



Designation: C 182 – 88 (Reapproved 2004)

Standard Test Method for Thermal Conductivity of Insulating Firebrick¹

This standard is issued under the fixed designation C 182; 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 supplements Test Method C 201, and shall be used in conjunction with that test method to determine the thermal conductivity of insulating firebrick.

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

1.3 *This standard does not purport to address all of the safety problems, 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:*²

C 155 Classification of Insulating Firebrick

C 201 Test Method for Thermal Conductivity of Refractories

E 220 Method for Calibration of Thermocouples by Comparison Techniques

3. Significance and Use

3.1 The thermal conductivity of insulating firebrick (IFB) is a property required for the selection of IFB for a specific thermal performance. Users select brick to provide a specified heat-loss and cold-face temperature without exceeding the temperature limitation of the brick. This test method establishes placement of thermocouples and the positioning of test samples in the calorimeter. This test method must be used with Test Method C 201.

4. Apparatus

4.1 The apparatus shall consist of that described in the Apparatus section of Test Method C 201 with the addition of thermocouples, drilling jig, and refractory fiber paper as described in Sections 6 and 7.

¹ This test method is under the jurisdiction of ASTM Committee C08 on Refractories and is the direct responsibility of Subcommittee C08.02 on Thermal Stress Resistance.

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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.

5. Test Sample

5.1 The test sample shall be selected and prepared as described in the Test Sample and Preparation section of Test Method C 201.

6. Installation of Thermocouples in Test Specimen

6.1 *Thermocouples*—Calibrated³ thermocouples shall be embedded in the test specimen at three points for measuring the temperature. Chromel-Alumel thermocouples shall be used for temperatures below 1400°F (760°C), and above that temperature platinum-10 % rhodium/platinum thermocouples shall be used. The platinum thermocouples may also be used at the lower temperatures, but the electromotive force (emf) will not be as high as when using base-metal thermocouples. Wire of AWG 28 (0.320 mm) shall be used for making either type of thermocouple.

6.2 *Installation of Thermocouples*—Holes for the thermocouple wires shall be drilled through the 4½-in. (114-mm) dimension of the test specimen by the use of a drilling jig so as to obtain accurate placement of the thermocouples. The three thermocouples shall be located so that the hot junction of the first couple is 0.20 in. (5.1 mm) below the hot face of the test specimen, the junction of the second at the midpoint, and the junction of the third 0.20 in. above the cold face. The thermocouple wires leading out from the hot junctions shall be located in planes parallel to the calorimeter surface. In order to have the hot junctions over the center of the calorimeter, they shall be located on an axis passing through the center of and at right angles to the 9 by 4½-in. (228 by 114-mm) area of the test specimen.

NOTE 1—Insulating firebrick that cannot be prepared to this precision because of the structure of the product, should be prepared in accordance with the instructions for fireclay dense refractories.

7. Set-Up of Test Sample and Silicon Carbide Slab

7.1 Two strips of refractory fiber paper 13½ by ½ by 0.02 in. (343 by 13 by 0.5 mm) shall be placed along the 13½-in. dimension of the inner guard at the outside edges, as shown in Fig. 1. Twelve strips of refractory fiber paper 2 by ½ by 0.02 in. (51 by 13 by 0.5 mm) shall be placed on the outer guard at intervals in the pattern shown in Fig. 1. These strips serve as

³ Method E 220 specifies calibration procedures for thermocouples.