

Residential - Handrails - Stairs - Landings - Guards

Exception: Basements used only to house mechanical equipment and not exceeding total floor area of 200 square feet (18.58 m²).

R310.1.1 Minimum opening area. All emergency escape and rescue openings shall have a minimum net clear opening of 5.7 square feet (0.530 m²).

Exception: Grade floor openings shall have a minimum net clear opening of 5 square feet (0.465 m²).

R310.1.2 Minimum opening height. The minimum net clear opening height shall be 24 inches (610 mm).

R310.1.3 Minimum opening width. The minimum net clear opening width shall be 20 inches (508 mm).

R310.1.4 Operational constraints. Emergency escape and rescue openings shall be *maintained free of any obstructions other than those allowed by this section and shall be operational* from the inside of the room without the use of keys, tools or special knowledge.

R310.2 Window wells. The minimum horizontal area of the window well shall be 9 square feet (0.9 m²), with a minimum horizontal projection and width of 36 inches (914 mm). The area of the window well shall allow the emergency escape and rescue opening to be fully opened.

Exception: The ladder or steps required by Section R310.2.1 shall be permitted to encroach a maximum of 6 inches (152 mm) into the required dimensions of the window well.

R310.2.1 Ladder and steps. Window wells with a vertical depth greater than 44 inches (1118 mm) shall be equipped with a permanently affixed ladder or steps usable with the window in the fully open position. Ladders or steps required by this section shall not be required to comply with Sections R311.7 and R311.8. Ladders or rungs shall have an inside width of at least 12 inches (305 mm), shall project at least 3 inches (76 mm) from the wall and shall be spaced not more than 18 inches (457 mm) on center vertically for the full height of the window well.

R310.2.2 Drainage. Window wells shall be designed for proper drainage by connecting to the building's foundation drainage system required by Section R405.1 or by an approved alternative method.

Exception: A drainage system for window wells is not required when the foundation is on well-drained soil or sand-gravel mixture soils according to the United Soil Classification System, Group I Soils, as detailed in Table R405.1.

R310.3 Bulkhead enclosures. Bulkhead enclosures shall provide direct access to the basement. The bulkhead enclosure with the door panels in the fully open position shall provide the minimum net clear opening required by Section R310.1.1. Bulkhead enclosures shall also comply with Section R311.7.10.2.

R310.4 Bars, grilles, covers and screens. Bars, grilles, covers, screens or similar devices are permitted to be placed over emergency escape and rescue openings, bulkhead enclosures, or window wells that serve such openings, provided the minimum net clear opening size complies with Sections R310.1.1

to R310.1.3, and such devices shall be releasable or removable from the inside without the use of a key, tool, special knowledge or force greater than that which is required for normal operation of the escape and rescue opening. *The release mechanism shall be maintained operable at all times.*

Such bars, grilles, grates or any similar devices shall be equipped with an approved exterior release device for use by the fire department only when required by the authority having jurisdiction.

Where security bars (burglar bars) are installed on emergency egress and rescue windows or doors, on or after July 1, 2000, such devices shall comply with California Building Standards Code, Part 12, Chapter 12-3 and other applicable provisions of this code.

SECTION R311 MEANS OF EGRESS

R311.1 Means of egress. All dwellings shall be provided with a means of egress as provided in this section. The means of egress shall provide a continuous and unobstructed path of vertical and horizontal egress travel from all portions of the dwelling to the exterior of the dwelling at the required egress door without requiring travel through a garage.

R311.2 Egress door. At least one egress door shall be provided for each dwelling unit. The egress door shall be side-hinged, and shall provide a minimum clear width of 32 inches (813 mm) when measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). The minimum clear height of the door opening shall not be less than 78 inches (1981 mm) in height measured from the top of the threshold to the bottom of the stop. Other doors shall not be required to comply with these minimum dimensions. Egress doors shall be readily openable from inside the dwelling without the use of a key or special knowledge or effort.

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 1/4 unit vertical in 12 units horizontal (2-percent).

Exception: Exterior balconies less than 60 square feet (5.6 m²) 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 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 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.

R311.3.2 Floor elevations for other exterior doors. Doors other than the required egress door shall be provided with landings or floors not more than $7\frac{3}{4}$ inches (196 mm) below the top of the threshold.

Exception: A landing is not required where a stairway of two or fewer risers is located on the exterior side of the door, provided the door does not swing over the stairway.

R311.3.3 Storm and screen doors. Storm and screen doors shall be permitted to swing over all exterior stairs and landings.

R311.4 Vertical egress. Egress from habitable levels including habitable attics and basements not provided with an egress door in accordance with Section R311.2 shall be by one or more ramps in accordance with Section R311.8 or one or more stairways in accordance with Section R311.7 or both. For habitable levels or basements located more than one story above or more than one story below an egress door, the maximum travel distance from any occupied point to a stairway or ramp that provides egress from such habitable level or basement, shall not exceed 50 feet (15 240 mm).

R311.5 Construction.

R311.5.1 Attachment. Exterior landings, decks, balconies, stairs and similar facilities shall be positively anchored to the primary structure to resist both vertical and lateral forces or shall be designed to be self-supporting. Attachment shall not be accomplished by use of toenails or nails subject to withdrawal.

R311.6 Hallways. The minimum width of a hallway shall be not less than 3 feet (914 mm).

R311.7 Stairways.

R311.7.1 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 $31\frac{1}{2}$ 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 R311.7.10.1.

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.

Exception: 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 $4\frac{3}{4}$ inches (121 mm).

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 $\frac{1}{8}$ 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).

R311.7.5.4 Exterior wood/plastic composite stair treads. Wood/plastic composite stair treads shall comply with the provisions of Section R507.3.

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).

R311.7.8 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 $7\frac{1}{2}$ -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 $9\frac{1}{2}$ 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.

R311.8 Ramps.

R311.8.1 Maximum slope. Ramps shall have a maximum slope of 1 unit vertical in 12 units horizontal (8.3-percent slope).

Exception: Where it is technically infeasible to comply because of site constraints, ramps may have a maximum slope of one unit vertical in eight horizontal (12.5-percent slope).

R311.8.2 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.

R311.8.3 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).

R311.8.3.1 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).

R311.8.3.2 Grip size. Handrails on ramps shall comply with Section R311.7.8.3.

R311.8.3.3 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 $\frac{1}{2}$ inches (38 mm) between the wall and the handrails.

SECTION R312 GUARDS AND WINDOW FALL PROTECTION

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 42 inches (1067 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.

R312.2 Window fall protection. Window fall protection shall be provided in accordance with Sections R312.2.1 and R312.2.2.

R312.2.1 Window sills. In dwelling units, where the opening of an operable window is located more than 72 inches (1829 mm) above the finished grade or surface below, the lowest part of the clear opening of the window shall be a minimum of 24 inches (610 mm) above the finished floor of the room in which the window is located. Operable sections of windows shall not permit openings that allow passage of a 4-inch-diameter (102 mm) sphere where such openings are located within 24 inches (610 mm) of the finished floor.

Exceptions:

1. Windows whose openings will not allow a 4-inch-diameter (102 mm) sphere to pass through the opening when the opening is in its largest opened position.
2. Openings that are provided with window fall prevention devices that comply with ASTM F 2090.
3. Windows that are provided with window opening control devices that comply with Section R312.2.2.

R312.2.2 Window opening control devices. Window opening control devices shall comply with ASTM F 2090. The window opening control device, after operation to release the control device allowing the window to fully

Stairs: General

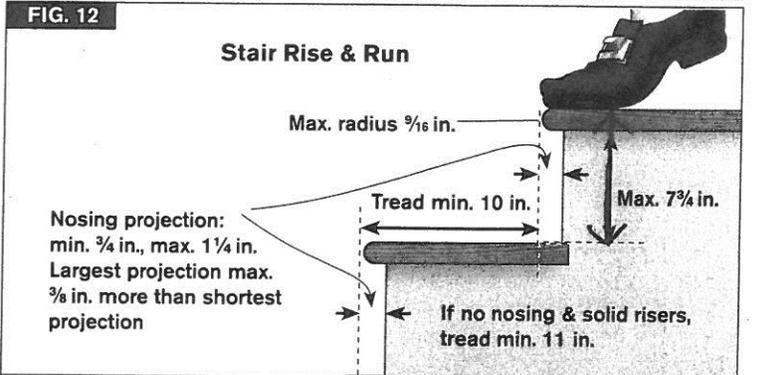
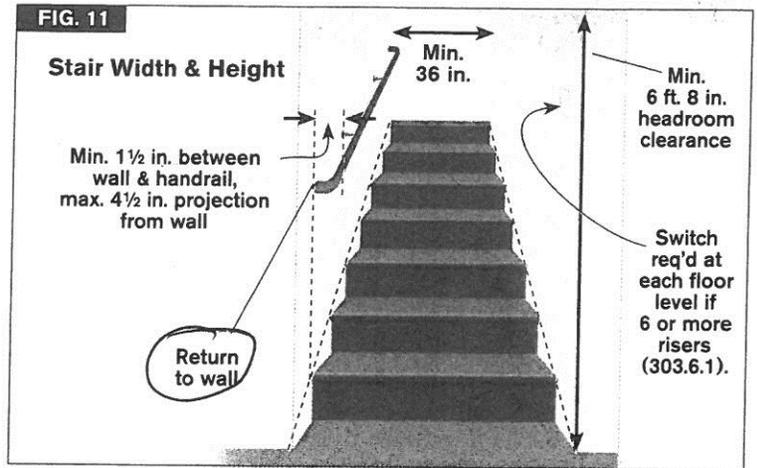
09 IRC

- Min width above handrail 36 in. except spiral stairways **F11** _____ [311.7.1]
- Max handrail projection into stairway 4 1/2 in. **F11** _____ [311.7.1]
- Min headroom 6 ft. 8 in. **EXC F11** _____ [311.7.2]
 - Floor openings above stair OK to project 4 3/4 in. into req'd headroom at the side of a flight of stairs _____ [311.7.2X]²⁰
- Riser height max 7 3/4 in., tread depth min 10 in. **EXC F12** _____ [311.7.4.1&2]
 - Tread depth min 11 in. if no nosing projection on treads **F12** _____ [311.7.4.3X]
- Measure rise & run exclusive of carpets, rugs, or runners _____ [311.7.4]²¹
- Tallest riser max 3/8 in. more than shortest riser **F12** _____ [311.7.4.1]
- Deepest tread max > 3/8 in. deeper than shortest tread **F12** _____ [311.7.4.2]
- Max 2% slope on treads & landings _____ [311.7.6]
- Enclosed accessible space below stairs req's min 1/2 in. **GB** _____ [302.7]

Nosings & Risers

09 IRC

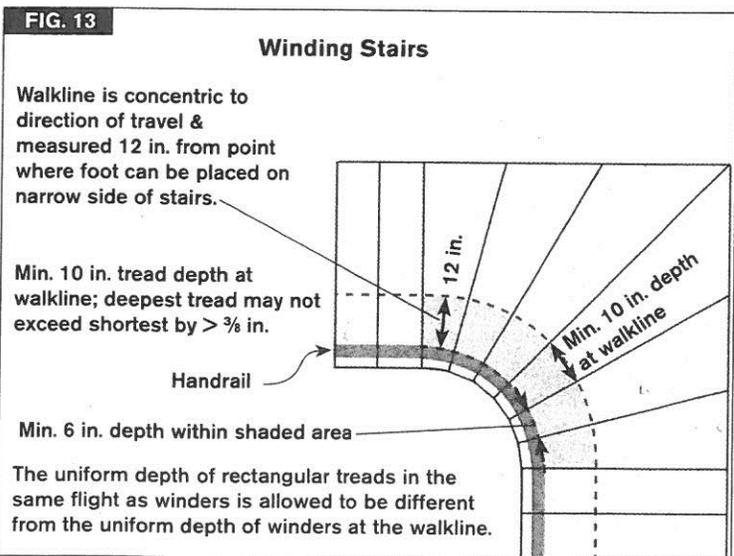
- Nosing req'd for solid risers with treads < 11 in. deep **F12** _____ [311.7.4.3]
- Nosing projection min 3/4 in., max 1 1/4 in. **F12** _____ [311.7.4.3]
- Deepest nosing projection max 3/8 in. more than shortest **F12** _____ [311.7.4.3]
- Beveling of nosing max 1/2 in., max nosing radius 3/16 in. _____ [311.7.4.3]
- Risers vertical or sloped from tread above max 30° from vertical _____ [311.7.4.3]
- Open riser treads must prevent passage of 4 in. sphere **EXC** _____ [311.7.4.3]
 - Openings between adjacent treads in stairs with rise ≤ 30 in. [311.7.4.3X]



Winding Stairs F13

09 IRC

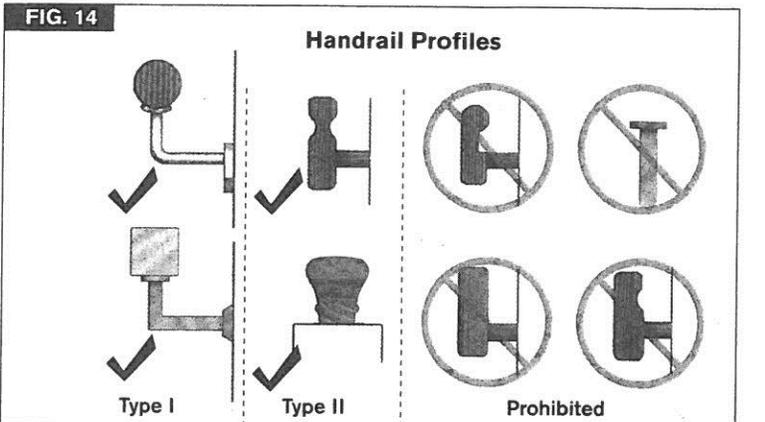
- Walkline concentric to curvature of stair & measured 12 in. from first clear area on narrow side of winder walking surface _____ [311.7.3]²²
- Min tread depth 10 in. at walkline _____ [311.7.4.2]
- Deepest tread max 3/8 in. more than shortest measured at walkline [311.7.4.2]
- OK for winder treads to not be within 3/8 in. of depth of rectangular treads in same flight of stairs _____ [311.7.4.2]²³



Handrails

09 IRC

- Req'd on at least one side of flights of stairs with ≥ 4 risers **F11,15** [311.7.7]
- Top 34–38 in. above line connecting nosings **F15** **EXC** _____ [311.7.7.1]
 - Volute, turnout, or starting easing OK over lowest tread _____ [311.7.7.1X1]
 - Fitting or bending OK to exceed max height at continuous transition between flights, start of flight, or from handrail to guard **F15** [311.7.7.1X2]²⁴
- Ends must return to wall or post or safety terminal **F11,15** _____ [311.7.7.2]
- Min 1 1/2 in. space between wall & handrail **F11** _____ [311.7.7.2]
- Handrail continuous from line above top & bottom nosings **EXC** _____ [311.7.7.2]
 - May be interrupted by post at landing _____ [311.7.7.2X1]
 - Volute, turnout, or starting easing OK over lowest tread **F15** _____ [311.7.7.2X2]
- Round handrails min 1 1/4 in.–max 2 in. diameter **F14** _____ [311.7.7.3]
- Non-round Type I handrails perimeter 4–6 1/4 in. **F14** _____ [311.7.7.3]
- If perimeter > 6 1/4 in., finger recess req'd both sides **F14** _____ [311.7.7.3]



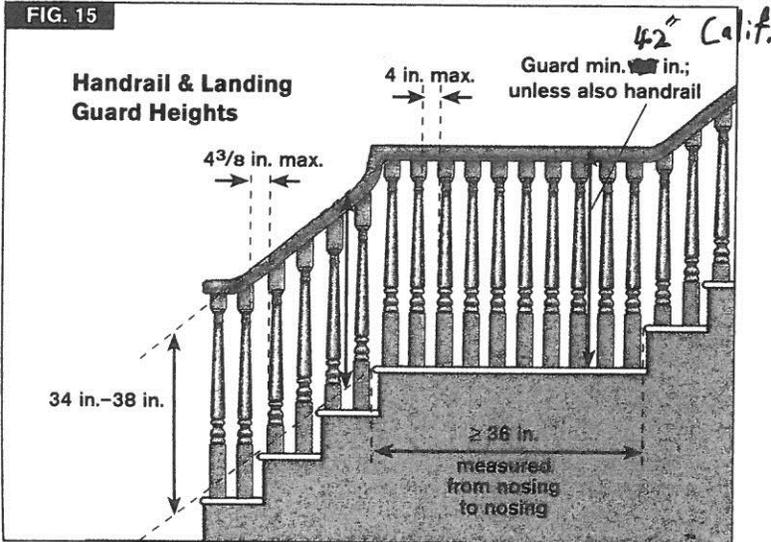
EGRESS ♦ SAFETY GLASS

Stairway Illumination

09 IRC

- Illumination req'd for stairs & landings _____ [303.6&311.7.8]
- Interior stair req's switch at each floor level if ≥ 6 risers **F11** _____ [303.6.1]
- Exterior stair light at top of landing, control inside dwelling EXC _____ [303.6]
 - Lights with automatic controls _____ [303.6.1X]

FIG. 15



SAFETY GLASS

Safety glass can be laminated or fully tempered. Proper use of safety glass is critical in areas that are subject to human impact. Typical causes of accidents are failure to see the glass, intentional breakage, or slips and falls.

Identification

09 IRC

- Safety glass req's permanent etched label EXC _____ [308.1]
 - Non-tempered safety glazing OK to provide certificate to BO _____ [308.1X1]
 - Tempered spandrel glass may have removable paper label _____ [308.1X2]
- Glass panes ≤ 1 sq. ft. in multipane assemblies OK for all but 1 to have label that states only "CPSC 16 CFR 1201" or "ANSI Z97.1" _____ [308.1.1]²⁵
- Glazing not in doors or enclosures of tubs or showers OK to have ANSI Z97.1 Category A without a CPSC label _____ [308.3.1X]²⁶

Human Impact Loads & Hazardous Locations

09 IRC

- Safety glazing req'd in locations per **T6, F16** EXC _____ [308.3&4]
 - Louvered windows & jalousies _____ [308.3X1]
 - Mirrors mounted on continuous backing support (typically vinyl) exempt from requirement to meet impact test standards _____ [308.3X2]
 - Glass unit masonry (glass block) _____ [308.3X3]

Impact Test Categories

09 IRC

- CPSC Category II req'd for doors or enclosures of wet areas (tubs, showers, spas, hot tubs, saunas, steam rooms, or pools) _____ [308.3.1]
- CPSC Category II or ANSI Z97.1 Category A req'd in non-wet areas EXC _____ [308.3.1]
 - CPSC Category I or ANSI Category B also allowed for lites ≤ 9 sq. ft. in doors or sidelites other than patio doors _____ [308.3.1]