

SACSA

South African Cool Surfaces Association

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About SACSA

On the 6th February 2014 the South African Cool Surfaces Association (SACSA) was established. The formation of the Association is as a result of a conference in May 2013 organized by the South African Department of Energy, United States Department of Energy and SANEDI who invited participation in the conference for the Cool Roofs and Pavements Working Group of the Global Superior Energy Performance Partnership (GSEP) – an initiative of the Clean Energy Ministerial (CEM) and the International Partnership for Energy Efficiency Cooperation (IPEEC).

High-level government officials, regional decision-makers, industry representatives, green building and sustainability experts and others convened to:

Introduce the concept of Cool Surfaces

Share the best practices and experiences of global leaders in sustainability, and forge new relationships and partnerships to support initiatives to bolster resiliency and sustainability through cooler buildings, communities, cities and nations. This conference led to the formation of SACSA.

SACSA is a non-profit organization to implement and communicate an accurate radiative energy performance rating systems for roof and other surfaces, support research, and serve as an educational resource for information on roofing.

The South African Cool Surfaces Association (SACSA) was created to develop accurate and credible methods for evaluating and labeling the solar reflectance and thermal emittance (radiative properties) of surfaces, including roofing products and to disseminate the information to all interested parties.

Vision & Mission

SACSA is a non-profit organization for the following purposes:

- To implement and communicate fair and accurate, credible radiative energy performance rating systems for roofs and surfaces
- To support research into energy related radiative properties of roofing surfaces, including durability of those properties
- To provide education and objective support to parties interested in understanding and comparing various roofing options

Technical Information

A cool roof reflects and emits the sun's energy (radiation) as light back to the sky instead of allowing it to enter the building below as heat. In many climate zones, a cool roof can substantially reduce the cooling load of the building, providing several direct benefits to the building owner and occupants.

If a building does not have air conditioning, this keeps the building cooler and a more constant temperature. If a building has air conditioning, the equipment does not have to work as hard.

Standards & Testing

Standards

Standards used by SACSA

- ASTM C1549 – Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer
- ASTM C1371 – Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissions Meters
- ASTM E903 – Standard Test Method for Solar Absorbance, Reflectance, and Transmittance of Materials Using Integrating Spheres
- ASTM E1918 – Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field
- ASTM E1980 – Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces

SABS Testing

The newly established Building Envelope Testing Services (BETS) at the SABS is in the process of procuring equipment to test the performance of cool roofs and surfaces in order to assist with the rating of products.

Product Directory

Product rating, labeling & certified product directory:

Product Rating:

At the core of SACSA is its Product Rating Program, in which roofing manufacturers can label various roof surface products with radiative property values rated under a strict program administered by SACSA and SAFIERA (South African Fenestration and Insulation Energy Rating Authority)

SACSA does not set a minimum definition for "cool"; the Association simply lists the measured radiative property values on our Directory. Any roofing product can be tested as long as it is in compliance with the product rating manual. A product's placement on the Directory does not mean that the product is "cool" as defined by any particular code body or program

All radiative property testing is conducted by accredited testing laboratories. The SABS is in the process of procuring equipment to become an Accredited Testing Laboratory

Labeling: Labeling will be similar to the Cool Roof Rating Council as per the example below:

	<u>Initial</u>	<u>Weathered</u>
Solar Reflectance	0.00	Pending
Thermal Emittance	0.00	Pending
SRI Index	0.00	
Rated Product ID	
Licensed Seller ID Number	
Classification	Production Line	

Ratings are determined for a fix set of conditions, and may not be appropriate for determining seasonal energy performance. The actual effect of solar reflectance and thermal emittance on building performance may vary. Manufacturer of product stipulates that these ratings were determined in accordance with the applicable SACSA procedures.

Certified Products Directory

Code bodies, architects, building owners and specifiers can rely on the rating information provided in the Products Directory.

What is cool roof?

A cool roof reflects and emits the sun's energy (radiation) as light back to the sky instead of allowing it to enter the building below as heat. In many climate zones, a cool roof can substantially reduce the cooling load of the building, providing several direct benefits to the building owner and occupants. If a building does not have air conditioning, this keeps the building cooler and a more constant temperature. If a building has air conditioning, the equipment does not have to work as hard.

Initially cool roofs were only white; white reflects more sunlight and absorbs less heat however a cool roof need not be white only. There are many "cool color" products which use darker-colored pigments that are highly reflective in the near infrared (non-visible) portion of the solar spectrum. Because a white roof strongly reflects both visible and near infrared sunlight, a white roof will typically be cooler than a cool colored roof.

The two basic characteristics that determine the "coolness" of a roof are solar reflectance (SR) and thermal emittance (TE). Both properties are rated on a scale from 0 to 1, where 1 is the most reflective or emissive and "cooler".

The "cool roof" concept is no longer restricted to roofs alone. In Europe this technology has been extended to surfaces, i.e. cool pavements. Increasing the solar reflectance of urban surfaces results in reflecting more of the incoming global solar radiation, hence, counters global warming.

Performance Parameters Guide

Solar Reflectance (SR)

Highly reflective (high albedo) roof surfaces can reflect solar energy into the atmosphere away from the building interior and away from the ambient air around the building. SR is expressed either as a decimal fraction or a percentage. SR is measured typically as the proportion of solar energy reflected on a scale from 0.0 (no energy reflected) to 1.0 (100% energy reflected). SR may be measured using a variety of standard test procedures, including ASTM C 1549, E 903, and E 1918.

Defined: The ability of surface material to reflect sunlight, include the visible, infrared and ultraviolet wave lengths on a scale of 0 to 1, it is also called "albedo"

Thermal Emittance (TE)

In addition to reflecting solar energy into the atmosphere, roofs also radiate (emit) back to the atmosphere a portion of the solar energy that is initially absorbed and not reflected. The TE of a roofing surface is measured as the relative proportion of energy that is radiated back to the atmosphere and is expressed on a scale from 0.0 to 1.0. TE may be measured using a variety of standard test procedures, including ASTM C 1371 and E 408.

Defined: Refers to a materials ability to release absorbed heat.

Solar Reflectance Index (SRI)

The Solar Reflectance Index (SRI) is a newer measurement standard which incorporates both SR and TE in a single value. This is a calculation that combines the Solar Reflectance and thermal emittance into one rating. SRI values are usually between 0 and 100, with particularly cool materials exceeding 100.

Defined: A value that incorporated, both solar reflectance and emittance in a single value to represent a material's temperature in the sun

SRI quantifies how hot a surface would get relative to standard black and standard white surfaces. 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.

What are the benefits?

A cool roof can significantly reduce cooling energy costs and increase comfort levels by reducing temperature fluctuations inside a building.

Average energy savings range from approximately 7%-15% of total cooling costs.

Some other benefits include:

- Reducing utility bills associated with air conditioning
- Increasing occupant comfort
- Avoid installing an air conditioner
- Decreasing the size and prolong the life of an air conditioning system
- Lowering roof maintenance costs and extend roof life
- Avoiding re-roofing costs and reducing solid waste
- Address air pollution and Global Warming concerns by lowering CO2 and other emissions associated with fossil fuel-generated electricity used for air-conditioning.
- Reduce the “Urban Heat Island Effect” by reflecting heat back to the atmosphere

FAQS**Q: What is the benefit of a cool roof?**

A: A cool roof can significantly reduce cooling energy costs and increase comfort levels by reducing temperature fluctuations inside a building.

Q: Does a “cool roof” replace insulation?

A: No. In most climate zones worldwide, cool roofs can significantly reduce a building’s cooling load. However, cool roofs can also increase heating costs in winter months therefore it is still necessary to have a certain amount of insulation. The required level of thermal roof insulation may be reduced if a high albedo roof is installed.

Q: What is the right product?

A: Although SACSA cannot recommend specific roofing products, below is a description of some things to consider in selecting a roofing product for a building, including a description of the types of roofing materials currently rated in our program.

Q: Does South Africa accept the ratings of the Cool Roof Rating Council (CRRC) of America when goods are imported?

A: Yes. The rating program is exactly the same

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Formation of the South African Cool Surfaces Association (SACSA)

SANEDI and AAAMSA, together with the USA Department of Energy’s GSEP initiative, formed the South African Cool Surfaces Association (SACSA) on 6 February 2014 at MBA Conference Center, Midrand. The event was opened by the esteemed Dr. Wolsey Barnard- Department of Energy Deputy Director - general of energy programs and projects.

Industry leaders from the private and public sectors are invited to participate in the formation of this new, exciting, ground-breaking association that aims to put Cool Surface technology on the South African map. At this inaugural meeting, stakeholders discussed how available innovative technologies, materials and interventions as well as projects that have been successfully implemented elsewhere, in order to improve thermal comfort, energy efficiency and sustainability of buildings in South Africa.

It was decided that all organizations and companies present would serve on the NEC of SACSA. Member organizations of the South African Cool Surfaces Association will determine the direction this technology will take.

The following companies and organizations were represented:

- AAAMSA
- Arkema
- Building Physics
- PEER Africa WC CC
- Cool Roof SA / Comfort Living Holdings (Pty) Ltd Department of Energy
- National Department of Human Settlements Dickson Constant
- DP & Associates
- Eskom
- Kansai Plascon Promech Publishing SANAS
- SANEDI
- Spectrum Element Control
- The DOW Chemical Company
- University of Pretoria

The official launch of SACSAs took place at the Africa Energy Indaba, on 18 February 2014 at the Sandton Convention Center.

South African Cool Surfaces Association

The South African Cool Surfaces Association is a non-profit organization, administered by AAAMSA, that aims to:

1. Represent the interests of industry, government and the consumer to the benefit of all
2. Disseminate the information to all interested parties
3. Create employment opportunities through training
4. Develop accurate and credible methods for evaluating and labeling the solar reflectance and thermal emittance of roofing and other building surfaces products to:
 - Verify compliance with the National Building Regulation SANS 10400: XA Energy Usage in Buildings
 - Commercial EE Building Envelope- eligible to apply for 12L EE Tax incentive which benefits to consumers
 - Assists professionals to make informed decisions during rational design
 - Promotes energy efficiency by providing a base line for product development and improvement
 - Provides performance comparison

The overarching goals and objectives of the SA Cool Surfaces Project

The Cool Surfaces Project is the South African involvement and participation in and contribution to the US DOE GSEP Cool Roofs and Pavements Working Group. This initiative is a multilateral collaboration that seeks to improve building energy efficiency and comfort as well as to address urban heat and climate change. Towards these ends, the Cool Surfaces

Project's objectives include

- Sharing best practices on cool surfaces (roofs, walls and windows);
- Supporting SA DOE / SANEDI action plans to accelerate technology adoption;
- Quantifying the impact of cool surfaces;
- Developing infrastructure to support markets for cool surface products;
- Building capacity via supplier development and localization, and supporting labour
- Skill set and workforce training for cool surface deployment;
- Informing and supporting sustainable low-income housing projects.

Impact

It is estimated that deploying cool roofs alone globally, would have a cooling effect that would offset the warming from 31 billion tonnes CO₂. Should pavements be included, it extends the offset of the warming from 57 billion tonnes CO₂. That is nearly double the global CO₂ emissions in 2012 of 31.6 billion tonnes.

The cool surfaces building envelope contributes significantly to the thermal comfort of residents as well as reducing the dependence on electricity for building cooling in hot weather and heat insulation in cold weather. While data from international studies are available for comparative modeling, studies under South African conditions are presently being conducted to establish the efficacy of Cool Surfaces' Technology in the various local climatic environments.