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A117.1-1961

UDC 725/728:

362.6:614.8

**American Standard Specifications for  
Making Buildings and Facilities  
Accessible to, and Usable by,  
the Physically Handicapped**

- 1. American Association of Architectural Engineers
- 2. American Association of Engineers
- 3. American Association of Engineers and Architects
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- National Society for Crippled Children and Adults**
- The President's Committee on Employment of the Physically Handicapped**

Approved October 31, 1961

**AMERICAN STANDARDS ASSOCIATION**

INCORPORATED



# American Standard

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Published by

National Society for Crippled Children and Adults, Inc.  
2023 West Ogden Avenue, Chicago 12, Illinois

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Universal Decimal Classification 725/728:362.6:614.8

Printed in U.S.A.

# Foreword

(This Foreword is not a part of American Standard Specifications for Making Buildings and Facilities Accessible to, and Usable by, the Physically Handicapped, A117.1-1961.)

Approximately one out of seven people in our nation has a permanent physical disability. This segment of our population represents human resources of inestimable value and is of great economic significance to the entire nation.

The most common design and construction of buildings and facilities cause problems for the physically handicapped that lessen the social and economic gains now evident in the rehabilitation of these individuals. These architectural barriers make it very difficult to project the physically handicapped into normal situations of education, recreation, and employment.

In May, 1959, the ASA, acting on the request of The President's Committee on Employment of the Physically Handicapped, called a general conference of those groups vitally interested in the problem. This conference recommended the initiation of a project, and this recommendation was subsequently approved by the Construction Standards Board. The President's Committee on Employment of the Physically Handicapped and the National Society for Crippled Children and Adults were designated as co-sponsors, and the latter agreed to assume the secretariat.

This standard supplements other American Standards relating to various aspects of buildings and facilities. Its specifications, which are the result of extended and careful consideration of available knowledge and experience on this subject, are intended to present minimum requirements. They are recommended for use in the construction of all buildings and facilities and for adoption and enforcement by administrative authorities, so that those individuals with permanent physical disabilities might pursue their interests and aspirations, develop their talents, and exercise their skills.

The ASA Sectional Committee on Facilities in Public Buildings for Persons with Physical Handicaps, A117, which developed this standard, had the following personnel at the time of approval.

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# American Standard Specifications for Making Buildings and Facilities Accessible to, and Usable by, the Physically Handicapped

## 1. Scope and Purpose

### 1.1 Scope

**1.1.1** This standard applies to all buildings and facilities used by the public. It applies to temporary or emergency conditions as well as permanent conditions. It does not apply to private residences.

**1.1.2** This standard is concerned with non-ambulatory disabilities, semi-ambulatory disabilities, sight disabilities, hearing disabilities, disabilities of incoordination, and aging.<sup>1</sup>

**1.2 Purpose.** This standard is intended to make all buildings and facilities used by the public accessible to, and functional for, the physically handicapped, to, through, and within their doors, without loss of function, space, or facility where the general public is concerned. It supplements existing American Standards, and reflects great concern for safety of life and limb. In cases of practical difficulty, unnecessary hardship, or extreme differences, administrative authorities may grant exceptions from the literal requirements of this standard or permit the use of other methods or materials, but only when it is clearly evident that equivalent facilitation and protection are thereby secured.

## 2. Definitions

**2.1 Non-ambulatory Disabilities.** Impairments that, regardless of cause or manifestation, for all practical purposes, confine individuals to wheelchairs.

**2.2 Semi-ambulatory Disabilities.** Impairments that cause individuals to walk with difficulty or insecurity. Individuals using braces or crutches, amputees, arthritics, spastics, and those with pulmonary and cardiac ills may be semi-ambulatory.

**2.3 Sight Disabilities.** Total blindness or impairments affecting sight to the extent that the individual functioning in public areas is insecure or exposed to danger.

**2.4 Hearing Disabilities.** Deafness or hearing handicaps that might make an individual insecure in public areas because he is unable to communicate or hear warning signals.

<sup>1</sup>See definitions in Section 2.

**2.5 Disabilities of Incoordination.** Faulty coordination or palsy from brain, spinal, or peripheral nerve injury.

**2.6 Aging.** Those manifestations of the aging processes that significantly reduce mobility, flexibility, coordination, and perceptiveness but are not accounted for in the aforementioned categories.

**2.7 Standard.** When this term appears in small letters and is not preceded by the word "American," it is descriptive and does not refer to an American Standard approved by ASA; for example, a "standard" wheelchair is one characterized as standard by the manufacturers.

**2.8 Fixed Turning Radius, Wheel to Wheel.** The tracking of the caster wheels and large wheels of a wheelchair when pivoting on a spot.

**2.9 Fixed Turning Radius, Front Structure to Rear Structure.** The turning radius of a wheelchair, left front-foot platform to right rear wheel, or right front-foot platform to left rear wheel, when pivoting on a spot.

**2.10 Involved (Involvement).** A portion or portions of the human anatomy or physiology, or both, that have a loss or impairment of normal function as a result of genesis, trauma, disease, inflammation, or degeneration.

**2.11 Ramps, Ramps with Gradients.** Because the term "ramp" has a multitude of meanings and uses, its use in this text is clearly defined as ramps with gradients (or ramps with slopes) that deviate from what would otherwise be considered the normal level. An exterior ramp, as distinguished from a "walk," would be considered an appendage to a building leading to a level above or below existing ground level. As such, a ramp shall meet certain requirements similar to those imposed upon stairs.

**2.12 Walk, Walks.** Because the terms "walk" and "walks" have a multitude of meanings and uses, their use in this text is clearly defined as a predetermined, prepared-surface, exterior pathway leading to or from a building or facility, or from one exterior area to another, placed on the existing ground level

and not deviating from the level of the existing ground immediately adjacent.

**2.13 Appropriate Number.** As used in this text, appropriate number means the number of a specific item that would be necessary, in accord with the purpose and function of a building or facility, to accommodate individuals with specific disabilities in proportion to the anticipated number of individuals with disabilities who would use a particular building or facility.

**EXAMPLE:** Although these specifications shall apply to all buildings and facilities used by the public, the numerical need for a specific item would differ, for example, between a major transportation terminal, where many individuals with diverse disabilities would be continually coming and going, an office building or factory, where varying numbers of individuals with disabilities of varying manifestations (in many instances, very large numbers) might be employed or have reason for frequent visits, a school or church, where the number of individuals may be fixed and activities more definitive, and the many other buildings and facilities dedicated to specific functions and purposes.

**NOTE:** Disabilities are specific and where the individual has been properly evaluated and properly oriented and where architectural barriers have been eliminated, a specific disability does not constitute a handicap. It should be emphasized that more and more of those physically disabled are becoming *participants*, rather than spectators, in the fullest meaning of the word.

## 3. General Principles and Considerations

**3.1 Wheelchair Specifications.** The collapsible-model wheelchair of tubular metal construction with plastic upholstery for back and seat is most commonly used. The standard model of all manufacturers falls within the following limits, which were used as the basis of consideration:

- (1) Length: 42 inches
- (2) Width, when open: 25 inches
- (3) Height of seat from floor: 19½ inches
- (4) Height of armrest from floor: 29 inches
- (5) Height of pusher handles (rear) from floor: 36 inches
- (6) Width, when collapsed: 11 inches

### 3.2 The Functioning of a Wheelchair

**3.2.1** The fixed turning radius of a standard wheelchair, wheel to wheel, is 18 inches. The fixed turning radius, front structure to rear structure, is 31.5 inches.

**3.2.2** The average turning space required (180 and 360 degrees) is 60 x 60 inches.

**NOTE:** Actually, a turning space that is longer than it is

wide, specifically, 63 x 56 inches, is more workable and desirable. In an area with two open ends, such as might be the case in a corridor, a minimum of 54 inches between two walls would permit a 360-degree turn.

**3.2.3** A minimum width of 60 inches is required for two individuals in wheelchairs to pass each other.

### 3.3 The Adult Individual Functioning in a Wheelchair<sup>2</sup>

**3.3.1** The average unilateral vertical reach is 60 inches and ranges from 54 inches to 78 inches.

**3.3.2** The average horizontal working (table) reach is 30.8 inches and ranges from 28.5 inches to 33.2 inches.

**3.3.3** The bilateral horizontal reach, both arms extended to each side, shoulder high, ranges from 54 inches to 71 inches and averages 64.5 inches.

**3.3.4** An individual reaching diagonally, as would be required in using a wall-mounted dial telephone or towel dispenser, would make the average reach (on the wall) 48 inches from the floor.

### 3.4 The Individual Functioning on Crutches<sup>3</sup>

**3.4.1** On the average, individuals 5 feet 6 inches tall require an average of 31 inches between crutch tips in the normally accepted gaits.<sup>4</sup>

**3.4.2** On the average, individuals 6 feet 0 inches tall require an average of 32.5 inches between crutch tips in the normally accepted gaits.<sup>4</sup>

## 4. Site Development<sup>5</sup>

**4.1 Grading.** The grading of ground, even contrary to existing topography, so that it attains a level with a normal entrance will make a facility accessible to individuals with physical disabilities.

<sup>2</sup>Extremely small, large, strong, or weak and involved individuals could fall outside the ranges in 3.3.1, 3.3.2, 3.3.3, and their reach could differ from the figure given in 3.3.4. However, these reaches were determined using a large number of individuals who were functionally trained, with a wide range in individual size and involvement.

<sup>3</sup>Most individuals ambulating on braces or crutches, or both, or on canes are able to manipulate within the specifications prescribed for wheelchairs, although doors present quite a problem at times. However, attention is called to the fact that a crutch tip extending laterally from an individual is not obvious to others in heavily trafficked areas, certainly not as obvious or protective as a wheelchair and is, therefore, a source of vulnerability.

<sup>4</sup>Some cerebral palsied individuals, and some severe arthritics, would be extreme exceptions to 3.4.1 and 3.4.2.

<sup>5</sup>Site development is the most effective means to resolve the problems created by topography, definitive architectural designs or concepts, water table, existing streets, and atypical problems, singularly or collectively, so that ingress, egress, and egress to buildings by physically disabled can be facilitated while preserving the desired design and effect of the architecture.

## 4.2 Walks

**4.2.1** Public walks should be at least 48 inches wide and should have a gradient not greater than 5 percent.<sup>6</sup>

**4.2.2** Such walks shall be of a continuing common surface, not interrupted by steps or abrupt changes in level.

**4.2.3** Wherever walks cross other walks, drive-ways, or parking lots they should blend to a common level.<sup>7</sup>

NOTE: 4.1 and 4.2, separately or collectively, are greatly aided by terracing, retaining walls, and winding walks allowing for more gradual incline, thereby making almost any building accessible to individuals with permanent physical disabilities, while contributing to its esthetic qualities.

**4.2.4** A walk shall have a level platform at the top which is at least 5 feet by 5 feet, if a door swings out onto the platform or toward the walk. This platform shall extend at least 1 foot beyond each side of the doorway.

**4.2.5** A walk shall have a level platform at least 3 feet deep and 5 feet wide, if the door does not swing onto the platform or toward the walk. This platform shall extend at least 1 foot beyond each side of the doorway.

## 4.3 Parking Lots

**4.3.1** Spaces that are accessible and approximate to the facility should be set aside and identified for use by individuals with physical disabilities.

**4.3.2** A parking space open on one side, allowing room for individuals in wheelchairs or individuals on braces and crutches to get in and out of an automobile onto a level surface, suitable for wheeling and walking, is adequate.

**4.3.3** Parking spaces for individuals with physical disabilities when placed between two conventional

<sup>6</sup>It is essential that the gradient of walks and driveways be less than that prescribed for ramps, since walks would be void of handrails and curbs and would be considerably longer and more vulnerable to the elements. Walks of near maximum grade and considerable length should have level areas at intervals for purposes of rest and safety. Walks or driveways should have a nonslip surface.

<sup>7</sup>This specification does not require the elimination of curbs, which, particularly if they occur at regular intersections, are a distinct safety feature for all of the handicapped, particularly the blind. The preferred method of meeting the specification is to have the walk incline to the level of the street. However, at principal intersections, it is vitally important that the curb run parallel to the street, up to the point where the walk is inclined, at which point the curb would turn in and gradually meet the level of the walk at its highest point. A less preferred method would be to gradually bring the surface of the driveway or street to the level of the walk. The disadvantage of this method is that a blind person would not know when he has left the protection of a walk and entered the hazards of a street or driveway.

diagonal or head-on parking spaces should be 12 feet wide.

**4.3.4** Care in planning should be exercised so that individuals in wheelchairs and individuals using braces and crutches are not compelled to wheel or walk behind parked cars.

**4.3.5** Consideration should be given the distribution of spaces for use by the disabled in accordance with the frequency and persistency of parking needs.

**4.3.6** Walks shall be in conformity with 4.2.

## 5. Buildings

**5.1 Ramps with Gradients.** Where ramps with gradients are necessary or desired, they shall conform to the following specifications:

**5.1.1** A ramp shall not have a slope greater than 1 foot rise in 12 feet, or 8.33 percent, or 4 degrees 50 minutes.

**5.1.2** A ramp shall have handrails on at least one side, and preferably two sides, that are 32 inches in height, measured from the surface of the ramp, that are smooth, that extend 1 foot beyond the top and bottom of the ramp, and that otherwise conform with American Standard Safety Code for Floor and Wall Openings, Railings, and Toe Boards, A12-1932.

NOTE 1: Where codes specify handrails to be of heights other than 32 inches, it is recommended that two sets of handrails be installed to serve all people. Where major traffic is predominantly children, particularly physically disabled children, extra care should be exercised in the placement of handrails, in accordance with the nature of the facility and the age group or groups being serviced.

NOTE 2: Care should be taken that the extension of the handrail is not in itself a hazard. The extension may be made on the side of a continuing wall.

**5.1.3** A ramp shall have a surface that is nonslip.

**5.1.4** A ramp shall have a level platform at the top which is at least 5 feet by 5 feet, if a door swings out onto the platform or toward the ramp. This platform shall extend at least 1 foot beyond each side of the doorway.

**5.1.5** A ramp shall have a level platform at least 3 feet deep and 5 feet wide, if the door does not swing onto the platform or toward the ramp. This platform shall extend at least 1 foot beyond each side of the doorway.

**5.1.6** Each ramp shall have at least 6 feet of straight clearance at the bottom.

**5.1.7** Ramps shall have level platforms at 30-foot intervals for purposes of rest and safety and shall have level platforms wherever they turn.

## 5.2 Entrances

**5.2.1** At least one primary entrance to each building shall be usable by individuals in wheelchairs.

NOTE: Because entrances also serve as exits, some being particularly important in case of an emergency, and because the proximity of such exits to all parts of buildings and facilities, in accordance with their design and function, is essential (see 112 and 2000 through 2031 of American Standard Building Exits Code, A9.1-1953) it is preferable that all or most entrances (exits) should be accessible to, and usable by, individuals in wheelchairs and individuals with other forms of physical disability herein applicable.

**5.2.2** At least one entrance usable by individuals in wheelchairs shall be on a level that would make the elevators accessible.

## 5.3 Doors and Doorways

**5.3.1** Doors shall have a clear opening of no less than 32 inches when open and shall be operable by a single effort.

NOTE 1: Two-leaf doors are not usable by those with disabilities defined in 2.1, 2.2, and 2.5 unless they operate by a single effort, or unless one of the two leaves meets the requirement of 5.3.1.

NOTE 2: It is recommended that all doors have kick plates extending from the bottom of the door to at least 16 inches from the floor, or be made of a material and finish that would safely withstand the abuse they might receive from canes, crutches, wheelchair foot-platforms, or wheelchair wheels.

**5.3.2** The floor on the inside and outside of each doorway shall be level for a distance of 5 feet from the door in the direction the door swings and shall extend 1 foot beyond each side of the door.

**5.3.3** Sharp inclines and abrupt changes in level shall be avoided at doorsills. As much as possible, thresholds shall be flush with the floor.

NOTE 1: Care should be taken in the selection, placement, and setting of door closers so that they do not prevent the use of doors by the physically disabled. Time-delay door closers are recommended.

NOTE 2: Automatic doors that otherwise conform to 5.3.1, 5.3.2, and 5.3.3 are very satisfactory.

NOTE 3: These specifications apply both to exterior and interior doors and doorways.

**5.4 Stairs.** Stairs shall conform to American Standard A9.1-1953, with the following additional considerations:

**5.4.1** Steps in stairs that might require use by those with disabilities defined in 2.2 and 2.5 or by the aged shall not have abrupt (square) nosing. (See Fig. 1.)

NOTE: Individuals with restrictions in the knee, ankle, or hip, with artificial legs, long leg braces, or comparable conditions cannot, without great difficulty and hazard, use steps with nosing as illustrated in Fig. 1a, but can safely and with minimum difficulty use steps with nosing as illustrated in Fig. 1b.

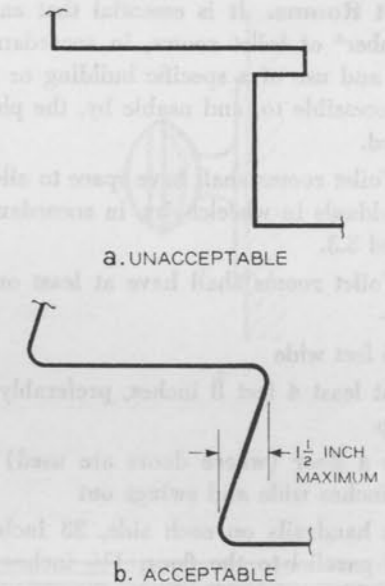


Fig. 1  
Steps

**5.4.2** Stairs shall have handrails 32 inches high as measured from the tread at the face of the riser.

NOTE: Where codes specify handrails to be at heights other than 32 inches, it is recommended that two sets of handrails be installed to serve all people. Where traffic is predominantly children, particularly physically disabled children, extra care should be exercised in the placement of handrails in accordance with the nature of the facility and the age group or groups being serviced. Dual handrails may be necessary.

**5.4.3** Stairs shall have at least one handrail that extends at least 18 inches beyond the top step and beyond the bottom step.

NOTE: Care should be taken that the extension of the handrails is not in itself a hazard. The extension may be made on the side of a continuing wall.

**5.4.4** Steps should, wherever possible, and in conformation with existing step formulas, have risers that do not exceed 7 inches.

## 5.5 Floors

**5.5.1** Floors shall have a surface that is nonslip.

**5.5.2** Floors on a given story shall be of a common level throughout or be connected by a ramp in accord with 5.1.1 through 5.1.6, inclusive.

EXAMPLE 1: There shall not be a difference between the level of the floor of a corridor and the level of the floor of the toilet rooms.

EXAMPLE 2: There should not be a difference between the level of the floor of a corridor and the level of a meeting room, dining room, or any other room, unless proper ramps are provided.

**5.6 Toilet Rooms.** It is essential that an appropriate number<sup>8</sup> of toilet rooms, in accordance with the nature and use of a specific building or facility, be made accessible to, and usable by, the physically handicapped.

**5.6.1** Toilet rooms shall have space to allow traffic of individuals in wheelchairs, in accordance with 3.1, 3.2, and 3.3.

**5.6.2** Toilet rooms shall have at least one toilet stall that—

- (1) Is 3 feet wide
- (2) Is at least 4 feet 8 inches, preferably 5 feet, deep
- (3) Has a door (where doors are used) that is 32 inches wide and swings out
- (4) Has handrails on each side, 33 inches high and parallel to the floor, 1½ inches in outside diameter, with 1½ inches clearance between rail and wall, and fastened securely at ends and center
- (5) Has a water closet with the seat 20 inches from the floor

**NOTE:** The design and mounting of the water closet is of considerable importance. A wall-mounted water closet with a narrow understructure that recedes sharply is most desirable. If a floor-mounted water closet must be used, it should not have a front that is wide and perpendicular to the floor at the front of the seat. The bowl should be shallow at the front of the seat and turn backward more than downward to allow the individual in a wheelchair to get close to the water closet with the seat of the wheelchair.

**5.6.3** Toilet rooms shall have lavatories with narrow aprons, which when mounted at standard height are usable by individuals in wheelchairs; or shall have lavatories mounted higher, when particular designs demand, so that they are usable by individuals in wheelchairs.

**NOTE:** It is important that drain pipes and hot-water pipes under a lavatory be covered or insulated so that a wheelchair individual without sensation will not burn himself.

**5.6.4** Some mirrors and shelves shall be provided above lavatories at a height as low as possible and no higher than 40 inches above the floor, measured from the top of the shelf and the bottom of the mirror.

**5.6.5** Toilet rooms for men shall have wall-mounted urinals with the opening of the basin 19 inches from the floor, or shall have floor-mounted urinals that are on level with the main floor of the toilet room.

**5.6.6** Toilet rooms shall have an appropriate number<sup>8</sup> of towel racks, towel dispensers, and other dispensers and disposal units mounted no higher than 40 inches from the floor.

**5.7 Water Fountains.** An appropriate number<sup>8</sup> of water fountains or other water-dispensing means shall be accessible to, and usable by, the physically disabled.

**5.7.1** Water fountains or coolers shall have up-front spouts and controls.

**5.7.2** Water fountains or coolers shall be hand-operated or hand- and foot-operated. (See also American Standard Specifications for Drinking Fountains, Z4.2-1942.)

**NOTE 1:** Conventional floor-mounted water coolers can be serviceable to individuals in wheelchairs if a small fountain is mounted on the side of the cooler 30 inches above the floor.

**NOTE 2:** Wall-mounted, hand-operated coolers of the latest design, manufactured by many companies, can serve the able-bodied and the physically disabled equally well when the cooler is mounted with the basin 36 inches from the floor.

**NOTE 3:** Fully recessed water fountains are not recommended.

**NOTE 4:** Water fountains should not be set into an alcove unless the alcove is wider than a wheelchair. (See 3.1.)

**5.8 Public Telephones.** An appropriate number<sup>8</sup> of public telephones should be made accessible to, and usable by, the physically disabled.

**NOTE:** The conventional public telephone booth is not usable by most physically disabled individuals. There are many ways in which public telephones can be made accessible and usable. It is recommended that architects and builders confer with the telephone company in the planning of the building or facility.

**5.8.1** Such telephones should be placed so that the dial and the handset can be reached by individuals in wheelchairs, in accordance with 3.3.

**5.8.2** An appropriate number<sup>8</sup> of public telephones should be equipped for those with hearing disabilities and so identified with instructions for use.

**NOTE:** Such telephones can be used by everyone.

**5.9 Elevators.** In a multiple-story building, elevators are essential to the successful functioning of physically disabled individuals. They shall conform to the following requirements:

**5.9.1** Elevators shall be accessible to, and usable by, the physically disabled on the level that they use to enter the building, and at all levels normally used by the general public.

**5.9.2** Elevators shall allow for traffic by wheelchairs, in accordance with 3.1, 3.2, 3.3 and 5.3.

**5.10 Controls.** Switches and controls for light, heat, ventilation, windows, draperies, fire alarms, and all similar controls of frequent or essential use, shall be placed within the reach of individuals in wheelchairs. (See 3.3.)

<sup>8</sup> See 2.13.

**5.11 Identification.** Appropriate identification of specific facilities within a building used by the public is particularly essential to the blind.

**5.11.1** Raised letters or numbers shall be used to identify rooms or offices.

**5.11.2** Such identification should be placed on the wall, to the right or left of the door, at a height between 4 feet 6 inches and 5 feet 6 inches, measured from the floor, and preferably at 5 feet.

**5.11.3** Doors that are not intended for normal use, and that might prove dangerous if a blind person were to exit or enter by them, should be made quickly identifiable to the touch by knurling the door handle or knob. (See Fig. 2.)

**EXAMPLE:** Such doors might lead to loading platforms, boiler rooms, stages, fire escapes, etc.

### 5.12 Warning Signals

**5.12.1** Audible warning signals shall be accompanied by simultaneous visual signals for the benefit of those with hearing disabilities.

**5.12.2** Visual signals shall be accompanied by simultaneous audible signals for the benefit of the blind.

**5.13 Hazards.** Every effort shall be exercised to obviate hazards to individuals with physical disabilities.

**5.13.1** Access panels or manholes in floors, walks, and walls can be extremely hazardous, particularly when in use, and should be avoided.

**5.13.2** When manholes or access panels are open and in use, or when an open excavation exists on a site, particularly when it is approximate to normal pedestrian traffic, barricades shall be placed on all open sides, at least 8 feet from the hazard, and warning devices shall be installed in accord with 5.12.2.

**5.13.3** Low-hanging door closers that remain within the opening of a doorway when the door is open, or that protrude hazardously into regular corridors or traffic ways when the door is closed, shall be avoided.

**5.13.4** Low-hanging signs, ceiling lights, and similar objects or signs and fixtures that protrude into regular corridors or traffic ways shall be avoided. A minimum height of 7 feet, measured from the floor, is recommended.

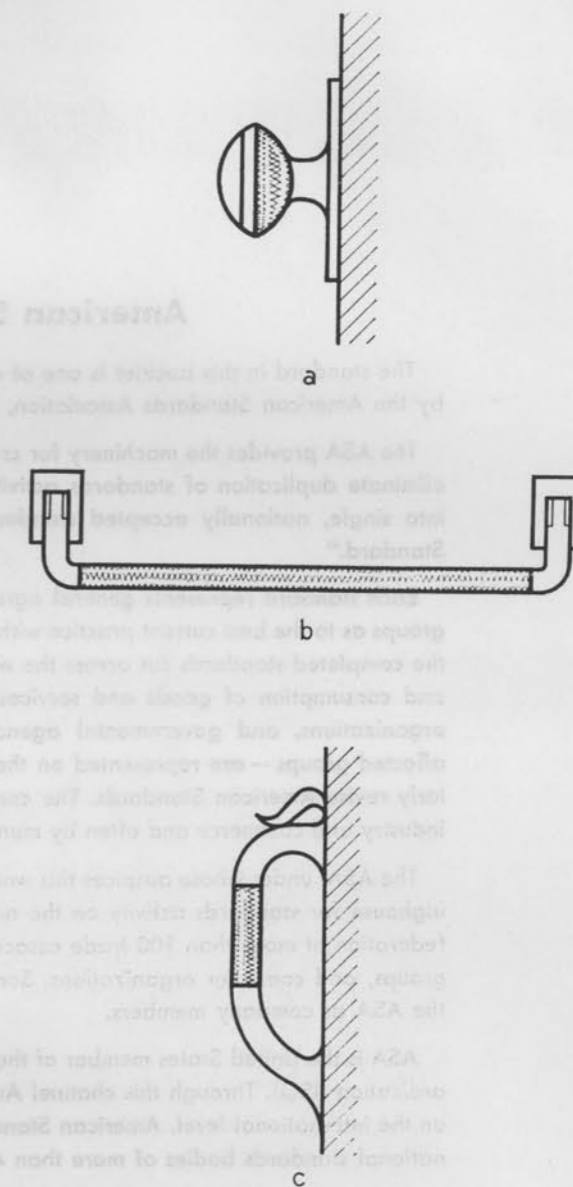


Fig. 2

### Knurled Door Handles and Knobs

**5.13.5** Lighting on ramps shall be in accord with 1201, 1202, 1203, and 1204 of American Standard A9.1-1953.

**5.13.6** Exit signs shall be in accord with 1205 of American Standard A9.1-1953, except as modified by 5.11 of this standard.



## American Standards

The standard in this booklet is one of over 2000 standards approved to date by the American Standards Association, Incorporated.

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