



Standard Test Method for Detergent Resistance of Ceramic Decorations on Glass Tableware¹

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1. Scope

1.1 This qualitative test method is designed to provide a convenient and reproducible method of determining the detergent resistance of decorations applied to glass tableware.

1.2 *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:

C 927 Test Method for Lead and Cadmium Extracted from the Lip and Rim Area of Glass Tumblers Externally Decorated with Ceramic Glass Enamels²

3. Terminology

3.1 Definition:

3.2 *detergent resistance*—the degree of resistance to the chemical action of detergents.

4. Significance and Use

4.1 This test method provides a means of estimating the qualitative performance of glass enamel decorations that are exposed to high phosphate detergents during use. This test method also attempts to simulate accelerated exposure to high phosphate detergents prior to testing for heavy metal release, such as in Test Method C 927 when long term performance of enamels must be evaluated.

5. Apparatus

5.1 *Test Chamber*—A thermostatically controlled tank, preferably stainless steel, that will maintain a solution temperature of $60 \pm 2^\circ\text{C}$.

5.2 *Specimen Holder*—A device for supporting the speci-

mens to be evaluated in such a manner as to ensure free and unobstructed contact between the decoration and the test solution.

6. Test Specimens

6.1 Test specimens consist of representative glass tableware with ceramic decorations.

7. Test Solution

7.1 Prepare a test solution consisting of 5 % sodium pyrophosphate ($\text{Na}_4\text{P}_2\text{O}_7 \cdot 10\text{H}_2\text{O}$) and 95 % distilled water.

8. Procedure

8.1 Immerse the samples for 2-h periods in the test solution maintained at $60 \pm 2^\circ\text{C}$. Retain a duplicate piece of ware with each decoration under test without exposure to the solution as an aid in judging the degree of chemical action on the specimens under test. At the end of the 2-h periods, remove the specimens from the solution, rub vigorously with a cloth under running water, dry, and evaluate.

8.2 Grade the decorations after each 2-h period of immersion in accordance with one of the following classes:

Class 1—No loss of gloss.

Class 2—Gloss loss, no loss of opacity.

Class 3—Noticeable loss of opacity.

Class 4—Complete removal of decoration.

9. Interpretation of Results

9.1 Grade the decorations after each 2-h period of immersion in accordance with one of the following classes:

Grade 1—No attack apparent.

Grade 2—Appearance of iridescence or visible stain on the exposed surface when viewed at a 45° angle but not apparent at angles less than 30° .

Grade 3—A definite stain which does not blur reflected images and is visible at angles less than 30° .

Grade 4—Definite stain with a gross color change or strongly iridescent surface visible at angles less than 30° and which may blur reflected images.

Grade 5—Surface dull or matte with chalking possible.

Grade 6—Significant removal of enamel with pinholing evident.

¹ This test method is under the jurisdiction of ASTM Committee C-14 on Glass and Glass Products and is the direct responsibility of Subcommittee C14.10 on Glass Decoration in cooperation with the Society of Glass Decorators' Committee A-20.

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² *Annual Book of ASTM Standards*, Vol 15.02.

Grade 7—Complete removal of enamel in exposed area.

round robin planned by Subcommittee C14.10.

10. Report

10.1 Report the following information:

10.1.1 Identification of the specimen tested, including decorating material used and maturing cycle used,

10.1.2 Grading of the specimens into the classes above after each 2-h period of immersion, and

10.1.3 Date of test and name of operator conducting test.

11.2 Because of the subjective nature of the grading, no justifiable statement can be made about the bias of this procedure.

12. Keywords

12.1 ceramic decorations; detergent resistance; glass tableware

11. Precision and Bias

11.1 Precision of this test method will be investigated in a

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