



ENERGY STAR® Program Requirements Product Specification for Roof Products

DRAFT 2 Test Method: Maintenance of Solar Reflectance Rev. March 1, 2016

Note: In conjunction with the Version 3.0 specification effective date, as of March 1, 2016 EPA will require that all products be third-party certified to this Test Method to remain ENERGY STAR qualified. Products currently on the qualified product list that were not tested on a weathering farm will need to be retested and third-party certified by an EPA-recognized certification body (CB) to remain qualified. Therefore, a new revision date has been added to the footer of this document.

1) OVERVIEW

The following test method shall be used for determining product compliance with maintenance of solar reflectance requirements in the ENERGY STAR Product Specification for Roof Products.

2) APPLICABILITY

This test protocol is applicable for evaluation to the ENERGY STAR Roof Products Eligibility Criteria.

3) DEFINITIONS

Unless otherwise specified, all terms used in this document are consistent with the definitions contained in the ENERGY STAR Product Specification for Roof Products.

4) TEST SETUP

Test setup and instrumentation shall be in accordance with applicable test standards, as referenced herein, unless otherwise noted in this document. In the event of conflicting requirements, this test procedure shall take precedence.

5) PREPARATION OF PRODUCT UNDER TEST

The test surface of each sample shall not be washed, cleaned, or wiped in any fashion. Loose dirt, embedded dirt, environmental stains, mold, mildew, and any other material that rests on – or has become incorporated into – the surface of the material shall not be altered.

6) TEST METHODS

Applicable Test Standards

Test setup and instrumentation shall be in accordance with applicable test standards, as referenced herein:

- a) ASTM G 7M-11: *Standard Practice for Atmospheric Environmental Exposure Testing of Nonmetallic Materials*
- b) ASTM E 903-96: *Standard Test Method for Solar Absorptance, Reflectance, and Transmission of Materials Using Integrating Spheres, or*
- c) ASTM C 1549-09: *Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer, or*
- d) ASTM E 1918-06: *Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field, or*
- e) CRRC-1 Test Method #1: *Standard Practice for Measuring Solar Reflectance of a Flat, Opaque, and Heterogeneous Surface Using a Portable Solar Reflectometer, or*
- f) Tile Product Test Method: CRRC-1 Program Manual, Section 2.2.4.A, or
- g) Wood Product Test Method: CRRC-1 Program Manual, Section 2.2.4.B
- h) CRRC-1-2010, S.2.6.A.1 Requirements for Aged Testing: *Cool Roof Rating Council, Product Rating Program, ANSI/CRRC-1-2010, ANSI Approved 11.16.2010.*

Note: EPA has added the Tile Products Test Method and Wood Products Test Method as options for testing product maintenance of solar reflectance, consistent with additions in Table 3 of the Draft 2 Version 3.0 specification.

Test Procedure

- a) Expose panels outdoors on commercial or private weathering farms that are accredited to ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*.
- b) Commercial or private weathering farm shall be located in a hot/humid climate in accordance with CRRC-1-2010, S.2.6.A.1.
- c) Prepare panels such that the surface to receive solar radiation goes over the intended substrate.¹ For factory or field applied coatings, the surface to receive solar radiation may be applied on a standard aluminum panel, 3003 H14 uncoated aluminum alloy, in accordance with ASTM D1730.

Note: EPA received a comment that proposed that all roof products be weathered in a single climate zone such as the state of Florida, which will allow end users to fairly compare products based on climate conditions and avoid testing in zones that produce more favorable results but are not representative of true performance. EPA is open to specifying allowed climate zones, but believes that restricting testing to one state may have an undue negative impact on manufacturing partners and laboratories using existing weathering farms in other states. EPA is interested in receiving feedback on alternative approaches including costs and benefits.

¹ For example, if a coating is intended for BUR, the specimen set needs to be prepared using BUR. If the coating is to be used over Modified Bitumen, a specimen set needs to be prepared using Modified Bitumen.

- d) At least three (3) panels with the identical formulation as those that were tested for initial solar reflectance shall be exposed for a minimum of three continuous years in accordance with ASTM G 7M-11.
- e) Each exposure panel shall be at least 24 square inches (155 square centimeters) in size, e.g. 4" x 6" or 3" x 8", and shall be mounted so that there is no run off from one panel to another. Each exposure panel shall be sized in accordance with applicable test method requirements e.g. For CRRC-1 Test Method #1 each exposure panel shall be 40 square inches and for E1918-06 each exposure panel shall be 172 square feet.
- f) To further avoid runoff onto samples, where possible, the exposure panel shall be mounted near the top of the test rack.
- g) For low-slope roof products and coatings and for product that can be applied to either low-slope or steep-slope roofs, test samples shall be exposed at a slope of 2:12 or less (1/4:12 is recommended) and facing south.
- h) For steep-slope roof products and coatings, test samples shall be exposed at a slope between 2:12 and 12:12 (4:12 is recommended) and facing south.
- i) Make at least three (3) measurements of solar reflectance from different areas on each sample.

Note: EPA has amended the sample size requirement for products tested using CRRC-1 Test Method #1 and E1918-06 in order to conform with the sample size requirement for each test method. In reviewing the recent ENERGY STAR qualified product list, EPA believes that most manufacturers are currently following this approach (i.e., 99% of products listed with ENERGY STAR) and as such, this change should have limited impact on currently qualified products.