



# Standard Specification for Sewer and Manhole Brick (Made From Clay or Shale)<sup>1</sup>

This standard is issued under the fixed designation C 32; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

*This standard has been approved for use by agencies of the 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.

### 1.1.1 Sewer Brick:

1.1.1.1 *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 (2.4 m)/s.

1.1.1.2 *Grade SM*—Brick intended for use in structures requiring resistance to the action of sewage carrying abrasive materials at velocities less than 8 ft (2.4 m)/s.

### 1.1.2 Manhole Brick:

1.1.2.1 *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.

1.1.2.2 *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.

1.2 The property requirements of this standard 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 property requirements (Section 3) of this standard is beyond the scope of this standard.

1.3 Brick covered by this standard are manufactured from clay, shale, or similar naturally occurring substances and subjected to a heat treatment at elevated temperatures (firing). The heat treatment must develop sufficient fired bond between the particulate constituents to provide the strength and dura-

bility requirements of this specification. (See *firing* and *fired bond* in Terminology C 43.)

1.4 The values stated in inch-pound units are to be regarded as the standard. The metric equivalents of inch-pound units given in parentheses may be approximate.

## 2. Referenced Documents

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

C 43 Terminology of Structural Clay Products

C 67 Test Methods for Sampling and Testing Brick and Structural Clay Tile

## 3. Physical Properties

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

3.2 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.

3.3 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.

3.4 Unless otherwise specified in the invitation for bids, brick shall be either solid or cored at the option of the seller. The net cross-sectional area of cored brick in any plane parallel to the bearing surface shall be at least 75 % of the gross cross-sectional area measured in the same plane. No part of any hole shall be less than  $\frac{3}{4}$  in. (19 mm) from any edge of the brick.

## 4. Dimensions and Permissible Variations

4.1 The size of the brick shall be specified by the purchaser, selecting any of the standard sizes of building brick.

4.2 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 4.1 by more than  $\pm\frac{1}{8}$

<sup>1</sup> 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.

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<sup>2</sup> 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.

**TABLE 1 Physical Properties**

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

<sup>A</sup> Where a high and uniform degree of resistance to frost action in the presence of moisture is required, Grades SM and MS shall conform to the additional requirements that the saturation coefficient (*C/B*), that is, ratio of absorption by 24-h submersion in cold water to that after 5-h submersion in boiling water, shall not exceed 0.80. If the average compressive strength is greater than 8000 psi or the average water absorption is less than 8.0 % after 24-h submersion in cold water, the requirement for saturation coefficient shall be waived.

<sup>B</sup> Maximum saturation coefficient for Grade MM brick shall not exceed 0.90.

in. (3 mm) in either transverse dimension, or by more than  $\pm 1/4$  in. (6 mm) in length.

## 5. Finish and Appearance

5.1 Sewer brick shall have plain or smooth surfaces on both ends and on the face side.

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

## 6. Sampling and Testing

6.1 The brick shall be sampled and tested in accordance with applicable sections in Test Methods C 67.

6.2 The manufacturer or the seller shall furnish specimens for tests. The place or places of selection are to be designated when the purchase order is placed.

NOTE 1—Unless otherwise specified in the purchase order, the cost of tests is typically borne as follows: If the results of the test show that brick do not conform to the requirements of this specification, the cost is typically borne by the seller. If the results of the tests show that the brick do conform to the requirements of this specification, the cost is typically borne by the purchaser.

## 7. Inspection

7.1 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. 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.

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

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

## 8. Keywords

8.1 brick; clay; drainage structures; industrial waste; manhole brick; physical properties; sewer brick; sewers; shale; storm water

## SUMMARY OF CHANGES

Committee C15 has identified the location of selected changes to this standard since the last issue (C 32 –04) that may impact the use of this standard.

(1) Section 6 was revised to remove wording on cost and be consistent with other C 15.02 standards.

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