



Designation: C 980 – 88 (Reapproved 2001)

Standard Specification for Industrial Chimney Lining Brick¹

This standard is issued under the fixed designation C 980; 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 specification covers solid kiln fired brick made from clay, shale, or mixtures thereof suitable for use in masonry construction in contact with the chemicals present in flue gases found in industrial chimneys. These brick are normally used with chemical-resistant mortars.

1.2 The physical and chemical properties of chimney lining brick differ from supplier to supplier mainly because their composition is determined by the source of raw materials. Chimney lining brick, regardless of these differences, are considered to be of three types noted as follows:

1.2.1 *Type I*—For use where low absorption and high acid resistance are not major factors.

1.2.2 *Type II*—For use where lower absorption and higher acid resistance are required.

1.2.3 *Type III*—For use where lowest absorption and highest acid resistance are required.

NOTE 1—Types I, II, and III may not differ significantly in their resistance to thermal shock, and selection of brick type should be based upon their absorption and acid-resistant service requirements.

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 *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 20 Test Methods for Apparent Porosity, Water Absorption, Apparent Specific Gravity, and Bulk Density of Burned Refractory Brick and Shapes by Boiling Water²

C 67 Test Methods of Sampling and Testing Brick and Structural Clay Tile³

¹ This specification is under the jurisdiction of ASTM Committee C15 on Manufactured Masonry Units and is the direct responsibility of Subcommittee C 15.02 on Brick and Structural Clay Tile.

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

³ *Annual Book of ASTM Standards*, Vol 04.05.

E 11 Specification for Wire-Cloth Sieves for Testing Purposes⁴

3. Sulfuric Acid Boil Test

3.1 When tested in accordance with Section 6, the brick shall conform to the requirements for “Maximum Average Weight Loss by H₂SO₄ Boil Test” as shown in Table 1.

4. Physical Properties

4.1 *Compressive Strength*—When tested in accordance with Test Methods C 67, Section 6 (Compressive Strength), the brick shall conform to the requirements for “Minimum Compressive Strength” as shown in Table 1.

4.2 *Water Absorption*—When tested in accordance with Test Methods C 20, Section 10 (Water Absorption), the brick shall conform to the requirements for “Maximum Water Absorption by 2-h Boiling” as shown in Table 1.

4.3 *Sizes*—The sizes of brick shall be as specified by the purchaser. When tested in accordance with Test Methods C 67, Section 11 (Measurement of Size), the brick shall conform to the requirements for “Permissible Variations in Dimensions” as shown in Table 2.

4.4 *Warpage*—When tested in accordance with Test Methods C 67, Section 12 (Measurement of Warpage), the tolerance on warpage of the brick shall be as indicated in Table 2.

4.5 *Texture*—Scoring or matte texturing, or both, of the brick is recommended. However, no flutes or scores shall exceed 1/8 in. (3.0 mm) in height of protrusion or in depth.

5. Black Heart

5.1 Brick when broken may have a dark area that has a steely appearance and is sharply delineated from the surrounding normal color of the brick it is known as black heart or black core. Black heart is generally the result of the reduction of iron minerals during the firing process. Its presence, regardless of size in brick that otherwise meet the physical and chemical requirements of this specification, shall not be cause for rejection.

6. Test for Solubility in Sulfuric Acid

6.1 *Significance and Use*—This test with sulphuric acid represents an extremely severe one and may not be significant

⁴ *Annual Book of ASTM Standards*, Vol 14.02.