

# SECTION R311 MEANS OF EGRESS

**R311.7 Stairways.** Where required by this code or provided, *stairways* shall comply with this section.

- Exceptions:**
1. Stairways not within or serving a building, porch or deck.
  2. Stairways leading to nonhabitable attics.
  3. Stairways leading to crawl spaces.

**IRC DEFINITION:**

**STAIRWAY.** One or more flights of stairs, either interior or exterior, with the necessary landings and connecting platforms to form a continuous and uninterrupted passage from one level to another.

**R311.7.1 Width.** Stairways shall be not less than 36 inches (914 mm) in clear width at all points above the permitted *handrail* height **PHOTO 1 & 2** and below the required headroom height **PHOTO 2**. The clear width of stairways at and below the *handrail* height, including treads and landings, shall be not less than 31½ inches (787 mm) where a *handrail* is installed on one side **PHOTO 3** and 27 inches (698 mm) where *handrails* are installed on both sides **PHOTO 4**.

**Exception:** The width of *spiral stairways* shall be in accordance with Section R311.7.10.1 See **PHOTO 52 (p. 19)**.

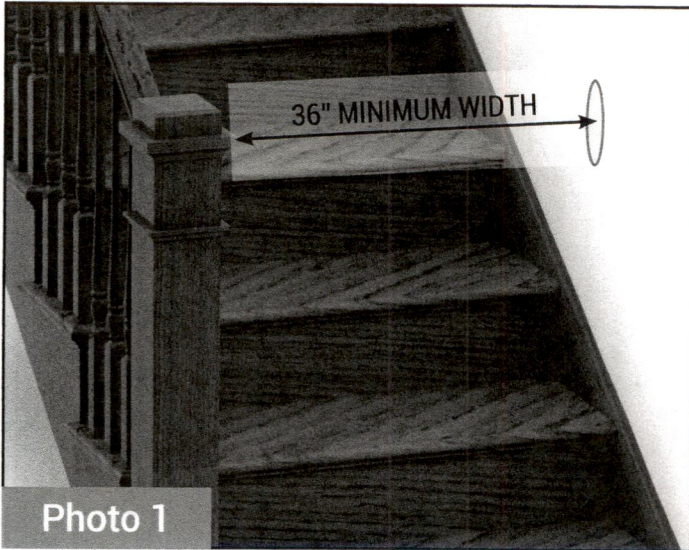


Photo 1

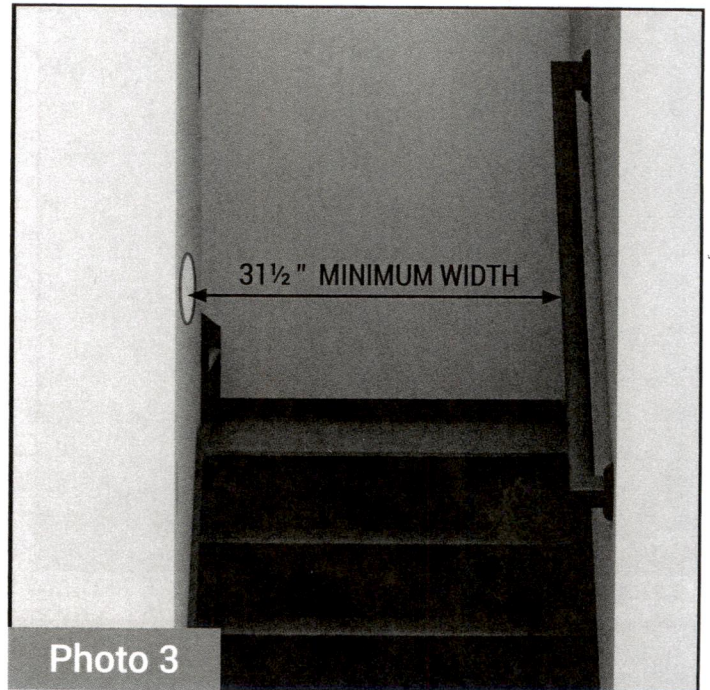


Photo 3

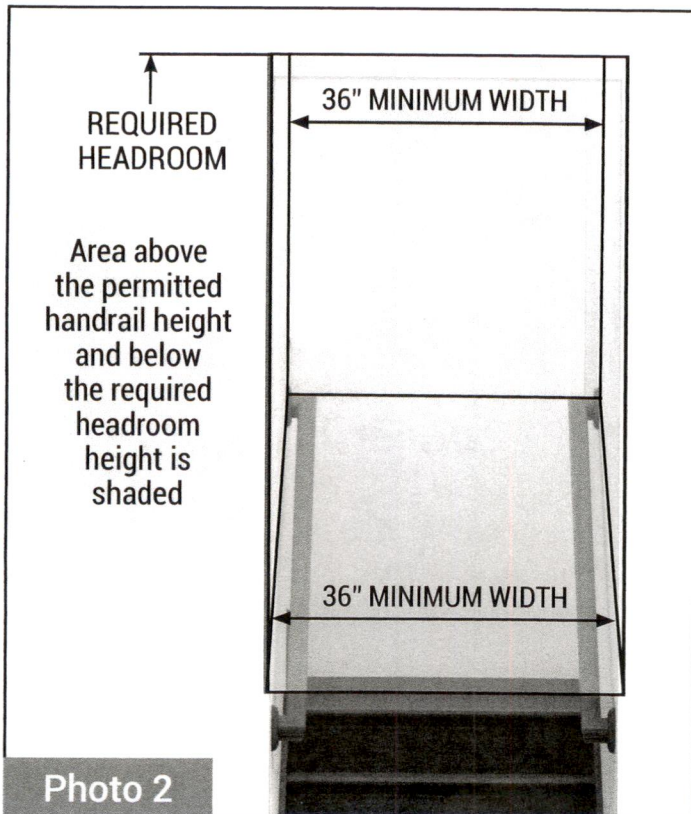


Photo 2

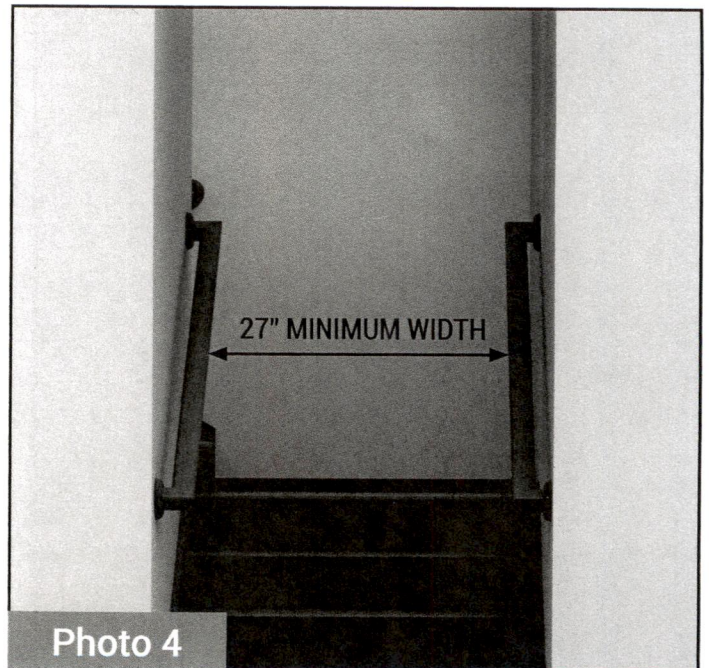
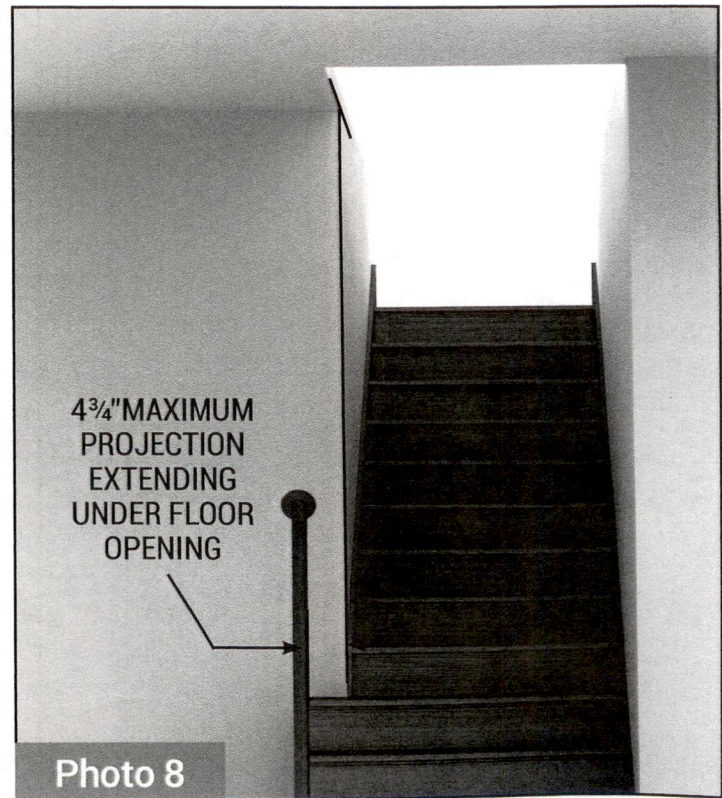
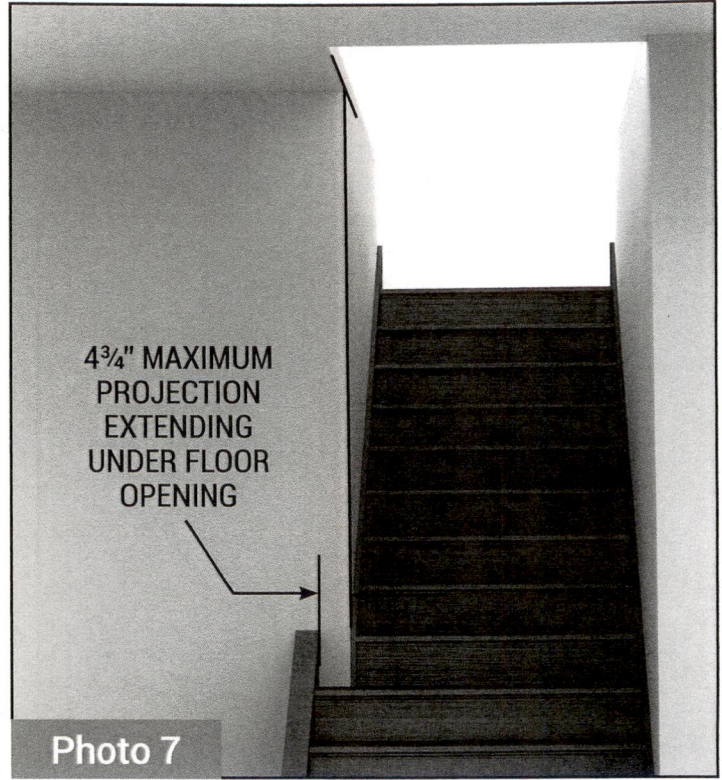


Photo 4

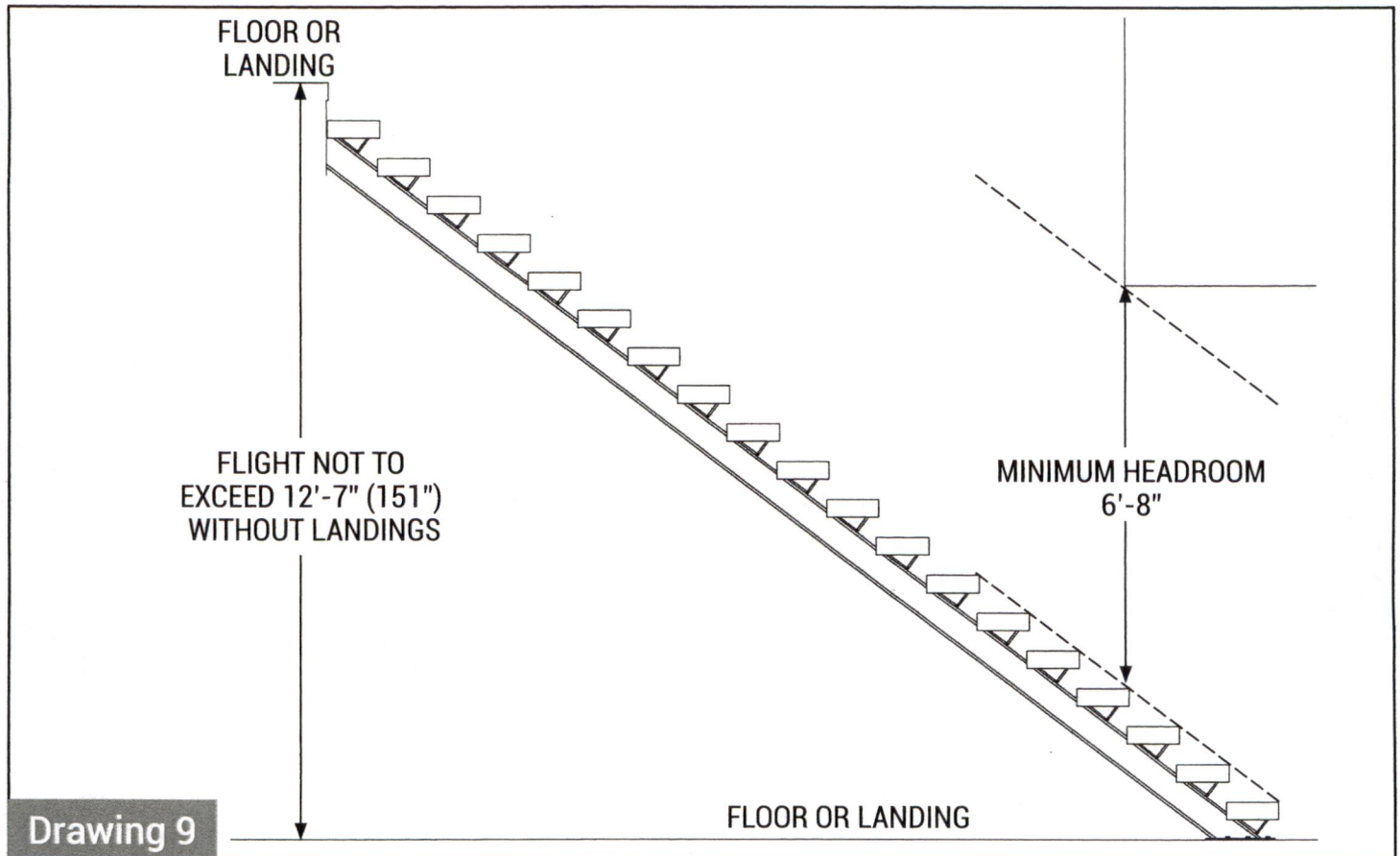
**R311.7.2. Headroom.** The headroom in stairways shall be not less than 6 feet 8 inches (2032 mm) measured vertically from the sloped line adjoining the tread *nosing* **PHOTO 5** or from the floor surface of the landing or platform on that portion of the *stairway* **PHOTO 6**.

**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 not project horizontally into the required headroom more than 4¾ inches (121 mm) **PHOTOS 7 & 8**.
2. The headroom for *spiral stairways* shall be in accordance with Section R311.7.10.1 **PHOTO 55 (p. 19)**.

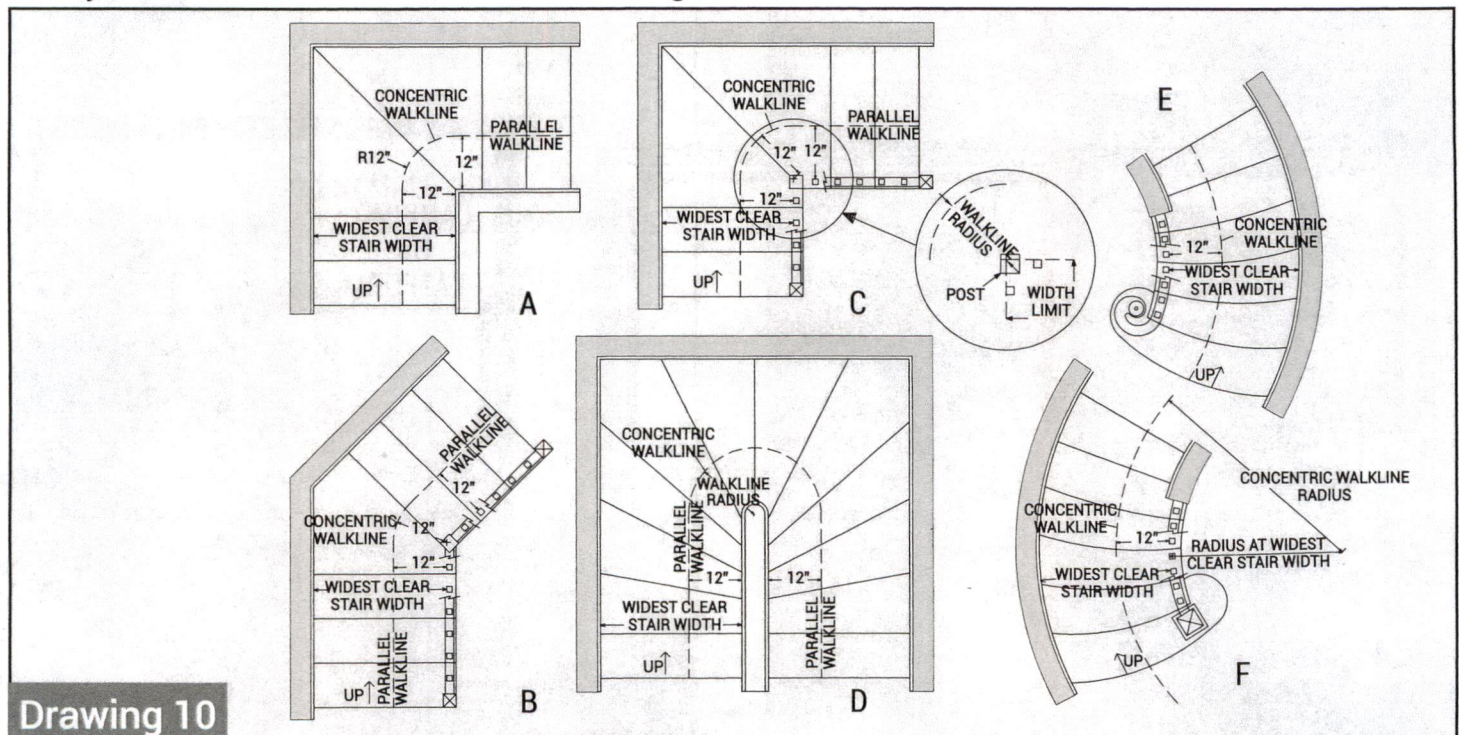


**R311.7.3 Vertical rise.** A flight of stairs shall not have a vertical rise greater than 12 feet 7 inches (3835 mm) between floor levels or landings **DRAWING 9**.



**Drawing 9**

**R311.7.4 Walkline.** The walkline across *winder* treads and landings shall be concentric to the turn **DRAWING 10 Figures A-F** and parallel to the direction of travel entering and exiting the turn **DRAWING 10 Figures A-D**. The walkline shall be located 12 inches (305 mm) from the inside of the turn. The 12-inch (305 mm) dimension shall be measured from the widest point of the clear *stair* width at the walking surface **DRAWING 10 Figures A-F**. Where *winders* are adjacent within the *flight*, **DRAWING 12 (p. 8)** the point of the widest clear stair width of the adjacent *winders* shall be used **DRAWING 10 Figures E-F**.



**Drawing 10**

**R311.7.5 Stair treads and risers.** Stair treads and *risers* shall meet the requirements of this section. For the purposes of this section, dimensions and dimensioned surfaces shall be exclusive of carpets, rugs or runners  
**PHOTO 11.**

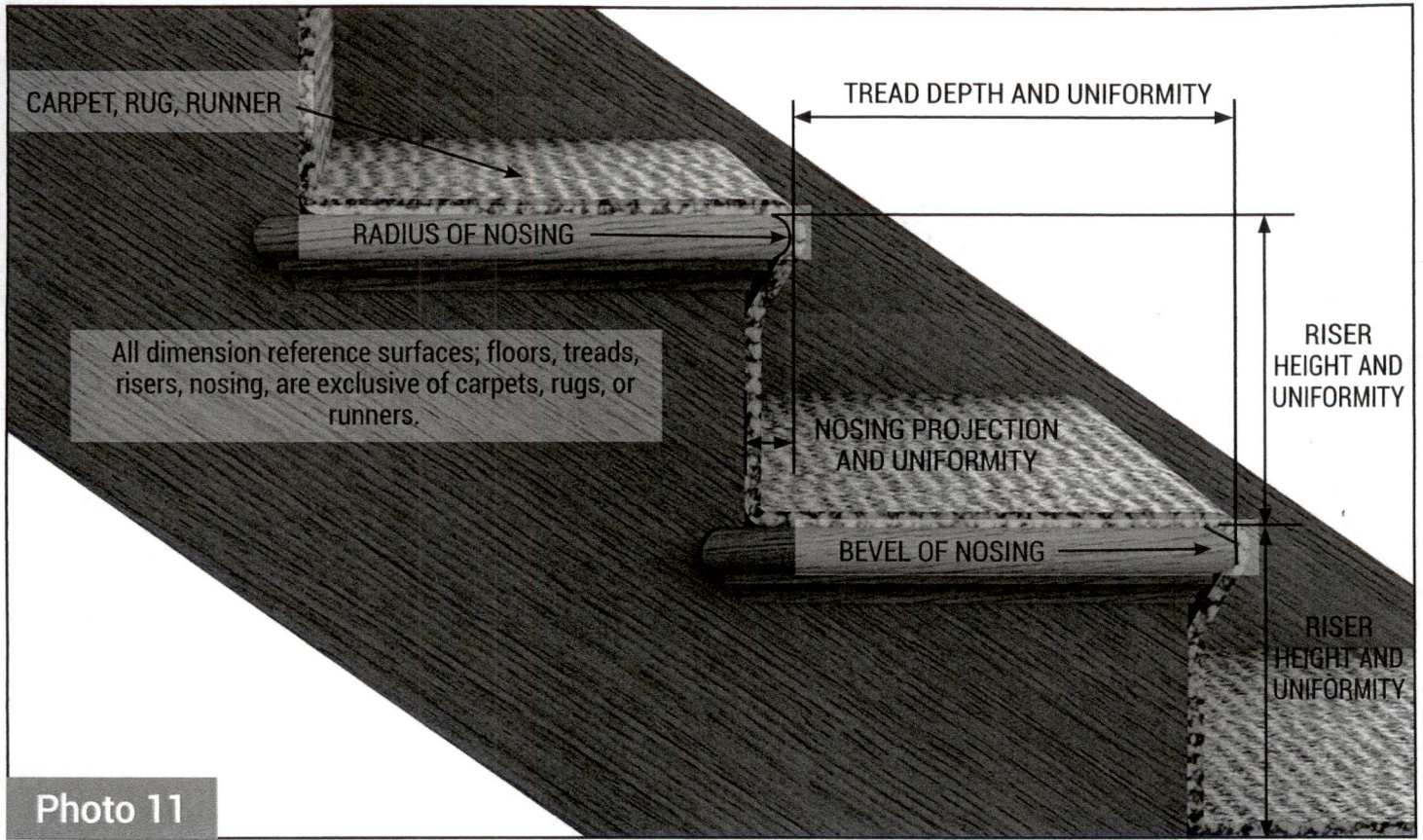
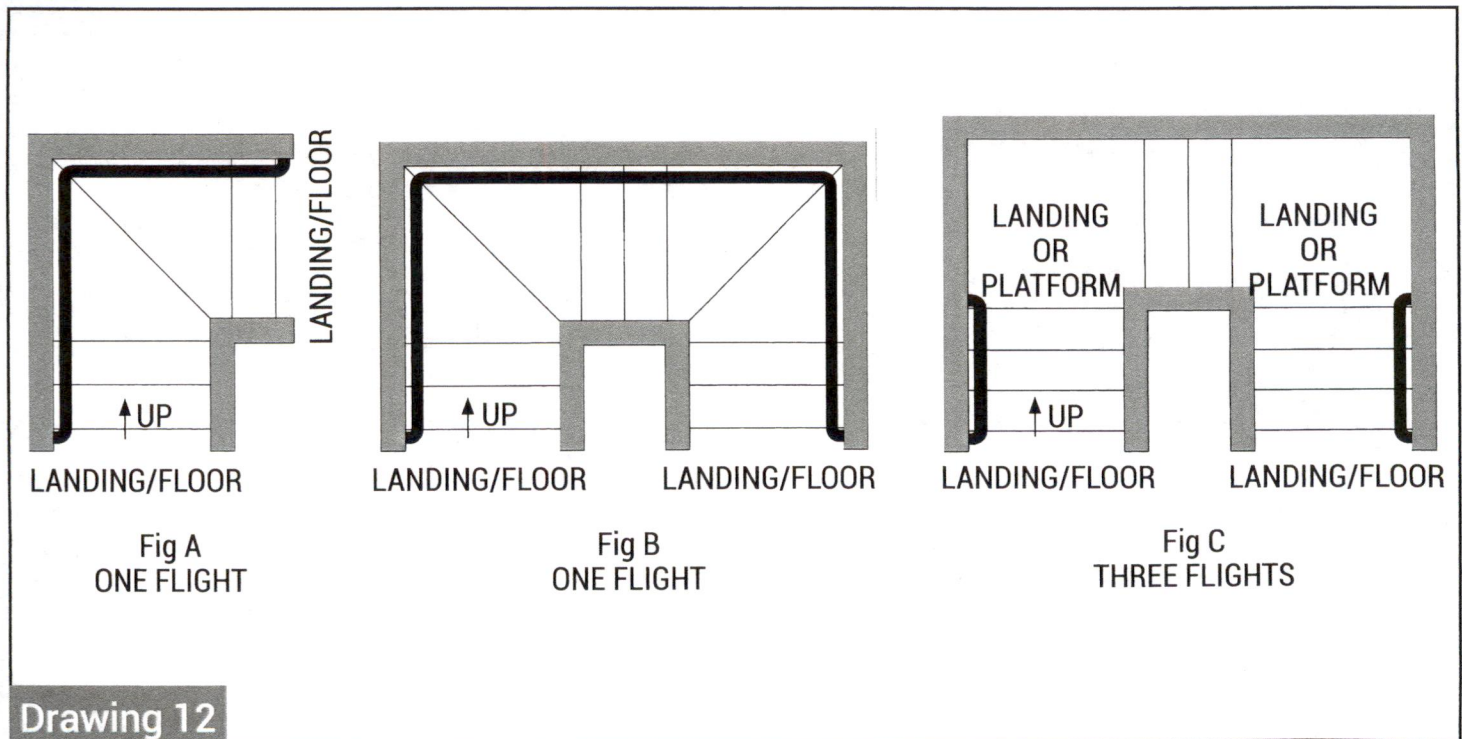


Photo 11

**ICC DEFINITION:**

**FLIGHT.** A continuous run of rectangular treads or winders or combination thereof from one landing to another.

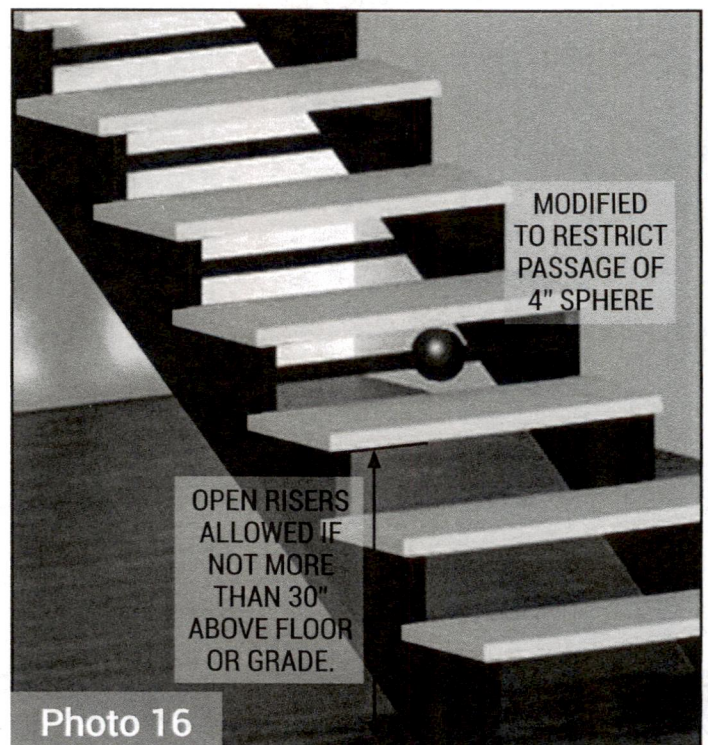
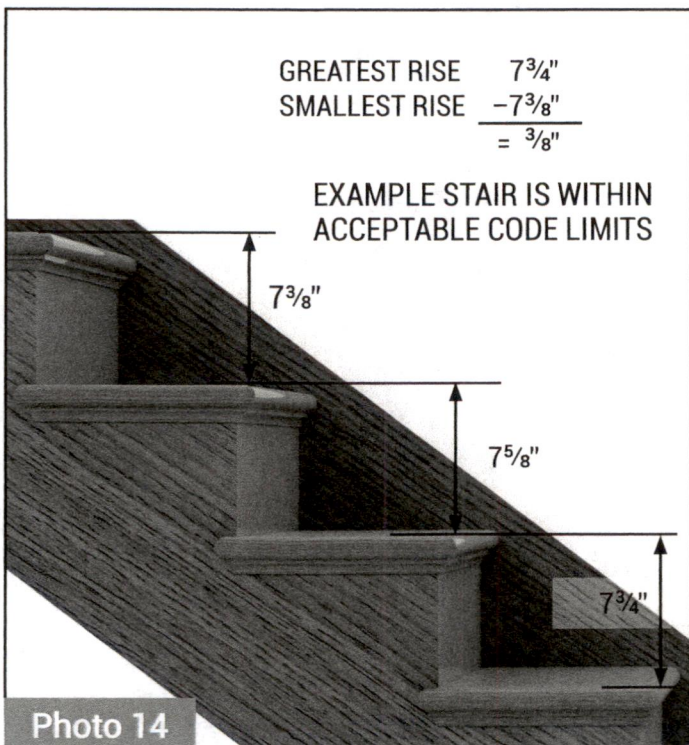
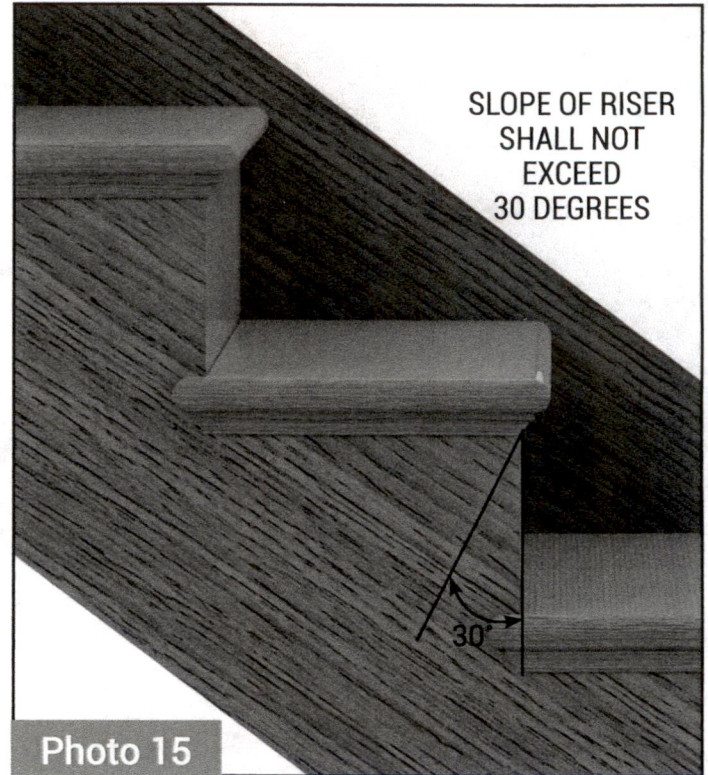
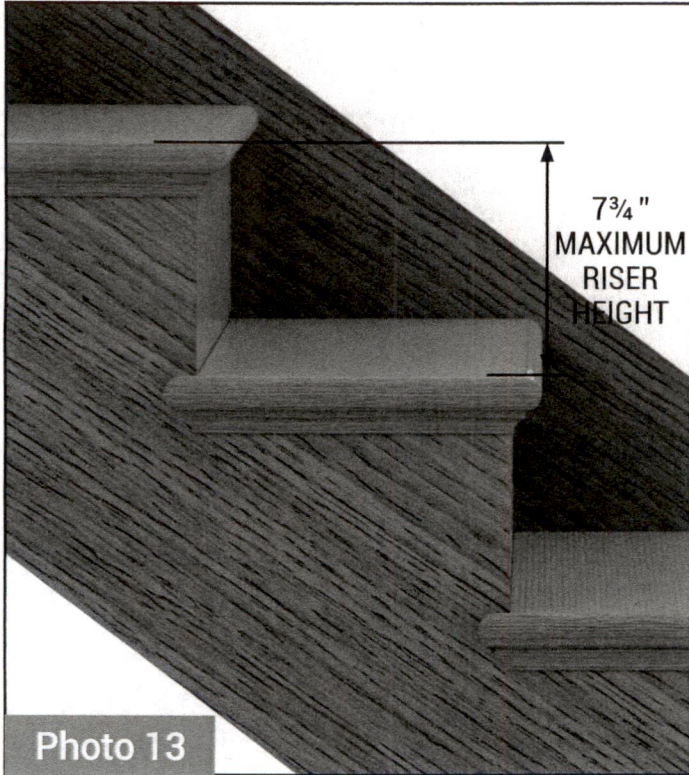


Drawing 12

**R311.7.5.1 Risers.** The *riser* height shall be not more than 7¾ inches (196 mm). The *riser* height shall be measured vertically between leading edges of the adjacent treads **PHOTO 13**. The greatest *riser* height within any *flight* **DRAWING 12 (p. 8)** of *stairs* shall not exceed the smallest by more than ¾ inch (9.5 mm) **PHOTO 14**. 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 **PHOTO 15**. At open *risers*, openings located more than 30 inches (762 mm), as measured vertically, to the floor or grade below shall not permit the passage of a 4-inch-diameter (102 mm) sphere **PHOTO 16**.

**Exceptions:**

1. The opening between adjacent treads is not limited on spiral stairways **PHOTO 55 (p. 19)**.
2. The *riser* height of spiral stairways shall be in accordance with Section R311.7.10.1 **PHOTO 52 (p. 19)**.



**R311.7.5.2 Treads.** The tread depth shall be not less than 10 inches (254 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads **PHOTO 17** and at a right angle to the tread's leading edge. The greatest tread depth within any *flight* **DRAWING 12 (p. 8)** of stairs shall not exceed the smallest by more than  $\frac{3}{8}$  inch (9.5 mm) **PHOTO 18**.

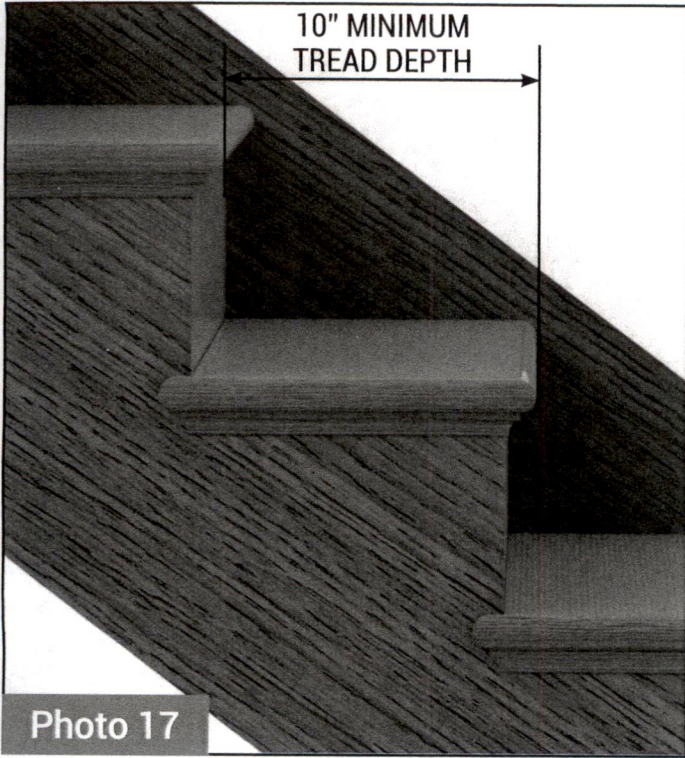


Photo 17

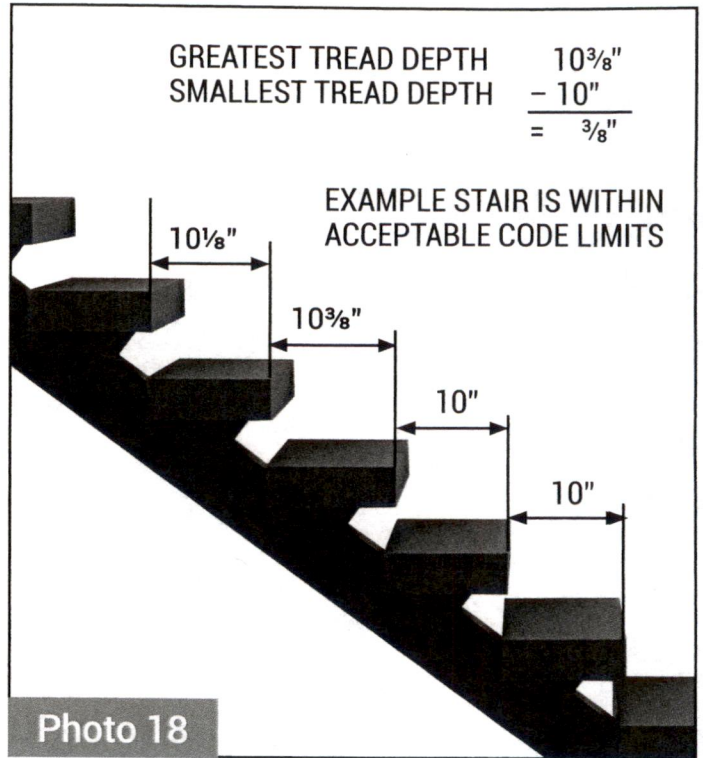
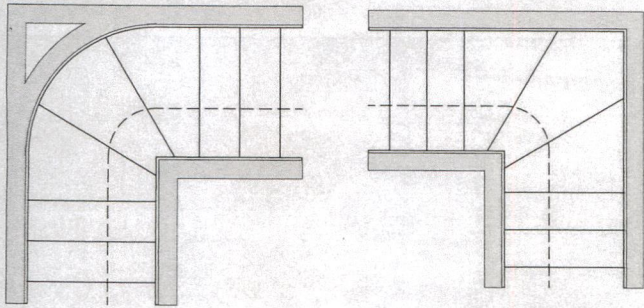


Photo 18

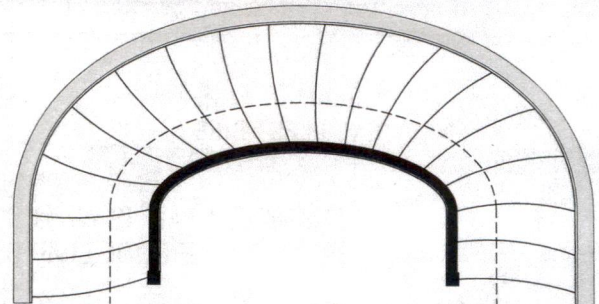
**ICC DEFINITION:**

**WINDER.** A tread with nonparallel edges.

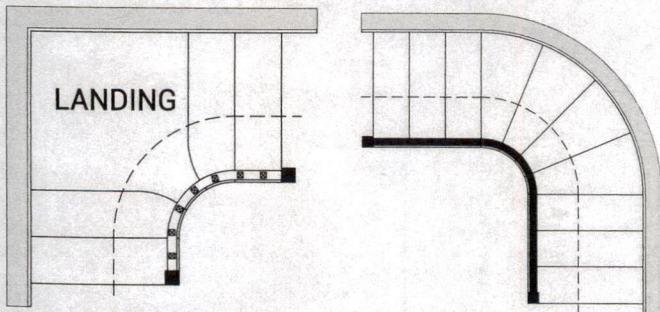


A.

B.



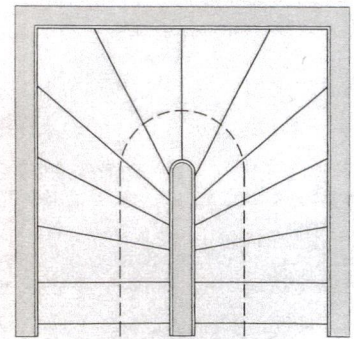
E.



C.

D.

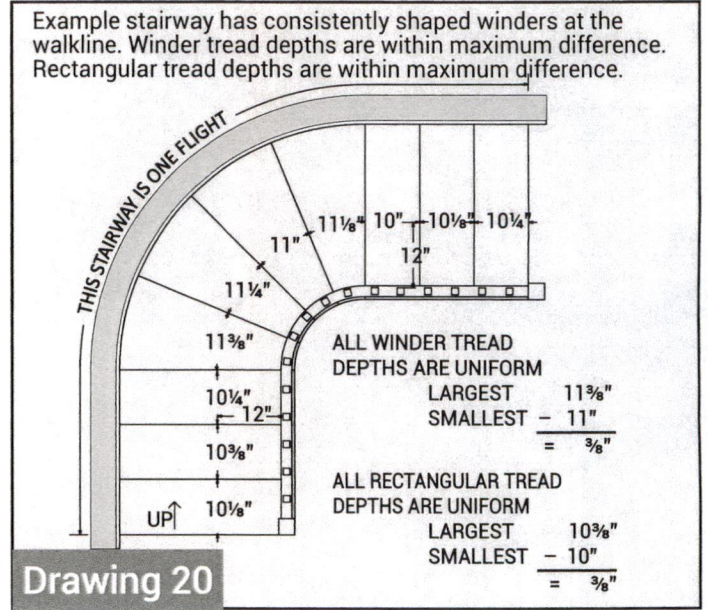
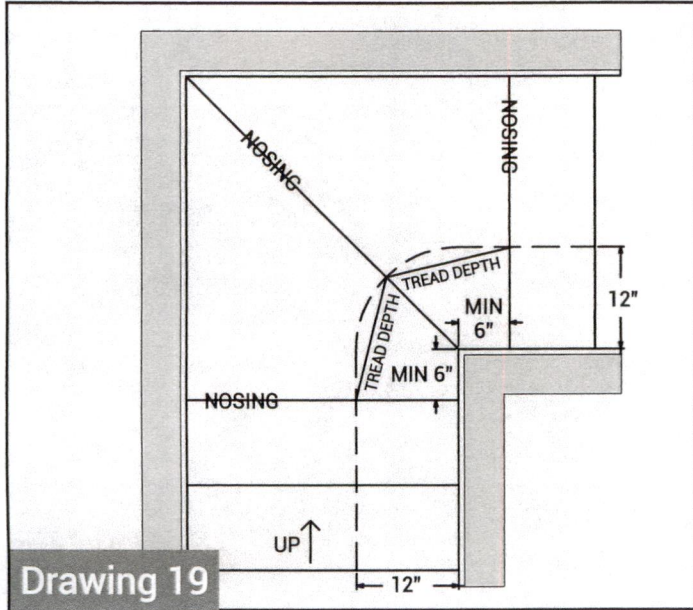
Figures A-F illustrate common stairway designs with consistently shaped winder treads at the walkline.



F.

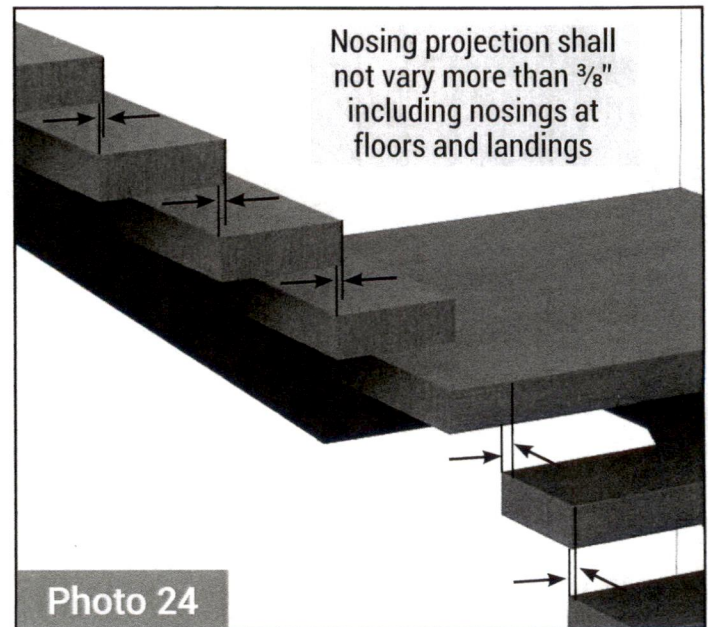
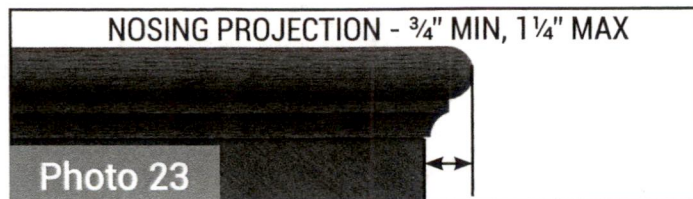
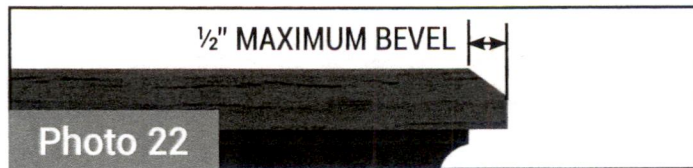
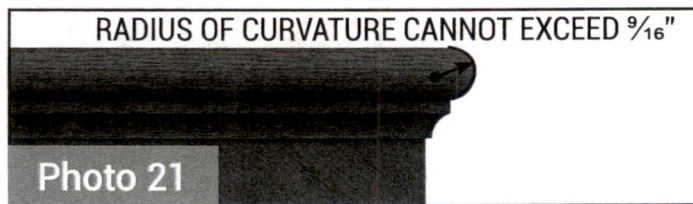
**R311.7.5.2.1 Winder treads.** *Winder* treads shall have a tread depth of not less than 10 inches (254 mm) measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline. *Winder* treads shall have a tread depth of not less than 6 inches (152 mm) at any point within the clear width of the *stair* **DRAWING 19**. Within any *flight of stairs*, **DRAWING 12 (p. 8)** 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) **DRAWING 20**. Consistently shaped *winders* at the walkline shall be allowed within the same *flight of stairs* as rectangular treads and shall not be required to be within  $\frac{3}{8}$  inch (9.5 mm) of the rectangular tread depth **DRAWING 20**.

**Exception:** The tread depth at *spiral* stairways shall be in accordance with Section R311.7.10.1 **DRAWING 54 (p. 19)**.



**R311.7.5.3 Nosings.** *Nosings* at treads, landings and floors of *stairways* shall have a radius of curvature at the *nosing* not greater than  $\frac{9}{16}$  inch (14 mm) **PHOTO 21** or a bevel not greater than  $\frac{1}{2}$  inch (12.7 mm) **PHOTO 22**. A *nosing* projection not less than  $\frac{3}{4}$  inch (19 mm) and not more than  $1\frac{1}{4}$  inches (32 mm) shall be provided on *stairways* **PHOTO 23**. The greatest *nosing* projection shall not exceed the smallest *nosing* projection by more than  $\frac{3}{8}$  inch (9.5 mm) within a *stairway* **PHOTO 24**.

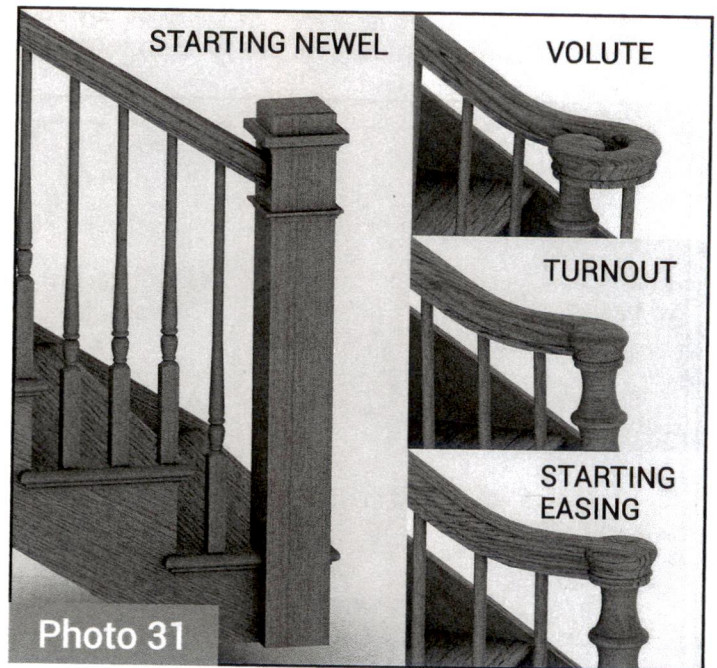
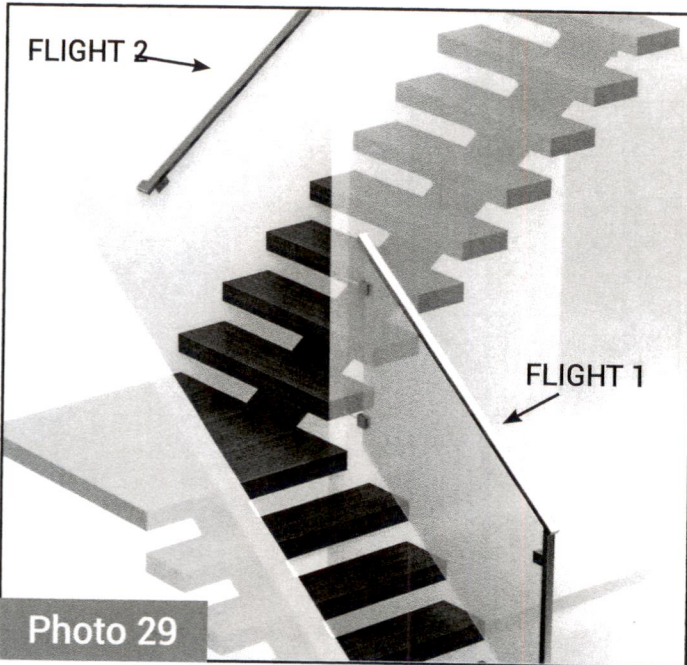
**Exception:** A *nosing* projection is not required where the tread depth is not less than 11 inches (279 mm).



**ICC DEFINITION:**

**HANDRAIL.** A horizontal or sloping rail intended for grasping by the hand for guidance or support

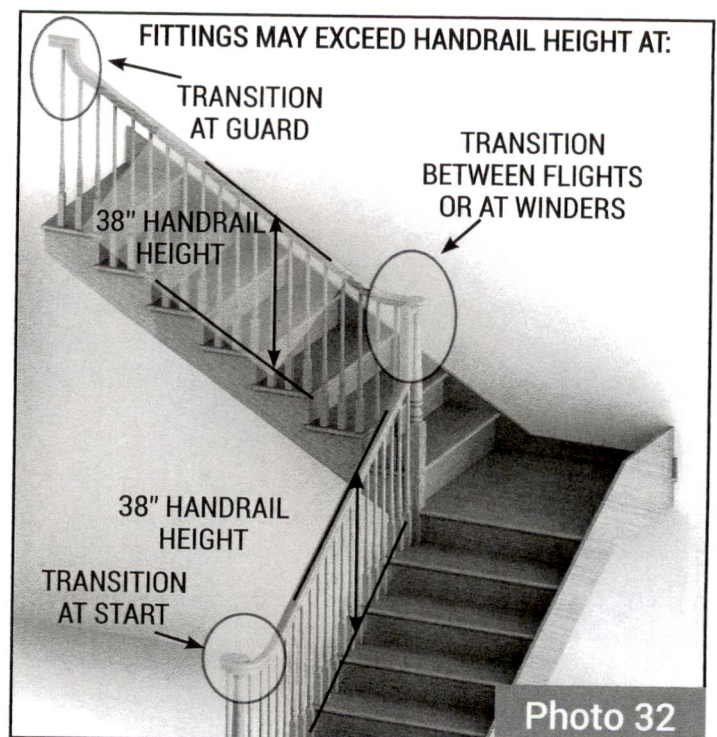
**R311.7.8 Handrails.** Handrails shall be provided on not less than one side of each flight of stairs **DRAWING 12 (p. 8)** with four or more risers **PHOTO 29.**



**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) **PHOTO 30.**

**Exception:**

1. The use of a volute, turnout or starting easing shall be allowed over the lowest tread **PHOTO 31.**
2. Where handrail fittings or bendings are used to provide continuous transition between flights, transitions at winder treads, the transition from handrail to guard, or used at the start of a flight, the handrail height at the fittings or bendings shall be permitted to exceed 38 inches (956 mm) **PHOTO 32.**



**R311.7.8.2 Handrail projection.** Handrails shall not project more than 4½ inches (114 mm) on either side of the stairway **PHOTO 33**.

**Exception:** Where nosings of landings, floors **PHOTO 34** or passing flights **PHOTO 35** project into the stairway reducing the clearance at passing handrails, handrails shall project not more than 6½ inches (165 mm) into the stairway, provided that the stair width and handrail clearance are not reduced to less than that required.

**R311.7.8.3. Handrail clearance.** Handrails adjacent to a wall shall have a space of not less than 1½ inches (38 mm) between the wall and the handrails **PHOTO 36**.

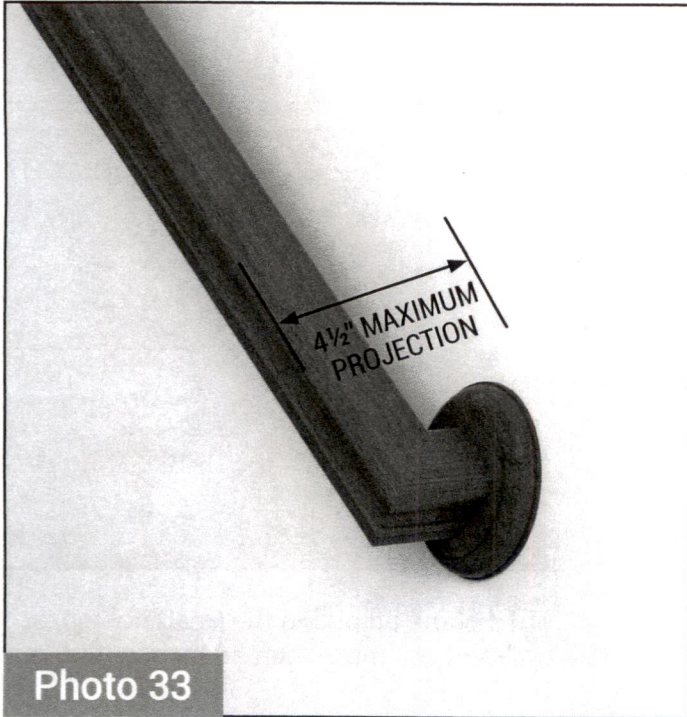


Photo 33

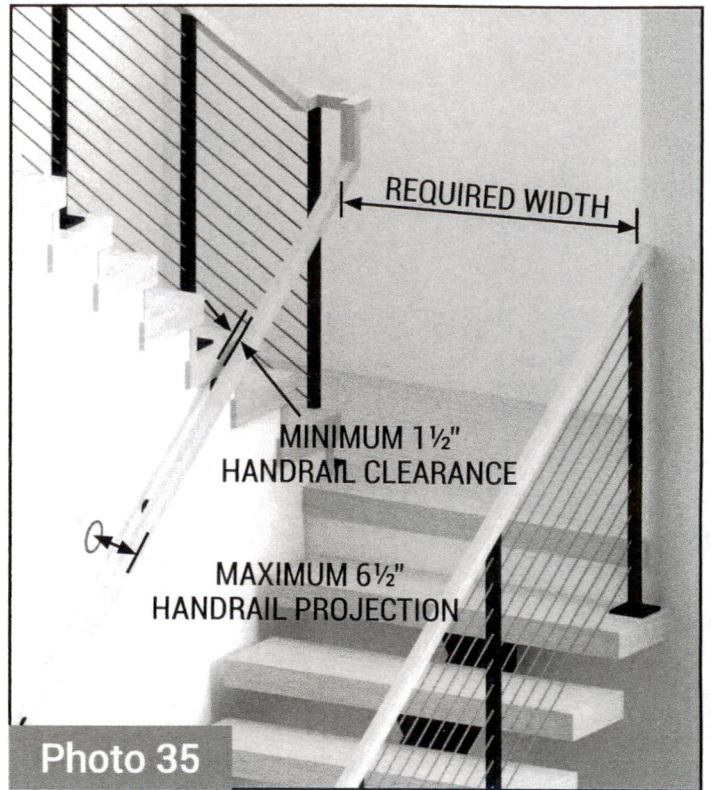


Photo 35



Photo 34

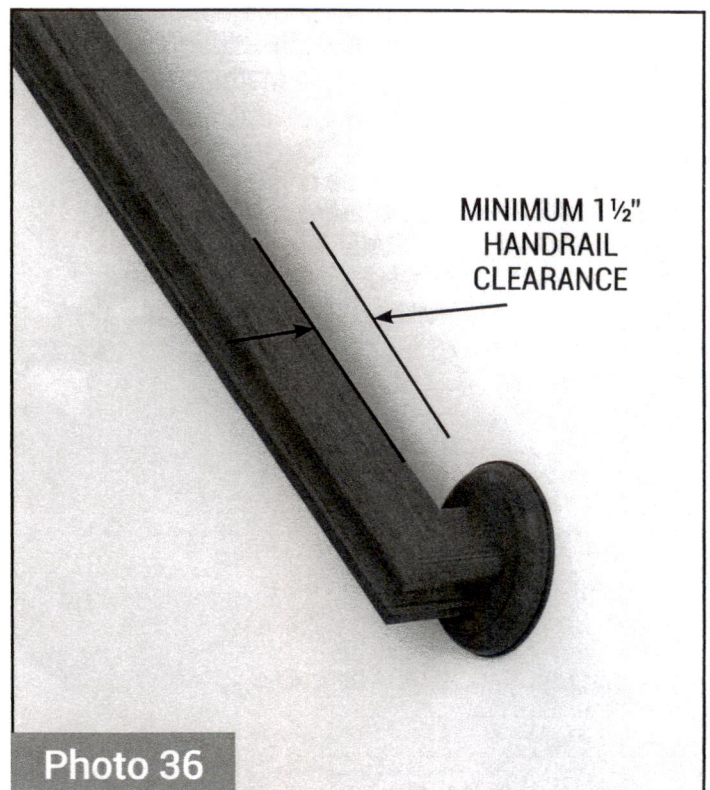
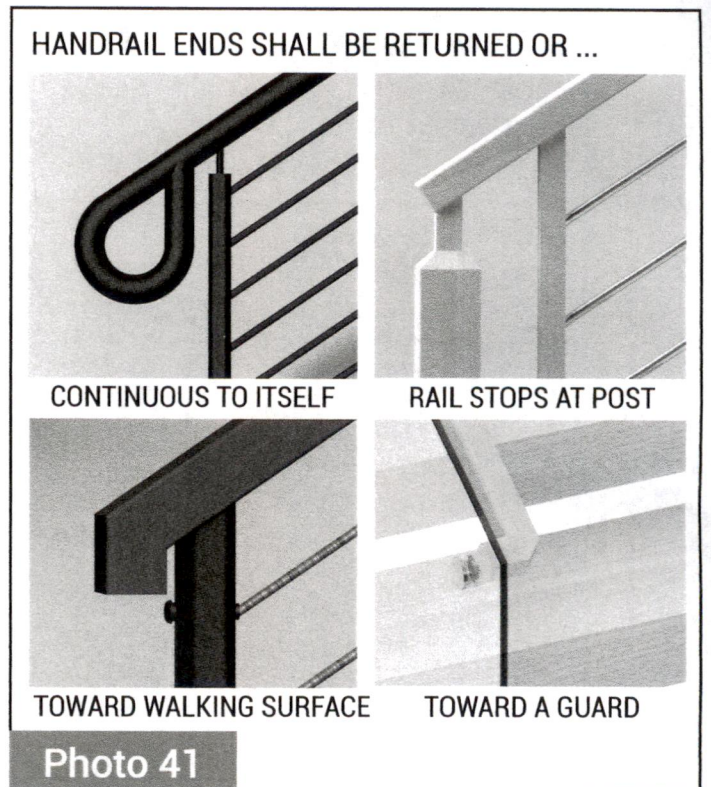
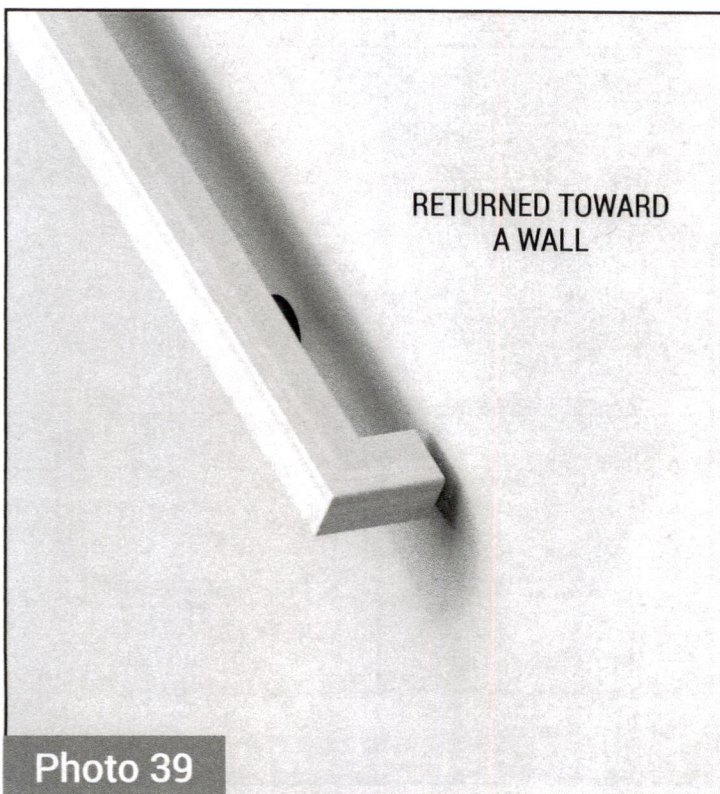
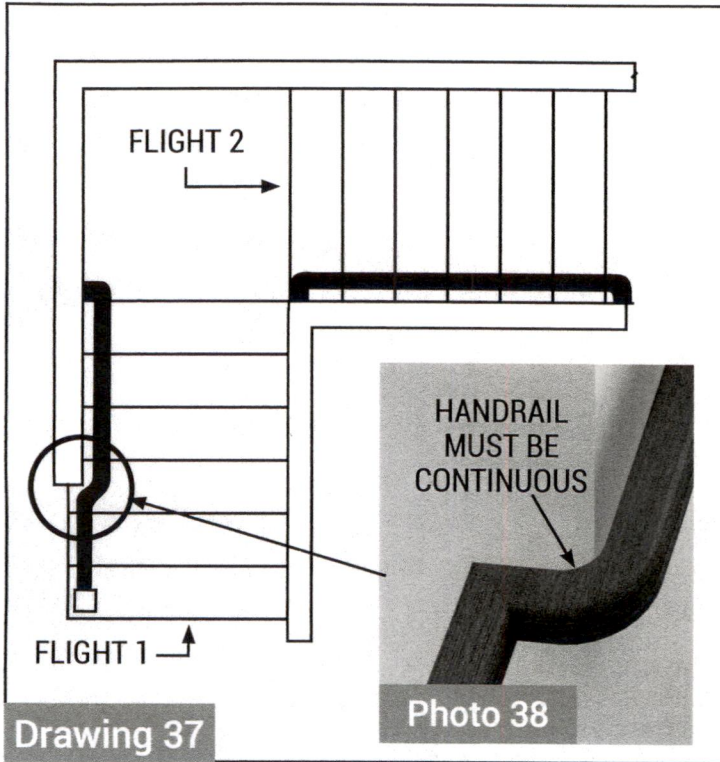


Photo 36

**R311.7.8.4 Continuity.** Handrails shall be continuous for the full length of the flight, **DRAWING 12 (p. 8)** from a point directly above the top riser of the flight to a point directly above the lowest riser of the flight **DRAWING 37 and PHOTO 38**. Handrail ends shall be returned toward a wall **PHOTO 39** guard, walking surface, continuous to itself, or terminate to a post **PHOTOS 40 and 41** or safety terminals.

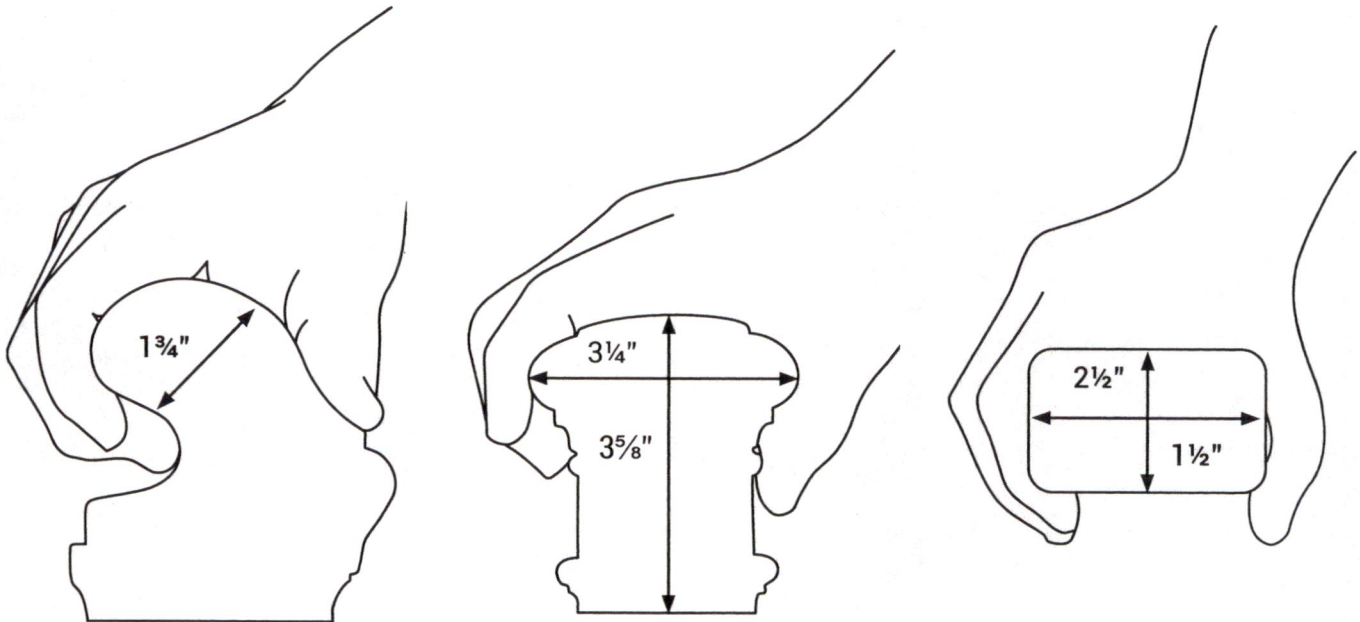
**Exception:**

1. Handrail continuity shall be permitted to be interrupted by a newel post at a turn in a flight with winders, at a landing **PHOTO 40**, or over the lowest tread **PHOTO 31 (p. 13)**.
2. A volute, turnout or starting easing shall be allowed to terminate over the lowest tread and over the top landing **PHOTO 31 (p. 13)**.



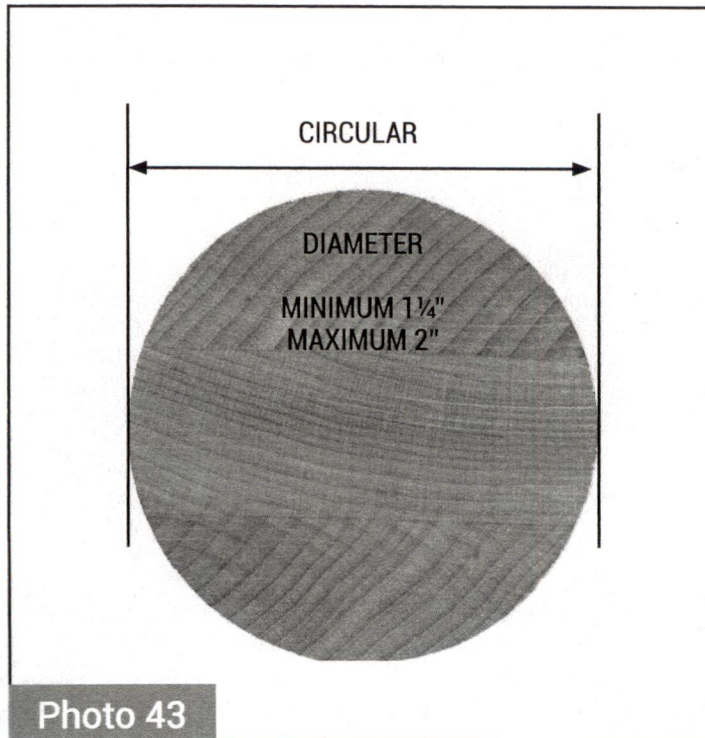
**R311.7.8.5 Grip-size.** Required *handrails* shall be of one of the following types or provide equivalent graspability **DRAWING 42.**

Profiles other than Type I and Type II may be determined to provide equivalent graspability.

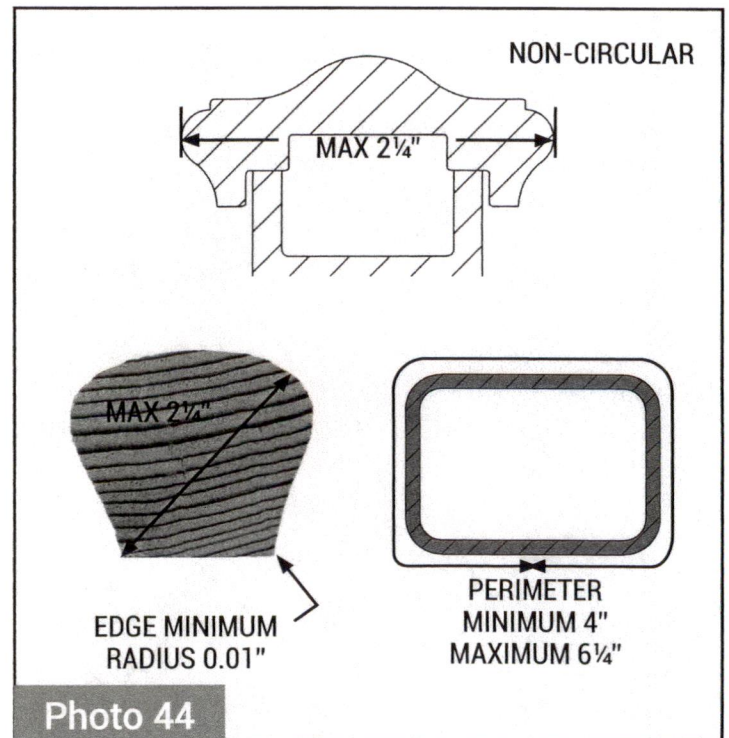


**Drawing 42**

1. Type I. *Handrails* with a circular cross section shall have an outside diameter of 1 1/4 inches (32 mm) and not greater than 2 inches (51 mm) **PHOTO 43.** If the *handrail* is not circular, it shall have a perimeter of not less than 4 inches (102 mm) and not greater than 6 1/4 inches (160 mm) and a cross section of not more than 2 1/4 inches (57 mm). Edges shall have a radius of not less than 0.01 inches (0.25 mm) **PHOTO 44.**



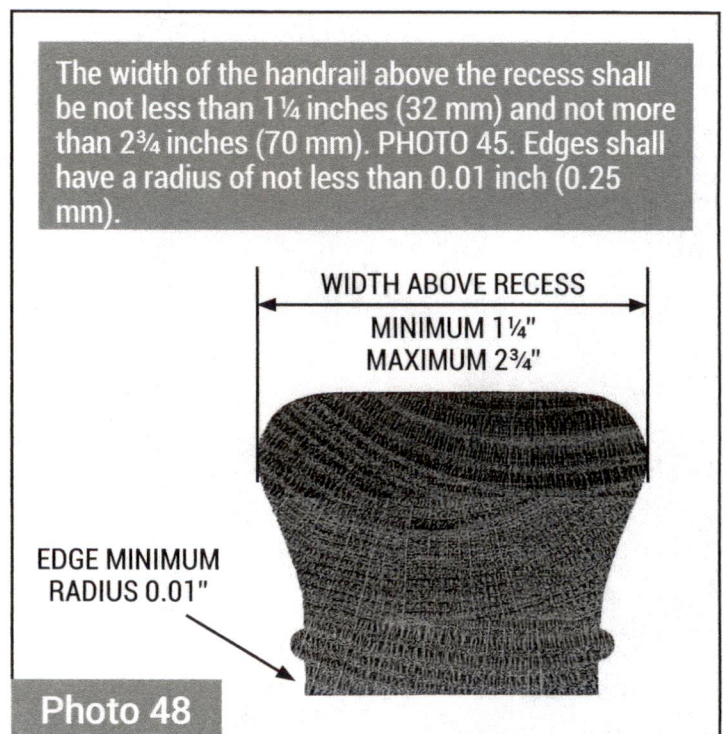
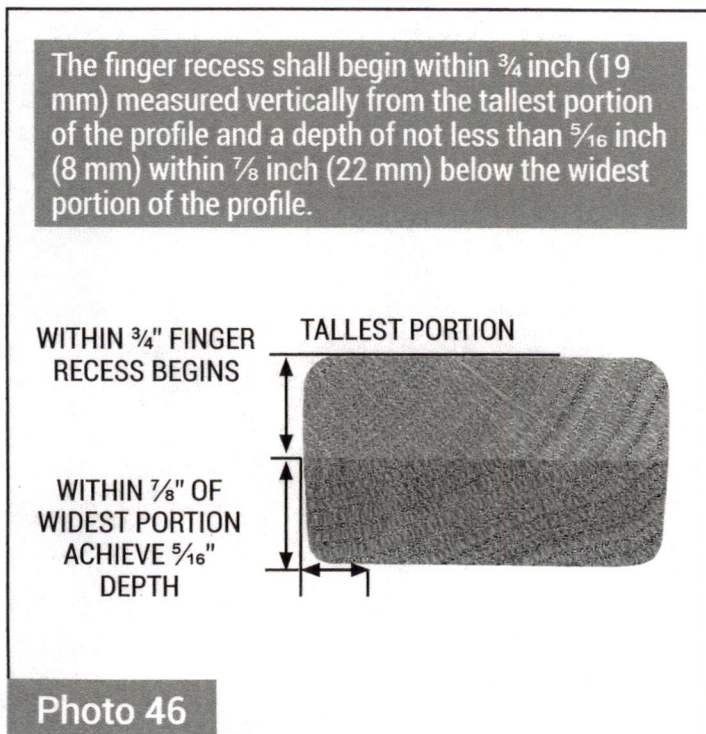
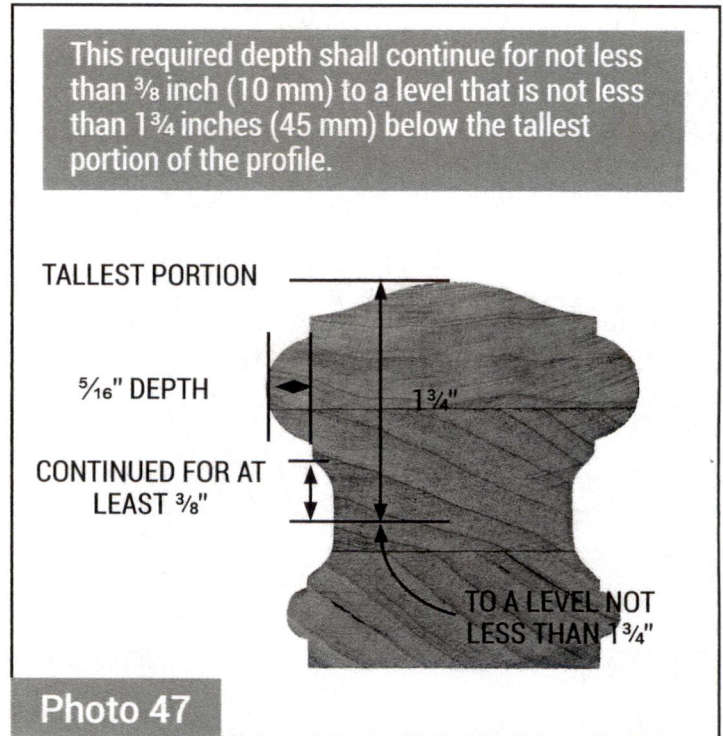
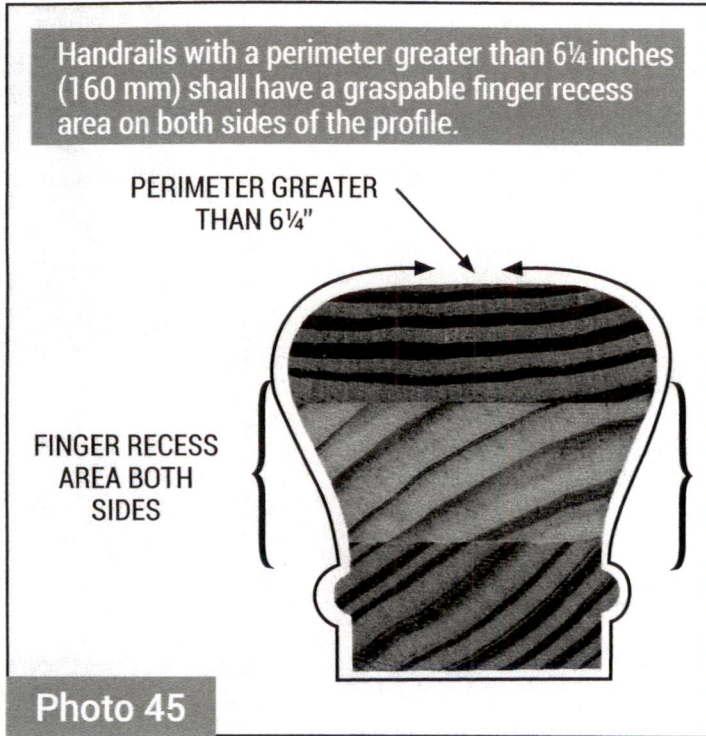
**Photo 43**



**Photo 44**

**R311.7.8.5 Grip-size. (continued)**

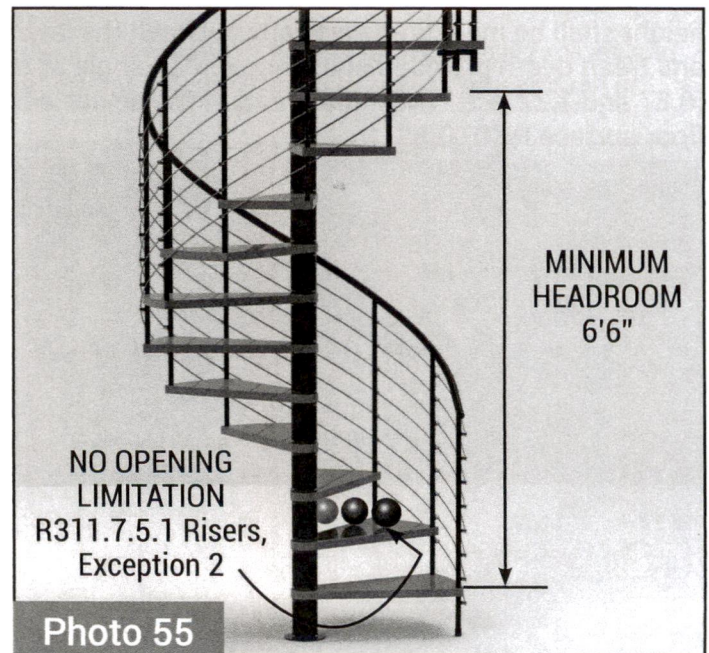
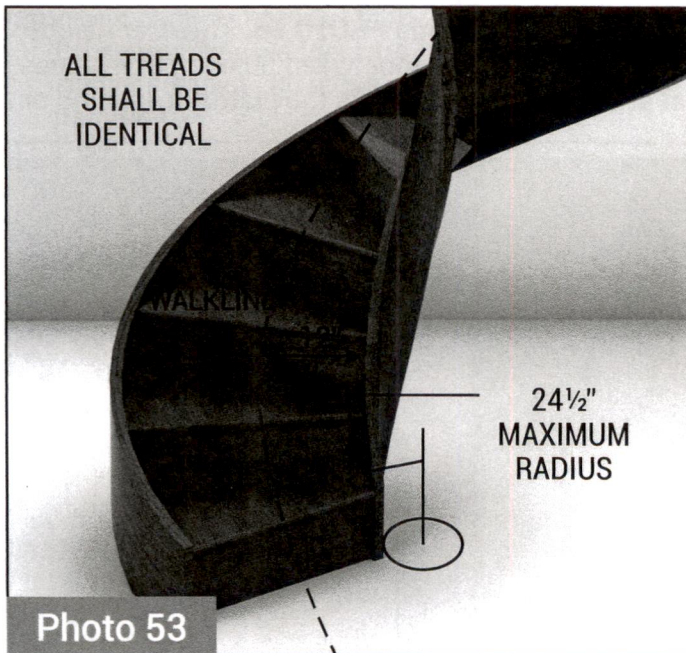
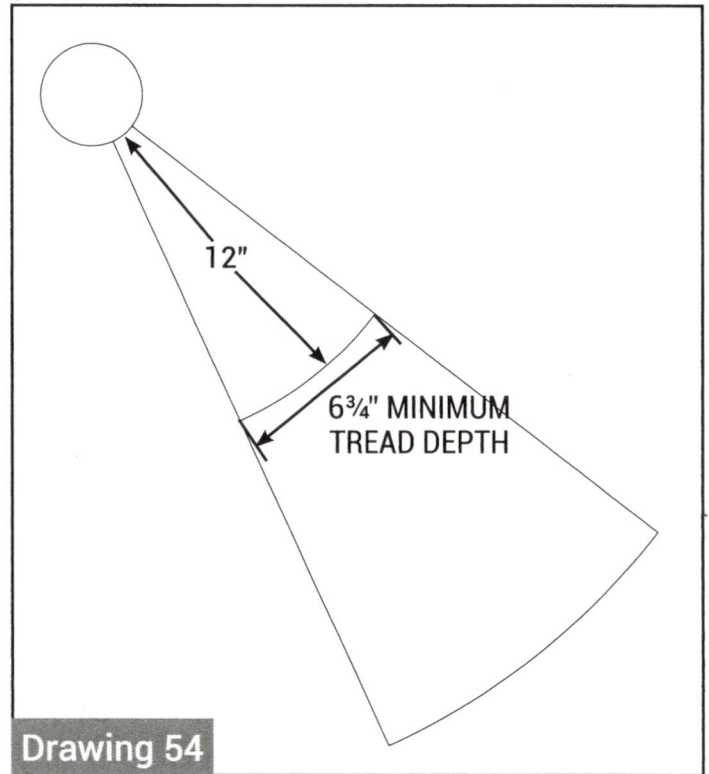
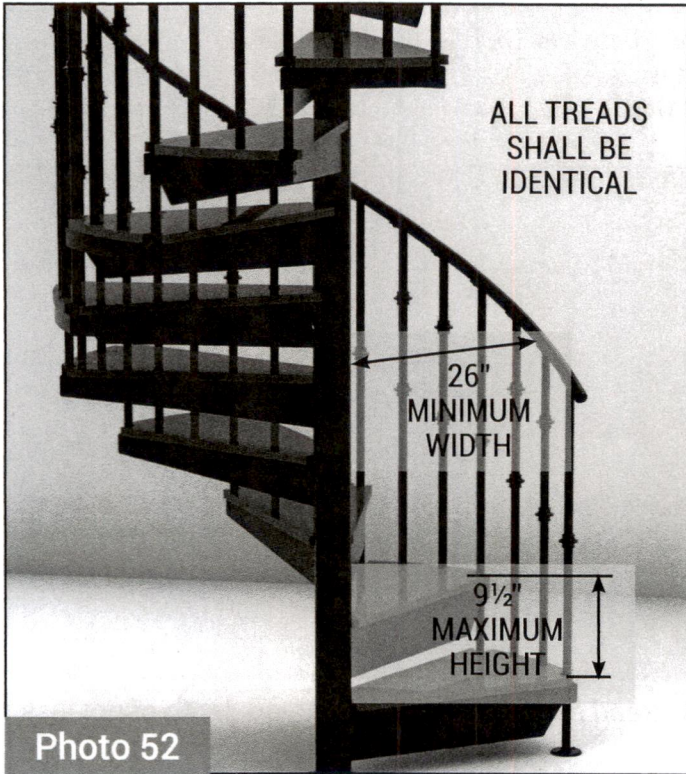
2. Type II. *Handrails* with a perimeter greater than 6¼ inches (160 mm) shall have a graspable finger recess area on both sides of the profile **PHOTO 45**. The finger recess shall begin within ¾ inch (19 mm) measured vertically from the tallest portion of the profile and have a depth of not less than ⅝ inch (8 mm) within ⅞ inch (22 mm) below the widest portion of the profile **PHOTO 46**. This required depth shall continue for not less than ⅜ inch (10 mm) to a level that is not less than 1¾ inches (45 mm) below the tallest portion of the profile **PHOTO 47**. The width of the handrail above the recess shall be not less than 1¼ inches (32 mm) and not more than 2¾ inches (70 mm). Edges shall have a radius of not less than 0.01 inch (0.25 mm) **PHOTO 48**.



**R311.7.8.6 Exterior plastic composite handrails.** Plastic composite exterior handrails shall comply with the requirements of Section R507.2.2

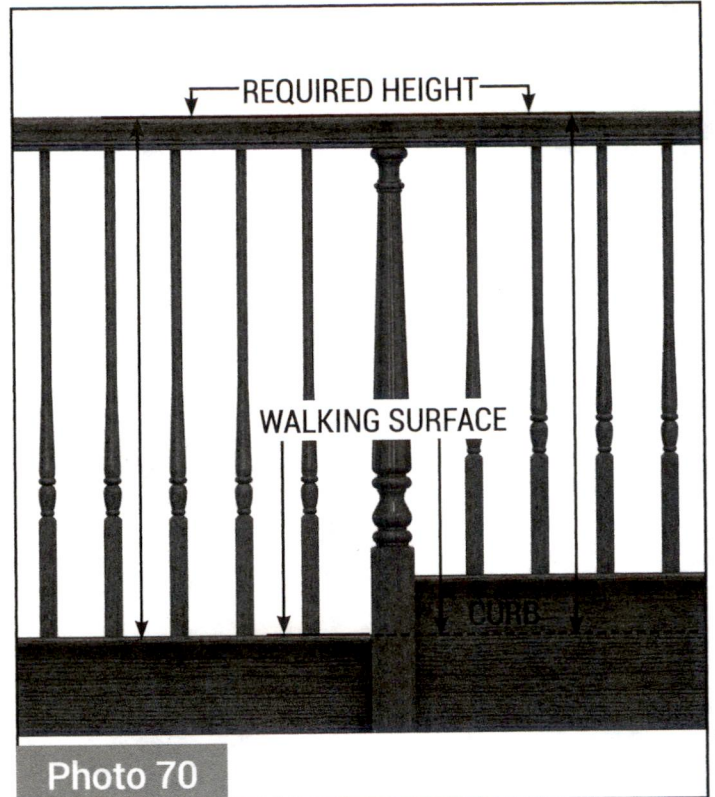
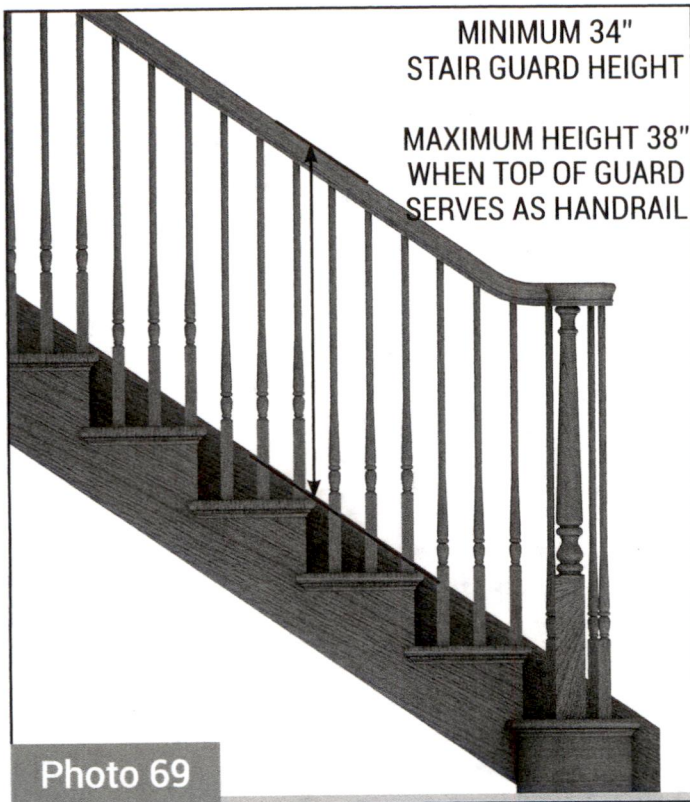
**R311.7.10 Special stairways.** Spiral stairways and bulkhead enclosure stairways shall comply with requirements of Section R311.7 except as specified in Sections R311.7.10.1 and R311.7.10.2.

**R311.7.10.1 Spiral stairways.** The clear width at and below the *handrails* at spiral stairways shall be not less than 26 inches (660 mm) **PHOTO 52** and the walkline radius shall be not greater than 24½ inches (622 mm) **PHOTO 53**. Each tread shall have a depth of not less than 6¾ inches (171 mm) at the walkline **DRAWING 54**. Treads shall be identical, **PHOTO 53** and the rise shall be not more than 9½ inches (241 mm) **PHOTO 52**. Headroom shall be not less than 6 feet 6 inches (1982 mm) **PHOTO 55**.



**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 height from the *basement* finished floor level to grade adjacent to the stairway is not more than 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.

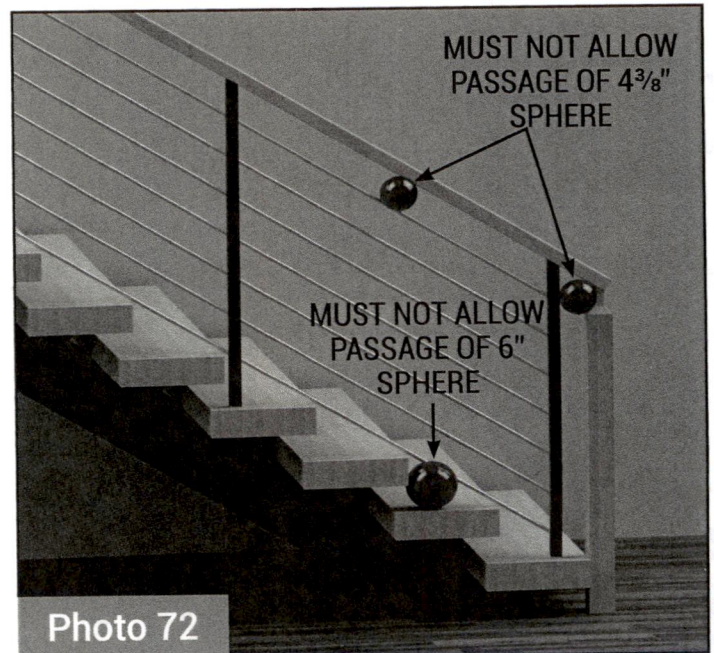
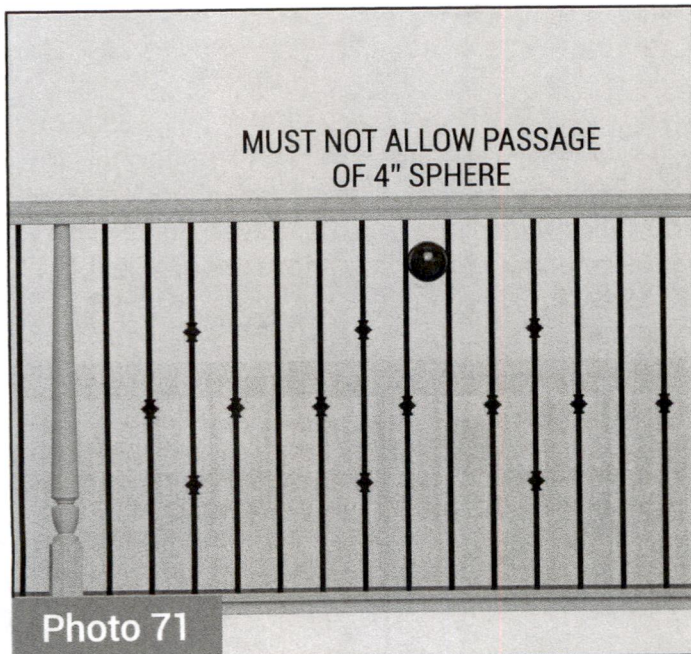
**R312.1.2 Height.**



**R312.1.3 Opening limitations.** Required *guards* shall not have openings from the walking surface to the required *guard* height that allow passage of a sphere 4 inches (102 mm) in diameter **PHOTO 71**.

**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 **PHOTO 72**.
2. *Guards* on the open side of *stairs* shall not have openings that allow passage of a sphere  $4\frac{3}{8}$  inches (111 mm) in diameter **PHOTO 72**.



**R312.1.4 Exterior plastic composite guards.** Plastic composite exterior *guards* shall comply with the requirements of Section R317.4