

PART III
Appendix D
Universal Accessibility

D.1 Scope

The aim of this Appendix is to set out the fundamental design and construction requirements and guidelines for different occupancy types, accessible to persons with permanent or temporary disabilities. The requirements and guidelines should be applicable for all buildings and facilities as shown in Table 3.D.1 for emergency evacuation provisions of Part 4 shall be applicable.

D.2 Terminologies

D.2.1 Definitions

For the purpose of this Part of the Code, the definitions/terminologies below shall be applicable:

ACCESSIBLE/ ADAPTABLE WASHROOM	Refers to a compartment with a water closet, wash basin, grab bars and other essential washroom accessories and with clear floor spaces at fixtures as per provision of this Code which a wheel chair user or any other person with disability can avail with ease and safety.
ACCESSIBLE/ ADAPTABLE WATER CLOSET COMPARTMENT	Refers to a compartment with adequate maneuvering space as per provision of this Code having a single water closet with grab bars installed to assist persons with disabilities.
ACCESSIBILITY	See Part 3 Chapter 1 definition.
ACCESSIBLE RAMP	See Part 3 Chapter 1 definition.
ACCESSIBILITY ROUTE	See Part 3 Chapter 1 definition.
ADAPTABLE	See Part 3 Chapter 1 definition.
AMBULANT DISABLED	Refers to any person who, with the help of prostheses (artificial limbs)/ orthotic/ crutches/canes/ sticks or any other walking aid, is able to walk on level plain or suitably graded steps with handrails complying the provision of this Code.

CIRCULATION PATH	See 'accessibility route'
CURB	Refers to a side barrier between a trafficable surface and adjacent area through level change.
CURB RAMP	Refers to a short ramp cutting through a curb or built on it to negotiate accessibility between levels, which may have a different gradient as per provisions of this Code than a conventional accessible ramp.
GRAB BAR	Refers to a bar of certain specification and height as per provision of this Code which is used for assisting to stabilize a person with disability for performing a particular function.
HANDRAIL AND GUARDS	See Part 4 Chapter 3.
OPERABLE PART	Refers to part or component of any equipment, appliance or fixture which is necessary to operate that equipment, appliance or fixture (for example, handle, lever, push-button etc.).
PERSONS WITH DISABILITIES	Refer to persons whose mobility and capacity to use a building or part there of or a facility are affected due to one or more physical and/or sensory disabilities or impairments. For the purpose of this Code, they will be categorized as following: (a) Wheelchair-bound (b) Ambulant disabled (c) Hearing impaired and (d) Visually impaired.
SYMBOL	Refers to the international symbol of access for persons with disabilities also known as International wheel-chair symbol.
WHEELCHAIR USER	Refers to a person with disability who is depended on a wheelchair for mobility.

D.3 Provisions For Accessibility

D.3.1 Barrier-Free Accessibility

The following building occupancies shall require barrier free accessibility for persons with disability in the areas or facilities as specified in Table 3.D.1.

Table 3.D.1: Requirements of Accessibility for Different Occupancies

Occupancy Type		Accessible Areas
Residential buildings	A3*, A5, MIXED	From public footpath and parking areas to the lift lobby, lift, from lift lobby to all housing units, at least one toilet per housing unit and all communal facilities
Hostels and dormitories	A4, MIXED	All public areas intended for access by staff, students or visitors and at least one room per every hundred rooms or portion thereof including access to public footpath and parking.
Schools, colleges, universities or other educational buildings	B1-B3, MIXED	All areas intended for access by staff, students or public use including access to public footpath and parking.
Hospitals, clinics, homes for the aged and Institutions for the physically challenged	D1, D2, C3	All areas intended for access by staff, patients, inmates or public use.
Office buildings	E1, E3, MIXED	All areas intended for access by employees or public including parking and at least one accessible toilet facility in each floor
Small shops and markets, Kitchen markets	F1, F3, MIXED	From parking and/or public footpath to sales counter service
Large shops and markets	F2, MIXED	All areas intended for access by employees or public including access to public footpath and parking.
Factories, workshops, industrial buildings and administration buildings in depots	G1, G2	All areas intended for access by employees or public use.

Occupancy Type		Accessible Areas
Religious buildings, crematoria	I1-I4, MIXED	All areas intended for access by worshippers or public including access to public footpath and parking.
Restaurants, food-courts, fast food outlets and other public eating outlets	I1-I4, MIXED	All areas intended for access by employees or public including access to public footpath and parking.
Cinemas, theatres, stadia or other places of assembly with permanent seating	I1-I5, MIXED	All areas intended for access by performers and areas prescribed by this Code for spectators or public use (Sections D.3.2.3 and D.3.2.5) including access to public footpath and parking.
Sports complexes, public gymnasiums and public swimming pools	I5	All areas intended for public access with at least one accessible shower compartment and one water closet compartment.
Stations, airports, river-ports, bus terminals, interchanges and other passenger transport terminal	MIXED	All areas intended for access by employees or public use including areas prescribed in Sec D.3.2.7.
Parking garage, private garage, repair garage and showrooms	K1-K3	Prescribed areas in accordance to Sections D.24 and D.25.
Note:*Excluding apartments without lift		

D.3.2 Minimum Accessible Provisions

D.3.2.1 Mess, dormitories and hostels

In residential occupancies such as mess, dormitories and hostels, at least one room in every 100 rooms or part thereof shall be accessible.

D.3.2.2 Hotels and lodging houses

In room based residential occupancies e.g. Hotels, lodging houses etc. at least one in every 200 guest-rooms or a portion thereof shall be made accessible.

D.3.2.3 Banks, ticketing offices and counter services

Public facilities with counter services, such as, banks, information desk, ticketing offices etc. at least one service counter shall be designated in accordance to the requirements of Sec D.13.

D.3.2.4 Large shops and markets, foyers and public concourses

In large shops and markets such as large departmental stores, shopping mall etc. seats shall be provided for persons with disabilities who are unable to stand or walk for long periods. There shall be at least one accessible toilet per floor connected to the accessible route within such facilities. Seats and free spaces for wheelchair users shall also be required in foyers and concourses of public buildings.

D.3.2.5 Movie theatres, theatres, stadiums or other places of fixed-seat assemblies

Assemblies with permanent fixed seats such as movie-theatres, theatres, stadium, indoor stadium etc. shall have one wheelchair space per every 150 seats or a portion thereof. Such spaces should be located at a level that is easy to access for the wheelchair users. Seat arrangements shall facilitate wheelchair users to sit with their able bodied companion together. All such assemblies shall facilitate accessible counter facilities and toilets for persons with disability within the accessible route.

D.3.2.6 Eating outlets

Eating outlets with fixed seats such as fast food shops, food courts etc. shall have one accessible wheelchair seating per 10 seats or portion thereof. Seat arrangements shall facilitate wheelchair users to sit with their able bodied companion together.

D.3.2.7 Public transport terminals, bus stops, railway stations

All public transport terminals including bus stops and railway stations shall be accessible to persons with disabilities. The waiting areas of all such facilities shall be provided with seats for such persons who are unable to stand for long periods. Aisles for movement in such spaces shall be not less than 1200 mm.

Necessary signs and symbols shall denote the accessible routes and facilities within or outside all such buildings or facilities where 'Tactile indicators' shall guide the passengers from public footpath and accessible parking areas to specific ticket counter, waiting areas, toilets and other service facilities, arrival and departure platforms and to exits.

Doors of all public transports shall be accessible universally. Minimum clearance of all such doors shall be 900 mm. All such public transport should have at least two designated seats per coach near the door reserved for people with disability. A stall for a wheel chair per coach near the door should also be designated with provision for wheel stop blocks, safety bar with safety straps and adequate signage.

In all public railway carriages with toilet or dining facilities, the aisle width within the carriage should be at least 1200 mm.

It is preferable that there should be no level change between the platform level and the deck of the transport in use. However, where such level differences occur, ramp or lift facilities should be available to ensure universal accessibility.

D.4 Minimum Space Allowances

D.4.1 Minimum Space Requirement for Wheel Chair Users

Depending upon the nearest obstruction and the direction of movement a wheelchair user shall be considered for two approaches and shall require a minimum of 900 mm x 1200 mm unobstructed floor area as shown in Figure 3.D.1.

To facilitate both parallel and forward approaches for wheelchair users, a minimum clear floor space of 1200 mm x 1200 mm, as shown in Figure 3.D.2.

The minimum clear turning space for a manually operated wheel chair shall be 1500 mm x 1500 mm. For a powered wheel chair the requirement of turning space shall be 2250 mm x 2250 mm.

Where two wheelchairs are required to cross side by side, a minimum accessible clear width of 1800 mm shall be provided. The minimum width of an accessible route shall be 1200 mm, as shown in Figure 3.D.3.

D.4.2 Projection, Protrusion and Obstacles in an Accessible Route

All along the pedestrian areas accessible to persons with disabilities (e.g. walkways, halls, corridors, passageways etc.) any kind of obstacle, projection or protrusion shall be avoided. For all such areas an obstacle or projection or protrusion of 100 mm or less from side walls within the circulation space may be exempted. When such protrusion is more than 100 mm, the bottom edge of the protruding object shall not be more than 580 mm above the floor level, as illustrated in Figure 3.D.4. Such projections or protrusions shall not reduce the clear width required for an accessible route or maneuvering space; to provide such protruding objects, space shall be provided to accommodate those objects in addition to the required clear width.

The minimum clearance for headroom in all accessible areas such as walkways, halls, corridors, passageways or aisles shall be 2000 mm. Any free standing post or object on or beside an accessible route shall follow the guidelines of Figure 3.D.5.

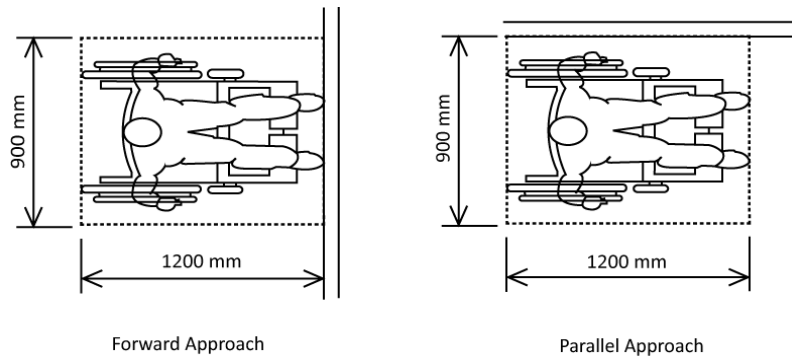


Figure 3.D.1 Minimum clear floor space

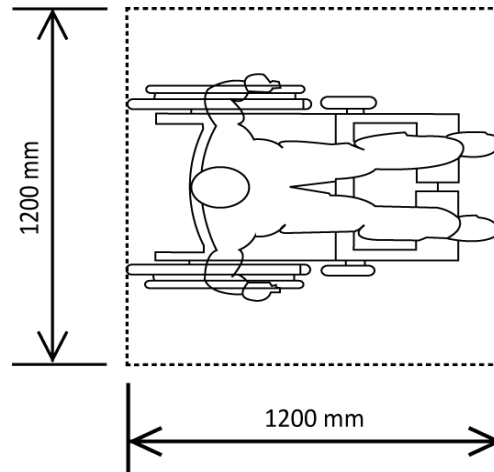


Figure 3.D.2 Minimum clear floor space (both frontal parallel approach)

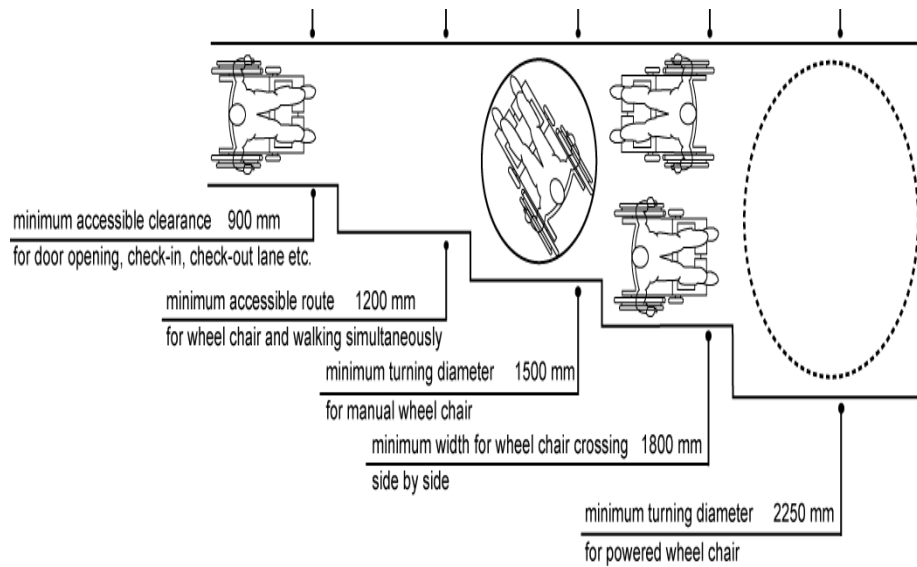


Figure 3.D.3 Minimum width of accessible routes

D.5 Surface Quality of Floor Space

D.5.1 General

All pavement or floor surfaces required to be accessible shall be firm, even, slip-resistant and stable. Any change of level of such surfaces shall be negotiated in compliance with Sec D.5.2 or through accessible lifts as per provision of this Code. To assist persons with visual impairment, such floors or their skirting shall have finishes of contrasting color with adjacent walls.

D.5.2 Change in Level

Any change of level in an accessible route shall generally have gradient of at least 1 vertical to 12 horizontal towards the direction of travel. All such slopes shall have special markings with contrasting colors at the top and the bottom of the ramp or on the ramp slope as shown in Figure 3.D.6.

However, for change of vertical level up to 150 mm within any accessible route a steeper slope may be allowed in accordance to Table 3.D.2.

Since for some ambulant disabled persons, steps are convenient and safer to use than ramps, accessibility provision by both ramps and steps should be given.

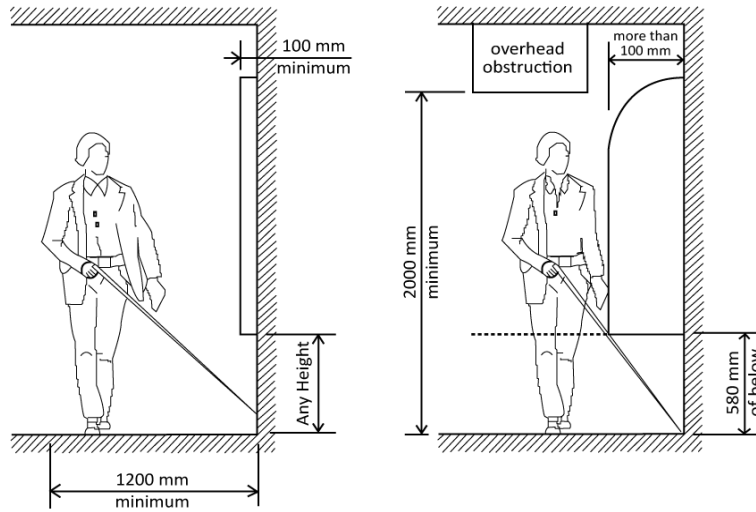


Figure 3.D.4 Limit of protruding objects

D.5.3 Gratings

For safety of people with disabilities, the elevation of gratings located on an accessible route shall be at the same level and aligned perpendicular to the direction of travel. The gap of such gratings shall not be more than 12 mm at any direction.

D.5.4 Surface Texture

In an accessible route, apart from the general requirement of Sec D.5.1, floor surfaces with tactile indicators shall be required. In such cases dot type surface texture on floor shall indicate a warning, while line type surface texture on floor shall indicate the intended path of travel.

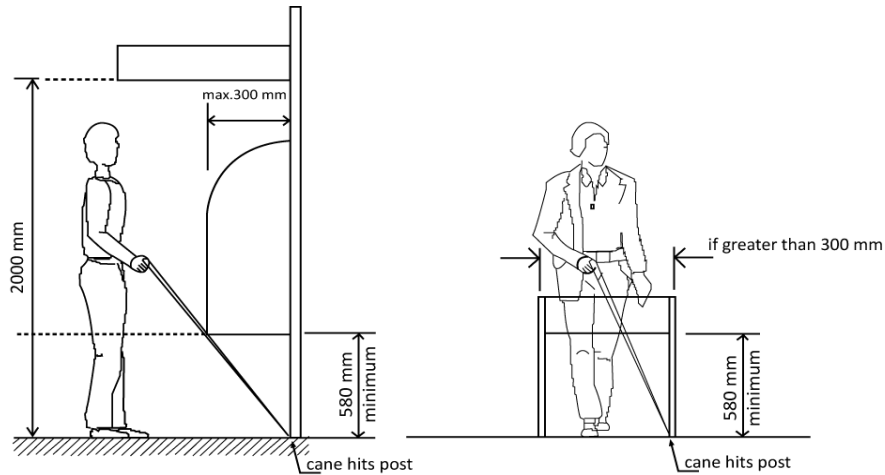


Figure 3.D.5 Limit for free-standing objects mounted on post

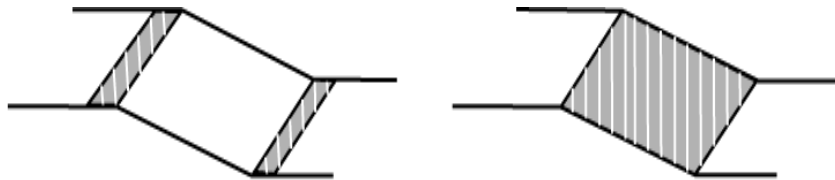


Figure 3.D.6 Markings on an internal ramp

Table 3.D.2: Gradient for Changes in Levels

Maximum Vertical Change of Level (mm)	Maximum Allowable Length (mm)	Maximum Slope Ratio
0 to 75	600	1 vertical to 8 horizontal
more than 75 to 150	1500	1 vertical to 10 horizontal
More than 150	9000	1 vertical to 12 horizontal

D.6 Approaches

D.6.1 Public Access Ways

The minimum unobstructed width of an accessible public access way such as footpath, corridor, foot over bridge, under pass etc. shall be 1200 mm. All such ways shall have a 1500 mm x 1500 mm space per every 30 m of length to facilitate crossing or turning of users. However for pathways with width of 1500 mm or more no additional width shall be required. The minimum access width shall not be encroached by obstruction or protrusion of any kind and shall comply with provisions of Sec D.4.2.

D.6.2 Vehicular Approach to Building

To facilitate persons with disability approaching by vehicles the driveway, walkway and accessible parking surfaces within a site shall either be merged to a common level or be connected by ramp (Sec D.5.2 and Table 3.D.2).

For occupancies mentioned in Sec D.3.2, at least one accessible route leading to an accessible entrance of the building shall be provided from the descending and boarding point of vehicle parking lots for persons with disabilities.

D.6.3 Access to Building

All accessible buildings or facilities as specified in Sec D.3 shall have at least one accessible entrance door, located preferably with the main entrance and connected to an accessible route which shall be minimum 1200 mm wide. All accessible entrance doors shall comply with the provisions of Sec D.8.

D.6.3.1 Directional signs

To direct persons with disabilities to the accessible entrance/directional signs bearing the symbol shall be displayed at all other non-accessible entrances and accessible parking areas.

D.7 Accessible Routes, Corridors or Paths

D.7.1 Length Width and Height

Any accessible route should not be more than 30 m of length at a stretch. Where such routes exceed this limit, provisions of seating preferably with shading shall be required to reduce strain of persons with disability. The minimum width of all accessible routes shall comply with the provisions of Sections D.4 and D.6.1. Where one way accessible check-in or check-out lanes are provided, the minimum width shall be 900 mm. The minimum height or headroom clearance for any accessible route shall be 2000 mm all along its path of travel.

D.7.2 Surface Finishes

All surfaces, edges, ends and corners of surrounding building and finish materials along an accessible route shall be free from sharp edges and shall comply with provisions of Sec D.5.

D.7.3 Obstruction or Protrusion on Accessible Route

An accessible route shall be free from any kind of obstruction or protrusion. The minimum circulation space required for persons with disability in such route shall not be impeded or obstructed by projection or protrusion from side walls, overhead planes or from floor below.

If incase vertical obstacles such as posts, bollards etc. are inevitable on or beside an accessible route there shall be at least 900 mm clearance between them to allow through circulation. Overhead obstacles such as drop beam, signboards, canopies etc. shall have a minimum clearance of 2000 mm from the floor level of the accessible route. All possible obstacles shall have color contrast with their background to ensure clear visibility.

Protrusion from side walls on or beside an accessible route shall follow the guidelines of Sections D.4.1 and D.4.2. Projections or protrusions shall not reduce the clear width requirement for an accessible route; when such protruding objects shall be there, space shall be provided to accommodate those objects in addition to the required clear width.

D.7.4 Warning for Overhead Hazard

The minimum clear headroom in all accessible areas shall comply with Sec D.4. Whenever the headroom of an area adjoining an accessible route is less than 2000 mm, a detectable guardrail having its detectable edge at or below 580 mm from the floor level shall be provided as shown in Figure 3.D.7 to warn persons with visual impairment.

D.7.5 Physical Cue and Tactile Guidance

All accessible routes shall have provisions for physical cues and tactile guidance for persons with disability as per provisions of Sections D.5.4 and D.29.

D.8 Accessible Doors

D.8.1 General

An accessible doorway shall ensure the access of all people with specific provisions for unassisted wheelchair users safely and without inconvenience. For occupancies mentioned in Sec D.3.1, if revolving doors or turnstiles are required an ancillary swing door with a clear opening of minimum 900 mm shall be required to ensure accessibility.

The door threshold should preferably be at the same level with the floor. However if absolutely necessary, the allowed level change shall be maximum 20 mm from the floor level and shall be sloped to allow wheelchair access. All accessible bathroom and toilet doors should swing outwards to facilitate external emergency assistance. Accessible door shall have color contrast with its adjacent walls.

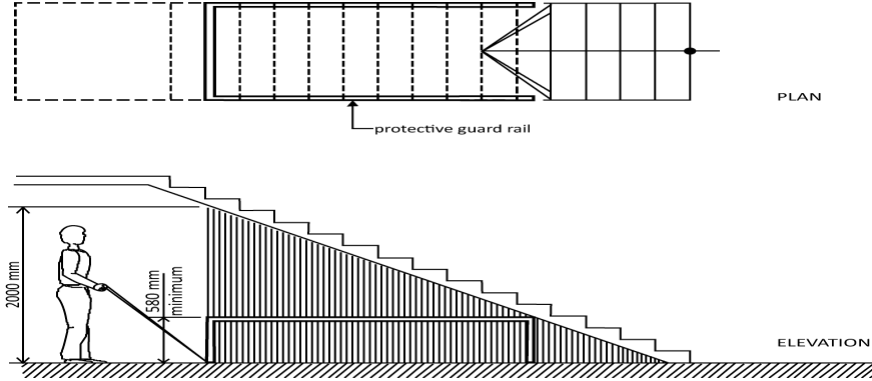


Figure 3.D.7 Protection from overhead hazard

D.8.2 Width of Accessible Door

A single leaf of any accessible doorway shall be 900 mm minimum measured between the face of the door leaf open at 90° and the face of the opposite jamb as illustrated in Figure 3.D.8. Where doorways have double-leaf at least one operable leaf shall allow 900 mm clearance to ensure accessibility.

D.8.3 Unobstructed Spaces for Operating Doors

All accessible swing doors shall have unobstructed spaces for wheelchair users on both side of the door leaf. In such cases the side, in which the door leaf swings open, shall be known as pull side while the opposite as push side. The requirement of unobstructed spaces in both the sides shall be in compliance with Figure 3.D.9.

Where two-way swing doors are used in an accessible route, both side shall be considered as pull sides and a vision panel complying with provisions of Sec D.8.5 shall be provided.

D.8.4 Door Operating Hardware

If not automatic, all accessories required for operating an accessible door such as door handles, fasteners, locks etc. shall be manually operable by one hand with ease. The height of all such accessories shall be within the range of 900 mm to 1100 mm from the floor level. Door handles are recommended over door knobs as knobs may be harder to operate for persons with grip difficulties, Figure 3.D.10.

D.8.5 Vision Panels

For the safety of ambulant disables or wheelchair users, all two-way swing doors across any accessible route shall have transparent vision panels as shown in Figure 3.D.11; where the bottom edge of such panels shall not be higher than 800 mm while the top edge of the panel shall not be less than 1500 mm, both measured from the floor level. The width of the viewing panel shall be not less than 150 mm. Such panels shall always be located at the opposite end of the hinged end on a door leaf.

D.8.6 Turnstiles

Whenever a turnstile is placed on an accessible route, an accessible gate with a clear width of at least 900 mm should be provided beside a turnstile, Figure 3.D.12.

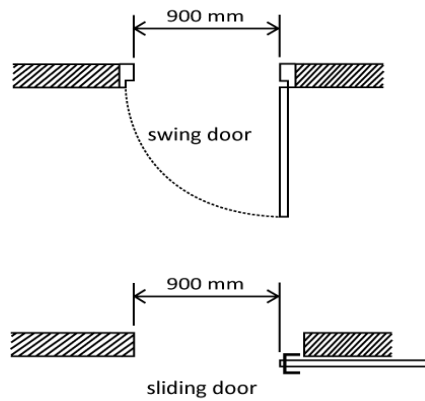


Figure 3.D.8 Clear width of accessible door

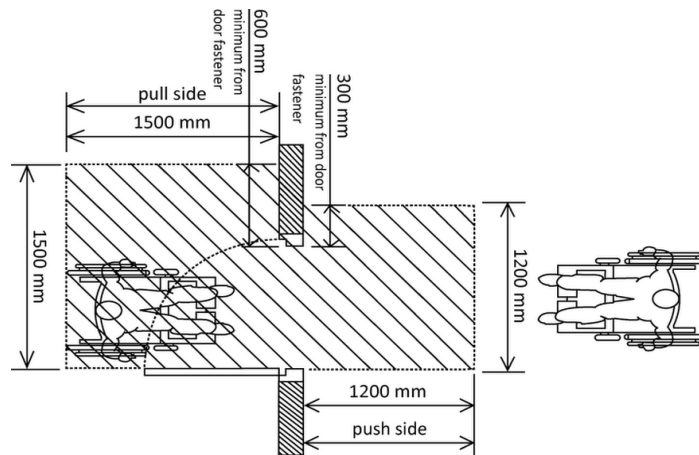


Figure 3.D.9 Minimum unobstructed space at doorway

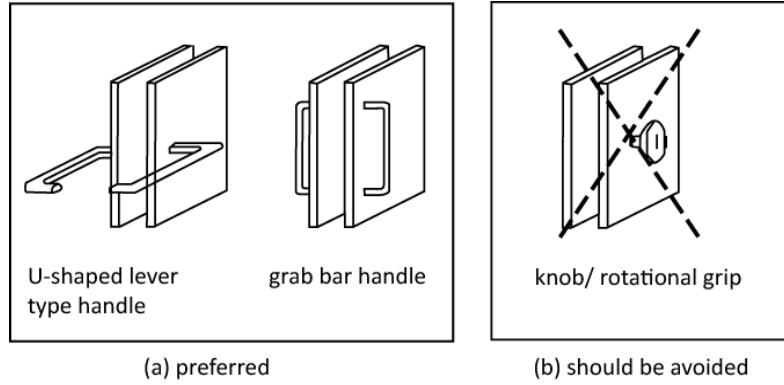


Figure 3.D.10 Preference of door handles

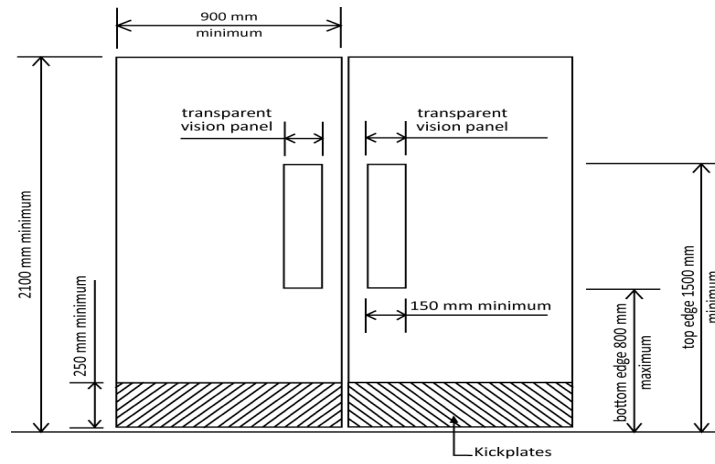


Figure 3.D.11 Dimensions and location of vision panel

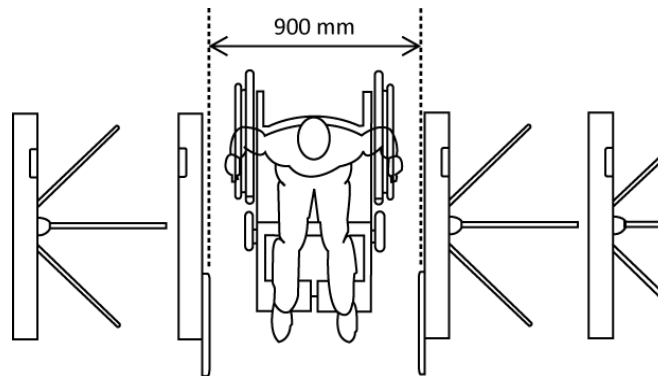


Figure 3.D.12 Access provision for turnstiles

D.9 Handrails and Grab Bars

D.9.1 General

Handrails and grab bars are very important safety features for any accessible facility. Therefore all such rails and bars shall be of accurate size and shape, slip-resistant, free of sharp or abrasive finishes and shall firmly hold with the supporting walls or floors or other form of supports. All such handrails shall have continuous gripping surfaces at a constant height throughout their length so that persons with disability do not lose balance due to loss of grip. There shall not be any sharp edges or corners in a handrail and a grab bar that may pose risk of injury. Handrail and grab bars should have color contrast with the background. Such handrails and grab bars shall not encroach on the minimum clear space for circulation.

D.9.2 Specific Requirements for Handrails and Grab Bars

All handrails in any accessible facility shall have a circular section of 35 mm to 50 mm external diameter or an equivalent gripping surface of any other section. The clearance between such hand rails and its adjacent wall shall be between 40 mm to 60 mm as shown in Figure 3.D.13.

Any recess containing a handrail shall have at least 450 mm clearance above the top of the rail as shown in Figure 3.D.13. Height of such handrails shall be within a range of 850 mm to 950 mm measured from the floor or in case of a stair from the nosing.

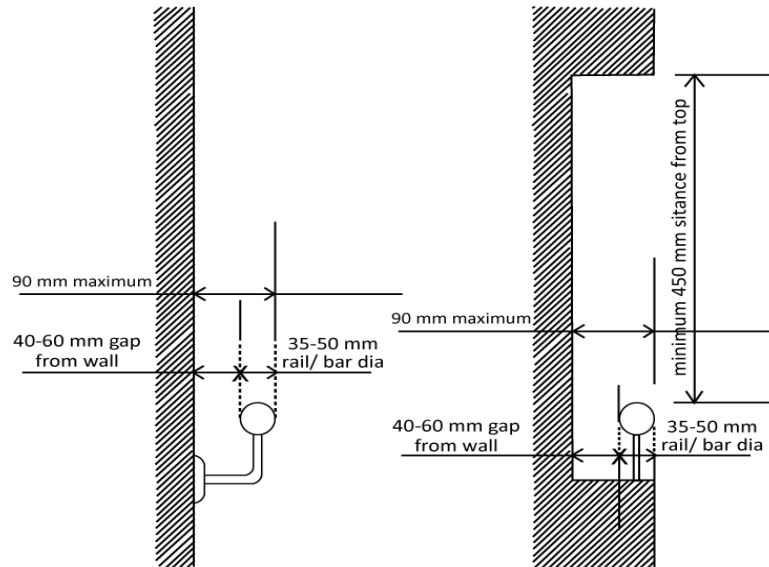


Figure 3.D.13 Handrails

D.9.3 Structural Strength

All hand rails and grab bars in an accessible facility shall be designed and built to resist a force of at least 1.3 kN applied vertically or horizontally.

D.10 Curb Ramps

D.10.1 General

Curb ramps in an accessible route should be kept within the pedestrian part of the circulation route and should not protrude within the vehicular area. If such protrusion is unavoidable, the curb ramps should be constructed with flared sides with gradient specified in Sec D.10.2. Such ramps do not require handrails as long as the level change is not greater than 150 mm.

D.10.2 Gradient, Width and Surface of Curb ramp

The gradient of a curb ramp shall follow the provisions of Table 3.D.2. The width of a curb ramp shall not be less than 900 mm. Where the vertical change of level is greater than 150 mm or the horizontal run is more than 1500 mm, it shall constitute an accessible ramp and shall conform to the requirements of Sec D.11. All surfaces of curb ramps shall be slip-resistant and shall have a detectable warning surface of contrasting color and texture complying with provisions of Sec D.29 for visually impaired persons. Curb ramps with flared sides shall not be steeper than 1:10 and shall follow the specifications shown in Figure 3.D.14.

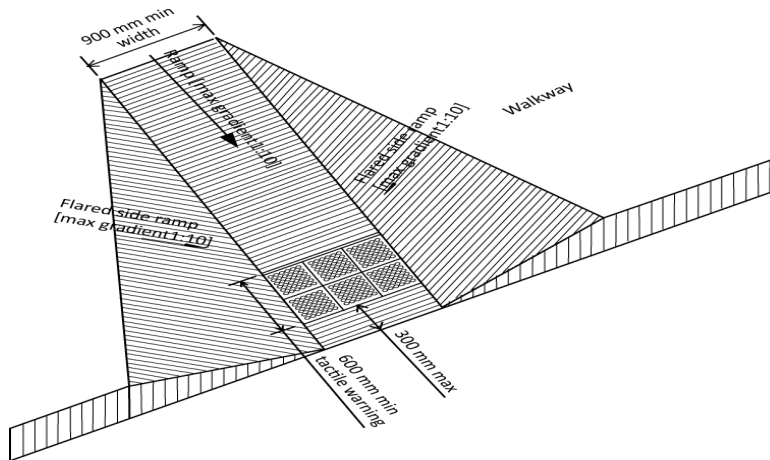


Figure 3.D.14 Curb ramp with flared sides

D.10.3 Location of Curb Ramps

All curb ramps should be built within the pedestrian zone and should not protrude to parking or any other vehicular area. However, in locations such as street crossing, road islands, road dividers and so on, curb ramps shall strictly be located within the pedestrian areas and shall follow the guidelines of Figure 3.D.15 and 3.D.16.

D.11 Accessible Ramps

Accessible ramps shall be used to provide connectivity between levels having height difference of more than 150 mm within a facility which are not served by accessible lift facilities. All such ramps shall comply with the provisions of Sections D.4 and D.5.

D.11.1 Gradient, Width and Surface of Accessible Ramp

The gradient of an accessible ramp shall follow the provisions of Table 3.D.2. The width of an accessible ramp shall not be less than 1200 mm. All surfaces of curb ramps shall be slip-resistant and shall have a detectable warning surface of contrasting color and texture complying with provisions of Sec D.29 for visually impaired persons. Where the horizontal run of an accessible ramp exceeds 9.0 m in length, there shall be a landing of at least 1500 mm length with tactile warning surface as shown in Figures 3.D.17 and 3.D.18. All such ramps shall have hand rails on both sides complying with provisions of Sec D.9.

D.12 Accessible Stairs

D.12.1 General

Stairs cannot provide accessibility for all persons with disability. Therefore stairs can only be an optional requirement for the ambulant disabled along with lifts or ramps. Any such stair or staircase should comply with the requirements of Sections D.12.2 to D.12.4. All handrail of accessible ramp shall have extensions either to floor or to wall as shown in Figure 3.D.19. For safety reason stairs with open risers or risers with projecting nosing

as shown in Figure 3.D.20 shall not be considered as accessible stair for ambulant disabled.

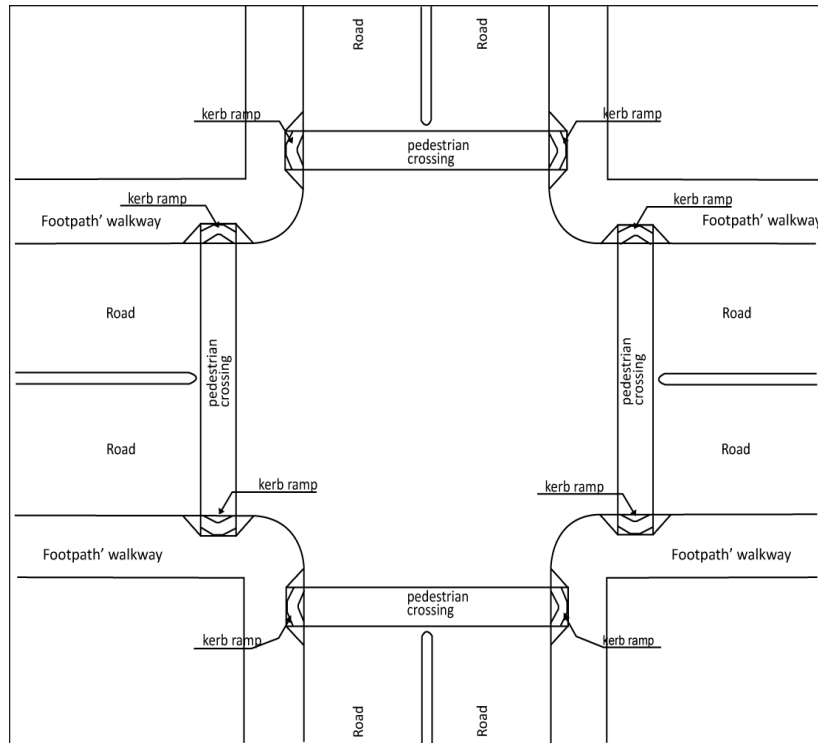


Figure 3.D.15 Location of curb ramp at street crossing

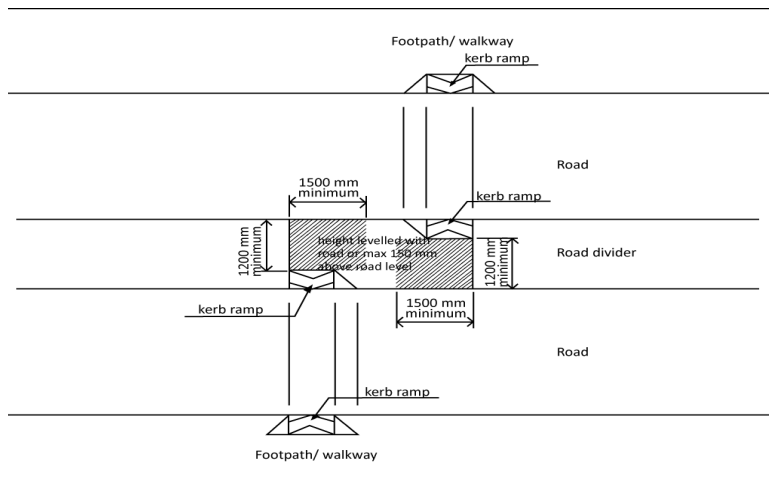


Figure 3.D.16 Location at road dividers

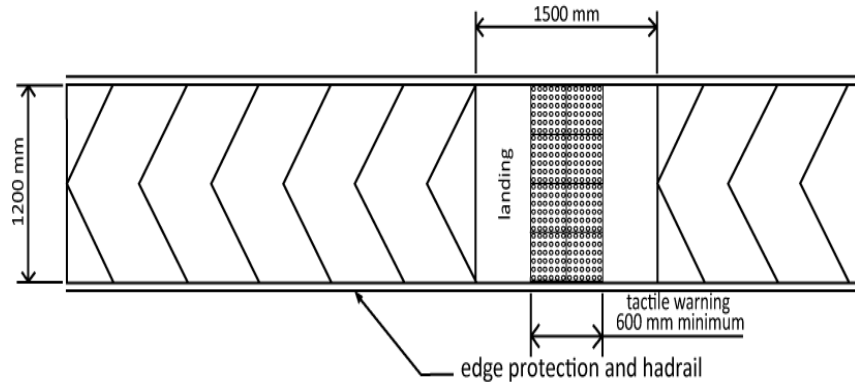


Figure 3.D.17 Plan of straight ramp and landing

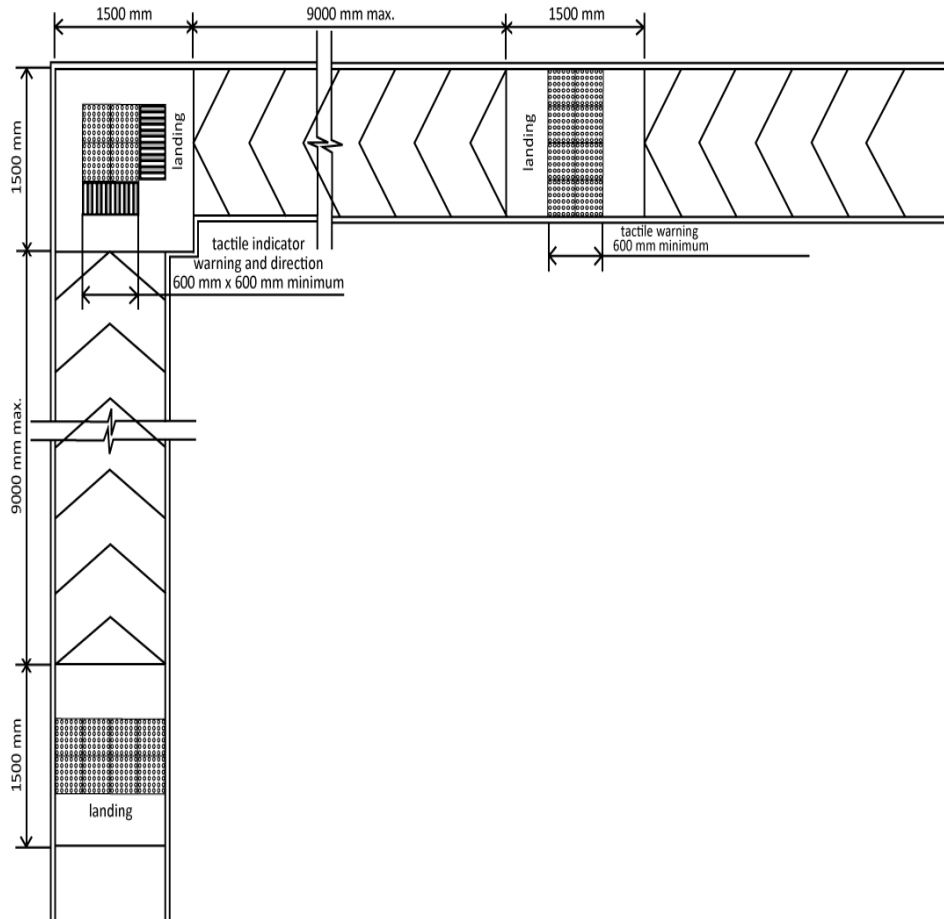


Figure 3.D.18 Plan of right-angled ramp and landing

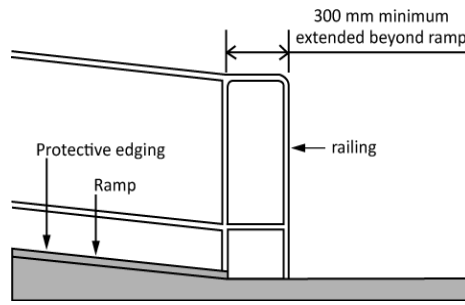


Figure 3.D.19 Hand rail extension (to floor or wall)

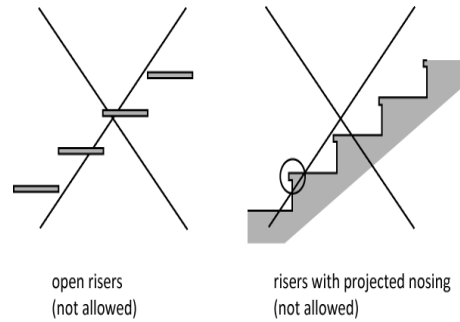


Figure 3.D.20 Stair detail

D.12.2 Tread, Riser and Nosing

All continuous flights of steps shall have uniform riser height of maximum 150 mm and tread width of minimum 300 mm. The risers shall be either vertical or receded back as per guidelines of Figure 3.D.21.

All steps should be fitted with contrasting visually detectable non-slip nosing as shown in Figure 3.D.21.

D.12.3 Warning Indicators

Stairs like any other level changes poses risks of accidents to persons with visual impairment. So all stairs in an accessible facility shall have detectable tactile warning strips provided at the top, bottom and intermediate landings in compliance to provisions of Sec D.29, Figures 3.D.21 and 3.D.22.

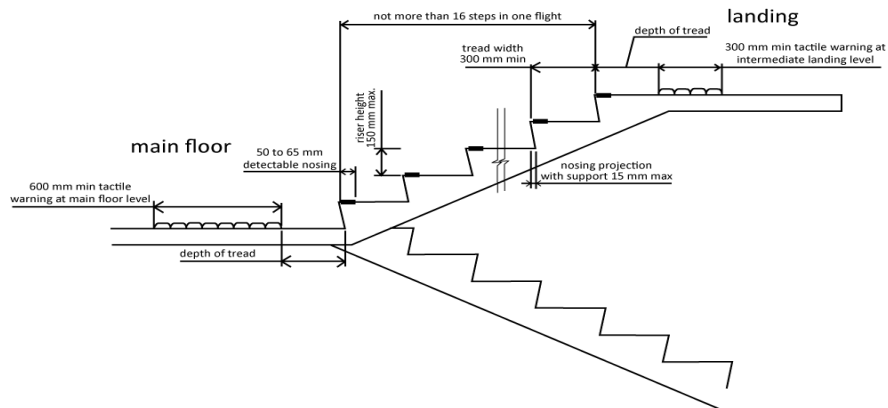


Figure 3.D.21 Tactile warning at beginning and ending of stairs and detectable edges

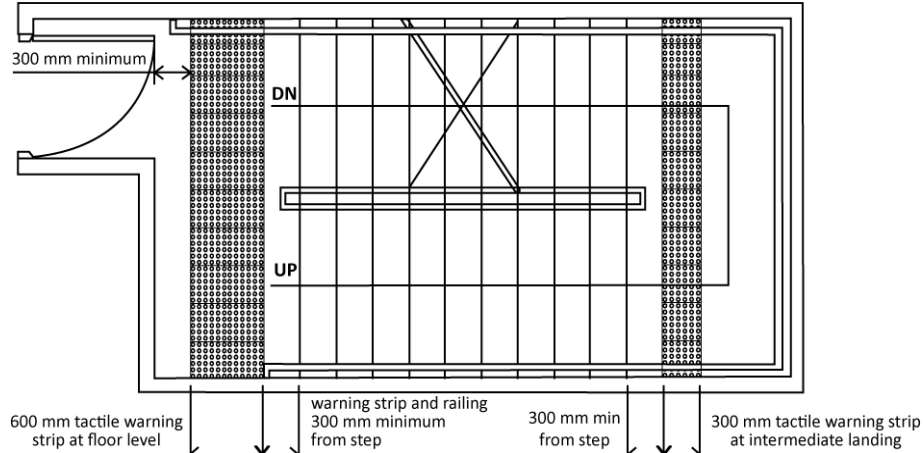


Figure 3.D.22 Tactile warning in staircase

D.12.4 Stair Handrails

Stair handrails shall comply with provisions of Sec D.9.2. Such handrails shall be installed on both sides of a stair as shown in Figure 3.D.23 and shall be installed between 800 mm and 900 mm height measured vertically from the pitch line of the steps to the top of the handrails. Stair handrails shall be continuous throughout the entire length of the stair and extend at least 300 mm beyond the top and bottom step as shown in Figure 3.D.23.

D.13 Accessible Seating Space and Counter Services

Any accessible seating space for wheelchair users such as work stations, tables, service counters in any building occupancy shall have a clear floor space not less than 900 mm x 1200 mm. Where a forward approach is required, the clear knee space shall be at least 900 mm wide, 480 mm deep and 700 mm high as shown in Figure 3.D.24. Writing surfaces or service counters shall not be more than 800 mm from the floor as shown in Figure 3.D.24.

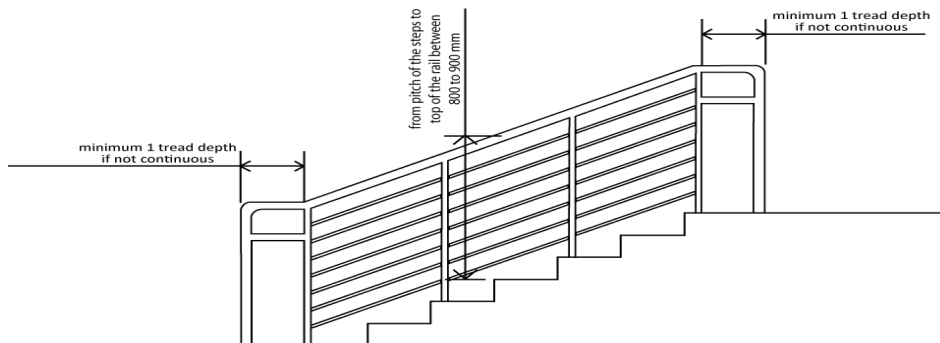


Figure 3.D.23 Handrail in stairway

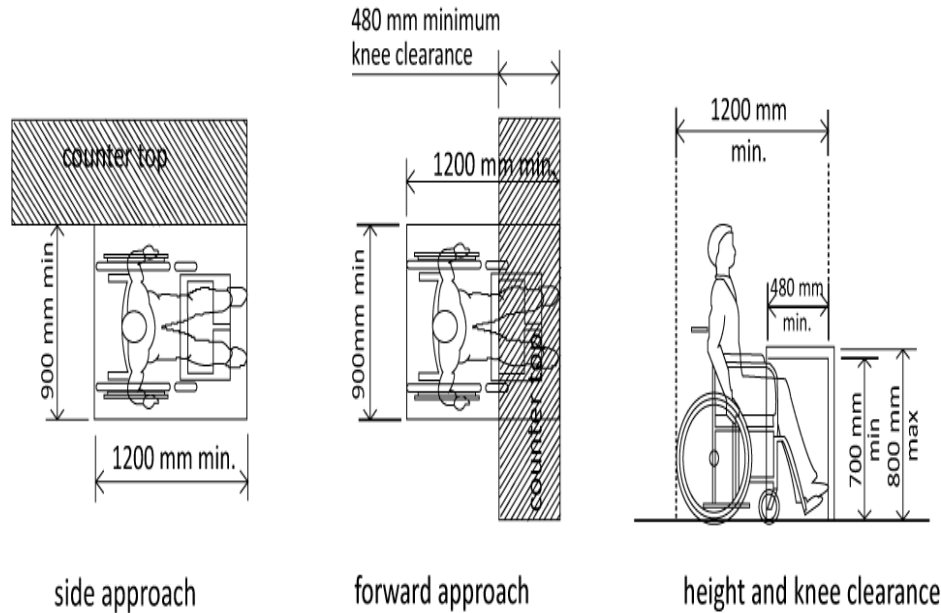


Figure 3.D.24 Forward or side approach to table or counter

D.14 Sanitary Provisions

D.14.1 General

In building occupancies described in Sec D.3, at least one toilet in each floor of a building or 5 percent of total toilets of the building, whichever is large, must be accessible. Among all accessible toilets preferably all or at least one shall be unisex in design provisions. The minimum dimension of an accessible WC compartment shall be 1500 mm x 1750 mm. All such toilets shall preferably have access directly from the accessible route. When they are part of a group of toilets, a clear approach path up to the accessible compartment with minimum of 1200 mm width shall be ensured. All accessible toilets shall have an emergency call button complying with the provisions of Sec D.17.

D.14.2 Fixtures and Accessories of Accessible Toilets

All fixtures in an accessible toilet shall abide by the provisions of this Section along with Sections D.16 and D.20 for minimum dimension, clearance from wall and other accessible clearances and limits along with minimum clear space for wheel chair maneuvering.

D.14.2.1 Accessible wash basin

All accessible basins shall comply with the provisions of Figure 3.D.25.

The faucets and other controls of such basins shall not involve powerful grasping or twisting of wrist and shall preferably be automatic or lever operated. If hot water provisions are there, proper insulation must be made to ensure safety of user.

D.14.2.2 Accessible water closet

The center line of a water closet in an accessible toilet shall maintain a distance of 460 mm to 480 mm from the adjacent sidewall. The front edge of such water closet shall be at least 750 mm away from the rear wall to allow side transfer for wheel chair users. The seating top shall have a height between 450 mm to 480 mm from the floor level. All such water closet shall have a back support to lean against it in the form of a seat lid or a flush tank or an added support. The flushing control if not automatic shall be located on the transfer side of the water closet. Figure 3.D.26 shows the basic requirements for such water closets.

D.14.2.3 Accessible urinals

Where urinals are provided, at least one shall be of wall hung type with a clear floor area of 750 mm x 1200 mm with level floor plane. The rim height of such urinals shall not be more than 400 mm measured from the floor. Any privacy shield on side shall have at least 120 mm clearance from the grab bars as shown in Figure 3.D.27. All such grab bars shall be installed as per provisions of Figure 3.D.27.

D.14.2.4 Washroom accessories

All washroom accessories such as towel rail, soap dispenser, waste bin, hand dryer, mirror, emergency call bell etc. shall be located within close proximity and shall comply with the provisions of Figure 3.D.28 and Sec D.17.

D.14.2.5 Signs at washroom entrances

All accessible toilets shall have clearly visible signs at washroom entrances complying with the provisions of Sections D.26.2 and D.27.

D.15 Doors of Accessible Washroom and Water Closet Compartment

Any door of an accessible washroom and water closet compartment in fully open position shall have an unobstructed opening of at least 900 mm. For such doors, pull and push bars, sufficient clearance at both pull and push side of the door for wheel chair maneuvering shall be provided in compliance with guidelines of Sec D.8, Figure 3.D.29 to 3.D.31. All doors for accessible washroom and water closet compartments should preferably swing outward.

D.16 Grab Bars

Any accessible toilet and bathing facility shall be mounted with at least two grab bars for each toilet fixtures except wash basin. The grab bars shall have a cross-sectional area complying with the provisions of Sec D.9. The length of such grab bars shall not be less than 600 mm. When both horizontal and vertical grab bars are required it is preferable that they should be continuous. All such grab bars shall follow the guidelines of Figure 3.D.28.

A horizontal grab bar mounted to the closest side wall of the water closet shall have a length starting from the rear wall and extending at least 450 mm beyond the front edge of the water closet and the same wall shall have a vertical grab bar as illustrated in Figures 3.D.31 to 3.D.33.

A foldable grab bar shall be mounted on the wider transfer side of the compartment as illustrated in Figures 3.D.26 and 3.D.29. Keeping a clearance of 380 mm to 400 mm from the center line of the water closet and same height with other grab bars. Foldable grab bars shall not extend more than 100 mm from the front edge of a water closet.

D.17 Emergency Call Bell

All accessible toilets, water closet compartments and wash rooms shall have a water proof emergency call bell in each compartment. Such emergency call bells shall be either push-button type or pull-chord type located for convenience of use at a height between 600 mm to 650 mm above the floor level. The buzzer of such call bells shall be so located that immediate attendance shall be available quickly.

D.18 Individual Water Closet Compartment

Any accessible water closet compartment for wheel chair users as required in Sec D.14.1 shall have a minimum internal dimension of 1500 mm x 1750 mm. All such water closet compartments shall comply with the provisions of Sections D.14.2.2, D.15, D.16, D.17, Figures 3.D.26 and 3.D.29.

D.19 Water Closet Compartment In Public Toilet

Any accessible water closet compartment for wheelchair users in a public toilet facility shall have a clear internal dimension of not less than 1500 mm x 1750 mm. All such water closet compartments shall comply with the provisions of Sections D.8, D.14.2.2, D.15, D.16, D.17 and Figure 3.D.30.

D.20 Bath Facilities

D.20.1 General

All residential occupancies, where accessible toilets are required by the provisions of Sec D.3, shall be provided with accessible bathing facilities either by providing bathtub complying with Sec D.20.2 or by providing shower stall complying with Sec D.20.3. Sports facilities and public swimming pools that need accessible provisions according to Sec D.3.1 shall also be provided with shower compartments in both male and female areas complying with Sec D.20.3.

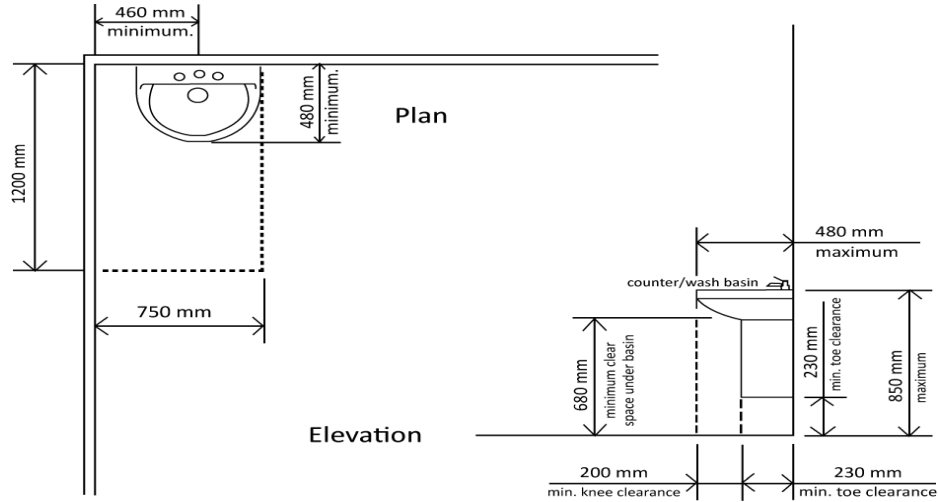


Figure 3.D.25 Details of accessible wash basin

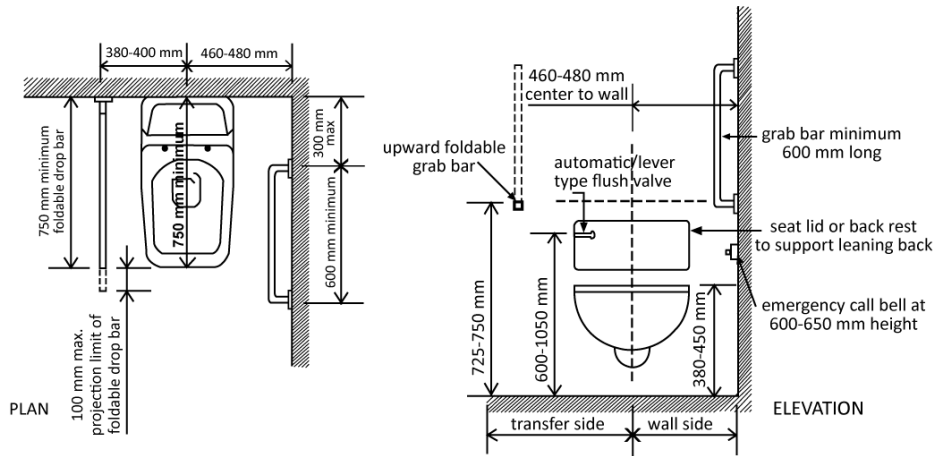


Figure 3.D.26 Accessible water closet for wheel chair users

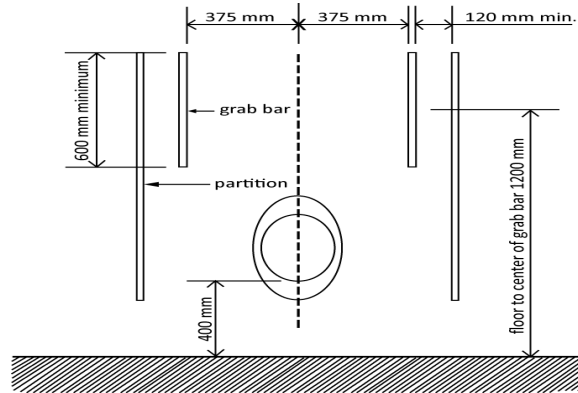


Figure 3.D.27 Basic dimensions for accessible urinals

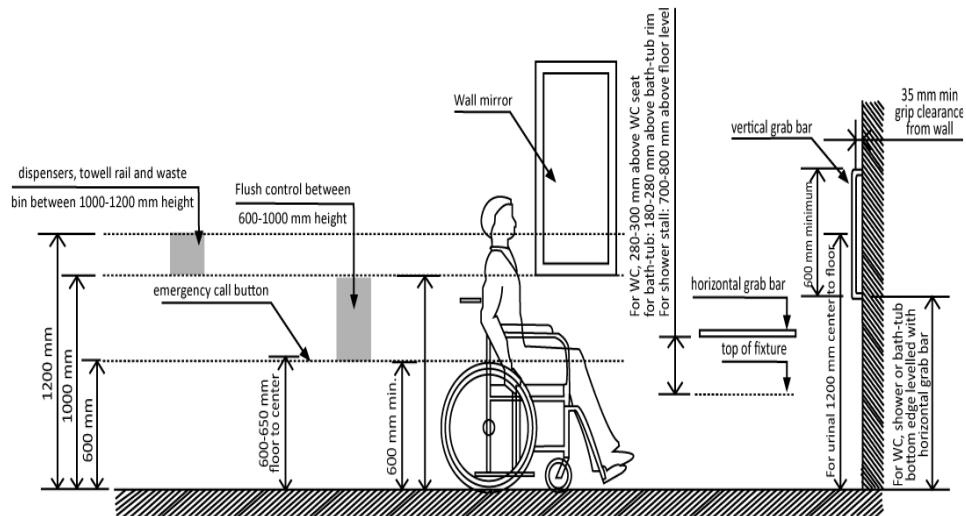


Figure 3.D.28 Standard dimensions for wash-room accessories and grab bars

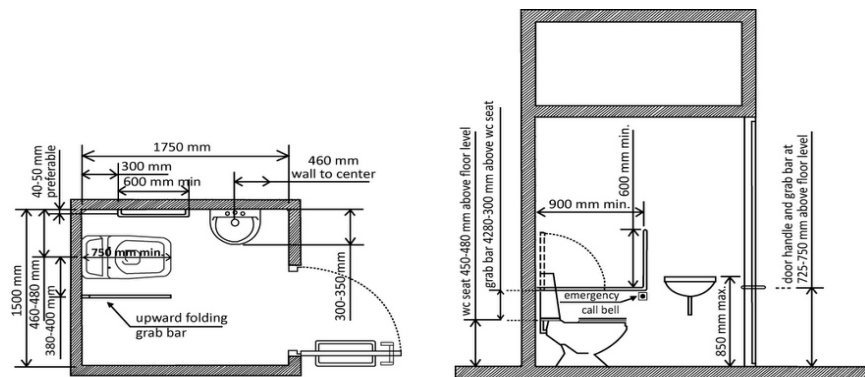
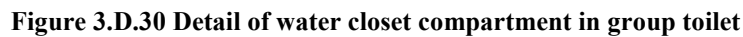


Figure 3.D.29 Water closet compartment for wheel chair users



Any accessible bathtub shall have a clear floor space of at least 750 mm x 1200 mm along its length as shown in Figure 3.D.31. A seat of at least 250 mm width along the entire length or width of such bathtub as shown in Figure 3.D.31 and shall be required. The floor of accessible bathtubs shall be slip resistant. The base of such bathtubs shall be slip-resistant. All accessible bathing facility shall have grab bars complying with Sec D.9 and with the provisions of Figures 3.D.31 and 3.D.32. Shower heads in such facilities shall be hand-held type with flexible cords and shall comply with the provisions of Figures 3.D.31 and 3.D.32. All other accessories of such facilities shall comply with Sec D.14.2.4.

An accessible shower stall shall have internal dimensions of at least 1500 mm x 1500 mm and shall comply with the provisions of Figure 3.D.33. The floor and seat of such accessible shower compartment shall be slip-resistant. The shower heads of such showers shall be hand-held type with flexible cord. All faucets and accessories of such shower compartments shall follow the guidelines of Sec D.14.2 and Figure 3.D.33. All such

shower compartments shall have grab bars in compliance with Sec D.9, Sec D.16 and Figure 3.D.33. Any level change of such floor shall not be more than 10 mm and shall be negotiated with a slope ratio of one vertical to two horizontal.

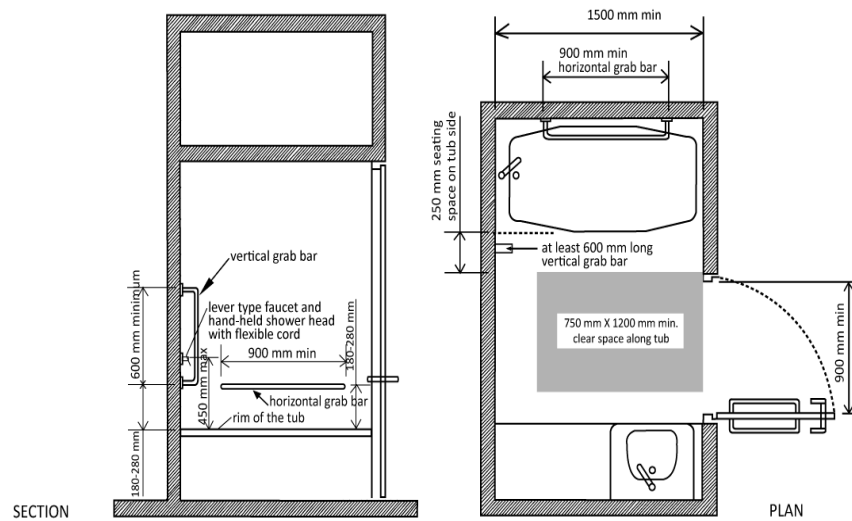


Figure 3.D.31 Bathtub for persons with disabilities

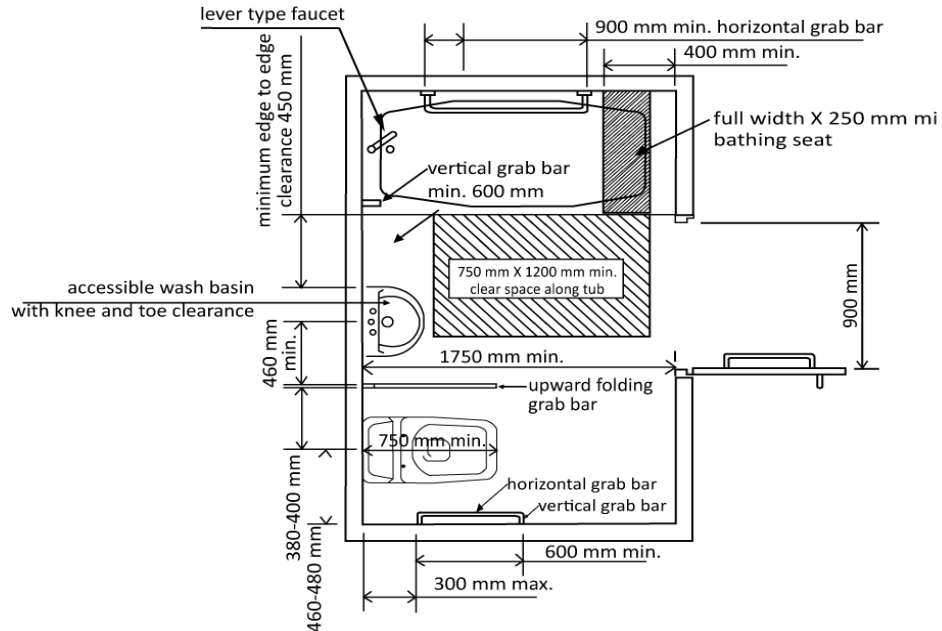
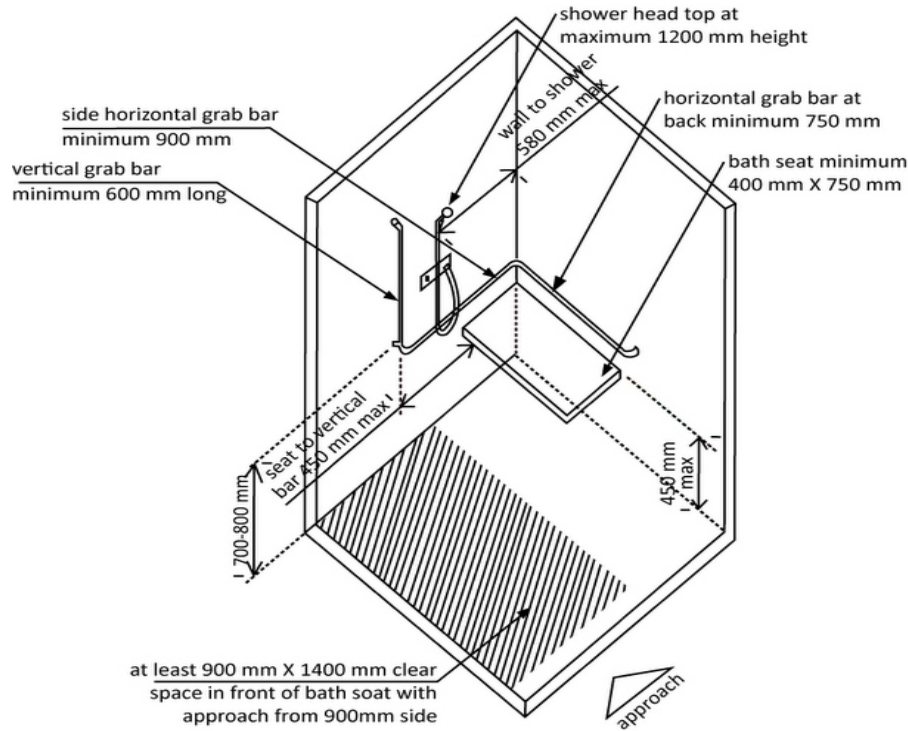


Figure 3.D.32 Layout plan for 3 fixture toilet



D.21 Kitchen Facilities

An accessible kitchen may have an open layout (e.g. pass-through type) or a closed layout (e.g. U-shaped). The open layout consists of a straight pass through aisle, which can be entered from both ends and where working top, appliances and cabinets are on two opposing sides as shown in Figure 3.D.34 (A). The clear width of such aisle shall be not less than 1015 mm.

The closed layout requires turning radius of a wheel-chair within the kitchen area resulting in a layout enclosed on three contiguous sides ensuring a minimum clearance of 1525 mm between all opposing cabinets, working tops, appliances and walls, as shown in Figure 3.D.34 (B).

All appliances shall be clearly approachable either by front approach or by parallel approach. Where a forward approach is provided, the clear floor or ground space shall provide knee and toe clearance as per provision of this Code. Knee and toe space under cooking range shall be insulated to prevent burns or abrasions or electrical shock. At least fifty percent of all cabinets and storage spaces shall be accessible as per provision of this Code. The height of the working top, sink, cooking range and all necessary appliances shall follow the guidelines for accessibility of this Code.

D.22 Lifts

D.22.1 General

Buildings, where lifts are needed as part of requirement by the building authority, should have at least one accessible lift for vertical circulation from the entrance level and serve all levels intended for use by persons with disabilities. Lift lobby for such facilities shall have a minimum dimension of 1500 mm × 1500 mm. The minimum size of an accessible lift car shall be 1500 mm × 1725 mm with a clear door opening of not less than 900 mm. Such accessible lifts shall follow the guidelines of Sec D.5 for floor finish, Sec D.9 for horizontal grab bar on back and side walls and the guidelines of Figure 3.D.35. All accessible lift shall have tactile marking and Braille on all buttons.

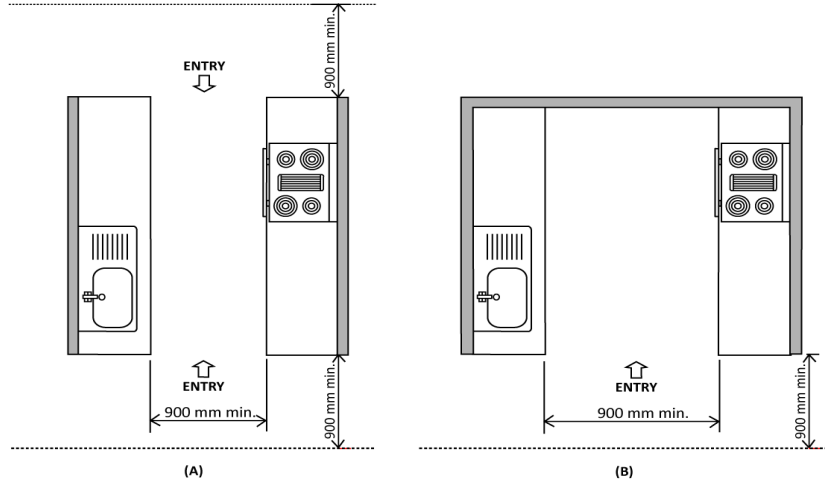


Figure 3.D.34 Accessible kitchen clearance

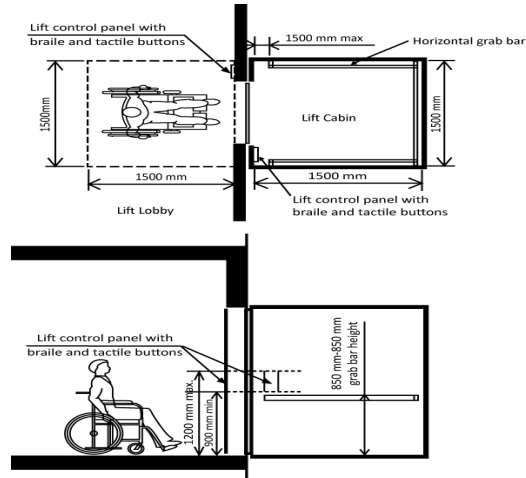


Figure 3.D.35 Lift for persons with disabilities

D.23 Eating Outlets

D.23.1 General

All eating outlets, with or without fixed seats, as mentioned in Sec D.3 shall have provisions of access for persons with disabilities complying with Sec D.23.2. Any aisle of circulation in such outlets shall be at least 1200 mm wide.

D.23.2 Seating

In an accessible eating outlet, the minimum clear space between seats in the required number of accessible tables shall be 750 mm measured along the edge of the table as shown in Figure 3.D.36. All such tables provided for persons with disabilities shall comply with provisions of Figure 3.D.37. All such tables should be clearly marked with accessibility symbol and shall have directional signage for indicating location.

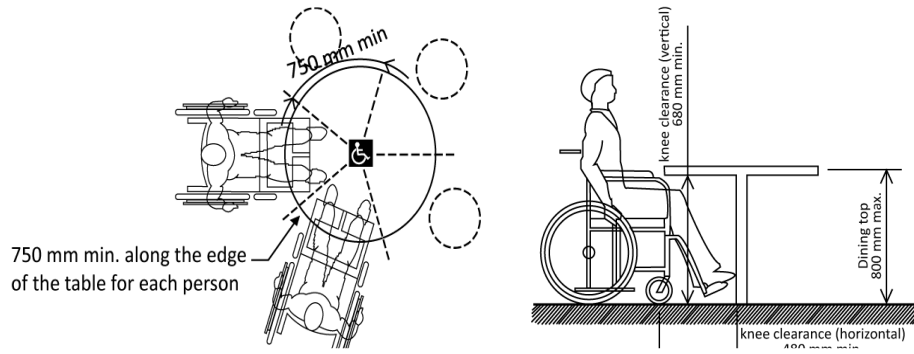


Figure 3.D.36 Space requirement for accessible seating Figure 3.D.37 Clearance for accessible seating

D.24 Accessible Parking Area

D.24.1 Parking Provision

In all occupancies referred in Sec D.3 where vehicle parking is required, the number of accessible parking stalls for vehicles for persons with disabilities shall be in accordance with Table 3.D.3. Such parking lots should be located as nearer as possible to the accessible entrance of the building. Pedestrian accessible routes connecting accessible parking shall be such that it avoids the risk of collision between an ambulatory disabled person and a backing out vehicle in a parking lot. Such parking shall not be occupied by vehicles of persons without disability.

Table 3.D.3: Minimum Number of Accessible Parking Stalls

Number of vehicle park stalls	Number of accessible stalls
For first 50 stalls	1
Next 400 stalls	1 additional stall per 100 parking stalls or portion thereof
Above 450 stalls	6

D.24.2 Symbols and Signage

Each accessible parking stall shall be clearly designated with the symbol of access, in accordance with the requirements of Sec D.26.2.

Such Symbol shall be painted in contrasting color at the center of the accessible parking stall, having a dimension between 1000 mm × 1000 mm to 1500 mm × 1500 mm and complying with provisions of Sec D.26.2.

The symbol of accessible parking shall be displayed at all approaches and entrances of parking lot indicating the location of such parking within the lot. Directional signs shall be displayed at every change of direction to direct persons with disabilities or their vehicle to the point of accessible parking stall.

D.25 Accessible Vehicle Parking Stalls

The minimum dimension of an accessible vehicle parking stall shall be 4800 mm × 3200 mm. All such parking shall be provided on a firm, non-slippery, leveled solid surface and if possible, be covered. Figure 3.D.38 shows the detail of an accessible parking stall.

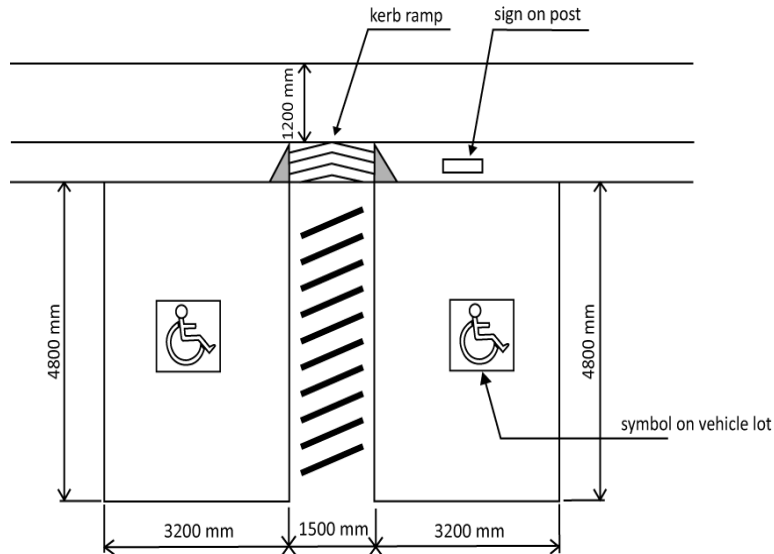


Figure 3.D.38 Accessible parking stall and approach

D.25.1 Signage

Any accessible parking lot shall be identified by the symbol of access in accordance with Sec D.26.2. The size and location of all signs should be such that they ensure clear visibility all along the accessible route.

D.26 The Symbol of Accessibility

D.26.1 General

The Symbol of Accessibility is an internationally accepted language that shall be permanently and clearly displayed to indicate and/or direct to the location of various accessible facilities in and around a building. All buildings or facilities mentioned in Sec D.3.1 shall display the required symbol of accessibility in compliance with the guidelines of this Code. Any such signs and symbols shall be simple, short and easy to understand. The text and use of pictographs shall be consistent throughout the building and outdoors in any accessible facility.

D.26.2 Symbol of Access

The form of the symbol of access shall consist a symbolized figure on a wheelchair and a contrasting plain square background as shown in Figure 3.D.39 where the symbolized figure shall be white on a blue background and shall always face to the right.

Any building that offers accessible facilities shall clearly display the symbol of access at road front. Inside the premise the symbol shall denote the location of the accessible facilities including accessible parking, accessible routes, entry and other accessible services and facilities for persons with disabilities.

D.26.3 Directional Signs

Whenever changes in direction occurs directional signs incorporating the symbol of access similar to Figure 3.D.40 shall be displayed. This shall include main lobbies, passageways and all points where there is a change of direction to direct persons with disabilities to various accessible functions and facilities such as lifts, entrances, toilets, car parks and the like.

Where the location of the designated facility is not obvious or is distant from the approach viewpoints, directional signs incorporating the symbol of access, as shown in Figure 3.D.41, should be placed along the route leading to the facility.



Figure 3.D.39 Symbol of access for persons with disabilities



Figure 3.D.40 Accessible directional sign

D.26.4 Service Identification Signs

Every accessible route shall contain service identification signs showing appropriate symbol of accessibility for persons with disabilities, as shown in Figure 3.D.42, to indicate the presence and direction to various service facilities such as entrances, lifts, telephone booths, toilets, vehicle parks, staircases and the like. Tactile pictographic signs shall distinguish between male and female toilets.



Figure 3.D.41 Signs directing to facility



Figure 3.D.42 Service Identification Signs at Destination

D.27 SIGNAGE

D.27.1 Specifications for Characters and Symbols

Letters and numbers, when put on signs shall be legible and shall be consistent in font type all along the accessible facility. Only 'CAPITAL LETTER's shall be used in such signage. Braille, if written, shall be located directly below the text or arrow in a signage.

D.27.2 The Size of Symbols

The size of symbols depending upon the distance, it is intended to be first viewed from shall vary and shall be in accordance with Table 3.D.4.

Table 3.D.4: Size of symbols varying with distance

Viewing distance (m)	Symbol size (mm)
Up to 7.0	60 × 60
7.0 to 18.0	100 × 100
Above 18.0	200 × 200 to 450 × 450

D.27.3 The Height of Letters

The height of letters in signs depending upon the distance, it is intended to be viewed from shall vary and shall be determined in accordance with Table 3.D.5.

Table 3.D.5: Height of letters varying with distance

Required viewing distance (m)	Minimum height of letters (mm)
1.5	50
2.0	60
2.5	100
3.0	120
4.5	150
6.0	200
8.0	250

D.27.4 Location of Signs

All signs shall be located such that they are clearly and legibly identifiable from an accessible route. Any change of direction in an accessible route shall always contain necessary directional signs for users. In case of internal signs the center line of the sign shall be at a height within the field of vision and preferably at 1500 mm above the floor level.

D.27.5 Tactile Characters or Symbols

Tactile characters or symbols when used on a sign shall have a size between 16 mm to 50 mm and shall be raised at least 0.8 mm above the background surface. All such signs shall be mounted at a height complying with Sec D.27.4.

D.27.6 Braille and Pictographs

When Braille, the tactile language, is used the Braille dot shall be raised in dome shape from the base and the sign shall be easy to touch and read. The height of all such signs shall comply with Sec D.27.4.

Pictographs, when used shall be supported by equivalent textual description placed directly below it.

D.28 Grading of Slip Resistance

For the purpose of accessibility, surface materials to be used as floor finishes should be graded for slip resistance in both dry and wet conditions. Table 3.D.6 indicates the slip resistance of some commonly used finish materials.

Table 3.D.6: Slip resistance grading

Grading	Co-efficient of surface friction	Example
Very good	More than 0.75	Clay tiles, carpets, dry rubber
Good	Between 0.75 to more than 0.4	Concrete pavers, dry terrazzo tiles, dry marble and granite
Poor to Fair	Between 0.4 to 0.2	Wet and polished terrazzo tiles, marble and granite
Very poor	Less than 0.2	Wet rubber

D.29 Tactile Ground Surface Indicators

D.29.1 Path of Travel and Mobility

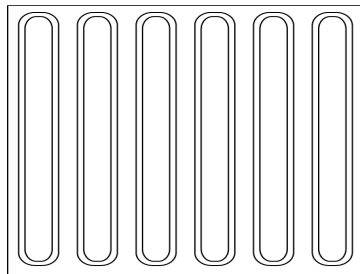
People with different forms of visual impairments can be assisted to find their way independently with the help of some physical or sensory cues e.g. landmarks and mind maps. For such users a predictable, logical and barrier free access route is required. Therefore all such path of travel dedicated to universal accessibility should be designed as free from barriers, hazards or obstructions along with physical and sensory cues for such users.

D.29.2 Physical Cues

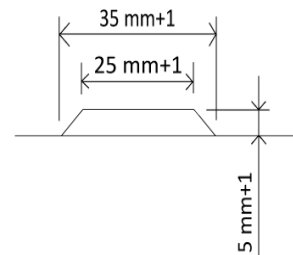
Physical cues are designed elements including buildings, walls, ground surfaces, railings, fences and curbs that can act as cues or clues to assist a visually impaired person. Such persons can identify physical cues either by use of a white cane, under foot, or by echo-location. All public buildings referred in Sec D.3 shall have physical cue both inside and outside the building to assist visually impaired persons.

Tactile ground indicators are designed physical cue to convey two important indications to visually impaired persons- a. directional indications and b. caution or warning indications.

Directional indicators, Figure 3.D.43, act as physical cues to guide persons with visual impairment to travel through an accessible route free from obstructions from beginning to end.



(a) Directional indicator: top view



(b) Directional indicator section detail

Figure 3.D.43 Directional indicators on ground of accessible route

Warning indicators are physical cues for warning users of an adjacent hazard or a destination. Such hazards include but not limit to level changes, change of direction, approaching vehicular roads, obstructions etc.

The pattern and dimensions of warning indicator are shown in Figure 3.D.44 (a) and (b).

Figure 3.D.45 shows the combined use of both directional and warning tactile indicators in an accessible route.

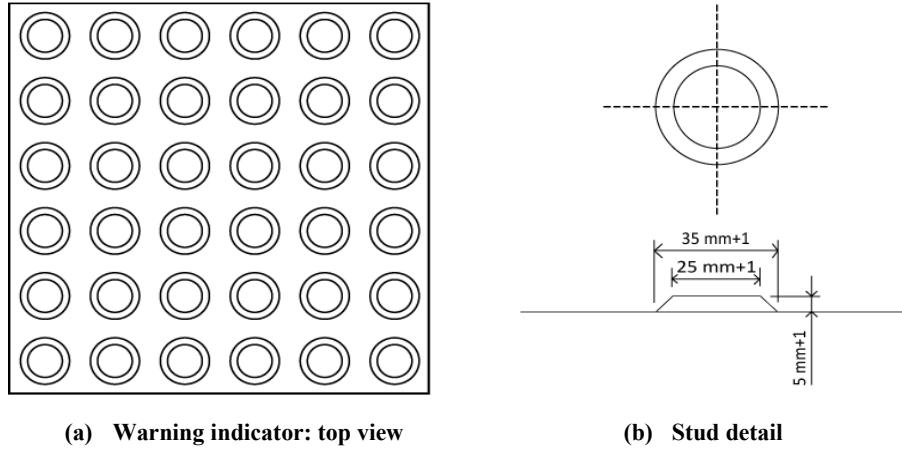


Figure 3.D.44 Warning Indicators on ground of accessible route

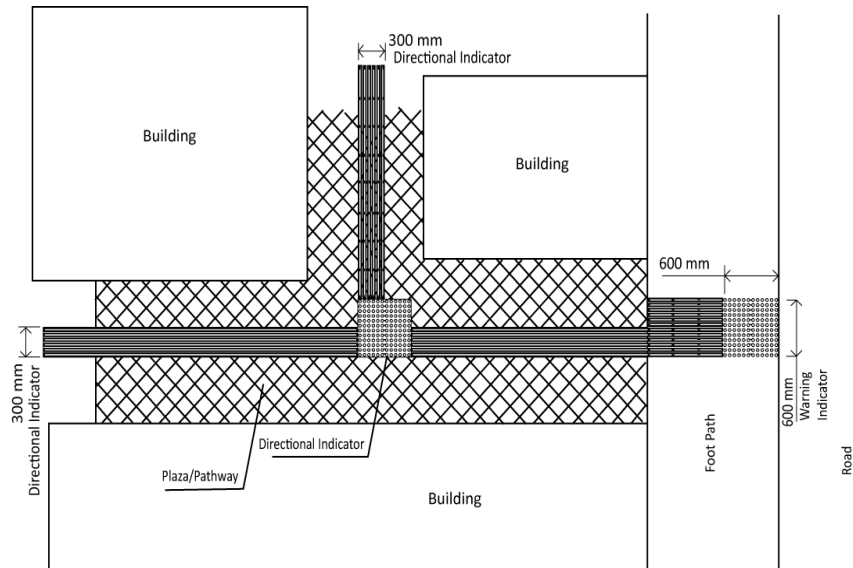


Figure 3.D.45 Use of tactile indicators in accessible route

PART III Appendix E

Building Types, Development Rights and Buildings Abutting Property Lines

E.1 General

These guidelines cover the planning and general building requirements of different building types such as attached type, detached type, semi-detached type etc. regarding their development rights and rights regarding building on abutting property lines. These requirements are applicable to all occupancy types taken up by public, private or co-operative agencies.

E.2 Definition and Typology

The following are some definitions and diagrams to explain different typologies and terminologies relevant to this Code:

E.2.1 Row Type Building

A row type building abuts two side plot party-lines and is one of a row of buildings on adjoining zoning lots. The end buildings of a row of attached buildings are considered semi-detached buildings if they each have minimum side setback. Here the rest two (non-abutting) sides of the building are surrounded by yards or open areas within the plot confirming at least to minimum setback requirements (Figure 3.E.1).

E.2.2 Semi-detached Building

A semi-detached building is a building that abuts one side on the party-line of a plot and does not abut any other building on any other side of any adjoining plot/s; here the rest three (non-abutting) sides of the building are surrounded by yards or open areas within the plot confirming at least to minimum setback requirements (Figures 3.E.2 and 3.E.3).

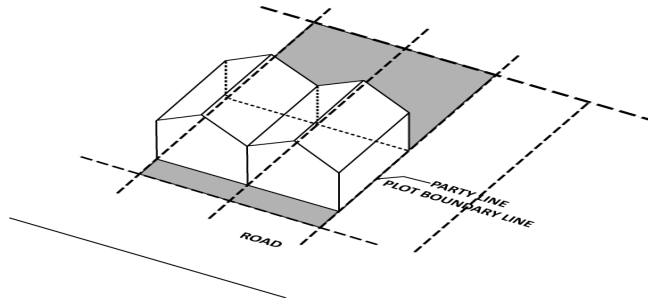


Figure 3.E.1 Row type buildings