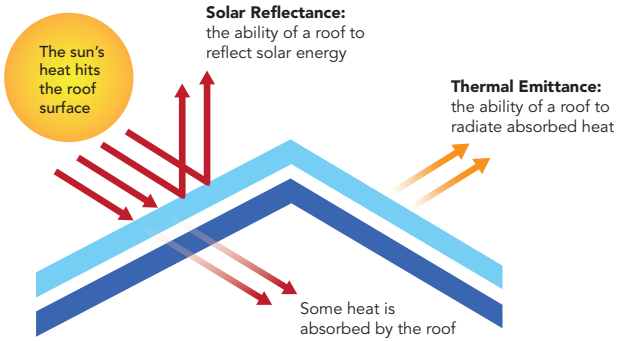
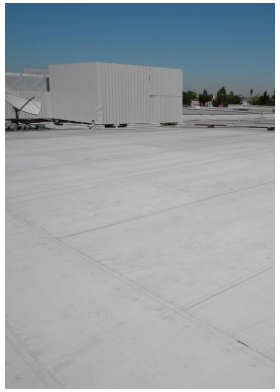
» COOL ROOFS

WHAT IS A COOL ROOF?

The term cool roof refers to a roofing product with high solar reflectance (SR) and thermal emittance (TE) properties. These properties help reduce electricity used for air conditioning by lowering roof temperatures on hot, sunny days. *Solar reflectance* refers to a material's ability to reflect the sun's solar energy back into the atmosphere. *Thermal emittance* provides a means of quantifying how much of the absorbed heat is rejected for a given material. Both properties are measured from 0 to 1 and the higher the value, the 'cooler' the roof.



Provided by the CRRC



Coating for a low-sloped roof
Photo credit: DNG Group

WHAT IS THE SOLAR REFLECTANCE INDEX (SRI)?

SRI combines SR and TE in an equation. It allows for trade-offs between SR and TE values used under the prescriptive compliance approach. SRI values range from 0 to 100, with the higher value, the better.

COOL ROOF REQUIREMENTS

The Cool Roof Rating Council (CRRC), at www.coolroofs.org, is the sole entity the California Energy Commission recognizes for certifying the solar reflectance and thermal emittance values of roofing products. Only reflectance and emittance values listed within the CRRC's Rated Products Directory may be used to meet cool roof requirements. Products that meet CRRC certification requirements will feature the CRRC label.

A residential cool roof
Photo credit: Owens Corning Roofing & Asphalt, LLC

BENEFITS OF COOL ROOFS:

- Energy and cost savings can be 20% depending on materials, climate zone, & electricity rates.[1]
- Improved occupant comfort
- Compliance with building energy standards and green energy programs
- Reduce air pollution and greenhouse gas emissions
- Lasts longer than standard roofs

A non-residential cool roof
Photo credit: Cool Metal Roofing Coalition

DO I NEED A BUILDING PERMIT FOR A RE-ROOF?

It depends. Check with your local building department. A contractor is required to be licensed by the Contractors State Licensing Board for any construction project valued at over $500 in labor and materials.

1. LBL.gov

Cool Roof tile samples. Photo Credit: Eagle Roofing

COOL ROOF MATERIALS

There are numerous materials in a wide range of colors that meet cool roof requirements. As shown on this brochure, tile, metal, asphalt, and coating materials may meet cool roof requirements.

THE *2016 BUILDING ENERGY EFFICIENCY STANDARDS* FOR COOL ROOFS:

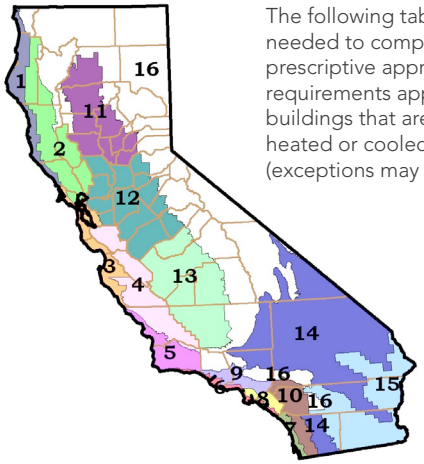
There are two approaches for compliance: performance and prescriptive.

The performance approach refers to how the entire building complies with energy efficiency standards using certified computer modeling programs.

The prescriptive approach has specific requirements for each part of the building (insulation, windows, etc.). For cool roof compliance, you must show:

- Solar reflectance values based on their reflectance properties after 3 years (known as "aged, or weathered, reflectance") as opposed to their initial values. If aged solar reflectance values are not available, the following formula may be used: $\rho_{aged}=0.2+\beta[\rho_{initial}-0.2]$
- *$\rho_{initial}$=solar reflectance from the Cool Roof Rating Council directorty
- * β is listed by product type in Table 110.8-B (Field –Applied Coating = 0.65, not a Field-Applied Coating = 0.70)
- Thermal emittance values
- Solar Reflectance Index (SRI) as an alternative to solar reflectance and thermal emittance values

What are the minimum requirements to demonstrate compliance with the Building Energy Efficiency Standards?



The following tables show values needed to comply under the prescriptive approach. These requirements apply only to buildings that are mechanically heated or cooled (exceptions may apply).

LOW-RISE RESIDENTIAL BUILDINGS

	CLIMATE ZONE	AGED SOLAR REFLECTANCE &	THERMAL EMITTANCE OR	SRI
L	13 & 15	≥ 0.63	≥ 0.75	≥ 75
SL	10–15	≥ 0.20	≥ 0.75	≥ 16

NONRESIDENTIAL BUILDINGS

	CLIMATE ZONE	AGED SOLAR REFLECTANCE &	THERMAL EMITTANCE OR	SRI
L	1–16	≥ 0.63	≥ 0.75	≥ 75
SL	1–16	≥ 0.20	≥ 0.75	≥ 16

HIGH-RISE RESIDENTIAL, HOTELS, AND MOTELS

	CLIMATE ZONE	AGED SOLAR REFLECTANCE &	THERMAL EMITTANCE OR	SRI
L	9*,10,11, 13,14,15	≥ 0.55	≥ 0.75	≥ 64
SL	2–15	≥ 0.20	≥ 0.75	≥ 16

* DOES NOT APPLY TO ALTERATIONS

ROOF CHARACTERISTICS

L — Low-sloped, rise to run of 2:12 or less

SL — Steep-sloped, rise to run of greater than 2:12

Tax credits and rebates may be available for cool roofs. Check with your local utility company and the IRS.

CEC-400-2016-021-BR

For alternatives and exceptions to these requirements:

CONTACT

Energy Standards Hotline:
(800) 772-3300
title24@energy.ca.gov

RESOURCES

www.coolroofs.org
www.energy.ca.gov/title24/orc

California

COOL ROOFS

2016 Building Energy Efficiency Standards

Photo credit: MCA Tile