

Engineering

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The ins and outs of grab bars

Horizontal. Vertical. Slanted. Doubled. L-shaped. U-shaped. Stainless steel. Chrome-plated. Nylon. Bending stress. Shear stress. Shear force. Tensile force. Welcome to the world of grab bars in hotel bathrooms. While some managers may remember a simpler day when a wall-mounted ceramic soap dish had a little handhold, those days are over. Today the rules of accessibility govern the why and how and where of handholds — grab bars — and there is not one hotel manager in America who can be exempted from knowing these rules.

ANSI develops accessibility standards

The story of the rules begins in 1961 when the original ANSI A117.1 (American National Standards Institute) formed the technical basis for the first accessibility standards adopted later by the United States federal government and most state governments. ANSI is a nongovernmental national organization that publishes a wide variety of recommended standards. ANSI's standards for barrier-free design are developed by a committee composed of 52 organizations representing associations of handicapped people, rehabilitation professionals, design professionals, builders and manufacturers. The standards, which are called "Specifications for Making Buildings and Facilities Accessible to, and Usable by, Physically Handicapped People," were developed using the consensus process.

The ABA is passed

In 1968, the U.S. Congress passed the Architectural Barriers Act (ABA) to require access to facilities designed, built, altered or leased with Federal funds. The Act was introduced by Senator E. L. Bartlett of Alaska who employed a wheelchair-using aide. The aide had been unable to enter the National Gallery of Art in Washington, D.C. without assistance. Although the National Gallery responded by installing a ramp, Bartlett recognized that the inaccessibility there was also present in many other buildings and he persisted in his efforts to have accessibility "one of the items on the checklist of designers and builders." The ABA marked one of the first efforts to ensure access to the built environment by regulating the four agencies of the government that separately write standards for accessibility: the Department of Defense, the Department of Housing and Urban Development, the General Services Administration and the U.S. Postal Service. These four agencies establish and enforce standards for design, construction and alteration of particular types of buildings and facilities.

The ATABC is established

Several years after the ABA had become law, Congress observed that compliance had been uneven and that no initiatives to create Federal design standards for accessibility were underway. Clearly, one central agency needed to take charge of enforcing the ABA and ensuring development of design standards. To ensure compliance with the standards,

Congress established the Architectural and Transportation Barriers Compliance Board (ATBCB) in Section 502 of the Rehabilitation Act of 1973. A 1978 amendment to Section 502 of the Rehabilitation Act added to the ATBCB's functions the responsibility to issue minimum guidelines and requirements for the standards established by the four standard-setting agencies. Today the Board is known as the Access Board and is comprised of representatives from 12 Federal agencies and 13 public members of which at least five must be persons with disabilities.

With the guidance of the Access Board, the Uniform Federal Accessibility Standards (UFAS) were published in 1984 and follow ANSI A117.1-1980 in format. Since publication of the UFAS (49 FR 31528), each of the four standard-setting agencies has taken action to incorporate the UFAS in its own standards, regulations or other directives.

While UFAS attempts to minimize the differences between the standards previously used by four agencies and the standards used by state and local governments, it also tries to coordinate with the access standards recommended for facilities that are not federally funded or constructed.

In fact, during the 1980's the Access Board was called upon many times to research and give testimony on accessible design issues which eventually came together as the Americans with Disabilities Act (ADA) of 1990.

Ahh, here's where the hotel industry enters the picture. All of the previously mentioned laws, guidelines, boards and agencies applied only to federally funded or constructed buildings. It wasn't until 1990 that Congress passed the Americans with Disabilities Act to regulate public and commercial facilities.

The Americans with Disabilities Act (ADA)

The ADA recognizes and protects the civil rights of people with disabilities, from physical conditions affecting mobility, stamina, sight, hearing and speech to conditions such as emotional illness and learning disorders. The ADA addresses access to the workplace (title I), state and local government services (title II), and places of public accommodation and commercial facilities (title III). It also requires phone companies to provide telecommunications relay services for people who have hearing or speech impairments (title IV) and miscellaneous instructions to Federal agencies that enforce the law (title V).

ADAAG guidelines

The jurisdiction of the Access Board was expanded to include the ADA regulations and in 1991, the Board published the ADAAG (Americans with Disabilities Accessibility Guidelines). The first four sections of ADAAG contain general sections, scoping provisions and technical specifications that apply to all types of buildings and facilities. Scoping provisions specify what has to be accessible, while technical provisions explain how access is to be achieved. Special occupancy chapters cover restaurants and cafeterias (Section 5), medical care facilities (Section 6), mercantile establishments (Section 7), libraries (Section 8); and hotels, motels and transient lodging (Section 9).

More recently the Access Board has developed guidelines for accessibility of transportation facilities, telecommunication processes and electronic/information technology.

Hotels are affected by the ADA in two ways: the facility must accommodate guests with disabilities (title III) AND must provide an accessible workplace for employees with disabilities (title I).

So when the TRC staff set off to identify the government regulations for grab bars, they encountered a confusing, unwieldy tangle of acronyms, laws, guidelines and boards. But fortunately, as the investigation progressed, it became clear that on the issue of grab bars, there is unanimity amongst the regulators. Whether accessed through UFAS or ADA, the guideline number is 4.26, "Handrails, Grab Bars, and Tub and Shower Seats."

The regulations apply to the rooms designated as accessible according to law. ADA (sometimes called handicap rooms), must meet these specifications for grab bars.

4.26 Handrails, Grab Bars, and Tub and Shower Seats.

4.26.2* Size and Spacing of Grab Bars and Handrails. The diameter or width of the gripping surfaces of a handrail or grab bar shall be 1-1/4 in to 1-1/2 in (32 mm to 38 mm), or the shape shall provide an equivalent gripping surface. If handrails or grab bars are mounted adjacent to a wall, the space between the wall and the grab bar shall be 1-1/2 in (38 mm). Handrails may be located in a recess if the recess is a maximum of 3 in (75 mm) deep and extends at least 18 in (455 mm) above the top of the rail.

4.26.3 Structural Strength. The structural strength of grab bars, tub and shower seats, fasteners, and mounting devices shall meet the following specification:

(1) Bending stress in a grab bar or seat induced by the maximum bending moment from the application of 250 lbf (1112N) shall be less than the allowable stress for the material of the grab bar or seat.

(2) Shear stress induced in a grab bar or seat by the application of 250 lbf (1112N) shall be less than the allowable shear stress for the material of the grab bar or seat. If the connection between the grab bar or seat and its mounting bracket or other support is considered to be fully restrained, then direct and torsional shear stresses shall be totaled for the combined shear stress, which shall not exceed the allowable shear stress.

(3) Shear force induced in a fastener or mounting device from the application of 250 lbf (1112N) shall be less than the allowable lateral load of either the fastener or mounting device or the supporting structure, whichever is the smaller allowable load.

(4) Tensile force induced in a fastener by a direct tension force of 250 lbf (1112N) plus the maximum moment from the application of 250 lbf (1112N) shall be less than the allowable withdrawal load between the fastener and the supporting structure.

(5) Grab bars shall not rotate within their fittings.

4.26.4 Eliminating Hazards. A handrail or grab bar and any wall or other surface adjacent to it shall be free of any sharp or abrasive elements. Edges shall have a minimum radius of 1/8 in (3.2 mm).

As to placement of the grab bars, the following diagrams are provided in the regulations:

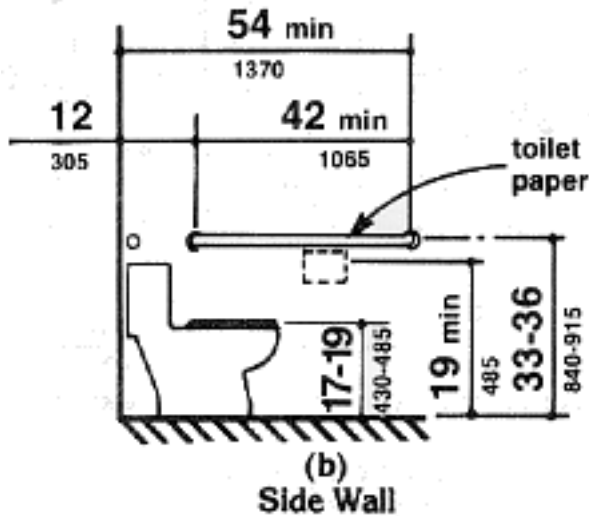


Figure 29b
Grab Bars at Water Closets
Side Wall

A 42-inch (1065 mm) minimum length grab bar is required to the side of the water closet spaced 12 inches (305 mm) maximum from the back wall and extending a minimum of 54 inches (1370 mm) from the back wall at a height between 33 and 36 inches (840-915 mm). The toilet paper dispenser shall be mounted at a minimum height of 19 inches (485 mm). (4.16.3, 4.16.4, 4.16.6)

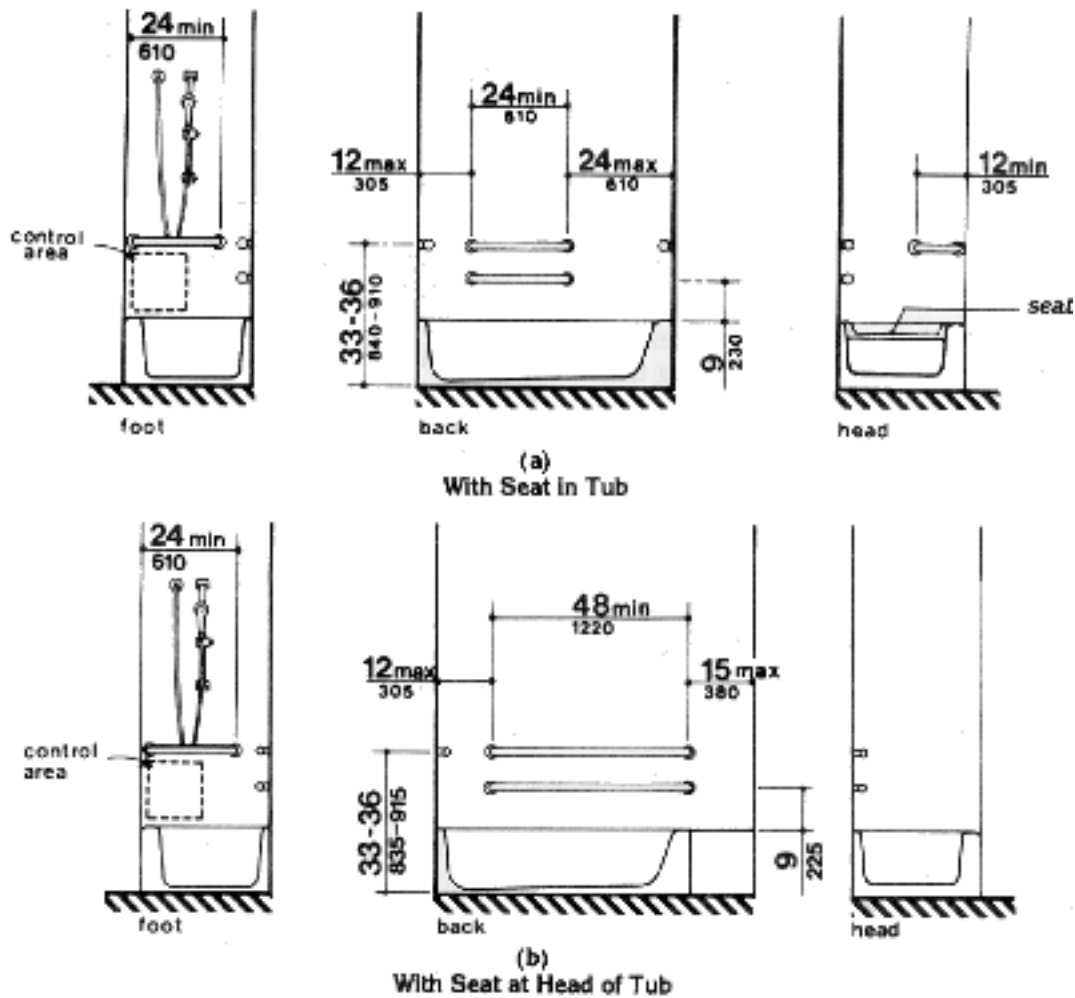


Figure 34
Grab Bars at Bathtubs

Fig. 34(a) With Seat in Tub. At the foot of the tub, the grab bar shall be 24 inches (610 mm) minimum in length measured from the outer edge of the tub. On the back wall, two grab bars are required. The grab bars mounted on the back (long) wall shall be a minimum 24 inches (610 mm) in length located 12 inches (305 mm) maximum from the foot of the tub and 24 inches (610 mm) maximum from the head of the tub. One grab bar shall be located 9 inches (230 mm) above the rim of the tub. The others shall be 33 to 36 inches (840 mm to 910 mm) above the bathroom floor. At the head of the tub, the grab bar shall be a minimum of 12 inches (305 mm) in length measured from the outer edge of the tub.

Fig. 34(b) With Seat at Head of Tub. At the foot of the tub, the grab bar shall be a minimum of 24 inches (610 mm) in length measured from the outer edge of the tub. On the back wall, two grab bars are required. The grab bars mounted on the back wall shall be a minimum of 48 inches (1220 mm) in length located a maximum of 12 inches (305

mm) from the foot of the tub and a maximum of 15 inches (380 mm) from the head of the tub. Heights of grab bars are as described above.

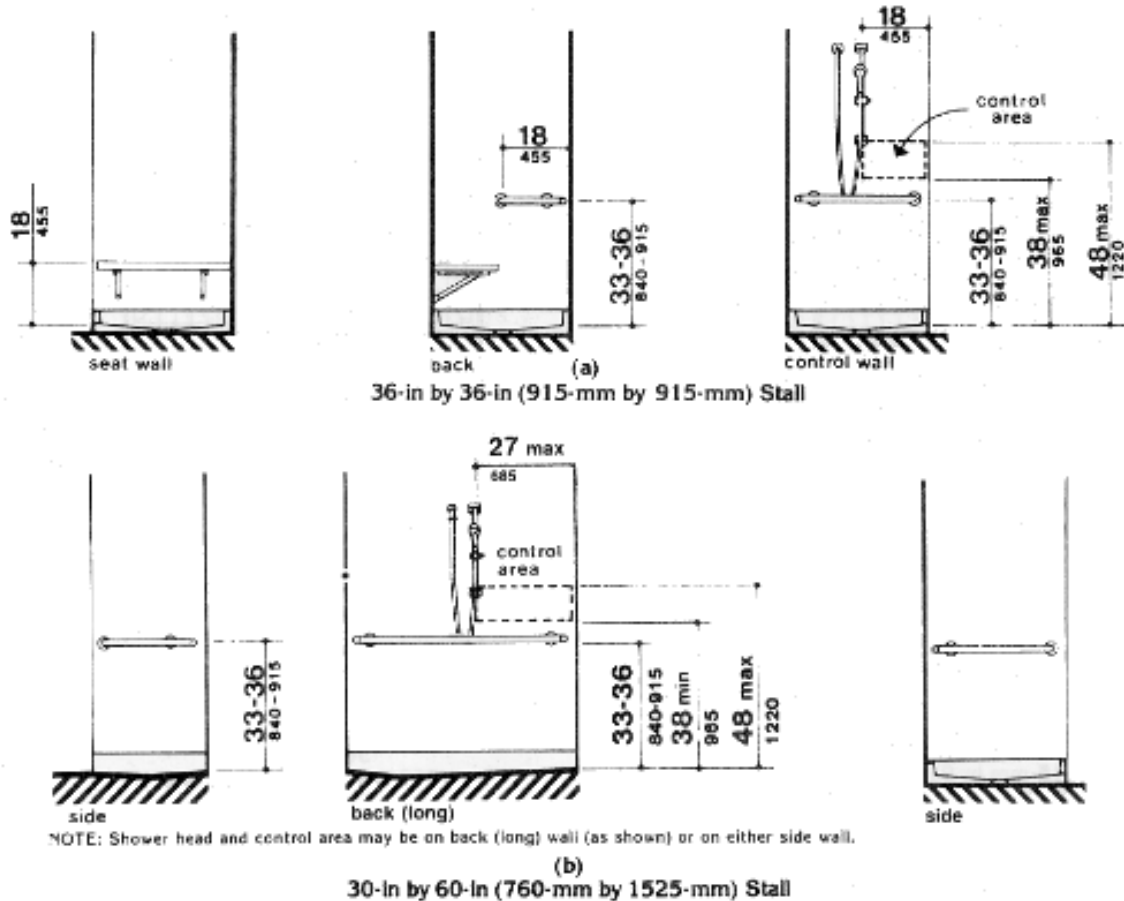


Figure 37
Grab Bars at Shower Stalls

Fig. 37(a) 36 inches by 36 inches (915 mm by 915 mm) Stall. The diagram illustrates an L-shaped grab bar that is located along the full depth of the control wall (opposite the seat) and halfway along the back wall. The grab bar shall be mounted between 33 to 36 inches (840-915 mm) above the shower floor. The bottom of the control area shall be a maximum of 38 inches (965 mm) high and the top of the control area shall be a maximum of 48 inches (1220 mm) high. The controls and spray unit shall be within 18 inches (455 mm) of the front of the shower.

Fig. 37(b) 30 inches by 60 inches (760 mm by 1525 mm) Stall. The diagram illustrates a U-shaped grab bar that wraps around the stall. The grab bar shall be between 33 to 36 inches (840-915 mm) high. The controls are placed in an area between 38 inches and 48 inches (965 mm and 1220 mm) above the floor. If the controls are located on the back (long) wall they shall be located 27 inches (685 mm) from the sidewall. The showerhead and control area may be located on either sidewall.

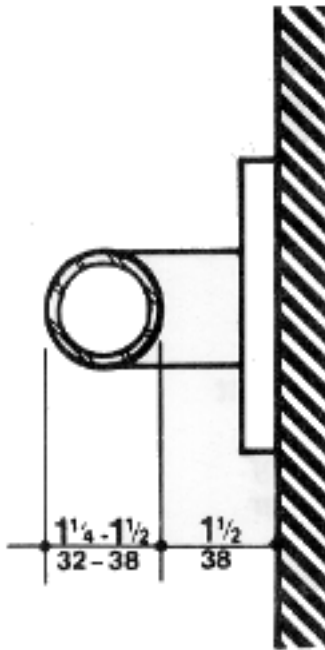


Figure 39e
Size and Spacing of Handrails and Grab Bars
Grab Bar

The ADA requires grab bar installation because handicapped persons use them to maintain balance, transfer and prevent falls. Grab bars are an important component of a barrier free design, and are specified, by the ADA, in both new and existing buildings.

When specifying grab bars, a manager must first review the safety of various products. Vendors have made it easy for buyers by indicating which of their products meet ADA requirements. Such requirements specify bar diameter, tensile strength, gauge and design. Most are constructed of Type 304 18-gauge stainless steel with .049 wall thickness. Grab bars also vary slightly in construction where some utilize covers to conceal their mounting hardware while others leave the hardware exposed.

Second, the grab bars must be installed correctly. Various methods of installation are available depending on the bathroom's construction. For instance, it is not acceptable to install a grab bar on a standard sheetrock wall unless reinforcement is added. Some vendors provide special mounting brackets or methods to provide the necessary stability. Managers must consider the construction of their walls (i.e., sheetrock, tile, marble, fiberglass) before choosing the bar and installation method. New construction can use such devices as Grabbar.com's Channel Backer while remodels might require something like WingIts™ that do not require tearing out the wall.

Third, the correct style and length grab bars must be chosen. Bars are available at 12-inch lengths or various lengths up to 48 inches. Shapes are also available, including L-shape, U-shape, 90° right-hand (or left-hand) angle, or custom designs.

Fourth, the grab bars must have a durable finish that is easy to clean. Typically commercial grab bars are made of polished or satin finish stainless steel. However, other finishes are available using a powder-coated method over the stainless steel. Colors such as white, green, blue, yellow and red are available as well as coated brass. Recently, a new line of nylon grab bars has been produced. Offered by HEWI, the company touts the advantages of their nylon bar as follows:

- Retains its brilliant finish even after many years of demanding use
- Colored throughout, to prevent fading, tarnish or rust.
- Strong, impact resistant and flexible.
- Smooth, non-porous surface which will not support bacteria or attract dust.
- Easily cleaned with a damp cloth. (Abrasive or chemical cleaning agents should be avoided.)
- Does not transmit static electric shocks or extreme changes in temperature; nylon is warm to the touch.
- Nylon is environmentally correct. It can be recycled and in case of fire the surface does not produce any toxic or caustic gases.

Fifth, the price must be affordable. Managers may select in several price ranges from a basic stainless steel to the elegant polished brass.

(price table)

Manufacturers include: Gamco, Taymoor, Olsonite, Franklin Brass, HEWI, Bobrick, Bradley, American Specialties, A&J and Koala

For more information:

www.Grabbars.com

www.plumbingworld.com/grabbars.html

www.grabbarsonline.com

www.access-board.gov/

Hot tip:

Twelve specific types of buildings must comply with the ADA guidelines. They include schools, restaurants, hotels, retail stores, stadiums, theaters, convention facilities, museums, parks and hospitals, banks, gas stations and laundromats. Professional offices of accountants, lawyers, insurance agents and the like are among the service establishments that must meet the ADA guidelines.