



Standard Test Method for Tableware Pattern Removal by Mechanical Dishwasher Detergents¹

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1. Scope

1.1 This test method covers the procedure for measuring the removal of overglaze patterns from tableware by dishwasher detergents. It is an accelerated method that provides an evaluation of the corrosiveness of the detergents under use conditions.

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.* Material Safety Data Sheets are available for reagents and materials. Review them for hazards prior to usage.

2. Referenced Documents

- 2.1 *ASTM Standards:*
D 1193 Specification for Reagent Water²

3. Summary of Test Method

3.1 Segments of fine chinaware having an overglaze pattern of known sensitivity are immersed in boiling detergent solutions and the degree of pattern removal is compared visually with the original.

4. Apparatus

- 4.1 *Stainless Steel Beakers*, 4-L size, with appropriate stainless steel covers.
- 4.2 *Stainless Steel Supports*, of wire or mesh to hold specimens off bottom of beakers.
- 4.3 *Steam Bath or Other Suitable Heating Device*, to maintain a temperature of 205 to 211°F (96 to 99.5°C).
- 4.4 *Muslin or Equivalent Soft Fabric*, cut into 1½-in. (38-mm) squares.

5. Reagents and Materials

5.1 Unless otherwise indicated, water shall be understood to mean Type IV reagent water conforming to Specification D 1193.

5.2 *Chinaware Plates*—8-in. (203-mm) diameter salad plates, with an overglaze pattern known to be sensitive to alkaline detergents.³

6. Preparation of Apparatus

6.1 The chinaware plates are divided into segments. The following methods may be used:

6.1.1 Sand blast cutting or striking at desired points of cleavage on each plate until about eight segments of about equal size are obtained.

6.1.2 Notching the base of a plate using a radial arm saw, with a masonry cutoff blade, to a depth of approximately ⅛ in. The notched plate is positioned upside down and, using heavy duty gloves the plate is grasped with both hands and sharply struck at the notches on the edge of a solid wood block to break the plate into eight equal pieces.

6.2 Three segments of plate, providing about 40 in² (258 cm²) of total glazed area (both sides) are used in each beaker.

7. Procedure

7.1 Prepare 0.15 and 0.30 % concentrations by weight of the detergents to be tested, each in 3 L of water, and heat these solutions to 205 to 211°F (96 to 99.5°C) in the stainless steel beakers containing the stainless steel supports.

7.2 Degrease the test specimens by first washing in warm water, rinsing with acetone until the surface films uniformly with distilled water, rinsing finally with fresh acetone, and air drying.

7.3 Transfer the clean, dry test specimens (or plate segments) to the test solution, resting them upon the stainless steel supports.

7.4 At the end of 2 h immersion, remove one specimen. Do not dry. Proceed immediately to 7.5.

¹ This method is under the jurisdiction of ASTM Committee D12 on Soaps and Other Detergents, and is the direct responsibility of Subcommittee D12.16 on Hard Surface Cleaning.

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² *Annual Book of ASTM Standards*, Vol 11.01.

³ After a 1979 round-robin test, the Holiday pattern made by Lenox, Inc., was approved as meeting these requirements by a technical committee of the Chemical Specialties Manufacturers Association in cooperation with ASTM Subcommittee D12.16 on Hard Surface Cleaning. Dinner plates in this pattern can be purchased directly from Lenox, Inc., Tilton Rd., Pomona, NJ 08240; please specify "For detergent testing."

7.5 Vigorously rub the decorated surface with a 1½-in. (38-mm) square of muslin folded over twice, and dampened in the test solution. Dip the plate segment in distilled water at about 180°F (82°C) and air dry. Retain the muslin square for record purposes.

7.6 Continue heating the detergent solution for a second 2-h period.

7.7 Repeat 7.4 and 7.5, using a fresh muslin square.

7.8 Continue heating the detergent solution for a third 2-h period.

7.9 Repeat 7.4 and 7.5, using a fresh muslin square.

7.10 Report the results as follows: Compare test specimens with new unexposed pieces from the same plate, and rate the depreciation of the rubbed area of the decoration by the following scale:

- 0—None: no pigment removed by rubbing, no fading, no loss of lustre.
- 1—Slight: traces of pigments on cloth; slight fading or dulling, first recognizable evidence of alteration.
- 2—Moderate: appreciable pigment on cloth; obvious fading or dulling (as judged from rubbed decorations).
- 3—Considerable: extensive pigment on cloth; extensive pigment removal

- (as judged from the rubbed decorations).
- 4—Complete: essentially complete pigment removal after rubbing (as judged from the rubbed decorations).

NOTE 1—An optional refinement is to rate separately the various color elements of the pattern to evaluate individual susceptibility.

8. Report

8.1 Record the chinaware pattern used, detergents and concentration used, and visual ratings for each 2-h period.

9. Precision and Bias

9.1 Since the nature and quality of the chinaware selected for this test is beyond the control of the user, the method does not have the precision or reproducibility of an analytical determination.

10. Keywords

10.1 automatic dishwasher detergents; detergents; glaze removal; tableware

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