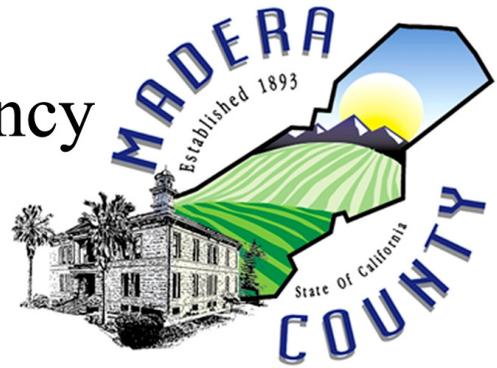


Resource Management Agency Building Division



2010 CALIFORNIA BUILDING CODE CALIFORNIA RESIDENTIAL CODE 2008 BUILDING ENERGY EFFICIENCY STANDARDS

STANDARDS REVIEW WITH RE-ROOF PERMIT APPLICATION

ATTENTION ROOFING CONTRACTORS AND HOMEOWNERS

**NEW REQUIREMENTS FOR COOL ROOFS ON RESIDENTIAL NEW
CONSTRUCTION AND REROOFS WENT INTO EFFECT**

JANUARY 1 2010

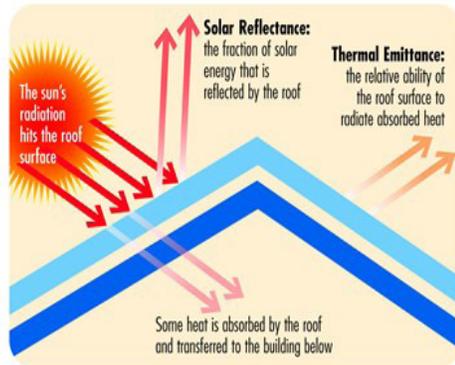
2008 California Energy Standards Roofing Products (Cool Roof Required for Residential and Commercial)

All roofing products must meet the mandatory requirements of §10-113 and §118(i), and the prescriptive requirements of §151(f) 12. Roofing products with high solar reflectance and thermal emittance are referred to as "cool roof", which refers to an outer layer or exterior surface of a roof. As the term implies, the temperature of a cool roof is lower on hot sunny days than for a conventional roof, reducing cooling loads and the energy required to provide air conditioning.

Alterations to existing roofs need to meet §152(b)1H which requires that when more than fifty percent of the roof or more than 1,000 square feet of exterior existing roof, whichever is less, is replaced, the criteria set forth below must be met.

Application requires:

1. Owner Builder Authorization Form or a Contractor Authorization form. Forms are available on at www.madera-county.com



What is a Cool Roof?

A cool roof reflects and emits the sun's heat back to the sky instead of transferring it to the building below. "Coolness" is measured by two properties, solar reflectance and thermal emittance. Both properties are measured from 0 to 1 and the higher the value, the "cooler" the roof. For more information go to www.coolroofs.org

Solar Reflectance: The fraction of incident solar radiation upon a surface that is reflected from the surface.

Thermal Emittance: The ratio of the radiant flux emitted by a sample to that emitted by a blackbody radiator at the same temperature, under the same spectral and geometric conditions of measurement.

Benefits of cool roofs include:

- Energy savings and global warming mitigation
- Reduction in urban heat island effect and smog
- Improved occupant comfort
- Comply with codes and green building programs

The roofing products manufacturer must have its roofing product tested for solar reflectance and thermal emittance, and be labeled according to CRRC procedures.

Rating and Labeling

Roofing products that are used for compliance with the standards (prescriptive and performance approaches) are required to be tested and labeled by the Cool Roof Rating Council (CRRC) per §10-113 and liquid applied products must meet minimum standards for performance and durability per §118(i)4. The **CRRC** is the supervisory entity responsible for certifying cool roof products. The CRRC test procedure is documented in CRRC-1, the CRRC Product Rating Program Manual. This test procedure includes tests for both solar reflectance and thermal emittance.

COOL ROOF RATING COUNCIL

The Cool Roof Rating Council (CRRC) is an independent, non-profit organization that maintains a third-party rating system for radiative properties of roof surfacing materials.

Where do I find CRRC rated roof products?
Rated Products Directory @ coolroofs.org

The residential roofing product requirement in the *prescriptive package* is as follows:

Note Madera County is located in climate zones 13 and 16

For **low-sloped** roofing applications (2:12 or less), in climate zones 13 and 15, there is a minimum aged solar reflectance of **0.55** and thermal emittance of **0.75**, or a minimum **SRI of 64**.

For **steep-sloped** applications (> than 2:12) in climate zones 10-15, for roofing products that have a density of *less than 5 pounds* per square foot (generally, asphalt shingle and metal products) there is a three year aged solar reflectance requirement of **0.20** and a (three year aged or new) thermal emittance requirement of **0.75**, or a minimum solar reflectance index (**SRI**) of **16**.

For roofing products with a density of *5 pounds per square foot or more* (generally include concrete, clay tiles, slate and possibly some synthetic roof coverings), in climate zones 1-16, there is a minimum aged solar reflectance of **0.15** and thermal emittance of **0.75**, or a minimum **SRI of 10**.

There are two exceptions to meeting the roofing products requirements in the prescriptive package:

1. The roof area with building integrated photovoltaic panels and building integrated solar thermal panels are exempt from the minimum requirements for aged solar reflectance and thermal emittance or SRI per Exception 1 to §151(f)12.
2. Roof constructions that have thermal mass over the roof membrane with a weight of at least 25 lb/ft² are exempt from the minimum requirements for aged solar reflectance and thermal emittance or SRI under Exception 2 to §151(f)12

If the aged value for the reflectance is not available in the CRRC's Rated Product Directory then the equation below can be used until the aged rated value for the reflectance is posted in the directory.

Aged Reflectance calculated = $(0.2 + 0.7 [p_{\text{initial}} - 0.2])$

Where p_{initial} = initial Reflectance listed in the **CRRC Rated Product Directory**.

Example: $(0.2 + 0.7 [0.37 - 0.2]) = 0.31$

Solar Reflectance Index (SRI) is a new concept in the 2008 Standards; in lieu of meeting a thermal resistance and solar reflectance requirement, compliance can be shown by meeting a minimum SRI.

Solar Reflective Index (SRI): The relative T_s of a surface with respect to the standard white (SRI = 100) and standard black (SRI = 0) under the standard solar and ambient conditions. In the context of this guideline, it is a measure of a constructed surface's ability to reflect solar heat, as shown by a small temperature rise. A standard black surface (reflectance 0.05 and thermal emittance of 0.90) is 0 and a standard white surface (reflectance 0.80 and thermal emittance of 0.90) is 100.

Steady-state Surface Temperature (T_s): The temperature of the surface, in Kelvin (K), under the standard solar and ambient conditions.

Solar Reflective Index: Calculations shall be provided of the solar reflective index (SRI) value for both initial and aged specimens. The SRI shall be calculated in accordance with ASTM E 1980.

Although not included as prescriptive equivalents for new construction, §152(b) 1H contains acceptable cool roof alternatives to the prescriptive requirements for alterations (*includes re-roofs*). These alterations can also be utilized in the design and construction of a new roof system to improve the thermal performance by reducing the cooling energy load placed on the building. Examples of these practices that can be utilized in new construction and that a contractor or designer could consider include: (Note: some of the following measures may result in an additional compliance credit if incorporated into the building.)

1. Insulation with a thermal resistance of at least 0.85 hr-ft²-°F/Btu or at least a 3/4 inch air-space is added to the roof deck over an attic; or
2. Existing ducts in the attic are insulated and sealed according to §151(f) 10; or
3. In climate zones 10, 12 and 13, with 1 sq ft of free ventilation area of attic ventilation for every 150 sq ft of attic floor area, and where at least 30 percent of the free ventilation area is within two feet vertical distance of the roof ridge; or
4. Buildings with at least R-30 ceiling insulation; or
5. Buildings with a radiant barrier in the attic meeting the requirements of §151(f) 2; or
6. Buildings that have no ducts in the attic; or
7. In climate zones 10, 11, 13 and 14, R-3 or greater roof deck insulation above vented attic.

PERMIT APPLICATION AND INSPECTION INSTRUCTIONS

1. Complete the site address and owner information on the reverse side of this sheet.
2. Provide the manufacturer name and type of roofing material being installed
3. Provide the fire retardant classification of the new roof system (ie. Class A, B or C).
4. Provide the number of squares of roofing material (100 sq. ft. = 1 square) and the percentage of the existing roofing being replaced. If more than 50% of roofing or more than 1000 sq. ft provide the solar reflectance, thermal emittance and/or solar reflective index (SRI) of the new roofing material.
5. Indicate what type of work will be done (ie. Tear Off, Tear Off & New Sheeting, Over Existing).
6. Sign and date the application.
7. Complete and include the attached CF-1R-ALT form with this application.

INSPECTIONS

There are typically three inspections required by Madera County for re-roofing projects.

Pre-Roof Inspection

After existing roof covering has been removed, an inspection is done to confirm soundness and adequacy of attachment of the existing sheathing. If the roof rafters show excessive deflection (sagging) or are spongy when walking on them, corrections can best be determined during this inspection while roof framing members are exposed.

Roof Nailing Inspection

After the existing roof covering has been removed an inspection of the roof sheathing, whether existing or new, is required prior to installing the new roof covering. Nailing of the roof sheathing is to be a maximum of 6" OC at the ends and maximum 12" OC in the field. End breaks shall be staggered and land over a rafter or truss. Two nails in each piece of the existing skip sheathing will meet the requirements of the end nailing, if a pre-roof inspection has been done. Spacing of the sheathing is to be consistent with the manufacturer's requirements and is typically stamped on the plywood or OSB sheet.

Verification of adequate attic ventilation will be made at this time.

If a **Tile Roof** is being installed, an additional inspection of the felt and battens is required.

Final Inspection

After the new roof covering has been installed, a final inspection is required to confirm the proper installation of the new roof covering. Roofing materials are checked for maximum exposure and that correct roofing materials have been used.

All flashings shall be complete, roof jacks and exposed nails are to be sealed with approved sealant.

Roof mounted mechanical equipment is checked to confirm that it is secure to the roof and that the condensate drain and gas piping have been properly reinstalled.

The completed and signed CF-6R-ENV-01 documents and the CRRC labels from the roofing material are required on site at the time of final inspection.

Direct wire or battery operated smoke and carbon monoxide detectors are required to be installed per the 2010 CA. Residential Code prior to final.



Re-Roof Permit Application

Effective January 1, 2010

SITE ADDRESS: _____

APN: _____ - _____ - _____

OWNER: _____

ADDRESS: _____

PHONE NUMBER: _____

PROJECT VALUE: \$ _____

ROOF MATERIAL MANUFACTURER: _____

ROOF MATERIAL MODEL/STYLE: _____

ROOF FIRE RETARDANT CLASSIFICATION: _____

NUMBER OF SQUARES: _____ PERCENT OF ROOF AREA TO BE REPLACED: _____

CRRC SOLAR REFLECTANNCE VALUE: _____ CRRC THERMAL EMITTANCE VALUE: _____

SOLAR REFLECTANCE INDEX: _____

When attic ventilation exception to cool roof is used complete calculation below. 50% of ventilation shall be in upper portion of roof with 30% minimum within 2 feet of ridge. Remaining 50% of ventilation to be at eaves.

SQ. FT. RESIDENCE: _____ / 150 FT. SQ = _____ SQ. FT. / 144 = _____ SQ. IN. ATTIC VENT
30% MIN. UPPER WITHIN 2 FT = _____ SQ. IN.

ROOF SLOPE: 2:12 or less Greater than 2:12

ROOFING DENSITY: Less than 5 PSF 5 PSF or more, but less than 25 PSF Greater than 25 PSF

TEAR OFF TEAR OFF (New Sheeting) OVER EXISTING ROOFING

I, the installer of the roof system at the location listed above, certify the roofing materials noted above shall be installed in accordance with the manufacturer's listing; and the manufacturer's listing for materials provide the fire retardant roof classification, solar reflectance value and thermal emittance value as defined and required by the California Building Code and California Residential Code. Direct wire or battery operated smoke and carbon monoxide detectors are required to be installed per the 2010 CA. Residential Code prior to final.

INSTALLER NAME: _____

INSTALLER ADDRESS: _____

PHONE NUMBER: _____

LICENSE NUMBER: _____
