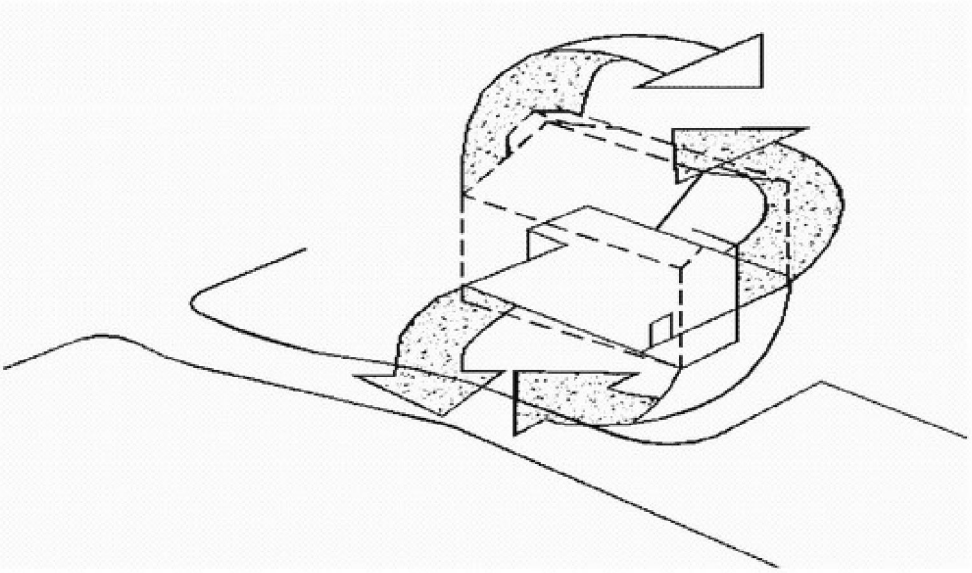
The accessibility of a building or facility is greatly affected by the type of site location and topography, placement and positioning of buildings on site and the type of construction used. These factors should be considered along with other essentials for successful early planning and design of accessible built environments.



SITE ANALYSIS OF UNDISTURBED SLOPING SITE

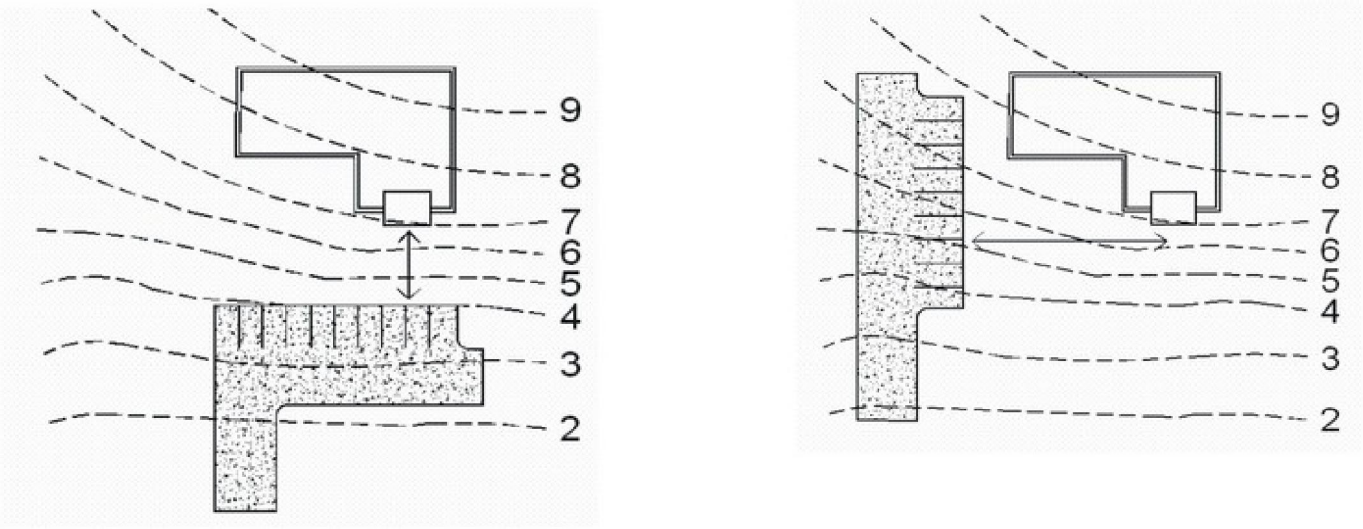
The leveled sites do not present much of problems in context of accessible site planning. However in cases of sloped sites and uneven areas, the way in which buildings and facilities are located on a site will affect the accessibility at entrances, regardless of the type of construction employed.

If entrances are placed at locations where the floor level is close to the ground, accessibility would be easier and less expensive to achieve. Sometimes plans could be just rotated or flipped to bring entrances closer to grade, avoiding the need to provide long ramps.



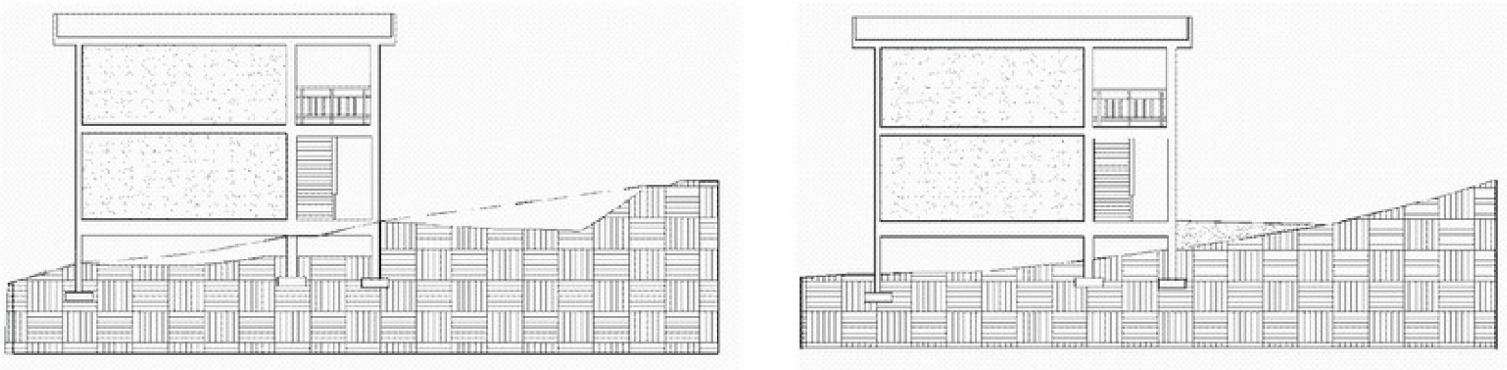
ROTATE, FLIP OR REDESIGN FLOOR PLAN
TO PLACE ENTRANCE CLOSER TO GRADE

Entrances and parking can often be relocated to maximize use of existing ground levels. Sometimes, the best solution is to relocate the positioning of proposed floor plans to place entrances at or near ground level.



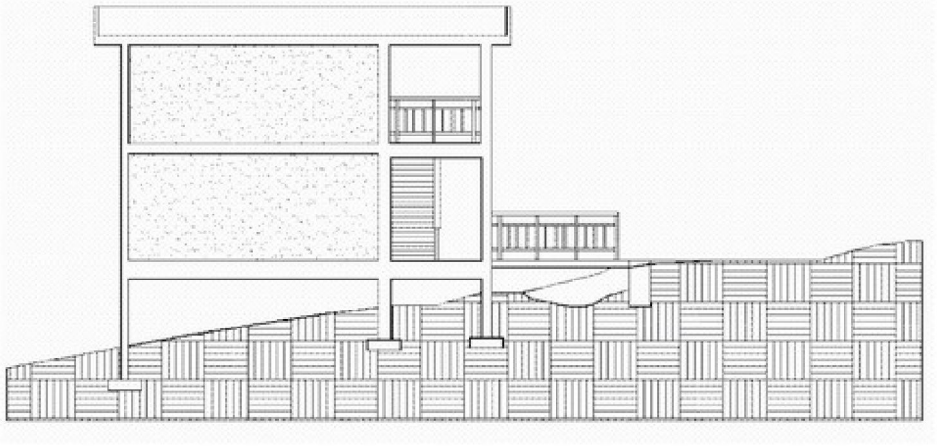
REORIENTATION OF PARKING AREA ACHIEVES ACCESSIBLITY

It is often possible to create accessible routes to entrances by means of carefully planned earthwork and the leveling of site. On sloping sites, fill can be added or the land can be cut and graded to place the entrances at ground level.



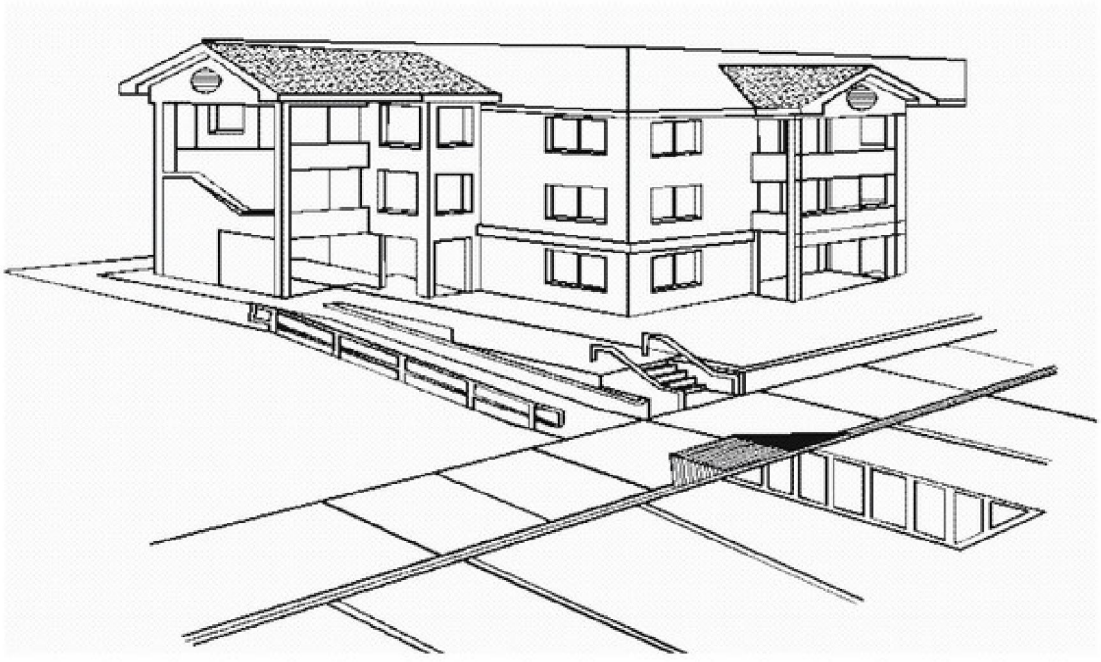
CUTTING OR FILLING OF SITE TO MAKE ENTRANCES ACCESSIBLE

In cases, when the building is approached from an uphill direction, the provision of bridges or elevated walkways may be a good solution to providing an accessible route.



BRIDGES TO PROVIDE ACCESSIBLE ENTRANCES

Accessible routes on a site may include site entrances, parking areas, access aisles from parking or dropping off areas, curb ramps, walkways, ramps, steps and lifts. Accessible route may be called the most critical element that allows the successful use of any site or building by persons with disabilities. Such a route is safe for someone using any of the mobility aids, or is infirm and needs assistance in maneuvering distances.

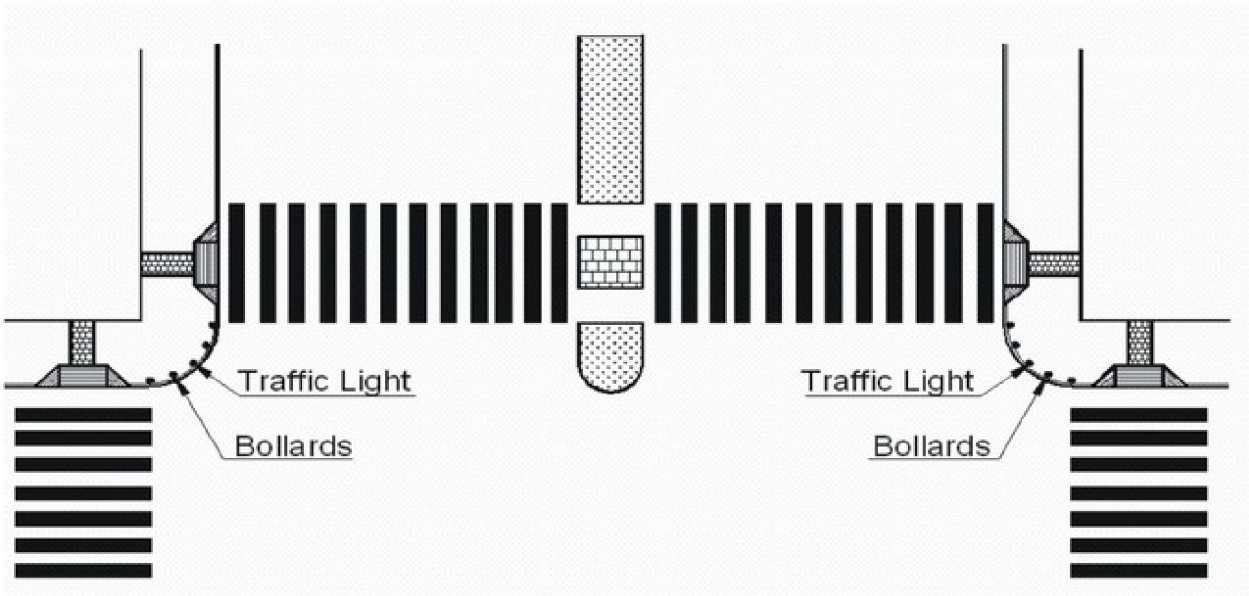


EXAMPLE OF ELEMENTS OF AN ACCESSIBLE ROUTE ON A SITE

Streets and Pathways [5.2.7]

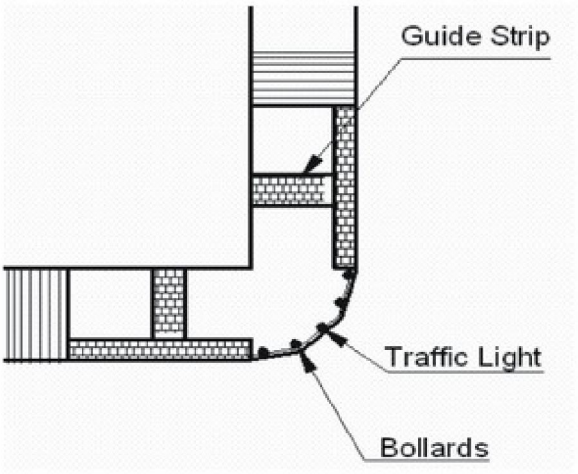
Street pavements, pedestrian passages in open spaces and recreational areas, pathways and ramps etc., should be clear, obstruction free, level and wide enough for the convenience of all users, including the sightless and people with mobility problems.

Pedestrian crossings should be equipped with curb ramps for wheelchair users, and guiding handrails and Braille blocks and warning signs for people with vision problems. Talking signs and manually operated traffic lights with reachable controls may be provided at locations of heavy pedestrian traffic.

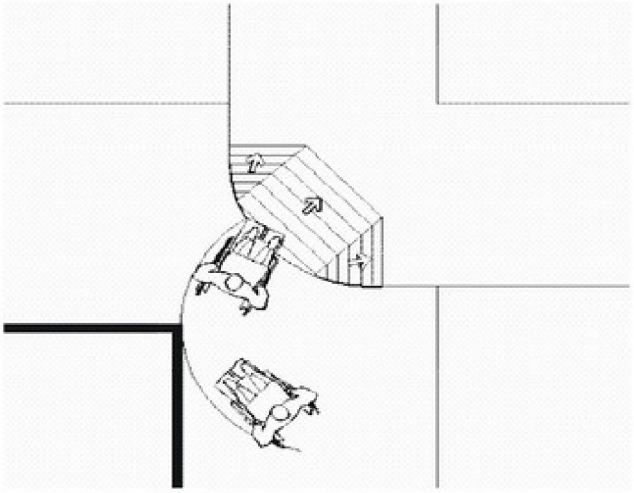


ACCESSIBLE ROAD INTERSECTION WITH CURB RAMPS AND CROSSINGS

Curb ramps at intersections of primary and arterial roads should be at right angles to the street alignment, and placed some distance apart, while curb ramps on tertiary or neighbourhood streets may be placed diagonally located across the corners.

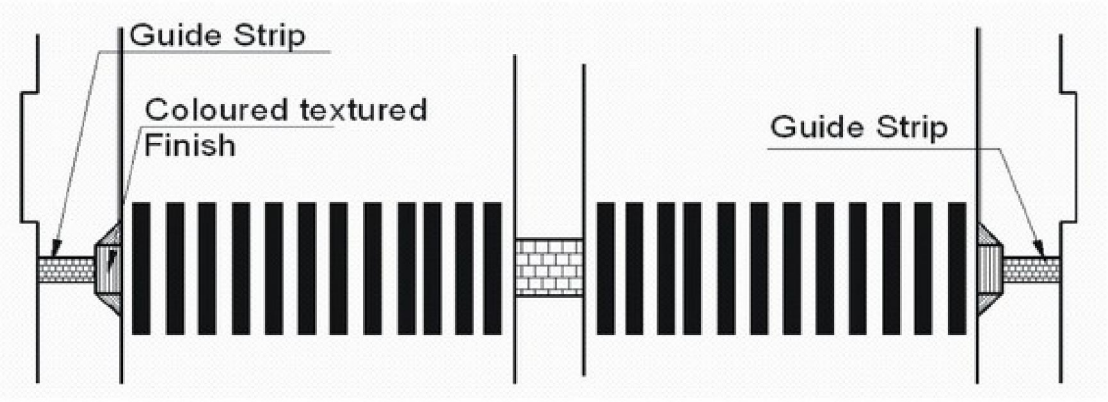


ELEMENTS OF CURB SIDE STREET FURNITURE AT INTERSECTION



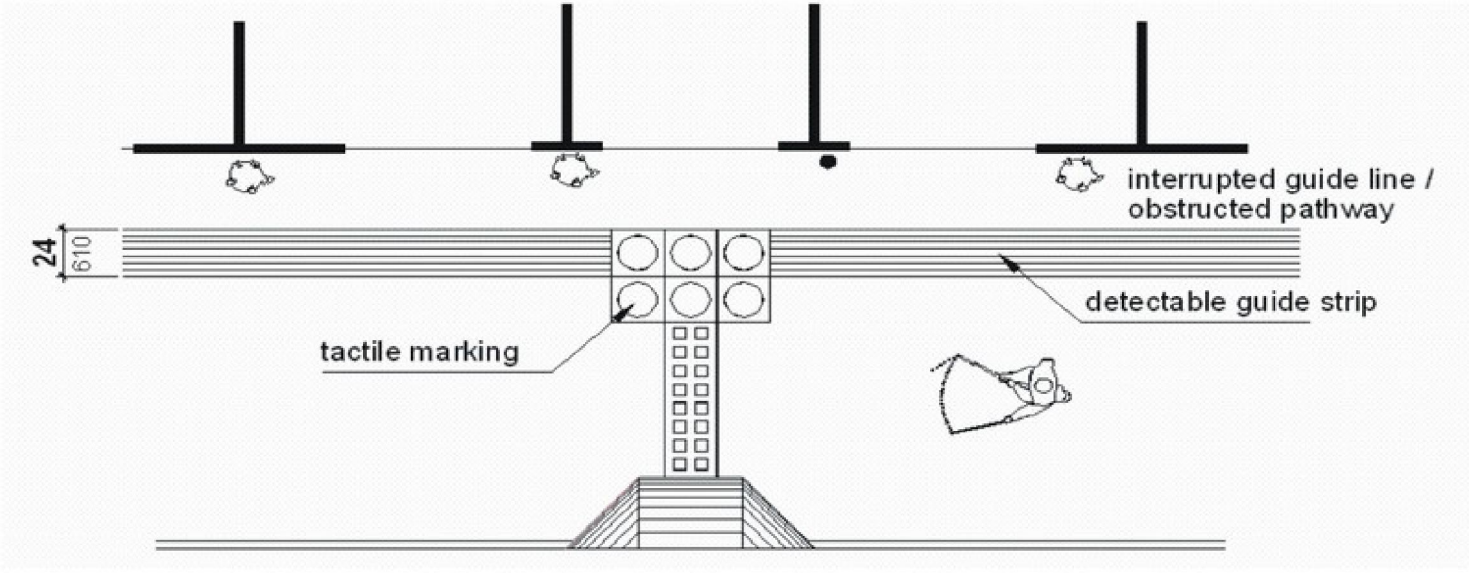
CURB RAMPS AT INTERSECTIONS OF NEIGHBOURHOOD STREETS

Safe traffic islands to reduce the length of crossing should be used for safety of all road users, and particularly for the infirm.

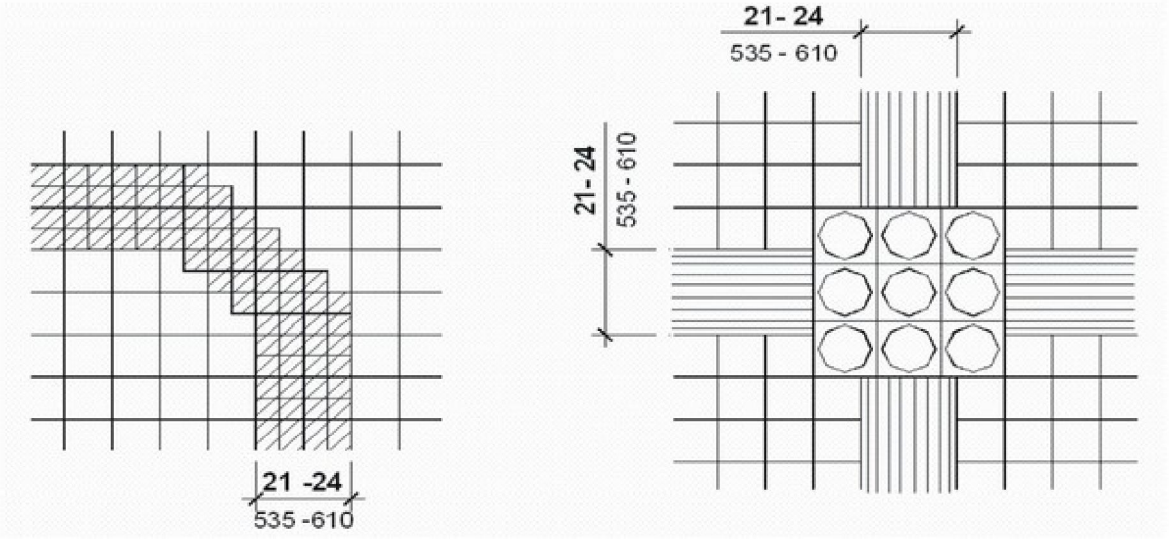


PEDESTRIAN CROSSINGS, CURB RAMPS AND SAFE ISLAND AT DIVIDED STREET

The path of travel should be easy to detect by a person with vision loss using a long cane. Built in guidelines and tactile blocks embedded in paving known as Braille blocks should be used as guidelines.

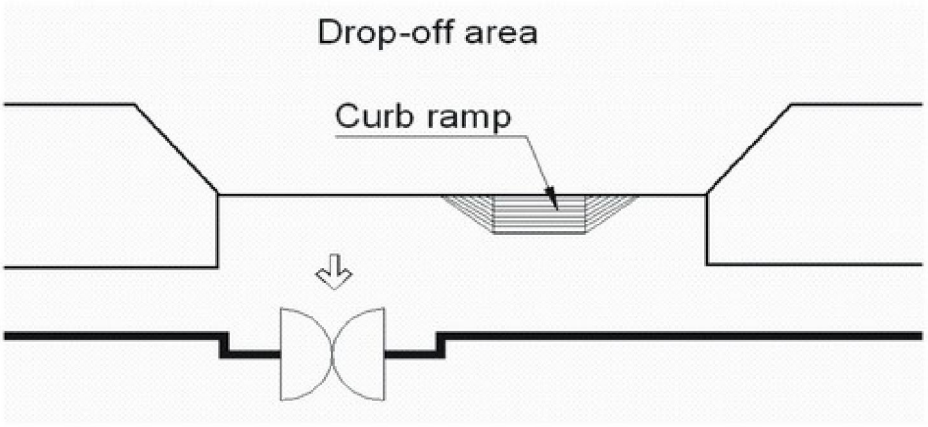


EXAMPLES OF TACTILE GUIDING STRIPS

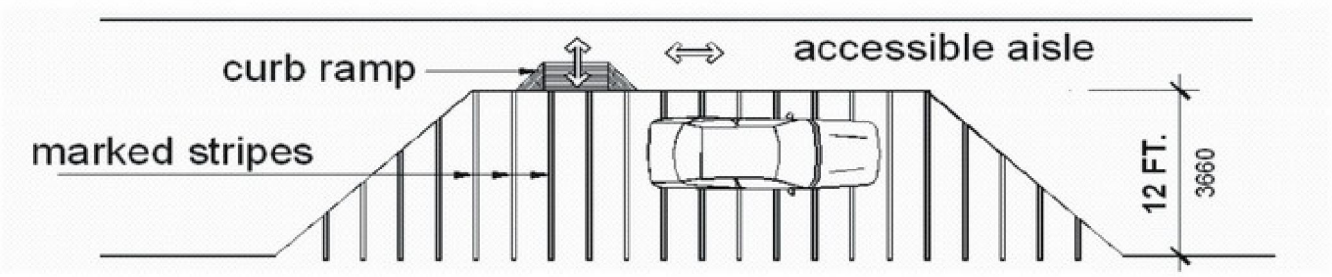


EXAMPLES OF GUIDING BRAILLE BLOCKS

Drop off bays should be detectable, clearly marked and served with curb ramps connecting to an accessible route. The surface of drop off bay should be painted with stripes to warn users against parking or withholding the area for longer duration of time.



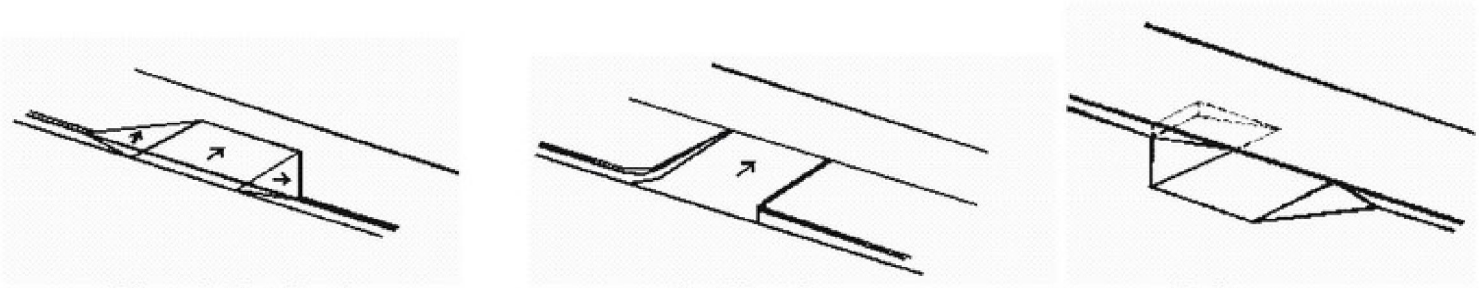
DROP OFF BAY AT STREET SIDE



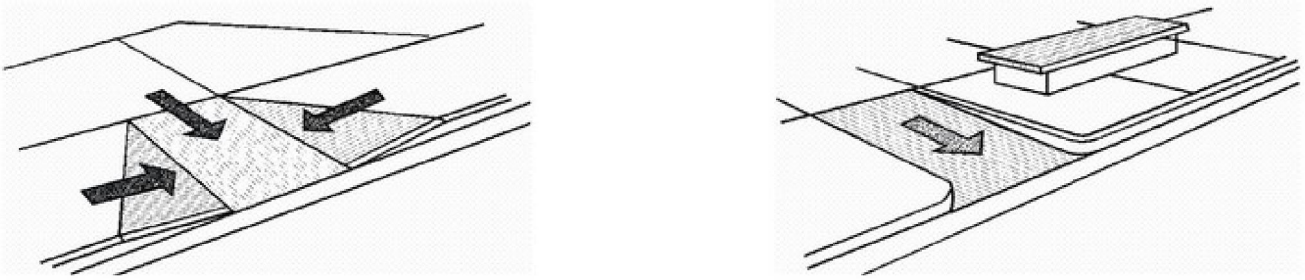
PROVISIONS REQUIRED AT THE DROP OFF BAY

Curb ramps allow designed transition from one pavement surface to another on a different level, at streets, open areas and in vicinity of buildings. To avoid confusing sightless pedestrians, curb ramps should be positioned out of the usual pedestrian flow, and should preferably be located away from areas where water accumulates. Standard curb types include:

- curb ramps cut back into the pavement with flared sides providing transition in three sides.
- returned curb ramps providing slope in one or three sides.
- built-up curb ramps extending into the lower pavement with flared sides in three directions.



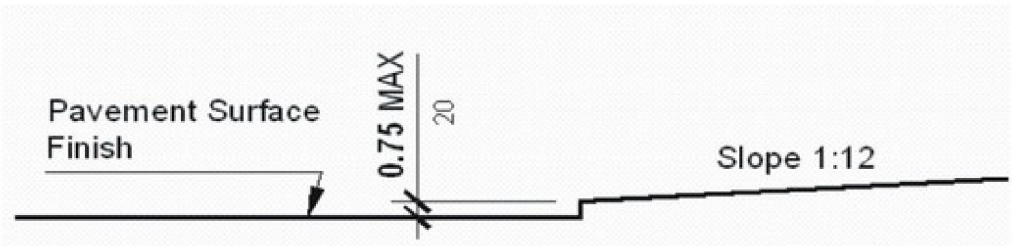
TYPES OF CURB RAMPS AT SIDE WALKS



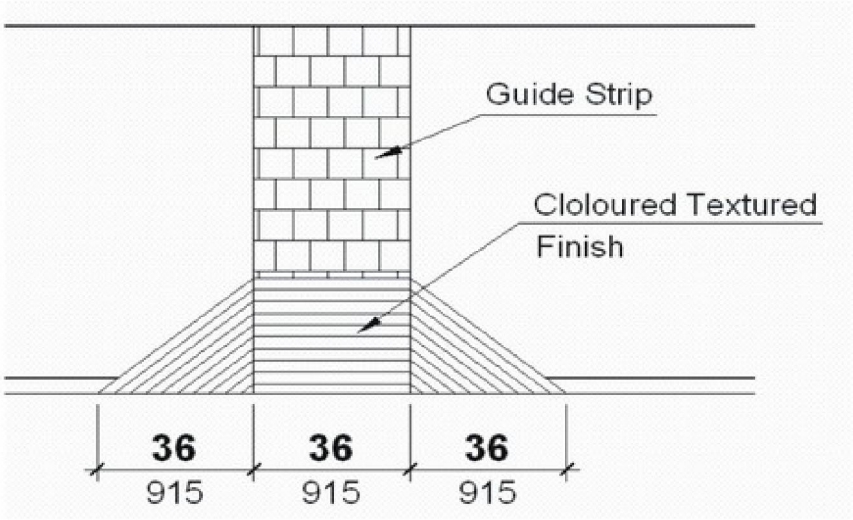
TYPES OF CURB RAMPS

Curb ramps should be provided at each quadrant of street intersection, on opposite sides of street at pedestrian crossings, at drop off zones and between parking and accessible route.

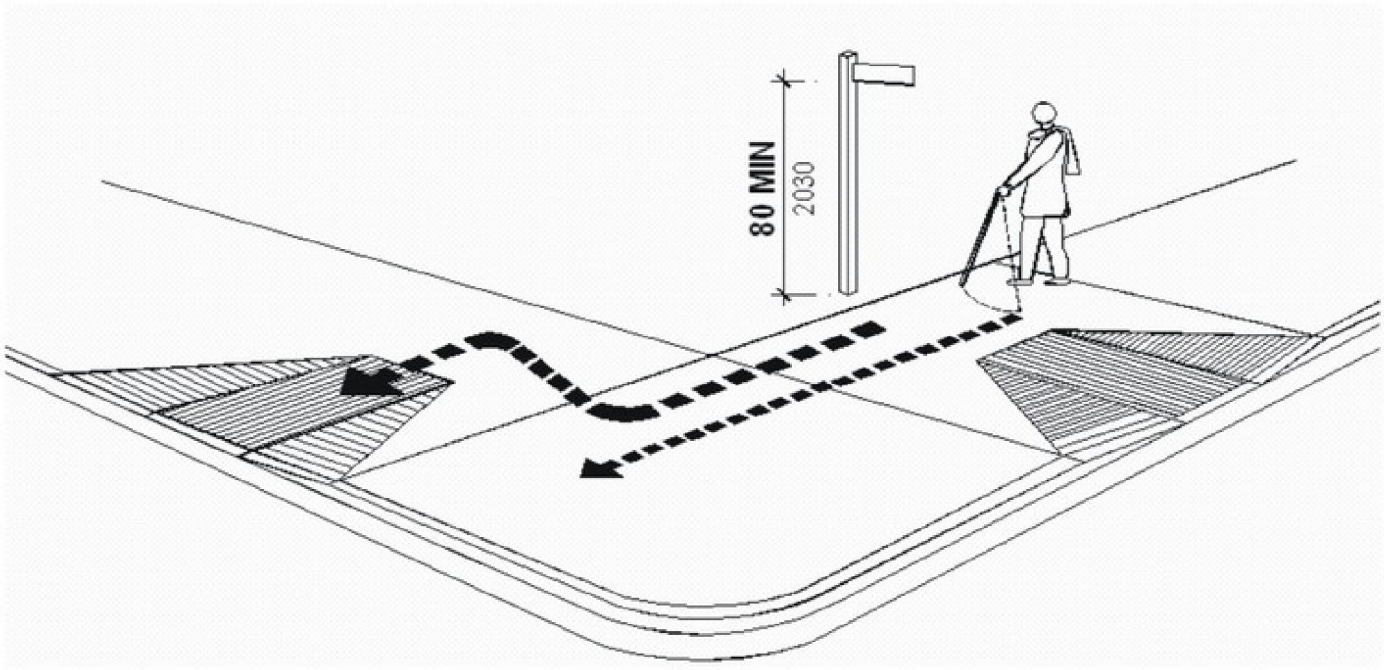
The curb ramps should be installed directly in the path of travel; diagonally across the corner; and continuously wrapped around the corner. The width of the curb ramp should preferable be the same as that of accessible route, but in no way should be less than 36 inches (915 mm). The surface of curb ramp should preferably be the same as that of the path of travel, and should have colour contrasting tactile identification.



CURB RAMP SURFACES



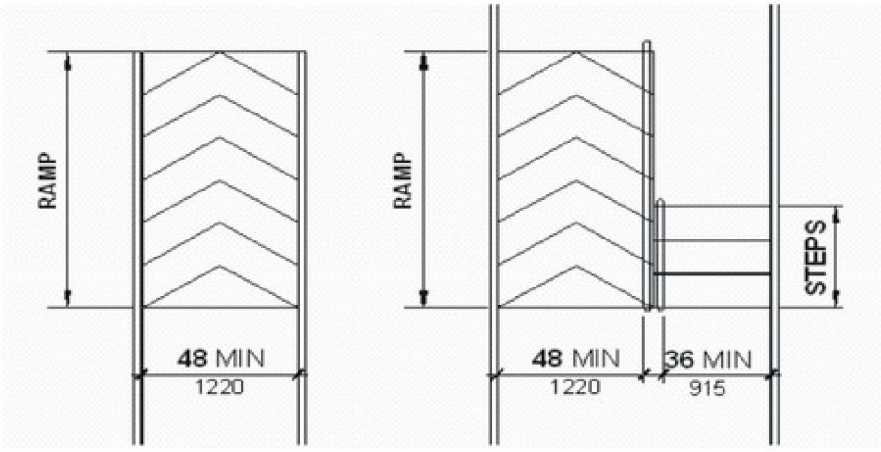
CURB RAMP AND GUIDING STRIP PROVISIONS



UTILITY OF CURB RAMPS FOR LONG CANE USERS

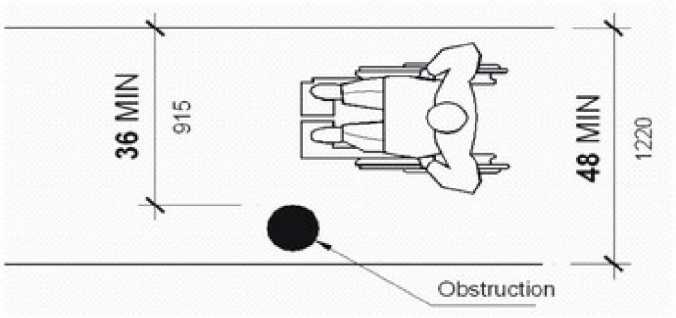
Accessible Route [5.2.1]

An accessible route is a continuous, unobstructed, well illuminated and reasonably weather protected path through sites and buildings which connects all accessible features, elements and spaces.
The clear width of an accessible route should not be less than 48 in. (1220 mm), and where ramp and steps are provided in combination with stairs to traverse the distance, the minimum width of the individual elements should in no way fall below 36 in. (915 mm) each.

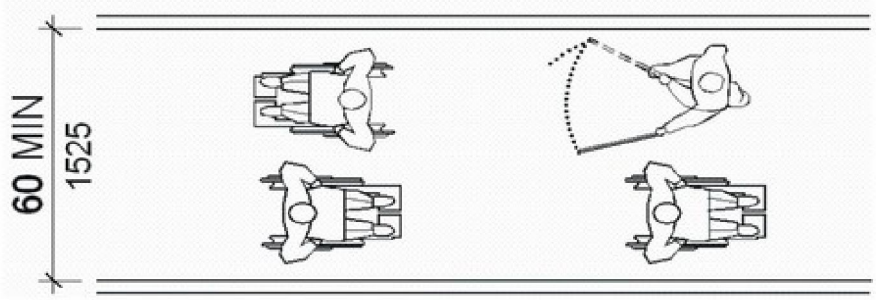


DIMENSIONAL STANDARDS FOR ACCESSIBLE ROUTE

Pedestrian travel routes should be free of obstructions for people to walk but should be broken regularly by detectable obstructions to discourage bicycle riders and motorcyclists. Where obstructions are unavoidable on the accessible route, the minimum width of the route at obstruction should not be less than 36 inches (915 mm).

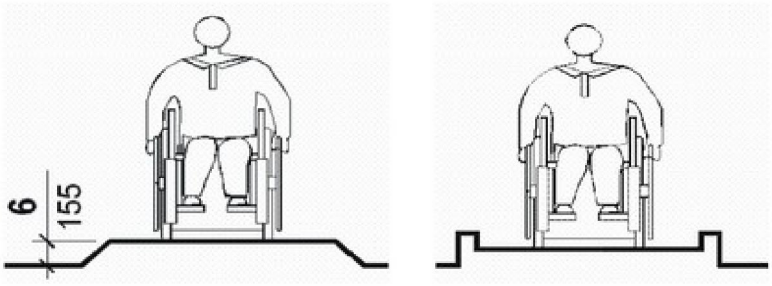


MINIMUM CLEAR WIDTH OF ACCESSIBLE ROUTE

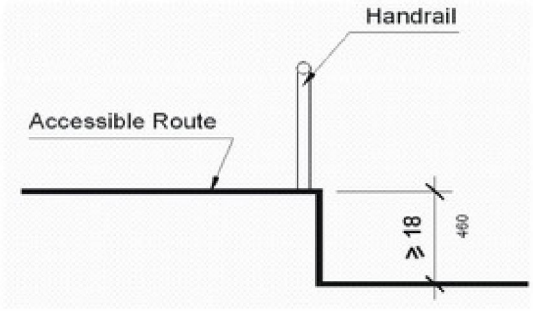


WIDTH OF ACCESSIBLE ROUTE WITH RESPECT TO TYPE, LOAD AND FREQUENCY OF USAGE

Stepped curbs should be avoided, as they are dangerous especially in the darkness. Guiding curbs that are slightly raised help wheelchair users. The surface of accessible pathways should be even, smooth, continuous, and non-slip.

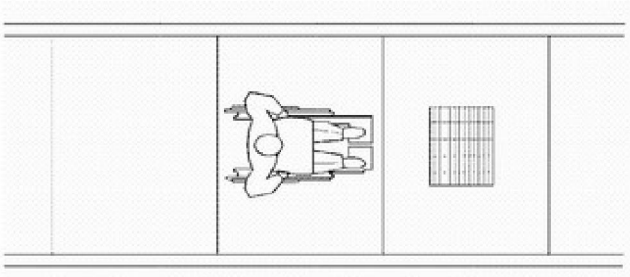


GUIDING CURBS ALONG AN ACCESSIBLE ROUTE



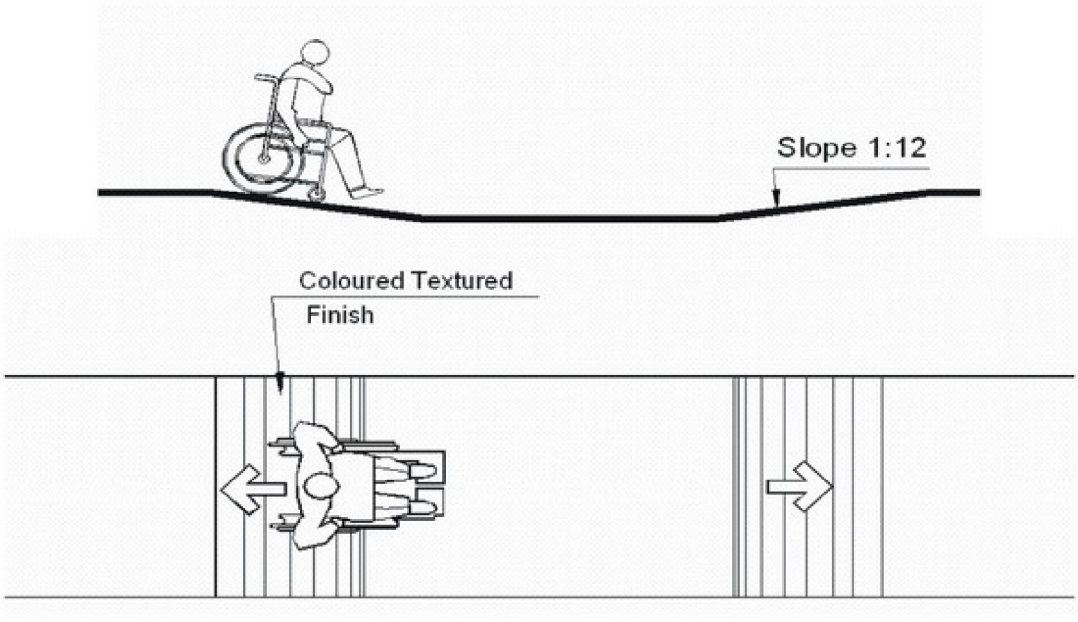
ACCESSIBLE ROUTE PROTECTED BY RAILING AT LEVEL DROP

Gratings can be hazardous to wheelchair users, cane and crutch users, people pushing trams and women using high heel shoes. Gratings should be placed with their perforations perpendicular to line of travel, and apertures not exceeding 1 in. (25 mm) in width.



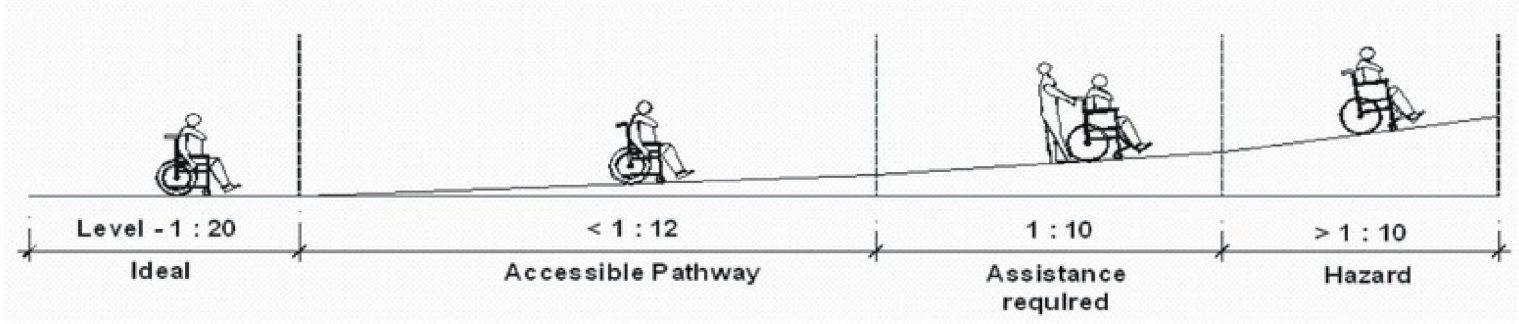
PLACEMENT OF GRATINGS ALONG AN ACCESSIBLE ROUTE

The slope of pathways should not exceed 1:20, and for short ramps preferably be 1:12. For extreme cases in existing situations the ramp slope may increase to 1:8. Single steps should be avoided. All level changes should preferably be marked with contrasting colours and tactile markings.



SLOPED ACCESSIBLE ROUTE WITH CONTRASTING COLOUR TACTILE IDENTIFICATION AT LEVEL CHANGES

Gradient of sloped pathways along an accessible route determines the ease and comfort for the users. A slope below 1:20 may be considered leveled ground. A slope of 1:12 with runs not exceeding 30 ft. (9.150 m) in length is an acceptable accessible ramp. Slopes above 1:8 may be highly difficult to negotiate. The width of a ramped pathway should not be less than 48 in. (1220 mm). [**5.2.3**]



RAMP GRADIENT AND ITS EFFECT ON MANEUVERABILITY

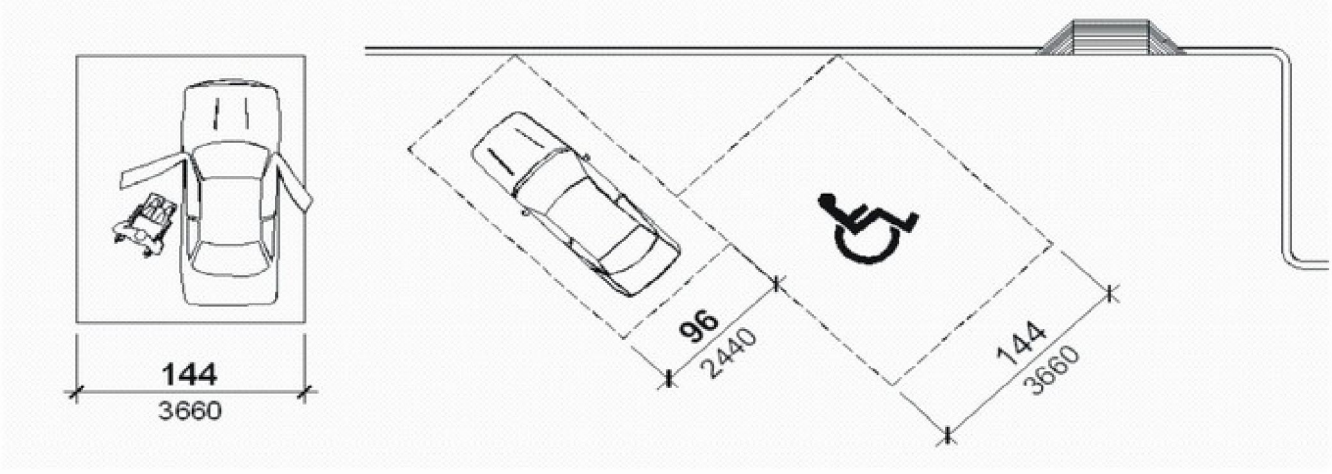
Vehicular Parking [5.2.9]

Accessible parking provisions apply to both outdoor and indoor parking facilities.

Parking facilities should be accessible through an accessible route and at least one floor of a multi-storey indoor parking facility shall be served either by an accessible elevator or an accessible ramp

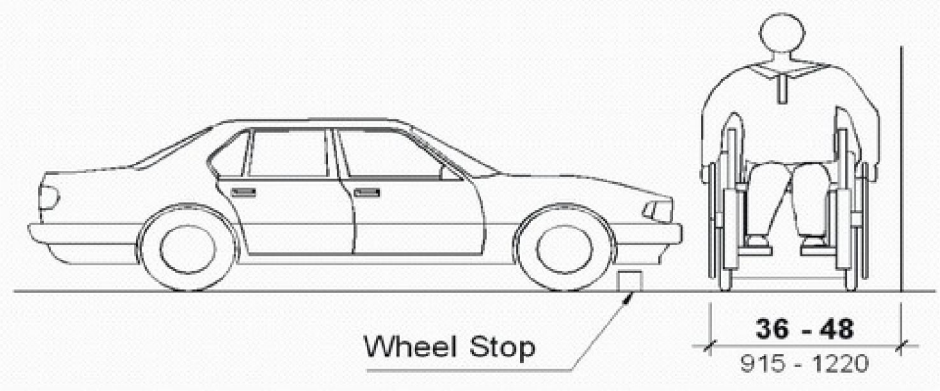
The reserved parking spaces should be located in clear view of and nearest to the accessible entrance to the building or facility.

The end spaces at parking rows are preferable for vans with lifts for wheelchair users.



PARKING ON RIGHT ANGLE AND ANGULAR PARKING STALLS
SHOWING STANDARD DIMENSIONS FOR ACCESSIBLE PARKING SPACE

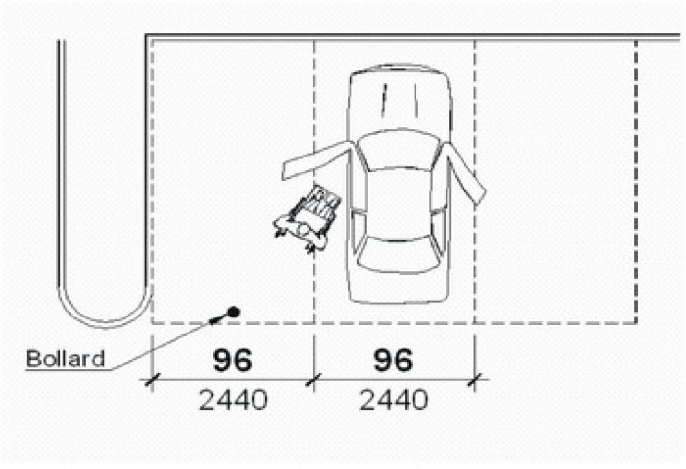
The accessible parking stall should not be less than 96 in. wide and adjacent accessible aisle not less than 48 in. (1220 mm) in width. The accessible route should serve all accessible parking stalls.

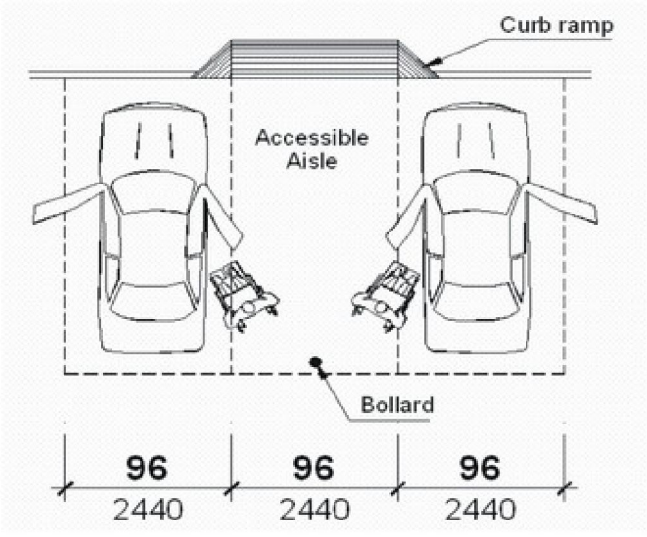


ACCESSIBLE ROUTE SHOULD CONNECT PARKING WITH ENTRANCES AND OTHER FACILITIES ON SITE

The width of an accessible reserved parking space for a car shall not be less than 12 feet (3660 mm), and for an adapted motorcycle or tricycle 6 feet (1830 mm). A 48 in. (1220 mm) wide access aisle may be provided between two car parking spaces.

For indoor parking, the minimum height clearance for accessible parking shall be maintained as 8 feet (2440 mm).

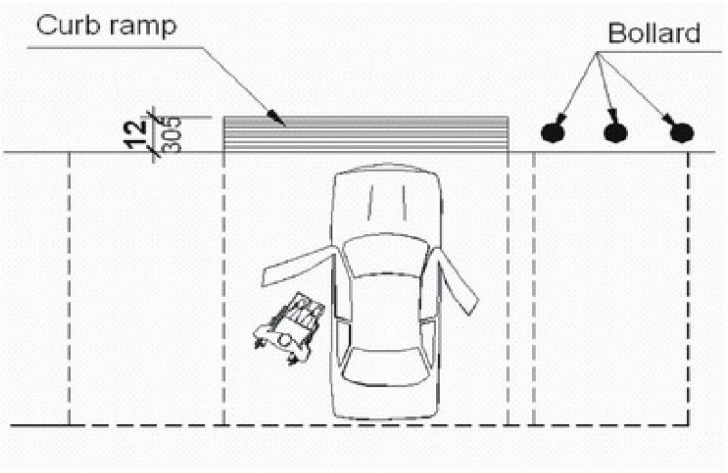




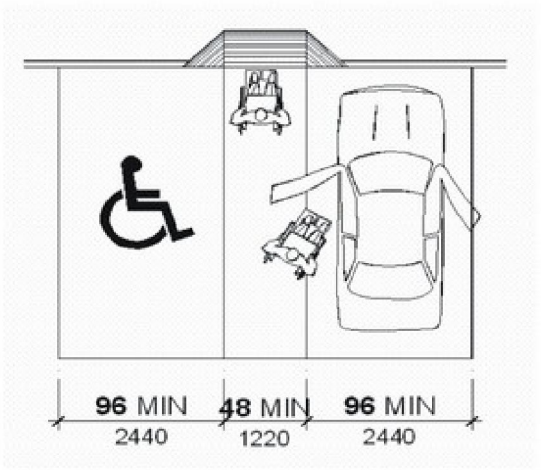
NORMAL CAR PARKING AREA CONVERTED INTO PARKING FOR WHEELCHAIR BOUND PERSON

When there are no curbs between parking stalls and accessible route, the surfaces should be differentiated with coloured markings.

Precast wheel stoppers or bollards should be used to define limits of vehicular approach.



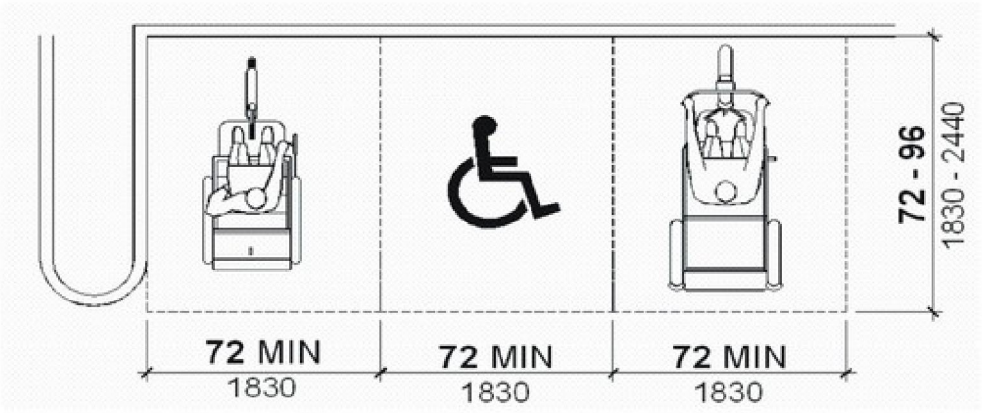
CURB RAMPS AND BOLLARDS DEFINING PARKING AREA LIMITS



FLOOR MARKINGS ON ACCESSIBLE PARKING STALL

All reserved parking spaces shall be clearly identified on the ground surface with internationally accepted markings and international symbol of accessibility.

Parking stalls for adapted tricycles and motorcycles should at least be of 72 in. (1830 mm) width.



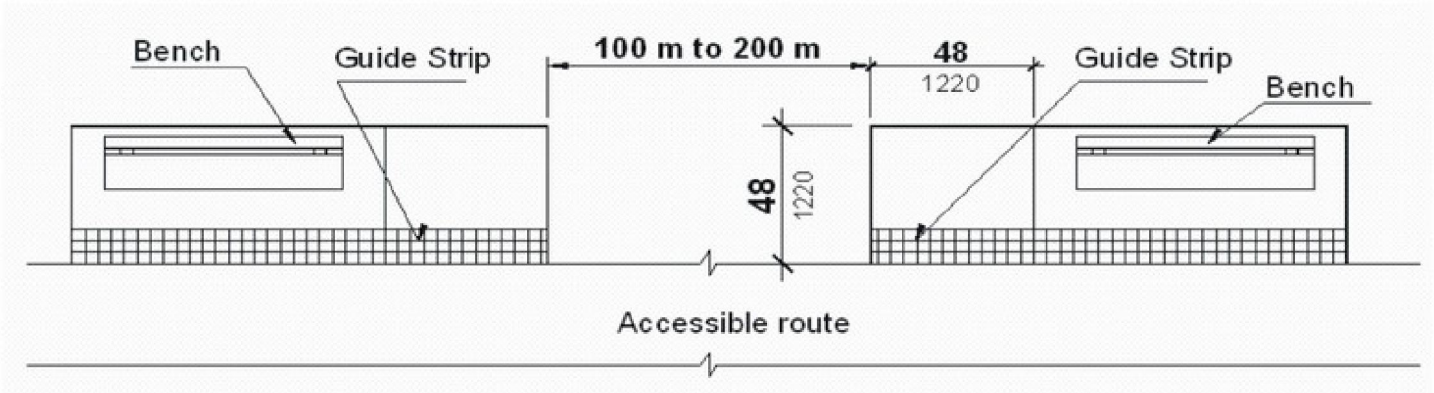
PARKING STALL DIMENSIONS FOR ADAPTED TRICYCLES AND MOTORCYCLES

Street Furniture [5.2.13]

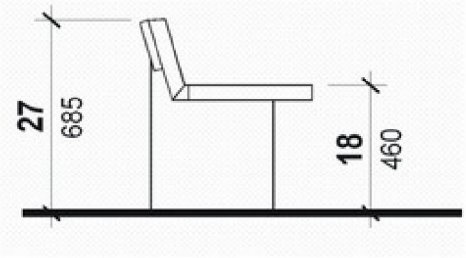
Street furniture includes bus stops, benches, mailboxes, lampposts, signboards, telephone booths, vending kiosks, planters, garbage bins and even public toilets placed in open areas along streets.

Street furniture should be so located so as to allow for free passage of all people without hazards. Textural and colour changes in floor surface shall be provided to identify provision of street furniture items.

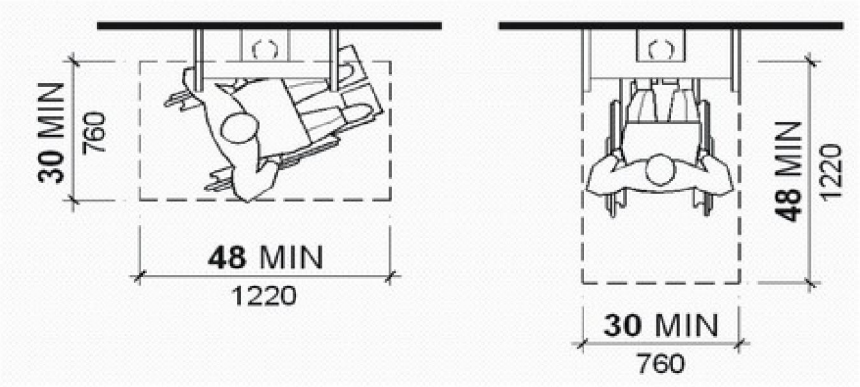
Resting facilities should be provided at regular intervals ranging between 100 m. and 200 m. distance, and shall be adjacent to but placed outside the main circulation path or the accessible route. Some seating accommodations should be placed close to public toilets.



LOCATION OF REST AREAS ALONG A PUBLIC PATH OF TRAVEL

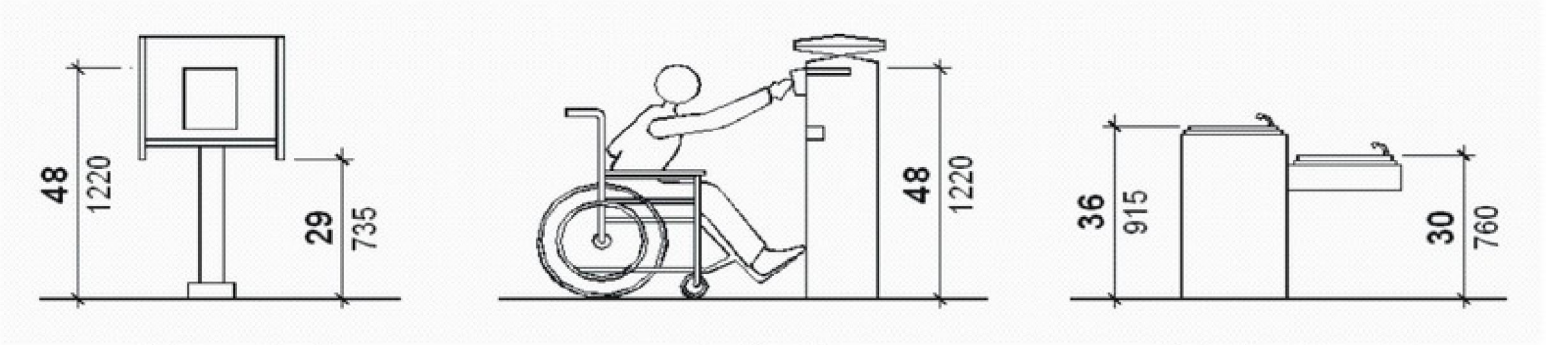


PROVISION OF BENCHES, GUIDE STRIPS AND
RESTING SPACE TO ACCOMMODATE WHEELCHAIR



WHEELCHAIR SPACE CLEARANCES
AROUND ITEMS OF STREET FURNITURE

Dimensional standards for vertical control of accessible amenity fixtures depend upon wheelchair sizes and maneuvering clearances. Items of street furniture are usually placed lower for wheelchair accessibility.



Phone Booth | Letter Box | Drinking Fountain

DIMENSIONAL STANDARDS FOR
PIECES OF STREET FURNITURE

6
DESIGN REQUIREMENTS FOR INTERNAL ENVIRONMENT

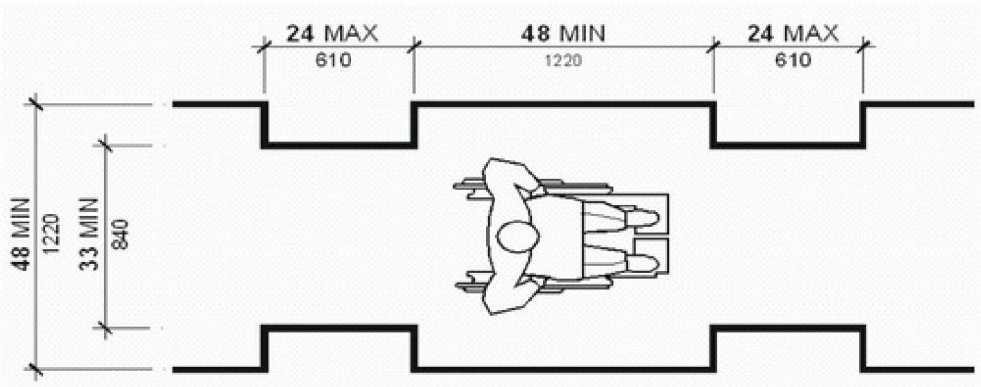
All areas within the interior of buildings comprising entrances, corridors, means of horizontal and vertical movement, level changes, illumination and wayfinding aspects are covered under internal environment considerations for creation of barrier free environments. [**6.2**]

Accessible Route [6.2.1]

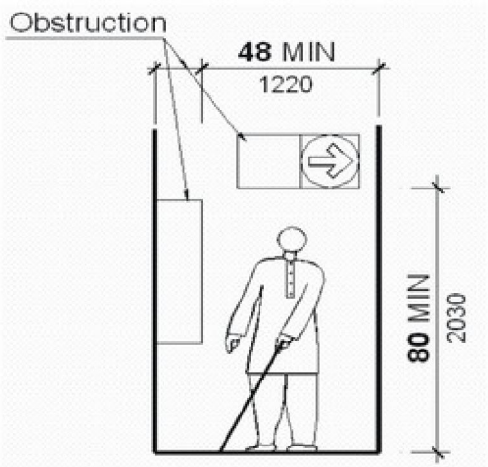
At least one accessible route, which is unobstructed, level, continuous and illuminated shall be provided on the premises, connecting accessible building or facility entrances with all accessible spaces and elements within the building or facility.

The minimum clear width of indoor accessible route shall be 48 in. (1220 mm) except at doors. If the clear width of an accessible route is less than 60 inches (1525 mm), passing spaces of size 60 in. (1525 mm) by 60 in. (1525 mm) shall be provided at reasonable intervals not to exceed 100 feet (30.5 m). An intersection with another corridor or passage of at least 36 in. (915 mm) width shall be considered acceptable passing space.

The minimum clear and unobstructed head room of an accessible route shall not be less than 80 inches (2030 mm). An accessible route serving an accessible space or area shall also serve as a means of emergency egress or connect to an area of refuge or rescue assistance.

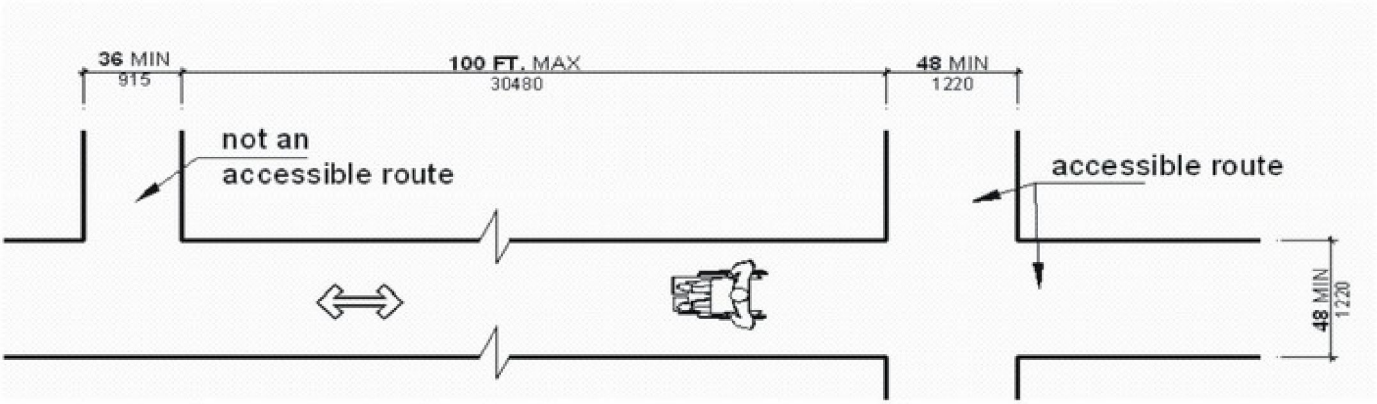


Plan



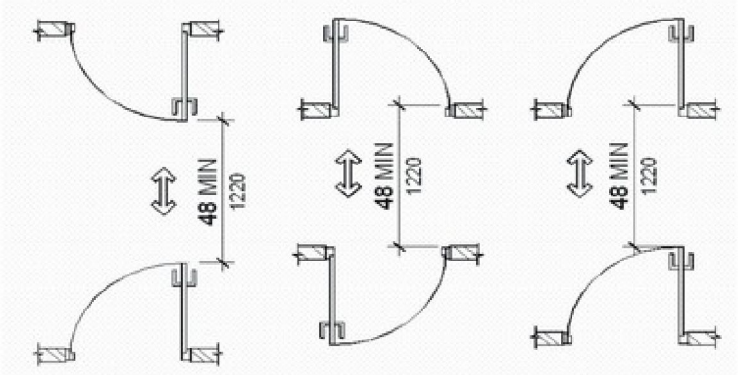
Section

DIMENSIONAL STANDARDS FOR ACCESSIBLE ROUTE



DIMENSIONAL STANDARDS FOR TURNING POINTS
ON MINIMUM WIDTH ACCESSIBLE ROUTE

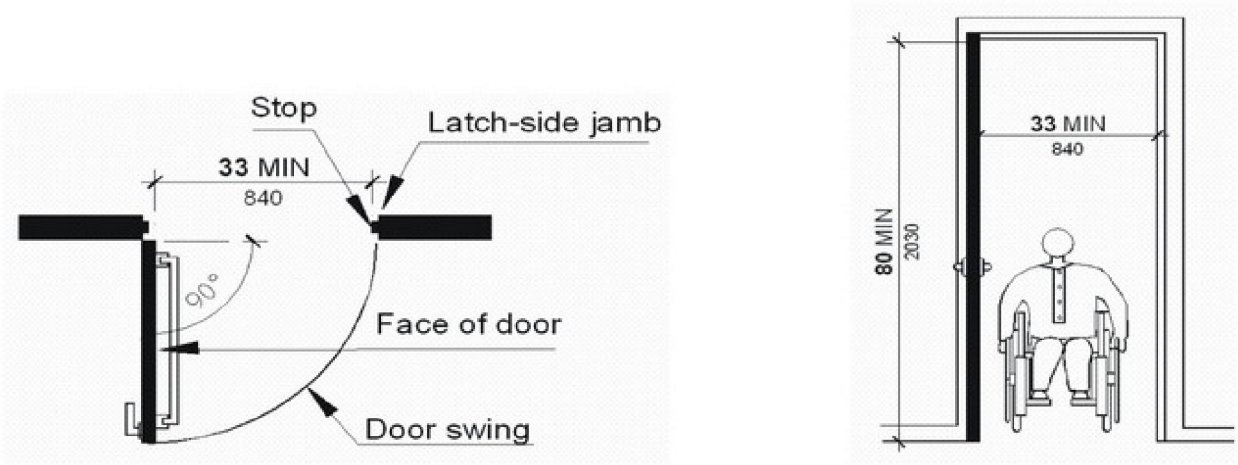
When doors open into accessible route, the width of the accessible route should be increased accordingly.



CLEAR WIDTH OF ACCESSIBLE ROUTE

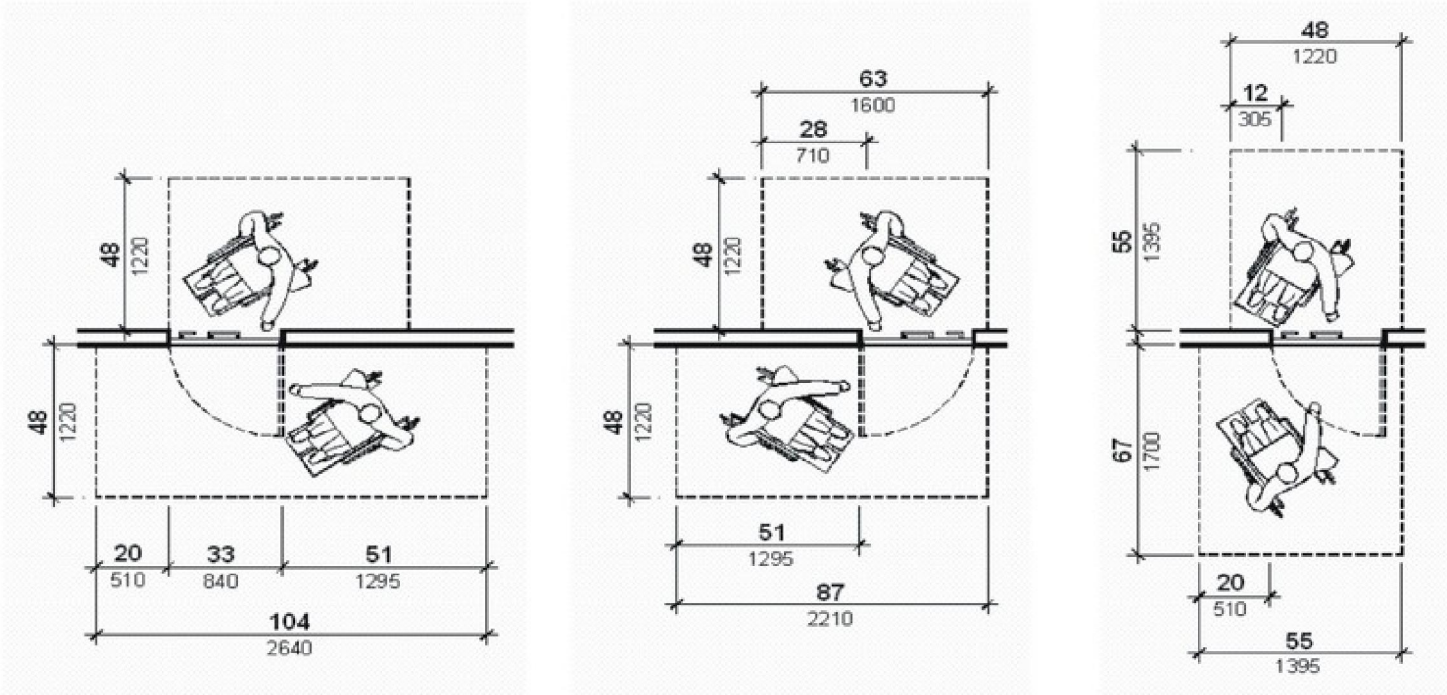
Entrances [6.2.2]

At each accessible entrance to building or facility at least one accessible door shall be provided having a clear opening of at least 33 inches (840 mm) wide and 80 inches (2030 mm) high, and opening in the direction of travel.



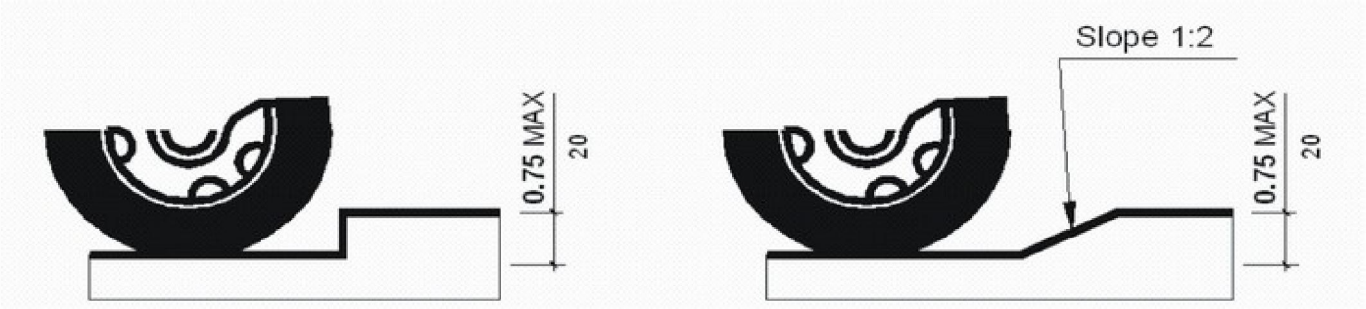
CLEAR WIDTHS OF ENTRANCES

Accessible entrance to building shall be easy to negotiate and shall have level space to accommodate one wheelchair beyond the swing of the door, at the same level on both sides of the door.



WHEELCHAIR MANEUVERING SPACE AT DOOR OPENING

The level change at threshold of an accessible entrance shall not exceed 0.75 in. (20 mm).



DIMENSIONAL STANDARDS FOR THRESHOLDS AT ENTRANCES

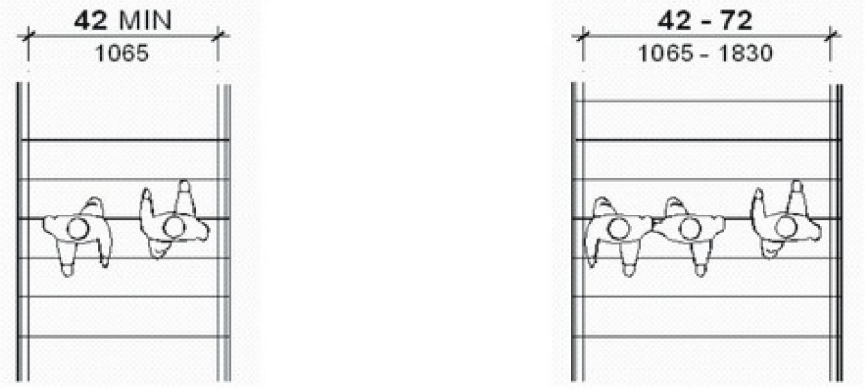
Staircases [6.2.3]

Staircases being the most common and widely used means of vertical movement, are also the sites of the highest incidence of mobility related accidents. For these reasons, stairway design should be strictly controlled with safety in mind.

Stairs may be categorized into several types depending upon their design and layout, which in turn is dictated by the space available, the starting and ending points required of the stair, the occupant load, and the appearance desired.

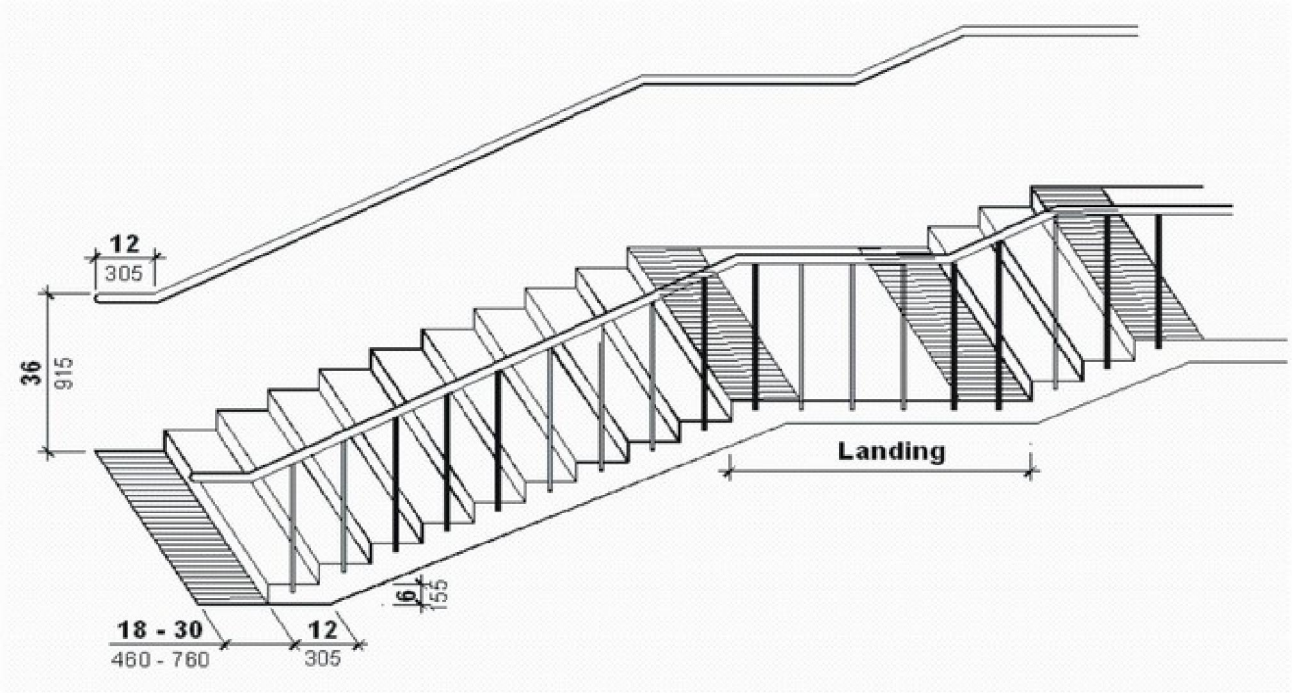
Egress staircases must be enclosed as required by most building codes, but other stairs may vary in design according to the requirements on case by case basis.

Staircases that can be used by the ambulant disabled, without compromising on their comfort or safety, are termed as accessible staircases. The minimum width required for an accessible staircase is 42 in. (1065 mm) clear between the handrails. For a one-way, or sparsely used staircase, the minimum width of an accessible staircase may be reduced to 30 in. (760 mm).



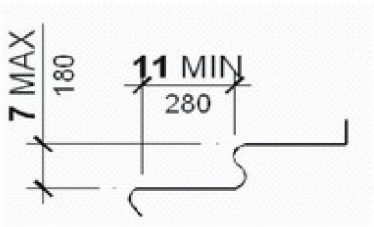
CLEAR WIDTH BETWEEN HANDRAILS

Tactile detectable warnings in contrasting colours at each landing to mark the staircase should be provided to warn the person with low vision of the impending change in level. These detectable warning strips should be of the same width as the stair, and the depth should be between 18 in. (460 mm) and 30 in. (760 mm).

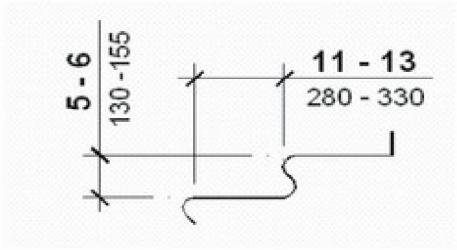


DIMENSIONAL STANDARDS FOR
PROTECTIONS AT STAIRCASES

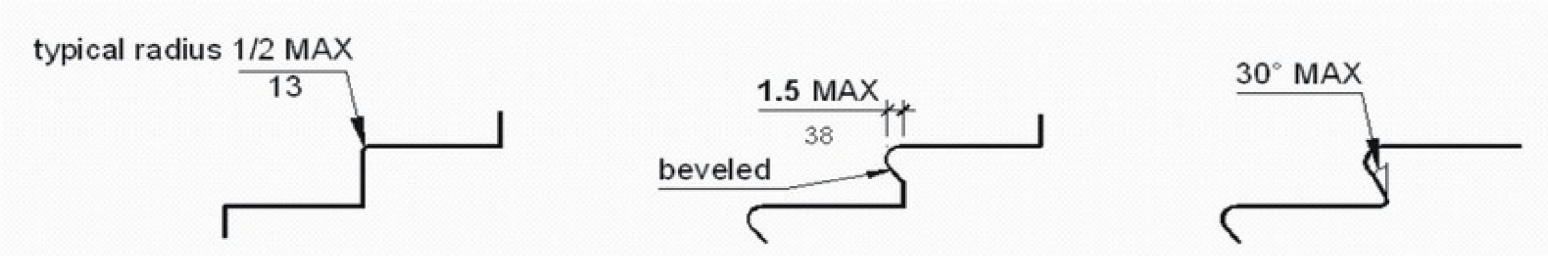
Tread and riser dimensions are critical in the design of any staircase including an accessible one. Steps and staircases to be accessible should not have treads less than 11 in. (280 mm) width, and risers of more than 7 in. (180 mm) height. However tread widths between 11 in. (280 mm) and 13 in. (330 mm) and riser heights between 5 in. (130 mm) and 6 in. (155 mm) are recommended. The staircases with winders having less than 6 in. (155 mm) width at a distance of 12 in. (305 mm) from the inside edge of the stair are not acceptable as accessible staircases.



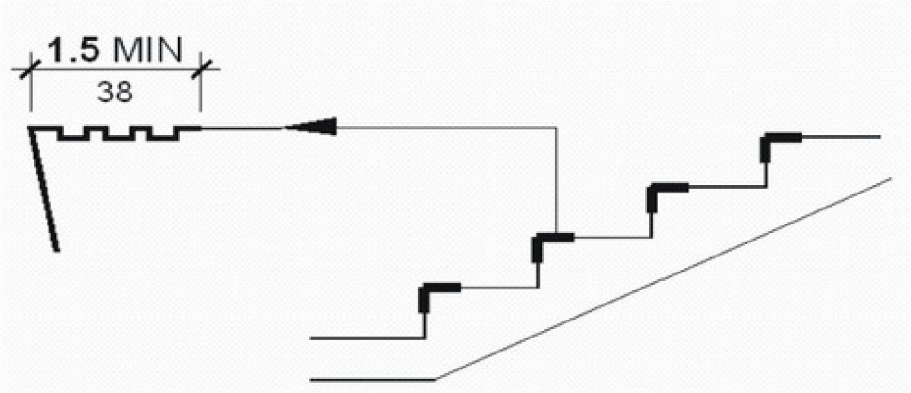
DIMENSIONAL STANDARDS FOR ACCESSIBLE TREAD AND RISER



PREFERRED DIMENSIONS FOR ACCESSIBLE TREAD AND RISER



STEP PROFILES AND KEY DIMENSIONS

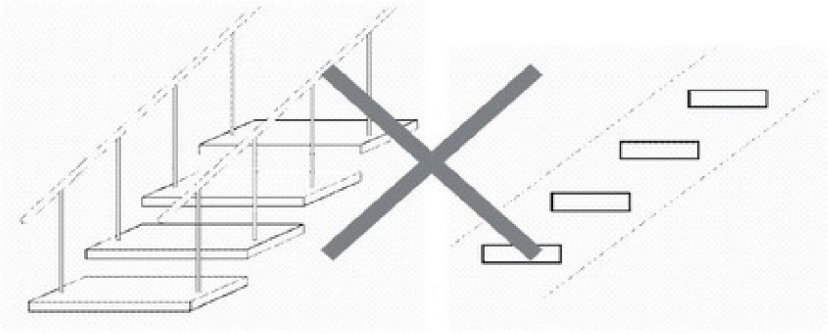


STEP PROFILES AND KEY DIMENSIONS

Open treads are not allowed for accessible stairs. All risers should be solid

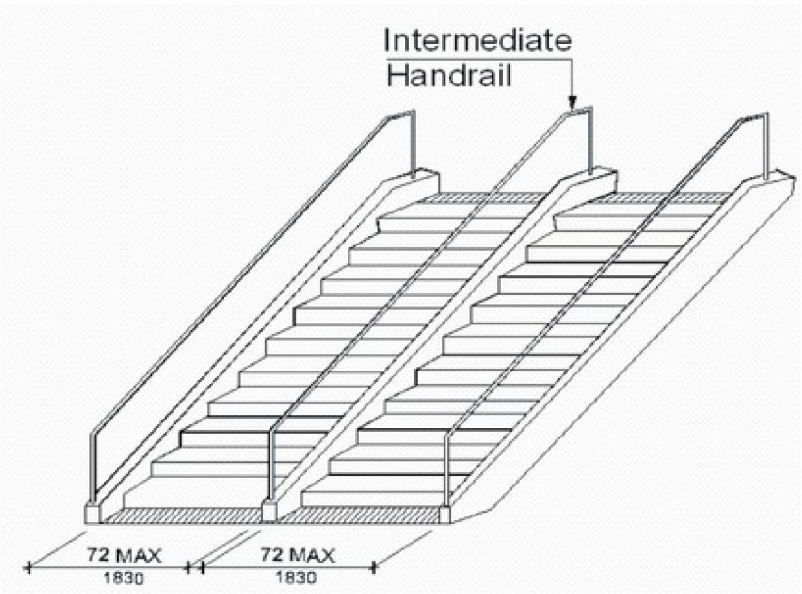
The steps with a level difference of more than 18 in. (460 mm) should be protected by handrails.

FEW STEPS MAY BE NEGOTIATED BY A PERSON USING A WALKER



OPEN RISERS ARE NOT ACCEPTABLE FOR ACCESSIBLE STAIRCASES

The handrails should be continuous around the stairs and ramps, and should extend at least 12 in. (305 mm) beyond the last and first step to maintain an even height of the handrails. For staircases that are more than 72 in. (1880 mm) wide, intermediate handrails should be provided.



INTERMEDIATE HANDRAILS ARE NECESSARY FOR WIDER STAIRCSES

Ramps [6.2.3]

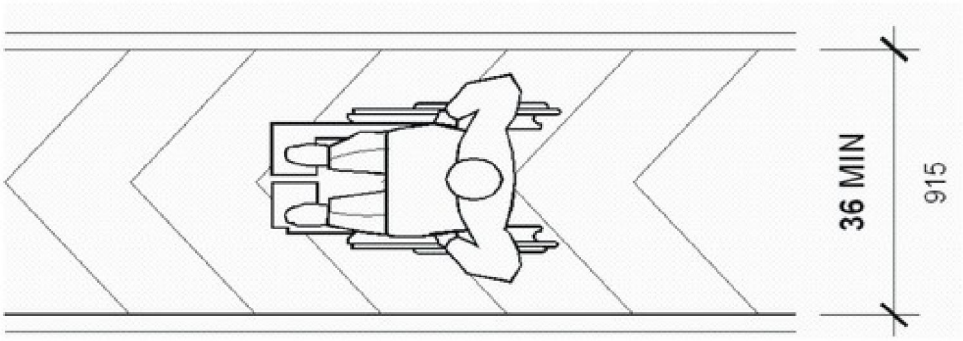
Wherever level changes necessitate provision of staircases, the creation of obstruction for wheelchair users and other people with mobility problems require alternate means for negotiating the level difference. Lifts and ramps provide this alternate to the use of stairs.

Ramps are preferred in exterior locations as indoor ramps occupy too much space.

Ideally, the entrance to ramp should be adjacent to the stairs.

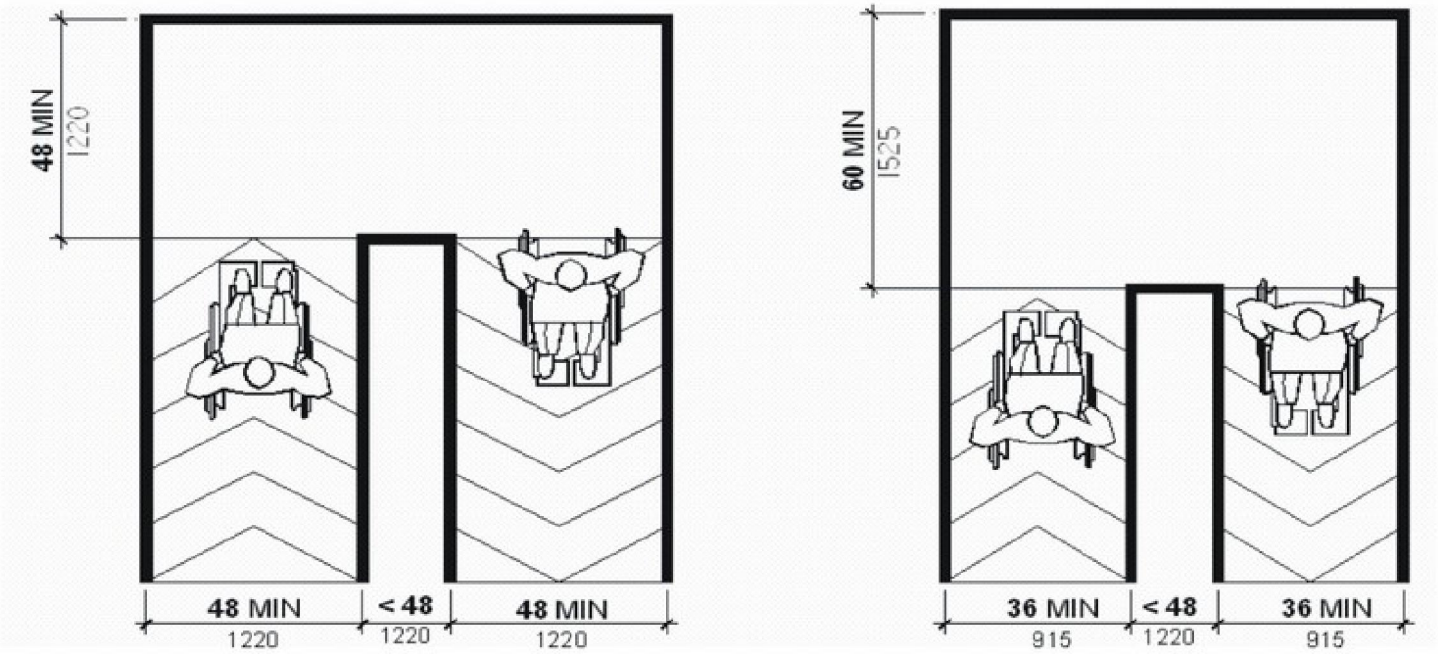
The slope of the ramp determines the ease with which a person with mobility aids can maneuver it. Preferably for new constructions, the ramp slope should remain between 1:20 and 1:12. However in tighter places in existing situations, ramps with a slope of up to 1:8 are also acceptable. The single run of an interior ramp should not exceed 48 ft. (14.630 m).

The width of the ramp depends upon use, configuration and slope, but it should not be less than 36 in. (915 mm) for a one-way use at a time.



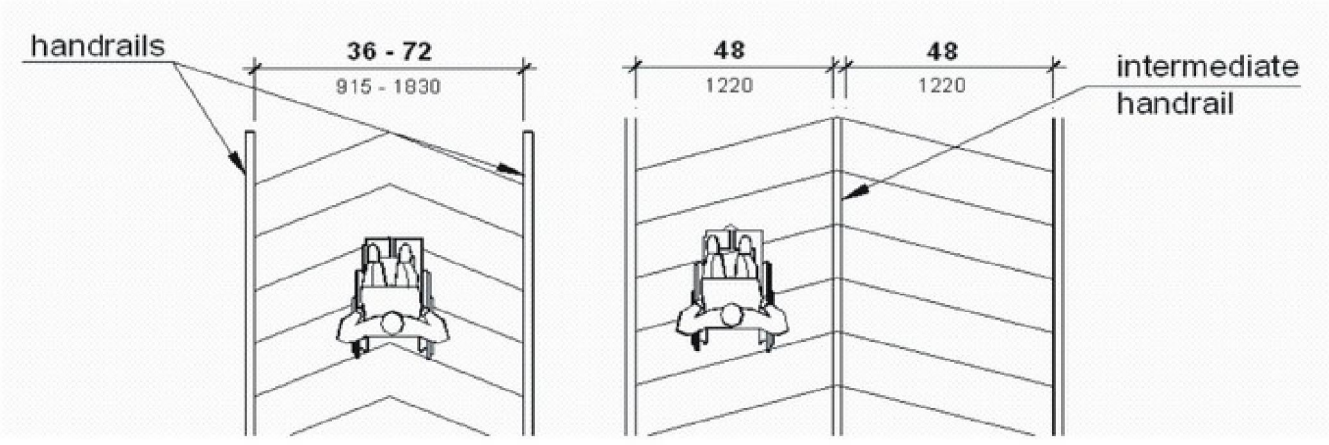
DIMENSIONAL STANDARDS FOR ACCESSIBLE RAMP

Ramps should be provided with landings for resting, maneuvering and avoiding excessive speeds. The width of the landing should be enough to allow for two wheelchairs to cross each other and turn at the same time.



CLEAR WIDTH OF RAMP AT LANDING

A protective handrail should be provided along the full length of the ramp, which should extend at least 12 in. (305 mm) beyond the extreme ends of the ramp. For ramps more than 72 in. (1880 mm) wide intermediate handrails should be provided.

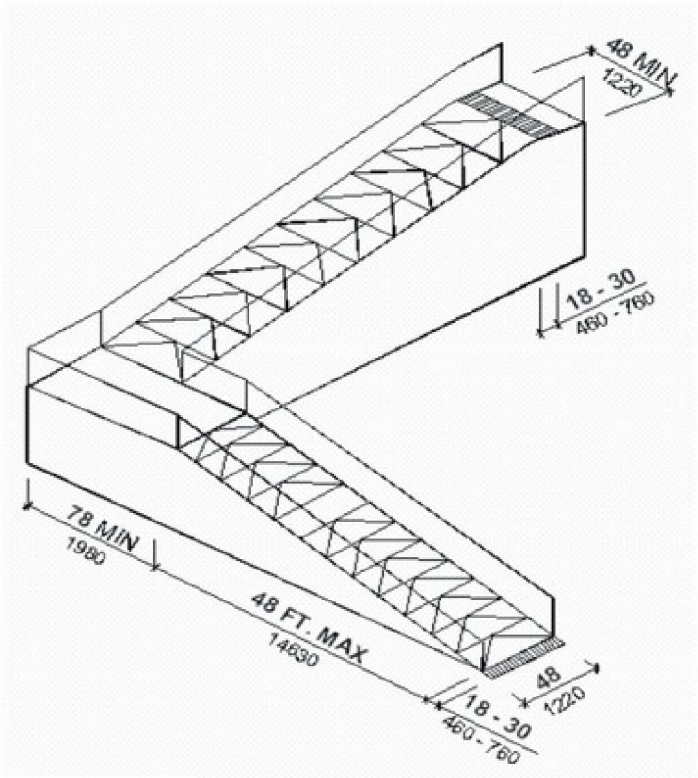


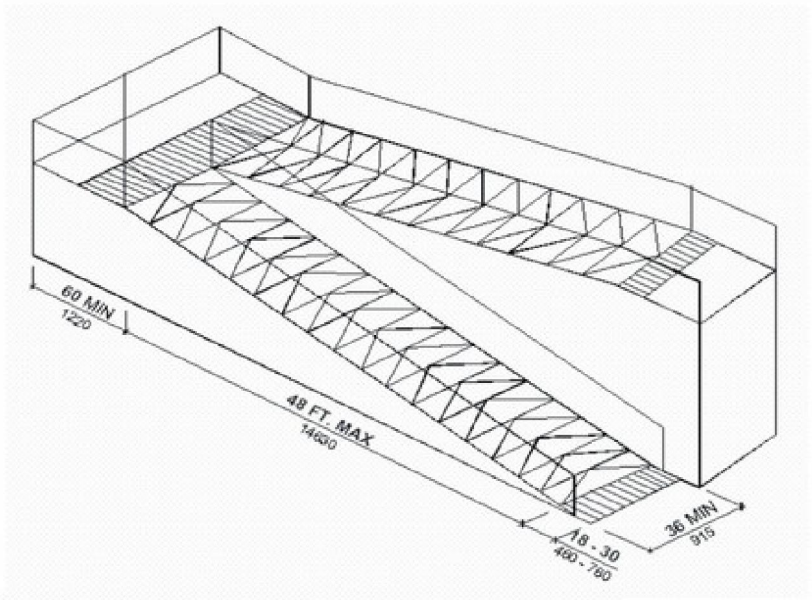
INTERMEDIATE HANDRAILS ARE REQUIRED
FOR WIDER THAN 72 IN. (1830 MM) RAMPS

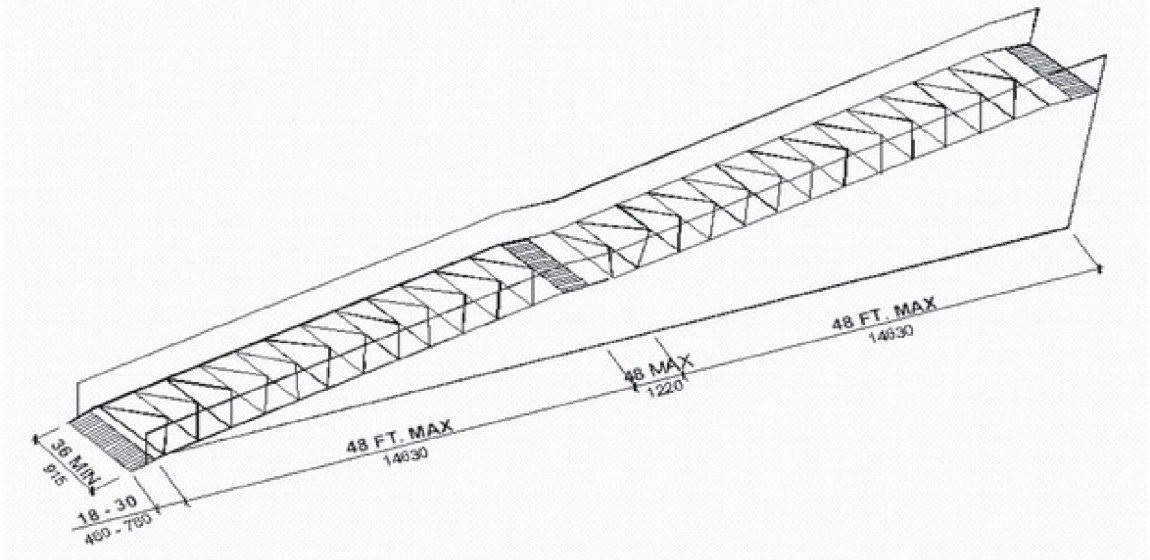
Like stairs, the ramps may have a number of configurations depending upon the space available, and the starting and end points required.

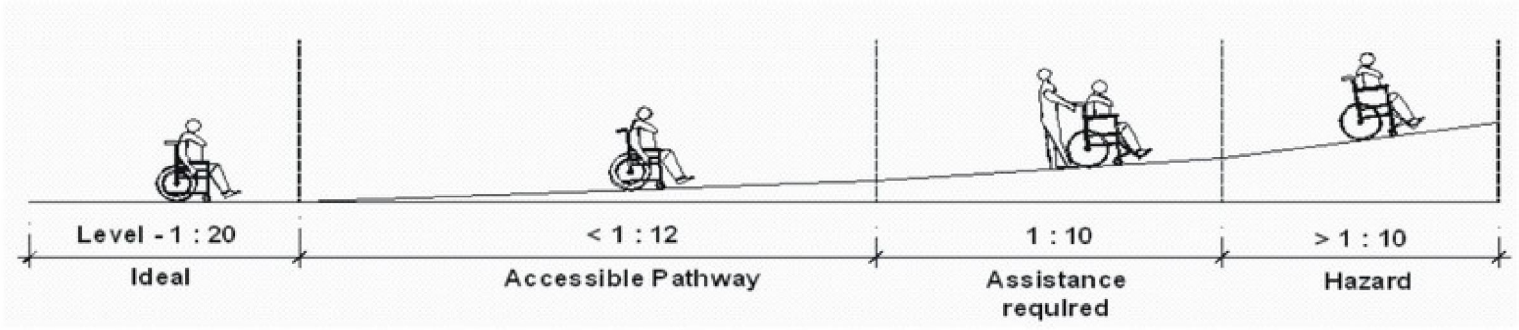
The floor surface of ramp should be of a non-skid material. Carpets should never be used on inclined surfaces. Colour contrasting tactile detectable warning strips should be placed at the start and end of ramp. These detectable warning strips should be of the same width as that for the ramp, and the depth should be between 18 in. (460 mm) and 30 in. (760 mm).

VARIOUS CONFIGURATIONS AND DIMENSIONAL STANDARDS FOR ACCESSIBLE RAMPS









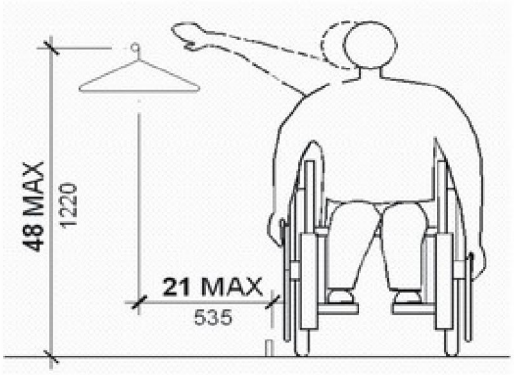
RAMP GRADIENT AND ITS EFFECT ON MANEUVERABILITY

Accessible Space [6.2.4]

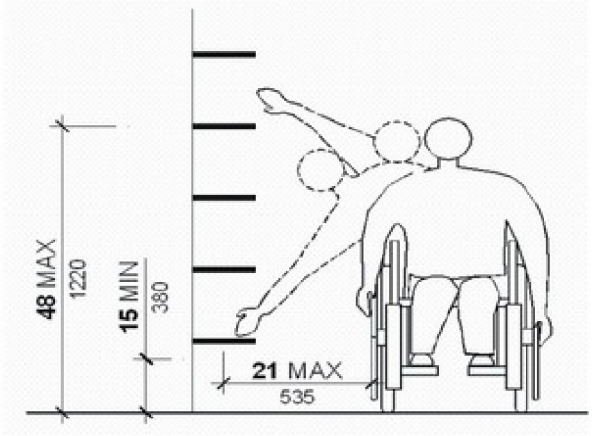
All spaces and areas required under the scoping requirements to be accessible and usable to persons with disabilities shall be developed in such a way so that those are served with

- an accessible route,
- required number of accessible means of egress in cases of emergencies,
- a floor surface that is fairly smooth, firm and slip-resistant in dry conditions.
- doors having a clear opening width of at least 33 in. (840 mm),
- sufficient space for at least one wheelchair inside and outside the door in addition to space required for opening of door,
- detectable coloured and tactile warning strips on the floor around all built-in obstructions and protrusions,
- windows having low level sills so as to allow view to wheelchair bound persons,

- enough width of all the maneuverable spaces to allow for movement of wheelchair bound persons without difficulty,
- enough knee and toe clearances for all areas for wheelchair maneuverability,
- enough level of general illumination ranging between 10 and 20 foot candles (110-220 lux),
- means of visual and oral communication to counter difficulties faced by persons with sensory impairments,
- grab rails along the walls and resting facilities in areas where large numbers of elderly visitors or persons with disabilities are expected,
- internal environment and indoor air quality, bearable to the infirm and the frail of health, and
- a sensitive social attitude.

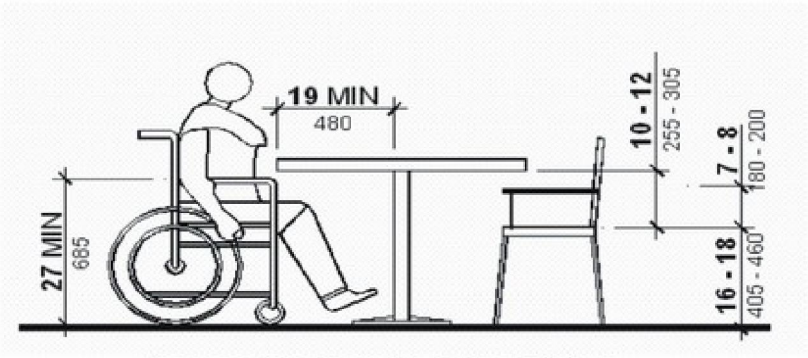


Reach Limits for Closets

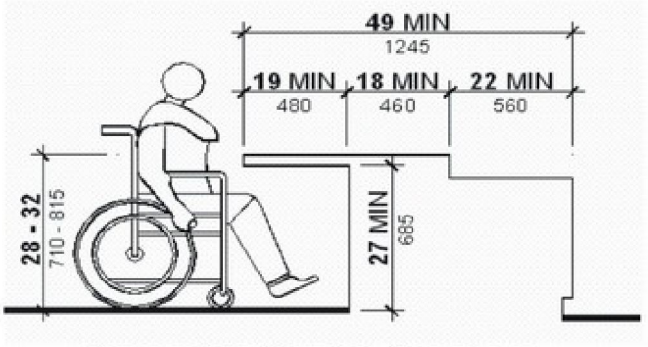


Reach Limits for Shelving

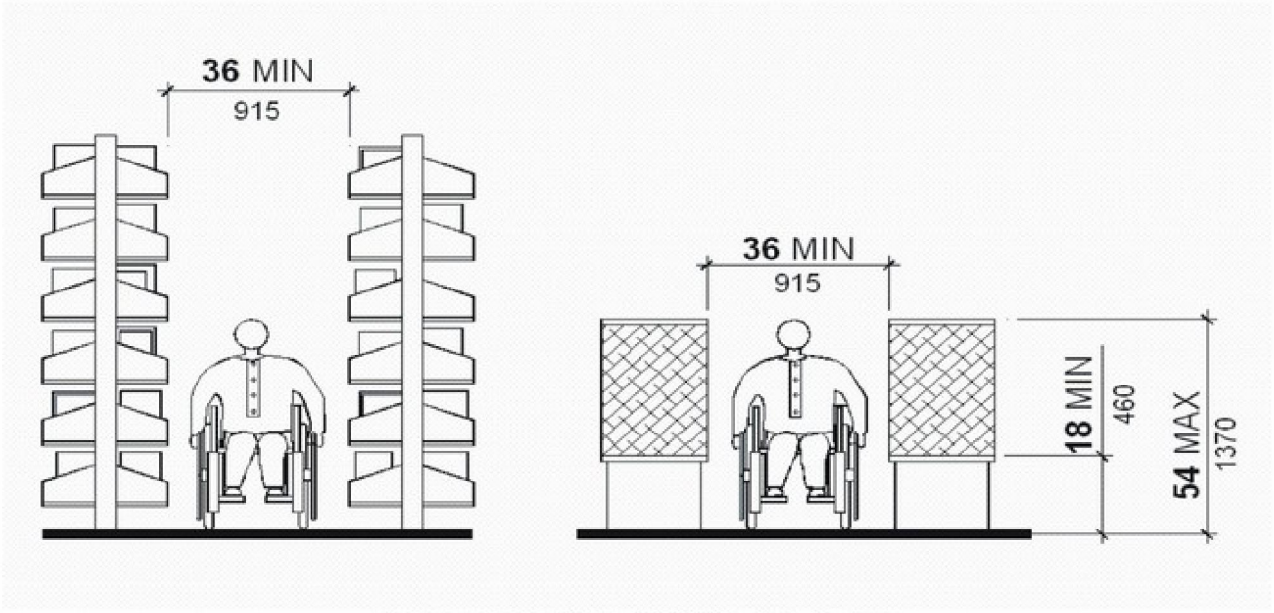
DIMENSIONAL STANDARDS FOR ACCESSIBLE SPACES



Accessible Furniture for Dining



Accessible Service Counters



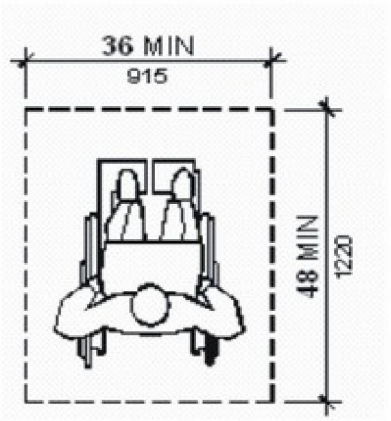
Accessible Aisle Widths in Library

DIMENSIONAL STANDARDS FOR ACCESSIBLE SPACES

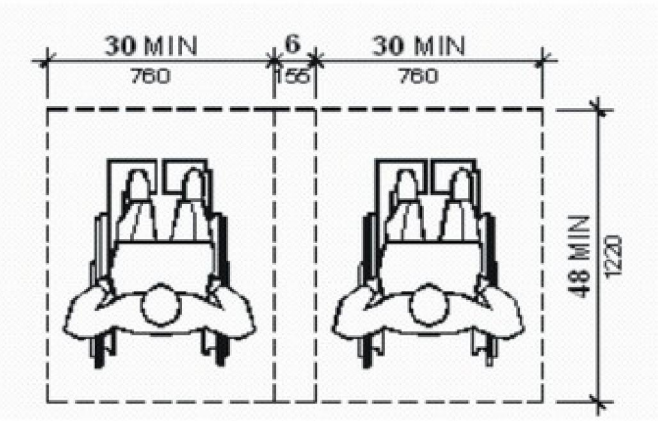
7
DESIGN REQUIREMENTS FOR BUILDING COMPONENTS, ELEMENTS AND SERVICES

Space Allowance & Maneuvering Clearances [7.2]

A wheelchair space is the minimum clear floor space required for a stationary wheelchair with its occupant and shall be 36 in. (915 mm) by 48 in. (1220 mm). [**7.2.1**] Change of level in this space is not permitted. Where two or more wheelchair spaces are grouped together, the width of each wheelchair may be reduced subject to a minimum of 33 in. (840 mm) space for each wheelchair.



STATIONARY WHEELCHAIR SPACE

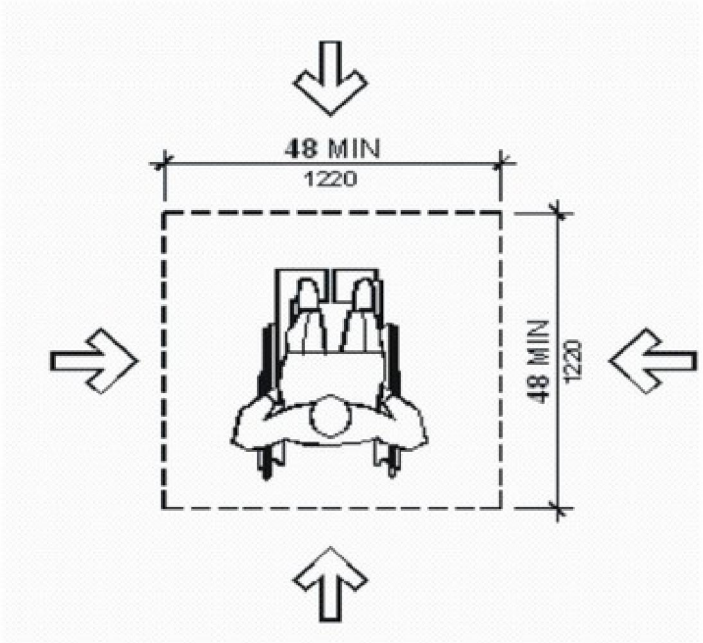


WHEELCHAIR SPACES GROUPED TOGETHER

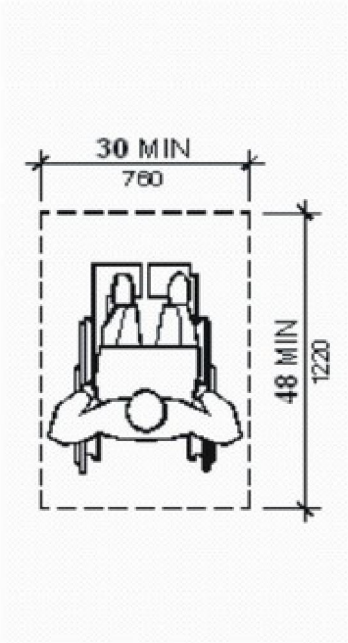
In an open accessible area a clear floor space required to accommodate a single, stationary wheelchair is 30 in. (760 mm) by 48 in. (1220 mm).

Space Allowances & Reach

A minimum clear floor space of 48 in. (1220 mm) by 48 in. shall be considered to allow access for both forward and side approach. [**7.2.1**]

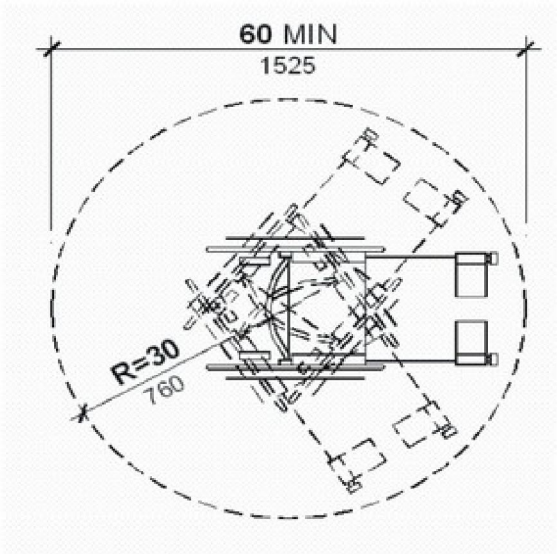


SPACE TO ALLOW WHEELCHAIR ACCESS FROM ANY DIRECTION

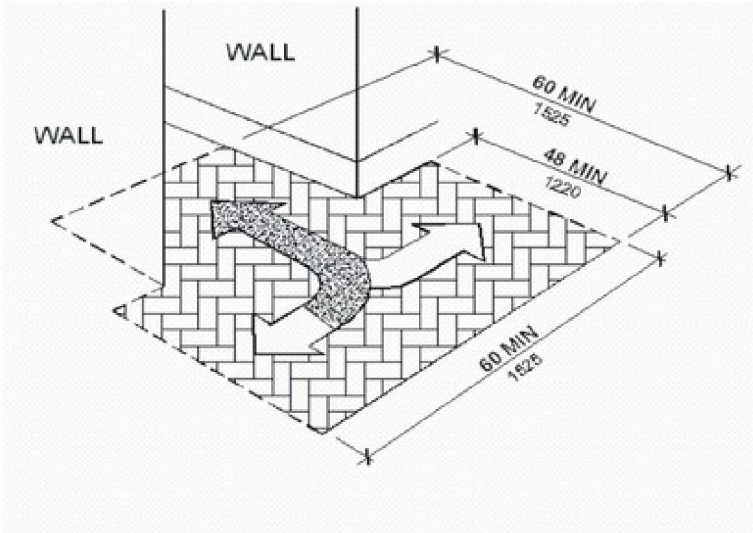


MINIMUM FLOOR SPACE IN OPEN AREA FOR WHEELCHAIR

A circle with a diameter of 60 in. (1525 mm) shall deem to provide the space required for a wheelchair bound person to turn in any direction. [**7.2.1**]



SPACE FOR WHEELCHAIR TO TURN IN ANY DIRECTION

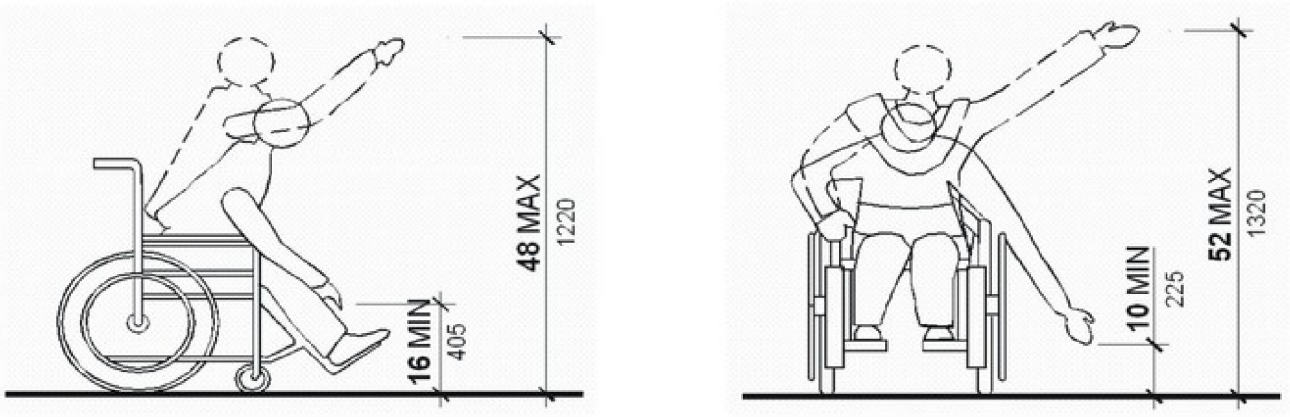


SPACE REQUIRED FOR THREE POINT TURN AROUND IN ACCESSIBLE ROUTE

Maximum reach for a wheelchair bound person over work counters, obstacles and protrusions and knee space under counters determines the efficiency of a work environment for the user. These limits of reach are determined by the wheelchair dimensions and vary slightly according to the person's anthropometrics.

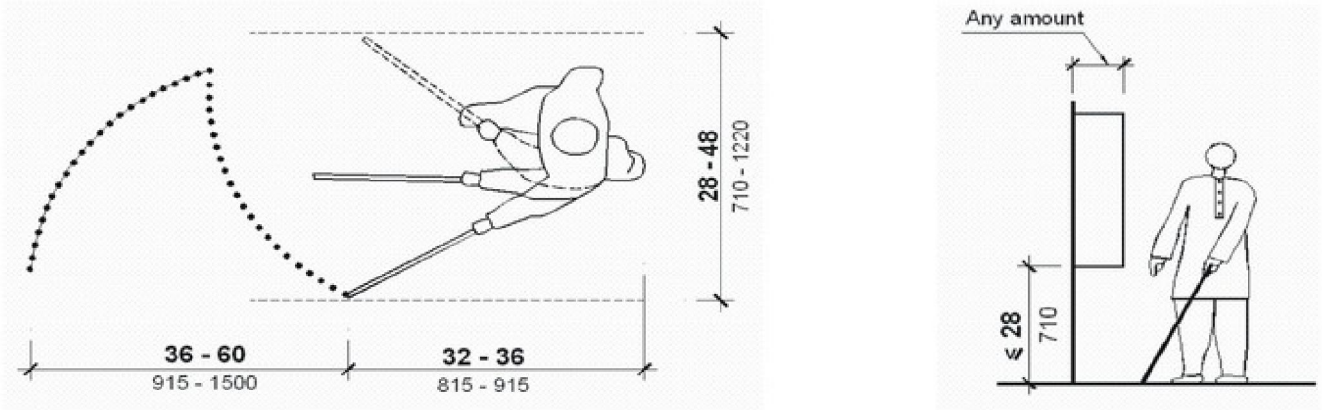
The forward reach range for a wheelchair bound person is between 48 in. (1220 mm) and 16 in. (405 mm) above floor level. The maximum forward reach over an obstruction like table, work counter etc., should be taken as 20 inches (510 mm). [**7.2.2**]

The side reach varies between a maximum of 52 in. (1320 mm) and a minimum of 10 in. (255 mm) above floor level. [**7.2.2**]

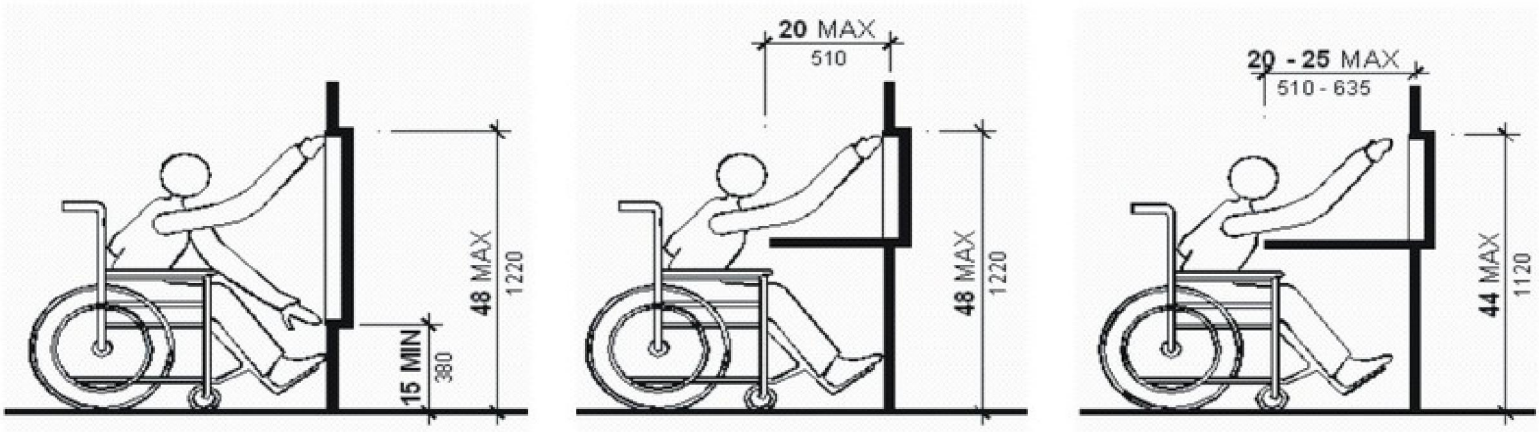


FORWARD AND SIDE REACH LIMITS OF WHEELCHAIR BOUND PERSON

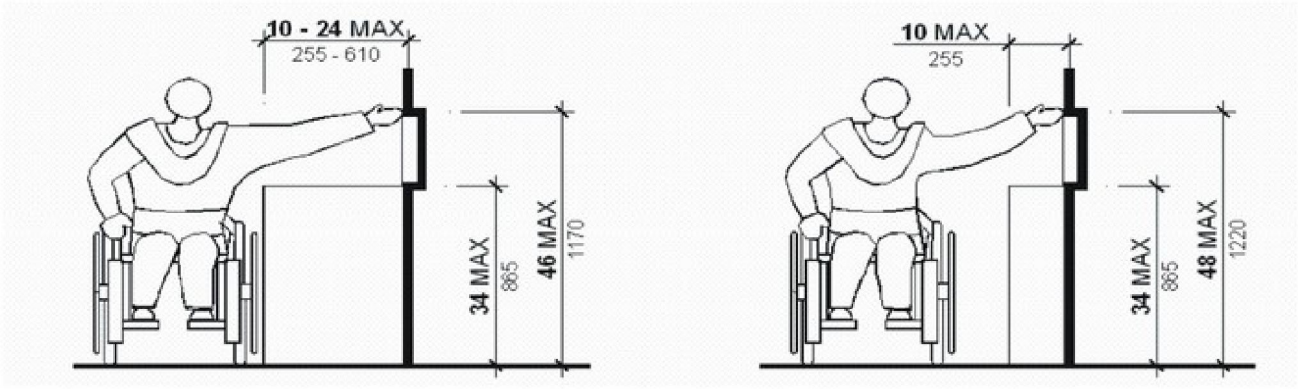
The white cane zone extends 48 in. (1220 mm) across and 28 in. (710 mm) in height in front of the person. [**7.2.2**]



FORWARD AND FRONT REACH LIMITS OF WHITE CANE ZONE



Forward Approach



Side Approach

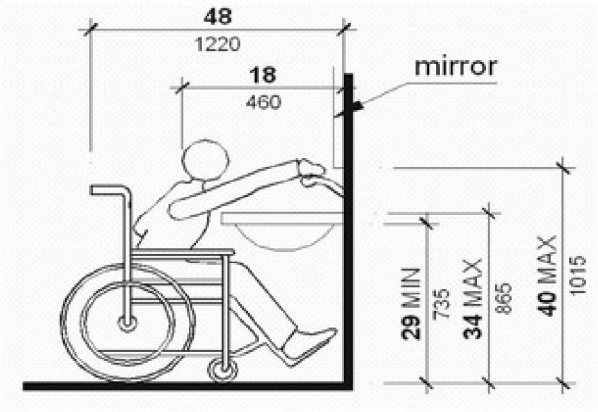
REACH LIMITS OVER WORK SURFACES

Toilets Facilities [7.3]

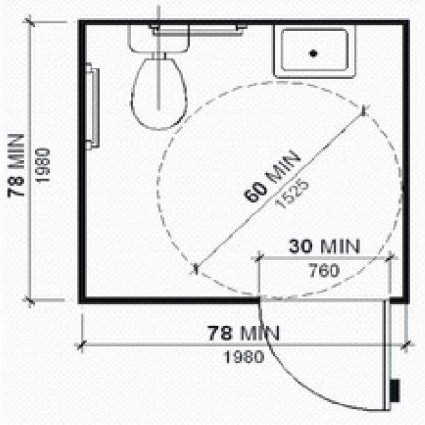
At every floor of a building or facility where toilets are required to be provided, at least one accessible and usable unisex toilet shall be provided. [**7.3.1**]

The accessible toilet should have at least 60 in. (1525 mm) wide clear space in both directions. Smaller toilets shall have doors opening outside. [**7.3.2**]

The wash basin shall be wall mounted type with lever handle controls and insulated and concealed hot water pipe connections. [**7.3.3**]

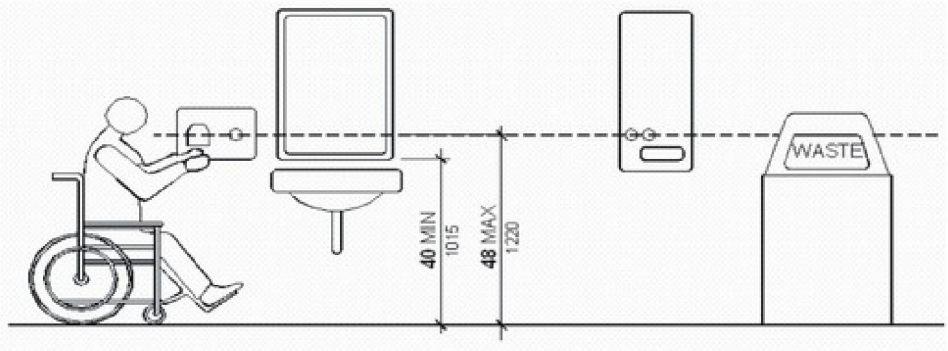


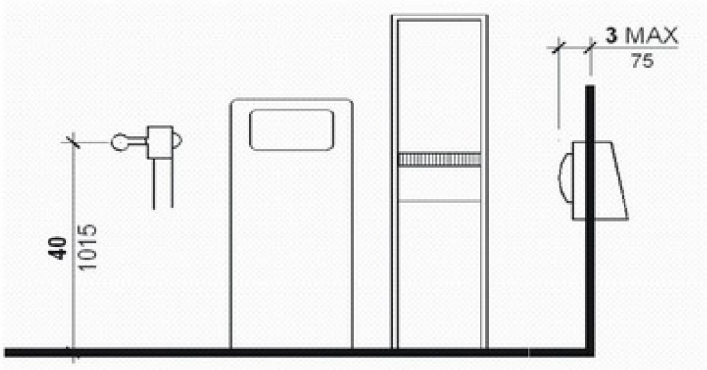
DIMENSIONAL STANDARDS FOR WASH HAND BASIN

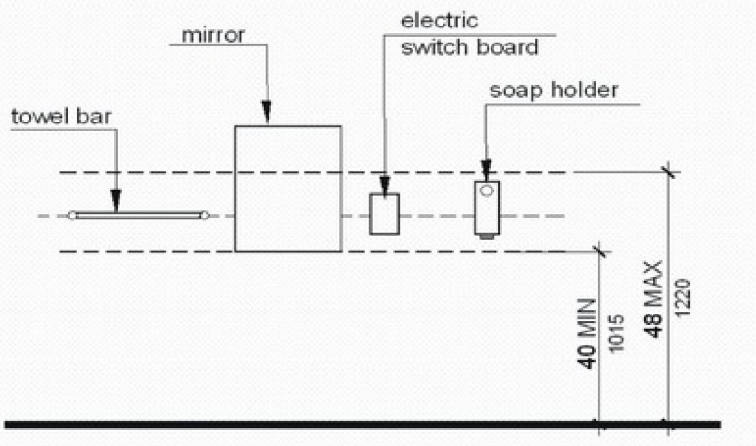


DIMENSIONAL STANDARDS FOR BATH ROOM LAYOUT

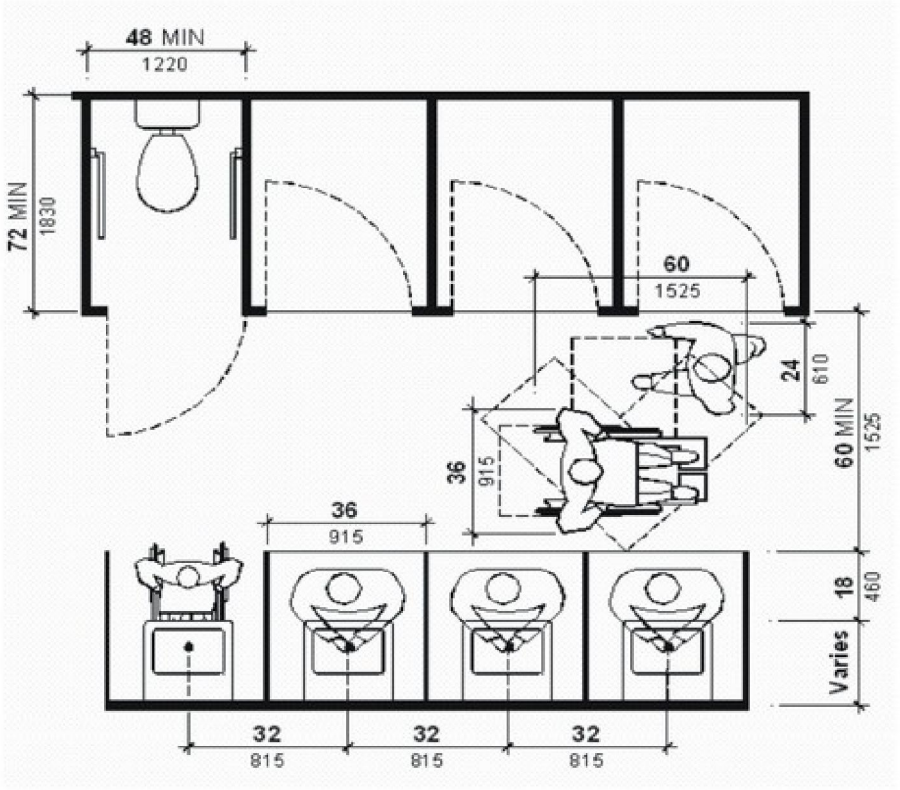
The bottom of the mirror shall not be more than 40 in. (1015 mm) above floor level, and all operable parts and controls of other fixtures and fittings shall be located within a range of 40 in. (1015 mm) and 48 in. (1220 mm) above floor level. [**7.3.7**]



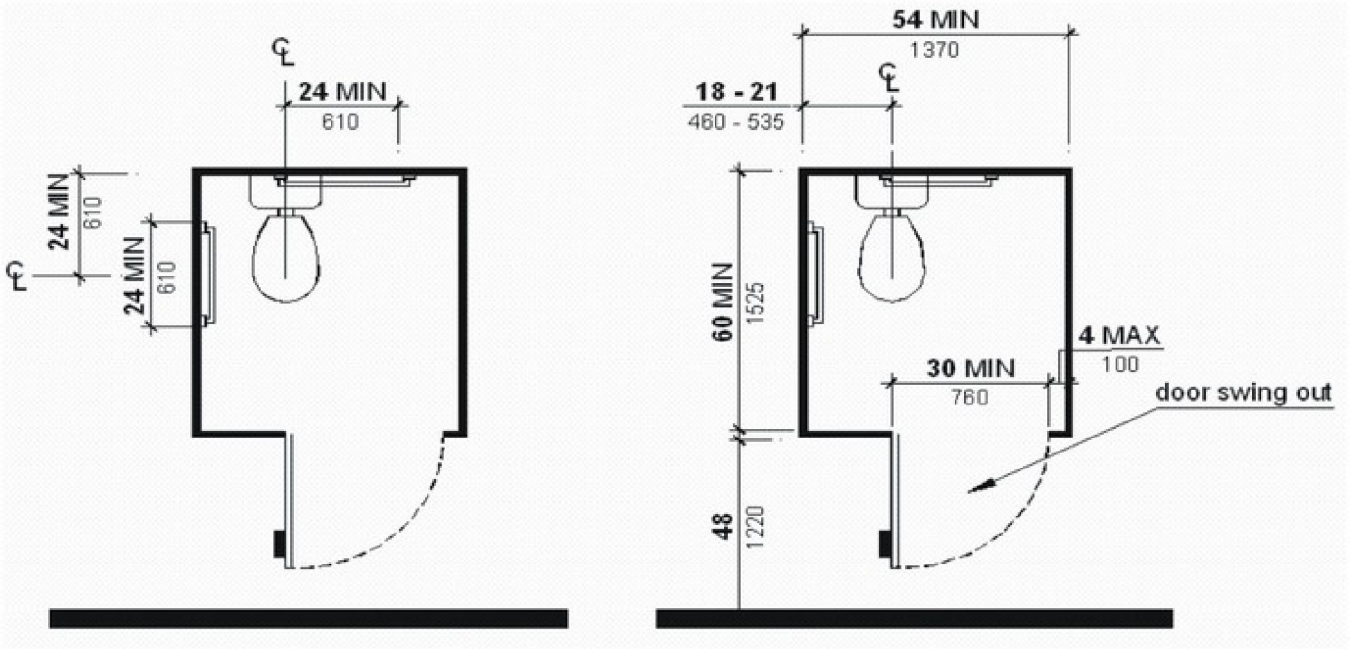




HEIGHT OF FIXTURES IN AN ACCESSIBLE TOILET



DIMENSIONAL STANDARDS FOR PUBLIC TOILET LAYOUT

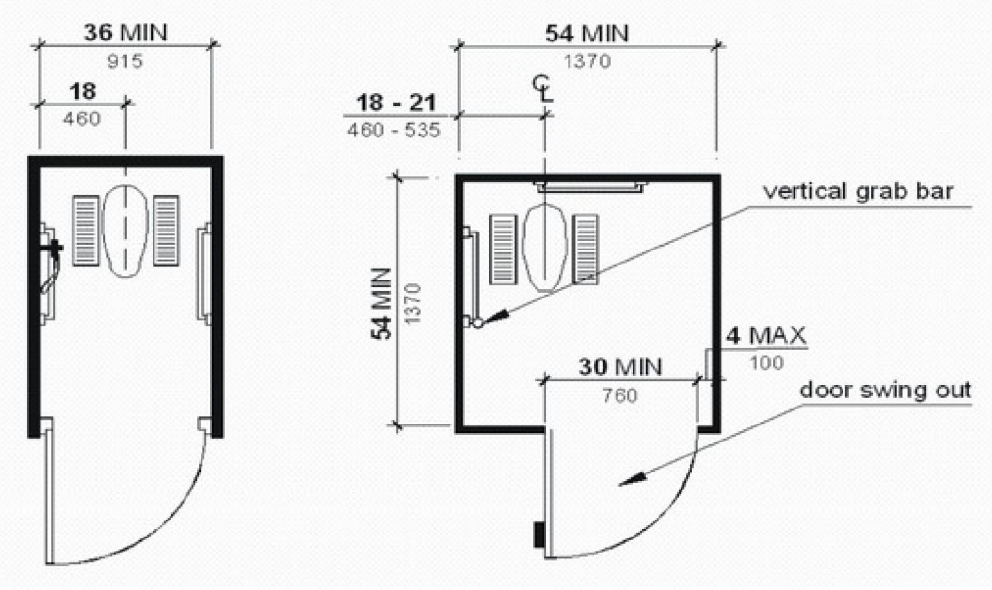


Grab Bar Locations

Water Closet Location

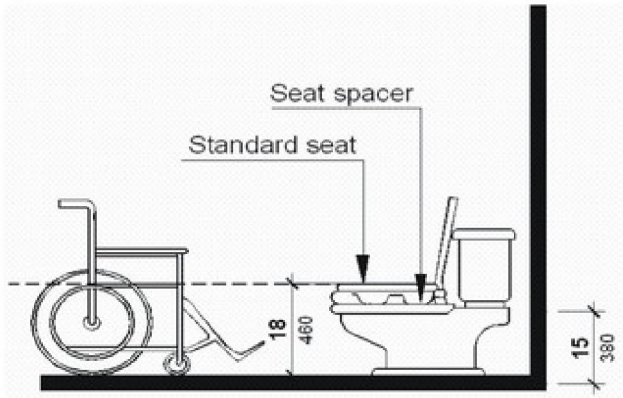
DIMENSIONAL STANDARDS FOR SINGLE TOILET LAYOUT

Water closet shall be located between 18 in. (460 mm) and 21 in. (535 mm) from the centre line of the water closet to one of the adjoining walls. If un-coupled, the water closet shall have a back support. [**7.3.4**] Reachable Muslim shower should be provided at the adjoining wall.

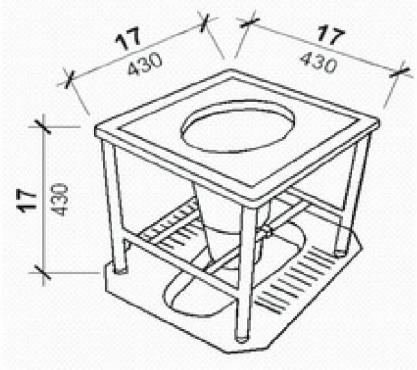


EXAMPLES OF TOILET LAYOUT FOR AMBULANT DISABLED

Water closet should be European type with the top of seat at a height between 18 in. (460 mm) and 20 in. (510 mm) above floor level. Toilet seats for people with mobility and neurological disabilities should be at least 18 in. high. Squatting type water closets can be modified with the help of removable adapters for persons who face difficulty in squatting.



STANDARD SEAT MODIFICATION
WITH SEAT SPACER

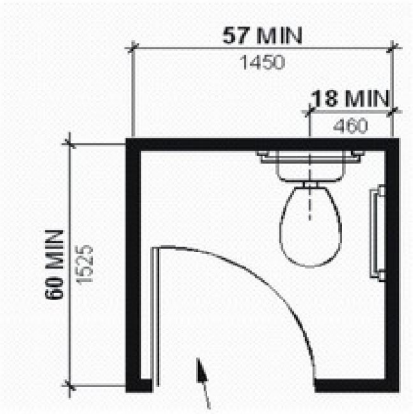


SQUATTING WC MODIFICATION
WITH REMOVABLE ADAPTER

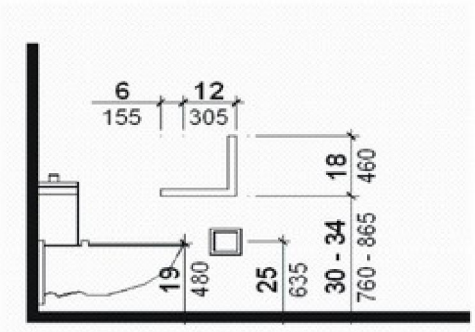
In smaller toilets where doors open inside, the swing of the door occupies circulation space and makes it difficult to close the door behind wheelchair.

Deep recessed wall mounted water closets are recommended for accessible toilets.

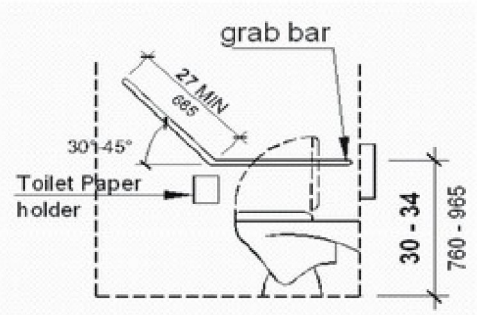
Water closet shall be provided with horizontal and vertical grab bars at adjoining and rear walls to assist transfer of wheelchair bound person to and from the water closet.

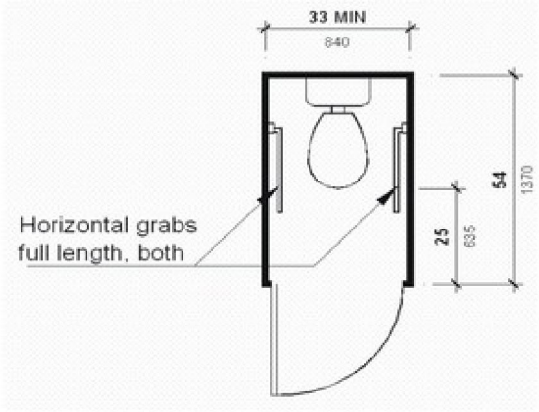


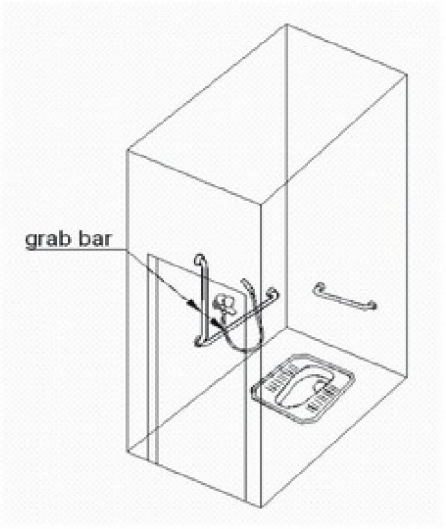
In-swing Door

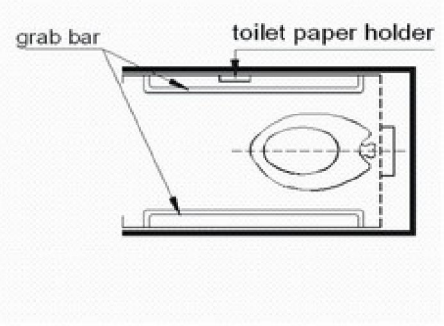


Wall Mounted Water Closet









DIMENSIONAL STANDARDS FOR WATER CLOSET AND ALLIED APPURTENANCES IN DIFFERENT CONFIGURATIONS

SPECIFICATIONS FOR WATER CLOSETS SERVING CHILDREN

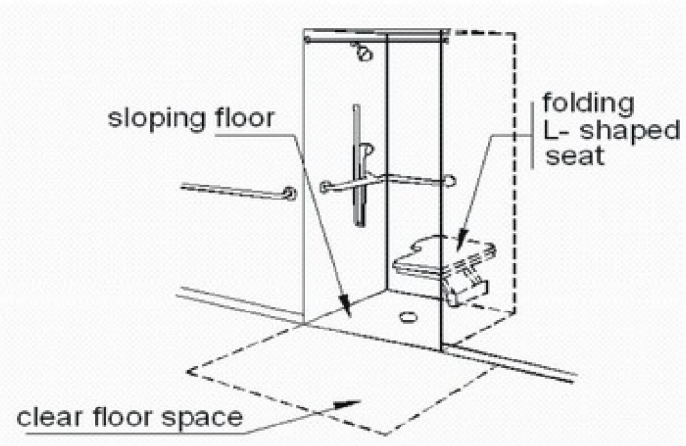
DIMENSIONS	PRE-/ KINDEGARTEN (AGES 3- 4) IN. (MM)	GRADES 1ST - 3RD (AGES 5- 8) IN. (MM)	GRADES 4TH - 7TH (AGES 9-12) IN. (MM)
Water closet centerline	12 (305)	12 - 15 (305 - 380)	15 - 18 (380 - 460)
Toilet seat height	11 - 12 (280 - 305)	12 - 15 (305 - 380)	15 - 17 (380 - 430)
Grab bar height	18-20 (460 - 510)	20 - 25 (510 - 635)	25 - 27 (635 - 685)
Dispenser height	14 (355)	14 - 17 (355 - 430)	17 - 19 (430 - 480)

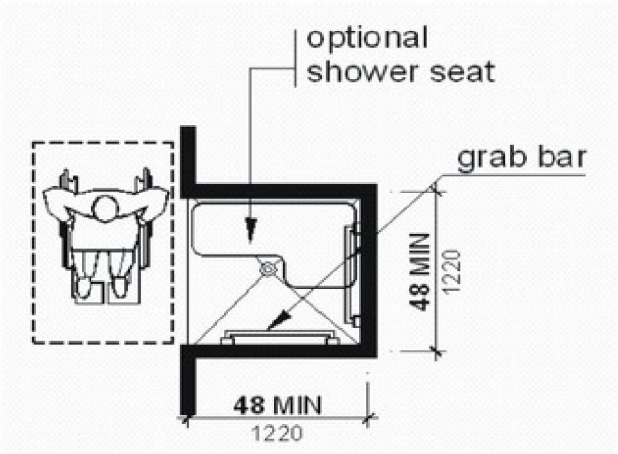
CHILDREN REACH RANGES FROM A WHEELCHAIR

FORWARD OR SIDE REACH	AGES 3 - 4 IN. (MM)	AGES 5 - 8 IN. (MM)	AGES 9 - 12 IN. (MM)
MAXIMUM	36 (915)	40 (1015)	44 (1120)
MINIMUM	20 (510)	18 (460)	16 (405)

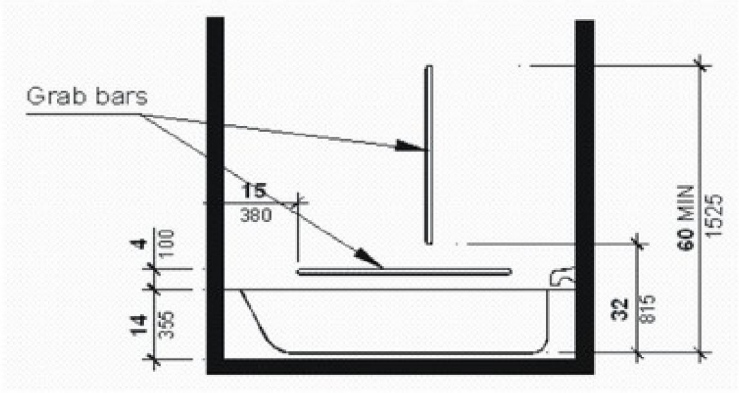
Door to the accessible toilet shall have a clear opening of at least 30 in. (760 mm) and shall be lockable from inside and releasable from outside under emergency situations. The door should be provided with a 24 in. (610 mm) pull bar on the inside, and be provided with spring- or gravity-closing hinges. [**7.3.9**]

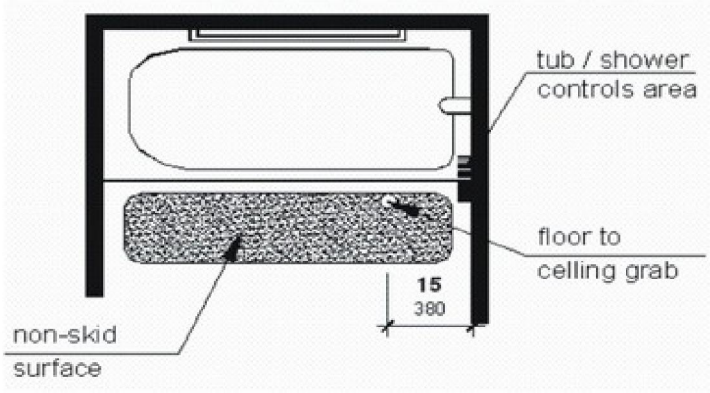
The shower area shall have a clear dimension of 48 in. (1220 mm) square and should preferably be provided with a folding shower seat of water proof construction.



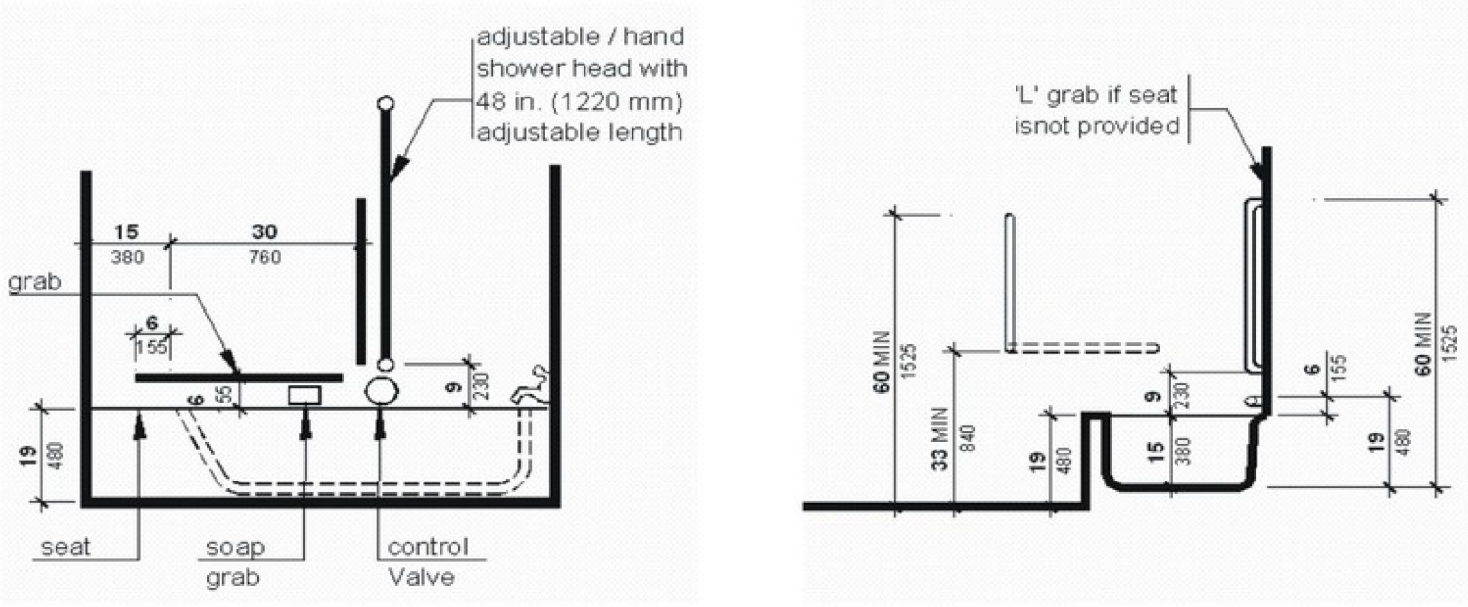


SHOWER COMPARTMENT WITH GRAB BARS AND SEAT





LOCATION AND HEIGHT OF FIXTURES AND CONTROLS IN A BATH TUB



DIMENSIONAL STANDARDS FOR AN ACCESSIBLE BATH TUB

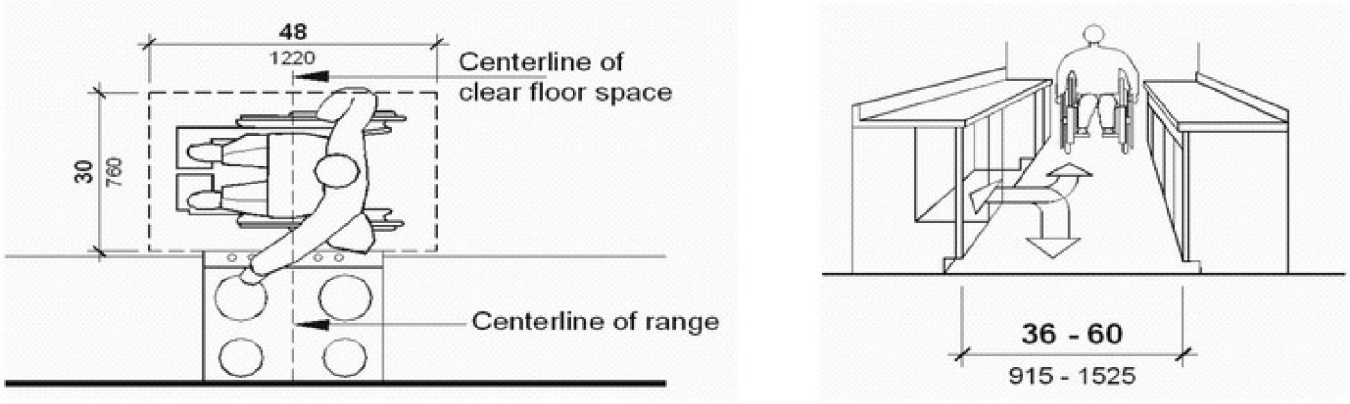
An accessible public toilet should be clearly identified with visual and tactile sign depicting international accessibility symbol.

Kitchen & Work Counters [7.4]

In kitchens, floor space should allow for easy maneuverability. The design guidelines given in this section deal primarily with domestic or small work kitchens for personal use of persons with disabilities.

A clear space of 60 in. (1525 mm) diameter between opposing vertical surfaces shall provide adequate space for wheelchair turning in any direction. [**7.4.1**]

Counter tops shall be between 30 in. (760 mm) and 33 in. (840 mm) in height and provide for clear knee space underneath. The depth of the counter top should not be more than 21 inches (535 mm). [**7.4.2**]

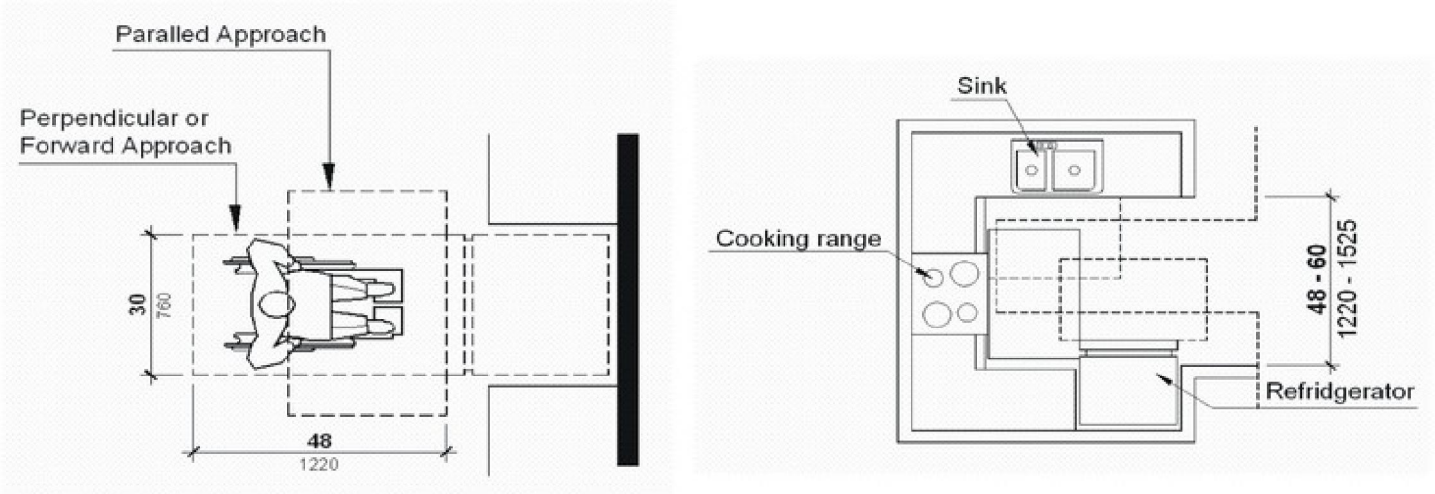


CLEAR SPACE REQUIREMENTS IN AN ACCESSIBLE KITCHEN

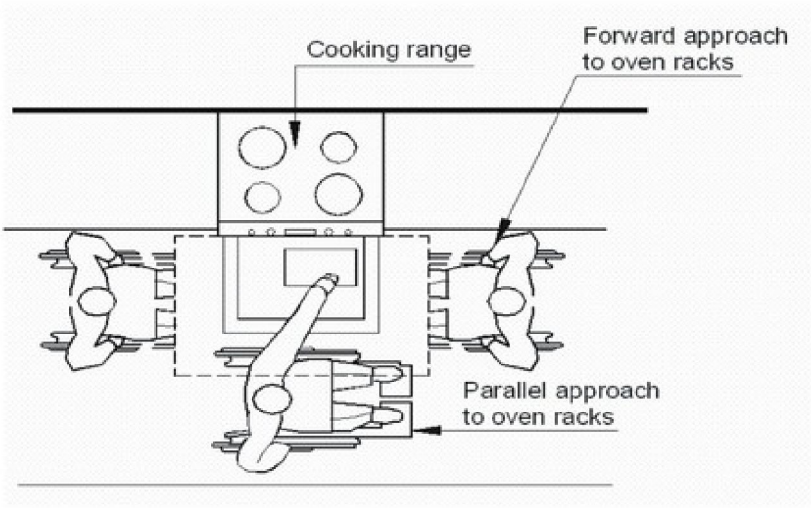
For people with ambulatory disabilities other than wheelchair users, stools with back and foot rest should be provided.

Shelves and storage space should be provided at a height between 12 in. (305 mm) and 48 in. (1220 mm) above floor level. [**7.4.4**]

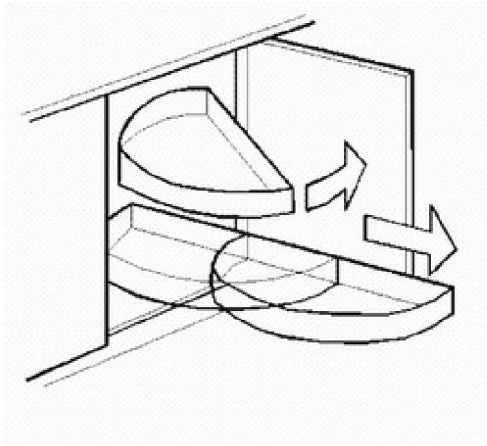
All exposed hot water pipes under the sink and counters should be insulated and concealed to avoid scalding.



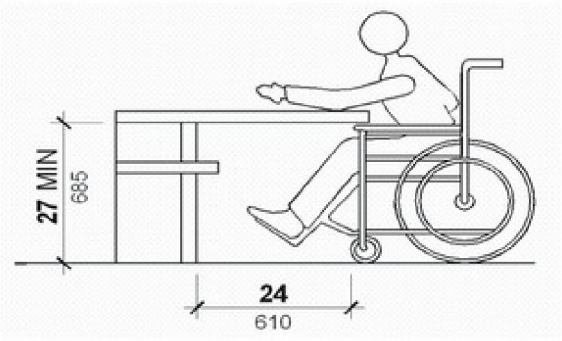
OVERLAPPING CLEAR FLOOR SPACES AND
ACCESSIBLE ROUTE PROVIDE MANEUVERING SPACE

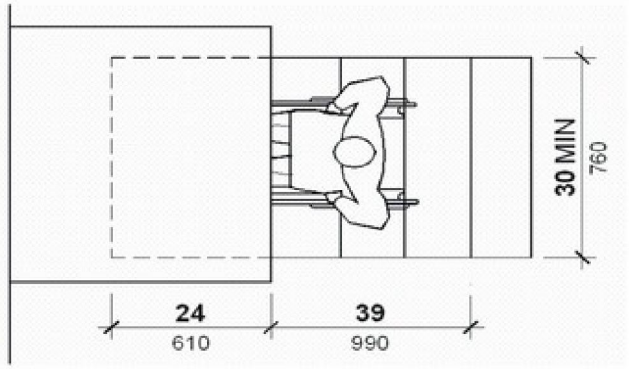


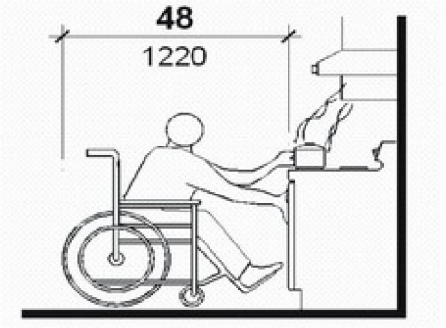
FUNCTIONAL USE OF OVEN COULD BE FROM ANY ONE OF THESE POSITIONS

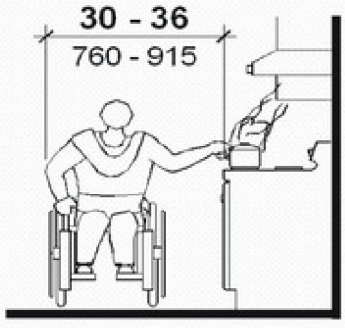


ACCESSIBLE KITCHEN SHELVING









FORWARD REACH AND KNEE SPACE REQUIREMENTS FOR ACCESSIBLE DINING FACILITIES

Assembly Seating [7.5]

In places of assembly two percent of seats shall be reserved for wheelchair bound persons. [7.5.1]

Establishments accommodating activities related to public assembly providing seating for public, whether as participants, like:

- dining and refreshment places;
- religious establishments;
- places of education;
- exhibition and cultural establishments;
- places of exercise, recreation or entertainment; and
- transportation establishments etc.,

or as spectators, like:

- cinemas;
- lecture theatres;
- auditoria;
- stadia, etc.,

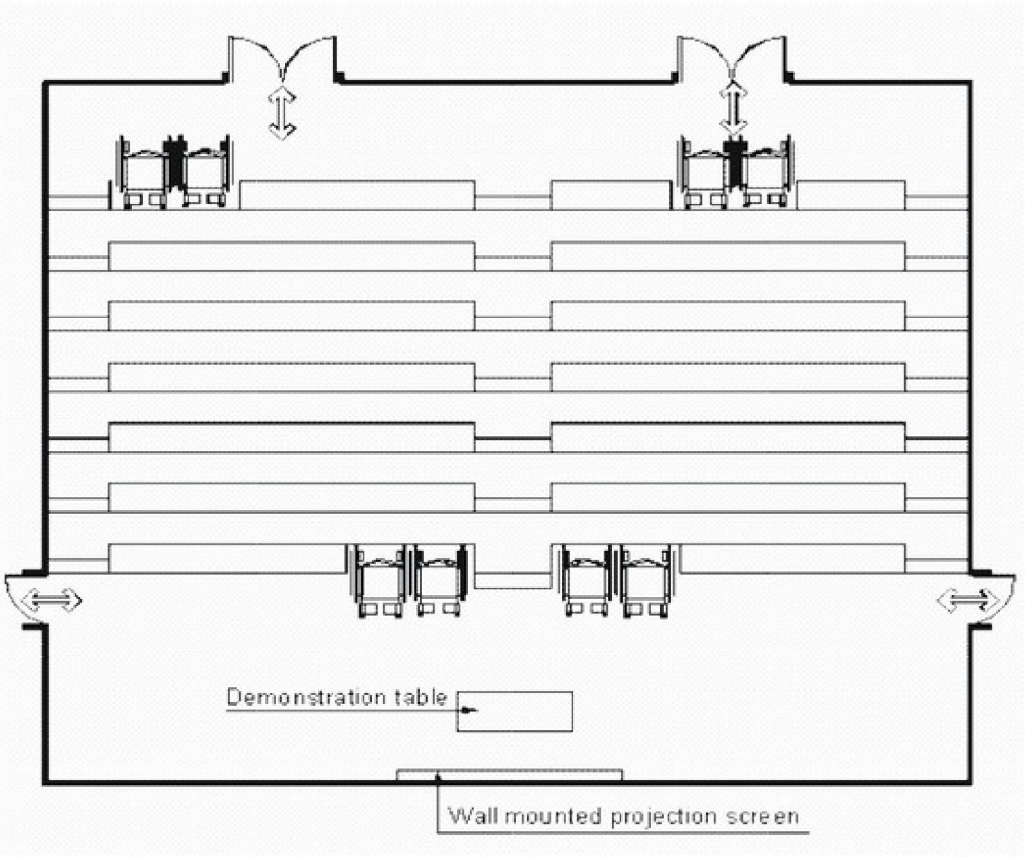
should not only be accessible as per scoping requirements, but the seating arrangement provided at these places of public assembly should also have reserved spaces for wheelchair bound persons.

Designated wheelchair spaces should wherever possible be paired.

Designated seating shall be on a direct route, free from obstructions and located in an easily identifiable situation.

Designated seating shall not obstruct participants, or other members of the audience.

The designated seating shall have direct link with accessible means of emergency egress.

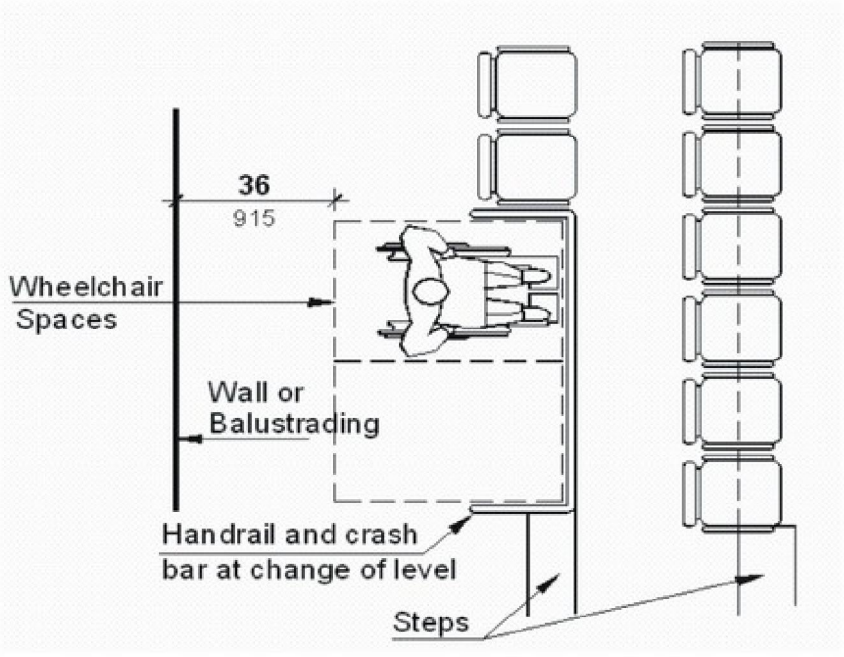


EXAMPLE OF A LECTURE THEATRE WITH RAKED FLOOR
HAVING EIGHT WHEELCHAIR SEATS

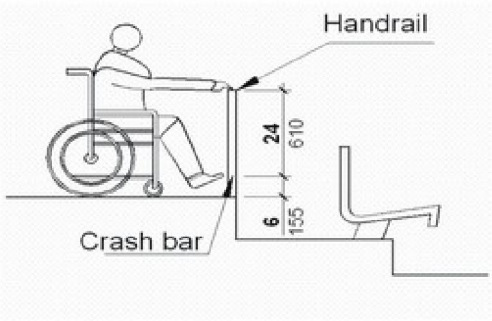
A clear space 36 in. (915 mm) wide shall be kept open for movement of wheelchair bound person, in front of the first row, or at back of the last row having designated assembly seating.

The wheelchair space should be guarded at change of level on a raked floor with a handrail and a crash bar at 6 in. (155 mm) above wheelchair floor level

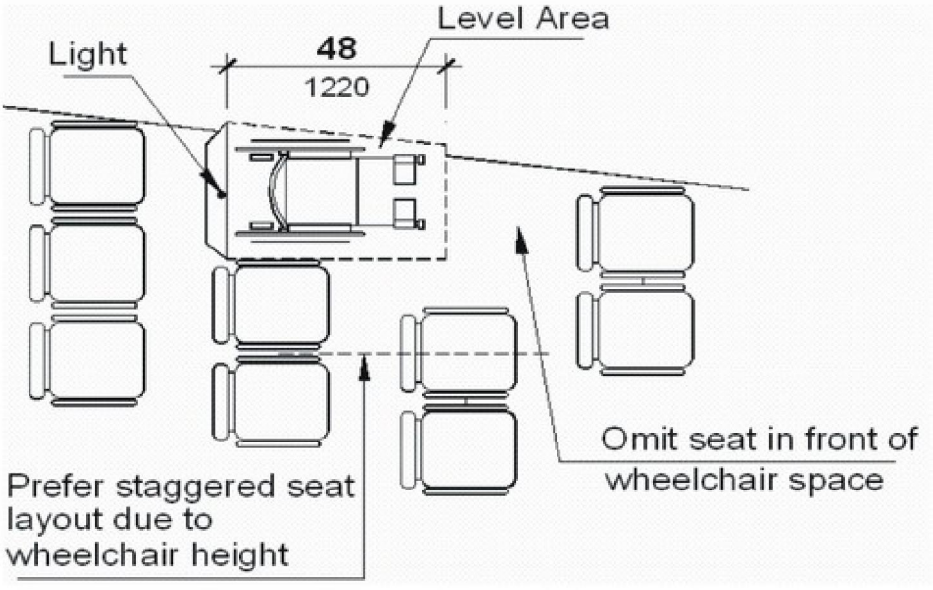
The stage or activity area in the place of assembly shall be accessible.



WHEELCHAIR SPACE IN SEATING ROWS



GUARDED WHEELCHAIR SPACE AT RAKED SEATING



WHEELCHAIR SPACE IN SEATING LOCATION

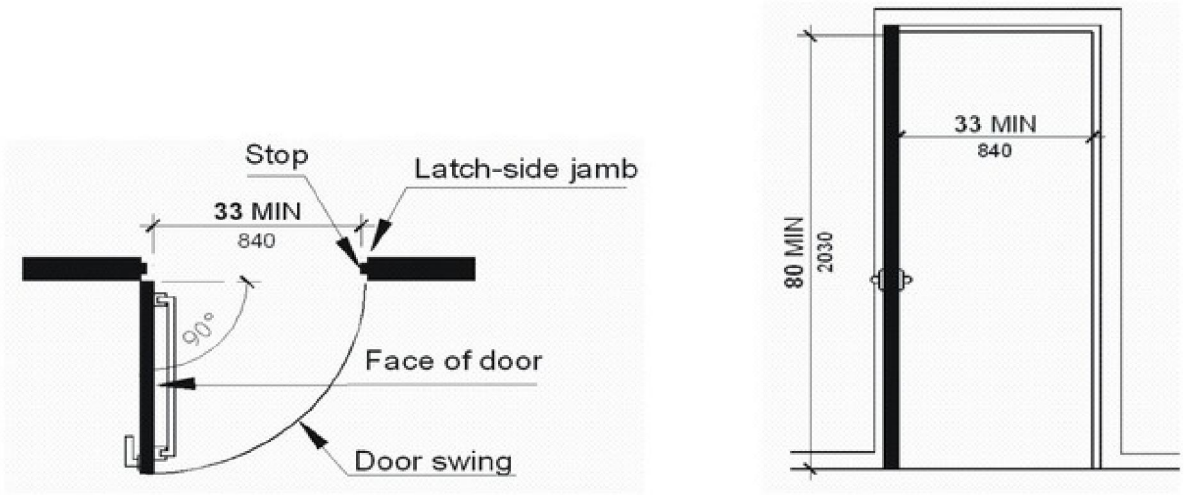
Doors & Windows [7.6]

Generally, doors wherever possible, should be practical, and swing doors are preferred over sliding type doors. Automatic doors, if possible, are by far the best choice, and should open in the direction of travel or be sliding type.

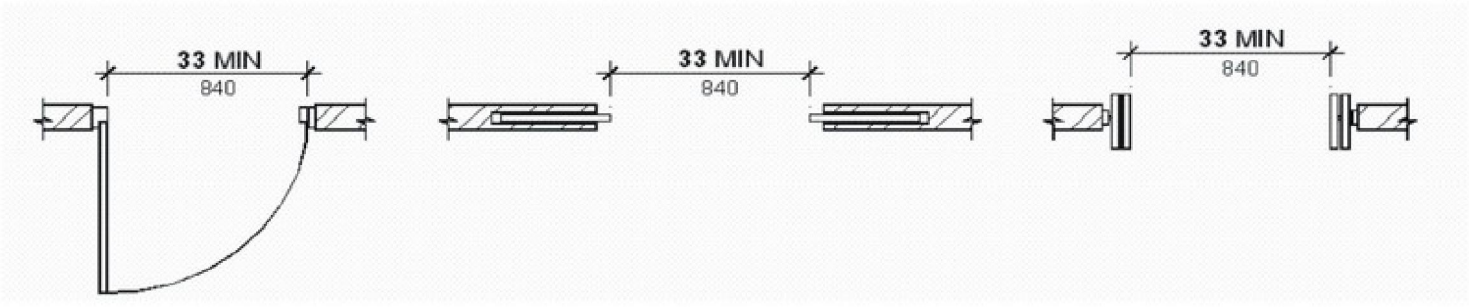
Where revolving doors or turnstiles are used as entrances, those should be supplemented by adjacent swing type doors of clear width not less than 33 in. (840 mm), and preferably 36 inches (840 mm).

The minimum width of the door is determined by the direction of approach and the width of the accessible route. In case of accessible route of minimum width, the door width should preferable be increased from 33 in. (840 mm) to 36 inches (915 mm) as the case may be.

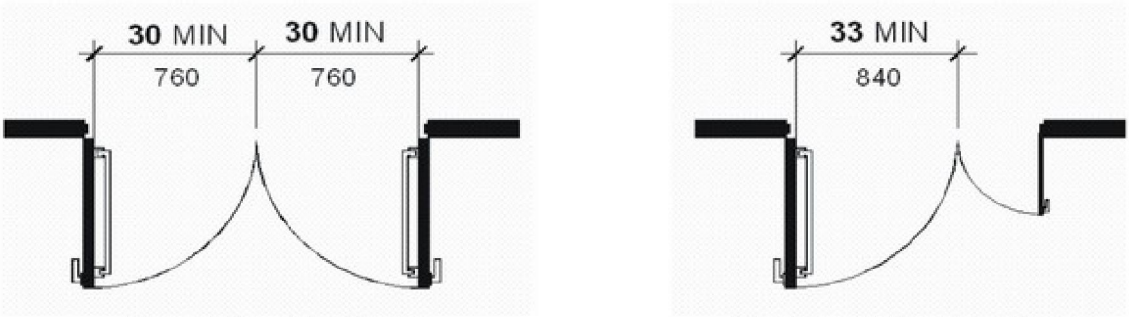
The clear width of a door is determined by the clear distance between the door panel in open position to the jamb or side of the other panel across it.



DIMENSIONAL STANDARDS FOR ACCESSIBLE DOOR



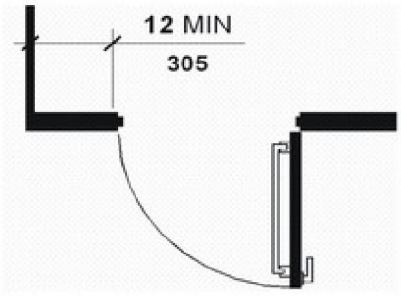
Swing Door | Sliding Door | Folding Door



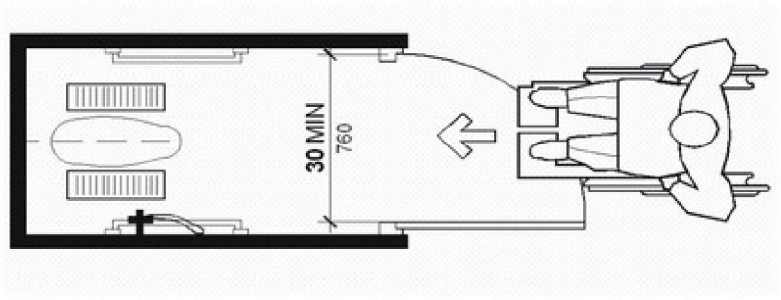
Equal Double Door | Un-Equal Double Door

CLEAR WIDTHS OF DOORS

Clear space should be allowed on both sides of the door to accommodate a stationary wheelchair, and a minimum distance of 12 in. (305 mm) from wall to the handle side of the door to allow for wheelchair maneuverability.

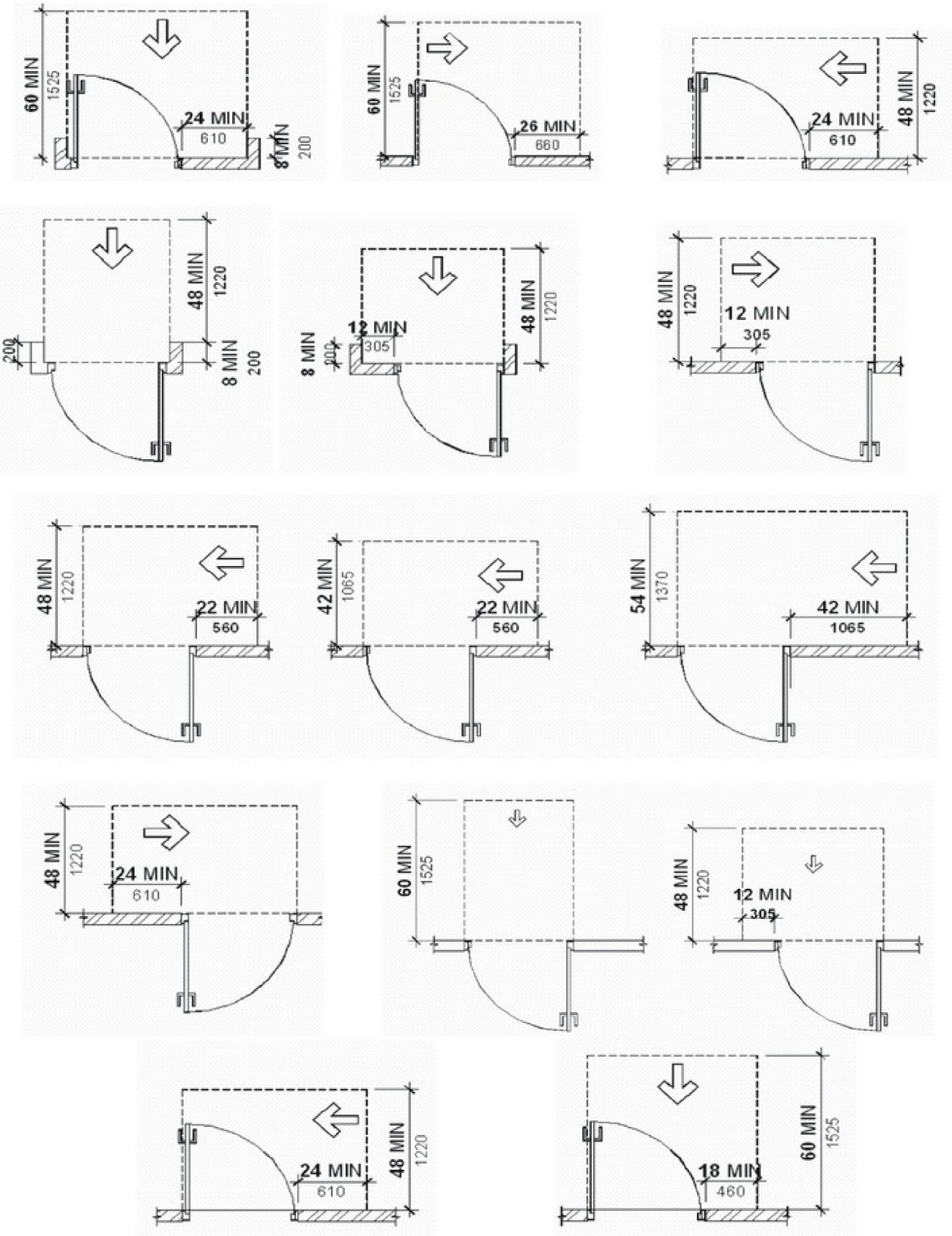


MIN. CLEARANCE AT DOOR HANDLE SIDE



DOOR WIDTHS FOR TOILET COMPARTMENTS

Doors of toilets and other sparsely used rooms may be of 30 in. (760 mm) if approached straight on. The toilet doors should open outside unless absolutely unavoidable.

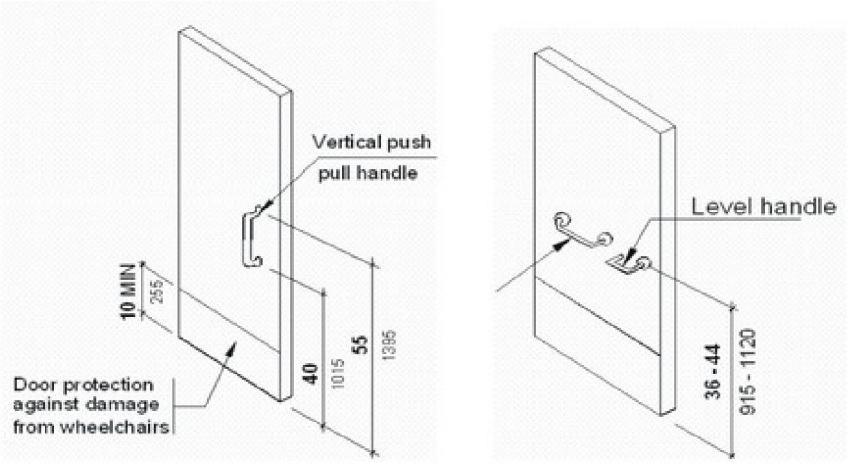


STANDARD DIMENSIONS AROUND SWING DOORS
FOR DIFFERENT MANEUVERABILITY SITUATIONS

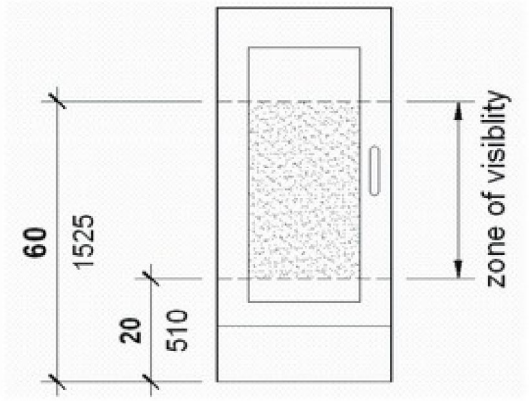
Door handles for an accessible door shall not be less than 38 in. (965 mm) and not more than 42 in. (1065 mm) from floor level. The door shall have lever-type handles. Additional pull bars may be added to door for easy operation by people with disabilities.

Kickplates to accessible doors shall not be less than 10 in. (255 mm) high.

Frameless glass doors shall be avoided unless prominently marked so as to make those visible in all conditions.



DIMENSIONAL STANDARDS FOR LOCATION OF FIXTURES ON DOORS



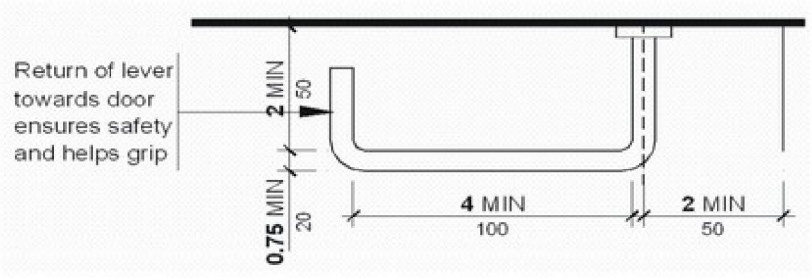
VISION ZONE OF WHEELCHAIR USER FOR GLAZED DOORS

Special hardware for accessible doors helps people with mobility or hand manipulation problems to operate the doors without undue difficulty. Lever type handles with returns are easier to grip and do not snag on clothing. Special add on adapters can help in converting round knobs into lever type handles.

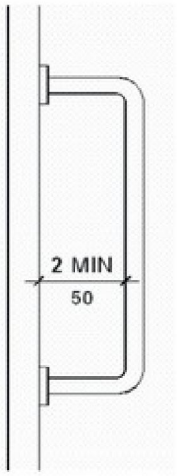
Swing clear hinges allow doors to open away thus allowing wider clear door widths. Special hardware allows bifolding doors to closets etc. to swing back against wall out of the path of a wheelchair bound user.

Horizontal or vertical push and pull bars of minimum ¾ in. (20 mm) diameter allow wheelchair bound persons to close the door behind them.

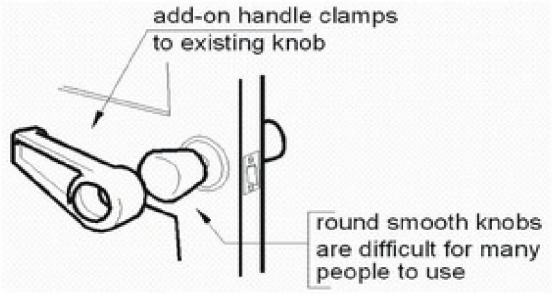
Abrasive coat, knurl or roughened surfaces on door handles and knobs warn people with vision loss of hazards on the other side.



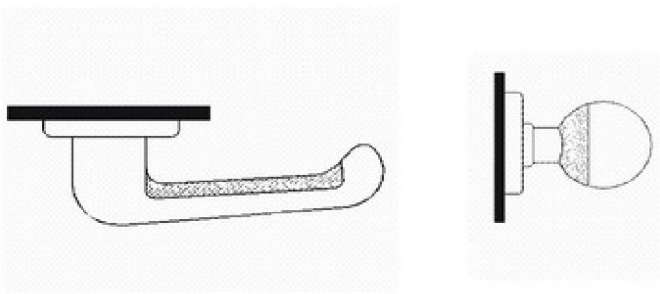
Lever Type Door Handle



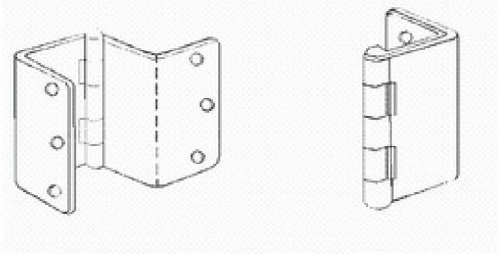
Push/Pull Bar



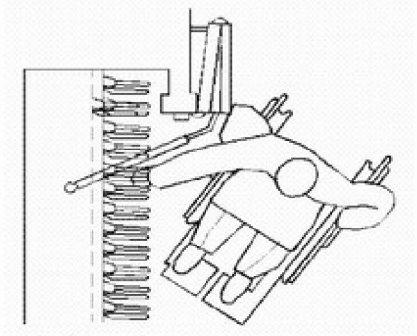
Add-on Door Handle Adapter



Knurled Door Handles



Swing Clear Hinges

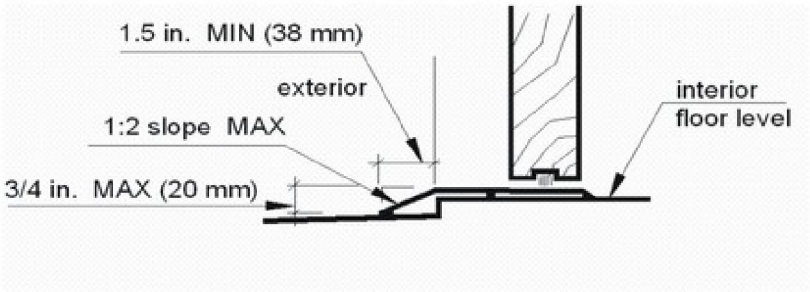


Swing Away Doors

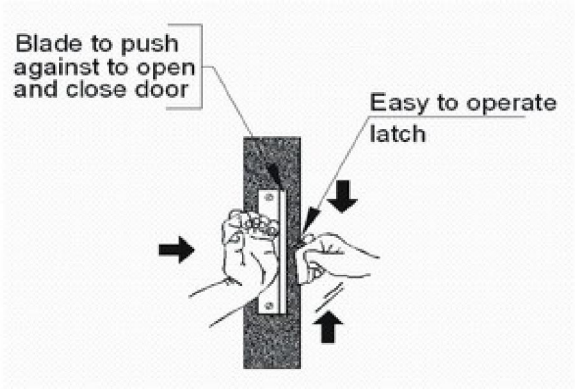
EXAMPLES OF SPECIAL HARDWARE FOR ACCESSIBLE DOORS

Level differences at thresholds should be minimized, and smooth transitions are preferred. The maximum difference of floor level allowed at threshold is ¾ inches (20 mm). However sloped thresholds with a maximum ratio of 1:2 are recommended over straight cut thresholds.

Window sills should be at such level that does not hamper the visibility of a chair bound person. Larger windows allow more light into the interior thus increasing the illumination level for persons with low vision. Windows should not swing out in the path of travel, and sliding windows are preferable. All latches, handles and controls for operating the windows should be within the reach range of 10 in. (225 mm) to 52 in. (1320 mm) for a chair bound person to operate. Latches, which can be operated without fine finger manipulation, are recommended.



SMOOTH TRANSITIONS AT THRESHOLDS RECOMMENDED



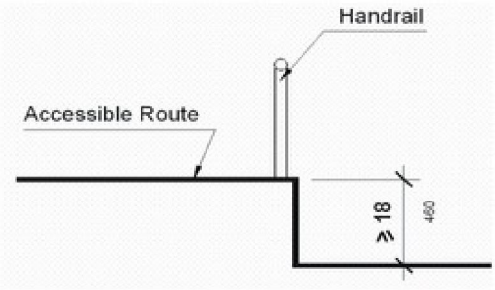
EASY TO OPERATE WINDOW LATCHES & CONTROLS

Handrails & Grab Bars [7.7]

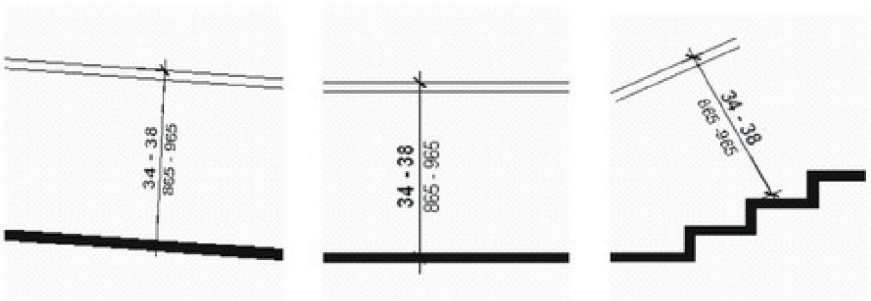
All accessible staircases, accessible ramps and corridors and spaces for the exclusive use of ambulatory people with disabilities shall be provided with securely fixed handrails. Where the gradient of a ramp is less than 1:20 no handrails are required.

Where there is a drop of more than 18 inches (460 mm), to the side of an accessible ramp, staircase or passage, a protecting handrail shall be provided.

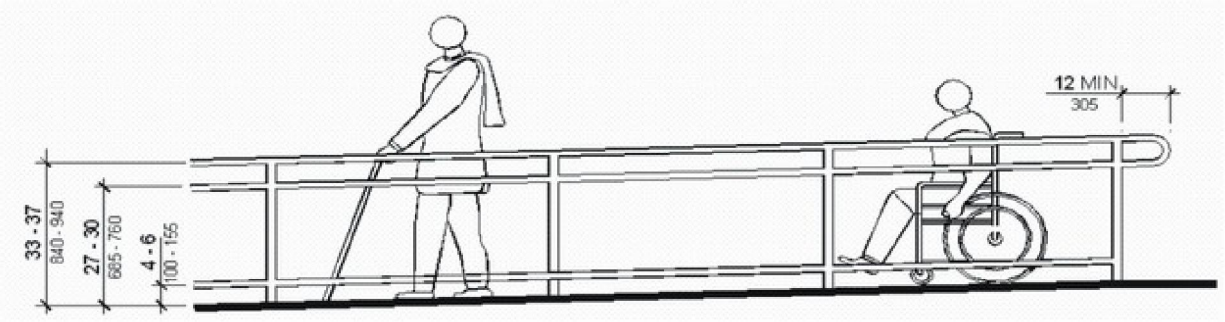
The height of handrails shall be not less than 30 in. (760 mm), or more than 48 in. (1220 mm) above floor level.



HANDRAILS REQUIRED
AT LEVEL DROPS

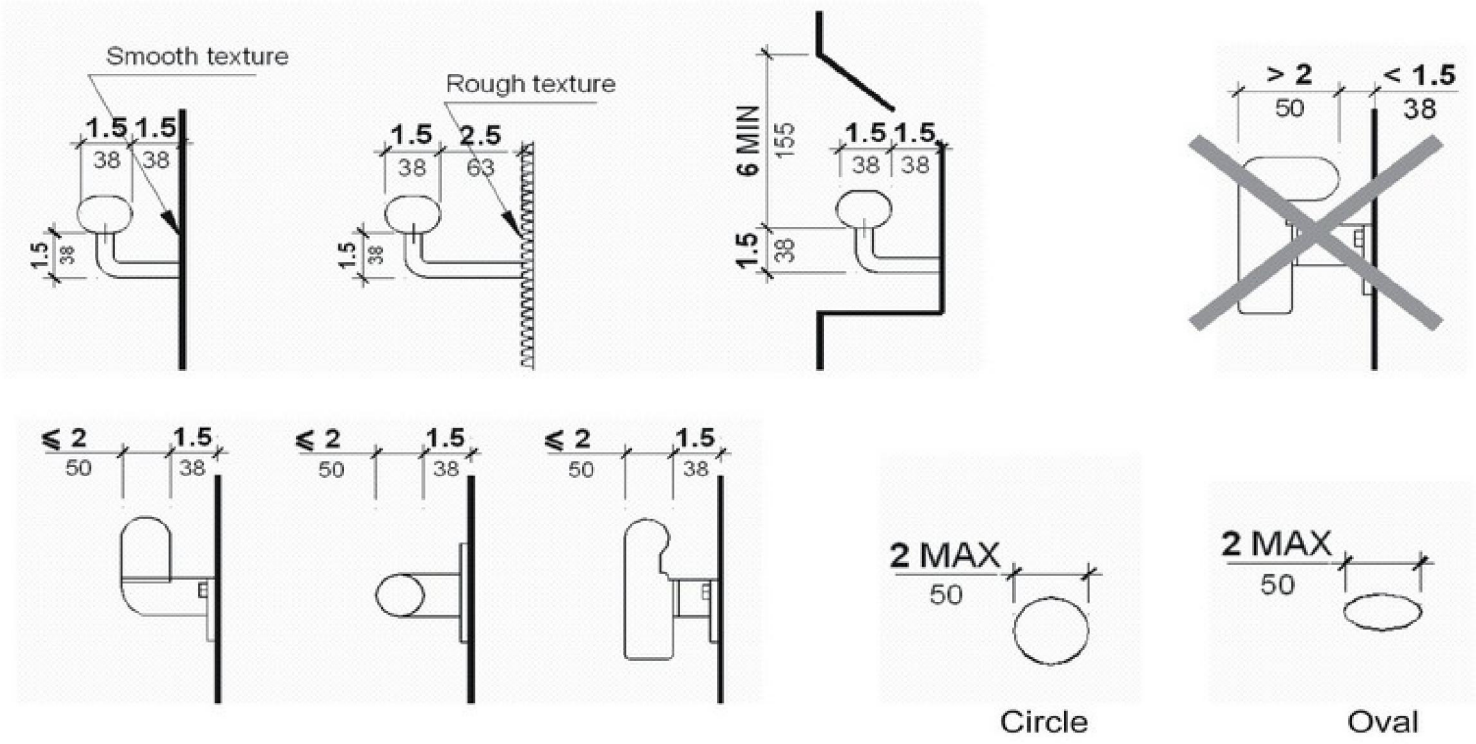


RECOMMENDED HEIGHT OF HANDRAILS
TO RAMPS, PASSAGES AND STAIRS

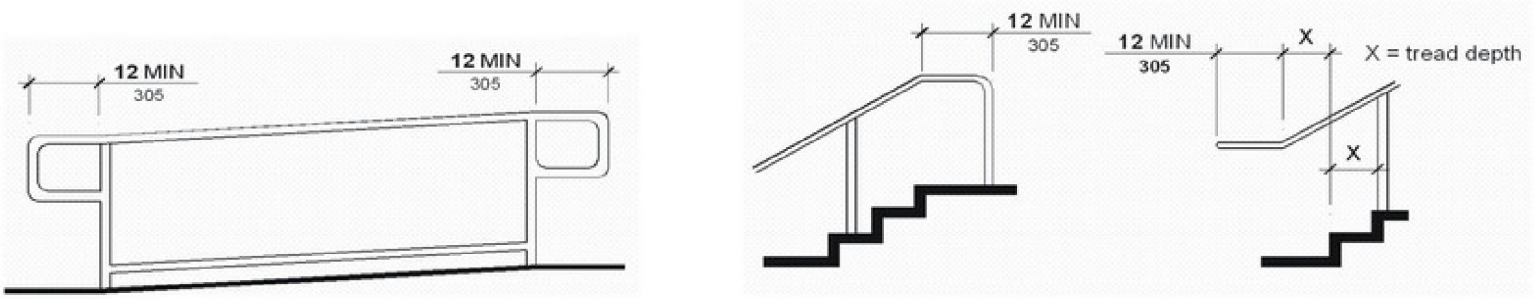


DIMENSIONAL STANDARDS FOR HANDRAILS TO RAMPS

The handrails shall either be circular or oval in shape and having a maximum diameter of 2 in. (50 mm) at the grip. Profiles or sizes of handrails that exceed 2 in. (50 mm) limits are not permitted. Handrails should extend horizontally for at least 12 in. (305 mm) at each end of staircase or ramp. To maintain the level of handrail it is recommended that at bottom end of stair run the handrail should extend the sum of one tread width and 12 in. (305 mm).



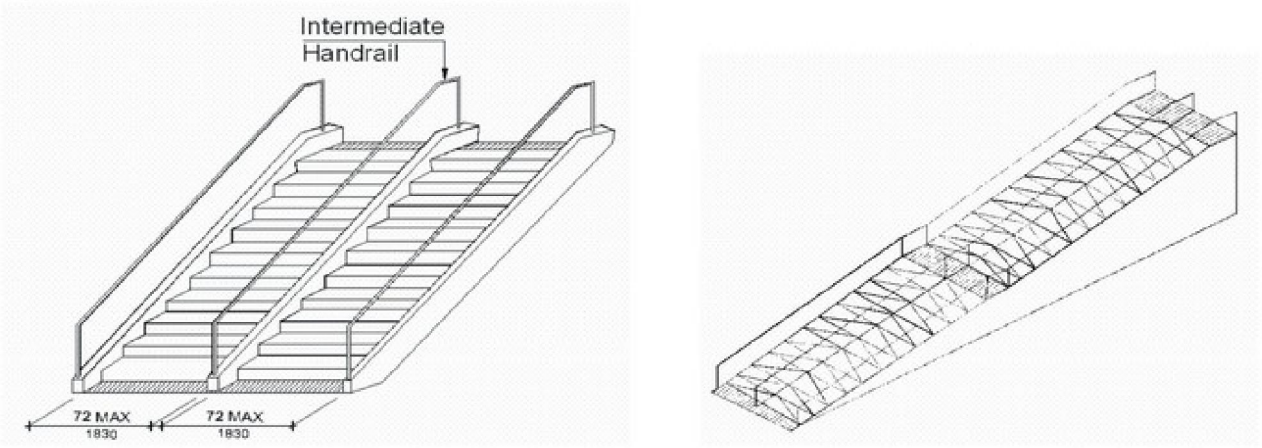
RECOMMENDED SHAPES AND SIZES OF HANDRAILS



HANDRAIL EXTENSION REQUIREMENTS BEYOND RAMP AND STAIRS

Wall fixed handrails shall provide a continuous uninterrupted grip throughout its length. The ends of the handrails shall be rounded and not be hazardous as protruding objects.

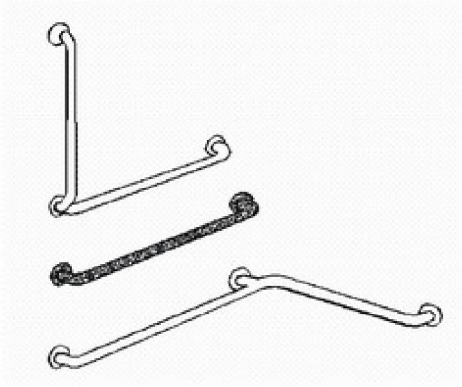
The maximum distance between two parallel handrails on an accessible staircase or ramp should not be more than 72 inches (1830 mm). For wider than 72 in. (1830 mm) stairs and ramps intermediate handrails should be provided.



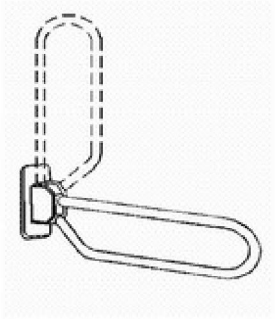
PROVISION OF INTERMEDIATE HANDRAILS
AT WIDER STAICASES AND RAMPS

Grab bars help people with disabilities to make use of toilet facilities. Wheelchair bound persons transfer to toilet or shower seats and vice versa with the help of conveniently located and securely fixed grab bars. Ambulant frail people also require the help of strategically placed grab bars to maintain balance. Vertical and horizontal, and occasionally inclined bars are used depending upon the angle of approach and capability of the user. In residential and customized situations the selection of type and location of grab bars should depend upon individual requirements. For general purpose installations, the grab bars should be installed on side and rear wall of water closet and shower area, and side rails next to wash hand basin are convenient for most people.

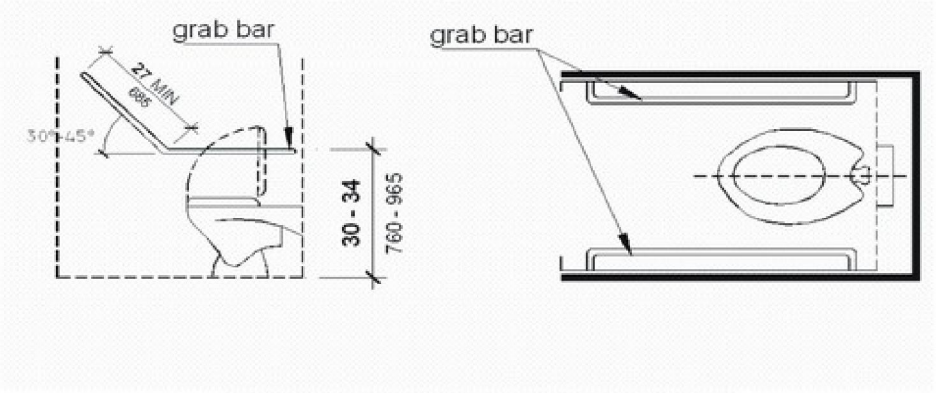
Grab bars for accessible and usable toilets shall not be less than 24 in. (610 mm) in length; shall extend 2 in. (50 mm) away from the wall; shall have an external diameter between 1 in. (25 mm) and 2 in. (50 mm), and shall be securely fixed to the wall. Plastic-covered grab bars are preferred over chrome fished rails, while slightly corrugated plastic surface is recommended.

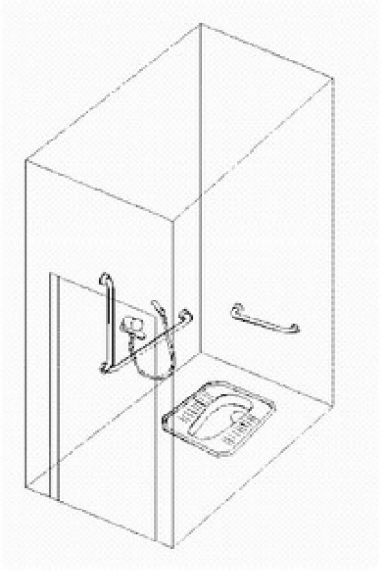


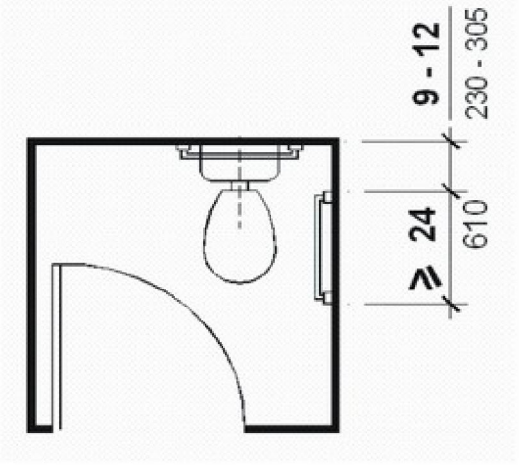
STANDARD GRAB BARS

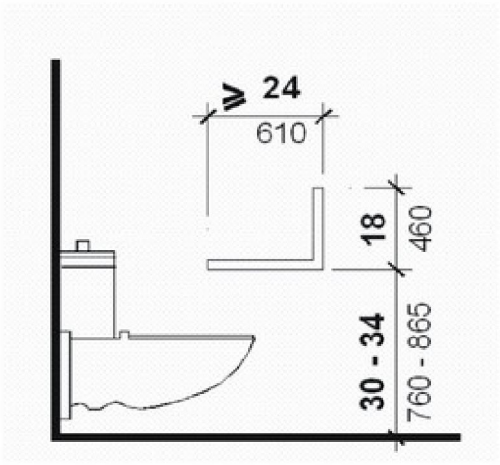


FOLDING GRAB BAR

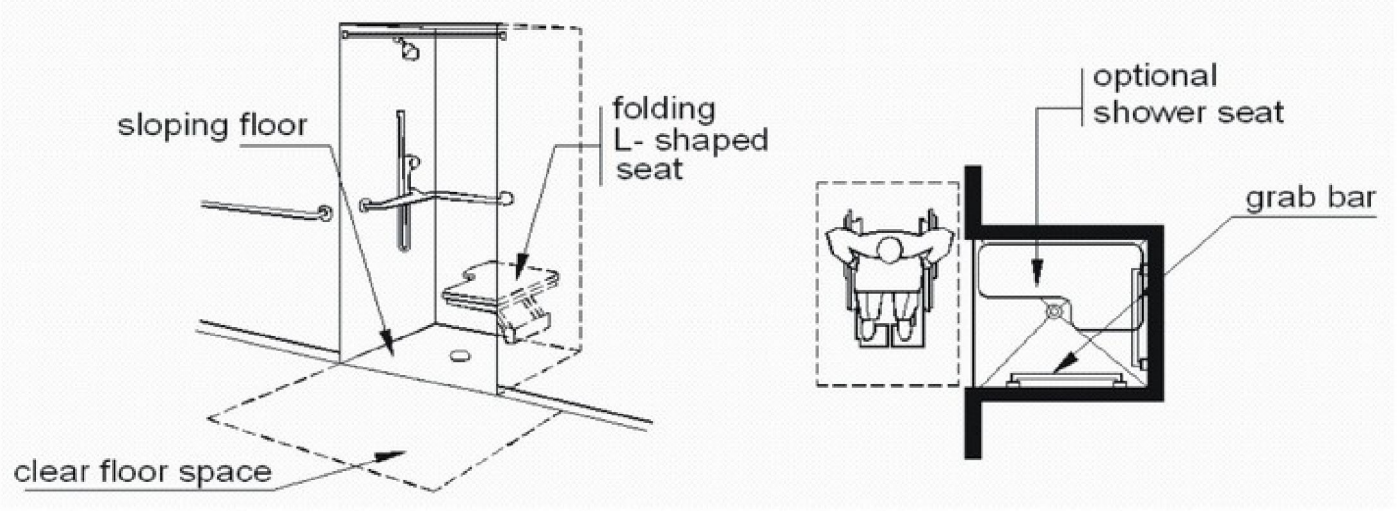




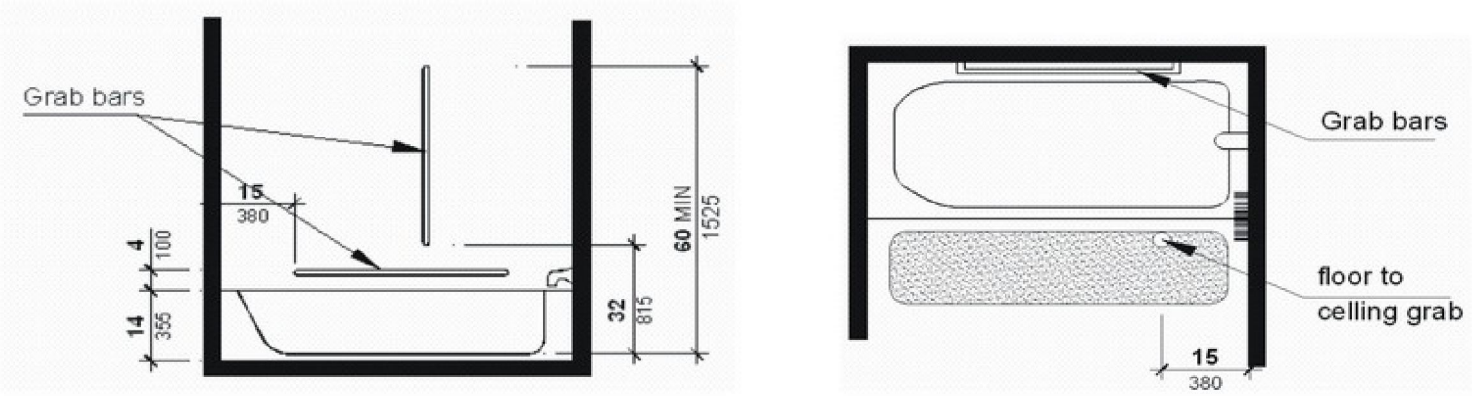




DIMENSIONAL STANDARDS FOR GRAB BAR
INSTALLATION AT WATER CLOSET SITUATIONS



RECOMMENDED GRAB BAR
ARRANGEMENT AT SHOWER COMPARTMENT



EXAMPLES OF GRAB BAR ARRANGEMENTS
AT BATH TUB LOCATIONS

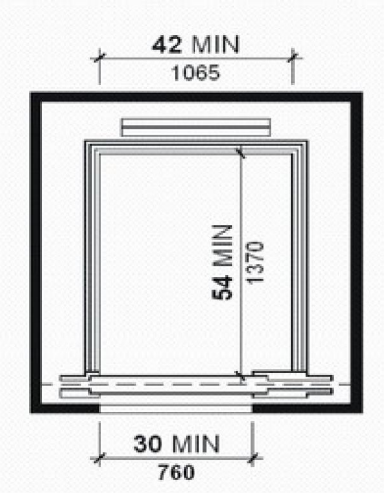
Lifts & Platform Lifts [7.8]

All accessible lifts shall be equipped with either sliding or outward opening doors of a minimum clear width of 30 inches (760 mm); shall have grab bars fixed to either the side walls or the back wall; switches and controls not more than 48 in. (1220 mm) high above floor level; talking and Braille signs in addition to regular signs; and threshold coverings. [**7.8.1**]

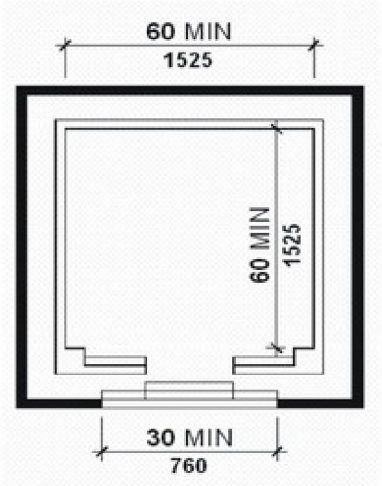
The floor of the lift cab shall be slip-resistant and walls shall be resistant to damage by wheelchairs.

The size of the elevator shall be such that it could accommodate at least one wheelchair bound person with an attendant.

A freight elevator shall not be considered an accessible lift. [**7.8.6**]

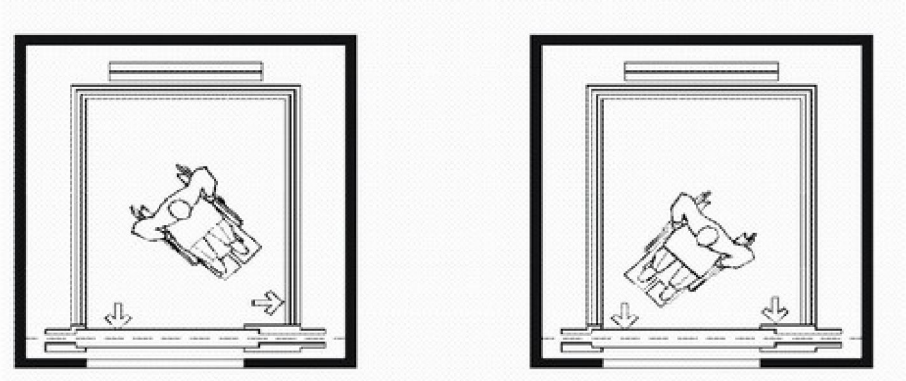


DIMENSIONAL STANDARDS OF ACCESSIBLE LIFT (ALL DOOR CONFIGURATIONS)

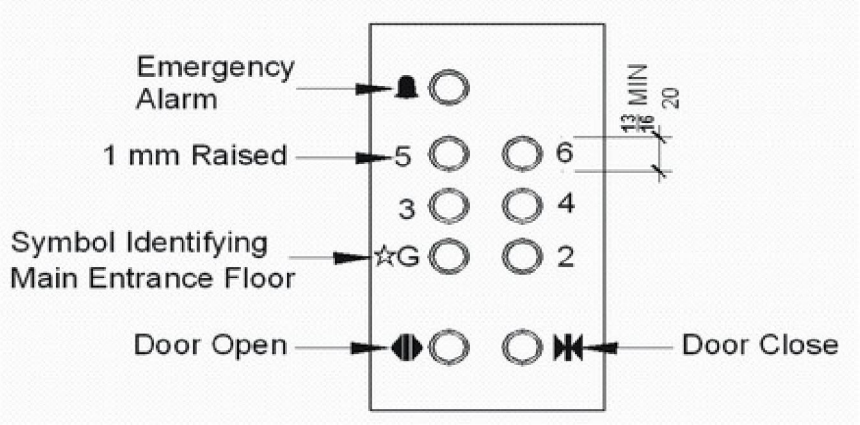


PREFERRED DIMENSIONS OF ACCESSIBLE LIFT (ALL DOOR CONFIGURATIONS)

All controls buttons required for operation of an accessible lift by a wheelchair user shall be placed within reach, and shall have Braille signs also.



ALTERNATE LOCATIONS FOR CONTROL PANEL

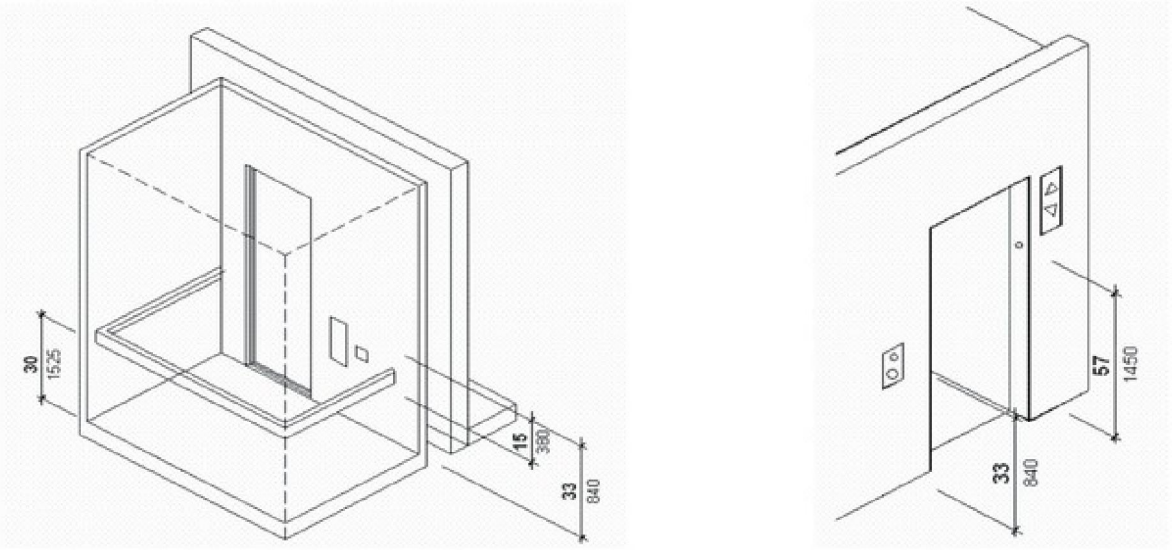


EXAMPLE OF CONTROL PANEL FOR ACCESSIBLE LIFT

Control Button	Tactile Symbol	Braille Message
Emergency Stop	⊗	"ST" OP Three cells
Alarm	🔔	AL"AR"M Four cells
Door Open	◫	OP"EN" Three cells
Door Close	⋈	CLOSE Five cells
Main Entry Floor	★	MA"IN" Three cells
Phone	📞	PH"ONE" FOUR cells

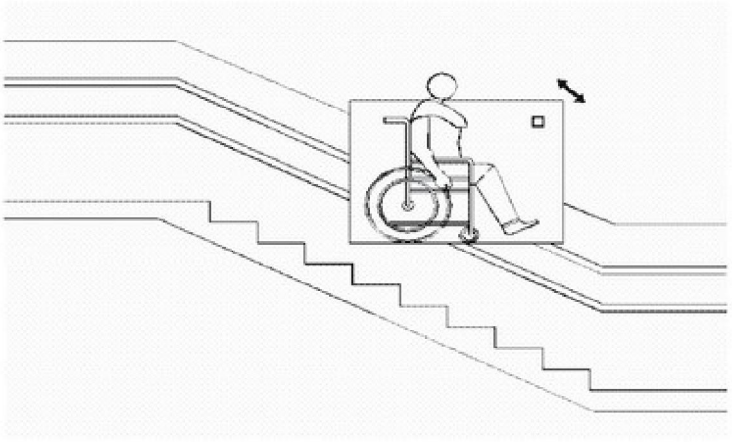
STANDARD ELEVATOR CONTROL BUTTON IDENTIFICATION

In cases where accessible lift is being designated as an accessible means of emergency egress, it shall be of fire-protected construction; shall be operable on emergency power supply for a minimum of 30 minutes' duration; shall be properly identified with egress signage; and shall be capable of being illuminated, meeting the requirements of emergency egress.



LIFT CAB AND APPURTENANCES

Inclined movement platform lifts can be installed along stair wall, as long as they do not obstruct the required width of the exit. The seat of the platform can be folded when not in use. The minimum width of the stair to allow a chair lift should be 36 inches (760 mm).

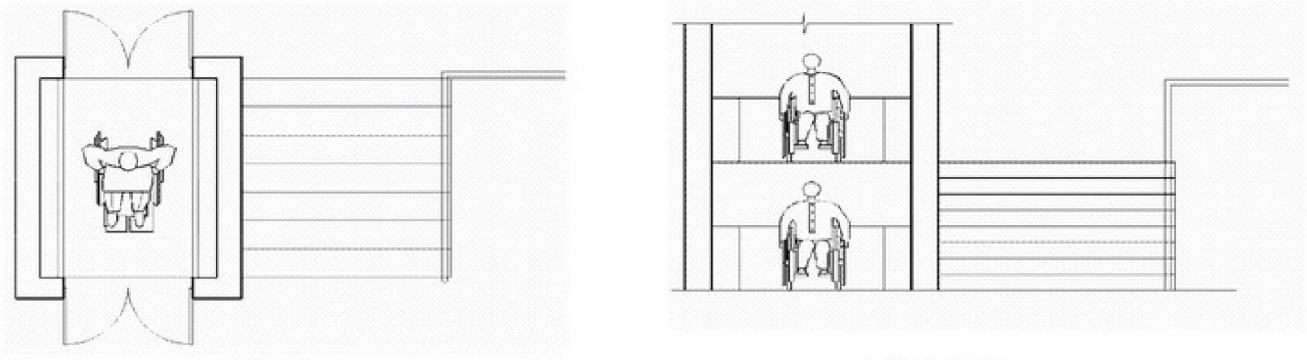


CHAIR LIFT ATTACHED TO THE HANDRAIL

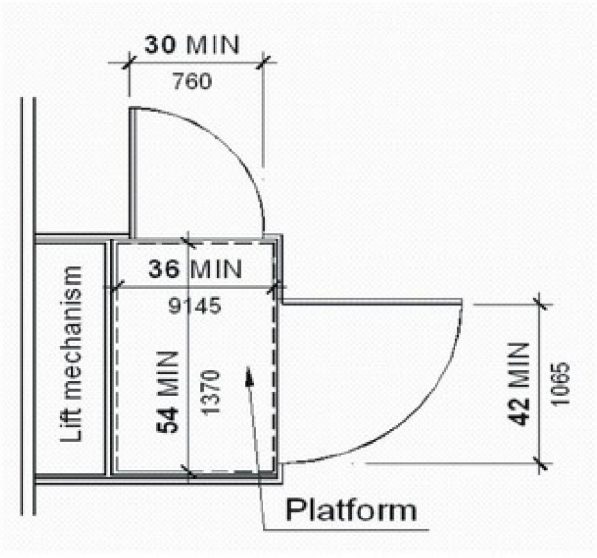
Platform lifts are special passenger elevating devices for the disabled. Platform lifts can be installed on all types of stairs including those that rotate on a 180 degree angle.

Platform lifts can be used to traverse a maximum level difference of 96 inches (2440 mm). When the traveled distance is more than 48 in. (1220 mm), the lift should be encased in a safety structure.

Vertical platform lifts can have a variety of multiple entry and exit configurations.



EXAMPLE OF PLATFORM LIFT CONFIGURATION



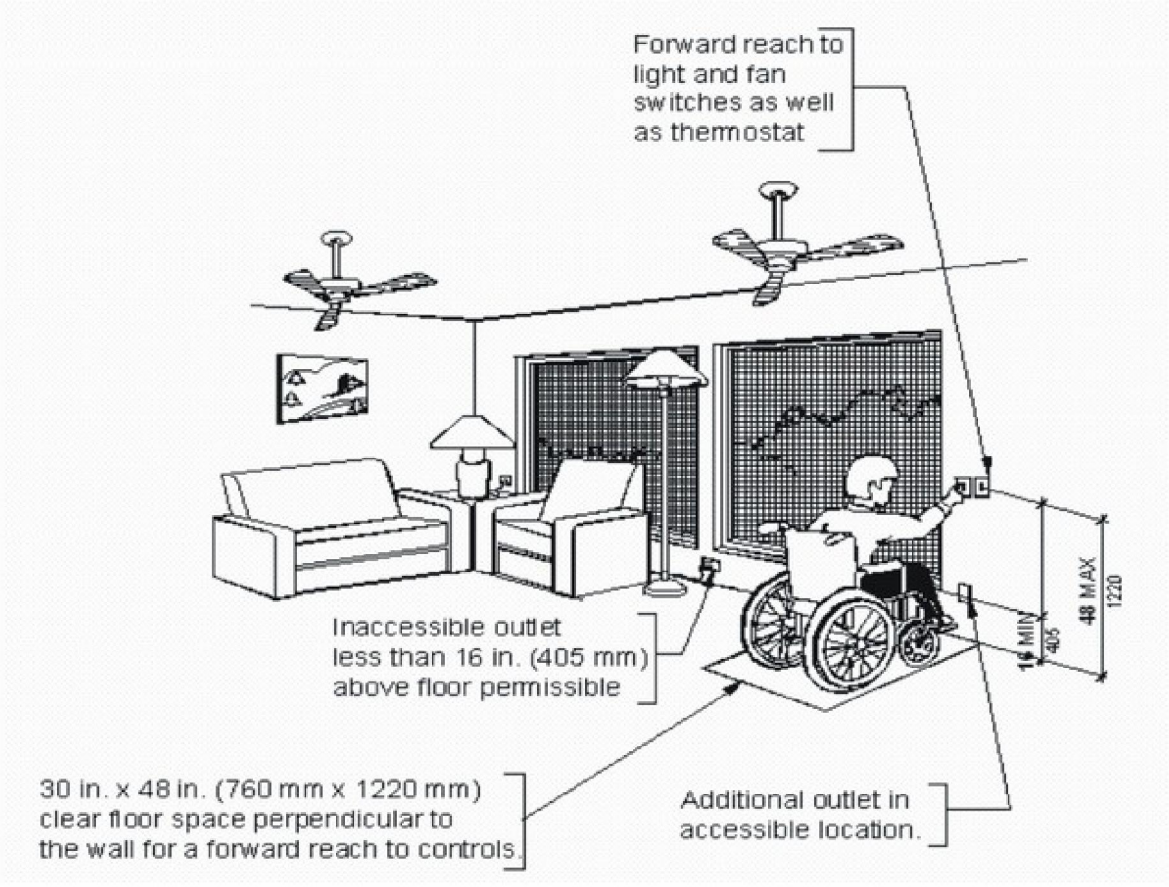
DIMENSIONAL STANDARDS FOR PLATFORM LIFT

Switches & Controls [7.9]

All light switches and other control switches and buttons shall be conveniently located within the reach ranges of wheelchair bound persons. A recommended height to locate these controls is 42 inches (1065 mm) above floor level.

All switches and control buttons should be within the reach limits of a wheelchair bound person ranging between 16 in. (405 mm) and 48 in. (1220 mm) above floor level for a forward approach, and between 10 in. (255 mm) and 52 in. (1320 mm) above floor level for a parallel approach.

Pull knobs for ceiling switches etc. should not be at a height of more than 40 in. (1015 mm) above floor level.

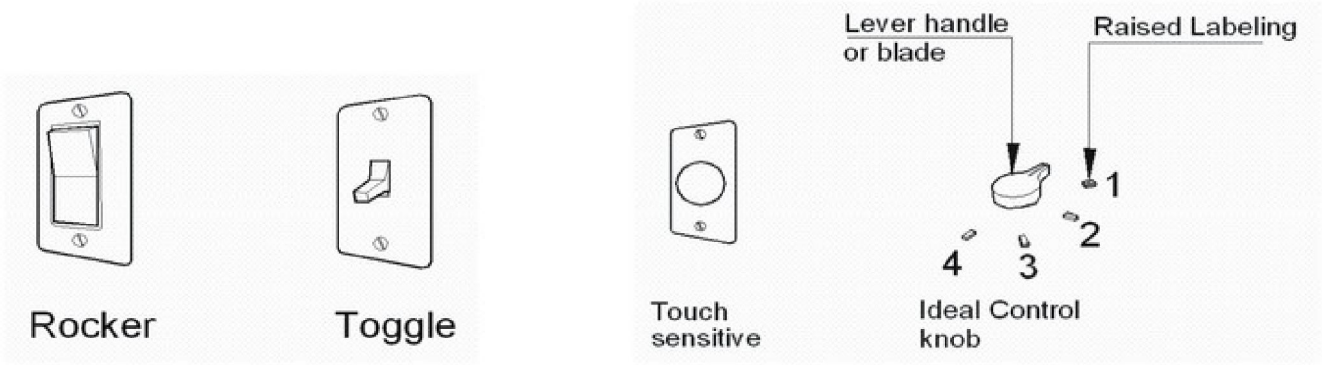


DIMENSIONAL STANDARDS FOR LOCATION OF SWITCHES & CONTROLS IN LIVING ROOM

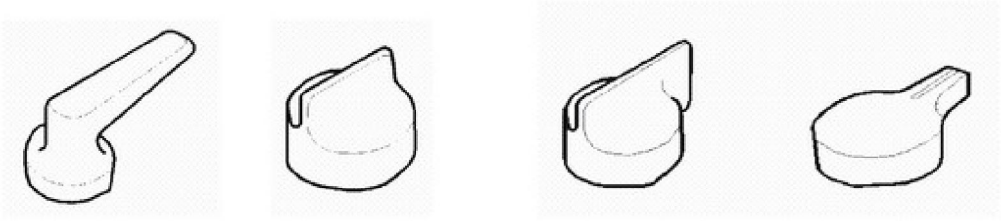
To permit easy manipulation, switches and controls should be as wide as possible. For extreme case situations rocker plate switches are recommended.

Lampholders and other fixtures on wall brackets in accessible positions are preferred over ceiling mounted fixtures.

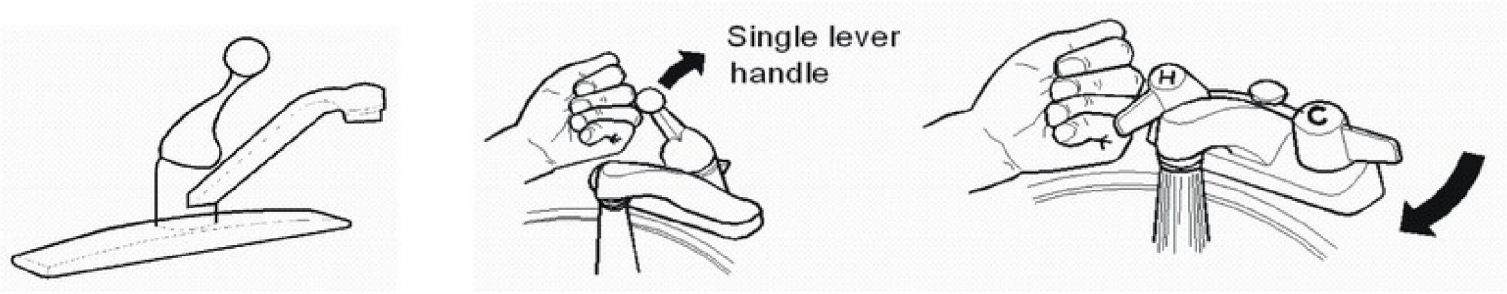
Round knobs and buttons, and other shapes requiring fine finger manipulations are not recommended for accessible switches or controls. Levers and blades with knobs are ideal, that indicate position making and turning somewhat easier and provide position pointer and leverage without gripping. Rocker, toggle head, and lever handle knobs and handles are therefore most suitable as accessible controls.



RECOMMENDED SHAPES FOR ELECTRICAL SWITCHES AND REGULATORS



RECOMMENDED SHAPES FOR CONTROL SWITCHES AND KNOB HEADS



LEVER HEAD TOGGLE ACTION BASIN MIXERS ARE RECOMMENDED FOR SINKS AND LAVATORY BASINS

Assistive Building Services

Building services and systems which specifically help persons with disabilities and other normal building services like, water supply, electrical systems, refuse disposal, indoor environmental control, personal security and the like require consideration to the extent that those are within reach limits of mobility impaired persons, and accessible to people with sensory impairments. The primary considerations in this respect are:

- Concealment of elements and appurtenances of building services so that those do not pose threat or hazard to persons who have difficulties in maneuvering around the environments, or are less capable of protecting themselves due to their physical or mental condition. Protection from hot water scalding under reachable basins and sinks; locating and maintaining of power outlets and mains to avoid accidental electrical shocks; provision of all controls and switches within reachable limits; maintaining premises in such a way so as to minimize clutter and possibility of tripping over carelessly discarded objects; etc. are some of the measures which can make built environments friendlier and accessible.

- Provision of emergency power supply for operations of safety and security mechanisms and egress under emergency situations. Battery operated security systems, alarms, and other features may be considered in addition to regular power supply.

- Means of communication are vital for persons who have limited capabilities to receive or send information and signals through normal means of sensory communication. Provision of auditory and visual communication devices for normal usage of the environments, as well as during emergency situations is required for accessible environments. Communication of information through signage, both visual and auditory, is one of the means to achieve this end. Visual, tactile and Braille signage to identify areas and guide visitors to components of the built environment along with higher level of illumination, avoidance of glare, and use of larger and legible notifications help persons with vision impairment to act independently.

- The considerations for communication services require special mention for persons with sensory impairments and measures required to mitigate their difficulties include measures like providing higher illumination levels for lip reading facilitation, avoiding echo and reverberations especially for public address systems, and provision of identifiable visual alarms etc. among others.

  In places of public assembly provision of assistive listening devices (ALS), which carry sound signals from a source through a wired or wireless network to the listening devices of the audience are recommended. Places like lecture halls, auditorium, stadium, and similar places requiring auditory information as an integral part of their functioning are possible locations for provision of ALS.

  Places that use or offer auditory or similar means of communication like hotels, call centers, information offices etc. can make use of telecommunication display devices (TDD), text telephones (TTY) and computers with special modems for communication with people having auditory impairments.

Floor Surfaces

The floor surface for movement of person with ambulatory disabilities should be firm, level, slip-resistant and should not have any projections, drops or unexpected variations in level.

When carpets are used for floor finishes it should be ensured that those are properly secured and the edges do not curl up, which may cause tripping.

Vinyl tiles if not secured properly may also curl up becoming a trip hazard. Vinyl tiles and sheets also have a tendency to become brittle and tear off with use, starting a gradual disintegration of floor surfaces.

Highly polished floor surfaces like marble, ceramic tiles, terrazzo and timber etc. should be employed with caution, and should especially be avoided where there is a possibility of getting the floor wet.

Potential for slip of different floor surfaces

Material	Potential for slip		Remarks
	Dry condition	Wet condition	
Brick tiles or pavers	Low	Moderate To low	When surface is polished and wet, the potential for slip can be quite high
Brick tiles textured	Extremely low	Low	High suitability for external applications
Carpet	Extremely low	Low	Loose or worn carpet, or with turned up edges can pose trip hazard
Ceramic tiles, matt finished	Low	High	Higher the surface roughness, lower the potential for wet slip
Ceramic tiles, high gloss and polished	Moderate to high	Extremely High	Avoid in areas intended to be used by infirm people
Concrete	Low	Moderate To low	If surface is textured, the potential for slip is quite low
Cork tiles	Extremely low	Low	High sound absorption
Linoleum/ Vinyl tiles and sheets	Low	Moderate To low	With use, edges of sheets/tiles may loosen and cause tripping
Marble	Moderate To low	Moderate to high	When surface is polished and wet, the potential for slip can be quite high
Mastic asphalt	Low	Low	Sound external pavement material
Rubber, tiles and sheets	Extremely low	High	Not suitable for foreseeably wet areas
Terrazzo	Low	Moderate to high	Highly polished surfaces should be avoided for stair treads. Add slip resistant inserts at stair treads
Timber	Extremely low	Moderate to high	High noise value, especially if raised flooring

8
MEANS OF EMERGENCY EGRESS

The human safety in an indoor environment also depends upon the means available for evacuation in cases of emergencies. People with disabilities are faced with new challenges when confronted with situations requiring evacuation in cases of fire or other threats to buildings and structures.

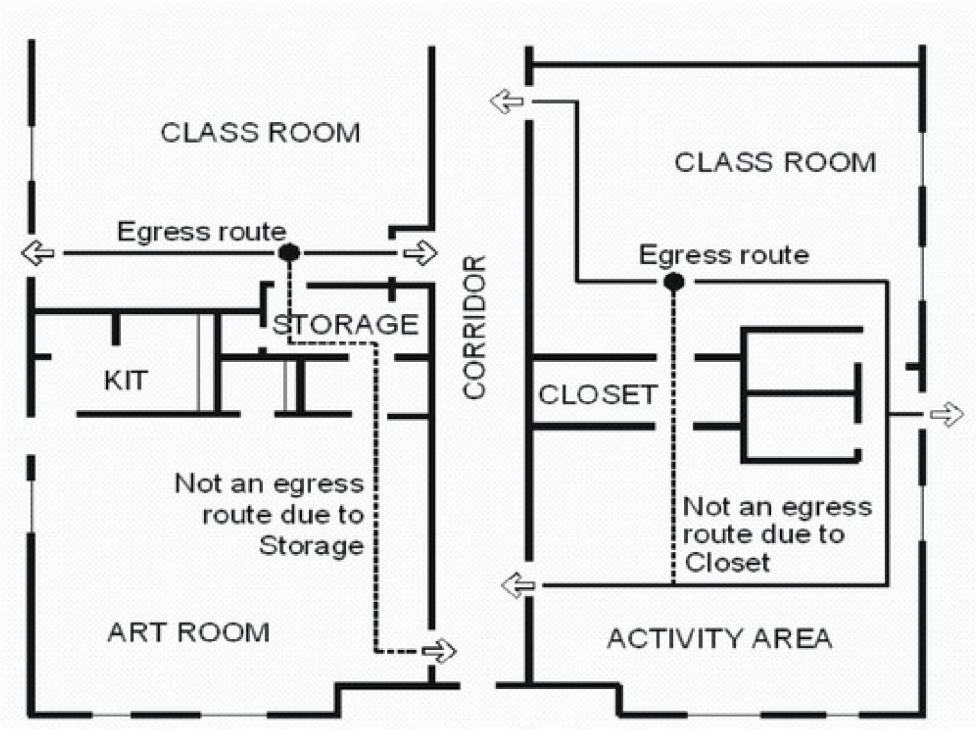
While safety is important to everyone, some groups of people like children, patients or persons with disabilities, can not act independently and need help to protect themselves, and to vacate the premises under threat in a short span of time. While safety codes may make it essential for the buildings to be designed and equipped with safety features, managing of emergency situations in itself is an integral component of building management. In an emergency situation, non-disabled people may also become handicapped with respect to the evacuating of the premises. Adapting or modifying the built environment to cater to the needs of special groups in cases of emergencies should be given the extra consideration that it requires.

Some of the safety considerations to keep in mind while designing or managing buildings include:

- Awareness regarding the potential threats to an indoor built environment.
- Incorporating arrangements for early detection of threats.
- Installing an effective mechanism of raising auditory, as well as visual alarms to warn the occupants of impending threat.
- Designing, identifying and maintaining a clear path of travel available for evacuation.

- Incorporating and maintaining an in-built system for fighting hazards like fire etc.
- Maintaining rescue assistance procedures with areas of refuge for people who have difficulty in evacuating on their own.
- Periodically carrying out drills for emergency evacuation and including the assistance requiring groups like people with disabilities, children etc. in the drills.

The accessibility code requires that all accessible areas within buildings or portions thereof shall be provided with accessible means of egress for use during emergencies, and that these means of egress shall be maintained in working order at all times, and shall not be altered or tempered with in a manner that would reduce or hamper the effectiveness of the accessible means of egress. [**8.1**]



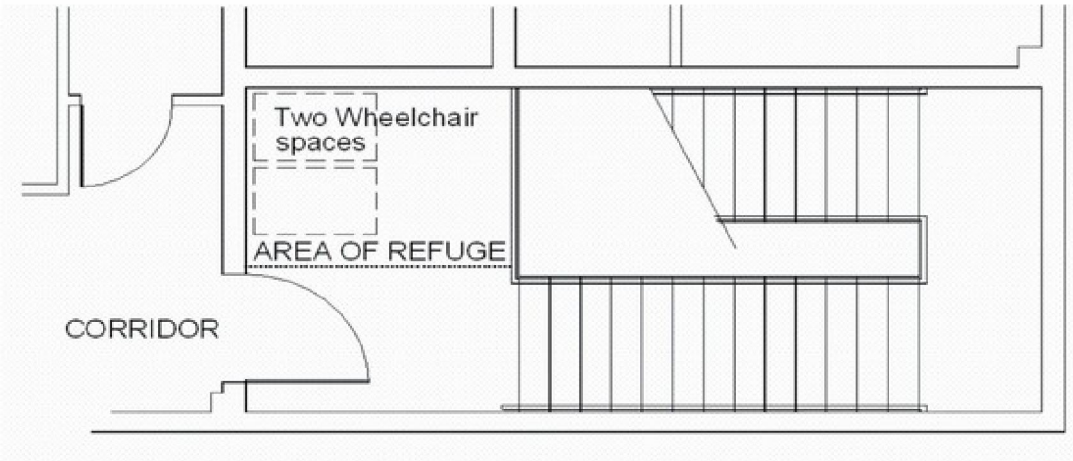
PARTIAL PLAN OF A BUILDING SHOWING
EXAMPLE OF ACCEPTABLE EGRESS ROUTE

The accessible means of emergency egress should be continuously illuminated with the capacity to automatically switch over to the building's emergency electrical system during power failure. Emergency alarms should have both audible as well as visual signals covering the entire accessible space within the building. [**8.2**]

In hospitals and other buildings for the specific use of persons requiring assistance for mobility, provision of accessible ramp for emergency egress should also be considered. [**8.2.7**]

In lager public use buildings, Areas of Rescue Assistance or Refuge are required to be provided for accommodating people who because of their disability are unable to use the staircases and would require assistance for evacuation during emergency situations. [**8.3**]

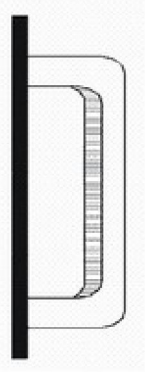
These areas of refuge should be located in a fire-protected area, preferably at the accessible stair landing or adjacent to an accessible emergency lift at each floor, and should be large enough to accommodate at least two wheelchairs with attendants. [**8.3.1**]



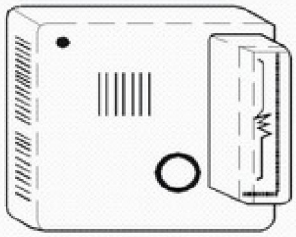
PLAN SHOWING EXAMPLE OF AREA OF RESCUE ASSISTANCE

The area of refuge should be equipped with accessible means of communication with the building managerial station, and should also be connected to an external area of assisted rescue, which must open to the outside. [**8.3.1**]

Doors opening into Area of Rescue Assistance should be properly identified with accessibility signage and door handles be knurled for the benefit of people with visual impairments. Knurled door handles are also recommended for identifying doors to staircases, fire escapes, loading platforms, pits, mechanical rooms and similar other places which may be of hazard to persons with disabilities.

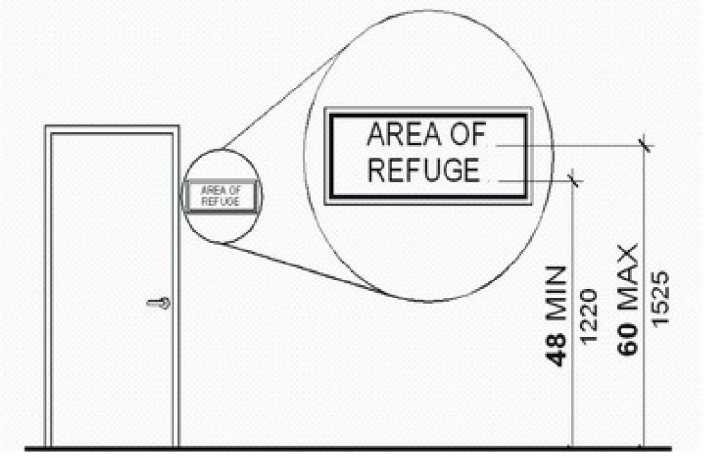


KNURLED DOOR HANDLES



Fire alarm with strobe light to alert people with hearing impairments

COMBINED AUDITORY AND VISUAL ALARM



PLACEMENT OF SIGNAGE IDENTIFYING AREA OF REFUGE

SIGNAGE IDENTIFYING AREA OF RESCUE ASSISTANCE

9 SIGNAGE

Displayed pictorial, verbal, symbolic and tactile information comprise the signage to mark and identify facilities available at any location, and to make people aware of those facilities or services it is essential that the information be relayed properly.

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

Clear signs and visual information are essential for people with impaired hearing, who may be unable to, or feel uncomfortable to ask for help or directions.

Similarly people with partial or complete loss of vision would require that the information be relayed to them through means that they could perceive. Audible signs and, when within reaches, tactile information, which could be perceived by the sense of touch are normally recommended in such cases.

Information may take the form of visual information, audible information or tactile information. Often visual and tactile information is reinforced by audible information. As no single medium can communicate information to all those who need to receive it, some duplication is unavoidable.

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

- The location, accessibility, layout and height of display.
- The size of lettering, symbols and their reading distances.
- The use of tactile letters and symbols.
- Visual contrast and lighting.
- The finished surface of materials used for signs.
- The simultaneous use of audible information.
- Integration with any other type of communication system.

Location and design of signs depends among other things upon the following:

- Directional signs should indicate the accessible route to a destination.
- Directional signs should be stationary and should only be placed on fixed parts of the building.
- In spaces where signs may not be visible in large crowds, then those should be suspended from ceiling.
- The preferred clear height under suspended or projected signs is 96 in. (2440 mm), and in no case should be less than 80 inches (2030 mm).
- The critical information may be duplicated at close viewing range, which should be at a level of between 45 in. (1145 mm) and 70 in. (1780 mm) for a visually challenged person when standing and between 40 in. (1015 mm) and 45 in. (1145 mm) for a wheelchair bound person.
- Signs and information associated with a control panel should be located between 36 in. (915 mm) and 48 in. (1220 mm) above floor level to meet the needs of people in a wheelchair or in a standing position.
- Signs should be so posted so as to avoid reflection.
- Signs for emergency egress should be illuminated at all times and during periods of power failure also.

Information and directional signs should be provided at strategic locations like entrance areas, junctions of pathways and corridors, key destinations, reception areas, and at facilities such as toilets, telephone counters, means of vertical movement, means of egress etc.

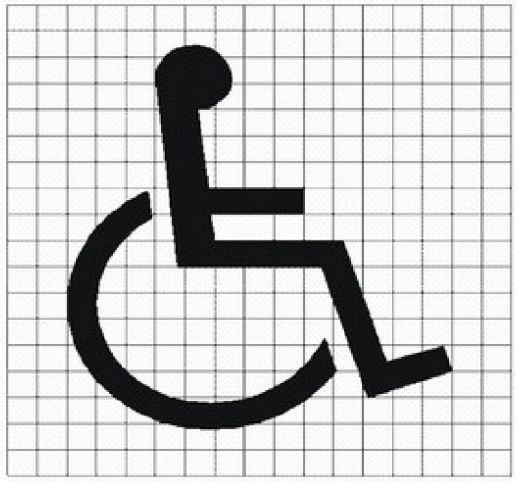
All key information should be visual, and preferably audible also, and should be in tactile form where low enough to touch. [**5.2.12.ii**] [**6.2.6.iii**]

Directional signs should readily identify and distinguish accessible routes from each other, and provide a clear indication of return routes to named exits. The names of destinations should be consistent throughout.

A clear indication of the existence of steps or ramps on a route should be provided at both ends. [**5.2.5.ii**] [**6.2.3.vii**]

International Symbol of Accessibility [**5.2.12**] [**5.3**] [**6.2.6**]

Signs to facilities for people with disabilities should incorporate the International Symbol for Access, and other internationally recognized symbols for accessible facilities, especially to mark accessible entrances and routes, accessible toilets, accessible means of egress and warnings against hazards etc.

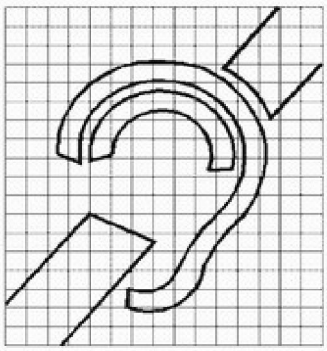


INTERNATIONAL SYMBOL OF ACCESSIBILITY
PROPORTIONS

The form and proportion of the International Symbol of Accessibility as given above (the background squares are for reference purposes only) consist of a symbolized figure on a wheelchair with plain background, in the exact proportion as depicted, facing towards right, and may be used in reverse form also.

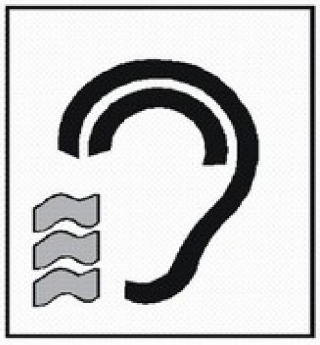
INTERNATIONAL SYMBOL OF ACCESSIBILITY
DISPLAY CONDITIONS

Other international standard public information symbols identifying presence of accessible facilities for people with specific disabilities are depicted below in their proportional layouts.

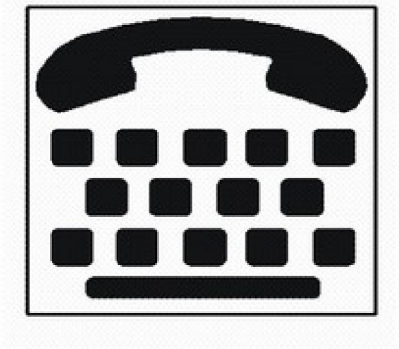


WORLD FEDERATION OF THE DEAF SYMBOL OF ACCESSIBLE FACILITIES FOR PEOPLE WITH HEARING LOSS – PROPORTIONAL LAYOUT AND DISPLAY CONDITIONS

EQUIPMENT TO ENHANCE MICROPHONE SOUND FOR HEARING AIDS FITTED WITH 'T' SWITCH

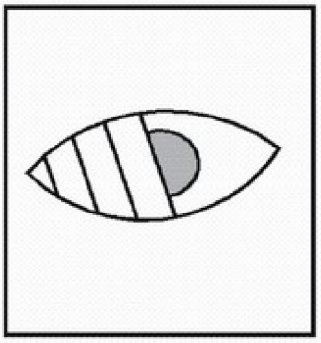


EQUIPMENT TO ENHANCE MICROPHONE SOUND THROUGH AN INFRARED RECEIVER



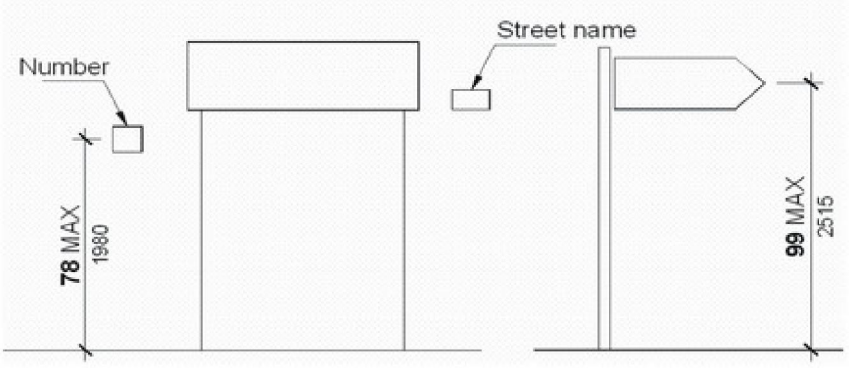
INTERNATIONAL TDD SYMBOL
(TELECOMMUNICATION DEVICE FOR DEAF PEOPLE)

PICTOGRAM IDENTIFYING FACILITY FOR VOLUME CONTROL TELEPHONE



SIGN IDENTIFYING FACILITIES FOR BLIND
OR PARTIALLY SIGHTED PEOPLE

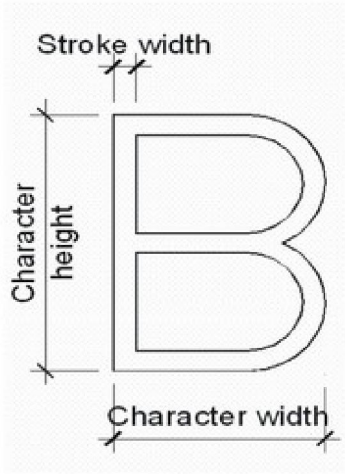
Signs used in external and internal environments require different design, construction, material and display conditions. Signs indicating house numbers and street names should be placed at a maximum height of 99 in. (2515 mm). [**5.2.12**]

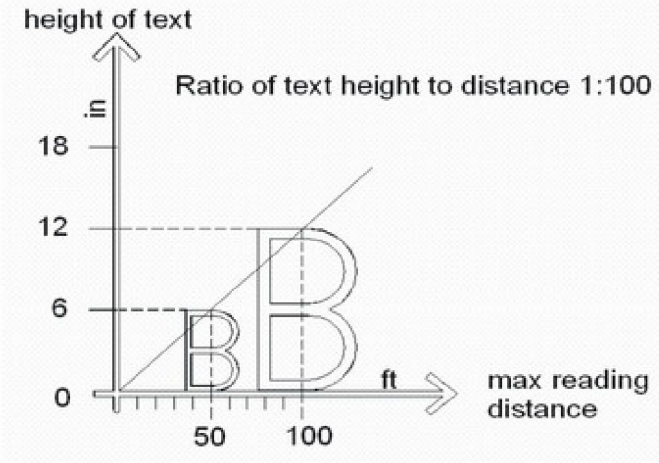


DESIGN PARAMETERS FOR SIGN BOARDS
INDICATING HOUSE NUMBERS OR STREET NAMES

For ease of readability the size of characters and letters should be proportionate to the reading distance. A ratio of text height to distance of 1:100 is normally employed. The height of lettering for visual signs should be chosen to suit the type of sign and the viewing distance in accordance with the table and figure below. [**5.2.12**] [**6.2.6**]

Character width to height ratio	3:5 – 1:1
Stroke width to character height ratio	1:5 – 1:10



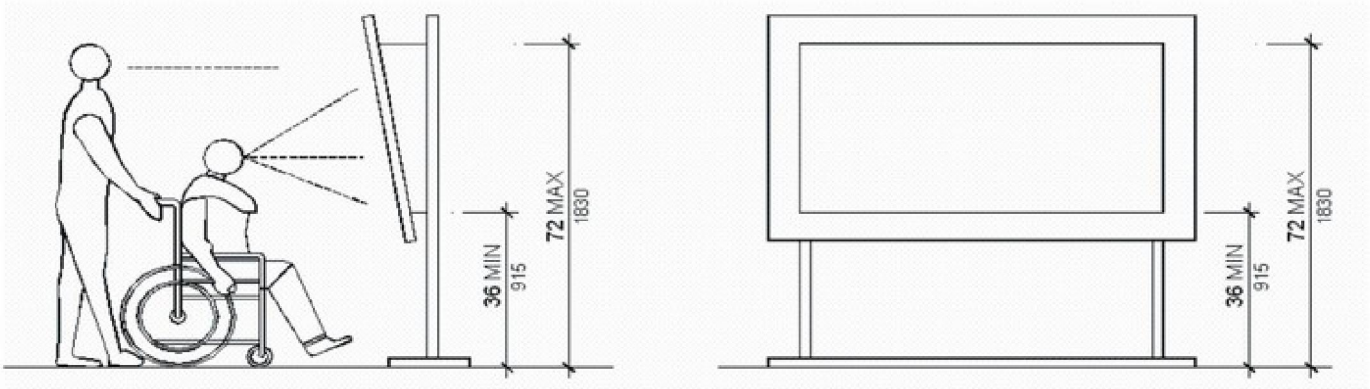


SIZE OF SIGN TO DISTANCE RATIO

Viewing distance	**Type of sign**	**Height of characters in. (mm)**
Long distance	External signs on fascia	8 (200 mm)
	External location signs	3.5 – 5 (88 – 125 mm)
	External directional signs	3.5 (88 mm)
	Building/House numbers	3.5 (88 mm)
Medium range	Location and directional signs	2.5 (63 mm)
	Identification signs	1.5 (38 mm)
Close range	Room/Door identification	1.5 (38 mm)
	Directories	0.75 (20 mm)
	Wall mounted information	0.75 (20 mm)

RECOMMENDED HEIGHT OF CHARACTERS
FOR DIFFERENT TYPES OF SIGNS

Information panels, boards and maps etc., placed along roads, at entrances to buildings and on public places should be within easy sight lines ranging between 36 in. (915 mm) and 72 in. (1830 mm) above floor level. [**6.2.6**]

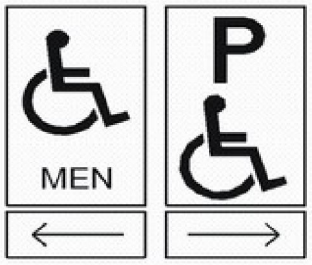


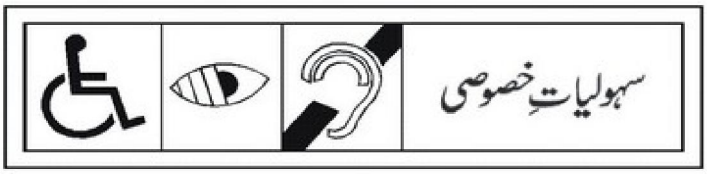
RANGE OF SIGHT LINES FOR CLOSE VIEWING

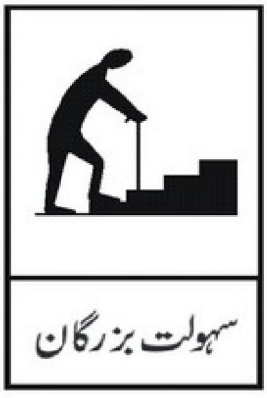
The letters and signs should preferably be raised at least 1 mm from the background to allow visually challenged people to read the information through feel of their finger tips.

General signboard	**Background wall finish**	**Text and pictorials**
White or very light	Dark material finish	Black, dark green or dark blue
Black or dark	Light material finish	White, yellow or very light colour
Black or dark	Light colour paint	White, yellow or very light colour
White or very light	Green vegetation	Black, dark green or dark blue
Light coloured text and symbols or pictograms on a dark background are recommended		

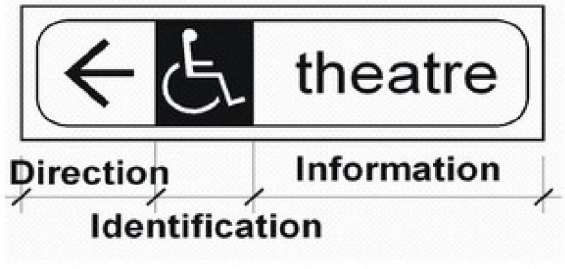
SUGGESTIONS ON COLOUR SCHEMES FOR GENERAL SIGNBOARDS





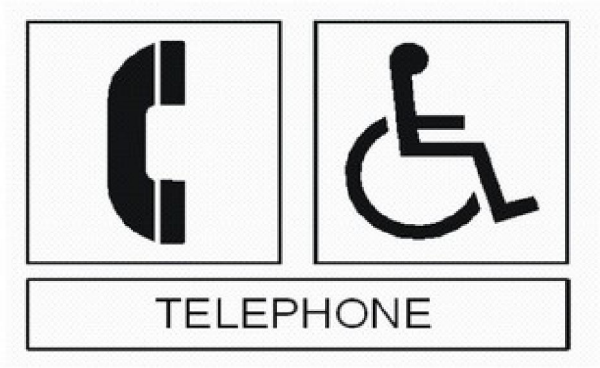


EXAMPLES OF SIGNS IDENTIFYING ACCESSIBLE FACILITIES

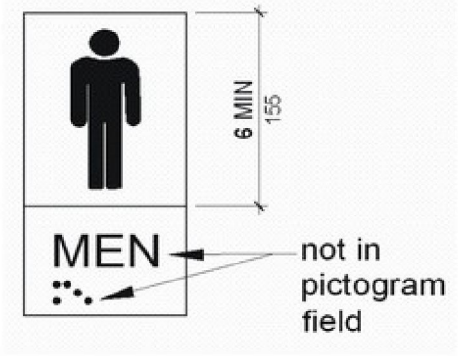


EXAMPLES OF ACCESSIBLE SERVICES IDENTIFICATION SIGNS

The signs having pictograms should have a field of 6 in. (155 mm) minimum, and the characters and Braille should preferably not be located in the pictogram field. The pictograms and their field should have a non-glare finish, and the text description should be located directly below the pictogram field.



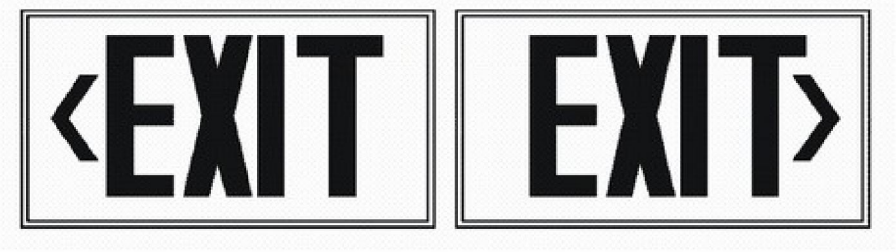
ACCESSIBLE TELEPHONE FACILITY



DESIGN PARAMETERS FOR PICTOGRAMS

Exit Signs [8.2.5]

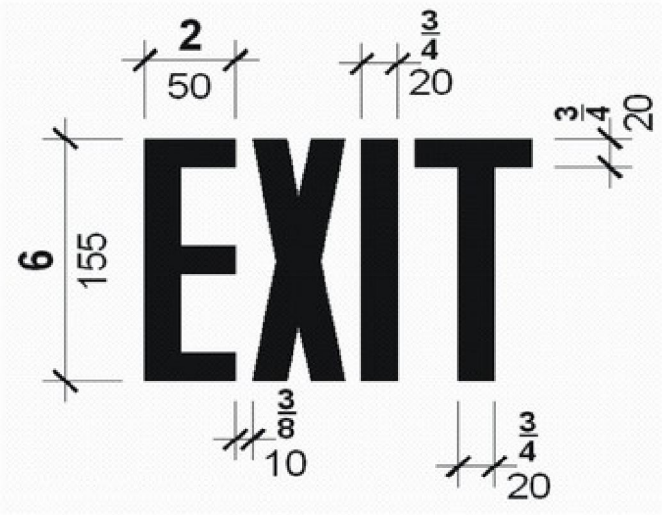
Exits in a building should be marked with exit signs readily visible from any direction of egress travel. Where the exit or path of egress travel is not immediately visible to the occupants, readily visible exit signs should be placed to mark the access to exits. The exit signs should be so placed that no point in exit route is more than 100 ft. (30.5 m) from the nearest visible exit sign.



DIRECTIONAL SIGNS SHOWING EXIT ROUTES MARKED FOR EMERGENCY EGRESS

Exit signs should be internally or externally illuminated and capable of being automatically switched over to emergency power supply during power failure.

Exit signs should have plainly legible letters not less than 6 in. (155 mm) in height and 2 in. (50 mm) in width. The stroke width of letters should not be less than 0.75 in. (20 mm). Signs larger than the minimum size should have proportionate character sizes.



DIMENSIONAL STANDARDS FOR EXIT SIGNS IDENTIFYING EGRESS LOCATIONS

The minimum height of characters should be 6 in. (155 mm) for exterior and 3 in. (75 mm) for interior signage, other than exit signs, identifying means of emergency egress.

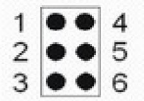
Braille and Tactile Signs [5.2.12.ii] [6.2.6.iii]

Directional and identification signs, when within reach should incorporate embossed letters in a sans serif type face for reading with the help of finger tips for the convenience of visually impaired persons. The raised letters and signs should have a depth of 1 mm and a stroke width of at least 2 mm. The height of characters should range between 0.5 in. (13 mm) and 2 in. (50 mm).

While providing Braille signs it is recommended that either single word signs (Grade 1) be used, or instead of multi-word signs contracted Braille (Grade 2) is used. Marking of Braille location on a signboard with notches to help locate the Braille message is also recommended.

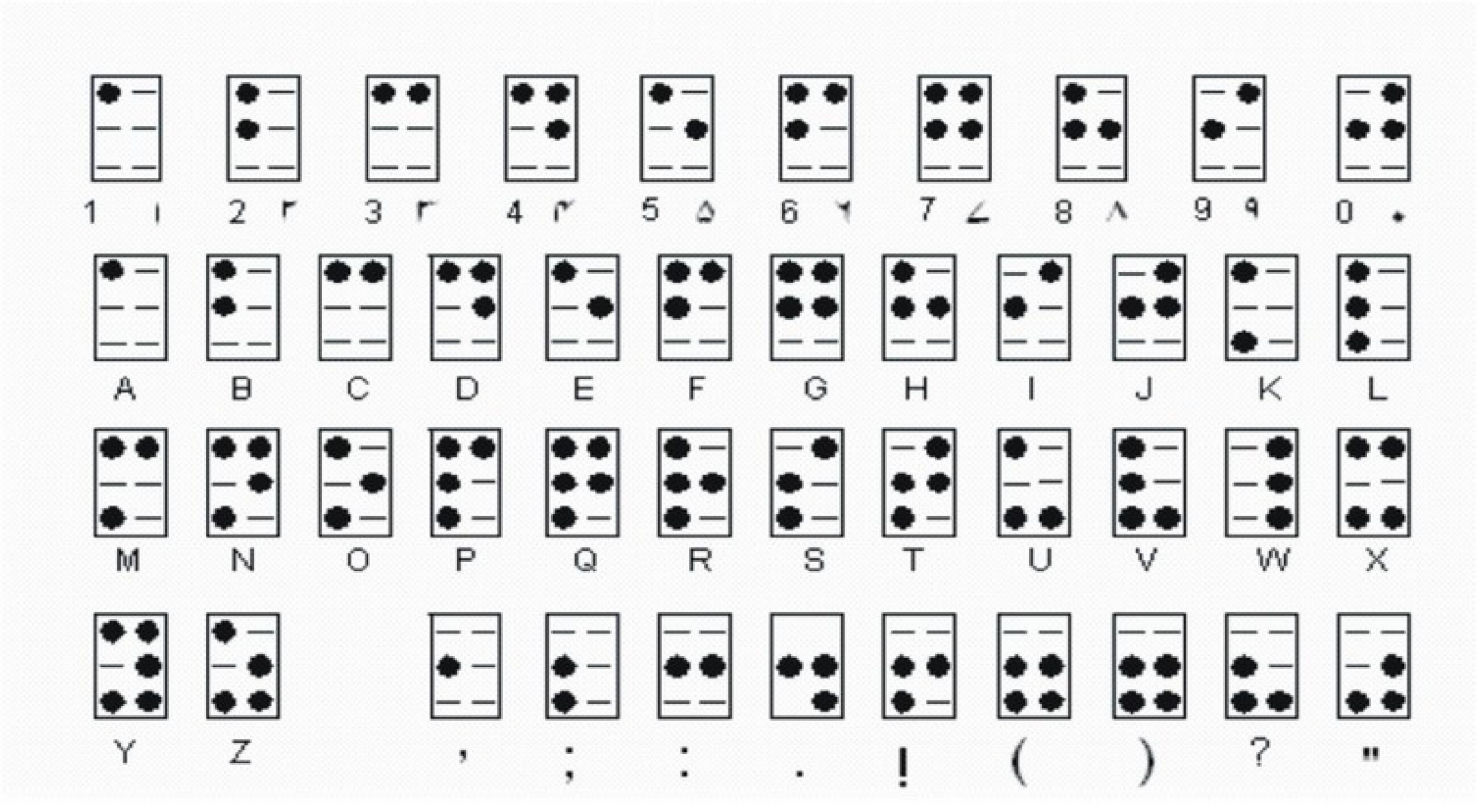
BRAILLE ALPHABETS

BRAILLE 'CELL'
All Braille letters and numbers are made using dots arranged in the standard 'cell', dots numbered for reference

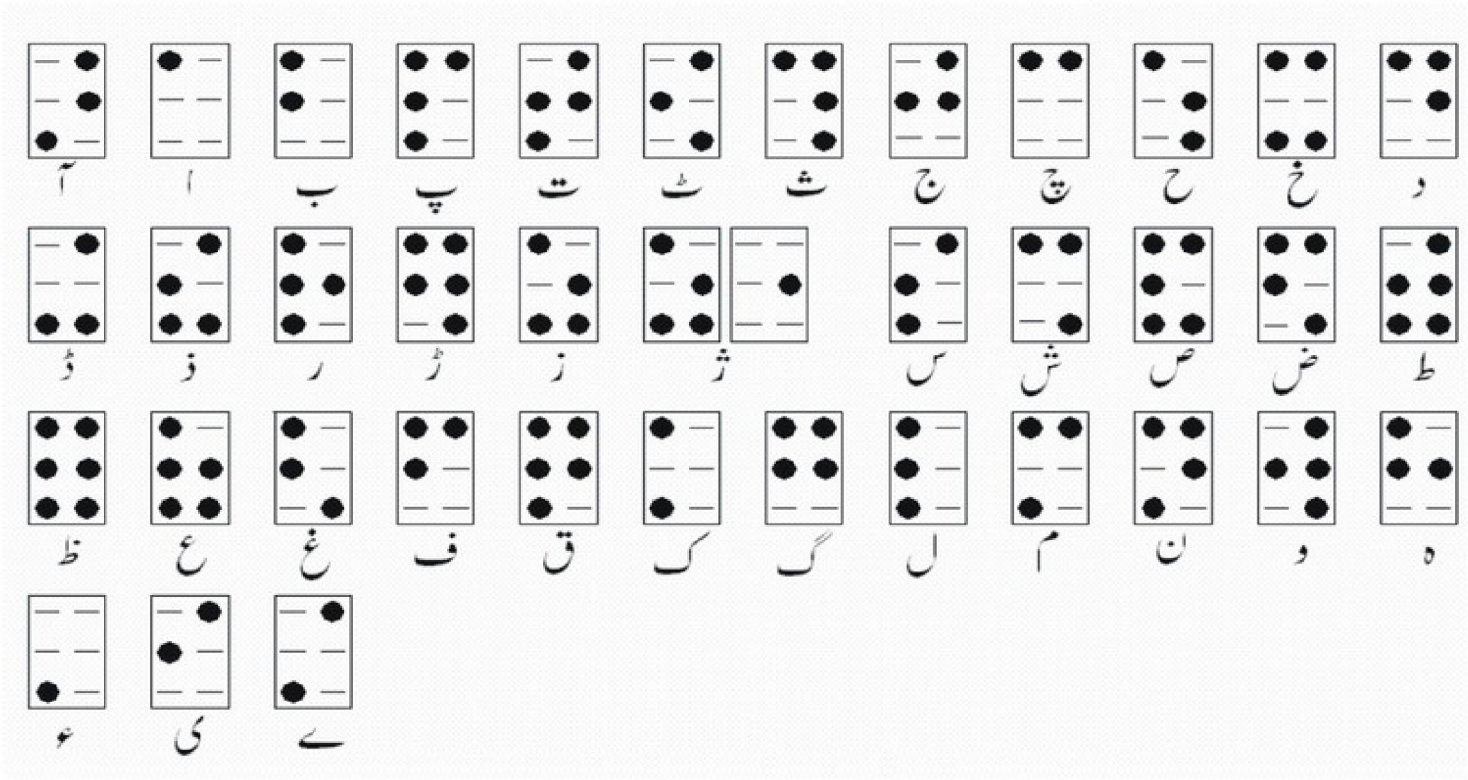


CAPITAL SIGN
Placed in front of any letter indicates a capital letter

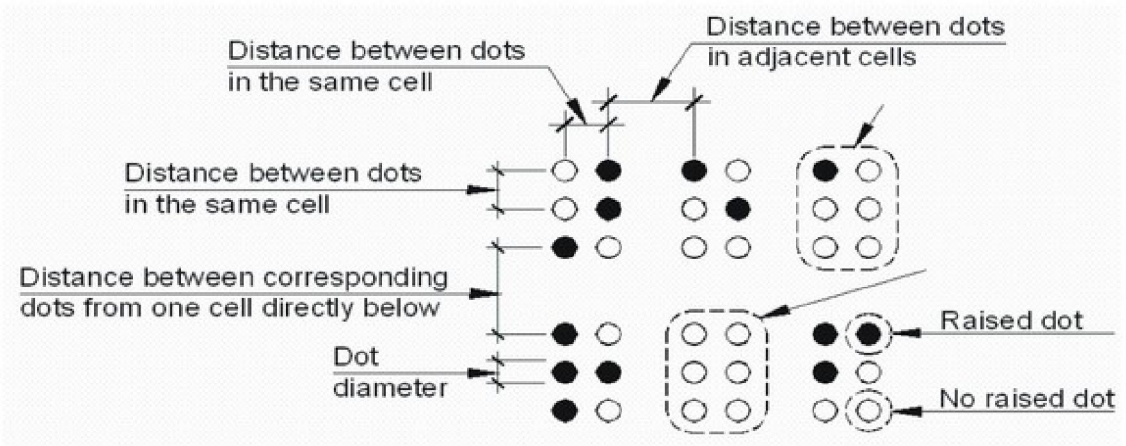
NUMBER SIGN
Placed before a number or group of numbers indicates that numbers follow (some numbers duplicate letters)



NUMBERS AND ENGLISH ALPHABET



URDU ALPHABET



BRAILLE MEASUREMENT

Braille should be positioned below the corresponding pictogram or text, and if the text is multi-lined, below the entire text. Braille should be separated minimum of 3/8 in. (10 mm) from other tactile characters or elements. Braille dots should have domed or rounded shape, with a base diameter of 1/16 in. (1.5 mm) and a distance

Braille Alphabets

between the two dots in the same cell of 1/8 in. (2.5 mm). Distance measured center to center, between corresponding dots in adjacent cells should be ¼ in. (6 mm), and between corresponding dots from one cell directly below should be 3/8 in. (10 mm).

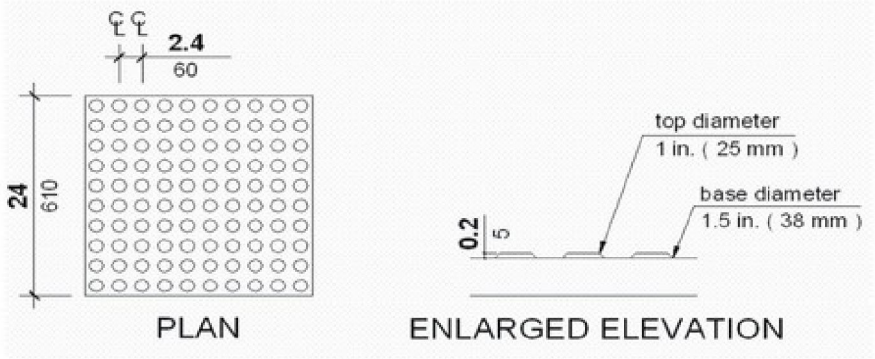
Tactile signs should preferably be complemented with audile information also.

Braille Blocks [5.5.ii] [5.3] [6.2.3.vii]

Guiding signs in the form of tactile blocks, known also as Braille blocks, are used in the floor or pavement surfaces to provide guidance for movement, to discourage movement in an incorrect direction, to screen off obstacles, or to warn of the impending danger to persons with impaired vision.

These blocks are usually used in front of areas where traffic is present; in front or end of staircases and ramps; at entrances or exits of public transport terminals or boarding facilities; at pedestrian crossings on the road intersections; at edges of boarding platforms or other areas with sudden drop in level; and as guiding paths from a public facility to the nearest public transport station.

Braille blocks, when used as detectable warning surfaces, should be 24 in. (610 mm) wide and should extend the full length of the public use side of the platform. The depth of the tactile surface should be 0.2 in. (5 mm) and truncated domes of 1.5 in. (38 mm) size placed at center to center distance not exceeding 2.4 in. (60 mm). Detectable warning surfaces should contrast visually with adjacent surfaces in colour as well.

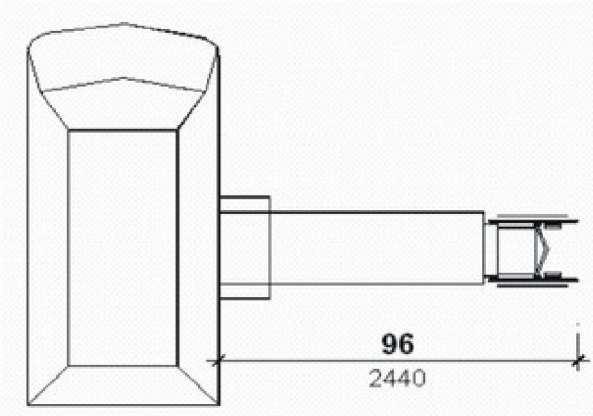


MEASUREMENTS OF DETECTABLE WARNING BLOCK

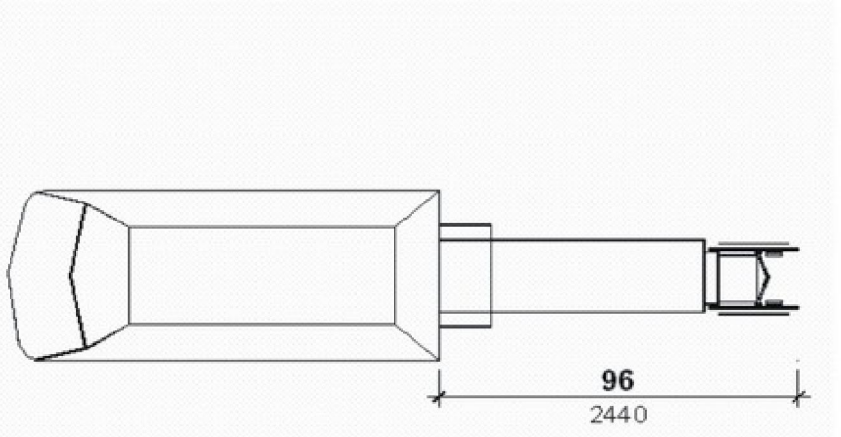
10
PUBLIC TRANSPORT REQUIREMENTS

Land Transport: [**5.3.1**] Public land transport like buses, vans, taxis, three-wheelers etc. should as far as practicable include facilities to accommodate people with disabilities. New services and vehicles, when provided, whether for use of general public or for dedicated use of people with disabilities, should comply with accessibility standards.

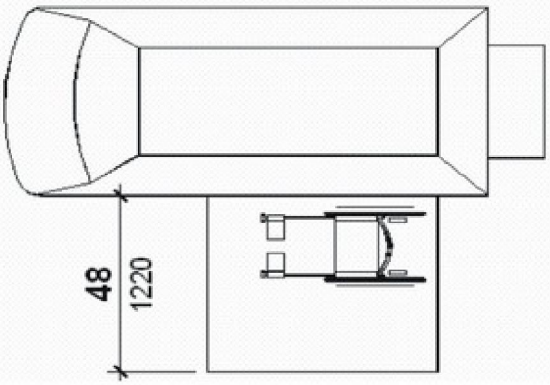
For buses and vans with hydraulic lift or pull out ramp apparatus, maintain a clear space of 48 in. (1220 mm) for vehicles using a lift, and a clear space of 96 in. (2440 mm) for vehicles using a ramp, at the side or rear of parked vehicle, as the case may be.



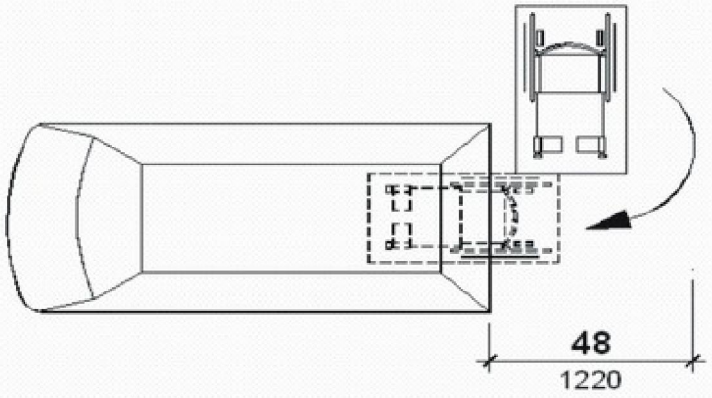
BUS WITH PULL OUT RAMP ON SIDE



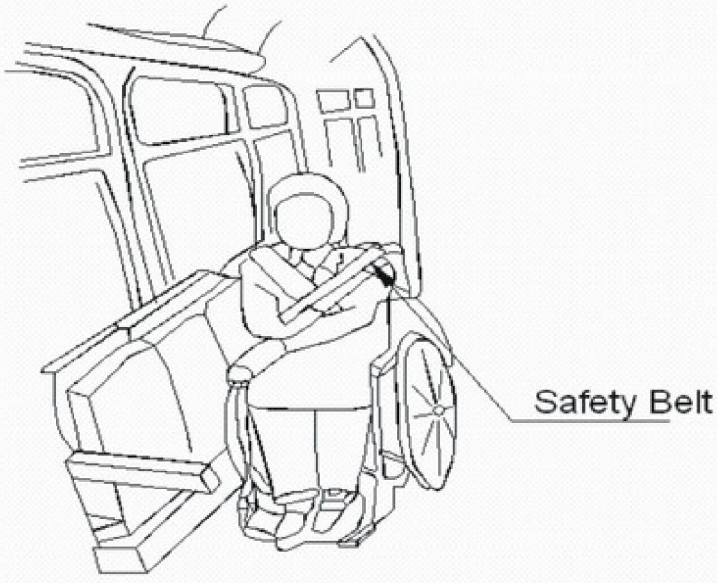
BUS WITH PULL OUT RAMP AT REAR



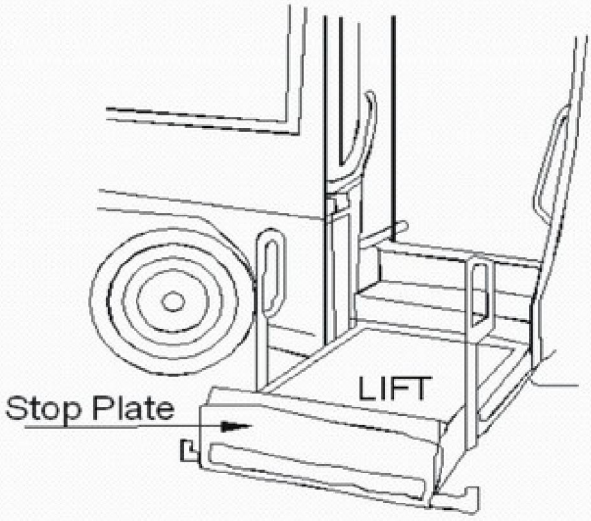
BUS WITH HYDRAULIC LIFT ON SIDE



BUS WITH HYDRAULIC LIFT AT REAR

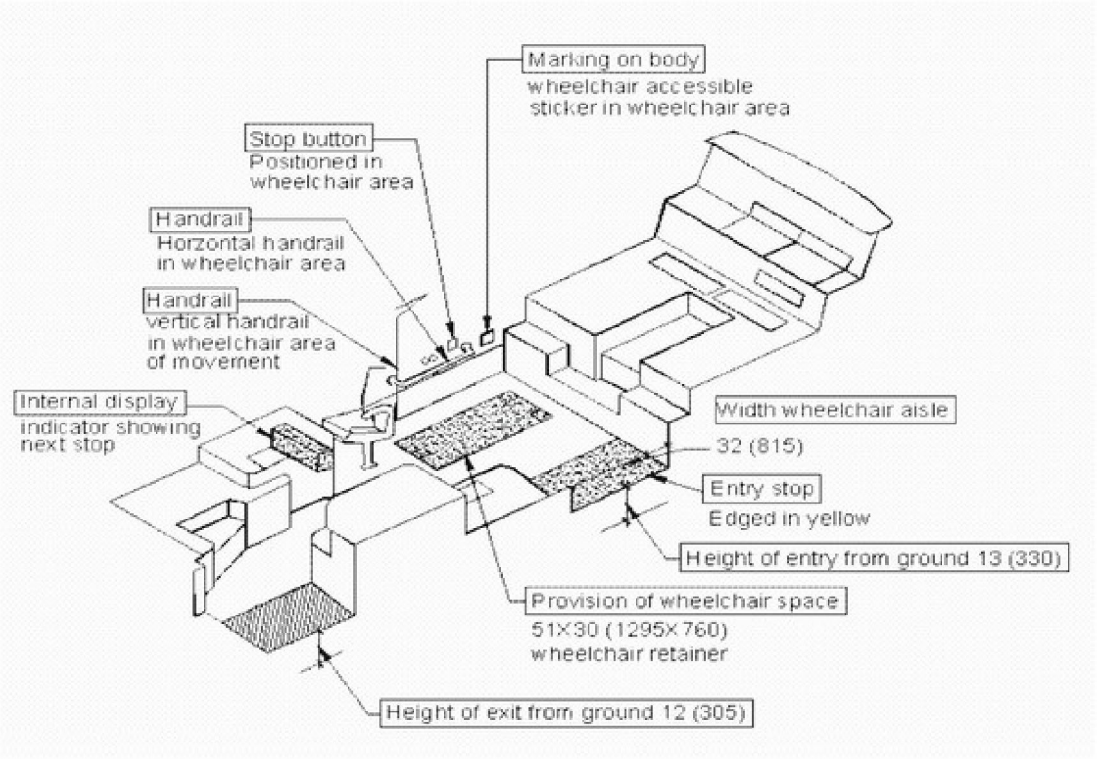


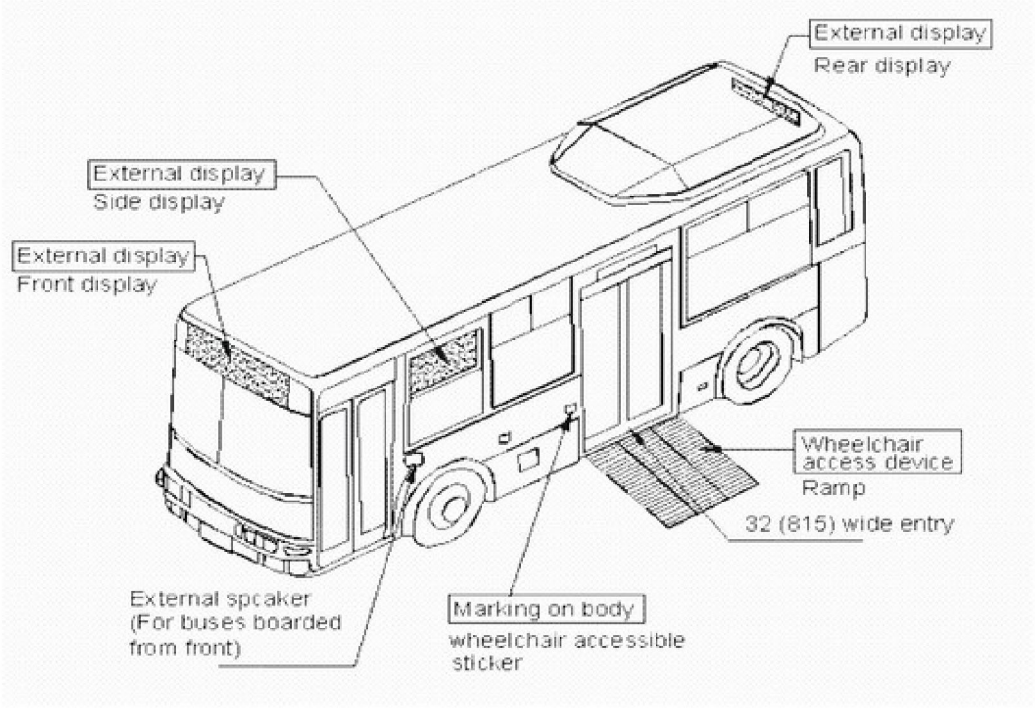
PROVISION OF SAFETY BELT IN BUSES FOR WHEELCHAIR USERS



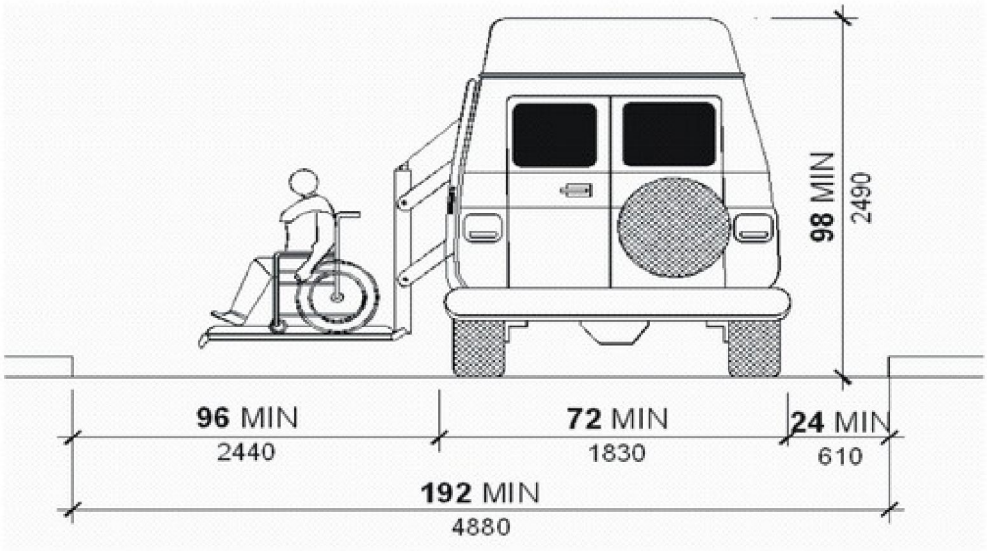
LOW LEVEL STEP/PLATFORM IN SPECIALIZED PUBLIC BUSES

Buses and vans should have doors and aisle between the seats of at least 30 in. (760 mm) clear width, and should be equipped with low-level step; handrail; foot light; wheelchair safety belts; and reachable alighting buzzer.



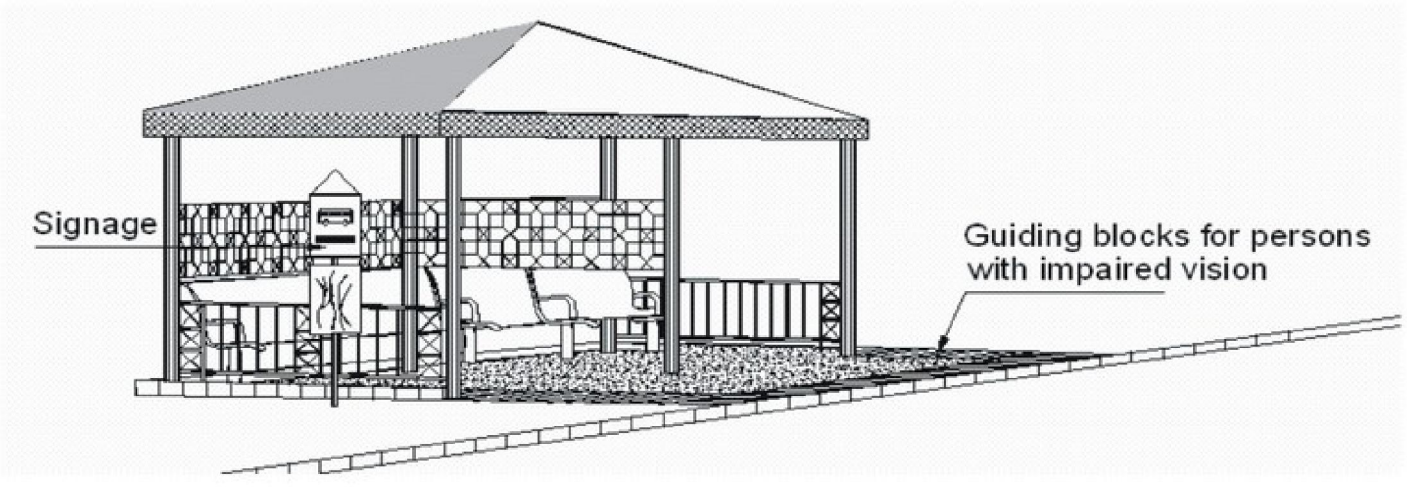


LOW-FLOOR VEHICLES HAVING A MAXIMUM HEIGHT OF 12 IN. (305 MM) ABOVE GROUND LEVEL SHOULD BE USED AS ACCESSIBLE VEHICLES

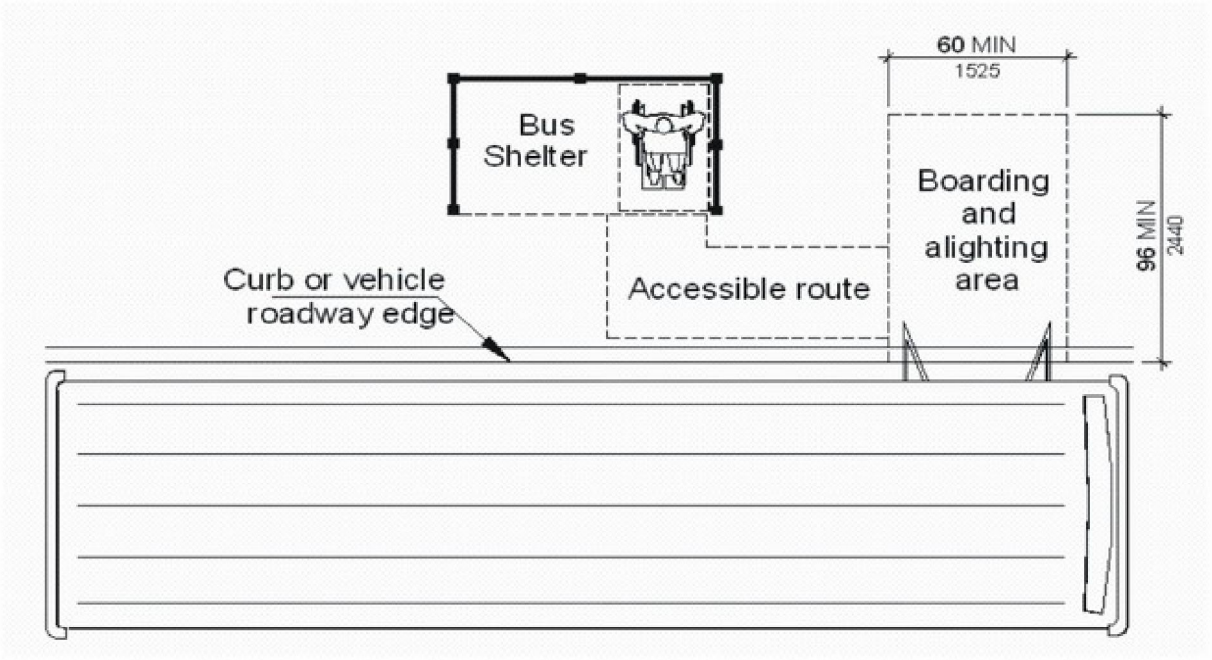


HORIZONTAL AND VERTICAL CLEARANCES FOR RAISED ROOF LIFT-EQUIPPED SPECIAL VAN

Public transport facilities include accessible travel routes, resting facilities, proper illumination and signage to bus stops and public waiting areas. Detectable warning strips and guiding blocks are recommended for boarding platforms as well as for bus shelters. While planning provision of accessibility facilities, design guidelines as required for external environments should be followed.



TACTILE GUIDING BLOCKS AND SIGNAGE WITH BRAILLE MARKINGS AT BUS SHELTERS



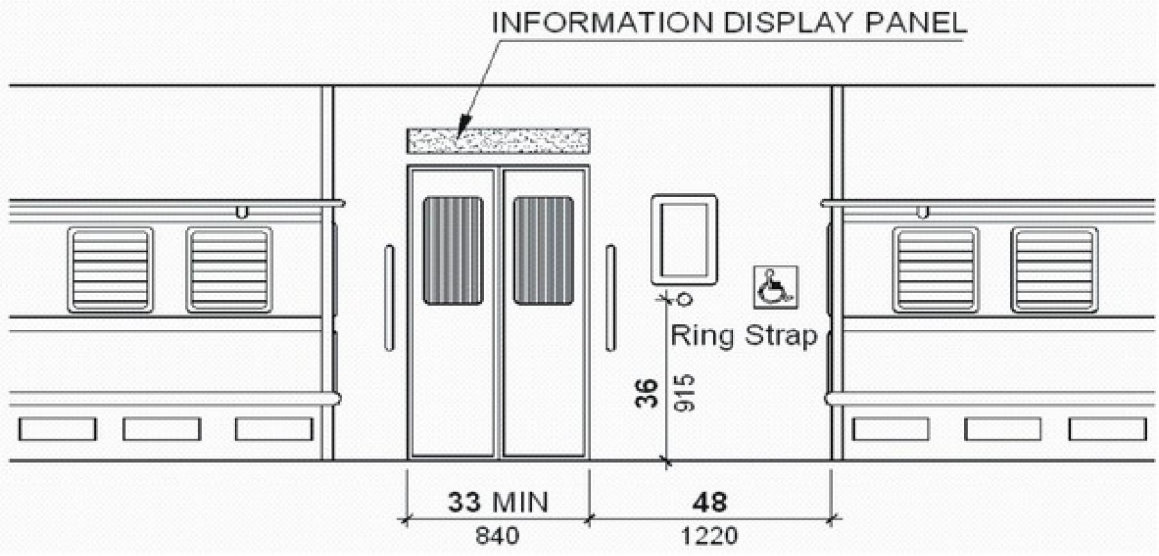
PROVISION OF ACCESSIBLE ROUTE AND STANDARD DIMENSIONS OF ALIGHTING AND BOARDING AREA AT PUBLIC TRANSPORT SHELTERS

Rail Transport: [**5.3.2**] Railway being an effective, and in certain cases, the only mode of transport, should be fully accessible to people with disabilities.

Railway stations should be fully accessible and wheelchairs maintained for the use of people in need at each station according to passenger load.

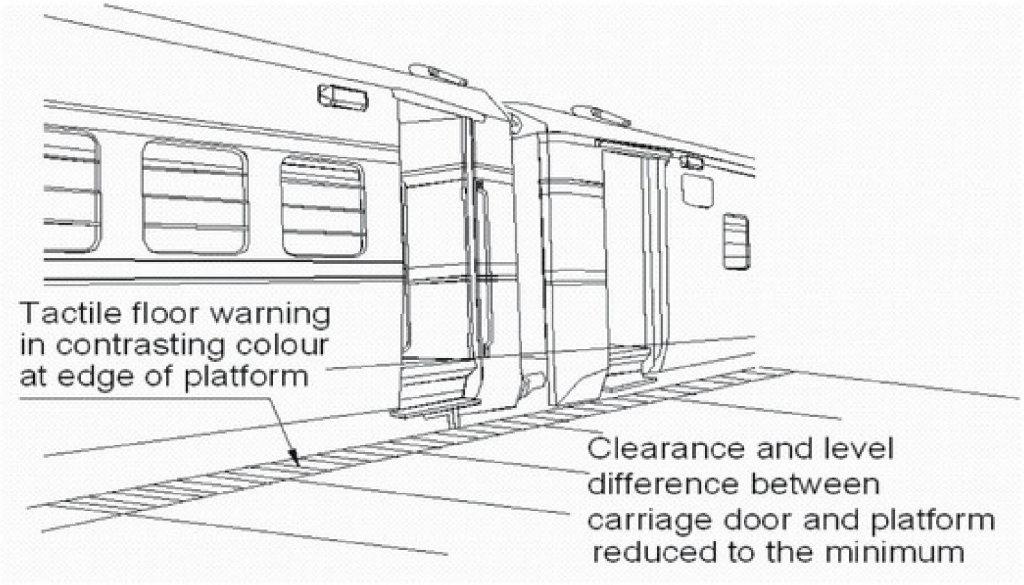
All edges of platforms and other places of possible hazard should be marked with tactile floor warnings.

Every train should contain fully accessible carriages with doors and aisle widths of at least 33 in. (840 mm) width, and be equipped with storage space for wheelchairs and, accessible and usable toilets.



LOCATION AND DESIGN PARAMETERS OF INFORMATION SIGNS AND CONTROLS ON A RAILWAY CARRIAGE

The railway carriage and platform should be at the same level, and the gap between the carriage door and the platform should not be more than 1 inch (25 mm).



DESIGN PARAMETERS FOR RAILWAY PLATFORM

In situations where platform and railway carriage cannot be at the same level, portable platform lifts shall be maintained at those stations.

The planning and designing of railway stations, terminal facilities and all building and facilities other than trains and transport carriages should follow the guidelines as required under scoping requirements and provisions for such building types.

Air Transport: [**5.3.3**] All passenger aircrafts and air terminals should have the capacity to safely accommodate wheelchair passengers and all related services should be accessible to people with disabilities.

All passenger terminals shall be fully accessible and wheelchairs shall be maintained for the use of people in need at each airport or terminal according to passenger load.

All aircrafts and on-board facilities should have the capacity to be used by wheelchair bound persons, with special attention given to toilet facilities.

Control switches for on-board facilities should not be above arm-rest level, so that those could be reached and operated without stretching the body.

Special care and preference should be given to people with disabilities in boarding and alighting the aircraft.

Air traffic service staff should be trained in methods of assistance to people with disabilities and be at hand on request.

All accessible facilities be identified with internal accessibility signage, meeting the design requirements for accessibility signage.

Water Transport: [5.3.4] All forms of public water transport facilities should have the capacity to accommodate people with disabilities, making all passenger terminals accessible.

Access ramps should be properly secured and protected with sturdy guard rails; non-slippery surfaces and tactile warning blocks.

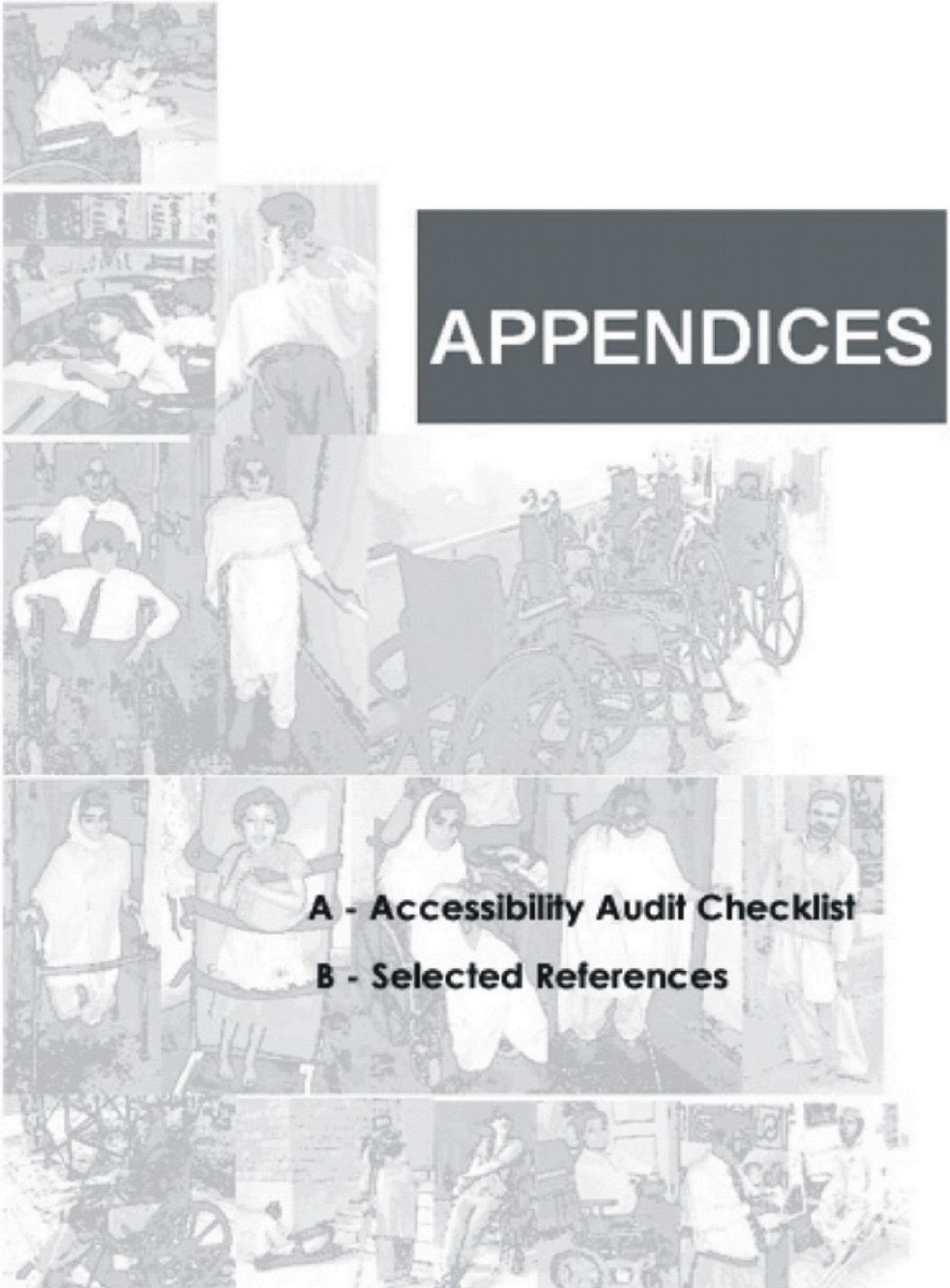
Pier and jetty areas should be accessible and have adequate protection against accidentally falling down the sides.

On-board facilities should include apparatus for securing wheelchairs and ample provision of grab bars for people with disabilities and infirmities.

The planning and designing of water transport terminal facilities and all building and facilities other than means of water transport like boats, streamers, ships, sea liners etc., should follow the guidelines as required under scoping requirements and provisions for such building types.

Service staff should be trained in methods of assistance to people with disabilities and be at hand on request.

All accessible facilities should be identified with international accessibility signage.



APPENDICES

A - Accessibility Audit Checklist

B - Selected References

A
ACCESSIBILITY AUDIT CHECKLIST

To assess the accessibility provisions and/or compliance with The Accessibility Code of a proposed or an already built building or area, an audit of the facilities is recommended. An assessor, who is well versed with the requirements of the code, should survey the existing building, facility or area; or audit the drawings of the proposed facility to review the provisions of accessibility facilities and to recommend measures for mitigating the shortcomings encountered. A sample checklist for such an audit is provided below.

Accessibility Audit Checklist For Existing And/Or Designed Elements Of Built Environment

A. Project/Site Data

Project Name _____ Project No./Code _____

Brief description of Project with list of component buildings _____

_____

_____

_____

Surveyed/Audited by _____ Date _____

Organization _____ Telephone No. _____

B. Accessibility Data/Audit

Sr. No.	Drg. Ref.	Space/Element	Code Ref.	Y	N	Recommendations
		B.1 External Environment	[4.3.1] [5.1]			
		1.1 Site ▪ Is location accessible during all weather conditions? ▪ Does site terrain allow full accessibility? ▪ Is the present site layout best possible arrangement?	[4.3.2]			
		1.2 Public Streets & Pathways ▪ Does the public transport serves the area and has accessibility provisions? ▪ Are there adequate waiting facilities at bus/taxi stand? ▪ Are pedestrian crossings easy to identify and safe to use? ▪ Is the road surface even and slip-resistant at pedestrian crossings?	[4.3.1.i] [5.2.8] [5.3]			

Legend:

Sr. No.	serial number
Drg. Ref.	drawing reference number
Code Ref.	refers to relevant clause of the accessibility code
Y	yes
N	no

Sr. No.	Drg. Ref.	Space/Element	Code Ref.	Y	N	Recommendations
		▪ Do traffic lights have visual and audible signs? ▪ Have tactile guidance blocks and guide rails provided at pedestrian crossings? ▪ Have medians and traffic islands at street level and have pass through facilities? ▪ Are all obstructions in the flow of pedestrian traffic easy to identify and avoid? ▪ Do streets have enough illumination for loss of vision? ▪ Is the surface of pathway level, smooth and non-slip? ▪ Are the edges of raised pathways protected? ▪ Are different pavement surfaces of easily identifiable color & texture? 1.3 Curb Ramps ▪ Are curb ramps provided to negotiate level differences at change of pavements? ▪ Are curb ramps located on all and opposite sides of street crossings? ▪ Are curb ramps placed outside of normal flow of traffic? ▪ Is the slope of curb ramp less than 1:8?	[5.2.11]			

Sr. No.	Drg. Ref.	Space/Element	Code Ref.	Y	N	Recommendations
		1.4 Signage ▪ Are accessible spaces and facilities identified with international symbol of accessibility? ▪ Are there direction signs indicating the location of accessible facilities? ▪ Are maps and information panels within easy sight lines of 36 in. and 72 in. height? ▪ Are signs easy to understand and of distinguishable colors? ▪ Are the signs supplemented with Braille lettering? ▪ Can the signs be read at night also? 1.5 Street Furniture ▪ Does the street furniture allow unobstructed flow of traffic? ▪ Are resting facilities provided at regular intervals not exceeding 200 m.? ▪ Do items of street furniture have adequate knee space and are within reach of wheelchair users? ▪ Are street side facilities usable in all weather conditions?				

Sr. No.	Drg. Ref.	Space/Element	Code Ref.	Y	N	Recommendations
		▪ Are items of street furniture usable at night also?				
		1.6 Public Toilets ▪ Is there provision of public toilet facilities at appropriate locations? ▪ Is the door to toilet wide enough to allow wheelchair entry? ▪ Are the toilet facilities accessible and usable? ▪ Are the toilet facilities available at all times? ▪ Are the toilet facilities in working order? ▪ Are toilet facilities easily identifiable?	[5.2.14]			
		1.7 Parking ▪ Are there accessible parking facilities? ▪ Is the number of accessible parking spaces according to the accessibility code? ▪ Is accessible parking located on the accessible route and closest to the accessible entrance or accessible lift? ▪ Is accessible parking space of wide enough size for vehicle as specified in the code?	[5.2.9]			

Sr. No.	Drg. Ref.	Space/Element	Code Ref.	Y	N	Recommendations
		▪ Is the minimum height clearance for indoor parking 8 feet? ▪ Is accessible parking marked with international symbol of accessibility? ▪ Are there enforcement procedures in effect to stop abuse of accessible parking facility? ▪ Are there marked drop off areas along accessible route on or near site? ▪ Is the drop off area identified with signage?				
		1.8 Accessible Route ▪ Is accessible route provided from public right of way to the entrance(s) of building(s) on site? ▪ Is the accessible route level, continuous, unobstructed, well lit and reasonably weather protected? ▪ Is the clear width of accessible route not less than 48 in.? ▪ Is the slope of the accessible route not more than 1:12 for new construction and 1:8 for existing development?	[5.2.1]			

Sr. No.	Drg. Ref.	Space/Element	Code Ref.	Y	N	Recommendations
		▪ Are the edges of accessible route protected where there is level drop of 18 in. or more? ▪ Are outside steps not less than 36 in. wide and having a tread not less than 11 in. and a riser not exceeding 6 in. in height? ▪ Have handrails been provided for guidance and support?				

Sr. No.	Drg. Ref.	Space/Element	Code Ref.	Y	N	Recommendations
		B.2 Internal Environment	[4.3.3] [6.1]			
		2.1 Accessible Route ▪ Is there a continuous, level, unobstructed and well illuminated route connecting all the accessible spaces within the building? ▪ Is the minimum width of accessible route not less than 48 in.? ▪ Does the accessible route allow for passing of wheelchairs at intervals not exceeding 100 ft.? ▪ Is the clear height of accessible route not less than 80 in.? ▪ Is the effective clear width of accessible route free of door swings and other obstructions? ▪ Does the accessible route provide all the information for wayfinding?	[6.2.1]			
		2.2 Corridors & Vestibules ▪ Is there enough space to maneuver between two sets of doors? ▪ Is the min. clear width of corridor unobstructed? ▪ Are the differences in level bridged by marked ramps and steps?				

Sr. No.	Drg. Ref.	Space/Element	Code Ref.	Y	N	Recommendations
		▪ Does the width of corridor allow maneuvering through the doors placed along its length, to accessible spaces?				
		2.3 Entrances ▪ Are the primary entrances to the building accessible? ▪ Is the approach to the entrance free of level obstructions? ▪ Is there enough space at the front and rear of entrance to accommodate wheelchair? ▪ Is the entrance door at least 33 in. wide? ▪ Can entrance door be operated by wheelchair bound person? ▪ Is the threshold level within allowable range of 0.75 in.? ▪ Are the accessible entrances clearly identifiable? ▪ Are the accessible entrances safe for all weather use? ▪ Are the accessible entrances properly illuminated at night?	[6.2.2]			
		2.4 Staircases ▪ Is the accessible staircase of a minimum width of 42 inches?	[6.2.3]			

Sr. No.	Drg. Ref.	Space/Element	Code Ref.	Y	N	Recommendations
		▪ Is there intermediate handrail installed for staircases of width of 72 in. or more? ▪ Does the accessible staircase have a tread width of not less than 11 in. and riser height not more than 7 in.? ▪ Does the handrail extend a min. of 12 in. beyond the stair ends? ▪ Are the treads of a non-slip surface? ▪ Is the location of accessible staircase easily identifiable? ▪ Do treads have a flush or rounded nosing? ▪ Have the landings provided with tactile warnings?				
		2.5 Ramps ▪ Is there an accessible ramp? ▪ Is the ramp slope not greater than 1:12? ▪ Is the ramp run not more than 48 ft. in one flight? ▪ Is the minimum width of ramp not less than 36 in.? ▪ Is the ramp clear of protruding objects and obstructions? ▪ Is the ramp surface non-slip? ▪ Is the ramp location clearly identified?	[6.2.3]			

Sr. No.	Drg. Ref.	Space/Element	Code Ref.	Y	N	Recommendations
		2.6 Lifts ▪ Is there requirement of an accessible lift? ▪ Does the accessible route serve the lift? ▪ Is the clear width of lift door not less than 30 in.? ▪ Are the lift controls within reach limits of wheelchair bound person not exceeding 48 in. in height? ▪ Is the cab provided with handrails on at least two sides? ▪ Are the handrails mounted at a height between 30 in. and 48 in. above floor level? ▪ Are control buttons provided with Braille translations? ▪ Is the lift provided with audible and visual announcements? ▪ Is the emergency intercom usable without voice communication? ▪ Is the elevator door easy to identify? ▪ Is the elevator easy to identify and locate?	[7.8]			
		2.7 Platform Lifts ▪ Is platform lift installed and in working order?	[7.8]			

Sr. No.	Drg. Ref.	Space/Element	Code Ref.	Y	N	Recommendations
		▪ Is the maximum level difference 100 in. where platform lift is installed? ▪ Is the lift structure enclosed for level change beyond 48 in.? ▪ Where inclined movement platforms are installed is the stair width not less than 36 in.? ▪ Is the min. clear size of platform 36"x48"? ▪ Is the clear height at platform not less than 80 in.? ▪ Are controls placed at a height not exceeding 48 in.?				
		2.8 Doors ▪ Is the clear width of door to accessible spaces not less than 33 in.? ▪ Can the doors be operated without much effort? ▪ Is the clear space on the handle side of door not less than 12 in.? ▪ Are there alternate access doors placed next to revolving doors and turnstiles? ▪ Are fully glazed doors marked with coloured bands at eye level?	[7.6]			

Sr. No.	Drg. Ref.	Space/Element	Code Ref.	Y	N	Recommendations
		▪ For double leaf doors, is the clear width of the active panel not less than 30 in.? ▪ Are door handles and latches placed at a height not exceeding 42 in.? ▪ Are door handles easy to grasp and operate? ▪ Do doors with automatic closers have an extra pull handle/bar? ▪ Is threshold level difference not more than 0.75 in.?				
		2.9 Toilet Facilities ▪ Is there accessible toilet at public toilet locations? ▪ Are the accessible toilets identified by proper signage? ▪ Is the door to the accessible toilet wide enough? ▪ Are the facilities in the accessible toilet usable? ▪ Is there enough space within the toilet for wheelchair maneuverability? ▪ Is there enough knee space under counters and basins? ▪ Are hot water pipes properly protected?	[7.3]			

Sr. No.	Drg. Ref.	Space/Element	Code Ref.	Y	N	Recommendations
		▪ Are water closets mounted at a height between 18 and 20 in.? ▪ Is the shower/tub provided with grab bars and seat? ▪ Is the water closet placed between 18 in. and 21 in. away from wall with grab bar? ▪ Is the floor of the toilet/bath slip resistant? ▪ Are faucets easy to grip and operate? ▪ Are flushing mechanisms within reach and easy to operate? ▪ Can the door be released from outside when locked from inside? ▪ Is there an alarm system in the bath room/toilet?				
		2.10 Railings & Handrails ▪ Are safety guards or railings provided at locations where level difference at adjacent surfaces exceeds 18 in.? ▪ Are handrails mounted at a height between 33 and 36 in.? ▪ Are handrails securely attached to walls/floors? ▪ Are handrails of diameter between 1 and 2 in.? ▪ Are handrails continuous throughout?	[7.7]			

Sr. No.	Drg. Ref.	Space/Element	Code Ref.	Y	N	Recommendations
		▪ Are low positioned fixtures at stairs, ramps and landings protected by handrails? ▪ Is the space between wall and wall mounted handrail between 1.5 and 2 in.? ▪ Do handrails extend at least 12 in. at end and start of stairs and ramp flights? ▪ Are handrails easy to identify and do not snag on clothes?				

Sr. No.	Drg. Ref.	Space/Element	Code Ref.	Y	N	Recommendations
		B.3 Emergency Egress	[8.1]			
		3.1 Space Standard ▪ Is gross floor area 5,000 sft. or more? ▪ Is occupant load 50 or more? ▪ Is farthest travel distance at one floor to exit is 100 ft. or more? ▪ What is the required number of accessible egress?	[8.2.2]			
		3.2 Continuous Egress ▪ Is there a continuous means of egress for emergency situations? ▪ Is the minimum width of accessible route for egress not less than 48 in.? ▪ Is the elevator fire-protected and operable on emergency power supply? ▪ Is ramp provided as alternate means of egress? ▪ Are exit signs provided with min. illumination level of 11 lux? ▪ Are exit signs operable on emergency power supply?	[8.2.3]			

Sr. No.	Drg. Ref.	Space/Element	Code Ref.	Y	N	Recommendations
		▪ Are warning alarms equipped with auditory as well as visual signals, and in working order?				
		3.3 Rescue Assistance ▪ Has the area of refuge been identified and marked? ▪ Is the minimum size of area of refuge 60"x78"? ▪ Has the rescue assistance plan been prepared and notified? ▪ When was the last evacuation drill conducted?	[8.3]			

B
SELECTED REFERENCES

The design guidelines and specifications given in this document are based on international accessibility standards as given in the following select list of bibliography that can also be referred to for additional information and material on requirements of accessibility provisions.

"Promotion of Non-Handicapping Physical Environments for Disabled Persons: Guidelines," UN Economic and Social Commission for Asia and the Pacific, (UN ESCAP), United Nations, New York, USA, 1995.

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