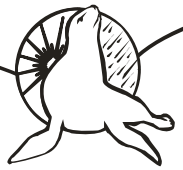


Albedo

Albedo, or solar reflectance, is a measure of a material's ability to reflect sunlight.

Albedo includes the visible, infrared and ultraviolet wavelengths on a scale of 0 to 1. An albedo value of 0.0 indicates that the surface absorbs all solar radiation, and a 1.0 albedo value represents total reflectivity. EPA ENERGY STAR specifies an albedo of 0.65 or higher for low-slope roof applications and 0.25 for sloped roofs.

Most roofing industry experts agree that a cool roof is one the exhibits a combination of high reflectivity and high emissivity.

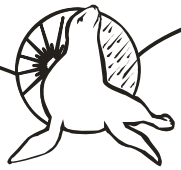
California's Title 24, Georgia Energy Code's White Roofing Amendment and ASHRAE 90.1 mandates cool roofing. Others like the U.S. Green Building Council's LEED rating system or Energy Star makes it an optional element of overall building design.

These specifications don't jibe when it comes to the exact emissivity or reflectivity numbers and creates more confusion to the building owner.

Specification	Emissivity	Reflectance
California Title 24	0.75	0.70
Georgia White Roofing Amendment	0.75	0.75
Energy Star	not specified	0.65

LEED version 2.2, released in October 2005, is the first national specification to use a relatively new measure of reporting a cool roof's properties. LEED 2.2 sustainable site credit 7.2 states that to receive one point, building owners should use a roof with a Solar Reflective Index (SRI) of 78 over at least 75% of the roof surface for roofs with slopes less than 2:12. The new twist is SRI, a unit developed by scientists at Lawrence Berkeley National Laboratory. SRI incorporates reflectivity and emissivity properties into one, easy to read, standardized measure so that roof buyers won't have to scratch their heads and try to figure our if a high reflectivity and low emissivity is better or worse than a medium reflectivity and high emissivity.

SRI is calculated with a complex formula spelled out in ASTM E1980 and is a scale of 1 to 100 that is a measure of a roof's combined thermal properties. It is defined so that a standard black (reflectance 0.05, emittance 0.90) is 0 and a standard white (reflectance 0.80, emittance 0.90) is 100. But some hot roofs can have negative values, and some white thermoplastics and white roof coatings have scored as high as 104 to 100.



SRI as a method for reporting cool roof data will probably take a little while to catch on. The Cool Roof Rating Council, an organization that verifies and labels cool roofing products has begun using the measure, while retaining reflectivity and emissivity measurements.

Articles

Durability of High-Albedo Roof Coatings

High-albedo roof coatings can be used to reduce building air-conditioning use and, if implemented at large-scale, might reduce summer urban temperatures. By lowering absorption of solar energy, high-albedo coatings reduce building surface temperatures, and heat-transfer to the building interior. The lower surface temperatures also reduce the building's contribution to urban air temperature. To maximize cooling energy savings, high-albedo roof coatings should have high solar reflectance (both in the visible and near-infrared bands), have high infrared emittance, and maintain these properties for the service life of the coating.

Cool Roof Research Grant by California Energy Commission

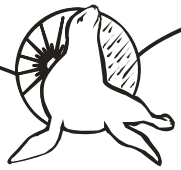
The California Energy Commission awarded $1.253 million to the Lawrence Berkeley National Laboratory (LBNL) for a three-year grant to develop, deploy, and validate "cool roof" technology.

This project will accelerate the acceptance of cool roofs through rebate programs sponsored by utility companies; expand the quantity of cool roofing products available to consumers by working with manufacturers; create more effective roofing materials; obtain labels from the Cool Roof Rating Council; and assist in marketing the new roofing products. Additionally, the funding allows the LBNL to conduct large-scale experiments to demonstrate the energy savings benefits of cool roofs to potential utility partners.

Acrylic Roof Coating Reduce Air-Conditioning Load

Rohm and Haas Company have been investigating the use of white acrylic roof coatings to reduce air conditioning demand since 1981. Early "birdhouse" experiments clearly demonstrated that white elastomeric roof coatings could reduce the internal temperature of un-insulated and poorly ventilated buildings significantly.

In 1981, researchers at Rohm and Haas Company began investigating the potential benefits for solar reflective coatings to increase the albedo of the roofing



membrane composite. Early "primitive" experiments included the use of "bird houses" roofed with asphalt shingles and coated with reflective elastomeric acrylic roof coatings. "Meat thermometers" were inserted into the closed interior and the inside air temperature was measured as a function of solar radiation. Similarly, although slightly more scientific, and infra-red thermometer was used to measure the surface temperature of light and dark surfaced roofing materials. As predicted, white reflective acrylic roof coatings greatly reduced the surface temperatures of roofing membranes and subsequently reduced the air temperature inside the "bird houses".

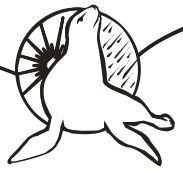
Acrylic reflective roof coatings have proven beneficial in increasing the albedo of buildings. Their cost effectiveness is dependent on building design parameters and location, and the ability of the coating to remain reflective. The coating's ability to function successfully is a composite of its initial reflectivity, dirty pickup resistance, mildew resistance and its ability to maintain its functional properties after years of in field service.

Polyurethane Foam Roof Coating

Even in a heavy industrial environment, the roof mastic based on RHOPLEX EC acrylic will retain its white, reflective color.

Condition: Constant expansion and contraction of the metal roof due to temperature changes caused splits in the panel seams and deterioration of the asphalt and felts. This caused leakage from holes, open seams, and rust spots. In many areas, rust spots had turned into holes.

Elastomeric roof mastics based on RHOPLEX EC acrylic prolong the life of polyurethane foam by protecting it from ultraviolet degradation.



How do Energy Seal Coatings compare with California's Title 24 and Georgia Energy Code's White Roofing Amendment?

Specification	Emissivity	Reflectance
California Title 24	0.75	0.70
Georgia White Roofing Amendment	0.75	0.75
Energy Star	not specified	0.65

Energy Seal Coatings Specifications

Product(s)	Emissivity	Reflectance
Acu-Shield	0.94	0.88
Acu-Shield w/ Acu-Gloss	0.98	0.90
Acu-Shield:Ceramic	0.94	0.89
Acu-Shield:Ceramic w/ Acu-Gloss	0.96	0.91