energy coatings

the heat is off

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Energy-saving coatings may spook contractors with their complexity—but interest has never been higher.
Although energy-saving coatings—those claiming to reduce the amount of energy a structure requires to stay cooler or warmer—are new, they appear to have slipped under the radar of most painting contractors. One reason might be that these coatings are most typically applied to roofs (although wall applications are not uncommon) and as such, are generally used by roofers—not even this industry at times has failed to take notice of these products, said Steve McGuinness, president of Atlanta-based Advanced Coating Systems.

"These coatings are sort of a hybrid product in that they can be applied by both roofers and painters," explained McGuinness, whose company primarily manufactures reflective acrylic elastomeric coatings. "At one time both industries were resistant to these coatings. The roofers didn’t want to paint, and the painters didn’t want to do roofs. But now everyone is more accepting."

This is a complicated product category, which is likely another factor inhibiting painterly interest. Some coatings are specifically designed for energy saving, and market themselves as such. For others, the energy-saving qualities are touted as an additional benefit to more primary characteristics. Energy-saving coatings can be applied to a roof’s exterior or to its underside. Both types are generally referred to as radiation control coatings (RCC), although some manufacturers will refer to their interior roof coatings as radiant barriers. Typically, RCCs act to reduce heat load to a building by either reflecting away sunlight, and/or by blocking the transfer of heat.

Energy-saving coatings can also be applied to exterior and interior walls and work in much the same way as those used on roofs. All these coatings have the purpose of reducing a structure’s heat gain when the weather is hot, and heat loss when weather is cold. (See sidebar for details about individual products.)

So what’s so complicated? Manufacturers seek from a simple relating of basic functions into dizzying discussions about thermodynamics and heat transfer, emissivity and R-values, reflectivity, and radiance barriers, all of which seems essential to understand in order to make optimal product decisions. But there are good reasons for painting contractors to gird their loins and at least consider adding energy-saving coatings to their repertoire. For one thing, interest in saving energy has never been higher, and it’s not going to abate. Ever.

Getting comfortable: This concern isn’t limited to the Sun Belt regions, said Bob Aresty, president of SOLEC-Solar Energy Corp., which specializes in low-emissivity and heat- and light-reflective coatings, based in Ewing, NJ.

"Even though the major portion of our business in this country is in air conditioning-dominated regions, we go all over because even on the East Coast, there are at least three months where you use air conditioning, and these bills are high."

Energy-saving coatings are also receiving strong government interest along with some support, said Joe Raver, president of SPM Thermo-Shield Inc., a manufacturer of energy coatings in Custer, SD.

"The U.S. government is really pushing reflective roof coatings in particular for their energy-saving benefits," said Raver, who mentioned the Energy Star program, formed in conjunction with the EPA and the Dept. of Energy to encourage the use of energy-saving products (www.energystar.gov). The Energy Star logo identifies all manner of products that have been found to be more energy efficient than standard ones.

McGuinness agreed. "In fact, some states, like California, Texas, and Florida are giving rebates for applying our coatings, or those like them, to reduce heat loads," he said. Which, he added, could provide a strong selling point for painting contractors.

According to information on the Energy Star website, some Energy Star-qualified exterior roof products (Energy Star only qualifies exterior roof coatings, said Aresty) can lower roof surface temperatures by up to 100 F and can reduce peak cooling demands by as much as 10 to 15 percent.

Manufacturers interviewed for this article agreed that energy costs can, in some cases, be significantly reduced, although all cautioned that when marketing these coatings to potential customers contractors should avoid specifying how much the owner will save. (Product warranties vary, but none of the manufacturers mentioned here warrantied actual energy savings). For one thing, the amount saved is dependent on the structure itself: its age, condition, cost.
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color, insulation already present, etc. Environment also exerts a significant influence. Those in hotter climates may notice more savings than those in cooler areas. In fact, assessing potential energy savings is somewhat of an art as well as a science, and may sometimes require manufacturer assistance.

"Instead of getting specific, tell customers that they will experience some energy savings, and/or an improvement in their comfort...

- Reflective: Indicates a coating that acts to reflect away light. Reflectivity or reflectance indicates the degree to which a coating does this, or the percentage of light that is reflected away from a surface.
- Emissivity: Aresty defines this as "the ability of a surface to radiate or emit energy in the form of longwave electromagnetic (infrared) radiation." Emissivity is represented by a value ranging from zero to one, he explained. "The closer the value is to one, the less effective the surface is at impeding radiant heat transfer." So, a resistance to heat flow through a solid material (the higher the R-value, the higher the insulating quality, he said) and should not be assigned to coatings. Aresty and McGuinness agreed.

"You can’t give an R-rating to a coating," McGuinness asserted. "R-values as some manufacturers use them are smoke and mirrors. They take two pieces of metal, apply their coating to one piece on one side and leave the other piece uncoated. Then they expose both to a heat source and measure the heat loads. Do this, and you’ll see that the coating stopped a percentage of the heat coming through. Once the coating people determine how much insulation would be needed to reduce the heat load by that equivalent amount, they say it only stands to reason that their coating has this R-value."

But this isn’t true, he continued. "R-value is a complex measurement, most typically applied to bulk insulation, that takes into account material, thickness, and density. You could not possibly apply a coating thick enough to warrant giving it an R-value."

Walters offers a slightly different perspective, saying that manufacturers can correctly describe a coating as having an "R equivalency" for comparison’s sake, but that assigning a set and specific R-value is incorrect.

Back to the potential energy savings customers can realize. Good radiant barriers can reduce air conditioning bills 8 to 12 percent, said Walters (again, he reminded, don’t make specific promises), so the motivation for painters to offer these to energy-conscious customers should be clear. But if you look at his installers, he said, just 30 percent are painters; the rest are roofers or installation contractors.

Aresty, who said that his company does a lot of commercial work, thinks that only 10 percent of those applying his roof coatings are painters. "It’s a very untapped market for painters,” he said.

"There is no reason why painters shouldn’t tap into this market as roofers have, especially if they’re out on the job anyway."

"THE U.S. GOVERNMENT IS REALLY PUSHING REFLECTIVE ROOF COATINGS IN PARTICULAR FOR THEIR ENERGY-SAVING BENEFITS," SAID RAVEN.

Photo courtesy SPM Thermo-Shield

level," said Lynn Walters, regional manager for the Radiance Division of Chemrex LLC, manufacturers of, among other finishes and paints, energy-saving coatings in Shakopee, MN. “Research has shown that human comfort is 50 percent radiant heat and 50 percent ambient temperature, so in the hottest times of the year, if you reduce the amount of heat coming out of the ceiling and it’s not beaming as much radiant heat down on people, their comfort level improves.” However, said manufacturers, it is safe to tell clients how much sunlight/heat a particular roof coating will divert from the structure.

Rated R: Before we proceed further, a vocabulary lesson is in order.

coating with an emittance value of say, 0.25 (making this a low-emissive coating) will be far more effective at blocking radiant heat transfer than something that has an emittance value of 0.75. For example, a coating with an emissive value of 0.25 would stop 75 percent of the potential radiant heat transfer from one surface to another.

- R-Value: Some manufacturers will assign an R-value to their reflective coatings and claim this indicates reflectivity and consequently heat reduction. “This is an impossibility,” said Dr. Harry Ozaroski, president of San Diego-based Cerama-Tech International Inc. Ozaroski explained that an R-value is appropriately applied to bulk insulation; it’s a measure of

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Running hot and cold

- Ames Research Laboratories, Jefferson, OR: Manufactures elastomeric coatings, paints, and primers for use on roofs, walls, and decks, in commercial, industrial, or residential applications. Their primary reflective roof coatings are Snow Seal and Iron Out (used on metal roofs). These are water-based, low or no VOC, bright white coatings, designed to reflect away 90 to 98 percent of the sunlight striking the roofs. Snow Seal is “almost universal” in its applications, said Curttright, although Iron Coat is better for metal roofs. The products (rated at 500 and 400 percent elongation respectively) are appropriate for use on a wide range of roofing materials; the only exception being those surfaces that do not accept a surface bond (like silicone) or where aesthetics demand a color, said Curttright.

- Nationwide Chemical Coating, Bradenton, FL: Manufactures a line of elastomeric ceramic reflective roof coatings (such as Snowbright, Insulkote, and Permakote) and wall coatings (such as Ultra Seal, Ultra Satin, and Ultra Kote). All wall and roof coatings have the same energy-saving benefits, achieved through solar reflectance, which Steve Ellis described as 80 to 85 percent, depending upon the product. The coatings also offer waterproofing and soundproofing benefits as well as durability. The ceramics in their coatings provide the additional benefit of dissipating heat buildup more efficiently, said Ellis. Their products are used in commercial, residential, and industrial applications.

- ChemRex LLC, Shakopee, MN: Their newest product in this category is Radiance e0.25 Attic Barrier, formulated to be sprayed on the underside of roof decks, rafters, ridges, and gable ends. This is marketed as a low-emissive radiant barrier that stops 75 percent of the potential radiant heat transfer into and out of building roofs. “When applied to a substrate, it creates a surface with an emissive value of 0.25 or less,” said Lynn Walters. Radiance e0.25 contains infrared (radiant energy) reflective particles suspended in an infrared transparent binder matrix. Their market is approximately 95 percent residential, with 60 percent of this being retrofit.

- SOLEC Solar Energy Corp., Ewing, NJ: Has two low-emissivity, heat- and light-reflecting roof coatings: LO/MIT-I, which is solventborne; and LO/MIT-II, which is waterborne. Both share the same energy-saving qualities. They can be sprayed or rolled and will inhibit 75 percent of the heat coming through the roof, making it anywhere from 10 to 25 degrees cooler in the structure, said Aresty. LO/MIT-I is “widely used” in roofs because it adheres well to rubber roofs. Both products are 100 percent silicone, so they are very flexible, said Aresty. Because LO/MIT-I is solvent-based, it’s generally used on rooftops, while LO/MIT-II is most often used on the interior roof deck (LO/MIT-I can be used in well-ventilated interiors). Appropriate for commercial, residential, and industrial applications. The coatings have an emissivity of 0.25.

- SPM Thermo-Shield, Custer, SD: Manufactures roof, wall, and acrylic stucco finishes, sold under the Thermo-Shield brand. All use hollow, vacuumed ceramic bubbles as the primary filler. “The exterior roof and wall coatings reflect around 85 percent of the solar light. Of the heat that develops, around 94 percent is emitted away, so it doesn’t enter the building,” said Joe Raver. The products also offer waterproofing and soundproofing benefits. They can be rolled or sprayed and are used in both commercial and residential applications. All are tinterable, although white is the recommended color for best energy saving. Contractors must be certified in order to apply the exterior roof coating (provided via onsite training). The interior coatings help structures retain heat and distribute it more uniformly, but can also be used in hot climates because the uniform heat dissipation improves the performance of air conditioning and reduces condensation. (For more information on ceramic coatings, see the May–June ‘03 issue of PWC.)

- Advanced Coating Systems, Atlanta, GA: Manufactures waterborne (solvent-based is available) reflective acrylic elastomeric roof and wall coatings (private label) used for both interior and exterior. These can be sprayed, brushed, or rolled, and are primarily white but can be tinted. The product dries to a rubber-like film that is flexible and waterproof. The roof coating will reflect up to 90 percent of sunlight away from the surface. Their primary customer is commercial, with flat or pitched roofs. “Where paints like ours add value is through their superior adhesion, their ability to expand and contract, and their resistance to wearing, which gives them great longevity,” said Steve McGuinness. This, rather than the reduction of heat load, is what the company advertises. Energy savings are a secondary, but apparent, benefit. If desired, ceramic modifiers can be added to the coatings for additional abrasion resistance for a slight additional charge.

- Cerama-Tech International, San Diego, CA: Manufactures a fluid-applied ceramic coating that is reflective, emissive, and elastomeric. It also insulates, soundproofs, encapsulates lead and asbestos, and is certified as an ASTM Class A, Type I fire retardant. (“We use ceramic platelets, which are very small and overlap to form a solid barrier,” Dr. Harry Ozaroski explained). The coating is white but can be tinted to almost any color.

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said Walters. “Every time a painter bids a home, they should also include a bid for a radiant barrier, especially for houses within the Sun Belt regions. The market is unlimited. After all, how many miles of unsprayed surfaces are there?”

Margins: There’s money to be made in applying these products, said manufacturers, who described the profit margins as being quite good.

“I’ve been told by my contractors that this is an extremely profitable business, because there is very little prep work involved when painting an attic,” said Walters. “Our product is applied as a thin, even coat to the entire underside of the roof deck and to any gable ends. It’s similar to priming. We tell people to spray it thin enough that the wood grain shows through, but not the wood color. There’s no masking, although you do have to cover HVACs.”

And it’s quick, he added. “We just did three new-home spray-outs, where each house was about 2,000 square feet of sprayable surface, and these took about two and a half hours each to do.”

Aresty said that a painter could expect to apply his interior radiant barrier coatings at a pace of around 1,000 SF per hour, and that
the material costs to the painter would generally run around 11 to 16 cents per square foot. However, *application* charges (product and labor) to the customer for new structures range from 21 to 30 cents per square foot, while retrofit applications run 40 to 50 cents. As for the exterior radiant barrier roof coatings, installation pricing “is all over the place,” he said.

It can be profitable, confirmed Dr. Bill Curttright, president of Ames Research Laboratories Inc. in Jefferson, OR, manufacturers of elastomeric coatings, paints, and primers. Although, he added, larger jobs and efficiency (in the form of commercial coating spraying equipment) will provide the greatest return to contractors.

“But please bear in mind that not all jobs are large,” he cautioned. “Smaller jobs tend to have a higher cost per square foot for installation, and this is normal and usually expected. My experience indicates that a larger job will be in excess of 5,000 SF, and this is where the commercial sprayer begins to really prove beneficial.”

Also remember, Curttright continued, that not all coatings are alike. Some are easier to mix and apply than others, and some may go on thicker or require two coats, all of which will impact profit margins.

There is no dearth of products on the market, but, as previously noted, this industry has had its share of companies that make exaggerated product performance claims—although this may be happening with less frequency since the Federal Trade Commission is starting to go after such companies, said McGuinness. However, regulation could definitely be better, said Aresty.

Consequently, when it comes to product selection, the more information an applicator has the better, said Stephen Ellis, marketing and IT manager for Nationwide Chemical Coating Manufacturers Inc., manufacturers of environmentally friendly paints and coatings in Bradenton, FL.

“Things to keep in mind are the type of substrate to be coated, and the environmental conditions to which it will be subjected,” Ellis said. “Questions that should be answered are: What results does the customer expect or need and what type of warranty do they want? How long has the manufacturer been in business? Does the manufacturer provide support and technical assistance? Do the products being considered have competitive pricing and what is their availability?”

Also:
- Look at what product testing the company has done. Companies that back up their claims with stringent product testing from reputable labs, universities, or other testing facilities are the best bets. Ask to see documentation and certification. See what standards the product meets. Inquire as to what programs, such as Energy Star, the company participates in.
- Learn about the products, said Curttright. Visit websites, read brochures, call manufacturers. It may be possible to contact certain test labs with questions as well. Also, read the containers, he added. Especially look for products that remain elastic. Because they’re flexible, they tend to bond better to the substrate and resist fracturing.
- Look for high reflectivity and low emissivity, Aresty advised. When considering an interior radiation control coating, painters should always ask about emissivity, and if it’s not 0.25 or lower, Aresty said, painters should “walk away from it.”

“All painting professionals can take advantage of energy-saving features in coatings,” said Ellis. “For our products, energy saving is a value-added benefit and that’s how it should be marketed. The cost difference is small, so the customer ends up with something extra for close to the same thing.”

And, reminded Aresty, by incorporating these coatings into what they’re currently offering, painting contractors will not only become more value-added to their customers, they will become more competitive and more profitable as well.

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