

What is the energy code and why does it matter?

California’s energy code, the **Building Energy Efficiency Standards** (Title 24, Part 6; the Standards), outlines the energy efficiency requirements for newly constructed buildings and additions and alterations to existing buildings. Energy efficiency reduces energy costs and wasteful consumption, improves building comfort, and reduces environmental impacts of energy use. The Standards ensure that builders use technologies and practices that are energy efficient and cost effective for building owners.

What are the roofing requirements?

The Standards require a building permit when replacing your roof and also require roof replacements to meet certain energy specifications. These specifications are the **thermal emittance** (the relative ability of the roof surface to radiate absorbed heat) and the three-year aged (or “weathered”) **solar reflectance** (the fraction of solar energy that is reflected by the roof after three years) of roofing materials used in new construction and re-roofing projects must meet minimum standards. Another option is to use the **Solar Reflectance Index** (SRI) (a measure of the constructed surface’s ability to stay cool in the sun by reflecting solar radiation and emitting thermal radiation). An SRI calculator can be used to determine the value by inputting the three-year aged solar reflectance and thermal emittance of the desired roofing material.

Roofing products (tile, asphalt shingles, etc.) with high solar reflectance and thermal emittance properties are called “**cool roofs.**” Cool roofing products must be certified by the **Cool Roof Rating Councils (CRRC)** (per §10-113 and §110.8(i)) and must have an official CRRC package label indicating compliance. Figure 1 shows a sample of an approved CRRC product label.


 CRRC COOL ROOF RATING COUNCIL	Solar Reflectance	Initial	Weathered	
	Thermal Emittance	0.00	Pending	
	Rated Product ID Number			----
	Licensed Seller ID Number			----
Classification			Production Line	
<small>Cool Roof Rating Council ratings are determined for a fixed set of conditions, and may not be appropriate for determining seasonal energy performance. The actual effect of solar reflectance and thermal emittance on building performance may vary. Manufacturer of product stipulates that these ratings were determined in accordance with the applicable Cool Roof Rating Council procedures.</small>				

Figure 1: Sample CRRC Product Label and Information.
Image Source: CEC

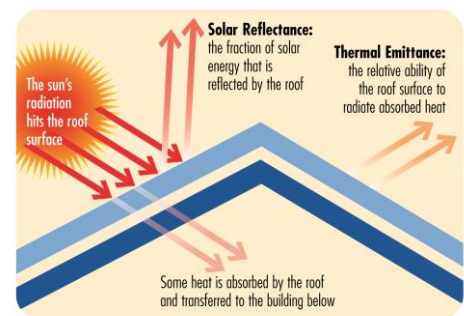


Figure 2: Solar Reflectance and Thermal Emittance.
Image Source: CRRC

Cool roofing requirements are triggered when 50% or more of the roof is being replaced. Any areas of roof covered by building integrated photovoltaic panels and solar thermal panels are exempt. However, the area of roof not covered by photovoltaic panels is still required to meet any applicable cool roof requirements.

(Step-by-step permit requirement guide on page 2)

Required 2019 compliance documents can be found at:

https://ww2.energy.ca.gov/title24/2019standards/2019_compliance_documents/Residential_Documents/

For more information on 2019 Title 24 Part 6 requirements:

- Visit <http://www.energy.ca.gov/title24/2019standards/>
- Contact the Energy Standards Hotline at (800) 772-3300 or email: title24@energy.state.ca.us
- Contact the BayREN Codes & Standards Program by email: codes@bayren.org

Requirements for residential buildings in the Bay Area are limited to parts of Alameda, Contra Costa, and Solano Counties (climate zone 12¹) and apply to **new construction, additions ≥ 300 ft² and alterations that replace over 50% of the roof surface.**

IF ANY OF THE FOLLOWING CRITERIA ARE MET, COOL ROOF IS NOT REQUIRED

Cool Roof Exemptions: Check all that apply.

- Roof has a low slope (pitch is less than 2:12)
- Roof area to be replaced is less than 50% of total
 - Area to be re-roofed = ____ ft²
 - Total roof area = ____ ft²
 - Total roof area / 2 = ____** (must be less than area to be re-roofed)
- Roof areas covered by building integrated photovoltaic panels and solar thermal panels are exempt. Note that any area not covered must meet any applicable cool roof requirements.

Cool Roof Alternatives: Check all that apply.

- There is/will be an attic radiant barrier
- There are/will be **NO** ducts in the attic
- Existing ducts in the attic are sealed and insulated with at least R-8 rated insulation
- The ceiling is/will be insulated with at least R-38 rated insulation
- There is/will be at least R-2 rated insulation above the roof deck
- There is/will be at least a 1 inch air-space between the top of the roof deck and the bottom of the roofing product
- The installed roofing product will have a profile ratio of rise to width of 1:5 for $\geq 50\%$ of the width of the roofing product (e.g. Spanish-style barrel tiles) (see Figure 3).
- The roof construction will have a weight of at least 25 lbs/ft² (e.g. green roofs).

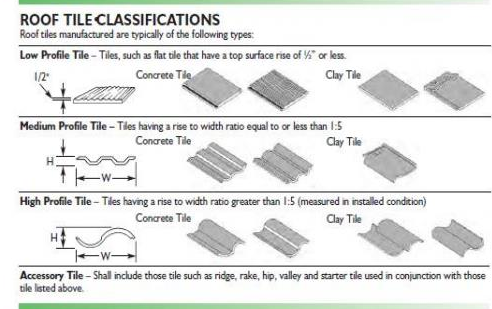


Figure 3: Roof Tile Classifications

COOL ROOF IS REQUIRED IF NONE OF THE BOXES ABOVE ARE CHECKED

Roofing material to be installed must meet the requirements in Table 1. Aged solar reflectance and thermal emittance (both initial and aged thermal emittance values can be used to demonstrate compliance) are tested performance values for roofing products that are available from the manufacturer. The product must have a Cool Roof Council (CRR) label to be shown to the building inspector.

3-year Aged Solar Reflectance, minimum	0.20
AND	
Thermal Emittance, minimum	0.75
-OR-	
Solar Reflective Index (SRI), minimum	16

Table 1: Cool Roofing Material Minimum Prescriptive Values

¹ California Building Climate Zone Areas: https://ww2.energy.ca.gov/maps/renewable/building_climate_zones.html. For information about roofing requirements in other climate zones, please reference the municipality's municipal code.

References:

California Energy Commission. 2019 Residential Compliance Manual. PDF file. December 3, 2019. <https://ww2.energy.ca.gov/2018publications/CEC-400-2018-017/CEC-400-2018-017-CMF.pdf>.

California Energy Commission. An overview of the 2019 Building Energy Efficiency Standards. PDF File. December 3, 2019. https://ww2.energy.ca.gov/title24/2019standards/documents/2018_Title_24_2019_Building_Standards_FAQ.pdf.

Cool Roof Rating Council. California Building Energy Efficiency Standards (Title 24, Part 6). December 3, 2019. www.coolroofs.org/resources/california-title-24.

Energy Code Ace. 10-113- Rating and Labeling of Roofing Product Reflectance and Emittance. Website. December 10, 2019. <https://energycodeace.com/site/custom/public/reference-ace-2019/index.html#!Documents/10113ratingandlabelingofroofingproductreflectanceandemittance.htm>

U.S. Green Building Council (USGBC). December 3, 2019. <https://www.usgbc.org/glossary/term/5590>.