

## - RESIDENTIAL STAIRWAYS -



### R311.5 STAIRWAYS

**R311.5.1 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.

**Exceptions:**

1. The width of spiral stairways shall be in accordance with Section R311.5.8.
2. The width of existing or replacement stairways serving existing unfinished attics or existing unfinished basements being converted to habitable space shall not be less than 32 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 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 28 inches where a handrail is installed on one side and 24 inches where handrails are provided on both sides.

**R311.5.2 HEADROOM.** The minimum headroom in all parts of the stairway shall not be less than 6 feet, 8 inches measured vertically from the sloped plane adjoining the tread nosing or from the floor surface of the landing or platform.

**Exception:** The minimum headroom in all parts of existing or replacement stairways serving existing unfinished attics or existing unfinished basements being converted to habitable space shall be 6 feet, 6 inches, measured as above.

### R311.5.3 STAIR TREADS AND RISERS

**R311.5.3.1 Riser heights.** The maximum riser height shall be 8 ¼ inches. The minimum riser height shall be 4 inches. Riser height shall be measured vertically between leading edges of adjacent treads.

**Exception:** The maximum riser height of existing or replacement stairs serving existing unfinished attics or existing unfinished basements being converted to habitable space shall be 9 inches, measured as above.

The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch.

**R311.5.3.2 Tread depth.** 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.

**Exception.** The minimum tread depth of existing or replacement stairs serving existing unfinished attics or existing unfinished basements being converted to habitable space shall be 8 inches, measured as above.

The greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8 inch. Winder and circular stairway treads shall have a minimum tread depth of 9 inches measured as above at a point 12 inches from the sides where the treads are narrower. Winder treads shall have a minimum tread depth of 6 inches at any point. The greatest winder tread depth at the 12-inch walk line within any flight of stairs shall not exceed the smallest by more than 3/8 inch. The greatest circular tread depth at any walking line within any circular flight of stairs, measured at a consistent distance from a side of the stairway, shall not exceed the smallest by more than 3/8 inch.

**R311.5.3.3 Profile.** The radius of curvature at the leading edge of the tread shall be no greater than 9/16 inch (14.3 mm). A nosing not less than ¾ inch (19 mm) but not more than 1 ¼ inch (32 mm) 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 (9.5 mm) between two stories, including the nosing at the level of floors and landings. Beveling of nosing shall not exceed ½ inch (12.7 mm). Risers shall be vertical or sloped from the underside of the leading edge of the tread above at an angle not more than 30 (0.51 rad) degrees from the vertical. Open risers are permitted, provided that the opening between treads does not permit the passage of a 4-inch diameter (102 mm) sphere.

**Exceptions:**

1. A nosing is not required where the tread depth is a minimum of 11 inches (279 mm).
2. The opening between adjacent treads is not limited on stairs with a total rise of 30 inches (762 mm) or less.

**R311.5.4 LANDINGS FOR STAIRWAYS.** There shall be a floor or landing at the top and bottom of each stairway.

**Exception:** A floor or landing is not required at the top of an interior flight of stairs, provided a door does not swing over the stairs.

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

The width of each landing shall not be less than the stairway served. Every landing shall have a minimum dimension of 36 inches (914 mm) measured in the direction of travel.

**R311.5.5 STAIRWAY WALKING SURFACE.** The walking surface of treads and landings of stairways shall be sloped no steeper than one unit vertical in 48 inches horizontal (2 percent slope).

**R311.5.6 HANDRAILS.** Handrails shall be provided on at least one side of each continuous run of treads or flight with four or more risers.

**R311.5.6.1 Height.** Handrail height, measured vertically from the sloped plane adjoining the tread nosing, or finish surface of

ramp slope, shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm).

**R311.5.6.2 Continuity.** Handrails for stairways shall be continuous for the full length of each flight, from a point directly above the top riser of the flight to a point directly above the lowest riser of the flight. Handrail ends shall be returned to a wall or shall terminate in newel posts or safety terminations. Handrails adjacent to a wall shall have a space of not less than 1 ½ inch between the wall and the handrails.

**Exceptions:**

1. Handrails shall be permitted to be interrupted by a newel post at a level landing.
2. The use of a volute, turnout, starting easing or starting newell shall be permitted over the lowest tread.

**R311.5.6.3 Handrail grip size.** All required handrails shall be of one of the following types or provide equivalent grasp ability.

1. Type I. Handrails with a circular cross section shall have an outside diameter of at least 1 ¼ inches (32 mm) and not greater than 2 inches (51 mm). If the handrail is not circular it shall have a perimeter dimension of at least 4 inches (102 mm) and not greater than 6 ¼ inches (160 mm) with a maximum cross section of dimension of 2 ¼ inches (57 mm).
2. Type II. Handrails with a perimeter greater than 6 ¼ inches (160 mm) shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of ¾ inch (19 mm) measured vertically from the tallest portion of the profile and achieve a depth of at least 5/16 inch (8 mm) within 7/8 inch (22 mm) below the widest portion of the profile. This required depth shall continue for at least 3/8 inch (10 mm) to a level that is not less than 1 ¾ inches (45 mm) below the tallest portion of the profile. The minimum width of the handrail above the recess shall be 1 ¼ inches (32 mm) to a maximum of 2 ¾ inches (70 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

**R311.5.7 ILLUMINATION.** All stairs shall be provided with illumination in accordance with Section R303.6.

**R311.5.8 SPECIAL STAIRWAYS.** Circular stairways, spiral stairways, winders and bulkhead enclosure stairways shall comply with all requirements of Section R311.5 except as specified below.

**R311.5.8.1 Spiral stairways.** Spiral stairways are permitted, provided the minimum width shall be 26 inches (660 mm) with each tread having a 7 ½ inches (190 mm) minimum tread depth at 12 inches from the narrower edge. All treads shall be identical, and the rise shall be no more than 9 ½ inches (241 mm). A minimum headroom of 6 feet 6 inches (1982 mm) shall be provided.

**R311.5.8.2 Bulkhead enclosure stairways.** Stairways serving bulkhead enclosures, not part of the required building egress, providing access from the outside grade level to the basement shall be exempt from the requirements of Sections R311.4.3 and R311.5 where the maximum height from the basement finished floor level to grade adjacent to the stairway does not exceed 8 feet (2438 mm), and the grade level opening to the stairway is covered by a bulkhead enclosure with hinged doors or other approved means.

**R311.6 RAMPS.**

**R311.6.1 Maximum slope.** Ramps shall have a maximum slope of one unit vertical in eight units horizontal (12.5 percent slope).

**R311.6.2 Landings required.** A minimum 3 foot by 3 foot (914 mm by 914 mm) landing shall be provided:

1. At the top and bottom of ramps,
2. Where doors open onto ramps,
3. Where ramps change direction.

**R311.6.3 HANDRAILS REQUIRED.** Handrails shall be provided on at least one side of all ramps exceeding a slope of one unit vertical in 12 units horizontal (8.33 percent slope).

**R311.6.3.1 Height.** Handrail height, measured above the finished surface of the ramp slope, shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm).

**R311.6.3.2 Handrail grip size.** Handrails on ramps shall comply with Section R311.5.6.3.

**R311.6.3.3 Continuity.** Handrails where required on ramps shall be continuous for the full length of the ramp. 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 (38 mm) between the wall and the handrails.

**SECTION R312 – GUARDS**

**R312.1 Guards required.** Porches, balconies or raised floor surfaces located more than 30 inches (762 mm) above the floor or grade below shall have guards not less than 36 inches (914 mm) in height. Open sides of stairs with a total rise of more than 30 inches (762 mm) above the floor or grade below shall have guards not less than 34 inches (864 mm) in height measured vertically from the nosing of the treads.

Porches and decks which are enclosed with insect screening shall be provided with guards where the walking surface is located more than 30 inches (762 mm) above the floor or grade below.

**R312.2 Guard opening limitations.** Required guards on open sides of stairways, raised floor areas, balconies and porches shall have intermediate rails or ornamental closures which do not allow passage of a sphere 4 inches (102 mm) or more in diameter.

**Exceptions:**

1. The triangular openings formed by the riser, tread and bottom rail of a guard at the open side of a stairway are permitted to be of such a size that a sphere 6 inches (152 mm) cannot pass through.
2. Openings for required guards on the sides of stair treads shall not allow a sphere 4 3/8 inches (107 mm) to pass through.