



Designation: C1314 – 23b

Standard Test Method for Compressive Strength of Masonry Prisms¹

This standard is issued under the fixed designation C1314; 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 test method covers procedures for masonry prism construction and testing, and procedures for determining the tested compressive strength of masonry, f_m , used to determine compliance with the specified compressive strength of masonry, f'_m . When this test method is used for research purposes, the construction and test procedures within serve as a guideline and provide control parameters.

1.2 This test method also covers procedures for determining the compressive strength of prisms obtained from field-removed masonry specimens.

1.3 The text of this standard refers to 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.

1.4 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.

1.5 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *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

¹ This test method is under the jurisdiction of ASTM Committee C15 on Manufactured Masonry Units and is the direct responsibility of Subcommittee C15.04 on Research.

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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.

C67/C67M Test Methods for Sampling and Testing Brick and Structural Clay Tile
C136/C136M Test Method for Sieve Analysis of Fine and Coarse Aggregates
C140/C140M Test Methods for Sampling and Testing Concrete Masonry Units and Related Units
C143/C143M Test Method for Slump of Hydraulic-Cement Concrete
C144 Specification for Aggregate for Masonry Mortar
C270 Specification for Mortar for Unit Masonry
C476 Specification for Grout for Masonry
C780 Test Methods for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
C1019 Test Method for Sampling and Testing Grout for Masonry
C1093 Practice for Accreditation of Testing Agencies for Masonry
C1180 Terminology of Mortar and Grout for Unit Masonry
C1232 Terminology for Masonry
C1532/C1532M Practice for Selection, Removal, and Shipment of Manufactured Masonry Units and Masonry Specimens from Existing Construction
C1552 Practice for Capping Concrete Masonry Units, Related Units and Masonry Prisms for Compression Testing
C1587/C1587M Practice for Preparation of Field Removed Manufactured Masonry Units and Masonry Specimens for Testing
C1716/C1716M Specification for Compression Testing Machine Requirements for Concrete Masonry Units, Related Units, and Prisms
E105 Guide for Probability Sampling of Materials
E111 Test Method for Young's Modulus, Tangent Modulus, and Chord Modulus

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this test method, refer to Terminologies C1180 and C1232.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *set*—a set consists of at least three prisms constructed of the same material and tested at the same age.

3.3 Notations:

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

- 3.3.1 f'_m —specified compressive strength of masonry.
- 3.3.2 f_{mi} —tested compressive strength of masonry.
- 3.3.3 h_p —prism height.
- 3.3.4 t_p —least actual lateral dimension of prism.

4. Significance and Use

4.1 This test method provides a means of verifying that masonry materials used in construction result in masonry that meets the specified compressive strength (Note 1).

NOTE 1—A prism is an assembly of components used to measure (in this case, the tested compressive strength of masonry, f_{mi}) or verify a property (in this case, the specified compressive strength of masonry, f'_m). Testing of prisms may be part of a project's field quality control or assurance program. In these cases, prisms are built as companions to a masonry element (for example, a masonry wall, column, pilaster, or beam) at a jobsite where the masonry element is site-constructed, or within a factory or shop where the element is shop-built. While these prisms can be used to determine compliance with the specified compressive strength of masonry, f'_m , they are not intended to replicate or model all of the performance or design attributes of the as-built element. Prisms may also be fabricated in a laboratory for research purposes (Appendix X2). In each scenario (field or research) the test procedures are structured so that masonry assembly tested compressive strength (f_{mi}) is measured in an accurate and repeatable manner.

4.2 This test method provides a means of evaluating compressive strength characteristics of in-place masonry construction through testing of prisms obtained from that construction when sampled in accordance with Practice C1532/C1532M. Decisions made in preparing such field-removed prisms for testing, determining the net area, and interpreting the results of compression tests require professional judgment.

4.3 If this test method is used as a guideline for performing research to determine the effects of various prism construction or test parameters on the compressive strength of masonry, deviations from this test method shall be reported. Such research prisms shall not be used to verify compliance with a specified compressive strength of masonry.

NOTE 2—The testing laboratory performing this test method should be evaluated in accordance with Practice C1093.

4.3.1 Appendix X2 includes guidance information for the researcher on aspects of materials, construction, and analysis.

5. Masonry Prism Construction

5.1 Construct prisms of units representative of those used in the construction. If units have projections (see Note 3) that project $\frac{1}{2}$ in. (12.5 mm) or more, remove those projections by

saw cutting flush with the surface of the unit at the base of the projection. If units contain insulation inserts, remove those inserts prior to prism construction. The resulting units shall be a fully enclosed cell or cells that will ensure a full bearing surface over the net cross-section of the prism. If saw cutting will not result in a fully enclosed cell or cells, use full-size units, and, if grout is used, grout in accordance with 5.9.4. If prisms are used for field quality control or assurance, record the location in the structure that corresponds to the set of prisms constructed.

NOTE 3—Examples of projections include flutes, ribs, and face shells of open-ended units.

NOTE 4—Building codes or project specifications may require a set of prisms for a given square footage of construction. Recording the location of the structure that corresponds to a set of prisms allows the test results to be attributed to a particular portion of the structure.

5.2 Construct a set of prisms for each combination of materials and each test age at which the compressive strength of masonry is to be determined.

5.3 Build each prism in an opened, moisture-tight bag large enough to enclose and seal the completed prism. Construct prisms on a flat, level base. Construct prisms in a location where they will remain undisturbed until transported for testing.

5.4 Construct prisms as shown in Fig. 1 with units laid in stack bond in stretcher position. Orient units in the prism as in the corresponding construction. At the time of prism construction, the surfaces of the units shall be free of moisture. Where the corresponding construction is of multi-wythe masonry having wythes composed of different units or mortar, build prisms representative of each different wythe and test separately.

5.5 Build prisms with full-size or reduced length units. Any required saw cutting shall be performed on units prior to prism construction. The moisture content(s) of units used to construct prisms shall be representative of those used in construction. Prisms composed of units that contain closed cells shall have at least one complete cell with one full-width cross web on either end (see Fig. 2). Prisms composed of units without closed cells shall have as symmetrical a cross section as possible. The minimum length of prisms shall be 4 in. (100 mm).

NOTE 5—When using larger masonry units, experience has shown that reducing the length of these units prior to prism construction makes their handling and transportation easier. Thus, these reduced length unit prisms are less likely to be damaged and are more likely to be properly capped

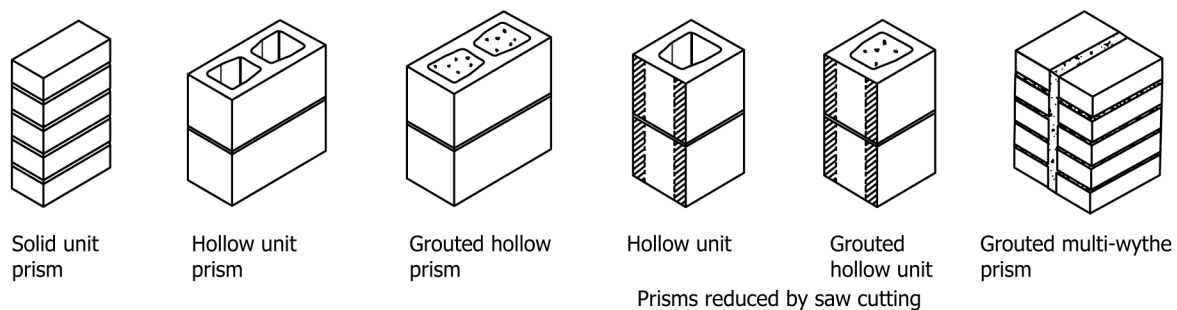


FIG. 1 Masonry Prism Construction