



## Designation: D5678 – 17 (Reapproved 2023)

# Standard Test Method for Freeze/Thaw Resistance of Wax Emulsion Floor Polish<sup>1</sup>

This standard is issued under the fixed designation D5678; 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.

## 1. Scope

1.1 This test method covers the determination of the stability of wax 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 The values stated in SI 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

[D1436 Test Methods for Application of Emulsion Floor Polishes to Substrates for Testing Purposes](#)

[D1455 Test Method for 60° Specular Gloss of Emulsion Floor Polish](#)

## 3. Significance and Use

3.1 This test method is used to determine the effect of freezing on wax emulsion floor polishes. It may be used to predict the stability of a floor polish in transit or when exposed to freezing, and whether or not the polish is damaged by freezing.

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

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

## 4. Apparatus

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

4.2 *Clear Bottles*, three, 4 oz (125 mL) capacity.

4.3 *Test Flooring Substrates—Official Vinyl Composition Tile (OVCT)*,<sup>3</sup> black, 304.8 mm (12 in. by 12 in.).

4.4 *60-Deg 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 Apply one coat of each test polish on a black vinyl composition tile using pour method (E) (see Test Method D1436). Allow polish to dry in a vertical position at room temperature. After polish is dry, wait 1 h, then buff with a soft cotton cloth. Determine the initial gloss in accordance with Test Method D1455.

5.3 Place 100 mL of polish in each of three 125 mL (4 oz) clear bottles. Place the filled bottles side by side, horizontally, in the freezer on a rack. Provide a minimum of 25 mm (1 in.) between the bottles and the freezer walls and keep the contact area between the bottles and the rack to a minimum.

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  $18\text{ }^{\circ}\text{C}$  to  $24\text{ }^{\circ}\text{C}$  ( $65\text{ }^{\circ}\text{F}$  to  $76\text{ }^{\circ}\text{F}$ ) for a period of 24 h.

5.6 Inspect all thawed samples visually. Observe and record any separation or stratification without disturbing the sample.

5.7 Mix one bottle of the thawed polish by inverting it ten times. Then apply one coat of polish on a black vinyl composition tile using the same procedure as in 5.2. Allow polish to dry in a vertical position at room temperature. After polish is dry, wait 1 h, then buff with a soft cotton cloth.

<sup>3</sup> OVCT tile may be obtained through Armstrong Flooring from various home improvement stores. The following Armstrong tile substrates have been found to perform adequately for this test method: Armstrong Excelon Feature Tile: Black (56790), [http://www.armstrong.com/commflooringna/product\\_details\\_toolbox\\_magnify.jsp?item\\_id=47394](http://www.armstrong.com/commflooringna/product_details_toolbox_magnify.jsp?item_id=47394).

Determine the gloss in accordance with Test Method **D1455**. Also determine and record while applying the polish if this agitated sample is a free flowing liquid, or has separated, or has large particles that cannot be buffed.

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

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 after mixing if there has been no meaningful change in appearance, for example, separation, large particles, not being a free flowing liquid, or anything else that would prevent its application and

use as a floor polish. The polish also passes each freeze/thaw cycle if there is no more than a 25 % loss in gloss. Gloss is determined as in **5.2**.

## 7. Report

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

## 8. Precision and Bias

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

8.2 *Bias*—This test method has no bias because the results developed are defined only in terms of this test method.

## 9. Keywords

9.1 floor polish; freeze/thaw; wax emulsion

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