



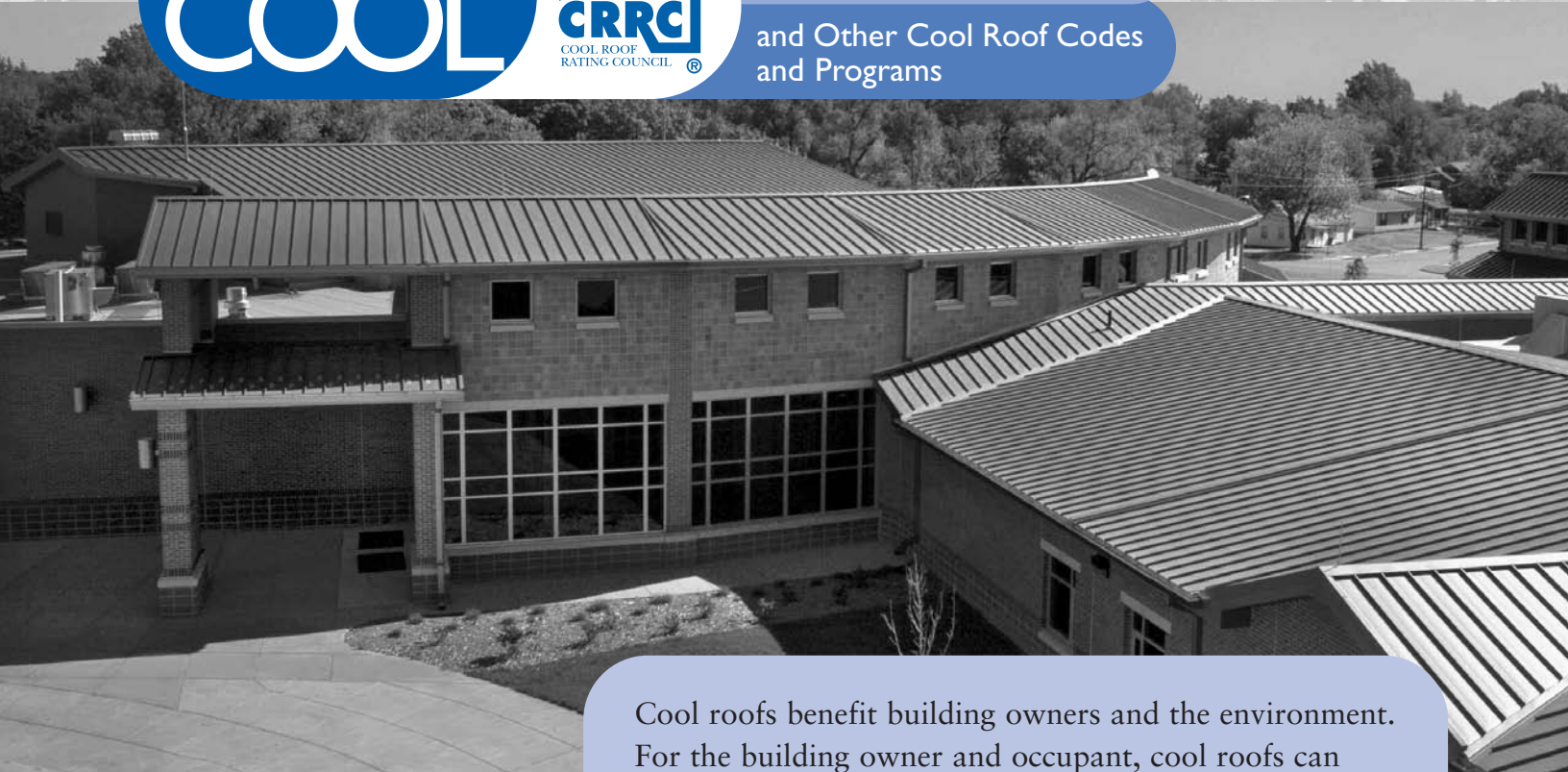
Know What's
COOL



Cool Roof Rating Council

and Other Cool Roof Codes
and Programs

- **Cool Roof Rating Council**
- **ENERGY STAR**
- **Title 24**
- **City of Chicago**
- **International Energy Conservation Code**
- **ASHRAE**
- **USGBC LEED**
- **Green Globes**
- **Utility Rebate Programs**



Cool roofs benefit building owners and the environment. For the building owner and occupant, cool roofs can reduce energy costs and increase roof longevity and occupant comfort. By reducing energy use, cool roofs lower carbon dioxide emissions; carbon dioxide emissions contribute to global warming. Additionally, by reflecting and emitting heat back to the atmosphere, cool roofs help mitigate the Urban Heat Island Effect and reduce smog formation.

Recognition of these benefits has led to the adoption of cool roof measures in energy codes and the inclusion of cool roofing as part of green building initiatives. Green building initiatives tend to address sustainability as a whole, while energy codes and rating programs focus more directly on energy performance. Energy performance is a vital component of sustainability, and cool roofs offer significant energy savings potential. To save energy and reduce peak demand, several electric utilities offer rebates for cool roofing materials.

For more information and updates on any of the following codes or programs, please contact each organization directly.

ROOF RATING PROGRAMS

Roof rating programs provide a source of radiative performance data for roofing products, as well as a means of exploring and comparing different roofing options. There are currently two nationally recognized roof rating programs in the United States: the Cool Roof Rating Council's Product Rating Program and the Environmental Protection Agency's ENERGY STAR® Reflective Roof program.

The Cool Roof Rating Council www.coolroofs.org

The Cool Roof Rating Council maintains a credible and unbiased third-party rating program for measuring and reporting the radiative properties of roof surfaces. The CRRC publishes the measured solar reflectance and thermal emittance values in their online Rated Products Directory and on CRRC Product Labels for use by roof specifiers, code officials, architects, contractors, engineers, and building owners. Radiative property values are measured by CRRC Accredited Independent Testing Laboratories, not by manufacturers¹.

The CRRC does not define what is “cool” or set minimum requirements. Any roofing product may be listed on the CRRC Directory with its respective measured values when rated in compliance with the CRRC Product Rating Program Manual (CRRC-1). Using the online Rated Products Directory, interested parties can search through a comprehensive list of ratings and narrow their results to products that meet their project criteria.

ENERGY STAR® www.energystar.gov

The Environmental Protection Agency's (EPA) ENERGY STAR Reflective Roof program is complementary to the CRRC Product Rating Program. Manufacturers can choose to rate their products with ENERGY STAR as long as they meet ENERGY STAR's minimum specifications. The ENERGY STAR program accepts either ratings provided from the manufacturer's own testing or ratings from the CRRC Product Rating Program.



ENERGY CODES

Two primary organizations, the International Code Council (ICC) and the American Society of Heating Refrigerating and Air-Conditioning Engineers (ASHRAE) have developed National Model Energy Codes. These documents are not mandatory or enforceable until a jurisdiction adopts the documents as part of regulation or law. In the U.S., many states and jurisdictions have adopted these organizations' codes, while others like California and the City of Chicago have developed their own.

California's Title 24 www.energy.ca.gov/title24/

The California Energy Commission's Building Energy Efficiency Standard, Title 24, includes a cool roof prescription for low-slope (less than 2:12) nonresidential roofs for new construction and major re-roofing. Section 10-113 requires that cool roofs be tested and labeled by the Cool Roof Rating Council. Title 24 defines a cool roof as “Any roofing product with an initial thermal emittance greater than or equal to 0.75 when tested in accordance with CRRC-1 [and] a minimum initial solar reflectance of 0.70 when tested in accordance with CRRC-1.” However, Title 24 makes limited exceptions for clay and concrete tiles and products with low thermal emittance and comparatively high solar reflectance.

¹ This excludes Custom Colors for factory-applied metal coatings, which may be measured by CRRC Accredited Manufacturing Testing Laboratories.

Cool roofs are not a mandatory measure for Title 24. Nonresidential buildings with low-sloped roofs can comply by choosing one of the following compliance options: the Performance Approach, the Envelope Component Approach or the Overall Envelope Approach (the latter two are under the larger umbrella, Prescriptive Approach). Depending on which option is chosen, a cool roof may or may not be necessary for compliance.

City of Chicago <http://egov.cityofchicago.org>

The Chicago Energy Conservation Code includes a requirement for cool roofs as a way to mitigate the Urban Heat Island Effect. Chicago requires cool roofs in low-slope roofing applications. Roofs installed before December 31, 2008 must meet a minimum solar reflectance of 0.25 for both initial and aged values. After December 31, 2008, roofing products must meet ENERGY STAR criteria.

International Energy Conservation Code (IECC®) www.iccsafe.org

The International Energy Conservation Code is a national model energy code produced by the International Code Council® (ICC). The code contains minimum energy efficiency provisions for residential and commercial buildings, offering both prescriptive- and performance-based approaches. The 2003 and 2006 versions of the IECC® reference ASHRAE 90.1.

ASHRAE Standards 90.1 and 90.2 www.ashrae.org

The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) maintains energy standards to define acceptable performance levels.

ASHRAE Standard 90.1 (2004 edition)

Energy Standard for Buildings Except Low-Rise Residential Buildings, section 5.3.1.1, allows reduced roof insulation (U-factor) if a cool roof is used. ASHRAE 90.1 defines a cool roof as having a minimum solar reflectance of 0.70 and minimum thermal emittance of 0.75. This allowance is permitted in climate zones one, two and three only. See DOE climate zone map at: http://www.energycodes.gov/implement/pdfs/color_map_climate_zones_Mar03.pdf.

ASHRAE Standard 90.2 (2004 edition)

Energy Efficient Design of Low-Rise Residential Buildings, section 5.5, also allows for reduced roof insulation with a cool roof, but sets the minimum solar reflectance at 0.65 or allows an SRI value of 75. SRI is a calculation measured from 0 to 100, using solar reflectance and thermal emittance, defined by ASTM E1980. Section 5.5 also states that values for solar reflectance and thermal emittance shall be determined by a laboratory accredited by a nationally recognized organization, citing the Cool Roof Rating Council as an example. This allowance is permitted in climate zones one, two and three only.

ASHRAE also produces **Advanced Energy Design Guides**, which include the Advanced Energy Design Guide for Small Office Buildings and Advanced Energy Design Guide for Small Retail. These guides provide energy-efficiency measures that can be directly applied depending on the project and will reduce energy use compared to ASHRAE Standard 90.1-1999. In climate zones 1, 2, and 3, which cover the southern states of the U.S., the design guide includes a suggestion for cool roofs and references the CRRC Product Rating Program.

Additional Energy Code Resources

These websites provide users with an initial perspective on what codes that state or jurisdiction has adopted. It should be noted that compliance is the responsibility of the building owner and that the local jurisdiction should be contacted to confirm the code(s) that are adopted and in effect.

Building Codes Assistance Project (BCAP) www.bcap-energy.org/map_page.php

The Building Codes Assistance Project provides visual overviews of state energy code adoptions for both residential and commercial codes in the form of interactive maps of the U.S.

Department of Energy (DOE) www.energycodes.gov/implement/state_codes/index.stm

The Department of Energy maintains a building energy code program that includes an interactive map of the United States that allows users to check the status of energy codes in any state by simply clicking on the state(s) in which they are interested.



GREEN BUILDING PROGRAMS

Green building is a growing trend in American architecture. To provide guidance on what makes a building “green,” several organizations have developed voluntary guidelines and certification programs. Some jurisdictions have adopted these green building programs as mandatory requirements. For example, New York City requires that many of the city’s new municipal buildings meet LEED requirements. Several other jurisdictions, including Seattle and Atlanta, have adopted similar measures.

USGBC’s LEED® www.usgbc.org

Leadership in Energy and Environmental Design (LEED) is the US Green Building Council’s Green Building Rating System, a voluntary certification program for sustainable buildings. LEED has several different systems, including one for New Construction and Existing Buildings.

LEED for New Construction and Major Renovations (LEED-NC) Version 2.2 gives credit for a cool roof under Sustainable Site Credit 7.2: Heat Island Effect: Roof. LEED-NC credits roofs with a Solar Reflectance Index (SRI) value greater than or equal to 78 for low-slope roofs, and 29 for steep-slope roofs. LEED-NC references the CRRC as a source of product ratings, though it does not require the product to be CRRC-rated. It permits other sources as well, such as the US-EPA ENERGY STAR Reflective Roof program.

LEED for Existing Buildings (LEED-EB) Version 2 gives credit for a cool roof under Sustainable Site Credit 6.2: Heat Island Reduction: Roof. LEED-EB gives credit for a roof that is an ENERGY STAR-compliant roofing material that has a minimum thermal emittance of 0.90.

Green Globes www.thegbi.com/greenglobes

Initially developed in Canada, The Green Building Initiative brought the Green Globes system to the US. Green Globes V. 1 Rating System is a questionnaire-based green building rating system, which allots up to 115 points for different measures in several categories. Under the “Site” category, up to 10 points can be earned for using high albedo, or “cool” roof surfacing. To earn this credit, Green Globes requires a Solar Reflectance Index (SRI) value greater than or equal to 78 for low-slope roofs, and 29 for steep-slope roofs. The number of points is assigned based on the percent of the roof covered with cool roof material.



REBATE PROGRAMS AND TAX CREDITS

The federal government offers a tax deduction for energy efficiency measures, including cool roofing, which demonstrate a certain percentage of improvement over ASHRAE 90.1. This deduction is currently available through the end of 2007 and may be extended in the future.

Several electric utility companies offer rebates for the installation of cool roofing materials in new construction and/or roof retrofits. Please check with your local utility company to see if they offer a cool roof rebate.

A few examples of current existing utility cool roof rebates include:

- Pacific Gas and Electric Company (PG&E), www.pge.com
- Southern California Edison (SCE), www.sce.com
- Idaho Power, www.idahopower.com
- City of Austin, www.austinenergy.com



CONTACT US

Visit the CRRC at www.coolroofs.org
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