



## Designation: ~~C32–13 (Reapproved 2017)~~ C32 – 23

American Association State  
Highway and Transportation Officials Standard  
AASHTO No.: M91-78

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

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 ( $\epsilon$ ) 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~~ 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 ~~property~~ requirements of this ~~standard~~ 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 ~~property~~ requirements (~~Section 5~~) of this ~~standard~~ specification is beyond the scope of this standard.

1.3 ~~Brick covered by this standard are manufactured~~ 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 ~~firing and fired bond in Terminology C1232.~~)

<https://standards.iteh.ai/catalog/standards/sist/010479f9-b52b-4d4c-bf56-f49b1c7feaf5/astm-c32-23>

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.

1.7 *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.*

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

## 2. Referenced Documents

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

[E67C67/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 (2.4 m)/s: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 less of no more than 8 ft (2.4 m)/s: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.

## 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.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

## 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, selecting any of the standard sizes of building brick 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 [6-17.1](#) 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 face side ~~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. ~~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.~~

8.4 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~~

**TABLE 1 Physical Properties**

Designation	Minimum Compressive Strength, Average Gross Area, psi (MPa)		Maximum Water Absorption by 5-h Boiling, %		Maximum Saturation Coefficient <sup>A</sup>
	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 <sup>A</sup>	5000 (34)	3750 (26)	12.0	15.0	0.80
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	
Grade MS <sup>A</sup>	3000 (21)	2500 (17)	17.0	20.0	0.80
Grade MM	2500 (17)	2200 (15)	22.0	25.0	0.90

<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 (The saturation coefficient is C/D), that is, the 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.