



WHITE PAPER

UNDERSTANDING POTENTIAL ROLLBACKS OF COOL ROOF REQUIREMENTS

OVERVIEW

Cool Roof Requirements have been in both model national and local building energy codes for more than two decades. During that time, both energy codes and buildings have evolved to the point that the need for cool roofs has changed and is now more individualized by use and location. Due to this as well as political reasons, some jurisdictions have opted to relax, or even roll back, cool roof requirements. This paper addresses many aspects of this changing landscape in a direct FAQ format and is intended to help building designers and owners understand the implications of these changes.

FREQUENTLY ASKED QUESTIONS

General

1. What is the cool roof requirement, and how did it originate in building energy codes?

Cool roof requirements were introduced into energy codes to reduce HVAC cooling loads by increasing the solar reflectance and thermal emittance of roof surfaces. They originated from research demonstrating that reflective roofing can reduce air-conditioning demand in certain climates, particularly hot, sunny regions. This advantage, coupled with growing concerns over urban heat islands, led many heavily densely populated states and municipalities to incorporate these requirements into building codes. Eventually, these requirements found their way into model codes as well.

2. What is the difference between solar reflectance, thermal emittance, and SRI?

All three metrics measure the same effect but in different ways. Solar Reflectance refers to a material's ability to reflect energy transmitted throughout the solar spectrum. Thermal emittance expresses the material's ability to cool itself off by emitting energy in the infrared spectrum. Solar Reflective Index, or SRI, includes the effects of reflectance and thermal emittance under a standard set of conditions and is generally considered a more dependable way to state performance. Albedo is a term also used to describe the combined effects qualitatively.

3. Why are some states and jurisdictions considering rolling back or modifying cool roof mandates?

Some jurisdictions are reevaluating these mandates due to concerns about cost impacts, limited benefits in mixed or cold climates, advances in insulation practices, aesthetics, and the desire for greater design flexibility. New studies suggest that cool roofs may not uniformly reduce energy use across all building types and climate zones

4. What climates or regions benefit most from cool roofs, and where is the least impact?

Cool roofs offer the greatest benefit in hot, cooling-dominated climates with high solar exposure. The impact is smaller in mixed climates and can be negative in cold climates where heating demand outweighs cooling savings over the course of the year or even a day. Energy models show that climate zone plays a significant role in determining net benefit.

5. How do cool roof requirements differ between energy codes, green codes, and voluntary programs?

Energy codes mandate minimum reflectance/emittance values for compliance, while green codes and voluntary programs (such as LEED or Green Globes) may award credit for reflective roofing or consider life-cycle impacts. Some programs focus on urban heat island reduction rather than direct building energy use.

Technical & Performance

6. Does rolling back cool roof requirements impact building energy use or HVAC demand?

The impact varies by climate as well as building type and construction. In hot climates, removing cool roof requirements may increase cooling loads. In colder climates, however, the reduced reflectivity may decrease heating demand, resulting in a negligible or even net-positive energy impact.

7. How does roof reflectivity influence urban heat island effects, and is that affected by a rollback?

Higher roof albedo generally reduces surface temperatures. Higher surface temperatures contributes to urban heat island effects. A rollback may reduce this effect in dense metropolitan areas, but the magnitude depends on local climate, building density, and the proportion of roofs that shift away from cool-rated products.

8. Are there building types or roof designs that see limited or no benefit from cool roof requirements?

Yes. Buildings with high insulation levels, minimal cooling loads, or heavy internal heat gains may see little benefit. Roofs shaded by equipment, parapets, or adjacent structures also receive less solar gain, reducing the value of reflective surfaces.

9. How do insulation levels, ventilation, and above-sheathing ventilation affect cooling loads compared to reflectivity alone?

Insulation and ventilation often have a greater impact on heat flow than roof albedo alone. Above-sheathing ventilation can significantly reduce heat transfer, sometimes matching or exceeding the cooling reductions achieved through cool roof coatings.

10. How does roof slope influence the effectiveness of cool roof coatings and pigments?

Cool roof coatings are generally more effective on low-slope roofs because these surfaces receive more direct solar exposure during the hottest time of the day. On steep-slope roofs, albedo still contributes to energy savings but at a reduced rate due to the angle of incidence.

11. Do cool roof benefits diminish over time due to dirt accumulation, weathering, or pigment degradation?

Generally, yes. Reflective surfaces lose some performance over time due to UV degradation and dirt and organic matter accumulates. More durable coatings help slow this effect by slowing oxidation and allowing natural cleansing by rainwater. While coating oxidation may actually improve albedo for some pre-painted metal systems, this effect is generally overcome by accumulation of debris. Therefore, long-term field-aged reflectance should be considered rather than initial values alone to better predict performance. Three-year aged reflectivity values are commonly published and there are accelerated aging procedures a manufacturer can use until the naturally aged performance can be measured.

Economic & Market Impact

12. What impact might a rollback have on building owners, contractors, and manufacturers?

A rollback may simplify product selection and provide more flexibility for contractors and designers. For manufacturers, demand may shift toward a broader range of colors or finishes rather than being driven by compliance requirements.

13. How does the cost difference between cool roof and non-cool roof products affect material selection?

Cool roof materials can cost more due to specialized pigments and formulations as well as extra inventory costs. However, this is generally not true for metal roofs due to conversion to high reflectivity pigments across the product offering. Although removing mandates may allow building owners to choose lower-cost alternatives when energy savings do not justify the premium for non-metal roofs, this cost difference likely does not apply for metal systems. Because lower cost alternatives for metal systems come with increased chalk and fade, the buyer should beware.

14. Will rolling back requirements simplify product availability and reduce project complexity?

In many cases, yes. A rollback can reduce the need to track reflectance ratings, manage prescriptive compliance paths, or limit color selections, resulting in greater design freedom and fewer specification constraints.

15. Does a rollback increase carbon emissions or overall energy use at the grid level?

This depends on climate and building stock. In hot climates, a rollback could increase cooling energy use and emissions. In colder climates, the opposite may occur due to reduced heating loads. Regional modeling is essential to understanding the net effect.

16. Are there alternative strategies that provide similar or greater benefits than cool roof requirements?

Yes. Higher insulation levels, improved air sealing, above-sheathing ventilation, reflective insulation, and optimized HVAC systems can offer equal or greater energy savings depending on climate and building type.

Issues Specific to Metal

17. Do metal roof systems inherently meet many cool roof performance targets without special coatings?

For pre-painted metal roofs, this is certainly true. Performance is determined by the pigments in the coating, not the resin used. This is why metal roofs offer moderate to high solar reflectance even in standard finishes. The lower emittance of unpainted roofs does lower albedo slightly, but this is a secondary effect compared to reflectivity. Therefore, bare metal finishes may often meet cool roof requirements for steeper-sloped roofs while still retaining heat during cool nights compared to other roofing materials.

18. How do advanced PVDF coatings and cool pigments interact with evolving energy codes?

PVDF and other supreme coatings with cool pigments provide long-term color stability. These coatings align well with performance-based energy codes even if prescriptive cool roof requirements are relaxed.

19. What role can metal roofing play in meeting energy performance goals if cool roof mandates are relaxed?

Metal roofing can still contribute to energy efficiency through reflectivity, above-sheathing ventilation, insulation compatibility, durability, and its ability to support on-site renewable energy technologies such as solar arrays or passive water or air heating. These combined attributes help buildings meet performance goals without relying solely on reflectance requirements.

20. Are metal roofs with high emissive finishes still beneficial in climates where cool roofs are less effective?

Yes. Emittance has a much lower effect on albedo than reflectivity. High-emissivity metal surfaces can still be confidently specified even when high reflectivity provides limited benefits.

Implementation & Transition

21. How should designers and building owners approach roof selection if the cool roof mandate is modified or removed?

Designers should evaluate building use, climate conditions, HVAC strategies, insulation, and long-term operating costs. Without prescriptive requirements, roof selection should shift toward performance-based design rather than prescriptive compliance.

22. Will local jurisdictions still be allowed to enforce stricter cool roof requirements even after a rollback?

Yes, but not always. Most states allow local jurisdictions to adopt more stringent provisions, but that is not always the case. A rollback at the state or national level does not inherently prevent cities from requiring cool roofs for local environmental or heat island objectives, but most states can preempt these regulations.

23. Are there transitional code periods or compliance timelines affected by the rollback?

Usually, yes. Changes to energy codes typically include phased implementation periods, permitted projects grandfathered, , and grace periods for specification updates. Designers and contractors should verify timelines with their local authority having jurisdiction.

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MCA's marketing and technical activities create awareness of metal, its applications, and its benefits. MCA also works to eliminate barriers to metal's use in construction by supporting product performance testing, initiating research, and monitoring and responding to codes and regulations that affect metal.

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