



Designation: C 1445 – 99

Standard Test Method for Measuring Consistency of Castable Refractory Using a Flow Table¹

This standard is issued under the fixed designation C 1445; 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 covers the procedure for determining the consistency of castable refractory mixes by the flow table method.

1.2 This test method applies to regular weight castable refractories, insulating castable refractories, and castable refractories that require heavy vibration for forming, which are described in Classification C 401. They also apply to such castables containing metal fibers.

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

1.4 *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 71 Terminology Relating to Refractories²

C 230 Specification for Flow Table for Use in Tests of Hydraulic Cement³

C 401 Classification of Alumina and Alumina-Silicate Castable Refractories²

C 860 Practice for Determining the Consistency of Refractory Castable Using the Ball-in-Hand Test²

D 346 Practice for Collection and Preparation of Coke Samples for Laboratory Analysis⁴

3. Significance and Use

3.1 The amount of water used in a castable mix for preparing test specimens has a significant influence on subsequent test results. This test method is used primarily to determine and reproduce the consistency required for the

optimum casting of refractory castables in the preparation of test specimens and to express that consistency quantitatively. The correct water content is one of the major factors that must be controlled to obtain uniform test specimens. Excess water can reduce strength, increase volume shrinkage, and promote segregation of the castable ingredients. Insufficient water can produce “honeycombs” (air voids) in the castable because of poor consolidation during placement and prevent complete hydration of cement.

3.2 The flow table (see sketches in Specification C 230) has been found to be an excellent tool for measuring the consistency of a castable and should be used in cases where a numerical result is required. Since castables differ somewhat in their “body” or plasticity, it has been found that a good casting range, expressed numerically, might vary from castable to castable. While one material may cast well between 40 and 60 % flow, another material may need to be in the 60 to 80 % flow range to properly flow. Because of this, it has been found that no arbitrary optimum range can be stated for all castables. The flow table then becomes a tool for measuring the flow and not determining it. It can allow the operator to follow the manufacturer’s recommendations or to reproduce the consistency of a particular castable between laboratories.

3.3 Total time of wet mixing must be closely controlled to obtain reproducible results.

3.4 This test method is not intended to be used to determine the proper water content for gunning applications, although it may provide information of value for interpretation by a skilled operator.

4. Apparatus

4.1 *Balance*, 15-lb (6.8-kg) capacity, with sensitivity of 0.002 lb (1 g).

4.2 *Flow Table, Mold, and Calipers*, conforming to the requirements of Specification C 230.

4.3 *Tamper*, A nonabsorbing, nonabrasive, non-brittle material such as a rubber compound having a Shore A durometer hardness of 80 ± 10 or seasoned oak wood rendered nonabsorbing by immersion for 15 min. In paraffin at approximately 392°F (200°C), and the tamper shall have a cross section of ½ by 1 in. (13 by 25 mm) and a convenient length of 5 to 6 in.

¹ This test method is under the jurisdiction of ASTM Committee C-8 on Refractories and is the direct responsibility of Subcommittee C08.09 on Monolithic Refractories.

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² *Annual Book of ASTM Standards*, Vol 15.01.

³ *Annual Book of ASTM Standards*, Vol 04.01.

⁴ *Annual Book of ASTM Standards*, Vol 05.05.