~~Designation:C181–09~~ Designation: C181 – 11

Standard Test Method for Workability Index of Fireclay and High-Alumina ~~Plastic Refractories~~Refractory Plastics[1]

This standard is issued under the fixed designation C181; 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 determination of the workability index of fireclay and high-alumina ~~plastic refractories~~refractory plastics by measuring the plastic deformation of a molded test specimen when subjected to impacts.

1.2 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.

1.3 *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:*[2]

D2906 Practice for Statements on Precision and Bias for Textiles

3. Significance and Use

3.1 Workability index serves as a measure of the facility with which ~~plastic~~ refractory plastic materials can be rammed, gunned, or vibrated into place.

3.2 Workability index is commonly used to control consistency of plastics during manufacture. It has also been found useful for specification acceptance by the consumer.

3.3 The workability index determination can provide information for developing a plastic body. When a sample splits under impact at various water contents, it is an indication that the material is "short" or lacking in plasticity.

3.4 Determinations on samples that split during impact will be difficult to reproduce. If the sample splits, the measurement is not a true indication of deformation. This should be noted in the report.

4. Apparatus

4.1 *Rammer*—The apparatus shall consist of the device known as the sand rammer for refractories (see Fig. 1). It shall consist essentially of a steel cylindrical mold (specimen tube) 2.00 in. (50.8 mm) in inside diameter and 4.75 in. (120.6 mm) in length, supported in a vertical position on the same axis as a shaft to which shall be fastened a plunger that fits inside the mold. A 14-lb (6.4-kg) cylindrical weight slides on the same shaft and is arranged to fall a distance of 2 in. (51 mm) before engaging a collar fastened to the shaft. As shown in Fig. 1, the weight may be raised by a manually rotated cam. Provision shall be made by the equipment manufacturer to support the weight, thereby removing the load from the vertical shaft (example shown in Fig. 2). The sand rammer will include a linear scale capable of measuring sample height to 0.02 in. (0.5 mm) with a typical range of 1.7–2.5 in. (Note 1). The portion of the scale to be used shall be adjusted so that when the vertical shaft is measuring a 3.00 in. standard, 3.00 in. is read on the scale.

NOTE 1—The apparatus as described in this section is capable of measuring workabilities up to about 32 %. For products of higher workability a suitable spacer block may be installed under the specimen.

4.1.1 *Mounting for Rammer*—It is recommended the rammer be mounted on sand rammer base sold by the manufacturer or a concrete column to isolate the rammer from vibration variations. The rammer is to be secured onto the base or column using steel bolts. Variable results are obtained from the test unless the described mounting or an acceptable alternative mounting is used for

[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.

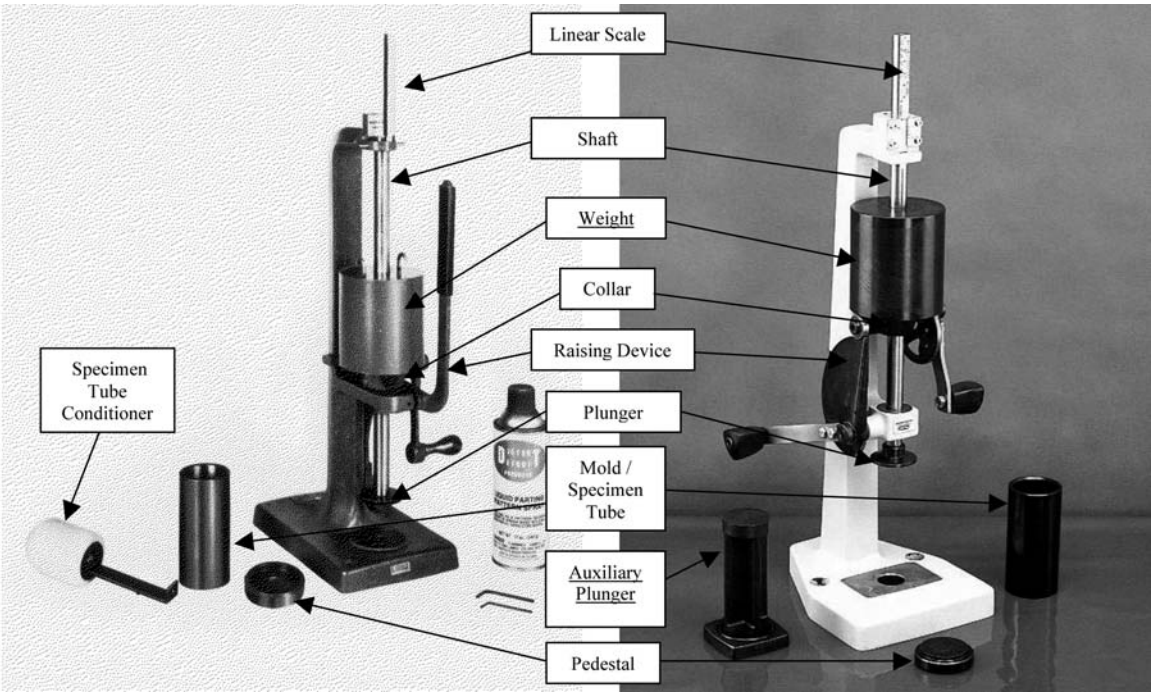

FIG. 1 Apparatus for Workability-Index Test

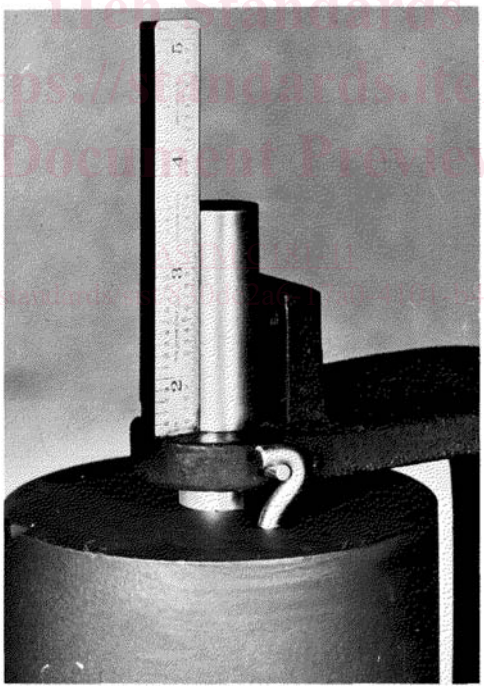

FIG. 2 Example of Provision to Suspend Weight

the rammer. An acceptable mounting method is one that can be calibrated using the manufacturer's calibration rings described below in 4.1.2.

4.1.2 *Maintenance and Calibration*—As needed, depending on use, clean all moving parts and lubricate with SAE 10 oil. Make periodic checks of the height that the weight drops to insure the weight is being raised 2 in. (51 mm). Inspect the rammer to