



# RESIDENTIAL STAIRWAYS, HANDRAILS, & GUARDRAILS

\*A Building permit is required for any alteration or addition to any existing building or structure. *MN State Building Code Section 1300.0120 Subpart 1.*

## R311.7 Stairways.

**R311.7.1 Stairways.** All stairways serving a dwelling or accessory structure, or any part thereof, shall comply with this section. This shall include exterior stairs from a dwelling or garage to grade and those stairs serving decks, porches, balconies, sun rooms, and similar structures.

**Exception:**

1. Stairs serving attics or crawl spaces.
2. Stairs that only provide access to plumbing, mechanical, or electrical equipment

**R311.7.1.2, Width.** Stairways shall not be less than 36 inches (914 mm) 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 (114 mm) 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 1/2 inches (787 mm) where a handrail is installed on one side and 27 inches (698 mm) where handrails are provided on both sides.

**Exception:** The width of spiral stairways shall be in accordance with Section R311.7.9.1.

**R311.7.2 Headroom.** The minimum headroom in all parts of the stairway shall not be less than 6 feet 8 inches (2032 mm) 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.

**Exceptions:**

1. 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).
2. The minimum headroom for existing buildings shall be in accordance with section R305.2.2.

### R311.7.3 Vertical rise.

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

#### **R311.7.4 Walkline.**

The walkline across winder treads shall be concentric to the curved 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.

#### **R311.7.5 Stair treads and risers.**

Stair treads and risers shall meet the requirements of this section. For the purposes of this section all dimensions and dimensioned surfaces shall be exclusive of carpets, rugs or runners.

##### **R311.7.5.1 Risers.**

The maximum riser height shall be  $7\frac{3}{4}$  inches (196 mm). The riser 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  $\frac{3}{8}$  inch (9.5 mm). Risers shall be vertical or sloped from the underside of the nosing of the tread above at an angle not more than 30 degrees (0.51 rad) 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.

**Exception:** The opening between adjacent treads is not limited on stairs with a total rise of 30 inches (762 mm) or less.

##### **R311.7.5.2 Treads.**

The minimum tread depth shall be 10 inches (254 mm). 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  $\frac{3}{8}$  inch (9.5 mm).

###### **R311.7.5.2.1 Winder treads.**

Winder treads shall have a minimum tread depth of 10 inches (254 mm) measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline. Winder treads shall have a minimum tread depth of 6 inches (152 mm) 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  $\frac{3}{8}$  inch (9.5 mm). Consistently shaped winders at the walkline shall be allowed within the same flight of stairs as rectangular treads and do not have to be within  $\frac{3}{8}$  inch (9.5 mm) of the rectangular tread depth.

##### **R311.7.5.3 Nosings.**

The radius of curvature at the nosing shall be no greater than  $\frac{9}{16}$  inch (14 mm). A nosing not less than  $\frac{3}{4}$  inch (19 mm) but not more than  $1\frac{1}{4}$  inches (32 mm) shall be provided on stairways with solid risers. The greatest nosing projection shall not exceed the smallest nosing projection by more than  $\frac{3}{8}$  inch (9.5 mm) between two stories, including the nosing at the level of floors and landings.

Beveling of nosings shall not exceed  $\frac{1}{2}$  inch (12.7 mm).

**Exception:** A nosing is not required where the tread depth is a minimum of 11 inches (279 mm).

#### **R311.7.6 Landings for stairways.**

There shall be a floor or landing at the top and bottom of each stairway. The minimum width perpendicular to the direction of travel shall be no less than the width of the flight served. Landings of shapes other than square or rectangular shall be permitted provided the depth at the walk line and the total area is not less than that of a quarter circle with a radius equal to the required landing width. Where the stairway has a straight run, the minimum depth in the direction of travel shall be not less than 36 inches (914 mm).

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

#### **R311.7.7 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).

### **R311.3 Floors and landings at exterior doors.**

There shall be a landing or floor on each side of each exterior door. The width of each landing shall not be less than the door served. Every landing shall have a minimum dimension of 36 inches (914 mm) measured in the direction of travel. Exterior landings shall be permitted to have a slope not to exceed  $\frac{1}{4}$  unit vertical in 12 units horizontal (2-percent).

**Exception:** Exterior balconies less than 60 square feet (5.6 m<sup>2</sup>) and only accessible from a door are permitted to have a landing less than 36 inches (914 mm) measured in the direction of travel.

#### **R311.3.1 Floor elevations at the required egress doors.**

Landings or finished floors at the required egress door shall not be more than  $1\frac{1}{2}$  inches (38 mm) lower than the top of the threshold.

**Exception:** The landing or floor on the exterior side shall not be more than  $7\frac{3}{4}$  inches (196 mm) below the top of the threshold provided the door does not swing over the landing or floor.

Where exterior landings or floors serving the required egress door are not at *grade*, they shall be provided with access to *grade* by means of a ramp in accordance with [Section R311.8](#) or a stairway in accordance with [Section R311.7](#).

## **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 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).

#### **Exceptions:**

1. The use of a volute, turnout or starting easing shall be allowed over the lowest tread.
2. When handrail fittings or bendings are used to provide continuous transition between flights, transitions at winder treads, the transition from handrail to guardrail, or used at the start of a flight, the handrail height at the fittings or bendings shall be permitted to exceed the maximum height.

### **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 the 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  $1\frac{1}{2}$  inch (38 mm) between the wall and the handrails.

#### **Exceptions:**

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

### **R311.7.8.3 Grip-size.**

All required handrails shall be of one of the following types or provide equivalent graspability.

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

### **R311.7.8.4 Exterior wood/plastic composite handrails.**

Wood/plastic composite handrails shall comply with the provisions of [section R507.3](#).

### **R311.7.9 Illumination.**

All stairs shall be provided with illumination in accordance with [Section R303.6](#).

### **R311.7.10 Special stairways.**

Spiral stairways and bulkhead enclosure stairways shall comply with all requirements of [Section R311.7](#) except as specified below.

#### **R311.7.10.1 Spiral stairways.**

Spiral stairways are permitted, provided the minimum clear width at and below the handrail shall be 26 inches (660 mm) with each tread having a 7<sup>1</sup>/<sub>2</sub>-inch (190 mm) minimum tread depth at 12 inches (914 mm) from the narrower edge. All treads shall be identical, and the rise shall be no more than 9<sup>1</sup>/<sub>2</sub> inches (241 mm). A minimum headroom of 6 feet 6 inches (1982 mm) shall be provided.

#### **R311.7.10.2 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 R311.3](#) and [R311.7](#) 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.

## **R312.1 Guards.**

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 (762 mm) measured vertically to the floor or *grade* below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Insect screening shall not be considered as a *guard*. **R312.1.2 Height.**

Required *guards* at open-sided walking surfaces, including stairs, porches, balconies or landings, shall be not less than 36 inches (914 mm) high measured vertically above the adjacent walking surface, adjacent fixed seating or the line connecting the leading edges of the treads.

#### **Exceptions:**

1. *Guards* on the open sides of stairs shall have a height not less than 34 inches (864 mm) 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 stairs, the top of the *guard* shall not be less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.

### **R312.1.3 Opening limitations.**

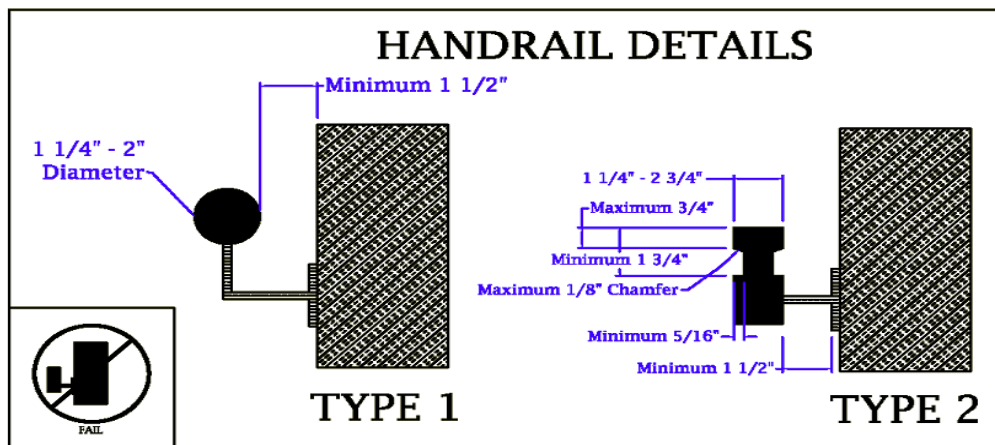
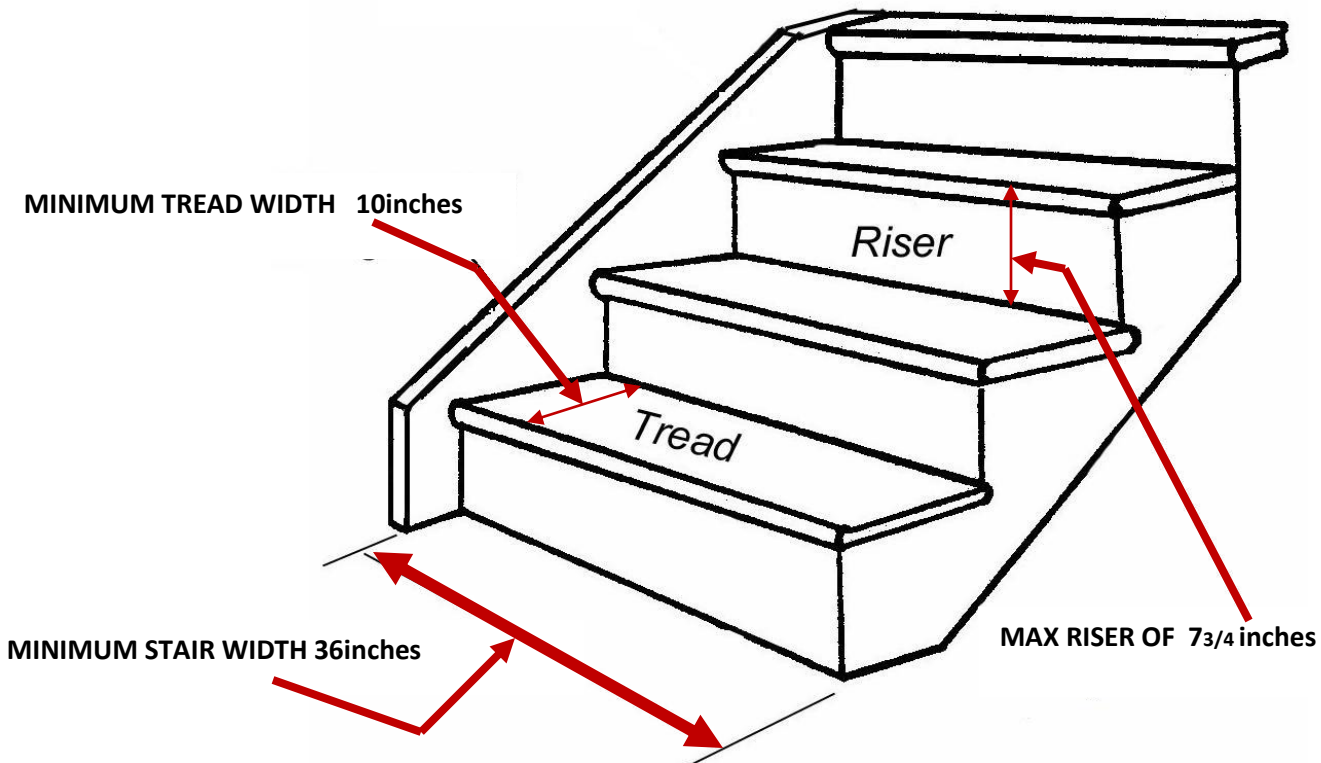
Required *guards* shall not have openings from the walking surface to the required *guard* height which allow passage of a sphere 4 inches (102 mm) in diameter.

**Exceptions:** 1. The triangular openings at the open side of stair, formed by the riser, tread and bottom rail of a guard, shall not allow passage of a sphere 6 inches (153 mm) 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 (111 mm) in diameter.

**R312.1.4 Exterior woodplastic composite guards.**

Woodplastic composite *guards* shall comply with the provisions of [Section R317.4](#).



The language & depictions in this hand out is meant as a guide for the construction code & building process and may not contain exact code language. For exact code you may go online at [www.revisor.mn.gov](http://www.revisor.mn.gov) or contact the Austin Building Department.