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Steve Ryan  
ENERGY STAR Program  
Roof Products Program Manager  
U.S. Environmental Protection Agency  
Subject: Partner Commitments

July 23, 2012

Dear Mr. Ryan,

The Cool Roof Rating Council (CRRC) appreciates the opportunity to comment on the following ENERGY STAR® Qualified Roof Products Program documents: Version 3.0 Roof Products Specification and the Draft 2 Test Method for Roof Products: Maintenance of Solar Reflectance Rev. March 1, 2016. The CRRC's Product Rating Program has operated for over 10 years, working with technical experts to develop test methods and protocol with the objective of producing accurate ratings for roofing products. We hope that our technical assessment of the ENERGY STAR Roof Products Program specification and test methods assists the EPA in designing a robust and credible program. Please find below our specific recommendations.

### **1. Weathering Testing from Three Climate Zones**

The CRRC recommends that the EPA require three climate zones (represented by hot/humid, hot/dry and cold/temperate locations) for the three-year aged weathering requirement. The CRRC recognizes that the EPA is striving to adopt a fair and accurate protocol for aging roofing products. These two criteria are met with the adoption of three climate zones, as it sets an equivalent baseline by which all manufacturers can objectively compare their products, as well as is representative of the climate options found in the United States.

From a technical standpoint, weathering research focuses on three main impacts: solar radiation, temperature and moisture. Outdoor exposure testing seeks to subject products to benchmark climates that best represent the impact of weathering. The hot/humid, or sub-tropical, climate possesses high levels of solar radiation, hot temperatures, humidity and wetness (rainfall). This environment is present in the United States in states like Florida, and is employed by many industries for exposure durability testing based on its severe weathering effects on building materials. Likewise, the hot/dry, or desert, climate is sought for its high levels of solar radiation and elevated temperatures, yet low relative humidity and moisture. Arizona adequately represents this climate zone, where high ultraviolet radiation and dry temperatures have the potential to stress materials to their limits. Lastly, the cold/temperate climate, like that found in Ohio, rounds out the cross-sectional representation of climates typical to the United States by offering exposure to four seasons, including a freeze/thaw cycle in the winter months. These three climate zones are considered benchmark climates for weathering by many industry standards beyond roofing, including automotive, plastics, and textiles. By exposing



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roofing materials to these benchmark climates, the EPA can have strong confidence in its listed aged ratings.

From an impartiality standpoint, by requiring three climate zones the EPA will be holding all roofing manufacturers to the same weathering criteria, thereby establishing a level playing field. ENERGY STAR consumers will be able to apply an apples-to-apples comparison of the aged performance ratings for all listed products.

For these reasons, the CRRC recommends that aged exposure results be gathered from multiple samples at each climate zone location, and averaged together to form the posted aged rating. The CRRC recommends that the EPA require three samples from each of the three climate zones, resulting in a total of nine samples aged and tested.

## **2. Accelerated Aging Protocol**

As the accelerated aging protocol is not completed, the CRRC has not yet taken a stance on the procedure. The EPA has expressed its interest in considering this procedure as an alternative to the natural three-year aging protocol. Please note that the accelerated aging protocol is based on three-year aged data derived from three climate zones (hot/humid, hot/dry and cold/temperate). The DOE driven program under Lawrence Berkeley National Laboratory and Oak Ridge National Laboratory has used three climate zone aged measurements to confirm accelerated aging results. Should the EPA decide to support the accelerated aging protocol, the CRRC recommends retaining consistency through the program by supporting the adoption of three climate zones.

On a related note, page 6 of the Specification Document, the EPA references the accelerated aging protocol as the “accelerated aged reflectance test method”. The protocol being developed is not a reflectance test method, but a process to mimic aging through laboratory accelerated mechanisms. As such, the language “reflectance test” should be removed.

## **3. Performance Specification Inclusion of Thermal Emittance**

The EPA has long considered including thermal emittance as a performance specification characteristic for roofing products. The update into Version 3.0 presents an opportune time to shore up the specification document and include this key radiative energy performance property into Tables 1 and 2. ENERGY STAR’s purpose is to showcase products that yield cooling energy savings for consumers and as such thermal emittance, the ability of a roofing product to emit absorbed heat as opposed to transfer it to the building below, should be included as a specification. Both solar reflectance and thermal emittance play a role in determining the radiative energy performance of a roofing product. Using the solar reflectance index (SRI) as an indicator, a product with a reflectance of 0.70 and thermal emittance of 0.85 will have an SRI of 85, whereas a product with the exact same reflectance of 0.70, but possessing an emittance of 0.05 will have an SRI of 57. The difference in energy savings impact between these two products would be significant. As thermal emittance is already submitted by all ENERGY STAR qualified roofing products, setting a requirement for this value should not significantly impact the current list of products.



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#### **4. Weathering Farm Approval by a Certification Body**

The CRRC requests that the EPA provide detailed guidance to the Certification Bodies so that clear weathering farm eligibility criteria is available for a rigorous approval process.

#### **5. Specification versus Test Method Document Discrepancies**

There are a couple of references that do not align between the Specification Version 3.0 and the Draft 2 Test Method documents. The CRRC appreciates the effort that the EPA has put forth into regarding changes from the last comment cycle, and some of these changes resulted in slight discrepancies, as listed below:

- Sample size from Section 4.2 in the Specification Document (page 7), versus Test Procedure section e in the Test Method document (page 3). The CRRC recommends updating the Specification Document to reflect the variety of sample size options dependent on test method used.
- Inclusion of E1918 as a reflectance test method: this is missing from the Specification Document Table 3 (page 6), however is included in the list of Applicable Test Standards (page 2) of the Test Method document.

#### **Overview**

With guidance from the roofing industry technical experts, the CRRC testing protocol, sample preparation and program processes have evolved to help ensure accurate and credible ratings for roofing products. The CRRC appreciates this opportunity to work with the EPA to establish consistent and thorough procedures that result in reliable energy performance roofing product ratings. We hope that the EPA concurs with the CRRC's recommendations for the Specification and Test Method Documents relating to three climate zone weathering and inclusion of thermal emittance as a performance characteristic.

Thank you again for considering the CRRC's comments.

Sincerely,

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