Designation: C 27 – 98

Standard Classification of Fireclay and High-Alumina Refractory Brick[1]

This standard is issued under the fixed designation C 27; 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 Department of Defense.

1. Scope

1.1 This classification covers machine-made fireclay and high-alumina refractory brick, and its purpose is to set forth the various classes and types of these materials in accordance with their normal and characteristic properties, which are important in their use.

2. Referenced Documents

2.1 *ASTM Standards:*

C 16 Test Method for Load Testing Refractory Brick at High Temperatures[2]

C 24 Test Method for Pyrometric Cone Equivalent (PCE) of Fireclay and High-Alumina Refractory Materials[2]

C 113 Test Method for Reheat Change of Refractory Brick[2]

C 133 Test Methods for Cold Crushing Strength and Modulus of Rupture of Refractories[2]

C 134 Test Methods for Size, Dimensional Measurements, and Bulk Density of Refractory Brick and Insulating Firebrick[2]

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 that are available from the National Institute of Standards and Technology[3] and other appropriate sources.

3. Significance and Use

3.1 Alumina-silica refractory brick is produced from various combinations of alumina and silica-containing materials. These bricks can vary in chemical composition from almost 100 % alumina and little silica to almost 100 % silica and little alumina. It is therefore useful to establish a classification scheme based on physical properties and chemical analysis. One group, fireclay brick, is classified based on physical properties since some overlap of alumina and silica content can occur. A second group, high-alumina brick, is classified primarily based on alumina content. The classification allows those familiar with refractory materials to group similar products from various suppliers in a standard and consistent manner.

4. Basis of Classification

4.1 *Fireclay Brick* are divided into five different classes:

4.1.1 Super-duty,

4.1.2 High-duty,

4.1.3 Semi-silica,

4.1.4 Medium-duty, and

4.1.5 Low-duty.

4.2 The super- and high-duty classes are divided further into three types under each class.

4.3 *High-Alumina Brick* are divided into seven different classes by percent alumina:

4.3.1 50,

4.3.2 60,

4.3.3 70,

4.3.4 80,

4.3.5 85,

4.3.6 90, and

4.3.7 99.

5. Properties

5.1 The properties required for compliance with a class or type are shown in Table 1.

6. Test Specimens

6.1 Testing for compliance with this classification shall be performed on 9 by 4½ by 2½ or 3-in. (228 by 114 by 64 or 76-mm) rectangular brick as made, or on specimens of either size cut from larger units having dimensions not more than 3 in. (76 mm) in thickness, 6¾ in. (171 mm) in width, and 13½ in. (342 mm) in length.

7. Test Methods

7.1 The properties enumerated in this classification shall be determined in accordance with the following ASTM test methods:

7.1.1 *Pyrometric Cone Equivalent (PCE)*— Test Method C 24.

[1] This classification is under the jurisdiction of ASTM Committee C-8 on Refractories and is the direct responsibility of Subcommittee C08.12 on Specification, Classifications, and Dimensions.

Current edition approved Sept 10, 1997. Published November 1998. Originally published as C 27 – 58. Last previous C 27 – 97.

[2] *Annual Book of ASTM Standards*, Vol 15.01.

[3] Available from the National Institute of Standards and Technology (NIST), Gaithersburg, MD 20899.