



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

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## 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 C 181, while ramming mixes generally have less than 15 % workability by the same procedure.

## 2. Referenced Documents

### 2.1 ASTM Standards:

C 24 Test Method for Pyrometric Cone Equivalent (PCE) of Fireclay and High-Alumina Refractory Materials<sup>2</sup>

C 181 Test Method for Workability Index of Fireclay and High-Alumina Plastic Refractories<sup>2</sup>

NOTE 1—Chemical analysis of refractory products are 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 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.

**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	62.6-67.5
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.

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<sub>2</sub>O<sub>3</sub>) 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 C 24.

## 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.

<sup>1</sup> This classification is under the jurisdiction of ASTM Committee C08 on Refractories and is the direct responsibility of Subcommittee C08.09 on Monolithic Refractories.

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<sup>2</sup> Annual Book of ASTM Standards, Vol 15.01.

**8. Keywords**

ramming mixes; workability

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