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2. *Fire exit hardware* shall be *listed* in accordance with UL 10C and UL 305;
3. The actuating portion of the releasing device shall extend at least one-half of the door leaf width; and
4. The maximum unlatching force shall not exceed 15 pounds (67 N).

1008.1.10.2 Balanced doors. If *balanced doors* are used and *panic hardware* is required, the *panic hardware* shall be the push-pad type and the pad shall not extend more than one-half the width of the door measured from the latch side.

1008.2 Gates. Gates serving the *means of egress* system shall comply with the requirements of this section. Gates used as a component in a *means of egress* shall conform to the applicable requirements for doors.

Exception: Horizontal sliding or swinging gates exceeding the 4-foot (1219 mm) maximum leaf width limitation are permitted in fences and walls surrounding a stadium.

1008.2.1 Stadiums. *Panic hardware* is not required on gates surrounding stadiums where such gates are under constant immediate supervision while the public is present, and where safe dispersal areas based on 3 square feet (0.28 m^2) per occupant are located between the fence and enclosed space. Such required safe dispersal areas shall not be located less than 50 feet (15 240 mm) from the enclosed space. See Section 1027.5 for *means of egress* from safe dispersal areas.

1008.3 Turnstiles. Turnstiles or similar devices that restrict travel to one direction shall not be placed so as to obstruct any required *means of egress*.

Exception: Each turnstile or similar device shall be credited with no more than a 50-person capacity where all of the following provisions are met:

1. Each device shall turn free in the direction of egress travel when primary power is lost, and upon the manual release by an employee in the area.
2. Such devices are not given credit for more than 50 percent of the required egress capacity.
3. Each device is not more than 39 inches (991 mm) high.
4. Each device has at least $16^1/_2$ inches (419 mm) clear width at and below a height of 39 inches (991 mm) and at least 22 inches (559 mm) clear width at heights above 39 inches (991 mm).

Where located as part of an *accessible route*, turnstiles shall have at least 36 inches (914 mm) clear at and below a height of 34 inches (864 mm), at least 32 inches (813 mm) clear width between 34 inches (864 mm) and 80 inches (2032 mm) and shall consist of a mechanism other than a revolving device.

1008.3.1 High turnstile. Turnstiles more than 39 inches (991 mm) high shall meet the requirements for revolving doors.

1008.3.2 Additional door. Where serving an *occupant load* greater than 300, each turnstile that is not portable shall have a side-hinged swinging door which conforms to Section 1008.1 within 50 feet (15 240 mm).

SECTION 1009
STAIRWAYS

1009.1 General. *Stairways* serving occupied portions of a building shall comply with the requirements of this section.

1009.2 Interior exit stairways. *Interior exit stairways* shall lead directly to the exterior of the building or shall be extended to the exterior of the building with an *exit passageway* conforming to the requirements of Section 1023, except as permitted in Section 1027.1.

1009.2.1 Where required. *Interior exit stairways* shall be included, as necessary, to meet one or more *means of egress* design requirements, such as required number of *exits* or *exit access* travel distance.

1009.2.2 Enclosure. All *interior exit stairways* shall be enclosed in accordance with the provisions of Section 1022.

1009.3 Exit access stairways. Floor openings between stories created by *exit access stairways* shall be enclosed.

Exceptions:

1. In other than Group I-2 and I-3 occupancies, *exit access stairways* that serve, or atmospherically communicate between, only two stories are not required to be enclosed.
2. *Exit access stairways* serving and contained within a single residential *dwelling unit* or *sleeping unit* in Group R-1, R-2 or R-3 occupancies are not required to be enclosed.
3. In buildings with only Group B or M occupancies, *exit access stairway* openings are not required to be enclosed provided that the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, the area of the floor opening between stories does not exceed twice the horizontal projected area of the *exit access stairway*, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13.
4. In other than Group B and M occupancies, *exit access stairway* openings are not required to be enclosed provided that the building is equipped throughout with an *automatic sprinkler system* in accordance with Section 903.3.1.1, the floor opening does not connect more than four stories, the area of the floor opening between stories does not exceed twice the horizontal projected area of the *exit access stairway*, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13.

5. *Exit access stairways* within an *atrium* complying with the provisions of Section 404 are not required to be enclosed.
6. *Exit access stairways* and *ramps* in open parking garages that serve only the parking garage are not required to be enclosed.
7. *Stairways* serving outdoor facilities where all portions of the *means of egress* are essentially open to the outside are not required to be enclosed.
8. *Exit access stairways* serving stages, platforms and *technical production areas* in accordance with Sections 410.6.2 and 410.6.3 are not required to be enclosed.
9. *Stairways* are permitted to be open between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, *places of religious worship*, auditoriums and sports facilities.
10. In Group I-3 occupancies, *exit access stairways* constructed in accordance with Section 408.5 are not required to be enclosed.

1009.3.1 Construction. Where required, enclosures for *exit access stairways* shall be constructed in accordance with this section. *Exit access stairway* enclosures shall be constructed as *fire barriers* in accordance with Section 707 or *horizontal assemblies* in accordance with Section 711, or both.

1009.3.1.1 Materials. *Exit access stairway* enclosures shall be of materials permitted by the building type of construction.

1009.3.1.2 Fire-resistance rating. *Exit access stairway* enclosures shall have a *fire-resistance rating* of not less than 2 hours where connecting four stories or more, and not less than 1 hour where connecting less than four stories. The number of stories connected by the *exit access stairway* enclosures shall include any basements, but not any mezzanines. *Exit access stairway* enclosures shall have a *fire-resistance rating* not less than the floor assembly penetrated, but need not exceed 2 hours.

1009.3.1.3 Continuity. *Exit access stairway* enclosures shall have continuity in accordance with Section 707.5 for *fire barriers* or Section 711.4 for *horizontal assemblies* as applicable.

1009.3.1.4 Openings. Openings in an *exit access stairway* enclosure shall be protected in accordance with Section 716 as required for *fire barriers*. Doors shall be self- or automatic-closing by smoke detection in accordance with Section 716.5.9.3.

1009.3.1.4.1 Prohibited openings. Openings other than those necessary for the purpose of the *exit access stairway* enclosure shall not be permitted in *exit access stairway* enclosures.

1009.3.1.5 Penetrations. Penetrations in an *exit access stairway* enclosure shall be protected in accordance with Section 714 as required for *fire barriers*.

1009.3.1.5.1 Prohibited penetrations. Penetrations other than those necessary for the purpose of the *exit access stairway* enclosure shall not be permitted in *exit access stairway* enclosures.

1009.3.1.6 Joints. Joints in an *exit access stairway* enclosure shall comply with Section 715.

1009.3.1.7 Ducts and air transfer openings. Penetrations of an *exit access stairway* enclosure by ducts and air transfer openings shall comply with Section 717.

1009.3.1.8 Exterior walls. Where *exterior walls* serve as a part of an *exit access stairway* enclosure, such walls shall comply with the requirements of Section 705 for *exterior walls* and the fire-resistance-rated enclosure requirements shall not apply.

1009.4 Width. The width of *stairways* shall be determined as specified in Section 1005.1, but such width shall not be less than 44 inches (1118 mm). See Section 1007.3 for *accessible means of egress stairways*.

Exceptions:

1. *Stairways* serving an *occupant load* of less than 50 shall have a width of not less than 36 inches (914 mm).
2. *Spiral stairways* as provided for in Section 1009.12.
3. *Aisle stairs* complying with Section 1028.
4. Where an incline platform lift or *stairway* chairlift is installed on *stairways* serving occupancies in Group R-3, or within *dwelling units* in occupancies in Group R-2, a clear passage width not less than 20 inches (508 mm) shall be provided. If the seat and platform can be folded when not in use, the distance shall be measured from the folded position.

1009.5 Headroom. *Stairways* shall have a minimum headroom clearance of 80 inches (2032 mm) measured vertically from a line connecting the edge of the *nosings*. Such headroom shall be continuous above the *stairway* to the point where the line intersects the landing below, one tread depth beyond the bottom riser. The minimum clearance shall be maintained the full width of the *stairway* and landing.

Exceptions:

1. *Spiral stairways* complying with Section 1009.12 are permitted a 78-inch (1981 mm) headroom clearance.
2. In Group R-3 occupancies; within *dwelling units* in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual *dwelling units* in Group R-2 occupancies; where the *nosings* of treads at the side of a *flight* extend under the edge of a floor opening through which the *stair* passes, the floor opening shall be allowed to project horizontally into the required headroom a maximum of $4^3/_4$ inches (121 mm).

1009.6 Walkline. The walkline across *winder* treads shall be concentric to the direction of travel through the turn and located 12 inches (305 mm) from the side where the *winders*

are narrower. The 12-inch (305 mm) dimension shall be measured from the widest point of the clear *stair* width at the walking surface of the *winder*. If *winders* are adjacent within the *flight*, the point of the widest clear *stair* width of the adjacent *winders* shall be used.

1009.7 Stair treads and risers. Stair treads and risers shall comply with Sections 1009.7.1 through 1009.7.5.3.

1009.7.1 Dimension reference surfaces. For the purpose of this section, all dimensions are exclusive of carpets, rugs or runners.

1009.7.2 Riser height and tread depth. Stair riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum. The riser height shall be measured vertically between the *nosings* of adjacent treads. Rectangular tread depths shall be 11 inches (279 mm) minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's *nosing*. *Winder* treads shall have a minimum tread depth of 11 inches (279 mm) between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline and a minimum tread depth of 10 inches (254 mm) within the clear width of the *stair*.

Exceptions:

1. *Alternating tread devices* in accordance with Section 1009.13.
2. Ship ladders in accordance with Section 1009.14.
3. *Spiral stairways* in accordance with Section 1009.12.
4. *Aisle stairs* in assembly seating areas where the stair pitch or slope is set, for sightline reasons, by the slope of the adjacent seating area in accordance with Section 1028.11.2.
5. In Group R-3 occupancies; within dwelling units in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual dwelling units in Group R-2 occupancies; the maximum riser height shall be $7^3/_4$ inches (197 mm); the minimum tread depth shall be 10 inches (254 mm); the minimum *winder* tread depth at the walkline shall be 10 inches (254 mm); and the minimum *winder* tread depth shall be 6 inches (152 mm). A *nosing* projection not less than ¾ inch (19.1 mm) but not more than $1^1/_4$ inches (32 mm) shall be provided on *stairways* with solid risers where the tread depth is less than 11 inches (279 mm).
6. See Section 3404.1 for the replacement of existing *stairways*.
7. In Group I-3 facilities, *stairways* providing access to guard towers, observation stations and control rooms, not more than 250 square feet (23 m^2) in area, shall be permitted to have a maximum riser height of 8 inches (203 mm) and a minimum tread depth of 9 inches (229 mm).

1009.7.3 Winder treads. *Winder* treads are not permitted in *means of egress stairways* except within a *dwelling unit*.

Exceptions:

1. Curved *stairways* in accordance with Section 1009.11.
2. *Spiral stairways* in accordance with Section 1009.12.

1009.7.4 Dimensional uniformity. *Stair* treads and risers shall be of uniform size and shape. The tolerance between the largest and smallest riser height or between the largest and smallest tread depth shall not exceed $^3/_8$ inch (9.5 mm) in any *flight* of *stairs*. The greatest *winder* tread depth at the walkline within any *flight* of *stairs* shall not exceed the smallest by more than $^3/_8$ inch (9.5 mm).

Exceptions:

1. Nonuniform riser dimensions of *aisle stairs* complying with Section 1028.11.2.
2. Consistently shaped *winders*, complying with Section 1009.7, differing from rectangular treads in the same *stairway flight*.

Where the bottom or top riser adjoins a sloping *public way*, walkway or driveway having an established grade and serving as a landing, the bottom or top riser is permitted to be reduced along the slope to less than 4 inches (102 mm) in height, with the variation in height of the bottom or top riser not to exceed one unit vertical in 12 units horizontal (8-percent slope) of *stairway* width. The *nosings* or leading edges of treads at such nonuniform height risers shall have a distinctive marking stripe, different from any other *nosing* marking provided on the *stair flight*. The distinctive marking stripe shall be visible in descent of the *stair* and shall have a slip-resistant surface. Marking stripes shall have a width of at least 1 inch (25 mm) but not more than 2 inches (51 mm).

1009.7.5 Nosing and riser profile. The radius of curvature at the leading edge of the tread shall be not greater than $^9/_{16}$ inch (14.3 mm). Beveling of *nosings* shall not exceed $^9/_{16}$ inch (14.3 mm). Risers shall be solid and vertical or sloped under the tread above from the underside of the *nosing* above at an angle not more than 30 degrees (0.52 rad) from the vertical.

1009.7.5.1 Nosing projection size. The leading edge (*nosings*) of treads shall project not more than $1^1/_4$ inches (32 mm) beyond the tread below.

1009.7.5.2 Nosing projection uniformity. All *nosing* projections of the leading edges shall be of uniform size, including the projections of the *nosings* leading edge of the floor at the top of a *flight*.

1009.7.5.3 Solid risers. Risers shall be solid.

Exceptions:

1. Solid risers are not required for *stairways* that are not required to comply with Section 1007.3, provided that the opening between

treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).

2. Solid risers are not required for occupancies in Group I-3 or in Group F, H and S occupancies other than areas accessible to the public. There are no restrictions on the size of the opening in the riser.
3. Solid risers are not required for *spiral stairways* constructed in accordance with Section 1009.12.
4. Solid risers are not required for *alternating tread devices* constructed in accordance with Section 1009.13.

1009.8 Stairway landings. There shall be a floor or landing at the top and bottom of each *stairway*. The width of landings shall not be less than the width of *stairways* they serve. Every landing shall have a minimum width measured perpendicular to the direction of travel equal to the width of the *stairway*. Where the *stairway* has a straight run the depth need not exceed 48 inches (1219 mm). Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into a landing. When *wheelchair spaces* are required on the *stairway* landing in accordance with Section 1007.6.1, the *wheelchair space* shall not be located in the required width of the landing and doors shall not swing over the *wheelchair spaces*.

Exception: *Aisle stairs* complying with Section 1028.

1009.9 Stairway construction. All *stairways* shall be built of materials consistent with the types permitted for the type of construction of the building, except that wood *handrails* shall be permitted for all types of construction.

1009.9.1 Stairway walking surface. The walking surface of treads and landings of a *stairway* shall not be sloped steeper than one unit vertical in 48 units horizontal (2-percent slope) in any direction. *Stairway* treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached.

Exceptions:

1. Openings in stair walking surfaces shall be a size that does not permit the passage of $^1/_2$-inch-diameter (12.7 mm) sphere. Elongated openings shall be placed so that the long dimension is perpendicular to the direction of travel.
2. In Group F, H and S occupancies, other than areas of parking structures accessible to the public, openings in treads and landings shall not be prohibited provided a sphere with a diameter of $1^1/_8$ inches (29 mm) cannot pass through the opening.

1009.9.2 Outdoor conditions. Outdoor *stairways* and outdoor approaches to *stairways* shall be designed so that water will not accumulate on walking surfaces.

1009.9.3 Enclosures under interior stairways. The walls and soffits within enclosed usable spaces under enclosed and unenclosed *stairways* shall be protected by 1-hour fire-resistance-rated construction or the *fire-resistance rating* of the *stairway* enclosure, whichever is greater. Access to the enclosed space shall not be directly from within the *stair* enclosure.

Exception: Spaces under *stairways* serving and contained within a single residential dwelling unit in Group R-2 or R-3 shall be permitted to be protected on the enclosed side with $^1/_2$-inch (12.7 mm) gypsum board.

1009.9.4 Enclosures under exterior stairways. There shall be no enclosed usable space under *exterior exit stairways* unless the space is completely enclosed in 1-hour fire-resistance-rated construction. The open space under *exterior stairways* shall not be used for any purpose.

1009.10 Vertical rise. A *flight* of *stairs* shall not have a vertical rise greater than 12 feet (3658 mm) between floor levels or landings.

Exceptions:

1. *Aisle stairs* complying with Section 1028.
2. *Alternating tread devices* used as a *means of egress* shall not have a rise greater than 20 feet (6096 mm) between floor levels or landings.
3. *Spiral stairways* used as a *means of egress* from *technical production areas*.

1009.11 Curved stairways. Curved *stairways* with *winder* treads shall have treads and risers in accordance with Section 1009.7 and the smallest radius shall not be less than twice the required width of the *stairway*.

Exception: The radius restriction shall not apply to curved *stairways* for occupancies in Group R-3 and within individual *dwelling units* in occupancies in Group R-2.

1009.12 Spiral stairways. *Spiral stairways* are permitted to be used as a component in the *means of egress* only within *dwelling units* or from a space not more than 250 square feet (23 m^2) in area and serving not more than five occupants, or from *technical production areas* in accordance with Section 410.6.

A *spiral stairway* shall have a $7^1/_2$-inch (191 mm) minimum clear tread depth at a point 12 inches (305 mm) from the narrow edge. The risers shall be sufficient to provide a headroom of 78 inches (1981 mm) minimum, but riser height shall not be more than $9^1/_2$ inches (241 mm). The minimum *stairway* clear width at and below the *handrail* shall be 26 inches (660 mm).

1009.13 Alternating tread devices. *Alternating tread devices* are limited to an element of a *means of egress* in buildings of Groups F, H and S from a mezzanine not more than 250 square feet (23 m^2) in area and which serves not more than five occupants; in buildings of Group I-3 from a guard tower, observation station or control room not more than 250 square feet (23 m^2) in area and for access to unoccupied roofs.

1009.13.1 Handrails of alternating tread devices. *Handrails* shall be provided on both sides of *alternating tread devices* and shall comply with Section 1012.

1009.13.2 Treads of alternating tread devices. *Alternating tread devices* shall have a minimum tread depth of 5 inches (127 mm), a minimum projected tread depth of $8^1/_2$ inches (216 mm), a minimum tread width of 7 inches (178 mm) and a maximum riser height of $9^1/_2$ inches (241 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projections of adjacent treads. The riser height shall be measured vertically between the leading edges of adjacent treads. The riser height and tread depth provided shall result in an angle of ascent from the horizontal of between 50 and 70 degrees (0.87 and 1.22 rad). The initial tread of the device shall begin at the same elevation as the platform, landing or floor surface.

Exception: *Alternating tread devices* used as an element of a *means of egress* in buildings from a *mezzanine* area not more than 250 square feet (23 m^2) in area which serves not more than five occupants shall have a minimum tread depth of 3 inches (76 mm) with a minimum projected tread depth of $10^1/_2$ inches (267 mm). The rise to the next alternating tread surface shall not exceed 8 inches (203 mm).

1009.14 Ship ladders. Ship ladders are permitted to be used in Group I-3 as a component of a *means of egress* to and from control rooms or elevated facility observation stations not more than 250 square feet (23 m^2) with not more than three occupants and for access to unoccupied roofs.

Ship ladders shall have a minimum tread depth of 5 inches (127 mm). The tread shall be projected such that the total of the tread depth plus the *nosing* projection is no less than $8^1/_2$ inches (216 mm). The maximum riser height shall be $9^1/_2$ inches (241 mm).

Handrails shall be provided on both sides of ship ladders. The minimum clear width at and below the *handrails* shall be 20 inches (508 mm).

1009.15 Handrails. *Stairways* shall have *handrails* on each side and shall comply with Section 1012. Where glass is used to provide the *handrail*, the *handrail* shall also comply with Section 2407.

Exceptions:

1. *Handrails* for *aisle stairs* provided in accordance with Section 1028.13.
2. *Stairways* within dwelling units and *spiral stairways* are permitted to have a *handrail* on one side only.
3. Decks, patios and walkways that have a single change in elevation where the landing depth on each side of the change of elevation is greater than what is required for a landing do not require *handrails*.
4. In Group R-3 occupancies, a change in elevation consisting of a single riser at an entrance or egress door does not require *handrails*.
5. Changes in room elevations of three or fewer risers within dwelling units and sleeping units in Groups R-2 and R-3 do not require *handrails*.

1009.16 Stairway to roof. In buildings four or more stories above *grade plane*, one *stairway* shall extend to the roof surface, unless the roof has a slope steeper than four units vertical in 12 units horizontal (33-percent slope). In buildings without an occupied roof, access to the roof from the top story shall be permitted to be by an *alternating tread device*.

1009.16.1 Roof access. Where a *stairway* is provided to a roof, access to the roof shall be provided through a *penthouse* complying with Section 1509.2.

Exception: In buildings without an occupied roof, access to the roof shall be permitted to be a roof hatch or trap door not less than 16 square feet (1.5 m^2) in area and having a minimum dimension of 2 feet (610 mm).

1009.16.2 Protection at roof hatch openings. Where the roof hatch opening providing the required access is located within 10 feet (3049 mm) of the roof edge, such roof access or roof edge shall be protected by *guards* installed in accordance with the provisions of Section 1013.

1009.17 Stairway to elevator equipment. Roofs and *penthouses* containing elevator equipment that must be accessed for maintenance are required to be accessed by a *stairway*.

SECTION 1010
RAMPS

1010.1 Scope. The provisions of this section shall apply to *ramps* used as a component of a *means of egress*.

Exceptions:

1. Other than *ramps* that are part of the *accessible routes* providing access in accordance with Sections 1108.2 through 1108.2.4 and 1108.2.6, ramped *aisles* within assembly rooms or spaces shall conform with the provisions in Section 1028.11.
2. Curb ramps shall comply with ICC A117.1.
3. Vehicle ramps in parking garages for pedestrian *exit access* shall not be required to comply with Sections 1010.4 through 1010.10 when they are not an *accessible route* serving *accessible* parking spaces, other required *accessible* elements or part of an *accessible means of egress*.

1010.2 Enclosure. All *interior exit ramps* shall be enclosed in accordance with the applicable provisions of Section 1022. *Exit access ramps* shall be enclosed in accordance with the provisions of Section 1009.3 for enclosure of *stairways*.

1010.3 Slope. *Ramps* used as part of a *means of egress* shall have a running slope not steeper than one unit vertical in 12 units horizontal (8-percent slope). The slope of other pedestrian *ramps* shall not be steeper than one unit vertical in eight units horizontal (12.5-percent slope).

Exception: *Aisle ramp* slope in a room or space used for assembly purposes shall comply with Section 1028.11.

1010.4 Cross slope. The slope measured perpendicular to the direction of travel of a *ramp* shall not be steeper than one unit vertical in 48 units horizontal (2-percent slope).

1010.5 Vertical rise. The rise for any *ramp* run shall be 30 inches (762 mm) maximum.