Designation: D 3719 – 00

Standard Test Method for Quantifying Dirt Collection on Coated Exterior Panels[1]

This standard is issued under the fixed designation D 3719; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers an instrumental procedure for quantifying the degree of dirt collection on exposed exterior coated panels.

1.2 This test method is limited to those coated exterior panels with lightness values before exposure significantly greater than those after exposure.

1.3 The instrumental readings do not distinguish between mildew growth and other forms of dirt.

1.4 This test method measures total dirt collection. Loose dirt may be washed and removed from specimens if only imbedded dirt collection is to be measured.

1.5 *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:*

D 823 Practices for Producing Films of Uniform Thickness of Paint, Varnish, and Related Products on Test Panels[2]

D 2244 Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates[2]

D 3274 Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Microbial (Fungal or Algal) Growth or Soil and Dirt Accumulation[2]

3. Terminology

3.1 *Definitions:*

3.1.1 *dirt collection*, *n*—the collection of foreign matter that darkens the surface of exterior exposed coated panels.

4. Summary of Test Method

4.1 Lightness readings using a color difference meter are made before and after exposure, and the difference is considered to be due to dirt collection.

5. Significance and Use

5.1 Change in color or appearance of coated exterior surfaces due to such factors as dirt collection or retention is undesirable. If Test Method D 3274 or other test methods are used to establish that dirt collection is the primary cause of such a change, this test method can be used to quantify the degree of dirt collection or, more properly, the degree of change in visual appearance of the coated surface due to dirt collection.

5.2 When used in this manner and with color change, exposure duration and environment specified, this test method can provide a performance specification with respect to dirt collection.

5.3 This test is only useful as a comparative test.

6. Apparatus and Materials

6.1 *Color Determination Instrument*, complying with Test Method D 2244.

6.2 *Test Panels*, of any convenient size and of substrate suitable for exterior use.

7. Preparation of Test Panels

7.1 Apply the material under test to the test panels in accordance with Practices D 823, or as agreed upon between the purchaser and the seller. Allow the final coat of air drying systems to cure for 7 days before exposure.

8. Procedure

8.1 Operate the color difference meter in accordance with the manufacturer's instructions. Standardize with either a primary or working standard as defined in Test Method D 2244. Restandardize at sufficient intervals, in accordance with the manufacturer's instructions, to minimize the effects of instrumental drift.

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[2] *Annual Book of ASTM Standards*, Vol 06.01.

8.2 Determine the metric lightness, L*, in the CIE 1976 L*a*b* Uniform Color Space (CIE LAB), for each unexposed panel at three marked, random locations. Calculate the arithmetic mean, L*A.

8.3 Expose the panels at a 45° angle to the horizontal facing the equator at an exterior location for 61 days.

8.3.1 The calendar time, location, angle of exposure, orientation, exposure time, and method of exposure may be modified by mutual agreement.

8.4 Remove the panels and determine, using the procedure outlined above, the light reflectance value, L*, for the exposed panels. Calculate the arithmetic mean of the marked locations, L*B.

9. Calculations

9.1 Compute the dirt collection index, D_c, as follows:

$$D_c = \frac{\text{L*B}}{\text{L*A}} \times 100 \quad (1)$$

where:
L*A = arithmetic mean of unexposed panel values, and
L*B = arithmetic mean of exposed panel values.

10. Report

10.1 Report the following information:

10.1.1 Arithmetic mean and range of each panel's L_x value, and whether fungal growth is included in the reading, as well as the calculated dirt collection index. Report if the exposed panel was washed before taking the light reflectance value.

10.1.2 Any noticeable color change which, for reasons other than dirt accumulation, may have occurred. The dirt collection index is not valid if these color changes or fungal growth are significant.

10.1.3 Description of the method of panel preparation, including substrate identity, coating types, number of coatings used, methods of application, coverage, and drying conditions.

10.1.4 Description of the exposure conditions, including location and calendar time of exposure period.

10.1.5 Identification of the color determination instrument by manufacturer's name and code number.

11. Precision and Bias

11.1 *Precision*—Precision of the dirt collection index has not been determined but the precision of the lightness values used in its calculation has been defined.

11.2 *Bias*—Bias cannot be determined because of the variability of natural weathering.

12. Keywords

12.1 dirt collection; instrumental measurement; outdoor exposure