Designation: C 735 – 93 (Reapproved 1999)

Standard Test Method for Acid Resistance of Ceramic Decorations on Returnable Beer and Beverage Glass Containers[1]

This standard is issued under the fixed designation C 735; 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 qualitative determination of the acid resistance of ceramic decorations on returnable beer and beverage containers, to assure the necessary durability of the decoration.

1.2 This test provides an indication of performance when and if the decoration is to be exposed to the acid solutions used in reclaiming bottles, and it also covers those instances where the beverages themselves have acidic properties.

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.*

2. Referenced Documents

2.1 *ASTM Standards:*

C 224 Practice for Sampling Glass Containers[2]

3. Summary of Test Method

3.1 This test method is a qualitative method which determines by visual inspection the degree of attack of a nominal 10 % hydrochloric acid solution on the ceramic decoration.

4. Significance and Use

4.1 This test method evaluates the quality and serviceability of ceramic decorations on returnable beer and beverage containers.

4.2 This test method is also suitable for specification acceptance. Its significance is that bottles with good acid resistance coatings have longer service life.

5. Reagent

5.1 *Hydrochloric Acid (27 + 73)*—Dilute 27 volumes of concentrated hydrochloric acid (HCl, sp gr 1.19) with 73 volumes of distilled water. This will produce nominal 11.5 weight % HCl. The volume of the solution may be varied as needed.

6. Test Specimen

6.1 The decorated ware should be representative of the lot, or run, and should be taken in accordance with the principles stated in Practice C 224.

7. Procedure

7.1 Pour the HCl (27 + 73) into a beaker large enough to accept all of the test specimen and the reference sample. Keep this solution at room temperature (25 ± 5°C).

7.2 Place the test specimen into the HCl so that approximately one half of the label is immersed, and cover the beaker.

7.3 Remove the specimen from the HCl after 20 min. Rinse with water and dry.

7.4 Record the temperature of the HCl at both the beginning and the end of the test period.

7.5 Retain a duplicate piece of ware with each decoration under test, without exposure to HCl as an aid in judging the degree of chemical attack on the specimens under test.

8. Interpretation of Results

8.1 Judge the degree of the HCl attack on the decorated surface by visually comparing the exposed specimen to the nonexposed specimen, if such is available.

8.2 Grade the decoration on the test specimen according to 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°.

Grade 5—Surface dull or matte with chalking possible.

Grade 6—Significant removal of enamel with pinholing evident.

Grade 7—Complete removal of enamel in exposed area.

8.3 Reference ware is a decorated, returnable beer or

---

[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.

Current edition approved Nov. 15, 1993. Published January 1994. Originally published as C 735 – 72 T. Last previous edition C 735 – 93.

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

beverage container of known acid resistance.

9. Report

9.1 Report the following information:

9.1.1 Identification of the ware, the decorating material used, and the firing cycle used,

9.1.2 Test solution temperature at both the beginning and the end of the test period,

9.1.3 Grading of the specimens and the reference sample as in 8.2, and

9.1.4 Date of test and name of operator conducting test.

10. Precision and Bias

10.1 Precision of this test method will be investigated in a round robin planned by Subcommittee C14.10.

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

11. Keywords

11.1 acid resistance; ceramic decorations; returnable glass containers