



Designation: C556 – 16 (Reapproved 2020)

Standard Test Method for Resistance of Overglaze Decorations to Attack by Detergents¹

This standard is issued under the fixed designation C556; 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 (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method² covers the determination and evaluation of the resistance of overglaze decorations on ceramic whitewares to attack by normal household soaps and liquid detergents under normal household conditions.

1.2 This test method applies primarily to overglaze decorations applied to dinnerware for domestic use wherein household soaps and detergents are used for cleaning the soiled ware by either hand or machine operations.

1.3 The values stated in SI units are to be regarded as standard. The values given in parentheses after SI units are provided for information only and are not considered standard.

1.4 *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.*

1.5 *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. Significance and Use

2.1 This test method provides an indication of service life under detergent exposure.

3. Apparatus

3.1 *Stainless Steel Beaker*, 4 L (4.2 qt) capacity, fitted with a stainless steel lid.

3.2 *Stainless Steel Supports*, to hold specimens off the bottom of the beaker.

¹ This test method is under the jurisdiction of ASTM Committee C21 on Ceramic Whitewares and Related Products and is the direct responsibility of Subcommittee C21.03 on Methods for Whitewares and Environmental Concerns.

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² This test method has been adapted from the FB2C test method developed by the United States Potters Association.

3.3 *Steam Bath*, or other heating device capable of maintaining bath temperature at 95 ± 1.1 °C (203 ± 2 °F).

4. Reagents and Materials

4.1 *Sodium Carbonate Solution*, made by dissolving anhydrous sodium carbonate in distilled water in the ratio of 5 g of sodium carbonate per litre (1.14 qt) of water.

4.2 *Clean Muslin Cloth*.

5. Sampling

5.1 Whole pieces or segments of ware are selected so as to be representative of the decoration to be tested.

6. Test Specimens

6.1 The size of the specimens shall be such that the ratio of the total surface area of three specimens to volume of test solution shall be not greater than 100 cm² (15.5 in.²) of surface to 3 L (3.2 qt) solution. Four identical specimens (identical as to decoration, not necessarily as to size or shape) are required for each test.

7. Procedure

7.1 Place the stainless steel specimen support in the bottom of the 4 L (4.2-qt) stainless steel beaker, and pour 3 L (3.2 qt) of sodium carbonate standard test solution into the beaker. Cover the beaker and let it remain covered throughout the test except for brief intervals when temperature measurements are made or when specimens are inserted or withdrawn. Place the beaker on the steam bath or other heat source, and heat the test solution to 95 ± 1.1 °C (203 ± 2 °F) throughout the test.

NOTE 1—The mean temperature at which this test must be conducted is just below (approximately 1 °C (or 2 °F)) the boiling point of water. If the test is conducted at altitudes above sea level, appropriate adjustment should be made where steam baths are not used.

7.2 Degrease the specimens just prior to testing by washing in warm distilled water, rinsing with acetone until the surface films uniformly with distilled water, rinsing finally with fresh acetone, and then air drying. When the test solution has reached temperature, insert three of the specimens in the beaker in such a manner that they are completely covered with solution and do not overlap each other.

TABLE 1 Evaluation of Degree of Anack to Overglaze Decoration

Numerical Rating	Degree of Attack	Visual Evidence of Erosion
0	none	no material removed by rubbing, no fading, no loss of lustre
1	slight	traces of material on cloth; slight fading, or dulling; first recognizable evidence of alteration
2	moderate	appreciable material on cloth; obvious fading or dulling
3	severe	extensive material on cloth, extensive removal of material from decoration
4	complete	essentially complete removal of material from decoration (as evidenced by lack of ability to discern original color of decoration)

7.3 After 2 h, remove one specimen from the beaker and rub the decorated area vigorously with a bit of muslin cloth, four plies thick, which has been dampened with test solution. Rinse the rubbed specimen in distilled water at not less than 82 °C (180 °F) and then air dry. Retain the muslin cloth for the record.

7.4 Leave the other two test specimens in the beaker at temperature for an additional 2 h after which remove a second specimen from the beaker and rub with fresh muslin in accordance with 6.1. Leave the third test specimen in the beaker at temperature for another 2-h period; then remove it and rub with fresh muslin in accordance with 7.3.

7.5 Examine the three exposed specimens visually for erosion of the decoration; use the unexposed specimen as a standard for comparison. Examine the muslin cloths used for rubbing for evidence of eroded decoration. Estimate the degree of attack of the decoration according to the scale of values in **Table 1**.

8. Report

8.1 Report the following information:

8.1.1 Identification of decoration to be tested; if the decoration contains two or more colors, each color shall be identified, and

8.1.2 Table listing numerical rating and degree of attack on each color in the decoration after 2, 4, and 6 h of exposure.

9. Precision and Bias

9.1 This is a subjective method whose precision depends on the skill and experience of the operator. Repeated tests by the same operator should provide identical numerical ratings. Interlaboratory testing produced ratings as great as ± 1 unit on identical pieces.

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