



Standard Specification for Sewer and Manhole Brick (Made From Clay or Shale)¹

This standard is issued under the fixed designation C32; 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 U.S. Department of Defense.

1. Scope*

1.1 This specification covers brick intended for use in (1) drainage structures for the conveyance of sewage, industrial wastes, and storm water, and (2) related structures such as manholes and catch basins.

1.2 The requirements of this specification apply at the time of purchase. The use of results from testing of brick extracted from masonry structures for determining conformance or non-conformance to the requirements of this specification is beyond the scope of this standard.

1.3 Brick are ceramic products manufactured primarily from clay, shale, or similar naturally occurring earthy substances and subjected to a heat treatment at elevated temperatures (firing). Additives or recycled materials are permitted to be included at the option of the manufacturer. The heat treatment must develop sufficient fired bond between the particulate constituents to provide the strength and durability requirements of this specification. (See Terminology C1232.)

1.4 Brick are shaped during manufacture by molding, pressing, or extrusion, and the shaping method is a way to describe the brick.

1.4.1 This specification and its individual requirements shall not be used to qualify or corroborate the performance of a masonry unit made from other materials, or made with other forming methods, or other means of binding the materials.

1.5 The text of this specification references notes and footnotes which provide explanatory material. These notes and footnotes, excluding those in tables and figures, shall not be considered as requirements of the specification.

1.6 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

¹ This specification is under the jurisdiction of ASTM Committee C15 on Manufactured Masonry Units and is the direct responsibility of Subcommittee C15.02 on Brick and Structural Clay Tile.

Current edition approved June 1, 2023. Published June 2023. Originally approved in 1921. Last previous edition approved in 2017 as C32 – 13(2017). DOI: 10.1520/C0032-23.

1.7 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*:²
C67/C67M Test Methods for Sampling and Testing Brick and Structural Clay Tile
C1232 Terminology for Masonry

3. Terminology

3.1 *Definitions*—For definitions relating to masonry, sewer brick, and manhole brick, refer to Terminology C1232.

4. Classification

4.1 *Grades*—Two grades of sewer brick are covered:

4.1.1 *Grade SS*—Brick intended for use in structures requiring low absorption and resistance to the action of sewage carrying large quantities of abrasive material at velocities exceeding 8 ft/s (2.4 m/s).

4.1.2 *Grade SM*—Brick intended for use in structures requiring resistance to the action of sewage carrying abrasive materials at velocities of no more than 8 ft/s (2.4 m/s).

4.2 *Grades*—Two grades of manhole brick are covered:

4.2.1 *Grade MS*—Brick intended for use in manholes and catch basins not requiring high degrees of abrasive resistance but where a high and uniform degree of resistance to frost action and disintegration is needed when the brick may be frozen when permeated with water.

4.2.2 *Grade MM*—Brick intended for use in manholes not requiring high degrees of abrasive resistance but where a moderate and nonuniform degree of resistance to frost action and disintegration is needed when the brick may be permeated with water.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

*A Summary of Changes section appears at the end of this standard

5. Ordering Information

5.1 Orders for sewer or manhole brick under this specification shall include the following information:

5.1.1 *Grade (4.1 and 4.2)*—Grade SS for sewer brick and Grade MS for manhole brick governs when grade is not specified.

5.1.2 *Size (7.1)*—Specify width by height by length.

5.1.3 *Sampling (10.2)*—Person to select samples and place or places of selection of samples for testing.

5.2 Orders for sewer or manhole brick under this specification may include the following information:

5.2.1 *Strength (6.1, 6.2)*—Specify only if above minimum compressive strength in Table 1.

5.2.2 *Coring (9.1)*—At option of manufacturer if not specified.

5.2.3 *Frogging (9.2)*—Frog permitted in one bearing face if not specified.

5.2.4 *Costs of Tests (Note 3)*—Party who will pay and conditions for payment of compliance testing.

5.2.5 *Special Shapes*—Specify size, dimensions and finished faces by approved shop drawing or other means.

NOTE 1—Nominal dimensions should not be used to specify size.

6. Physical Properties

6.1 Brick for sewer or drainage structures shall conform to the physical properties for the specified Grades SS or SM as established in Table 1.

6.2 Brick for manholes, catch basins, and other related structures shall conform to the physical properties for the specified Grades MS or MM as established in Table 1.

6.3 *Absorption Alternate*—For Grade SM and Grade MS brick, the saturation coefficient requirement does not apply, provided the average compressive strength is greater than 8,000 psi (55 MPa) or the average 24-h cold water absorption does not exceed 8.0 %.

6.4 Unless otherwise specified by the purchaser, brick of Grade SS shall be accepted instead of Grade SM; also Grade MS shall be accepted instead of Grade MM.

7. Dimensions and Permissible Variations

7.1 The size of the brick shall be specified by the purchaser.

7.2 For any lot of sewer brick furnished under this specification, not more than 2 % of the brick shall vary from the nominal size requirements specified in 7.1 by more than $\pm 1/8$ in. (3 mm) in either transverse dimension, or by more than $\pm 1/4$ in. (6 mm) in length.

NOTE 2—Brick names denoting sizes may be regional and, therefore, may not be included in all reference books. Purchasers should ascertain the size of brick available in their locality and should specify accordingly, stating the desired dimensions (width by height by length).

8. Finish and Appearance

8.1 Sewer brick shall have plain or smooth surfaces on both ends and on the stretcher faces.

8.2 Manhole brick shall have plain, slightly, or moderately textured surfaces.

8.3 The brick, as delivered to the site, shall conform by visual inspection to the requirements specified by the purchaser or to the sample or samples approved as standard of comparison and to the samples passing the tests for physical requirements.

8.4 The brick shall be free of defects, deficiencies, and surface treatments, including coatings, that would interfere with the proper laying of the brick or significantly impair the strength or performance of the construction. Minor indentions and surface cracks incidental to the usual methods of manufacture, or the small chipping resulting from the customary methods of handling in shipment and delivery, should not be deemed grounds for rejection.

8.5 Brick shall be of rectangular cross section with substantially straight edges and square corners.

8.6 Kiln marks, belt marks, or depressions not exceeding $3/16$ in. (5 mm) in depth shall be permitted on the backside of the brick.

9. Coring and Frogging

9.1 Unless otherwise specified, brick may be cored at the option of the manufacturer. Special coring configurations or 100 % solid units shall be specified and shall meet all other requirements of this section. The net cross-sectional area of cored brick in any plane parallel to the surface containing the cores shall be at least 75 % of the gross cross-sectional area

TABLE 1 Physical Properties

Designation	Minimum Compressive Strength, Average Gross Area, psi (MPa)		Maximum Water Absorption by 5-h Boiling, %		Maximum Saturation Coefficient ^A
	Average of 5 Brick	Individual	Average of 5 Brick	Individual	Individual
Sewer brick:					
Grade SS	8000 (55)	6000 (41)	6.0	9.0	n/a
Grade SM ^A	5000 (34)	3750 (26)	12.0	15.0	0.80
Manhole brick:					
Grade MS ^A	3000 (21)	2500 (17)	17.0	20.0	0.80
Grade MM	2500 (17)	2200 (15)	22.0	25.0	0.90

^A The saturation coefficient is the ratio of absorption by 24-h submersion in cold water to that after 5-h submersion in boiling water.