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Standard Test Method for Efflorescence of Interior Wall Paints¹

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1. Scope

1.1 This test method covers the determination of the tendency of an interior wall paint to effloresce under normal environmental conditions. Historically this phenomenon has been exhibited primarily with latex, or other water-based paints, and the method has been used in testing aqueous products.

1.2 This test method is limited to the determination of the efflorescence resulting from migration of soluble salts from within the paint film. It does not deal with the efflorescence attributable to certain substrates.

1.3 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems 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 Document

- 2.1 *ASTM Standard:*
D 1193 Specification for Reagent Water²

3. Terminology

3.1 Descriptions of Terms Specific to This Standard:

3.1.1 *efflorescence*—a condition that occurs when soluble salts in the dried paint film or in the substrate migrate to the film surface during exposure. It should not be confused with other causes of nonuniform appearance or whitening that may occur at the time of application. Efflorescence is seen as either a light, medium, or heavy deposits of crystals. It exists both in isolated patches and over wide areas. Another evidence of efflorescence is the development of a non-uniform appearance of flat or glossy areas during the cycling procedure of the test.

3.1.2 degrees of efflorescence:

3.1.2.1 *flattening and glossing*—A nonuniform decrease or increase in gloss noticeable when the surface is illuminated and viewed at near grazing angles. There is no apparent change in color when viewed perpendicularly to the surface.

3.1.2.2 *fine efflorescence*—A barely discernible whitening of the surface when viewed perpendicularly.

3.1.2.3 *medium efflorescence*—A readily noticeable whitening of the surface without a marked masking of the color.

3.1.2.4 *heavy efflorescence*—A white deposit sufficient to mask the color.

4. Summary of Test Method

4.1 Painted panels are exposed to controlled cycles of low temperature and high humidity, and to standard conditions of temperature and humidity, inducing a fine condensate on the surface. The test is run for a maximum of eight cycles.

5. Significance and Use

5.1 The test conditions are similar to conditions that produce efflorescence inside a home or building. The degree of efflorescence and the number of cycles required to produce it are a good indication of the paint's ability to resist efflorescence.

6. Apparatus

6.1 *Test Cabinet*—A cold-wall type of household refrigerator without exposed cooling coils. Additional humidity shall be introduced into the test area from a pan of water on the chamber floor, or by putting water in the butter conditioner and setting the conditioner at its highest temperature. Conditions in the test cabinet shall be maintained at $42 \pm 3^\circ\text{F}$ ($5.5 \pm 1.5^\circ\text{C}$) and at 75 to 80 % relative humidity. Any other type of cabinet used should be checked for reproducibility of test results by comparison with a recommended cabinet.

7. Reagents

7.1 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent water as defined by Type IV of Specification D 1193.

8. Test Panels

8.1 A sealed substrate shall be used. One satisfactory surface is tempered hardboard sealed with one coat of shellac varnish (3 to 4-lb cut). The panel size shall be 6 by 18 in. (150 by 450 mm). If the panel does not fit the cabinet, the size may be changed, although the area should be kept approximately the same.

9. Preparation of Panels

9.1 Apply the shellac varnish to the test panel and allow to dry. Brush two coats of the test paint on both sides of the sealed panel. Apply the test paint at a temperature above 60°F (15.5°C) and allow approximately 1 h between coats or, if not a latex paint, allow an appropriate time for drying between coats. After applying the second coat, dry the panel for 1 h (or appropriate time) at the same temperature and observe for uniformity of appearance at all angles of viewing before placing in the test cabinet. If the panels are

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² *Annual Book of ASTM Standards*, Vol 06.03.