



Designation: C139 – 22

Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes¹

This standard is issued under the fixed designation C139; 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 solid precast segmental concrete masonry units made from hydraulic cement, water, and suitable mineral aggregates, with or without the inclusion of other materials. The units are intended for use in the construction of catch basins and manholes.

1.2 The text of this standard referenced notes and footnotes that provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

1.3 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.

1.4 *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

- C33/C33M Specification for Concrete Aggregates
- C140/C140M Test Methods for Sampling and Testing Concrete Masonry Units and Related Units
- C150/C150M Specification for Portland Cement
- C207 Specification for Hydrated Lime for Masonry Purposes
- C595/C595M Specification for Blended Hydraulic Cements

¹ This specification is under the jurisdiction of ASTM Committee C15 on Manufactured Masonry Units and is the direct responsibility of Subcommittee C15.03 on Concrete Masonry Units and Related Units.

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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.

- C618 Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
- C979/C979M Specification for Pigments for Integrally Colored Concrete
- C989/C989M Specification for Slag Cement for Use in Concrete and Mortars
- C1157/C1157M Performance Specification for Hydraulic Cement
- C1232 Terminology for Masonry
- C1240 Specification for Silica Fume Used in Cementitious Mixtures

3. Terminology

3.1 Terminology defined in Terminology C1232 shall apply for this specification.

4. Materials

4.1 Cementitious materials shall conform to the following ASTM specifications:

- 4.1.1 *Portland Cement*—Specification C150/C150M.
- 4.1.2 *Modified Portland Cement*—Portland cement conforming to Specification C150, modified as follows:
 - (1) *Limestone*—If calcium carbonate is added to the cement, the CaCO₃ content shall not be less than 85%.
 - (2) *Limitation on Insoluble Residue*—1.5 %.
 - (3) *Limitation on Air Content of Mortar*—Volume percent, 22 % max.
 - (4) *Limitation on Loss on Ignition*—7 %.
- 4.1.3 *Blended Hydraulic Cements*—Specification C595/C595M.
- 4.1.4 *Hydraulic Cement*—Specification C1157/C1157M.
- 4.1.5 *Pozzolans*—Specification C618.
- 4.1.6 *Blast Furnace Slag Cement*—Specification C989/C989M.
- 4.1.7 *Silica Fume*—Specification C1240.

4.2 *Aggregates*—Aggregates shall conform to Specification C33/C33M, except for grading requirements.

NOTE 1—The grading requirements of Specifications C33/C33M may not be suitable for concrete masonry production. Because of this, producers are allowed to modify grading to meet their needs and the requirements of this specification.

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

4.3 *Pigments for Integrally Colored Concrete*—Specification **C979/C979M**.

4.4 *Other Constituents*—Air-entraining agents, integral water repellents, and other constituents shall be previously established as suitable for use in concrete masonry units and shall conform to applicable ASTM standards or shall be shown by test or experience not to be detrimental to the durability of the concrete masonry units or any material customarily used in masonry construction.

5. Physical Requirements

5.1 At the time of delivery to the purchaser, the units shall conform to the requirements prescribed in **Table 1**. Units shall be free of defects that significantly impair the strength or permanence of the construction.

6. Dimensions and Permissible Variations

6.1 The thickness of any unit shall be not less than 5 in. (127 mm).

6.2 Overall dimensions shall not vary by more than $\pm 3\%$ from the specified dimensions.

7. Sampling and Testing

7.1 The purchaser or his authorized representative shall be accorded proper facilities to inspect and sample the units at the place of manufacture from the lots ready for delivery.

7.2 Compressive strength, absorption, density, and dimensional tolerances shall be based on tests of concrete masonry units of any configuration or dimensions made with the same materials, concrete mix design, manufacturing process, and curing method, conducted in accordance with Test Methods **C140/C140M** and not more than 12 months prior to delivery.

TABLE 1 Strength and Absorption Requirements

Compressive Strength, min, lb/in ² (MPa) (Average Gross Area)		Water Absorption, max, lb/ft ³ (kg/m ³)	
Average of 3 Units	Individual Units	Average of 3 Units	Individual Units
2500 (17)	2000 (13)	10 (160)	12 (192)

7.3 Except as specified in Section 5, and unless otherwise agreed, the expense of inspection and testing shall be borne by the purchaser.

8. Compliance

8.1 Minor cracks, incidental to the usual method of manufacture or minor chipping resulting from customary methods of handling in shipment and delivery, are not grounds for rejection.

8.2 *Non-conforming Units*—No more than 5 % of the units in the shipment shall exhibit any of the characteristics described in 8.2.1 through 8.2.3.

8.2.1 Units that do not comply with the requirements of Section 6.

8.2.2 Units with cracks or other defects that interfere with the proper placement of the unit.

8.2.3 Units that are broken.

8.3 After units are placed in usage, the manufacturer or manufacturer's agent are not responsible for non-conforming units defined in 8.2.

8.4 If a sample fails to conform to the specified requirements, the manufacturer shall be permitted to remove units from the shipment. A new sample shall be selected by the purchaser from remaining units from the shipment with a similar configuration and dimension and tested at the expense of the manufacturer. If the second sample meets the specified requirements, the remaining portion of the shipment represented by the sample meets the specified requirements. If the second sample fails to meet the specified requirements, the remaining portion of the shipment represented by the sample fails to meet the specified requirements.

NOTE 2—Unless otherwise specified in the purchase order, the cost of tests is typically borne as follows: (1) if the results of the tests show that the units do not conform to the requirements of this specification, the cost is typically borne by the seller; (2) if the results of the tests show that the units conform to the specification requirements, the cost is typically borne by the purchaser.

9. Keywords

9.1 catch basins; concrete masonry units; manholes; masonry units

SUMMARY OF CHANGES

Committee C15 has identified the location of selected changes to this standard since the last issue (C139 – 17) that may impact the use of this standard. (December 15, 2022)

(1) Modified Section 4 to add reference to C1240 and C979, clarify that grading requirements do not apply for aggregates, add modified portland cements, and clean up language on other constituents.

(2) Changes were made throughout to consolidate requirements for compliance into Section 8.