



Designation: C 113 – 93 (Reapproved 1998)

## Standard Test Method for Reheat Change of Refractory Brick<sup>1</sup>

This standard is issued under the fixed designation C 113; 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 approval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

*This standard has been approved for use by agencies of the Department of Defense.*

### 1. Scope

1.1 This test method covers the determination of the permanent linear change of refractory brick when heated under prescribed conditions.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

NOTE 1—Test methods incorporating additional provisions pertinent to specific refractory materials are given in the following Test Methods: C 179, C 210, C 436, and C 605.

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 134 Test Methods for Size, Dimensional Measurements, and Bulk Density of Refractory Brick and Insulating Firebrick<sup>2</sup>
- C 179 Test Method for Drying and Firing Linear Change of Refractory Plastic and Ramming Mix Specimens<sup>2</sup>
- C 210 Test Method for Reheat Change of Insulating Firebrick<sup>2</sup>
- C 436 Method of Test for Reheat Change of Carbon Refractory Brick and Shapes<sup>2</sup>
- C 605 Test Method for Reheat Change of Fireclay Nozzles and Sleeves<sup>2</sup>
- E 230 Temperature-Electromotive Force (EMF) Tables for Standardized Thermocouples<sup>3</sup>

### 3. Significance and Use

3.1 Refractory brick and shapes of different compositions exhibit unique permanent linear changes after heating or

reheating. This test method provides a standard procedure for heating various classes of refractories with appropriate heating schedules.

3.2 Linear reheat changes obtained by this test method are suitable for use in research and development, also often used to establish written specifications between producers and consumers.

3.3 Care should be exercised in selecting samples that are representative of the product being tested and that the schedule selected is appropriate to the product.

### 4. Apparatus

4.1 *Kiln*, of such design that the specified heating schedule and atmosphere can be maintained throughout the heating zone.

4.2 *Linear Measuring Device*, capable of being read to 0.02 in. (0.5 mm) over a span of 10 in. (254 mm). A hook-rule, as specified in Test Methods C 134, a vernier caliper, or a dial gage device may be used.

4.3 *Gas Sampling and Analysis Equipment*, capable of determining the percent free oxygen and total combustibles in the atmosphere of the test chamber.

### 5. Test Specimens

5.1 For each test use three rectangular specimens measuring 9 by 4½ by 2½ or 3 in. (228 by 114 by 64 or 76 mm) in size, or, if smaller, shapes approaching these dimensions as closely as possible. These may be commercial brick of the specified size or test pieces cut out of larger shapes.

5.2 Using ceramic paint or crayon, label each specimen, and make a reference mark at each end on the center line of a broad face to indicate the exact position where the measurement is made. Measure the length on each of the three test specimens to the nearest 0.02 in. (0.5 mm).

### 6. Procedure

6.1 *Placing Specimens in Kiln*—Place the test specimens in the kiln so that each rests edgewise, that is, on a 9 by 2½ or 3-in. (228 by 64 or 76-mm) face and set only one course high. Place each specimen upon the corresponding face of a supporting brick that is from the same lot as the test specimen or at least of equal refractoriness. Place between the test specimen and the supporting brick a layer of suitable refractory material,

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee C-8 on Refractories and is the direct responsibility of Subcommittee C08.03 on Physical Tests.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 15.01.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 14.03.