



Planning, Development & Transportation Services
Community Development & Neighborhood Services

To: Residential Stakeholders
From: Richard C. Anderson, CBO
Chief Building Official
Date: July 20, 2020
File: Residential Code Interpretation

INTERPRETATION NUMBER: 2020-0001

TITLE: Interior Stair riser inspection requirements

CODE EDITION: 2018 International Residential Code (IRC)

SECTIONS:

- R202 Definitions
- R311.3.2 Floor elevations at other exterior doors
- R311.7.3 Vertical rise
- R311.7.5 Stair treads and risers
 - R311.7.5.1 Risers
 - R311.7.5.2 Treads
- R311.7.6 Landings for stairways

PURPOSE: To provide clarification on where and how to measure the a flight of stairs from a dwelling unit into a garage, when there is a threshold, to ensure that the greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm).

DEFINITIONS:

APPROVED. Acceptable to the *building official*.

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

RISER (STAIR). The vertical component of a step or stair.



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CODE REQUIREMENTS:

R311.3.2 Floor elevations at other exterior doors.

Doors other than the required egress door shall be provided with landings or floors not more than 7 3/4 inches (196 mm) below the top of the threshold.

R311.7.3 Vertical rise. A flight of stairs shall not have a vertical rise larger than 151 inches (3835 mm) between floor levels or landings.

R311.7.5.1 Risers. The riser height shall be not more than 7 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 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. 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.

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 R311.7.10.1.

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 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 3/8 inch (9.5 mm).

R311.7.6 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.



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CODE INTERPRETATION:

It is the determination of the Building Official that the door leading from the habitable space in a dwelling unit to a garage is a hybrid between an interior and exterior door. If the door does not swing over the stairs no landing is required, per section R311.7.6. When there is no landing required the number of treads allowed is only limited by the maximum vertical rise, per section R311.7.3. These stairs are also limited to a maximum riser height from the top of the threshold located on the landing at the top of the flight, not to exceed $7\frac{3}{4}$ inches (196 mm) to the floor or landing below, per section R311.3.2. The Building Official has also determined that section R311.3.2 shall also apply to the first step below the threshold when no landing is required, and the threshold is location within the required tread depth at the top of the stairs.

When a person walks on a flight of stairs, they take steps with muscle memory. One of the most common places for a person to fall on a flight of stairs, is at the top going up. With all stairs being allowed a $\frac{3}{8}$ inch (9.5 mm) tolerance in riser height per flight, it is paramount that we determine where to measure the riser height for all flights of stairs that include a threshold at the top of the flight, when the threshold is located within the required tread depth at the top of the stairs. The code requires that we calculate in the threshold in the overall tolerance of the flight. If this extra height is not calculated in, it will create a trip hazard. Unlike most risers where the riser height is always measured from the front leading edge of the tread, these hybrid stairs are measured differently. For the top riser, the measurement shall be taken from the top of the threshold per figure 1 to the tread below. For the remaining risers in the flight the measurement will be taken from the front leading edge of the tread, floor or landing below per figure 2. If all these measurements are within the allowable tolerance listed in section 311.7.5.1, the flight is approved. For garage stairs where the threshold is not located within the required tread depth at the top of the stairs, the measurement for the top riser shall be taken from the front leading edge of the adject riser per section R311.3.2.

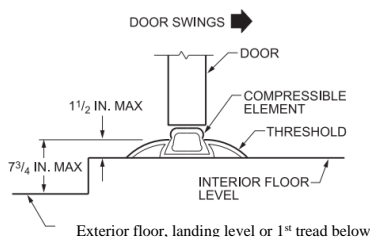


Figure 1

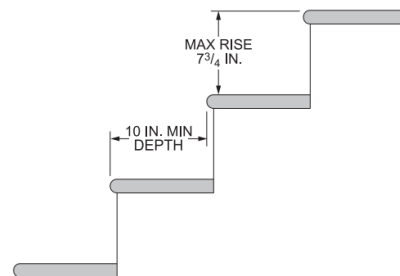


Figure 2

A handwritten signature in blue ink, reading "Richard C. Anderson".

Richard C. Anderson, CBO
Chief Building Official
City of Fort Collins