

SECTION R311.7 STAIRWAYS

R311.7.1 Width. Stairways shall not be less than 36 inches in clear width at all points above the permitted handrail height and below the required headroom height. Handrails shall not project more than 4.5 inches on either side of the stairway and the minimum clear width of the stairway at and below the handrail height, including treads and landings, shall not be less than 31.5 inches where a handrail is installed on one side and 27 inches where handrails are provided on both sides.

Exception:

1. The width of spiral stairways shall be in accordance with Section R311.7.10.1.

R311.7.2 Headroom. The minimum headroom in all parts of the stairway shall not be less than 6 feet, 8 inches measured vertically from the sloped line adjoining the tread nosing or from the floor surface of the landing or platform on that portion of the stairway.

Exception:

1. Where the nosing 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 4.5-inches.

R311.7.3 Vertical Rise A flight of stairs shall not have a vertical rise larger than 12 feet between floor levels or landings.

R311.7.4 Walkline The walkline across riser treads shall be concentric to the curved direction of travel through the turn and located 12-inches from the side where the winders are narrower. The 12-inch 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.

R311.7.5.1 Risers. The maximum riser height shall be 8 1/4-inches. The riser height shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch. Risers shall be vertical or sloped from the

underside of the leading edge of the tread above at an angle not more than 30 degrees from the vertical. Open risers are permitted provided that the opening between the treads does not allow passage of a 4-inch sphere.

Exception:

1. The opening between adjacent treads with a total rise of 30-inches or less.

R311.7.5.2 Treads The minimum tread depth shall be 9-inches. The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8 inch.

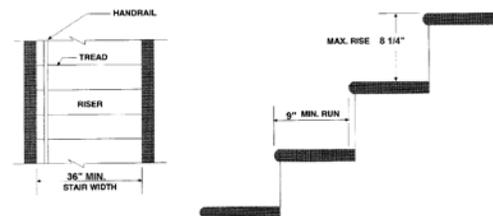
R311.7.5.2.1 Winders Treads Winder treads shall have a minimum tread depth of 9-inches measured between the vertical planes of the foremost projection of adjacent treads at the intersection of the walkline. Winder treads shall have a minimum tread depth of 6-inches at any point within the clear width of the stair. Within any flight of stairs, the largest winder tread depth at the walkline shall not exceed the smallest winder tread by more than 3/8inch.

R311.7.5.3 Nosing. The radius of curvature at the nosing shall be no greater than 9/16 inch. A nosing not less than 3/4 inch but not more than 1 1/4-inches shall be provided on stairways with solid risers. The greatest nosing projection shall not exceed the smallest nosing projection by more than 3/8 inch between two stories, including the nosing at the level of floors and landings. Beveling of nosing shall not exceed 1/2 inch.

Exception:

1. A nosing is not required where the tread depth is a minimum of 11 inches.

SECTION 314 — STAIRWAYS
314.2 Treads and risers. Figure 314.2 shows a typical conventional stairway.



SECTION R311.7.8 HANDRAILS

R311.7.8 Handrails. Handrails shall be provided on at least one side of each continuous run of treads or flight with four or more risers.

R311.7.8.1 Height Handrail height measured vertically from the nosing, or finish surface of the ramp slope, shall not be less than 34 inches and not more than 38 inches.

Exception:

1. The use of a volute, turnout, or starting easing shall be allowed over the lowest tread.

R311.7.8.2 Continuity Handrails for stairways shall be continuous for the full length of the flight from a point directly above the top riser of a flight to a point directly above the lowest riser of the flight. Handrail ends shall be returned or shall terminate in newel posts or safety terminals. Handrails adjacent to a wall shall have a space of not less than 1.5 inches between the wall and the handrails.

Exceptions:

1. Handrails shall be permitted to be interrupted by a newel post at a turn.
2. The use of a volute, turnout or starting easing shall be allowed over the lowest tread.
3. Handrails within a dwelling unit shall be permitted to be discontinuous between the top and bottom of a flight of stairs where the ends of the discontinued rail are returned to a wall or post and the maximum distance between the ends of discontinued rails in not greater than 4 inches.

R311.7.8.3 Grip size. All required handrails shall be one of the following types or provide equivalent graspability:

Type I Handrails with a circular cross section shall have an outside diameter of at least 1 1/4 inches and not greater than 2 5/8 inches. maximum. Other handrail shapes, including those complying with Figure 311.7(a-f), are considered equivalent. IF the handrail is not circular it shall have a perimeter dimension of at least 4-inches and not greater than 6 1/4 inches with a max. cross section dimension of 2 1/4 inches.

Type II Handrails with a perimeter greater than 6 1/4 inches, shall provide a graspable finger recess on both

sides of the profile. The finger recess shall begin within a distance of $\frac{3}{4}$ inch measured vertically from the tallest portion of the profile and achieve a depth of $\frac{5}{16}$ inch with $\frac{7}{8}$ inch below the widest portion of the profile. The required depth shall continue for at least $\frac{3}{8}$ inch to a level that is not less than $1\frac{3}{4}$ inches below the tallest portion of the profile. The min. width of the handrail above the recess shall be $1\frac{3}{4}$ inches to the maximum of $2\frac{3}{4}$ inches. Edges shall have a minimum radius of 0.01 inch.

SECTION R316 GUARDS

R312.1 Guards required. Guards shall be provided in accordance with Sections R312.1.1 through R312.1.4

R312.1.1 Where Required. Guards shall be located along open-sided walking surfaces, including stairs, ramps, and landings that are located more than 30 inches measured vertically to the floor or grade below at any point within 36-inches horizontally to the open side. Insect screen shall not be considered a guard.

R312.1.2 Height Required guards at open-sided walking surfaces including stairs, porches, balconies, or landings shall not be less than 36-inches high measured vertically above the adjacent walking surface, adjacent fixed seating, or the line connecting the leading edge of treads.

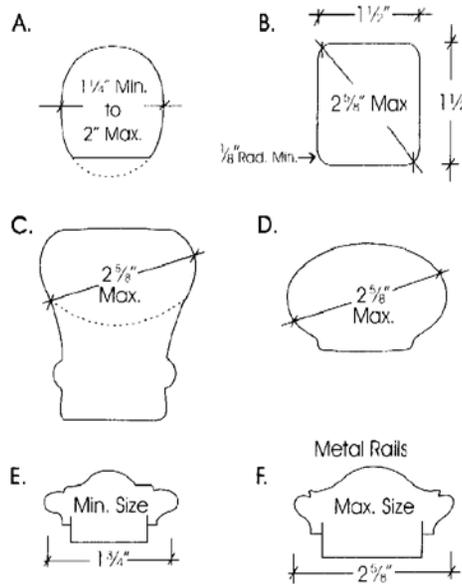
Exception:

1. Guards on open sides of stairs shall have a height not less than 34-inches measured vertically from a line connecting the leading edges of the treads.
2. Where the top of the guard also serves as a handrail on the open sides of the stairs, the top of the guard shall not be less than 34-inches and not more than 38-inches measured vertically from a line connecting the leading edge of the treads.

R312.1.3 Opening limitations. Required guards shall not have openings from the walking surface to the required guard height which allow passage of a sphere 4-inches in diameter.

Exception:

1. The triangular openings at the open sides of stair, formed by the riser, tread, and bottom rail of a guard, shall not allow passage of a sphere 6-inches in diameter.
2. Guards on the open side of stairs shall not have openings which allow passage of a sphere $4\frac{3}{8}$ inches in diameter.



For SI: 1 inch = 25.4 mm; 1 degree = 0.018 rad.

Stairs, Handrails, & Guards



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