



Carlisle SynTec Incorporated

October 20, 2005

Jackalyne Pfannenstiel, Vice Chair
2008 Title 24
California Energy Commission
1516 9th Street, MS- 25
Sacramento, CA 95814-5504

Dear Ms. Pfannenstiel:

Please find accompanying this letter the Measure Information Template form for including “Cool Roof” for low-rise residential building with low-sloped roofs in the 2008 Title 24. The template and data in the template will support this recommendation. As the 2008 Title 24 review process moves forward, we will be ready to answer any questions and supply additional information that may be needed by the committee to achieve approval for the recommended inclusion in the standard.

Best regards,

A handwritten signature in cursive script, reading "Richard J. Gillenwater".

Richard J. Gillenwater

cc: Elaine Hebert Bill Pennington

ROOFING AMERICA: OVER 40 YEARS AND 10 BILLION SQUARE FEET

CARLISLE

Carlisle SynTec Incorporated

Measure Information Template – Cool Roofs on Low-Rise Residential with Low-Sloped Roofs

2008 California Building Energy Efficiency Standards

Richard J. Gillenwater
10/19/2005

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Overview

Description	Cool Roofs would be applied to low-sloped roofs on low-rise residential buildings when the building is conditioned.
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<p>Type of Change</p>	<p>Mandatory Measure</p> <p>There would be a minor change to the language in Section 118 to note the Cool Roof insertion in Sections 150 and 151 for residential. Wording in Section 118 would be as follow:</p> <p>Section 118 (i) Mandatory Requirements for Cool Roofs. In order to qualify for compliance credit as a cool roof or meet the requirements of section 143 (a) 1 or, 149 (b) 1 B, <u>150 (n), or 151 (g)</u>, a cool roof shall be certified and labeled according to the requirements of Section 10-113 and meet conditions 1 or 2 and, for liquid applied roofing products, 3 below:</p> <p>For Subchapter 7, Section 150, the item (n) would be added defining the Cool Roof requirements for new construction of residential building that are conditioned and have a low-slope roof per the definition ($\geq 2:12$). The wording would be as follows:</p> <p>(n). Mandatory Requirement for Cool Roofs. Cool Roofs for residential buildings that have condition space and a low-slope roof shall meet the requirements of Section 118 (i).</p> <p>Prescriptive Requirement The Cool Roof applications are to be added to Section 151, Performance and Prescriptive Compliance Approaches, under item (f), Prescriptive Standards/Alternative Component Packages. This will define then Cool Roofs apply. The inserting would be a new (f) 2 just after 1. Insulation (the items below this would be renumbered) and would be worded as follows:</p> <p>Section 151 (f) 2. Exterior roofs. Exterior roofs shall for low-rise residential buildings with low-slope roofs, meet the requirements of either 118 (i) 1 or 118 (i) 2 and for liquid applied roof coatings, Section 118 (i) 3;</p> <p>Exception to Section 151 (f) 2: Any roofing product with a minimum initial thermal emittance $\epsilon_{\text{initial}}$ less than 0.75 when tested in accordance with CRRC-1, including but not limited to roof products with metallic surfaces, if that roofing product has a minimum initial solar reflectance of $0.70 + 0.34 * (0.75 - \epsilon_{\text{initial}})$ when tested in accordance with CRRC-1.</p> <p>There would also be an Exception added to Section 151 (f) old 2, Radiant Barrier that would state:</p> <p>Exception to Section 151 (f) 2: Radiant Barrier in not required when a Cool Roof is installed.</p>
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Type of Change	To complete the integration of Cool Roofing, there a minor wording addition to Subchapter 9 in Section 152 (a) 2 B at the end of the first sentence. The addition would state: <u>... plus an addition that complies with the applicable energy budget. The Cool Roof reflective value of 0.70 shall be used in the energy budget calculations. When an improvement is proposed the existing...</u>
Energy Benefits	Applies the known energy savings of Cool Roofs to low-rise residential. This type construction accounts for about 15 percent of the California housing market per the National Home Builders Association. Allows this segment of the residential roofing market to have the opportunity for the same performance level as commercial roofing.
Non-Energy Benefits	Heat Island affects. Aesthetics
Environmental Impact	Heat Island affects. Does not require a kettle to heat asphalt nor the VOC's released from the mopping of asphalt to adhere two layers of roofing.
Technology Measures	Measure Availability and Cost Cool Roof products from membranes to metal to coatings have know availability and can meet the demand of this market segment. Useful Life, Persistence and Maintenance The same products that are used in commercial roofing will be used in this residential application offering warranties up to 20 years.
Performance Verification	The Performance Verification would be as presently outlined in the 2005 Title 24 which requires the roof membrane to be tested for reflectivity and emissivity per CRRC-1 test method, listed in the CRRC Product Directory, and have a reflectivity and emissivity that meets or exceeds the requirements spelled out in Title 24.
Cost Effectiveness	For residential buildings, the cost effectiveness of expanding Cool Roof applications is based not only on the work originally done to justify the use of Cool Roofs in the 2001 Title 24 standard, there is the additional work at the Florida Solar Energy Center and in Philadelphia that have shown the benefits of these applications. The Philadelphia study showed temperatures just below the ceiling to drop 4.7 degrees F, which equated to an 80% reduction in heat gain. During hot weather, this study found the Cool Roof to reduce air conditioning loads by 30,000 BTU per day. A number of residential structures in California have been done with these Cool Roofs with good success.
Analysis Tools	Products must be testing and certified to CRRC-1 method and be labeled according to Section 10-113.
Relationship to Other Measures	N/A

Methodology

- Following the present Cool Roof procedures and requirements
- The work done at the Florida Solar Energy Center.

- The two major studies conducted in Philadelphia that has been reported on by the Energy Coordinating Agency.

Analysis and Results

- Temperatures just below the ceiling dropped 4.7 degrees F
- Heat gain reduction equated to 80%.
- During hot weather, air condition loads were reduced by 30,000 BTU per day.
- Data showed a one-degree reduction in ambient temperature in the neighborhood with the Cool Roof versus neighborhood with standard roofing.

Recommendations

Add Cool Roof technology to low-rise residential buildings with low-slope roofs to take advantage of this technology following the lead of the low-slope non-residential market. The recommended wording changes are listed above in the Type of Change section of the form.

Material for Compliance Manuals – N/A

Bibliography and Other Research

- Robinson, Liz, Kirm, Bill, 2005. Cool Roof Coatings to Reduce Energy Demand and Temperature in an Urban Environment. Presented at the RCI Foundation conference on “Cool Roofing – Cutting through the Glare”. Energy Coordinating Agency
- Robinson, Liz, 2003. Cool-Homes: Affordable Cooling for Low Income Households. Presented at the Environmental Business Association of New York State’s “New Roofs for a New Century” conference. Energy Coordinating Agency
- Parker, D.S., 2005. Cooling Related Thermal Performance of Standard & Innovative Metal Roofing Products (Case Study). Presented at the RCI Foundation conference on “Cool Roofing – Cutting through the Glare”. Florida Solar Energy Center

Appendices - NONE