



## Standard Practice for Safe Walking Surfaces<sup>1</sup>

This standard is issued under the fixed designation F 1637; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 *Scope*—This practice covers design and construction guidelines and minimum maintenance criteria for new and existing buildings and structures. This practice is intended to provide reasonably safe walking surfaces for pedestrians wearing ordinary footwear. These guidelines may not be adequate for those with certain mobility impairments.

1.2 *Application*—This practice addresses elements along and in walkways including floors and walkway surfaces, sidewalks, short flight stairs, gratings, wheel stops, and speed bumps. Swimming pools, bath tubs, showers, natural walks, and unimproved paths are beyond the scope of this practice.

1.3 Conformance with this practice will not alleviate all hazards; however, conformance will reduce certain pedestrian risks.

1.4 The values stated in inch-pound units are to be regarded as the standard. The SI units given in parentheses are for information only.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

### 2. Referenced Document

- 2.1 *ANSI Standard:*  
ANSI-Z535.1 Safety Color Coding<sup>2</sup>

### 3. Terminology

#### 3.1 Definitions:

3.1.1 *bollard*—a thick, low, short, post, often of iron or steel and usually used in series, provided for the purpose of excluding or diverting motor vehicles from a road, lawn, or path.

3.1.2 *carpet*—permanently secured fibrous floor covering.

3.1.2.1 *Discussion*—Area rugs, mats, and runners are not considered to be carpet for the purpose of this practice.

3.1.3 *cross slope*—the slope of a pedestrian walkway that is perpendicular to the direction of travel.

3.1.4 *element*—an identifiable part of an architectural component, for example, a stair handrail, tread, riser, or landing.

3.1.5 *fair*—a smooth transition between adjacent surfaces.

3.1.6 *foreseeable pedestrian path*—any place where a

pedestrian could reasonably be expected to walk.

3.1.7 *footwear*—shoes, including boots, sandals, slippers, or foul weather gear such as overshoes and rubbers, or a combination thereof.

3.1.8 *planar*—flat.

3.1.9 *ramp*—a walkway surface that has a slope steeper than 1:20 (5%).

3.1.10 *sidewalk*—a paved surface, such as concrete or asphalt, usually parallel and adjacent to streets.

3.1.11 *slip resistance*—the relative force that resists the tendency of the shoe or foot to slide along the walkway surface. Slip resistance is related to a combination of factors including the walkway surface, the footwear bottom, and the presence of foreign materials between them.

3.1.11.1 *Discussion*—Slip resistance is dependent upon many factors such as: material and condition of the walkway surface; material and condition of the shoe sole or heel material; the physical abilities of the user; the attempted or proposed activities of the user, and; the presence of any contaminants on any or both of the surfaces, and other factors.

3.1.12 *slip resistant*—the provision of adequate slip resistance to reduce the likelihood of slip for pedestrians using reasonable care on the walking surface under expected use conditions.

3.1.13 *walkway surface hardware*—includes manhole covers, cellar doors used as walking surfaces, junction box covers, cleanout covers, hatches, sidewalk elevator covers, sewer grates, utility covers, and similar elements that pedestrians can reasonably be expected to walk on.

3.1.14 *walkway*—walking surfaces constructed for pedestrian usage including floors, ramps, walks, sidewalks, stair treads, parking lots and similar paved areas which may be reasonably foreseeable as pedestrian paths. Natural surfaces such as fields, playing fields, paths, walks, or footpaths, or a combination thereof, are not included.

### 4. Walkway Surfaces

#### 4.1 General:

4.1.1 Walkways shall be stable, planar, flush, and even to the extent possible. Where walkways cannot be made flush and even, they shall conform to the requirements of 4.2 and 4.3.

4.1.2 Walkway surfaces for pedestrians shall be capable of safely sustaining intended loads.

4.1.3 Walkway surfaces shall be slip resistant under expected environmental conditions and use. Painted walkways shall contain an abrasive additive, cross cut grooving, texturing or other appropriate means to render the surface slip

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resistant where wet conditions may be reasonably foreseeable.

4.1.4 Interior walkways that are not slip resistant when wet shall be maintained dry during periods of pedestrian use.

4.2 *Walkway Changes in Level:*

4.2.1 Adjoining walkway surfaces shall be made flush and fair, whenever possible and for new construction and existing facilities to the extent practicable.

4.2.2 Changes in levels of less than 1/4 in. (6 mm) in height may be without edge treatment. (See Fig. 1.)

4.2.3 Changes in levels between 1/4 and 1/2 in. (6 and 12 mm) shall be beveled with a slope no greater than 1:2 (rise:run).

4.2.4 Changes in levels greater than 1/2 in. (12 mm) shall be transitioned by means of a ramp or stairway that complies with applicable building codes, regulations, standards, or ordinances, or all of these.

4.3 *Carpet:*

4.3.1 Carpet shall be maintained so as not to create pedestrian hazard. Carpet shall be firmly secured and seams tightly maintained. Carpet shall not have loose or frayed edges, unsecured seams, worn areas, holes, wrinkles or other hazards that may cause trip occurrence.

4.3.2 Carpet on floor surfaces shall be routinely inspected. Periodic restretching may become necessary. Periodic inspection is particularly important at step nosing edges.

4.3.3 Carpet and carpet trim (as measured when compressed) shall meet the transition requirements of 4.2.

4.3.4 Shag-type carpet shall not be used on stair treads. Carpeting should be firmly secured onto the tread and around the nosing.

4.4 *Mats and Runners:*

4.4.1 Mats, runners, or other means of ensuring that building entrances and interior walkways are kept dry shall be provided, as needed, during inclement weather. Replacement of mats or runners may be necessary when they become saturated.

4.4.2 Building entrances shall be provided with mats or runners, or other means to help remove foreign particles and other contaminants from the bottom of pedestrian footwear. Mats should be provided to minimize foreign particles, that may become dangerous to pedestrians particularly on hard smooth floors, from being tracked on floors.

4.4.3 Mats or runners should be provided at other wet or contaminated locations, particularly at known transitions from dry locations. Mats at building entrances also may be used to control the spread of precipitation onto floor surfaces, reducing the likelihood of the floors becoming slippery.

4.4.4 Mats shall be of sufficient design, area, and placement to control tracking of contaminants into buildings. Safe practice requires that mats be installed and maintained to avoid tracking water off the last mat onto floor surfaces.

4.4.5 Mats, runners, and area rugs shall be provided with

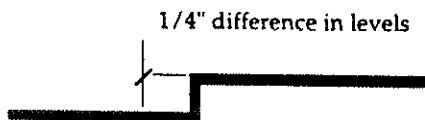


FIG. 1 Changes in Levels of Less Than 1/4 in. (6 mm)

safe transition from adjacent surfaces and shall be fixed in place or provided with slip resistant backing.

4.5 *Illumination:*

4.5.1 Minimum walkway illumination shall be governed by the requirements of local codes and ordinances or, in their absence, by the recommendations set forth by the Illuminating Engineering Society of North America (IES) (Application and Reference Volumes).

4.5.2 Illumination shall be designed to be glare free.

4.5.3 Illumination shall be designed to avoid casting of obscuring shadows on walkways, including shadows on stairs that may be cast by users.

4.5.4 Interior and exterior pedestrian use areas, including parking lots, shall be properly illuminated during periods when pedestrians may be present.

4.6 *Headroom*—A minimum headroom clearance of 6 ft 8 in. (2.03 m), measured from the walkway surface, shall be provided above all parts of the walkway. Where such clearance is not provided in existing structures, the low clearance portions of the walkway shall be safely padded, marked with safety contrast color coding (for example, see ANSI-Z535.1) and posted with appropriate warning signs.

4.7 *Exterior Walkways:*

4.7.1 Exterior walkways shall be maintained so as to provide safe walking conditions.

4.7.1.1 Exterior walkways shall be slip resistant.

4.7.1.2 Exterior walkway conditions that may be considered substandard and in need of repair include conditions in which the pavement is broken, depressed, raised, undermined, slippery, uneven, or cracked to the extent that pieces may be readily removed.

4.7.2 Exterior walkways shall be repaired or replaced where there is an abrupt variation in elevation between surfaces. Vertical displacements in exterior walkways shall be transitioned in accordance with 4.2.

4.7.3 Edges of sidewalk joints shall be rounded.

5. *Walking Surface Hardware*

5.1 Walking surface hardware within foreseeable pedestrian paths shall be maintained flush with the surrounding surfaces; variances between levels shall be transitioned in accordance with 4.2.

5.2 Walking surface hardware within foreseeable pedestrian paths shall be maintained slip resistant.

5.3 Walking surface hardware shall be installed and maintained so as to be stable under reasonable foreseeable loading.

6. *Stairs*

6.1 *General:*

6.1.1 Stairways with "distracting" forward or side views shall be avoided. A "distracting" view is one which can attract the stair user's attention, (for example, advertisements, store displays), thus distracting the stair user.

6.1.2 Step nosings shall be readily discernible, slip resistant, and adequately demarcated. Random, pictorial, floral, or geometric designs are examples of design elements that can camouflage a step nosing.

6.1.3 Doors shall not open over stairs.

6.1.4 Structure (reserved).

6.2 *Short Flight Stairs (Three or Fewer Risers):*

6.2.1 Short flight stairs shall be avoided where possible.

6.2.2 In situations where a short flight stair or single step transition exists or cannot be avoided, obvious visual cues shall be provided to facilitate improved step identification. Handrails, delineated nosing edges, tactile cues, warning signs, contrast in surface colors, and accent lighting are examples of some appropriate warning cues.

7. Speed Bumps

7.1 Design to avoid the use of speed bumps.

7.2 All speed bumps which are in foreseeable pedestrian paths shall comply with 4.2 (walkway changes in level).

7.3 Existing speed bumps, that do not conform to 4.2, shall be clearly marked with safety color coding to contrast with surroundings in accordance with ANSI Z535.1. Painted speed bumps shall be slip resistant. Pedestrian CAUTION signs are recommended.

8. Wheel Stops

8.1 Parking lots should be designed to avoid the use of wheel stops.

8.2 Wheel stops shall not be placed in pedestrian walkways or foreseeable pedestrian paths.

8.3 Wheel stops shall be in contrast with their surroundings.

8.4 Wheel stops shall be no longer than 6 ft (1.83 m) and shall be placed in the center of parking stalls. The minimum width of pedestrian passage between wheel stops shall be 3 ft (0.91 m).

8.5 The top of wheel stops shall not exceed 6.5 in. (165 mm) in height above the parking lot surface.

8.6 Adequate illumination shall be maintained at wheel stops as governed by the requirements of local codes and

ordinances or, in their absence, by the recommendations set forth by the Illuminating Engineering Society of North America (IES-Application and Reference Volumes).

8.7 Bollards, not less than 3 ft 6 in. (1.07 m) height, may be placed in the center of parking stalls as an alternative to wheel stops. Bollards should be appropriately marked to enhance visibility in accordance with ANSI-Z535.1.

9. Gratings

9.1 Gratings used in public areas should be located outside of pedestrian walkways.

9.2 Gratings located in foreseeable pedestrian walkways shall not have openings wider than 1/2 in. (13 mm) in the direction of predominant travel.

9.2.1 *Exemption*—The requirements of 9.2 do not apply in areas where footwear worn is controlled (for example, industrial areas).

9.3 Gratings with elongated openings shall be placed with the long dimension perpendicular to the direction of predominant travel.

9.4 Gratings shall be maintained slip resistant.

10. Warnings

10.1 The use of visual cues such as warnings, accent lighting, handrails, contrast painting, and other cues to improve the safety of walkway transitions are recognized as effective controls in some applications. However, such cues or warnings do not necessarily negate the need for safe design construction.

11. Keywords

11.1 carpet; floors; gratings; mats; runners; sidewalks; short flight stairs; slip resistance; speed bump; stairs; walkway; wheel stop

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