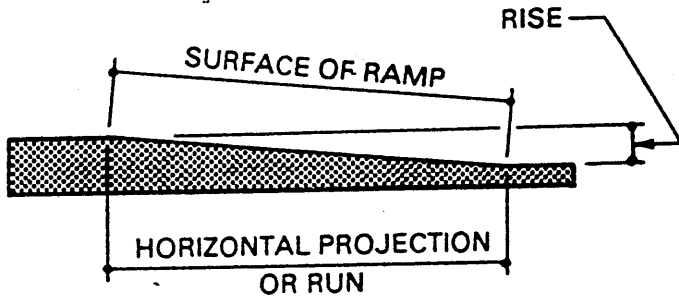


Below are excerpts from ANSI 117.1 detailing ramp specifications. These are the basic requirements. See the complete code text for additional details.

## 4.8 Ramps

**4.8.1\* General.** Any part of an accessible route with a slope greater than 1:20 shall be considered a ramp and shall comply with 4.8.

**4.8.2\* Slope and Rise.** The least possible slope shall be used for any ramp. The maximum slope of a ramp in new construction shall be 1:12. The maximum rise for any ramp run shall be 30 in (760 mm) (see Fig. 16). Curb ramps and ramps to be constructed on existing sites or in existing buildings or facilities may have slopes and rises as shown in Table 3 if space limitations prohibit the use of a 1:12 slope or less.



Slope	Maximum Rise		Maximum Horizontal Projection	
	in	mm	ft	m
1:12 to 1:15	30	760	30	9
1:16 to 1:19	30	760	40	12
1:20	30	760	50	15

**Fig. 16**  
Components of a Single Ramp Run and Sample Ramp Dimensions

**Table 3**  
Allowable Ramp Dimensions for Construction in Existing Sites, Buildings, and Facilities

Slope†	Maximum Rise		Maximum Run	
	in	mm	ft	m
Steeper than 1:10 but no steeper than 1:8	3	75	2	0.6
Steeper than 1:12 but no steeper than 1:10	6	150	5	1.5

†A slope steeper than 1:8 not allowed.

**4.8.3 Clear Width.** The minimum clear width of a ramp shall be 36 in (915 mm) (see Fig. 17).

**4.8.4 Landings.** Ramps shall have level landings at the bottom and top of each run. Landings shall have the following features:

- (1) The landing shall be at least as wide as the widest ramp run leading to it
- (2) The landing length shall be a minimum of 60 in (1525 mm) clear
- (3) If ramps change direction at landings, the minimum landing size shall be 60 in by 60 in (1525 mm by 1525 mm)

(4) If a doorway is located at a landing, then the area in front of the doorway shall comply with 4.13.6

**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. Handrails shall have the following features:

- (1) Handrails shall be provided along both sides of ramp segments. The inside handrail on switch-back or dogleg ramps shall always be continuous.
- (2) If handrails are not continuous, they shall extend at least 12 in (305 mm) beyond the top and bottom of the ramp segment and shall be parallel with the floor or ground surface.

(3) The clear space between the handrail and the wall shall be 1½ 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 (see Fig. 39(d)).

(4) Gripping surfaces shall be continuous, without interruption by newel posts, other construction elements, or obstructions.

(5) The diameter or width of the gripping surfaces of a handrail shall be 1¼ in to 1½ in (32 mm to 38 mm), or the shape shall provide an equivalent

gripping surface (see Fig. 39(a), (b), and (c)). Standard pipe sizes designated by the industry as 1¼ in to 1½ in (32 mm to 38 mm) are acceptable industry tolerances as noted under 3.2.

(6) The top of handrail gripping surfaces shall be mounted between 30 in and 34 in (760 mm and 865 mm) above ramp surfaces.

(7) A handrail 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 ¼ in (3.2 mm).

**4.8.6 Cross Slope and Surfaces.** The cross slope of ramp surfaces shall be no greater than 1:50. Ramp surfaces shall comply with 4.5.

**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 (51 mm) high (see Fig. 17).

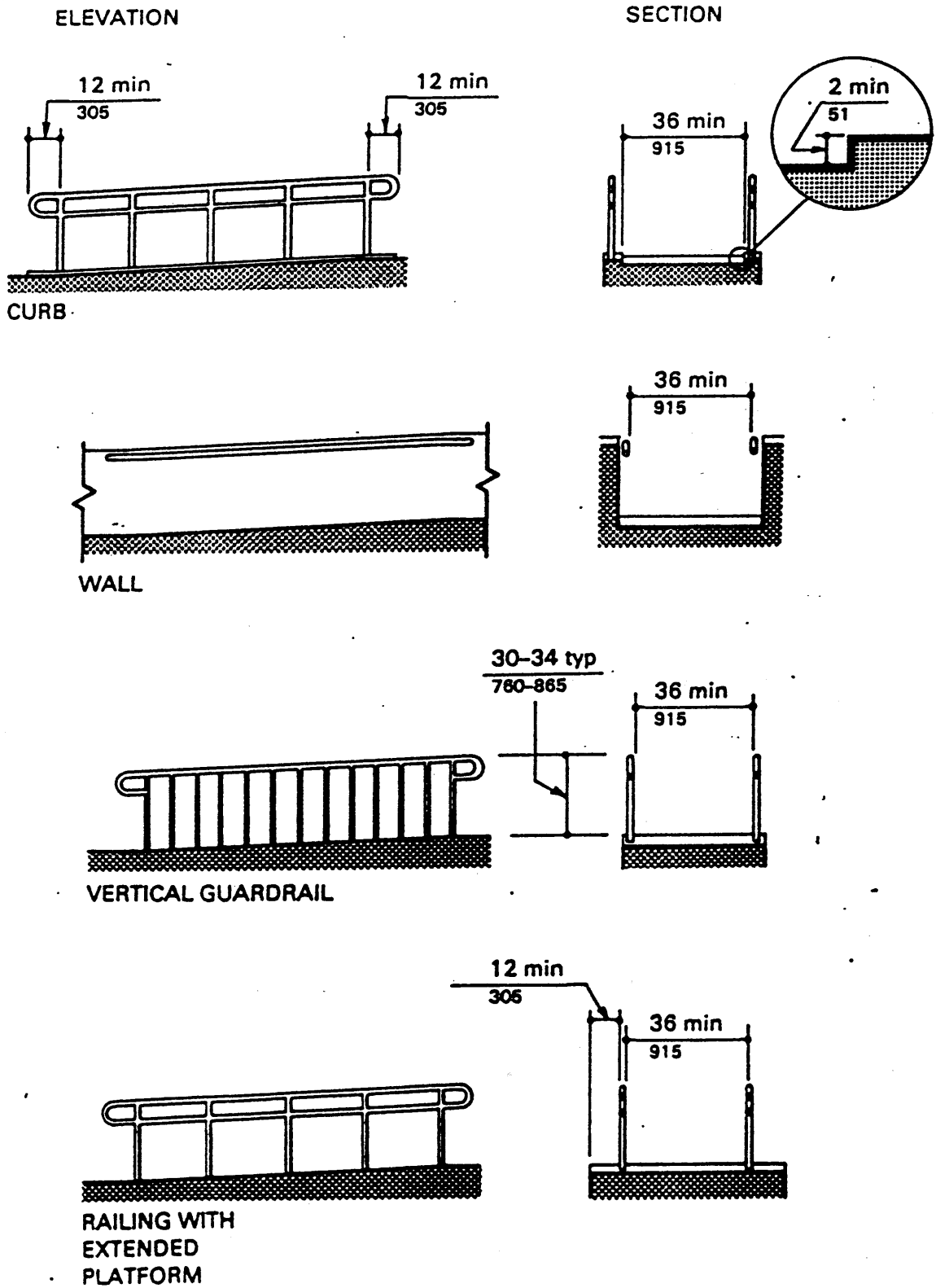
**4.8.8 Outdoor Conditions.** Outdoor ramps and their approaches shall be designed so that water will not accumulate on walking surfaces.

ON PL 3

ON PL 6

ON PL 7

1



**Fig. 17**  
**Examples of Edge Protection and Handrail Extensions**

→ **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. 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.

**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).

**4.13.8\* Thresholds at Doorways.** Thresholds at doorways shall not exceed 3/4 in (19 mm) in height for exterior sliding doors or 1/2 in (13 mm) for other types of doors. Raised thresholds and floor level changes at accessible doorways shall be beveled with a slope no greater than 1:2 (see 4.5.2).

**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. In dwelling units, only doors at accessible entrances to the unit itself shall comply with the requirements of this paragraph. Doors to hazardous areas shall have hardware complying with 4.29.3. *Mount no hardware required for accessible door passage 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)

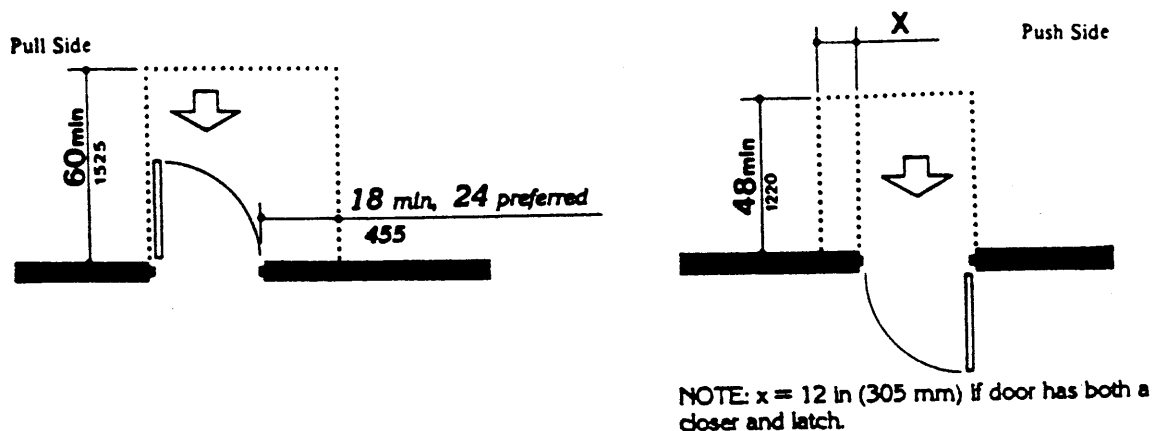
These forces do not apply to the force required to retract latch bolts or disengage other devices that may hold the door in a closed position.

**4.13.12\* Automatic Doors and Power-Assisted Doors.** If an automatic door is used, then it shall comply with American National Standard for Power-Operated Doors, ANSI A156.10-1979. Slowly opening, low-powered, automatic doors shall be considered a type of custom design installation as described in paragraph 1.1.1 of ANSI A156.10-1979. Such doors shall not open to back check faster than 3 seconds and shall require no more than 15 lbf (66.6N) to stop door movement. If a power-assisted door is used, its door-opening force shall comply with 4.13.11 and its closing shall conform to the requirements in section 10 of ANSI A156.10-1979.

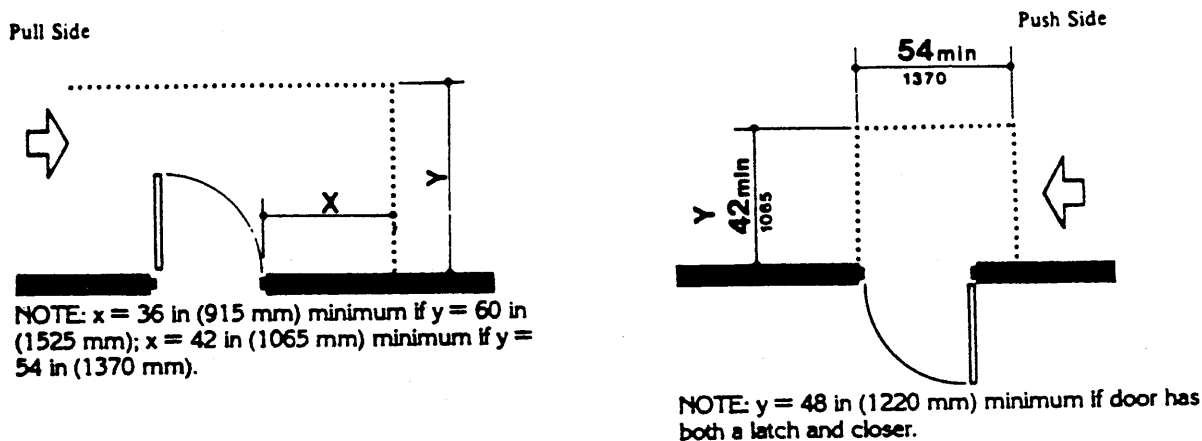
NOTE

In addition to providing access for the disabled, ramps are also part of the egress facilities of the building and need to meet applicable code requirements just as for stairs, stoops, etc.. The railings on portions of ramps over 15 1/2" (30" in single family occupancies) above the adjacent ground or surface must have balusters or other features built into the railing so that a 4" sphere cannot fit through them. Stoops, decks, etc, over 15 1/2" (30" in single family occupancies) above the ground or adjacent ground or surface must have guardrails at least 42" high (36" high in single family occupancies), with balusters or other construction such that a 4' sphere cannot fit through it.

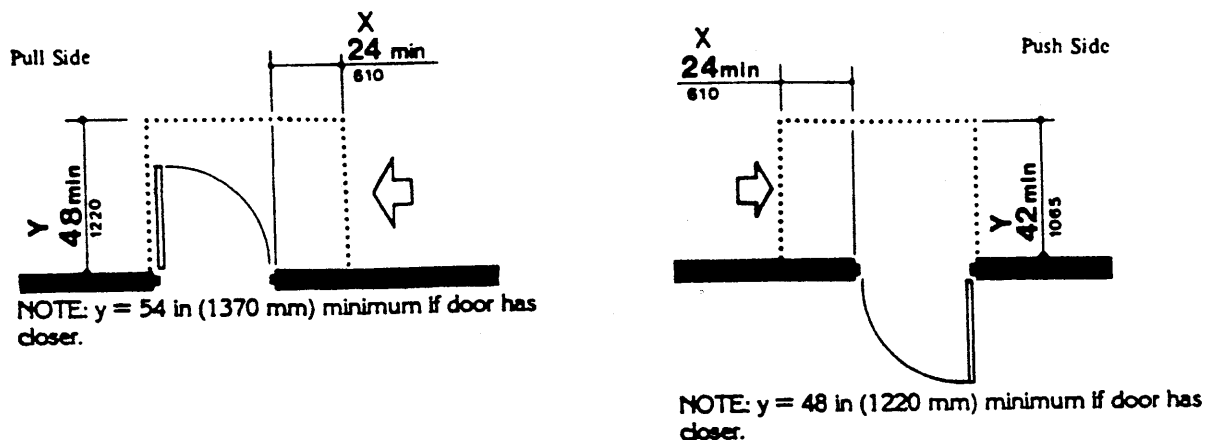
If you have questions, ask.



(a)  
Front Approaches — Swinging Doors



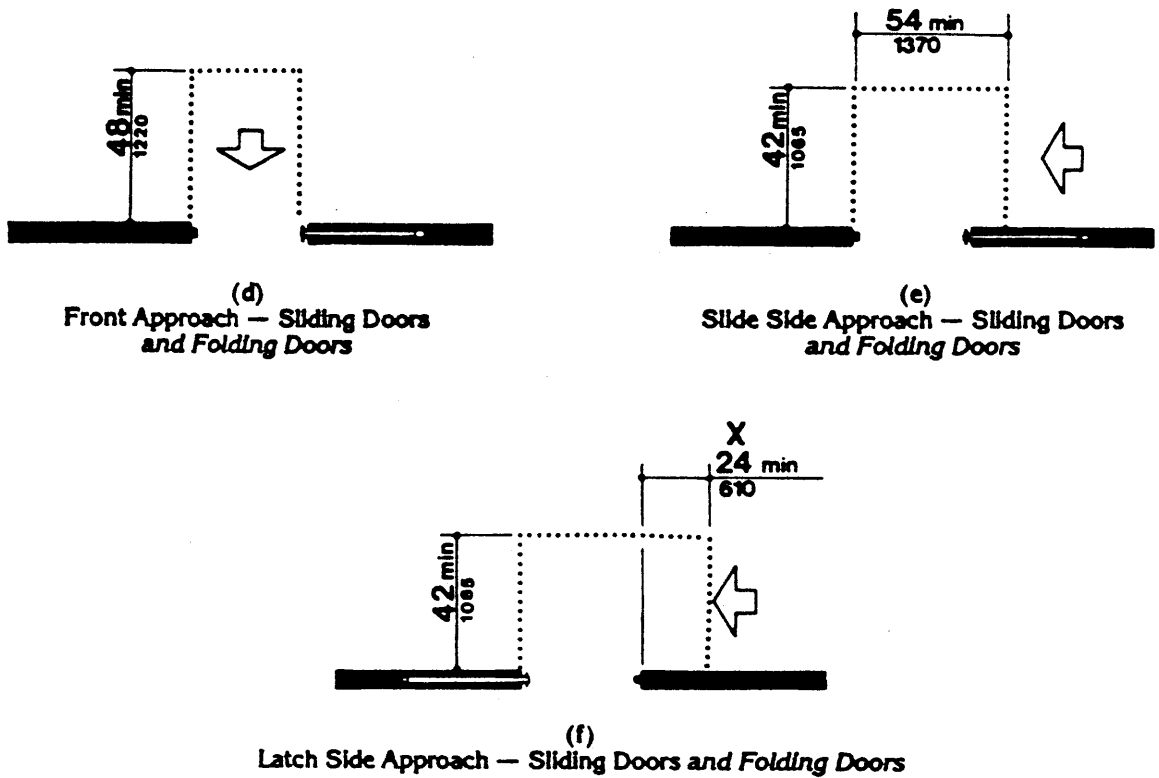
(b)  
Hinge Side Approaches — Swinging Doors



(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



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

Fig. 25  
Maneuvering Clearances at Doors (Continued)

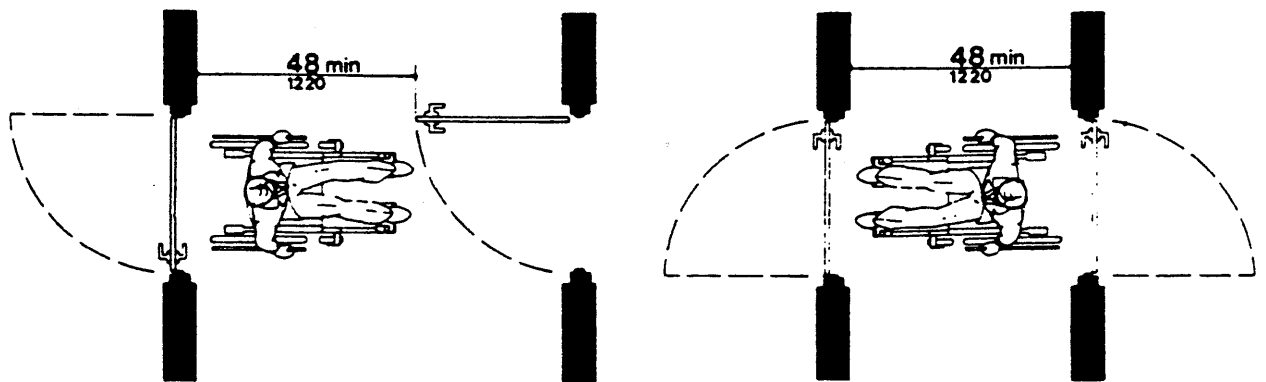


Fig. 26  
Two Hinged Doors in Series

(5)

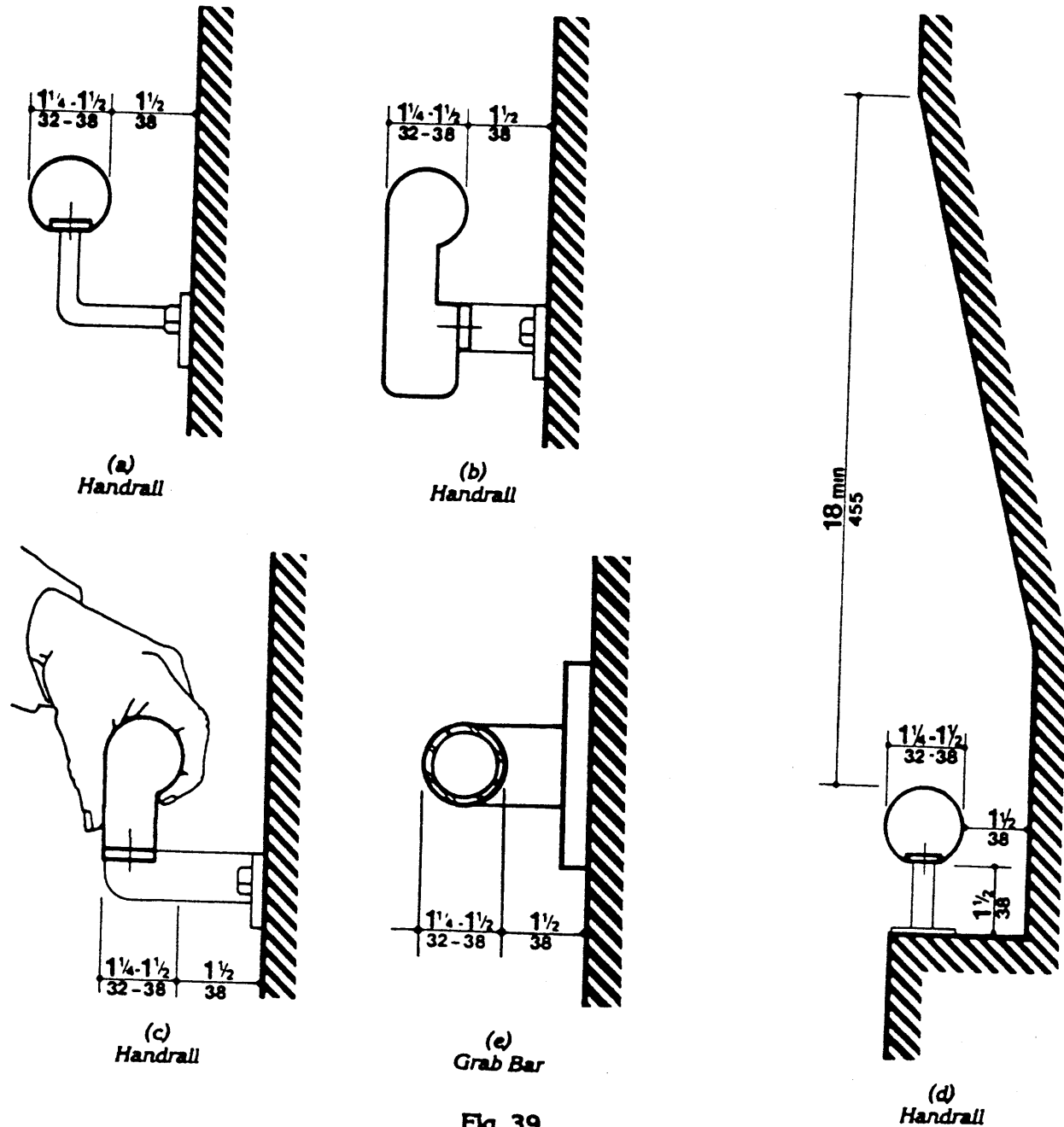


Fig. 39  
Size and Spacing of Handrails and Grab Bars

**EXCEPTIONS:**

(1) Visual alarm devices that are mounted adjacent to emergency exit signs may be used in lieu of flashing exit signs.

(2) Specialized systems utilizing advanced technology may be substituted for the visual systems specified above if equivalent protection is afforded handicapped users of the building or facility.

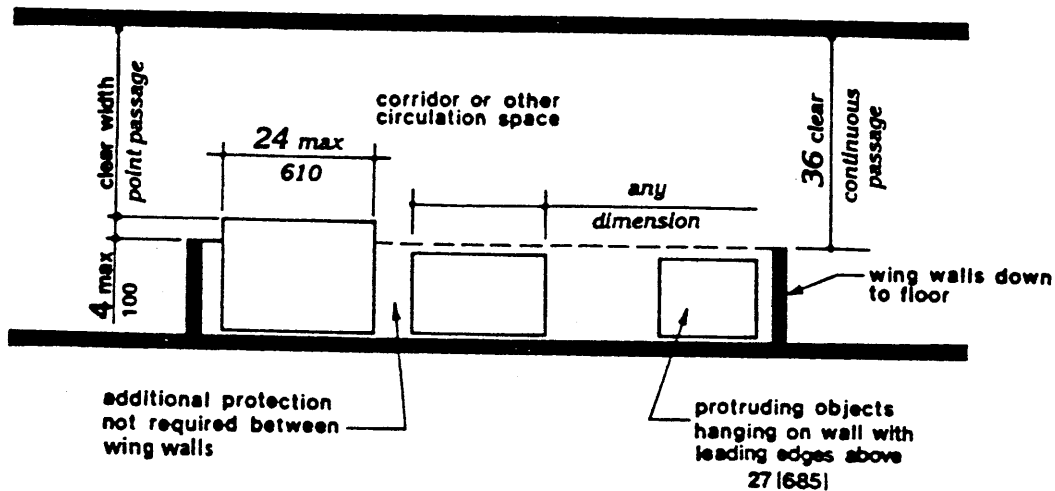
**4.28.4\* Auxiliary Alarms.** Accessible sleeping accommodations shall have a visual alarm connected

to the building emergency alarm system or shall have a standard 110-volt electrical receptacle into which such an alarm could be connected. Instructions for use of the auxiliary alarm or connection shall be provided.

**4.29 Tactile Warnings.**

**4.29.1 General.** Tactile warnings required to be accessible by 4.1 shall comply with 4.29.

**4.29.2\* Tactile Warnings on Walking Surfaces.** (Reserved).



(e)  
Example of Protection around Wall-Mounted Objects and Measurements of Clear Widths

Fig. 8  
Protruding Objects (Continued)

**4.5 Ground and Floor Surfaces.**

**4.5.1\* General.** Ground and floor surfaces along accessible routes and in accessible rooms and spaces, including floors, walks, ramps, stairs, and curb ramps, shall be stable, firm, *slip-resistant*, and shall comply with 4.5.

**4.5.2 Changes in Level.** Changes in level up to 1/4 in (6 mm) may be vertical and without edge treatment (see Fig. 7(c)). Changes in level between 1/4 in and 1/2 in (6 mm and 13 mm) shall be beveled with a slope no greater than 1:2 (see Fig. 7(d)). Changes in level greater than 1/2 in (13 mm) shall be accomplished by means of a ramp that complies with 4.7 or 4.8.

**4.5.3\* Carpet.** If carpet or carpet tile is used on a ground or floor surface, then it shall be securely

attached; have a firm cushion, pad, or backing or no cushion or pad; and have a level loop, textured loop, level cut pile, or level cut/uncut pile texture. The maximum pile height shall be 1/2 in (13 mm). Exposed edges of carpet shall be fastened to floor surfaces and have trim along the entire length of the exposed edge. Carpet edge trim shall comply with 4.5.2. *If carpet tile is used on an accessible ground or floor surface, it shall have a maximum combined thickness of pile, cushion, and backing height of 1/2 in (13 mm) (see Fig. 8(f)).*

**4.5.4 Gratings.** If gratings are located in walking surfaces, then they shall have spaces no greater than 1/2 in (13 mm) wide in one direction (see Fig. 8(g)). If gratings have elongated openings, then they shall be placed so that the long dimension is perpendicular to the dominant direction of travel (see Fig. 8(h)).