



Standard (Method) Practice for Laboratory Evaluation of Bleed Through of Field Applied Light Colored Roof Coatings when applied to Asphaltic Substrates

¹

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1. Scope

1.1 This (method) standard practice covers liquid applied materials used in roofing systems as the final waterproofing membrane or as a subsequent coating used for either enhancing the overall energy efficiency of the roof system or for esthetic purposes only.

1.2 This (method) standard practice provides an accelerated laboratory procedure that compares the ability of a applied coating to resist color and reflectivity changes as a result of chemical or physical changes in the coating

¹ This test method is under the jurisdiction of ASTM Committee and is the direct responsibility of Subcommittee

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(caused by) resulting from the interaction of the asphaltic substrate (system) over which the coating has been(is being) applied.

1.3 This (method) standard practice is designed for comparative purposes only. It measures specific changes in the coating(s) over the specified substrate(s) tested. Color changes are observed and recorded as tristimulus values, while reflectivity is measured as the gross solar reflectance of the coating.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

D312 – Specification for Asphalt Used in Roofing.

D2244 – Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.

C1549 – Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.

3. Definition of Terminology

3.1 Definitions in terminologies D16 and D1079 shall apply to this method



3.2 Standard Lab conditions, for the purposes of this method are a temperature of $77^{\circ}\text{F} \pm 2$ ($25^{\circ}\text{C} \pm 1$) and a humidity of $50\% \text{RH} \pm 10$.

3.3 Light colored roofing materials have a CIE L* value of above 80.

4. Summary of Test Method

4.1 The coating to be analyzed is selected. The specific substrate to be analyzed is selected and noted.

4.2 Application is made by the manufacturer's specification to the applicable substrate.

4.3 Initial solar reflectance and color are measured and recorded.

4.4 The sample is aged in an air circulated oven for the specified period of time.

4.5 Final solar reflectance and color are measured and recorded.

5. Significance and Use

5.1 Roofing systems can absorb significant solar energy, affecting not only their performance, but also the heating and cooling requirements of the structures they protect. This effect is dominated by the color of the final layer of the system and is an important consideration in the specifying and selection of roofing systems and may be a component in complying with building codes and regulations.

6. Apparatus

6.1 A spectrophotometer covering the visual range of the spectrum that provides information consistent with ASTM D2244.

6.2 A solar reflectometer complying with ASTM C1549.

6.3 Laboratory or field application equipment for producing membranes from fluid applied products.

6.4 An air circulating oven capable of maintaining a temperature of $120 \pm 3.5^{\circ}\text{F}$ ($49 \pm 2^{\circ}\text{C}$).

(Hazards

6.5 No specific known hazards are associated with this method other than those already addressed in the referenced weathering apparatus. Standard laboratory practices used in the preparation of the dispersion and the dispersion equipment should be observed as well as all applicable environmental, health and safety regulations.)

7. Sampling, Test Specimens, and Test Units

7.1 No sampling plan for membranes, pre-formed or fluid applied is used. The materials are assumed to be new. Unless other wise agreed upon by the buyer and seller. Laboratory or field application methods do not need to be specified, unless agreed upon by buyer and seller.

7.2 Liquid-applied coatings are to be applied per manufacture's instruction.

8. Calibration and Standardization

8.1 The calibration of the spectrophotometer, the reflectometer, and the air circulated oven shall be consistent with their respective standards.

8.2 The spectrophotometer should be calibrated and have a reproducibility of 0.05 CIE units when tested against a white standard

9. Conditioning

9.1 No specific membrane film thickness, or conditioning required except those agreed to by buyer and seller.

10. Procedure

10.1 Substrates are prepared for coating and should be clean and free of loose debris. Minimum sample size should be 3" (7.6 mm) x 6" (15.2 mm).

10.2 If substrates are not specified for the test, a control of TYPE III Asphalt as determined by ASTM D312 should be utilized. The asphalt should be applied at a thickness of 0.040" (1.0 mm) to an aluminum substrate.

10.3 Applications of the coating should be made as specified by the manufacturer. Likewise, any primers or base coats should be applied as specified by the manufacturer.

10.4 Curing periods should be defined by the manufacturer and strictly adhered to as a set minimum for curing. Curing should take place at $77^{\circ}\text{F} \pm 2$ ($25^{\circ}\text{C} \pm 1$) and a humidity of $50\% \text{RH} \pm 10$, unless otherwise specified by the manufacturer.

10.5 Initial readings should be made for reflectivity by C1549 and tristimulus values by spectrophotometry by D2244.

10.6 Samples should be conditioned in an air circulated oven for 192 hours \pm 6 hours at $120 \pm 3.5^{\circ}\text{F}$ ($49 \pm 2^{\circ}\text{C}$).

10.7 Final readings should be made after heat conditioning for reflectivity by C1549 and tristimulus values by spectrophotometry by D2244.

11. Calculation and Interpretation of Results

11.1 A minimum of two samples should be conditioned and measured for each coating to be tested.

11.2 A minimum of three reflectivity and tristimulus readings should be made on each panel at each conditioning stage. Interim measurements can be made through out the heat aging stage if desired.

11.3 Samples shall be compared to a control consisting of a the liquid applied coating applied at the manufacture's specifications on a inert substrate such as a Lennetta card or other inert substrate common to laboratory practices for liquid applied coating evaluation and comparison.

12. Report

12.1 Report all details with regard to the substrate being coated include type, age and any preparation.

12.2 Report all application information on the coating being analyzed, including any primers or base coats. At minimum information should include applied thicknesses, application order, and cure times.

12.3 Report the average reflectance and tristimulus b-value for each panel analyzed at each conditioning stage.

13. Precision and Bias

13.1 The precision statement for this method is under development.

14. Keywords

14.1 Bleed through, roof coating, color, reflectance.