

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. [Appendix Note](#)

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).

4.29.4 Detectable Warnings at Stairs. (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).

4.30 Signage.

4.30.1* General. Signage required to be accessible by [4.1](#) shall comply with the applicable provisions of 4.30. [Appendix Note](#)

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. [Appendix Note](#)

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

4.30.4* Raised and Brailled Characters and Pictorial Symbol Signs (Pictograms). Letters and numerals shall be raised 1/32 in (0.8 mm) minimum, upper case, sans serif or simple serif type and shall be accompanied with Grade 2 Braille. Raised characters shall be at least 5/8 in (16 mm) high, but no higher than 2 in (50 mm). Pictograms shall be accompanied by the equivalent verbal description placed directly below the pictogram. The border dimension of the pictogram shall be 6 in (152 mm) minimum in height. [Appendix Note](#)

4.7 Curb Ramps.

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

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](#).

4.7.5 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 [\(b\)](#)).

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. [Appendix Note](#)

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. [Appendix Note](#)

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](#).

[Appendix Note](#)

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:

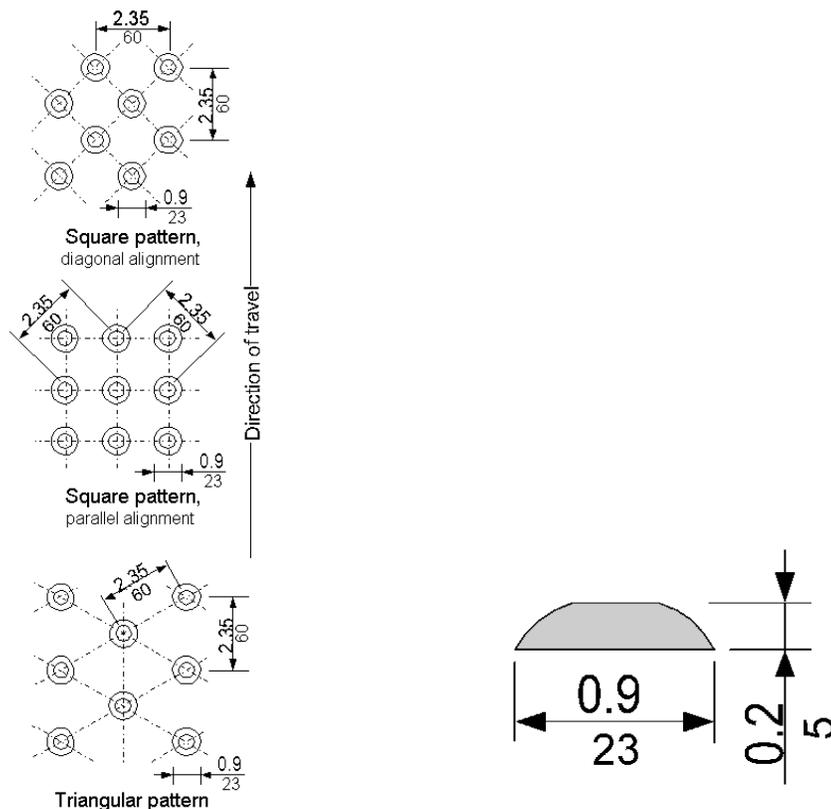
- (1) Handrails shall be provided along both sides of ramp segments. The inside handrail on switchback or dogleg ramps shall always be continuous.
- (2) If handrails are not continuous, they shall extend at least 12 in (305 mm) beyond the top and bottom of the ramp segment and shall be parallel with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

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.



Contrast

Interior applications require that the warning feature provide contrast in resilience or in sound when sensed with a cane. The domes and their matrix must also offer a strong visual contrast to adjacent pedestrian surfaces.

Recommendation: Although ADAAG does not specify values for light-on dark or dark-on light contrast, a minimum 70% light reflectance contrast is recommended.