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

February 15, 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 2.3 Roof Products Specification, Version 3.0 Roof Products Specification and the Test Method for Roof Products: Maintenance of Solar Reflectance, March 2015. The CRRC's comprehensive and independent Product Rating has operated for over 10 years, developing processes to manage complex testing and procedural issues and ensure accurate ratings for roofing products. The EPA has already chosen to adopt aspects of the CRRC program into the ENERGY STAR Qualified Roof Program, and the CRRC encourages the EPA to employ this adoption consistently throughout their Roof Program. By adopting the complete CRRC Product Rating Program protocol the EPA will strengthen the integrity of the ENERGY STAR Qualified Roof Products Program. Please find below our specific recommendations to each document.

A. Recommendations pertaining to both Specifications Version 2.3 and 3.0:

**A1. Color Family Program Clarification**

Section 4.1.4 states "Reported values shall be no higher than the average of the initial test results of the Color Family Representative Element." This statement does not align with the Color Family Program as designed and implemented by the CRRC. In the CRRC program reported values should use the Color Family table default values, not the actual measured values of any of the representative or additional element products. This requirement was put into place to remove the possibility of intentional misclassification within the Color Family Program. The default values are conservative values that allow the grouping of colors together and eliminate the need to have each individual shade of color listed and aged. By allowing the reported values to be the same as the representative element, the EPA has created a loophole where a high reflectance product could be selected to represent a collection of less reflective additional products. The CRRC recommends that ENERGY STAR change the language to "Reported values shall be the default values of the Color Family Program as defined for that color group."

**A2. Inclusion of the Slide Method for Measuring Thermal Emittance**

As of late 2011, the CRRC approved use of the Slide Method to measure the thermal emittance of products of high thermal resistance. The Slide Method uses the emissometer and is a variation of ASTM C1371, where the emissometer is slide across the sample, allowing no one area to heat up and affect the



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measurement. The CRRC performed a round robin study to demonstrate the accuracy of this procedure and has applied this test method to all products except for products placed on un-insulated metal substrates. In general, field applied coatings and metal products will use C1371, whereas all other products (tile, shingle, shake, modbit, BUR, single ply, wood) will use the Slide Method. The CRRC recommends that ENERGY STAR add the Slide Method to the list of applicable test methods for roofing products (Table 3).

### **A3. Inclusion of the Tile and Wood Product Test Methods for Measuring Solar Reflectance**

In 2008, the CRRC approved the Tile Test Method and, in 2011, the CRRC approved the Wood Product Test Method. These two product types employ a similar test method to one another: use of CRRC-1 Test Method #1, however, with a standard error allowance of 0.02 (as opposed to the standard error allowance of 0.005). The Tile Test Method also allows the use of the Template Method, which requires 6 specific points to be measured on each tile, using a template. The CRRC recommends that ENERGY STAR add the Tile and Wood Products Test Methods to the list of applicable test methods for roofing products (Table 3).

### **A4. Consistency Regarding Sample Size Requirements**

In section 4.2, the Specification documents reference a 3” by 3” sample size. The CRRC program specifies nine samples for each product, where the dimensions are dependent on the type of test method used.

<b>Test Method</b>	<b>Required Sample Dimensions</b>
C1549	24 in <sup>2</sup> per sample
CRRC-1 Test Method #1	40 in <sup>2</sup> per sample (360 in <sup>2</sup> per entire 9 sample array)
Tile Test Method	36 in <sup>2</sup> per sample
E1918	172 ft <sup>2</sup> per sample

These dimensions were vetted by the CRRC program as necessary for the accuracy of the test protocol. If ENERGY STAR continues to allow use of the CRRC-1 Test Method #1, then a larger sample size should be specified in order to accurately capture the multicolor variation of variegated products. The CRRC recommends that ENERGY STAR adopt our sample size requirements.

### **A5. Referencing the Current Version of the CRRC Program Manual**

The Specification documents reference older versions of the CRRC-1 Program Manual (2008 and 2009 versions) that are no longer posted. As noted above, the CRRC program is constantly being improved to ensure the accuracy of our test methods. As a result, the Program Manual is updated at almost every Board meeting, of which there are three to four each year. Please also note that the CRRC testing and sample preparation protocol was adopted as an ANSI standard in 2010; hence when the EPA references the CRRC Program Manual, it is also subsequently referencing the CRRC ANSI Standard. The CRRC recommends that the EPA references the most current version of the Program Manual. Since Version 3.0 of the Specification document is slated to become effective in 2015, the EPA could more clearly



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reference the future CRRC Program Manual by stating “the most current edition as published by the CRRC will be used”.

#### **A6. Removal of E408**

While the CRRC agrees with using C1371 (and the Slide Method mentioned above) to measure thermal emittance, it is not because as the EPA states that it creates “more reliable results”. E408 and C1371 test different non-comparable properties; the former measures near normal emittance and the latter measures total hemispherical emittance. Currently, E408 references an obsolete device (the Gier Dunkle) and the new device on the market has not yet been round robin verified, nor included in the ASTM E408 standard. Should the new device be included in E408, and the standard updated to include a conversion to total hemispherical emittance, the CRRC may consider its applicability as a test method.

#### **A7. Allowance for AMTLs to Conduct Colorimetry Measurements**

In the CRRC program, colorimetry properties (hunter L, a and b measurements) can be measured by CRRC Accredited Manufacturer Test Laboratories (AMTLs). Colorimetry measurements pertain to products listed under the Color Family Program, aligning each product under the appropriate Color Family Group. It is important to distinguish that AMTLs are not permitted to submit the energy performance reflectance and emittance properties of roofing products (the only exception in the CRRC program is for one time use custom products). The CRRC requests that the EPA clarify whether Certification Bodies can certify ENERGY STAR products where AMTLs have measured the colorimetry properties, as not all CRRC AMTLs are EPA approved laboratories.

### **B. Recommendations pertaining to Specification Version 3.0:**

#### **B1. Concerns with the 2015 Implementation**

The Specification Version 3 requires that all qualified products meet the current protocol in order to remain on the ENERGY STAR list. It was noted that this Specification becomes effective on March 1, 2015, providing Partners three years to retest the products that do not meet the protocol. However, this process will include conducting initial tests, three years of aging, aged tests, shipping time and certification processing before a product can be ready for qualification and relisted on ENERGY STAR. As such, the March 1, 2015 deadline will not allow Partners sufficient time to retest their products, and additional time should be added to account for testing, shipping, and processing. At best a product would only need a couple extra months added to the three year period to complete processing, however, at worst a product may need half a year extra to complete the relisting process. There are many factors at play; hence it is difficult to provide an estimate.

There are a few concerns that the CRRC has in regards to the three year grace period. As mentioned in section A above, test methods are constantly being improved upon and updated. By defining a Specification document in 2012 for implementation in 2015, the ENERGY STAR program is investing in a document that will not be up-to-date with current research and testing protocol. Additionally, the three year grace period creates a loophole, allowing ratings to sit on the ENERGY STAR list unchecked for three years.



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The CRRC recommends an alternative option to implement the test farm aging requirement, one that is currently being used in the CRRC program. The CRRC suggests setting the deadline date to be when products must show proof that they have been placed on a test farm, not three years from now at the completion of the aging process. This will ensure that products don't remain on the ENERGY STAR Qualified Products List for the three year grace period, with no intention of obtaining an aged rating. Instead products placed on the test farm must submit a placement notification form completed by the test farm company. The retesting protocol should include initial testing to ensure that the aged ratings are representative. Implementing this option would remove the three year loophole, ensuring that products are investing in the three year test farm process. It would also make the date of Specification Version 3 more immediate, such that the testing protocol is up-to-date.

## **B2. Reinstate E1918 for Measuring Solar Reflectance**

On Table 3 of the Specification Version 3, E1918 has been removed as an acceptable test for solar reflectance. Though this test method is not often utilized, it is still an acceptable CRRC test method. It is the only test method where the device does not lie flush against the sample, making it potentially applicable to certain unique product types. The CRRC is currently performing a Precision and Bias study for the E1918 test method, which may help address some of the concerns with this protocol. The CRRC recommends that ENERGY STAR add E1918 back into the list of applicable test methods (Table 3).

## **C. Recommendations pertaining to Test Method: Maintenance of Solar Reflectance:**

### **C1. Test Farm Criteria**

The CRRC supports the adoption of the CRRC aging protocol—i.e., using three locations that represent climates found in the United States (hot/dry - Arizona, hot/humid - Florida, and cold/temperate - Ohio). Given that ENERGY STAR is a nation-wide program where products may be placed in a variety of different climates across the country, a solid representation of the aging and weathering process should be implemented. By setting specific criteria for the aging process to be adopted by all listed products, the program will be providing consumers a comparative baseline for product performance.

As there are multiple Certification Bodies (CBs) for roofing products, ENERGY STAR must create defined criteria to guide the CBs in their approval process for test farms. The CRRC requests that ENERGY STAR adopt the CRRC criteria for test farms. This will include specifying the three climates, averaging the results from nine samples, applying a 5° exposure angle (1:12) for low slope products, applying a 45° exposure angle (12:12) for steep slope products, and specifying placement exposure dates.

### **C2. Applicable Test Methods & Sample Size Requirements**

As mentioned above, the CRRC recommends that ENERGY STAR include the Slide Method, Tile Test Method, Wood Products Test Methods, and E1918 on the list of applicable test methods. It was noted that CRRC-1 Test Method #1 is missing from this document, though present in the Specification documents; hence, we suggest adding it to this list as well.



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The Test Method document references a conflicting sample size from the Specification documents; additionally, it is still not consistent with the different types of test methods applicable to roofing products. As mentioned above, the CRRC encourages the adoption of our program's sample size protocol, dependent on the test method used.

### **C3. Substrate Requirement**

The Test Method document states in the Test Procedure section 2 that one should "prepare panels such that....goes over the intended substrate." The CRRC program allows field applied coatings and factory applied coatings to use a standard aluminum panel (3003 H14 uncoated aluminum alloy in accordance with ASTM D1730) as their substrate; manufacturers can also choose to apply their product on a substrate intended for end use. The CRRC recommends that ENERGY STAR adopt this same protocol.

### **Overview**

With guidance from the roofing industry technical experts, the CRRC testing protocol, sample preparation and program processes have evolved to 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 the EPA concurs with our recommendations for their Specification and Test Method documents relating to updating the test methods list, reconsidering the timeline for test farm aging to commence with the start of the aging process, modifying the sample size specification, and correcting the color family program language.

Thank you again for considering our comments.

Sincerely,

A handwritten signature in black ink, appearing to read "Sherry Hao", is written over a horizontal line that extends to the right.

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