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AMERICAN SOCIETY FOR TESTING AND MATERIALS  
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## Standard Specification for Lead and Cadmium Extracted from Glazed Ceramic Cookware<sup>1</sup>

This standard is issued under the fixed designation C 1035; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This specification provides limits for the extraction of lead and cadmium from glazed ceramic surfaces under boiling conditions. It is applicable to ceramic cookware intended for use in contact with food, for example cookware made of china, crockery, porcelain, and earthenware.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

C 242 Terminology of Ceramic Whitewares and Related Products<sup>2</sup>

C 738 Test Method for Lead and Cadmium Extracted from Glazed Ceramic Surfaces<sup>2</sup>

C 1034 Test Method for Lead and Cadmium Extracted from Glazed Ceramic Cookware<sup>2</sup>

### 3. Terminology

#### 3.1 Description of Term Specific to This Standard:

3.1.1 *cookware*—ceramic articles including those intended to be heated in the preparation of foodstuffs, for example, china, crockery, porcelain, and earthenware, excluding items not specifically designed for cooking, such as cups, plates, and soup bowls, which may be occasionally used to warm foods in a microwave oven.

3.2 *Definitions*—For definitions of terms used in this specification, see Terminology C 242.

### 4. Significance and Use

4.1 The problem of lead and cadmium release from cookware require effective means of control to ensure the protection of the population against a possible health hazard (see Test Method C 738).<sup>3</sup> This potential arises with improperly formulated, applied, and fired glazes and decorations. There is a

particular concern for cookware because the normal conditions of use (heating acid foods for prolonged periods) are conducive to extracting the soluble lead and cadmium into the food. Therefore, this specification deals specifically with ceramic cookware intended to be used for the preparation of foods by heating.

### 5. Sampling

5.1 *Preference*—Preference should be given to items that have the highest surface area/volume ratio and to those that have decorated or cadmium red colored food contact surfaces (including the interior of the lid).

5.2 *Sample Size*—Where feasible, test six pieces. Each of the pieces should be identical in size, shape, and color.

### 6. Specimen Preparation

6.1 Specimens of cookware must be free of grease or other matter likely to prevent contact between the vessel's surface and the simulating solvent. Wash the specimen with a mild liquid detergent at a temperature of about 40°C. Rinse with distilled, deionized water or water of equivalent quality. Then drain the vessel and dry it either in a drying oven or with clean filter paper. Store the specimen in a clean air hood or other clean environment to prevent contamination of the surface by airborne particles.

### 7. Test Methods

7.1 Measure the lead and cadmium extractable from the samples in accordance with Test Method C 1034.

### 8. Permissible Limits<sup>4</sup>

8.1 The permissible limits for lead and cadmium release shall not exceed the following values:

	Lead	Cadmium
Cookware	5 mg/L	0.5 mg/L

Limits are expressed in absolute maximum values, in that no individual piece within a sample lot may exceed these levels.

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee C-21 on Ceramic Whitewares and Related Products and is the direct responsibility of Subcommittee C21.03 on Fundamental Properties.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 15.02.

<sup>3</sup> *Proceedings, International Conference on Ceramic Foodware Safety*, Lead Industries, Inc., 1975, pp. 8–17.

*WHO Food Additives Series, No. 4*, World Health Organization, 1972.

"Ceramic Foodware Safety, Sampling, Analysis and Results for Release," Report

of a WHO Meeting, Geneva, Switzerland June 8–10, 1976, *WHO/Food Additives 77.44*, World Health Organization, 1972.

<sup>4</sup> Could, J. H., Butler, S. W., Boyer, K. W., and Steele, E. A., "Hot Leaching of Ceramic and Enamelled Ware: A Collaborative Study," *Journal, Association Official Analytical Chemists*, 66(3), 1983, pp 610–619.