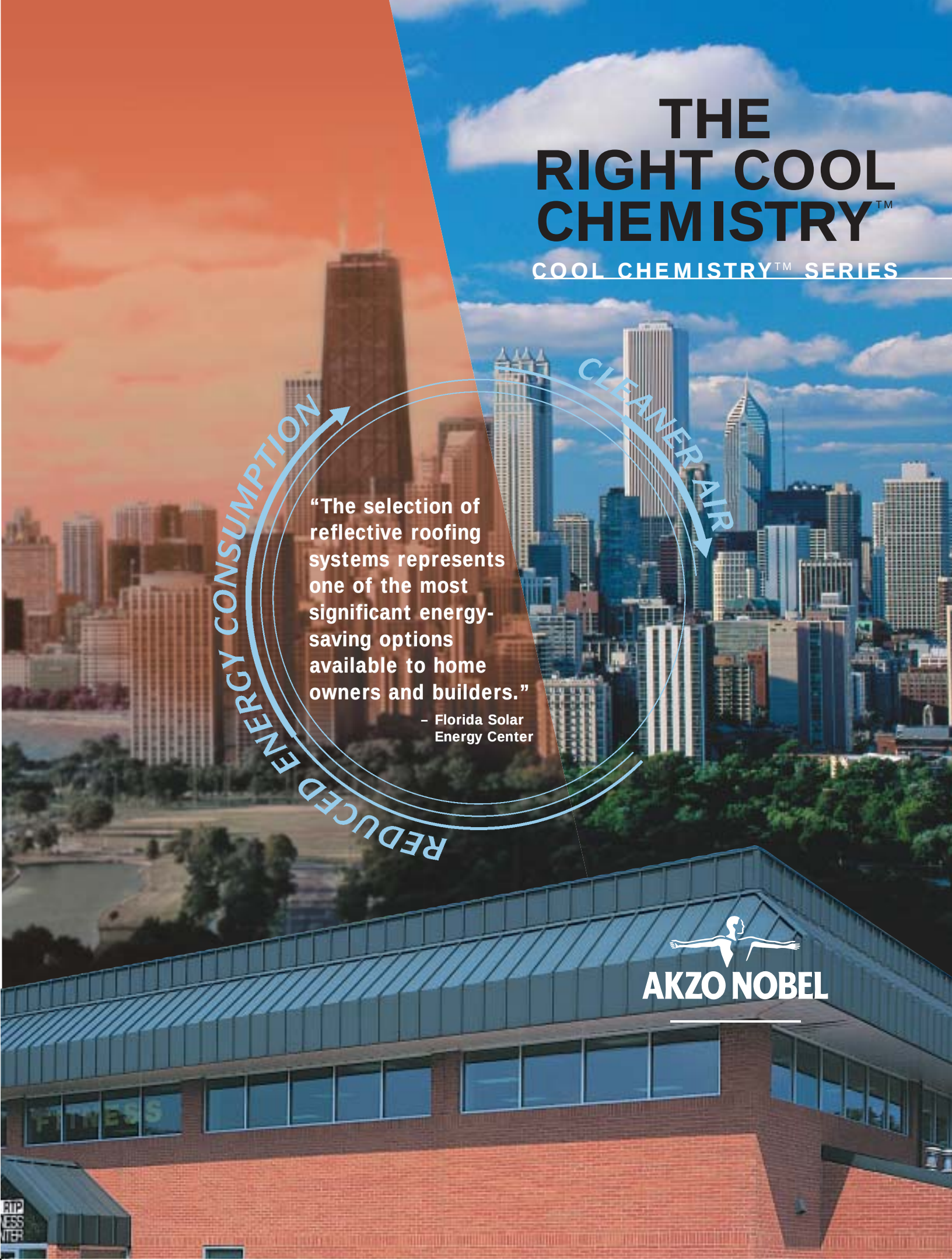
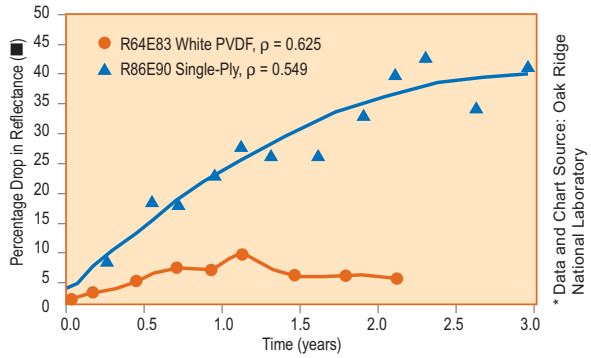

THE RIGHT COOL CHEMISTRY™
COOL CHEMISTRY™ SERIES
REDUCED ENERGY CONSUMPTION
CLEANER AIR
"The selection of reflective roofing systems represents one of the most significant energy-saving options available to home owners and builders."
– Florida Solar Energy Center
AKZO NOBEL

PAINTED METAL OUTSHINES THEM ALL

Studies conducted by several independent and government sponsored research organizations have demonstrated the improved energy efficiency attributable to the use of more solar reflective materials on roofs. More recently, these organizations have concluded, based on additional studies, that prepainted metal outperforms other construction materials for reducing energy costs when used on roofs.

Oak Ridge National Labs

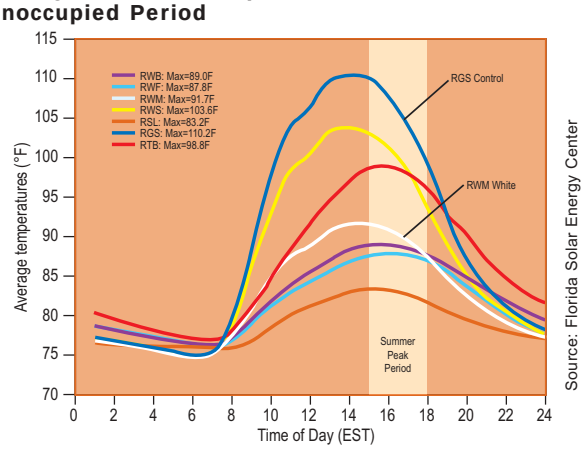
In a three-year study conducted with the cooperation of several industry groups, various metal roofing systems are being compared for energy efficiency and service life. The study is scheduled to be completed in 2004. “Early data suggests both, that metal panels maintain high reflectance, even after continuous exposure to the elements and also that painted and unpainted metal panels maintain their energy efficiency better over time than other roofing materials under test.”*



Florida Solar Energy

Results of tests conducted by Florida Solar Energy Center for FPL showed that white painted galvanized metal roof saved the most energy. Other materials included dark gray shingles, white shingles, white flat tile, white tile, terra-cotta S-shaped tile. The results are being used to develop a program that will promote selection of white or light colored roofs for energy conservation.

Average Attic Air Temperatures Over Unoccupied Period

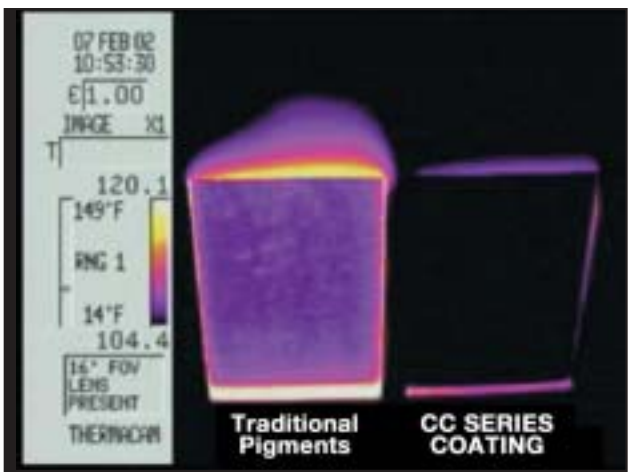


The maximum attic temperature during the peak summer hours is 40°F higher than the ambient air temperature in the control home, but no higher than ambient with highly reflective roofing systems. Light colored shingles and terra cotta roofs show temperatures in between.

IR Camera - Laboratory Demonstration

In the laboratory, the effect of infrared light can be demonstrated on various materials through a simple arrangement. New materials can be tested, and the amount of heat generated directly observed , under controlled conditions, without the need to construct test buildings.

A bank of infrared lamps is arranged to shine on test materials mounted at an angle approximating a roof exposure.



Through the use of a thermal imaging camera, a permanent visual record is made of the temperature of the test materials. The positive performance of AKZO NOBEL COOL CHEMISTRY COATINGS, compared to traditional materials, is recorded.

SO WHAT ABOUT THE PAINT?

All coatings contain two primary ingredients – resin and pigment. The long-term performance of exterior coatings is dictated by resin strength and the correct choice of pigmentation. You simply cannot have one without the other. The right combination will insure a superdurable coating.

The resin's primary functions are to provide adhesion, flexibility, hardness, moisture and chemical resistance, and resistance to U-V light.

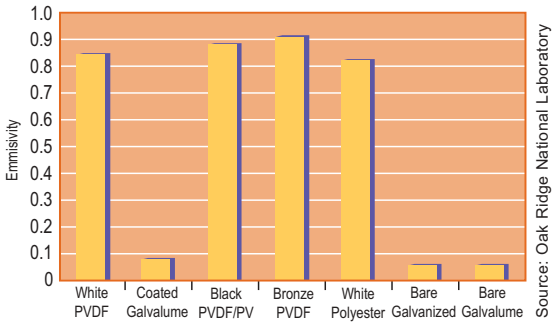
The pigment provides the color of the coating. The right pigment is critical in formulating a coating that resists fading, another important property of the pigment.

What's The Differences In Pigment Types?

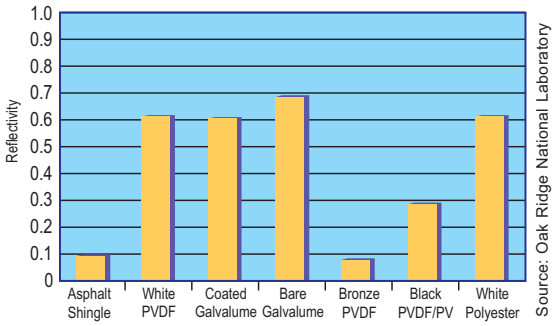
Pigments used in exterior metal coatings fall into three classifications. Here are the dictionary definitions of these three types — and their meanings as used in the paint industry:

Dictionary definitions:	Paint industry definitions:
or•gan•ic\or-'gan-ik: of, relating to, or containing carbon compounds.	**organic pigments:** comprising a a class of pigments that may have good — but usually not ultimate — durability. Just as the curtains in your living room can be expected to fade with time, so can the organic pigments used in coatings. It generally costs less to use organic pigments.
in•or•gan•ic\in-or-'gan-ik: being, or composed of matter other than plant or animal: MINERAL.	**inorganic pigments:** pigments that are synthetic or naturally occurring which do not contain carbon compounds. The majority of these colorants provide excellent long-term performance. The exception is carbon black. Their higher performance usually comes at a higher cost than organic colorants.
ce•ram•ic\ce-'ram-ik: of or relating to any product made essentially from a nonmetallic material by firing at high temperatures.	**ceramic pigments:** named after their original use in ceramic products, these complex inorganic pigments are made from mixed metal oxides synthesized at molten metal temperatures. The most color-stable pigments available today, they offer unparalleled resistance to heat, light, chemical attack and higher solar reflectance. These attributes make them ideal to use in the highest quality exterior coatings to assure long-term color retention even after decades of weathering. Higher cost is usually associated with their higher performance.

What Influences Emmisivity? It's The Paint On The Metal.



What Influences Reflectivity? It's The Pigment In The Paint.



Akzo Nobel's COOL CHEMISTRY™ Series Coatings Now Expands Formulating Capabilities To Provide Greater Reflectivity

These pigments take solar reflectance a step higher than previously possible. Solar Reflective Pigments (SRP) have been altered, physically and chemically, to reflect infrared radiation while still absorbing the same amount of visible light, thus appearing as the same color as lesser reflecting pigments, yet staying much cooler.

It should be no secret – higher solar reflective coatings are possible through the use of select ceramic pigments and new SRP's. If there is any magic in formulating coatings for cooler roofs...

AKZO NOBEL HAS BEEN MAKING COOL ROOF FINISHES FOR YEARS

TRINAR® and CERAM-A-STAR® 950

The Proof Is In The Performance

Long term durability needs to go hand-in-hand with solar reflectance. Many of the SRP's are mixed metal oxides (inorganic/ceramic) that have been around for years, and are typically used in high performance coatings such as TRINAR and CERAM-A-STAR 950.

The truly new SRP's now appearing in the marketplace are represented by a handful of colors, chemistries, and suppliers, for which only limited actual South Florida testing data is available.

Examples of 'improved solar reflectance" appearing in the marketplace are quite often nothing more than the comparison between low-cost, organic pigmentation and the inorganic/ceramic pigments which have been used for years in TRINAR and CERAM-A-STAR 950.

Many existing TRINAR and CERAM-A-STAR 950 colors are, and have always been, formulated with SRP's because both systems use high quality pigmentation! The most notable exceptions are those colors using considerable amounts of black or brown traditional ceramic pigments. For these colors, improvements in TSR may be realized by using Akzo Nobel's COOL CHEMISTRY Series Coatings with ceramic pigments that have the highest level of infrared reflectance.

For years AKZO NOBEL has served its customers worldwide by "creating the right chemistry" with products such as TRINAR and CERAM-A-STAR 950.

By Introducing COOL CHEMISTRY™ COATINGS, AKZO NOBEL continues to offer the unparalleled durability of TRINAR and CERAM-A-STAR 950 in formulations which reduce energy consumption in buildings, thus lowering costs while protecting natural resources and help reduce pollution.

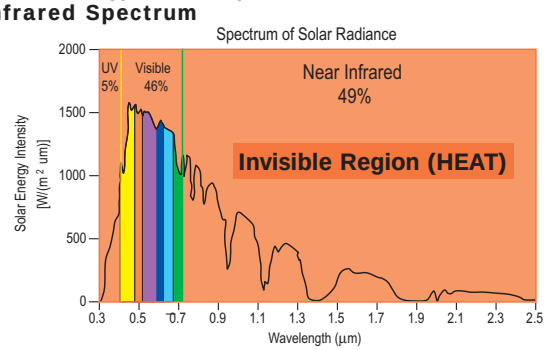
AKZO NOBEL COATINGS-- *Creating the Right* COOL CHEMISTRY.™

IT ALL STARTS WITH THE SUN

CAUSE & EFFECTS

Energy from the sun that strikes the earth has three components, most of which we cannot see. The energy that determines the color of an object, the visible spectrum, represents only 46% of the sun's energy. Ultraviolet light (UV) is about 5% of the spectrum and is the energy that can cause damage to our bodies and skin, as well as degrade paints and polymers. Infrared light, the invisible portion, represents about 49% of the spectrum.

Sun's Energy Primarily In Visible and Infrared Spectrum



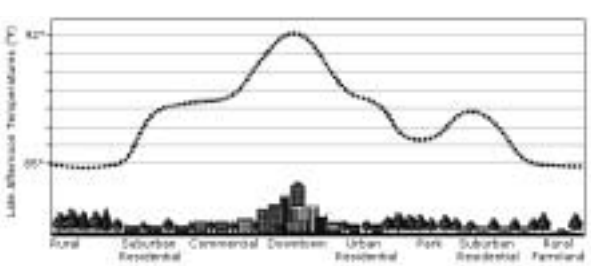
INVISIBLE SPECTRUM

Infrared light contributes to heat build-up. Products containing infrared-absorbing pigments will heat up faster and to a greater degree than products colored with infrared-reflecting pigments. The benefits of reducing temperature are well known. Heat accelerates the degradation of color, gloss, elasticity, and other physical properties of roofing materials. Thermal expansion and contraction may shorten the life of roofing.

HEAT ISLAND EFFECT

Growth in urban areas has produced "Urban Heat Islands." These urban heat islands may be as much as 12 degrees warmer than surrounding, less developed areas. Surface temperatures of roads, sidewalks, and building roofs may be 70 degrees higher than the ambient air temperature. These higher temperatures result in high air conditioning costs and the need for greater electrical production. The excess heat and increased energy production leads to increased levels of ozone and pollution/smog. Reducing temperature by as little as one half degree can reduce smog by 5%. Using highly reflective roofing materials can reduce cooling costs by as much as 23%.

Sketch of an Urban Heat Island Profile



Source: NASA/GHCC Project Atlanta

In the laboratory, an Emissometer (left photo) – Model AE measures Thermal Emittance (TE) and a Solar Spectrum Reflectometer (right photo) – Model SSR-ER measures Total Solar Reflectance (TSR).

Total Solar Reflectance (TSR)

- Amount of infrared radiation reflected from a surface.
- Expressed in terms of % or decimal (i.e., 68% or 0.68).

Thermal Emittance (TE)

- Percentage of radiation emitted from a heated body, compared to a perfect black body.
- Expressed in terms of % or decimal (i.e., 68% or 0.68)

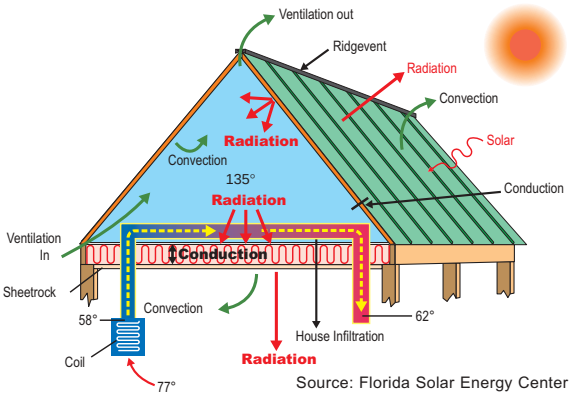
ENERGY EFFICIENCY

Various scientific studies document that the energy efficiency of a building is dependent upon many factors, including the building age, occupancy and the design and selection of construction materials.

One study, of more than 200 homes in central Florida, reports that air conditioning accounts for 33% of electrical consumption.

The report notes that higher levels of ceiling insulation and lower attic temperatures produced by reflective roofs are major factors in reducing air conditioning energy use and demand.

Vented Attic Thermal Processes



Source: Florida Solar Energy Center

Roof and attic thermal performance exerts a powerful influence on cooling energy use in Florida homes. Unshaded residential roofs are heated by solar radiation causing high afternoon attic air temperatures. The large influence on cooling is due to increased ceiling heat transfer as well as heat gains to the duct systems which are typically located in the attic space.

AKZO NOBEL

FOR MORE INFORMATION GO TO
www.akzonobel-ccna.com

Our Commitment To Customer Needs

Akzo Nobel's headquarters are in Columbus, Ohio, with other manufacturing and service locations in key areas of North America, Europe and the Pacific Rim. Our state-of-the-art manufacturing facility in Columbus has attained ISO 9001 certification in order to provide the highest levels of quality and consistency which you demand. This modern plant maintains highly efficient production while operating in an environmentally friendly manner. With these extensive facilities and our ongoing research and development efforts, Akzo Nobel has reaffirmed its commitment to architects, specifiers, contractors, coaters and building owners worldwide. The knowledge and experience of our people help you make the coating choices that are right for your applications and requirements. And because of Akzo Nobel's global strength and international capabilities, you have the assurance of getting on-time delivery and on-going consistency anywhere in the world.

ISO 9001
CERTIFIED
COMPANY

Energy Star® Program

The EPA believes that the energy savings possible from roofing products are so important that it has included them in its Energy Star® program. States and localities are using Energy Star® specifications to award tax rebates and incentives.

An Energy Star® compliant roof must meet Total Solar Reflectance units:

High Slope	25% initial	15% after 3 yrs.
Low Slope	65% initial	50% after 3 yrs.

FOR MORE INFORMATION ON TRINAR® AND CERAM-A-STAR® 950 COOL CHEMISTRY SERIES COIL COATINGS, CONTACT:

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