photo by Marissa Roth

Mark Taper Forum, Los Angeles, CA: Backstage dressing room with actress Lisa Mann

CHAPTER 3

Architectural Access

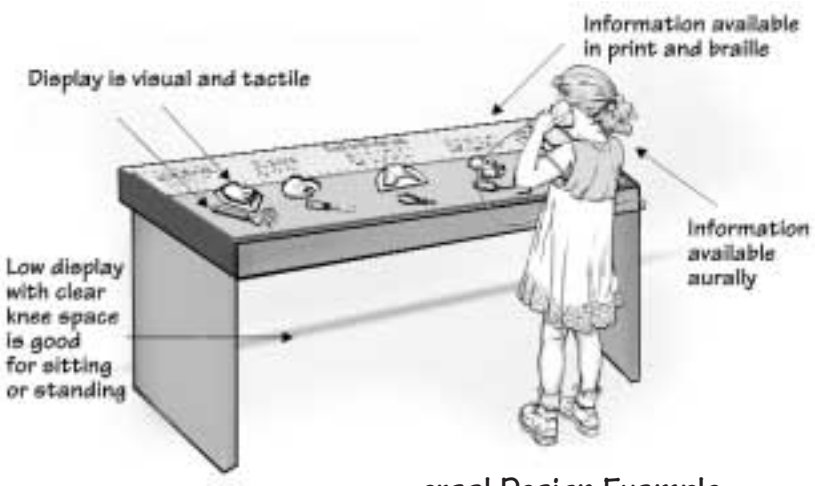
Universal Design

Universal design goes beyond minimum access standards to the design of products and environments usable by the broadest public to the greatest extent possible. The intent of universal design is to simplify life for everyone by making products, communications and the built environment usable by as many people as possible. In the best of all possible worlds, the concept of universal design would guide the creation of all facilities and programs.

Universal design benefits people of all ages and abilities because what is an accommodation for one person may be a convenience for many. The seven principles of universal design can be applied in many ways, not just to architecture and buildings, but also to programs and policies. For example: Does an organization's ticket sales system allow for flexibility in use? Can everyone purchase tickets on the phone, via the Internet or at the door? Is the system simple and intuitive? Are the purchasing policies simple and straightforward?

The following seven principles inform the creation of more inclusive and universally accessible environments.

These principles were compiled by advocates of universal design, listed in alphabetical order: Bettye Rose Connell, Mike Jones, Ron Mace, Jim Mueller, Abir Mullick, Elaine Ostroff, Jon Sanford, Ed Steinfeld, Molly Story and Gregg Vanderheiden, with major funding provided by the National Institute on Disability and Rehabilitation Research and the U.S. Department of Education, Copyright 1997, NC State University, The Center for Universal Design.



ersal Design Example

Principle One: Equitable Use

The designs are useful and marketable to people with diverse abilities.

- Provide the same means of use for all users, identical whenever possible, equivalent when not.
- Avoid segregating or stigmatizing any users.
- Make provisions for privacy, security and safety equally available to all users.
- Make the design appealing to all users.
- Examples
  - Power doors with sensors at entrances that are convenient for all users.
  - Integrated, dispersed and adaptable seating in assembly areas such as theaters.

Principle Two: Flexibility in Use

Designs accommodate a wide range of individual preferences and abilities.

- Provide choice in methods of use.
- Accommodate right- or left-handed access and use.
- Facilitate the user's accuracy and precision.
- Provide adaptability to the user's pace.
- Examples
  - Scissors designed for right- or left-handed users.
  - An automated teller machine (ATM) that has visual, tactile, and audio feedback, a tapered card opening and a palm rest.

Principle Three: Simple and Intuitive Use

Uses of the designs are easy to understand, regardless of the user's experience, knowledge, language skills or current concentration level.

- Eliminate unnecessary complexity.
- Be consistent with user expectations and intuition.
- Accommodate a wide range of literacy and language skills.
- Arrange information consistent with its importance.
- Provide effective prompting and feedback during and after task completion.
- Examples
  - A moving sidewalk or escalator in a public space.
  - An instruction manual with drawings and no text.

Principle Four: Perceptible Information

The designs communicate necessary information effectively to the user regardless of ambient conditions or the user's sensory abilities.

- Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.
- Provide adequate contrast between essential information and its surroundings.
- Maximize "legibility" of essential information.
- Differentiate elements in ways that can be described (make it easy to give instructions or directions).
- Provide compatibility with a variety of techniques or devices used by people with sensory limitations.
- Examples
  - Tactile, visual, and audible cues and instructions on a display with video or on a thermostat.
  - Redundant cueing (e.g. voice communications and signage) in airports, train stations and subway cars.

Principle Five: Tolerance for Error

The designs minimize hazards and the adverse consequences of accidental or unintended actions.

- Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated or shielded.
- Provide warnings of hazards and errors.
- Provide fail-safe features.
- Discourage unconscious action in tasks that require vigilance.
- Examples
  - A double-cut key easily inserted into a recessed keyhole in either of two ways.
  - An "undo" feature in computer software that allows the user to correct mistakes without penalty.

"You must understand that no matter what your occupation, we are all designers. Everything conceived or made by humans is designed. Universal design suggests that products, architecture, museum programs—all human-made things—must be functional and aesthetically enhancing, democratic, humane, adaptable, cost effective and inclusive. From huge systems such as urban planning, to a museum exhibition, down to a seemingly insignificant object like a can opener, designers must include the largest possible audience. I don't think most people realize how design has an impact on every aspect of their daily lives."

Dianne H. Pilgrim, Director Emeritus and Senior Advisor for Special Projects, Cooper–Hewitt National Design Museum, Smithsonian Institution

Universal Design Example

Principle Six: Low Physical Effort

The design can be used efficiently and comfortably and with a minimum of fatigue.

- Allow user to maintain a neutral body position.
- Use reasonable operating forces.
- Minimize repetitive actions.
- Minimize sustained physical effort.
- Examples
  - Lever or loop handles on doors and faucets.
  - Touch lamps operated without a switch.

Principle Seven: Size and Space for Approach and Use

The design provides appropriate size and space for approaching, reaching, manipulating and using regardless of user's body size, posture or mobility.

- Provide a clear line of sight to important elements for any seated or standing user.
- Make reaching to all components comfortable for any seated or standing user.
- Accommodate variations in hand and grip size.
- Provide adequate space for using assistive devices or personal assistance.
- Examples
  - Controls on the front and clear floor space around an interactive exhibition, mailboxes and other elements.
  - Wide gates at subway station that accommodate all users.

"Universal design is a new approach that assumes most places and programs can be designed to accommodate a much wider audience—if we plan from the beginning. It is becoming the approach used by cultural administrators who want their places, media and programs to reach the widest possible audience. Universal design helps develop audiences and careers and community."

Elaine Ostroff, Founding Director, Adaptive Environments

Surveying for Physical Accessibility

Many arts and humanities programs are housed in facilities built before the Rehabilitation Act, the ADA, the conception of universal design, and before all of the architectural guidelines developed to increase accessibility. Nonetheless, cultural programs still require accessible buildings and spaces.

Whether the organization owns or leases a facility, whether the facility is old or new, there are five steps to ensuring physical accessibility.

1. Conduct a survey to identify accessibility barriers.

A thorough survey should be conducted of every facility where cultural events occur. Use a reputable survey or checklist to identify barriers to accessibility. Involve knowledgeable individuals with disabilities in the process of evaluating what does and doesn't meet the Americans with Disabilities Act Accessibility Guidelines (ADAAG), Uniform Federal Accessibility Standards (UFAS), state or local accessibility standards and codes. Keep in mind that looking beyond the minimum level of accessibility laid out by codes and standards will broaden the potential for usability of facilities and programs.

2. Brainstorm ways in which barriers may be eliminated and ways in which environments may be made more universally accessible.

Once the survey is completed, keep the principles of universal design in mind, examine the barriers identified and start creating solutions. For example, the front door leading into the organization's office has a round doorknob, which is difficult to turn. Solutions might include: removing the door knob, propping the door open, replacing the door knob with a levered handle or installing an electronic door opener.

3. Estimates of cost, time and resources involved in removing barriers and enhancing access.

Take each proposed solution and cost it out. Figure out the time and resources necessary to accomplish each solution. Look at the practicality of each solution. For example, removing the doorknob or propping the door open isn't practical from a safety or security point of view. Installing an electronic door opener might be the optimal and most universal solution, but it may not be within the organization's financial reach. Replacing the round knob with a levered handle is the least expensive solution and will make the door more accessible.

4. Prioritize projects and apply universal design principles to barrier removal efforts.

After identifying solutions to barriers, determine in what order barrier removal will be accomplished. A good plan, both long-term and short-term, can maximize the effectiveness of barrier removal measures as well as the use of resources. Use the following priorities recommended by the U.S. Department of Justice while striving to create a universally accessible cultural environment.

First priority: Get people in the door.

Second priority: Provide access to goods and services.

Third priority: Provide access to restrooms.

Fourth priority: Remove any remaining barriers.

5. Develop time frame, implement the plan and review it periodically.

The final step is to develop the time frame and implement the plan. As in the examples above, fixing the barrier caused by the round doorknob would be a first priority because it involves getting people in the door. Initially, the plan would be to replace the round knob with a levered knob, but within two years identify or budget funds to install an electronic door opener. Reviewing and reassessing plans is very important. In two years, the organization may move to a different office space, the levered handle may provide suitable access or the electronic door may be a lot less expensive.

Even if an organization's permanent programs are in an accessible building, it may occasionally use other facilities temporarily or for a specific event. The organization should survey for accessibility. If the facilities are not accessible, the organization has two choices: either not use that facility or instigate barrier removal. For example, functions like festivals, circulating exhibitions or special performances may need temporary solutions to bypass a curb or a set of stairs, or to provide usable restrooms or improve signage. For conferences and meetings, the organization might negotiate with the site management to require accessibility improvements before signing an agreement to use the site.

Organizations that are building new or renovating old facilities should carefully select an architect and contractor who are willing to apply universal design concepts to their work and are committed to creating fully accessible environments. Architects and contractors should work with recognized specialists in the field of accessibility along with members of the local disability community who are fully aware of all applicable accessibility standards and sensitive to the environmental needs of people with disabilities.

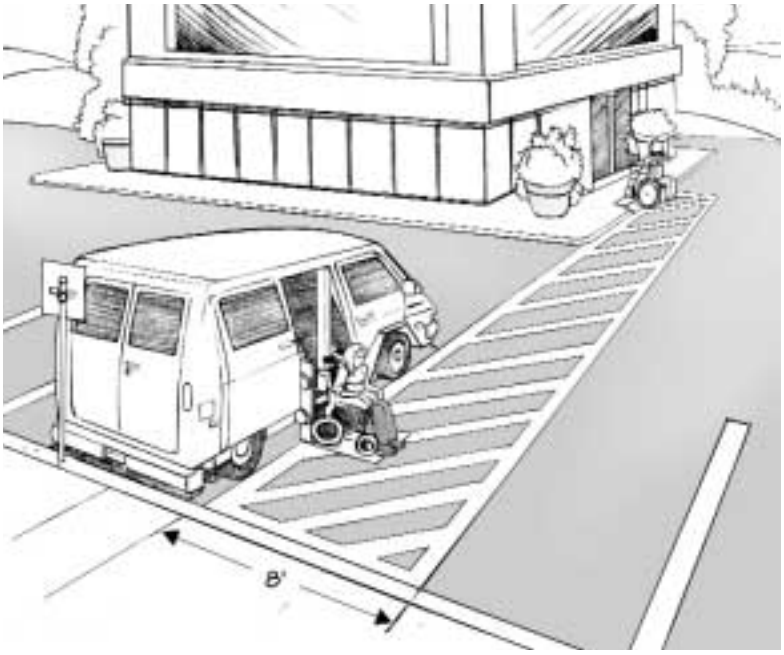
The following is a preliminary guide to help identify areas that need particular attention, but it is not a comprehensive review of architectural accessibility standards. For a complete review of accessibility requirements, refer to either the Americans with Disabilities Act Accessibility Guidelines (ADAAG) or the Uniform Federal Accessibility Standards (UFAS), both of which can be obtained from:

The Access Board
1331 F Street, NW, Suite 1000
Washington, DC 20004-1111
(800) 872-2253 voice
(800) 993-2822 TTY
info@access-board.gov
www.access-board.gov

"Every individual, no matter what age, needs accessible venues. We all benefit from a door that opens easily or a water fountain of an acceptable height. . . . In the new millennium our mandate is determined: accessibility for all. "

Denise Chavez, Artistic Director, The Border Book Festival

A Hazard at Small Changes in Level



Exterior Accessible Route

Preliminary Guide to Architectural Accessibility

1. Exterior Accessible Route

An accessible route is a continuous pathway with a stable, firm and slip-resistant surface at least 36 inches wide, which has no curbs, steps, stairs or abrupt changes in level greater than 1/4 inch. It should be free from sand, gravel, gratings, debris or anything that could trip people or result in an unstable or uneven surface.

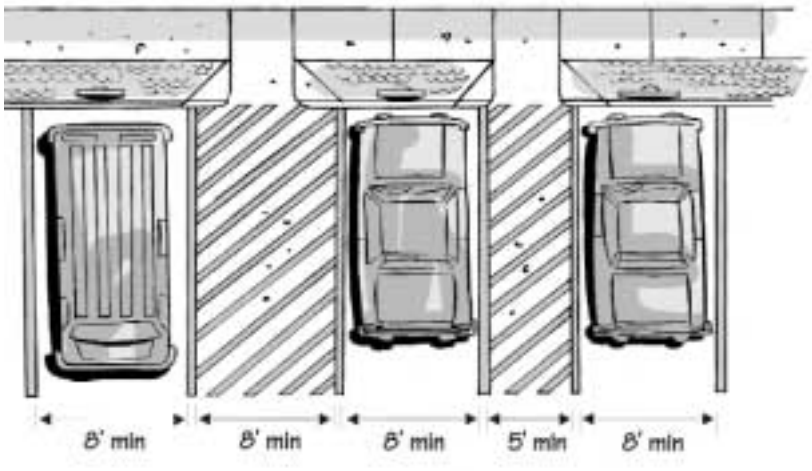
An accessible route provides a safe and usable path for people who walk with difficulty, use wheelchairs, crutches, braces, canes or walkers, or who have respiratory or heart problems or other conditions that limit stamina or mobility. Accessible routes are also safer and easier for everyone to follow.

In surveying walks, paths, corridors and floor surfaces, look for small changes in level, steps and protruding objects (tree branches, shrubbery, signs, light fixtures). Holes and cracks should be filled in, bumps should be smoothed out, small changes in level should be ramped and thresholds should be level with the path or beveled. Curbs encountered on the accessible route must have curb ramps (commonly known as curb cuts). If a flight of stairs is the only available route, install a ramp or an elevator.

2. Parking

Parking Spaces

Drivers who use wheelchairs need parking spaces on level surfaces that are 8 feet wide with a 5-foot access aisle next to them. The first accessible parking space and 1/8th of all parking spaces need to be able to accommodate vans with side lifts by having an 8-foot-wide access aisle. Each accessible space must be as close as possible to the accessible building entrance and adjoin an accessible route.



Accessible Parking Spaces with Accessible Aisles

International Symbol of Accessibility

The spaces must be marked by an above-ground sign that cannot be obscured by a vehicle parked in the space and that shows the international symbol of accessibility. The Americans with Disabilities Act Guidelines, Standard 4.30.7 (1) specify that facilities and elements, such as signs, required to be identified as accessible use the international symbol of accessibility. A sign painted on the pavement is required in some states but is not sufficient to satisfy federal requirements. Most large hardware stores carry ready-made signs. If the route is not apparent, provide signs directing people to an accessible entrance.

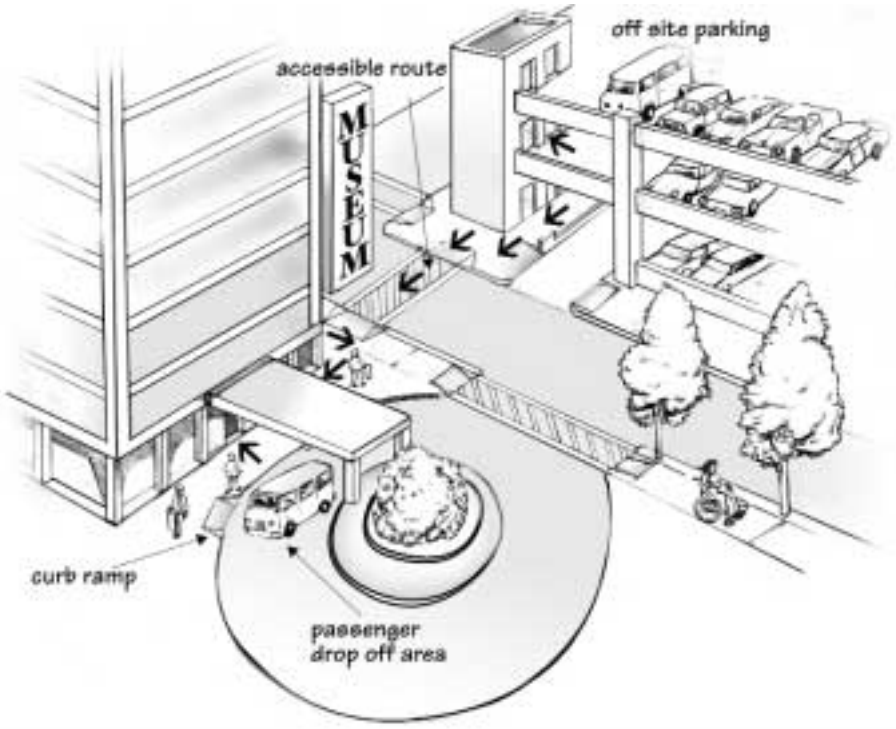
Accessible Parking Signage

Both the UFAS and ADAAG (section 4.1.1) calculate the number of required accessible spaces as follows:

Total Parking Spaces	Minimum Number of Accessible Spaces Required
1 to 25	1
26 to 50	2
51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8
401 to 500	9
501 to 1000	2 percent of total
1001 and over	20 plus 1 for each 100 over 1000

Off-site Parking

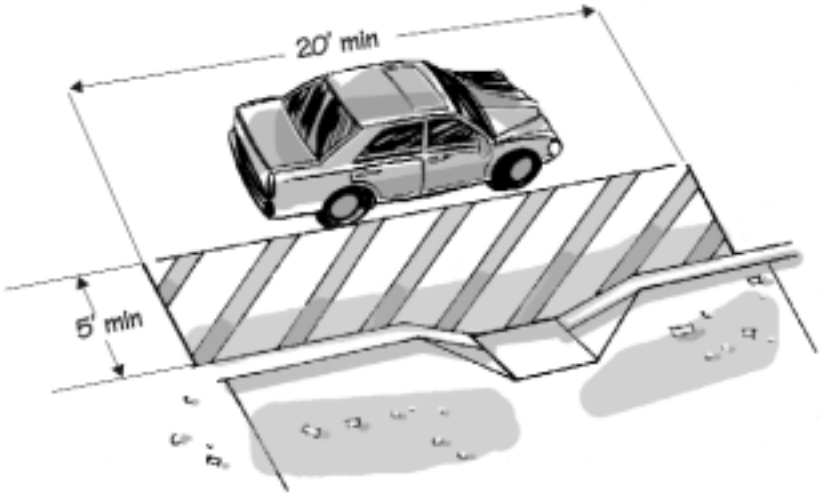
If off-site parking is available, ensure that there is an accessible route of travel from the off-site parking to the facility's entrance. Mark the accessible route clearly with appropriate signage.



Accessible Route from Off-Site Parking

Passenger-Loading Zone

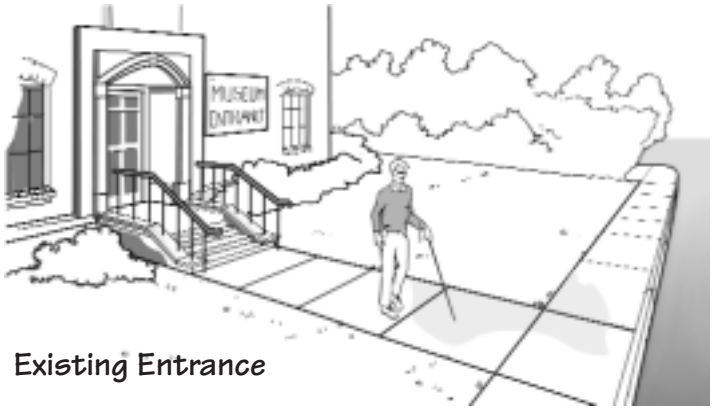
A passenger-loading zone should have at least 5 feet of clear space beside the vehicle for passenger loading. The passenger-loading zone must connect to an accessible route to the building entry. Curbs at passenger drop-off zones must have curb cuts that are kept unobstructed.



Passenger Loading Zone

3. Entrances and Doors

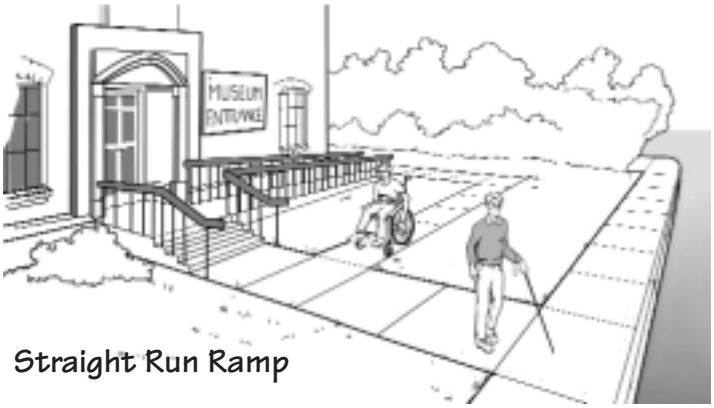
Entrances to buildings should be approached by a flat or gradually sloping and smooth surface. An accessible route must connect parking areas, drop-off zones, public transportation stops or other buildings with the building entrance.



Existing Entrance

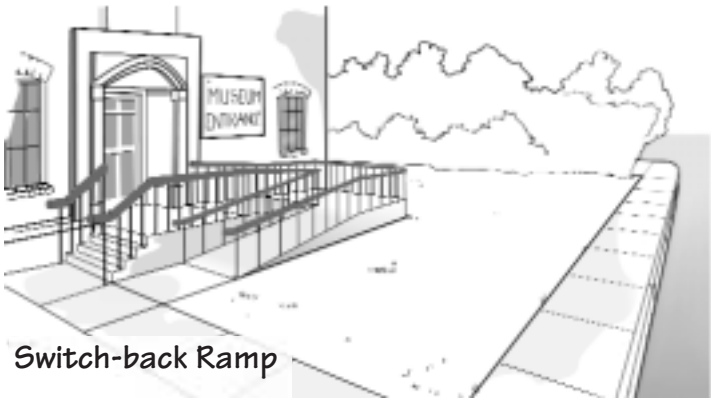
Entrance Ramps

Most building standards specify ramps with a maximum slope of 8.3 percent, which is one foot of rise for every 12 feet of horizontal run. For every 30 feet of run an intermediate 5-foot long landing or rest platform is required. In addition, 5-foot level platforms must be at both the top and bottom of the ramp. Consequently, a ramp for a 4-foot rise must be at least 48 feet long plus have 5-foot long landings at the top and bottom and at least one level intermediate 5-foot long landing. Ramps are usually required to have hand railings on both sides.



Straight Run Ramp

Long ramps can be handled in a variety of ways: straight run, switch back or L-shape. Level approaches however, are always preferable to ramps. In some instances, particularly in historic buildings, re-landscaping the approach to change the entrance level may be the best solution. Also, interior ramps are always preferable to exterior ramps so that no one is required to roll or walk on an inclined surface during inclement weather.

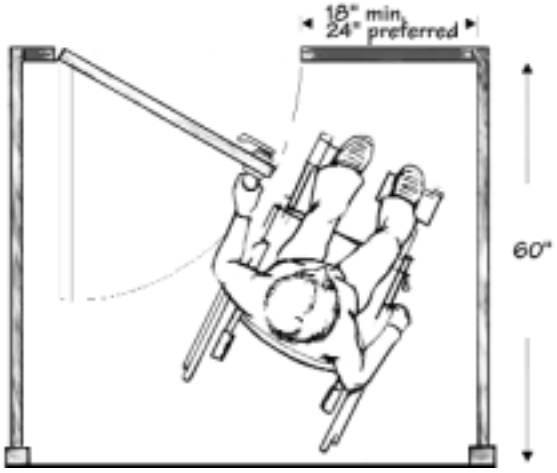


Switch-back Ramp

Doorways and Thresholds

Doorways must provide a minimum of 32 inches of clearance when the door is standing open at 90 degrees. Most exterior doorways are 36 inches wide, but interior doors are often narrower. All doorways need a 5-foot by 5-foot level and clear area on the pull side. The door should have a kickplate and lever-type or push-pull or U-shaped hardware.

32" Minimum Clear Width Door



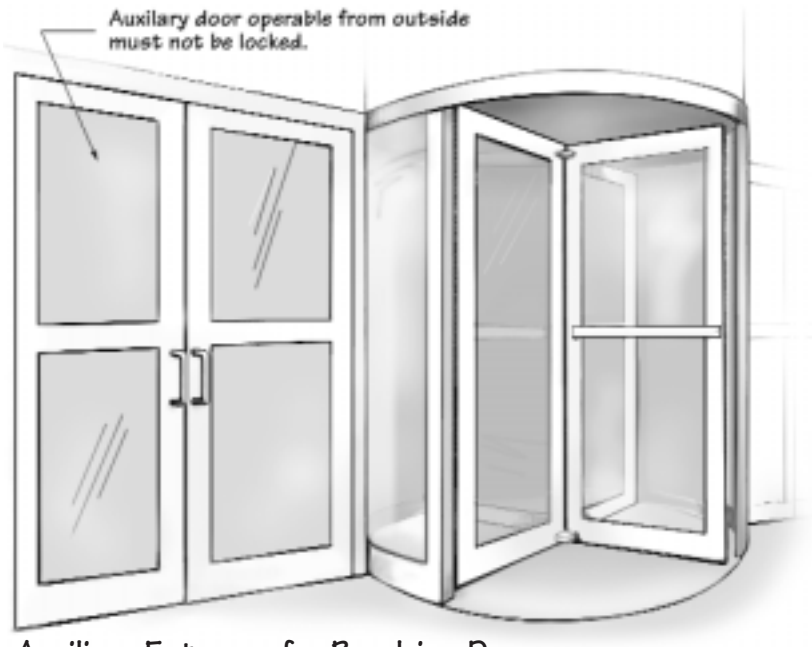
Clear Space to Side of Door

Sign at Inaccessible Entrance

Weather stripping on the bottom edge of the door is preferable to a threshold as a means of stopping infiltration. Thresholds must not be more than 1/2 inch high and must be beveled if more than 1/4 inch high. Interior doors should take no more than 5 pounds of pull (force) to open. Door closers should be adjusted or removed so that someone with limited upper body strength or limited mobility can easily open the door.

Revolving Doors

Many people with disabilities cannot use revolving doors or turnstiles. If either exists in a cultural facility, there must be a readily accessible alternate route around them. A swinging door placed immediately adjacent to a revolving door or a gate next to a turnstile are most convenient.



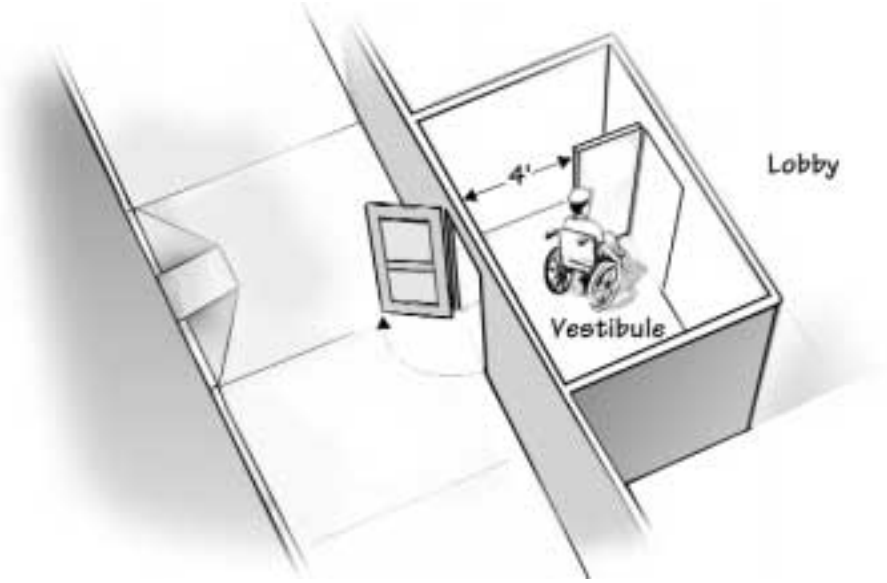
Auxiliary Entrance for Revolving Door

If a swinging door is not located near a revolving door, provide an alternate entrance. Post a sign at the revolving door directing people to the usable door. Proper signage, with the universal symbol for access, must be placed at any inaccessible entrance to notify the public where the closest accessible entrance is located.

Power-Operated Door at Entrance
If swinging power-operated doors are used for two-way traffic, the activating and safety mats, as well as guard rails, must extend well in front of the door swing to prevent the opening door from hitting anyone. If the power door is operated with a button, be sure to place the button in an accessible location and out of the way of the swing of the door.

Power Operated Door at Entrance

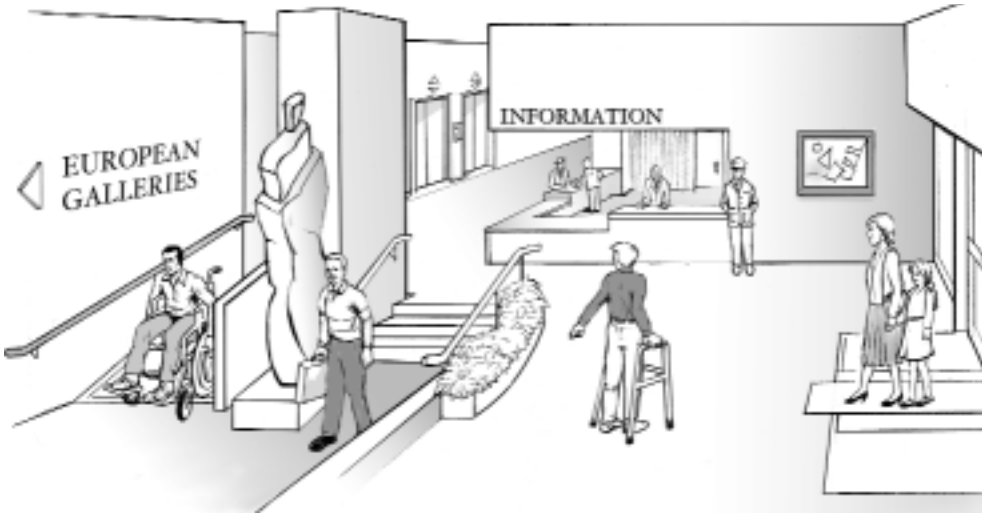
Double Door Vestibule
Double door vestibules with limited maneuvering space can trap people who use wheelchairs. At least 4 feet must be between the face of the first door and the second door in its open position. The best entrance for older adults and people with disabilities is one with power-operated doors.



Vestibule at Entrance

4. Interior Accessible Route

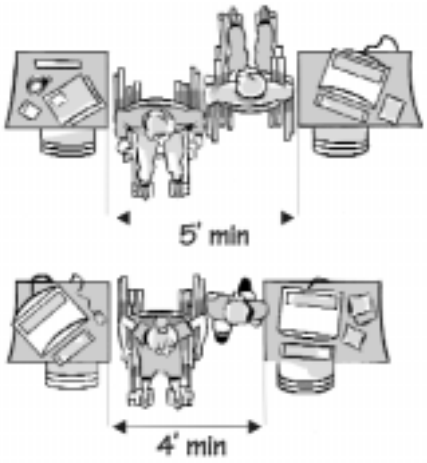
Inside a building, people must be able to move about using a continuous pathway that is well lit, stable, firm, slip-resistant, unobstructed and at least 36 inches wide. The accessible route should be the shortest route. Signage should clearly mark the accessible route, if not all routes are accessible. If possible, seating should be provided at periodic intervals for people who need to rest.



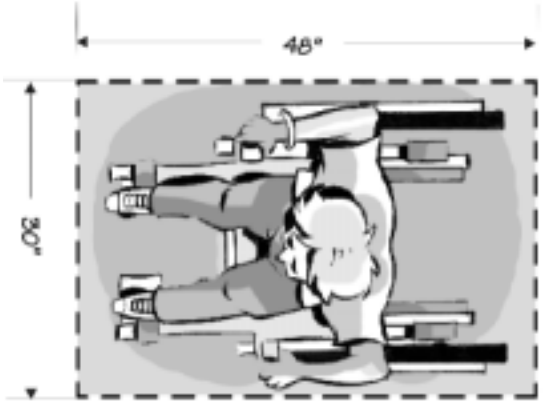
Interior Accessible Route

Clearance for Passage

People who use mobility aids such as wheelchairs, walkers or crutches and braces require more space in which to maneuver. The average adult-sized wheelchair is about 26 to 28 inches wide and uses about 30 inches by 48 inches of floor space. Because at least four feet is required for a person in a wheelchair to pass a walking person—five feet for two people using wheelchairs to pass—it is recommended that all aisles and hallways have a minimum width of 5 feet.



Clearance for Aisles



Clear Floor space

Carpet

Carpet must adhere directly to the flooring, with a firm cushion, pad or backing that must be attached to the carpet. The carpet should be level loop, textured loop, level cut pile or level cut/uncut pile texture with a maximum pile thickness of 1/2 inch. Soft carpet or padding, especially in thicknesses greater than 1/2 inch, make using wheelchairs, crutches, canes and walkers very difficult. Any carpet that shifts, or has an unattached pad underneath, is very difficult for wheelchair users to negotiate.

Protruding Objects

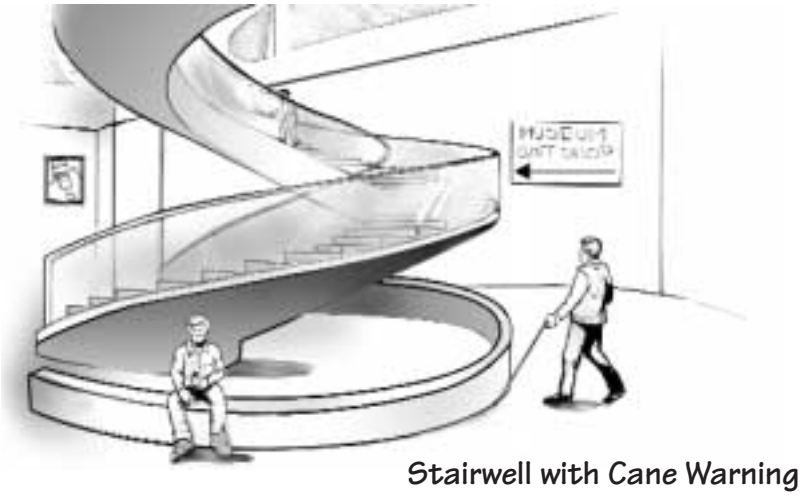
Wall-mounted elements such as telephone enclosures, light fixtures, fire extinguishers, water fountains, exhibit cases or signs that stick out more than four inches from the wall can be hazardous to people who are blind or have low vision and who depend on a long cane for mobility. If the cane passes below the object, the object is not detected, and people could walk into it.

There are several solutions: secure or extend a cane-detectable object under the protruding object; recess the object so it no longer protrudes; if possible, raise the object above 80 inches; or lower the protruding object to less than 27 inches so a person using a cane can detect it.

Problems can also result from handrails, cueing line barriers or objects with widely spaced supports. The latter can be imperceptible to those using a long cane because the cane can pass between or beneath them without making contact.

Protruding Object Hazard

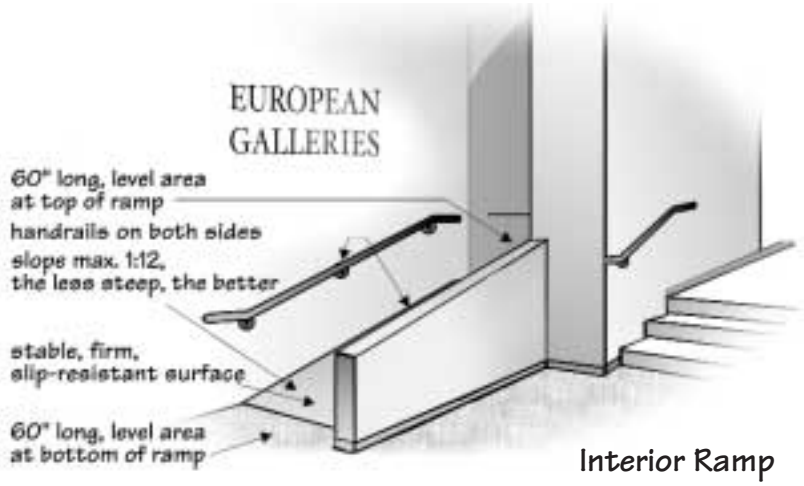
Protruding Object Warning



Stairwell with Cane Warning

Interior Changes in Levels

Abrupt changes in floor levels in buildings are one of the most common problems for people with disabilities. If one or more steps elevate an entire area, it is inaccessible and will need to be made accessible. Using wedges or small ramps can eliminate small changes in levels up to 6 inches in height.



Interior Ramp

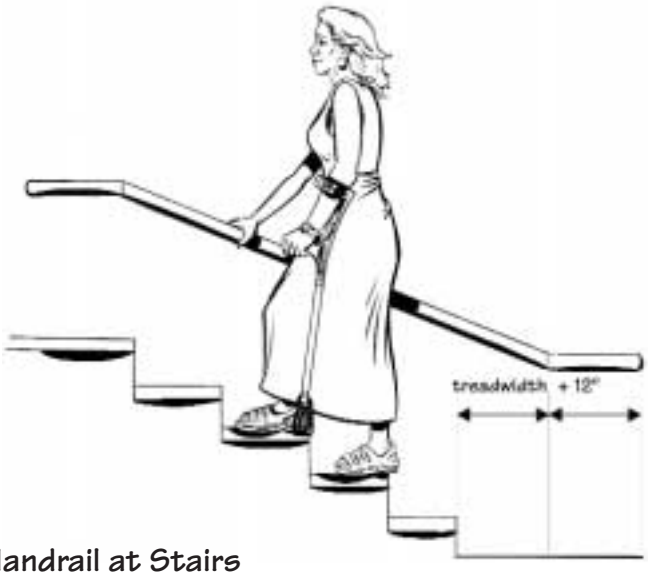
Interior Ramps

The best and safest solution to an interior change in level is a permanent ramp. Finish material can match surrounding materials, but the ramp surface should be firm and have a non-slip surface. Such ramps must not be steeper than 1:12 and must have hand railings on both sides.

Remember, every foot of rise requires at least 12 feet of run. An intermediate 5-foot long landing or rest platform that is at least as wide as the ramp is required for every 30 feet of run. In addition, 5-foot level platforms must be provided at both the top and bottom of the ramp. Extended lengthy ramps are a poor solution for the wheelchair user, because many people cannot push themselves up such a long slope.

Intermittent/Temporary Ramps

For intermittent or temporary situations such as an outdoor art or music festival or a lecture/panel platform, use ramps with substantial handrails on each side and a non-slip surface. Portable metal ramps are another temporary solution. However, these folding lightweight ramps have small curbs, no handrails and should not be left in place unattended.



Handrail at Stairs

Stairs

Handrails should be provided on both sides of stairs and around landings. Handrails must extend at least 1 foot horizontally beyond the top step and the bottom step. Hand railings should be 1 1/4 inches to 1 1/2 inches in diameter and be 1 1/2 inches from the wall. If handrails exist, but do not have horizontal extensions, modify or replace them. If horizontal extensions cannot be installed on both handrails, install them on at least one. If children will use stairs, consider installing a second, lower handrail.

Elevators

If the building is equipped with elevators, the elevator may be completely accessible or may need some improvements to be usable by everyone.

Elevator Lobbies

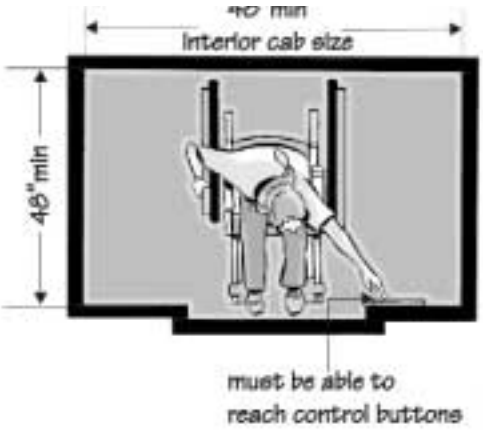
Call buttons must be no more than 48 inches above the floor. Car arrival indicators should light up and ring to announce a car's arrival so people with either visual or hearing loss can perceive them.

Raised numeral and braille floor indicators must be placed on both doorjambs and located at a height of 60 inches above the floor. The raised numeral should be at least 2 inches tall and raised at least 1/16 of an inch above the surface. These can be easily added to elevator doorjambs.

Elevator Lobby

Elevator Cab

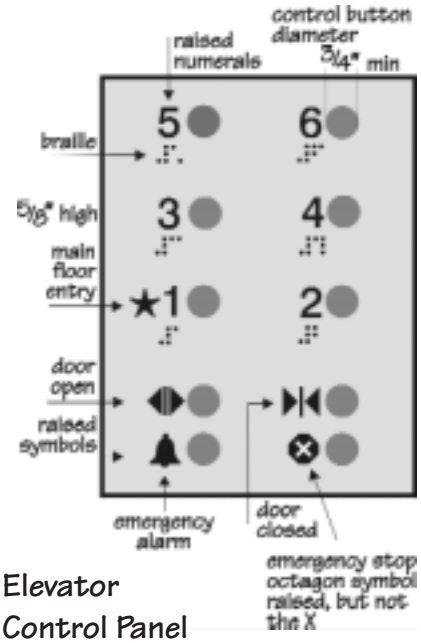
Elevator size is critical for people who use wheelchairs. Elevators should have enough space to allow a person using a wheelchair to turn around inside. If an elevator has at least a 30 inch by 48 inch clear floor space inside, it should accommodate a person using a wheelchair. By pulling straight in and backing out or vice versa, most people using wheelchairs can fit in an elevator that is as small as 48 inches from the door to the back wall. In these very small elevators, however, a person who uses a wheelchair will probably not be able to reach the controls unless the controls are placed on a side wall.



Minimum Cab Size

Elevator Control Panel

The highest operable part of the control panel (top elevator control button and/or the emergency controls) must be no more than 48 inches above the floor. In some cases, it may be acceptable to install a stick or wand hung from a chain in the corner of the cab that can be used to push controls that are out of reach.



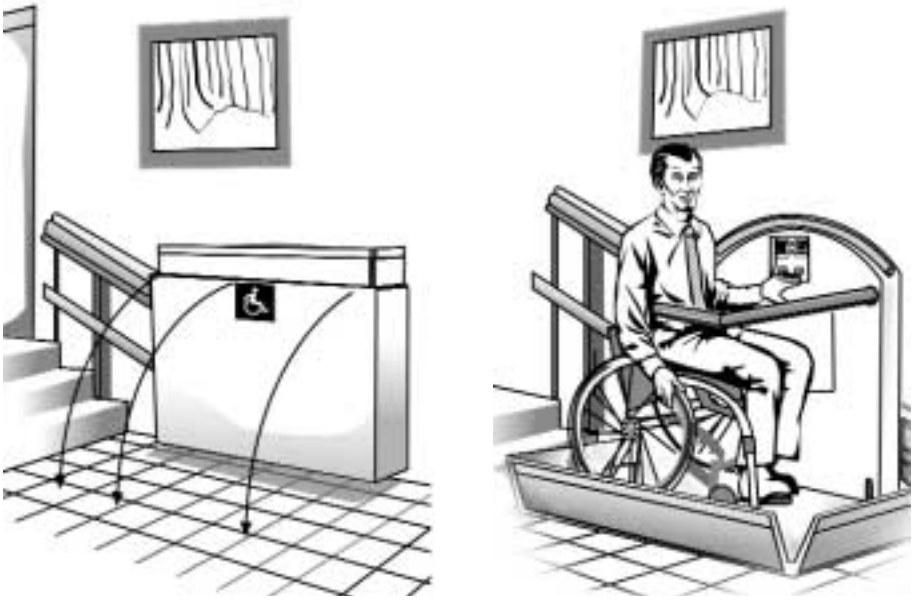
Elevator Control Panel

Elevator control buttons must have raised numerals and braille to the left of each button. Inexpensive, adhesive-backed, raised numerals with braille can be added to existing elevator panels. However, these labels are easily removed and must be continually monitored to ensure that they remain in place. For people who are blind or have low vision, lighting is also particularly important, as are the size and contrast of color on the call buttons.

Lifts

Mechanical wheelchair lifts are a solution of last-resort. Lifts require power, are subject to mechanical failure and operator error, need routine and regular maintenance, require the use of a key and have several built-in safety features that make them difficult to use independently in public spaces. Wheelchair lifts should only be installed if there is not adequate room for a ramp or another solution is not available. Post instructions for operation on or near the lift and have the key readily available.

Mechanical lifts can be placed over or next to existing stairs. Two types of lifts exist, vertical and inclined. Vertical lifts are placed at or beside the stairs and rise or lower vertically. Inclined lifts travel on a track mounted on the wall beside the stair. Most inclined lifts can be folded out of the way when not in use. Many jurisdictions restrict them from use on narrow flights of stairs where they may block fire egress.



Lift

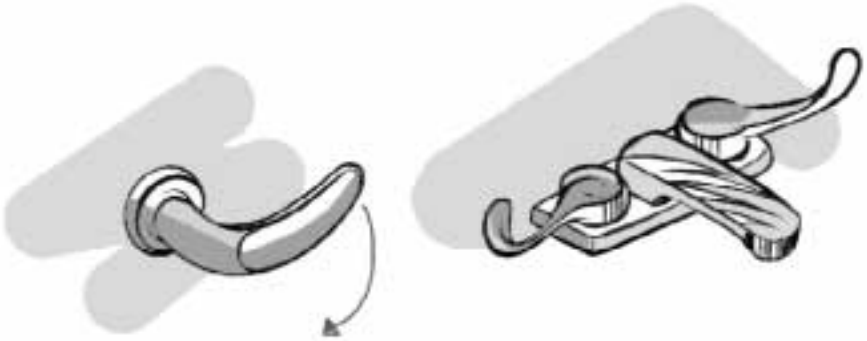
5. Amenities, Services and Conveniences

People with disabilities must be able to take advantage of food services, shops, and other amenities and conveniences. Accessibility goes beyond the ability to just enter and exit an area, space or room. It also means the ability to use the facilities or take advantage of the services provided.

Controls and Hardware

Controls and hardware include operating mechanisms such as door handles, thermostats, toilet flush controls, faucet handles, locks, dial pads, window cranks, computer keyboards and touch screens, fire alarms, light switches and coin slots. They must be mounted where short or seated people or those who cannot raise their arms can reach them. There has to be enough clear floor space for people using wheelchairs to get close to the controls. In addition, controls must be easy to operate. Controls should be operable with one hand in a closed fist and not require gripping, twisting nor more than five pounds of pressure.

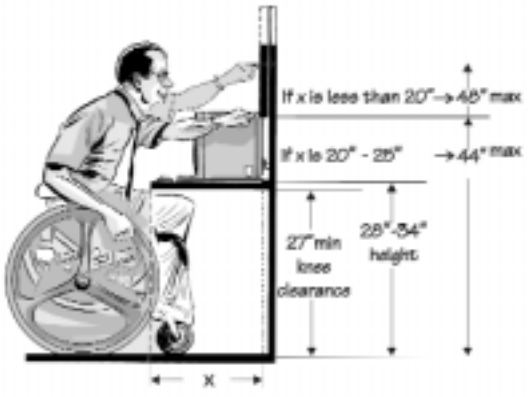
Rocker Switch



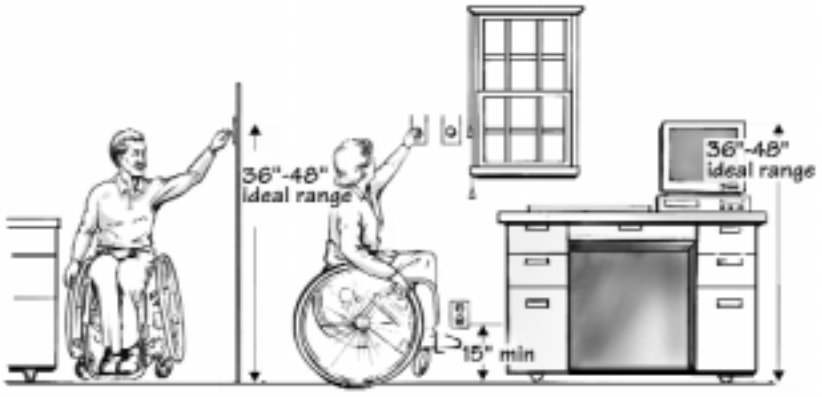
Lever handles

Reach Ranges

People with disabilities who are of short stature or who use wheelchairs cannot easily reach objects or controls placed higher than 48 inches above the floor. The most usable range is between 36 and 48 inches above the floor.



Forward Reach Range at Work Surface



Side Reach Range

Accessible Pay Telephone

Telephones

Public telephones should be mounted along an accessible route (not protruding) with the highest operable part (coin slot or keypad) no more than 48 inches above the floor. Clear floor space of at least 30 by 48 inches must be in front of the phone so that a person using a wheelchair can comfortably pull up to it.

At least one phone in each phone bank should have volume control for people who are hard-of-hearing. If public pay phones are made available, then a TTY for public use should also be available. Place signage at public phones to indicate the availability of volume controls and the location of the nearest TTY.

Water Fountains

Water fountains should be located along an accessible route and can be used by most people with disabilities, if the spout is no more than 36 inches above the floor.

The best type of water fountain for people who use wheelchairs is one that has at least 27 inches of clear space between the bottom of the apron and the floor. A high-low arrangement of water fountains is accessible to standing, seated or short individuals. Water fountains with automatic or lever-type handles are best because wheelchair users cannot use foot-operated controls. Installing a new lower water fountain may be more economical than relocating or modifying an existing installation.

Minimum Apron Clearance

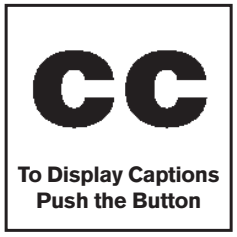
Maximum Spout Height

Hi-Low Fountains

Signage

Signs that designate permanent rooms and spaces such as restrooms, conference or meeting rooms and offices must be accessible. In general, accessible signs have raised letters and numerals, use sans serif type and braille. Typeface must be clear, with maximum contrasting colors. The surface of the sign should be well lit and have a matte or other non-glossy finish.

Signage is a much overlooked accessibility asset. It should be used to give people information and direct them to accessible routes and entrances, telephones, restrooms and emergency exits (especially when not all are accessible). Most people, including those who cannot read or do not know English, can understand pictographs and international symbols.



Readable Sign

Pictograph

Warning Signals

Emergency warning systems should produce signals that can be perceived by people who are blind or have low vision and those who are deaf or hard-of-hearing. Signals that are exclusively bells, buzzers, flashing lights or visual warning signs are useless to people who cannot hear or see them.

Many new electronic devices provide warning signals that are both audible and visible. If ringing bells are used, for example, to signal patrons and visitors of the start of a movie or performance, the arrival of transportation or the start of a demonstration, make sure to have some visual alert such as flashing lights.

Audible and Visible Signals

Ticket Offices and Information Booths

Ticket offices and information booths should be located on accessible routes and have a minimum clear space of 30 by 48 inches in front of the transaction window or counter. A 60 by 60 inch clear floor area is preferable so that someone using a wheelchair, scooter or walker can approach and turn around to leave rather than having to back away.

At least one counter and/or window should be a maximum of 36 inches above the floor with knee space that is at least 27 inches high and at least 36 inches wide so that a person who is seated or short can approach the transaction space. At this level a short or seated user can see and communicate easily with the person behind the counter. It will also allow the person to use the counter space to write checks or make transactions. If stanchions or other crowd-control devices are used to organize lines, be sure these are placed so that the path is at least 36 inches wide at all points.

Ticket Office Window

Information Counter

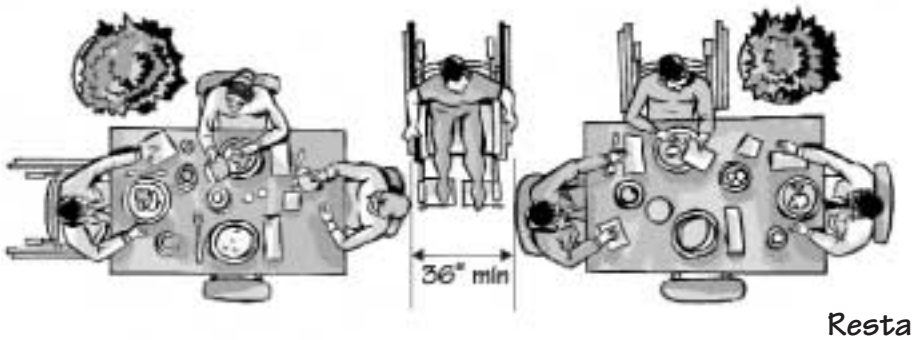
Locate ticket offices and information booths in areas that are acoustically protected so that patrons are able to hear the person selling tickets or providing information. These areas also should be well lit to allow patrons who have low vision to see seating charts, tickets, maps, brochures and receipts. Signage should be clear and legible with large simple fonts in high contrast colors.

Coatrooms

The counter at the coatroom should be no higher than 36 inches so that a short or seated person can easily pass heavy coats and bags to the attendant. If the coatroom is self-service, at least one rack or section of hangers and coat hooks should be no higher than 48 inches.

Concessions and Food Service

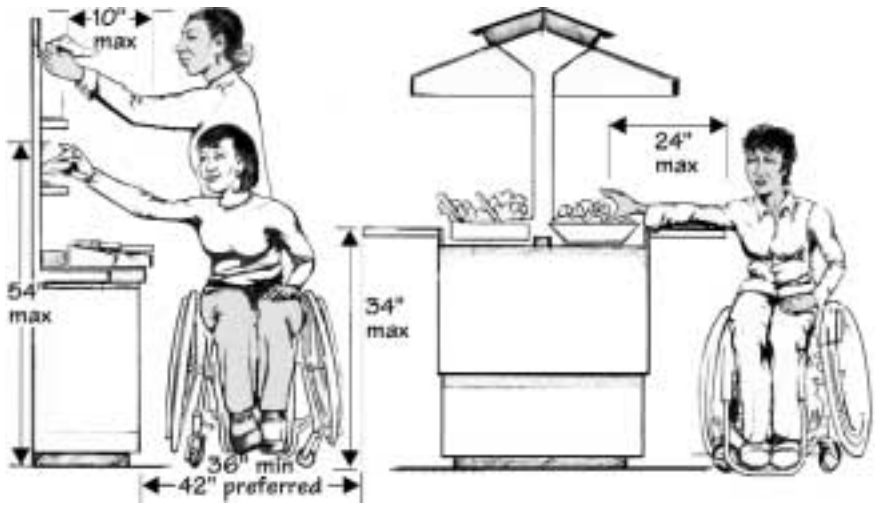
Seating for individuals who use wheelchairs or other mobility aids should be integrated and dispersed throughout restaurants, dining rooms, canteens and cafeterias. At least five percent of the tables must be accessible. Aisles and space between tables should be at least 36 inches wide to allow people to easily maneuver between the tables and chairs—even when people are seated at the tables.



Restaurant Seating

People using wheelchairs must be able to get their knees under the table. This requires clearance that is at least 27 inches high, 30 inches wide and 17 inches deep under accessible tables and counters. The tops of accessible tables and counters should be no higher than 34 inches above the floor.

Provide menus in accessible formats such as large print and braille, or prepare waiters to read the menu to diners who are blind, have low vision or difficulty reading text materials. People who are deaf or hard-of-hearing appreciate well lit and quiet dining areas.



Food Service Area

Gift Shop

Shops

Make gift shops accessible with good lighting, wide aisles and easy to reach items.

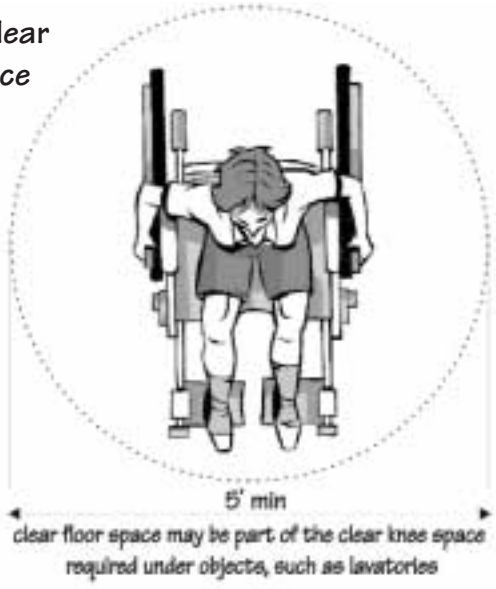
Keep aisles at least 36 inches wide. Placing displays and allowing merchandise to protrude into the aisles makes it difficult, uncomfortable and potentially unsafe for people with different mobility aids, as well as for those who are blind or have low vision, to maneuver around the shop. Train staff to assist customers in retrieving objects that are displayed out of reach and to read prices to those who cannot read text.

Make at least one cash register and counter accessible to people who are short or use a wheelchair. The counter top should be no more than 36 inches above the floor, at least 36 inches in length and placed along an accessible route.

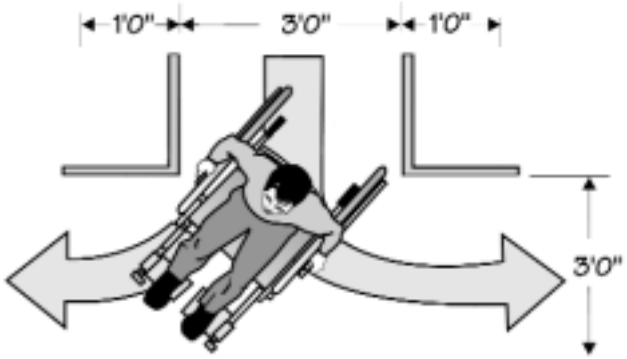
6. Restrooms

Accessible restroom facilities may have many different configurations. Single user restrooms are convenient for individuals who use power wheelchairs or scooters or who need assistance with personal care. These single-user (unisex) restrooms are also very useful for parents who need to assist children.

Circular Clear Floor Space

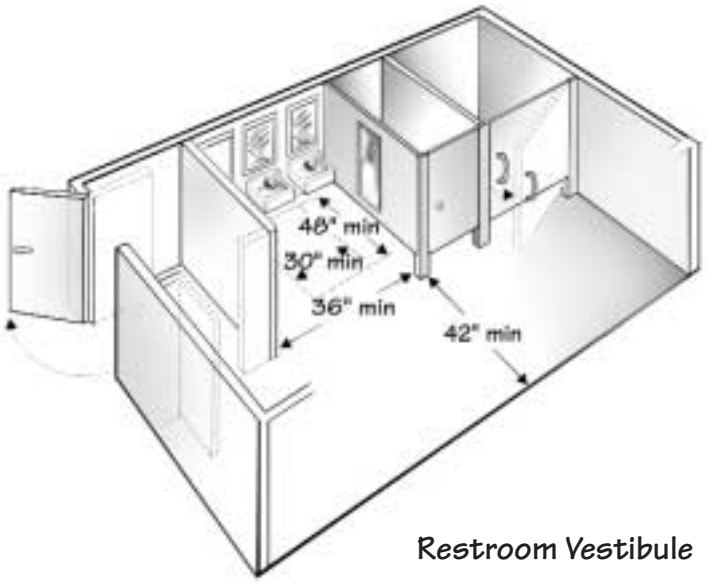


T-shaped Clear Floor Space



Restroom Signage, Doors and Vestibules

Signage at restrooms must have raised characters, braille and pictograms. Signs must be located on the wall at the latch side of the door whenever possible and be hung 60 inches from the center point of the sign to the floor. Signs should indicate whether the restroom is for men, women or unisex and whether the restroom is accessible. If the restroom is not accessible, signage must be provided that directs people to the nearest accessible restroom.



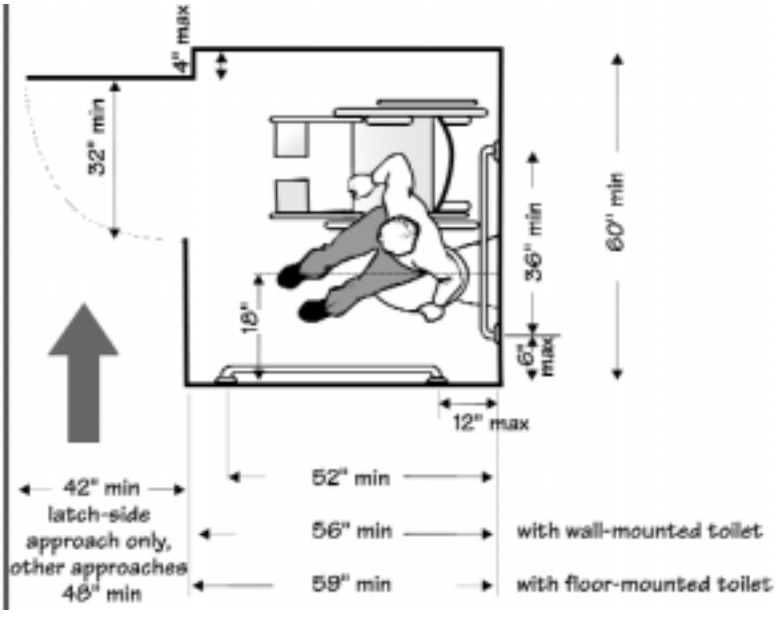
Restroom Vestibule

Doors to be used by people with disabilities must provide a 32-inch clear opening width when the door is in the open position. Some restrooms have a vestibule or an entrance that requires people to turn a sharp corner. These and double-door vestibules with limited maneuvering space can trap people who use mobility aids.

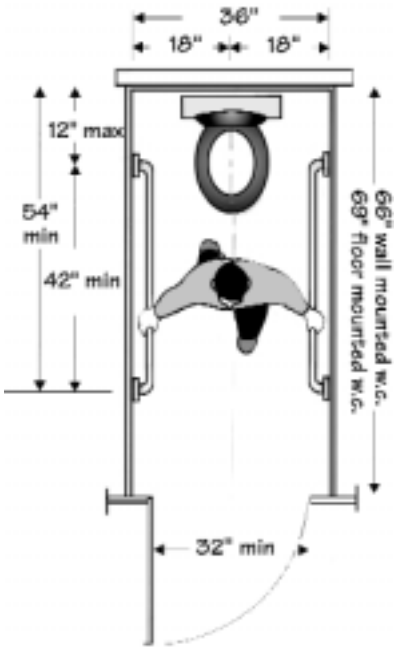
There must be at least 4 feet between the vestibule's second door in its open position and the face of the first door. Entrances that wrap or turn corners should be wide enough to allow a person using a scooter or larger power wheelchair to comfortably turn and maneuver into the restroom.

Toilet Stalls

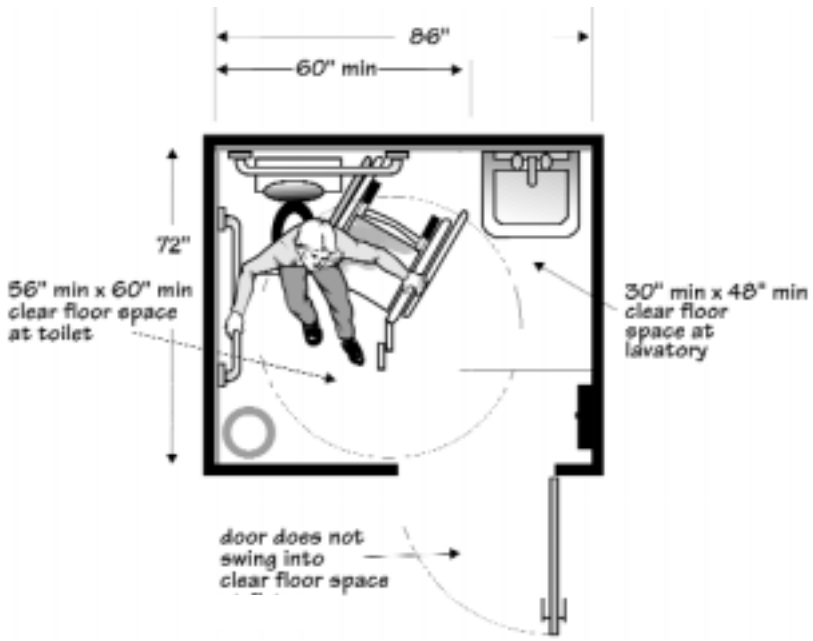
Every restroom should have at least one accessible stall that has a 60-inch diameter or T-turn clear floor space free of the door swing. The toilet should be located in the corner diagonally opposite from the door. This space configuration allows a wheelchair user to do a side transfer onto the toilet, and turn around inside the stall. Accessible toilet stalls must have doors that, when open, have a clear opening width of 32 inches. This usually means that the door itself will be at least 33 inches wide. Inside the stall there should be two 1 1/2 inch diameter grab bars mounted



Accessible Toilet Stall



te Toilet Stall



5 Foot wide Toilet Stall

horizontally, with a 42-inch bar on the near wall and another 36-inch bar on the rear wall, both at a height of 33 inches above the floor. The space between the grab bars and the wall should be exactly 1 1/2 inches wide. The top of the toilet seat in the down position should be between 17 and 19 inches from the floor.

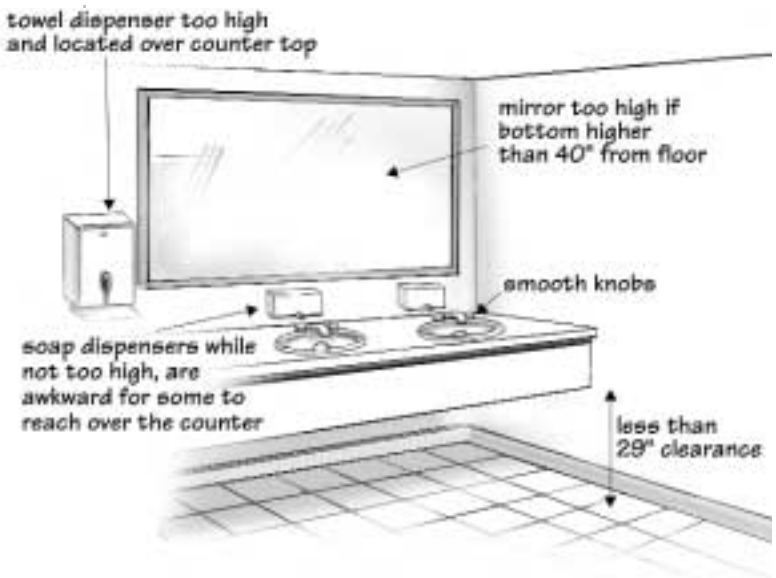
Toilet paper dispensers should allow for a continuous flow of paper and be located in a position below the grab bars that is easy to reach while seated at the toilet. Recessed dispensers are preferred but not required. Stall doors should have locks and handles that can be operated easily with a closed fist. Coat hooks, dispensers and trash receptacles should be located within reach range no lower than 15 inches and no higher than 48 inches from the floor.

Lavatories, Mirrors, Soap and Towel Dispensers

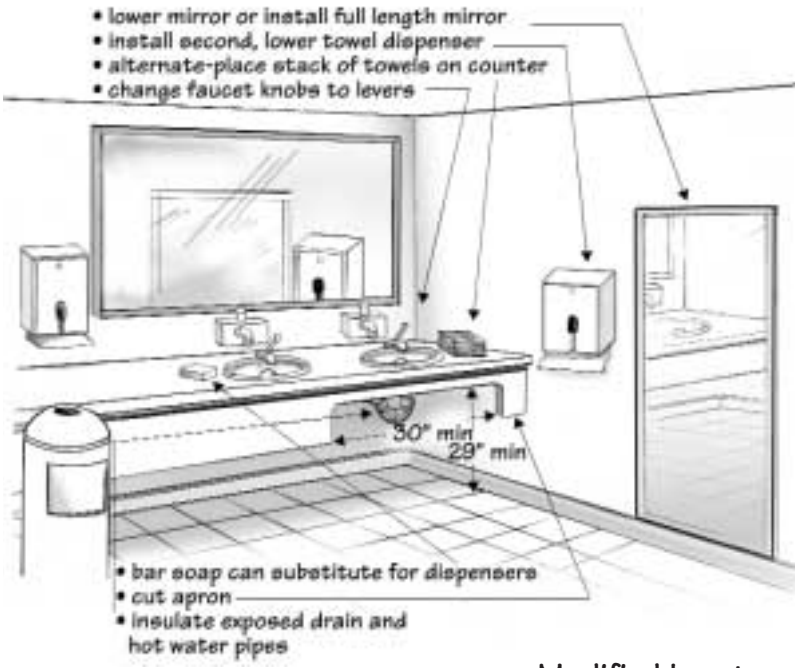
Lavatories used by people with disabilities must have at least 29 inches of clearance between the bottom edge of the apron front and the floor. The faucets should be automatic or have handles that can be operated without grasping and twisting. Levers and push buttons (the kind that require light pressure and leave the water running for a while) are generally preferred. Pipes under the lavatory must be insulated to protect people who have no sensation in their legs from burning.

Mirrors must have bottom-reflecting edges no more than 40 inches above the floor. Dispensers and trash receptacles should have the highest operable part no more than 48 inches above the floor. Do not locate them so the wheelchair approach is obstructed. Following are some suggestions for modifications:

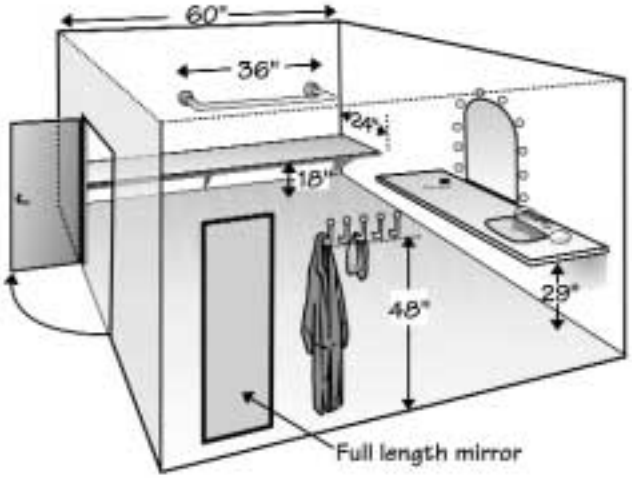
- Cut lavatory aprons to provide necessary knee clearances.
- If dispensers and mirrors are too high, it is often easier to mount a new dispenser nearby and install a full-length mirror on another wall than to relocate the existing ones.
- If towel and soap dispensers are too high, place towels and soap on the lavatory counter or on a shelf or table within reach of seated or short people. Remember, however that doing this requires daily maintenance.
- Replace round faucet knobs with automatic controls or with lever handles that can be operated with a closed fist.



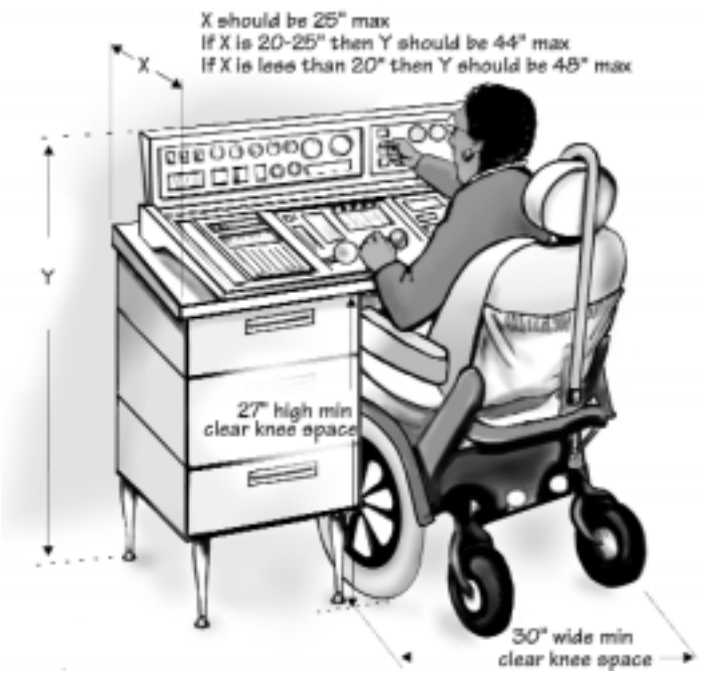
Problem at Lavatories



Modified Lavatory



Work Areas - Dressing Room



Work Areas - Control Booth

7. Work Areas

Be prepared to provide reasonable accommodations to make work areas accessible to staff, board members, panelists, volunteers, performers, technicians and others with disabilities. Work areas should be clear of protruding objects. Aisles and passageways should be kept unobstructed, well lit and safe for individuals who are blind or have low vision. A person who uses a wheelchair or other mobility aid should be able to get comfortably into and out of work areas and be able to use and reach workstations, operate equipment, use the restrooms and take advantage of break rooms, lounges and cafeterias.

RESOURCES

Universal Design

The Center for Universal Design

The center is a national research, information and technical assistance center that evaluates, develops and promotes universal design.

Center for Universal Design
North Carolina State University
School of Design
Box 8613
Raleigh, NC 27695-8613
(919) 515-3082 voice/TTY
(919) 515-3023 fax
(800) 647-6777 voice
cud@ncsu.edu
www.design.ncsu.edu/cud/index.html

"Global Universal Design Educators Monthly On-Line News"

A monthly on-line newsletter that highlights projects related to universal design around the world, and the efforts of designers and educators who are involved in the practice of universal design.

Adaptive Environments Center, Inc.
374 Congress Street, Suite 301
Boston, MA 02210
(617) 695-1225 voice/TTY
(617) 482-8099 fax
adaptive@adaptenv.org
www.adaptenv.org/global

Center for Inclusive Design & Environmental Access

IDEA provides resources and technical expertise in architecture, product design, facilities management and the social and behavioral sciences. They offer "Universal Design Education On-Line" and "Unlimited by Design" a traveling exhibit originally developed by the Cooper Hewitt National Design Museum/ Smithsonian Institution in 1999.

School of Architecture and Planning - University at Buffalo
Center for Inclusive Design & Environmental Access
Buffalo, NY 14214-3087
(716) 829-3485 ext 329 voice
(877) 237-4219 ext 336 TTY
(716) 829-3861 fax
IDEA@ap.buffalo.edu
www.ap.buffalo.edu/idea/

Surveys and Checklists for Accessibility

"Readily Achievable Checklist: A Survey for Accessibility"
An easy-to-use survey tool, based on the ADAAG, to help owners and managers of public accommodations identify barriers in facilities.
Adaptive Environments Center, Inc.
374 Congress Street, Suite 301
Boston, MA 02210
(617) 695-1225 voice/TTY
(617) 482-8099 fax
adaptive@adaptenv.org
www.adaptenv.org

"ADA Compliance Guidebook: A Checklist for Your Building"
This guide is a reference document and workbook for surveying buildings and facilities for accessibility.
Building Owners and Managers Association International
1201 New York Avenue, NW, Suite 300
Washington, DC 20005
(202) 408-2662 voice
(202) 371-0181 fax
www.boma.org/pubs/guide.htm

"Checklist For Buildings And Facilities"
This checklist was prepared by the Access Board to assist individuals and entities with Title II and Title III of the Americans with Disabilities Act (ADA) in applying the requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) to buildings and facilities subject to the law.
Access Board
1331 F Street, NW, Suite 1000
Washington, DC 20004-1111
(202) 272-5434 voice
(202) 272-5449 TTY
(202) 272-5447 fax
(800) 872-2253 voice
(800) 993-2822 TTY
info@access-board.gov
www.access-board.gov/adaag/checklist/a16.html