



Designation: D 3209 – 93 (Reapproved 1998)

## Standard Test Method for Freeze/Thaw Resistance of Polymer Floor Polishes<sup>1</sup>

This standard is issued under the fixed designation D 3209; 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 approval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This test method covers the determination of the stability of polymer emulsion floor polishes when these are exposed to repeated cycles of freezing and thawing. Possible degradation of the emulsion is observed and possible reduction of initial gloss is measured.

1.2 *This standard does not purport to address all of the safety problems, 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 1455 Test Method for 60-Deg Specular Gloss of Emulsion Floor Polish<sup>2</sup>

### 3. Significance and Use

3.1 This test method is used to determine the effect of freezing on floor polishes. It may be used to predict the stability of a floor polish when exposed to freezing.

### 4. Apparatus

4.1 *Freezer*, adjusted to  $-7.8$  to  $-6.7^{\circ}\text{C}$  ( $18$  to  $20^{\circ}\text{F}$ ).

4.2 *Flint Glass Bottles*, three, 4 oz (125 mL) capacity.<sup>3</sup>

4.3 *Black Glass*,<sup>4</sup> standard, polished as described in Test Method D 1455.

4.4 *60° Gloss Meter*.

4.5 *Polishes* to be tested.

### 5. Procedure

5.1 Determine the turbidity of each polish, visually or by any other suitable method.

5.2 Pour one coat of each polish to be tested on the black glass. Allow to dry in a vertical position at room temperature. Determine the initial gloss in accordance with Test Method D 1455.

5.3 Place 100 mL of polish in each of three 125-mL (4-oz) flint glass bottles. Place the filled bottles side by side, horizontally, in the freezer on a rack, providing a minimum of 25 mm (1 in.) between the bottles and the freezer walls with the contact area between the bottles and the rack no greater than that required to support the bottles.

5.4 Allow the samples to remain in the freezer for 16 h, or a minimum of 8 h after becoming solid.

5.5 Remove all the samples of frozen polish and allow to thaw, undisturbed, at 18 to 24°C (65 to 76°F) for a period of 24 h.

5.6 Inspect all thawed samples visually. Observe and record any separation, stratification, or coagulation.

5.7 Determine the turbidity on the open sample of polish as in 5.1.

5.8 Agitate one bottle of thawed polish and apply one coat of polish to the standard black glass as in 5.2. Determine gloss as in 5.2.

5.9 Return the remaining two bottles of polish to the freezer for 16 h, and repeat 5.4-5.8 for the second freeze/thaw cycle.

5.10 Return the third bottle of polish to the freezer for 16 h and again repeat 5.4-5.8.

### 6. Interpretation of Results

6.1 The polish passes each freeze/thaw cycle if there has been no apparent change in appearance and no significant loss in gloss or increase in turbidity.

### 7. Report

7.1 Report test results as the number of cycles passed together with visual inspection comments regarding possible separation, stratification, or coagulation.

### 8. Precision and Bias

8.1 The test method differentiates polishes that are freeze stable from those which are not. Polishes that are borderline in freeze/thaw stability may pass in some laboratories and fail in others.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D-21 on Polishes and is the direct responsibility of Subcommittee D21.03 on Chemical and Physical Testing.

Current edition approved Nov. 15, 1993. Published January 1994. Originally published as D 3209 – 73. Last previous edition D 3209 – 87.

<sup>2</sup> *Annual Book of ASTM Standards*, Vol 15.04.

<sup>3</sup> Available from Fisher Scientific, Catalog No. 02-883 BA.

<sup>4</sup> Available from Peril Stein Glass, 2543 Kensington Ave., Phila. PA 19125.