

Requirements Catalogue of the Accessibility Standard DGS 1119_2016 - Part II and III

Authors: Dipl.-Ing. Angelika Plümmer, Victor Momoh, Obed Webu

PART II: EXTERIOR AREAS

2.1 Exterior Routes	
Section on the AC Measurement	Areas / Components / Requirements
2.1.3	Kerb Ramps/Kerb Cuts on Public Right of Way
1500mm 900mm 1500mm 1:20	<p>Provide kerb ramps at level difference between the sidewalk and the road surface at street corners, parking areas, etc (fig. 2.3)</p> <p>min. length of kerb transition, to provide safer sidewalk ramp transition slope(fig. 2.4)</p> <p>min. width of kerb ramp between two flared sides of minimum width of 1.20m.</p> <p>min. width of kerb ramp when the ramp is located on a public thoroughfare</p> <p>slope ratio of ramp (1:10 for shorter kerb), and 1:10 maximum slope of the flare</p> <p>Kerb ramps should be made of non-slippery materials</p> <p>At zebra/pedestrian crossings, kerb ramps should be provided at both sides of the crossing</p> <p>Kerb ramp should be at right angle to the path of travel and should have a cane-detectable edge(fig. 2.4)</p> <p>Kerb ramps should have a contrasting colour to the road surface and with a different texture(fig. 2.5)</p> <p>Kerb ramps must be free from obstacles</p>
1065mm	min. depth of a clear and level landing at the top of the kerb ramp
2.1.5	Guards and Handrails
30-60 mm 865 - 965 mm 300mm	<p>Continuous handrails should be provided on either sides of all ramps or stairs, or wherever three or more steps are provided</p> <p>Handrails should be of a smooth, easy to grip design</p> <p>max. diameter of handrails (fig. 2.8 & 2.9)</p> <p>mounting distance of handrail above the stair nosing</p> <p>min. extension of handrail beyond the top and bottom risers of all flights of stairs or ramps(fig. 2.10)</p> <p>Handrail ends should terminate either by turning down or by going into the wall</p> <p>Guards are required on both ramps and stairs wherever height differences are significant</p> <p>Guards and/or handrails, where provided on terraces or viewing platforms, should be designed so that a seated person (e.g., wheelchair user) can see under the handrail or guard</p>
1000mm	<p>distance within roadway, where handrails and/or guards should not be located</p> <p>For ramps more than 3000mm wide and stairs more than 2700mm wide , there should be intermediate handrails painted in contrasting colours.</p> <p>Handrails should be made of preferably metal or any other approved strong and sturdy material</p>
2.1.5.1	Handrails
32 - 45 mm 40mm 600 - 700mm (1) 800 - 900mm (2) 150 - 200 mm	<p>recommended diameter of handrail on both sides of stairs</p> <p>min. distance between handrail and vertical wall surface</p> <p>Double handrails at different heights (1) for children and disabled and (2) for other users (fig. 2.11)</p> <p>Required height of rails at the bottom of railings for protection of wheels from falling out of the ramp edge</p>
2.1.6	Lay-Bys for Vehicles
3050 X 7925 mm 3555mm 1980mm	<p>Provide special lay-by area, free of other vehicular traffic at every regular vehicular stops</p> <p>min. width x length of lay-by, with a kerb cut located towards the rear of the space</p> <p>min. lay-by headroom for special transit vehicle and for adapted vans etc.(fig. 2.13)</p> <p>min. width of sidewalks adjacent to lay-by, to accommodate side-loading vehicles with hydraulic lifts</p> <p>Bus stop boarding and alighting areas shall have a firm, stable surface</p>
2440 x 1525 mm	<p>min. clear length x width of bus stop boarding and alighting areas</p> <p>Bus stop boarding and alighting areas shall be connected to streets, sidewalks, or pedestrian paths by an accessible route</p>
2.1.7	Paths, Sidewalks and Walkways
1675mm 1100mm 1:20 (5%) 6mm 13mm	<p>Firm, level, and non-slip unit paving materials</p> <p>min. width of walkways and paths in public property, to allow for two wheelchairs or scooters at a time</p> <p>min. width of walkways and paths on private property</p> <p>max. gradient of sidewalks, except when site conditions prevent this(fig. 2.29)</p> <p>max. width of unit paving joint (fig. 2.16)</p> <p>max. opening, where gratings must be located in sidewalks</p> <p>Bars of gratings should be perpendicular to the path of travel(fig. 2.17)</p>
2.1.8	Pedestrian Routes
1500mm	<p>min. width of all active routes (1675mm preferable)</p> <p>All routes should be free of protruding obstacles, overhanging signs, branches etc.(fig. 2.6, 2.7 & 2.18)</p>
100mm	max. allowable protrusion of objects into any pedestrian route from grade to a recommended height of 2030 mm
2.1.9	Ramps
1:12 9000mm 1015 - 1100 mm	<p>max. steepness of ramp</p> <p>max. length of individual ramp sections</p> <p>width of ramps, with handrails at both sides</p>

1525mm	recommended width of ramp for use by persons with visual limitations only, to allow space for a companion or a guide dog
1670 x 1670 mm	min. depth x width of intermediate level landing of ramps (fig. 2.21, 2.24 & 2.25) min. depth x width of level platform area, plus an additional distance for any doors opening onto the landing, where ramps return upon
1670 x 1670 mm	themselves or where doors open out onto the ramp (fig. 2.22 & 2.23)
50mm	height of recommended up-stand kerb or solid barrier on either side of ramps to act as a safety stop for the front wheels of wheelchairs and/or scooters.
865 - 965 mm	Provide handrails at both sides of ramps with slopes between 1:20 and 1:12 as aid to mobility mounting height of handrails on ramps There should be a smooth continuous surface of handrail from top to bottom of the ramp, without breaking the handhold.
300mm	min. extension of handrail beyond the top and bottom of the ramps (fig. 2.26) Handrail ends must be turned down or curved into an adjacent wall
2.1.9.1	Tactile Marking
	A tactile marking with contrasted colours should be placed at the beginning and end of the ramp to alert the blind persons with visual impairment about the length and width of the ramp
600mm	width of marking
2.1.10	Stairs and Steps
	Exterior steps should be of firm; non-slip materials
180mm	max. height of riser
280mm	max. length of tread (fig. 2.27)
	Tread nosings should be clearly marked with either a brightly painted non-slip finish and/or include an integrated non-slip nosing that clearly contrasts in tone/colour from the tread
	Continuous handrails should be provided on both sides of all exterior flights of stairs/steps, which include 3 or more risers
2200mm	min. width of stair/step flights, where an intermediate handrail is recommended Provide cane-detectable and textured paving surfaces at top and bottom of all flights of stairs/steps Exterior doors that open onto landings should be avoided wherever possible
2.1.12	Drainage
2.1.12.1	Drainage Gratings
	If feasible, drainage gratings should be positioned beyond the boundaries of the access route Gratings within an access route should be set flush with the surrounding surface
13mm	max. width of slots in gratings, and should be set at right angles to the dominant line of travel
18mm	max. diameter of circular holes in gratings
2.2	Transport Infrastructure
2.2.5	Parking
30m	Recommended distance from the main/other accessible entrance, within which accessible parking space(s) should be provided Protected or designated route from the accessible parking space to the accessible entrances should be provided
	Parking meters to be accessible for persons with disabilities
1:25	ratio of accessible parking spaces to normal parking spaces, plus 2 spaces for each additional 100 parking spaces (i.e. 1:50)
1	min. number of accessible parking space, where the number of parking spaces provided is less than 25
1:100	min. ratio of accessible parking space for wheelchair vans to other spaces
3660 x 5385 mm	min width x length of accessible parking space for wheelchair vans (fig. 2.33 & 2.37)
2750mm	min. headroom clearance for van parking spaces
	min. headroom below beams, pipes, or sprinkler heads, where covered or underground parking spaces for cars are provided
2100mm	In multi-storey or underground parking garages, at least one level of parking should include easy to locate accessible parking spaces
1100mm	min. width of walkway from designated parking to the accessible entry to the building Walkway must be firm, level, non-slip material with a texture contrasted with the adjacent surfaces. All accessible parking spaces should be marked with the "International Symbol of Accessibility" (fig. 2.35 & 2.36)
3660mm	min. width of accessible parking spaces
1200mm	required clear pedestrian aisle for an accessible parking space
1500mm	recommended pedestrian aisle, where two accessible parking spaces are adjacent (fig. 2.34 & 2.36)
	clear zone behind accessible parking space with a contrasting surface marking, for safe access to the boot or rear hoist of vehicles (fig. 2.39)
1200mm	required width x length of at least one parking space, to cater for commercial vehicles converted for side or rear access using hoists or ramps
4800 x 8000 mm	Provide a suitable kerb ramp from the accessible car parking area to any adjacent walkway where difference in elevation is greater than 13mm
	Keep pedestrian walkways safe by the use of painted yellow lines and/or distinctive paving surfaces
20 lux	min. illuminance in parking spaces and any connecting access routes to the building entrance

2.2.5.1	Signage General	<p>Signs should be readable and legible for people who have vision or mental impairments Information with text should be supplemented with international graphical symbols to facilitate comprehension</p> <p>Signs should be provided in relief and Braille Signs should be made of robust materials and be easy to change, clean and repair An excessive quantity of signs in close proximity should be avoided, as well as visual material placed too close to wall fixed signs Braille used as a complementary or independent feature to tactile signs should be easy to locate</p>
2.3	Special Exterior Areas and Features	
2.3.1	Sports Fields and Spectator Areas	
915mm		<p>min. width of controlled access points (e.g., turnstiles), to accommodate the free movement of wheelchairs or scooters Provide level, accessible seating areas beside sports fields for both spectators and athletes with disabilities Fixed or portable seating should include some seats with back supports and arm rests</p>
2.3.2	Amphitheatres	
2%		<p>Exterior amphitheatres or performance areas should include seating areas that are accessible to persons using mobility aids At least two spaces should be provided side by side in each accessible location to allow for a companion min. number of sitting space for persons using mobility aids (fig. 2.47 & 2.48)</p>
2.3.3	Outdoor Eating and Entertainment Spaces, Balconies and Terraces	
13mm		max. thresholds for public balconies or terraces, accessible from interior spaces
150 x 1200 mm		max. height x length of ramp, and max. pitch of 1:7.5 should be used where greater differences in elevation are unavoidable
1830mm		Firm, non-slip surface materials for balcony or terrace, laid to fall (no greater than 5%) Handrails or guards should be designed to allow clear vision beyond the rails min. recommended depth of balcony, to allow free rotation of mobility aids (fig. 2.49) Locate doors opening onto balconies or terraces against a sidewall or rail
2.3.10	Parks and Parkettes	
		<p>Entrance gates, parking areas, paths and walkways through the park should be fully accessible to persons using mobility aids Play areas and recreational equipment, or other amenities should be accessible to and useable by children with varying abilities/ disabilities (fig. 2.74 & 2.75) Benches and seating areas should be accessible to a variety of users Locate all obstructions to one side of all paths and/or active playing areas</p>
2.3.11	Play Grounds	
1500mm		min. clear width of accessible route to the play grounds from accessible parking spaces (1675mm preferable)
1:20		max. slope for accessible route (use ramp when the slope exceeds 1:20)
1:12		max. slope for a ramp (1:15 preferable)
1015mm		recommended min. width (between handrails), for a max. sloped distance of 9m
915mm		min. clear width of accessible routes connecting elevated play components (815mm min. width when distance is 610mm max.)
2%		min. cross-slope of landings, to allow adequate drainage Firm, easy to drain, non-slip accessible surfacing Separate play areas by age appropriate equipments Exception: clear minimum width of transfer systems connecting elevated play components shall be permitted
610 mm		
610 x 430 x 760 mm		Guidance on reach ranges for children seated in wheelchairs (Tab. 2.4)
785mm		min. height x depth x width of knee clearance, where play tables are provided max. height of the tops of rims, curbs, or other obstructions
2.3.19	Market Places	
2.3.19.2	Walkways and Aisles	
3000mm		min. width of walkways or aisles between stalls and edge of vending tables create a clear distinction between the truck pushers' lane and that of pedestrians Size of waiting areas at every 30000mm interval on the walkway, along the access route and passage between stalls
2997 x 3000 mm		
2.3.19.4	Fire Safety	
		<p>Means of escape should be in accordance with the fire safety standard Create an access route for fire tenders to access the stalls</p>
2.3.19.5	Signage	
		<p>Provide signage at entrances and within the concourse of stalls for information and direction purposes Audio and Visual systems for information should be installed. (Refer to section on Signage)</p>
2.3.20	Place of Worship	
	Parking	
		<p>Parking should conform to accessibility standards (refer to section 2.2.5) Pedestrian access and traffic should be separated from vehicular traffic as much as possible to avoid conflicts A level or accessible route should be provided at entrances</p>
2.3.20.2	Fire Safety	

		Provision for fire prevention, fire protection and fire safety should conform with the fire safety standard
2.3.20.3		Mezzanine Floor
		Provide ramps and lifts in addition to staircases, where mezzanine floors have been created
2.3.20.4		Mosques
	850 x 1000 mm	required space per abled person
	1000 x 1400 mm	required space per person for persons with disabilities
	900 x 1400 mm	Size of storage space required for wheelchair users, adjacent to praying mat
		Access to seating in general waiting areas should be direct and unobstructed
	900mm	min. clear width of access in front of a row for disabled people (1200mm where practicable)(fig. 2.85)
	1050 x 2300 mm	min. width x depth e.g., between rows of seats to allow maneuvering of wheelchairs into a designated space(fig. 2.86)
		The entrance area for shelves and shoe racks must be accessible to Persons with disabilities
		A hearing enhancement system should be provided for people with hearing impairment
		Provide visual aid, eg. Projectors and TV screens where practicable
		Seating areas should be located so that they are easily identifiable by blind and partially sighted people
2.3.20.5		Abulution Space
		It should be accessible and conform with bathroom standards for persons with disabilities
2.3.20.6		Washrooms
		Provide separate washrooms for persons with disabilities
		Separate entrance for males and females should be provided
		Squatting closets appropriate for persons with disabilities should be provided where necessary
2.3.20.7		Types of Seating
		Removable seating should be provided at various locations in places of worship to accommodate wheelchairs
		Provide seats with and without arms
		Whenever feasible, seatings should have cushions
	450 - 475 mm	Desired seat height, or compressed cushion height, or fixed seating
2.3.20.8		Crematoria and Cemetery Chapels
		A covered assembly area should be provided at crematoria
		The entrance and exit of the crematorium should be accessible to people with disabilities
		Provide seating space for wheelchair users
2.4		Outdoor Amenities
2.4.1		Benches and Seats
		Exterior benches or seats should be mounted on a firm and level base (e.g., concrete pad, brick pavers etc)
		Exterior benches or seats should be located to one side of public walkways or paths(fig. 2.87)
		Fixed benches should include suitable back supports and arms to allow for easy transfers
	405 - 460 mm	suitable seat height (fig. 2.87)
	1015 x 1220 mm	min. clearance space provided at least one place beside the bence for persons using a wheelchair or scooter
	1065 x 510 mm	min. length x depth of benches (610mm max. depth)
		Where installed in wet locations, the surface of the seat shall be slip resistant and shall not accumulate water
2.4.5		Public Shower rooms and bathrooms
		Where public showers and bathrooms are provided in exterior settings (e.g., as part of a campground, exterior swimming pool or other recreational facility), they should be designed to be accessible to persons using various mobility aids
	>13mm	max high for lip, threshold or step at the entry of doors of showers that should be of firm and solid material laid to drain
2.4.8		Street Furniture and Vending Machines
		All street furniture, including light Standards, signs, planters, mail boxes and vending machines, should be mounted to one side of the normal path of travel
		Wherever possible, street furniture should be positioned securely on a continuous separate amenity strip (beside sidewalks), or located to one side of accessible entrances
	610mm	min. width for amenity strips, and should be of a different paving material to the normal path of travel(fig. 2.93)
2.4.9		Waste Receptacles and Recycling Bins
		Waste receptacles and recycling bins should be permanently located to one side of any path or walkway
		In busy locations, waste receptacles should be securely mounted and large enough to contain the anticipated amount of waste so that overflows do not cause a tripping hazard.(fig. 2.94)
		Waste receptacles in open areas such as parks, wilderness, beach or picnic areas should be securely mounted on firm level pads
		Waste receptacles or holders containing waste bins should be clearly identified by suitable signs and/or colours
	1065mm	max. mounting height of lids, when provided on waste receptacles, and should be easy to operate with one hand
		Ensure a clear, safe, and accessible route to the waste receptacles
2.5		Outdoor Support Systems
2.5.1		Zebra Crossing and Pedestrian Signals
		Both audible and flashing crossing signals should be provided as an aid to persons who have hearing or visual limitations

	1065mm	<p>Audible pedestrian signals should be loud enough to be heard clearly above the ambient noise (min. 15 decibels louder than ambient noise)</p> <p>max. mounting height of a clearly marked pedestrian button on a pole beside the curb cut, where extended time is required to cross (e.g., by senior citizens and persons with disabilities)</p> <p>Tactile features should be provided as an aid to persons who have both hearing and vision limitations. (i.e. a tactile or vibro-tactile feature on push buttons.)</p> <p>In locations frequently used by senior citizens or persons with disabilities, crossing timing should be provided to permit pedestrians, or wheelchair users to cross safely</p>
2.5.2		Lighting for Exterior Areas not including Roads
	30 lux	recommended lighting level at frequently used pedestrian routes (including paths, stairs, and ramps)
	50 lux	min. lighting level in the accessible parking areas, and along accessible routes from area of parking to accessible entrances
		<p>Lighting sources should be selected and located at, or beside steps and stairs, to ensure clear definition of treads, risers, and nosings</p> <p>All lighting over pedestrian routes should be evenly distributed, provide a reasonable colour spectrum, and minimize cast shadows for persons with low vision</p> <p>Supplementary lighting should be provided to highlight all key way-finding signage</p> <p>Lighting Stands or posts should be mounted to one side of pedestrian walkways to allow the free movement of persons using mobility aids</p> <p>Low-level lighting Stands should be high enough to ensure visibility</p> <p>Overhead light fixtures should be mounted on Stands that ensure clear headroom of 2030 mm</p> <p>Lighting of landscape on special site features should be designed and installed to minimize direct glare to both pedestrians and building users</p>
2.5.3		Public Address Systems
		<p>Where public address systems are required, select and install those that minimize distortion and provide a full spectrum of sound.</p> <p><i>For speech, the frequency range only needs to be from 100 Hz to about 8000 Hz.</i></p> <p>Loudspeakers should be located so as to cover the desired area adequately</p> <p>Where significant information (e.g. emergency information) is to be announced, a clear warning signal should be provided before the announcement, to alert persons who have hearing impairment</p> <p>Where large outdoor concerts are regularly performed, every attempt should be made to include a FM loop (or other suitable systems), for persons who are hearing impaired (fig. 2.98)</p>
2.5.4		Signage and Way-finding
		<p>The street address and/or building/facility name should be clearly visible from the street or public laneway</p> <p>Lettering size should be legible at typical viewing distances (e.g., from the road, approach route, parking area, etc.)</p> <p>Signage generally should be in bold 'sans-serif' lettering (e.g., Helvetica) on a highly contrasting background</p> <p>Building addresses or identifying signage at street level, whether it is mounted in landscaped areas or on posts, should be high enough to be visible even with nearby piles</p> <p>Pedestrian, vehicular, and emergency routes should all be clearly identified</p> <p>One-way routes should be clearly marked – both with paving markings and by post-mounted signs</p> <p>The "International Symbol of Accessibility" should be used to identify special amenities, such as accessible parking, accessible entrances, or accessible washrooms</p> <p>Provide spaces for announcement, and show directions to such space through signages</p>
2.5.5		Traffic Signals
		<p>Traffic light timing at specific sites should be adjustable to suit not only the volume of vehicular traffic, but also the volume of pedestrian traffic</p> <p>Timing of lights for frequently used pedestrian crossings should be adjustable so that the walking speed of persons with disabilities, or seniors, can be accommodated safely</p> <p>Audible pedestrian signal indicating when it is safe to walk should operate consistently with visible pedestrian signals</p> <p>The sound of signals should be capable of being heard above ambient traffic noise</p> <p>Signal sounds should differentiate directional crossings (e.g., east to west signal should differ from north to south signals)</p> <p>Tactile features should be provided as an aid to persons who have both hearing and vision limitations. (ie. A tactile or vibro-tactile feature on a pushbutton)</p> <p>Buttons for pedestrian initiated calls should be located in a constant location, on posts set at level surfaces that are identified by textured paving, for persons with visual limitations</p> <p>recommended constant height of the buttons for pedestrian initiated call</p> <p>No obstacles, poles, bins, signs etc., should be located on the level of approach area or within 990mm of the normal pedestrian approach to the call button location (fig. 2.101)</p>
	1065mm	
	990mm	
2.6		Other Exterior Features
2.6.1		Colour, Pattern and Texture
	70%	<p>Signage should generally be designed using highly visible and contrasting colours (fig. 2.102)</p> <p>approximate light reflectance of colour/tone contrast on signage</p> <p>All finishes should be matte in order to minimize glare</p> <p>Colour contrast should also be used to define edges or boundaries of objects</p> <p>In frequently use spaces, colour or tone contrast should also be used to define the boundaries of a room (e.g., at the junction between walls and floors), as an aid to orientation</p>

		<p>Colour may also be used to provide constant information (e.g., the location of exit doors, for example, by painting all exit doors in the same distinctive colour)</p> <p>Use textured paving strip, at least one pace deep - 915mm at head of stairs or ramps or wherever walking hazards may exist (fig. 2.103)</p> <p>All textured surfaces used as warning devices should be cane-detectable and clearly differentiated from surrounding paving surfaces</p>
2.6.3		<p>Free-standing Objects</p> <p>Permanent objects such as bollards, bicycle racks, etc., should all be placed to one side of designated pedestrian routes (fig. 2.106)</p> <p>Temporary objects such as queuing lines, sales booths, loose garbage receptacles, etc., should be located to one side of the normal pedestrian route. (fig. 2.107)</p> <p>Guy wires, and other braces or supports for trees, posts etc., should be located so they do not constitute a hazard for persons with visual limitations</p>
2.6.4		<p>Garbage Handling</p> <p>Waste receptacles, containers, or boxes, (including recycling boxes), should be large enough to contain the anticipated quantity of waste in any one location</p> <p>All waste receptacles (except large industrial containers) should be accessible to persons using mobility aids</p> <p>The paving around waste receptacles should be level, firm, free draining and easy to wash down</p> <p>Where covered waste receptacles are used, the covers should be useable with one hand</p> <p>Temporary construction scows or large mobile industrial containers should be located away from normal pedestrian routes</p> <p>Vehicular access routes to garbage containers for maintenance purposes should not cross normal pedestrian routes</p>
2.6.6		<p>Landscape Materials and Planting</p> <p>Recommended height of planter beds above grade should be provided</p> <p>min. height of planter bed edges, provided adjacent to busy pedestrian walkway, as an aid to persons with visual limitations</p> <p>Provide defined edges at trail boundaries wherever the adjacent grade is variable</p> <p>Trim overhanging branches of trees or shrubs, located over walkways or paths</p> <p>min. headroom for tree branches over walking spaces (2030mm preferable)</p> <p>Walking areas should be clear of thorns, branches, heavy berries etc.(fig. 2.113)</p>
2.6.7		<p>Materials and Finishes</p> <p>All paving should be laid to drain easily</p> <p>Gratings or grills should generally be located to one side of pedestrian walkways, however, where they are inevitable, then the bars of the grating or grill should be located at right angles to the normal path of travel</p> <p>max. opening on gratings or grills (fig. 2.103, 2.114, 2.115 & 2.116)</p> <p>All steps should be of non-slip materials with highly contrasted nosings</p> <p>All ramp surfaces should be firm and non-slip</p> <p>Handrails and guardrails should be continuous, smooth and well maintained</p> <p>Walls adjacent to ramps or stairs should be in non-abrasive finishes</p> <p>Smooth walking surfaces are preferred</p> <p>Where interlocking pavers are used, they should be laid on a firm, well-compacted backing (e.g., stabilized base)</p>
2.6.8		<p>Maintenance</p> <p>All key pedestrian routes to accessible entrances and/or exits should be kept free of any obstacles</p> <p>All garbage containers should be emptied regularly to avoid the accumulation of extraneous garbage around the containers</p> <p>All light bulbs along pedestrian routes should be replaced on a regular schedule, with lamps (of the same wattage) for which they were designed</p> <p>All gates, closers, automatic door operators, porch lifts, automatic ticket machines or other essential equipment should be inspected and well maintained on a regular schedule</p>
2.6.9		<p>Obstacle Removal</p> <p>Regular and systematic checks should be undertaken to ensure that no obstacles have been located in pedestrian routes (fig. 2.117)</p>
2.6.10		<p>Safety and Security</p> <p>Ensure that adequate lighting is provided over public walkways, steps and ramps as well as where public parking is provided. (fig. 2.118)</p> <p>Pedestrian walkways should be designed to provide clear lines of sight to ensure personal safety wherever possible</p> <p>Provide a call bell or a two-way communication device at the main accessible entrance</p> <p>Provide a call bell or two-way communication device in enclosed public parking areas where accessible parking is provided</p> <p>Provide an accessible public telephone at or in close proximity to the main accessible entrance for persons waiting for a ride or for persons requiring emergency assistance</p> <p>Consider the inclusion of a two-way call system or other suitable emergency call system linked to a central location (e.g., office or switchboard) from any accessible unisex washrooms in larger public buildings such as hospitals, schools or recreation facilities, for persons who may require assistance</p>

Develop a comprehensive 'Emergency Plan,' which addresses the needs of persons with varying disabilities, as well as frail senior citizens, for exiting large outdoor recreational facilities or other places where crowd-control is likely to be an issue

PART III: INDOOR AREAS

Section on the AC Measurement	Areas / Components / Requirements
3.1	Entrance
3.1.1	Canopies and weather Protection
2750mm	All main entrances and other accessible entrances should be protected by a canopy or overhang
3555mm	min. headroom clearance for canopies over passenger boarding zones
2895mm	min. headroom clearance for special transit vehicles
	min. headroom clearance for adapted vans used by persons with disabilities(fig. 3.1)
3.1.2	Doors and Doorways
915mm	min. width of main entrance door and other accessible doors
1	number of accessible entrance required for building with 1 to 3 entrances
2	number of accessible entrance for building with more than 3 to 5 entrances, 50% minimum accessible entrances for buildings with more than 5 entrances)
810mm	min. width of at least one leaf of door pairs
	Automatic or power-assisted door openers are required for accessible entrance doors and related vestibule doors
305mm	min. clearance between door swing and guards or highly contrasting and textured surface (or mat)
1200mm	Space needed to allow access by people using crutches
	Use automatic sliding glass doors at busy entrances, not designated exits
	Use colour differentiation to aid location of entrances in buildings with significant amount of glazing at grade(fig. 3.3)
3.1.2.1	Self-Closing Swing Doors
	Hinged or pivoted entrance doors should have controlled door closing devices and independent use by everyone
3.1.2.2	Power-Operated Doors
	Use a manually activated door controlled by a push pad, coded entry system, card swipe or remote control device; or
	An automatically activated door controlled e.g. by a motion sensor or a hands-free proximity reader
3.1.2.3	Double-Leaf Doors and Gates
815mm	min. clear width of at least one of the active leaves of doorways with two leaves shall
90 degrees	clear opening of at least one of the active leaves of doorways
915mm	min. clear opening, where openings are more than 610mm deep
	There shall be no projections into the required clear opening width lower than 865mm above the finish floor or ground.
100mm	max. projections into the clear opening width between 865 - 2030 mm above the finish floor or ground
	EXCEPTIONS: 1. In alterations, a projection of 16 mm maximum into the required clear width shall be permitted for the latch side stop.
	EXCEPTIONS: 2. Door closers and door stops shall be permitted to be 1980 mm minimum above the finish floor or ground.
3.1.2.4	Doorways without Doors, Sliding Doors, and Folding Doors
	Doorways less than 915 mm wide without doors or gates, sliding doors, or folding doors shall have maneuvering clearances complying with Tab. 3.2 .
3.1.2.5	Recessed Doors
	Provide maneuvering clearance for forward approach when any obstruction within 455mm of the latch side of a doorway projects more than 205 mm beyond the face of the door(fig. 3.8)
3.1.2.6	Door and Gate Hardware
865 - 1220 mm	Recommended height of handles, pulls, latches, locks, and other operable parts on doors and gates of such hardware above the finish floor or ground
	Where sliding doors are in the fully open position, operating hardware shall be exposed and usable from both sides
3.1.3	Door Hardware, Locks and Closers
	Automatic door openers are recommended wherever possible
1000 - 1100 mm	Push buttons or card access controls used to open doors should be located away from the door swing
	recommended mounting height of push buttons or card access control on walls or posts
	Preferred push button 150 mm diameter is recommended
2135mm	min. distance between doors in a series (e.g., in a vestibule) and/or the clear floor area between door swings
915 - 1065 mm	should be no less than 1200 mm.
	recommended mounting height of door hardware from grade, including pulls and push plates
	All door opening hardware on entrance, vestibule, and room doors should be easy to grasp and use (e.g., of the lever handled type). (fig. 3.9)
760 - 1065 mm	Hardware for closet doors, drawer pulls etc., should be continuous and easy to grasp(fig. 3.10)
	required mounting height of door locks

		Select sliding door hardware that does not reduce the effective clear opening width below 810 mm Provide an additional pull handle, mounted horizontally and close to the hinge side of the door where out-swinging doors must be closed to preserve privacy (e.g. on washroom doors)
3.1.3.1		Manual Door Opening and Closing Furniture It should be possible to operate all door opening furniture one-handed, without the need to grasp or twist Care should be taken in the selection of security and fire exit fittings with the aim of making them manageable for all users Wherever possible, door opening furniture used in conjunction with locks and latches should have a lever action.
	0.5 N-m	max. torque force required to operate keys and cylinder turns of Knobs All door opening furniture should contrast visually with the surface of the door As a principle, pull handles should not be fitted to the push side of doors please see fig. 3.11, 3.12 & 3.13 for the location and design of lever furniture and pull handles for both external and internal doors, and should be consistent throughout the property Where lever furniture intercepts viewing panels, any projecting glazing beads should not interfere with the operation of the lever or reduce the effective clearance behind it.
3.1.4		Entrances min. waiting space in the main accessible entrance, with clear entrance for vehicles Building entrance must be protection from weather Call bell (or information telephone) should be provided at accessible entrances that have security locks or other locking devices Accessible public telephone should be provided near the entrance in public buildings
3.1.5		Glazed Screens and Sidelights Fully glazed sidelights at exterior entrances or in interior vestibules, as well as fully glazed screens elsewhere, should be clearly identifiable so as not to constitute a hazard for persons with visual limitations mounting height of a row of bright decals or a continuous opaque stripe, a minimum of 50 mm wide and of highly contrasting colour location of decals on center and can be either 50 mm square or round and/or of a special design Where etched or patterned glass is used, decals or a stripe of a highly contrasting colour, are recommended Partially glazed doors should have glazed panels that extend low enough to allow persons using mobility aids to see what is on the far side of the door (fig. 3.16)
	1350 - 1500 mm	
	150mm	
3.1.6		Mats and Mat Sinkages Mats at entrances and in vestibules should be level with the floor and/or located in mat sinkages Occasional mats (e.g., runners provided during bad weather) should be level with the floor surface and/or have gently bevelled edges Runners used to define paths should lead directly to the desired objective with no furniture or obstacles Large, repeating patterns that incorporate bold contrasting colours or simulate steps should not be used for any floor surface
3.1.7		Thresholds height of thresholds at exterior areas (e.g., terraces and balconies) with gentle bevelled height of thresholds at interior doorways (fig.3.18) height of existing or altered thresholds that has a bevelled edge on each side with 1:2 maximum slope. cumulative height of upstands, where thresholds are raised e.g. for water ingress.
	13mm max.	
	13mm max.	
	19mm max.	
	15mm	
3.1.8		Vestibules min. width of interior vestibules, corridors, or aisle for ease of turning of mobility aid users min. depth of vestibule, clear of door swings and/or other obstacles min. clear space, where doors swing towards the person using a mobility aid (fig. 3.19) min. clear space, where doors swings away from the person using a mobility aid (fig. 3.19)
	1100mm	
	1200mm	
	600mm	
	300mm	
3.1.9		Waiting Areas
3.1.9.1		Provision of Spaces for Wheelchair Users min. requirement of two wheelchairs or scooters, plus other members of the public (with level floor)
	2 wheelchairs	
3.1.9.2		Access Access to seating in general waiting areas should be direct and unobstructed. min. clear space in front of a row of seats (1200mm where practicable) (fig. 3.20) width and depth of space from circulation route at right angles (e.g between rows of seats), for wheelchair maneuvering into a designated place (fig. 3.21)
	900mm	
	1050 x 2300 mm	
3.1.9.3		Seating Layouts Two wheelchair seating layout or wheelchair user sitting next to user of standard seating One standard sized seating space within or at the end of a block of seating for an assistance dog (guide or hearing dog)
3.1.9.4		Types of Seating Provide seating options, e.g. fixed or removable, with or without arms (where feasible, with cushions) seat height, or compressed cushion height for fixed seatings Provide other seats with varied height and width for differently sized people and those with restricted leg movement
	450-475mm	
3.1.10		Floor or Ground Surfaces Stable, firm, and slip resistant floor and ground surface (except areas within animal containment and sport activity) Securely attached carpet or carpet tile max. height of pile for carpet with level cut pile, or level cut/uncut pile texture
	13mm	

6.4 -13mm 13mm 13mm diameter	bevel change in level with a slope of max. 1:2 (fig. 3.22) otherwise, see section 2.1.9, and 2.1.3 max. allowable thickness of carpet and permanently affixed mat Mats and carpet must be firm, to prevent roll resistance of wheelchairs Openings in floor or ground surfaces shall not allow passage of a sphere more than 13mm diameter (fig. 3.24)
3,2	Interior Routes
3.2.1	Aisles and passages
1675mm 1200mm 1100mm 1600 x 1600 mm	min. width of aisles and passages for two wheelchairs or scooters in high use public areas width of aisles or passages for a wheelchair and one ambulatory person (fig. 3.25) min. width for clear aisle and passageways in low use areas and offices turning space at 30m interval and dead ends of 1100mm wide aisle
3.2.2	Corridors and Passageways
1100mm 1600mm diameter 1065mm	min. width for high use accessible public corridors and path of travel turning space at every 20m path of travel and corridors (fig. 3.26, 3.27, 3.28, & 3.29) min. width passageway within accessible residential suites and aisle in public areas and workspaces etc. Colour contrasted and suitable handrail, on at least one side of extended length corridors is required Benches should be provided at intermediate point in extended length corridors of 40m or more
3.2.2.1	Projections into Corridors and Passageways
1200mm 1:20 steepness 100 lux	Avoid obstructions such as radiators and fire hose in corridors or passageways, or use visible warning signs (fig 3.31) min. surface width of corridor (1000mm min., where there is a permanent obstruction over a short distance) Avoid floor patterning that could be mistaken for steps, e.g stripes) max. slope of floors in corridors (exemption for ramp that includes landing) Lighting in a corridor should be even, diffused and without glare, reflections or shadow min. artificial light illuminance required at floors level for corridors that receives no daylight An outward-opening door is preferable Effective clear widths of doors (see table 3.3) Doors with viewing panel(s) (fig.3.32) When glass doors are used, especially in fully glazed walls, they should be more prominent (e.g., with apparent edges)
3.2.2.2	Fire Escape Routes via Horizontal Circulation
1200mm	min. unobstructed width for an escape route The fire escape routes width should be at least as the escape stairs
3.2.3	Doors and Doorways
915mm 915mm 22 Newtons 38 Newtons	min. width for doors, doorways or arched openings (860mm min. opening, clear of obstruction) min. width for fire doors or smoke doors in corridors (860mm clear width) (fig.3.33) opening force for interior doors using closers or other automatic latching devices opening force for exterior doors, which include panic hardware
3.2.4	Passenger and Platform Lifts
1725 x 2285mm 1065 x 1370mm 100 lux.	Used independently and accessible to persons using mobility aids in all public facilities Must comply with the most recent CAN/CSA B355 Standards (alternative BS Standards) "Lifts for Persons with Physical Disabilities". Must comply with the most recent CAN/CSA Standards B44, "Safety Code for Elevators," (alternative BS Standards) It must be easily accessible and operated controls/buttons (fig.3.35) It must have delay button for boarding of slower users min. size of at least one elevator in high-rise residential and institutional facilities (fig. 3.36) min. platform size for individual platform lifts required to travel between levels of max. 1980mm (fig. 3.37) The lift should have an emergency call system linked to a monitored location within the building Install a concave mirror at the back of the lift car required lighting at floor level in lift cars and platform lifts (also in adjacent lobby space)
3.2.4.2	Platform Lifts
2030mm 32mm 20 sec. 815mm 1065mm	Platform lifts shall not be attendant-operated and shall provide unassisted entry and exit from the lift Recommended vertical clearance of lift Floor surfaces in platform lifts shall comply with section 3.1.10 max. clearance between the platform sill and the edge of any runway landing Platform lifts shall have low-energy power-operated doors or gates min. time which door should remain open min clear width of end doors and gates min. clear width of side doors and gates EXCEPTION: Platform lifts serving two landings maximum and having doors or gates on opposite sides shall be permitted to have self-closing manual doors or gates
3.2.4.3	Lifts
	Lifts may be conventional passenger lifts, vertical lifting platforms or stair lifts
3.2.5	Interior Ramps
1:12 9000mm	Ramps are preferred over platform lifts max. slope of interior ramps (1:15 is preferred) max. length of ramp between level landing areas ramp surfaces should be non-slip

900 - 1100 mm	required width between handrails
300mm	required extension of handrail beyond the head and root of a ramp Provide handrails at both sides of the ramps
765mm	Provide a cane-detectable floor surface (colour or tone contrasted) at 765mm deep at the head and foot of all ramps
3.2.6	Safe Holding Areas Safety holding areas included as emergency plan should accommodate a number of persons using mobility aids It should be logically located, easy to identify and accessible It should have separate lighting and ventilation system A two-way voice communication system linked to the fire control center should be provided
3.2.7	Stairs and Steps
280mm	min. width of stair treads
180mm	max. height of stair riser
	Cane-detectable barrier should be provided where the headroom of stairs underside is less than 1980mm A highly contrasting and cane-detectable floor surface at least 915 mm deep at the head or foot of each flight of steps or stairs is required
300mm	min. projection of handrail and guard beyond the top and bottom riser, and should be in contrasting colour
3.2.7.1	Design of Steps and Stairs Provide a landing at the top and bottom of each flight Length, clear space of any door or gate swing should be at least the width of the flight Provide sufficient illumination at every flight and landing of a stepped access route min. illumination at tread level is required Surface material should be easy to maintain, and slip-resistant
100 lux.	
3.3	Interior Amenities
3.3.4	Equipment and Furniture Furniture, equipments and other objects should be positioned on one side of the normal path of travel required seat heights of loose seating, chairs or benches Some seats should have both armrests and backrests, to provide adequate support for stability-challenged persons etc. max. working surface of tables and desks clear knee space of tables and desks min. width between supports of tables and desks (fig.3.42) min. height of coffee and telephone tables located at waiting area and lounges Planters with strong cane detectable bases should be selected
405 - 460 mm	
785mm	
700mm	
760mm	
510mm	
3.3.5	Information and Service Counters <i>InducTive hearing aids to support understandingNoise reduction in fact supports understanding even in a foreign language and not only in cases of hearing loss.</i> max. height of at least one section of a counters used for information or service purpose, for wheelchair/scooter users min. width of accessible sections of counters knee space depth and height max. height of at least one speaking port at enquiry counters, ticket sales desk, etc.
865mm	
760mm	
250 x 700 mm	
1065mm	
3.3.5.1	Counters and Reception Desks Location and Access for Visitors and Customers Strategic location of counter or reception desks for easy identification from the building entrance Provide a direct and Unobstructed approach to the counter or desk Provide sufficient space for wheelchair users where permanent or temporary control barriers are used
3.3.5.2	Space in Front of a Counter or Reception Desk depth x width of clear maneuvering space in front of a counter or reception desk when there is a min. 500mm deep knee recess depth x width of clear maneuvering space in front of a counter or reception desk when there is no knee recess
1200 x 1800 mm	
1400 x 2200 mm	
3.3.6	Lockers and Baggage Storage required height of bottom shelf from the floor, for every storage or baggage lockers compactment (fig.3.46, 3.47 & 3.48) required height of locks for accessible storage lockers Locks should be easy to operate by persons with limited manual dexterity required height of numbers or names on locker, in distinct and legible lettering, and either in raised or recessed lettering Highly contrasted lettering colour from the background should be used required height of lettering or number size min. depth of aisle in front of lockers, baggage compartments and carousels max. height of platform surface for baggage racks or carousels total allocated storage units for persons with disability, in available public storage facilities
460 - 1220 mm	
915 - 1065 mm	
1525mm	
13 - 19 mm	
1370mm	
460mm	
10%	
3.3.6.1	Access to Storage Facilities Storage facilities should be clearly indicated, and access to them should be direct and unobstructed min. distance between opposing banks of storage facilities (e.g., shelving, lockers), if knee spaces are provided
1200mm	
1400mm	min. distance between opposing banks of storage facilities, if knee spaces are provided (fig. 3.50)

650 - 1150 mm	Wherever practicable, shelving should be positioned so that it can be reached independently by people with disabilities (fig. 3.49) recommended position of storage shelvings, if access is from the front and the use is infrequent by wheelchair users
650 - 1000 mm	recommended position of shelvings, if access is from the front and the use is frequent by wheelchair users (fig. 3.50)
630 - 1170 mm	recommended position of shelvings, if access is from the side and the use is infrequent by wheelchair users
665 - 1060 mm	recommended position of shelvings, if access is from the side and the use is frequent by wheelchair users
400mm	min. height of bookshelves or drawer pulls for use by wheelchair users height of shelving for use by people who can stand but have reach difficulties and difficulties bending, where use is frequent
750 - 1500 mm	height of shelving for use by people who can stand but have reach difficulties and difficulties bending, where use is infrequent
700 - 1625 mm	Adjustable fixtures and fittings should be used as part of storage and shelving systems if facilities are being customized to meet the needs of a particular person with disability Projecting door and drawer hardware should contrast visually with its associated storage facilities and have no sharp edges
3.3.6.2	Lockers for Self-contained or Communal Changing Areas
300 x 600 mm	width x depth of lockers suitable for wheelchair users
400 x 800 mm	bases of lockers above the floor level
1200mm	min. height of lockers intended to store crutches, calipers, or artificial limbs
800 x 600 mm	recommended width x depth of lockers that are intended to store walking frames
1150mm	suitable height of locks for lockers, and should be easy to use Lockers should be securely constructed and located in a dry place, preferably outside the changing area Wheelchair maneuvering space in front of a locker should be in accordance with the recommendations in 3.1.9: Waiting Areas <i>Room acoustic measures are necessary for the changing areas, especially if a voice alarm system is also installed. Otherwise, the required speech intelligibility cannot be achieved.</i>
3.3.10	Public Washrooms
865mm	Where unisex/family washrooms are provided, they should be located close to public Washrooms. required height of baby-changing table from floor level Provide automatic door openers for accessible public and staff washrooms whenever possible The preferred side grab bar is the reversed "L" shaped type. The preferred faucet on basins are of the automatic type (fig. 3.55, 3.57, & 3.58)
3.3.13	Washroom Accessories
1200mm	max. mounting height of washroom accessories (fig. 3.62) Toilet paper dispenser should be mounted so they are reachable from a seated position and capable of being operated with one hand
1	recommended min. numbers of full-length mirror in public washrooms, change rooms or locker
485mm	Faucets on basins may be automatic (preferred) or of the lever handled type (fig. 3.63) max. distance from the edge of the vanity or basin to the faucet
3.3.13.1	Unisex (single-Use or Family) Toilet and Unisex Bathing Rooms
1	max. number of lavatory in a unisex toilet room
2	max. number of water closets without urinal (where there is a urinal, only one water closet is required)
3.3.14	Windows and Window Hardware
760mm	In buildings with operable windows, the opening sections should be easy to reach and operate by persons using mobility aids max. height of sill from the floor (fig. 3.64)
1070 - 1200 mm	required height of the horizontal transoms in windows, so that they do not interrupt the eye level of seated persons Deep windowsills located in residential and institutional units that provide an extra surface for plants and photographs should be reachable by persons using mobility aids
1065mm	max. mounting height of window opening hardware, where possible Where required, window hardware should be of the lever handle type (i.e., not a rotary action)
1200mm	max. mounting height of Window blinds, drapes or louvers, and should have operators, controls, and pull cords etc
3.4	Interior Systems and Controls
3.4.1	Acoustics Design
	Floor finishes, wall surfaces and ceilings should be selected so that occasional noise is not unduly amplified (the different reaction caused by the sound from hard floor surfaces has an effect on visually impaired persons and persons with auditory disabilities) Design changes may be desirable to ensure that impact sounds from secondary corridors are different in quality from sounds in major routes (e.g., through changes in floor finishes). Ceiling shapes should be designed so that echoes do not occur. Note: Domed shaped ceilings tend to distort sound Public address and call systems should be capable of being zoned to key areas, not everywhere Use the appropriate acoustic absorbency for each surface (BS 8233)
3.4.2	Audible and Visual Information

		Provide loud and distinct essential audible signals such as fire-alarm signals or elevator arrival call system (fig. 3.65)
		Fire alarm signals should alert senior citizens and persons with sensory disabilities of problems and when to evacuate the building
3.4.3		Automatic Door Openers
		Provide automatic door openers or assisted door openers on both the exterior entrance and the related vestibule door at the main entrance and other accessible entrances to a public buildings and institutions
		Power assistend openers may be used for interior doors that provide access to essential services, programs, work or support areas
	1000 - 1100 mm	height of door controls from floor
		Where automatic detection systems are used, ensure sufficient wait time for persons with mobility aid to clear the opening safely, before the door closes
		Where automatic exterior doors swing open toward oncoming pedestrians or are located in busy interior areas, lateral guards should be provided
	305mm	min. extension of guards beyond the door swing on both sides of the opening
3.4.5		Communication Systems
		General (non-emergency) communication systems should be accessible to, useable and understood <i>and be found or lacatable</i> by persons with various sensory limitations
		<i>All essential two-way communication systems that use voice input or output should also include a digital text display for persons with auditory or speech impairments.</i>
		All essential two-way communication systems, utilizing voice input or output, should also include a digital display for persons with auditory or voice limitations.
	1	min. number of communication system units in each array with volume enhancement for persons with hearing limitations
		Consider the use of TTY telephone at major information counters (i.e., text telephone with a digital display) (fig. 3.68)
		Consider the use of an alternate or supplementary system, with an audio output, for people with visual limitations
		Audio output, and other forms of essential informations (large prints and Braille text) should be considered where visual public communication systems or displays are utilized
		In networked systems, consideration should be given to special input and output requirements for persons with sensory limitations
		Where both visual and tactile characters are required, either one sign with both visual and tactile characters, or two separate signs shall be provided
	0.8mm	min. depth of raised characters above their background (uppercase sans serif style, not in italic, oblique, script, highly decorative, or of other unusual forms)
	55% W. & 110% H.	character Proportion: min. width of the uppercase letter "O", and the max. height of the uppercase letter "I"
	16 - 51mm	character height measured vertically from the baseline of the character, based on the height of the uppercase letter "I" (fig. 3.69)
	13mm	exception: min. raised character height, where separate raised and visual characters with the same information are provided.
3.4.5.1		Height of Raised Characters
	15%	stroke thickness: Stroke thickness of the uppercase letter "I" shall be 15 percent maximum of the height of the character
		Character Spacing:
	135 - 170%	line spacing: raised character height between the baselines of separate lines of raised characters within a message
		Braille: Braille shall be contracting in colour and texture (Grade 2)
		Dimensions and Capitalization: Domed or rounded shape braille dots (table 3.5 - is missing)
		The indication of an uppercase letter or letters shall only be used before the first word of sentences, proper nouns and names, individual letters of the alphabet, initials, and acronyms.
3.4.5.2		Symbols of Accessibility
		Finish and Contrast: Non-glare
		It shall contrast with their background with either a light symbol on a dark background or a dark symbol on a light background.
3.4.6		Controls and Operating Mechanisms
		Safe, easy and independent design and installation of operating controls and devices
		Easy to understand switches and control
		Sufficient lighting of the control devices
		The use of photoluminescent pictogram signs shall be provided where appropriate.
	800 - 1100 mm	height of devices, controls, etc, above floor level
	600mm	min. location of devices and controls from any internal corner (700mm preferable)
	400mm	min. height of Electrical wall socket outlets, telephone points and TV sockets above the floor level
	610 - 1200 mm	height of all controls, operating components or dispensing slots above the floor level, for easy access by persons using mobility aids
		Controls and operating mechanisms should be easily identifiable by using highly contrasting background colour
		Clearly visible instruction information detailing the use of key controls or operating mechanisms

13mm	min. diameter of lever type controls or raised push buttons
1200mm	max. height of all light switches, thermostats and fire alarm pull stations etc.
460 - 1065 mm	required height of all duplex receptacles from the floor
3.4.8	Fire/Emergency Systems and Signals
	<p>Fire alarm signals should include both audible and visible components to alert persons with sensory limitations.</p> <p>Distinctive sound audible signals, with sufficient power to be heard above the ambient noise in the environment</p> <p><i>It is useful to practice siren alarm once a year</i></p> <p>Audible signals for two-stage evacuation should have distinct noises/sounds in each stage (e.g. be distinguishable from each other). (fig.3.74)</p> <p>Announcements regarding fire-exiting procedures should be loud enough above ambient noise levels and be preceded by a distinctive sound</p> <p>Visible flashing signals should be utilized</p> <p><i>Signals should be placed high and be clearly visible, taking into account illuminance, colour contrast and luminance contrasts.</i></p> <p>Provide increased warning signage in facilities serving persons who are blind or who have visual limitations</p> <p>Portable vibratory alarms should be considered to supplement auditory signals, for persons (including staff) with hearing limitations who are permanent occupants of the institution</p>
3.4.10	Information Systems and Directories
	<p>Information systems should to be comprehensible to a wide variety of users, including persons with sensory disabilities</p> <p>Where essential auditory information is available, it should be complemented by suitable printed material</p> <p><i>Essential print information should generally be printed in large type and with high luminance contrast</i></p> <p>Print information should also be available in alternate formats, including Braille or audiotape</p> <p>Information typically available on visual display screens should also be available in other formats, including audiotape or large print.</p> <p>On display monitors, consideration should be given to include an enlarging function for persons with low vision</p>
1200mm	<p>mounting height of information system for direct public access</p> <p>Information systems should be easy to operate and require little physical effort</p> <p>Push-buttons (or other controls) accessing public information systems should be clearly identifiable by colour and/or tone from the background colour</p>
70%	<p>min. required contrast level between push buttons and their background</p> <p>Push-buttons or other controls should include raised numbers, numerals or symbols (section 3.4.6)</p>
200lux	<p>recommended lighting levels at keyboards or other controls, and should be evenly distributed</p> <p>Visual display screens, in public information or display systems, should be mounted to ensure there is no direct glare and no reflections from other light sources</p>
3.4.11	Artificial Lighting
	<p>Artificial lighting should be comfortable, evenly distributed at all working surfaces, on the floors of all circulation routes and in all areas of potential hazard</p> <p>Light sources and fixtures should be selected to minimize direct or indirect glare from nearby reflective surfaces and easy navigation of visually-impaired persons</p> <p>The quality of light is close to a full spectrum as possible to aid in edge and colour definition by persons who have visual disabilities.</p> <p>offset of light colour temperature, where fluorescent or quartz light source with a high blue content are used, to ensure the warm end of the spectrum provides appropriate colour definition</p> <p>Avoid light fixtures with multiple points of high intensity light, as they increase glare</p> <p>Even distribution of light at floor level</p> <p>The leading edges of stairs, steps, ramps or escalators should be evenly lit to minimize tripping hazards</p> <p>Lighting levels in elevator lobbies should be similar to the lighting levels in elevator cabs in order to minimize tripping hazards</p>
2700 - 3000 Kelvin	<p>min. lighting levels in elevator lobbies, at the threshold of the elevator</p> <p>required emergency lighting over interior stairs and ramps, in exits, or other paths of travel at the walking surface</p>
100 lux	
100 lux	
50 lux	<p>required emergency lighting at exterior locations at the walking surface</p> <p>min. lighting over directional or informational signage at public telephones, informational/service counters, automatic teller machines, or other keypad operations at the working or information surface</p> <p>Lighting over lecterns, podiums, platforms or other speaker locations should be enhanceable, even when other lighting is dimmed, to permit lip-reading and a view of any of the hand actions (i.e., from 'signers') used to communicate with persons who are deaf.</p> <p>Avoid glare and strong shadows</p>
200 lux	
3.4.12	Natural Lighting
	<p>Wherever possible, natural light should be utilized to assist in lighting entrances, corridors and major workspaces</p> <p>Minimize direct glare (e.g., reflected from floor or work surfaces)</p>
3.4.13	Listening Devices
	<p>An FM loop, or other assistive listening systems are recommended to be considered for all meeting rooms or assembly and entertainment areas, serving more than 35 persons. (Fig. 3.75)</p>

For more details: It is recommended that an FM loop InducTive Hearing System (AFILS = audio frequency induction loop system) according to ISO 60118-4 or other assistive listening systems (e.g. FM= radio) be considered for all meeting rooms or assembly and entertainment areas serving more than 35 people.

Where infrared assistive listening devices are used, ensure that no overhead lights cancel out the infrared signal at the receiver

Daylight is more critical because there are significantly more infrared (heat) components. Shading by people sitting in front of it is also a problem, which is why a high mounting of the spotlights is necessary.

In meeting areas, dimmer switches (or other transformer coils) should be carefully located so as not to cause electro-magnetic interference with any audio induction loops

Neck loops compatible with personal hearing aids, where an FM loop system, or other assistive listening device is provided in public buildings or meeting areas (fig. 3.75)

Where an induction loop system is utilized, only half the seating area will need to be encompassed

Every theatre or studio intended for viewing of motion pictures shall accommodate described video and the installation of captioning in conformance with the Ghana Building Code.

Larger meeting rooms should be designed and furnished to allow a clear view of the speaker(s) at all times

3.4.13.1

Assistive Listening Systems

Provide an assistive listening system in each assembly area where audible communication is integral to the use of the space

Receivers shall be provided for assistive listening systems in each assembly area in accordance with Table 3.6

Other insight: Permanently installed hearing aid systems are only required if a public address system is also available (theatre, lecture hall, cinema, church where the participants are only listening). Without a sound system, there is no microphone and therefore no signal in the hearing aid system.

And in general: In communication rooms, room acoustics are a priority. It also supports people with good hearing who have "difficulties understanding", e.g. foreign speakers). If the reverberation time is optimally short, even wearers of hearing systems usually manage well.

3.4.14

Public Address Systems

Public address system should be easy to hear above ambient background noise, without distortion or feedback

The speakers should be mounted above head-level and provide effective sound coverage in required areas such as It should preferably be zoned so that information can be directed to key locations only, to minimize background noise in other spaces

All-point call systems should only be utilized for fire and emergency information (i.e., not for paging staff)

Personal alarm, staff or other call systems (e.g., nurse call), should be selected with care and according to the requirements of the particular setting or user

Call systems should always be used with discretion

Paging systems for use by staff or other key personnel should be selected to be discreet and low in volume

3.4.16

Signage and Way-finding

Signages and way-finding strategies must be logical and consistent in design and distribution throughout the building

The letters, numbers, and pictograms used must be legible and easy to comprehend (fig 3.77, 3.78, 3.79, 3.81, & 3.82)

1370 - 1525 mm
305mm
25mm
70%

required mounting height of all directional signage and locational signage (at eye level) for quick and easy identification by persons with visual limitations. (fig 3.80)

constant reference location from the door frame, where room numbers or names should be mounted

min. height of lettering for room numbers or names, in sans serif type print and raised lettering

min. percentage of contrast between print and the background colour

Braille information should be located immediately below all room numbers and names, as well as below any major directional signs. (fig. 3.85)

In larger public facilities, a tactile map of the facility showing the distribution and location of key areas/spaces, other directional information, instructional information, or maps showing exiting details for emergency situations should be provided in the main entrance lobby, or on each floor and should be located close to the major point of arrival to the floor (e.g., elevator lobby)

Lettering or signs providing general directions should be in large size print that is legible from normal viewing distance(s) (fig. 3.84)

3.5

Special Facilities and Areas

3.5.3

Cafeterias, Restaurants, Dining Areas and Bars

1065mm

min. width of major aisle

810mm

min. width of the narrowest aisle (fig.3.90)

915 x 760 mm

min. height x width of at least one section of the counter, where counter service is provided (fig 3.91)

915mm

max. mounting height of displays from the floor, where cafeteria or buffet style food services are provided

1220mm

max height of overhead display shelves (e.g., for desserts and salads etc.)

1065mm

max. mounting height of cutlery, condiments, and napkin containers from the floor

Provided tray rails should be as continuous as possible to allow persons using wheelchairs or scooters to slide a tray along easily

915mm

min. width of accessible aisle at the casheir locations, with clear resting surfaces for trays etc.

915mm

max mounting height of surfaces from the floor (fig. 3.92)

915mm

min. width of at least one access location, where barriers and turnstiles are provided to control access

3.5.8		Displays, Exhibition Area, Galleries, and Museums
	1065mm 915mm 700mm	<p>min. width of the aisle between exhibits or study area</p> <p>max. mounting height of exhibits, where they are displayed in horizontal or inclined cases</p> <p>clear knee space below displays, to allow a direct approach by a person using a mobility aid</p> <p>For persons with visual limitations, tactile exhibits should be available (e.g., sculptural pieces), with nearby information printed in large print text, Braille, or provided on an audiotape.</p> <p>Where audio information is provided, some consideration of increased volume on personal audio devices and compatibility with hearing aids is desirable.</p> <p><i>Basically, any audio output has a volume control. therefore, connecting neck ring loops instead of headphones is preferable.</i></p> <p>Lighting in exhibit and display areas should be capable of being enhanced in key locations for specific exhibit</p> <p>Lighting at display cases should be designed to minimize reflected glare</p>
3.5.9		Gymnasias
		<p>The main floor or exercise areas of gymnasiums should be fully accessible to persons using mobility aids, including all related changing areas, showers, washrooms, and lockers (section 3.3.10 & 3.3.6)</p> <p>Seating areas provided as bleachers or galleries overlooking the gymnasium floor should be accessible to persons using mobility aids</p> <p>No obstacles in the gymnasium area that might constitute a hazard to visually impaired persons</p> <p>sufficient clear floor space</p>
3.5.10		Hospitals, Clinics and Health Care Facilities
	1100mm 865mm	<p>Fully accessible health services to people with varying disabilities</p> <p>min. width of the internal aisle of the clinic, diagnostic, treatment, or support areas, including offices, consultation, and treatment cubicles</p> <p>min. width of internal doorway</p> <p>Provide accessible arrival and entrance areas to persons using mobility aids and to persons with visual limitations (Section 3.1.4)</p> <p>Provide accessible information and service counter, and other support areas (Section 3.3.5)</p> <p>Provide accessible washrooms, storages and waiting areas (section 3.1.9 & 3.3.10)</p> <p>Provide appropriate heating, ventilation and communications systems</p> <p>Provide appropriate communication systems, such as nurse calls, telephones or public address systems (section 3.4.14)</p>
3.5.11		Libraries
	915mm 200 lux 700mm 1220mm	<p>Book return and checking area counters should be designed to be accessible to persons using mobility aids</p> <p>min. width of aisles for book stack areas (preferable width of 1065mm)(fig. 3.93)</p> <p>required lighting levels at book stack (at approx. 915mm height), mounted directly over the aisle space</p> <p>clear knee space below study table</p> <p>max. height of shelving over study carrels, tables or study counters</p> <p>Acoustic quality in library, reading and study areas should limit extraneous background noise (section 3.4.1)</p> <p>Provide a separate space for CD's, taped information and talking books etc, to avoid disturbance of other library users</p> <p>Where reading carrels are provided in libraries, at least one should be large enough to accommodate a wheelchair user <i>and accessible from underneath</i></p>
3.5.13		Meeting Rooms, Assembly Areas, and Theatres
		<p>Aisles and passageways (section 3.2.1) and grandstands and viewing areas (section 2.3.8)</p> <p>Accessible seating should be distributed and integrated throughout seating areas of assembly rooms with different vantage points</p> <p>All entertainment and assembly areas should be able to accommodate persons using various mobility aids. (fig. 3.94)</p> <p>All meeting and assembly areas should be able to accommodate persons who have visual limitations</p> <p>Good sight lines and sufficient lighting is required to interpret sign language adequately within a group setting.</p> <p><i>Provide an assistive listening system as described in 3.4.13.1</i></p>
3.5.14		Recreation Facilities
		<p>All areas and amenities should be accessible to persons using mobility aids.</p> <p>Exterior routes (section 2.1) and entrances (section 3.1)</p> <p>Visual limitations: Interior routes (section 3.2), signagenand way finding (section 3.4.16), and materials and finishes (section 3.6.6)</p> <p>Hearing limitations: Acoustics (section 3.4.1), communication systems (section 3.4.5), and meeting rooms, assembly areas and theatres (section 3.5.13)</p>
3.5.18.5.3		Other Kitchen and Laundry Appliances
	200mm 200mm 200mm 1200mm 1150mm 1050mm	<p>approx. height of plinth for fitting refrigerator and/or freezer (excluding chest freezer) for wheelchair users</p> <p>required height of plinth upon which a front-loading washing machine and front-loading tumble dryer intended for wheelchair users is installed</p> <p>approx. height of plinth upon which a dishwasher intended for wheelchair users is installed</p> <p>max. height of a free-standing water heater controller from the floor</p> <p>max. height of water heater controller, when mounted on a work surface</p> <p>Adjustable folding wall-mounted ironing board, in conjunction with an adjacent socket outlet</p> <p>max. height of switched socket outlet center line from the floor, where a clear space has been provided beneath a work surface of 900mm</p>

	150mm	max. height of switched socket outlet on a return wall above the work surface, where no space has been provided beneath a work surface and not more than 150 mm back from the front edge of the work surface. Isolating switches controlling socket outlets should be positioned on a fascia (fig. 3.101)
	750 - 1200 mm	required height of the center line of switches and controls in kitchens from floor, where mounted on a wall without an intervening work surface or counter
	1200mm	Work surface light switches should be located on a wall remote from the light fittings for easy access
	43°C	max. height of controls for general kitchen appliances other than ovens max. surface temperature of heat emitters, or screened to prevent burns The signal emitted by a fire alarm should be both visible and audible
	760mm	Accessible kitchen and dining area for every persons required height of tables in the kitchen provided for two people to eat together informally, with 700mm vertical knee space beneath the table Provide a serving hatch at the rear of a wheelchair work surface, and level with the work surface, to link directly with any separate dining area Cupboard units and work surfaces should contrast visually with background finishes Flooring should be slip-resistant and contrast visually with wall surfaces Shiny floor and wall surfaces should be avoided as they can produce reflections and glare Bold patterns should not be used on floors and walls, as they are confusing for partially sighted people
	200 - 300 lux	illuminance of the kitchen at work surface level
3.5.20.6.1		Clear Widths of Door Openings (Section 3.2.3 has addressed this part)
3.5.20.9		Switches, Sockets and Controls
3.5.22.5.3		Hearing Enhancement System (Section 3.5.18.5.3 has addressed this topic)
		Systems for hearing enhancement should be installed in entertainment buildings Wherever possible, electric cables carrying current in which the waveform has been modified (dimmed) should be routed to avoid, as far as is practicable, any interference to hearing aids Equipment, such as computers or slide projectors, that uses fans, should be carefully sited to reduce background noise Fluorescent fittings should be selected to ensure that they do not cause interference to hearing aids An acoustic booth for the provision of audio description should be provided with full view of the stage or screen in the hall
3.6		Other Interior Features
3.6.1		Colour, Pattern and Texture
	70%	min. contrast for way-finding strategies (e.g., signage system), except the use of bright yellow, which is acceptable at 40% contrast Choose appropriate floor, wall and ceiling materials that contrast visually with adjacent surfaces
3.6.2		Floor and Wall Surfaces/Textures
	915mm	Non-slip and low-glare interior and exterior floor/paving surface Mark all level changes (Stairs, steps, escalators, and ramps) by both distinct colours and textural changes at the walking surface min. distance where changes in texture should occur before the actual level change Modern textures can also be used on wall surfaces as part of the overall way-finding strategy
3.6.2.1		Floor Surfaces Avoid using shiny finishes due to glare and the perception of being slippery Do not use large, repeating patterns that incorporate bold contrasting colours or simulate steps for any floor surface Slip-resistant floor surface is the best choice
3.6.2.2		Slip Potential Characteristics of Treads, Ramp Surfaces and Floor Finishes Floor surfaces should have appropriate coefficient of friction for foot and wheel
3.6.2.3		Ramps and Sloping Surfaces A sloping surface requires a higher coefficient of friction than an equivalent level surface to maintain the same degree of traction
3.6.3		Colour and Tone
	70%	Use a bright colour or highly contrasting tones for signage min. required contrast (40% contrast is sufficient when using industrial yellow colour) End walls or return walls in long corridors can also be defined by the use of highly contrasting colours or tones Baseboards in monochromatic environments should be highly contrasting (70% or higher) with wall and floor colours to provide needed boundary definition Use colours in the warm end of the spectrum are easier to distinguish for senior citizens with vision loss Colours such as pastel blue or grey should be avoided in spaces used by senior citizens
3.6.4		Fire and Life Safety
	1 hour	A comprehensive evacuation plan and operational strategies for everybody during fire outbreak or other emergencies (fig. 3.135, & 3.136) Allow 'horizontal exiting' to a safe area on the same floor or create a 'safe holding areas' in the same general area (fig. 3.137, 3.138, & 3.139) Where safe-holding areas are provided, they should be equipped with emergency lighting, a two-way communication system, as well as separate ventilation so that they can be used when normal building systems are shutdown min. time of protective enclosure for safe-holding areas

	<p>Specific strategies to provide early warning of emergency situations for persons with hearing limitations, (e.g., a portable vibrating alarm, or a flashing light at their workstation) may also be desirable</p> <p>Provision of a fire fighter's elevator for wheelchair users, during fire outbreak (section 2.2.4 & 2.2.6)</p>
3.6.4.1	<p>Fire Alarm Systems</p> <p>In existing facilities, visible alarms shall not be required except where an existing fire alarm system is upgraded or replaced, or a new fire alarm system is installed</p> <p><i>Why not?</i></p> <p>Unlike audible alarms, visible alarms must be located within the space they serve so that the signal is visible</p> <p>Fire alarm signal should be distinct from other warning alarm signals</p> <p>Where employee work areas have audible alarm coverage, the wiring system shall be designed so that visible alarms can be integrated into the alarm system</p>
3.6.5	<p>Maintenance</p> <p>Remove all objects along paths of travel that may cause hazards or limitations for persons with visual and other impairments</p> <p>Do not compromise lighting and safety with energy conservation</p> <p>Runners or mats on the floor in entrance during the rainy season should be introduced with caution</p>
3.6.6	<p>Materials and Finishes</p> <p>Carpet floor finishes in paths of travel should be suitable for persons using mobility aids</p> <p>Carpet should be firmly glued down to the sub-floor</p> <p>Where hard, monolithic materials are selected for floor finish, they should be non-slip and non-glare (section 3.6.2 & 3.6.9)</p> <p>6mm max. width of joint, where floor tiles, bricks, or pavers are used internally</p> <p>Ceramic tile used in washrooms, changing areas or on pool decks should have non-slip and non-glare finishes</p> <p>Wall surfaces in corridors, adjacent to stairs, ramps or any part of the normal path of travel should be of non-abrasive finish.</p>
3.6.7	<p>Obstacles</p> <p>Ensure that all items of furniture, equipment and displays are stable and will not move or tip over when touched by someone requiring support.</p> <p>All temporary or permanent waste and recycling containers should be located in constant locations to one side of the path of travel</p> <p>All furniture and equipments should be located to one side of the normal path of travel and cane detectable</p> <p>Ensure that all signage, signage supports, or other information strategies do not intrude into normal walking areas. (fig. 3.143)</p> <p>Ensure that all permanent or temporary barriers that control people's movement (e.g., queuing lanes) are firmly mounted to the floor, and are stable for seniors or other persons who might need them for support.</p> <p>Keep all maintenance or repair equipment (e.g., ladders and carts) away from normal paths of travel</p> <p>Ensure that all temporary barriers and hoardings, used to protect work sites or maintenance activities, are substantial, securely mounted, continue to floor level and are cane detectable.(fig. 3.144)</p> <p>Ensure that all loose wires, rugs or any potential tripping hazards at the floor level are removed or made secure</p>
3.6.9	<p>Glare and Light Sources</p> <p>Attempt to select materials and finishes that do not constitute glare</p> <p>Control natural light where necessary with curtains, blinds, or sunscreens</p> <p>Monolithic floor surfaces such as stone, granite, marble or terrazzo should be selected in a matte or honed finish (section 3.6.2)</p> <p>Floor finishes such as vinyl, quarry and glazed tile, mosaics or other composition materials should also be in matte or satin finishes</p> <p>High gloss finishes should be avoided at all times</p> <p>Light fixtures should be selected so that no direct glare is created (e.g., with diffusers, lenses, or recessed light sources) (section 3.4.11 & 3.4.12)</p> <p>Where surface mounted fluorescent ceiling lights are used (e.g., in corridors), it should have darkened sides, and should be positioned at right angles to the path of travel</p> <p>Supplementary lighting sources can be used to enhance special features at key locations (e.g., with upward and downward light components only)</p> <p>High intensity light sources such as quartz, halogen or other pin-point sources (e.g., chandeliers) should be used with extreme caution</p>

Notes in italics: Comments by Dipl.-Ing. Carsten Ruhe, German expert on inclusion for hearing impaired