

# Considering a New Roof? Don't Get Whitewashed with Your Choice



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For several years, manufacturers of white or light-colored roof membranes have extolled the energy-related, solar reflection benefits of their product as an indisputable advantage. This article pointedly asks whether such a statement is accurate? More important, it questions why anyone should be expected to base a decision on as large and important an expenditure as a roof on such narrowly defined and

scientifically questionable evidence?

Frankly, the answer isn't the black and white conclusion those manufacturers would have you believe. While it's true that white or lighter-colored membranes reflect infrared heat away from the roofing surface, color is only one factor in an otherwise complex combination of natural and man-made dynamics affecting a roof's performance, energy-efficiency, durability and ultimately, its overall cost to own and maintain.

Basing your decision solely on color – which admittedly no one does – is a sure-shot way to achieve less-than-acceptable performance. Numerous factors should be evaluated before making any selection of roofing materials and workmanship. Factors such as: heating vs. cooling days; cloud cover; energy costs; long-term color-retention; and roof-top maintenance are all significant determinants as to whether your ultimate roofing decision will lead to savings or loss.

Research is underway to find mathematical models to adequately answer such questions, but for now, old-fashioned common sense remains your best guide.

**ASK YOURSELF:**  
**WHAT 'S THE TRUE GOAL OF A ROOF?**  
**ANSWER:**  
**TO REMAIN LEAK-FREE FOR AS LONG AS POSSIBLE.**

Color retention and surface texture ARE two important factors that relate to solar reflectance – the amount of solar radiation reflected away from

the roof surface.

Since solar radiation is responsible for heat, it is an important value to consider.

But how often does the pristine white material you see in a sales presentation compare to the actual color of the roof after exposure to the elements? Does the membrane collect pollution? Does it permit biological growth? Does the fastening method or installation technique allow plain old dirt and dust to accumulate? Are any materials regularly exhausted onto the roof surface from inside the building or by rooftop equipment? Finally, how often must such a membrane be washed – and at what expense? – to maintain a color that is even close to that of the new material?

If those weren't apparent questions to ask before, they should be now. The fact is, ALL roofing membranes change color after installation. In the case of white membranes, the color typically darkens, resulting in lower solar reflectance as the membrane ages and



*No matter how much you try to prevent it, white roofs will become discolored over time.*

becomes discolored. This discoloration and aging may also lead to overheating of the roofing formulation, weakening and physically damaging the roof over time. EPDM, on the other hand, is formulated to craze and naturally lightens to a grayish color over time, leading to slightly better solar reflectance – a significant side-benefit worth noting in any discussion on solar reflectance.

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*Discoloration means both seen and unseen perils to the roof's long-term performance.*

One way manufacturers of white membranes try to keep the color constant is by formulating products that “chalk” or release fillers onto the roof surface. Typically, an element such as titanium dioxide is incorporated. This filler material exudes to the surface of the membrane, dislodging any foreign objects that are stuck to the surface. The membrane is then washed, or worse, simply allowed to drain from natural rainfall.

The down side of this entire approach is that fillers that contribute to the compound quality of the exposed membrane are washed away, resulting in: loss of thickness, surface deterioration (such as cracking or exposure to the reinforcement scrim), changes in the physical properties of the overall roofing formulation, and ultimately roof failure.

It's a fact of life: everyday materials are going to be installed on rooftops. Harmful substances range from dust, dirt and pollution (from auto and carbon-related emissions) to biological growth that either takes root in collected dirt or attaches itself directly to the membrane. If aggressive, regular countering measures are not taken, these materials will become embedded in the membrane surface in a way that resists rainfall-erosion and promotes discoloration. Thus, solar reflectance is decreased and so are the energy savings these membrane manufacturers promote.

Are you willing to spend money on a roof-scrubbing program to save the money you thought you saved by purchasing a white roof? And, if money isn't an issue, will the cumulative damages made by excessive cleaning void your warranty or detract from the roof's long-term viability? Again, tough questions that should be addressed when making any roofing decision.

#### HOW TO AVOID BEING “BLINDED BY THE WHITE ”

The smartest, most efficient and proven way to save on your roof's energy costs and your long-term cost of ownership is by selecting the right combination of membrane, insulation and installation workmanship up front. In fact, insulation is the best understood method of controlling energy loss. Today's range of insulating materials are well understood, well documented in their efficacy, and are not subject to things like solar reflectance, dust and dirt. Nor do they need to be cleaned regularly to do their job.

While it's true that R-values of insulations may change over time, extensive research and documentation have led to aged values for the various products available. Industry organizations such as the National Roofers Contracting Association (NRCA) suggest the use of insulation as a reliable, long-term method of controlling energy consumption. It simply makes more sense to spend on a known quantity like insulation than an inconsistent property like color.

#### EPDM: HISTORY 'S MOST PROVEN MEMBRANE ACTUALLY GETS BETTER WITH AGE

Long-term considerations should rule any common sense evaluation of performance expectations and costs. This is especially true when you consider the long-term cost implications of a major expense like a roof. With that in mind, perhaps the greatest attention should be paid to the life expectancy of the roof membrane itself.

There isn't a single white membrane on the market today that can match the successful service history of EPDM. Not one! In fact, it's difficult to find any white roofs using current formulations that have survived 10-year material warranties, especially considering that most of the white

#### COMPARING REFLECTIVE ROOFING VS. INSULATED LESS-REFLECTIVE ROOFING

*Source: Oak Ridge National Laboratory  
Roof Radiation Control Calculator*

- Using reflective roofs alone in Northern United States may actually increase energy costs by decreasing solar heat gain in winter months.
- Non-reflective roofs can be made to be just as energy-efficient as reflective roofs simply by adding roof insulation; in many areas of the U.S., a minimal amount of insulation (often as little as a factor of R-1) is needed to offset a heat-reflective coating.

Note: The calculated energy savings for reflective roofs assume that the reflective roof will be cleaned periodically to maintain optimum solar reflectivity. Lack of periodic cleaning may reduce energy savings over time.



*This aged EPDM roof has been repaired with newer membrane – notice the light gray reflective color of the aged membrane.*

membrane formulas being sold today have not even experienced three years of in-service life.

Contrast that with the unparalleled history of EPDM. When you evaluate factors such as weathering performance and tensile strength, EPDM continues to be the material of choice for building owners who have an eye on both the long-term viability of their roof and the bottom line. As

According to the **“Laboratory Evaluation of EPDM Roof Membrane: A 17-year History of Performance”** reported at the International Symposium on Roofing Technology, over time, “EPDM’s physical properties show a general increase in tensile strength, tear resistance and hardness.”

The study also states that “it may require more than 50 years of exposure [to the elements] to drop below MRCA ME-20 performance requirements.”

What is the “best” way to evaluate the long-term value of any roof? Locate and deal with a manufacturer that promises to stand behind its product with a long-term warranty, a proven history of performance and a real-world look at the energy efficiency of the product you’re buying. Better yet, make your purchase decision based on all of the points addressed in this article, and throw in other factors such as installation expertise and the financial strength of the roofing company you choose.

Today, more than ever before, it is wise to make investments that are based on sound principles. Investing your roofing dollars on the performance of a product property that could change daily just does not pass the “common sense” test.

Remember, your best investment is one that: 1) involves a membrane product EPDM – which has stood the test of time, 2) combines insulation materials that match your specific needs and performance expectations, and 3) all professionally installed with a roofing system that has similarly been tested, proved and warranted to provide long-term durability and reliability. Such a combination is a real winner for any building owner, and one that never requires whitewashing to look attractive.



*Black EPDM – the industry’s most proven membrane technology – is formulated to slightly gray over time, actually increasing its solar reflectance capabilities as it ages.*

Professional Roofing magazine raved back in 1994, “By comparison, no other membrane has ever come into such wide use without experiencing weathering problems as a material.”

To be reliable, the life-cycle costs of your roof must incorporate the expected life of the roofing membrane, not just whether the membrane will provide negligible savings over a 10- or 20-year period IF it stays white.