



Designation: C 181 – 91 (Reapproved 1997)^{e1}

Standard Test Method for Workability Index of Fireclay and High-Alumina Plastic Refractories¹

This standard is issued under the fixed designation C 181; 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.

^{e1} NOTE—Section 9 was added editorially in October 1997.

1. Scope

1.1 This test method covers the determination of the workability index of fireclay and high-alumina plastic refractories by measuring the plastic deformation of a molded test specimen when subjected to impacts.

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 64 Specification for Fireclay Brick Refractories for Heavy Duty Stationary Boiler Service²

D 2906 Practice for Statements on Precision and Bias for Textiles³

3. Significance and Use

3.1 Workability index serves as a measure of the facility with which plastic refractory 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.

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.

Current edition approved Dec. 15, 1991. Published February 1992. Originally published as C 181 – 43 T. Last previous edition C 181 – 82 (1987)^{e 1}.

² Discontinued, see 1984 Annual Book of ASTM Standards, Vol 15.01.

³ Annual Book of ASTM Standards, Vol 07.01.

4. Apparatus

4.1 *Rammer*—The apparatus shall consist of the device known as the rammer for refractories⁴ (see Fig. 1). It shall consist essentially of a steel cylindrical mold 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 to support the weight, thereby removing the load from the vertical shaft by the installation of two hooks (having a 10-32 screw thread) in the top side of the weight in a position that enables them to engage with pins (having an 8-32 screw thread) placed on each side of the upper portion of the framework, as shown in Fig. 1 and in detail in Fig. 2. A steel rule,⁵ one edge graduated in 0.02-in. (0.5-mm) increments, shall be attached (Note 1) to the rammer so that the position of the end of the vertical shaft can be read. The portion of the rule to be used shall be adjusted so that when the vertical shaft is in the lowest position, its machined end is in alignment with the

⁴ The rammer for refractories, Model 315-R, is available from the George Fischer Foundry Systems, Inc., 407 Hadley St., P.O. Box 40, Holly, MI 48442. Accessory parts required for conduct of this test and calibration of the rammer include:

Test Equipment	Part Number
Specimen tube	315-9
Cup pedestal	315-11
1.000 in. cup pedestal spacer block	315R-8
Stripping post	315-14
Specimen tube conditioner	315-30
Replacement swab for 315-30	315-02006
Liquid parting pattern spray	315-02007
Calibration Equipment	
Part Number	
Rammer foundation tester (includes impact rings, micrometer, and test anvil)	307
Replacement impact rings	307-3A
Master precision specimen tube	315-18

⁵ A suitable rule is the Lufkin Rule Co. Rule No. 2103-R, which is 6 in. (152 mm) in length and must be cut off at each end so that the desired portion of the graduations aligns with the shaft.