

Assessment of Public Policies Affecting Cool Metal Roofs

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Prepared for:

Cool Metal Roofing Coalition

Prepared by:



142 Minna Street
San Francisco, California 94105
(415) 957 1977 Voice
(415) 957 1381 Fax
www.eley.com

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Overview

This report identifies and evaluates current codes, standards, regulations and other programs administered by state, local, and federal governments that affect cool roofs. Each policy¹ is reviewed to understand how cool roof language was added; to identify who was involved in initiating and implementing the cool roof language; and to determine how aspects of these cool roof policies may evolve in the future. Twelve cool roof policies were identified as currently active or in the development stage within the U.S. and Canada.

Some of the policies evaluated in this report are model codes: codes developed and placed in the public domain for cities and states to adopt. Other policies have implemented these model codes and included certain amendments specific to a region. Because such policies have adopted language from other policies, and because many of the same energy consultants developed these policies, there are a number of similarities in how cool roofs are addressed in these codes.

Cool roofs, sometimes called high albedo roofs, are roofing materials with high solar reflectance and high emittance that reduce heat gain. The lower temperature of a cool roof reduces cooling loads and the energy required to provide air conditioning. Reflectance is an essential aspect of a cool roof because dark surfaces absorb sunlight and become hot, while light-colored surfaces reflect sunlight and stay cooler. Reflectance percentage (or the absorptance percentage, which is 100% minus the reflectance percentage) is used to define a cool roof in all the reviewed policies. The reviewed policies below define a cool roof as having a reflectivity of at least 60%-80%.

Some of the policies also require a high emissivity value in the range of 70%-90%. Emissivity relates to the ability of heat to escape from a hot surface. Low emittance surfaces (usually shiny metallic surfaces) trap heat in the building structure, while high emittance surfaces allow heat to escape through radiation. The emissivity requirement essentially prevents the eligibility of high reflecting unpainted metal roofs. Although some of the policies reviewed do not have emissivity requirements, most of the recently revised policies do, and consensus seems to be developing in the energy efficiency community that high emissivity is a necessary aspect of a cool roof.

Concern for prolonged performance is also addressed in some of the cool roof policies. About half of the policies required a certain reflectivity percentage of the product after three years of use. There is currently no standard method for measuring or verifying weathered reflectivity, and the policy enforcers simply accept a manufacturer's claim. Both the Environmental Protection Agency (EPA) and the Cool Roof Rating Council (CRRC) are working on methods to standardize a testing protocol for verifying weathered reflectivity.

While not all the policies require a specific testing protocol to verify cool roof properties (some simply accept manufacturer's claims), those that do require testing all require the same protocols from the American Society for Testing and Materials (ASTM). ASTM E903 must be followed if reflectance testing is performed in a lab. ASTM E1918 is required if reflectance testing is performed on site. Thermal emittance must be verified using ASTM E408.

There are several ways to achieve the high reflectance and high emittance required to qualify as a cool roof. One method is to use a single-ply roofing membrane with the surface properties as an integral part of the material. Another way to achieve a cool roof is to apply a coating to the surface of a conventional roof membrane, such as modified bitumen or a mineral top sheet. Metal roofing that has been painted with a light color often has both a high reflectance and high emittance. Unpainted metal roofing generally does not have a high emittance. There are a number of qualifying liquid products, including elastomeric coatings and white acrylic coatings. See the Appendices for a listing of reflectance and emittance properties of some cool roof products.

Cool roofs are more commonly used on low-sloped roofs (pitch < 2:12) for aesthetic reasons, and because many of the cool roof systems can only be used on low-sloped roofs. For this reason, many of the policies

¹ In the context of this report, the term *policies* refers to codes, standards, regulations, and programs administered by state, local, and federal governments as well as model code organizations such as ASHRAE, IECC, and others.

reviewed do not address mid-sloped roofs (pitch > 2:12), and those that do have more lax cool roof requirements for mid-sloped roofs. Metal roofs are one of the few roof types available as a mid-sloped cool roof.

Except for the Chicago Energy Code, none of the identified codes have a mandatory requirement for cool roofs. Instead, the reflectivity of the roofs is taken into account in determining the overall thermal performance of the building. This allows reflectivity to be traded with other thermal measures, such as insulation. Some of the weaker codes assume a cool roof is not being used, thereby providing a thermal credit if the designer specifies a cool roof. More stringent codes are making cool roofs the standard, which creates a thermal penalty if a cool roof is not specified. The less stringent system seems to be a common way to initially introduce cool roofs into a code, while the more stringent approach is the next evolutionary step. Chicago took a more drastic step and chose to require cool roofs on all buildings without any trade-off option. Chicago's attempt, however, met fierce opposition from roofers, and the final policy was severely weakened.

The benefits of cool roofs have only become known in the past few years. A decade ago the term "cool roof" could not be found in any energy code throughout the country. Almost all of the policies reviewed in this report have only recently added cool roof requirements. Some of these policies are still in the development stage. Although the appearance of cool roof requirements in energy codes and building guidelines is fairly new, it appears to be quickly gaining momentum as the benefits become better understood by energy efficiency consultants, and as policy makers realize that addressing cool roofs is a simple code change that can have a positive effect on their community.

Table 1 – Summary of Cool Roof Policies

Policy	Policy Requirements ¹	Minimum Reflectivity	Minimum Emissivity	Minimum Aged Reflectivity	Testing Protocol
California Energy Code (Title 24)	Required	0.70	0.75	None	ASTM E903 ASTM E1918 ASTM E408
Chicago Energy Conservation Code	Mandatory	0.25	None	None	ASTM E903 ASTM E1918
Hawaii Model Energy Code	Credit	None	None	None	None
ANSI/ASHRAE/IESNA 90.1-2001 Guidelines	Credit	0.70	0.75	None	ASTM E903 ASTM E1918 ASTM E408
EnergyStar	N/A	0.65	None	0.50	ASTM E903 ASTM E1918
LEED	Credit	0.65	0.90	0.50	ASTM E903 ASTM E408
Florida State Energy Code	Required	0.65	0.80	None	ASTM E903 ASTM E1918 ASTM E408
Georgia Energy Code	Credit	0.70	0.75	None	ASTM E903 ASTM E408
Guam/Samoa Energy Code	Credit	0.70	0.75	None	ASTM E903 ASTM E408
IECC	Credit	0.70	0.75	None	ASTM E903 ASTM E1918 ASTM E408
Advanced Building Guidelines	Required	0.65	None	0.50	ASTM E903 ASTM E1918
California State/Utility Cool Roof Programs	Mandatory	0.65	None	0.50	ASTM E903 ASTM E1918
Canadian Energy Code	Credit	None	None	None	None

¹Mandatory refers policies where cool roofs must be used to comply.

Required refers to policies where cool roofs are not mandatory, but an energy penalty is given if one is not used.

Credit refers to policies where cool roofs are not mandatory, but an energy credit is earned if one is used.

California Energy Code, Title 24

General Information

The *California Title 24 Energy Efficiency Standards for Residential and Nonresidential Buildings* have been in effect since 1978, and are mandatory for all buildings in the state. When the Title 24 Standards were amended in 2001 in response to the electricity crisis, a number of changes were implemented. Among these was a credit for cool roofs. There are no mandatory requirements for cool roofs, but a credit is offered through the *overall envelope approach* and the *whole building performance method* of the energy code.

The *overall envelope approach* is outlined in Section 143(b) of the Standards. The procedure is intended to provide flexibility to designers in complying with the Title 24 Standards. There are two criteria that must be met. The overall heat gain of the Proposed Design must be less than the Standard Design, and the overall heat loss of the Proposed Design must be less than the Standard Design. The Standard Design is a building substantially similar to the Proposed Design, but in exact compliance with the Title 24 Standards. The cool roof credit only affects the heat gain comparison. This means that if a cool roof were installed, the designer would be able to relax other measures that affect heat gain (such as using windows with a higher SHGC). There is no consideration of cool roofs with regard to heat loss. The credit is not offered in climate zone 1, which essentially does not have a cooling load.

The *whole building performance method* is the second way that the 2001 Title 24 Standards recognize cool roofs. With this compliance option, the designer performs an annual energy simulation of the Proposed Design and the Standard Design, and shows that the Proposed Design uses less source energy than the Standard Design. Before the 2001 amendments, the absorptance of the roof (equals 1 minus the reflectance) was a fixed input that could not be varied. With the amendment, the Standard Design roof has an absorptance of 0.70 (reflectance of 0.30), while a qualifying cool roof on the Proposed Design can be modeled with an absorptance of 0.45 (reflectance of 0.55). Keep in mind that a qualifying cool roof must have an initial reflectance of 0.70 in order to take credit for the 0.55. In this sense, the Title 24 Standards are conservative. The stated reason for making the code conservative here is because the cool roof may get dirty and not perform as well as it ages. An issue related to cool metal roofs is that they may have a reflectance substantially greater than 0.70, plus evidence shows that there may be little or no deterioration over time.

The cool roof credit for low-rise residential buildings is “declared” to be equal to that of a radiant barrier, but with benefits only during the cooling season, or when the residential building is in cooling mode. The *Residential ACM Manual* discusses the rules for calculating credit for radiant barriers and for cool roofs.

Cool Roof Qualifications

For nonresidential buildings, a cool roof is defined as a roof with a reflectance of 0.70 or greater, and an emittance of 0.75 or greater. The same criteria apply to low-rise residential buildings.

Beginning January 1, 2003, qualifying roofing materials had to be certified and labeled by the Cool Roof Rating Council (CRRC). The certification and labeling requirements for cool roofs are specified in Section 10-113 of the Standards (see the Appendices). Previously, the eligibility criteria could be verified through the manufacturer's published performance data.

Metal Roofing Considerations

The Title 24 Standards do not recognize different classes of roof constructions and have just one set of requirements for roofs. This means that the thermal performance criteria for metal building roofs are just as stringent as the criteria for roofs constructed with residential-style attics where the insulation can be inexpensively blown into the attic space. Standards that recognize different classes of roof construction generally have less stringent criteria for metal building roofs because of the added cost and difficulty of installing the insulation.

In 2005, cool roofs will be required for low-sloped roofs (pitch < 2:12). No cool roof requirement exists in the draft Title 24 Standard for mid-sloped roofs, which are commonly metal. In 2005, an exception will go into effect for roofing with a thermal emittance lower than 0.75 (see the Updates section below), which mostly applies to unpainted metal roofing.

Concrete tile (as defined in ASTM C55-99) and clay tile (as defined in ASTM C1167-96) roofing products have lower reflectance requirements. They have a minimum initial total solar reflectance of 0.40 when tested in accordance with ASTM E903 or E1918, and a minimum thermal emittance of 0.75 when tested in accordance with ASTM E408.

Liquid applied roofing products must be applied at a minimum dry mil thickness of 20 when tested in accordance with ASTM D6083-97 for the following key properties: initial tensile strength, initial elongation, elongation after 1000 hours, permeance, and accelerated weathering. The ASTM requirements for tensile strength, elongation, and weathering are shown below in Table 2.

Table 2 – Minimum Performance Requirements for Liquid Applied Roof Coatings

Physical Property	ASTM Test Procedure	Requirement
Initial percent elongation (break)	D2370	Minimum 60% 0°F (-18°C) Minimum 200% 73°F (23°C)
Initial tensile strength (maximum stress)	D2370	Minimum 100 psi (1.38 Mpa) 73°F (23°C) Minimum 200 psi (2.76 Mpa) 0°F (-18°C)
Final percent elongation (break) after accelerated weathering 1000 h	D2370	Minimum 40% 0°F (-18°C) Minimum 100% 73°F (23°C)
Permeance	D1653	Maximum 50 perms
Accelerated weathering 1000 h	D4798	No cracking or checking ¹

¹ Any cracking or checking visible to the eye fails the test procedure.

Updates

Amendments are presently being developed, which are expected to be adopted in mid-2003 to become mandatory in 2005, to make cool roofs a prescriptive requirement for nonresidential low-slope applications (pitch < 2:12). The proposal to require cool roofs was developed by the Lawrence Berkeley National Laboratory (LBNL) with funding from Pacific Gas & Electric (PG&E).

When cool roofs become a prescriptive requirement, the energy budget of a proposed low-sloped building will be compared against a standard building with a roof reflectivity of 0.70. If the proposed low-sloped building has a qualifying cool roof, the building's energy budget will be calculated assuming that the roof reflectance is 0.70. If the proposed low-sloped building does not have a qualifying cool roof, a punitive value of 0.10 for low-sloped roofs, or 0.30 for mid-sloped roofs, must be used for the roof reflectance. The result is a more stringent standard, but it also formalizes cool roofs as part of the prescriptive compliance process, which is used for the majority of building permit applications.

In 2005, if the roofing product has an initial thermal emittance less than 0.75 when tested in accordance with CRRC-1, it can still qualify, but the solar reflectance requirement becomes more stringent, i.e., the reflectance requirement becomes $0.70 + 0.34 * (0.75 - \text{initial thermal emittance})$.

How the Process Works

The process of making modifications to the Title 24 Standards is rather formal and lengthy. The update cycle is on the order of three to five years, but can be shortened in an emergency as with the 2001 amendments that responded to the California electricity crisis. The current process, which will result in the adoption of an updated code later this year with an effective date of 2005, began in the fall of 2001.

At that time, a contractor (Eley Associates) was hired to assist the California Energy Commission (CEC) staff in the development of the Title 24 Standards. The first activity identified possible code changes. Suggestions from the public and other participants were collected using a template developed by the contractor. The contractor team also developed code change proposals. There were about 200 suggested modifications. These proposals were considered at public workshops in November 2001 and January 2002.

Following these workshops, the contractor and the CEC staff developed a draft of the Title 24 Standards that was first presented in November 2002, and at another workshop in February 2003. The draft Title 24 Standards will be revised again for a public hearing in May 2003.

The public hearing in May will mark the beginning of the formal rulemaking process that all California agencies must follow when adopting regulations. The rulemaking lasts a minimum of 75 days, but the common duration tends to be 120 days.

Major Groups Involved

The following groups are regular participants at the review workshops. They are active voices in the revision process and have influenced the outcome of the Title 24 Standards.

- California Association of Building Energy Consultants (CABEC): Represents consultants that make a living filling out compliance forms and doing the required calculations to show that buildings comply with the Title 24 Standards.
- California Association of Licensed Building Officials (CALBO): Represents the building officials in California. Their interests are in keeping the Title 24 Standards simple and easy to enforce since enforcement is their responsibility.
- Lawrence Berkeley National Laboratory (LBNL): A division of LBNL, The Heat Island Group, is a strong proponent of cool roofs.
- Pacific Gas & Electric (PG&E): California's largest utility has been an active participant in the process. They have used some of their Public Goods Cost (PGC) money to develop code initiatives. They are able to recover some of the money if they can show that their adopted proposal saves energy.
- Southern California Edison (SCE): Another large utility that is active in the code development. They have interests similar to PG&E.
- Southern California Gas Company (SCG): Another large utility that is active in the code development. They have interests similar to PG&E.
- California Building Industry of America (CBIA): Represents the homebuilders in California. They want to keep first costs as low as possible, and often see certain energy codes as potentially harmful to their business interests.
- ConSol: A Stockton, CA-based energy consulting company that is the primary consultant to CBIA.

More Information

All the CEC documents are located on their website at http://www.energy.ca.gov/2005_standards/index.html. The documents of importance are listed below:

- *Warren Alquist Act*. This law created the CEC and gives it the authority to develop energy codes and policies.
- *Title 24 Standards*. This document is officially known as the *California Building Code (CBC) Part 6*. The CBC also includes a fire code, mechanical code, building code, etc.
- *Residential and Nonresidential ACM Manuals*. These documents contain software specifications for computer programs used for compliance, but they also have eligibility criteria for certain measures, like cool roofs, and procedures for field verification and diagnostic testing.
- *Residential and Nonresidential Manuals*. These reference documents for building officials and practitioners contain compliance forms, reference material, and other general information to assist with Title 24 Standards compliance.

Chicago Energy Conservation Code

General Information

After the Chicago Mayor's office established a Chicago Energy Committee in 2001, Chicago implemented its first ever energy code, known as the Chicago Energy Conservation Code, in 2002. Chicago Energy

Conservation Code requirements include the insulation of floors, roofs, and walls, as well as the installation of energy-efficient windows and mechanical systems.

The Chicago Energy Conservation Code provides multiple paths for demonstrating code compliance including prescriptive, performance, and acceptable practice approaches. MECcheck is used for residential structures and COMcheck for commercial buildings.

Chapter 18-13 of the Municipal Code of Chicago is the Chicago Energy Conservation Code. Section 18-13-303, Urban Heat Islands, addresses roof reflectivity. This section was amended by the Chicago City Council on January 16, 2003 and became effective on April 1, 2003. The code establishes standards to limit the amount of solar energy absorbed by building roofs and transmitted to the atmosphere. The goal is to reduce the heat island effect and energy use.

In the Chicago code, roof reflectivity is a mandatory requirement. Roof reflectivity cannot be “traded off” with other energy efficiency requirements when evaluating a building in terms of overall performance. Most other policies allow cool roof performance to be traded with other energy efficiency requirements.

The reflectivity requirements for Chicago’s Energy Conservation Code were originally proposed to be more stringent. However, negotiations with the Chicago Roofers Coalition resulted in significant weakening of these roofing requirements. Originally the reflectivity requirement was set at 0.65 for low-sloped roofs and at 0.15 for mid-sloped roofs. Emissivity was also initially required to be greater than 0.9 for both roof types.

Cool Roof Qualifications

All roof solar reflectance must be measured in accordance with ASTM E903, ASTM E1918, or by testing with a portable reflectometer at near ambient conditions.

Until December 31, 2008, all low-sloped roofs (2:12 or less) must have a minimum solar reflectance, both initial and weathered, of 0.25. Roofs installed after December 31, 2008 must use roofing products that meet or exceed the minimum criteria to qualify as a U.S. Environmental Protection Agency EnergyStar Cool Roof.

Emissance is not addressed.

Metal Roofing Considerations

Currently there are no requirements for mid-sloped roofs (pitch > 2:12), which is commonly metal roofing. An initial proposal to establish a minimum reflectivity of 0.15 was rejected by the Chicago City Council on January 13, 2003.

Since the Chicago Energy Code does not address emissivity, certain metal roofs are credited that would not be considered a cool roof by other code standards. Roofs with low emissance are usually unpainted metal roofs.

Updates

The Chicago policy includes a provision in the cool roof amendment that will require all roofs to meet or exceed the minimum criteria to qualify as a U.S. Environmental Protection Agency EnergyStar Cool Roof beginning in 2009. No updates are scheduled before 2009.

How the Process Works

In 2000, the Major’s office established an Energy Code Committee, consisting primarily of local architects and engineers, to draft Chicago’s first energy code. The code was based on the International Energy Conservation Code (IECC). The committee drafted an energy standard for both residential and nonresidential buildings. The proposal was subject to public review, and was adopted in 2002 by the Chicago City Council. The cool roof section of the energy code was amended after the initial implementation, due to protests from the Chicago Roofers Coalition.

Groups Involved

Energy Code Committee: a group of local architects and engineers compiled by the Mayor's office. This committee drafted the Chicago Energy Conservation Code.

Andy Pierce

Department of Buildings

(312) 744-5334

Chicago Roofers Coalition: an ad hoc group of roofers in Chicago that came together to protest the cool roof requirement in the Chicago Energy Conservation Code.

More Information

The *City of Chicago Conservation Code* is available at the City of Chicago Department of Buildings Website, <http://www.ci.chi.il.us/Buildings>.

Chicago Energy Conservation Code: Chapter 18-13 of the Municipal Code of Chicago.

Technical Amendment to the Chicago Energy Conservation Code:

<http://www.cityofchicago.org/Buildings/BuildingCode/AmendDigest.pdf>.

Hawaii Model Energy Code

General Information

The Hawaii Model Energy Code is adapted from ASHRAE 90.1-1989, and is also influenced by the most recently adopted California Title 24 codes and the U.S. Department of Energy standard for nonresidential buildings. In addition, many parts of the code have been developed specifically for the unique conditions of the Islands, in particular the requirements for natural ventilation. The counties, not the State, have the authority to adopt codes, so the State developed a model code. This model code was adopted first by the County of Honolulu, and then later by Hawaii, Maui, and Kauai.

Roof absorptivity was adopted into the nonresidential and high-rise residential sections of Hawaii's Energy Code in 1993, and the language has not been updated since then for nonresidential buildings. There are no mandatory requirements for cool roofs, but a credit for lower roof absorptivity is offered through the *prescriptive method* and the *building energy cost budget method*.

The *prescriptive method* uses a roof heat gain factor (see Equation 1), which is the product of the roof U-factor, the absorptivity, and radiant barrier value. The average roof heat gain factor for the roof may not exceed 0.05. This system allows a roof absorptivity anywhere from 0.3 (cool roof) to 0.9 (black roof) to be used. The roof heat gain factor allows the designer to replace lower absorptivity with insulation level, or visa versa. Buildings with roofs completely shaded from sunlight or with a well-ventilated attic are exempt from this roof heat gain factor requirement. Well ventilated is defined as 1 ft² of free area for each 10 ft² of attic floor area.

$$\text{RHGF} = U_r \times \alpha \times \text{RB}$$

Equation 1 – Roof Heat Gain Factor

With the *building energy cost budget method*, a computer program is used to compare the energy between a building's Standard Design and Proposed Design. The Standard Design is a building substantially similar to the Proposed Design, but in exact compliance with the code. The Standard Design roof has an absorptance of 0.70 (reflectance of 0.30), while absorptance of the roof on the Proposed Design can be modeled at any absorptance between 0.3 and 0.9.

Cool Roof Qualifications

The Hawaii Model Energy Code does not define a cool roof, but rather acknowledges roof absorptivity, which is an essential cool roof characteristic.

The Hawaii Model Energy Code for nonresidential buildings does not require any specific emissivity value.

Metal Roofing Considerations

Since the Hawaii Model Energy Code does not address emissivity, certain metal roofs are credited that would not be considered a cool roof by other code standards. Roofs with low emittance are usually unpainted metal roofs.

Updates

In 1998, cool roofs were added to the low-rise residential section of Hawaii's Model Energy Code. The residential section requires buildings to have at least one of the following energy-efficient measures:

- (1) R-19 insulation between roof or ceiling framing members;
- (2) Two inches of foam board insulation;
- (3) A radiant barrier and ventilation;
- (4) A cool roof and a radiant barrier; or
- (5) Any roof construction that has an average roof heat gain factor no greater than 0.05.

A cool roof for residential compliance must have a total solar reflectance when tested according to ASTM E903 of no less than 0.70. The infrared emittance using ASTM E408 must be no less than 0.75. The manufacturer's test results are considered acceptable for compliance.

How the Process Works

In Hawaii, the Energy Office of the Department of Business and Economic Development and Tourism (DBET) has responsibility for developing and maintaining the code. Eley Associates has been a consultant and advisor to DBET since the late 1980s and has developed most drafts of the Hawaii Model Energy Code. Since the code at the state level is only a model energy code, it does not go through a formal adoption process. However, DBET typically puts together a committee of architects; engineers; contractors; members of the hospitality industry; building owners and managers; building officials from the county offices; and others to offer advice when major changes to the model code are being considered. Hawaii has no regular cycle for updating the code.

The local island governments, as well as the City and County of Honolulu, then have responsibility for adopting the energy code. Sometimes they adopt the energy code with local amendments, which is the approach the island of Hawaii took in the early 1990s. For the City and County of Honolulu, the energy code is typically adopted by the city council or by the county supervisors.

Groups Involved

AIA, ASHRAE, IESNA: The local chapters of these professional societies have been involved in the reviewing the energy code.

Outrigger Hotel and other members of the hospitality industry: These groups have been involved with the process and have offered input.

More Information

The *Hawaii Model Energy Code* is available at the State of Hawaii Website:
http://www.hawaii.gov/dbedt/ert/model_ec.HTML.

ANSI/ASHRAE/IESNA Standard 90.1-2001

General Information

Standard 90.1 is a national consensus standard co-sponsored by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) and the Illuminating Engineering Society of North

America (IESNA). Standard 90.1 provides minimum requirements for energy-efficient design and construction of all buildings except for low-rise residential buildings. Standard 90.1 is the result of a consensus process, meaning participants in the development and review of the standard included professional, technical, and trade organizations; environmental organizations; equipment manufacturers; utility companies; code officials; and design professionals. ASHRAE follows the ANSI definition of the consensus process that states any legitimate comment must be addressed in some way. A single unresolved comment can lead to significant delays in the process. There are three editions of Standard 90.1: the 1989, the 1999, and 2001 editions.

Standard 90.1 is not a code, but is written in code-enforceable language intended for adoption by national, state/province, and local code jurisdictions. The 1992 Energy Policy Act (EPAC) requires all states to adopt energy codes, which are at least as stringent as the 1989 version of Standard 90.1. A recent ruling by the U.S. Department of Energy has changed the reference from the 1989 version to the 2001 version of Standard 90.1. Figure 1 shows which states currently have adopted ASHRAE Standard 90.1 (or equivalent), as of January 2002.

Cool roofs were first addressed in Standard 90.1-1999. The previous edition (Standard 90.1-1989) only recommends that, “The effects of roof absorptivity or reflectivity...shall be evaluated.” Standard 90.1-2001 allows the proposed roof U-factor to be adjusted by a “Roof U-factor Multiplier,” which reduces the suggested roof insulation level if a qualifying cool roof is used (see Equation 2). The multipliers vary by climate (in terms of heating degree days), so that using a cool roof reduces the suggested roof insulation more in warmer climates than in colder climates (see Table 3). With Standard 90.1-2001, there are no credits for cool roofs in climates with more than 3600 heating degree days. The rationale for not having a credit in moderate or colder climates is that the effect of a cool roof is to increase heating loads while reducing cooling loads, and in climates where heating loads are significant, the benefits are less when both heating and cooling are balanced together.

$$U_{\text{roofadj}} = U_{\text{roofproposed}} \times \text{Factor}_{\text{roofmultiplier}}$$

Equation 2 – Adjusted Roof U-factor

Table 3 – ASHRAE 90.1 Roof U-factor Multipliers

Roof U-Factor Multipliers for Exception to 5.3.1.1

HDD65	Roof U-Factor Multiplier
0-900	0.77
901-1800	0.83
1801-2700	0.85
2701-3600	0.86
>3600	1.00

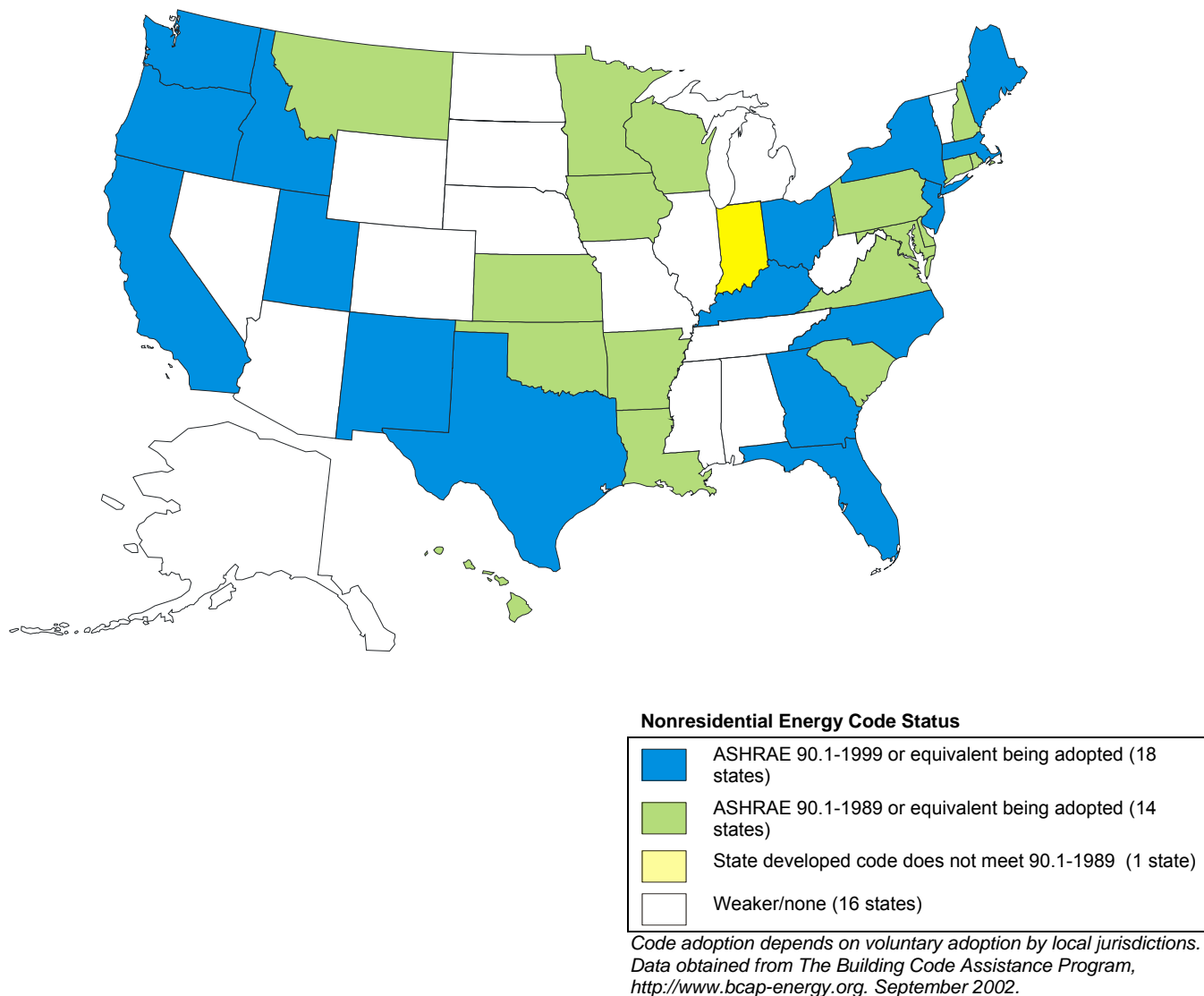


Figure 1 – ASHRAE Adoption

Cool Roof Qualifications

ASHRAE defines a cool roof as having a minimum total solar reflectance of 0.70 when tested in accordance with ASTM E903, and a minimum thermal emittance of 0.75 when tested in accordance with ASTM E408.

Metal Roofing Considerations

Standard 90.1-2001 recognizes different classes of roof constructions. Metal building roofs have less stringent thermal performance criteria because of the added cost and difficulty of installing the insulation.

This is a major difference between the 1989 version and 1999/2001 versions of 90.1. In the 1989 version, there is one set of thermal criteria for roofs that applied to all classes of construction. This means that it was very difficult for some classes of constructions, such as metal buildings, to meet the criteria, while the criteria were easily satisfied in classes of constructions that involved attics where insulation could be blown in to nearly any thickness.

Updates

The 1999 version of ASHRAE Standard 90.1 was the last major overhaul of the document. With the 1999 version, ASHRAE went into a process called continuous maintenance. With the 2001 version, ASHRAE has attempted to synchronize its adoption process with the three-year IECC cycle.

How the Process Works

With the process of continuous maintenance, changes are proposed for one or more specific sections of Standard 90.1. Changes are then considered by the committee, voted on, and submitted through the chain of approval within ASHRAE. Proposals for changes are typically made from within the committee; however there is a process that allows any interested party to propose changes. Within the committee, the subcommittee first considers the change (there are subcommittees for building envelope; HVAC and water heating; lighting and electrical systems; format and compliance; and the energy cost budget). After the subcommittee is satisfied with a particular proposed change, it is moved on to the full committee for a vote. Once the committee approves the proposal, it is submitted to the Standards Committee for approval. The ASHRAE Standards Committee includes not just energy interests, but also interests such as indoor air quality (Standard 62) and thermal comfort (Standard 55). Once the Standards Committee approves a proposed change, it is given to the ASHRAE Board of Directors. The final step in the process is for Standard 90.1 to be approved by the American National Standards Institute (ANSI). Only after obtaining ANSI approval is Standard 90.1 considered a genuine consensus standard. ASHRAE has created the Codes Liaisons Committee, chaired by Bruce Wilcox of Berkeley Solar Group, to ensure that there is a smooth transition between the national consensus standards developed by ASHRAE and IENSA, and to ensure the adoption of these standards by IECC and local governments.

Groups Involved

Some of the key groups involved with the building envelope portion of Standard 90.1 include:

- National Fenestration Rating Council
- North American Insulation Manufacturers Association
- Primary Glass Manufacturers Council
- Concrete Masonry Association
- American Iron and Steel Institute
- American Institute of Architects
- New Buildings Institute
- Natural Resources Defense Council
- Alliance to Save Energy
- American Council on an Energy-Efficient Economy

One of the most powerful groups on the ASHRAE 90.1 Committee is the Edison Electric Institute (EEI). EEI has worked hard to ensure that there are no restrictions on the use of electric resistance heat in either residential or nonresidential buildings. A number of seats on the committee are held directly by EEI representatives, their utility members, or in some cases, manufacturers of electric resistance heating equipment. Not only does EEI have the votes on the committee, but they also wield considerable power at the highest levels of ASHRAE, as they are major contributors to the ASHRAE research fund and other ASHRAE projects. It is very difficult to get any proposal through the ASHRAE process without at least the tacit support of EEI. One of the most influential members on the committee is Chuck Foster, a staff member at EEI in Washington.

Manufacturers also play a key role on the ASHRAE 90.1 Committee. The HVAC Committee includes representatives from Trane, Carrier, and other major manufacturers of HVAC equipment or components. The Lighting Committee includes representatives from luminaire and lighting control manufacturers.

The cost of participating on the ASHRAE 90.1 Committee can be quite high. When Charles Eley was on the committee, the total cost of participation was on the order of \$30,000 a year. Some members, such as Merle McBride, from Owens-Corning Fiberglass, spend practically all of their time dealing with committee activities. Other industry groups have staff people that spend all, or a significant portion, of their time interfacing with the ASHRAE Committee. In these cases the cost of participation is well in excess of \$100,000 a year, when staff, support, travel, and direct expenses are accounted for.

Participation by design professionals, such as practicing architects, mechanical engineers, and lighting designers, is very lax. The main reason for this is the cost of participation and the fact that most practitioners do not have the time, or are unable to dedicate the time, to really become a player in the process.

The chairman of the Building Envelope Committee is Joe Deringer of the Deringer Group in Berkeley, California. Deringer has a long history of energy standards development. Other key and influential members of the committee include John Hogan, a building official for the City of Seattle; Martha VanGeen who works with CTG in Chicago; Valerie Block who represents the Primary Glass Manufacturers Council; Charles Cottrell who represents the North American Insulation Manufacturers Association; and other key members.

More Information

All ASHRAE documents are located on their website at <http://www.ashrae.com/>.

EnergyStar

General Information

EnergyStar was introduced by the U.S. Environmental Protection Agency (EPA) in 1992 as a voluntary labeling program designed to identify and promote energy-efficient products to reduce carbon dioxide emissions. The EPA partnered with the U.S. Department of Energy (DOE) in 1996 to promote the EnergyStar label, with each agency taking responsibility for particular product categories. EnergyStar has expanded to cover new homes, most of the buildings sector, residential heating and cooling equipment, major appliances, office equipment, lighting, consumer electronics, and more. The EPA oversees the EnergyStar roofing products. The EnergyStar label was first applied to roofs in 1999 to identify “high reflectance” roofs (the EPA does not consider EnergyStar roofs as cool roofs because emissivity is not addressed). The EPA promotes a list of roof products that meet the EnergyStar criteria (see the Appendices).

Cool Roof Qualifications

EnergyStar-labeled roof products must meet the following criteria:

- Low-sloped roofs must have an initial solar reflectance of greater than 0.65. After three years, the solar reflectance must be greater than 0.50.
- Mid-sloped roofs must have an initial solar reflectance of greater than 0.25. After three years, the solar reflectance must be greater than 0.15.

Manufacturers must supply reflectance data for new and three-year old roofing using testing protocol ASTM E903, or ASTM E1918 if being tested on-site. Manufacturers may also determine reflectance using a solar spectrum reflectometer (ASTM protocol is currently being established). Manufacturers do not need testing to be performed independently, but are required to supply details to their testing procedure.

Metal Roofing Considerations

Since EnergyStar does not address emissivity, certain metal roofs are credited that would not be considered a cool roof by other code standards. Roofs with low emittance are usually unpainted metal roofs.

Updates

The EnergyStar roofing program has not been updated since it was established in 1999. The EPA is currently considering three updates to the policy. They are discussing including emissivity requirements in the EnergyStar qualifications, but are hesitant because this will require them to re-analyze their database. The EPA is also looking for ways to better standardize the testing protocol for roof aging, including “roof farms” that would allow different roofing to be aged and tested under similar conditions. They are also working with the DOE to develop a procedure to accelerate the roof aging process for testing purposes. An accelerated aging procedure is still in the nascent stages, since most processes do not account for certain types of degradation, such as mold growth or pollutants.

How the Process Works

The EPA does not have an established cycle for updates. EnergyStar is a partnership with manufacturers that were involved with the initial development. Any future updates would be drafted by the EPA and then distributed to manufacturers for feedback. Iterations between the EPA and manufacturers are expected to take anywhere from a few months to two years before any changes would go into effect.

Groups Involved

National laboratories, such as Lawrence Berkeley National Laboratory and Oakridge National Laboratory, were involved in establishing the EnergyStar roofing policy. Input from many manufacturer and trade organizations was also included during the policy development, including The Metal Construction Association and The Plastics Forum.

More Information

Information about the EnergyStar cool roof program can be found at http://www.energystar.gov/index.cfm?c=roof_prods.pr_roof_products.

U.S. Environmental Protection Agency
Rachel Schmeltz
(202) 564-9124

Leadership in Energy and Environmental Design (LEED)

General Information

Developed by the U.S. Green Building Council membership, the Leadership in Energy and Environmental Design (LEED) Green Building Rating System is a national consensus-based, market-driven building rating system designed to accelerate the development and implementation of green building practices. The program awards “points” for different green building design measures. In short, it is a system for designing, constructing, and certifying the world’s greenest buildings. The full program offers training workshops, professional accreditation, resource support, and third-party certification of building performance. The current version of the rating system, LEED 2.1, is a recent administrative update to LEED 2.0 that was launched in March 2000 following a review by the entire USGBC membership and a national pilot testing program. Since November 2002, all new buildings are being registered according to LEED 2.1. LEED 2.1 is designed for rating new and existing commercial, institutional, and high-rise residential buildings.

Cool Roof Qualifications

LEED requires roofs to meet the EnergyStar requirements for reflectivity:

- Low-sloped roofs must have an initial solar reflectance of greater than 0.65. After three years, the solar reflectance must be greater than 0.50.
- Mid-sloped roofs must have an initial solar reflectance of greater than 0.25. After three years, the solar reflectance must be greater than 0.15.

Along with the EnergyStar requirements for reflectivity, LEED requires roofs to have an emissivity of 0.9.

Metal Roofing Considerations

The LEED emissivity requirement, in addition to the basic EnergyStar requirements for cool roofs, essentially prevents certain metal roofs from achieving LEED credit. Roofs with low emittance are usually unpainted metal roofs. Many painted metal roofs still qualify.

The credit for cool roofs is one of the relatively easier and cheaper credits to achieve in the LEED rating system.

Updates

LEED recently released the 2.1 version of its rating system. As of November 14, 2002, all projects have been registered under LEED 2.1. No changes were made regarding cool roofs in the update from version 2.0 to version 2.1. The USGBC is currently working to develop the next edition of the LEED Green Building Rating System, version 3.0, due for release in 2005.

How the Process Works

Technical Advisory Groups (TAGs) have been formed to review credits and concerns in each of the LEED categories, plus additional TAGs have been created for process/innovation and multiple buildings. There are 10 core TAG members who convene for bi-weekly conference calls to exchange information and review comments and proposals. Bryna Dunn of Moseley Architects is the chair for the Sustainable Site Selection Committee, which oversees the cool roof credit.

Groups Involved

Members of the USGBC representing all segments of the building industry developed LEED. A list of the current LEED board members is included in the Appendices.

More Information

Information about the USGBC and LEED programs is available at <http://www.usgbc.org/>.

Florida State Energy Code

General Information

Chapter 13 of the Florida Building Code (FBC) is the statewide uniform standard for energy efficiency in the design and operation of all buildings in the state of Florida. As such, the energy code is uniform throughout the state and cannot be made more lenient or stringent by local government. It applies to all new buildings; additions to existing buildings and manufactured homes; renovations to existing buildings (both public and private) with certain exceptions; and changes of occupancy type. It also applies to site-installed components and features of manufactured homes for initial setup. It does not include buildings for which federal mandatory standards preempt the state energy code.

Originally, this state law referenced minimum standards for construction to meet or exceed national standards such as those of ASHRAE/IES 90-1975. However, nationally recognized energy codes or standards, such as ASHRAE, were designed primarily for climates where heating, rather than cooling, is dominant. The Florida Energy Efficiency and Conservation Building Code was developed to be climate-specific for Florida.

Changes were affected in order to bring the 2001 Florida State Energy Code into alignment with the 1998 (and 2000) International Energy Conservation Code (IECC), the prevailing federal standard for residential energy codes. These most recent changes took effect in March 2002.

A cool roofs credit is available in the residential section of the 2001 Florida State Energy Code. Florida assigns a “summer point multiplier” to each level of insulation for residential ceilings. A higher multiplier indicates

higher energy use. Having a cool roof (called a “white roof” in the code) allows that multiplier to be reduced (see Table 4 below).

Table 4 – Florida Residential Cool Roof Credit

6A-4 Ceiling Summer Point Multipliers (SPM)						
Under Attic		Single Assembly		Concrete Deck Roof		
R-Value	SPM	R-Value	SPM	Ceiling Type		
				R-Value	Exposed	Dropped
19-21.9	2.82	10-10.9	10.27	10-13.9	11.13	10.40
22-25.9	2.55	11-12.9	9.73	14-20.9	8.42	7.99
26-29.9	2.28	13-18.9	8.72	21 & Up	5.99	5.76
30-37.9	2.13	19-25.9	6.90			
38 & Up	1.84	26-29.9	5.82			
		30 & Up	5.40			
RBS Credit	0.700					
IRCC Credit	0.864					
White Roof Credit	0.550					

Cool Roof Qualifications

For residential buildings, the Florida State Energy Code provides a credit to all residential roofs with a reflectivity of 0.65 and an emissivity of 0.80, regardless of roof slope.

Metal Roofing Considerations

Due to difficulty in insulation installation, the Florida State Energy Code has reduced insulation standards for single assembly roofs (exposed deck and beam type) and concrete deck roofs for both residential and nonresidential buildings.

Updates

There are currently no reflectivity requirements for nonresidential buildings. Reflectivity requirements are expected to be added in the 2004 code revision.

How the Process Works

The Florida Building Commission is responsible for administering, modifying, revising, updating, and maintaining the code. The Florida Department of Community Affairs is responsible for supporting the Florida Building Commission. The code is revised on a three-year cycle, following ASHRAE and International Code Council (ICC) revision activities, in addition to including criteria deemed appropriate for Florida. The Florida Solar Energy Center is responsible for the majority of the input that the Florida Building Commission receives regarding cool roofs.

Groups Involved

Florida Department of Community Affairs
Ann Stanton (850) 488-0964

Florida Solar Energy Center: a state supported renewable energy and energy efficiency research institute that promoted and developed the cool roof credit.
James Cummings
(321) 638-1403

More Information

The Florida Building Code is available at <http://www.floridabuilding.org>.

The Florida Solar Energy Center website is available at <http://www.fsec.ucf.edu>.

Georgia Energy Code

General Information

The initial edition of the Georgia Energy Code (GEC) went into effect in 1978. The code was based on both the Model Code for Energy Conservation (MEC), developed by the National Conference of States on Building Codes and Standards, and ASHRAE/IES Standard 90-1975.

In 1997, Georgia adopted the 1995 MEC with state amendments for residential buildings. In 2003, the Georgia Energy Code adopted the 2000 International Energy Conservation Code (IECC) with Georgia supplements and amendments for both residential and nonresidential buildings. The 2000 IECC is an update to the 1995 MEC. The code is mandatory for all buildings, except those owned or leased in whole by the U.S. government.

Cool roofs were first addressed in the 1997 code. The code allows for an adjustment of the required roof/ceiling U-value. The adjustment factor allows for an increased U-value allowance of 11% to 16%, based on climate variations.

Cool Roof Qualifications

The code allows for an adjustment of the required roof/ceiling U-value when the roof surface has a solar reflectance greater than or equal to 0.75 per ASTM E903, and infrared emittance greater than or equal to 0.75 per ASTM 408.

Metal Roofing Considerations

The Georgia Energy Code recognizes different roof types in commercial buildings. The R-value requirement is less stringent for a metal roof compared to a typical wood-framed roof, since a metal roof is more difficult and expensive to insulate.

Updates

The Georgia Department of Community Affairs has a goal of revising the Georgia Energy Code on a three-year cycle, in response to IECC updates. However, the department does not plan on adopting the 2003 IECC update. It is expected that they will adopt the 2006 IECC code.

How the Process Works

A rule-making process is used to adopt new codes and to change existing codes. When a proposed code change is forwarded to the Department of Community Affairs, a task force consisting of engineers, architects, builders, and contractors first reviews it. The task force evaluates the proposal and forwards it to the State Codes Advisory Committee, if deemed appropriate. This committee also evaluates the proposal and submits it for public hearing. If approved, the proposal is adopted by the Board of Community Affairs for inclusion into the next edition of the code. The Department of Community Affairs is responsible for final rulemaking.

The Georgia Energy Code is based on the IECC. In 2001, the Georgia Department of Community Affairs hired consultants to address the 2000 IECC update, and to suggest appropriate supplements and amendments. A Cool Communities Steering Committee was established and was responsible for determining how cool roofs would be implemented in the Georgia Energy Code. Members of the Steering Committee are described in the following section.

Groups Involved

The following groups were part of the Cool Communities Steering Committee.

Georgia Department of Community Affairs, Office of Coordinated Planning, Building Codes Section: the state department that oversaw the Georgia Energy Code revision.

Bill Towson, Jr.
Consultant
(404) 679-3104

Southface Energy Institute: a non-profit education organization in Atlanta that wrote much of the amendments.
Mike Barcik
Director of Technical Services
(404) 872-3549

Atlanta Cool Communities: a division of the U.S. Department of Energy (DOE) Energy Partners Program. The group also works to establish incentives for using cool roofs.
Lucy Griggs
Director

Owens-Corning Corporation: a prominent insulation manufacturer.
David D. Lovich, P.E.
Manager, Codes, Standards and Technical Services
(770) 494-7731

New Buildings Institute: a non-profit organization that promotes energy efficiency in buildings through policy development, research, guidelines, and codes.
Jeffrey Johnson
Executive Director
(509) 493-4468

More Information

The Georgia supplements and amendments to the IECC are available at <http://www.dca.state.ga.us/planning/codespdf/energy2003.pdf>.

Guam/Samoa Energy Code

General Information

The Guam/Samoa Building Energy Code was established for commercial buildings in 1995. A residential section to the code was adopted in 2000.

Cool roofs are not prescriptively required in the Guam/Samoa Energy Code, but Equation 3 shows that using a cool roof can reduce the amount of roof insulation required. For mass and metal building roofs, an absorptance (1-reflectance) (α) of 0.70 is assumed for roofs that do not qualify as high albedo. For high albedo roofs, an absorptance (α) of 0.30 is assumed.

$$EPF_{\text{Roof}} = C_{\text{Roof,Mass}} \sum_{s=1}^n U_s A_s \alpha_s + C_{\text{Roof,MtlBldg}} \sum_{s=1}^n U_s A_s \alpha_s + C_{\text{Roof,Other}} \sum_{s=1}^n U_s A_s RBF_s$$

Equation 3 – Envelope Tradeoff Equation

Where

EPF_{Roof}	Envelope performance factor for roofs.
A_s	The area of a specific envelope component.
U_s	The U-factor for the envelope component referenced by the subscript "s".
RBF_s	Radiant barrier factor for roof surface "s". A radiant barrier factor (RBF) of 0.33 shall be assumed for roof constructions with a qualifying radiant barrier, otherwise RBF shall be assumed to be 1.00.

- α_s For mass and metal building roofs, an absorptance (α) of 0.70 shall be assumed for roofs that do not qualify as high albedo. For high albedo roofs, an absorptance (α) of 0.30 shall be assumed.
- $C_{Roof,Mass}$ A coefficient for the "Roof, Mass" class of construction.

Cool Roof Qualifications

Approved cool roof surfaces are required to have a minimum total solar reflectance of no less than 0.70 when tested according to ASTM E903. The test sample needs to also be tested for its infrared emittance using ASTM E408 and have an emittance no less than 0.75. Testing must be performed by an independent laboratory. The roof surface must have a slope of at least ¼ inch per foot of run.

Metal Roofing Considerations

The Guam/Samoa Energy Code recognizes different classes of roof constructions. Metal building roofs have less stringent thermal performance criteria because of the added cost and difficulty of installing the insulation. Table 5 shows the different prescriptive roof requirements for different roof construction classes.

Table 5 – Guam/Samoa Prescriptive Roof Requirements

Class	Nonresidential and High-Rise Residential	Low-Rise Residential
Mass	(a) High albedo roof surface; (b) R-11 insulation in interior furring space; (c) Two inches of continuous insulation; or (d) Any other construction with a U-factor less than or equal to 0.12.	(a) High albedo roof surface; (b) R-11 insulation in interior furring space; (c) Two inches of continuous insulation; or (d) Any other construction with a U-factor less than or equal to 0.12.
Metal Buildings	(a) Six inches of insulation; or (b) Any other construction with a U-factor less than or equal to 0.07.	(a) Six inches of insulation; or (b) Any other construction with a U-factor less than or equal to 0.07.
Other Roofs	(a) R-19 insulation; or (b) Any other construction with a U-factor less than or equal to 0.06.	(a) R-19 insulation; or (b) Any other construction with a U-factor less than or equal to 0.06.

Updates

No updates are scheduled for the Guam/Samoa Energy Code.

How the Process Works

The nonresidential code (adopted in 1995) and the residential code (adopted in 2000) were the first codes developed for these two building types in Guam/Samoa. The code was adopted by the Guam legislature and is enforced by the Guam Building Department. Public hearings were held to obtain community input, and a series of revisions occurred before the code was adopted.

Groups Involved

Guam Building Department: hired Eley Associates to develop this code.

More Information

The Guam/Samoa Energy Code is available at <http://www.eley.com/guam>.

International Energy Conservation Code (IECC)

General Information

The International Energy Conservation Code (IECC) establishes minimum design and construction parameters for energy-efficient buildings through the use of prescriptive and performance-based provisions. It establishes minimum thermal performance requirements for building envelopes including windows, and sets minimum efficiencies for mechanical systems in buildings.

Before 1998 the residential portion of the IECC was issued under a different name, the Model Energy Code (MEC). The U.S. Department of Housing and Urban Development (HUD) loan guarantee program requires compliance with the MEC. The Rural Economic and Community Development (RECD, formerly the Farmer's Home Administration) loan guarantee program requires that single-family buildings comply with the MEC.

Commercial buildings are also incorporated into the 2000 IECC by reference to the ASHRAE/IES Energy Code for Commercial and High-Rise Residential Buildings 90.1-1999. A useable compliance path for "simple" commercial buildings was approved and now appears as Chapter 8 of the 2000 IECC.

IECC provides multiple paths for demonstrating code compliance including prescriptive, performance, and acceptable practice approaches. MECcheck is used for residential buildings, with COMcheck for commercial ones.

Cool Roof Qualifications

The nonresidential section of the code references ASHRAE 90.1-99 (see the ASHRAE section of this report). Cool roofs are not addressed in the residential section of the code.

Metal Roofing Considerations

See the ASHRAE section.

Updates

The IECC is updated on a three-year cycle, with the next update scheduled for 2005.

How the Process Works

Any interested individual or group may submit a code change proposal and participate in the proceedings. This open debate and broad participation, before a committee of code regulators and construction industry representatives, ensures a consensus of the construction community in the decision-making process. Voting members may either ratify the committee's recommendation or make their own recommendation. The results of all votes are published in the ICC hearing report.

Eligible voting members of three model code groups review the ICC Code Development Committee's recommendations at their annual conference, and then determine the final action. Following consideration of all public comments, each proposal is individually balloted by the eligible voters. The final action on the proposals is based on the aggregate count of all votes cast.

Groups Involved

The MEC (now called the IECC) was previously maintained by the Council of American Building Officials (CABO), which was comprised of the three U.S. model code groups: the Building Officials and Code Administrators, International (BOCAI); the International Conference of Building Officials (ICBO); and the Southern Building Code Congress International (SBCCI).

An International Energy Conservation Code Committee was established for the 2002 revision. See the Appendices for a list of these committee members.

More Information

Information regarding the IECC is available at <http://www.intlcode.org/>.

International Code Council, ICC (Formerly BOCA International, ICBO, SBCCI)
(800) 214-4321
Fax: (800) 214-7167

Advanced Building Guidelines (ABG)

General Information

The New Buildings Institute (NBI), along with a team of experts in building performance, is currently developing the Advanced Building Guidelines (ABG). NBI is a 501(c)(3) not-for-profit public benefits corporation. The ABG are intended for use in designing, constructing, and operating nonresidential buildings to exceed national model codes. They can also be used as a model for an advanced building energy code.

The goal of the ABG is to define best practice in the design, construction, and startup of new and renovated nonresidential buildings. The ABG project evaluates new technologies and practices currently being promoted by public benefit programs, and is being used in advanced commercial construction. The project will also provide ways to ensure the proper performance of measures specified and installed through functional performance verification and acceptance testing.

The ABG requires cool roofs to be installed on at least 75% of a roof's surface for buildings in Department of Energy (DOE)'s southern climate zones.

Cool Roof Qualifications

The ABG define a cool roof as an EnergyStar roof that has been rated by a laboratory accredited by the Cool Roof Rating Council (CRRC).

EnergyStar labeled roof products must meet the following criteria (see the EnergyStar section of report for more information):

- Low-sloped roofs must have an initial solar reflectance of >0.65. After three years, the solar reflectance must be >0.50.
- Mid-sloped roofs must have an initial solar reflectance of >0.25. After three years, the solar reflectance must be >0.15. EnergyStar does not address emissivity.

While the ABG recommends cool roofs with high emissivity, high emissivity is not required (as per the EnergyStar criteria).

Metal Roofing Considerations

Similar to ASHRAE Standard 90.1, the ABG recognizes different classes of roof constructions. Metal building roofs have less stringent thermal performance criteria because of the added cost and difficulty of installing the insulation. Unlike ASHRAE, however, ABG differentiates between metal roofs with and without thermal blocks (ASHRAE assumes all metal roofs have thermal blocks).

Since the ABG does not address emissivity, certain metal roofs are credited that would not be considered a cool roof by other code standards. Roofs with low emittance are usually metal roofs.

Updates

The second public review draft of the ABG became available on February 11, 2003. The public comment period extended from February 11, 2003 through March 24, 2003. A meeting of the Criteria Review Committee was held on March 10-11 in Atlanta, Georgia.

How the Process Works

NBI managed and authored this first-edition document. NBI developed technical committees for each aspect of the ABG. The Cool Roof Rating Council participated on the technical oversight committee for the cool roof guidelines.

Groups Involved

CRRC was NBI's primary resource for cool roof information.

More Information

The ABG are available on the NBI website at <http://www.newbuildings.org/ABG.htm>.

California State/Utility Cool Roofs Program

General Information

The California Energy Commission (CEC) currently oversees a cool roof rebate program, titled the Cool Savings Program, which is administered by several program administrators (PAs) across the state. These PAs are responsible for recruiting and screening applicants, processing applications and related documents, inspecting projects as required by contract, and paying the rebate for finished projects. The PAs are currently the Sacramento Municipal Utility District (SMUD), the Sacramento Tree Foundation, and the San Diego Regional Energy Office.

Rebates are available to businesses, local governments, schools, and other entities that replace (or resurface) their old roofs with cool roofs. Rebates are also available for installation of cool roofs on new buildings. The rebates are available for nonresidential or residential buildings, but individual single-family homes are not eligible (must be aggregated).

The program provides a rebate of \$0.15 for each ft² of cool roofing installed above conditioned space.

Cool Roof Qualifications

For the Cool Savings program, a cool roofing material is defined as having a solar reflectivity of at least 65% upon installation. Products must retain a reflectivity of at least 50% after three years of service. There is currently no protocol for verifying the reflectivity after three years of service, so the program accepts manufacturers' claims. The emissivity of the roof must be at least 80% upon installation. The roof must also have a minimum two-year labor and five-year materials warranty (provided by the contractor and/or manufacturer) in the event of cracking, flaking, peeling, or leaking.

Mid-sloped roofs (greater than 2:12) must have an initial reflectivity of greater than or equal to 40% and an emittance of greater than or equal to 80%, OR a minimum SRI of 41% (calculated using ASTM E-1980 for moderate wind conditions).

Metal Roofing Considerations

The requirements for the cool roof rebate limits metal roofs, since high emissivity is required for both low-sloped and mid-sloped roofs. Low emissivity roofs are generally unpainted metal roofs. The lower reflectivity requirement on mid-sloped roofs allows light-colored tile, which usually has a lower reflectivity, to be used as roofing.

How the Process Works

The cool roof rebate program is managed through the CEC and various state utility programs. The program requires a series of applications to be filled out and returned to the PA. Qualifying projects are processed on a first-come, first-served basis. Each applicant must have a signed and correctly completed Customer Application form on file with a PA and be in receipt of a Notice of Eligibility from the PA in order to reserve a

rebate. Rebates are awarded in order, based on the date of the Notice of Eligibility. The applicant must properly complete and submit an acceptable Final Application within the allowed schedule in order to receive the rebate. Rebates are sent out after the project has been completed.

Updates

This program began in 2001 and is scheduled to end in June 2003. The California public utility companies (Pacific Gas & Electric, Southern California Edison, Southern California Gas, and San Diego Gas & Electric) are expected to begin administering their own rebate programs to replace the CEC program. These new programs are expected to provide the same rebates and have the same cool roof qualifications as the CEC program.

Groups Involved

California Energy Commission
Virginia Lew
Cool Savings Program Manager
(800) 555-7794.

Sacramento Municipal Utility District (SMUD): a program administer for the programs in SMUD territories.

Sacramento Tree Foundation: a program administer for the program in all Northern California areas outside of the SMUD territories.

San Diego Regional Energy Office: a program administer for the program in all Southern California areas.

National Roofing Contractors Association

Lawrence Berkeley National Laboratory
Lisa Gartland

More Information

Details regarding the California State program are available at <http://www.coolroofs.info/>.

Canadian Energy Code

General Information

Canada's Model National Energy Code for Buildings (MNECB) applies to all new buildings, other than houses of three stories or less. The code offers three compliance approaches: a prescriptive Path, a trade-off path, and a performance path.

The MNECB was prepared under the auspices of the Canadian Commission on Building and Fire Codes, and was first published in 1997 by the National Research Council Canada (NRC). The NRC, Natural Resources Canada, the Canadian Electricity Association, and the provincial and territorial government ministries of energy funded the research in support of the development of the model code requirements and the supporting software.

Under Canada's Constitution Act, building regulation is the responsibility of provincial and territorial governments. The MNECB is written as a model code to permit adoption by the provinces. To date, the Province of Ontario and the City of Vancouver have referenced the MNECB in their building regulations and enforce its requirements. Natural Resources Canada's Commercial Building Incentive Program uses the MNECB energy efficiency levels as a reference baseline.

Cool roofs are not a prescriptive requirement, but using a cool roof provides an "energy credit" against roof insulation when complying with the trade-off or performance methods. The methods compare the energy use between a building's Standard Design and Proposed Design. The Standard Design is a building substantially similar to the Proposed Design, but in exact compliance with the code. The Standard Design roof has an

absorptance of 0.70 (reflectance of 0.30), while absorptance on the Proposed Design can be modeled at any absorptance between 0.2 and 0.9. The default absorptance for the Proposed Design is 0.70.

Cool Roof Qualifications

The MNECB does not define a cool roof, but rather acknowledges roof reflectivity, which is an essential cool roof characteristic. The MNECB does not require any specific emissivity value.

Roof reflectivity is not addressed in the residential code.

Metal Roofing Considerations

Since the MNECB only addresses absorptance and emissivity, certain metal roofs are credited that would not be considered a cool roof by other code standards. Roofs with low emittance are usually unpainted metal roofs.

Updates

The next update to the MNECB is scheduled for 2004. The first public consultation on the objectives and structure of the codes was completed in March 2001. A more detailed consultation on the format is planned for early 2003.

How the Process Works

The Canadian Commission on Building and Fire Codes (CCBFC) develops the national model codes through a consensus-based process that relies on the voluntary contributions of public and private sector experts from across Canada. Under the auspices of the CCBFC, the Standing Committee on Energy Conservation in Buildings (SCECB) reviews and develops proposed technical changes to the codes before they are submitted for public review. The changes must then be approved by the CCBFC before publication by the NRC.

The decisions of this Standing Committee constitute advice to the CCBFC, which retains final authority on the content of all national code documents. The SCECB can only consider requirements that are within the scope of the MNECB. Issues concerning the scope of the codes are addressed by the CCBFC in cooperation with the provinces and territories.

Groups Involved

Members of the Standing Committee on Energy Conservation in Buildings are regulators, representatives of governmental energy ministries, designers, contractors, building operators/developers, researchers, consumer representatives, manufacturers, and suppliers from across Canada who volunteer their time and expertise for a two- or three-year term. The Standing Committee recruits task group members for short, specific projects. See the Appendices for a list of the SCECB members.

More Information

Information regarding Canada's building codes is available at http://www.nationalcodes.ca/ncd_home_e.shtml.

John Gibson, Chair of the Standing Committee on Energy Conservation in Buildings
Alberta Infrastructure
Edmonton, AB

Appendices

1. *Cool Roof Rating Council Product Listing*
2. *California Title 24 Section 10-113*
3. *Amendment to Chapter 18-13 of the Municipal Code of Chicago*
4. *EnergyStar Roofing Products List*
5. *LEED Board Members*
6. *Roster of the Canada's SCECB Members*
7. *2002 International Energy Conservation Code Committee Roster*

Cool Roof Rating Council
Product Listing
As of April 3, 2003

Company Name and Contact	Brand	Model	Type	Solar Reflectance		Thermal Emittance		Applications		CRRC Prod. ID
				Initial	3-year	Initial	3-year	Low-slope	Steep-Slope	
Akzo Nobel Coatings, Inc. Lori E. Witherup 614-294-3361	Polydure 1000 CC Series	White	Coating	0.70	pending	0.80	pending			0618-0001
Akzo Nobel Coatings, Inc. Lori E. Witherup 614-294-3361	Trinar CC Series	Bone White	Coating	0.70	pending	0.80	pending			0618-0002
Carlisle Syntec, Inc. Brian Gish 717-245-7041	Sure-Weld	TPO Tan	Single-Ply Thermoplastic	0.67	pending	0.87	pending			0628-0001
Carlisle Syntec, Inc. Brian Gish 717-245-7041	Sure-Weld	TPO White	Single-Ply Thermoplastic	0.77	pending	0.88	pending			0628-0002
Carlisle Syntec, Inc. Brian Gish 717-245-7041	Brite-Ply	EPDM White	Single-Ply Thermoset	0.78	pending	0.86	pending			0628-0003
Carlisle Syntec, Inc. Brian Gish 717-245-7041	Sure-Weld	TPO Gray	Single-Ply Thermoplastic	0.26	pending	0.87	pending			0628-0004
CENTRIA Mark Thimons 412-299-8189	SRS Roof System	Fluropon LS System - 431R005	Metal	0.71	pending	0.83	pending	x	x	0636-0001
Duro-Last Roofing, Inc. Todd D. Fritz 800-248-0280	PVC Thermoplastic	White	Single-Ply Thermoplastic	0.88	pending	0.87	pending			0610-0001
ER Systems Tim Leonard 763-479-6690	Eraguard 500	White	Coating	0.86	pending	0.86	pending			0622-0001
ER Systems Tim Leonard 763-479-6690	Erlastic Acrylic Copolymer		Coating	0.86	pending	0.86	pending			0622-0002
ER Systems Tim Leonard 763-479-6690	Eraguard 1000	White	Coating	0.87	pending	0.86	pending			0622-0003
Everest Coatings Incorporated John Linell 281-350-9800	Evercoat 922	Brown HR	Coating	0.40	pending	0.87	pending		x	0624-0001
Everest Coatings Incorporated John Linell 281-350-9800	Evercoat 922	Terracotta HR	Coating	0.50	pending	0.86	pending		x	0624-0002

Cool Roof Rating Council
Product Listing
As of April 3, 2003

Company Name and Contact	Brand	Model	Type	Solar Reflectance		Thermal Emittance		Applications		CRRC Prod. ID
				Initial	3-year	Initial	3-year	Low-slope	Steep-Slope	
Everest Coatings Incorporated John Linell 281-350-9800	Evercoat 922	Tan HR	Coating	0.67	pending	0.86	pending		x	0624-0003
Everest Coatings Incorporated John Linell 281-350-9800	Evercoat 922	Forest Green HR	Coating	0.36	pending	0.87	pending		x	0624-0004
Everest Coatings Incorporated John Linell 281-350-9800	Evercoat 922	Aztec Red HR	Coating	0.38	pending	0.87	pending		x	0624-0005
Everest Coatings Incorporated John Linell 281-350-9800	Evercoat 500	Tan HR	Coating	0.70	pending	0.86	pending	x		0624-0006
Everest Coatings Incorporated John Linell 281-350-9800	Evercoat 500	Gray HR	Coating	0.69	pending	0.87	pending	x		0624-0007
Everest Coatings Incorporated John Linell 281-350-9800	Evercoat 500	Ivory HR	Coating	0.77	pending	0.86	pending	x		0624-0008
Everest Coatings Incorporated John Linell 281-350-9800	Evercoat 500	White HR	Coating	0.83	pending	0.89	pending	x		0624-0009
Everest Coatings Incorporated John Linell 281-350-9800	Evercoat 500	Eversil 580	Coating	0.79	pending	0.85	pending	x		0624-0010
Everest Coatings Incorporated John Linell 281-350-9800	Evercoat 500	Evercoat 5400	Coating	0.82	pending	0.90	pending	x		0624-0011
Firestone Building Products Ross H. Robertson 371-575-7227	AcryliTop	PC-100 Gray	Coating	0.32	pending	0.88	pending			0608-0001
Firestone Building Products Ross H. Robertson 371-575-7227	AcryliTop	PC-100 Tan	Coating	0.53	pending	0.88	pending			0608-0002
Firestone Building Products Ross H. Robertson 371-575-7227	AcryliTop	PC-100 White	Coating	0.82	pending	0.87	pending			0608-0003
Firestone Building Products Ross H. Robertson 371-575-7227	RubberGard	LSFR EPDM Membrane	Single-Ply Thermoset	0.06	pending	0.82	pending			0608-0004

Cool Roof Rating Council
Product Listing
As of April 3, 2003

Company Name and Contact	Brand	Model	Type	Solar Reflectance		Thermal Emittance		Applications		CRRC Prod. ID
				Initial	3-year	Initial	3-year	Low-slope	Steep-Slope	
Firestone Building Products Ross H. Robertson 371-575-7227	UltraPly	PVC White	Single-Ply Thermoplastic	0.84	pending	0.83	pending			0608-0005
Firestone Building Products Ross H. Robertson 371-575-7227	AcryliTop	PC-100 Base Coat	Coating	0.60	pending	0.88	pending			0608-0006
Firestone Building Products Ross H. Robertson 371-575-7227	Acrylic	Base Coat for Asphalt	Coating	0.78	pending	0.85	pending			0608-0007
Firestone Building Products Ross H. Robertson 371-575-7227	UltraPly	TPO White	Single-Ply Thermoplastic	0.79	pending	0.85	pending			0608-0008
Gardner-Gibson, Inc. Bob Hyer 562-423-6471	APOC 252	White	Coating	90.00	pending	0.87	pending			0646-0001
Gardner-Gibson, Inc. Bob Hyer 562-423-6471	STA-KOOL 770	White	Coating	88.40	pending	0.87	pending			0646-0002
Gardner-Gibson, Inc. Bob Hyer 562-423-6471	APOC QU	White	Coating	85.20	pending	0.88	pending			0646-0003
Gardner-Gibson, Inc. Bob Hyer 562-423-6471	STA-KOOL 700	White	Coating	0.88	pending	0.89	pending			0646-0004
Gardner-Gibson, Inc. Bob Hyer 562-423-6471	APOC 258	White	Coating	86.50	pending	0.89	pending			0646-0005
Gardner-Gibson, Inc. Bob Hyer 562-423-6471	STA KOOL 780	White	Coating	87.30	pending	0.89	pending			0646-0006
Gardner-Gibson, Inc. Bob Hyer 562-423-6471	SK-770			88.40	pending	0.87	pending			0646-0007
Gardner-Gibson, Inc. Bob Hyer 562-423-6471	SK-700			88.00	pending	0.89	pending			0646-0008
Gardner-Gibson, Inc. Bob Hyer 562-423-6471	SK-780			87.40	pending	0.89	pending			0646-0009

Cool Roof Rating Council
Product Listing
As of April 3, 2003

Company Name and Contact	Brand	Model	Type	Solar Reflectance		Thermal Emittance		Applications		CRRC Prod. ID
				Initial	3-year	Initial	3-year	Low-slope	Steep-Slope	
Gardner-Gibson, Inc. Bob Hyer 562-423-6471	APOC-QU			85.20	pending	0.88	pending			0646-0010
Gardner-Gibson, Inc. Bob Hyer 562-423-6471	APOC-258			86.50	pending	0.89	pending			0646-0011
GenFlex Roofing Systems Tim McQuillen 419-891-4448	GenFlex	White (PVC) RM	Single-Ply Thermoplastic	79.90	pending	0.87	pending			0632-0001
GenFlex Roofing Systems Tim McQuillen 419-891-4448	GenFlex	White TPO	Single-Ply Thermoplastic	77.30	pending	0.87	pending			0632-0002
GenFlex Roofing Systems Tim McQuillen 419-891-4448	GenFlex	Gray TPO	Single-Ply Thermoplastic	46.60	pending	0.87	pending			0632-0003
GenFlex Roofing Systems Tim McQuillen 419-891-4448	GenFlex	Charcoal TPO	Single-Ply Thermoplastic	7.00	pending	86.00	pending			0632-0004
GenFlex Roofing Systems Tim McQuillen 419-891-4448	GenFlex	Tan (PVC) RM	Single-Ply Thermoplastic	58.70	pending	85.00	pending			0632-0005
GenFlex Roofing Systems Tim McQuillen 419-891-4449	GenFlex	Gray (PVC) RM	Single-Ply Thermoplastic	48.70	pending	0.86	pending			0632-0006
Henry Company John Seymour 484-923-2280	HE287 Solar-Flex	White Acrylic	Coating	0.85	pending	0.89	pending			0620-0001
Henry Company John Seymour 484-923-2280	HE229 Aluminum Emulsion	Standard	Coating	0.59	pending	0.45	pending			0620-0002
Henry Company John Seymour 484-923-2280	HE555 Brilliant Aluminum	Standard	Coating	0.53	pending	0.50	pending			0620-0003
Henry Company John Seymour 484-923-2280	HE280 Premium White Elastomeric	White	Coating	0.84	pending	0.89	pending			0620-0004
Henry Company John Seymour 484-923-2280	HE299 Premium Elastomeric	White	Coating	0.87	pending	0.88	pending			0620-0005

Cool Roof Rating Council
Product Listing
As of April 3, 2003

Company Name and Contact	Brand	Model	Type	Solar Reflectance		Thermal Emittance		Applications		CRRC Prod. ID
				Initial	3-year	Initial	3-year	Low-slope	Steep-Slope	
Henry Company John Seymour 484-923-2280	PG550 Elastomeric	White	Coating	0.75	pending	0.88	pending			0620-0006
Henry Company John Seymour 484-923-2280	HE287SF Solar-Flex	White	Coating	0.86	pending	0.88	pending			0620-0007
Henry Company John Seymour 484-923-2280	HE275 MetalShield	Acrylic White	Coating	0.75	pending	0.89	pending			0620-0008
Henry Company John Seymour 484-923-2280	HE517 MetalShield Rubber Based	White	Coating	0.86	pending	0.88	pending			0620-0009
Henry Company John Seymour 484-923-2280	HE520 Premium Fibered Aluminum	Standard	Coating	0.58	pending	0.49	pending			0620-0010
Henry Company John Seymour 484-923-2280	HE220 Alumi- Top Fibered Aluminum	Standard	Coating	0.57	pending	0.49	pending			0620-0011
Henry Company John Seymour 484-923-2280	HE120 Premium Non- Fibered Aluminum	Standard	Coating	0.59	pending	0.49	pending			0620-0012
Henry Company John Seymour 484-923-2280	HE827 Rubberkote	White	Coating	0.87	pending	0.88	pending			0620-0013
Henry Company John Seymour 484-923-2280	HE869 Elastomeric Aluminu	Standard	Coating	0.69	pending	0.40	pending			0620-0014
IB Roof Systems Trace Stanley 800-426-1626		50 Mil White PVC, Sandblast Grain	Single-Ply Thermoplastic	0.87	pending	0.88	pending			0640-0001
IB Roof Systems Trace Stanley 800-426-1626		80 Mil White PVC, Sandblast Grain	Single-Ply Thermoplastic	0.87	pending	0.85	pending			0640-0002

Cool Roof Rating Council
Product Listing
As of April 3, 2003

Company Name and Contact	Brand	Model	Type	Solar Reflectance		Thermal Emittance		Applications		CRRC Prod. ID
				Initial	3-year	Initial	3-year	Low-slope	Steep-Slope	
KST Coatings Manufacturing, Inc. Paul Bauer 330-405-1622	41-300 Uniflex	White	Coating	0.86	pending	0.91	pending			0630-0001
MEGA Industries Corporation Woody Martensen 904-642-0690	MegaFlex M-100	Cool Roof White	Coating	0.86	pending	0.87	pending			0644-0001
Metacrylics Mark Anthenien 408-280-7733	Acrylic White	Clear Stone	Coating	87.00	pending	0.90	pending			0660-0001
National Coatings Corporation Rick Sexauer 805-388-7112	AcryShield A400	White	Coating	0.83	pending	0.88	pending			0626-0001
National Coatings Corporation Rick Sexauer 805-388-7112	AcryShield A500	White	Coating	0.83	pending	0.88	pending			0626-0002
National Coatings Corporation Rick Sexauer 805-388-7112	AcryShield A550	White	Coating	0.86	pending	0.88	pending			0626-0003
National Coatings Corporation Rick Sexauer 805-388-7112	AcryShield RP	White	Coating	0.83	pending	0.88	pending			0626-0004
National Coatings Corporation Rick Sexauer 805-388-7112	AcryShield A600	White	Coating	0.83	pending	0.88	pending			0626-0005
Polyglass USA Shaik Mohseen 570-384-1230	Polykool	APP Self- Adhered	Modified Bitumen	0.65	pending	0.79	pending			0616-0001
Polyglass USA Shaik Mohseen 570-384-1230	Polykool	SBS Self- Adhered	Modified Bitumen	0.65	pending	0.79	pending			0616-0002
Polyglass USA Shaik Mohseen 570-384-1230	Polykool	APP Torch	Modified Bitumen	0.65	pending	0.79	pending			0616-0003
Republic Powdered Metals, Inc. Kurt Sosinski 216-766-5511	Solargard Hy- build Finish Coat	15107000 White	Coating	0.80	pending	0.86	pending			0650-0001
Republic Powdered Metals, Inc. Kurt Sosinski 216-766-5511	Solargard Finish Coat	11047000 White	Coating	0.82	pending	0.87	pending			0650-0002

Cool Roof Rating Council
Product Listing
As of April 3, 2003

Company Name and Contact	Brand	Model	Type	Solar Reflectance		Thermal Emittance		Applications		CRRC Prod. ID
				Initial	3-year	Initial	3-year	Low-slope	Steep-Slope	
Republic Powdered Metals, Inc. Kurt Sosinski 216-766-5511	Solargard Ultra	11037000 White	Coating	0.83	pending	0.83	pending			0650-0003
Republic Powdered Metals, Inc. Kurt Sosinski 216-766-5511	Alumanation 301	301	Coating	0.66	pending	0.39	pending			0650-0004
Resin Technology/Henry Company James Doose 909-947-7224	Permax-108	Acrylic	Coating	0.85	pending	0.88	pending			0648-0001
Resin Technology/Henry Company James Doose 909-947-7224	Permax-110	Acrylic	Coating	0.83	pending	0.88	pending			0648-0002
Resin Technology/Henry Company James Doose 909-947-7224	Permax-200	Silicone	Coating	0.81	pending	0.88	pending			0648-0003
Resin Technology/Henry Company James Doose 909-947-7224	Permax-115	Acrylic	Coating	0.87	pending	0.88	pending			0648-0004
Seaman Corporation Jonathan C. Pierson 800-927-8578	FiberTite	Roof Membrane	Single-Ply Thermoplastic	0.83	pending	0.85	pending			0634-0001
Seaman Corporation Jonathan C. Pierson 800-927-8578	FiberTite	45 Mil Non-Fleece		0.84	pending	0.87	pending			0634-0002
Seaman Corporation Jonathan C. Pierson 800-927-8578	FiberTite	36 Mil Non-Fleece		0.83	pending	0.86	pending			0634-0003
Stevens Roofing Systems Peter A. Bonavita 413-552-1017	Stevens Hypalon		Single-Ply Thermoset	0.85	pending	0.87	pending			0652-0001
Stevens Roofing Systems Peter A. Bonavita 413-552-1017	Stevens EP		Single-Ply Thermoplastic	0.80	pending	0.84	pending			0652-0002
Technical Roofing Solutions Tom Meyer 920-699-3390	ACRA-TEK 4000	White	Coating	81.00	pending	0.87	pending			0642-0001
Technical Roofing Solutions Tom Meyer 920-699-3390	VRE-TEK 8000	White	Coating	78.00	pending	0.84	pending			0642-0002

Cool Roof Rating Council
Product Listing
As of April 3, 2003

Company Name and Contact	Brand	Model	Type	Solar Reflectance		Thermal Emittance		Applications		CRRC Prod. ID
				Initial	3-year	Initial	3-year	Low-slope	Steep-Slope	
Technical Roofing Solutions Tom Meyer 920-699-3390	ACRA-TEK 5000	White	Coating	82.00	pending	0.84	pending			0642-0003
Technical Roofing Solutions Tom Meyer 920-699-3390	POLY-SIL 2200	White	Coating	84.00	pending	0.85	pending			0642-0004
Technical Roofing Solutions Tom Meyer 920-699-3390	ACRA-TEK 4200	White	Coating	80.00	pending	0.85	pending			0642-0005
Technical Roofing Solutions Tom Meyer 920-699-3390	ACRA-TEK 9000	White	Coating	85.00	pending	0.85	pending			0642-0006
Tremco Incorporated Kurt Sosinski 216-766-5511	Walltite F	344-87000 White	Coating	0.80	pending	0.86	pending			0612-0001
Tremco Incorporated Kurt Sosinski 216-766-5511	Polarcote FR	346-102 White	Coating	0.83	pending	0.84	pending			0612-0002
Tremco Incorporated Kurt Sosinski 216-766-5511	Tremlite Coating	346-07000 White	Coating	0.82	pending	0.87	pending			0612-0003
Tremco Incorporated Kurt Sosinski 216-766-5511	One Coat Aluminum	352-561	Coating	0.66	pending	0.39	pending			0612-0004
Tremco Incorporated Kurt Sosinski 216-766-5511	High Build Reflective Coating	344-17000	Coating	0.83	pending	0.83	pending			0612-0005

SECTION 10-113 – CERTIFICATION AND LABELING OF ROOFING PRODUCT REFLECTANCE AND EMITTANCE

This section establishes rules for implementing labeling and certification requirements relating to reflectance and emittance for roofing products for showing compliance with Sections 141, 142, and 151(b) of Title 24, California Code of Regulations, Part 6. This section also provides for designation of the Cool Roof Rating Council (CRRC) as the supervisory entity responsible for administering the state's certification program for roofing products, provided CRRC meets specified criteria.

(a) Labeling Requirements.

Effective January 1, 2003, every roofing product installed in construction to take compliance credit for reflectance and emittance under Sections 141, 142, and 151(b) shall have a clearly visible packaging label that lists the reflectance and emittance tested in accordance with the following ASTM Standards. Product reflectance and emittance ratings determined through these testing procedures shall be placed on a label on all packaging which contains the product. The words “Manufacturer stipulates that this rating was determined in accordance with applicable CRRC procedures” followed by the rating procedure number and certified reflectance and emittance shall be placed on the packaging of the roofing products. The label shall also state any limitations or conditions of the applicability of the rating to installed roofing products.

ASTM E408-71(1996)e1– Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques.

ASTM E903-96– Standard Test Method for Solar Absorptance, Reflectance and Transmittance of Materials Using Integrating Spheres.

ASTM E1918-97– Standard Test Method for Measuring Solar Reflectance of Horizontal and Low Sloped Surfaces in the Field

Packaging for liquid applied roof coatings shall state that they meet the minimum performance requirements set forth in ASTM D6083-97a – Standard Specification for Liquid Applied Acrylic Coating Used in Roofing, for initial tensile strength, initial elongation, elongation after 1000 hours accelerated weathering, permeance, and accelerated weathering.

(b) Certification Requirements.

Effective January 1, 2003 every roofing product installed in construction to take compliance credit for reflectance and emittance under Sections 141, 142, and 151(b) shall be certified only by CRRC or another supervisory entity approved by the commission pursuant to Section 10-113(c).

(c) Designation of Supervisory Entity. The Cool Roof Rating Council shall be the supervisory entity to administer the certification program relating to reflectance and emittance ratings for

roofing products, provided the commission determines that the CRRC meets the criteria in paragraph (d).

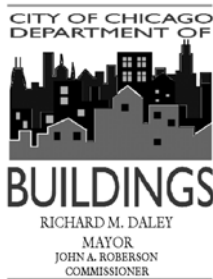
1. The commission may consider designating a supervisory entity other than CRRC only if the commission determines that the CRRC cannot meet the criteria in paragraph (d) by January 1, 2002. Such other supervisory entity shall meet the criteria in paragraph (d) prior to being designated.
2. The commission shall periodically review, at least annually, the structure and operations of the supervisory entity to ensure continuing compliance with the criteria in paragraph (d).

(d) Criteria for Supervisory Entity.

1. Membership in the entity shall be open on a nondiscriminatory basis to any person or organization that has an interest in uniform performance ratings for roofing products, including, but not limited to, members of the roofing industry, building industry, design professionals, specifiers, utilities, government agencies, and public interest organizations. The membership shall be composed of a broad cross section of those interested in uniform thermal performance ratings for roofing products.
2. The governing body of the entity shall reflect a reasonable cross-section of the interests represented by the membership.
3. The entity shall maintain a program of oversight of product manufacturers, laboratories, and independent certifying organizations that ensures uniform application of the ASTM Standards E408, E903, E1918, D6083 testing and rating procedures, labeling and certification, and such other rating procedures for other factors affecting energy performance as the CRRC and the commission may adopt.
4. The entity shall require manufacturers and independent certifying organizations within its program to use only laboratories accredited by the supervisory entity to perform tests under the CRRC rating procedure.
5. The entity shall maintain appropriate guidelines for testing laboratories and manufacturers, including requirements for adequate:
 - a. Possession and calibration of equipment;
 - b. Education, competence, and training of personnel;
 - c. Quality control;
 - d. Record keeping and reporting;
 - e. Periodic review (including but not limited to, blind testing by laboratories; inspections of products; inspections of laboratories, and manufacturing facilities);
 - f. Challenges to certified ratings; and
 - g. Guidelines to maintain the integrity of the program, including, but not limited to, provisions to avoid conflicts of interest within the rating and certification process.

6. The entity shall be a nonprofit organization and shall maintain reasonable, nondiscriminatory fee schedules for the services it provides, and shall make its fee schedules, the financial information on which fees are based, and financial statements available to its members for inspection.
7. The entity shall provide hearing processes that give laboratories, manufacturers and certifying agencies a fair review of decisions that adversely affect them.
8. The entity shall maintain a certification policy committee whose procedures are designed to avoid conflicts of interest in deciding appeals, resolving disputes and setting policy for the certifying organizations in its program.
9. The entity shall publish at least annually a directory of products certified and decertified within its program.
10. The entity itself shall be free from conflict-of-interest ties or to undue influence from any particular roofing product manufacturing interest(s), testing or independent certifying organization(s).
11. The entity shall provide or authorize the use of labels that can be used to meet the requirements for showing compliance with the requirements of Sections 141, 142, and 151(b), and this section.
12. The entity's certification program shall allow for multiple participants in each aspect of the program to provide for competition between manufacturers and between testing labs.

NOTE: Authority cited: Section 25402.1, Public Resources Code. Reference: Section 25402.1, Public Resources Code.



Summary and Text of Amendment to the Chicago Energy Conservation Code, Chapter 18-13 of the Municipal Code of Chicago

This amendment to Chapter 18-13 makes technical changes to the grammar, punctuation and citations of the Chicago Energy Conservation Code. It was passed by the Chicago City Council on Jan. 16, 2003. Please note: Section 303 of this ordinance is effective April 1, 2003. All other sections became effective with publication on Feb. 4, 2003.

The summary and detail information below regarding specific amended sections is provided for your convenience. Please view <http://www.cityofchicago.org/Buildings/BuildingCode/EnergyCodeInfo.html> for more about the Chicago Energy Conservation Code.

SUMMARY

18-13-101.4.1: Stipulates that the exemption provided to low-energy use industrial and storage type buildings does not extend to the Urban Heat Island provisions.

18-13-101.4.2.3: Clarifies the exemption for “landmark buildings” so that the energy provisions will apply to any non-designated interior remodeling. Further clarifies the exemption for “landmark buildings” so that the energy provisions will apply to new construction in landmark districts.

18-13-202: Redefines “roof top garden” to require a plan approved by DOB in order to protect against inferior “gardens” designed to evade the roofing reflectance requirement.

18-13-303.2.1 (1): Reduces the initial minimum reflectance requirements for low-slope roofing to 0.25.

18-13-303.2.1 (2): Eliminates the intermediate timetable, requiring compliance with higher standards by 12/31/08.

18-13-303.2.1 (2): Sets the standard for roofing materials to the Energy Star program as determined by the U.S.E.P.A.

18-13-503.3.3.4 and .5: Reinserts sections inadvertently omitted which set standards for the installation and testing of duct systems.

KEY TO GRAPHIC DISPLAY OF AMENDMENT TEXT:

1. ~~Example~~ ~~Strikethrough~~ text indicates deletion.
2. **Example** Bold text with underline indicates addition.

DETAIL

18-13-101.4.1 Exempt buildings. Buildings and structures indicated in Sections 18-13-101.4.1.1 and 18-13-101.4.1.2 shall be exempt from the provisions of this chapter. Commercial buildings provided with service water-heating and/or electric lighting shall meet the applicable provisions of Article 7 or Article 8 regardless of this exempt status. **The exemption under this section shall not apply to the urban heat islands provisions, Section 18-13-303.**

18-13-101.4.2.3 Historic buildings. The provisions of this chapter relating to the ~~construction~~, alteration, enlargement, restoration, relocation or moving of buildings or structures shall not be mandatory for existing buildings or structures that have ~~received landmark designation under the Chicago Landmark Ordinance or have been listed in The National Register of Historic Places.~~ **been, either individually or as part of a landmark or historic district, designated as Chicago Landmarks under Chapter 2-120 of the Municipal Code of Chicago, or listed in the National Register of Historic Places. Such buildings are exempt from these code requirements as they apply to the exterior envelope of a building or structure and any designated interior. This exception only applies to existing structures that are designated landmarks or within landmark districts, not new construction or new additions.**

18-13-202 (definitions) ...

ROOF TOP GARDEN. ~~A roof area covered in part with landscaping materials or plantings in containers, intended as an environmental and decorative amenity which may be used for social or recreational purposes or for strictly aesthetic purposes not permitting human occupancy.~~ **A roof area covered wholly or in part with plants and landscaping materials in accordance with a plan approved by the Building Department and which may be used for human occupancy.**

303 URBAN HEAT ISLANDS

18-13-303.1 Roof Reflectance. ~~18-13-303.1 **Roof Reflectance.** To minimize the undesirable “urban heat islands effect,” low and medium sloped roofs shall comply with the following requirements when tested in accordance with ASTM E408. The roof surface of low sloped roofs (2:12 or less) shall have an initial solar reflectance greater than or equal to 0.65 and shall maintain a reflectance equal to greater than 0.50 for three years after installation. Medium sloped roofs (greater than 2:12 and less than or equal to 5:12) shall have a solar reflectance equal to or greater than 0.15 initially and for three years after installation. Minimum emissivity shall be 0.9.~~

Exception: Roofs or portions of roofs that utilize photovoltaic, solar thermal or roof garden systems.

Urban heat island provisions. The reflectance and emittance requirements of Sections 18-13-303.1 through 18-13-303.2.1 are intended to minimize the urban heat island effect, as defined in Section 18-13-202, Definitions.

- 1. The portion of the roof that is covered by a rooftop deck covering 1/3 or less of the aggregate area of the roof, or a rooftop garden, or a green roof, is exempted from the requirements of this section.**
- 2. An area including and adjacent to rooftop photovoltaic and solar thermal equipment, totaling not more than three times the area that is covered with such equipment, may be exempted from the requirements of this section.**

18-13-303.2 Solar Reflectance. All roof exterior surfaces shall have a minimum solar reflectance as specified in 18-13-303.2.1 when tested in accordance with ASTM E903, ASTM E 1918 or by testing with a portable reflectometer at near ambient conditions.

18-13-303.2.1 Roofing materials used in roofs with slopes of 0 in 12 to 2 in 12 shall meet the following requirements:

- 1. Roofs installed prior to and including 12/31/08 shall have a minimum solar reflectance, both initial and weathered, of 0.25.**
- 2. Roofs installed after 12/31/08 shall utilize roofing products that meet or exceed the minimum criteria to qualify for an Energy Star label as designated by the USEPA Energy Star program.**

18-13-303.2.2 Deliberately omitted.

18-13-503.3.3.4 Duct construction. Duct work shall be constructed and erected in accordance with 13-176-160.

18-13-503.3.3.4.1 High- and medium-pressure duct systems. High-pressure and medium-pressure ducts shall be leak tested in accordance with the SMACNA *HVAC Air Duct Leakage Test Manual* with the rate of air leakage not to exceed the maximum rate specified in that standard.

18-13-503.3.3.4.2 Low-pressure duct systems. All longitudinal and transverse joints, seams and connections of low-pressure supply and return ducts shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems or tapes installed in accordance with the manufacturers installation instructions. Duct tape shall not be permitted as a sealant on any ducts.

Exception: Continuously welded and locking-type longitudinal joints and seams on ducts operating at static pressures less than 2 inches w.g. (500 Pa) pressure classification.

-- END --

ENERGY STAR® for Roof Products
Qualifying Product List
As of January 21, 2003

NEW - Denotes products recently added to the list.

Company Name	Brand	Model	Type	Initial Solar Reflectance	Solar Reflectance After 3 years*	Applications		Warranty (years)†	
						Low Slope	Steep Slope		
Ace Coating Co., Inc. Benjamin Heilbrunn (619) 697-3300	Alpha 8	Roof Coating	Coating (Acrylic)	0.73	0.66	Yes		10	
Acry-Tech Dan Hiltnerberger (954) 565-6001	Acry-Tech	Super Roof Seal	Coating (Acrylic)	0.77	0.66	Yes	Yes	5 - 10	
Acrymax Technologies, Inc. (610) 566-7470	Scott Bernung	Acrymax	AF-130	Coating (Acrylic)	0.85	0.70	Yes	Yes	5 - 10
Advanced Coating Systems Brian O'Donnell (800) 587-3758	Energy Seal Coatings	Acu-Shield	Coating (Acrylic)	0.88	0.84	Yes	Yes	10	
Advanced Coating Systems	Energy Seal Coatings	Acu-Shield: Ceramic	Coating	0.89	0.82	Yes	Yes	10	
Advanced Coating Systems	Energy Seal Coatings	Acu-Shield: F.R.C.	Coating (Acrylic)	0.86	0.82	Yes	Yes	10	
Advanced Coating Systems	Energy Seal Coatings	Acu-Shield: Sub Zero	Coating (Acrylic)	0.88	0.84	Yes	Yes	10	
Advanced Coating Systems	Energy Seal Coatings	Acu-Shield: Urethane	Coating	0.88	0.84	Yes	Yes	10	
Advanced Coating Systems	Energy Seal Coatings	Acu-Flex	Coating (Acrylic)	0.89	0.85	Yes	Yes	10	
Advanced Coating Systems	Energy Seal Coatings	Acu-Flex: Ceramic	Coating	0.88	0.84	Yes	Yes	10	
Advanced Coating Systems	Energy Seal Coatings	Acu-Flex: Sub Zero	Coating (Acrylic)	0.90	0.83	Yes	Yes	10	
Advanced Coating Systems	Energy Seal Coatings	Acu-Flex: Urethane	Coating	0.88	0.84	Yes	Yes	10	
Advanced Coating Systems	Energy Seal Coatings	Acu-Kool	Coating (Acrylic)	0.88	0.82	Yes	Yes	10	
Advanced Coating Systems	Energy Seal Coatings	Acu-Flex: Hydro	Elastomeric Coating	0.91	0.87	Yes	Yes	10	
AEP-Span Jim Daniels (800) 527-2503	AEP-Span	Cap Seam - Bare Metal	Standing Seam Metal Roofing	0.78	0.58	Yes	Yes	20	
AEP-Span	AEP-Span	Flush Panel - Bare Metal	Standing Seam Metal Roofing	0.78	0.58	Yes	Yes	20	
AEP-Span	AEP-Span	High Seam - Bare Metal	Standing Seam Metal Roofing	0.78	0.58	Yes	Yes	20	
AEP-Span	AEP-Span	Snap Seam - Bare Metal	Standing Seam Metal Roofing	0.78	0.58	Yes	Yes	20	
AEP-Span	AEP-Span	Span Lok - Bare Metal	Standing Seam Metal Roofing	0.78	0.58	Yes	Yes	20	
AEP-Span	AEP-Span	Span Seam - Bare Metal	Standing Seam Metal Roofing	0.78	0.58	Yes	Yes	20	
ALCO-NVC, Inc. (313) 823-7500	Edward Karpinski	ALCO	Non-Fibered Alumagard _{4u}	Coating (Aluminum)	0.72	0.53	Yes		5 - 10
ALCO-NVC, Inc.		ALCO	Fibered Alumagard _{4u}	Coating (Aluminum)	0.74	0.51	Yes		5 - 10
ALCO-NVC, Inc.		ALCO	White Elastomeric	Elastomeric Coating	0.86	0.61	Yes	Yes	5
American Chemical Technologies Corp. Heather Shepherd (219) 266 8960	TRI-Coat		Elastomeric Coating	Elastomeric Coating	0.78	0.78	Yes		
American Hydrotech, Inc. Edward Tierney (312) 537-4998	Hydroguard®	RE	Insulation Panel System	0.84	0.65	Yes	No	5 - 20	
Anchor Coatings, Inc. (352) 728-0777	Amanda Wells	Anchor Coatings, Inc.	Thermo-Flex 103	Coating (Acrylic)	0.87	0.75	Yes	Yes	5
ATAS International Inc. Robert R. Goodhart (610) 395-8445	1" Field Lok Panel	FLL	Metal	0.68	0.57	No	Yes	20	
ATAS International Inc.	1 1/2" Field Lok Panel	FLM	Metal	0.68	0.57	Yes	Yes	20	
ATAS International Inc.	2" Field Lok Panel	FLN	Metal	0.68	0.57	Yes	Yes	20	
ATAS International Inc.	23/8" Field Lok Panel	FLS	Metal	0.68	0.57	Yes	Yes	20	
ATAS International Inc.	Dutch Seam Panel	MRD	Metal	0.68	0.57	No	Yes	20	
ATAS International Inc.	Monarch MRK Panel	MRK	Metal	0.68	0.57	No	Yes	20	
ATAS International Inc.	Monarch Structural MRS Panel	MRS	Metal	0.68	0.57	No	Yes	20	
ATAS International Inc.	Monarch Batten Seam	MRB	Metal	0.68	0.57	No	Yes	20	
ATAS International Inc.	Bermuda Panel/Rumba Shake	MBS	Metal	0.68	0.57	No	Yes	20	
BASF Corporation Michelle Vondran (909) 825-6292	Fluoroceram	836W29	Coating (Acrylic)	0.63	0.61	No	Yes	30	
Berridge Manufacturing Company David Doyle (713) 223-4871	Berridge	Tee-Panel Standing Seam	Metal (Bare)	0.78	0.58	Yes	Yes	20	
Berridge Manufacturing Company	Berridge	Cee-Lock Standing Seam	Metal (Bare)	0.78	0.58	Yes	Yes	20	

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						Low Slope	Steep Slope	
Berridge Manufacturing Company	Berridge	Zee-Lock Standing Seam	Metal (Bare)	0.78	0.58	Yes	Yes	20
Berridge Manufacturing Company	Berridge	Curved Tee-Panel Standing Seam	Metal (Bare)	0.78	0.58	Yes	Yes	20
Berridge Manufacturing Company	Berridge	S-Deck Corrugated Panel	Metal (Bare)	0.78	0.58	Yes	Yes	20
Berridge Manufacturing Company	Berridge	'M' & 'R' Panel Corrugated Panel	Metal (Bare)	0.78	0.58	Yes	Yes	20
Berridge Manufacturing Company	Berridge	Classic & Victorian Shingles	Metal (Bare)	0.78	0.58	Yes	Yes	20
Bond Cote Corporation David Harrison (540) 674-6408	Bond Cote Roofing Systems	400 E Plus	Single-Ply (Thermoplastic)	0.79	0.73	Yes		15
Bond Cote Corporation	Bond Cote Roofing Systems	500 E Plus	Single-Ply (Thermoplastic)	0.79	0.73	Yes		15 - 20
Bond Cote Corporation	Bond Cote Roofing Systems	600 E Plus	Single-Ply (Thermoplastic)	0.79	0.73	Yes		15 - 20
Bond Cote Corporation	Bond Cote Roofing Systems	800 E Plus	Single-Ply (Thermoplastic)	0.79	0.73	Yes		15 - 20
Bond Cote Corporation	Bond Cote Roofing Systems	350 Series	Single-Ply (Thermoplastic)	0.79	0.73	Yes		15
Bond Cote Corporation	Bond Cote Roofing Systems	400 Series	Single-Ply (Thermoplastic)	0.79	0.73	Yes		15
Bond Cote Corporation	Bond Cote Roofing Systems	450 Series	Single-Ply (Thermoplastic)	0.79	0.73	Yes		15
Bond Cote Corporation	Bond Cote Roofing Systems	500 Series	Single-Ply (Thermoplastic)	0.79	0.73	Yes		15
Building Energy Savings Technology Chris Dwyer (775) 888-9595	Roofcool	Superior	Elastomeric Coating	0.88	0.80	Yes		10
Building Energy Savings Technology	Roofcool	Supreme	Elastomeric Coating	0.88	0.80	Yes		10
Burkline Roofing Systems Brad Roades (800) 669-7010	Burkline	M-358	Single-Ply (Hypalon)	0.82	0.77	Yes	No	15
Butler Manufacturing Company Charles Milburn (816) 968-5731	Butler	VSR	Metal (Bare)	0.68	0.57	Yes	Yes	20
Butler Manufacturing Company	Butler	MR-24	Metal (Bare)	0.68	0.57	Yes	Yes	20
Butler Manufacturing Company	Butler	BUTLERIB II	Metal (Bare)	0.68	0.57	Yes	Yes	20
CAMEO Specialty Coatings Company Abe Carmella (310) 534-2022	Cameo-Flex Elastomeric	Carnig #800	Elastomeric (Acrylic) Coating	0.83	0.82	Yes	Yes	
Canadian General-Tower, Ltd. Patrick Diebel (519) 823-1630	Tower PVC	40 to 80 G	Thermoplastic PVC	0.83	0.83	Yes	Yes	10 - 20
Carlisle Syntec, Inc. Richard J. Gillenwater (800) 479-6832	Syntec	Sure-Weld White	Single-Ply (TPO)	0.87	0.83	Yes		15
Carlisle Syntec, Inc.	Syntec	Brite-Ply EPDM	Single-Ply	0.84	0.80	Yes	No	15
Carlisle Syntec, Inc.	Sure-Seal	White	Coating (Acrylic)	0.85	0.66	Yes	Yes	5
Carlisle Syntec, Inc.	Versico	Versiweld Premier White	Single-Ply (TPO)	0.87	0.83	Yes		15
CECO Building Systems Doug Jurney (601) 328-6722	CECO	CXP	Metal (Bare)	0.78	0.58	Yes		20
CECO Building Systems	CECO	CLP	Metal (Bare)	0.78	0.58	Yes		20
CECO Building Systems	CECO	MAP	Metal (Bare)	0.78	0.58	Yes		20
CECO Building Systems	CECO	MVR	Metal (Bare)	0.78	0.58	Yes		20
CENTRIA Mark Thimons (412) 299-8189	CENTRIA	SRS 2, SRS 3	Metal (Bare)	0.68	0.57	Yes	Yes	20
CENTRIA	CENTRIA	Style-Rib	Metal (Bare)	0.68	0.57	Yes	Yes	20
CENTRIA	CENTRIA	BR5-36	Metal (Bare)	0.68	0.57	Yes	Yes	20
CENTRIA	CENTRIA	TR4-36	Metal (Bare)	0.68	0.57	Yes	Yes	20
CENTRIA	CENTRIA	MR3-36	Metal (Bare)	0.68	0.57	Yes	Yes	20
CENTRIA	CENTRIA	Super-Rib	Metal (Bare)	0.68	0.57	Yes	Yes	20
CENTRIA	CENTRIA	Econolap 3/4"	Metal (Bare)	0.68	0.57	Yes	Yes	20
CENTRIA	CENTRIA	CR56 1/2"	Metal (Bare)	0.68	0.57	Yes	Yes	20
CENTRIA	RollCom	SDP 175	Metal (Bare)	0.68	0.57	Yes	Yes	20

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						Low Slope	Steep Slope	
CENTRIA	RollCom	SDP 200 Series	Metal (Bare)	0.68	0.57	Yes	Yes	20
CENTRIA	RollCom	SDP 300	Metal (Bare)	0.68	0.57	Yes	Yes	20
CENTRIA	RollCom	ADP 100 Series	Metal (Bare)	0.68	0.57	Yes	Yes	20
CENTRIA	RollCom	R Panel	Metal (Bare)	0.68	0.57	Yes	Yes	20
CENTRIA	RollCom	2.67 Corrugated	Metal (Bare)	0.68	0.57	Yes	Yes	20
CENTRIA	RollCom	7.2 Rib	Metal (Bare)	0.68	0.57	Yes	Yes	20
CENTRIA	RollCom	Shallow Rib	Metal (Bare)	0.68	0.57	Yes	Yes	20
Cerama-Tech International Dr. H.W. Ozarowski (619) 690-0773	Cerama-Tech	Cerama-Tech	Coating	0.83	0.78	Yes	Yes	15
Ceratech Coatings E.J. King (817) 831-1232	Ceratech	CTE-901 Metal Coat	Coating (Acrylic)	0.82	0.75	Yes	Yes	10
Ceratech Coatings	Ceratech	CTE-6 Pond Coat	Coating (Acrylic)	0.82	0.76	Yes	Yes	10
Classic Products, Inc. Joe Koife (937) 773-9840	Rustic Shingle	White	Shake-Shingle	0.66	0.68	No	Yes	50
Color and Chemical Research (630) 966-0931 Marketing	CCR	Coating (Bitumen Jacket)	Modified Bitumen	0.78	0.75	Yes	No	10
Conklin Company, Inc. (800) 888-8838 John Knop	Hy-Crown	Hypalon	Single-Ply (Hypalon)	0.83	0.73	Yes	Yes	15
Conklin Company, Inc.	Rapid Roof HV	White Acrylic Top Coat	Coating (Acrylic)	0.73	0.55	Yes	Yes	10
Conklin Company, Inc.	Rapid Roof LLI	White Acrylic Top Coat	Coating (Acrylic)	0.85	0.55	Yes	Yes	10
Conklin Company, Inc.	Benchmark	White Acrylic Top Coat	Coating (Acrylic)	0.86	0.80	Yes	Yes	12
Consolidated Coatings Corp. Dominic Cremona (216) 766-5605	Colormeric Ultra	High Build Reflective Coating	Coating (Acrylic)	0.84	0.60	Yes	No	10
Consolidated Coatings Corp.	Colormeric	Water-Based Elastomeric Coating	Elastomeric Coating	0.78	0.64	Yes	No	10
Consolidated Coatings Corp.	Rubber-Kote	Elastomeric, urethane	Elastomeric Coating	0.84	0.69	Yes	No	12
Consolidated Coatings Corp.	Alumatek	Aluminum Coating	Coating	0.68	0.50	Yes	Yes	10 - 12
Consolidated Fiber Glass Products Robert K. Perry (661) 323-6026	Conglas	Metal Shield Aluminum	SBS Modified Bitumen	0.70	0.50	Yes	Yes	10
Cool-It Mfg. Company Donald W. Rickert (916) 339-2454	No-Burn	105	Coating (Acrylic)	0.77	0.76	Yes	Yes	10
Copper Sales, Inc. Sal Dellino (954) 968-3100	Galvalume	UNA-CLAD UC-1 through 11	Metal (Bare)	0.78	0.58	Yes	Yes	20
Copper Sales, Inc.	Galvalume	UNA-CLAD UC-600	Metal (Bare)	0.78	0.58	Yes	Yes	20
Copper Sales, Inc.	Galvalume	UNA-CLAD UC-601	Metal (Bare)	0.78	0.58	Yes	Yes	20
Copper Sales, Inc.	Galvalume	UNA-CLAD UC-700	Metal (Bare)	0.78	0.58	Yes	Yes	20
Copper Sales, Inc.	Galvalume	UNA-CLAD 5-V-CRIMP	Metal (Bare)	0.78	0.58	Yes	Yes	20
Copper Sales, Inc.	Galvalume	UNA-CLAD HR-ULTRA OMEGA	Metal (Bare)	0.78	0.58	Yes	Yes	20
Copper Sales, Inc.	Galvalume	UNA-CLAD UR-PRO OMEGA	Metal (Bare)	0.78	0.58	Yes	Yes	20
Copper Sales, Inc.	Galvalume	UNA-CLAD VR-CLASSIC OMEGA	Metal (Bare)	0.78	0.58	Yes	Yes	20
Copper Sales, Inc.	Galvalume	UNA-CLAD NB1-BUILTITE I	Metal (Bare)	0.78	0.58	Yes	Yes	20
Copper Sales, Inc.	Galvalume	UNA-CLAD NB2-BUILTITE II	Metal (Bare)	0.78	0.58	Yes	Yes	20
Copper Sales, Inc.	Galvalume Plus ^{NEW}	UNA-CLAD UC-1 through 11	Metal (Bare)	0.68	0.57	Yes	Yes	20
Copper Sales, Inc.	Galvalume Plus ^{NEW}	UNA-CLAD UC-600	Metal (Bare)	0.68	0.57	Yes	Yes	20
Copper Sales, Inc.	Galvalume Plus ^{NEW}	UNA-CLAD UC-601	Metal (Bare)	0.68	0.57	Yes	Yes	20
Copper Sales, Inc.	Galvalume Plus ^{NEW}	UNA-CLAD UC-700	Metal (Bare)	0.68	0.57	Yes	Yes	20
Copper Sales, Inc.	Galvalume Plus ^{NEW}	UNA-CLAD 5-V-CRIMP	Metal (Bare)	0.68	0.57	Yes	Yes	20
Copper Sales, Inc.	Galvalume Plus ^{NEW}	UNA-CLAD HR-ULTRA OMEGA	Metal (Bare)	0.68	0.57	Yes	Yes	20
Copper Sales, Inc.	Galvalume Plus ^{NEW}	UNA-CLAD UR-PRO OMEGA	Metal (Bare)	0.68	0.57	Yes	Yes	20
Copper Sales, Inc.	Galvalume Plus ^{NEW}	UNA-CLAD VR-CLASSIC OMEGA	Metal (Bare)	0.68	0.57	Yes	Yes	20
Copper Sales, Inc.	Galvalume Plus ^{NEW}	UNA-CLAD NB1-BUILTITE I	Metal (Bare)	0.68	0.57	Yes	Yes	20
Copper Sales, Inc.	Galvalume Plus ^{NEW}	UNA-CLAD NB2-BUILTITE II	Metal (Bare)	0.68	0.57	Yes	Yes	20

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						Low Slope	Steep Slope	
Custom Seal Roofing Systems Steven Mayle (800) 370-7325	Custom Seal	White	Single-Ply (Thermoplastic)	0.78	0.72	Yes	Yes	15
Danosa Roofing Products Felix Romero (787) 785-4545	Danosa	Glasdan AL-80	Single-Ply (SBS Modified Asphalt)	0.80	0.68	Yes	Yes	10 - 20
Dura-Loc Roofing Systems (800) 265-9357	R. Allan Reid Dura-Loc	Lasting Impressions Galvalume Plus	Metal (Bare)	0.78	0.58	Yes		25
Duro-Last Roofing, Inc. Drew Ballewsky (800) 248-0280	Duro-Last® Cool Zone™	40 mil white	Single-Ply (CPA - PVC)	0.87	0.86	Yes		15 - 20
Ecology Roof Systems (714) 972-1001	William Pfeifer Ecology Roof Systems	White Top	Coating	0.88	0.62	Yes	Yes	10
Ecology Roof Systems	Ecology Roof Systems	ERS-8000 W/Fleece Back	Single-Ply (Thermoplastic)	0.81	0.81	Yes	Yes	15
Ecology Roof Systems	Ecology Roof Systems	ERS-8000 MA	Single-Ply (Thermoplastic)	0.85	0.82	Yes	Yes	15
Ecology Roof Systems	Ecology Roof Systems	ERS-703	Modified Bitumen	0.85	0.62	Yes	Yes	10
Ecology Roof Systems	Ecology Roof Systems	ERS-Rain Coat	Modified Bitumen	0.78	0.75	Yes	No	10
Ecostar Science & Technology, Inc. William B. Coe (916) 387-8797	InfraLastic	RBC	Coating	0.85	0.63	Yes	Yes	5
Elastomeric Roofing Systems (800) 403-7747	Tim Leonard ERS	Eraguard 1000	Coating (Acrylic)	0.82	0.65	Yes		10 - 15
Elastomeric Roofing Systems	ERS	Eraguard 500	Coating (Acrylic)	0.82	0.65	Yes		10 - 15
Elastomeric Roofing Systems	ERS	Erakote	Coating (Polyurethane)	0.77	0.65	Yes		10 - 15
Elastomeric Roofing Systems	ERS	Erathane 300 Finish Coat	Coating (Polyurethane)	0.65	0.60	Yes		10 - 15
Elastomeric Roofing Systems	ERS	Permweld 48 mil	Single-Ply (PVC)	0.83	0.54	Yes		10 - 15
Elastomeric Roofing Systems	ERS	Ertastic	Coating (Acrylic)	0.82	0.76	Yes		3
Englert Inc. Gene Johnson (732) 826-8614	ENGLERT	Chemically Treated Series A1000, A1100, A1101, A1200, A1300 Standing Seam	Metal (Bare)	0.78	0.58	Yes	Yes	20
Englert Inc.	ENGLERT	Chemically Treated Series C1300 Standing Seam	Metal (Bare)	0.78	0.58	Yes	Yes	20
Englert Inc.	ENGLERT	Chemically Treated Series S2000, S2100, S2400, S2500, S3000 Standing Seam	Metal (Bare)	0.78	0.58	Yes	Yes	20
Englert Inc.	ENGLERT	Chemically Treated Series A500 5V Crimp	Metal (Bare)	0.78	0.58	Yes	Yes	20
Englert Inc.	ENGLERT	Acrylic Coated Series A1000, A1100, A1101, A1200, A1300 Standing Seam	Metal (Bare)	0.68	0.57	Yes	Yes	20
Englert Inc.	ENGLERT	Acrylic Coated Series C1300 Standing Seam	Metal (Bare)	0.68	0.57	Yes	Yes	20
Englert Inc.	ENGLERT	Acrylic Coated Series S2000, S2100, S2400, S2500, S3000 Standing Seam	Metal (Bare)	0.68	0.57	Yes	Yes	20
Englert Inc.	ENGLERT	Acrylic Coated Series A500 5V Crimp	Metal (Bare)	0.68	0.57	Yes	Yes	20
Environmental Roofing Systems Paul Lundquist (800) 476-2580	ERSI	Metal Top Coating	Coating (Acrylic)	0.77	0.55	Yes	Yes	5 - 10
Everest Coatings, Inc. (281) 350-9800	John Linnell Everest	EC500	Elastomeric Coating	0.86	0.62	Yes		10
Everest Coatings, Inc.	Everest	EC700	Elastomeric Coating	0.81	0.64	Yes		10
Everest Coatings, Inc.	Everest	EC5400	Elastomeric Coating	0.86	0.66	Yes		10
Fabral Bill Croucher (717) 291-5188	Fabral	Exposed Fastened Roof Panels	Metal (Bare)	0.78	0.58	Yes	Yes	20
Fabral	Fabral	Standing Seam Roof Panels	Metal (Bare)	0.78	0.58	Yes	Yes	20
Fabral	Fabral	Standing Seam Roof Panels	Metal	0.68	0.55	Yes	Yes	20
Fabral	Fabral	Exposed fastened roof panels	Metal	0.68	0.55	Yes	Yes	20
Farrow Manufacturing, Inc. (760) 591-0906	Vernon J. Farrow, Jr. Farrow Mfg. Inc.	NovaCoat	Coating (Acrylic)	0.80	0.81-0.60	Yes		10
Fields Corporation Brian Stein (800) 627-4098	A850	AtcoWhite	Elastomeric Coating	0.88	0.70	Yes	No	0
Fields Corporation	M850	PoliShield	Elastomeric Coating	0.88	0.70	Yes	No	0
Fields Corporation	A860	AtcoBrite	Elastomeric Coating	0.80	0.60	Yes	No	0
Fields Corporation	M860	PoliBrite	Elastomeric Coating	0.80	0.60	Yes	No	0
Fields Corporation	F630	SoliShield3	Coating (Aluminum)	0.68	0.55	Yes	No	0
Fields Corporation	M630	SilvrShield3	Coating (Aluminum)	0.68	0.56	Yes	No	0
Firestone Building Products Company Jim Jannasch (800) 428-4442	Firestone	Firestone Metal flash AL	Single-Ply (SBS Modified Asphalt)	0.80	0.68	Yes		20
Firestone Building Products Company	Firestone	Firestone Aluminum Fibered Roof Coating	Coating (Aluminum)	0.74	0.51	Yes		20
Firestone Building Products Company	Firestone	Firestone SBS Metal Flash-AL	Flash Sheet	0.80	0.69	Yes		20

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						Low Slope	Steep Slope	
Firestone Building Products Company	Firestone Building Products	AcryliTop PC-100 (White)	Coating (Acrylic)	0.81	0.66	Yes		5
Firestone Building Products Company	UltraPly 78	PVC	Single-Ply (PVC/KEE)	0.84	0.68	Yes		5 - 20
Firestone Building Products Company	UltraPly TPO	TPO	Single-Ply (Thermoplastic)	0.79	0.72	Yes	No	5 - 20
Flex Coatings, Inc. (559) 891-2888 Eldridge Jones	Flex White	3150	Coating (Acrylic)	0.85	0.67	Yes	Yes	5 - 10
Flex Membrane International Doyle John L. (800) 969-0108	Flex Membrane	Flex FB Elvaloy Membrane White	Single-Ply (PVC)	0.81	0.81	Yes	Yes	15
Flex Membrane International	Flex Membrane	Flex MF/R Elvaloy Membrane White	Single-Ply (PVC)	0.84	0.82	Yes	Yes	15
Flex Membrane International	Flex Membrane	Flex MF/R PVC Membrane White	Single-Ply (PVC)	0.79	0.78	Yes	Yes	15
Foam Enterprises Andersen James L. (763) 559-9300	Foam Enterprises	Diathon; FE Coat 1000 Series	Coating (Acrylic)	0.78	0.60	Yes		5 - 15
Foam Enterprises	Foam Enterprises	Elastuff 102; FE Coat 2000 Series	Coating (Acrylic)	0.79	0.68	Yes		5 - 15
G.E. Silicones Dan Clark (909) 549-0660	GE	SCM 3402	Elastomeric Coating	0.74	0.71	Yes		10
GAF Materials Corporation Michael Raw (973) 628-3451	EverGuard	PVC EGSR Membrane	PVC Roof Membrane	0.83	0.81	Yes		10
GAF Materials Corporation	EverGuard	TPO SRT Membrane	Single-Ply (TPO)	0.74	0.73	Yes		10
GAF Materials Corporation	GAF	Jumbo Royal Sovereign	Fiberglass Asphalt Shingle	0.29	0.29	No	Yes	25
GAF Materials Corporation	GAF	Timberline® Select 40™ Shingles ^{NEW}	Fiberglass Asphalt Shingle	0.29	0.29	No	Yes	40
GAF Materials Corporation	GAF	Timberline® 30 Shingles ^{NEW}	Fiberglass Asphalt Shingle	0.29	0.29	No	Yes	30
GAF Materials Corporation	GAF	Timberline® Ultra® Shingles ^{NEW}	Fiberglass Asphalt Shingle	0.29	0.29	No	Yes	Lifetime
GAF Materials Corporation	GAF	Sentinel® Shingles ^{NEW}	Fiberglass Asphalt Shingle	0.29	0.29	No	Yes	20
GAF Materials Corporation	GAF	Royal Sovereign® Shingles ^{NEW}	Fiberglass Asphalt Shingle	0.29	0.29	No	Yes	25
GAF Materials Corporation	GAF	Marquis® WeatherMax® ^{NEW}	Fiberglass Asphalt Shingle	0.29	0.29	No	Yes	30
Gaco Western, Inc. Irene Schwedler (800) 331-0196	GACOSIL	S1000	Coating (Silicone)	0.87	0.75	Yes		10 - 15
Gaco Western, Inc.	GACOFLEX	A6200	Elastomeric Coating	0.83	0.66	Yes		10 - 15
Gardner Asphalt (562) 423-6471 Robert Hyer	APOC	#252 Sun-White Elastomeric	Coating (Acrylic)	0.81	0.67	Yes	Yes	5 - 10
Gardner Asphalt	APOC	#258 EPDM Renew-It Elastomeric	Coating (Acrylic)	0.82	0.78	Yes	Yes	10
Gardner Asphalt	APOC	#211 Non-Fibered Aluminium Coating	Coating (Aluminum)	0.68	0.59	Yes	Yes	5
Gardner Asphalt	APOC	#212 Fibered Aluminium Coating	Coating (Aluminum)	0.67	0.57	Yes	Yes	5
Gardner Asphalt	Sta-Kool	#770 White Elastomeric	Coating (Acrylic)	0.79	0.65	Yes	Yes	7
Gardner Asphalt	Sta-Kool	#780 White Elastomeric	Coating (Acrylic)	0.78	0.70	Yes	Yes	5 - 10
Garland Company, Inc., The (216) 641-7500 Melissa Rus	R-MER LITE	White Insulated Steel Roof System	Steel System	0.67	0.60	Yes		30
Garland Company, Inc., The	Pyramic	White Reflective Coating	Elastomeric Coating	0.85	0.54	Yes		1 - 10
Garland Company, Inc., The	WhiteKnight	Elastomeric Polyurethane Coating	Elastomeric Coating	0.77	0.63	Yes		10
General Coatings, Inc. (559) 495-4004 Chris Walton	Ultra-Flex	1000 Standard	Coating (Acrylic)	0.76	0.65	Yes	Yes	5 - 10
General Coatings, Inc.	Ultra-Flex	1000 w/White Granules	Coating (Acrylic) w/ Fire White Granules	0.73	0.70	Yes	Yes	5 - 10
General Coatings, Inc.	Ultra-Flex	1600	Coating (Acrylic)	0.76	0.65	Yes	Yes	5 - 10
General Coatings, Inc.	Ultra-Shield	3000	Coating (Aliphatic)	0.83	0.68	Yes	Yes	5 - 10
General Coatings, Inc.	Ultra-Guard	5500	Coating (Silicone)	0.81	0.66	Yes	Yes	5 - 10
General Coatings, Inc.	Ultra-Flex	1000 High Tensile	Coating (Acrylic)	0.84	0.70	Yes	Yes	5 - 10
General Coatings, Inc.	Ultra-Flex	1000 High Tensile w/ White Granules	Coating (Acrylic) w/ Fire White Granules	0.79	0.74	Yes	Yes	5 - 10
Genflex Roofing Systems (800) 443-4272 Mike Hubbard	GenFlex	White RM	Single-Ply (PVC)	0.78	0.71	Yes		10 - 20
Genflex Roofing Systems	GenFlex	White TPO	Single-Ply (TPO)	0.78	0.60	Yes		10 - 20
Genflex Roofing Systems	GenFlex	Ace Coating	Coating (Acrylic)	0.70	0.60	Yes		None
Global Ceramic Coatings International, LLC Bernard Stevens (804) 675-4001	PermAKote	7525	Elastomeric Coating	0.80	0.80	Yes		20
GMX, Inc. (216) 641-7502 Melissa Rus	Ultra-Shield	White Acrylic Roof Coating	Elastomeric Coating	0.85	0.54	Yes		5 - 10

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GMX, Inc.	Ultra-Shield	#5301 White Roof Coating	Elastomeric Coating	0.86	0.72	Yes		10
Hanson Roof Tile, Inc. Jeff Bobolits (909) 350-4238	Hanson Roof Tile	Slate E433 (SL 433)	Concrete Roof Tile	0.26	0.28	No	Yes	Lifetime
Hanson Roof Tile, Inc.	Hanson Roof Tile	Slate E541 (SL541)	Concrete Roof Tile	0.27	0.30	No	Yes	Lifetime
Hanson Roof Tile, Inc.	Hanson Roof Tile	Hacienda E114 (H114)	Concrete Roof Tile	0.34	0.29	No	Yes	Lifetime
Hanson Roof Tile, Inc.	Hanson Roof Tile	Hacienda E122 (H122)	Concrete Roof Tile	0.47	0.33	No	Yes	Lifetime
Hanson Roof Tile, Inc.	Hanson Roof Tile	Regal E134 (R134)	Concrete Roof Tile	0.59	0.53	No	Yes	Lifetime
Hanson Roof Tile, Inc.	Hanson Roof Tile	Regal E128 (R128)	Concrete Roof Tile	0.69	0.68	No	Yes	Lifetime
Hanson Roof Tile, Inc.	Hanson Roof Tile	Regal E212 (R212)	Concrete Roof Tile	0.62	0.65	No	Yes	Lifetime
Hanson Roof Tile, Inc.	Hanson Roof Tile	Regal E213 (R213)	Concrete Roof Tile	0.62	0.65	No	Yes	Lifetime
Hanson Roof Tile, Inc.	Hanson Roof Tile	Regal E420 (R420)	Concrete Roof Tile	0.37	0.32	No	Yes	Lifetime
Henry Company Lance Hamilton (800) 486-1278	Henry	#869	Coating (Aluminum)	0.70	0.54	Yes		5
Henry Company	ProGrade	#550	Coating (Acrylic)	0.76	0.62	Yes		10
Henry Company	MetalShield	#275	Coating	0.76	0.62	Yes		10
Henry Company	RubberKote	#827	Coating	0.76	0.62	Yes		10
Henry Company	Henry	#280	Coating (Acrylic)	0.76	0.62	Yes		10
Henry Company	Henry	#582	Coating (Acrylic)	0.90	0.63	Yes		10
Henry Company	Henry	#582 w/ white granule finish	Coating (Acrylic) w/ white granule finish	0.79	0.54	Yes		10
Henry Company	Henry	#580 w/ white granule finish	Coating (Acrylic) w/ white granule finish	0.78	0.54	Yes		10
Hydrosel Polymers Inc. Albert Corey (909) 272-2344	Hydrosel Polymers	Hydrosel Acrylic	Elastomeric Coating	0.76	0.69	Yes	Yes	10
Hydro-Stop Inc. Nick Causey (800) 739-5566	Hydro-Stop	Premium Coat	Coating (Acrylic)	0.78	0.68	Yes	Yes	10
IB Roof Systems (541) 242-2871 Shawn Stanley	IB Single-Ply	50 to 80 mil.	Thermoplastic PVC	0.83	0.83	Yes	Yes	10 - 25
Industrial Coatings Alliance Group, Inc. Rod Sulborski (770) 475-3066	ICAG	Super Therm	Coating (Acrylic/Urethane)	0.80	0.79	Yes		10
Infiniti Paints and Coatings David Ziluck (954) 972-2225	Infiniti Paints	Great White 100% Acrylic	Coating (Acrylic)	0.90	0.79	Yes	Yes	5 - 10
Infinity Performance Products, Inc. Steve Barnett (801) 292-4079	Epoxyflex	Coating	White Reflective Coating	0.75	0.67	Yes		10
Inland Coatings Corporation Walmsley 4524 Douglas (515) 993-	Inland Coatings	RC-2000 White	Coating	0.82	0.72	Yes	Yes	10
Inland Coatings Corporation	Inland Coatings	SRC-2000 White	Coating	0.82	0.72	Yes	Yes	10
Innovative Formulations Ian Ornstein (520) 528-1553	MIRRORSEAL	WHITE	Single-Ply	0.82	0.77	Yes	Yes	5
Insulating Coatings Corporation Steven Ziebarth (800) 345-5306	ASTEC	#900	Coating (Acrylic)	0.86	0.77	Yes		10
Isothermal Protective Coatings Christopher J. Carroll (800) 237-8759	IPC	Acrylink G	Elastomeric Coating	0.79	0.72	Yes		5 - 10
Johns Manville Corporation Lawrence G. Glass (800) 654-3103	UltraGard	SR50	Single-Ply (PVC)	0.84	0.76	Yes		15
Johns Manville Corporation	UltraGard	SR60	Single-Ply (PVC)	0.84	0.76	Yes		15
Johns Manville Corporation	UltraGard	SR80	Single-Ply (PVC)	0.84	0.76	Yes		15
Johns Manville Corporation	UltraGard	TPO	Single-Ply (TPO)	0.87	0.83	Yes	No	15
Johns Manville Corporation	DynaClad*	Modified Bitumen	Modified Bitumen	0.85	0.62	Yes	No	20
Kamak Corporation (732) 388-0300 Chris Salazar	Kamak	502 RCW Elasto-Kote	Coating	0.87	0.63	Yes		3
Kamak Corporation	Kamak	505 Elasto-Brite M	Coating	0.87	0.63	Yes		3
Kamak Corporation	Kamak	501 Elasto-Brite	Coating	0.85	0.68	Yes		3
Kamak Corporation	Kamak	98AF	Coating	0.69	0.56	Yes		3
Kamak Corporation	Kamak	298 Alumin-R	Coating	0.71	0.56	Yes		3
KM Coatings Mfg., Inc. Harry Hummel (602) 253-1168	KM	FinalCoat	Coating (Acrylic)	0.81	0.62	Yes	No	5 - 10
Kryton Coatings Int., Inc. Robert Hartley (865) 212-9945	Kryton	Multi-Gard System	Elastomeric Coating	0.88	0.84	Yes	Yes	25
KST Coatings Mfg., Inc. Paul Bauer (330) 405-1622	Kool Seal	63-600	Coating (Acrylic)	0.87	0.61	Yes	Yes	10
KST Coatings Manufacturing, Inc.	Kool Seal	63-300	Coating (Acrylic)	0.86	0.61	Yes	Yes	7

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KST Coatings Manufacturing, Inc.	Kool Seal	63-450	Coating (Acrylic)	0.86	0.61	Yes	Yes	7	
KST Coatings Manufacturing, Inc.	Snow Roof Systems	Snow Roof	Coating (Acrylic)	0.85	0.62	Yes		10	
KST Coatings Manufacturing, Inc.	Snow Roof Systems	Roofers Best	Coating (Acrylic)	0.75	0.54	Yes		5	
L & L Suppliers, Inc. Lease 5954	Craig (209) 466-5954	Heat Shield	Heat Shield Tar & Gravel	Coating	0.73	0.68	Yes		5 - 30
L & L Suppliers, Inc.		Heat Shield	Heat Shield Capsheet	Coating	0.76	0.66	Yes		5
LaPolla Industries, Inc. Michael Broinholt (480) 966-6390		Therm-O-Flex	Ultra-Flex	Coating (Acrylic)	0.86	0.80	Yes		5 - 10
LaPolla Industries, Inc.		Therm-O-Flex	TF II	Coating (Acrylic)	0.84	0.78	Yes		5 - 10
LaPolla Industries, Inc.		Therm-O-Flex	TF Original	Coating (Acrylic)	0.85	0.78	Yes		5 - 10
LaPolla Industries, Inc.		Therm-O-Flex	TF III w/ Ceramic	Coating (Acrylic)	0.83	0.69	Yes		5 - 10
Life Paint Corporation (562) 944-6391	David Sibbrel	Stretch-Guard	88-20	Elastomeric Coating	0.80	0.76	Yes	Yes	5 - 20
Liquid Ceramic International, Inc. Trista Holwager (800) 466-2651		Liquid Ceramic Roof Coating	White	Coating (Acrylic)	0.85	0.66	Yes	Yes	20
M.C.A. Clay Roof Tile (800) 736-6221	Yoshihiro Suzuki	M.C.A.	Weathered Green Blend (B305)	Clay Roof Tile	0.43	0.49	No	Yes	50
M.C.A. Clay Roof Tile		M.C.A.	Natural Red (F40)	Clay Roof Tile	0.43	0.38	No	Yes	50
M.C.A. Clay Roof Tile		M.C.A.	Traditional Flash (F41 or 2F41)	Clay Roof Tile	0.36	0.31	No	Yes	50
M.C.A. Clay Roof Tile		M.C.A.	Brick Red (F43 or 2F43)	Clay Roof Tile	0.42	0.40	No	Yes	50
M.C.A. Clay Roof Tile		M.C.A.	White Buff (F44 or 2F44)	Clay Roof Tile	0.68	0.56	No	Yes	50
M.C.A. Clay Roof Tile		M.C.A.	Tobacco (F45 or 2F45)	Clay Roof Tile	0.43	0.41	No	Yes	50
M.C.A. Clay Roof Tile		M.C.A.	Peach Buff (F47 or 2F47)	Clay Roof Tile	0.61	0.48	No	Yes	50
M.C.A. Clay Roof Tile		M.C.A.	Cactus Green (F48 or 2F48)	Clay Roof Tile	0.37	0.34	No	Yes	50
M.C.A. Clay Roof Tile		M.C.A.	Regency Blue (F52 or 2F52)	Clay Roof Tile	0.38	0.34	No	Yes	50
M.C.A. Clay Roof Tile		M.C.A.	Light Cactus Green (F53 or 2F53)	Clay Roof Tile	0.51	0.52	No	Yes	50
M.C.A. Clay Roof Tile		M.C.A.	Light Regency (F54 or 2F54)	Clay Roof Tile	0.55	0.41	No	Yes	50
Malarkey Roofing Company Denny Cranford (503) 283-1191		Acrylic Finish Coat	#802	Coating (Acrylic)	0.76	0.65	Yes	Yes	5 - 10
Masters Choice Coatings, Inc. Charles Morando (954) 818-3056		Masters Choice	Professional Rubber Rerof	Coating	0.88	0.88	Yes	Yes	10
MB Technology Bahman Behbehani (559) 233-2181		Metaflex SBS	MF160WAL	Modified Bitumen	0.85	0.62	Yes	Yes	10 - 20
MEGA Industries Corporation Woodward Martensen (800) 772-7205		MegaFLEX	M-100 Cool Roof White	Coating (Acrylic)	0.84	0.65	Yes		5 - 10
MEGA Industries Corporation		IGLOO	Cool Roof Elastomeric	Coating (Acrylic)	0.84	0.65	Yes		5
Metacrylics (408) 280-7733	Mark Anthenien	Metacrylics	Acrylic White	Coating (Acrylic)	0.79	0.59	Yes		10
Metal Building Components, LP (MBCI) Scott McHugh (281) 445-8555		MBCI	Architectural Profiles	Metal (Bare)	0.68	0.57	Yes	Yes	20
Metal Building Components, LP (MBCI)		MBCI	Exposed Fastener Profiles	Metal (Bare)	0.68	0.57	Yes	Yes	20
Metal Building Components, LP (MBCI)		MBCI	Standing Seam Profiles	Metal (Bare)	0.68	0.57	Yes	Yes	20
MetalWorks Murphy	Susan (519) 858-9937	AstonWood	Wood Profile - Brite Red	Steel Shingles	0.33	0.33	No	Yes	50
MetalWorks		AstonWood	Wood Profile - Coastal White	Steel Shingles	0.58	0.58	No	Yes	50
MetalWorks		AstonWood	Wood Profile - Sequoia Red	Steel Shingles	0.27	0.27	No	Yes	50
MetalWorks		AstonWood	Wood Profile - Taupe	Steel Shingles	0.28	0.28	No	Yes	50
MetalWorks		StoneCrest	Slate Profile - Brite Red	Steel Shingles	0.33	0.33	No	Yes	50
MetalWorks		StoneCrest	Slate Profile - Canyon Copper Bronze	Steel Shingles	0.32	0.32	No	Yes	50
MetalWorks		StoneCrest	Slate Profile - Sequoia Red	Steel Shingles	0.27	0.27	No	Yes	50
MFM Building Products Corp. Wesley Simpson (740) 622-2645		MFM	Peel & Seal Aluminum	Self-Adhesive Aluminum	0.90	0.75	Yes		10
Mule-Hide Products Co. (608) 365-3111	Timothy McFarland	Mule-Hide	A-300 Finish Coating	Coating (Acrylic)	0.87	0.73	Yes		10
Mule-Hide Products Co.		Mule-Hide	TPO Membrane	Single-Ply (TPO)	0.74	0.73	Yes		10
Multi-Trade Coating Co., Int'l Lawrence Mancini (407) 539-1553		Ceramic Guard	Ceramic Guard® Finish Coat	Coating (Acrylic)	0.80	0.73	Yes	Yes	10
National Coatings Corporation (800) 423-9557	Chris Harris	AcryShield®	A400	Coating (Acrylic)	0.75	0.61	Yes		5 - 20

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National Coatings Corporation	AcryShield®	A400 White-Granulated	Coating (Acrylic)	0.67	0.54	Yes		5 - 20
National Coatings Corporation	AcryShield®	A500	Coating (Acrylic)	0.75	0.61	Yes		5 - 20
National Coatings Corporation	AcryShield®	A500 White-Granulated	Coating (Acrylic)	0.67	0.54	Yes		5 - 20
National Coatings Corporation	AcryShield®	A510	Coating (Acrylic)	0.75	0.61	Yes		5 - 20
National Coatings Corporation	AcryShield®	A510 White-Granulated	Coating (Acrylic)	0.67	0.54	Yes		5 - 20
National Coatings Corporation	AcryShield®	A550	Coating (Acrylic)	0.75	0.61	Yes		5 - 20
National Coatings Corporation	AcryShield®	A550 White-Granulated	Coating (Acrylic)	0.67	0.54	Yes		5 - 20
National Coatings Corporation	AcryShield®	A600	Coating (Acrylic)	0.75	0.61	Yes		5 - 20
National Coatings Corporation	AcryShield®	A600 White-Granulated	Coating (Acrylic)	0.67	0.54	Yes		5 - 20
National Coatings Corporation	AcryShield®	AcryShield RP	Coating (Acrylic)	0.75	0.61	Yes		5 - 20
National Polymers Incorporated Harry Jackson (724) 483-9300	National Polymers ^{NEW}	NP811FP	Coating (Acrylic)	0.81	0.78	Yes	Yes	5 - 10
Nationwide Chemical Coatings Mfr.s, Inc. Linda Ferrara (941) 753-7500	Nationwide	Ultra Seal	Coating (Acrylic)	0.82	0.73	Yes	Yes	10
Nationwide Chemical Coatings Mfr.s, Inc.	Nationwide	Permakote Plus	Coating (Acrylic)	0.81	0.72	Yes	Yes	10
Nationwide Chemical Coatings Mfr.s, Inc.	Nationwide	Ultra Kote	Coating (Acrylic)	0.83	0.73	Yes	Yes	10
Nationwide Chemical Coatings Mfr.s, Inc.	Nationwide	Permakote	Coating (Acrylic)	0.83	0.74	Yes	Yes	12
Nationwide Chemical Coatings Mfr.s, Inc.	Nationwide	Ultra Kote XL	Coating (Acrylic)	0.82	0.72	Yes	Yes	10
Nationwide Chemical Coatings Mfr.s, Inc.	Nationwide	Insulkote	Coating (Acrylic)	0.82	0.72	Yes	Yes	8
Nationwide Chemical Coatings Mfr.s, Inc.	Nationwide	Snowbrite	Coating (Acrylic)	0.84	0.70	Yes	Yes	6
Neogard (800) 321-6588	Mark Pavic Neogard	Low VOC Silicone 7860-01	Coating (Silicone)	0.75	0.75	Yes		5 - 15
Neogard	Neogard	Elastomeric Polyurethane Coating 70613	Coating (Polyurethane)	0.77	0.63	Yes		5 - 15
Neogard	Neogard	Elastomeric Polyurethane Coating 7443	Coating (Polyurethane)	0.76	0.76	Yes		10
Neogard	Neogard	Elastomeric Acrylic 7251	Coating (Acrylic)	0.74	0.68	Yes		5 - 15
Neogard	Performance Coating System (PCS) by Neogard	Low VOC Silicone 2500-005	Coating (Silicone)	0.75	0.75	Yes		5 - 15
Neogard	Performance Coating System (PCS) by Neogard	Elastomeric Polyurethane Coating 2300-005	Coating (Polyurethane)	0.77	0.63	Yes		5 - 15
Neogard	Performance Coating System (PCS) by Neogard	Elastomeric Acrylic 2100-005	Coating (Acrylic)	0.74	0.68	Yes		5 - 15
Owens Corning (419) 248-7222	Gregory Schill Owens Corning	TruCool	Elastomeric Coating	0.84	0.65	Yes	No	5
Palmer Asphalt Company Van Ripspe (201) 339-0855	Bulldog	Durex	Coating (Acrylic)	0.85	0.70	Yes	Yes	5 - 10
Performance Roof Systems, Inc. Greg Perkins (800) 727-9872	PermaCool™	Reflective Roof Coating	Coating (Acrylic)	0.84	0.65	Yes	No	5 - 10
Polyglass USA Shaik Mhaisen (570) 384-1230	Polyglass	PolyAll	Modified Bitumen	0.81	0.73	Yes		10 - 15
Polyglass USA	Polyglass	PolyAll SA	Self-Adhered Modified Bitumen	0.81	0.73	Yes		10 - 15
Polyurea Coating Systems, Inc. Greg Livingston (773) 528-4723	PCSI	PCS-305	Elastomeric Coating	0.78	0.75	Yes	Yes	5
Ponderosa Paint Co., Inc. Eric Sorensen (559) 291-0664	Galacti-Kote	Elastomeric Roof Coating	Elastomeric Coating	0.99	0.54	Yes	No	5
PRO-TECH Products, Inc. (480) 945-8873	Dan Kelly Pro-tech	EC-100	Coating (Acrylic)	0.85	0.72	Yes	Yes	5
Pro Tek - USA Cherrie Swindall (206) 782-8399	THERMCOTE	A-5	Coating (Acrylic)	0.84	0.78	Yes		5
Pro Tek - USA	THERMCOTE	A-7	Coating (Acrylic)	0.82	0.77	Yes		7
Pro Tek - USA	THERMCOTE	A-10	Coating (Acrylic)	0.83	0.78	Yes		10
Pro Tek - USA	THERMCOTE	A-PW5	Coating (Acrylic)	0.81	0.77	Yes		5 - 10
R & R Coating Inc. Randall F. Newton (530) 682-5521	Ruberseal	FR 60	Coating (Acrylic)	0.84	0.60	Yes	No	10
Republic Powdered Metals Dominic Cremona (216) 766-5605	Geoflex	Single Ply Membrane	Single Ply Membrane	0.80	0.54	Yes		10
Republic Powdered Metals	Geogard	Elastomeric, urethane	Elastomeric Coating	0.84	0.69	Yes	No	12
Republic Powdered Metals	Solargard Ultra	High Build Reflective Coating	Coating (Acrylic)	0.84	0.60	Yes		10
Republic Powdered Metals	Solargard Hy-build	Water-based elastomeric coating	Coating (Acrylic)	0.78	0.64	Yes	No	12

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ENERGY STAR® for Roof Products
Qualifying Product List
As of January 21, 2003

NEW - Denotes products recently added to the list.

Company Name	Brand	Model	Type	Initial Solar Reflectance	Solar Reflectance After 3 years*	Applications		Warranty (years)†	
						Low Slope	Steep Slope		
Republic Powdered Metals	Coolcy C-3	Single Ply Membrane	Single Ply (Thermoplastic)	0.84	0.57	Yes		10 - 15	
Republic Powdered Metals	Alumanation 301	Aluminum Coating	Coating	0.68	0.50	Yes	Yes	10 - 12	
Resin Technology Company Rodney R. Sells (800) 729-0795	Permax ^{NEW}	Permax-100	Coating (Acrylic)	0.90	0.73	Yes	Yes	10	
Resin Technology Company	Permax ^{NEW}	Permax-108	Coating (Acrylic)	0.92	0.85	Yes	Yes	10	
Resin Technology Company	Permax	Permax-108 w/White Granule Finish	Coating (Acrylic) w/White Granule Finish	0.79	0.54	Yes		10	
Resin Technology Company	Permax ^{NEW}	Permax-110	Coating (Acrylic)	0.90	0.81	Yes	Yes	10	
Resin Technology Company	Permax ^{NEW}	Permax-115	Coating (Acrylic)	0.94	0.91	Yes	Yes	10	
Resin Technology Company	Permax	Permax-115 w/White Granule Finish	Coating (Acrylic) w/White Granule Finish	0.78	0.54	Yes		10 - 20	
Resin Technology Company	Permax ^{NEW}	Permax-800	Coating (Acrylic)	0.84	0.80	Yes	Yes	10	
Resin Technology Company	Permax ^{NEW}	Permax-2000	Coating (Acrylic)	0.89	0.54	Yes	Yes	10	
Resin Technology Company	Permax ^{NEW}	Permax-580	Coating (Acrylic)	0.94	0.91	Yes	Yes	10	
Resin Technology Company	Permax ^{NEW}	Permax-582	Coating (Acrylic)	0.92	0.85	Yes	Yes	10	
RGM Products James T. Neffigan (559) 499-2222	RGM Cool Roof Systems	AcryShield	Elastomeric Coating	0.75	0.61	Yes		5 - 20	
RGM Products	RGM Cool Roof Systems	AcryShield +	Elastomeric Coating	0.75	0.61	Yes		5 - 20	
RGM Products	RGM Cool Roof Systems	UltraShield	Elastomeric Coating	0.75	0.61	Yes		5 - 20	
Rockford Manufacturing Ltd. Robert Viles (303) 759-3200	Rockford	Commercial High Rib/ Rockweld TS 324	Metal (Bare)	0.78	0.58	Yes	Yes	20	
RoofMart International, Inc. Beau Burris (785) 922-6544	Garnite Roofing Products	Garna-Thane	Coating (Alum./Poly)	0.87	0.83	Yes		10 - 30	
RoofMart International, Inc.	Garnite Roofing Products	Krylyk	Coating (Acrylic)	0.73	0.70	Yes	Yes	5 - 15	
Sarnafil Inc. (800) 856-9938	Kevin Foley	EnergySmart Roof	All 48-120 Mil. S327 & G410	Single-Ply (Thermoplastic)	0.83	0.50-0.83	Yes	5 - 20	
Samafil Inc.	Décor Profile Roof™	All 48-120 Mil. S327 & G410 Décor Profile LIGHT GREY #6500 Roof Membrane	Single-Ply (Thermoplastic)	0.48	0.15 - 0.48		Yes	5 - 20	
Samafil Inc.	CLASSIC ^{NEW}	All 48-120 Mil. S327 & G410 CLASSIC color #6505 Roof Membrane	Single-Ply (Thermoplastic)	0.66	0.50 - 0.66	Yes	Yes	5 - 20	
Sealoflex, Inc. Kaufmann 6466	Robert F. (800) 770-	Sealoflex	Finish Coat (White)	Coating (Acrylic)	0.77	0.69	Yes	Yes	10
Seaman Corporation Jonathan Pierson (330) 262-1111	FiberTite®	FiberTite® FiberTite® XT, FiberTite® SM, FiberTite® LX, FiberTite® Xtreme	Single-Ply (Thermoplastic)	0.81	0.77	Yes	Yes	10 - 15	
Siplast, Inc. (870) 246-8094	Tim Kersey	Siplast, Inc.	PC-227 Elastomeric Roof Coating	Coating (Acrylic)	0.75	0.65	Yes	No	5 - 10
Siplast	Siplast, Inc.	Veral Aluminum	Modified Bitumen	0.88	0.66	Yes	No	10 - 20	
SOLEC (609) 883-7700	Robert J. Aresty	LO/MIT	LO/MIT-I	Coating (Silicone)	0.80	0.67	Yes		1 - 5
Soprema Inc. Paul C. Riesebieter (330) 334-0066	Soprema Inc.	R' NOVA Roof Coating	Coating	0.79	0.63	Yes		10	
SouthLand Enviro-Green Bednarz	Paul (770) 517-6568	Thermal Ply 21 Coatings	ThermaLastic Thermal Barrier	Coating (Acrylic)	0.89	0.82	Yes	Yes	10
SPM Thermo-Shield, Inc. (605) 673-3201	Joe Raver	Thermo-Shield	Roof Coat	Coating (Acrylic)	0.84	0.63	Yes		5 - 15
SR Products Jeffrey L. Blank (216) 751-9787	Write Brite Elastomeric Coating		Coating (Acrylic)	0.84	0.71	Yes	Yes	2	
Steelox Roofing Systems Barbara Kuhns (513) 573-5565	Steelox	Sentry XTR	Metal (Bare)	0.78	0.58	Yes		20	
Stevens Roofing System (413) 533-8100	Tom Gallivan	Stevens	Stevens EP	Single-Ply (TPO)	0.86	0.85	Yes		5 - 20
Stevens Roofing System	Stevens	Stevens Hypalon (CSM)	Single-Ply (Hypalon)	0.85	0.77	Yes		5 - 20	
Stevens Roofing System	Stevens Roofing Systems	Stevens Multi-Purpose Roof Coating	Coating	0.82	0.72	Yes		10	
Structural Elastomeric Products, Inc. Rick Ulrich (520) 624-6282	E-las-tek	100 Solar Mastic	Elastomeric Coating	0.86	0.77	Yes	No	5	
Structural Elastomeric Products, Inc.	E-las-tek	120 Solar Tek 2000	Elastomeric Coating	0.84	0.80	Yes	No	6	
Structural Elastomeric Products, Inc.	E-las-tek	109 Solar Magic	Elastomeric Coating	0.79	0.78	Yes	No	4	
Sun Tech Coating Manufacturing Cox	Gene (623) 842-0690	Sunguard	Top Coat 1	Coating (Acrylic)	0.81	0.70	Yes	No	5
Sunlife Premium Paint (602) 258-0956	Dale Krog	Sunlife	Superlastic 919	Coating (Acrylic)	0.75	0.75	Yes	No	5
Sunlife Systems Jerry C. Auten (800) 328-5885	Sunlife	Sunlife Roofing Compound	Coating (Acrylic)	0.90	0.84	Yes	Yes	10 - 15	
Sunward Corporation Robert Viles (303) 759-3200	Sunward	Commercial High Rib/ Rockweld TS 324	Metal (Bare)	0.78	0.58	Yes	Yes	20	
Superior Products Int. II, Inc. (913) 962-4848	J.E. Pritchett	Ceramic	Super Therm	Coating (Acrylic/Urethane)	0.80	0.79	Yes		10
SWD Urethane Company Whipple 8413	Ron (480) 965-	Kool-Kote	1929F	Coating (Acrylic)	0.81	0.72	Yes		10
SWD Urethane Company		Kool-Kote	1929R	Coating (Acrylic)	0.81	0.71	Yes		10

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ENERGY STAR® for Roof Products
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As of January 21, 2003

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Company Name	Brand	Model	Type	Initial Solar Reflectance	Solar Reflectance After 3 years*	Applications		Warranty (years)†
						Low Slope	Steep Slope	
T. Clear Corporation (800) 544-7398 Allen Tomes	LightGuard	RE	Insulation Panel System	0.84	0.65	Yes	No	5 - 10
TCR International, LLC Carl B. Jacobs (954) 561-4244	EERS International	Ceramiccoat K-21	Coating	0.80	0.65	Yes		10
TCR International, LLC	EERS International	Total Shield Polyurea	Coating	0.80	0.70	Yes		15
Technical Roofing Solutions, Inc. Douglas Circuit (262) 373-4296	Roof-Tek	RT-SP2206	Elastomeric Coating	0.83	0.83	Yes	Yes	5 - 10
Technical Roofing Solutions, Inc.	ADURON®	OC9000	Elastomeric Coating	0.85	0.72	Yes	Yes	5 - 10
Thermo Manufacturing Co. (903) 881-8771 Fred Kunz	Thermolastic	Solar Shield	Coating (Acrylic)	0.82	0.66	Yes		1 - 10
Thermo Manufacturing Co.	Thermolastic	Super Prep	Coating (Acrylic)	0.82	0.66	Yes		1 - 10
Thermo Manufacturing Co.	Thermolastic	Sun Stop	Coating (Acrylic)	0.82	0.66	Yes		1 - 10
TopCoat, Inc. Corp. (973) 872-4495 (of GAF Materials Corp.) Scott Lelling	TopCoat	Liquid Applied Roof Membrane	Coating	0.86	0.76	Yes		15
TREMCO Inc. Dominic Cremona (216) 766-5605	Polarcote	Fire Retardant Coating	Coating (Acrylic)	0.82	0.50	Yes		10
TREMCO Inc.	Tremfast	Single Ply Membrane	Single-Ply	0.80	0.54	Yes		10
TREMCO Inc.	TREMCO	High Build Reflective Coating	Coating (Acrylic)	0.84	0.60	Yes		10
TREMCO Inc.	TPA/TPA FB	Single Ply Membrane	Single-Ply (Thermoplastic)	0.84	0.57	Yes	No	10 - 15
TREMCO Inc.	TREMCO SRC	Elastomeric, Urethane	Elastomeric Coating	0.84	0.69	Yes	No	12
TREMCO Inc.	Tremite	Water-based Elastomeric	Elastomeric Coating	0.78	0.57	Yes	No	10
TREMCO Inc.	HP 4510	Hypalon Single Ply	Single-Ply (Hypalon)	0.82	0.77	Yes	No	10 - 15
TREMCO Inc.	One Coat Aluminum	Aluminum Coating	Coating	0.68	0.50	Yes	Yes	10 - 12
TREMCO Inc.	Tremco	TremLock VP	Metal (Bare)	0.68	0.57	Yes	Yes	10
TREMCO Inc.	Tremco	TremLock LSP	Metal (Bare)	0.68	0.57	Yes	Yes	10 - 15
TREMCO Inc.	Tremco	TremLock SL	Metal (Bare)	0.68	0.57	Yes	Yes	10 - 12
Tresco Paint Company, Inc. (510) 887-7254 Clint Sohrabi	RoofGuard	751	Coating (Acrylic)	0.84	0.60	Yes	Yes	
Tresco Paint Company, Inc.	Solatak	3150	Elastomeric Coating	0.85	0.67	Yes	Yes	10
Tropical Asphalt Products (954) 983-3434 George Buckhold	Roofing	Eternalastic	Coating (Acrylic)	0.98	0.79	Yes		5
UCSC (505) 623-9726 Lela Wright	UCSC	Durashield II	Coating (Acrylic)	0.91	0.69	Yes		5 - 10
U.S. Intec Inc. (of GAF Materials Corp.) Mike DeSauto (508) 668-4128 x105	Matrix	1229	Elastomeric Coating	0.86	0.76	Yes	Yes	15
UNIFLEX INC. (888) 321-3539 Steve Killian	UNIFLEX	41-300	Coating (Acrylic)	0.88	0.62	Yes		10
UNIFLEX INC.	UNIFLEX	41-500	Coating (Acrylic)	0.86	0.61	Yes		5
United Coatings (503) 926-7143 Bill Mann	Elastuff	102	Coating (Polyurethane)	0.79	0.68	Yes		5 - 15
United Coatings	Roof Mate	Roof Mate White	Coating (Acrylic)	0.85	0.66	Yes		5 - 15
United Coatings	Roof Mate HT	High Tensile White	Coating (Acrylic)	0.85	0.66	Yes	Yes	5 - 15
United Coatings	Diathon	White	Coating (Acrylic)	0.78	0.60	Yes		5 - 15
United Coatings	Diathon HT	High Tensile White	Coating (Acrylic)	0.78	0.60	Yes	Yes	5 - 15
VP Buildings Jim Peckham (901) 748-8000	VP Buildings	Panel Rib Roof	Galvalume	0.68	0.57	Yes	Yes	
VP Buildings	VP Buildings	SSR - Standing Seam Roof	Galvalume	0.68	0.57	Yes	Yes	
W.P. Hickman Systems, Inc. Paul Sanicky (440) 248-7760	W.P. Hickman	White Roof Coating WC	Coating (Acrylic)	0.77	0.55	Yes		5
W.P. Hickman Systems, Inc.	W.P. Hickman	HK-3000	Single-Ply (Hypalon)	0.82	0.77	Yes	Yes	15
Weather Barrier, Inc. (610) 825-1900 Jim Bove	Weather Barrier	1650 White	Coating (Acrylic)	0.83	0.67	Yes		10
Weather Barrier, Inc.	Weather Barrier	1655 White	Coating (Acrylic)	0.80	0.72	Yes		10
WedgCor Inc. Steel Building Systems Robert Viles (303) 759-3200	WedgCor	Commercial High Rib/ Rockweld TS 324	Metal (Bare)	0.78	0.58	Yes	Yes	20
Western Colloid S.C., Inc. (323) 231-8292 Gregory Hlavaty	Western Colloid	ElastaHyde 757E	Coating (Acrylic)	0.85	0.59	Yes		5 - 10
Western Colloid S.C., Inc.	Western Colloid	ElastaHyde 720 Arc	Coating (Acrylic)	0.85	0.59	Yes		5 - 10
Western Colloid S.C., Inc.	Western Colloid	ElastaHyde 790 AFC ^{NEW}	Coating (Acrylic)	0.835	0.63	Yes		5 - 10

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STAFF LIAISONS:

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Technical Staff
BOCA International, Inc.
4051 West Flossmoor Road
Country Club Hills, IL 60478-5795
Phone: (708) 799-2300 x 307
Fax: (708) 799-0310
dmeyers@bocai.org

Eric Makela

Senior Education Code Dvlp Committee Programs
Administrator
International Conference of Building Officials
17542 Friends Rd.
Caldwell, ID 83607-9408
Phone: (208) 459-9564
Fax: (208) 459-9565
emakela@icbo.org

Larry Simpson, P.E. (Secretariat)

Senior Staff Engineer, Codes
Southern Building Code Congress International
900 Montclair Road
Birmingham, AL 35213-1206
Phone: (205) 591-1853 x 282
Fax: (205) 592-7001
lsimpson@sbcci.org