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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Test Method for Alkali Resistance of Ceramic Decorations on Returnable Beverage Glass Containers¹

This standard is issued under the fixed designation C 675; 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 method covers determination of the alkali resistance of ceramic labels (hereafter referred to as ACL (Applied Color Label)) on returnable beverage bottles (hereafter referred to as ware) to ensure the necessary durability of the label. A number of states require the cleaning and sanitizing of this ware by washing in hot alkali solutions. Accelerated tests are needed to ensure that the ACL will withstand the anticipated number of washings and still present an acceptable ware identification and appearance.

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 Method

2.1 The time required for destruction of ACL on exposure to alkali solutions is roughly proportional to the label thickness. A thin coating of good alkali-resistant enamel will fail in a relatively short time, while an extremely heavy coating of a poor alkali-resistant enamel will look reasonably good. A qualitative procedure is described. Any plant or laboratory using this procedure should establish its own standards.

2.1.1 This test method is a qualitative method and determines the time required for 90 % destruction of any ACL exposed to an alkali solution by visual inspection. This test method requires a minimum of skill and experience by the operator.

3. Significance and Use

3.1 This test method provides a means for determining the durability of decorated returnable glass beverage containers which may be a prerequisite in product specifications.

4. Interferences

4.1 Prepare fresh alkali solution for each set of ware and do not use the solution more than 24 h because of carbon dioxide (CO_2) absorption and the inhibiting action of boron compounds

dissolved from the ACL.

4.2 Do not use borosilicate glass containers for test solutions.

5. Apparatus

5.1 *Tank*, steel or stainless steel, equipped with a thermostatically controlled means of heating, and a solution level control, to prevent variations in solution concentration and temperature. The tank should be equipped with a coarsescreen mesh shelf on which ware being tested is placed to avoid sludge build-up around the ware.

5.2 *Bottle Saw or Hot Wire Cutter*—Either a hot wire or an abrasive wheel saw can be used to cut ware. If an abrasive wheel is used, the abrasive and glass sludge should be rinsed off the ware to avoid excessive depletion of the alkali solution.

6. Reagents

6.1 Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society,² where such specifications are available. Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

6.2 *Alkali Solution*—Prepare the alkali solution by mixing the following reagents:

	weight%
Sodium hydroxide (NaOH)	9.1
Trisodium phosphate ($\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$)	0.9
Tap water	90.0

7. Test Specimens

7.1 The test ware should be representative of the lot or run and should have good application and fire. Tests should be run on ware with bottoms removed. The bottoms can be easily removed with a hot wire cutter or a water-cooled abrasive wheel cut-off saw. It is also convenient to simultaneously cut a ring section for fit determination from the same ware. If an

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.

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² *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.