



Standard Test Method for Determining the Consistency of Refractory Castable Using the Ball-In-Hand Test¹

This standard is issued under the fixed designation C860; 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.

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

1. Scope

1.1 This test method covers the procedures for determining the consistency of a castable using the Ball-in-Hand Test. The amount of water used in a castable has a significant influence on its performance.

1.2 This test method applies to castable refractories that are described in Classification **C401**. It also applies to such castables containing metal fibers.

1.3 This test method is not intended to determine the proper consistency for gunning, pumping, or self flow applications.

1.4 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. (See 6.2.3 for a specific safety warning.)*

2. Referenced Documents

2.1 *ASTM Standards:*²

C401 Classification of Alumina and Alumina-Silicate Castable Refractories

3. Significance and Use

3.1 This test method is used to determine if a freshly mixed refractory castable is of the proper consistency to provide optimum performance. There are times when the manufactur-

er's specified water content and consistency will purposely not lead to the correct ball in hand but should be used to provide optimum performance. Contact the manufacturer when in doubt. This test method can also be used to estimate the correct water addition rate of a castable when either the manufacturer's specified water content is not available or when unique circumstances have rendered that recommendation unusable.

3.2 The correct water content is an important factor that must be controlled to obtain optimum castable performance. 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 the insufficient mobility during placement and in extreme cases can prevent the complete hydration of the cement (if used).

3.3 The Ball-in-Hand test is subjective and somewhat depends on the skill of the operator. However, it is a universally accessible method due to the simplicity of the equipment required, and it is readily used in the field.

3.4 The total wet mixing time of a castable influences the rheological and final properties and therefore should be monitored.

3.5 This test method can be performed in a laboratory or on a job site.

4. Apparatus

4.1 *Castable Mixer*—Either a manually or electrically operated mechanical mixer (see Fig. 1) may be used to prepare batches for consistency determination in a laboratory. Wet castable may also be obtained while in the field from the mixer being used for installation.

4.2 *Heavy Rubber Gloves*, for castables containing metal fibers.

4.3 *Clock or Watch*, with a readability of 1 s.

5. Sampling

5.1 A representative handful of freshly mixed castable should be drawn from the center of the mixer while the mixer is not running.

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

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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.