



Designation: C 199 – 84 (Reapproved 2000)

## Standard Test Method for Pier Test for Refractory Mortars<sup>1</sup>

This standard is issued under the fixed designation C 199; 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.

### 1. Scope

1.1 This test method covers the determination of refractoriness of all types of refractory mortar by heating a pier of brick laid up with the test mortar to learn whether the prescribed heat treatment causes the mortar to flow out of the joints.

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 determine the applicability of regulatory limitations prior to use.*

### 2. Referenced Documents

2.1 *ASTM Standards:*

- C 24 Test Method for Pyrometric Cone Equivalent (PCE) of Fireclay and High Alumina Refractory Materials<sup>2</sup>
- C 113 Test Method for Reheat Change of Refractory Brick<sup>2</sup>

### 3. Significance and Use

3.1 This test method is used to estimate the application temperature limits of a refractory mortar and will establish its classification.

3.2 This test method will be regarded as a pass or fail test because the results are based on observations of whether the mortar flowed from the joints as a result of the heat treatment used.

3.3 Results obtained by this test method will not agree with those obtained in service when heating is done from only one side.

3.4 This test method is not applicable for testing nonaqueous mortars.

### 4. Apparatus

4.1 *Brick*—Three 9-in. (228-mm) straight fireclay or high-alumina brick, conforming to the following respective requirements for refractories:

Class of Mortar to Be Tested	PCE, <sup>4</sup> Not Lower Than Cone No.
High-alumina	36
Super-duty	33

Class of Mortar to Be Tested	PCE, <sup>4</sup> Not Lower Than Cone No.
High-duty	31½
Medium-duty	29

<sup>4</sup> See Test Method C 24.

4.2 *Spacing Rods*—Nine joint-thickness spacing rods made of 3/32-in. (2-mm) diameter drill rod, cut into 6-in. (152-mm) lengths.

4.3 *Drying Oven*, to accommodate five 9-in. (228-mm) straight brick standing on end, for use at 220 to 230°F (105 to 110°C).

4.4 *Furnace*, capable of heating the test pier uniformly at one of four temperatures, the highest being 3100°F (1705°C).

### 5. Sampling

5.1 The sample of mortar evaluated will be a prepared test sample of about 10 lb (4.5 kg). If a larger quantity is presented, ranging in size up to a commercial container, it must be reduced in size to about 10 lb (4.5 kg) for evaluation. To do this, the contents of the container shall be thoroughly mixed in the container, or transferred without loss to a clean impervious receptacle of larger size and mixed thoroughly to a uniform consistency. A 10 lb (4.5 kg) test sample shall then be taken and sealed in a metal or glass container.

### 6. Test Specimens

6.1 The test mortar shall be of troweling consistency. When working with wet mortars not at this consistency small amounts of water will be added, followed by thorough mixing until a troweling consistency is achieved. For dry mortars, the mortar shall be thoroughly mixed with water to a troweling consistency, and allowed to stand in a suitable sealed container for a period of not less than 16 h before preparing the test specimen.

### 7. Procedure

#### 7.1 Construction of Pier:

7.1.1 The pier shall consist of two whole brick and two half-brick laid flat. The top and bottom brick shall be whole brick, and between these the two half-brick shall be placed so that the original ends will form a vertical joint in the center of the pier. The class of mortar being tested shall determine the

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