
VALSPAR
AND
GREEN
DESIGN
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Anyone who has got any pleasure at all from nature should try to put something back. Life is like a superlative meal and the world is the maitre d'hotel. What I am doing is the equivalent of leaving a reasonable tip.

– Gerald Durrell (b. 1925)
British conservationist, author

Need for Green Design

In the late 20th century, the world experienced energy shortages and skyrocketing energy costs. We developed a fear of depleting the earth's natural resources such as water, forests, and minerals. While people had been concerned about outdoor air pollution for years, several cases of "sick building syndrome" raised our awareness of indoor air quality. Troubled economic times caused companies to examine worker productivity. As we searched for solutions, a movement was created within the design community.

Definition of Green Design

Design and construction practices that significantly reduce or eliminate the negative impact of buildings on the environment and occupants are called "green design." Often called "sustainable design," these practices cover five broad areas:

1. Sustainable site planning
2. Safeguarding water and water efficiency
3. Energy efficiency and renewable energy
4. Conservation of materials and resources
5. Indoor environmental quality

The goal of green design is high performance buildings that improve our local and global communities.

Advantages of Green Design

Choosing to use green design products and services has numerous advantages for the individual, their community and the global environment.

Occupants benefit from health and safety features. The average American spends more than 90% of their time indoors. According to the U.S. EPA, indoor air quality can be two to five times worse than outdoor air quality. This also relates to risk management and economics. Employers have realized that people are more productive in a pleasant working environment.

Residential and commercial building owners can save money on energy bills by using green design products. For example, studies have reported up to a 20% drop in energy costs by converting from an asphalt roof to a prepainted metal shingle roof.

Green design reduces the need for expenditures such as landfills and water supplies. As a result, communities have more money to improve the quality of life in the community. For example, money could be used for an art museum or a sports arena rather than a new landfill.

The environment benefits because green design is dedicated to protecting air quality, water quality, and overall natural resource consumption.


Study nature, love nature, stay close to nature.
It will never fail you.
– Frank Lloyd Wright (1868-1959)
Architect

Growth and Evolution

The number of green design programs and initiatives is increasing as the acceptance of green design practices continues to grow. Most of these programs and initiatives are voluntary but some could potentially become mandatory. Keeping track of these programs and their changes can be difficult to understand. If your organization does not have the luxury of appointing a team or a member to follow these activities, you can develop a headache trying to digest it all.

Many states including California, Minnesota and Florida are establishing their lead in the green design arena. Some of the key state initiatives are California Cool Savings Program, Minnesota's Sustainable Sites Program, Florida Energy Code, and Georgia Energy Code. City initiatives are also forming. For example, Seattle, Chicago and San Jose each have their own local initiative. Be aware that some of the state and local programs are setting higher reflectivity and emissivity targets than the national programs do.

Three key national initiatives or programs that you should understand are CRRC, LEED® and ENERGY STAR®.

CRRC (Cool Roof Rating Council)

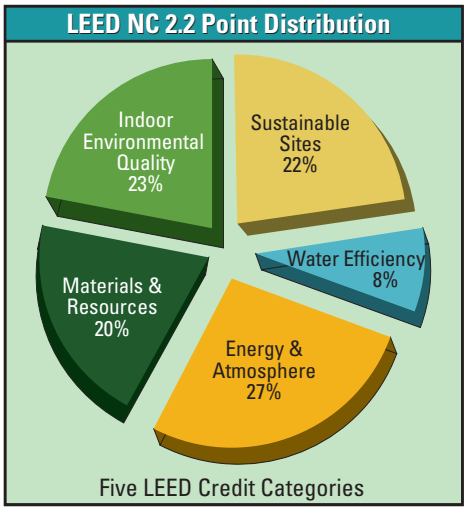
CRRC, a national initiative created in 1998, has established a methodology and system of quality control for roofing manufacturers to report reflectance and emittance data in roofing products.

CRRC does not set reflectivity or emissivity criteria. It does not specify what is or is not a cool roof. The reflectivity and emissivity criteria are determined by the project specifier, building owner, code body, or others.

Through a licensing program, manufacturers are able to utilize a proprietary CRRC label to designate the properties of their products. Valspar is currently working to achieve OM Certified Testing Laboratory status. *www.coolroofs.org*

LEED (Leadership in Energy and Environmental Design)

The US Green Building Council, a national nonprofit organization formed in 1993, applies a "whole building" perspective to green design in their LEED program. Several LEED programs exist including New Commercial Construction, Existing Building Operation and Maintenence, and LEED for Schools. To earn one of the four levels of LEED certification, the applicant project must satisfy all of the prerequisites and a minimum number of points. Not all credits and points are equal as you can see in the chart below.



The majority of metal building components that are prepainted with a Valspar coating can contribute to achieving LEED points especially in the Sustainable Sites, Energy and Atmosphere, and Materials and Resources areas. Additional details can be found in the LEED Reference Package and Credit Rulings. *www.usgbc.org*

ENERGY STAR

The US Environmental Protection Agency's ENERGY STAR program offers businesses and consumers energy efficient solutions -- helping to save money while protecting the environment for future generations.

This program is organized by product categories. Roofing is one of those categories. The roofing category is further divided into two subcategories: Low Slope Roofs (2:12 inches or less) and Steep Slope Roofs (greater than 2:12). Requirements for both categories can be found on the Solar Reflectivity and Emissivity page. *www.energystar.gov*


I cannot say whether things will get better if we change; what I can say is they must change if they are to get better.
– G.C. Lichtenberg

An Energy Friendly Combination

Reflectance and emittance are both important to the temperature that a roof will reach in direct sunlight, as are other factors such as insulation in the roof.

The solar reflectivity and emissivity requirements for several green design programs can be found in the chart below.

Cool Roof Energy Initiatives and Criteria[1]

Organization	Solar Reflectance		Thermal Emittance
	Low Slope	Steep Slope	
ENERGY STAR 2.0	0.65	0.25	Must report but no minimum required
LEED-NC 2.1	0.65	0.25	0.9
LEED-NC 2.2	SRI = 78 About 0.70	SRI = 29 About 0.32	Included in SRI About 0.85
ASHRAE [2]	0.70	0.65	0.75
CRRC/California Title 24	0.70	N/A	0.75
State and Local	Most regulations are voluntary or relate to energy credits. A large number reference one of the above.		

(1) This chart is accurate as of fall 2007

(2) American Society of Heating, Refrigeration and Air Conditioning Engineers

Solar Reflectivity Explained

A common theme in green design is the importance of building components with a high solar reflective value. Solar reflectance or reflectivity is the fraction of energy reflected over energy incident on the surface. It is the deflection of solar energy from a surface. The greater the amount of solar energy reflected from a surface, the less energy the building will need to cool down. This is especially important in the south.

Ultraviolet, visible and infrared spectra are the components of natural sunlight. A compilation of these three components is measured to determine the reflectance value of a surface: infrared radiation 42%, visible light 52%, ultraviolet 6%. Reflectivity is expressed as a value ranging from 0.00 to 1.00. The higher the number, the more heat is reflected away.

Emissivity Explained

High emissivity also plays a role in saving energy in warmer climates. Emittance or emissivity is the fraction of power radiated as thermal infrared over the amount radiated by a blackbody. It is related to the amount of energy radiated, or the radiation efficiency. The greater the emissivity, the greater the ability of a surface to cool itself through radiative heat loss. The faster a surface can cool down, the less energy the building needs to be cool.

Emissivity values are expressed from 0.0 to 1.0. A higher number indicates a more efficient radiator. The closer the value is to 1.0, the more efficiently heat is emitted.

The nation that destroys its soil destroys itself.

– Franklin D. Roosevelt (1882-1945)
American president

The Many Shades of Green

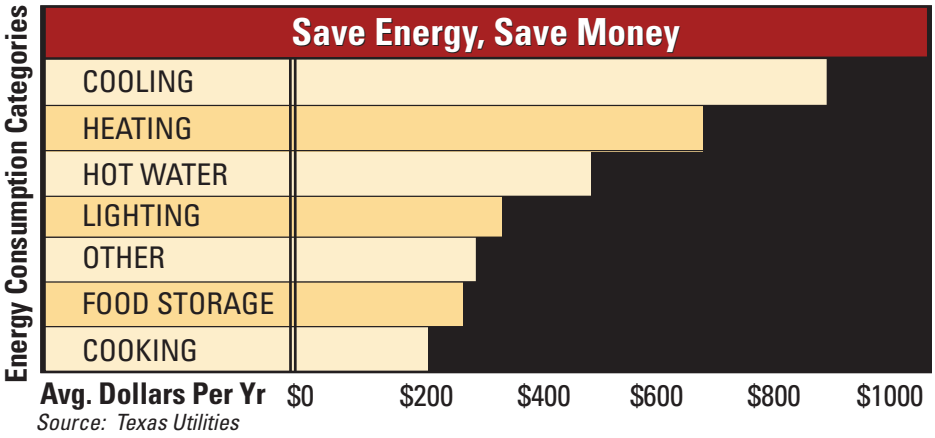
Valspar offers high solar reflectance and high emittance coatings for coil and extrusion applications that play an important role in designing green buildings located in warm to hot climates. This powerful combination resists heat absorption and enables the building to cool down faster. As a result, the air-conditioner does not run as much and energy consumption is decreased.

By choosing a Valspar SR coating, an architect is free to choose from a variety of colors without sacrificing the building's energy efficiencies. Valspar SR colors include greens, blues, reds, dark bronzes, and black. These coatings have the same long life characteristics as the original formulations. We have not sacrificed any of the qualities that you've learned to trust.

How It Works

Think of yourself preparing to do yard work in 100° temperatures, a too familiar experience for those of us living in the South. Do you choose to wear dark clothes or light clothes? Light, of course, because dark colors absorb nearly all the visible light spectrum and retain the most energy. Just as with clothes, light paint colors also naturally reflect solar energy. This is why, in the past, architects have been limited to whites and light beiges for roofs in warm regions when energy savings was a priority design criteria.

Some pigment manufacturers now produce solar reflective pigments. These pigments reflect more of the invisible infrared radiation from the sun. This increases total reflectance while maintaining the color in the visible spectrum. By using these pigments, Valspar can offer you coatings with better solar reflectance properties. So if you want to use a green, you can. If you want to use a better reflective white, you can. It's an environmentally friendly way to design a building.



Source: Texas Utilities

How to Get Colorful, Protective Coatings that Meet Green Product Guidelines

Valspar Solar Reflective coatings are available from leading metal building component manufacturers. Architects that want these products used for their projects should specify: Factory applied, baked-on (INSERT: Fluropon®SR, Flurothane®SR, WeatherX™SR, Acroflur®SR or Acrodize®SR) solar reflective paint coating as manufactured by The Valspar Corporation.

There are many paths to the top of the mountain, but only one view.

– Harry Millner

FREQUENTLY ASKED QUESTIONS

Q: Is my color selection limited if I choose a Valspar Solar Reflective coating?

A: A wide variety of colors including greens, reds, dark browns, and black are available in SR coating formulations.

Q: What are the solar reflective and emissivity values of Valspar coatings with an SR designation?

A: The solar reflective values of Valspar SR coatings range from 0.25 up to 0.85. Most Valspar SR coatings have high emissivity values around 0.90. Coatings with metallic or pearlescent effects generally have a little lower emissivity values.

Q: How much does the solar reflectance value and emissivity value of SR coatings change over time?

A: Very little change in both solar reflectivity value and emissivity value is expected. This information is based on data gathered from coating samples that have been on Valspar's test fence in Ft. Myers, Florida for more than ten years.

Q: How is solar reflectivity measured?

A: Ultraviolet, visual and infrared spectra are the components of natural sunlight. A compilation of these components is measured using a solar spectrum reflectometer in accordance to ASTM E 903/C 1549. The closer the value is to 1.0, the more efficiently the surface reflects heat.

Q: How is emissivity measured?

A: Emissivity is measured using an emissometer. The emissometer is operated in accordance to ASTM E 408/C 1371. It uses a heated thermopile radiation detector.

Q: How does the emissivity value of prepainted metal building components compare with other bare metal components?

A: Bare metal will have lower emissivity than paints. Paints generally fall in the 0.80 to 0.90 emissivity range. Bare metals are typically less than 0.10.

Q: Is there activity among architects and specifiers?

A: We are seeing project specs written with both reflectivity and emissivity requirements. Architectural firms that are cutting edge and positioning their firms as "green" are taking advantage of these long lasting coatings.

Q: What is the life expectancy of a Valspar SR coating?

A: Valspar SR coatings will last for the same length of time as the original formulas.

Q: How much of a prepainted metal building component can be recycled?

A: 100% of a prepainted metal roof can be recycled. According to the American Iron and Steel Institute, each year steel recycling saves enough energy to electrically power more than 18 million households or to meet the needs of Los Angeles for more than 8 years.

Q: Are metal building components composed of recycled material?

A: Yes. Steel's recycling rate is about 2/3 according to the American Iron and Steel Institute. About 1/3 of the aluminum used in the US comes from recycled material according to the US Aluminum Association.

Q: Most of the attention on solar reflective coatings is associated with metal roofs. Is it useful on other building components?

A: Yes. Roofs are getting a great deal of attention due to their mass and their position in relation to the sun's rays, but Valspar SR coatings can also be useful on other components.

Q: How much energy can be saved by using Valspar SR coatings?

A: Due the varying size of buildings and their locations as well varying cooling units, an exact number is not possible. However, studies such as one done by Florida Power and Light validate the savings. Florida Power and Light built six identical 1700 ft 2 residences in Ft. Meyers, Florida. They found that the prepainted metal roof saved 23% in energy costs compared to asphalt shingle.

Q: Does climate affect the impact of typical energy use reduction?

A: Yes. Valspar SR coatings are best suited for warm to hot climates.

Q: What is urban heat island effect and can Valspar SR coatings offer a solution?

A: Urban heat island effect refers to the rise of temperatures in urban areas relative to the surrounding rural or natural areas due to the high concentration of heat-absorbing surfaces. Valspar SR coatings reduce this effect by deflecting more of the suns rays so that the buildings will not absorb as much energy resulting in lower energy consumption in urban areas.

Q: What is the VOC (Volatile Organic Compound) emission of Valspar SR coatings?

A: Although Valspar manufacturers solvent based coatings, the factory application process allows our coaters to capture and destroy the VOCs before they escape into the atmosphere.

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