

It's Not Just Black vs. White: Why EPDM Outperforms

THE SCIENCE-BASED CASE FOR EPDM ROOFING

While the conversation around roof color has evolved toward holistic design and sustainable assemblies, some stakeholders still focus on the outdated “black vs. white” debate. Roofing decisions today involve more than color alone. With thicker insulation requirements, changing climate conditions, and growing interest in long-term sustainability, owners need materials that perform reliably across a range of factors. EPDM has a long history of stable performance in regions where insulation and durability drive energy outcomes more than surface reflectivity.

The Research Reality

Research in the early 2000s suggested white roofs offered energy benefits, but those studies relied on simplified models, low insulation levels, and limited climate data. These early studies are an insufficient justification for broad ‘cool roof’ mandates today. A comprehensive literature review published in 2022 revealed critical flaws in ‘cool roof’ studies from 1985-2018:

- Oversimplified modeling, ignoring real-world complexity
- Limited geographic scope and locations, missing the climate diversity seen in real-world applications
- Low insulation levels (R-values) resulting in reflectivity benefits that don't exist when currently required insulation levels are used.
- Short-term studies overlooking seasonal impacts/heating penalties in more northern climates

What Current Research Shows

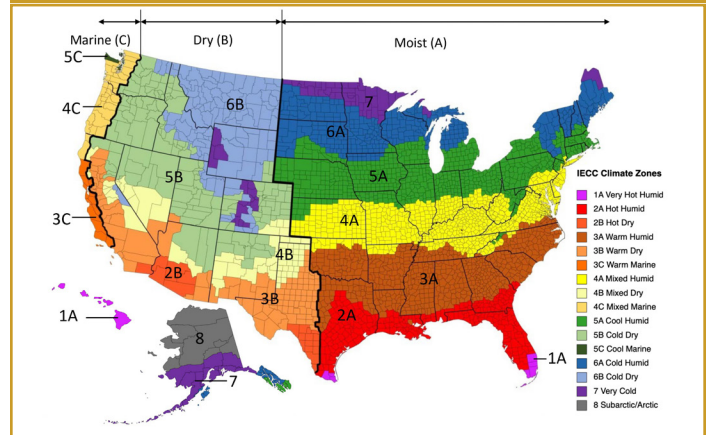
Harvard Study (2024): Widespread adoption of highly reflective white roofs can increase surrounding temperatures, reduce precipitation, and worsen heat inequality between neighborhoods.

ICF Study (2023): No correlation between highly reflective white roof mandates and urban heat island reduction in ASHRAE Climate Zones (ACZ) 3-5. Cities like Chicago and New York reported no measurable improvement after 15+ years of mandates.

ICF Study (2022): In ACZ 4 and north, insulation reduced any incremental gains from reflectivity. Overall, insulation, not roof color, delivered the strongest and most consistent energy benefits.

Tewari et al. (2019): Irrigated vegetative roofs are more effective in mitigating urban heat islands than reflective surfaces.

IECC 2021 map based on current ASHRAE Climate Zones (ACZ)



Energy Efficiency: Insulation Wins

Modern building codes require a minimum of R-25 to R-38 roof insulation, three times more than the level required 25 years ago. In ACZ 4 and north, increasing insulation to the level required by the current IECC provides greater energy benefits than reflectivity.

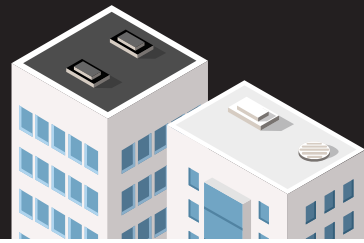
- Increasing insulation from R-20 to R-30 can reduce annual energy use by 10%+ in ACZ 4 and north, which are heating-days-dominated climates
- Highly reflective white roofs can increase heating demand in cold months, offsetting summer cooling savings
- Energy modeling shows insulation delivers greater lifecycle savings than reflectivity in ACZ 4 and north

Hidden Moisture Risks

In the heating-days-dominated climates of ACZ 4 and north, highly reflective white roofs often require additional vapor retarders or air barriers to prevent condensation. Since codes don't mandate these components, cost-conscious owners or less knowledgeable roof system designers may skip them, creating unintended consequences and assemblies that:

- Trapped moisture that cannot fully dry in summer
- Reduced insulation effectiveness due to persistent dampness
- Create conditions for mold growth and material degradation

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EPDM has a long, proven history of dependable performance across a wide range of climates and building types. Its durability and real-world results highlight why roof system design should go beyond the simple ‘black vs. white’ debate. Many roofing contractors tell me they would choose EPDM for their own homes and businesses.

— Jason P. Wilen, AIA, NCARB, CDT, RRO; Associate Principal, Klein & Hoffman; former Technical Director at the National Roofing Contractors Association

THE EPDM ADVANTAGE: PROVEN PERFORMANCE WHERE IT MATTERS MOST

Exceptional Longevity

EPDM roofs deliver a service life of 38* years—more than double the typical 15-20 year industry standard of commonly used highly reflective white roof membranes. This longevity translates to:

- Fewer replacements over a building’s service life
- Reduced landfill waste and embodied carbon
- Lower total lifecycle costs for building owners
- Fewer manufacturing and installation impacts

Superior Durability & Maintenance

- Resilient during extreme weather, temperature changes, hail, and UV exposure
- Flexible across wide temperature ranges, reducing cracking and splitting
- Easy, cost-effective repairs that extend service life without full replacement
- Can support foot traffic for rooftop gardens and maintenance

Innovative Infrastructure Compatibility

EPDM provides an optimal foundation for vegetative roof installations—the roofing strategy proven most effective for mitigating urban heat islands. Ballasted and adhered membranes, common attachment methods for EPDM roof systems also serve as an excellent platform for solar panel installations, enabling renewable energy goals without compromising roof performance.

The Real UHI Solution: Urban Tree Canopy

While highly reflective white roof mandates show no measurable reduction in urban heat islands after 15+ years, increased urban

tree canopy provides clear, demonstrable cooling benefits. EPDM manufacturers support this proven mitigation strategy that makes a real difference.

What This Means for Building Owners

In ACZ 4-8, dark EPDM often delivers greater energy efficiency and avoids the moisture and condensation risks associated with highly reflective white membranes. However, even when dark EPDM may be less energy-efficient, there are many other compelling reasons to choose EPDM, such as longevity, lower life-cycle costs, and durability. EPDM’s long service life provides owners with a reliable, low-maintenance roof that supports both current needs and long-term planning.

The Bottom Line

EPDM offers steady, research-backed performance in climates where longevity and durability outweigh the benefits of reflectivity. For owners, it provides a long-lasting, low-risk roofing solution that supports strong energy performance and long-term value.

Recent research shows that “cool roofs” don’t always keep buildings cooler. In most of the country, ASHRAE Climate Zones 4 – 8, highly reflective white roofs can actually increase overall energy use. Because the nickname “cool roofs” can be misleading, we use the more accurate term “highly reflective white roofs” (HRWR).

*An expected service life of 38 years for EPDM membrane is supported by the EPDM Roofing Association based on in-situ testing, laboratory testing, and the opinions of over 550 roofing professionals. The expected service life of thirty-eight years is averaged across various thicknesses and attachment methods, and assumes proper installation and maintenance.