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, including New York City, Atlanta, and Seattle.

USGBC’s LEED® (2009) www.usgbc.org
Leadership in Energy and Environmental Design (LEED) is the U.S. Green Building Council’s Green Building Rating System, a voluntary certification program for sustainable buildings. LEED Version 3 gives credit for a cool roof under Sustainable Sites Credit 7.2: Heat Island Effect: Roof. LEED-New Construction credits roofs with a SRI value greater than or equal to 78 for steep-slope roofs, and 29 for low-slope roofs, covering at least 75% of the roof area. A lower SRI is allowed if more than 75% of the roof is covered, using a weighted formula. A cool roof surface may also be installed in concert with a vegetated roof; see the rating documents for details. These LEED cool roof credits apply to LEED for New Construction and Major Renovations, LEED for Existing Buildings, LEED for Schools, and LEED for Core and Shell. LEED references the CRRC and ENERGY STAR as a source of rated products.

Green Globes® www.thegbi.com/greenglobes
Green Globes Rating System is a questionnaire-based online green building rating system, which allows points for different measures in several categories. It compares the building design against data generated by the EPA’s Target Finder, which reflects real building performance. Buildings earn a rating between 1 and 4 globes. Green Globes 2004 includes a cool roof credit for roofs that have a minimum solar reflectance of 0.65 and a minimum thermal emittance of 0.90. One to 10 points are awarded based on the percent of the roof covered with cool roof material. A project can earn a total of 350 points in the Energy category, under a total of 1000 points for the whole rating program.

Built It Green’s GreenPoint Rated (2010) www.builditgreen.org
GreenPoint Rated is a program of Built It Green, whose mission is to promote healthy, energy- and resource-efficient homes in California. A GreenPoint Rated home is evaluated by independent, certified raters in 5 categories and bears the GreenPoint Rated label if it scores more than 50 out of 300 total points. The GreenPoint Rated program has a mandatory requirement that homes exceed Title 24 requirements by at least 15% in energy savings. A cool roof is based on Title 24 requirements. GreenPoint Rated has modules for New Homes, Multifamily units and Existing Homes.

The Collaborative for High Performance Schools (CHPS) is a school building rating program with the mission to facilitate the design, construction, and operation of energy efficient schools. The CHPS Best Practices Manual requires that roof materials that meet a minimum SRI (82 for steep-slope roofs, 29 for low-slope roofs) must cover at least 75% of the roof area.

REBATE PROGRAMS AND TAX CREDITS
The federal government offers a tax deduction for certain residential energy efficiency measures, including cool roofing. This deduction is currently available through the end of 2010 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. The Database of State Incentives for Renewables and Efficiency (www.dsireusa.org) is a resource for state, local, utility and federal incentives.

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
- Sacramento Municipal Utility District, www.smuud.org
- Burbank Water and Power, www.burbankwaterandpower.com
- Idaho Power, www.idahopower.com
- City of Austin, www.ausenergy.com
- Bryan Texas Utilities, www.btuutilities.com
- CPS Energy (San Antonio), www.cpsenergy.com
- Florida Light and Power, www.fpl.com
- Progress Energy (North and South Carolina), http://progress-energy.com
- Gainesville Regional Utilities, www.gru.com
- Salt River Project (Arizona), www.srpnet.com

Cool roofs can help conserve energy, money, and the environment. For the building owner and occupant, cool roofs can reduce energy costs, increase roof longevity, and improve occupant comfort. By reducing energy use, cool roofs lower carbon dioxide emissions, which contribute to global warming. Additionally, by reflecting solar radiation and re-emitting absorbed solar radiation back to the sky, 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.

CONTACT US
Visit the CRRC at www.coolroofs.org
or contact us directly:
Tel: 1-866-465-2523 (toll-free in the U.S.)
Email: info@coolroofs.org
ROOF RATING PROGRAMS

Roof rating programs provide a source of radiative energy 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 U.S. Environmental Protection Agency’s ENERGY STAR® Reflective Roof Program.


The Cool Roof Rating Council (CRRC) 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, thermal emittance, and Solar Reflective Index (SRI) values in their online Rated Products Directory and 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 manufacturers.

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 U.S. Environmental Protection Agency’s (EPA) ENERGY STAR® Reflective Roof Program is complementary to the CRRC Product Rating Program. Manufacturers can list their products with ENERGY STAR as long as they meet ENERGY STAR’s minimum specifications. The CRRC Product Rating Program accepts either ratings provided from the CRRC Product Rating Program or manufacturers list their products with ENERGY STAR through the CRRC Product Rating Program Manual CRRC-1.

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.


The International Energy Conservation Code is a national model energy code produced by the ICC. The code contains minimum energy efficiency provisions for residential and commercial buildings, offering both prescriptive- and performance-based approaches. The 2003, 2006, and 2009 versions of the IECC reference ASHRAE 90.1, including its cool roof provisions.

ASHRAE Standards www.ashrae.org

ASHRAE Standard 90.1 (2007)

ASHRAE Standard 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings, section 5.6, defines a cool roof as having a minimum solar reflectance of 0.70, a minimum thermal emittance of 0.75, a minimum SRI of 82. It also states that values for solar reflectance and thermal emittance shall be determined by a laboratory accredited by a nationally recognized accreditation organization, citing the CRRC as an example. ASHRAE’s goal for the 2010 standard is 30% energy savings over the 2004 version, as part of a target to achieve net-zero energy buildings by 2050. Proposed addendum I of the standard contains new mandatory prescriptive requirements for cool roofs, including minimum three-year aged reflectance and emittance values.

ASHRAE Standard 90.2 (2007)

ASHRAE Standard 90.2, Energy Efficient Design of Low-Rise Residential Buildings, section 5.6, defines a cool roof as having a minimum solar reflectance of 0.65 and a minimum thermal emittance of 0.75, or a minimum SRI of 75 in climates where the CRRC is recognized as an SRI provider. For roofs installed after the 2009 deadline, the CRRC Product Rating Program is installed the standard allows the residential building to have a lower insulation R-value and also accept CRRC reflectance and emittance ratings.


ASHRAE Standard 189.1, Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings is meant to provide a uniform, comprehensive code for green buildings. Section 5.2-2.3, the roofs portion of the Mitigation of Heat Island Effect section, refers specifically to cool roofing standards. The proposed code requires that 75% of the uncovered roof surface have a minimum initial SRI of 78 for low-slope roofs, initial SRI of 29 steep-slope roofs, or comply with the eligibility criteria for ENERGY STAR roof products. The requirements for cool roofs apply only to climates zones 1 through 3. It contains an exception for roofs over parking or unheated spaces. It also contains an exemption for buildings that use a non-cool roof to be used if it can be shown, through simulation, that the non-cool roof has at least 2% less annual energy use and CO₂ production than a qualified roof would.

Finally, ASHRAE also produces Advanced Energy Design Guides (AEDG) for nonresidential buildings. These guides provide prescriptive energy efficiency measures aimed to reduce energy use compared to ASHRAE Standard 90.1-1999. The 2009 version requires a target of 30%. In climate zones 1, 2, and 3, which cover the southern United states, the 2009 version includes a suggestion for cool roofs and references the CRRC. AEDGs with 50 percent energy savings are being planned by ASHRAE for 2009-2011.

State & City Codes

Listed below is a cross-section of state and city cool roofing codes. Please note it is not a comprehensive list.

California’s Title 24 (2008) www.energy.ca.gov/title24

The California Energy Commission’s Title 24 Energy Efficiency Requirements for Residential and Nonresidential Buildings establishes prescriptive requirements for cool roof materials in new construction or major re-roofing projects. Title 24 defines minimum prescriptive values for 3-year aged reflectance, thermal emittance, and Solar Reflectance Index (SRI).

Title 24 requirements apply to all new construction, and to retrofit buildings that replace or exceed the 2004 efficiency of roof space for nonresidential buildings and 1000 ft² of roof space for residential buildings, or 10% or more of the roof surface (whichever is larger). These requirements apply to nonresidential, high-rise residential, and residential building and are limited to specific climate zones. Generally, requirements are followed by applications for CRRC-certified products for aged reflectance / emittance / SRI as follows:

- For low-sloped (2:12) roofs, 0.55 / 0.75 / 0.64
- For steep-sloped roofs with roof weight < 5 lbs/ft², 0.20 / 0.75 / 0.16
- For steep-sloped roofs with roof weight ≥ 5 lbs/ft², 0.15 / 0.75 / 0.10

Section 10-113 of Title 24 requires that cool roof products be tested and labeled by the CRRC. If CRRC testing for 3-year aged reflectance is not available for any roofing products, the 3-year aged value shall be determined by the CRRC, or, from the CRRC Solar Reflectance Index using the equation $R_{3yr} = 0.50 	imes (0.75 + 0.2 \times R_{1yr} - 0.2)$, where $R_{1yr}$ is the initial solar reflectance. Section 118 states that the cool roof requirements for aged reflectance and emittance values for uncertified and unlabeled products. The default aged reflectance / emittance values are as follows: for asphalt shingles, 0.08 / 0.75; for all other roofing products, 0.10 / 0.75. Title 24 makes many exemptions to these roofing requirements, such as for roofs with building-integrated photovoltaic panels, or roofs with a mass greater than 2.5 lbs/ft² over the roof membrane. Please see the CEC document for details on these and other exemptions.


The Chicago Energy Conservation Code includes a requirement for cool roofs as a way to mitigate the Urban Heat Island Effect. The Chicago code will assume default ratings for aged reflectance and emittance values for uncertified and unlabeled products. The code will assume default ratings for aged reflectance and emittance values for uncertain and unlabeled products. The default aged reflectance / emittance values are as follows: for asphalt shingles, 0.08 / 0.75; for all other roofing products, 0.10 / 0.75. Title 24 makes many exemptions to these roofing requirements, such as for roofs with building-integrated photovoltaic panels, or roofs with a mass greater than 2.5 lbs/ft² over the roof membrane. Please see the CEC document for details on these and other exemptions.