ENERGY STAR® Program Requirements for Roof Products

Partner Commitments
FINAL DRAFT

Commitment

The following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the manufacturing of ENERGY STAR qualified roof products. The ENERGY STAR Partner must adhere to the following program requirements:

- comply with current ENERGY STAR Eligibility Criteria, defining the performance criteria that must be met for use of the ENERGY STAR certification mark on roof products and specifying the testing criteria for roof products. EPA may, at its discretion, conduct tests on products that are referred to as ENERGY STAR qualified. These products may be obtained on the open market, or voluntarily supplied by Partner at EPA's request;

- comply with current ENERGY STAR Identity Guidelines, describing how the ENERGY STAR marks and name may be used. Partner is responsible for adhering to these guidelines and for ensuring that its authorized representatives, such as advertising agencies, dealers, and distributors, are also in compliance;

- qualify at least one ENERGY STAR roof product within one year of activating the roof products portion of the agreement. When Partner qualifies the product, it must meet the specification (e.g., Tier 1 or 2) in effect at that time;

- provide clear and consistent labeling of ENERGY STAR qualified roof products. The ENERGY STAR mark must be clearly displayed in product literature (i.e., user manuals, spec sheets, etc.) and on the manufacturer's Internet site where information about ENERGY STAR qualified products is displayed;

- through product literature, provide the following information to end users: 1) a description of the variables that influence the amount of energy savings that can be realized when an ENERGY STAR qualified roof product is installed on a home or building, 2) an acknowledgement that the solar reflectance of any roof products over time may increase or decrease, depending on the product make-up, due to aging and dirt and microbial accumulation, and 3) a description of the proper maintenance procedures required to maximize solar reflectance over the longest period of time possible (e.g., rinsing or power washing each spring or recoating every five years). Partners may continue to use the following statement to meet this requirement: "When installed properly, this product will help reduce energy costs. Actual savings will vary based on geographic location and individual building characteristics. Consult your product manufacturer, roofing contractor, or call 1-888-STAR-YES (1-888-782-7937) for more information." This statement must be placed in close proximity to the ENERGY STAR mark wherever it is included in product literature and on the manufacturer's Internet site.

- provide to EPA, on an annual basis, an updated list of ENERGY STAR qualifying roof product models. Once the Partner submits its first list of ENERGY STAR qualified roof products, the Partner will be listed as an ENERGY STAR Partner. Partner must provide annual updates in order to remain on the list of participating product manufacturers;

- for each qualifying roof product, provide to EPA test data to certify that the product has met the required performance characteristics. This data may be in the form of a testing report, either from the Partner or a third party. EPA will only add models to its product list after reviewing and approving the product test results;

- provide to EPA, on an annual basis, unit shipment data or other market indicators to assist in determining the market penetration of ENERGY STAR. Specifically, Partner must submit the total number of ENERGY STAR qualified roof products shipped (in units by model) or an equivalent measurement as agreed to in advance by EPA and Partner. Partner is also encouraged to provide ENERGY STAR qualified unit shipment data segmented by meaningful product characteristics (e.g., capacity, size, speed, or other as relevant), total unit shipments for each model in its product line, and percent of total unit shipments that qualify as ENERGY STAR. The data for each calendar year should be submitted to EPA, preferably in electronic format, no later than the following March and may be provided directly from the Partner or through a third party. The data will be used by EPA only for program evaluation purposes and will be closely controlled. If requested under the Freedom of Information Act (FOIA), EPA will argue that the data is exempt. Any information used will be masked by EPA so as to protect the confidentiality of the Partner;

- notify EPA of a change in the designated responsible party or contacts for roof products within 30 days.

Performance for Special Distinction

In order to receive additional recognition and/or support from EPA for its efforts within the Partnership, the ENERGY STAR Partner may consider the following voluntary measures and should keep EPA informed on the progress of these efforts:

- consider energy efficiency improvements in company facilities and pursue the ENERGY STAR mark for buildings;

- purchase ENERGY STAR qualified products. Revise the company purchasing or procurement specifications to include ENERGY STAR. Provide procurement officials' contact information to EPA for periodic updates and coordination. Circulate general ENERGY STAR qualified product information to employees for use when purchasing products for their homes;

- ensure the power management feature is enabled on all ENERGY STAR qualified monitors in use in company facilities, particularly upon installation and after service is performed;

- provide general information about the ENERGY STAR program to employees whose jobs are relevant to the development, marketing, sales, and service of current ENERGY STAR qualified product models;

- feature the ENERGY STAR mark(s) on Partner Web site and in other promotional materials. If information concerning ENERGY STAR is provided on the Partner Web site as specified by the ENERGY STAR Web Linking Policy (this document can be found in the Partner Resources section on the ENERGY STAR Web site at www.energystar.gov), EPA may provide links where appropriate to the Partner Web site;

- provide a simple plan to EPA outlining specific measures Partner plans to undertake beyond the program requirements listed above. By doing so, EPA may be able to coordinate, communicate, and/or promote Partner's activities, provide an EPA representative, or include news about the event in the ENERGY STAR newsletter, on the ENERGY STAR Web pages, etc. The plan may be as simple as providing a list of planned activities or planned milestones that Partner would like EPA to be aware of. For example, activities may include: (1) increase the availability of ENERGY STAR labeled products by converting the entire product line within two years to meet ENERGY STAR guidelines; (2) demonstrate the economic and environmental benefits of energy efficiency through special in-store displays twice a year; (3) provide information to users (via the Web site and user's manual) about energy-saving features and operating characteristics of ENERGY STAR qualified products, and (4) build awareness of the ENERGY STAR Partnership and brand identity by collaborating with EPA on one print advertorial and one live press event;

- provide quarterly, written updates to EPA as to the efforts undertaken by Partner to increase availability of ENERGY STAR qualified products, and to promote awareness of ENERGY STAR and its message.

ENERGY STAR® Program Requirements for Roof Products

Eligibility Criteria FINAL DRAFT

Below is the **FINAL DRAFT** product specification (Version 2.0) for ENERGY STAR qualified roof products. A product must meet all of the identified criteria if it is to earn the ENERGY STAR.

1) Definitions: Below is a brief description of roof products and other terms relevant to ENERGY STAR.

   A. Roof surface: The uppermost part of the roof system that is in direct contact with solar radiation.

   B. Low-Slope Roofs: Surfaces with a slope of 2:12 or less.[1]

   C. Steep-Slope Roofs: Surfaces with a slope greater than 2:12.

   D. Low-Slope Roof Products: Products that are typically installed on low-slope surfaces such as single-ply membranes, built-up-roofs (BUR), modified bitumen, spray polyurethane foam, roof coatings, metal panels, and standing-seam profiled metal. Some products that are typically installed on low-slope roofs may also be installed on steep-slope roofs (e.g., single-ply membranes and roof coatings). For the purposes of this specification, the roof product will constitute the uppermost surface of the building structure.

   E. Steep-Slope Roof Products: Products that are typically installed on steep-slope surfaces such as composite shingles, clay, concrete, or fiber-cement tile, slate, metal panels, and metal shingles. Some products that are typically installed on low-slope roofs may also be installed on steep-slope roofs (e.g., single-ply membranes and roof coatings). For the purposes of this specification, the roof product will constitute the upper most surface of the building structure.

   Roof Product Technologies

   F. Built-Up-Roof (BUR): Traditional hot asphalt or coal tar built-up roofing membrane assembly consists of alternating layers of felts, fabrics, or mats saturated with bitumen during manufacture, assembled in place, and adhered with applied layers of hot bitumen. Surfacing for the hot BUR can be aggregate embedded in hot asphalt; mineral-surface cap sheets; modified bitumen cap sheets; or smooth-surface applications or coatings.[2]

   G. Asphalt Shingle: Composed of a base material, either organic felt or glass fiber mat; asphalt; and surfacing material, generally in the form of mineral granules.[3]

   H. Metal Roof Component: Metal roof product designed to resemble a traditional steep-slope residential product such as shingle, tile, shake, or slate.

   I. Metal Roof Panel: Roofing systems using metal panels are divided into two categories: architectural and structural. Architectural metal roofs are applied over a substrate while structural metal roofs span between structural supports without the need for a substrate to carry the applied loads. Standing seam roofs can be used on roofs with slopes as low as ¼:12. Steel and aluminum sheets are commonly used to fabricate metal roof panels. Steel requires a corrosion resistant metal coating such as zinc, aluminum, alloys of zinc-aluminum, or tin. Metallic coated steel includes galvanized steel, aluminized steel, zinc-aluminum-coated steel and terne-coated steel. Metallic coated steels are also painted to provide additional corrosion protection, as well as

[1] As defined in proposed ASTM Standard E 1918-97.
[2] National Roofing Contractors Association Commercial Low-Slope Roofing Materials Guide 1998.
[3] Ibid.

color.

J. Modified Bitumen: Roll roofing products consisting of asphalt, reinforcing layers, and in some cases, surfacing. During manufacture, a polymer (APP, or atactic polypropylene, and SBS, or styrene butadiene styrene, are the most common) is added to the bitumen while heating, which "modifies," or changes, its properties.[4]

K. Roof Coating: A material typically applied in the liquid state to the roof surface at the time of construction or at a later time as a retrofit measure. Roof coatings may be bituminous, polymeric, or polymer modified. Bituminous roof coatings are formulated using bitumen. Polymeric roof coatings are formulated using a variety of synthetic resins such as acrylic, neoprene, styrene butadiene, urethane, polyvinyl acetate, and others. Polymer modified roof coatings are manufactured by combining a portion of the polymeric technology with bitumen technology.

L. Roof Tile: May be composed of clay, concrete, fiber-cement, or synthetic materials. A variety of tile profiles, styles, finishes, and colors are available.

M. Single-Ply Membrane: A term applied to a sheet membrane which is a membrane fabricated in a controlled factory environment. It is waterproof and weather resistant. It may be a laminate of one or more materials and may or may not contain reinforcing fabrics.[5]

N. Spray Polyurethane Foam Roof System: A fully adhered system that consists of a rigid closed-cell sprayed-in-place polyurethane foam insulation and a protective roof coating. Typical coatings include acrylic, silicon, or urethane elastomers.

O. Variegated Roof Products: A material with a varied surface color, requiring a larger sample measurement of Solar Reflectance.[6]

Roof Product Performance

P. Solar Flux: The direct and diffuse radiation from the sun received at ground level over the solar spectrum expressed in watts per square meter.

Q. Solar Reflectance: The fraction of solar flux reflected by a surface expressed as a percent or within the range of 0.00 and 1.00.

R. Solar Reflectance Index (SRI): The relative steady-state surface temperature with respect to the standard white (SRI=100) and standard black (SRI=0) under the standard solar and ambient conditions.[7]

S. Solar Spectrum: Radiation originating from the sun, including ultraviolet, visible, and near-infrared radiation. Approximately 99 percent of solar energy lies between wavelengths of 0.3 to 3.5 micrometers (Fm).

T. Thermal Emittance: The ratio of the radiant heat flux emitted by a sample to that emitted by a blackbody radiator at the same temperature (Total Thermal Emittance).[8]

***Note**: A definition for Solar Reflectance Index (SRI), adopted from ASTM 1980-01, was added above to support the proposed new SRI Alternative provided in Section 3, below.*

[4] National Roofing Contractors Association Commercial Low-Slope Roofing Materials Guide 1998.
[5] As found in Single Ply Roofing Industry's Publication, Flexible Membrane Roofing: Professional's Guide to Specifications, 2003.
[6] As defined in Cool Roof Rating Council, Product Rating Program, CRRC-1, October 4, 2005.
[7] As defined in ASTM E 1980-01, *Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces*.
[8] Ibid.

2) Qualifying Products: Any roof product, as defined in Section 1 above, is eligible for ENERGY STAR.

3) Energy-Efficiency Specifications for Qualifying Products: Only those products listed in Section 2 that meet the criteria below (in Tables 1 and 2) may qualify as ENERGY STAR. **Roof products that may be applied to either low-slope or steep-slope roofs, such as roof coatings and single-ply membranes, must meet the ENERGY STAR low-slope requirements provided in Table 1, below.**

Table 1 – Specifications for Low-Slope Roof Products	
Characteristic	**Performance Specification**
Energy Efficiency Levels	
Initial Solar Reflectance	Greater than or equal to 0.65.
Maintenance of Solar Reflectance	Greater than or equal to 0.50 three years after installation under normal conditions.
Thermal Emittance	Greater than or equal to 0.75.
SRI Alternative (to be used if roof product cannot achieve required thermal emittance value)	
Initial SRI	SRI $\geq$ 75
Maintenance of SRI	SRI $\geq$ 53
Reliability	
Manufacturer warranty for defects in materials and manufacturing	Each company's warranty for ENERGY STAR qualified roof products must be equal in all material respects to the product warranty offered by the same company for comparable non-ENERGY STAR qualified roof products. A company that sells only ENERGY STAR qualified roof products must offer a warranty that is equal in all material respects to the standard industry warranty for comparable non-ENERGY STAR qualified roof products.

Table 2 – Specifications for Steep-Slope Roof Products	
Characteristic	**Performance Specification**
Energy Efficiency Levels	
Initial Solar Reflectance	Greater than or equal to 0.25.
Maintenance of Solar Reflectance	Greater than or equal to 0.15 three years after installation under normal conditions.
Thermal Emittance	Greater than or equal to 0.75.
SRI Alternative (to be used if roof product cannot achieve required thermal emittance value)	
Initial SRI	SRI $\geq$ 18
Maintenance of SRI	SRI $\geq$ 4
Reliability	
Manufacturer warranty for defects in materials and manufacturing	Each company's warranty for ENERGY STAR qualified roof products must be equal in all material respects to the product warranty offered by the same company for comparable non-ENERGY STAR qualified roof membrane products. A company that sells only ENERGY STAR qualified roof products must offer a warranty that is equal in all material respects to the standard industry warranty for comparable non-ENERGY STAR qualified roof products.

SRI Formula[9]

α = solar absorptance = 1 − solar reflectance,
I = solar flux, $W \cdot m^{-2}$,
ϵ = thermal emissivity,
σ = Stefan Boltzmann constant, 5.66961 x 10^{-8} $W \cdot m^{-2} \cdot K^{-4}$,
T_s = steady-state surface temperature, K,
T_{sky} = sky temperature, K,
h_c = convective coefficient, $W \cdot m^{-2} \cdot K^{-1}$, and
T_a = air temperature, K.

$$T_s = 309.07 + \frac{(1066.07\alpha - 31.98\epsilon)}{(6.78\epsilon + h_c)} - \frac{(890.94\alpha^2 + 2153.86\alpha\epsilon)}{(6.78\epsilon + h_c)^2}$$

$$SRI = 100\,\frac{T_b - T_s}{T_b - T_w}$$

Example of How the SRI Alternative Can be Used to Meet ENERGY STAR Levels: Low Slope

Initial Solar Reflectance: 0.70
Thermal Emittance: 0.50
Initial SRI: 75

Maintenance of Solar Reflectance: 0.57
Thermal Emittance: 0.50
Maintenance of SRI: 54

In both cases this roof product falls short of the required 0.75 minimum emittance value and would not qualify under this specification. However, using the SRI formula the roof product gets "credit" for a higher reflectance value and is now able to qualify as ENERGY STAR.

Note: For the purposes of this specification, a roof product's SRI value assumes the "medium wind" condition, as defined in ASTM E 1980-01. An SRI calculator, provided by Lawrence Berkeley National Laboratory, is available on the ENERGY STAR Roof Products Web page to assist Partners in the conversion of emittance and reflectance values into an SRI value: www.energystar.gov/products.

9 ASTM E 1980-01, *Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces,* Page 2

***Note**: In response to EPA's proposed emittance requirement, a number of stakeholders requested that EPA consider a tradeoff equation alternative so that roof products failing to meet the initial emittance value would still have an opportunity to earn the ENERGY STAR if they had a higher solar reflectance. In response to this request, EPA reviewed tradeoff options currently available in the marketplace including: (1) the proposed 2008 California Energy Commission Title 24 tradeoff equations; (2) the current Title 24 tradeoff equation in effect for low slope nonresidential roofs; and (3) the Solar Reflectance Index (SRI) calculation referenced in ASTM E 1980-01. Based on a close review of these options and several discussions with experts in the cool roofing field, EPA is proposing the Solar Reflectance Index (SRI), adopted from ASTM E 1980-01, as an alternate method of qualifying roof products that allows for a tradeoff between emittance and reflectance.*

The SRI formula is supported by a significant number of case study analyses by Lawrence Berkeley National Laboratory (LBNL) and is recognized by many industry stakeholders as an accurate representation of the tradeoff between emittance and reflectance. SRI internalizes an emittance-reflectance tradeoff into a single number, which is based on the expected temperature of the roof given certain ambient conditions. The use of a single index, from 0 to 100, with 0 representing the properties of a standard black roof and 100 representing the standard white roof, simplifies the comparison of roof products and is the primary reason why EPA is considering it under this specification. The proposed SRI values were derived by using the initial and maintenance reflectance values and initial emittance values, provided in Tables 1 and 2, and plugging them into the SRI formula above. Due to the fact that emittance tends to remain constant over the lifetime of a roof, initial emittance may be used in determining both the aged and initial SRI values. To assist Partners in determining the SRI for any given roof product, EPA will offer a calculator on its ENERGY STAR Roof Products Web site, developed and provided by LBNL.

EPA is proposing this alternative in an attempt to show flexibility and an understanding of some of the challenges in meeting a strict emittance requirement. Regionally based specifications and removal of emittance from the specification is not being considered by EPA at this time.

4) Test Criteria: Manufacturers are required to perform tests and self-certify product models that meet the ENERGY STAR guidelines. Partner agrees to follow the test methods as outlined below. Alternatively, a Partner already participating in the Cool Roof Rating Council (CRRC) Product Rating Program[10] may submit solar reflectance and thermal emittance product information derived from CRRC certification. Please note, at the time that this document was written the CRRC Product Rating Program had not yet produced results for maintenance of solar reflectance. Therefore Partners shall either wait until these results are available to submit product information, or use one of the test procedure options listed below to derive values for the maintenance of solar reflectance.

   Test results must be reported to EPA using the Roof Products Qualifying Product Information (QPI) Form. Only completed QPI forms will be accepted. QPI forms indicating that data is pending will not be accepted. When completing the QPI form:

   - Initial solar reflectance, maintenance of solar reflectance, and thermal emittance values must be reported individually, regardless if Partners elect to use the SRI Alternative. Partners can use the SRI calculator, available on the ENERGY STAR Web site, to determine the SRI values for their products based on emittance and reflectance characteristics.
   - Documentation of test results, e.g., test reports, in either hard copy or electronic format, must be submitted to EPA along with the QPI Form for each qualifying product. Note: Supporting documentation must include the test results of all required samples in addition to providing the final average test results for ENERGY STAR qualification.

[10] Information on the Cool Roof Rating Council Product Rating Program can be found at www.coolroofs.org

***Note**: EPA is requiring Partners to report reflectance and thermal emittance values, regardless if the SRI formula is used to qualify the roof product as ENERGY STAR. EPA plans to post all performance values on the ENERGY STAR Qualifying Product List to allow purchasers and utilities the opportunity to identify the ENERGY STAR qualified roof product that best suits their needs based on energy and cost savings, which is determined by using the individual reflectance and emittance values.*

Initial Solar Reflectance

Product shall be tested using ASTM E 903 - *Standard Test Method for Solar Absorptance, Reflectance, and Transmission of Materials Using Integrating Spheres*. Products need only be tested for solar reflectance (values for solar absorptance and transmission need not be obtained). Manufacturers will submit a 3" X 3" flat sample of each product to a laboratory that has the appropriate equipment. The manufacturer shall request that the test be performed using a black background for the sample. Where appropriate, the sample shall be prepared according to manufacturer recommendation for thickness used in the field.

Product may also be tested using ASTM C 1549 - *Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer*.

Variegated roof products may also be tested according to the CRRC Test Method #1.[11]

If Partner has changed a fundamental element of product formulation such as the base latex, Partner must retest for the solar reflectance of the product both initially and according to the Maintenance of Solar Reflectance (see next section). In addition, to ensure other product formulation changes will not affect the solar reflectance of the product, Partner shall certify that the product formulation or recipe has not changed since the solar reflectance testing was performed.

Maintenance of Solar Reflectance

Partner shall use one of the following methods to test the maintenance of solar reflectance of a roof product. NOTE: 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. For existing products qualified under version 1.0 of the roof products specification, retesting on uncleaned samples is not required. These products will be denoted in some manner on the ENERGY STAR qualifying product list as having been tested on clean samples.

A) Identify three (3) existing roofs on which the same product was installed a minimum of three years prior. At least one of these existing roofs must be located within a major metropolitan area such as Atlanta, Boston, Chicago, Dallas, Houston, Los Angeles, Miami, Minneapolis, New York, Philadelphia, San Francisco, St. Louis, Washington D.C., etc. The roof product need not have been installed at the same time on the three buildings; however, the roofs must each be at least three years old.

1) For low-slope roof products and coatings, use either ASTM E 1918 - *Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field* or ASTM C 1549, to test the solar reflectance of the roof product as installed and weathered for three years. Partner shall divide the roof into at least ten (10) equal sections. Measurements shall be performed in the center of each area. At least three (3) repetitions shall be made of each measurement (the exact same area). Note that if a pond or birdbath occurs in the center of the area to be measured, offset the measurement location so that it is outside of the pond or birdbath. Partner shall take the average of all solar reflectance values obtained from the roof to determine if the solar reflectance of the roof product as installed and weathered for three years is greater than or equal to the threshold value in Table 1. If Partner is employing ASTM E 1918, the test must be performed on a clear day (no clouds) between 10:00 AM and 2:00 PM when the sun is high in the sky and there can be no obstruction in the field of view.

[11] CRRC Test Method #1 may be found at http://www.coolroofs.org/productratingprogram.html

2) To measure the solar reflectance of steep-slope roofs as installed and weathered for three years, use ASTM C 1549. Partner shall divide the roof into at least ten (10) equal sections. Measurements shall be performed in the center of each area. At least three repetitions shall be made of each measurement. Partner shall take the average of all solar reflectance values obtained from the roof to determine if the solar reflectance of the roof product as installed and weathered for three years is greater than or equal to the threshold value in Table 2.

B) Take a minimum of three (3) samples from the each of the existing roofs as identified above. At least three (3) measurements of solar reflectance are to be taken from different areas on each sample using either ASTM E 903 or ASTM C 1549. Partner shall take the average of all solar reflectance values obtained from the panels to determine if the solar reflectance of the weathered roof product is greater than or equal to the threshold values in Tables 1 and 2. Subsequently, the Partner is responsible for ensuring that the roof from which samples were taken is properly repaired so as to resume watertight integrity.

C) Expose panels outdoors on commercial or private weathering farms that are accredited to ISO/IEC 17025:1999 *General Requirements for the Competence of Testing and Calibration Laboratories*. The panel must be prepared such that the surface to receive solar radiation goes over the intended substrate[12]. At least three (3) panels with the identical formulation as those that were tested for initial solar reflectance must be exposed for three years in accordance with ASTM G 7 - *Standard Practice for Atmospheric Environmental Exposure Testing of Nonmetallic Materials*. Each exposure panel must be at least 24 square inches (155 square centimeters) in size, e.g. 4" x 6" or 3" x 8", and must be mounted so that there is no run off from one panel to another. To further avoid runoff onto samples, where possible, the exposure panel should be mounted near the top of the test rack.

At least three (3) measurements of solar reflectance are to be taken from different areas on each weathered panel using either ASTM E 903 or ASTM C 1549. Partner shall take the average of all solar reflectance values obtained from the panels to determine if the solar reflectance of the weathered roof product is greater than or equal to the threshold values in Tables 1 and 2.

1) For low-slope roof products and coatings and for product that can be applied to either low-slope or steep-slope roofs, Partner shall use test samples exposed at a slope of 2:12 or less (1/4:12 is recommended) and facing south.

2) For steep-slope roof products and coatings, Partner shall use test samples exposed at a slope between 2:12 and 12:12 (4:12 is recommended) and facing south.

Thermal Emittance

Product shall be tested according to ASTM C1371-04a – *Standard Test Method for Determination of Emittance of Materials Near Room Temperature using Portable Emissometers*.

Products may also be tested according to ASTM E408-71(1996)e1 - *Standard Test Method for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques*.

Note: In the case that an ASTM test procedure expires, due to the ASTM committee's failure to revise it within an 8-year period, manufacturers will use the most recent version of the test procedure for purposes of testing roof products under this specification.

***Note**: Some stakeholders requested that EPA consider requiring standardized test locations and discontinue the allowance of self-testing. With few exceptions, EPA allows for self-testing under all of its ENERGY STAR specifications to minimize the cost burden to the manufacturers and facilitate the speed of which a product is tested, submitted, and qualified. With regard to quality assurance, EPA feels that the submittal of test reports to supplement the QPI form and the requirement to test at least one sample of each product in a major metropolitan area, is sufficient for ensuring an accurate representation of a roof product's performance.*

[12] 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.

5) Effective Date: The date that manufacturers may begin to qualify products as ENERGY STAR will be defined as the *effective date* of the agreement. The ENERGY STAR Roof Products Specification (Version 2.0) shall go into effect on **May 1, 2007**. Any previously executed agreement on the subject of ENERGY STAR qualified roof products shall be terminated effective April 30, 2007.

   Qualifying Roof Products under Version 2.0: All products, including models originally qualified under Version 1.0, with a **date of manufacture** on or after **May 1, 2007**, must meet the new (Version 2.0) requirements in order to qualify for ENERGY STAR. The **date of manufacture** is specific to each product and is the date (e.g., month and year) of which a unit is considered to be completely assembled.

> ***Note:*** *In the Draft 2 version of this specification EPA proposed an effective date of January 31, 2007. This effective date was proposed with the hopes of completing the specification revision in May. Due to the amount of additional research performed by EPA in order to determine an appropriate reflectance tradeoff alternative, this finalization process was delayed by a few months. EPA is now proposing an effective date of May 1, 2007 with the goal of finalizing the specification in August, which would provide manufacturers approximately 9 months to transition to the new specification requirements. Unless manufacturers have lingering concerns about this effective date, EPA considers it to be final and does not intend on any further delays.*

6) Future Specification Revisions: ENERGY STAR reserves the right to change the specification should technological and/or market changes affect its usefulness to consumers, industry, or the environment. In keeping with current policy, revisions to the specification are arrived at through industry discussions. In the event of a specification revision, please note that the ENERGY STAR qualification is not automatically granted for the life of a product model. To qualify with the energy efficiency criteria of ENERGY STAR, a product model must meet the ENERGY STAR specification in effect on the date of manufacture.