ALUMINIZATION

PROPOSAL

BLUESTONE , INC.

P.O. Box 304
NEW BOSTON, NEW HAMPSHIRE 03070
603-486-5419
bsprs.com

Mr. Dan Noury

PROPOSAL SUBMITTED TO	PHONE	DATE
Noury Supply	603-668-8667	July 5, 2013
STREET	JOB NAME	
8001 S. Willow St.	**ALUMINIZING ENTIRE ROOF WITH BLUESTONE SUPER DUTY ALUMINUM PAINT**	
CITY, STATE and ZIP CODE	JOB LOCATION	
Manchester, NH 03103	8001 S. Willow St. Manchester, NH	
ARCHITECT / DATE OF PLANS		JOB PHONE

We hereby submit specifications and estimates for:

25,960 SQ. FT. OF ALUMINIZATION WITH BLUESTONE SUPER DUTY ALUMINUM PAINT

The small addition with the concrete deck that has been leaking will be re-roofed.

All roofs will be cleaned with a 4,000 PSI pressure washer to insure a clean bonding surface.

The roof will then be closely inspected for minor damage and repaired with original sheets of 160 mil BLUESTONE COPA 4 membrane and sealed where needed with BLUESTONE SUPERFLEX CAULK and SUPERFLEX COATING to insure a watertight roofing system.

The thin EPDM rubber roof membrane will be resealed where the seams are failing prior to painting. The failed seams are numerous.(See attached video)

Once the roof is cleaned and water tight, it will be painted with one coat of BLUESTONE SUPER DUTY ALUMINUM PAINT at a rate of 300 to 400 sq. ft. per gallon.

TOTAL for only 55¢ per sq. ft. ----------= $14,278.00

OPTION with spot washing entire roof for only 45¢ per sq. ft.----------= $11,682.00

Extra roof repairs will be $45.00 per man hour plus materials
NONE EXPECTED

We Propose hereby to furnish material and labor - complete in accordance with above specifications, for the sum of:
FOURTEEN THOUSAND TWO HUNDRED SEVENTY EIGHT AND 00/100

Payment to be made as follows:

50% down with balance due upon completion

All material is guaranteed to be as specified. All work to be completed in a workmanlike manner according to standard practices. Any alteration or deviation from above specifications involving extra costs will be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accidents or delays beyond our control. Owner to carry fire, tornado and other necessary insurance. Our workers are fully covered by Workman's Compensation Insurance.

Authorized Signature Gerard Beloin Note: This proposal may be withdrawn by us if not accepted within 30 days

Acceptance - The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

Signature: Date of Acceptance

Signature: Date of Acceptance

Reflective Roofs

A hot ticket for cooling energy use

Heat-reflective roofing materials are a bright idea that can cut energy use in Sun Belt states—and in cooler climates as well

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By Teresa O'Dea, Senior Editor

Self-improvement has become an obsession in this country, but one easily manageable task is to learn a new word every day or so. Well, here's a word that will cover you for a whole month: albedo. Essentially, it's a fancier way of saying solar reflectance.

Albedo is defined in *Webster's* dictionary as "reflective power; the fraction of incident light or electromagnetic radiation that is reflected by a surface; from the Latin *albus,* meaning 'whiteness.'"

Albedo: Reflective power; the fraction of incident light or electromagnetic radiation reflected by a surface. From the Latin *albus:* "whiteness."

As a unit of reflectivity, albedo is being popularized by scientists at the Lawrence Berkeley Research Laboratory (LBL), Berkeley, CA.

Reflectivity, experts explain, is made up of two factors: how energy strikes a roof surface, and how much energy is reflected away from the surface.

The higher the albedo of a roof covering, such as 0.8, the more energy that is reflected away before being converted into heat.

The concept is not as simple as it may first seem, however, because color indicates only the reflectance of visible radiation, not whether the material is also reflective in the



Manufacturers say that when newly installed, white roof coatings typically reflect up to 85% of sunlight, which would give them an albedo of 0.85.





non-reflective, infrared part of the solar spectrum. For this reason, surfaces that appear to be the same color can have different albedos.

The word "albedo" figured prominently in a seminar title at the recently held convention of the Roof Consultants Institute (RCI). Dr. Lisa Gartland of LBL presented a program on the "Demonstrated Energy Savings of High Albedo Roof Coatings and Future Directions for Research."

Her work at LBL, along with research she cites from the Florida Solar Energy Center, found that the use of high albedo roof coverings improved the overall comfort of buildings.

One roof coatings supplier also cites a 1988 study by another Department of Energy facility, the Oak Ridge (TN) National Laboratory (ORNL), which found that reflective roof coverings can reduce roof temperatures by up to 50°F. This is particularly significant when you consider that rooftop temperatures in the summer can reach 180°F to 190°F.

A second Oak Ridge study also confirmed that HVAC equipment faces a decreased summer cooling load once a highly reflective roof system is in place.

Furthermore, a joint experiment funded by a university and a roof coatings supplier determined that even well-insulated buildings could experience a summertime HVAC energy savings of more than 20% due to increased roof reflectivity.

Because air conditioning costs are typically higher in the southern U.S. than heating costs, roof reflectivity can be a helpful tool in offsetting those building operating costs. Climatically, south of St. Louis is where cooling costs especially start to become an issue, explains roof consultant Patrick L. Downey, president of Merik Inc., Roswell, GA.

Furthermore, reflective roofs reportedly keep non-cooled buildings at lower temperatures for greater occupant comfort, as well as protecting roofs from thermal shock and UV.

However, some industry experts add that it is typically easier and cheaper to heat a building than to cool it, meaning that reflective roof coverings can also be cost-effective in areas that lie outside the Sun Belt. One researcher cites studies on buildings in Philadelphia that found that the cooling benefit for summertime outweighed the penalty for wintertime heating costs.

Reflective roof coverings can also help buildings minimize peak cooling loads, which are often measured and sometimes used in determining penalty charges by some utility companies.

Although it is hard to quantify, some roofing observers add that light-colored roofing surfaces will often last longer because they're not as hot, just as a car's radiator helps the engine run cooler and last longer.

Furthermore, as higher levels of roof insulation are used, researchers add, it can become harder for heat to escape. Instead, it can build up in the roof system and hasten its deterioration, making the case greater for reflecting away heat in the first place.

LBL and Oak Ridge are both funded by the Department of Energy, which in the past decade has focused on reducing overall energy consumption. To that end, points

out one coatings supplier, energy-efficiency ratings have been developed for appliances like refrigerators and air conditioners. While roof systems are far more variable and complicated, their effect on a building's energy usage can also be great, so albedo ratings could be equally useful.

Work on quantifying solar reflectivity is also underway at the American Society for Testing & Materials (ASTM). The Cool Construction Materials Task Group of Building Performance Committee E06 is developing a "Standard Practice for Calculating the Solar Reflective Index of Horizontal and Low-Sloped Opaque Surfaces." This task group is being chaired by Dr. Hashem Akbari, another researcher in the Environmental Energy Technologies Division of LBL.

Reflectivity is already one of the criteria listed in the ASTM standard (D2824) for aluminum roof coatings. The standard calls for a minimum of 50% reflectivity, and some aluminum products even reflect 60% of the sun's rays.

Currently, there is no ASTM specification for white roof coatings, but manufacturers say that when newly installed, they typically reflect up to 85% of sunlight, and new white flexible or single-ply roof membranes often reflect about 80%, which would give them an albedo of 0.8.

To be more accurate, analyses do take into account the fact that roof surfaces tend to fade or gray out or pick up dirt over time. Reflectivity reportedly diminishes typically in the first year and then usually stabilizes. For example, a white roof membrane's or white coating's reflectivity can drop to 60% after a year or two. This is, it should be noted, still double or triple that of darker colored materials. But coatings are often re-applied after several years of exposure, which would again increase the roof's reflectivity.

Albedo ratings for roofing

Albedo testing of roofing materials may be the next step. In fact, one white flexible membrane manufacturer expects to have available Albedo ratings on its white roofing membranes by this autumn. These ratings of reflectivity are going to be measured by a certified third-party laboratory, as fire resistance and wind uplift testing are presently evaluated.

Albedo ratings will be referenced, expects one Southern roof consultant, just like insulation's R-value or a car's expected miles per gallon already is.

However, it should be noted that quality-oriented suppliers of reflective coatings point out that there are other factors besides reflectivity involved in the successful performance of roof coatings. Properties like adhesion, substrate compatibility, scrub resistance, dirt pickup, gloss, ultraviolet resistance, and aging characteristics are important items that must also be evaluated when choosing a reflective product.

One product development manager for a coating manufacturer emphasizes that the bottom-line reason for using a roof coating is to protect the roof membrane in order to prolong its life, especially in hot, sunny climates where the vital oils in asphalt roofing may dry out faster, and the surface may be exposed to more damaging ultraviolet radiation. The accompanying benefits of energy savings when using a white or aluminum coating are like the proverbial icing on the cake.

High-albedo roofs reflect heat away from surfaces, protecting them from thermal shock and ultraviolet degradation.



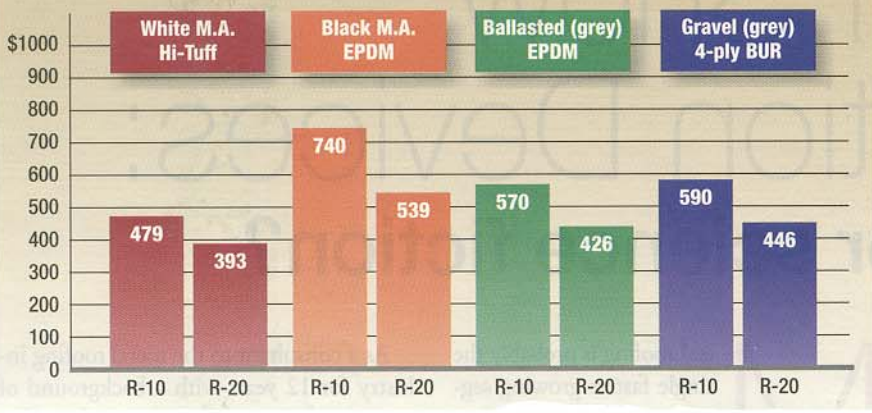
For this reason, some suppliers even advocate coating a cap sheet in Sun Belt areas. They explain that this additional safeguard, which coats the asphalt that is exposed between the granules and helps seal the granules in, can prolong the cap sheet's life and prevent the occurrence of leaks caused by the roof getting overheated and drying out. As costs of tear-off and disposal have risen, efforts to extend a roof's life span provide another environmentally friendly angle to this picture.

Additional roofing research on aging characteristics is also expected to be undertaken in joint efforts between Oak Ridge National Laboratory and the Roof Coatings Manufacturers Association (RCMA).

Another side effect of these energy savings is that, when evaluated as part of all building operating and maintenance costs, they are expected to lower the cost differential between white and black roof membrane systems.

In a warm climate, topping a building with a reflective roof covering is a measure

Energy-Efficiency Comparisons show, in 1993 dollars, the relative cooling/heating costs of various colors of roof coverings in Miami, where there are typically 4,095 cooling degree days and 199 heating degree days. (M.A. stands for Mechanically Attached.)



ROOF SURFACE	ALBEDO*
Smooth-Surfaced Asphalt (weathered)	0.07
Tar and gravel	0.08–0.18
Tile	0.10–0.35
Slate	0.10
Thatch	0.20–0.25
Corrugated Iron	0.10–0.16
Highly Reflective Roof after Weathering	0.6–0.7

* Albedo is the fraction of solar radiation reflected by a surface.

Source: Lawrence Berkeley Laboratory, Berkeley, CA

also expected to be good for the building owner, his tenants, and the environment, in terms of reducing ambient temperatures, thereby decreasing smog production.

As proof of what a large role roofing can play in a city's environment, LBL estimates that the city of Sacramento, CA is made up of 28% rooftop, 16% paved streets and 14% parking lots, sidewalks, school yards and driveways.

Cool Communities, an Atlanta-based division of the 122-year-old nonprofit group American Forests, recently studied data from the Landsat satellite system. Due to what is known as the "urban heat island" effect, the group found that summertime temperatures in Atlanta, for example, tend to be about 12°F hotter than the surrounding Georgia countryside.

It attributed this "urban heat island effect" to reductions in the naturally shady tree canopy and the use of dark, heat-absorbing materials in roads, parking lots and buildings.

LBL found that white or light-colored roofing materials reflect most of the sun's energy back into space before it can be converted into heat energy and absorbed by the structure.

In cities such as Phoenix, where natural landscaping that could absorb heat is minimal, Downey notes, the use of light-colored roofing materials could offer even greater benefits.

Recognizing that the color of a roof offers benefits to both the individual building owner and the community as a whole, Georgia recently became the first state in the country to recognize how color can act as an energy conservation tool and to thus codify the reflectivity of roof coverings into a statute.

It is expected that this statute will affect two types of roof coverings: integrally white single-ply membranes, and roof coatings applied to built-up, modified bitumen and metal roofs.

The state's Department of Community Affairs, the agency that handles building code issues, recently adopted "Section 704 of the 1995 CABO Model Energy Code with Georgia Supplements and Amendments, Regulating Roof Coverings with High-Albedo Surfaces (Commercial Structures)."

This amendment, which went into effect April 1, states that if a high albedo (75% initial reflectivity) roof covering is installed, the building owner has the option of trading off some of the required roof insulation in accordance with prescribed calculations.

Albedo testing of roofing materials may be the next step for product suppliers.

Initially, this pertains only to new construction projects. However, considering that Georgia is expected to have about 80 million square feet of new and reroofing projects each year for an indefinite period, Downey notes, the effect could be far-reaching.

Downey says that other areas, including the city of Austin, TX, have been considering similar measures.

As a matter of fact, usage of both white flexible membranes and reflective roof coatings is said to be on the increase, according to two different industry tracking reports.

For example, RSI's most recent State of the Industry Survey found that 94% of commercial roofing contractors use roof coatings, and almost one out of four said their use of roof coatings increased last year. Contractors from the South were most likely to report an increase in coatings usage.

For more information, a handy resource is at the fingertips of roofing contractors who are hooked up to the Internet: A number of coatings suppliers now operate World Wide Web sites. Some of these sites are extensive and provide a great deal of information on why and where to use these materials, and how they work. **RSI**



Jun 26, 2006

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How Roof Coatings Affect Fire Ratings

Mar 1, 2006
By: W.J. "Skip" Leonard, RRO, CDT, Director of Technical Service, Henry Company
Roofing/Siding/Insulation (RSI)

The increasing use of roof coating restoration systems, reflective coatings for roof maintenance, and meeting mandated roof reflectivity requirements have brought into play the need for clarification as to fire ratings when these coatings are applied to new and existing systems.

Reflective roof coatings and maintenance systems are proven to reduce thermal shock, membrane fatigue, heating or cooling loads and extend roof service life that alone can lower building energy and maintenance costs. Roof restoration systems provide environmentally friendly solutions to many owners and design professionals that are safe and can be cold (ambient) applied.

Some typical questions are: "By adding a reflective or roof restoration coating, how will that affect the fire rating of the roof system?" or "Can any water-based, fire-rated coating be applied over a UL classified roof system or FM Global roof system and maintain the existing ratings?" The answers are: "It depends."

UL takes the position that UL classified roof systems must pass UL 790 *Standard Tests of Roof Coverings* as a part of an overall test program that exposes roof coverings to simulated fire sources originating from the outside on which the coverings are installed. This includes combustible or non-combustible decks and various slopes.

FM Approvals takes a similar position by requiring internal and external fire evaluations. The external evaluation is accomplished via a fire test conforming to ASTM E108 *Standard Test Methods for Fire Tests of Roof Coverings* to ensure that the coating does not compromise the external fire performance of the roof assembly.

The ICC building code actually requires coatings to be fire rated through



Roof Insulation
Roof Shingles
SPF Roofing
Single-ply Roofing
Spray Polyurethane Foam
TPO
Special Projects
2006 Top 100 sign-up form
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their reference to UL Class "A, B or C" requirement; but again, as part of a roof system that includes the fire rated or maintenance coating.

Roof coating manufacturers can test their coatings for fire contribution at both UL and FM Approvals on the specific roof systems coated. In many cases, on installed roof systems where the maintenance or reflective coatings are being added, this means that there can be no increased spread of flame or fuel contribution beyond the original roof system fire test classification.

However, if a maintenance or reflective coated Class A roof system has achieved only a Class B rating by testing, it could be approved as a Class B assembly by UL or FM and be acceptable to a design professional or a code body. It should be emphasized that it is the roof *system* that receives the fire rating, not individual components.

What this means to roofing contractors, owners or designers is the need to check with UL, FM Global (through their field engineers) and the applicable building code or the roof coatings manufacturer for confirmation that the coating has passed the required testing to gain or maintain the specific fire rating or regulatory compliance on the proposed or installed roof system.

Although published UL or FM Approvals requirements can seem onerous, it should be remembered that interpretation of the data by local building officials and FM Global field engineers makes defining assemblies a much more practical matter. It is always advisable to contact them for the proper approval of a fire rated roof system with a maintenance or reflective coating.

FM Approved roof products and assemblies can be found at RoofNav.com/ or www.FMGlobal.com/.

UL maintains a free, on-line database by manufacturer at www.ul.com/ or call 877 854-3577.

RCMA, in cooperation with major roof membrane manufacturers and NRCA, continue to combine their efforts toward quality and energy efficient fire rated or maintenance roof coatings.

The RCMA Web site (www.roofcoatings.org/) has technical data sheets, lists of publications and the contact information for all manufacturing and supplier member companies, including direct hyperlinks to the member companies respective Web sites.

The Roof Coatings Manufacturers Association is the trade association of manufacturers of cold-applied roof coatings, cements and waterproofing agents, as well as suppliers of products, services and equipment. For additional information, contact RCMA at: 202-207-0919.

About the Author

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