



Standard Test Method for Sampling Protocol for TCLP Testing of Container Glassware¹

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1. Scope

1.1 This test method defines the way in which container glassware should be prepared before performing the Toxicity Characteristic Leaching Procedure (TCLP). The method covers the homogenization of the sample, and the selection of a representative portion of the sample to test and get reproducible results.

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 to determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

3. Summary of Test Method

3.1 Container glass articles decorated with ceramic glass decorations are broken to fit the requirements of the TCLP protocol by using a disc mill or roll mill apparatus, and then the samples are homogenized using a riffle box. A representative sample of the glass articles can then be put through the TCLP test with reproducible results.

4. Significance and Use

4.1 Sampling of decorated glass containers for the TCLP can vary greatly, resulting from the size and shape of the article relative to the amount of ceramic decoration on the ware. Breaking the glass can cause some of the pieces to have no decoration on them, and others to be heavily decorated and

more likely to leach lead and cadmium under the TCLP test. This method provides an effective tool to homogenize the glass containers so that reproducible results can be attained from the TCLP test.

5. Apparatus

5.1 Pre-breaking apparatus, consisting of:

5.1.1 Two L (or larger) polythene bucket with a tightly sealed lid,

5.1.2 One or two clean 35 to 40 mm diameter alumina grinding balls,

5.2 Disc mill or roll mill,

5.3 Sieves, as needed,

5.4 Riffle box, and,

5.5 Roller or tumbler apparatus.

6. Reagents and Materials

6.1 Glassware to be tested, in two sets of 10 units each.

7. Hazards

7.1 When working with glassware, always be aware and careful of the potential of getting cut by the glass. Personal protective equipment, such as a face shield or goggles, leather gloves, and a protective apron should be worn when working with glass.

Take precautions when working with the samples and apparatus to avoid the possibilities of getting hurt.

8. Sampling, Test Specimens, and Test Units

8.1 Since the amount of lead and cadmium that leaches from a decoration can be affected by the relative size of the decoration, it is important to start with two sets of ten units each.

9. Procedure

9.1 To minimize the variation of sampling, this testing shall be done in duplicate, and therefore, take two sets of 10 units of the glassware to be tested.

9.2 Pre-break the glass prior to milling, using the following procedure:

¹ This test method is under the jurisdiction of ASTM Committee C21 on ceramic Whitewares and Related Products and is the direct responsibility of Subcommittee C21.03 on Methods for Whitewares and Environmental Concerns.

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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.

9.2.1 Place the first set of glassware into the 2 L bucket, along with one or two clean 35 to 40 mm diameter alumina grinding balls.

9.2.2 After tightly sealing the lid, shake the vessel hard enough to smash the glass to create pieces that can be fed into the roll or disc mill.

9.3 Clean both the mill and riffle box, prior to use.

9.4 Feed the pre-broken glass into the disc mill or roll mill as feedstock.

9.4.1 Grind the glass as two separate lots, with the selected mill apertures set between 2.5 mm and 3.5 mm. These aperture settings tend to produce crushed glass with a maximum particle size of 5 mm.

9.5 Any oversized material must be removed by sieving or hand picking, and be broken up prior to blending back into the original sample.

9.6 Homogenize the sample using a roller or tumbler apparatus.

9.7 Immediately pass sample through the riffle box collecting two sub-samples of 100g each.

9.8 Perform TCLP extraction according to EPA specifications.

10. Precision and Bias

10.1 The number of laboratories, materials, and determinations in this study DOES NOT meet the minimum requirements for determining precision prescribed in Practice E 691.

10.1.1 This precision statement is provisional. Within five years, additional data will be obtained and processed which does meet the requirements of E 691.

TABLE 1 Precision Statement for Test Method Sampling Protocol for TCLP Testing of Container Glassware

NOTE—Precision, characterized by repeatability, S_r , r , and reproducibility, S_R , R has been determined for the materials to be:

Material	Average	S_r	r	S_R	R
ppm Pb	0.192000	0.076158	0.213242	0.086429	0.242002

11. Keywords

11.1 TCLP; ceramic glass enamels; ceramic glass decorations

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