# Proposal Summary

CALIFORNIA ENERGY CODES & STANDARDS
A STATEWIDE UTILITY PROGRAM

**2022 California Energy Code (Title 24, Part 6)**

## Nonresidential High Performance Envelope – Roof Alterations

Updated: Friday, February 14, 2020

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## Introduction

The document summarizes proposed revisions to the California Energy Code (Title 24, Part 6) that will be discussed during a utility-sponsored stakeholder meeting on March 10, 2020. The Statewide Utility Codes and Standards Enhancement (CASE) Team is seeking input and feedback. To provide your comments, email info@title24stakeholders.com by March 24, 2020.

## Measure Description

The roof alterations code change proposal is to require the same insulation for roof replacements and recovers as new construction. This has been the case for roof replacements in the IECC and ASHRAE 90.1 since 2000, which is when the model codes started to be applied to alterations. In 2018 it became possible to fully deduct the expense of roof replacements when completed, rather than over a 39-year period. Adequate insulation levels increase the effectiveness of the building envelope and reduce the energy required to maintain the temperature in conditioned space. Adding insulation during a roof replacement is the most cost-effective time to do so and is a key component for California to achieve its goal of having 50 percent of commercial buildings retrofit to zero net energy by 2030.

## Draft Code Language

The proposed changes to the Standards and Reference Appendices are provided below. Changes to the 2019 documents are marked with red underlining (new language) and ~~strikethroughs~~ (deletions). Expected sections or tables of the proposed code (but not specific changes at this time) are highlighted in yellow.

### Standards

**Section 100.1**

**ROOF RECOVER.** The process of installing an additional roof covering over a prepared existing roof covering without removing the existing roof covering.

**ROOF REPLACEMENT.** The process of removing the existing roof covering, repairing any damaged subtrate and installing a new roof covering.

**Section 141.0(b)2B:** Existing roofs being replaced, recovered or recoated, of a nonresidential, high-rise residential and hotels/motels shall meet the requirements of Section 110.8(i). Roofs with more than 50

percent of the roof area or more than 2,000 square feet of roof, whichever is less, is being altered the requirements of i through iii below apply:

i. Roofing Products. Nonresidential buildings:

a. Low-sloped roofs in Climate Zones 1 through 16 shall have a minimum aged solar reflectance of ~~0.63~~ 0.70 and a minimum thermal emittance of 0.75, or a minimum SRI of ~~75~~ 85.

b. Steep-sloped roofs in Climate Zones 1 through 16 shall meet the requirements in 140.3 (a)1Aib ~~have a minimum aged solar reflectance of 0.20 and a minimum thermal emittance of 0.75, or a minimum SRI of 16.~~

**EXCEPTION to Section 141.0(b)2Bia:** An aged solar reflectance less than ~~0.63~~ 0.70 is allowed provided the maximum roof/ceiling U-factor in TABLE 141.0-B is not exceeded.

ii. Roofing Products. High-rise residential buildings and hotels and motels:

a. Low-sloped roofs in Climate Zones 10, 11, 13, 14 and 15 shall have a minimum aged solar reflectance of 0.55 and a minimum thermal emittance of 0.75, or a minimum SRI of 64.

b. Steep-sloped roofs Climate Zones 2 through 15 shall meet the requirements in 140.3 (a)1Aiib ~~have a minimum aged solar reflectance of 0.20 and a minimum thermal emittance of 0.75, or a minimum SRI of 16.~~

**EXCEPTION 1 to Section 141.0(b)2Bi and ii:** Roof area covered by building integrated photovoltaic panels and building integrated solar thermal panels are not required to meet the minimum requirements for solar reflectance, thermal emittance, or SRI.

**EXCEPTION 2 to Section 141.0(b)2Bi and ii:** Roof constructions with a weight of at least 25 lb/ft² are not required to meet the minimum requirements for solar reflectance, thermal emittance, or SRI.

*Table 141.0-B Roof/Ceiling Insulation Tradeoff for Aged Solar Reflectance*

| Aged Solar Reflectance | Climate Zone 1, 3-9 U-factor | Climate Zone 2, 10-16 U-factor |
|---|---|---|
| 0.62- 0.60 | 0.075 | 0.052 |
| 0.59-0.55 | 0.066 | 0.048 |
| 0.54-0.50 | 0.060 | 0.044 |
| 0.49-0.45 | 0.055 | 0.041 |
| 0.44-0.40 | 0.051 | 0.039 |
| 0.39-0.35 | 0.047 | 0.037 |
| 0.34-0.30 | 0.044 | 0.035 |

| | | |
|---|---|---|
| 0.29-0.25 | 0.042 | 0.034 |

**Section 141.0(b)2Biii:** For nonresidential buildings, high-rise residential buildings and hotels/motels when low-sloped roofs ~~are exposed to the roof deck or to the roof recover boards, and~~ meet~~s~~ Section 141.0(b)2Bia or iia, the ~~exposed~~ area of the roof alteration shall be insulated above the roof deck to the levels specified in TABLE 140.3-B, C, or D ~~141.0-C~~.

**EXCEPTION to Section 141.0(b)2Biii**

~~a. Existing roofs that are insulated with at least R-7 insulation or that has a U-factor lower than 0.089 are not required to meet the R-value requirement of TABLE 141.0-C.~~

~~b. If mechanical equipment is located on the roof and will not be disconnected and lifted as part of the roof replacement, insulation added may be limited to the maximum insulation thickness that will allow a height of 8 inches (203 mm) from the roof membrane surface to the top of the base flashing.~~

~~c. If adding the required insulation will reduce the base flashing height to less than 8 inches (203 mm) at penthouse or parapet walls, the insulation added may be limited to the maximum insulation thickness that will allow a height of 8 inches (203 mm) from the roof membrane surface to the top of the base flashing, provided that the conditions in Subsections i through iv apply:~~

~~i. The penthouse or parapet walls are finished with an exterior cladding material other than the roofing covering membrane material; and~~

~~ii. The penthouse or parapet walls have exterior cladding material that must be removed to install the new roof covering membrane to maintain a base flashing height of 8 inches (203 mm); and~~

~~iii. For nonresidential buildings, the ratio of the replaced roof area to the linear dimension of affected penthouse or parapet walls shall be less than 25 square feet per linear foot for Climate Zones 2, and 10 through 16, and less than 100 square feet per linear foot for Climate Zones 1, and 3 through 9; and~~

~~iv. For high-rise residential buildings, hotels or motels, the ratio of the replaced roof area to the linear dimension of affected penthouse or parapet walls shall be less than 25 square feet per linear foot for all Climate Zones.~~

d. Tapered insulation may be used which has a thermal resistance less than that prescribed in TABLE 140.3-B, C, or D ~~141.0-C~~ at the drains and other low points, provided that the thickness of insulation is increased at the high points of the roof so that the average thermal resistance equals or exceeds the value that is specified in TABLE 140.3-B, C, or D ~~141.0-C~~.

~~*TABLE 141.0-C INSULATION REQUIREMENTS FOR ROOF ALTERATIONS*~~

| | ~~*Nonresidential*~~ | | ~~*High-Rise Residential and Guest Rooms of Hotel/Motel Buildings*~~ | |
|---|---|---|---|---|
| ~~*Climate Zone*~~ | ~~*Continuous Insulation*~~<br><br>~~*R-value*~~ | ~~*U-factor*~~ | ~~*Continuous Insulation*~~<br><br>~~*R-value*~~ | ~~*U-factor*~~ |
| ~~*1*~~ | ~~*R-8*~~ | ~~*0.082*~~ | ~~*R-14*~~ | ~~*0.055*~~ |
| ~~*2*~~ | ~~*R-14*~~ | ~~*0.055*~~ | ~~*R-14*~~ | ~~*0.055*~~ |
| ~~*3-9*~~ | ~~*R-8*~~ | ~~*0.082*~~ | ~~*R-14*~~ | ~~*0.055*~~ |
| ~~*10-16*~~ | ~~*R-14*~~ | ~~*0.055*~~ | ~~*R-14*~~ | ~~*0.055*~~ |

**Reference Appendices**