



Designation: D 3556 – 85 (Reapproved 1995)

Standard Test Method for Deposition on Glassware During Mechanical Dishwashing¹

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1. Scope

1.1 This test method covers a procedure for measuring performance of a mechanical dishwashing detergent in terms of the buildup of spots and film on glassware. It is designed to evaluate household automatic dishwasher detergents but can be used as a screening test for institutional dishwashing products.

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. Summary of Test Method

2.1 Glass tumblers are given multiple washes in a mechanical dishwasher in the presence of food soil and the levels of spotting and filming allowed by the detergents under test are compared visually.

3. Significance and Use

3.1 This test method is intended as a laboratory screening test to determine performance of the detergent under actual use conditions, but will not necessarily predict performance under all end-use conditions.

4. Apparatus

4.1 *Automatic Dishwasher(s)*—Typical household machines should be selected. If more than one machine is required, pairs with consecutive production numbers are recommended. For further refinement, two or more pairs of differing makes, models, or ages (pair to pair) may be used.

4.2 *Clear Undecorated Glass Tumblers*,² from 8 to 15 per machine, a larger number being used if it is planned to remove one tumbler at intervals throughout the test (see Section 6). Ten tumblers simplify scoring.

4.2.1 Before each use, even if new, the glass tumblers may be cleaned in a machine, first in a 1 % solution of citric acid and then with a household automatic dishwashing detergent at the manufacturer's recommended use level, each in a normal

wash cycle. Use deionized or distilled water for the rinses during this cleaning procedure. Do not use the drying cycle of the machine until the tumblers appear to be free of soil or film. No "water break" should be evident when the tumblers have been rinsed. Any other procedure (such as hand washing and polishing) which yields tumblers that are spot- and film-free may be used.

4.3 *Standard Tableware* (Note 1) (optional, see Section 6):

4.3.1 Suggested tableware is as follows, *Dinner plates*, 10-in. diameter, *Salad plates*, 7-in. diameter, *Cereal bowls*, 6-in. diameter, *Saucers*, 6-in. diameter, and *Cutlery*, stainless steel.

NOTE 1—A mixture of china and plastic dishes is recommended but is not essential; any standard quality type of dishware is satisfactory.

4.3.2 For each machine used, six dinner plates, six knives, six forks, and six spoons are required, plus optionally enough of the other dishes to fill the lower rack of each machine (see Section 6).

4.4 *Light Box for Visual Evaluation of Tumblers*—A typical light box is rectangular, open to the front, and has dead black inside surfaces. It is large enough to hold up to 15 tumblers side by side. Fluorescent lights are mounted in the base of the box in such a manner that light passes up through the tumblers. It is preferable to have the light come only through the tumblers and have the area surrounding them blocked out by suitable means.

5. Materials and Manufacture

5.1 *Standard Food Soil Components*:³ nonfat powdered milk, margarine, and wheat-based cooked cereal (optional).

5.2 *Standard Food Soil Preparation*—A mixture of 80 weight % of margarine and 20 weight % of powdered milk is prepared. The margarine is warmed until fluid (not over 100°F (37.8°C)) and the powdered milk is sifted in and mixed thoroughly. The mixture should be refrigerated when not in use and not kept more than 2 weeks.

5.3 *Optional Food Soil Preparation*—This mixture consists of 70 % margarine, 15 % powdered milk, and 15 % cooked cereal. The cooked cereal is separately prepared as follows: Add 45 g of cereal to 228 g of water, heat to boiling, and boil for 5 min. Dissolve 100 g of powdered milk in 500 g of water and stir this solution into the cooked cereal. Continue stirring as portions are removed to be combined with margarine and

¹ This test method is under the jurisdiction of ASTM Committee D-12 on Soaps and Other Detergents, and is the direct responsibility of Subcommittee D 12.16 on Hard Surface Cleaning.

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² Libby No. 53, 10-oz (300-mL) size or Federal No. 812, 10.5-oz, (310-mL) size, have been found satisfactory.

³ Any commercial brand of these items is satisfactory.