Inclusion of persons with disabilities and accessibility at workplace
Inclusion of persons with disabilities and accessibility at workplace
“Cyberabad is considered to be one of the most distinctive work and living spaces in the country. It is important to maintain that reputation by identifying new opportunities to enhance the quality of life of the people who live and work here, and those who are visitors. The 5-point environmental initiatives will help Cyberabad catch up with other cities that now exemplify the best urban practices across the world.”

Mr. Jayesh Ranjan
VC & MD, Telangana State Industrial Infrastructure Corporation

“The Retrofitting of the Cyberabad Zone is a commendable initiative by the Telangana State Industrial Infrastructure Corporation. The Foundation is excited to partner with TSIIC–GIZ to create barrier-free access to support inclusion of Persons with Disabilities in the workplace. We are keen to make this an example for all the other IT Parks to follow.”

Dr. Ganesh Natarajan
Chairman
NASSCOM Foundation
There are approximately 70 million persons with disability in India, only about 0.1 million have succeeded in getting employment across industries till now. The IT Industry hopes to provide a much needed paradigm shift towards creating new opportunities for people with disabilities; be it through accessible software products or encouraging companies to build indigenous technology that can help persons with disabilities to live more independently.

NASSCOM Foundation through its Disability Initiative aims to advocate and create an ecosystem that fosters and mainstreams ‘Disability Inclusion’ at workplace.

The Foundation would like to thank the Telengana State Industrial Infrastructure Corporation (TSIIC) on taking the first steps in the direction to demonstrate ‘Retrofitting of IT parks in Cyberabad’.

NASSCOM Foundation is excited to be a part of this project and is contributing towards e-Waste Management and Barrier-free Accessibility; the goal is to create responsible e-Waste management practices and barrier free accessibility in the parks and workplaces respectively.

It is indeed a pleasure to share this information booklet that encapsulates the often asked questions that one may have/need to know, when it comes to inclusion of persons with disabilities at workplace. This booklet is a compilation of the knowledge that exists among inclusivity practitioners and advocates.

I would also like to acknowledge Rama Chari, Director- Diversity and Equal opportunity Centre and Shivani Gupta, Founder and Chief Consultant - AccessAbility for their guidance and support in building this information booklet. Congratulations to the Disability Initiative team at the Foundation for this succinct compilation.

R. Chandrashekar
President, NASSCOM
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Employability

The following section covers important aspects of employability of persons with disabilities. It begins with the broader theme of evolving an inclusion plan for persons with disabilities and then provides critical points with respect of Accessibility & Work and Employment mentioned in United Nations Convention on the Rights of Persons with Disabilities (CRPD) guidelines.

Sensitization of people in the workforce in the appropriate ways of interacting with persons with disabilities is crucial to prevent intentional or unintentional discrimination of persons with disabilities and also integrating them into the workforce.

This information has been provided by Ms. Rama Chari of Diversity and Equal Opportunity Centre (DEOC), a leading social enterprise that undertakes audits and helps companies to build an inclusive workplace for persons with disabilities.

Rama Chari is the Founder & Director of Diversity and Equal Opportunity Centre for any further information you may contact her at: rama_c@deoc.in

Website: http://deoc.in/
Evolving an Inclusion Plan for Persons with Disabilities

The companies that are interested in creating an inclusive workplace could take the following steps:

- **Educate yourself and your employees** about the why and how of inclusion on a continuous basis.

- Incorporate disability and inclusion into your organisation’s overall strategic vision and **formulate an Equal Opportunity Policy** based on the UN Convention on the Rights of Persons with Disabilities and create a system to implement, including allocating human and financial resources.

- Review and audit operational policies, systems and facilities to ensure non-discrimination and to make them disabled friendly.

- Build capacity of HR, Administration, IT and other relevant officials on disability and inclusion.

- **Make your physical and information infrastructure inclusive based on accessibility standards.**

- **Make your recruitment, training, retention and growth plan inclusive based on audit findings.**

- **Disseminate information about your organisation being disabled-friendly** using your newsletter, website, press releases and during corporate events.

- Make continuous effort to build awareness to ensure an inclusive work culture across the organisation.

- **Ensure an inclusive plan for safety and emergency preparedness.**

- **Develop a vendor diversity programme.**
Article 9 and 27 of the UNCRPD

United Nations Convention on the Rights of Persons with Disabilities (CRPD) was ratified by India in October of 2007. This means that India is legally required to fulfill the provisions given in the Convention. Ratified Conventions are also used by the Indian Courts to make their decisions, in the absence of domestic law, particularly on issues related to human rights.

From the perspective of companies Article 9 and 27 of the CRPD guidelines are important. The guidelines have been provided below for reference —

Article 9 - Accessibility

- To enable persons with disabilities to live independently and participate fully in all aspects of life, States Parties shall take appropriate measures to ensure to persons with disabilities access, on an equal basis with others, to the physical environment, to transportation, to information and communications, including information and communications technologies and systems, and to other facilities and services open or provided to the public, both in urban and in rural areas. These measures, which shall include the identification and elimination of obstacles and barriers to accessibility, shall apply to, inter alia:
  - Buildings, roads, transportation and other indoor and outdoor facilities, including schools, housing, medical facilities and workplaces;
  - Information, communications and other services, including electronic services and emergency services.
- States Parties shall also take appropriate measures:
  - To develop, promulgate and monitor the implementation of minimum standards and guidelines for the accessibility of facilities and services open or provided to the public;
  - To ensure that private entities that offer facilities and services which are open or provided to the public take into account all aspects of accessibility for persons with disabilities;
  - To provide training for stakeholders on accessibility issues facing persons with disabilities;
  - To provide in buildings and other facilities open to the public signage in Braille and in easy to read and understand forms;
• To provide forms of live assistance and intermediaries, including guides, readers and professional sign language interpreters, to facilitate accessibility to buildings and other facilities open to the public;

• To promote other appropriate forms of assistance and support to persons with disabilities to ensure their access to information;

• To promote access for persons with disabilities to new information and communications technologies and systems, including the Internet;

• To promote the design, development, production and distribution of accessible information and communications technologies and systems at an early stage, so that these technologies and systems become accessible at minimum cost.

Article 27 - Work and employment

• States Parties recognize the rights of persons with disabilities to work, on an equal basis with others; this includes the right to the opportunity to gain a living by work freely chosen or accepted in a labour market and work environment that is open, inclusive and accessible to persons with disabilities. States Parties shall safeguard and promote the realization of the right to work, including for those who acquire a disability during the course of employment, by taking appropriate steps, including through legislation, to, inter alia:

  • Prohibit discrimination on the basis of disability with regard to all matters concerning all forms of employment, including conditions of recruitment, hiring and employment, continuance of employment, career advancement and safe and healthy working conditions;

  • Protect the rights of persons with disabilities, on an equal basis with others, to just and favorable conditions of work, including equal opportunities and equal remuneration for work of equal value, safe and healthy working conditions, including protection from harassment, and the redress of grievances;

  • Ensure that persons with disabilities are able to exercise their labor and trade union rights on an equal basis with others;

  • Enable persons with disabilities to have effective access to general technical and vocational guidance programs, placement services and vocational and continuing training;

  • Promote employment opportunities and career advancement for persons with disabilities in the labor market, as well as assistance in finding, obtaining, maintaining and returning to employment;
• Promote opportunities for self-employment, entrepreneurship, the development of cooperatives and starting one’s own business;

• Employ persons with disabilities in the public sector;

• Promote the employment of persons with disabilities in the private sector through appropriate policies and measures, which may include affirmative action programs, incentives and other measures;

• Ensure that reasonable accommodation is provided to persons with disabilities in the workplace;

• Promote the acquisition by persons with disabilities of work experience in the open labour market;

• Promote vocational and professional rehabilitation, job retention and return-to-work programmes for persons with disabilities.

• States Parties shall ensure that persons with disabilities are not held in slavery or in servitude, and are protected, on an equal basis with others, from forced or compulsory labour.

The above guidelines have been taken from UN ENABLE website
Etiquette for Interacting with Colleagues with Different Disabilities

These guidelines have reproduced from the Manual “Value Route to Business Success: The why and how of hiring persons with disability” published by Confederation of Indian Industry (CII) and Diversity and Equal Opportunity Centre (DEOC) in 2009.

**Introduction:** Knowing and applying disability etiquette is one way of making people with disabilities feel welcomed. When supervisors and co-workers use disability etiquette, employees with disabilities feel more comfortable.

Some of the general pointers for people about interacting with persons with disabilities are mentioned below

- It is important to keep in mind that all people have to be treated respectfully. There are some general considerations while interacting with people with different kinds of disabilities. Treat each person as an individual with unique needs, talents and abilities. Just because a person has a kind of disability, does not mean her/his needs are the same as anyone else with that same disability.

- When talking or writing about a person with disability, emphasise the person, not the disability. People with disabilities are not conditions or diseases. They are individual human beings. For example, a person is not epileptic but rather a person with epilepsy.

- Do not assume anything. If you do not know, ask. If you have a question about what to do, how to do, what terminology to use, what assistance to offer, ask the person with the disability. That person is your first and best resource. Be willing to learn.

- Be prepared to invest a little extra time and extra effort in understanding the needs of a person.

- Offer your assistance if it seems to be needed and wait for your offer to be accepted before acting.

- Make effective communication a priority. Social acceptance is the most important factor in job success and employee satisfaction.

- Remember that the greatest obstacle that people with disabilities face in life is often the negative attitude of others.
Some tips for specific circumstances are mentioned below:

- **How to interact with a person using a wheelchair?**
  - Do not push, lean on, or hold onto a person’s wheelchair unless the person asks you to. The wheelchair is part of her or his personal space.
  - Try to put yourself at eye level when talking with someone in a wheelchair.
  - Rearrange furniture or objects to accommodate a wheelchair before the person arrives.
  - Offer to tell the person where accessible rest rooms, telephones, and water are located.
  - When giving directions to a person in a wheelchair, consider distance, weather conditions, and physical obstacles (curbs, stairs, steep hills, etc.).
  - Do not assume that a person on a wheelchair needs help. They would have been trained to use their wheelchair and know their limits and possibilities.

- **How to interact with a person who has difficulty in seeing?**
  - When greeting the person, identify yourself and introduce others who may be present.
  - Don’t leave the person without excusing yourself first.
  - To guide someone with a sight disability, do not push or pull the person. Allow her or him to take your arm, and then walk slightly ahead.
  - Make it a point to inform the person you are assisting regarding stairs, or curbs, as you approach them.
  - As you enter a room with the person, describe the layout and location of furniture, etc.
  - Do not grab or try to steer the cane of a person with visual impairment.
  - Guide dogs/service animals are working animals and should not be treated as pets. They have to be allowed entry along with the person with disability. Do not give the dog instructions/play/feed/touch her/him.
  - Be specific when describing the location of objects. (Example: “There is a chair three feet from you, on your left.”)
  - Speak in a normal voice. Speak directly and not through their companion.
  - If you are reading for a person with visual impairment, first describe the information to be read. Do not skip information unless requested to do so.
• Do not assume, always ask, which format a person with visual impairment prefers to receive information in (Braille, large font, audiotape or CD).

• Don’t worry about using everyday words and phrases like “look”, “see you”, etc.

• How to interact with a person who has difficulty in hearing?

• Let the person take the lead in establishing the communication mode, such as lip-reading, sign language, or writing notes.

• Talk directly to the person, even when a sign language interpreter is present.

• If the person lip-reads, face her or him directly, speak clearly, using a normal tone, and at a moderate pace.

• Do not obscure your face/mouth.

• Do not position yourself in front of a window or with light behind you as the person who is hard of hearing will have difficulty seeing you.

• With some people, it may help to simplify your sentences and use more facial expressions and body language.

• If you do not understand what is being said do not pretend that you have understood. Never say, “oh forget it, it is not important’. Ask for alternative means of communication, for example, written communication.

• Be aware of the environment. Large and crowded rooms and hallways can be difficult for hearing impaired person to communicate.

• To get attention of a person with a hearing impairment from the back, you can lightly touch her/him on the arm or shoulder.

• Arrange for people with hearing impairment to sit in front of the speaker at a lecture or performance.

• Arrange for sign language interpreters/transcription service at meetings, seminars, conferences and training sessions based on the need.

• One can also learn basic conversation in sign language. Organise a training session for all the team members if you have a person with hearing impairment in your team.

• During meeting, you could follow basic etiquettes, like one person speaks at a time. Seating arrangement should also be considered so that the person with hearing impairment is able to see all the people at the meeting.
• **How to interact with a person who has psycho-social impairment?**

  • Treat the individual with respect. Do not assume that a person with psycho-social impairment has cognitive disability or lower intelligence.
  
  • Do not assume that all people with psycho-social disabilities take or should take medication.
  
  • Do not assume that a person with psych-social disability is not capable of working in a wide variety of jobs that require a wide range of skills and abilities.
  
  • Do not assume that a person with psycho-social disability do not know what is best for her/him, or has poor judgment.
  
  • If someone with a psycho-social disability gets upset, ask calmly if there is anything, you can do to help and respect her/his wishes.
  
  • Do not assume that a person with a psycho-social disability is unable to cope with stress.
  
  • Always discuss issues related to mental illness in private.
  
  • Do not attempt to counsel the individual or provide therapy.

• **How to interact with a person who has learning disability?**

  • A learning disability is not indicative of low intelligence. People with learning disabilities could have average or above average intelligence.

  • Ask if the person with learning disability needs any workplace accommodation.

  • You may need to communicate with multiple formats, e.g., notes, written instructions, tape recordings and verbal directions based on individual need.

  • Be aware of the fact that some information processing impairment may affect social skills.

• **How to interact with a person with intellectual impairment?**

  • Adults who have intellectual impairment are adults. Assume their life experiences are similar to other adults and speak with them from that perspective. Bring up topics that would be approached in general conversation such as weekend activities, vacation plans, the weather or recent events.

  • Do not “talk down” to persons with intellectual impairment.

  • Some people benefit from information presented in a clear, concise, concrete, and simple manner.
When necessary, repeat information using different words or use a different communication approach. Allow time for the information to be fully understood.

When possible, avoid clichés and jargon.

If needed, analyse activities into small steps and present tasks sequentially. Allow the individual to perform each step just after the explanation or instructions have been provided.

When appropriate, use pictures or simple photographs to identify people, rooms, tasks or directions. Think of creative ways to make tasks easier for the individual. For example, non-readers may benefit from colour-coded files, watches with talking timers and alarms, and tape-recorded instructions.

Remember a person with an intellectual impairment has equal legal rights. They can vote, give consent to medical care, sign, etc.¹

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Use People First Language

People-first language recognizes that someone is a person, a human being, or a citizen first, and that the disability is a part, but not all of them. Use ‘person with disability’ or ‘person with visual impairment’ or ‘person with autism’ – these are universally accepted terminologies.

Avoid calling a person ‘the blind’ or ‘autistic’ or ‘epileptic’ as this means defining the entire individuality with a disability. Some people also prefer to use ‘differently-abled persons’ or ‘special persons’ but these, although non-negative and polite, sound patronising, and hence should be avoided.

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¹ "Job Corps disability website- Awareness/ Etiquette”; “AFB- American Foundation for the Blind; VSA Arts access and opportunities - A guide to Disability Awareness."
Understanding Accessibility

Background:

The following section covers accessibility at workplaces. Accessibility is the cornerstone of any inclusive ecosystem. The physical accessibility standards covered are presented from a universal design perspective so that the buildings or public spaces are accessible irrespective of the type of disabilities in persons.

The physical accessibility standards begin the general principles and considerations that should be made for persons with disabilities while designing building or public area and then goes into the details of standards for design of every element for public areas and buildings.

The physical accessibility standards have been adopted from the Accessibility standard: “Recommendations for Buildings and Facilities for Inclusion of Persons with Disabilities” compiled by Ms. Shivani Gupta, Founder and Chief Consultant AccessAbility for National Centre for Promotion of Employment for Disabled People (NCPEDP). The standards have been reproduced here with her permission.

Shivani is one of the leading accessibility experts in the country. She is the Founder and Chief Consultant of AccessAbility. For any further information you may reach out to her on shivani@accessability.co.in, shewany@gmail.com

Website: http://www.accessability.co.in/access/
Physical Accessibility Standard

The Physical Accessibility Standard is divided into the following sections:

- General Principles and Considerations
- Site Development
- Buildings

General Principles and Considerations

Wheelchair

For details regarding wheelchair, see IS: 7454-1974 and IS: 8086-1976. While the guidelines in this standard attempt at including the needs of all wheelchair users, dimensions of the following manual adult wheelchair have been used as a reference to guide the recommendations:

![Wheelchair Dimensions](image)

All dimensions in millimetres

Figure 1: Reference Wheelchair

Functioning of a wheelchair

- When planning spaces in buildings to cater for wheelchair turning, a guide is to impose on the plan a circle of 1800 diameter. If this space is clear, the plan arrangement will normally be satisfactory. However, spaces in doorways, niches and under work-tops, desks or furniture can often be used when turning. Where a high degree of accessibility is required, such as in hospital buildings, spaces should be more generous.

- Considerable energy is needed to propel a wheelchair manually up ramps, over changes in level or over soft or uneven surfaces. Thresholds and changes in level should be avoided. Ground and floor surfaces should be hard and even.
- The fixed turning radius of a standard wheelchair, wheel to wheel, is 450 mm. the fixed turning radius, front structure to rear wheel, is 785 mm.
- The average turning spaces required is 1800 x 1800 mm (see Fig. 2)

![Figure 2: Average Turning Space for a Wheelchair](image)

- A minimum width of 1650 mm, preferably 1800 mm, is required for two individuals in wheelchairs to pass each other.
- The width of corridors in the hospital rehabilitation centre and in the paraplegic centres should be two meters.

**Adult Individual Functioning in a Wheelchair**
- The average unilateral reach is 1500 mm and ranges from 1350 to 1600 mm.
- The average horizontal working (table) reach is 775 mm and ranges from 715 to 830 mm.
- The bilateral horizontal reach, both arms extended to reach side shoulder high, ranges from 1350 to 1700 mm and averages 1560 mm.
- An individual reaching diagonally, as would be required in using a wall-mounted dial telephone or towel dispenser, would make the average reach (on the wall) 1125 mm from the floor.
Individual Functioning on Crutches

• When walking with a normal gait, the distance between crutch tips ranges from 760 to 840 mm depending on the height of the person.
  • Most individuals ambulating on braces or crutches, or both, or on canes are able to manipulate within the specifications prescribed for wheelchair users, although doors present quite a problem at time. However, attention is called to the fact that a crutch tip extending laterally from an individual is not obvious to others in heavily trafficked areas, certainly not as obvious or protective as a wheelchair is, therefore, a source of vulnerability.
  • Some individuals with cerebral Palsy, and some severe arthritics, would be extreme exceptions to the above mentioned points.

People with Hearing Disabilities

• People with hearing disabilities have particular difficulty in comprehending sounds and words in noisy environments. Rooms should be acoustically well insulated. In public buildings loud-speaking systems should be clearly audible. Supplementary visual information should be provided, for example, in bus terminals, railway stations and airports.

• People with hearing disabilities may rely on lip reading; this is helped if there is good overall lighting which is non-reflective. Where communication is required with persons sitting on the other side of counters separated by glass panes, in order to minimize reflected glare it is important that these glass panels be screened from light sources. They may have difficulty using telephones, etc. Audible signals may be supplemented with visual signals.

• People using hearing aids will benefit with sound amplification and induction loop devices. Sound amplification systems and Induction loops should be installed in reception and information counters, auditoria, theatres, meeting rooms, etc, to improve sound reception for people with hearing aids. Inductive couplers should be installed in public telephones.

• Persons with hearing impairments rely on signage for way-finding. It is therefore important that signage and orientation information be provided at all key decision making points, such as intersections along the primary circulation route, staircase landings and lift lobbies.
People with Sight Disabilities

- For people with sight disabilities, orientation can be aided by marking with the use of colour, illumination and, in certain cases, the texture of material. Design and plan arrangements should be simple and uncomplicated. Contrasting colours should be used to aid the identification of doors, stairs, ramps, passage ways, changes of direction, etc. Surfaces can be varied to indicate passage ways, changes of direction, etc. Orientation cues should be specially illuminated. Handrails can be used as a location aid.

- To minimize the risk of falls and injuries, hazards such as posts, single steps and projections from walls should be avoided wherever possible. Hazards should be emphasized by means of illumination and by contrasting colours and materials. Obstacles should not project into the circulation routes where there should be a clear headroom of at least 2.1 meters.

- People with sight disabilities are often sensitive to glare. Unwanted mirroring affects and reflections may be avoided by attention to the location of windows and illumination, and the choice of floor and wall surfaces. Persons with reduced sight benefit with provision of large font sizes in signs and printed information. Blind people are restricted to tactile reading and benefit with incorporation of embossed characters and Braille. Visual information in, for example, bus terminals, railway stations and airports should be supplemented with audible information.

People with Cognitive Disabilities

- People with cognitive disability have varying needs. Some may also have mobility restrictions as a result of their cognitive disability. A large number of people with this disability may have difficulties in coordinating and controlling their movements.

- When moving about outdoors, they may be confronted with difficulty in perceiving, comprehending, or interpreting information such as signs or complex site maps. They may stumble easily over even minor bumps and fall heavily. They may also have spatial orientation difficulties and in some cases lack the ability to distinguish color or to differentiate between left and right.

- While addressing access needs of people with other disabilities may meet most of their access requirements, some things that may aid their access include
  - Even pathway surface
  - Adequate resting spaces
Site Development

Almost any building can be made accessible to disabled people by so planning the site that the terraces, retaining walls and winding walks are used effectively.

Site development is the most effective means to resolve the problems created by topography, definitive architectural designs or concepts, water table, existing streets, and typical problems, singularly or collectively, so that, ingress and egress to buildings by disabled people may be facilitated while preserving the desired design and effect of the architecture.

The relative levels of the principal entrance to the building and the entry point to the site (as well as walks across the site) should be designed to, as far as is practicable, provide level access, thereby eliminating the need for ramped and stepped approach.

Walks

• Public walks should be at least 1200 mm wide and should preferably with level or have the gentlest possible gradient that does not exceed 1 in 20.

• It is essential that the gradient of walks and driveways be less than that prescribed for ramps, since walks would be devoid of handrails and kerbs and would be considerably longer and more vulnerable to the elements. Walks of near maximum grade and considerable length should have level areas at intervals for purposes of rest and safety. Walks or driveways should have a non-slip surface.

• Slopes with gradient steeper than 1 in 20 are to be treated as ramps and must comply with requirements of handrails, edge protection, tactile warning blocks and landings as detailed in section 5.1.

• The cross-fall gradient across a level access route should not exceed 1 in 50, except when associated with a dropped kerb.

• Such walks shall be of a continuing common surface not interrupted by steps or abrupt changes in level.

• Wherever walks cross other walks, driveways, or parking lots they should blend to a common level.

• This requirement, does not require the elimination of kerbs, which, particularly if they occur at regular intersections, are a distinct safety feature for all of the challenged, particularly the blind. The preferred method of meeting the requirement is to have the walk incline to the level of the street. However, at principal intersections, it is vitally important that the kerbs run parallel to the street, up to the point where the walk is inclined, at which point the kerb would turn in and gradually meet the level of the walk at its highest point. A less preferred
method would be to gradually bring the surface of the driveway or street to the level of the walk. The disadvantage of this method is that a blind person would not know when he has left the protection of a walk and has entered the hazards of a street or driveway (see Fig. 3).

![Figure 3: Suitable Method of Blending Pavement and Roadway Surfaces](image)

- A walk shall have a level platform at the top which is at least 1500 mm long, if a door swings out onto the platform or towards the walk. This platform shall extend at least 300 mm beyond each side of the doorway. A walk shall have a level platform at least 900 mm deep, if the door does not swing onto the platform or towards the walk. This platform shall extend at least 300 mm beyond each side of the doorway.

- Gratings within an access route should be set flush with the surrounding surface. To prevent trapping of front castors of wheelchairs, and bases of walking sticks, white canes and crutches, the gratings along walkways should not have slots greater than 13 mm wide and should be set at right angles to the dominant line of travel.

- In order to ensure easy navigation by persons with visual impairments, the following features should be incorporated throughout the length of walks:

**Tactile Paving**

- Tactile tiles have specially raised finishes that are easily detectable by persons with visual impairments. There are predominantly two kinds of tactile blocks – tactile guidance tiles and tactile warning tiles.
• Tactile guidance blocks indicate a barrier free route for a person with visual impairment. It is recommended to install two rows of tactile guidance tiles along the entire length of the proposed accessible route. Care must be taken to ensure that there are no obstacles, such as trees, poles or uneven surfaces, along the route traversed by the guidance blocks. Also, there should be a clear headroom of at least 2.1 meters height above the tactile guidance blocks, free of protruding objects such as overhanging tree branches and signage, along the entire length of the walk.

• Tactile warning blocks indicate an approaching potential hazard or a change in direction of the walkway, and serve as a warning of the approaching danger to persons with visual impairments, preparing them to tread cautiously and expect obstacles along the travel path, traffic intersections, doorways, etc. The warning blocks prepare the person to tread cautiously. Two rows of tactile warning tiles should be installed across the entire width of the designated accessible pedestrian pathway at appropriate places such as before intersections, building entrances, obstacles such as trees, and each time the walkway changes direction.

**Barriers and Hazards**

• Obstacles such as lighting columns, bollards, signposts, seats and trees, should be located at or beyond the boundaries of walkways. Where unavoidable, protruding objects should not reduce the clear width of an accessible route or manoeuvring space.

• Protruding objects in the access route should contrast visually with the background environment.

• Free-standing columns that support an entrance canopy and low level posts, e.g. bollards, should not be positioned within the width of an access route.

• Free standing columns and posts within an access route should incorporate a band 200 mm high, between heights of 1350 mm and 1650 mm from the walkway floor finish, and which contrasts visually with the remainder of the post or column.

• Bollards should be at least 1000 mm high, provide a wheelchair passage width of at least 850 mm, and should not be linked with chains.

• To be detectable by a white cane, protruding objects should follow the following rule:

• Objects projecting with the lower edge of the projection at or below 300 mm and upper edge of the projection minimally 1200 mm above the finished walk surface are detectable by the white cane, and these may protrude into the walks to an extent that allows wheelchair passage, in keeping with 4.2.1.

• Objects mounted with their leading edges between 300 mm and 2100 mm above the finished walk surface should not protrude more than 100 mm into the walks.
• Hazard protection should be provided if objects project more than 100 mm into an access route and their lower edge is more than 300 mm above the ground.

• Hazard protection associated with such objects should take the form of a kerb or other solid barrier so that a blind or partially sighted person can detect the hazard using a cane. The hazard protection should not extend beyond the front edge of the object, nor should it be set back more than 100 mm from its front edge.

• In addition to a means of cane detection, guarding rail at a level of 900 mm from the surface of the accessible route should be installed to guide people around an obstruction.

Parking Space

• Spaces that are accessible and approximate to the facility should be set aside and identified for use by individuals with physical disabilities. The designated accessible space should be no more than 50 meters away from the main accessible entrance.

• Parking spaces for individuals with physical disabilities when placed between two conventional diagonal or head-on parking spaces should be 3.6 m to 3.8 m wide, including a 1200 mm wide wheelchair transfer space on one side, and the length of the aisle should 7.3 m, 6.1 m and 6.5 m for head-on, 90° and 60° parking respectively. These minimum dimensions include provision of a 1200 mm wide wheelchair loading/ transferring space along the side and at the rear of the parking bay. Where there are two accessible parking bays adjoining each other, then the 1200mm side transfer bay may be shared by the two parking bays. The transfer zones, both on the side and the rear should have yellow or white cross-hatch road markings.

Figure 4: Accessible Car Parking Bay
• Care in planning should be exercised, so that individuals in wheelchairs and individuals using braces and crutches are not compelled to wheel or walk behind parked cars.

• Consideration should be given to the distribution of spaces for use by the disabled in accordance with the frequency and persistency of parking needs. The following minimum requirement shall apply.

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<td><strong>Visitors Parking</strong></td>
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<tr>
<td>Car park capacity upto 50</td>
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<tr>
<td><strong>Employees Parking</strong></td>
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<tr>
<td>Car park capacity over 50</td>
</tr>
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• Have a walkway conforming to 4.2 connecting the designated parking to the accessible entrance.

**Signage**

• There should be the international symbol of accessibility painted on the 2400 mm wide floor where the car is to be parked. The symbol should be large enough to be easily visible by person looking for the accessible parking, recommended size being 1000 mm x 1000 mm but not larger than 1500mm x 1500mm. With the preferred colours being white and blue, the sign painted on the floor should contrast in colour and luminosity with the floor colour.

• There should also be a signboard with the international symbol of accessibility at the height of 1200mm from the floor right at the end of the parking.

• The Symbol of Access should be displayed at approaches and entrances to car parks, to indicate the provision of accessible parking lot, for people with disabilities within the vicinity. Directional signs should be displayed at points where there is a change of direction to direct people with disabilities to the accessible parking bays.
Buildings

Ramps with Gradients

This standard recommends that that the approach to a building is level. If a change in level along the access route is unavoidable, it will be necessary to provide a sloped surface on which a wheelchair user can travel. As some ambulant disabled people have difficulty using ramps, it is undesirable for a ramp to be the only approach to a building. However, where change in change in level is no greater than 200 mm, a ramp may be acceptable as the only means of access, avoiding the need for a step. Where ramps with gradients are necessary or desired, they shall conform to the following specifications.

<table>
<thead>
<tr>
<th>Level difference</th>
<th>Minimum gradient of Ramp</th>
<th>Ramp Width</th>
<th>Handrails on both sides</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 150 mm</td>
<td>1:10</td>
<td>900 mm</td>
<td>X</td>
<td>Flared Sides preferable</td>
</tr>
<tr>
<td>≥ 150 mm ≤ 300 mm</td>
<td>1:12</td>
<td>1200 mm</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>≥ 300 mm ≤ 750 mm</td>
<td>1:12</td>
<td>1500 mm</td>
<td>✓</td>
<td>Landings every 5 meters of ramp run.</td>
</tr>
<tr>
<td>≥ 750 mm ≤ 3000 mm</td>
<td>1:15</td>
<td>1800 mm</td>
<td>✓</td>
<td>Landings every 9 meters of ramp run.</td>
</tr>
<tr>
<td>≥ 3000 mm</td>
<td>1:20</td>
<td>1800 mm</td>
<td>✓</td>
<td>Landings every 9 meters of ramp run.</td>
</tr>
</tbody>
</table>

- A ramp gradient of 1:15 (or less) is considered adequate and a gradient of 1:12 is the absolute maximum. The ramp with a gradient of 1:12 is considered too steep by many wheelchair users to use independently and usually results in the wheelchair ‘flipping’ backwards when ascending. It is also equally difficult to control the wheelchair while descending such a ramp. Therefore, wherever possible, a ramp should never be steeper than 1:15.

- Beyond a certain height, ramps become too tiring for the user, even if a number of rest landings have been provided. It is therefore recommendable that a series of ramps is a
building should rise in total more than 2 meters. If a series of ramp flights rise more than 2 meters an alternative means of access, such as a lift, should be provided.

Figure 5: Example of Ramped Approach

- The required minimum clear unobstructed width of a ramp (i.e. between handrails) is 1200 mm for ramps up to 3.6 meters long. For ramps longer than 3.6 meters and up to 9 meters the minimum width should be 1500mm. For ramps more than 9 meters long the ramp should be minimally 1800 mm wide.

- A uniform illumination level of 150 lux should be maintained on the ramp.

- The materials selected for the surface finish of a ramp should be firm and easy to maintain. These must also be slip resistant, especially if surfaces are likely to become wet due to location or use, or if spillage occurs. The use of shiny, polished surface materials that cause glare should be avoided.

- The provision of non-slip surfaces on ramps greatly assists the challenged persons with semi-ambulatory and ambulatory disabilities. Non-slip surfaces are provided by many finishes and materials. The surfaces of the concrete ramps can be made non-skid by brooming the surface or by finishing with an indenting roller.

- Tactile warning blocks should be installed at the top, bottom and landings of each ramp run.

- The space under the ramp, with a head room of up to 2.1 meters, to be cordoned off either by building a wall in front of it or by putting handrails to guide persons with visual impairments around the hazard. This space can also be used as storage area if required.

- A ramp shall have handrails on both sides, that are at a height of 900 mm measured from the surface of the ramp, and extend 300 mm beyond the top and bottom of the
ramp. Where major traffic is predominantly children, the handrails should be placed 760 mm high.

*NOTE 1 - Where codes specify handrails to be of heights other than 900 mm, it is recommended that two sets of handrails be installed to serve all people. Where major traffic is predominantly children, particularly physically disabled children, extra care should be exercised in the placement of handrails, in accordance with the nature of the facility and the age group or groups being serviced (see also 6.1).

- The handrails must extend 300 mm beyond the top and bottom of the ramp and the ends should either be grouted in the wall/floor or be rounded. As much of the extension as possible should be horizontal. The extension should not intrude into any circulation route so as to cause an obstruction.

The handrails should also have following features:

- Be continuous on both the sides, even on landings.
- Be of 30 – 45 mm diameter, installed at a distance of at least 40 mm from the adjacent wall.
- Preferably be mounted on wall/ baluster by using L-Shaped brackets that do not break a continuous grip when sliding hand on the handrail.
- Be finished so as to contrast in colour and luminance with the background against which these will be viewed.

- Note: Achieving adequate Visual Contrast - For people with adequate sight, differences in the nature or the intensity of colour provide adequate visual contrast. Unfortunately, this is not the case for all people who are visually impaired. The main feature of a surface, which appears to be strongly correlated with the ability of visually impaired people to identify differences in colour, is the Light Reflectance Value (LRV) of the surfaces. Differences in LRV can be used to assess the degree of visual contrast between the surfaces of elements such as handrails, doors, door furniture, key fittings/fixtures and surrounding surfaces etc. It is recommended to maintain a minimal LRV difference of 26 points in order to ensure adequate visual contrast between any two surfaces. Best contrasts are achieved by incorporating combinations that involve one light (with LRV/ tone value between 0 and 50) and one dark (with LRV/ tone value between 50 and 100) colour. Visual contrast can be further enhanced by increasing differences in the Hue and Chroma values. Most major paint manufacturers include Hue, LRV and Chroma values for their colours in their swatch books. Manufacturers of many other materials will make the LRV available, since light reflectance is now very important in the building of “green” buildings.
• The provision of non-slip surfaces on ramps greatly assists the challenged persons with semi-ambulatory and ambulatory disabilities. Non-slip surfaces are provided by many finishes and materials. The surfaces of the concrete ramps can be made non-skid by brooming the surface or by finishing with an indenting roller.

• A ramp shall have a level platform at the top which is at least 1800 mm long, if a door swings out onto the platform or toward the ramp. This platform shall extend at least 300 mm beyond each side of the doorway (see Fig. 6).

\[ \text{Figure 6: Level Areas Required at End of Ramps Leading to Doorways} \]

• Each ramp shall have at least 1800 mm of straight clearance at the bottom.

• Landings, minimally 1500 mm long, should be provided along the length of the ramp, at intervals of every 5 meters for a gradient of 1:12 and every 9 meters for a gradient of 1:15 or 1:20. Landings also need to be provided at the beginning and the end of the ramp and where the ramp changes direction.

**Note:** An unobstructed width of 1800 mm is the minimum that permits two wheelchair users to pass each other. Although landings will generally have the same width as that of the ramp, if there is likely to be frequent use of the ramp by people in wheelchairs, it may be advisable to maintain a minimum width of 1800 mm for the intermediate landings so that these may serve as passing places for wheelchair users.

• For visually impaired people, ramps may be colour contrasted with landing.

• To minimize rise to wheelchair users, ramps should be equipped with herbs approximately 50 mm high at exposed sides.
**Entrances**

- At least one primary entrance to each building shall be usable by individuals in wheelchairs. This should be either step free or have a ramp as per clause mentioned in the ramp section.

![Diagram of doors and sign](image)

*Figure 7: Entrances*

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

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

- Threshold at the entrance should be avoided but if unavoidable, it should be no higher than 15 mm and must be levelled.

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

- Internal floor surfaces should be of materials that do not impede the movement of wheelchairs. If mat is provided it should be in level with the floor finish.

*Beepers may be put at all main entrances so enable people with visual impairments to locate them. Also tactile layout plan of the building may be kept at the entrance for people with visual impairments.*
• Persons with visual impairments find it easier to locate doors if there is a texture difference in the floor around the doorway from the rest of the flooring. It is generally good practice to recess foot mats in the floor on either side of the door but care must be taken to ensure that the top end of the mats are flush with the rest of the flooring.

• **Glazed entrance doors** must have manifestations on the glass preferably at two levels i.e. one between 850 to 1000 mm and another between 1400 to 1600 mm above the floor. The manifestation should be contrasting in colour from the immediate background and be minimally 150 mm high.

**Doors and Doorways**

• **Doorwidth** - To enable wheelchair users to pass through doors, the minimum clear width should be 900 mm.

  • The door opening force, when measured at the leading edge of the door, should not be more than 30 N from 0° (the door in the closed position) to 30° open, and not more than 22.5 N from 30° to 60° of the opening cycle.

  • Two-leaf doors are not usable by those with disabilities defined in the general and unless they operate by a single effort, or unless one of the two leaves meets the requirements of 5.3.1.

  • Side-hung doors - To facilitate wheelchair manoeuvre and safety of building users, doors should be hung with the hinges in room corners. Doors opening out into corridors or circulation spaces should be avoided as far as possible.

  • It is recommended that all doors have kick plates extending from the bottom of the door to at least 400 mm from the floor, or be made of a material and finish that would safely withstand the abuse they might receive from canes, crutches, wheelchair foot-platforms, or wheelchair wheels.

• **Wheelchair Manoeuvring Space** - To enable wheelchair users to approach doors manoeuvring space is needed as shown in the Fig. 8. A corridor should have a width of at least 1200 mm to allow a 90° turn to be made through a door. In narrow spaces sliding doors may be preferable.

  • Front approaches to pull side of swinging doors shall have manoeuvring space that extends 600 mm minimum beyond the latch side of the door if 1200 mm minimum is provided perpendicular to the doorway or manoeuvring space that extends 450 mm minimum beyond the latch side of the door shall be provided if 1500 mm minimum is provided perpendicular to the doorway.
• Front approaches to push side of swinging doors shall have manoeuvring space that extends 300 mm minimum beyond the latch side of the door and 1200 mm minimum perpendicular to the doorway.

![Diagram](image1)

All dimensions in millimetres.

Note: Depending on the free space beside the opening side (450 or 550 mm), the depth of free space should be 1,500 or 1,400 mm.

Figure 8: Maneuvering Space Needed for Wheelchair Users to Approach Doors

• Two Doors in a Series: Incase of doors in a sequence such as in the lobby of public restrooms, the minimum space between two hinged or pivoted doors in series should be 1500 mm plus the widths of the two doors swinging into that space, as illustrated in figure 9.

![Diagram](image2)

Figure 9: Two Doors in a Series
• **Thresholds** - Raised thresholds should be avoided, but where this is not possible, their height should not exceed 15 mm. Thresholds exceeding 5 mm should be levelled. Rubber thresholds are advantageous for wheelchair users.

  • Door Closers. If a door has a closer, then the sweep period of the closer shall be adjusted so that from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 75 mm from the latch, measured to the leading edge of the door. Public buildings should preferably have sliding automatic doors.

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

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

• **Glass Doors** - The presence of a glass door should be made apparent, with permanent (manifestation) at two levels, within 850 mm to 1000 mm from the floor and within 1400 mm to 1600 mm from the floor, contrasting visually with the background seen through the glass in all light conditions. The edges of a glass door should also be apparent when the door is open.

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

• **Vision Panels** - If a door has a single viewing panel, the minimum zone of visibility should be between 500 mm and 1500 mm from the floor. If a door requires an intermediate horizontal section for strength or to accommodate door furniture, the door should have two viewing panels, one accommodating a zone of visibility between 500 mm and 800 mm from the floor and the other accommodating a zone of visibility between 1150 mm and 1500 mm from the floor.

• **Handles** - Door handles and locks should be easy to manipulate. To facilitate the closing of a door by wheelchair users (for example, a water-closet compartment, that does not have a self-closing mechanism), the door should have a horizontal handle, provided on the closing face of the door, approximately 800 mm from the floor. Self-closing doors should be equipped with an easy gripped vertical pull-handle with a length of at least 300 mm, and with the lower end approximately 800 mm above floor. For many people and especially those with impaired sight, it is helpful to make clear whether doors are to be pulled or pushed (see Fig. 10).
- Wherever possible, door-opening furniture with a lever action should be used. Knob type door furniture is difficult to use by people with manual impairment,” arthritis or a weak grip. It should be possible to operate door opening furniture one handed, without tightly grasping it or twisting the wrist, e.g. by using a closed fist.

- For easy identification by visually impaired people all door furniture should contrast visually with the surface of the door.

- The location and design of latch and push/pull handles should be consistent throughout a building.

Figure 10: Position of Handle

**Windows**

- Windows should be designed to avoid the glare which is a particular problem for people with impaired sight. Large glass areas close to circulation spaces should be marked a little below eye-level with a coloured band or frame. To enable wheelchair users to see through a window comfortably, the sill should be not higher than 800 mm from the floor. Transoms positioned between 900 mm and 1200 mm should not be incorporated into the design to allow a clear view through a window from a seated position. Windows should be easy to open and close. Their controls should be placed in the zone 900 to 1200 mm from the floor (see Fig. 11). Lever handles should be used in preference to knobs.
Windows should contrast visually with their background for the benefit of persons with visual impairments.

Figure 11: Position of Sill and Window Control

Stairs

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

- Straight flights of steps are preferred by ambulant disabled people. Treads should be approximately 300 mm deep and risers not higher than 150 mm. Steps should be of a consistent height and depth throughout the stair. Projecting nosings and open stairs should be avoided to minimize the risk of stumbling. Also, spiral stairs should be avoided.

- Handrails should be provided to both sides of any stairway. They should be continuous, even on landings, and extend not less than 300 mm beyond the top and bottom step (otherwise it is difficult for the disabled to use the rail at the first and last step; (see Fig. 12). The handrails should be installed between heights of 900 mm and 1000 mm from the furnished surface of treads and landings.
Figure 12: Extension of Handrail in Stairs

- For people with impaired sight, there should be a colour contrast between landings, and the steps.
- The nosing on the edge of the steps should not project more than 25 mm over the tread below and the nosing (25 mm on the riser and 25 mm on the tread) must contrast in colour to the risers and the treads.
- Illumination level of 150 lux should be maintained on the stairs.
- The materials selected for the surface finish of the stairs should be firm and easy to maintain. It must also be slip resistant, especially if surfaces are likely to become wet due to location or use, or if spillage occurs. The use of shiny, polished surface materials that cause glare should be avoided.
- Tactile warning blocks should be installed at the top, bottom and landings of each flight of steps.
- The space under the stairs, with a head room of up to 2.1 meters, to be cordoned off either by building a wall in front of it or by putting handrails to guide persons with visual impairments around the hazard. This space can also be used as storage area if required.
- There should be no more than 12 steps in one flight run.
- The stairs landing should be minimally 1200 mm deep.
- The stairs should have minimum 1000 mm clear width.
Floors

- Floors shall have a non-slip surface.
- Floors on a given storey shall be of a common level throughout or be connected by a ramp in accordance with the points below
  - A gentle slope up to 10 mm may be given between the level of the floor of the corridor and the level of the floor of the toilet rooms.
  - There should not be a difference between the level of the floor of a corridor and the level of a meeting room, dining room, or any other room, unless proper ramps are provided.

**Note:** Changes in level up to 6 mm may be vertical and without edge treatment Changes in level between 6 mm and 12 mm shall be beveled with a slope no greater than 1:2. Changes in level greater than 12 mm shall be accomplished by means of a ramp in accordance with.

- Applying textural differences and colour contrasts in the internal floor finishes to different functional areas such as ticket counters, enquiry desk, waiting areas, etc enhances detectability of these areas by persons with visual impairments. Where such textural differences are provided, it is important that these are detectable and distinguishable underfoot by persons with visual impairments. The following table provides a list of some floor texture combinations that are easily distinguished by persons with complete sight loss.
  - The floor surfaces next to entrances, internal doors, ramps, stairs and any other unavoidable permanent fixtures in the circulation route (such as pillars and lobby centre pieces) should be different from the rest of the surrounding areas, in colour and texture, to highlight the desirable features.
  - For large open and plane areas, consider defining routes with contrasting floor finishes and textures. Having the floor finish of the restaurant or the bar in a different texture and colour from the connecting corridor or lobby will help in their recognition.
  - Surface materials for stairs and ramps should be of a different texture and contrast visually with the landings.
  - Highly contrasting coloured strips may be laid along the access corridors and emergency escape paths, to enhance the mobility of persons with visual impairments.

**Note:** Where different materials are to be used for demarcating areas e.g. ramps, landings and approaching paths, it is important to ensure that the coefficients of friction are similar to minimize the risk of stumbling, especially for people with impaired mobility, such as the ones using crutches or other mobility aids.
### Table 3: Recommended Internal Floor Surface Combinations

<table>
<thead>
<tr>
<th></th>
<th>Marble (polished)</th>
<th>Granite</th>
<th>Sandstone</th>
<th>Kota Stone</th>
<th>Ceramic Tiles</th>
<th>Vinyl</th>
<th>Carpet (Thick Pile)</th>
<th>Carpet (Thin Pile)</th>
<th>Wooden Flooring</th>
<th>Terrazo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marble (unpolished)</td>
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<td>Kota Stone</td>
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<td>Carpet (Thick Pile)</td>
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<td>Wooden Flooring</td>
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</tbody>
</table>

- Avoid too many patterns or textures on floor finishes and carpets, as these tend to confuse people with visual impairments and those with cognitive disabilities. Floor surface finishes with patterns that could be mistaken for steps or changes in level should be avoided.

- Acoustic qualities of surfaces, such as sound absorption, become imperative when choosing floor finishes for lobby areas and conference halls/meeting rooms, as these can enhance or diminish independence of guests with hearing impairments.

- Surfaces that are highly reflective, especially when polished, have an adverse effect on people who cannot withstand glare and should be avoided. Moreover, reflections can mislead people, particularly those who are visually impaired.

- Whilst the surface finish should be as smooth as possible to prevent tripping hazards and to provide an easy travel surface for wheelchairs; it must also be slip resistant, especially when wet such as when spillage occurs.

- Cobbles, bare earth, sand and loose gravel should not be used on external approach paths, such as the route from accessible parking to the building entrance,
• For external ramps, slip resistant surfaces can be formed using several slabs or a concrete or similar base covered with an applied slip resistant coating (like paint, grit in an epoxy carrier etc.).

• It is important to ensure that regular cleaning and polishing does not produce a slippery surface.

• If floor surfaces are carpeted, they should be firmly fixed with no loose edges, so as not to provide a tripping hazard for ambulant disabled people or people who are visually impaired. Deep pile carpets (deeper than 12 mm) should be avoided.

• If gratings are located in walking surfaces, then they shall have spaces no greater than 12 mm wide in one direction. If gratings have elongated openings, then they shall be placed so that the long dimension is perpendicular to the dominant direction of travel.

Sanitary Facilities

Accessible unisex sanitary facilities allow persons with disabilities to be assisted by carers of the opposite gender. It is therefore essential that at least one unisex accessible sanitary facility be available on the principle floor. In addition, in public use buildings such as Malls, Hospitals, Museums etc., and in larger buildings such as multi-storey offices there should be unisex accessible facilities on all floors. Apart from this all toilet blocks must have one cubicle suitable for use by persons with ambulatory disabilities.

• An accessible unisex sanitary facilities must have the minimum dimension of 1800 mm x 2350 mm to allow traffic of individuals in wheelchairs,

• **Layout:** The layout of the fixtures in the restroom should be such that there is a clear manoeuvring space of 1800mm x 1800mm in front of the water closet and wash basin in the accessible toilet unit. All fixtures and utilities should provide a clear space of 750 mm x 1200 mm for wheelchair users to access them.

• **Door:** The toilet door should have the following specifications
  
  • The toilet door should either be an outward opening door or a sliding type and should provide a clear opening width of at least 900 mm.
  
  • Be provided with a horizontal pull-bar, at least 600 mm long, on the inside of the door, located so that it is 130 mm from the hinged side of the door and at a height of 1100 mm.
  
  • Be capable of being locked from the inside by a device that is operable by one hand, activated by a force not more than 22 N and which does not require fine finger control, tight grasping, and pinching or twisting of the wrist.
• **Water Closet**: The water closet should have the following features
  
  - The Water Closet should preferably be of wall-hung or corbel type as it provides additional space at the toe level;
  
  - Should be positioned such that the distance between the centerline of the water closet and the adjacent wall is 450 mm to 480 mm, and the distance between front edge of the water closet and the rear is 750 mm. The top of the water closet seat should be at a height of 450 - 500 mm from the floor.
  
  - There should be an adequate clear floor space of at least 1350 mm depth and 900 mm width, both in front and on the transfer side, adjacent to the water closet.
  
  - A back support reduces the chance of imbalance or injury caused by leaning against exposed valves or pipes. A back support should be provided where there is no seat lid or tank.
  
  - The flush control should either be lever type or automatic, and located on the transfer side of the water closet. The flush control should not be located more than 1100 mm from the floor.

• **Grab-bar**: The grab-bar should have the following specifications
  
  - Be slip-resistant with round ends;
- Have a circular section of 30-45 mm in diameter;
- Be free of any sharp or abrasive elements
- Be mounted at a height between 200 mm and 250 mm from the top of the water closet seat;
- One 600 mm long horizontal and one 600 mm long vertical grab bar should be mounted on the side wall closest to the water closet, as illustrated in fig. 15;
- A fold-up type horizontal grab bar should be installed adjacent to the water closet, at a distance of 320 mm from the centre-line of the WC, between heights of 200 mm and 250 mm from the top of the water closet seat and extending 100 to 150 mm beyond the front of the water closet.

Figure 15: WC Grab-bars for Wheelchair Users
- **Wash Basin** - To comply with accessibility requirements the wash basin should:
  
  - Be mounted such that the minimum distance between the centerline of the fixture and the side wall is 460 mm. The top edge should be between 800 mm and 840 mm from the floor;
  
  - Have a knee space underneath that is at least 750 mm wide, 200 mm deep and 750 mm high;
  
  - Have a minimum clear floor space of 750 mm wide by 1200 mm deep, of which a maximum of 480 mm in depth may be under the wash basin;
  
  - Have the hot water and drain pipes within the knee space or toe space properly insulated;
  
  - Have automatic or lever type faucets;

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

  - All utilities and accessories such as soap dispenser, hand dryer etc should be installed between heights of 800 mm and 1100 mm from the floor surface.

  - Sanitary facilities shall have at least one water-closet cubical for the ambulant disabled *(see Fig. 16 and 17)*, which should have the following features
    
    - It is 900 mm wide; is at least 1500 mm, preferably 1600 mm deep;
    
    - It has a door (where doors are used), that is, 800 mm wide and swings out;
    
    - It has handrails on each side, 780 mm high and parallel to the floor, 40 mm clearance between rail and wall, and fastened securely at ends and centre;
    
    - It has a water-closet with the seat 500 mm from the floor;
    
    - Have adequate clear floor space of at least 750 mm circular diameter in front, in the water closet; and

    - Where the wash basin is meant to be used by people with ambulatory disabilities, two 600 mm long vertical grab bars should be installed on either side of the basin with their mid points at 1100 mm from the floor level.

- **Additional Considerations:**
  
  - There should be adequate colour and tonal contrast between the fixtures, walls and the flooring. This is to enable easy recognition by persons with visual impairments.
• There should be a visual emergency alarm in the toilet.

• Some mirrors and shelves shall be provided above the wash basins at a height as low as possible, and not higher than 1 m above the floor, measured from the top of the shelf and the bottom of the mirror.

• Sanitary facilities for men shall have wall-mounted urinals with the opening of the basin 460 mm from the floor, or shall have floor-mounted urinals that are on level with the main floor of the toilet room.

Figure 16: Suggested Plan WC Compartment for the Ambulant Disabled

Figure 17: Section through WC Compartment for the Ambulant Disabled
Shower Facility

- A roll in shower facility with a shower seat is preferred over a bath tub as most persons with mobility impairments find it difficult to step in/out of the latter.

- The minimum dimensions of an accessible shower facility should be 1800 mm x 2350 mm.

![Diagram of a shower facility with dimensions in millimetres.](image)

*Figure 18: Shower Facility*

- There should be a 1800 mm x 1800 mm wheelchair turning space with the shower facility
- Door shall comply with the specification mentioned in the toilet door
- **Shower seat**: A wall mounted shower seat, preferably fold up kind, shall be installed.
  - The shower seat should be positioned such that the distance between the centerline of the water closet and the adjacent wall is 450 mm to 480 mm, and the distance between front edge of the water closet and the rear wall is 650 mm. The top of the shower seat should be at a height of 450 - 500 mm from the floor.
  - There should be an adequate clear floor space of at least 1350 mm depth and 900 mm width, both in front and on the transfer side, adjacent to the water closet.
  - Grab rails Details as per the specification mentioned for the grab rails in Sanitary facilities
• **Stationary, Fittings and Accessories:** Stationary, Fittings and Accessories should have the following specifications
  
  • A shelf should be provided for toiletries in a position that can be reached by a person sitting on the shower seat or from the wheelchair before or after transfer.
  
  • All shower controls should be at a distance of 500 mm from the rear wall.
  
  • Shower controls should be between installed between 750 mm to 1000 mm from the floor.
  
  • The adjustable and detachable shower head, with a minimally 1500 mm long hose, should be installed between 900 mm and 1200 mm from the floor.

**Drinking Fountains**

• An appropriate number of drinking fountains or other water-dispensing means shall be accessible to and usable by the physically disabled.

• Drinking water fountains or water coolers shall have up front spouts and control.

![Figure 19: Combined WC & Shower Facility](image-url)
• Drinking water fountains or water coolers shall be hand-operated or hand and foot-operated.

• Conventional floor mounted water coolers may be convenient to individuals in wheelchairs if a small fountain is mounted on the side of the cooler 800 mm above the floor.

• Fully recessed drinking water fountains are not recommended.

• Drinking water fountains should not be set into an alcove unless the alcove is wider than a wheelchair (see 3.1)

Public Telephones

• In buildings in which telephones for public use are provided, at least one accessible telephone mounted at a height suitable for use by a wheelchair user should be provided in an accessible location, preferably near the entrance. Where several accessible telephones are provided, they should be positioned at different heights to suit ambulant people and wheelchair users.

• A fold down seat (450 mm – 520 mm high) or a perch seat (650 mm – 800 mm high) should be provided for the convenience of people with ambulatory disabilities.

• Preferably, telephones for use by disabled people should be located to enable wheelchair users to approach and use the telephone from the front and the side. Where it is only possible to approach a telephone from the front, a knee recess at least 750 mm wide, 480 mm deep and 760 mm high should be provided under the telephone unit.

• Directions to accessible telephones for disabled people should be clearly marked by combining the International Symbol of Access (ISA) with a telephone symbol.

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**Telephone control**

*Controls on accessible telephones for wheelchair users should be angled so that they can be used by people when seated or when using a perch seat, if provided.*

*Telephone controls should be located between 750 mm and 1000 mm above the floor.*

*To benefit visually impaired people, telephones should be selected which have well lit keypads, large embossed or raised numerals that contrast visually with their background and a raised dot on the number 5.*

*To assist persons using hearing aids, accessible telephone units should have inbuilt inductive couplers.*
Handrails

Handrails are used as a locational and mobility aid by blind and visually impaired people, and as a support for people with mobility impairments. Many disabled and elderly people rely on handrails/grab bars to maintain balance or prevent serious falls. The handrail should be securely fitted to the wall to withstand heavy pressure.

- Handrails should be approximately 900 mm from the floor. The rail should be easy to grip, having a circular section with a diameter of approximately 40 mm and fixed as shown in Fig. 20.

- To aid identification, the colour of the rail should contrast with the wall behind.

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

- Have continuous gripping surfaces, without interruptions or obstructions that can break a hand hold;

![Image](image.png)

All dimensions in millimetres.

Figure 20: Fixing of Handrail

- For stairs and ramps: Handrails should have the following specifications for stairs and ramps
  - Be provided on both the sides;
  - Be continuous, even at the landings; and
  - Extend at least 300 mm beyond the stairs/ramps.

- In case the handrail is enclosed in a recess, the recess should extend at least 450 mm above the top of the rail.
Elevators

In a multi-storey building, elevators are essential to the successful functioning of physically disabled individuals. Elevators should have the following specification

- Elevators shall be accessible to, and usable by the physically disabled on the level that they use to enter the building, and at all levels normally used by the general public.

- The minimum internal clear space of the lift car should be 1200 mm wide and 1400 mm deep.

- The lift door should be a minimum of 900 mm wide and should contrast with the adjoining wall.

- The lift should have a voice announcement system along with a visual display to indicate the floor level.

- A clear manoeuvring space of 1800 mm × 1800 mm should be provided in front of the entrance to all types of lift. This landing area should be well lit artificially with a maintained luminance level of at least 100 lux.

- Lift Call Buttons should comply with the specifications mentioned in the control section.

- Signs indicating the location of an accessible lift should be provided in a location that is clearly visible from the building entrance. The sign should incorporate a representation of the International Symbol for Access.

- A sign indicating the number of the floor should be provided on each lift landing on the wall opposite the lift. It is also recommended to install a floor directory of the main facilities and services available on the lift landing, along with an accessible emergency egress route that clearly indicates the location of nearest refuge areas for persons with disabilities.

- The use of visually and acoustically reflective wall surfaces should be minimized within the lift car as visual reflections can cause discomfort and affect the visual acuity of people with visual impairments.

- The floor of the lift car should be slip resistant and have similar frictional qualities to the floor of the lift landing to decrease the risk of stumbling.

- There should be handrails placed horizontally, at a height of 900 mm from the floor level; and be fixed on both sides and at the rear of the elevator.

- The provision of a mirror on the wall of the lift car opposite the lift door is a positive aid to navigation for wheelchair users. It allows the wheelchair user to see if anyone is behind them and also to see the floor indicator panel. The mirror should not extend below 900 mm from the lift floor to avoid confusing people with impaired sight.
• There should be no horizontal or vertical gaps between the floors of the lift landings and lift car. Where a horizontal gap is unavoidable, this should not exceed 12 mm.

The emergency communication system should be coupled with an induction loop system installed all around the lift. Telephone units, where provided, should have an inbuilt inductive coupler to assist persons using hearing aids.

• While a conventional passenger lift is the preferred option to provide comprehensive access for all users to levels in a building, in existing buildings where access to such a lift is not possible, a platform lift should be provided as an alternative option.
  
  • The size of the platform should be minimally 1050 mm x 1250 mm.
  
  • Platform lifts for public use by disabled people should be provided with clear instructions for use and fitted with an alarm in case users get into difficulty.
  
  • The addition of a fold-down seat would be a benefit to ambulant disabled people.

Controls

• It is advantageous for wheelchair users if controls are placed at low level. For visually impaired people, they should be at eye-level.

• To enable wheelchair users to reach controls while not placing them too low for visually impaired people, controls should be in the zone 900 mm to 1200 mm from the floor. It is advantageous if controls in, for example, lifts are placed at an angle of approximately 45° to the wall so that they are easier to read and operate.

• To cater for wheelchair users, controls should be placed not less than 400 mm from room corners. All the power and electric points should be placed at one meter above the floor level and should not project outside walls.

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

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

• Controls for powered door openers to hinged doors should be located so that the doors do not conflict with wheelchairs, sticks, walking aids, etc.
• To facilitate operation for people with limited strength in arms and hands, handles should be easy to grip and turn. These should be operable by one hand.

**Identification**

Appropriate identification of specific facilities within a building used by the public is particularly essential to the blind. To enable way finding in building interiors by persons with visual impairments, it is important to ensure provision of tactile information in directional and room identification signage. This is achieved by incorporation of embossed/raised lettering and pictograms, as well as Braille descriptions.

Signage should form part of an integrated communication scheme that gives clear directions, information and instructions for the use of a building. These should support a wayfinding strategy that considers the needs of different types of building users as well as the complexity of the building layout. Visual and tactile information should be reinforced by audible information.

• **Location and Positioning of Visual Signage**
  • Directional signs should be placed only on fixed parts of the building such as walls, posts and floors.
  • Directional signs should readily identify and easily distinguish accessible routes from each other, providing a logical sequence from a starting point to a point of destination and providing a clear indication of return routes to named exits.
  • Information and direction signs should be provided at each point where they are required, for example at junctions of circulation routes and key destinations such as doorways, at reception points, at facilities such as telephones, buffets and toilets, and in rooms, spaces and counters where hearing enhancement systems are fitted. Clear directions indicating the facilities on each floor are essential on landings and stairs to help ensure that disabled people do not visit the wrong floor of a building.
  • With the exception of signs to toilets, signs to rooms should generally not be placed on doors but on the wall to the leading edge side of the door as otherwise when the door is open the sign may not be visible.
  • In spaces in which signs would not be visible in large crowds, they should be suspended from the ceiling. The preferred minimum headroom of directional signs suspended from ceilings or posts, or projected from walls, should be 2100 mm.
Consideration should be given to duplicating detailed signs or instructions, especially safety notices, at high and low level, i.e. at 1350 to 1650 mm for a visually impaired person when standing and 1000 mm to 1100 mm for convenient close viewing by a wheelchair user.

Signs associated with a control panel, such as lift controls, should be located between 800 mm and 1100 mm above floor level to meet the needs of people sitting in a wheelchair and people standing.

Signs should be positioned to avoid reflections from daylight and artificial lighting.

**Signage Design**

- Visual signs should comprise of simple words, clearly separated from one another, in short sentences.
- Abbreviations, words placed closely together, and very long words are all hard to read and should be avoided.
- Visually impaired people will more easily read a short sentence or single word message in Title Case, i.e. with an initial upper case letter of each word followed by lower case letters. Words entirely in upper case type (capital) should be avoided.
• A sans serif type face should be used. Fonts that are commonly used are Helvetica medium, Arial, Futura or Avant Garde.

• Embossed letters are easier to read than indented or engraved letters, especially if their leading edges (left and upper) are sharp and as well defined as possible. Therefore, directional signs and signs identifying functions or activities within a building should incorporate embossed letters with a depth of 1.25 mm ± 0.25 mm, a stroke of 1.75 mm ± 0.25 mm, and the edges slightly rounded.

• The height of lettering for signs should be chosen to suit the type of sign and the viewing distance in accordance with the following table.

• To enable persons with visual impairments to locate and establish the extent of text on a sign, the text should be left aligned.

![Image of a sign with embossed text, symbol, and Braille]

Figure 22: Incorporating Embossed Text, Symbol and Braille

• Universally recognized symbols should be used to replace text, wherever possible. Other symbols should supplement text, but should not be used in isolation. The symbols or pictograms on visual signs should be embossed and their size should be as large as the location will allow, subject to design constraints.

• Signs to designated accessible facilities for disabled people should incorporate the International Symbol for Access. Examples of such facilities include accessible entrances and accessible toilets.
**Table 4: Text Heights for Different Types of Sign**

<table>
<thead>
<tr>
<th>Viewing Distance</th>
<th>Type of Sign</th>
<th>Text Height (mm)</th>
<th>Embossed &amp; Braille Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long range</td>
<td>External fascia signs</td>
<td>200</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>External location signs</td>
<td>90 – 120</td>
<td>Preferable</td>
</tr>
<tr>
<td></td>
<td>External direction signs</td>
<td>90</td>
<td>Preferable</td>
</tr>
<tr>
<td></td>
<td>House numbers</td>
<td>90</td>
<td>Preferable</td>
</tr>
<tr>
<td>Medium range</td>
<td>Location and direction</td>
<td>60</td>
<td>Preferable</td>
</tr>
<tr>
<td></td>
<td>Identification signs</td>
<td>40</td>
<td>Preferable</td>
</tr>
<tr>
<td>Close range</td>
<td>Room identification signs</td>
<td>30</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td>Directories</td>
<td>15</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td>Wall mounted information</td>
<td>15</td>
<td>√</td>
</tr>
</tbody>
</table>

- The colour and light reflectance value (LRV) of letters, symbols and pictograms should contrast by at least 70% with the LRV of the colour used for the signboard. Signboards should contrast visually with their backgrounds. Where the LRV of a required signboard colour matches that of the background wall colour and neither can be changed, a visually contrasting border should be placed around the sign, equal in width to at least half the letter height of the text used for the sign.

- Universally accepted colour coding should be used for the background or text of warning signs, as appropriate, i.e. green for safety, yellow for risky and red for danger/emergency.

- Where Braille is to be provided grade 1 Braille should be used for single word signs and grade 2 contracted Braille should be used to reduce the length of multi-word signs. Where Braille forms part of a sign, a marker (e.g. a notch) should be located at the left hand edge of the sign to help locate the Braille message.

- Information based on colour codes only should be avoided; colourblind people may find them difficult to understand.

- Doors that are not intended for normal use, and that might prove dangerous if a blind person were to exit or enter by them, should be made quickly identifiable to the touch by knurling the door handle or knob (see Fig. 24).

**Warning Signals**

- Audible warning signals shall be accompanied by simultaneous visual signals for the benefit of those with hearing disabilities.
Figure 23: Technical Specifications for Braille

- Visual signals shall be accompanied by simultaneous audible signals for the benefit of the blind. To assist blind people, lettering and symbols on signs should be in relief for tactile reading.

Figure 24: Door Handle

Work Bench

This should be at least 800 mm wide, 600 mm deep and 650 mm to 700 mm high. For wheelchair users, the convenient height of work tops is between 760 mm and 850 mm; flexible provision is preferred. Further, for wheelchair access to a work bench, wash basin or table, a clear space for knees and toe is needed. This clear space shall be minimally 750 mm wide, 480 mm deep and 760 mm high.
Hazards

- Every effort shall be exercised to obviate hazards to individuals with physical disabilities.

- Access panels or manholes in floors, walks, and walls may be extremely hazardous, particularly when in use, and should be avoided.

- When manholes or access panels are open and in use, or when an open excavation exists on a site, particularly when it is in proximity of normal pedestrian traffic, barricades shall be placed on all open sides, at least 8.5 m from the hazard, and warning devices shall be installed in accordance with fig. 23.

- Low-hanging door closers that remain within the opening of a doorway, when the door is open or that protrude hazardously into regular corridors or traffic ways when the door is closed, shall be avoided.

- Low-hanging signs, ceiling lights, and similar objects or signs and fixtures that protrude into regular corridors or traffic way shall be avoided. A minimum height of 2.1 m measured from the floor is recommended.

- Ramps and stairs shall be adequately lighted with a minimum maintained illumination level of 150 lux.

- Exit signs shall be in accordance with IS: 4878-1968.

- Equipment and materials causing allergic reactions should as far as possible be avoided in dwellings and buildings.

- Hazard protection should be provided if objects project more than 100 mm into an access route and their lower edge is more than 300 mm above the ground. This is especially important for open areas under staircases and ramps.

- Hazard protection associated with such objects should take the form of a kerb or other solid barrier so that a blind or partially sighted person can detect the hazard using a cane. The hazard protection should not extend beyond the front edge of the object, nor should it be set back more than 100 mm from its front edge.

- In addition to a means of cane detection, guarding rail at a level of 900 mm from the surface of the accessible route should be installed to guide people around an obstruction.

- Also, all protruding obstacles should also be sufficiently differentiated in colour and tone from the floor and wall surfaces and other backgrounds against which they may be viewed. Particularly strong contrast is needed for features that extend more than 100 mm beyond their support at ground level, such as signs, telephone counters, literature
displays and fire extinguishers. To make such protruding objects distinctly obvious, it is recommended to provide a high contrast background as well as contrasting hatching on the floor under such features.

- Pillars extending in circulation path should either contrast sharply from the background walls or have a 200 mm wide band of a colour that contrasts from the rest of the pillar as well as from the background environment, placed at eye level (i.e. between 1350 mm and 1650 mm from the furnished floor level)

- In order to warn persons with visual impairments of the approaching danger, it is recommended to incorporate Tactile Ground Surface Indicators (TGSIs) along the approach path to unavoidable obstacles and hazards. Examples of usage of tactile warning blocks are at beginning, end and landings of staircases and ramps; at trip hazards such as single steps and thresholds; along approach to features that protrude into the circulation path up to a height of 2.1 meters from the floor level, such as signs, telephone counters, literature displays and fire extinguishers; and along unprotected edges such as on railway platform.

**Emergency Egress**

Provision of accessible means of egress from all public use areas and facilities is as vital a component as accessible egress. Emergency Egress should have the following specifications

- **Raising the Alarm**: Placement (accessibility) and visibility of alerting devices is very important. Fire alarm boxes, emergency call buttons and lighted panels should be installed between heights of 800mm and 1100 mm from the furnished floor surface. These should be adequately contrasted in colour and tone from the background wall and should be labelled with raised letters and also in Braille.

- **Alerting Systems**: In emergency situations, it is critical that people are quickly alerted to the situation at hand, for persons with disability the following needs to be considered:

  - Audible alarms with ‘Voice Instructions’ should be installed that can help guide them to the nearest emergency exit. As an alternative to the pre-recorded messages, these alarms may be connected to central control room for on-the-spot broadcasts.

  - Non-auditory alarms (visual or sensory) to alert persons with hearing impairments should be installed at visible locations in all areas that the building users may visit (including toilet areas, storerooms etc.). Non-auditory alarms include flashing beacons. To prevent triggering an epileptic attack, light strobes should not exceed 5 flashes per second.

- **Evacuation Plans**: Evacuation plans that clearly indicate the designated emergency evacuation routes (which are in compliance with specification below) as well as location of refuge areas (which are in compliance with specification below) should be displayed at
all public areas of the building. These should contrast strongly against the background. Where possible, these should incorporate raised letters and tactile routes, and Braille for benefit of persons with visual impairments.

- **Emergency Evacuation Routes:** In buildings or facilities, or portions of buildings or facilities, required to be accessible, accessible means of egress shall be provided in the same number as required for exits by local building/life safety regulations.
  - Designating evacuation routes shall be at least 1200 mm wide, to ensure a wheelchair user and an able bodied person are able to pass each other along the route. The route should be free of any steps or sudden changes in level and should be kept free from obstacles such as ash trays and flower pots.
  - An exit stairway to be considered part of an accessible means of egress shall have a minimum clear width of 1200 mm between handrails and shall either incorporate an area of refuge within an enlarged floor-level landing or a horizontal exit.
  - While typical elevators are not designed to be used during an emergency evacuation, evacuation elevators are designed with standby power and other features according to the elevator safety standard and can be used for the evacuation of individuals with disabilities. An evacuation elevator to be considered part of an accessible means of egress shall be accessed from either an area of refuge or a horizontal exit.
  - Orientation and direction signs should be installed frequently along the evacuation route and these should preferably be internally illuminated.
  - Whilst the emergency lighting provided by traditional overhead emergency lighting luminaries, conforming to the Indian Standard IS: 9583-1981: Emergency Lighting Units, is acceptable for people who are visually impaired, there is research based evidence that provision of photo luminescent way-guidance systems that create a minimum luminance of 0.2 lux along the emergency escape route can significantly enhance independent navigation of persons with vision impairments during emergency evacuation. A ‘Way Guidance lighting system’ consisting of low mounted LED or other photo luminescent strips to outline the exit route (with frequent illuminated direction indicators along the route) should be installed along the entire length of the evacuation route.
  - Exit signs shall be in accordance with IS: 4878-1968. Exit signage should also be available in tactile format in the evacuation route.

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

- **Provision of Refuge Areas**: Where a required exit from a level above or below a level of accessible exit discharge is not accessible, refuge areas shall be provided on each such level (in a number equal to that of inaccessible required exits). A refuge area, also known as an area of rescue assistance, is a place of relative safety where persons who may not be able to negotiate inaccessible egress routes may await rescue assistance.
  - Every required area of refuge is to be accessible from the space it serves by an accessible egress route.
  - Every area of refuge shall have direct access to an exit stairway or an evacuation elevator.
  - Each area of refuge must be separated from the remainder of the story by a smoke barrier having minimally one hour fire resistance rating. Each area of refuge is to be designed to minimize the intrusion of smoke.
  - The size of the refuge to provide at least two accessible areas each being not less 750 mm by 1200 mm. The area of rescue assistance shall not encroach on any required exit width. The total number of such areas per storeys shall be not less than one for every 200 persons of calculated occupant load served by the area of rescue assistance.
  - All stairs next to the refuge should have a clear width of 1200 between the handrails.
  - A method of two-way communication, with both visible and audible signals, shall be provided between each area of rescue assistance and the primary entry.

  *An 'Evac Chair' should be installed in all refuge areas. Evac Chairs are assistive devices that can be rolled down the stairs by trained personnel when conducing assisted evacuation of persons with mobility impairments.*

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

Given below are some of the ways to make communication and information accessible to people with disabilities.

- **Company Websites, intranet portals** and other software applications should be made compliant to Web Content Accessibility Guidelines 2.0. (Refer to the link: [http://www.w3.org/WAI/WCAG20/quickref/](http://www.w3.org/WAI/WCAG20/quickref/))

- **Printed materials** should be available in alternate and adaptable formats, such as Braille/ large print/audio/accessible digital versions). Information can also be represented in graphic or pictorial format for people with intellectual or reading disabilities.

- **Audio and visual media** should have transcripts, captions and audio descriptions.

- **Presentations/meetings/trainings** can be made accessible by having sign language interpreter or transcriber; keeping lights on at all times for participants who are either lip-reading or following an interpreter; hand-outs/presentations in accessible formats which could be sent beforehand. These should be based on individual preferences needs.

- **Facilities/tools/equipment** used to communicate and provide information should be accessible, example, information kiosks, accessible signages, maps.

- **Assistive technologies** such as computers with screen readers and magnifiers, OCR scanner, voice recognition software, modified keyboards should be provided based on individual needs. However, some assistive technologies like screen readers, OCR scanners, etc, can be installed in libraries and training rooms.

**WCAG 2.0 Quick Reference List**

- **Text Alternatives**: Provide text alternatives for any non-text content so that it can be changed into other forms people need, such as large print, braille, speech, symbols or simpler language.

- **Time-based Media**: Provide alternatives for time-based media.

- **Adaptable**: Create content that can be presented in different ways (for example simpler layout) without losing information or structure.

- **Distinguishable**: Make it easier for users to see and hear content including separating foreground from background.

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1. W3C Web Accessibility Initiative; [http://www.w3.org/WAI/WCAG20/quickref/](http://www.w3.org/WAI/WCAG20/quickref/)
• Keyboard Accessible: Make all functionality available from a keyboard.
• Enough Time: Provide users enough time to read and use content.
• Seizures: Do not design content in a way that is known to cause seizures.
• Navigable: Provide ways to help users navigate, find content and determine where they are.
• Readable: Make text content readable and understandable.
• Predictable: Make Web pages appear and operate in predictable ways.
• Input Assistance: Help users avoid and correct mistakes.
• Compatible: Maximize compatibility with current and future user agents, including assistive technologies.

Listed below are the links for Web Standards and Document Standards that can be used as guidelines to build your organizational practices towards Web Accessibility.

• Web Content Accessibility Guidelines (WCAG) 2.0
  http://www.w3.org/WAI/intro/wcag.php

• Authoring Tool Accessibility Guidelines 2.0 (ATAG) (in progress)
  http://www.w3.org/WAI/intro/atag.php

• User Agent Accessibility Guidelines 2.0 (UAAG) (in progress) -
  http://www.w3.org/WAI/intro/uaag.php

• Read more about ISO/IEC 40500:2012 - Information technology -- W3C Web Content
  Accessibility Guidelines (WCAG) 2.0

• Mobile Web Best Practices 1.0 (MWBP) - http://www.w3.org/TR/mobile-bp/

• Mobile Web Application Practice - http://www.w3.org/TR/mwabp/

• Web Accessibility Initiative – Accessible Rich Internet Applications 1.0 (WAI-ARIA)
  (in progress) -http://www.w3.org/WAI/intro/aria.php

• Independent User Interface (Indie UI)-http://www.w3.org/WAI/intro/indieui.php

• Evaluation and Report Language (EARL)- http://www.w3.org/WAI/intro/earl.php

Document Standards

• ISO 14289-1:2012 (PDF/UA) - Document management applications -- Electronic document file format enhancement for accessibility -- Part 1: Use of ISO 32000-1
  (PDF/UA-EPUB3) - http://www.iso.org/iso/catalogue_detail.htm?csnumber=5456
Glossary of Important Terms

Persons with Disabilities: The term persons with disabilities is used to apply to all persons with disabilities including those who have long-term physical, mental, intellectual or sensory impairments which, in interaction with various attitudinal and environmental barriers, hinders their full and effective participation in society on an equal basis with others.³(http://www.un.org/disabilities/default.asp?navid=12&pid=25)

**Discrimination on the basis of disability:** Discrimination on the basis of disability means any distinction, exclusion or restriction on the basis of disability which has the purpose or effect of impairing or nullifying the recognition, enjoyment or exercise, on an equal basis with others, of all human rights and fundamental freedoms in the political, economic, social, cultural, civil or any other field. It includes all forms of discrimination, including denial of reasonable accommodation.⁴

**Reasonable Accommodation:** Reasonable accommodation means necessary and appropriate modification and adjustments not imposing a disproportionate or undue burden, where needed in a particular case, to ensure to persons with disabilities the enjoyment or exercise on an equal basis with others of all human rights and fundamental freedoms.²

**Universal Design:** Universal Design means the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialised design. “Universal design” shall not exclude assistive devices for particular groups of persons with disabilities where this is needed.³

**Assistive Technology:** Assistive technology refers to “any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities”. Assistive technology is an umbrella term that includes assistive, adaptive, and rehabilitative devices for people with disabilities and also includes the process used in selecting, locating, and using them.

International and National Legislations and Guidelines

Convention on Rights of Persons with Disabilities 2006

International Classification of Functioning, Disability and Health (ICF)
http://www.who.int/classifications/icf/en/

UN Enable
http://www.un.org/disabilities/

The Mental Health Care Bill, 2013

The Rights to Persons with Disabilities bill, 2014
http://www.prsindia.org/uploads/media/Person%20with%20Disabilities/The%20Right%20of%20Persons%20with%20Disabilities%20Bill.pdf

Web accessibility Guidelines
http://www.w3.org/WAI/intro/accessibility.php

WCAG Guidelines
http://www.w3.org/WAI/guid-tech.html

Creating Change- Innovations in the World of Disability, an Ashoka publication
About the Five-Point Program—
“Retrofitting of IT Parks in the Cyberabad Zone”

The five-point program “Retrofitting of IT Parks in the Cyberabad Zone” was launched by Telangana State Industrial Infrastructure Corporation (TSIIC) and (GIZ) on 9th July 2014. The program aims to build a sustainable model for IT parks in the Cyberabad zone. The program focuses on five thematic areas:

1. Retrofitting of Existing Buildings
2. Waste Management in the Industrial Park including e-waste management
3. Promotion of Cycle to Work
4. Increasing Green Cover in the Industrial Parks
5. Storm-Water Management and Rain Water Harvesting

NASSCOM Foundation has partnered with Telangana State Industrial Infrastructure Corporation (TSIIC) for e-waste management and barrier-free accessible building component of program.

The barrier free-accessible building component aims to build awareness among companies in the IT Park and the builder community about creating an environment for inclusion of people with disabilities.

The e-waste management component seeks to develop a road map for effective and responsible e-waste management in the Cyberabad Zone.

NASSCOM Foundation will be working with 15 companies in the Cyberabad Zone for implementation of the program. To know more about how you can participate in the program. Please contact

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A Snapshot of Activities Organised as the Part of the Five Point Program “Retrofitting of IT Parks in the Cyberabad Zone”

Workshop “Moving towards a Barrier-Free Environment” organised from 7th to 9th October

Access Audit at Divyasree Orion

Access Audit at YSR Bhavan
About Nasscom Foundation’s Disability Initiative:

Vision: The Disability Initiative (DI) of NASSCOM Foundation envisages to create sustainable ecosystem to mainstream employment for persons with disability and making ICT accessible to all.

Goals

● To harmonize (adapt, adopt, localize) International IT standards for accessibility.
● To harmonize (adapt, adopt, localize) physical standards for accessibility.
● To promote and facilitate inclusion of Persons with Disabilities through employment in Industry.
● To help develop and promote affordable tools and technologies that facilitate inclusion of Persons with Disabilities.
● To advocate for national and state level policy changes for the adoption of Inclusive ICT.

To know more, please visit:  

About NASSCOM Foundation:

NASSCOM Foundation is driving technology for good. The Foundation’s work is just as expansive and evolutionary as the potential that technology and corporate India entail. Drawing strength from its parent body NASSCOM, the Foundation works in partnership with four major stakeholders: NASSCOM member companies, NGOs, emerging social enterprises and Government; working towards #ChangingIndia..bit by bit, a journey to foster a strategic relationship between technology and development. Visit www.nasscomfoundation.org for more Information.