University Heights
Stairway & Guardrail Specifications
(Minimum Codified Ordinance Requirements from Ohio Residential Code)

Handrail Detail
Clearance from Wall: 1 1/2 inches
Noncircular Dimension: 2 3/4 inches
Circular Diameter: 1 1/4 - 2 inches

Headroom Requirements
Ceiling: 8 feet 8 inches
Plane of Treads Nosing: 6 feet 3 inches

Stairway Treads & Risers
8 1/4 inch Max. Rise
9 inch Min. Run

Stair Width: 36 inches

6 inch sphere unable to pass through opening
311.7.5.3 Nosings. Nosings at treads, landings and floors of stairways shall have a radius of curvature at the nosing not greater than \( \frac{\pi}{16} \) inch (14 mm) or a bevel not greater than \( \frac{1}{4} \) inch (12.7 mm). A nosing projection not less than \( \frac{1}{4} \) inch (19 mm) and not more than \( 1\frac{1}{4} \) inches (32 mm) shall be provided on stairways. The greatest nosing projection shall not exceed the smallest nosing projection by more than \( \frac{1}{8} \)-inch (9.5 mm) within a stairway.

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

311.7.5.4 Exterior plastic composite stair treads. Plastic composite exterior stair treads shall comply with the provisions of this section and Section 507.2.2.

311.7.6 Landings for stairways. There shall be a floor or landing at the top and bottom of each stairway. The width perpendicular to the direction of travel shall be not less than the width of the flight served. For landings of shapes other than square or rectangular, the depth at the walk line and the total area shall be 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 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 that a door does not swing over the stairs.

311.7.7 Stairway walking surface. The walking surface of treads and landings of stairways shall be sloped not steeper than one unit vertical in 48 inches horizontal (2 percent slope).

311.7.8 Handrails. Handrails shall be provided on not less than one side of each flight of stairs with four or more risers.

311.7.8.1 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. Where handrail fittings or bends 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 bends shall be permitted to exceed 38 inches (956 mm).

311.7.8.2 Handrail projection. Handrails shall not project more than \( 4\frac{1}{2} \) inches (114 mm) on either side of the stairway.

Exception: Where nosings of landings, floors or passing flights project into the stairway reducing the clearance at passing handrails, handrails shall project not more than \( 6\frac{1}{4} \) inches (165 mm) into the stairway, provided that the stair width and handrail clearance are not reduced to less than that required.

311.7.8.3 Handrail clearance. 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.

311.7.8.4 Continuity. Handrails 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.

Exceptions:
1. Handrail continuity shall be permitted to be interrupted by a newel post at a turn in a flight with winders, at a landing, or over the lowest tread.
2. A volute, turnout or starting easing shall be allowed to terminate over the lowest tread.
3. Two or more separate rails shall be considered continuous if the termination of the rails occurs over a single tread and positioned within 4 inches of each other. If the transition occurs between a wall mounted handrail and handrail/guardrail combination, the wall mounted handrail shall return into the wall.

311.7.8.5 Grip size. 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 not less than \( 1\frac{1}{4} \) inches (32 mm) and not greater than 2 inches (51 mm). If the handrail is not circular, it shall have a perimeter of not less than 4 inches (102 mm) and not greater than \( 6\frac{1}{4} \) inches (160 mm) and a cross section of not more than \( 2\frac{1}{4} \) inches (57 mm). Edges shall have a radius of not less than 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 \( \frac{1}{4} \) inch (19 mm) measured vertically from the tallest portion of the profile and have a depth of not less than \( \frac{1}{4} \) inch (8 mm) within \( \frac{1}{4} \) inch (22 mm) below the widest portion of the profile. This required depth shall continue for not less than \( \frac{1}{4} \) inch (10 mm) to a level that is not less than \( 1\frac{1}{4} \) inches (45 mm) below the tallest portion of the profile. The width of the handrail above the recess shall be not less than \( 1\frac{1}{4} \) inches (32 mm) and not more than \( 2\frac{1}{4} \) inches (70 mm). Edges shall have a radius of not less than 0.01 inch (0.25 mm).

311.7.8.6 Exterior plastic composite handrails. Plastic composite exterior handrails shall comply with the requirements of Section 507.2.2.
311.7.9 Illumination. Stairways shall be provided with illumination in accordance with Sections 303.7 and 303.8.

311.7.10 Special stairways. Spiral stairways and bulkhead enclosure stairways shall comply with the requirements of Section 311.7 except as specified in Sections 311.7.10.1 and 311.7.10.2.

311.7.10.1 Spiral stairways. The clear width at and below the handrails at spiral stairways shall be not less than 26 inches (660 mm) and the walkline radius shall be not greater than 24 1/2 inches (622 mm). Each tread shall have a depth of no less than 6 1/4 inches (171 mm) at the walkline. Treads shall be identical, and the rise shall be not more than 9 1/2 inches (241 mm). Headroom shall be not less than 6 feet 6 inches (1982 mm).

311.7.10.2 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 311.3 and 311.7 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.

311.7.11 Alternating tread devices. Alternating tread devices shall not be used as an element of a means of egress. Alternating tread devices shall be permitted provided that a required means of egress stairway or ramp serves the same space at each adjoining level or where a means of egress is not required. The clear width at and below the handrails shall be not less than 20 inches (508 mm).

Exception: Alternating tread devices are allowed to be used as an element of a means of egress for lofts, mezzanines and similar areas of 200 gross square feet (18.6 m²) or less where such devices do not provide exclusive access to a kitchen or bathroom.

311.7.11.1 Treads of alternating tread devices. Alternating tread devices shall have a tread depth of not less than 5 inches (127 mm), a projected tread depth of not less than 8 1/4 inches (216 mm), a tread width of not less than 7 inches (178 mm) and a riser height of not more than 9 1/2 inches (241 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projections of adjacent treads. The riser height shall be measured vertically between the leading edges of adjacent treads. The riser height and tread depth provided shall result in an angle of ascent from the horizontal of between 50 and 70 degrees (0.87 and 1.22 rad). The initial tread of the device shall begin at the same elevation as the platform, landing or floor surface.

311.7.11.2 Handrails of alternating tread devices. Handrails shall be provided on both sides of alternating tread devices and shall comply with Sections 311.7.8.2 to 311.7.8.6. Handrail height shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).

311.7.12 Ships ladders. Ships ladders shall not be used as an element of a means of egress. Ships ladders shall be permitted provided that a required means of egress stairway or ramp serves the same space at each adjoining level or where a means of egress is not required. The clear width at and below the handrails shall be not less than 20 inches (508 mm).

Exception: Ships ladders are allowed to be used as an element of a means of egress for lofts, mezzanines and similar areas of 200 gross square feet (18.6 m²) or less that do not provide exclusive access to a kitchen or bathroom.

311.7.12.1 Treads of ships ladders. Treads shall have a depth of not less than 5 inches (127 mm). The tread shall be projected such that the total of the tread depth plus the nosing projection is not less than 8 1/4 inches (216 mm). The riser height shall be not more than 9 1/2 inches (241 mm).

311.7.12.2 Handrails of ships ladders. Handrails shall be provided on both sides of ships ladders and shall comply with Sections 311.7.8.2 to 311.7.8.6. Handrail height shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).

311.8 Ramps.

311.8.1 Maximum slope. Ramps serving the egress door required by Section 311.2 shall have a slope of not more than 1 unit vertical in 8 units horizontal (12.5-percent slope).

311.8.2 Landings required. There shall be a floor or landing at the top and bottom of each ramp, where doors open onto ramps, and where ramps change directions. The width of the landing perpendicular to the ramp slope shall be not less than 36 inches (914 mm).

311.8.3 Handrails required. Handrails shall be provided on not less than one side of ramps exceeding a slope of one unit vertical in 12 units horizontal (8.33-percent slope).

311.8.3.1 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).

311.8.3.2 Grip size. Handrails on ramps shall comply with Section 311.7.8.5.

311.8.3.3 Continuity. Handrails where required on ramps shall be continuous for the full length of ramp. Handrail ends shall return or shall terminate in newel posts or safety terminals. Handrails adjacent to a wall shall have a space of not less than 1 1/2-inches (38 mm) between the wall and the handrails.

SECTION 312
GUARDS AND WINDOW FALL PROTECTION

312.1 Guards. Guards shall be provided in accordance with Sections 312.1.1 through 312.1.4.
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 311.8 or a stairway in accordance with Section 311.7.

311.3.2 Floor elevations at other exterior doors. Doors other than the required egress door shall be provided with landings or floors not more than 8'/6 inches (209 mm) below the top of the threshold.

Exception: A top landing is not required for the stairway located on the exterior side of the door, provided that the threshold of the door is not more than 30" above the adjacent grade and the door does not swing over the stairway.

311.3.3 Storm and screen doors. Storm and screen doors shall be permitted to swing over exterior stairs and landings.

311.4 Vertical egress. Egress from habitable levels including habitable attics and basements that are not provided with an egress door in accordance with Section 311.2 shall be by a ramp in accordance with Section 311.8 or a stairway in accordance with Section 311.7.

311.5 Landing, deck, balcony and stair construction and 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.

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

311.7 Stairways.

311.7.1 Width. Stairways shall be not less than 36 inches (914 mm) in clear width at all points above the permitted handrail height and below the required headroom height. The clear width of stairways at and below the handrail height, including treads and landings, shall be not less than 31 1/2 inches (787 mm) where a handrail is installed on one side and 27 inches (698 mm) where handrails are installed on both sides.

Exception: The width of spiral stairways shall be in accordance with Section 311.7.10.1.

311.7.2 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 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 not project horizontally into the required headroom more than 4 3/4 inches (121 mm).

2. The headroom for spiral stairways shall be in accordance with Section 311.7.10.1.

311.7.3 Vertical rise. A flight of stairs shall not have a vertical rise larger than 148 1/2-inches (3772 mm) between floor levels or landings.

311.7.4 Walkline. The walkline across winder treads and landings shall be concentric to the turn and parallel to the direction of travel entering and exiting the turn. 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. Where winders are adjacent within a flight, the point of the widest clear stair width of the adjacent winders shall be used.

311.7.5 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.

311.7.5.1 Risers. The riser height shall be not more than 8 1/4 inches (209 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 3/4 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. 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 (100 mm) sphere.

Exceptions:

1. The opening between adjacent treads is not limited on spiral stairways.

2. The riser height of spiral stairways shall be in accordance with Section 311.7.10.1.

311.7.5.2 Treads. The tread depth shall be not less than 9-inches (229 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 3/4 inch (9.5 mm).

311.7.5.2.1 Winder treads. Winder treads shall have a tread depth of not less than 9-inches (229 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. Within any flight of stairs, the largest winder tread depth at the walkline shall not exceed the smallest winder tread by more than 3/4 inch (9.5 mm). 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 3/4 inch (9.5 mm) of the rectangular tread depth.

Exception: The tread depth at spiral stairways shall be in accordance with Section 311.7.10.1.