

# PORTFOLIO 1

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**“Universal design is a leading-edge design concept that strives to accommodate human functional diversity and the future changes in how people perform their activities of daily living.(Mack, Susan)”**

As a practice, universal design has its roots in 1947, when an 11 year old named **Marc Harrison** suffered a traumatic brain injury that required extensive therapy to help him re-learn basic functions. This event inspired Harrison, and as someone who had experienced a term of reduced physical ability, he received an MFA in industrial design, and began working to merge aesthetic and functional design considerations in a way that hadn't been previously considered. Harrison is the person directly responsible for the design of the Cuisinart food processor, and up until his passing in 1998, continued to work on a project known as the Universal Kitchen, meant to improve the functionality of the kitchen space to reduce the amounts of bending, reaching, and twisting that is required by traditional designs. Harrison is considered to be the principal figure in the birth of modern universal design.

# UNIVERSAL DESIGN

## Definitions

Inclusive Design is sometimes used interchangeably with two other terms, Universal Design and Design for All. All three have a similar purpose but have different origins and are used in various parts of the world.

### Inclusive Design

Defined in 2000 by the UK Government as "products, services and environments that include the needs of the widest number of consumers". It has a history stretching back to the social ideals in Europe that materialised after World War II. These include healthcare and housing for everyone. Inclusive Design is used within Europe and goes beyond older and disabled people to focus on other excluded groups to deliver mainstream solutions.

### Universal Design

This term originated in the USA and is now adopted by Japan and the Pacific Rim. It started with a strong focus on disability and the built environment. Driven by the large number of disabled Vietnam War veterans, it was modelled on the Civil Rights Movement that promised "full and equal enjoyment ... of goods and services". It has been a driving force in establishing American legislation regarding older and disabled people.

### Design For All

Closely related to Inclusive Design, Design for All started by looking at barrier-free accessibility for people with disabilities but has become a strategy for mainstream, inclusive solutions. As highlighted by the European Commission, it is about ensuring that environments, products, services and interfaces work for people of all ages and abilities in different situations and under various circumstances. This term is used in continental Europe and Scandinavia. There are other terms that are sometimes used with varying relevance to Inclusive Design. A few include Co-design, People-centred Design, User-focused Design and Transgenerational Design. Please see the Glossary for further information.

<http://www.inclusivedesign.no/practical-tools/definitions-article56-127.html>

### CASE STUDIES

<http://www.inclusivedesign.no/furniture-and-interior/category263.html>

# SUSTAINABILITY IN UNIVERSAL DESIGN

There is a confluence of factors generating the need for systemic change that will lead to more universally designed products, environments, and amenities within a context of socially, environmentally, and economically sustainable design. The growing passion for environmental sustainability in design education must be incorporated with social and economic issues and knowledge of the global community

Another private-sector strategy to develop a certification and rating process for universal design of both buildings and practitioners, following the model of LEED for sustainable design, is currently underway. The Global Universal Design Commission has been working on standards for UD, using a consensus model with design professionals.

Universal design requires integration as a process within the sustainable design framework and mainstream design thinking.

This is the major shift from the approach of designing for people with disabilities as a separate, specialized population. The challenge is for everyone to create sustainable communities in which people and the environment are protected.

An interest in preserving quality of life during old age is increasingly driving decisions of all kinds. Also, economic forces are demanding higher standards of usefulness. Sustainability (eliminating waste) and better information are making performance more important in purchasing decisions by individuals and organizations.



# Views from Disabled People



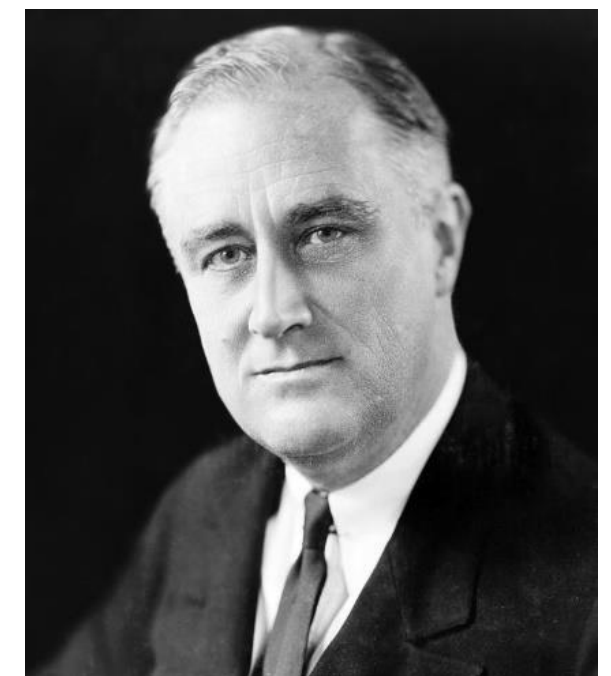
**Stephen Hawking** was a very well-known scientist. He struggled with motor abilities, speech, and everyday tasks. Hawking was given two to three years to live after he was first diagnosed at the age of twenty one. He feels lucky to have surpassed that guesstimate by many years. Although he has difficulty with communication, he believes it has happened him become a better scientist. He admits that when he falls behind in conversations, he is able to think about physics and focus on research. Although society might not recognize it, Hawking has been able to truly see that his studies are no handicap for his disability.

“If one is disabled, one should concentrate on the things one can do and not regret the things one can’t do.” -Hawking

“We are more disabled by the society we live in than by our bodies and our diagnoses.” -Young



**Stella Young** was a comedian, writer, and disability rights activist. She passed away at the age of 32 but was known for her outlook on what it is actually like to be disabled. She admitted that there were the everyday struggles, but that it was nothing to be given an achievement award for; such as something as simple as getting out of bed or remembering your own name. She describes it in the sense that people without disabilities view the disabled as “object of inspiration”. They see the tasks that disabled people have to overcome and it inspires nondisabled people to achieve more and work harder. She brings to a point that people have been taught to believe that being disabled is a bad thing; however, she does not think it is bad or that it makes someone exceptional. The way that she sees people with challenges is that they are living their lives and using their bodies to the best of their capabilities just like everyone else.



“The only limit to our realization of tomorrow will be our doubts of today.” -Roosevelt

# TYPES OF PHYSICAL IMPAIRMENTS

## Auditory Impairment

- hearing loss is the most prevalent and fastest growing sensory related chronic disability in North America
- Within Barrier Free design ideology, a barrier is defined as anything that prevents a person with a disability from fully participating in all aspects of society because of his or her disability, including physical, architectural, informational, communication, attitudinal, and technological barriers, policies or practices (Accessibility for Ontarians with Disabilities Act, 2005)
- “no right-angled walls or sharp turns, since people can’t see or hear people coming around corners. Instead corners are curved” (Natarajan). The placement of windows was also very important. In this building “windows are located so they produce diffused light, not glaring light...so that students can see what is being signed”
- wide entryways that allow signers more room to gesture and the automatic doors that don’t require anyone to stop mid-phrase to grab a handle
- (Deaf homeowners often cut holes in walls to communicate between rooms.)
- Blue wall color contrasts with flesh tones, making gestures easy to see; **2)** Furniture in dorm common space is easily rearranged for student groups to see one another; **3)** Pedestal surface provides a place to put down bags and hand-held items, freeing a speaker to sign; **4)** Sloping walkway replaces stairs, which tend to draw the eye away from a signing companion. Photograph courtesy of Gallaudet University.

## Visual Impairments

- Fourteen individual design typologies were identified by the research as impacting how a visually impaired user perceives interior space. These fourteen design “problems” were able to be categorized into four groups: luminance contrast, value contrast, object placement, and luminance placement. Typologies in the luminance contrast group relate to the types of glare created by a bright source or task relative to its background. Value contrast was found to be most pervasive,
- Many people who are legally blind actually have some vision. Bright colors, wall murals, and changes in illumination can help persons whose vision is limited. Tactile cues, including different floor and sidewalk textures as well as changes in heat and sound, can provide landmarks for persons who cannot see.
- Multisensory wayfinding cues that let the children identify that they’ve arrived at their cluster, classroom or playground door. Acoustics, lighting, floor pattern, color palette and texture all change with each destination.

## Mobile Impairments

- Creating temporary/portable ramps
- Hallways ideally 48” wide
- Avoid shag pile carpet
- Drawers and cabinets should come with pull out options
- Railings in bathrooms
- Minimalist designs



## Social Statistics of Individuals with Disabilities

- 41% of people with arthritis are forced to limit their physical activity, making it the leading cause of disability in the US- Which limits motor skills, and at times, a person's ability to engage outside of the home.

- On average, most of the decrease in paid work time is offset by more time spent on leisure activities and sleeping, which is likely due to these being default activities for individuals whose medical issues and environment constrain them from participating in other activities.

### Time Spent in the Home:

A large percentage of the elderly and people with a disability do not have the means to transport themselves, creating a dilemma where they rely on public transportation or carpools. This impairment results in a higher portion of the day spent in the home

"Nondrivers with disabilities were remarkably reliant on the car—and even more so if we add taxi use to the mix. Over 86 percent of nondrivers were passengers in a car, 16 percent rode in a car- or vanpool, and almost 22 percent used a regular taxi during the previous month."- *Sandra Rosenbloom* "The Future of Disability in America"

### Current Issues With the Home Environment:

- People with activity limitation seem more likely to experience problems associated with housing deprivation (e.g. no bath or shower in the dwelling, a leaking roof or the dwelling being too dark)
  - 14 % of people with activity limitation reported not being able to heat their home properly, 3 % said they had no bath or shower in their home, and 3 % had no indoor flushing toilet.
  - 8 % of people with activity limitation in the EU 28 felt their home was too dark, compared to only 5 % of those without activity limitation

## Color and Light Affecting Mood and Behavior:

"Passive pink" -calming manic and psychotic juveniles:

Children under detention that became violent at a county probation department are put in an 8x4 cell with bubble gum pink walls. Children tend to relax, stop yelling, and often fall asleep 10 minutes later.

"It seems clear that light is the most important environmental input, after food, in controlling bodily function," reported Richard J. Wurtman, a nutritionist at the Massachusetts Institute of Technology. Several experiments have shown that different colors affect blood pressure, pulse and respiration rates as well as brain activity and biorhythms. As a result, colors are now used in the treatment of a variety of diseases."

All signs point to blue as the most soothing and "healthiest" color.



Delos WELL Building Standard and Universal Design

*“We believe that buildings should be developed with people's health and wellness at the center of design.”*

## AIR

Optimize and achieve indoor air quality.

## WATER

Optimize water quality while promoting accessibility.

## NOURISHMENT

Encourage healthy eating habits by providing occupants with healthier food choices, behavioral cues, and knowledge about nutrient quality.

## LIGHT

Minimize disruption to the body's circadian rhythm.

## FITNESS

Utilize building design technologies and knowledge-based strategies to encourage physical activity.

## COMFORT

Create an indoor environment that is distraction-free, productive, and soothing.

## MIND

Support mental and emotional health.

## Doors, Windows and Hallways, Universal Design Tips

1. Have a covered outdoor entryway.



2. Allow space for a future ramp.
3. Minimize the front threshold.
4. Make sure that there is at least one step-free entry into the home with easy access to the driveway
5. Install 3'-0" wide doors with lever door knobs throughout the house.
6. Do not block doorways.
7. Consider a 3'-0" out-swinging or 6'-0" sliding glass exterior door in a downstairs Accessible Guest Suite for easy emergency medical support access.
8. Consider 3'-0" pocketing doors or 6'-0" bi-pass doors on closets.
9. Make all Hallways a minimum of 5'-0" wide and use the extra space for bookshelves, a computer desk, or display furniture until a time when you need the additional access space.
10. Make sure that windows are easy to open and easy to lock.
11. Install towel bars that are rated as pull bars.
12. Install 48" high robe hook and towel bars near the shower.
13. Consider towel bars that are also grab bars.
14. Install a shower curtain rod or create an open shower area. Avoid tight glass shower enclosures.
15. Create a shower without a step.
16. Install a comfortable seat in the shower.
17. Install soap and shampoo niches near the shower seat.
18. Install a hand held shower that mounts on a slide bar.
19. Consider installing a blow drying machine to dry your entire body.
20. Check the size of a step in bath tub with the door that closes after you enter the tub. Many people do not like having to sit in the tub while it fills and then again while it drains.
21. Add an instant hot water heater by your bathroom.
22. Install lever faucets at sinks with pull out sprayers.

23. Consider a heat lamp if you chill easily.

24. Consider radiant floors for heat

25. Add a large linen closet with a 3'-0" wide door in the bathroom for large towels and personal products.

## First Floor Guest Suite, Universal Design

1. If you sleep upstairs, design a first floor Guest Suite large enough for a full size bed, large chair and dresser with a minimum of 4'-0" clear on all sides and 5'-0" clear on the closet side, exit door side and direct access to a 3 foot wide pocketing bathroom door.
2. The bathroom with this suite should be accessible.
3. The entrance to this bedroom should be easily accessible for medical personnel.

## Bathrooms, Universal Design

1. Have the Builder put wood bracing behind the drywall and tile in



*Aging In Place and Universal Design Solutions for Homes*

2. the bathroom walls for future grab bar locations.
3. On the first floor, have a roll-in curbless shower without a step or lip (slope floor to drain in at least one bathroom).
4. This shower should be a minimum of 5'-0" wide by 4'-0" deep.
5. This shower could be located near a Guest Suite or used as the Pool Bath.
6. Consider multiple shower heads.



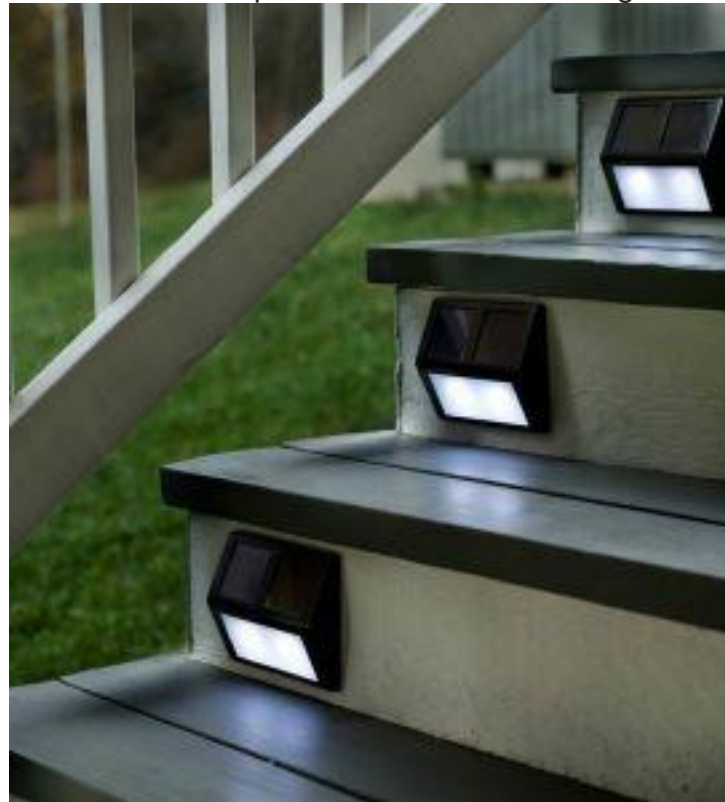
7. Have a hand held shower head mounted on a slide bar, with a separate valve to control it from a seated position.
8. Install lever faucets in this bathroom and an adjustable handheld shower head. Do the closed fist test, by seeing if you can turn the water on and off with a closed fist.
9. Provide a toilet in the same bathroom with a 3'-0" clear empty space next to it for transferring.
10. Install comfort level toilets.
11. Install a bidet if you have space.
12. Consider a water wand at the toilet if there is no room for a bidet.

9. If you need to walk through a Laundry Room to access the garage, make sure that it is large enough for both a wheelchair to turn around in and clothes hampers on the floor.

## Lighting and Electrical, Universal Design

### Floors, Steps and Stairs, Universal Design

1. Select slip-resistant flooring that is comfortable.



2. Limit stairs. Design stairs wide enough to fit a future chair lift.
3. Consider building a 5 x 5 closet on the first floor with a 5 x 5 closet above, for a future elevator.
4. Minimize changes in floor level throughout the home and outdoor spaces.
5. Anywhere that there is a step-down, select two different colors of flooring material.
6. Minimize any step down to the garage. Provide enough clear floor space for a future ramp.
7. Make sure that there is adequate space in the garage to maneuver a wheelchair with an assistant around a parked vehicle.
8. Add extra lighting to the Garage for maximum visibility.



1. Automate Lighting Systems.
2. Maximize natural light.
3. Locate extra security system and lighting controls in the rooms where you plan to spend most of your time.
4. Install adequate lighting throughout the home for safety and visibility.
5. Locate electrical service boxes, security boxes, main water disconnect valve and any system controls that you might need to access in an emergency, where they can be comfortably reached from a sitting position. 42" to 48" off of the floor.
6. Make sure that the thermostat is not higher than 48" off the floor.
7. Make sure that electrical outlets are 18" to 24" off of the floor.
8. Make sure that all switches are easy to reach from a seated position.
9. Consider easy touch lighting and electrical switches.
10. Install task lighting in all areas.
11. Make sure that kitchen some electrical outlets can be reached from a seated position.
12. install flood lights on all corners of the outside of the house. Have them on timers.

## Kitchen & Laundry, Universal Design



1. Create work areas in the kitchen.
2. Install pull out racks and drawers in base cabinets.
3. Keep everyday storage at waist level.
4. Install dishwasher drawers.
5. Add a 9" high kick plate under a standard size dishwasher.
6. Install a Microwave drawer.
7. Add under counter safety lighting.
8. Bring outlets to the front of the cabinets for easy reach.
9. Leave a minimum of 48" clearance between surfaces in kitchen aisles.

10. Buy a front-loading washer and dryer set and mount them on a



pedestal.

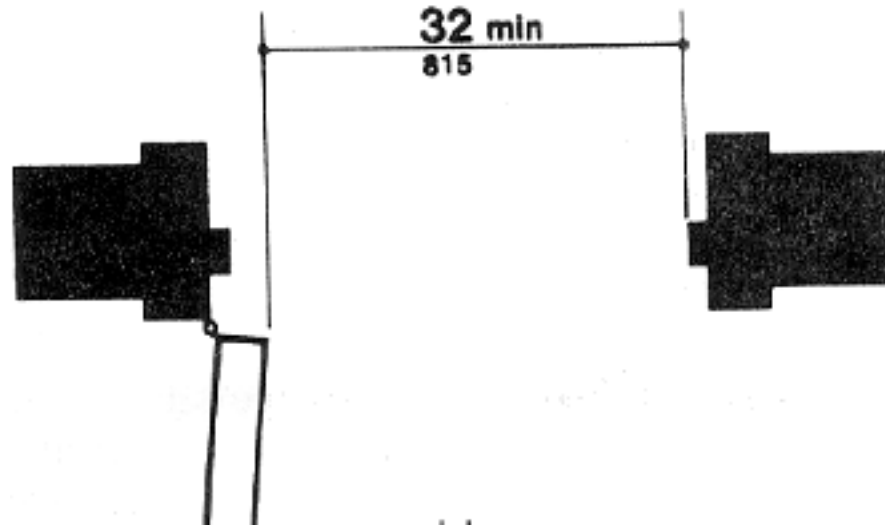
11. Consider an adjustable height sink that raises and lowers at the push of a button.
12. Consider an adjustable height range that raises and lowers at the push of a button.
13. Buy a side by side refrigerator freezer.
14. Provide a pull out shelf below a wall oven door
15. Use "D" shape cabinet pull handles.
16. Have multi-level countertops for different tasks.
17. Use light colored countertops to make items easier to see.
18. Use easy slide and close drawers.
19. Use a 3'-0" pocket door on the pantry.
20. Mount wall ovens at a height where they can be reached from a seated position.
21. Add an instant hot water faucet at the sink.
22. Install a pull out flexible faucet at the kitchen sink and laundry sink.
23. Select lever faucets.
24. Locate the faucets to the side of the sink for easier reach.
25. Put lockable caster wheels on a kitchen island for flexible space.

# Designing for Accessibility

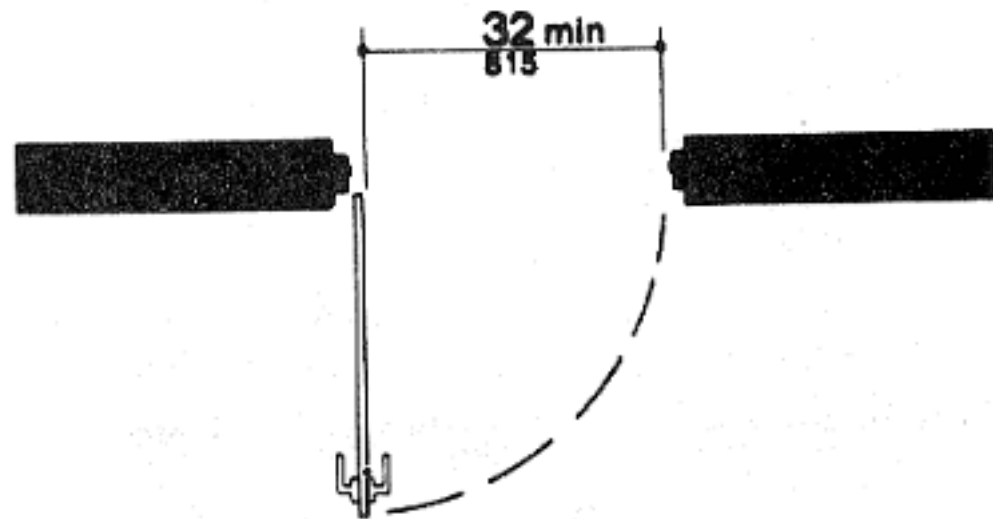
## ADA passageways/doors

**4.13.5 Clear Width.** Doorways shall have a minimum clear opening of 32 in (815 mm) with the door open 90 degrees, measured between the face of the door and the opposite stop (see Fig. 24(a), (b), (c), and (d)). Openings more than 24 in (610 mm) in depth shall comply with **4.2.1** and **4.3.3** (see Fig. 24(e)).

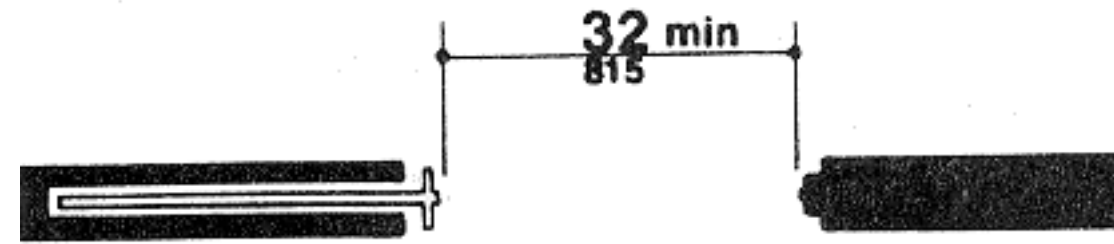
EXCEPTION: Doors not requiring full user passage, such as shallow closets, may have the clear opening reduced to 20 in (510 mm) minimum.



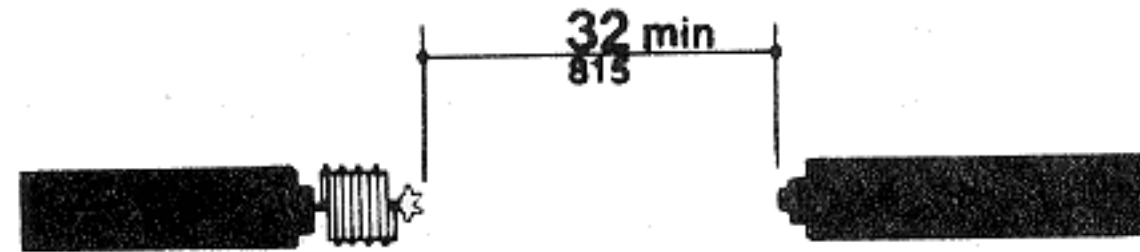
**Figure 24a**  
Clear Doorway Width and Depth Detail



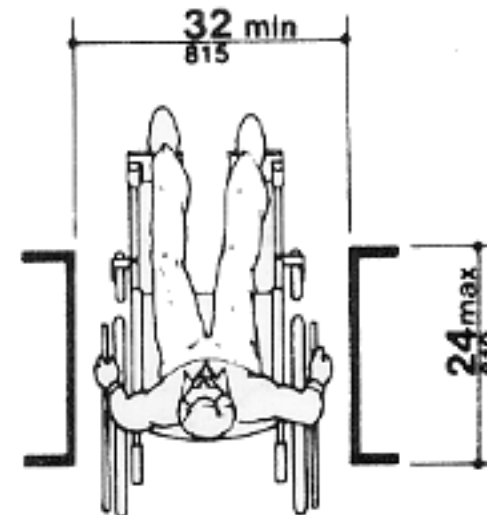
**Figure 24b**  
Clear Doorway Width and Depth  
Hinged Door



**Figure 24c**  
Clear Doorway Width and Depth  
Sliding Door



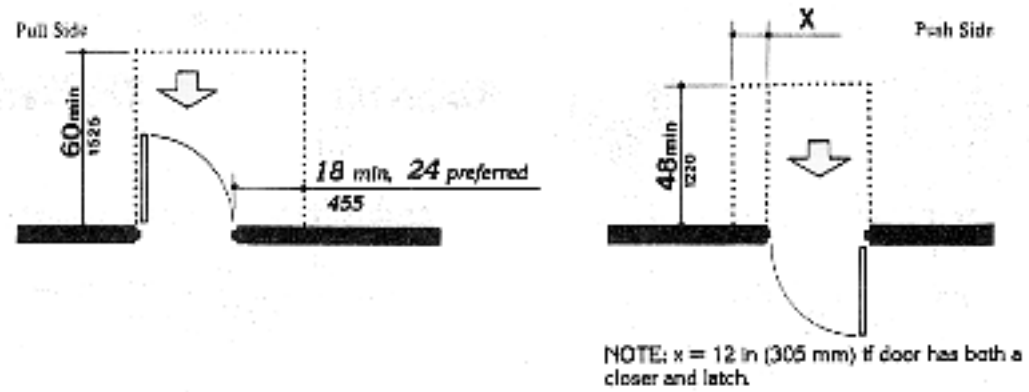
**Figure 24d**  
Clear Doorway Width and Depth  
Folding Door



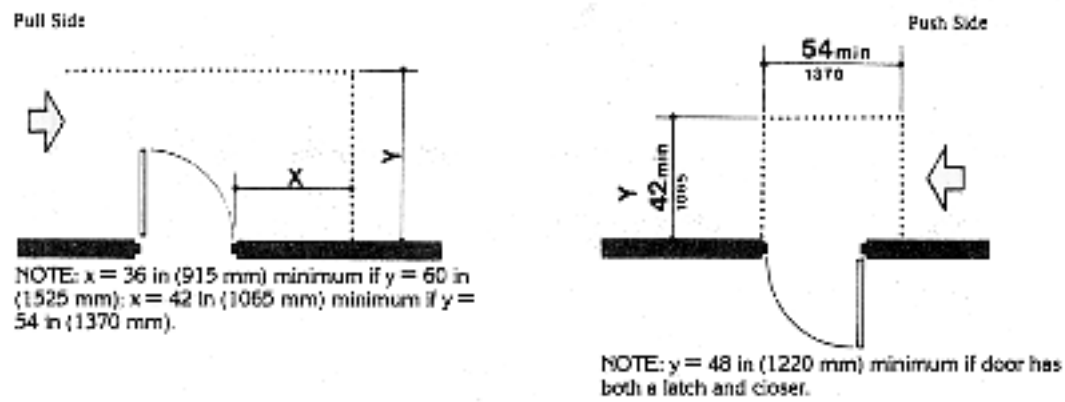
**Figure 24e**  
Clear Doorway Width and Depth  
Maximum Doorway Depth

**4.13.6 Maneuvering Clearances at Doors.** Minimum maneuvering clearances at doors that are not automatic or power-assisted shall be as shown in Fig. 25. The floor or ground area within the required clearances shall be level and clear.

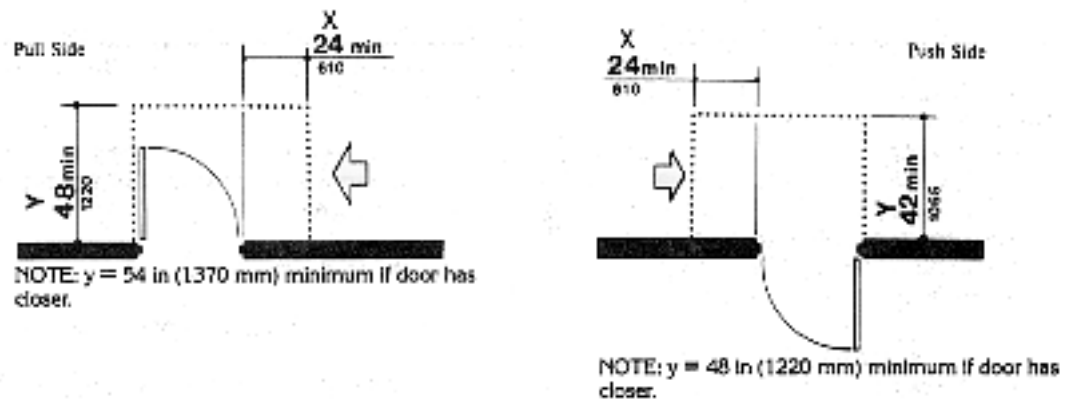
EXCEPTION: Entry doors to acute care hospital bedrooms for in-patients shall be exempted from the requirement for space at the latch side of the door (see dimension "x" in Fig. 25) if the door is at least 44 in (1120 mm) wide.



(b) Front Approaches — Swinging Doors



(b) Hinge Side Approaches — Swinging Doors



(c) Latch Side Approaches — Swinging Doors

NOTE: All doors in alcoves shall comply with the clearances for front approaches.

Figure 25

**Maneuvering Clearances at Doors**

**4.13.7 Two Doors in Series.** The minimum space between two hinged or pivoted doors in series shall be 48 in (1220 mm) plus the width of any door swinging into the space. Doors in series shall swing either in the same direction or away from the space between the doors (see Fig. 26).

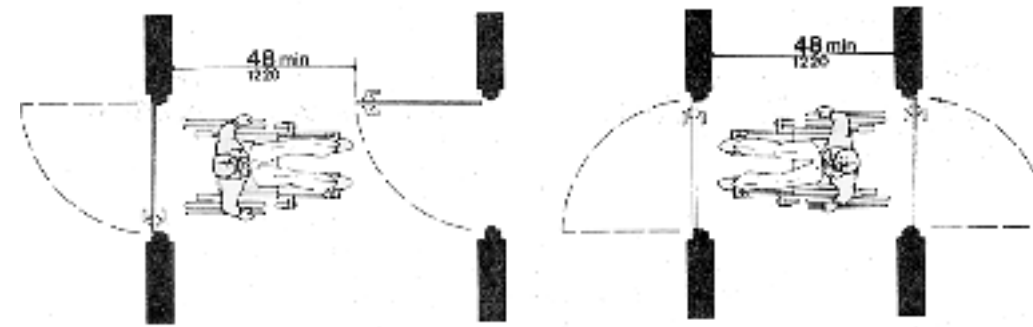


Figure 26

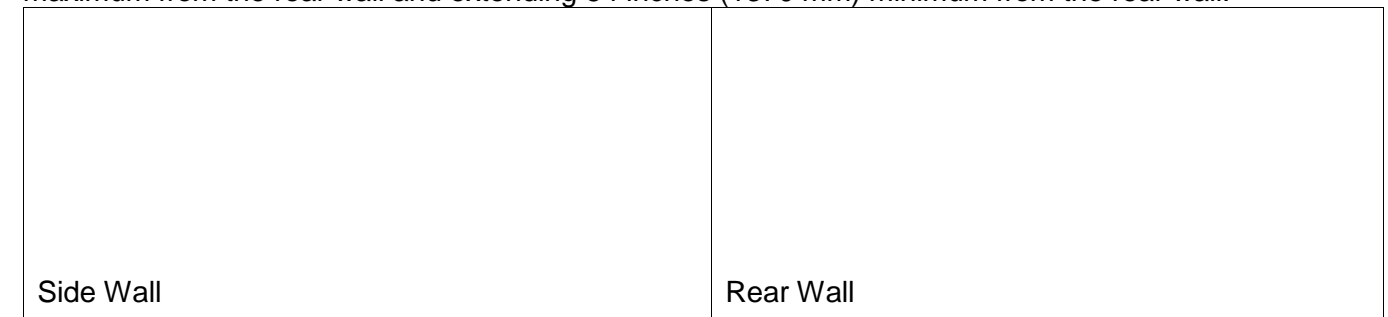
**Two Hinged Doors in Series**

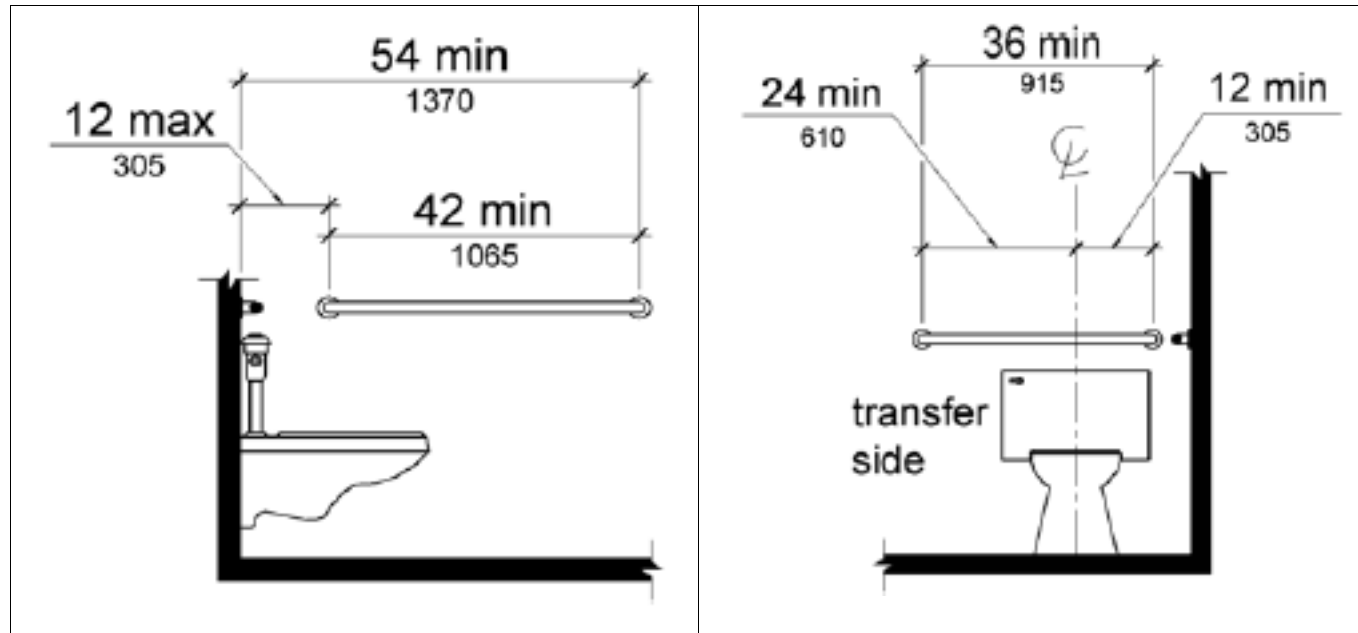
**4.13.9\* Door Hardware.** Handles, pulls, latches, locks, and other operating devices on accessible doors shall have a shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist to operate. Lever-operated mechanisms, push-type mechanisms, and U-shaped handles are acceptable designs. When sliding doors are fully open, operating hardware shall be exposed and usable from both sides. Hardware required for accessible door passage shall be mounted no higher than 48 in (1220 mm) above finished floor.

**ADA Baths**

Grab Bars in Toilet Stall Requirements:

**Side Wall** - The side wall grab bar shall be 42 inches (1065 mm) long minimum, located 12 inches (305 mm) maximum from the rear wall and extending 54 inches (1370 mm) minimum from the rear wall.

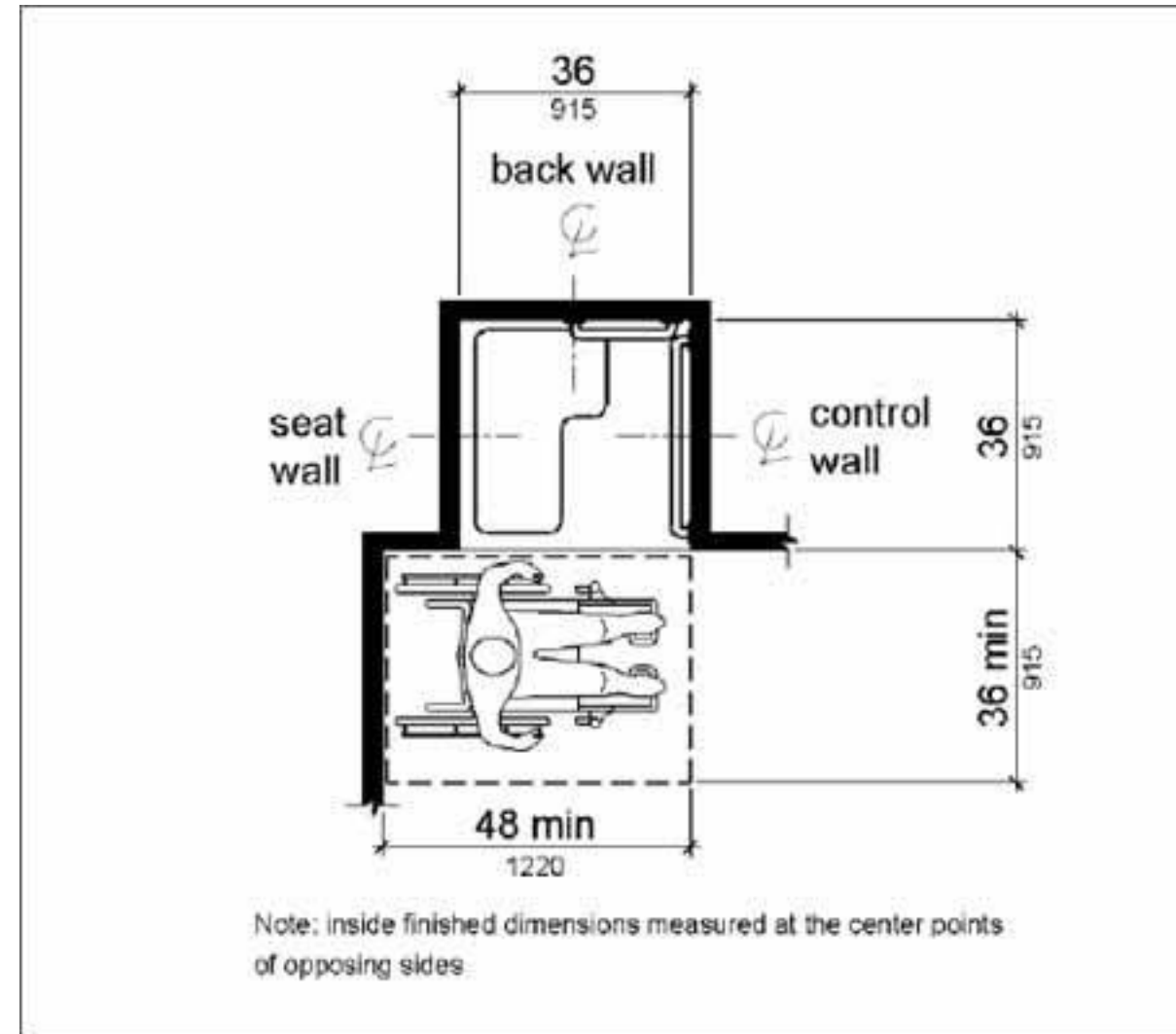




**Rear Wall** - The rear wall grab bar shall be 36 inches (915 mm) long minimum and extend from the centerline of the water closet 12 inches (305 mm) minimum on one side and 24 inches (610 mm) minimum on the other side.

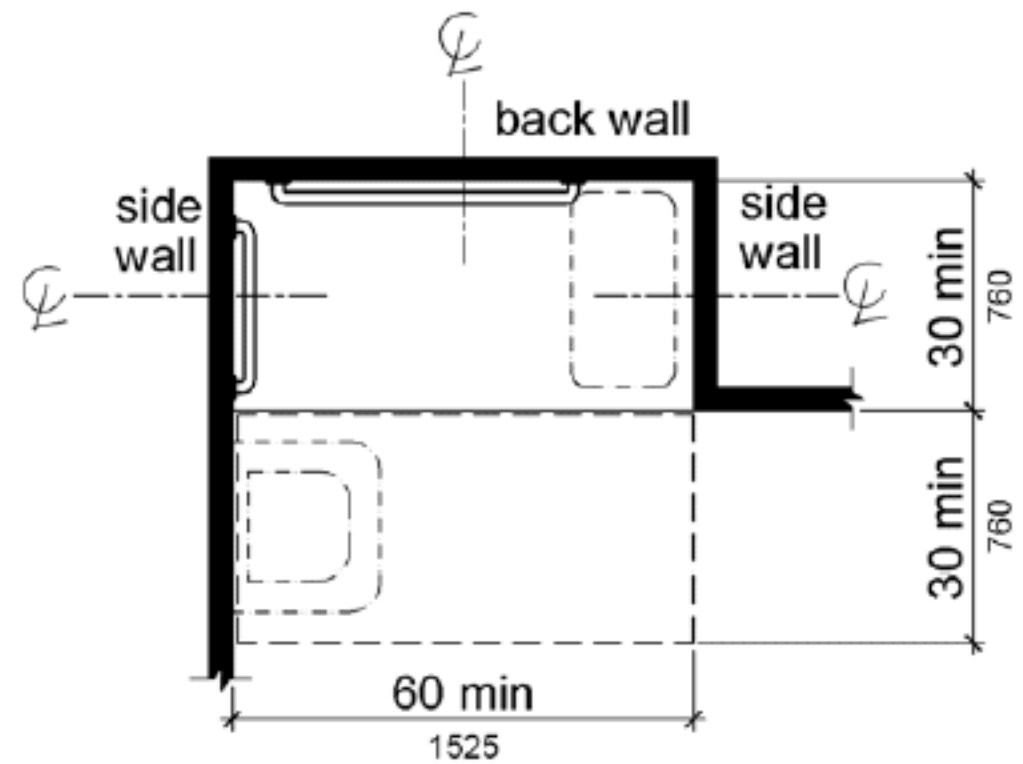
EXCEPTIONS: 1. The rear grab bar shall be permitted to be 24 inches (610 mm) long minimum, centered on the water closet, where wall space does not permit a length of 36 inches (915 mm) minimum due to the location of a recessed fixture adjacent to the water closet.

Grab Bars in Shower Stall Requirements



**Standard Roll-In Type Shower Compartments** - Standard roll-in type shower compartments shall be 30 inches (760 mm) wide minimum by 60 inches (1525 mm) deep minimum clear inside dimensions measured at center points of opposing sides and shall have a 60 inches (1525 mm) wide minimum entry on the face of the shower compartment.

608.2.2.1 Clearance. A 30 inch (760 mm) wide minimum by 60 inch (1525 mm) long minimum clearance shall be provided adjacent to the open face of the shower compartment.



Note: inside finished dimensions measured at the center points of opposing sides

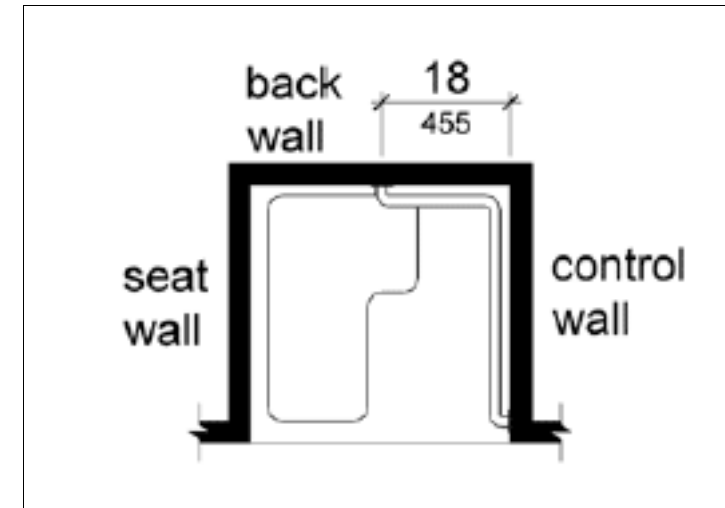
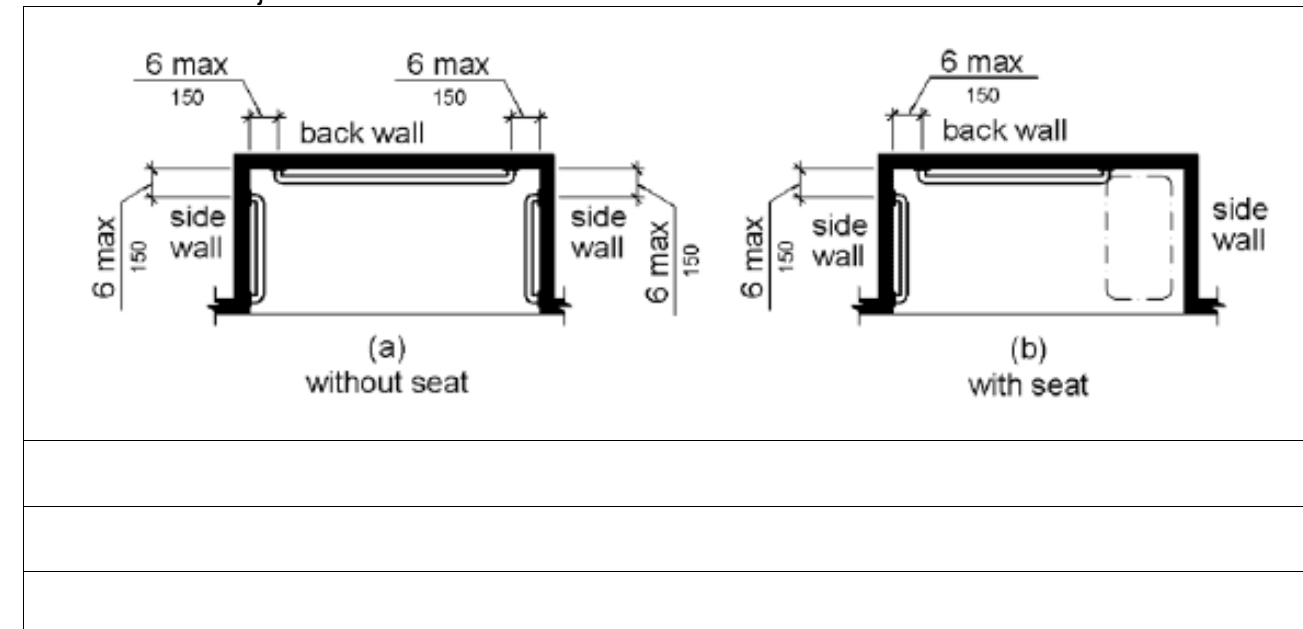


Figure 608.3.1 Grab Bars for Transfer Type Showers

**Standard Roll-In Type Shower Compartments** - Where a seat is provided in standard roll-in type shower compartments, grab bars shall be provided on the back wall and the side wall opposite the seat. Grab bars shall not be provided above the seat. Where a seat is not provided in standard roll-in type shower compartments, grab bars shall be provided on three walls. Grab bars shall be installed 6 inches (150 mm) maximum from adjacent walls.



**608.3 Grab Bars** - Grab bars shall comply with 609 and shall be provided in accordance with 608.3. Where multiple grab bars are used, required horizontal grab bars shall be installed at the same height above the finish floor.

**EXCEPTIONS:**

1. Grab bars shall not be required to be installed in a shower located in a bathing facility for a single occupant accessed only through a private office, and not for common use or public use provided that reinforcement has been installed in walls and located so as to permit the installation of grab bars complying with 608.3.
2. In residential dwelling units, grab bars shall not be required to be installed in showers located in bathing facilities provided that reinforcement has been installed in walls and located so as to permit the installation of grab bars complying with 608.3.

**Transfer Type Shower Compartments** - In transfer type compartments, grab bars shall be provided across the control wall and back wall to a point 18 inches (455 mm) from the control wall.

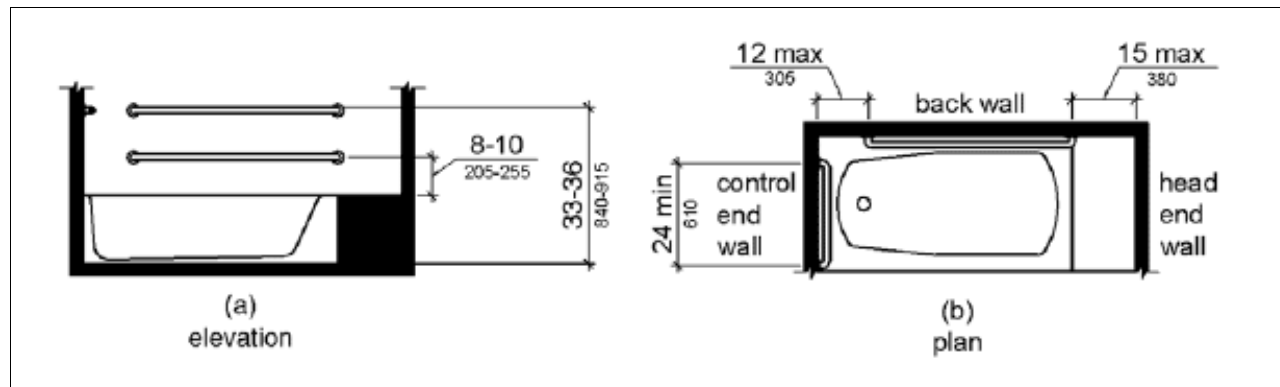


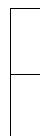
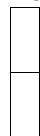
Figure 607.4.1 Grab Bars for Bathtubs with Permanent Seats

**Bathtubs Without Permanent Seats**

**Back Wall.** Two grab bars shall be installed on the back wall, one located in accordance with 609.4 and other located 8 inches (205 mm) minimum and 10 inches (255 mm) maximum above the rim of the bathtub. Each grab bar shall be 24 inches (610 mm) long minimum and shall be installed 24 inches (610 mm) maximum from the head end wall and 12 inches (305 mm) maximum from the control end wall.

**Control End Wall.** A grab bar 24 inches (610 mm) long minimum shall be installed on the control end wall at the front edge of the bathtub.

**Head End Wall.** A grab bar 12 inches (305 mm) long minimum shall be installed on the head end wall at the front edge of the bathtub.



**ADA Kitchens**

803.2 Turning Space. Turning space complying with 304 shall be provided within the room.

804 Kitchens and Kitchenettes 804.1

General. Kitchens and kitchenettes shall comply with 804. Advisory 802.4.2 Identification.

Seats with folding or retractable armrests are intended for use by individuals who have difficulty walking. Consider identifying such seats with signs that contrast (light-on-dark or dark-on-light) and that are also photo luminescent. Advisory 803.1

Where a U-shaped kitchen is provided, clearances shall comply with 804.2.2. EXCEPTION: Spaces that do not provide a cooktop or conventional range shall not be required to comply with 804.2. 804.2.1

Pass Through Kitchen. In pass through kitchens where counters, appliances or cabinets are on two opposing sides, or where counters, appliances or cabinets are opposite a parallel wall, clearance between

all opposing base cabinets, counter tops, appliances, or walls within kitchen work areas shall be 40 inches (1015 mm) minimum.

Pass through kitchens shall have two entries. 804.2.2 U-Shaped. In U-shaped kitchens enclosed on three contiguous sides, clearance between all opposing base cabinets, counter tops, appliances, or walls within kitchen work areas shall be 60 inches (1525 mm) minimum. Advisory 804.2

Clearance. Clearances are measured from the furthest projecting face of all opposing base cabinets, counter tops, appliances, or walls, excluding hardware.

804.3 Kitchen Work Surface. In residential dwelling units required to comply with 809, at least one 30 inches (760 mm) wide minimum section of counter shall provide a kitchen work surface that complies with 804.3.

804.3.1 Clear Floor or Ground Space. A clear floor space complying with 305 positioned for a forward approach shall be provided. The clear floor or ground space shall be centered on the kitchen work surface and shall provide knee and toe clearance complying with 306. EXCEPTION: Cabinetry shall be permitted under the kitchen work surface provided that all of the following conditions are met: (a) the cabinetry can be removed without removal or replacement of the kitchen work surface; (b) the finish floor extends under the cabinetry; and (c) the walls behind and surrounding the cabinetry are finished.

804.3.3 Exposed Surfaces. There shall be no sharp or abrasive surfaces under the work surface counters.

804.5 Storage. At least 50 percent of shelf space in storage facilities shall comply with 811.

Clear floor or ground space shall be positioned adjacent to the dishwasher door. The dishwasher door, in the open position, shall not obstruct the clear floor or ground space for the dishwasher or the sink.

804.6.4 Range or Cooktop. Where a forward approach is provided, the clear floor or ground space shall provide knee and toe clearance complying with 306. Where knee and toe space is provided, the underside of the range or cooktop shall be insulated or otherwise configured to prevent burns, abrasions, or electrical shock. The location of controls shall not require reaching across burners.

804.6.6 Refrigerator/Freezer. Combination refrigerators and freezers shall have at least 50 percent of the freezer space 54 inches (1370 mm) maximum above the finish floor or ground. The clear floor or ground space shall be positioned for a parallel approach to the space dedicated to a refrigerator/ freezer with the centerline of the clear floor or ground space offset 24 inches (610 mm) maximum from the centerline of the dedicated space.

## **ADA Heights/ Projection into the space**

**4.4.1\* General.** Objects projecting from walls (for example, telephones) with their leading edges between 27 in and 80 in (685 mm and 2030 mm) above the finished floor shall protrude no more than 4 in (100 mm) into walks, halls, corridors, passageways, or aisles. Objects mounted with their leading edges at or below 27 in (685 mm) above the finished floor may protrude any amount. Free-standing objects mounted on posts or pylons may overhang 12 in (305 mm) maximum from 27 in to 80 in (685 mm to 2030 mm) above the ground or finished floor. Protruding objects shall not reduce the clear width of an accessible route or maneuvering space.

**4.4.2 Head Room.** Walks, halls, corridors, passageways, aisles, or other circulation spaces shall have 80 in (2030 mm) minimum clear head room. If vertical clearance of an area adjoining an accessible route is reduced to less than 80 in (nominal dimension), a barrier to warn blind or visually-impaired persons shall be provided.

804.3.2 Height. The kitchen work surface shall be 34 inches (865 mm) maximum above the finish floor or ground. EXCEPTION: A counter that is adjustable to provide a kitchen work surface at variable heights, 29 inches (735 mm) minimum and 36 inches (915 mm) maximum, shall be permitted.



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