



**ROBIN STEEL**

WAYFINDING SOLUTIONS



**ADAAG**

Americans with Disabilities Act (ADA)

Accessibility Guidelines for Buildings and Facilities

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# ADA ACCESSIBILITY GUIDELINES FOR BUILDINGS & FACILITIES

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## 4.7 CURB RAMPS

### 4.6.3\* Parking Spaces

Accessible parking spaces shall be at least 96 in (244 mm) wide. Parking access aisles shall be part of an accessible route to the building or facility entrance and shall comply with 4.3. Two accessible parking spaces may share a common access aisle (see Fig. 9). Parked vehicle overhangs shall not reduce the clear width of an accessible route. Parking spaces and access aisles shall be level with surface slopes not exceeding 1:50 (2%) in all directions.

### 4.6.4\* Signage

Accessible parking spaces shall be designated as reserved by a sign showing the symbol of accessibility (see 4.30.7). Spaces complying with 4.1.2(5)(b) shall have an additional sign "Van-Accessible" mounted below the symbol of accessibility. Such signs shall be located so they cannot be obscured by a vehicle parked in the space.

### 4.6.5\* Vertical Clearance

Provide minimum vertical clearance of 114 in (2895 mm) at accessible passenger loading zones and along at least one vehicle access route to such areas from site entrance(s) and exit(s). At parking spaces complying with 4.1.2(5)(b), provide minimum vertical clearance of 98 in (2490 mm) at the parking space and along at least one vehicle access route to such spaces from site entrance(s) and exit(s).

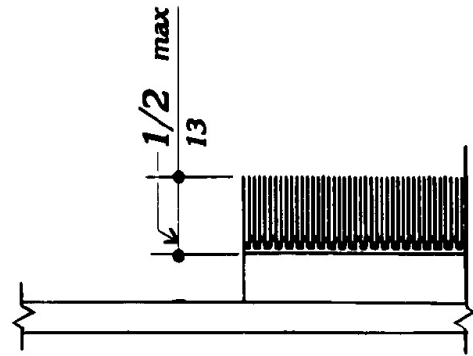
### 4.6.6 Passenger Loading Zones

Passenger loading zones shall provide an access aisle at least 60 in (1525 mm) wide and 20 ft (240 in) (6100 mm) long adjacent and parallel to the vehicle pullup space (see Fig. 10). If there are curbs between the access aisle and the vehicle pull-up space, then a curb ramp complying with 4.7 shall be provided. Vehicle standing spaces and access aisles shall be level with surface slopes not exceeding 1:50 (2%) in all directions.

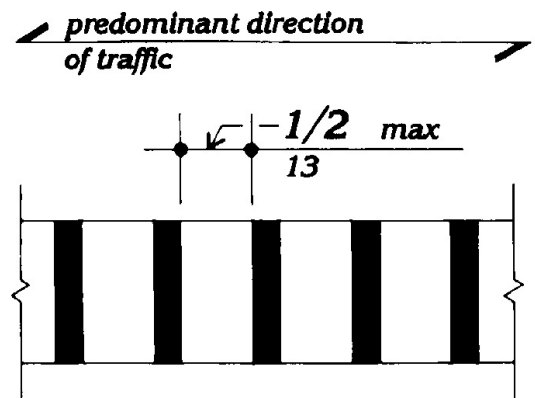
## 4.7 Curb Ramps

### 4.7.1 Location

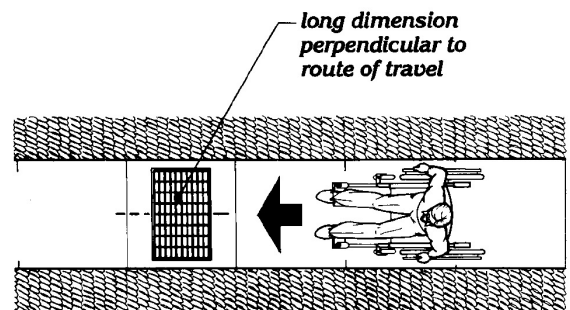
Curb ramps complying with 4.7 shall be provided wherever an accessible route crosses a curb.



**Fig. 8 (f)**  
**Carpet Pile Thickness**



**Fig. 8 (g)**  
**Gratings**



**Fig. 8 (h)**  
**Grating Orientation**

## 4.7 CURB RAMPS

### 4.7.5 Sides of Curb Ramps

If a curb ramp is located where pedestrians must walk across the ramp, or where it is not protected by handrails or guardrails, it shall have flared sides; the maximum slope of the flare shall be 1:10 (see Fig. 12(a)). Curb ramps with returned curbs may be used where pedestrians would not normally walk across the ramp (see Fig. 12(b)).

### 4.7.6 Built-up Curb Ramps

Built-up curb ramps shall be located so that they do not project into vehicular traffic lanes (see Fig. 13).

### 4.7.7 Detectable Warnings

A curb ramp shall have a detectable warning complying with 4.29.2. The detectable warning shall extend the full width and depth of the curb ramp.

### 4.7.8 Obstructions

Curb ramps shall be located or protected to prevent their obstruction by parked vehicles.

### 4.7.9 Location at Marked Crossings

Curb ramps at marked crossings shall be wholly contained within the markings, excluding any flared sides (see Fig. 15).

### 4.7.10 Diagonal Curb Ramps

If diagonal (or corner type) curb ramps have returned curbs or other well-defined edges, such edges shall be parallel to the direction of pedestrian flow. The bottom of diagonal curb ramps shall have 48 in (1220 mm) minimum clear space as shown in Fig. 15(c) and (d). If diagonal curb ramps are provided at marked crossings, the 48 in (1220 mm) clear space shall be within the markings (see Fig. 15(c) and (d)). If diagonal curb ramps have flared sides, they shall also have at least a 24 in (610 mm) long segment of straight curb located on each side of the curb ramp and within the marked crossing (see Fig. 15(c)).

### 4.7.11 Islands

Any raised islands in crossings shall be cut through level with the street or have curb ramps at both sides and a level area at least 48 in (1220 mm) long between the curb ramps in the part of the island intersected by the crossings (see Fig. 15(a) and (b)).

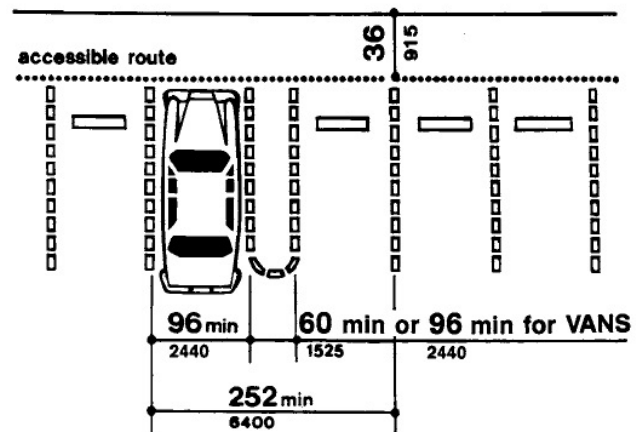


Fig. 9  
Dimensions of Parking Space

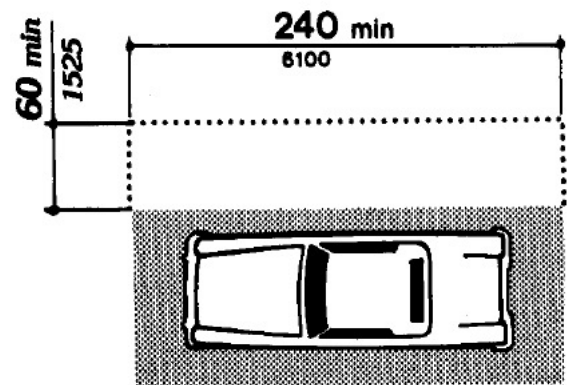


Fig. 10  
Access Aisle at Passenger Loading Zones

### 4.7.2 Slope

Slopes of curb ramps shall comply with 4.8.2. The slope shall be measured as shown in Fig. 11. Transitions from ramps to walks, gutters, or streets shall be flush and free of abrupt changes. Maximum slopes of adjoining gutters, road surface immediately adjacent to the curb ramp, or accessible route shall not exceed 1:20.

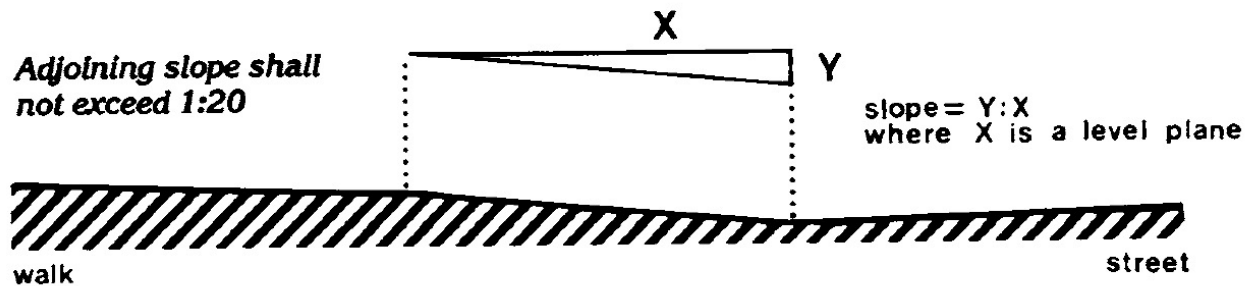
### 4.7.3 Width

The minimum width of a curb ramp shall be 36 in (915 mm), exclusive of flared sides.

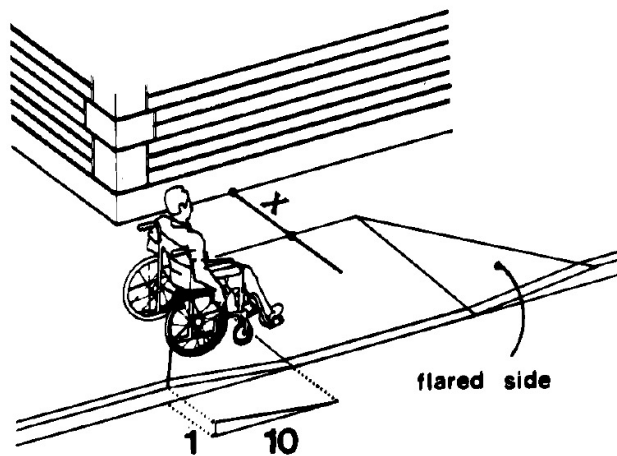
### 4.7.4 Surface

Surfaces of curb ramps shall comply with 4.5.

## 4.8 RAMPS

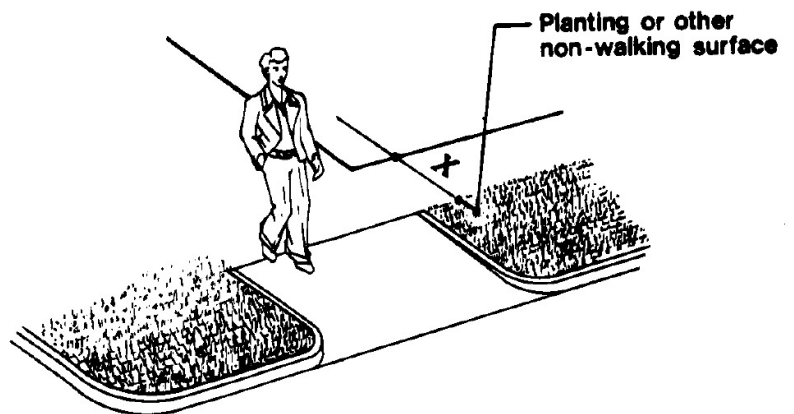


**Fig. 11**  
**Measurement of Curb Ramp Slopes**



**(a)**  
**Flared Sides**

If X is less than 48 in,  
then the slope of the flared side  
shall not exceed 1:12.



**(b)**  
**Returned Curb**

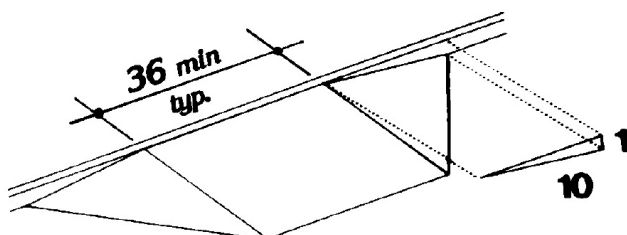
**Fig. 12**  
**Sides of Curb Ramps**

### 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

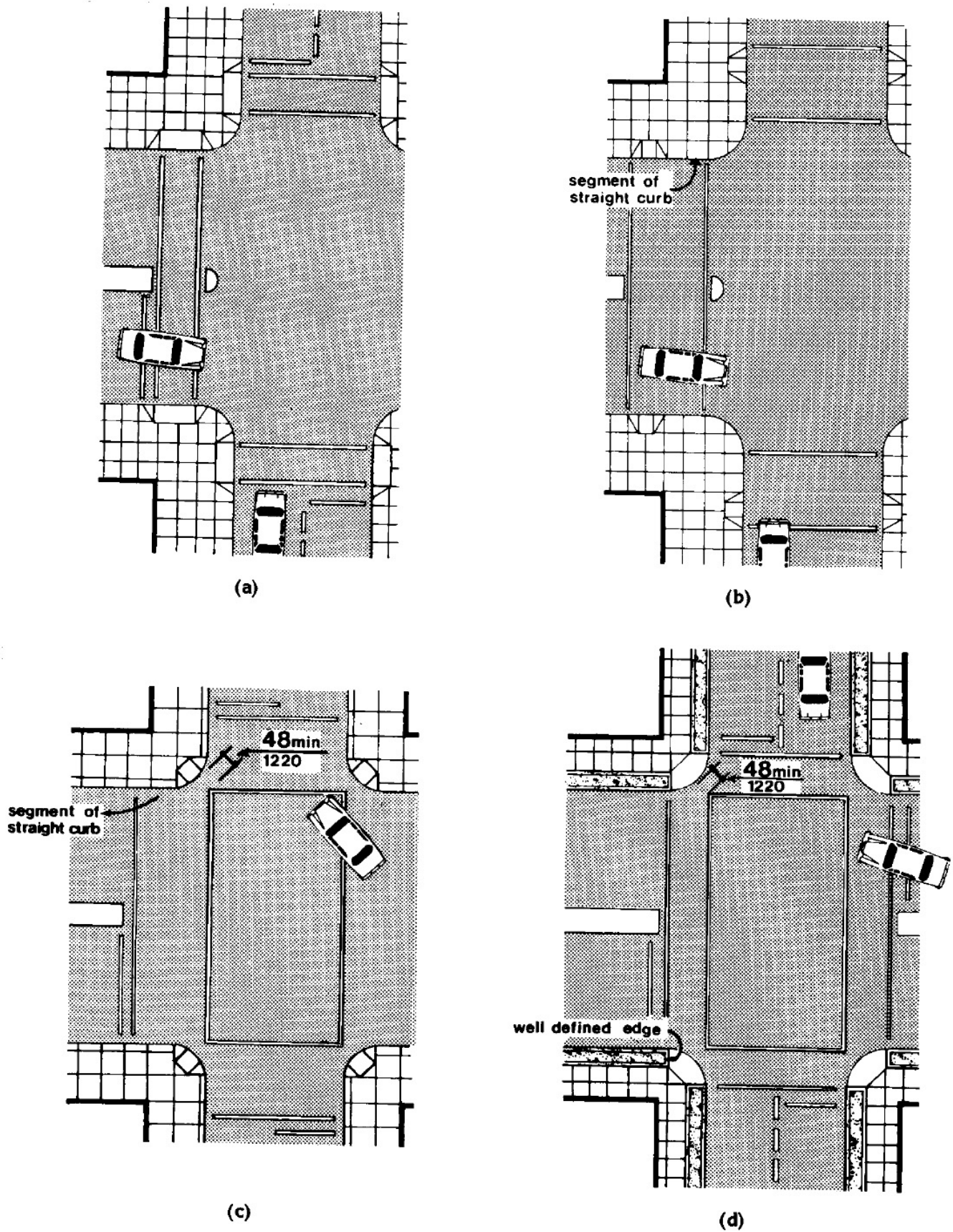
The least possible slope shall be used for any ramp. The maximum slope of a ramp in new construction shall be 1:12. The maximum rise for any run shall be 30 in (760 mm) (see Fig. 16). Curb ramps and ramps to be constructed on existing sites or in existing buildings or facilities may have slopes and rises as allowed in 4.1.6(3)(a) if space limitations prohibit the use of a 1:12 slope or less.



**Fig. 13**  
**Built-Up Curb Ramp**



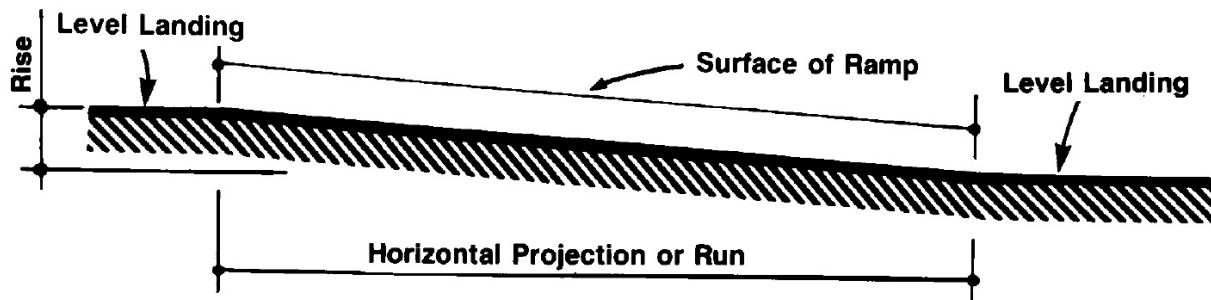
## 4.8 RAMPS



**Fig. 15**  
**Curb Ramps at Marked Crossings**



## 4.8 RAMPS



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

**Fig. 16**

**Components of a Single Ramp Run and Sample Ramp Dimensions**

### 4.8.3 Clear Width

The minimum clear width of a ramp shall be 36 in (915 mm).

### 4.8.4\* Landings

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

- (1) The landing shall be at least as wide as the 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 or adjacent to seating in assembly areas. Handrails shall comply with 4.26 and shall have the following features:

- (1) Handrails shall be provided along both sides of ramp segments. The inside handrail on switchback 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 (see Fig. 17).
- (3) The clear space between the handrail and the wall shall be 1 - 1/2 in (38 mm).
- (4) Gripping surfaces shall be continuous.
- (5) Top of handrail gripping surfaces shall be mounted between 34 in and 38 in (865 mm and 965 mm) above ramp surfaces.
- (6) Ends of handrails shall be either rounded or returned smoothly to floor, wall, or post.
- (7) Handrails shall not rotate within their fittings.

## 4.9 STAIRS

### 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 (50 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.

## 4.9 Stairs

### 4.9.1\* Minimum Number

Stairs required to be accessible by 4.1 shall comply with 4.9.

### 4.9.2 Treads and Risers

On any given flight of stairs, all steps shall have uniform riser heights and uniform tread widths. Stair treads shall be no less than 11 in (280 mm) wide, measured from riser to riser (see Fig. 18(a)). Open risers are not permitted.

### 4.9.3 Nosings

The undersides of nosings shall not be abrupt. The radius of curvature at the leading edge of the tread shall be no greater than 1/2 in (13 mm). Risers shall be sloped or the underside of the nosing shall have an angle not less than 60 degrees from the horizontal. Nosings shall project no more than 1-1/2 in (38 mm) (see Fig. 18).

### 4.9.4 Handrails

Stairways shall have handrails at both sides of all stairs. Handrails shall comply with 4.26 and shall have the following features:

- (1) Handrails shall be continuous along both sides of stairs. The inside handrail on switchback or dogleg stairs shall always be continuous (see Fig. 19(a) and (b)).
- (2) If handrails are not continuous, they shall extend at least 12 in (305 mm) beyond the top riser and at least 12 in (305 mm) plus the width of one tread beyond the bottom riser. At the top, the extension shall be parallel with the floor or ground surface. At the bottom, the handrail shall continue to slope for a distance of the width of one tread from the bottom riser; the remainder of the extension shall be horizontal (see Fig. 19(c) and (d)). Handrail extensions shall comply with 4.4.
- (3) The clear space between handrails and wall shall be 1-1/2 in (38 mm).
- (4) Gripping surfaces shall be uninterrupted by newel posts, other construction elements, or obstructions.
- (5) Top of handrail gripping surface shall be mounted between 34 in and 38 in (865 mm and 965 mm) above stair nosings.
- (6) Ends of handrails shall be either rounded or returned smoothly to floor, wall or post.
- (7) Handrails shall not rotate within their fittings.

## 4.9 STAIRS

### 4.9.5 Detectable Warnings at Stairs

(Reserved).

### 4.9.6 Outdoor Conditions

Outdoor stairs and their approaches shall be designed so that water will not accumulate on walking surfaces.

## 4.10 Elevators

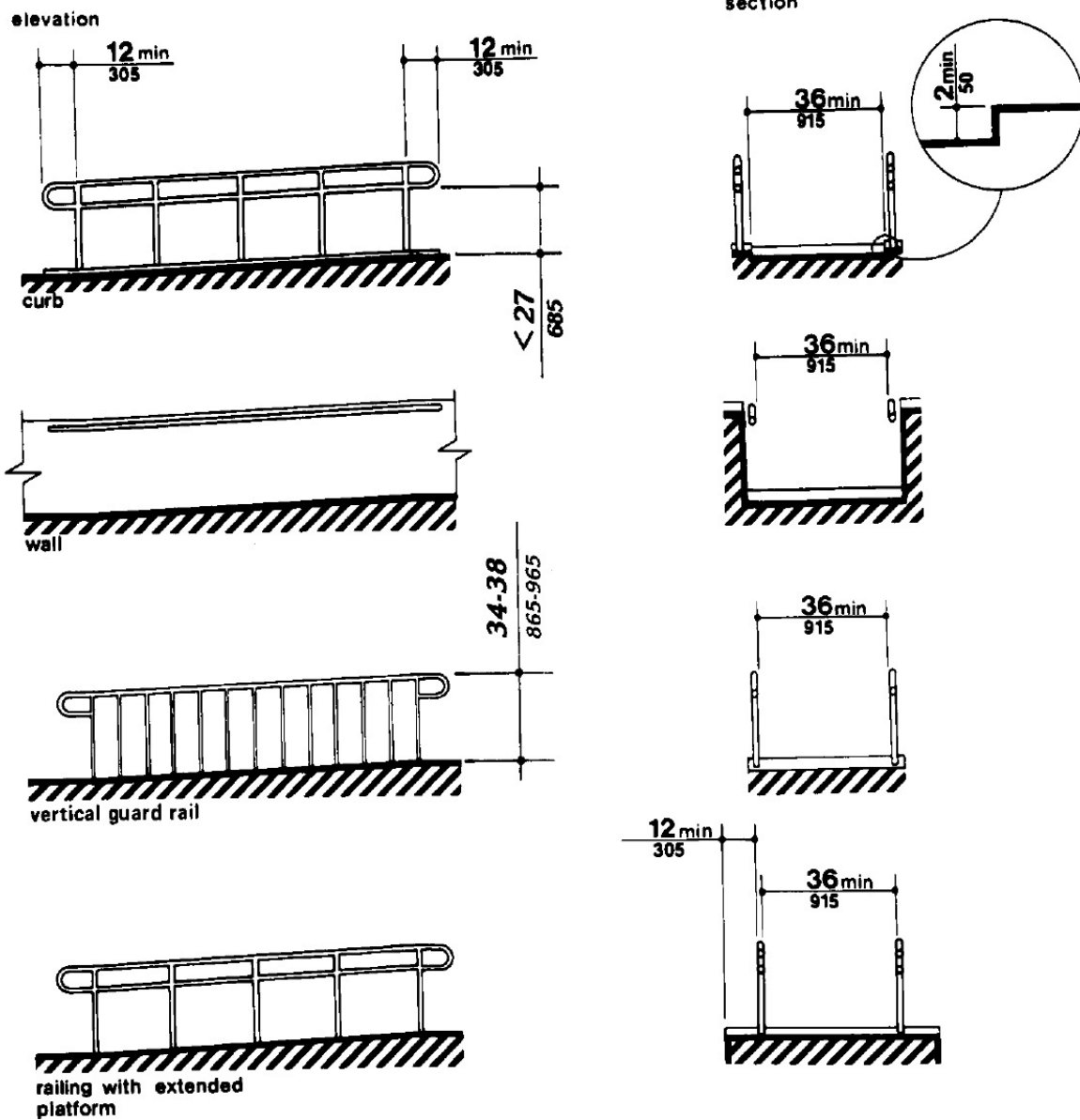
### 4.10.1 General

Accessible elevators shall be on an accessible route and shall comply with 4.10 and with the ASME A17.1-1990, Safety Code for Elevators and Escalators. Freight elevators shall not be considered as meeting the requirements of this section unless the only elevators provided are used as combination passenger and freight elevators for the public and employees.

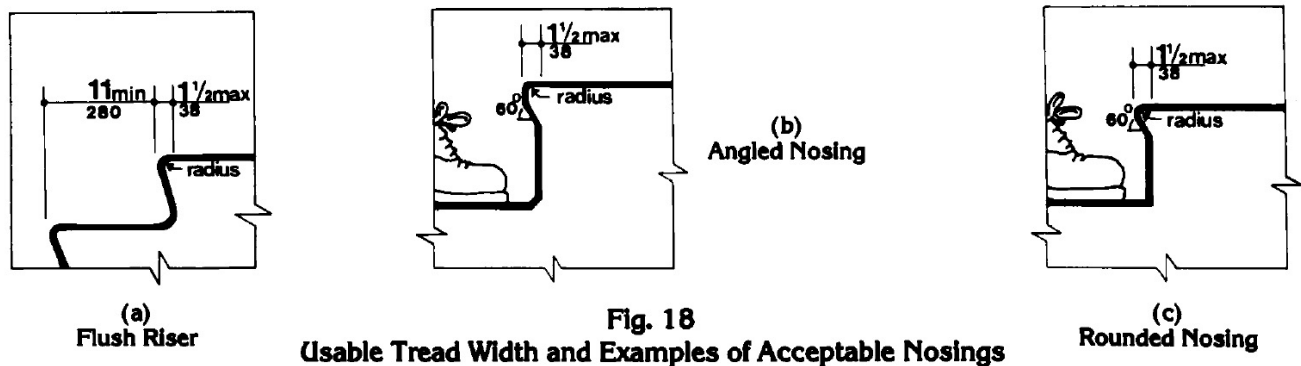
### 4.10.2 Automatic Operation

Elevator operation shall be automatic. Each car shall be equipped with a self-leveling feature that will automatically bring the car to floor landings within a tolerance of 1/2 in (13 mm) under rated loading to zero loading conditions. This self-leveling feature shall be automatic and independent of the operating device and shall correct the over-travel or undertravel.

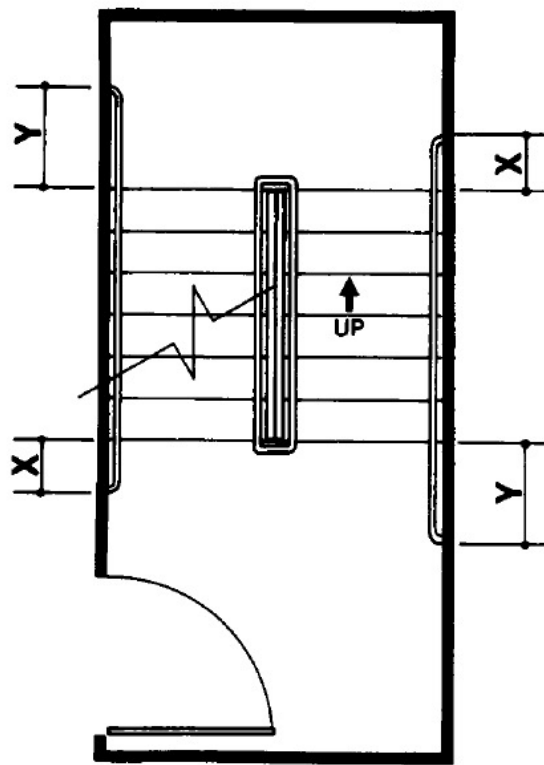
## 4.10 ELEVATORS



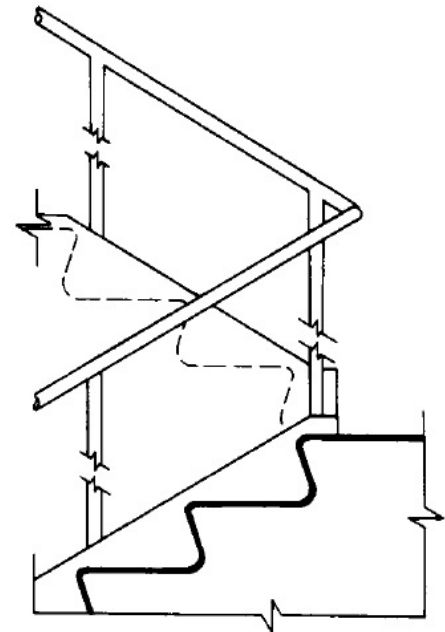
**Fig. 17**  
**Examples of Edge Protection and Handrail Extensions**



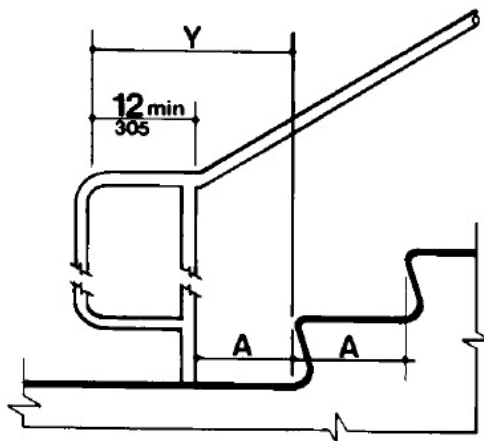
## 4.10 ELEVATORS



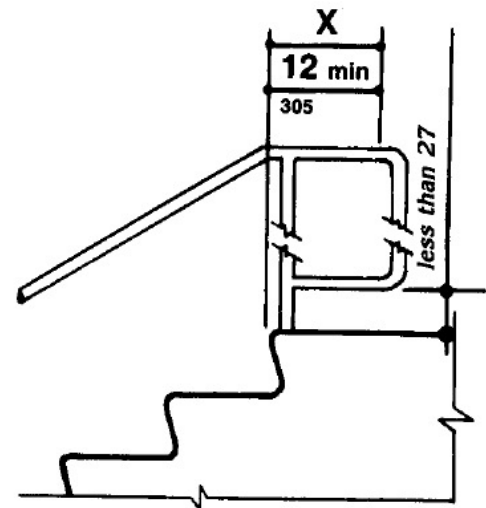
(a)  
Plan



(b)  
Elevation of Center Handrail



(c)  
Extension at Bottom of Run



(d)  
Extension at Top of Run

**NOTE:**

*X is the 12 in minimum handrail extension required at each top riser.*

*Y is the minimum handrail extension of 12 in plus the width of one tread that is required at each bottom riser.*

**Fig. 19**  
**Stair Handrails**



## 4.28 ALARMS

### 4.27.4 Operation

Controls and operating mechanisms shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate controls shall be no greater than 5 lbf (22.2 N).

### 4.28 Alarms

#### 4.28.1 General

Alarm systems required to be accessible by 4.1 shall comply with 4.28. At a minimum, visual signal appliances shall be provided in buildings and facilities in each of the following areas: restrooms and any other general usage areas (e.g., meeting rooms), hallways, lobbies, and any other area for common use.

#### 4.28.2\* Audible Alarms

If provided, audible emergency alarms shall produce a sound that exceeds the prevailing equivalent sound level in the room or space by at least 15 dbA or exceeds any maximum sound level with a duration of 60 seconds by 5 dbA, whichever is louder. Sound levels for alarm signals shall not exceed 120 dbA.

#### 4.28.3\* Visual Alarms

Visual alarm signal appliances shall be integrated into the building or facility alarm system. If single station audible alarms are provided then single station visual alarm signals shall be provided. Visual alarm signals shall have the following minimum photometric and location features:

- (1) The lamp shall be a xenon strobe type or equivalent.
- (2) The color shall be clear or nominal white (i.e., unfiltered or clear filtered white light).
- (3) The maximum pulse duration shall be twotenths of one second (0.2 sec) with a maximum duty cycle of 40 percent. The pulse duration is defined as the time interval between initial and final points of 10 percent of maximum signal.
- (4) The intensity shall be a minimum of 75 candela.
- (5) The flash rate shall be a minimum of 1 Hz and a maximum of 3 Hz.
- (6) The appliance shall be placed 80 in (2030 mm) above the highest floor level within the space or 6 in (152 mm) below the ceiling, whichever is lower.
- (7) In general, no place in any room or space required to have a visual signal appliance shall be more than 50 ft (15 m) from the signal (in the horizontal plane). In large rooms and spaces exceeding 100 ft (30 m) across, without obstructions 6 ft (2 m) above the finish floor, such as auditoriums, devices may be placed around the perimeter, spaced a maximum 100 ft (30 m) apart, in lieu of suspending appliances from the ceiling.
- (8) No place in common corridors or hallways in which visual alarm signalling appliances are required shall be more than 50 ft (15 m) from the signal.

#### 4.28.4\* Auxiliary Alarms

Units and 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 can be connected and a means by which a signal from the building emergency alarm system can trigger such an auxiliary alarm. When visual alarms are in place the signal shall be visible in all areas of the unit or room. Instructions for use of the auxiliary alarm or receptacle shall be provided.

## 4.28 ALARMS

### 4.29 Detectable Warnings

#### 4.29.1 General

Detectable warnings required by 4.1 and 4.7 shall comply with 4.29.

#### 4.29.2\* Detectable Warnings on Walking Surfaces

Detectable warnings shall consist of raised truncated domes with a diameter of nominal 0.9 in (23 mm), a height of nominal 0.2 in (5 mm) and a center-to-center spacing of nominal 2.35 in (60 mm) and shall contrast visually with adjoining surfaces, either light-on-dark, or dark-on-light.

The material used to provide contrast shall be an integral part of the walking surface. Detectable warnings used on interior surfaces shall differ from adjoining walking surfaces in resiliency or sound-on-cane contact.

#### 4.29.3 Detectable Warnings on Doors To Hazardous Areas

(Reserved).

#### 4.29.5 Detectable Warnings at Hazardous Vehicular Areas

If a walk crosses or adjoins a vehicular way, and the walking surfaces are not separated by curbs, railings, or other elements between the pedestrian areas and vehicular areas, the boundary between the areas shall be defined by a continuous detectable warning which is 36 in (915 mm) wide, complying with 4.29.2.

#### 4.29.6 Detectable Warnings at Reflecting Pools

The edges of reflecting pools shall be protected by railings, walls, curbs, or detectable warnings complying with 4.29.2.

#### 4.29.7 Standardization

(Reserved).

## A4.29 DETECTABLE WARNINGS

### A4.28.3 Visual Alarms

The specifications in this section do not preclude the use of zoned or coded alarm systems.

### A4.28.4 Auxiliary Alarms

Locating visual emergency alarms in rooms where persons who are deaf may work or reside alone can ensure that they will always be warned when an emergency alarm is activated. To be effective, such devices must be located and oriented so that they will spread signals and reflections throughout a space or raise the overall light level sharply. However, visual alarms alone are not necessarily the best means to alert sleepers. A study conducted by Underwriters Laboratory (UL) concluded that a flashing light more than seven times brighter was required (110 candela v. 15 candela, at the same distance) to awaken sleepers as was needed to alert awake subjects in a normal daytime illuminated room. For hotel and other rooms where people are likely to be asleep, a signal-activated vibrator placed between mattress and box spring or under a pillow was found by UL to be much more effective in alerting sleepers. Many readily available devices are sound-activated so that they could respond to an alarm clock, clock radio, wake-up telephone call or room smoke detector. Activation by a building alarm system can either be accomplished by a separate circuit activating an auditory alarm which would, in turn, trigger the vibrator or by a signal transmitted through the ordinary 110-volt outlet. Transmission of signals through the power line is relatively simple and is the basis of common, inexpensive remote light control systems sold in many department and electronic stores for home use. So-called "wireless" intercoms operate on the same principal.

## A4.29 Detectable Warnings

### A4.29.2 Detectable Warnings on Walking Surfaces

The material used to provide contrast should contrast by at least 70%. Contrast in percent is determined by:  $\text{Contrast} = [(B1 - B2)/B1] \times 100$  where B1 = light reflectance value (LRV) of the lighter area and B2 = light reflectance value (LRV) of the darker area. Note that in any application both white and black are never absolute; thus, B1 never equals 100 and B2 is always greater than 0.

## A4.30 Signage

### A4.30.1 General

In building complexes where finding locations independently on a routine basis may be a necessity (for example, college campuses), tactile maps or prerecorded instructions can be very helpful to visually impaired people. Several maps and auditory instructions have been developed and tested for specific applications. The type of map or instructions used must be based on the information to be communicated, which depends highly on the type of buildings or users. Landmarks that can easily be distinguished by visually impaired individuals are useful as orientation cues. Such cues include changes in illumination level, bright colors, unique patterns, wall murals, location of special equipment or other architectural features. Many people with disabilities have limitations in movement of their heads and reduced peripheral vision. Thus, signage positioned perpendicular to the path of travel is easiest for them to notice. People can generally distinguish signage within an angle of 30 degrees to either side of the centerlines of their faces without moving their heads.

### A4.30.2 Character Proportion

The legibility of printed characters is a function of the viewing higher than 10,000 Hz. An alarm signal which has a periodic element to its signal, such as single stroke bells (clang-pause- clang-pause), hi-low (up-down-up-down) and fast whoop (on-off-on-off) are best. Avoid continuous or reverberating tones. Select a signal which has a sound characterized by three or four clear tones without a great deal of "noise" in between.

# 4.30 SIGNAGE

## 4.30.1\* General

Signage required to be accessible by 4.1 shall comply with the applicable provisions of 4.30.

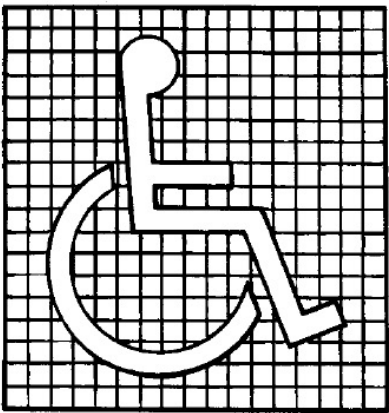
## 4.30.2\* Character Proportion

Letters and numbers on signs shall have a width-to-height ratio between 3:5 and 1:1 and a stroke-width-to height ratio between 1:5 and 1:10.

## 4.30.3 Character Height

Characters and numbers on signs shall be sized according to the viewing distance from which they are to be read. The minimum height is measured using an upper case X. Lower case characters are permitted.

Height Above Finished Floor	Minimum Character Height
Suspended or Projected Overhead in compliance with 4.4.2	3 in (75 mm) minimum



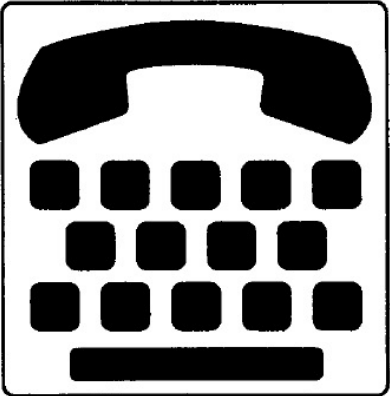
(a)

Proportions  
International Symbol of Accessibility



(b)

Display Conditions  
International Symbol of Accessibility



(c)

International TDD Symbol



(d)

International Symbol of Access for Hearing Loss

**Fig. 43**  
**International Symbols**