



Designation: C673 – 97 (Reapproved 2022)

# Standard Classification of Fireclay and High-Alumina Plastic Refractories and Ramming Mixes<sup>1</sup>

This standard is issued under the fixed designation C673; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This classification covers fireclay and high-alumina plastic refractories and ramming mixes that can be pounded or rammed into place to form a monolithic structure. The terms “plastic” and “ramming mix” are generally intended to describe the workability of the material. In this regard, plastics are considered to be materials having a workability index of more than 15 % in accordance with Test Method C181, while ramming mixes generally have less than 15 % workability by the same procedure.

1.2 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

C24 Test Method for Pyrometric Cone Equivalent (PCE) of Fireclay and High-Alumina Refractory Materials

C181 Test Method for Workability Index of Fireclay and High-Alumina Refractory Plastics

NOTE 1—Chemical analysis of refractory products is determined by a combination of X-ray fluorescence (XRF) and inductively coupled plasma (ICP) using standard reference materials (SRM), including various types of minerals and refractory materials which are available from the National Institute of Standards and Technology and other appropriate sources.

## 3. Significance and Use

3.1 This classification defines a group of classes for use by those producing or purchasing fireclay and high-alumina plastic refractories and ramming mixes. Each class is limited by

<sup>1</sup> This classification is under the jurisdiction of ASTM Committee C08 on Refractories and is the direct responsibility of Subcommittee C08.92 on The Joseph E. Kopanda Subcommittee for Editorial, Terminology and Classification.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

PCE or alumina content, or both. This classification is frequently used as a specification when the properties shown in Table 1 are the only items specified.

## 4. Classifications

4.1 Fireclay plastic refractories and ramming mixes are divided into two different classifications: (1) super duty, and (2) high duty.

4.2 High-alumina plastic refractories and ramming mixes are divided into eight different classifications: (1) 60 % alumina, (2) 65 % alumina, (3) 70 % alumina, (4) 80 % alumina, (5) 85 % alumina, (6) 90 % alumina, (7) 95 % alumina, and (8) 100 % alumina.

## 5. Basis of Classification

5.1 The properties required for compliance with a particular classification are shown in Table 1.

## 6. Test Methods

6.1 The determination of aluminum oxide ( $Al_2O_3$ ) on an ignition-free basis, as required by this classification, as determined by XRF and ICP.

6.2 The determination of the pyrometric cone equivalent (PCE), as required by this classification, shall be in accordance with Test Method C24.

## 7. Retests

7.1 Because of possible variables that may result from sampling or an unsatisfactory reproducibility of tests by different laboratories, the material may be resampled and retested at the request of either the purchaser or the manufacturer. This could apply where the first test results may not conform to the requirements prescribed in this classification. Therefore, the final results to be used shall be the average of at least two series of tests, each of which has been obtained by following the specified testing procedures in detail.

## 8. Keywords

8.1 classification; fireclay plastic refractories; fireclay ramming mixes; high-alumina plastic refractories; high-alumina ramming mixes; workability

**TABLE 1 Classification of Fireclay and High-Alumina Plastic Refractories and Ramming Mixes**

Class	PCE, min	Al <sub>2</sub> O <sub>3</sub> , %
High duty	31	NR <sup>A</sup>
Super duty	32½	NR
60 % alumina	35	57.6 to 62.5
65 % alumina	35–36	62.6 to 67.5
70 % alumina	36	67.6 to 72.5
80 % alumina	37	77.6 to 82.5
85 % alumina	NR	82.6 to 87.5
90 % alumina	NR	87.6 to 92.5
95 % alumina	NR	92.6 to 97.5
100 % alumina	NR	>97.5

<sup>A</sup> NR = not required.

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