

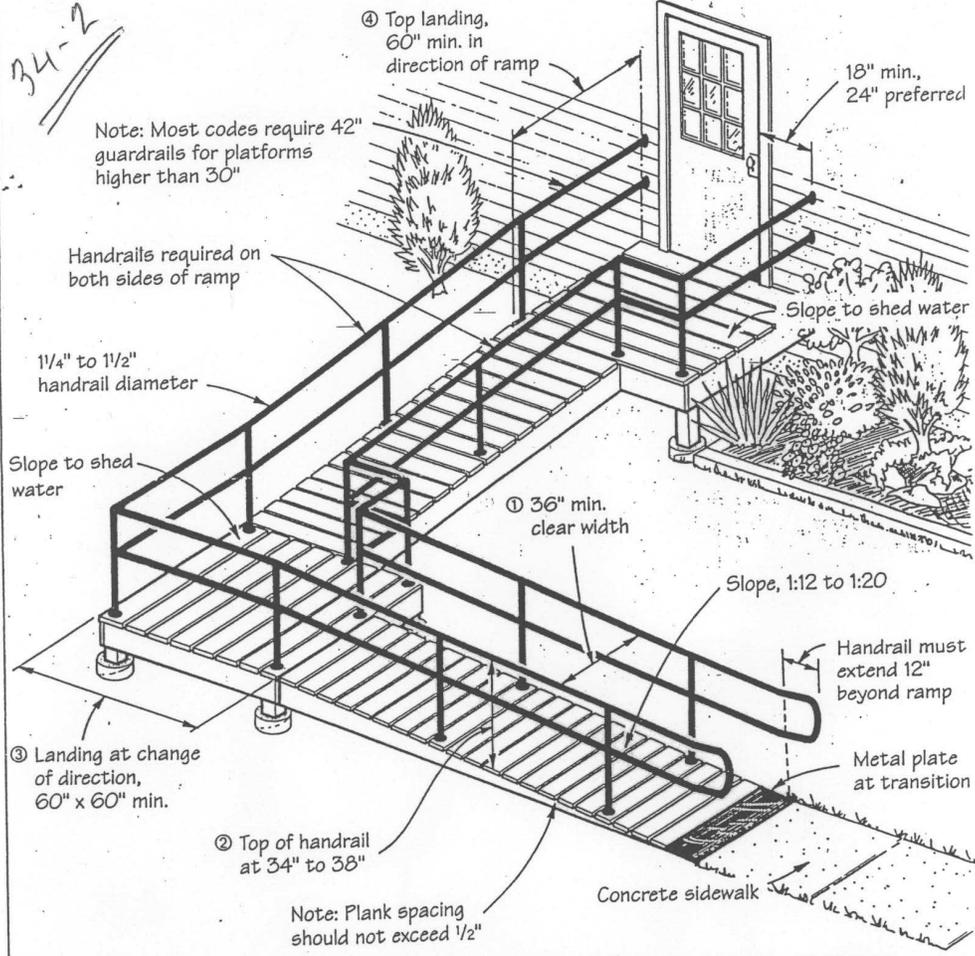
ACCESSABILITY
FOR THE
HANDICAPPED

Disabilities Act requires in an access ramp.

by Kenneth Hoffman

34-2

An Access Ramp for a Small Business

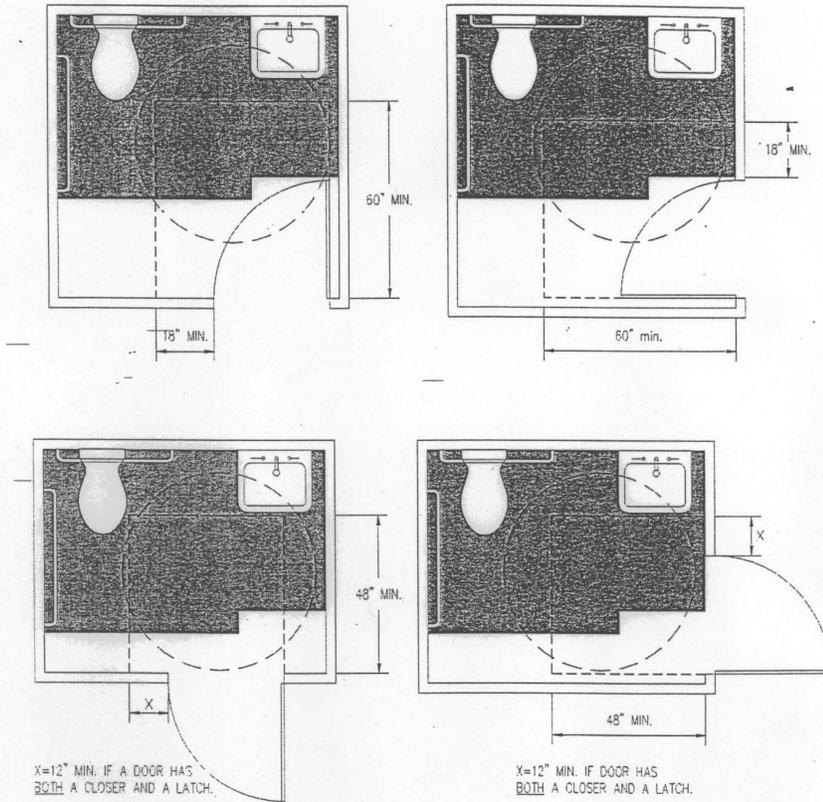


State Accessibility Codes vs. the ADA

① Min. Clear	② Handrail	③ Min. Size of	④ Min. Length of
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Chapter 4.22 Toilet Rooms & 4.23 Bathrooms, Bathing Facilities, and Shower Rooms

Doors must comply with 4.13, which specifies maneuvering clearances. The location of doors is based on their size and sweep. Doors can swing into the turning space but not the clear floor space required at fixtures. In-swinging doors clearing fixture clearances usually determine the minimum room depth.



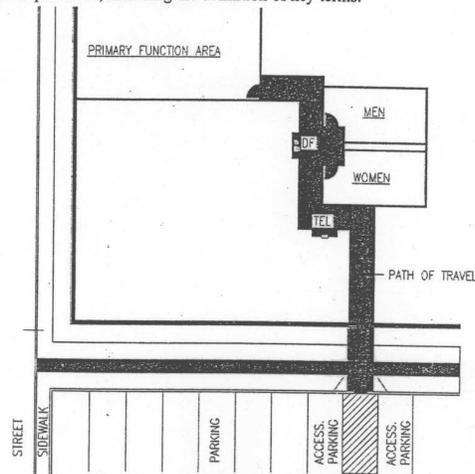
Where doors can swing out, the minimum room depth is typically determined by the lavatory depth and door clearances for forward approaches; (turning space is usually available within these dimensions). For side approaches, it is often determined by the turning space and the degree of fixture overlap. Latch-side clearance 12 inches minimum is required on the push-side of doors equipped with both a closer and latch; otherwise, clearance beyond the stop is not required.

ADA Update on Min | 4/01 |

Chapter 4.1 Minimum Requirements

Primary Function Areas [4.1.6(2)]

If alterations are made to an area containing a primary function, an accessible "path of travel" is required which means a continuous route connecting the altered area to an entrance, including phones, restrooms, and drinking fountains that, where provided, serve the altered area. Since this may involve modifications outside the intended alteration, compliance is required to the extent it is not "disproportionate" to the cost of alterations to the primary function area; "disproportionality" is defined in the DOJ rule (section 36.403) as costing more than 20% of the cost of the alteration to the primary function area. This rule and the DOJ technical assistance manual for title III provide important information on this requirement, including the definition of key terms.



Special Technical Provisions for Alterations to Existing Buildings and Facilities [4.1.6(3)]

Section 4.1.6(3) recognizes certain allowances where technical feasibility is encountered, such as steeper slopes for short ramps. Special provisions also address stairs, elevators, doors, toilet rooms, assembly areas, platform lifts, and dressing rooms. These provisions are discussed in the relevant technical chapters of this manual.

Historic Preservation [4.1.7]

ADAAG covers historic properties in the context of planned renovations to qualified historic facilities, including those subject to the National Historic Preservation Act. "Qualified historic facilities" are facilities listed in the National Register of Historic Places or facilities designated as historic under state or local law. Alterations to such facilities are required to be done in full compliance with the alteration requirements for other types of buildings. However, if following the usual requirements would threaten or destroy the historic significance of a feature of the building, alternative criteria in 4.1.7(3) may be used. These requirements address accessible routes, ramps, entrances, toilet rooms, access between floors, and displays. The decision to use these alternative requirements must be made in consultation with the appropriate advisory board designated in 4.1.7(2).

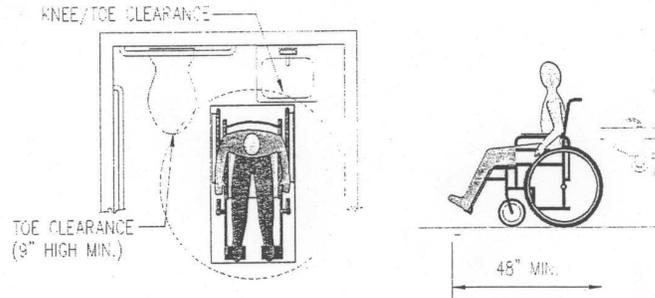
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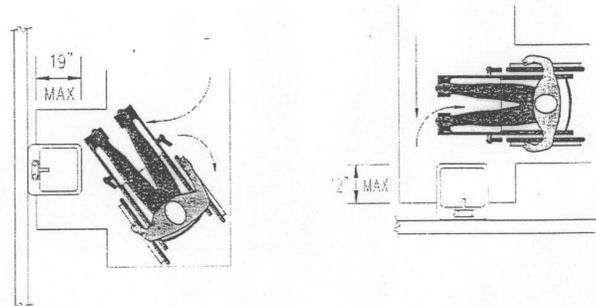
Chapter 4.2 Space Allowances and Reach Ranges

Overlapping Fixed Elements

Fixed elements can overlap turning space if required knee and toe clearances are provided. Since maneuvering for turns varies, the overlap of fixed elements should be minimized. *Recommendation:* Where space for turns is confined to the minimum, consider limiting the overlap so that wheelchair space (30 by 48 inches minimum) remains clear.



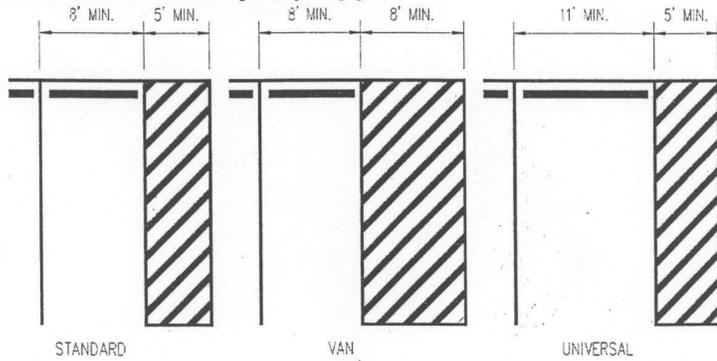
Generally, the depth of usable floor space below fixed elements with knee and toe clearance is limited to 19 inches. The overlap of turning space must be limited to one segment of the T so that back-up maneuvering is not restricted. On the short segment of the T, the overlap must be limited to 12 inches; on the long segment of the T, an overlap up to 19 inches is permitted.



Chapter 4.6 Parking and Passenger Loading Zones

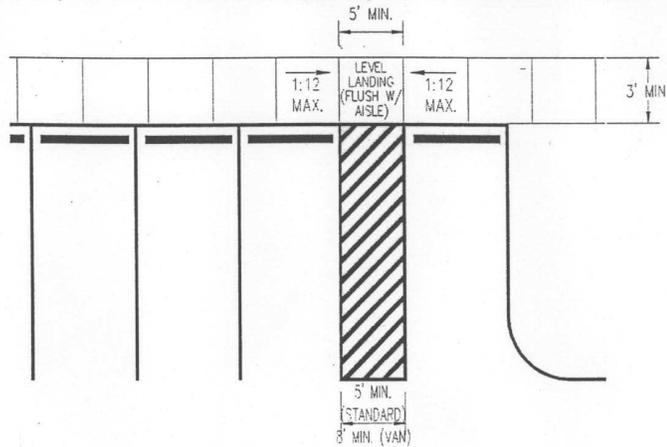
Parking Spaces [4.6.3]

For vans with side-mounted lifts, a combined width of almost 17 feet is often needed for the deployment and use of side-mounted lifts; ADAAG requires at least 16 feet. "Universal" parking spaces can be provided instead of separate standard and van spaces; (designated van spaces are not required under this design). Universal spaces are wider so that users can park to one side or the other as needed, including car drivers. The length of accessible spaces is not specified. Access aisles must be as long as the parking space.



NOTE: TWO SPACES CAN SHARE ONE AISLE

A maximum slope of 2% is required in all directions for both the space and access aisle since level surfaces are important for wheelchair transfer to and from vehicles. For this reason, built-up curb ramps cannot project into access aisles. *Recommendation:* Connecting accessible routes should be configured so that people using wheelchairs, who may not be as visible to drivers backing out of spaces, do not have to travel behind other vehicles.



Chapter 4.8 Ramps

Ramps [4.8]

Where the running slope of an accessible route is more than 5%, it is considered a ramp. Generally, changes in level up to 6 inches can be treated as a curb ramp.

Curved ramps, while not specifically addressed by ADAAG, are not considered suitable for wheelchair traffic unless the radius of curvature is large enough. The curvature and slope typically result in an uneven surface that makes wheelchair maneuvering difficult because not all wheels rest on the surface. An inner radius of curvature over 30 feet is considered necessary in order to minimize the slope differential.

Slope and Rise [4.8.2]

Slope represents the proportion of vertical rise to horizontal length and can be represented as a ratio (as in ADAAG), percentage, pitch or in degrees.

rise:length	percent	pitch	degree
1:8	12.50%	.1250	7.13
1:10	10%	.1000	5.71
1:12	8.33%	.0833	4.76
1:13	7.69%	.0769	4.40
1:14	7.14%	.0714	4.09
1:15	6.67%	.0667	3.81
1:16	6.25%	.0625	3.58
1:17	5.88%	.0588	3.37
1:18	5.55%	.0555	3.18
1:19	5.26%	.0526	3.01
1:20	5.00%	.0500	2.86
1:50	2.00%	.0200	1.15

Slope and length greatly determine a ramp's usability. There are trade-offs between the two: a steeper slope makes the run shorter, while a more gradual slope increases the length. A maximum slope of 1:12 is specified although ADAAG calls for the "least possible" slope to encourage more gradual slopes which better serve children and people with limited stamina or upper body strength. A recent study by the Access Board ("Technical Requirements for Ramps" (1996) by the Center for Accessible Housing) indicates a significant increase in exertion occurs on ramps with slopes 1:14 or steeper. *Recommendations:* Consider slopes between 1:16 and 1:20 as preferred, especially at ramps with long runs. The slope should be consistent along the full length of the run. Variation above regular construction tolerances can be disruptive to wheelchair travel, especially in the ascent direction.

Chapter 4.8 Ramps

Alterations/ Historic Preservation

Steeper slopes are allowed for short ramps where a 1:12 slope is not technically feasible.

Scope	Max. Rise	Max. Slope
altered facilities (including historic)	3 in.	1:8
altered facilities (including historic)	6 in.	1:10
qualified historic structures only	4 in.	1:6

Rise

The maximum length of a run is determined by the rise (30 inches maximum) and the slope:

Max. Rise	Slope	Max. Length	Max. Rise	Slope	Max. Length
30 in.	1:12	30 ft.	30 in.	1:16	40 ft.
30 in.	1:13	32.5 ft.	30 in.	1:17	42.5 ft.
30 in.	1:14	35 ft.	30 in.	1:18	45 ft.
30 in.	1:15	37.5 ft.	30 in.	1:19	47.5 ft.

The number of runs per ramp is not limited although the more runs a ramp has the less usable it is. While intermediate landings offer resting points, they do not reduce the amount of force people using wheelchairs must exert traveling up ramps.

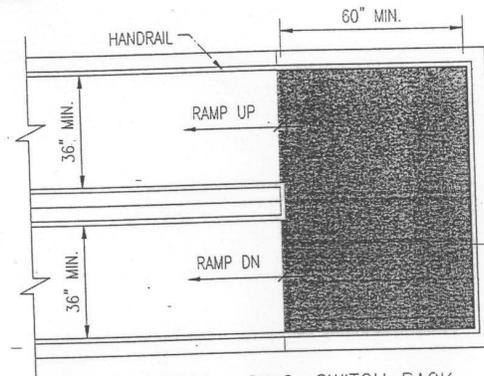
Clear Width [4.8.3]

The minimum clear width for ramps of 36 inches is measured between the leading edge of handrails. A maximum clear width is not specified. *Recommendation:* It is often advisable that ramps be wider than the minimum required where usage of the ramp may be subject to appreciable pedestrian traffic.

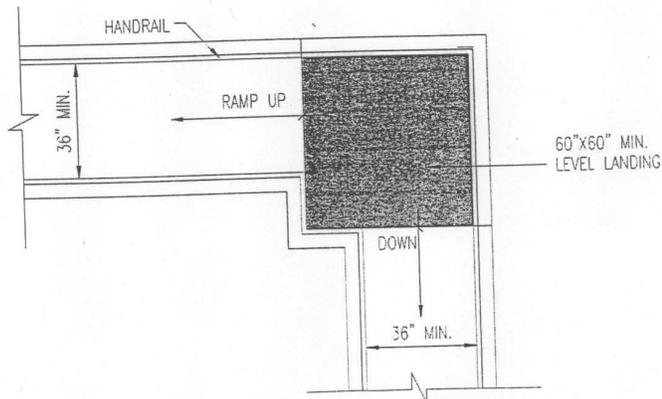
Chapter 4.8 Ramps

Landings [4.8.4]

Landings at the top and bottom and intermediate landings, must be at least 60 inches long so maneuvering space is available for approaching ramps straight on. Landings must be at least as wide as the ramp they serve and cannot slope more than 2% in any direction. Where ramps change direction, the landing must be at least 60 by 60 inches. This applies to switchback ramps, ramps with a 90 degree turn, and angled ramps. *Recommendation:* Ramps and landings should be configured to facilitate maneuvering. For example, runs should be aligned along the outside landing edge, as in the case of ramps with a 90 degree turn, so that a wider turn is permitted. Handrail extensions can wrap around landings. It is recommended that landings of exterior ramps be drained so that water does not accumulate on the surface.



INTERMEDIATE LANDING: SWITCH BACK

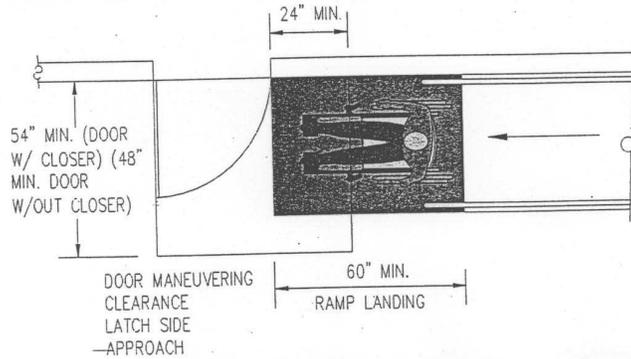


INTERMEDIATE LANDING: ALIGN OUTSIDE EDGE

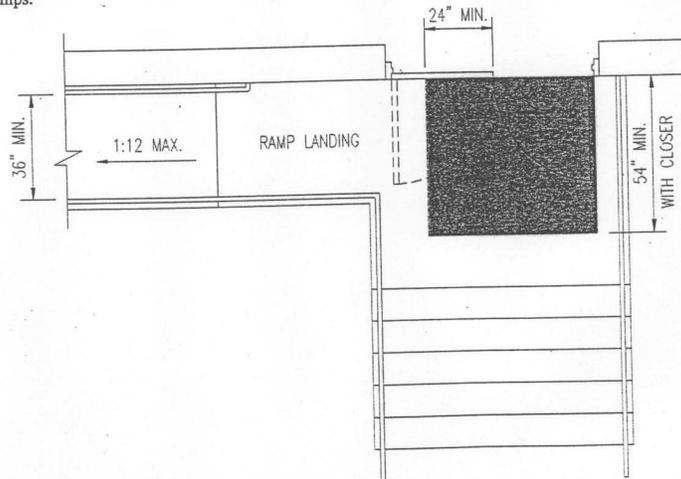
Chapter 4.8 Ramps

Doorways [4.8.4]

Landings must provide the maneuvering clearance at doors required in ADAAG 4.13. ADAAG allows the landing to overlap maneuvering clearances at doors. *Recommendation:* Ramps and doors should be configured to facilitate wheelchair maneuvering and to prevent open doors from obstructing ramp openings (important along egress routes). Keeping the door swing clear of minimum landing dimensions is a good idea, especially at the bottom of ramps since people using wheelchairs may exit them with some force and speed.



Recommendation: Stairs that open onto ramp landings should be configured so that a person using a wheelchair is not required to maneuver close to the stair opening. Consider allowing additional space beyond the minimum maneuvering clearance required at doors and/or locating stair openings away from the accessible route connecting doors and ramps.



Handrails [4.8.5]

Handrails are required on both sides for ramps with a rise more than 6 inches or a horizontal length more than 72 inches. They are not required along ramps adjacent to seating in assembly areas.

ADAAG shows a diameter of 1¼ to 1½ inch for handrails. A standard IPS pipe designated as 1¼ to 1½ inch is acceptable. Since 1½ inch pipe has an outside diameter close to 2 inches, it is important that handrails mounted to walls still provide the 1¼ inch (absolute) knuckle clearance. This clearance allows space for knuckles while preventing entrapment for people who lean on rails with their forearm. Handrails can be mounted to guardrails or on top of walls consistent with ADAAG specifications. The height of a guardrail (to prevent falling off the edge) is not specified by ADAAG; local building codes do, however, commonly regulate the minimum height of a guardrail at 42 inches. Because, in ADAAG, the maximum height of a handrail is 38 inches, a handrail must be installed in addition to the guardrail.

Extensions

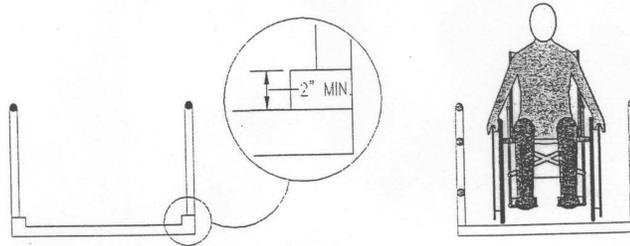
Handrails that are not continuous must have horizontal extensions at both the top and bottom of the ramp at least 12 inches long that are rounded or returned smoothly to walls, posts, or floors. Inner handrails on switchback ramps must be continuous. Handrail extensions are required on all new ramps but need not project into perpendicular circulation paths in alterations. ADAAG (Figure 17) illustrates returns to post that comply as protruding objects.

Cross Slope and Surfaces [4.8.6]

The cross slope (2% maximum) must be minimized because it makes wheelchair travel difficult by distributing more weight and required force to one side and causing front casters to veer. Ramp surfaces must comply with requirements for ground and floor surfaces and be "stable, firm, and slip-resistant." A specific level of slip-resistance is not mandated. It is difficult to categorize various materials as acceptable or unacceptable since surface treatments (texturing and applied coatings) can make a considerable difference. *Recommendation:* It is important that consideration be given to the conditions likely to be found on the surface, such as providing a higher level of slip-resistance on surfaces exposed to moisture.

Edge Protection [4.8.7]

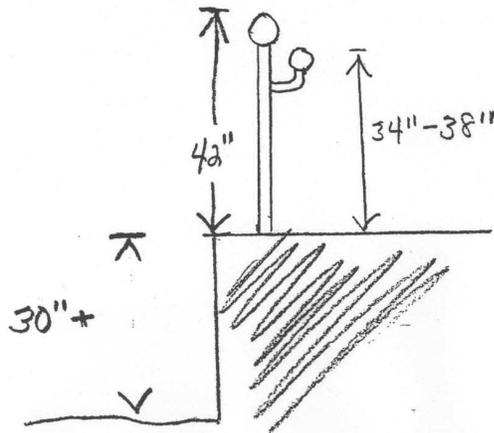
Handrails alone do not necessarily provide effective edge protection for people who use wheelchairs, crutches, and other mobility aids. Curbs (or walls) are effective in keeping both wheelchairs and crutch-tips from slipping off the edge or getting caught on vertical posts. Horizontal rails are another alternative although mounting heights are not specified (the 27 inch height in ADAAG Figure 17 pertains to the return of extensions as protruding objects). A rail mounted close enough to the ramp surface to prevent passage of a 4 inch diameter sphere can function like a curb in keeping front casters from getting stuck on vertical posts and crutch-tips from slipping off the edge.



3. Rise over 30".

Top of guard 42" as per. SBC - 1021.2

Top of handrail 34" - 38" as per. SBC - 16 4.8.5 (5)
and spacing of 4" max. per SBC 10.21.3



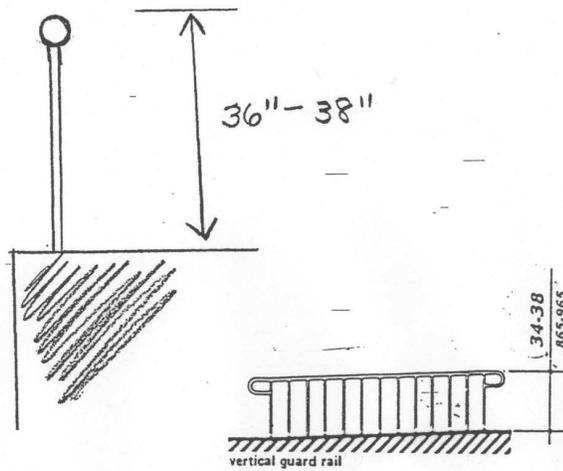
1021.2 Height: The guards shall be at least 42 inches (1067 mm) in height measured vertically above the leading edge of the tread or adjacent walking surface.

4.8.5* Handrails. If a ramp run has a rise greater than 6 in (150 mm) or a horizontal projection greater than 72 in (1830 mm), then it shall have handrails on both sides. Handrails are not required on curb ramps or adjacent to seating in assembly areas. Handrails shall comply with 4.26 and shall have the following features:

(5) Top of handrail gripping surfaces shall be mounted between 34 in and 38 in (865 mm and 965 mm) above ramp surfaces.

2. Rise from 15 1/2" to 30".

Top of guard must be at least 36" in accordance with (1021.2 and Exception 3) but not higher than 38" as per SBC 16 - 4.8.7 Fig. 17. and spacing of balusters at 4" max. per SBC - 1021.3.



1021.2 Height: The guards shall be at least 42 inches (1067 mm) in height measured vertically above the leading edge of the tread or adjacent walking surface.

Exceptions

3. Guards along open-sided floor areas located less than 30 inches (762 mm) above the floor or grade below shall not be less than 36 inches (914 mm) in height.

1021.3 Opening limitations: In occupancies in Use Groups A, B, E, H-4, I-1, I-2, M and R, and in *public garages* and open parking structures, open guards shall have balusters or be of solid material such that a sphere with a diameter of 4 inches (102 mm) cannot pass through any opening. Guards shall not have an ornamental pattern that would provide a ladder effect.

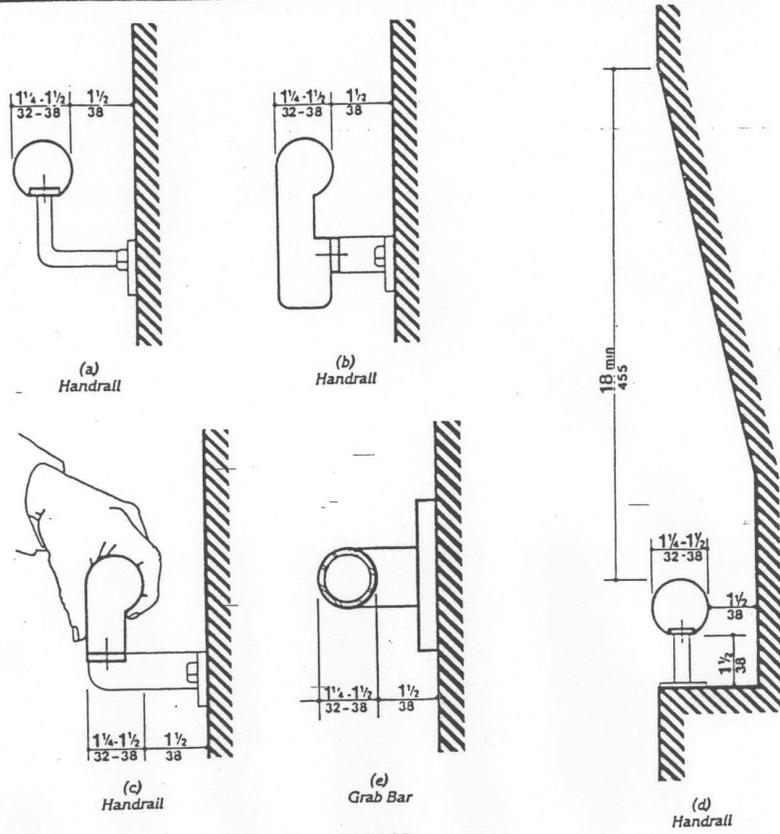


Fig. 39
Size and Spacing of Handrails and Grab Bars

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).

4.27 Controls and Operating Mechanisms.

4.27.1 General. Controls and operating mechanisms required to be accessible by 4.1 shall comply with 4.27.

Guards and Handrails on Ramps

1. SBC 16 Fig. 17 controls along from 0" to 15 1/2" Rise.

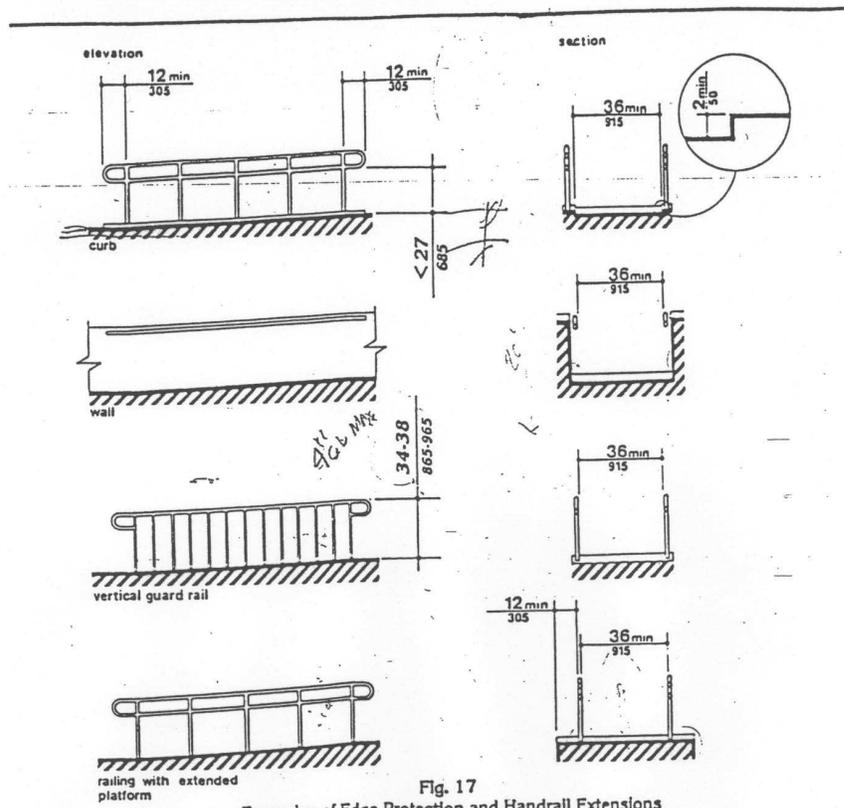


Fig. 17
Examples of Edge Protection and Handrail Extensions

SBC -16- 4.8.7 and SBC - 1005.5

4.8.7 Edge Protection. Ramps and landings with drop-offs shall have curbs, walls, railings, or projecting surfaces that prevent people from slipping off the ramp. Curbs shall be a minimum of 2 in (50 mm) high (see Fig. 17).

1005.5 Open-sided walking areas: Guards shall be located along open-sided walking surfaces, mezzanines, stairways, ramps and landings which are located more than 15 1/2 inches (394 mm) above the floor or grade below. The guards shall be constructed in accordance with Section 1021.0.

Guards and Handrails on Ramps

1. SBC 16 Fig. 17 controls along from 0" to 15 1/2" Rise.

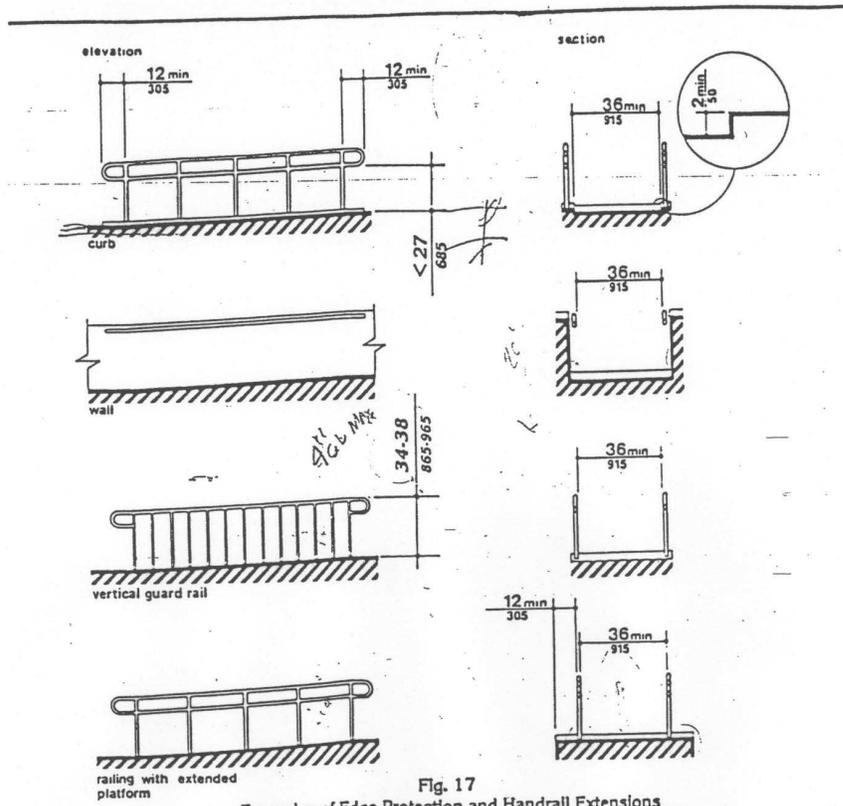


Fig. 17
Examples of Edge Protection and Handrail Extensions

SBC -16- 4.8.7 and SBC - 1005.5

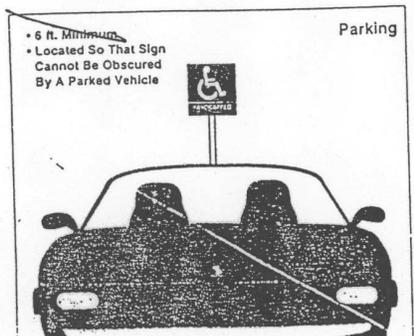
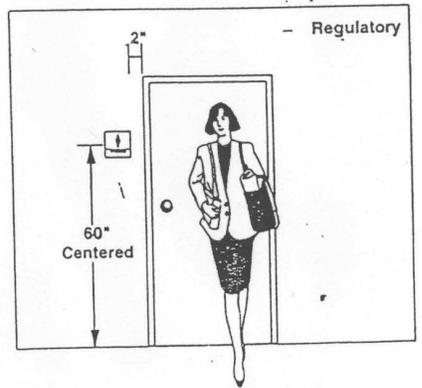
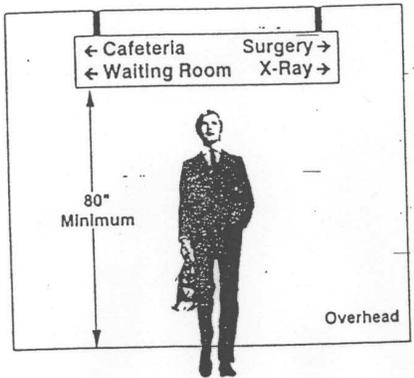
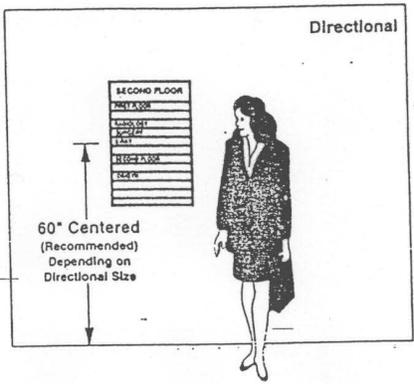
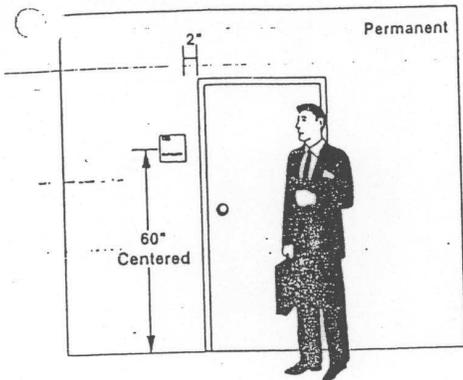
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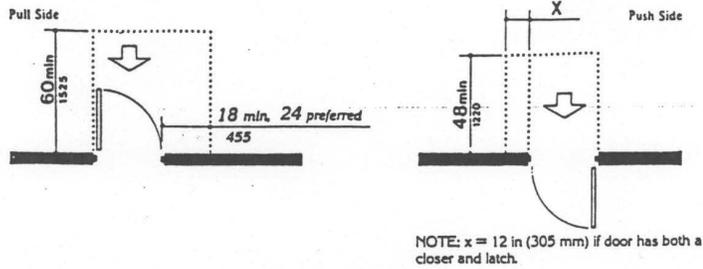
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Installation

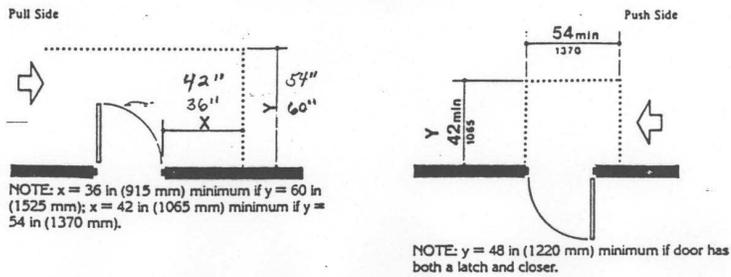


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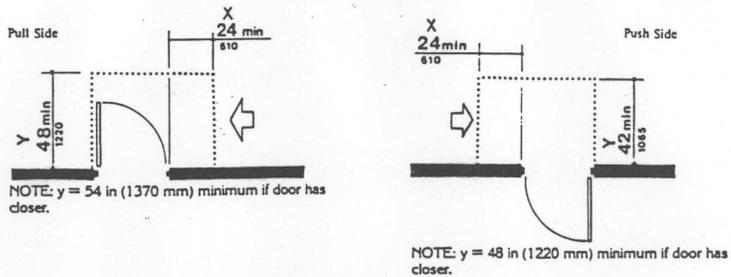
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Scottsdale, AZ 85260
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in Arizona 948-2222
Fax: 1-602-951-7033



(a) 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.

Fig. 25 Maneuvering Clearances at Doors

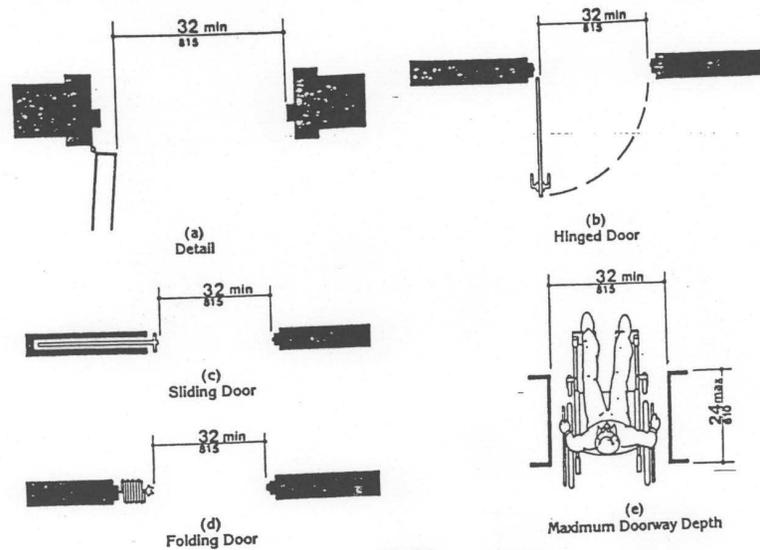


Fig. 24
Clear Doorway Width and Depth

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.*

4.13.10* Door Closers. If a door has a closer, then the sweep period of the closer shall be adjusted so that from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 in (75 mm) from the latch, measured to the leading edge of the door.

4.13.11* Door Opening Force. The maximum force for pushing or pulling open a door shall be as follows:

(1) Fire doors shall have the minimum opening force allowable by the appropriate administrative authority.

(2) Other doors.

(a) exterior hinged doors: *(Reserved)*.

(b) interior hinged doors: 5 lbf (22.2N)

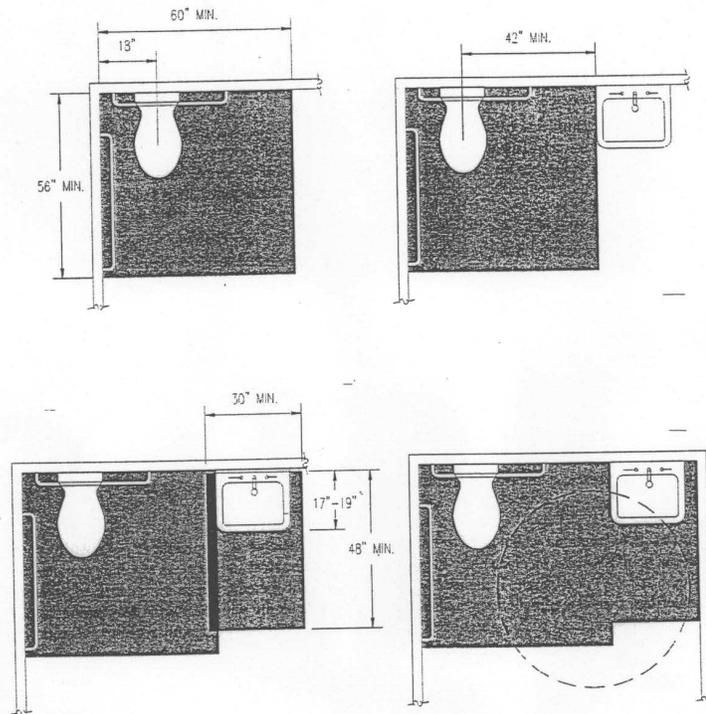
(c) sliding or folding doors: 5 lbf (22.2N)

These forces do not apply to the force required to retract latch bolts or disengage other devices that may hold the door in a closed position.

Chapter 4.22 Toilet Rooms & 4.23 Bathrooms, Bathing Facilities, and Shower Rooms

Single-User Toilet Rooms: Side Transfer Space

These drawings illustrate the space requirements for a single-user toilet room with a single plumbing wall. Clear floor space at water closets at least 60 inches wide allows room for side transfers. Lavatories can abut this space (or overlap it as shown on page 89).



Clear floor space should be centered at lavatories. This clear floor space, which can overlap space required at water closets, must extend 17 to 19 inches below the lavatory. Where provided, towel dispensers within reach from the lavatory will allow people to dry their hands before maneuvering from the fixture (see page 76). Knee and toe clearances below fixtures can overlap turning space, although this should be limited where the space is confined to the minimum (see page 15). Turning space can be provided in the form of a 60 inch diameter circle (as shown) or T-shaped space.