ASTEC®
INSULATING COATINGS CORPORATION

NSF®
Registered to ISO 9001

White is Green.

Making sense of cool roofing.

What is a "Cool" Roof ??
What is a "Green" Roof ??
Are "Cool" Roofs effective in colder climates??
How can it cost less to go "Green"??
What is a "Sustainable" roof ??
What is a "Renewable" roof ??
Are there other benefits from a "Cool/Green" roof ??
Which "Cool/Green" roofing is best for me ??

Saving your roof. Saving money. Saving energy. Sustaining the planet.

This is an informational publication prepared by Insulating Coatings Corporation to unify understandings in conversation with our customers, our Authorized Contractors, and others. We have used standard EPA (Evironmental Protection Agency) definitions and descriptions as a starting point, expanded with pertinent independent comment, and, in blue, applied the characteristics of ICC's ASTEC® Re-Ply™ elastomeric cool roofing systems to each question at hand. ICC's intent is to establish common ground for discussions of Cool Roof technologies, especially as they apply to new codes and expectations emerging in response to growing environmental awareness and economic realities.

For a comprehensive and up-to-date glossary related to cool roofing, try:

(www.epa.gov/heatisld/resources/glossary.html)

(www.energycodes.gov/support/glossary.stm)

What is a "Green" Roof ?

Green roofs are rooftops planted with vegetation. Intensive green roofs have thick layers of soil (6 to 12 inches, or more) that can support a broad variety of plant or even tree species. Extensive roofs are simpler green roofs with a soil layer of 6 inches or less to support turf, grass, or other ground cover.

(www.epa.gov)

Can a "White" Roof be "Green"?

Most generally, a roof can be considered "green" if it is environmentally friendly. The International Council for Research and Innovation in Building and Construction,...formerly... the "Conseil International du Batiment" (CIB), recognizes a roof as sustainable if it adheres to the following tenets:

1. minimizes the burden on the environment by using the earth's resources responsibly
2. conserves energy by improving the thermal efficiency of roofs
3. extends roof life span by improving long-term performance (CIB 2001)

(www.fmlink.com article by L.M. Cavanaugh)

...a truly green roof should be identified as:

"...a roofing system that is designed, constructed, maintained, rehabilitated, and demolished with an emphasis throughout its life-cycle on using natural resources efficiently and preserving the global environment."

(Cavanaugh citing Oak Ridge National Laboratory, 1996)

Using the formula below, **ASTEC® Re-Ply™** cool roofing now in place is providing 3 million metric tons of CO2 offset each year. Re-Ply™ white is definitely "Green".

"...replacing nonreflective, dark roofing materials with white ones ... (every 1000 square feet) would result in an equivalent CO2 offset of 10 metric tons (about $250) annually."

(www.energy.ca.gov/2008publications/LBNL-1000-2008-022/LBNL-1000-2008-022.PDF)
Akbari, H., S. Menon, and A. Rosenfeld. 2008. "D2 Global Cooling: Increasing Solar Reflectance of Urban Areas to Offset CO_2,"D3 In press, *Climatic Change*.

U.S. Naval Air Museum, Pensacola, Florida

This museum along the coast of Florida's panhandle had a heat-absorbing modified bitumen roof prior to the installation of the **ASTEC® Re-Ply™** cool roof. The installation savings alone were significant. A complete roof tear-off was under consideration and the price was estimated at *over 3 times* the cost of the Re-Ply™ alternative. In addition, several other "green" benefits were gained with the selection of the **ASTEC® Re-Ply™** roof:

- Land fill and disposal issues were eliminated.
- Energy savings through reduced air conditioning demand were realized.
- Qualifications for LEED benefits were added.
- An easily renewable and sustainable roof was in place for the future.

Also, the **ASTEC® Re-Ply™** System did not require the museum to be closed during the installation. And, unlike the other replacement options, the Re-Ply™ roof became a totally seamless, wind and weathertight surface in a storm-prone region.

What is a "Cool" Roof?

The term cool roof is used to describe roofing material that has high solar reflectance. This characteristic can reduce heat transfer to the indoors and enhance roof durability. Cool roofs may also be highly emissive, releasing a large percentage of the solar energy they absorb.

(www.epa.gov)

Albedo (solar reflectance):

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

(**ASTEC® Re-Ply™** tests independently at .87)

Emittance:

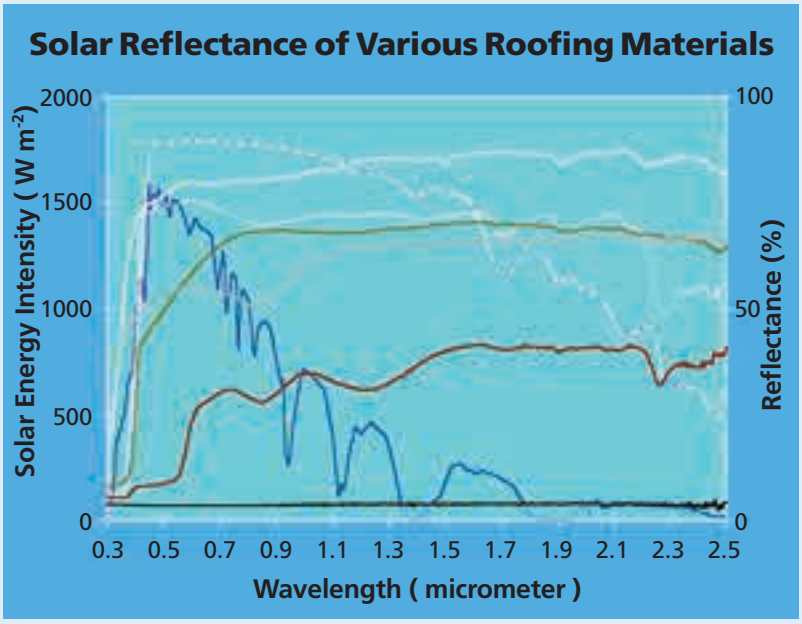
The emittance of a material refers to its ability to release absorbed heat. Scientists use a number between 0 and 1, or 0% and 100%, to express emittance. With the exception of metals, most construction materials have emittances above 0.85 (85%).

(**ASTEC® Re-Ply™** tests independently at .91 thermal emissivity.)

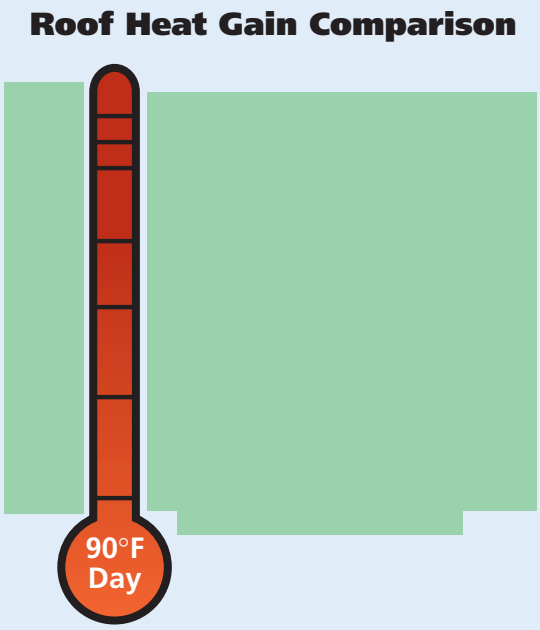
Solar Reflectance Index (SRI):

SRI is a value that incorporates 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 calculated using equations based on previously measured values of solar reflectance and emittance as laid out in the American Society for Testing and Materials Standard E 1980. It is expressed as a fraction (0.0 to 1.0) or percentage (0% to 100%).

(**ASTEC® Re-Ply™** white acrylic roofs rate as near 100.0 SRI as any current roofing material.)



(eetd.lbl.gov/HeatIsland/PUBS/PAINTING/CoolerRoofs.GIF)



(comprised of data from: www.eetd.lbl.gov/coolroof/how.htm)

New Orleans Convention Center, New Orleans, Louisiana

A cool roof must *keep you dry* before it *keeps you cool*!

An **ASTEC® Re-Ply™** system was applied to upgrade an older metal roof for the New Orleans Convention Center prior to the Katrina hurricane disaster of 2005. The seamless, weathertight Re-Ply™ roofing sustained very minimal damage from the Category 4+ hurricane. This allowed the facility to be used as a relocation center for occupants of the severely damaged Superdome.

In addition to hurricane-beating toughness, the chart on page 16 shows how **ASTEC® Re-Ply™** Systems easily meet and surpass all recognized criteria for keeping you cool — saving buildings like this thousands in unnecessary cooling costs. Policies related to cool roofing from the EPA, ASHRAE, GBI, USGBC, and others demonstrate how, for ASTEC roofs, "white" can be very "green".

What are the benefits of a "Cool" Roof?

Direct and Indirect Energy Savings:

Air conditioning energy savings from installing a cool roof or planting shade trees to reduce heat transfer into homes and buildings are direct energy savings. Indirect energy savings are savings accrued from lower ambient temperatures (presuming a decrease in air conditioning under cooler outdoor temperatures).

(www.epa.gov)

Cool roofs reduce the roof surface temperature by up to 100 degrees Fahrenheit, thereby reducing the heat transferred into the building below. This helps to reduce energy costs (by keeping attics and ducts cooler), improve occupant comfort, cut maintenance costs, increase the life cycle of the roof, and reduce urban heat islands along with associated smog.

Some benefits of Cool Roofs:

- Save on annual electricity bills by reducing summer air conditioning costs.
- Save peak electricity demand costs if you have time-of-use metering.
- Reduce roof maintenance and replacement expenses by extending roof life.
- Increase indoor comfort in summer by reflecting heat from the roof surface.
- Reduce the heat island effect in cities and suburbs.
- Reduce air pollution and smog formation.
- Reduce roofing waste added to landfills.
- Help builders and building managers meet California's Title 24 Energy Efficiency Building Standards.

(www.consumerenergycenter.org)

What is the DOE-2 Model?

The ***DOE-2 Model*** is a computer program that simulates hourly building energy use. It is an international benchmark used as the basis for building standards in the U.S. and other countries.

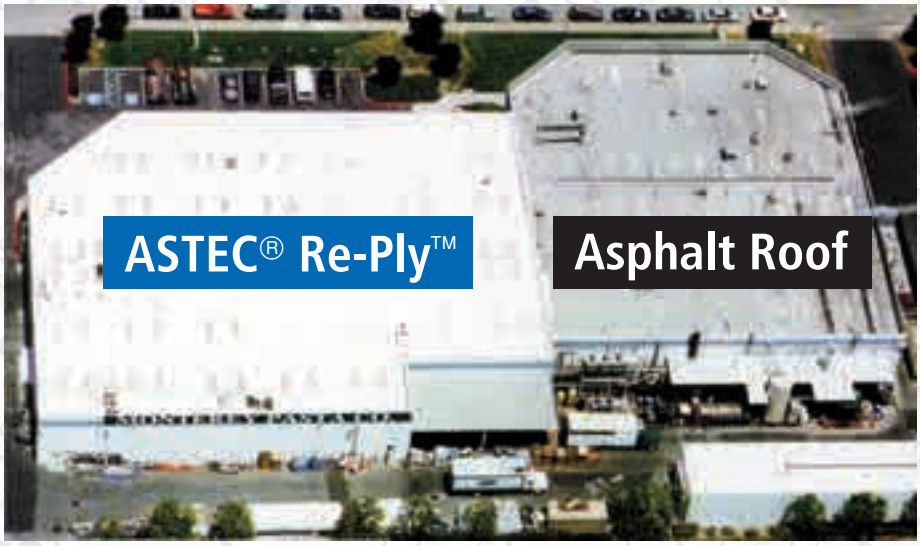
(www.eere.energy.gov/buildings/tools_directory)

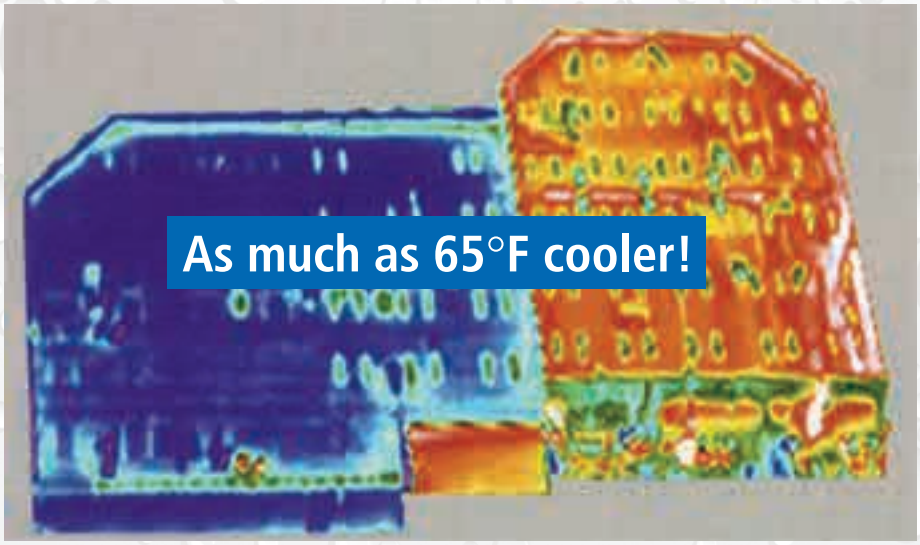
Just like the example at the right, **ASTEC® Re-Ply™** Cool Roof Systems consistently score at the top of any calculation for reducing building energy use (cooling costs) year after year.

Americans spend about $40 billion annually to air condition buildings — one-sixth of all electricity generated in this country

(www.energystar.gov/index.cfm?c=roof_prods.pr_roof_products)

ASTEC can save up to 40% on cooling costs as well as fulfill every other benefit listed above by the *Consumer Energy Center.*





As a check on **ASTEC® Re-Ply™** cool roofing effectiveness, the facility above completed one section of their roof as a seamless Re-Ply surface and used infrared imaging to visually capture the benefits of maximized cool roof technology. Heat measurements have revealed as much as a 65°F difference in roof temperature. That translates, by the ***DOE-2 Model***, into a 33% air-conditioning energy savings under this **ASTEC® Re-Ply™** cool roof.

ASTEC's "green" cool roof technology saves energy, saves on replacement costs, saves the environment. Going "green" costs less with ASTEC.

What's the benefit of Energy Star® qualified roofs ?

Benefits of ENERGY STAR qualified roof products include:

- *Saves Money and Energy.* According to EPA, about $40 billion is spent annually in the US to air condition buildings — one-sixth of all electricity generated in a year! ENERGY STAR qualified roof products reduce the amount of air conditioning needed in buildings, and can reduce energy bills by up to 50 percent.
- *Downsizes Cooling Equipment.* A reflective roof can reduce peak cooling demand by 10-15%. As a result, the home or building owner may be able to purchase a smaller, more efficient, and less expensive cooling system.
- *Decreases Pollution in Urban Areas.* Reduced energy demand means less burning of fossil fuels, which results in less pollution from power plants. Also, ENERGY STAR qualified roof products help to reduce the "heat island effect," in which dark, heat-absorbing buildings and paved areas make the air in urban areas hotter, and more smoggy.
- *Increases Roof Product Life.* ENERGY STAR qualified roof products maintain a more constant temperature and reduce thermal shock, which occurs when cool rain hits a hot roof, causing a sharp drop in temperature. During temperature changes, a roof expands and contracts, causing stress and degrading the roof.

(www.energystar.gov/index.cfm?c=roof_prods.pr_roof_faqs)

Is roofing a factor in Global Warming ?

The term climate change is often used interchangeably with the term global warming, but according to the National Academy of Sciences, "the phrase 'climate change' is growing in preferred use to 'global warming' because it helps convey that there are [other] changes in addition to rising temperatures."

Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from:

- natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;
- natural processes within the climate system (e.g. changes in ocean circulation);
- human activities that change the atmosphere's composition (e.g. through burning fossil fuels) and the land surface (e.g. deforestation, reforestation, urbanization, desertification, etc.)

(www.epa.gov/climatechange/basicinfo.html)

For over 20 years ago, **ASTEC® Re-Ply™** cool roof systems have been conserving resources, reducing landfill waste and developing products and systems that provide renewable protection for our customers and sustainability for the world.

By reducing the kilowatts needed to keep a building cool, **ASTEC® Re-Ply™** roofing helps reduce heat island effects, CO_2 emissions, smog, and other manageable climate change aspects.

ASTEC has also proven that cool roofs can help reduce the destructive *natural* effects of intense climatic heat (infrared) and sunlight (ultraviolet) on a roof's life cycle.

In these ways, we believe our proven technologies are contributing to the management of climate change from both natural and induced causes.

(Annually) roofing replacement generates 8 to 10 million tons of old roofing waste. Historically, about 95% (or 22 million cubic yards) ... has ended up in landfills.

(www.dot.state.tx.us/services/general_services/recycling)

Museu de Arte Contemporânea de Niterói, Brazil

"With the whole world becoming more in tune with climate change, carbon emissions, and sustaining the planet for more than our own generation, we're finding the "green" benefits of ASTEC over the past 20 years are coming front and center today... not just here in the states, but around the globe."

— Rick Thomas, International Business Director, ASTEC Roofs and Walls

What is an urban "heat island"?

The **urban heat island effect** is a measurable increase in ambient urban air temperatures resulting primarily from the replacement of vegetation with buildings, roads, and other heat-absorbing infrastructure. The heat island effect can result in significant temperature differences between rural and urban areas.

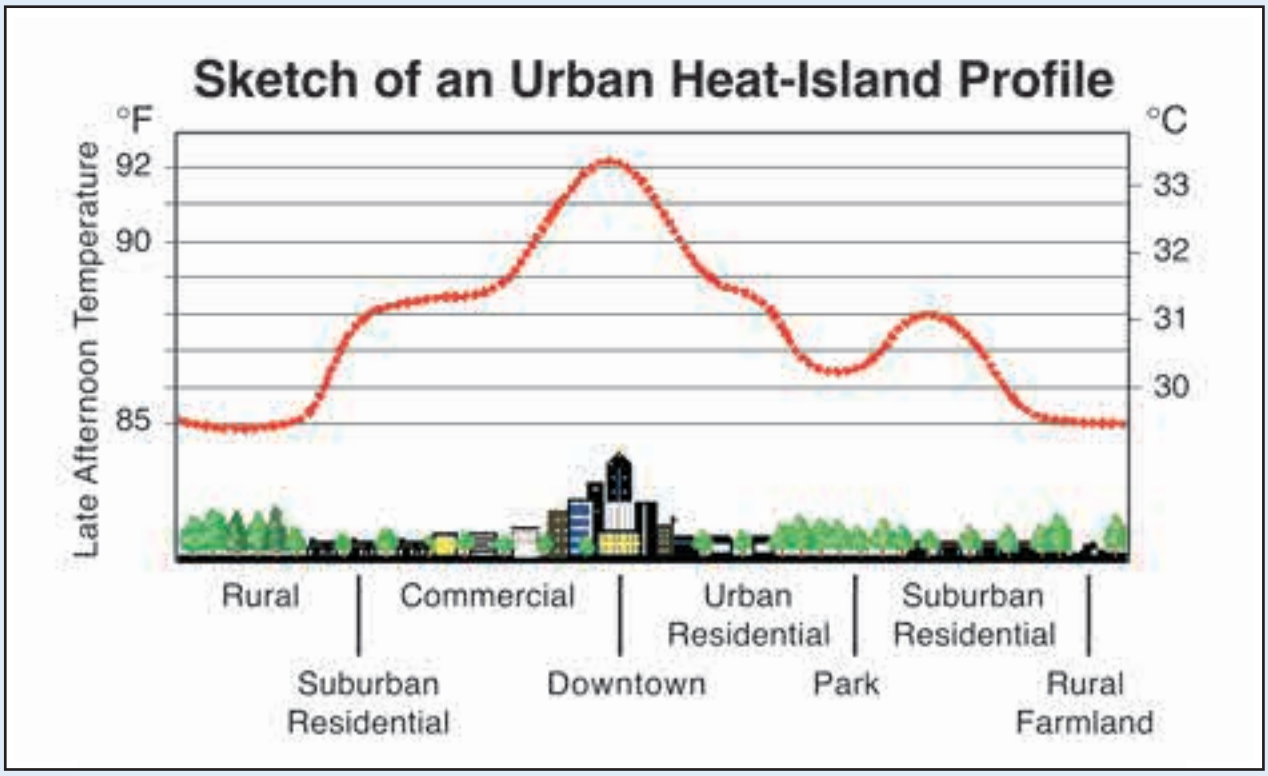
(www.epa.gov/heatisld/resources/glossary)

On warm summer days, a city can be 6 to 8°F warmer than its surrounding areas. This effect is called the urban heat island. Cool roof materials, pavements, and vegetation can reduce the heat island effect, save energy and reduce smog formation. The goal of this research is to develop cool materials to save energy and money.

(eetd.lbl.gov/r-bldgsee-crhi.html)

The Heat Island Group has monitored buildings in Sacramento with lightly colored, more reflective roofs. We found that these buildings used up to 40% less energy for cooling than buildings with darker roofs. The Florida Solar Energy Center performed a similar study, also showing up to 40% cooling energy savings.

(eetd.lbl.gov/HeatIsland/CoolRoofs/)



By significantly reducing the amount of heat absorbed from dark roofs, **ASTEC® Re-Ply™** cool roofs help reduce the "heat island" effect in major metropolitan areas. ASTEC leads to a positive "domino effect": cooler roofs result in interiors that require less air conditioning load to maintain comfortable temperatures. Lowered air conditioning demand results in less energy use, contributing in turn, to lower emissions and smog reduction.

Using the Los Angeles basin as a model, Lawrence Berkley National Laboratory made some projections based on only a 15% shift* to recommended heat island mitigation solutions, including cool roof conversions.

...peak power rises 3% for every 0.5°F rise in daily maximum temperature... about 1-1.5 gigawatts of power are used to compensate the impact of the heat island... costing the Los Angeles ratepayers about $100,000 per hour, about $100 million per year.

* Staff scientist Haider Taha... divided the L.A. basin into hundreds of portions and estimated how much vegetation and reflective surfaces could be added to each location. Then he added trees and lightened surfaces in only about 15% of the possible areas. Summer temperatures at 3 p.m. dropped 6°F.

About 40% of the area in the LA basin is covered by buildings (roofs) and roads which could realistically be made 30% more reflective during their next resurfacing... summer temperatures in LA at 3 p.m. on August 27 could become 5 to 9°F (or 3 to 5°C) lower... (with a predicted) ozone reduction of 10 to 20% overall.

... the rate of smog formation depends on temperature, this same model... showed an overall reduction in smog by about 10%, the equivalent of removing three to five million cars from the roads.

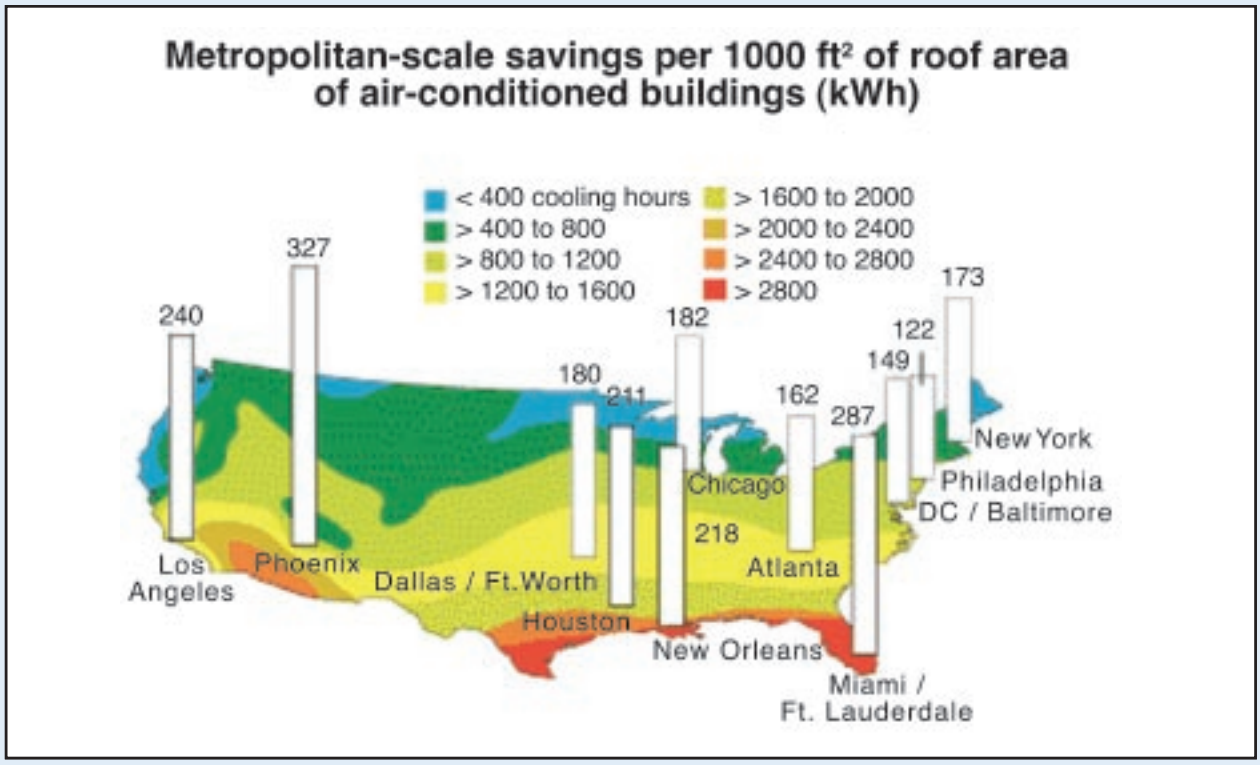
(heatisland.lbl.gov/LEARN/LAIsland/)

Are "Cool" roofs effective in colder climates?

Heating or Winter Penalty:

Cool roofs reflect solar energy year-round. In the winter, cool roofs reflect solar energy that could have been used to warm the building, and more heating energy may be required. This heating penalty is small in most U.S. climates because there is less sunlight available during the winter. In addition, it is usually offset by cooling energy savings during the summer. Cool roofs typically result in net annual energy savings.

(www.epa.gov/heatisld/resources/glossary.html)



Results of UHIPP Eleven City Energy Savings Study

...Energy savings are calculated by comparing decreased summertime costs (from lowered air conditioning demand) with any observed increases in wintertime heating expenditures. The results of research studies indicate that in most U.S. climates, summertime air conditioning energy savings significantly exceed this "winter penalty."

(www.epa.gov/hiri/strategies/coolroofs.html)

If all roofs were cooler the energy savings in many cities could be tens of millions of dollars a year — and in the billions nationwide. The commonly referenced graph above uses data projected by the Heat Island Group of Lawrence Berkley National Laboratories. It shows the estimated annual kilowatt hours saved by cool roofing in selected cities. ***These savings are after subtracting any potential winter penalties.*** With the cost of energy soaring, these economies become significant even in those regions with fewest total cooling hours.

Additionally, for buildings in the north, **ASTEC® Re-Ply™** elastomeric cool roofing is able to retain its protective characteristics better than many roofing materials in frigid winters as well as in sweltering summers.

ASTEC® Re-Ply™ technology stands at the top of cool roof reflectivity and emissivity. Our combination of energy savings, roof sustainability, and green impact is unbeatable among current cool roofing choices.

Light Manufacturing Building, Kirkwood, New York

In hot climates, the high reflectivity and high emissivity of **ASTEC® Re-Ply™** cool roofing are constantly saving energy.

In cold climates, the energy savings from reduced summer cooling costs are still shown to override any heating energy gains in the winter. This is especially true in metropolitan areas with "heat island" temperatures and high energy costs. It should also be noted that a dark roof, covered with snow, is still reflecting solar energy (forfeiting any benefit of a dark roof in winter).

Additionally, in any climate, the cost of replacing a roof far exceeds the cost of an **ASTEC® Re-Ply™** system. Never pay to replace a roof if you can simply Re-Ply™ it.

"The estimated U.S.potential savings for white roofs are in excess of $1 billion per year in net annual energy bills (cooling-energy savings minus heating-energy penalties)."

(www.energy.ca.gov/2008publications/LBNL-1000-2008-022/LBNL-1000-2008-022.PDF)

Akbari, H., S. Menon, and A. Rosenfeld. 2008.
"'D2Global Cooling: Increasing Solar Reflectance of Urban Areas to Offset CO2,"'
D3 In press, *Climatic Change*.

What is Energy Star®?

ENERGY STAR is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy helping us all save money and protect the environment through energy efficient products and practices.

Results are already adding up. Americans, with the help of ENERGY STAR, saved enough energy in 2007 alone to avoid greenhouse gas emissions equivalent to those from 27 million cars — all while saving $16 billion on their utility bills.

(www.energystar.gov/index.cfm?c=about.ab_index)

What is LEED®?

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ encourages and accelerates global adoption of sustainable green building and development practices through the creation and implementation of universally understood and accepted tools and performance criteria.

LEED is a third party certification program and the nationally accepted benchmark for the design, construction and operation of high performance green buildings. LEED gives building owners and operators the tools they need to have an immediate and measurable impact on their buildings' performance. LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.

(www.usgbc.org/DisplayPage.aspx?CMSPageID=222)

What is Green Globes™?

The Green Globes system is a revolutionary building environmental design and management tool. It delivers an online assessment protocol, rating system and guidance for green building design, operation and management. It is interactive, flexible and affordable, and provides market recognition of a building's environmental attributes through third-party verification.

(www.greenglobes.com)

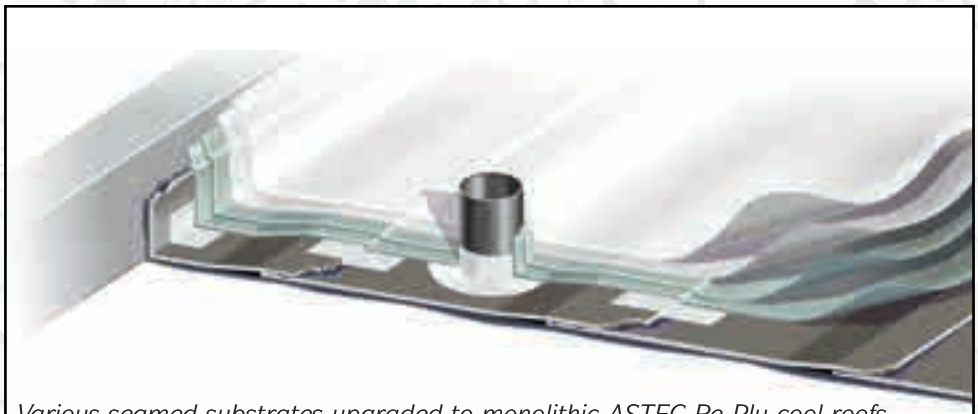
What is ASHRAE 90.1?

ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) develops standards for refrigeration processes and the design and maintenance of indoor environments. (The ANSI/ASHRAE/IESNA Standard 90.1-2007 is the current Energy Standard for [commerical] Buildings Except Low-Rise Residential Buildings. It gives "consensus standards" and exceptions for reducing energy usage including those for membrane cool roofing.)

ASHRAE is accredited by the American National Standards Institute (ANSI) and follows ANSI's requirements for due process and standards development.

(www.ashrae.org/technology/page/548)

Aging metal converted to sustainable ASTEC Re-Ply cool roofing.



Various seamed substrates upgraded to monolithic ASTEC Re-Ply cool roofs.

ASTEC® Re-Ply™ Roofing Systems are fluid-applied to a variety of roof surfaces and cure to a completely seamless, water-tight, and flexible membrane.

Re-Ply™ cool roofs, prepared and installed by ASTEC Authorized Contractors, can be inspected, renewed, and sustained under our 10-Year Renewable™ Warranty.

"ENERGY STAR qualified roof products...can lower roof surface temperature by up to 100°F...(reducing) the amount of air conditioning needed... and peak cooling demand by 10-15 %."

(www.energystar.gov/index.cfm?c=roof_prods.pr_roof_products")

Are there "cool roof" standards or policies?

Cool Roof Policies Comparison

Policy	Policy Requirements[1]	Minimum Reflectance	Minimum Emissivity	Minimum Aged Reflectance
California Energy Code (Title 24)[2]	Required	0.70	0.75	None
Chicago Energy Conservation Code	Mandatory	0.25	None	None
Hawaii Model Energy Code	Credit	None	None	None
ANSI / ASHRAE / IESNA 90.1-2004	Credit	0.70	0.75	None
EPA ENERGY STAR®	0.75	0.65	0.75	0.50
LEED Green Building Rating System™ (SRI 78)[3]	Credit	0.65	0.90	0.50
GBI Green Globes™ (SRI 78)[4]	Credit	N/A	N/A	N/A
Florida State Energy Code	Required	0.65	0.80	None
Georgia Energy Code	Required	0.75	0.75	None
Guam/Samoa Energy Code	Credit	0.70	0.75	None
International Energy Conservation Code	Credit	0.70	0.75	None
Advanced Building Guidelines	Required	0.85	None	0.50
California State/Utility Cool Roof Rebate Programs	Mandatory	0.65	None	0.50
Canadian Energy Code	Credit	None	None	None
ASTEC® Re-Ply™ Cool Roof System		0.87	0.91	0.78

[1] **"Mandatory"** refers to 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 poicies where cool roofs are not mandatory, but an energy credit is earned if one is used.

[2] **Title 24** allows for some degree of trade-off between emissivity and reflectance.

[3] The values in this table are for **LEED v2.1**. The requirements for the more recent version, **LEED v2.2**, are Solar Reflectance Index (SRI) minimum values of 78 for low-slope roofs (less than 2-in-12 [9 degrees]) and 29 for steep slope roofs (greater than 2-in-12 [9 degrees]). SRI is calculated according to **ASTM E1980, "Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces,"** using solar reflectance and infrared emittance values. Aged reflectance is not considered in the SRI calculation.

[4] **Green Globes** has the same SRI requirements as **LEED v2.2.**

(data from: www.professionalroofing.net/article.aspx?id=924)

What other groups support cool roofing?

CRRC (Cool Roof Rating Council) *www.coolroofs.org*

DOE (Department of Energy) *www.energy.gov*

EERE (Energy Efficiency and Renewable Energy) *www.eere.energy.gov*

EETD (Environmental Energy Technologies Division of Lawrence Berkeley National Laboratory) *www.eetd.lbl.gov*

EPA (Enviromental Protection Agency) *www.epa.gov*

GBI (Green Building Initiative) *www.thegbi.org*

RRCI (Reflective Roof Coatings Institute) *www.reflectivecoatings.org*

USGBC (U.S. Green Building Council) *www.usgbc.org*

Hickham Air Force Station, Hawaii

"After the application of the coating, the average peak temperature in the warehouse area (decreased) 17 degrees... The coating is unquestionably an effective and cost efficient way to insulate buildings and still maintain an attractive appearance."

— James N. Amend, Capt. USAF
Chief, Readiness and Support Directorate of Civil Engineering,
re: corrugated metal quonset, Hickham Air Force Station, 1988

ASTEC® Re-Ply™ Systems meet or beat the toughest guidelines for durable, watertight service, including *Military Specifications*. And, as testified above, we have been providing the "extra" benefits of cool roofing for many years.

ASTEC® Re-Ply™ Systems have also been tested for compliance with the *Factory Mutual System* for metal roofs, and by the *Miami-Dade Building Code*, recognized as the benchmark for much building code enforcement nationwide.

In addition to the organizations listed on pages 12 & 14, many individual states, municipalities and international bodies have evolving guidelines, codes and programs to introduce planet-sustaining assets to new and renovating construction. Some, with recommendations directly related to cool roofing, have registered with the *Cool Roof Rating Council* (CRRC) of which ASTEC's Insulating Coatings Corporation is a charter member.

Are there other benefits to ASTEC Re-Ply roofing?

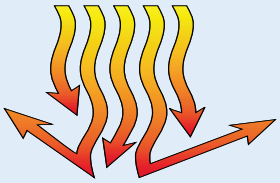
Putting aside all the "green" advantages in this booklet, **ASTEC® Re-Ply™** cool roofing membranes have inherent benefits as part of their titanium white, 100% acrylic, ceramic-impregnated formulations and stringent application specifications. This combination makes **ASTEC® Re-Ply™** technologies today's smart choice for your roofing needs:

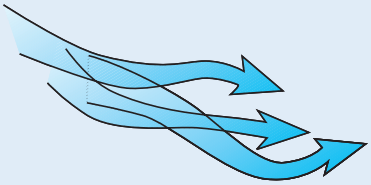
Installation savings up to 50% or more

ASTEC® Re-Ply™ fluid-applied cool roof coatings can be installed directly over most traditional roof substrates. Tear-off, land-fill fees, reconstruction, and long facility disruptions are eliminated.

A UV solar shield

The **ASTEC® Re-Ply™** ceramic-impregnated, titanium acrylic base has superior resistance to UV degradation than most traditional roofing materials.



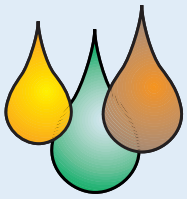


Seamless wind and weather protection

Once all the old joints, fasteners, and leaks are made watertight, seamless layers of **ASTEC® Re-Ply™** rust protection, waterproofing, and resilient top coatings are fluid applied. There are no edges, butting, or overlaps for wind to find.

A corrosion barrier

ASTEC® Re-Ply™ formulations are virtually impervious to ocean salt spray, acid rain, and other airborne contaminants.



All-climate stability

Once cured, a Re-Ply™ surface retains its flexible, watertight superiority in extremes of heat or cold, and dry or wet conditions.

Reduces thermal shock damage

ASTEC® Re-Ply™ seamless insulating roofs minimize the effects of varying coefficients of expansion and contraction within roofs and buildings that cause damaging shifts, cracking, and loosening conditions.

The ASTEC® 10-Year Renewable™ Warranty

A professionally applied **ASTEC® Re-Ply™** Cool Roof is guaranteed weathertight for 10 years — material AND labor. It can be renewed to original condition at a fraction of replacement costs.

PG&E Diablo Canyon Nuclear Plant, Avila Beach, San Luis Obispo, California

The Diablo Canyon Power Plant is a prime example of the numerous benefits of the **ASTEC® Re-Ply™** System. Situated right on the Pacific Ocean, the facilities are constantly exposed to moisture, UV degradation, and thermal shock, as well as the highly corrosive salt mist environment.

Various **ASTEC® Re-Ply™** systems have been protecting several roof surfaces at the facility from these damaging effects for a number of years.

Very few facilities are exposed to so many climate challenges.

Cool Roofing is...

White (reflective)
Green (environmentally helpful)
Economical (saves energy)

ASTEC® Re-Ply™ Cool Roofing is...

White (highly reflective – surpasses all standards, codes and requirements)
Green (environmentally sustaining – products, processes, renewability)
Economical (maximizes savings – installation, maintenance, energy efficiency)

Why pay to replace a roof if you can Re-Ply™ *it?*

ASTEC® RE-PLY™ 10 YEARS RENEWABLE WARRANTY
ASTEC®
TM

Re-Ply™ Cool Roof Systems
Perfecting Elastomeric Membranes Since 1986

CRRC COOL ROOF RATING COUNCIL
CHARTER MEMBER

U.S. GREEN BUILDING COUNCIL
MEMBER

ENERGY STAR
QUALIFIED

NSF®
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MIAMI-DADE
APPROVED

FM APPROVED
FOR METAL ROOFS

For additional information, contact: **Insulating Coatings Corporation** 103 Main Street, Binghamton, NY 13905
Toll Free: 1.**800.223.8494** Telephone: 607.723.1727 Fax: 607.723.1700 E-Mail: **iccnorth@icc-astec.com**
www.icc-astec.com

View a 3-minute presentation online at www.whyreplace.com

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