

# COOL ROOFS

Energy-Saving Reflective Roof Surfaces



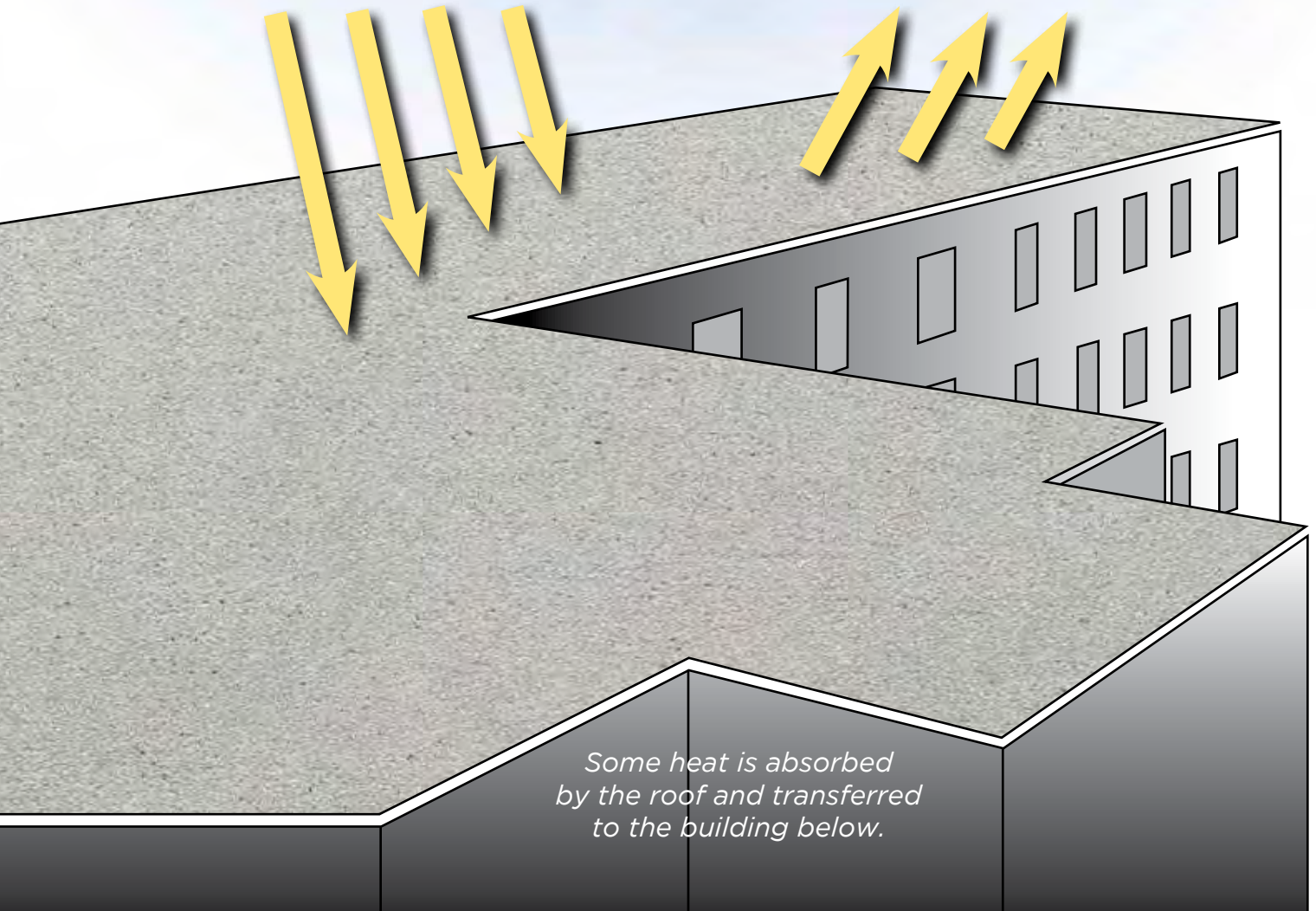
# USING COOL ROOF TECHNOLOGY IS ONE OF THE EASIEST, MOST COST-EFFECTIVE WAYS TO LOWER ENERGY CONSUMPTION.

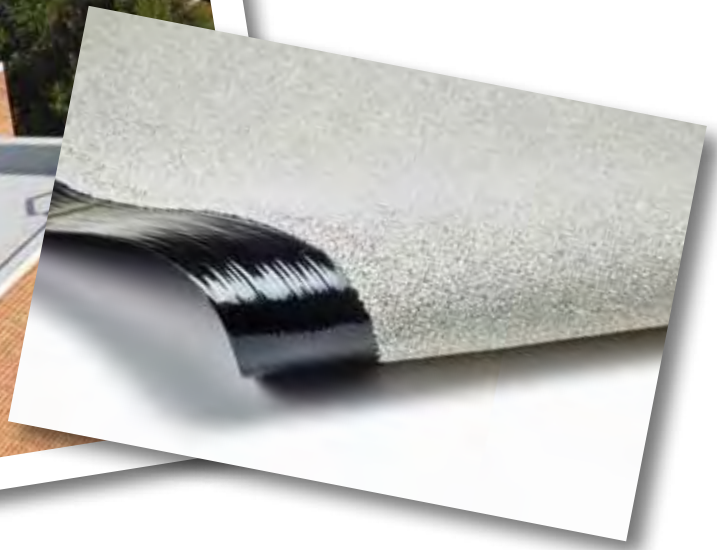
## **Thermal Emittance:**

*The relative ability of the roof surface to radiate absorbed heat.*

## **Solar Reflectance:**

*The fraction of solar energy that is reflected by the roof.*





## What makes a roof “cool?”

Building and home interiors stay cooler when the roof surface reflects the sun’s solar radiation during summer days. The ability of a surface to reflect solar radiation is called “solar reflectance.” Solar radiation that is not reflected is absorbed by the roof and will result in an increase of roof temperature.

Another way your hot roof surface can efficiently cool itself is by “emitting” thermal radiation. This property is called “thermal emittance” - the higher the thermal emittance, the more the surface can transfer absorbed heat to the atmosphere. One of the benefits of asphaltic low-slope membranes is their high thermal emittance, which enable their surfaces to cool themselves faster.

The solar reflectance and thermal emittance of a surface are called its “radiative properties” because they describe its ability to reflect and emit thermal radiation. “Cool roofs” have significantly greater radiative property values as compared to standard roofs.

## Cool Roof Products

CertainTeed’s CoolStar® membrane surfacing utilizes naturally occurring aggregate processed to ultra-high brightness to enhance reflectivity. These bright white granules are 100% opaque to UV radiation, protecting the asphaltic membrane from UV degradation while maintaining granule adhesion with superior solar reflectance. CertainTeed’s SMARTCOAT™ liquid-applied roof coatings offer another avenue to achieve exceptional reflectivity. Using SMARTCOAT acrylic and silicone roofing restoration systems not only saves costs by reducing energy consumption but also supports sustainability by extending the life of a roof and reducing the need to tear-off and dispose of old roofing.

## Works with a range of roof systems.

**CoolStar surfacing is available on a variety of cap sheets:**

- APP modified bitumen
- BUR (Built-up roofing)
- SBS modified bitumen

**SMARTCOAT can be applied on a variety of substrates:**

- Modified bitumen
- BUR (Built-up roofing)
- Single-ply (EDM,TPO,PVC)
- Metal and more

## CALIFORNIA TITLE 24

CoolStar® APP-modified and BUR cap sheets and SMARTCOAT™ coatings can be used to comply with 2019 California Title 24 Part 6 Cool Roof requirements.

To meet California Title-24 prescriptive standards, a low-slope roofing surface must achieve either an aged Solar Reflectance (SR) value of > 0.63 OR an aged Solar Reflective Index (SRI) of > 75. The SRI is a calculation based on the Solar Reflectance and Thermal Emittance of a product. A black, non-reflective roof has an SRI of 0; the highest possible value for SRI is 100, indicating maximum reflectivity. The higher the SRI, the cooler the surface will be.

It is generally industry accepted that highly reflective low-slope roofs can help reduce energy consumption by at least 30%.

### What are the benefits of having a cool roof?

Cool roofs are one of several strategies building owners can use to increase occupant comfort, and reduce energy consumption/cost. Lower roof temperatures also mean reduced thermal movement and stress on the roof system, extending the lifetime of a properly maintained roof.



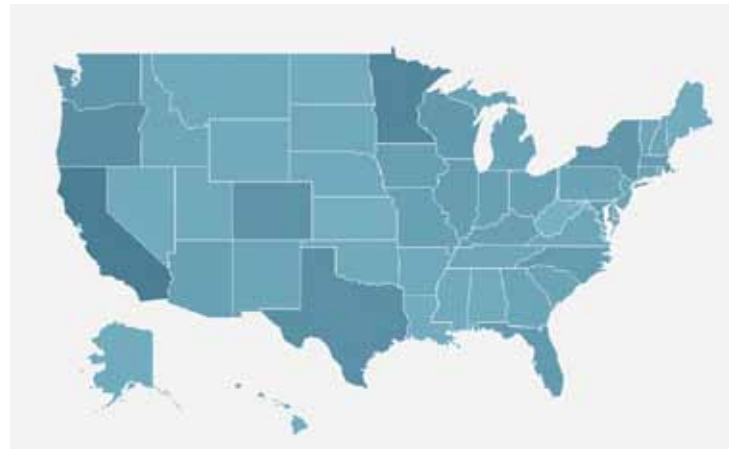
In urban areas, replacing dark colored surfaces with more reflective surfaces helps mitigate the “heat island effect,” a phenomenon that makes urban areas significantly warmer than surrounding rural areas because of large expanses of dark surfaces (pavements, roofs). Increased temperatures contribute to photochemical reactions that lead to the formation of smog. Installing cool roofs contributes to better urban air quality.

It's important to note, buildings and homes function as a system; the reflectivity of the roof is only one component. Energy use is also affected by the insulation and air tightness of the building's envelope.

### When is a cool roof required?

Some state and municipal building codes contain cool roof requirements. CertainTeed recommends contacting your local building official to understand the specific requirements before starting a new building, reroofing or recover project.

### Areas with Cool Roof Policies and/or Incentives



For details on programs in your area, visit [www.dsireusa.org](http://www.dsireusa.org)

Even if a particular state or local municipality doesn't require a cool roof, some power companies may offer rebates for qualified roofing products. Additionally, voluntary green building rating programs such as LEED® give credit toward building certification for installing a cool roof product meeting the minimum SRI threshold.

## Is a Cool Roof right for every building?

Climate is an important consideration when calculating the benefits of a cool roof. While significantly reducing the demand for energy associated with cooling (usually electricity), a cool roof could potentially lead to a slightly increased need for heating energy in winter. This is because a cool roof keeps your “lid” cooler year-round. To calculate what the savings may be in your area, Oak Ridge National Laboratory has an easy to use on-line calculator: <https://web.ornl.gov/sci/buildings/tools/cool-roof/>

Please remember that environmental benefits may outweigh economic benefits for some consumers. Changes in the types of fuels used for heating vs. cooling (and their associated environmental impacts) and the reduction in Urban Heat Island effect may be more important to some building owners than utility bills alone. In those cases, cool roofs are the obvious choice.

Moisture management is a key aspect of any roof assembly, especially for reflective roofs as water dissipation is less efficient beneath cooler surfaces. Sealing roof and ceiling penetrations that could allow moisture transmission to the interior, properly ventilating attics, and installing air- and vapor-retarders are effective strategies to limit moisture damage.

Just as for other building assemblies, proper roof design and installation are key to ensuring durability and long-term performance.

### Roof system selection questions?

Consult CertainTeed Commercial Roofing Technical Services Department for the best way to optimize your future energy savings and meet local building codes.

## Do reflective roofs remain cool over time?

CertainTeed's CoolStar membranes and SMARTCOAT™ coatings are engineered to deliver long-term performance without significant fading or color change. An important benefit of modified bitumen cap sheets is that its granules tend to be “self-cleaning” when sufficient positive surface drainage occurs, helping to keep the roof covering clean and reflective. In areas where rainfall is infrequent, CertainTeed recommends hosing off the roof as part of a routine maintenance program to regain its higher solar reflectance.

Many other bright white, reflective low-slope solutions such as TPO membranes and silicone coatings, are valued for high initial reflectivity but are well known for relatively quick dirt pick-up, significantly reducing their reflective properties and performance benefits.

Over time, soiling of the roof occurs, on any low-slope roof, especially where water ponds, decreasing its solar reflectance. This is why

the California Title-24 standards are based off aged values. These values are ultimately determined by a national average performance measurement after a product has been in the field for three years, though a Rapid Ratings test can be performed to temporarily assign a predictive aged value while actual aging takes place.



APP-MODIFIED BITUMEN CAP SHEET

Product Name	Description	ASTM	Radiative Properties					
			Solar Reflectance		Thermal Emittance		SRI	
			Initial	Aged	Initial	Aged	Initial	Aged
Flintlastic® GTA CoolStar®	Workhorse granule surfaced cap membrane; offers the strength and UV resistance of APP modified bitumen with the stress resistance of a quality polyester reinforcement- for torch applications	D6222, Grade G, Type I	0.73	0.63**	0.91	0.91**	90	76**
Flintlastic GTA-FR CoolStar	Enjoy the benefits of 'GTA' with fire retardant additives for Class A Fire Ratings	D6222, Grade G, Type I	0.73	0.63**	0.91	0.91**	90	76**

BUILT-UP ROOFING (BUR)

MS Cap Sheet CoolStar	Granule-surfaced non-modified asphalt membrane, commonly specified as weathering layer for hot asphalt-applied built-up roof assemblies in lieu of flood coat and gravel.	D3909 and D4897	0.73	0.63**	0.91	0.91**	90	76**
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SELF-ADHERED SBS-MODIFIED BITUMEN CAP SHEET

Flintlastic SA Cap CoolStar*	Granule surfaced self-adhering cap membrane; highly stress resilient with pliable SBS modified bitumen and polyester reinforcement	D6164 Grade G,	0.71	0.57	0.90	0.91	87	68
Flintlastic SA Cap FR CoolStar*	Granule surfaced, fire retardant self-adhering membrane; combines the strength of a heavy cap duty fiberglass reinforcement and the pliability of SBS modified bitumen	D6163, Grade G, Type I UL 2218, Class 4	0.71	0.57	0.90	0.91	87	68

SBS-MODIFIED BITUMEN CAP SHEET<sup>2</sup>

Flintlastic Premium FR-P CoolStar*	Enjoy the benefits of "FR-P" with increased modified asphalt per square and a heavier, high-performance, extra-tough, stress resistant polyester reinforcement mat	D6164, Grade G, Type II	0.71	0.57	0.90	0.91	87	68
Flintlastic GTS-FR CoolStar*	One of CertainTeed's most robust granule surfaced cap membranes with 67 pounds of modified asphalt per square; highly stress resilient with pliable SBS modified bitumen and polyester reinforcement- for torch applications	D6164, Grade G, Type II	0.71	0.57	0.90	0.91	87	68

LIQUID-APPLIED ROOFING

SMARTCOAT™ 400 High Performance Acrylic Coating	Heavy-bodied elastomeric roof coating manufactured with 100% acrylic-based polymers, reflective white pigments, and high-grade biocides. Remains bright white after weathering. Extremely high elastomeric properties - tough, durable solution to seal roof surfaces.	D6083, Type I	0.86	0.69	0.88	0.91	108	85
SMARTCOAT 401 High Solids Acrylic Coating	High-solids, heavy-bodied elastomeric roof coating manufactured with 100% acrylic-based polymers, reflective white pigments and UV-reactive chemicals for enhanced dirt pickup resistance. Remains bright white after weathering. Durable, workhorse solution to prolong roof service life		0.83	0.80**	0.90	0.90**	104	100**
SMARTCOAT 450 High Solids Silicone Coating	100% silicone-based, solvent-free, single-part roof coating. Creates a vapor-permeable, UV-resistant, watertight, and weatherproof membrane. Remains bright white after weathering. Outstanding ponded water resistance.	D6694	0.88	0.70	0.90	0.90	111	86

\*Made to Order, 160 Roll Minimum Order Requirement \*\*CRRC Rapid Rating  
CoolStar touch-up granules are available in 5-gallon buckets for use on asphalt bleed-out areas.



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