Designation: C777 – 04 (Reapproved 2019)

Standard Test Method for Sulfide Resistance of Ceramic Decorations on Glass[1]

This standard is issued under the fixed designation C777; 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 the qualitative determination of the sulfide resistance of ceramic decorations on glass to assure the necessary durability of the decoration.

1.2 This test method provides an indication of performance when and if the decorations are exposed to sulfide attack.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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 test method generates hydrogen sulfide gas which is highly poisonous.

1.6 *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. Referenced Documents

2.1 *ASTM Standards:*[2]

C224 Practice for Sampling Glass Containers

3. Summary of Test Method

3.1 One half of the specimens are immersed in a volume 4 % acetic acid solution that contains 1 mL of saturated sodium sulfide solution per each 100 mL of the acetic acid solution in a suitable covered container at room temperature. The degree of attack is determined by visual observation and physical testing of the specimen exposed to a hydrogen sulfide atmosphere.

4. Apparatus

4.1 *Suitable Covered Container.*

4.2 *Stirrer.*

4.3 *Hot Plate.*

4.4 *Pipet.*

4.5 *Fume Hood,* or other means of adequately exhausting H_2S produced during the test.

5. Reagents

5.1 *Sodium Sulfide* ($Na_2S \cdot 9H_2O$), reagent grade.

5.2 *Acetic Acid* (CH_3COOH, min 99.8 %), reagent grade.

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 C224.

6.2 Standard reference ware of known resistance must be run with each test.

7. Preparation of Test Solution

7.1 Make a 4 % volume acetic acid solution by adding to each 96 mL of distilled water 4 mL of acetic acid.

7.2 Dissolve an excess amount of sodium sulfide in warm (35 to 40°C) distilled water. Make sure there is undissolved sodium sulfide left over. Cool to room temperature.

7.3 Stir into each 100 mL of the 4 % acetic acid solution 1 mL of saturated, clear, sodium sulfide solution for 2 or 3 min. A milk of sulfur will precipitate.

8. Procedure

8.1 Place the test specimens and the reference standard of known resistance into the test solution prepared according to 7.3 at room temperature so that only half of the decoration is immersed. Stir and cover.

8.2 Remove specimens from solution after 15 min and allow to air dry.

[1] This test method is under the jurisdiction of ASTM Committee C14 on Glass and Glass Products, and was written by Subcommittee C14.10 on Glass Decoration in cooperation with the Society of Glass Decorator's Committee A-20.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.