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AMERICAN SOCIETY FOR TESTING AND MATERIALS  
100 Barr Harbor Dr., West Conshohocken, PA 19428  
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## Standard Test Method for Freeze-Thaw Stability of Multicolor Lacquers<sup>1</sup>

This standard is issued under the fixed designation D 2337; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

<sup>ε1</sup> NOTE—Keywords and the unit of measurement statement were added editorially in May 1996.

### 1. Scope

1.1 This test method covers the determination of the extent to which multicolor lacquers resist coagulation and coalescence when subjected to freezing and subsequent thawing.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *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 562 Test Method for Consistency of Paints Using the Stormer Viscometer<sup>2</sup>

### 3. Summary of Test Method

3.1 Specimens of multicolor lacquers are placed in a chamber maintained at a temperature between  $-10$  and  $-15^{\circ}\text{F}$  ( $-23$  and  $-26^{\circ}\text{C}$ ) and allowed to remain 24 h. The specimens are removed from the chamber and allowed to remain at room temperature for 24 h to reach thermal equilibrium. After the specimens are mixed and the viscosity adjusted, they are then sprayed and allowed to dry before comparing with the control standard sprayed from the original specimen.

### 4. Significance and Use

4.1 Waterborne coatings, when subjected to cycles of freezing and thawing, can undergo detrimental changes in application and performance characteristics. This test method evaluates the ability of multicolor lacquers to resist these changes.

### 5. Apparatus and Materials

5.1 *Cabinet, Room, or Enclosed Space*, large enough to contain the specimens to be tested and allowing at least 1 in.

(25 mm) of air space between the sides of adjacent cans. It should be capable of being maintained at a temperature between  $-10$  and  $-15^{\circ}\text{F}$  ( $-23$  and  $-26^{\circ}\text{C}$ ).

5.2 *Stormer Viscometer*, with paddle-type rotor.

5.3 *Spray Gun*, pressure-feed internal-mix type, tip 0.086 in. (2 mm) in diameter with wide-spray nozzle.

5.4 *White Paper Stock*, minimum size 8 by 11 in. (200 by 280 mm).

### 6. Preparation of Samples

6.1 For all gloss and semigloss multicolor lacquers, prepare ten 1-qt (1-L) specimens and for flat multicolor lacquers four 1-qt specimens for testing. Mix the sample from which the specimens are filled well by boxing so that it is of a uniform consistency and appearance. After recording the consistency reading as determined with a Stormer viscometer (in accordance with Test Method D 562 fill all samples in baked varnish-lined containers and apply the lids promptly to prevent evaporation loss).

### 7. Preparation of Control Standard

7.1 Prepare a control standard by spraying from one of the 1-qt (1-L) specimens of each product to be tested. Use a coated white paper stock and spray on a sheet at least 8 by 11 in. (200 by 280 mm) in size. Adjust the fluid and atomizing pressures to give a spreading rate of 150 to 200 ft<sup>2</sup>/gal (3.7 to 4.9 m<sup>2</sup>/L) for complete covering and 200 to 300 ft<sup>2</sup>/gal (4.9 to 7.35 m<sup>2</sup>/L) for scatter coat application.

### 8. Exposure of Samples to Test Conditions

8.1 Place nine specimens of all gloss and semigloss multicolor lacquers and three specimens of all flat multicolor lacquers under test in the chamber that is maintained between  $-10$  and  $-15^{\circ}\text{F}$  ( $-23$  and  $-26^{\circ}\text{C}$ ). Place the specimens on racks in such a manner that they do not touch the walls or bottom of the chamber and so that there is at least 1 in. (25 mm) of air space between adjacent specimens. On each cycle allow all specimens to remain in the chamber for 24 h before removal. Remove from the chamber all specimens of each multicolor lacquer and let them come to thermal equilibrium by allowing them to remain at room temperature ( $77^{\circ}\text{F}$  ( $25^{\circ}\text{C}$ )) for 24 h. Mix these specimens to a uniform consistency by boxing. Run a minimum of three specimens and all specimens shall

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 06.01.