



Residential Cool Roofing Requirements Effective January 1, 2010

Forms:

- A **CF-1R ALT** Form is required for all reroofing applications to verify that all projects meet or exceed the Prescriptive Approach requirements of the 2008 California Energy Efficiency Standards. When a reroof is exempt from or meets an alternative to the Cool Roof requirements, the applicable exception or alternative must be identified on the CF-1R ALT Form.
- A **CF-6R-ENV-01** Form must be posted, or made available with the building permit(s) at final inspection, and a signed copy is required to be included with the documentation the installer provides to the building owner.

Minimum Requirements:

When more than 50% of the exterior surface of the roof or more than 1,000 ft² of roof will be replaced, whichever is less, the altered exterior surface area of the existing roofs must be a product certified by the Cool Roof Rating Council (CRRC). Certified roofing products can be found on the CRRC website at: <http://www.coolroofs.org/>

For alterations to steep-sloped roofs (rise to run greater than 2:12), the following are considered to be equivalent to (or an alternative to) cool roofing requirements:

- With 1 ft² of free ventilation area of attic ventilation for every 150 ft² of attic floor area, and where at least 30 percent of the free ventilation area is within 2 feet vertical distance of the roof ridge; or
- Buildings with at least R-30 ceiling insulation; or
- Buildings that have no ducts in the attic; or
- Existing ducts in the attic are insulated and sealed as verified by a HERS rater; or
- Buildings with a radiant barrier in the attic; or
- 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.

Cool Roof Values:

- Roofing products with a density of less than 5 pounds per square foot shall have a minimum 3-year aged solar reflectance of 0.20 and a minimum thermal emittance of 0.75, or a minimum Solar Reflectance Index (SRI) of 16.
- Roofing products with a density of 5 pounds per square foot or more shall have a minimum 3-year aged solar reflectance of 0.15 and a minimum thermal emittance of 0.75, or a minimum SRI of 10.

Solar Reflectance and Thermal Emittance:

The Mandatory Measures require that all roofing products installed to meet the Cool Roof requirements for alterations shall be certified to the Cool Roof Rating Council (CRRC). Certified roofing products can be found on the CRRC website at: <http://www.coolroofs.org/>. *Roofing products that are not certified to the CRRC cannot be installed to meet the Cool Roof requirements.*

The Mandatory Measures also mandate how the applicant shall determine the Solar Reflectance and Thermal Emittance of the roofing product to meet the Cool Roof Requirements. Solar Reflectance Index (SRI) is a new concept in the 2008 Standards; in lieu of meeting a thermal resistance and an aged solar reflectance requirement, compliance can be shown by meeting a minimum SRI. Emittance refers to the ability of heat to escape from a surface once it is absorbed.

Under the 2008 Standards, the Prescriptive Approach requires that the roofing product meet a 3-year aged solar reflectance value; not an initial solar reflectance value. The efficiency values of the roofing product shall be determined by one of the following methods (on next page):

- The roofing product is certified to the CRRC with a 3-year aged solar reflectance and thermal emittance values.
- The roofing product is certified to the CRRC with an initial solar reflectance and thermal emittance values. The applicant shall input the initial solar reflectance into the equation R_{aged} below to calculate the aged solar reflectance:

$$R_{aged} = 0.2 + 0.7(\text{initial solar reflectance} - 0.2)$$

Here is an example of how to calculate the aged solar reflectance for a CRRC certified roofing product with an initial solar reflectance of 0.77:


$$R_{aged} = 0.2 + 0.7(0.77 - 0.2)$$

$$R_{aged} = 0.2 + 0.7(0.57)$$

$$R_{aged} = 0.2 + 0.40$$

$$R_{aged} = 0.60$$

- The roofing product is certified to the CRRC with a 3-year aged solar reflectance and thermal emittance values, but these values do not meet the Prescriptive requirements. As an alternative, the applicant may input the 3-year aged solar reflectance and thermal emittance into the Solar Reflectance Index (SRI) calculator to meet the SRI requirement. The SRI calculator can be downloaded from the Energy Commission website at: <http://www.energy.ca.gov/title24/>.

		<u>Initial</u>	<u>Weathered</u>
	Solar Reflectance	0.00	Pending
	Thermal Emittance	0.00	Pending
	Rated Product ID Number		
Licensed Seller ID Number			-----
Classification		Production Line	
<p>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.</p> <p>Manufacturer of product stipulates that these ratings were determined in accordance with the applicable Cool Roof Rating Council procedures.</p>			

Prescriptive Certificate of Compliance: Residential		CF-1R-ALT
Residential Alterations		(Page 3 of 5)
Project Name:	Climate Zone #	# of Stories

ROOFING PRODUCTS (COOL ROOFS) §151(f)12

When the area of exterior roof surface to be replaced exceeds more than 50% of the existing roof area, or more than 1,000 ft², whichever is less, the new roofing area must meet the roofing product "Cool Roof" requirements of §152(b)1Hi, 152(b)1Hii, or 152(b)1Hiii.

Check applicable alternative or exception below if the roof alteration is exempt from the roofing product "Cool Roof" requirements. Note: If any one of the alternatives or exception below is checked, the Aged Solar Reflectance and Thermal Emittance requirements for roofing products in §118(i) are not applicable. Do not fill table below.

- Cool Roofs Not Required in Climate Zones 1-12, 14, and 16 with a Low Sloped. Less or 2:12 pitch.
- Cool Roofs Not Required in Climate Zones 1 through 9 and 16 with a Steep-Sloped Roofs (pitch greater than 2:12) and product unit weight less than 5lb/ft².

Alternatives to §152(b)1Hi and §152(b)Hii, Steep-slope roof (pitch > 2:12)

- 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
- Existing ducts in the attic are insulated and sealed according to §151(f)10; or
- In climate zones 10, 12 and 13, with 1 ft² of free ventilation area of attic ventilation for every 150 ft² of attic floor area, and where at least 30 percent of the free ventilation area is within 2 feet vertical distance of the roof ridge; or
- Building has at least R-30 ceiling insulation; or
- Building has radiant barrier in the attic meeting the requirements of §151(f)2; or
- Building has no ducts in the attic; or
- ~~In climate zones 10, 11, 13 and 14, R-3 or greater roof deck insulation above vented attic.~~

Exception to §152(b)1Hiii, Low-slope roof (pitch ≤ 2:12)

- Building has no ducts in the attic.

Other Exceptions

- Roofing area covered by building integrated; photovoltaic panels and solar thermal panels are exempt from the below Cool Roof criteria.
- Roof constructions that have thermal mass over the roof membrane with at least 25 lb/ft² is exempt from the below Cool Roof criteria.

Note: If no CRRC-1 label is available, this compliance method cannot be used, use the Performance Approach to show compliance, otherwise, Check the applicable box below if Exempt from the Roofing Products "Cool Roof" Requirement:

CRRC Product ID Number ¹	Roof Slope		Product Weight		Product Type ²	Aged Solar Reflectance ^{3,4}		Thermal Emittance	SRI ⁵
	≤ 2:12	> 2:12	< 5lb/ft ²	≥ 5lb/ft ²					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>			
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>			

1. The CRRC Product ID Number can be obtained from the Cool Roof Rating Council's Rated Product Directory at www.coolroofs.org/products/search.php
2. Indicate the type of product is being used for the roof top, i.e. single-ply roof, asphalt roof, metal roof, etc.
3. If the Aged Reflectance is not available in the Cool Roof Rating Council's Rated Product Directory then use the Initial Reflectance value from the same directory and use the equation $(0.2+0.7(p_{initial} - 0.2))$ to obtain a calculated aged value. Where p is the Initial Solar Reflectance.
4. Check box if the Aged Reflectance is a calculated value using the equation above.
5. Calculate the SRI value by using the SRI- Worksheet at <http://www.energy.ca.gov/title24/> and enter the resulting value in the SRI Column above and attach acopy of the SRI- Worksheet to the CF-1R.

To apply **Liquid Field Applied Coatings**, the coating must be applied across the entire roof surface and meet the dry mil thickness or coverage recommended by the coatings manufacturer and meet minimum performance requirements listed in §118(i)4. Select the applicable coating:

<input type="checkbox"/> Aluminum-Pigmented Asphalt Roof Coating	<input type="checkbox"/> Cement-Based Roof Coating	<input type="checkbox"/> Other _____
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Prescriptive Certificate of Compliance: Residential		CF-1R-ALT
<i>Residential Alterations</i>		(Page 5 of 5)
Project Name:	Climate Zone #	# of Stories

Documentation Author's Declaration Statement		
<ul style="list-style-type: none"> I certify that this Certificate of Compliance documentation is accurate and complete. 		
Name:	Signature:	
Company:	Date:	
Address:	If Applicable <input type="checkbox"/> CEA or <input type="checkbox"/> CEPE (Certification #):	
City/State/Zip:	Phone:	
Responsible Building Designer's Declaration Statement		
<ul style="list-style-type: none"> I am eligible under Division 3 of the California Business and Professions Code to accept responsibility for the building design identified on this Certificate of Compliance. I certify that the energy features and performance specifications for the building design identified on this Certificate of Compliance conform to the requirements of Title 24, Parts 1 and 6 of the California Code of Regulations. The building design features identified on this Certificate of Compliance are consistent with the information provided to document this building design on the other applicable compliance forms, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application. 		
Name:	Signature:	
Company:	Date:	
Address:	License:	
City/State/Zip:	Phone:	

For assistance or questions regarding the Energy Standards, contact the Energy Hotline at: 1-800-772-3300.

INSTALLATION CERTIFICATE**CF-6R-ENV-01****Envelope – Insulation; Roofing; Fenestration****(Page 2 of 3)**

Site Address:	Enforcement Agency:	Permit Number:
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Description of Roofing Products									
CRRC Product ID Number ¹	Manufacturer Information	Brand/Model	Product Type	Roof Area	Roof Slope	Product Weight ²	Initial Solar Reflectance	Aged Solar Reflectance ⁴	Thermal Emittance
								<input type="checkbox"/> ³	
								<input type="checkbox"/> ³	
								<input type="checkbox"/> ³	

1. The CRRC Product ID Number can be obtained from the Cool Roof Rating Council's Rated Product Directory at www.coolroofs.org/products/search.php

2. The weight in lbs per square feet of the roofing product being installed.

3. Check box if the Aged Reflectance is a calculated value using the equation below, footnote 4.

4. If the aged reflectance is not available in the Cool Roof Rating Council's Rated Product Directory then use the initial reflectance value from the directory and use the equation $(0.2+0.7(\rho_{initial} - 0.2))$ to obtain a calculated aged value.

CHECK APPLICABLE BOX BELOW IF EXEMPT FROM THE ROOFING PRODUCT "COOL ROOF" REQUIREMENT:

The roof area covered by building integrated photovoltaic panels and building integrated solar thermal panels are exempt from the above Cool Roof criteria.

Roof constructions that have thermal mass over the roof membrane with a weight of at least 25 lb/ft² is exempted from the above Cool Roof criteria.

To apply Liquid Field Applied Coatings, the coating must be applied with a minimum dry mil thickness of 20 mils across the entire roof surface and meet minimum performance requirements listed in §118(i)3 and Table 118-C. Select the applicable coating

Aluminum-Pigmented Asphalt Roof Coating Cement-Based Roof Coating Other _____

CRRC-1 Label Attached to CF-6R
(Note if no CRRC-1 label is available, this compliance method cannot be used and another method is required to meet compliance).

DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, the information provided on this form is true and correct.
- I am eligible under Division 3 of the Business and Professions Code to accept responsibility for construction, or an authorized representative of the person responsible for construction (responsible person).
- I certify that the installed features, materials, components, or manufactured devices identified on this certificate (the installation) conforms to all applicable codes and regulations, and the installation is consistent with the plans and specifications approved by the enforcement agency.
- I reviewed a copy of the Certificate of Compliance (CF-1R) form approved by the enforcement agency that identifies the specific requirements for the installation. I certify that the requirements detailed on the CF-1R that apply to the installation have been met.
- I will ensure that a completed, signed copy of this Installation Certificate shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a signed copy of this Installation Certificate is required to be included with the documentation the builder provides to the building owner at occupancy.

Company Name: (Installing Subcontractor or General Contractor or Builder/Owner)		
Responsible Person's Name:		Responsible Person's Signature:
CSLB License:	Date Signed:	Position With Company (Title):