

**NC Department of Insurance  
Office of the State Fire Marshal - Engineering Division  
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**Barrier Height Requirements for Sloped Ceilings Under Stairways**

**Code:** 2018 Building Code  
**Section:** 1003.3 and 1101.2

**Date:** September 11, 2018

**Question:**

For condition such as shown in the photo below, is there a minimum height for the rail providing the vertical clearance beneath the stair that is required in ANSI A117.1, Section 307.4?

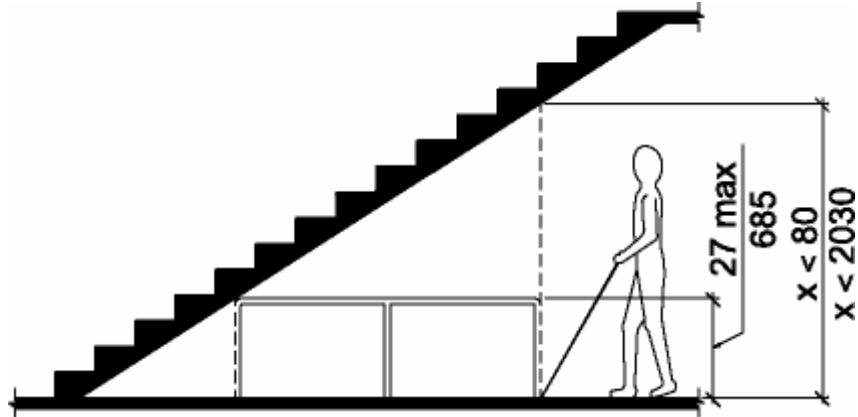


**Answer:**

No, there is not. While the North Carolina Building Code 1101.2 references that buildings and facilities shall be designed to be accessible in accordance with the NCBC and ANSI A117.1, Section 307.4 states only that the leading edge of such a rail or barrier providing the vertical clearance shall be located 27 inches maximum above the floor. The standard is silent on what the minimum height of the rail or barrier shall be.

The intent of the vertical barrier is to allow detection of an overhead obstruction at the floor level by someone with a visual impairment before that person bumps into the overhead protrusion. The guard, rail or other type of barrier shall be installed so that it can be detected, typically, by a cane, as indicated in ANSI A117.1, Figure 307.4 (below). The cane will locate the barrier, allowing the person to turn away from the overhead obstruction.

A low height barrier is not as effective as a higher barrier. A person with a visual impairment may mistake a low curb for a step or stair tread, step up onto it, hitting the person's head. A higher rail at handrail height may not be detectable by a cane before the person using it walks into the rail. Consider also that children and persons of shorter stature may have a detectable range below 27 inches.



While there are no minimum height requirements in ANSI A117.1, Section 307.4, there have been requests for recommendations as to a minimum height. The designer may wish to look toward similar locations in ANSI to see what dimensions have been used so that the guard or rail would not be considered a ‘tripping hazard’. For non-visually impaired individuals, this should not be an issue, however, there is a new and growing group of what has become termed as ‘wi-fi challenged’ individuals who tend to focus on hand-held devices rather than where they are walking. In this arena, designers may believe that it is legally prudent to select a reasonable minimum barrier that is related to other relevant ANSI standard sections

Where a curb is required on the edge on a ramp, in line with the handrails/guardrails, ANSI 405.9.2.1 requires a 4” minimum curb for edge protection. The 4” height is intended to prevent chairs of a wheelchair from slipping off, a crutch tip from getting to the edge of the ramp or landing, or to maintain a similar restriction for the leg of a walker. The same 4” height may work as a minimum height, since the code is silent on what the minimum height of the guardrail or barrier shall be. Remember, though that the 4” curb is provided along with the handrail, not by itself.

**References:**

ANSI A117.1-09

**Keywords:**

Protruding objects, headroom