



# **CRRC as a Countermeasure Tool to UHI**

**Presentation to the 2<sup>nd</sup>  
International Conference  
on Countermeasures to  
Urban Heat Islands**

Berkeley, CA

September 22, 2009



## What is the CRRC?

Non-profit organization that:

- Maintains a fair, accurate, and credible roof rating system
- Is an educational resource for cool roofs
- Supports cool roof-related research

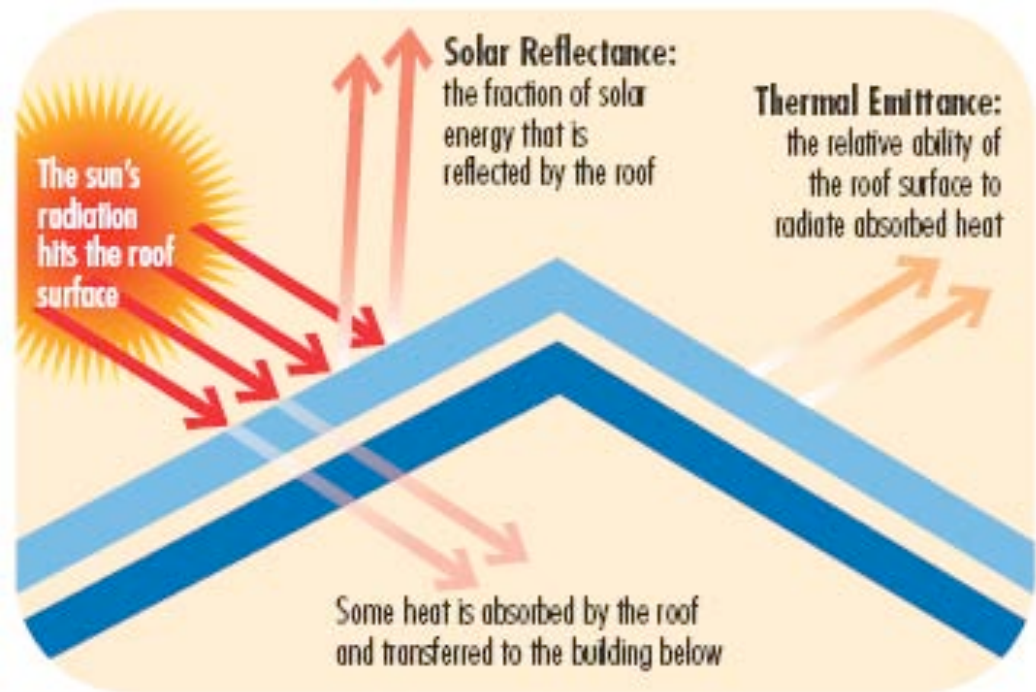


# What is a Cool Roof?

CRRC only looks at surface properties:

- Solar Reflectance
- Thermal Emittance

CRRC does not set minimum requirements





# Energy Savings Benefits

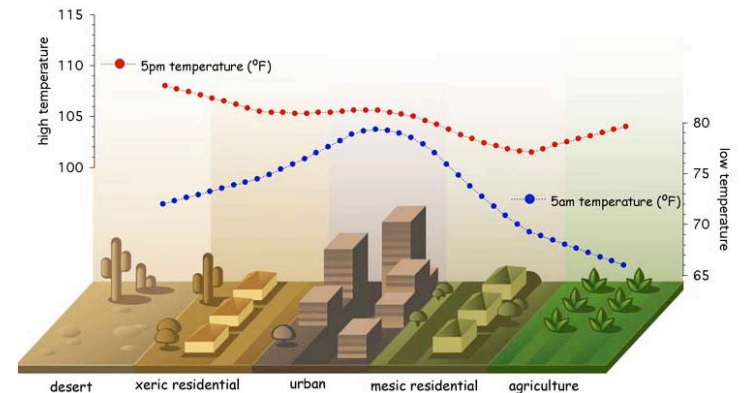
- Lower roof-top and building temperatures
  - Less heat transfer
  - Increased occupant comfort
  - Reduced AC load
- Lower building occupants' electricity bills
- Reduce peak electricity demand (avoid black-outs)

**LBNL estimates Worldwide energy savings of \$27 billion (2008)**



# Environmental Benefits

- Reduced energy consumption means less air pollution from power plants
- Global warming mitigation
- Reduce Urban Heat Island Effect
  - Lower ambient air temperature
  - Improves local air quality
  - Reduction in heat and smog-related health issues





# Evolution of the CRRC

- Early 1980s CR rebate programs fared poorly
  - Lacked definitions & objective performance criteria
  - Inferior & inappropriate products used
- 3<sup>rd</sup> party rating system = CRRC formed in 1998
  - Determination of Scope, Formation of Board & AITLs
- First products rated in 2003
- First T24 requirements effective October 2005



## **CRRC Founding Partners**

- **California Energy Commission**
- **Environmental Protection Agency**
- **Pacific Gas & Energy**
- **Lawrence Berkeley National Laboratory**
- **Oak Ridge National Laboratory**
- **National Resources Defense Council**
- **Key Industry Players**



# A Balanced Structure

**Board Members: 6 Industry (Class A) and 5 Other (Class B)**

- Balanced between industry and other interests (code bodies, utilities)
- Guidance taken from the National Fenestration Rating Council
- All decisions made by the Board of Directors, with input from various committees



# CRRC Scope

- Radiative surface properties only
  - No insulation
  - No ventilation
  - No thermal mass
- No minimum values
  - Gather and publish credible data
  - Code bodies must set their own minimums





# CRRC's Rating Program

- Measures *reflectance* and *emittance* values
- Initial and three year values
- Actual weather exposure in 3 sites:
  - Hot/Humid
  - Cold/ Temperate
  - Hot/Dry
- Directory and Product Label



# The CRRC Label

		<u>Initial</u>	<u>Weathered</u>
	<b>Solar Reflectance</b>	<b>0.00</b>	<b>Pending</b>
	<b>Thermal Emittance</b>	<b>0.00</b>	<b>Pending</b>
	Rated Product ID	— — — —	
	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>			



# Rated Products Directory

The screenshot shows the CRRC website interface. On the left is a vertical navigation menu with links: About the CRRC, Product Rating Program, Rated Products Directory (highlighted), CRRC Members, CRRC News, Become a Member, How Do I, Contact Us, Cool Roof Links, and Home. The main content area features the CRRC logo at the top left, followed by the title 'Rated Products Directory' with a link to 'show all products' and a timestamp '(last updated 20 Apr 2007 16:04 EDT)'. Below this is a search section with a 'Keywords:' text input field and an information icon. The 'Product Type:' section has a radio button for 'All' (selected) and a 'Selected:' section with checkboxes for: Built-up Roofing (incl asphalt and coal tar pitch), Factory-Applied Coating, Field-Applied Coating, Metal, Modified Bitumen, Shingles or Shakes, Single-Ply-Thermoplastic (includes TPO, PVC, etc), Single-Ply-Thermoset (includes EPDM, Hypalon), Tile or Slate, and Other. At the bottom, the 'Product Sold To:' section has radio buttons for 'All Markets' (selected), 'End-User', and 'Roofing Manufacturer'. On the right side of the page, there is a 'Directory of Rated Products' section with links for 'About California Title 24' and 'About USGBC's LEED', and a small image of a building.

<http://www.coolroofs.org/products/search.php>



# Rated Products Directory

Model:  (1302)

Color:

- All
- Selected:
  - Black
  - Multicolor
  - Blue
  - Bright White
  - Off-White
  - Grey
  - Tan
  - Brown
  - Green
  - Metallic
  - Orange
  - Yellow
  - Purple
  - Red

**Initial Radiative Properties**  
(between 0 and 1.0) ⓘ

Initial Minimum Solar Reflectance:

Initial Minimum Thermal Emittance:

**Aged Radiative Properties**  
(between 0 and 1.0) ⓘ

Aged Minimum Solar Reflectance:

Aged Minimum Thermal Emittance:

Slope:  All Products  Low ( $\leq 2:12$ )  Steep ( $> 2:12$ )

CRRC Product ID:

Please note: This is a directory of all rated products. Inclusion in this directory **does not** imply that the product meets any program or code requirements. You must check your local building code requirements to ensure compliance.

<http://www.coolroofs.org/products/search.php>



# Rated Products Directory: Results



[Directory of Rated Products](#)



Rated Products Directory: Search Results [[new search](#)] [[print friendly view](#)]

(last updated 14 Sep 2009 10:12 PDT)

Showing Search Results for ALL PRODUCTS.

select \* from products order by company\_name asc

[previous](#) | [1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [8](#) [9](#) [10](#) [11](#) [12](#) [13](#) **14** [15](#) [16](#) [17](#) [18](#) [19](#) [20](#) [21](#) [22](#) [23](#) [24](#) [25](#) [26](#) [27](#) [28](#) [29](#) [30](#) [31](#) [32](#) [33](#) [34](#) [35](#) [36](#) [37](#) [38](#) [39](#) [40](#) [41](#) [42](#) [43](#) [44](#) [45](#) [46](#) [47](#) [48](#) [49](#) [50](#) [51](#) [52](#) [53](#) [54](#) [55](#) [56](#) [57](#) [58](#) [59](#) [60](#) | [next](#)

(showing records 326 - 350 of 1491)

25 Records per Page

CRRC Prod. ID	Manufacturer Information (sorted +)	Brand	Model	Color	Product Type	Solar Reflect.		Therm Emit.		Slope Application
						init	3 yr	init	3 yr	
0972-0003	Clay Tile Venture, Inc. Robert Towery (760-602-9567)	<a href="#">Redland Clay Tile</a>	Pinto Gold Flash	Red, Orange, Yellow, Black, Multicolor	Tile or Slate	0.40	pending	0.89	pending	Steep
0972-0002	Clay Tile Venture, Inc. Robert Towery (760-602-9567)	<a href="#">Redland Clay Tile</a>	Old Sedona	Red, Orange, Black, Multicolor	Tile or Slate	0.39	pending	0.88	pending	Steep
0972-0001	Clay Tile Venture, Inc. Robert Towery (760-602-9567)	<a href="#">Redland Clay Tile</a>	Café Antigua	Brown	Tile or Slate	0.36	pending	0.88	pending	Steep
0972-0008	Clay Tile Venture, Inc. Robert Towery (760-602-9567)	<a href="#">Redland Clay Tile</a>	Terra Antigua	Red	Tile or Slate	0.40	pending	0.90	pending	Steep
0642-0001	Coating & Foam Solutions, LLC Tom Meyer (262-567-9400)	<a href="#">ACRY-TEK 4000</a>	White	Bright White	Field-Applied Coating	0.81	0.70	0.87	0.90	Low
0642-0005	Coating & Foam Solutions, LLC	<a href="#">ACRY-TEK 4200</a>	White	Bright White	Field-Applied Coating	0.80	0.69	0.85	0.92	Low



# Who Needs a Rating System?

- Roofing specifiers, architects, and building owners
- Code bodies and building officials
  - CEC: Title 24, ASHRAE
- Voluntary programs
  - LEED, Energy Star, Utility Rebate Programs

**Anyone who wants to encourage adoption of Cool Roof technology**



## Credibility & Independence

- All testing performed by independent labs
  - ISO Certified
  - Lab Training
  - Annual Round Robins = QA
  - Strict chain of custody
- Random Testing
- ANSI Accredited







# Codes and Programs Today

- Energy Star
- ASHRAE 90.1
- States: CA & FL
- Cities: Chicago, Dallas
- LEED
- Green Globes
- Utility Rebate Programs

All looking to the CRRC for credible roof ratings



# Cool Roof Standards

- Code bodies and voluntary programs each have their own definitions
- Different definitions for low and steep slope (2:12)
- Some use reflectance and emittance, some only consider reflectance, some use the Solar Reflectance Index (SRI)
- Cool doesn't always mean white!



# CRRC Approved Test Methods

## Solar Reflectance

- Reflectometer (ASTM C1549)
- CRRC-1 Test Method 1
- Spectrometer (ASTM E903)
- Pyranometer (ASTM E1918 and E1918A)





# CRRC Approved Test Methods

## Thermal Emittance

- Emittance meter (ASTM 1371)





## On the Horizon

- New 5 Year Strategic Plan in Development
- Possible International Collaborative Opportunities
- Energy Sec. Chu and Copenhagen
- Continually tackling technical topics, new test methods & procedures



## Contact Us

[www.coolroofs.org](http://www.coolroofs.org)

### The “Cool Line”

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