

CECD1-11-22

IECC: SECTION 202, C402.4, CB103.1, CD101.3

Proponents: Tom Culp, representing IECC Commercial Envelope & Embodied Energy Subcommittee

2024 International Energy Conservation Code [CE Project]

Revise as follows:

~~LOW SLOPE~~**LOW-SLOPED ROOF.** A roof having a slope less than 2 units vertical in 12 units horizontal (17-percent slope) as applied to roofs.

C402.4 Roof solar reflectance and thermal emittance. ~~Low-sloped~~ Low slope roofs directly above cooled conditioned spaces in *Climate Zones 0* through 3 shall comply with one or more of the options in Table C402.4.

Exceptions: The following roofs and portions of roofs are exempt from the requirements of Table C402.4:

1. Portions of the roof that include or are covered by the following:
 - 1.1. Photovoltaic systems or components.
 - 1.2. Solar air or water-heating systems or components.
 - 1.3. Vegetative roofs or landscaped roofs.
 - 1.4. Above-roof decks or walkways.
 - 1.5. Skylights.
 - 1.6. HVAC systems and components, and other opaque objects mounted above the roof.
2. Portions of the roof shaded during the peak sun angle on the summer solstice by permanent features of the building or by permanent features of adjacent buildings.
3. Portions of roofs that are ballasted with a minimum stone ballast of 17 pounds per square foot (74 kg/m²) or 23 psf (117 kg/m²) pavers.
4. Roofs where not less than 75 percent of the roof area complies with one or more of the exceptions to this section.

CB103.1 General. A solar-ready zone shall be located on the roof of buildings that are five stories or less in height above grade plane, and are oriented between 110 degrees and 270 degrees of true north or have ~~low-sloped~~ low slope roofs. Solar-ready zones shall comply with Sections CB103.2 through CB103.8.

Exceptions:

1. A building with a permanently installed, on-site renewable energy system.
2. A building with a solar-ready zone that is shaded for more than 70 percent of daylight hours annually.
3. A building where the licensed design professional certifies that the incident solar radiation available to the building is not suitable for a solar-ready zone.
4. A building where the licensed design professional certifies that the solar zone area required by Section CB103.3 cannot be met because of extensive rooftop equipment, skylights, vegetative roof areas or other obstructions.

CD101.3 On-site renewable electricity systems. In addition to any renewable energy generation equipment provided to comply with Section C406.3, buildings shall install equipment for on-site renewable energy generation with a direct current (DC) nameplate capacity rating of not less than that computed using Equation CD-2.

$$AA = CA + SNA/3$$

CD-1

AA = Adjusted area, in ft² (m²)

CA = Conditioned area, in ft² (m²)

SNA = Semi-heated and nonconditioned area, in ft² (m²)

$$REQ = AA \times CF$$

CD-2

REQ = Required on-site capacity, in DC watts

AA = Adjusted area from Equation CD-1, in ft² (m²)

CF = Capacity factor from Table CD101.3, in watts/ft² (m²)

Exceptions:

1. Any required renewable energy generation capacity in excess of 10 W/ft² (108 W/m²) of net available roof area is permitted to be provided using an off-site renewable energy system in accordance with Section CD101.4. For the purposes of this section, net available roof area is the gross roof area minus the roof area occupied by any combination of skylights, mechanical equipment, vegetated areas, required access pathways, vehicle parking, and occupied roof terrace area.
2. The following buildings are permitted to provide off-site renewable energy generation in accordance with Section CD101.4 in lieu of all or part of the on-site renewable energy generation capacity required by Section CD101.3.
 - 2.1 Any *building* where more than 50 percent of roof area would be shaded from direct-beam sunlight by existing natural objects or by structures that are not part of the building for more than 2500 annual hours between 8:00 a.m. and 4:00 p.m.
 - 2.2 Any *building* with gross conditioned floor area less than 1,000 square feet (93 m²).
 - 2.3 Any *building* whose primary roof slope is 2 units vertical in 12 units horizontal (17-percent slope) or greater than 2 in 12.
3. Alternate forms of renewable energy generation capacity are permitted where the annual energy generation is not less than that produced by the required solar capacity, and where annual energy generation is calculated using an *approved* methodology.
4. All or part of the required renewable energy generation capacity is permitted to be replaced by other efficiency measures provided such measures will reduce the annual energy consumption of the *building* by an amount no less than that which would otherwise be produced annually by the required renewable energy capacity, as calculated using the total building performance compliance path in Section C407 and an approved calculation methodology for solar production.

Reason: This comment:

- Changes the IECC commercial provisions defined term from “low-sloped roof” to “low slope.”
- Adjusts the definition to align with the term and coordinate with the existing IBC definition of “steep slope” [i.e., “A roof slope 2 units vertical in 12 units horizontal (17-percent slope) or greater.”].
- Makes changes to use the defined term in C402.4.
- Makes changes to use the defined term in CB103.1.
- Changes the wording of CD101.3 to align the exception with the definition.

In combination, these modifications are intended to clarify provisions within the IECC and align complementary terminology between the IECC and IBC.

RED1-182-22 is a companion comment which changes the new terms “low-sloped roof” and “steep-sloped roof” in the residential 1st Public Comment Draft to “low slope” and “steep slope,” respectively, and coordinates their use with the residential roof radiative property provisions. RED1-182-22 has been approved by the Residential Consensus Committee.

The term serves within the body of the commercial 1st Public Comment Draft solely as a trigger in C402.4 for roof radiative properties. As is shown via the proposed change to CB103.1, it may be appropriate as a trigger for solar-ready zones. However, if the intention in CB103.1 is to refer to a slope trigger different than 2 in 12, the defined term should not be used and the proposed change to CB103.1 should be removed from this comment.

The proposed modification to CD101.3 coordinates an exception to the onsite renewable electricity system provisions in the appendix by clarifying that a roof with a slope of exactly 2 in 12 falls within the exception, creating consistency between the defined term and this trigger.

Regarding potential concerns about defining the term “low slope” solely with respect to roofs, note that the words “slope” and “sloped” appear in the Commercial 1st Public Comment Draft in the following locations in addition to the ones included for revision in this comment:

- **Chapter 2, definition of fenestration**
 - o **FENESTRATION.** Products classified as either skylights or vertical fenestration. **Skylights.** Glass or other transparent or translucent glazing material installed at a slope of less than 60 degrees (1.05 rad) from horizontal, including unit skylights, tubular daylighting devices and glazing

materials in solariums, sunrooms, roofs, greenhouses and sloped walls.

Vertical fenestration. Windows that are fixed or operable, opaque doors, glazed doors that are more than half glazed, glazed block and combination opaque and glazed doors composed of glass or other transparent or translucent glazing materials and installed at a slope of not less than 60 degrees (1.05 rad) from horizontal.

- **Table C301.1**

- o North Slope, Alaska
- o Slope, North Dakota

- **Figure C405.2.4.2(3)**

- o Daylight Zone Under a Sloped Rooftop Monitor

No confusion is created with the proposed term “low slope” with respect to these other uses of “slope.” Uses in the residential 1st Public Comment Draft are identical except there is no equivalent to Figure C405.2.4.3(3) and there is a use in the definition of “grade plane,” which is not defined in the commercial 1st Public Comment Draft.

Limiting the definition to roofs also serves to guide decisions about where to italicize “low slope.” In fact, this is not an issue in the 2021 IBC or 2021 IRC, which include no uses of the phrase “low slope” outside the roofing chapters (i.e., 15 and 9, respectively). There are no uses of “low slope” in the IEBC.

Cost Impact: The code change proposal will neither increase nor decrease the cost of construction. This proposal neither increases or decreases the cost of construction. It is merely a terminology clarification.