**Designation: ~~C1006 – 07 (Reapproved 2013)~~ C1006/C1006M – 19**

# Standard Test Method for Splitting Tensile Strength of Masonry Units[1]

This standard is issued under the fixed designation ~~C1006;~~C1006/C1006M; 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~~ Scope*

1.1 This test method covers the determination of the splitting tensile strength of masonry units.

1.2 *Units*—The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values ~~given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered~~ stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.3 The text of this standard references 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 *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~~ safety, health, and ~~health~~environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *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]

C1232 Terminology for Masonry

C1552 Practice for Capping Concrete Masonry Units, Related Units and Masonry Prisms for Compression Testing

E4 Practices for Force Verification of Testing Machines

## 3. Terminology



[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.

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

3.1 *Definitions:*

3.1.1 For definitions of terms used in this test method, refer to Terminology C1232.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *bearing rod, n*—steel cylinder to concentrate the applied load along a single line.

3.2.1.1 *Discussion*—

The diameter of the bearing rod is determined by the height of the specimen.

3.2.2 *compressible brace, n*—tube or rod made of a non-rigid material.

3.2.2.1 *Discussion*—

Compressible braces are used to support the test assembly during the initial loading to prevent the rocking of the test assembly. The compressible braces are required to be slightly smaller in diameter than the bearing rods to prevent interference with the test results.

3.2.3 *gross split length, n*—distance along the fracture from one face of the specimen to the opposite face of the specimen.

3.2.4 *net split length, n*—gross split length minus the length of any voids along the failure plane of the bearing rods.

3.2.5 *test assembly, n*—the combination of the specimen with a bearing rod adhered to the top and a bearing rod adhered to the bottom of the specimen.

## 4. Summary of Test Method

4.1 A test assembly is made by adhering steel bearing rods to the top and bottom faces of the specimen using capping compound. After the capping compound has cured, the test assembly is placed in the test machine while supported by compressible braces to prevent the test assembly from rocking. A load is applied to the test assembly. The compressible braces are removed once the test machine holds the test assembly firmly. The load is continued to be applied until specimen failure.

## 5. Significance and Use

5.1 Masonry units alone and within assemblages commonly fail in a tensile mode when loaded in compression to failure. These tensile stresses result from differences in modulus of elasticity and Poisson's ratio between the masonry unit and mortar. Additionally, the dissimilarity in behavior of the grout within cores of masonry units under load leads to tensile stresses in the units and results in a splitting failure.

5.2 This test method produces a line load along the bed surface of the masonry unit. The compressive load applied to the unit, imposed by means of bearing rods, results in a tensile stress distributed over the height of the unit for the split length of the unit. This test method can be conducted with the rod oriented either in the longitudinal direction or in the transverse direction of the bed face. The splitting tensile strength is calculated by the equation given in ~~7.1~~10.1.

5.3 The test value provides an indicator of masonry-unit splitting tensile strength. Additionally, the presence of defects such as visible voids or impurities in masonry units may be revealed.

5.4 The moisture content of the specimen will affect test results.

5.5 The height of the specimen will affect test results.

## 6. Apparatus

6.1 *Bearing Rods*—Matched, paired steel bearing rods with diameters ~~within~~8.0 % ~~⅛~~ to ~~½~~12.0 % of the specimen height, of a length greater than the ~~length of the intended test area,~~ gross split length, and of straightness within 0.5 % of the ~~specimen~~ gross split length shall be provided for each unit. Bearing rods that meet the straightness requirement can be reused.

6.2 *Compressible Braces*—Non-rigid rods or tubes with a diameter that is 1.5 ± 0.5 mm [1⁄16 ± 1⁄32 in.] smaller than the diameter of the bearing rods.

6.3 *Alignment Jig (for specimens less than 100 mm. [4.0 in.] high)*—An alignment jig similar to that shown if Figure 1.

NOTE 1—The alignment jig is used while adhering the rods to the specimen to maintain the two bearing rods in the same vertical plane.

6.4 *Supplemental Bearing Bar or Plate*—If the diameter or largest dimension of the upper bearing face or lower bearing block is less than the length of the specimen to be tested, a supplementary bearing bar or plate shall be used. The contact surfaces of the bar or plate shall be machined to within 0.05 % of planeness as measured on any line of contact of the bearing area. The bearing bar or plate shall have a width of at least ~~2 in. (51 mm),~~50 mm [2.0 in.], and a thickness not less than the distance from the edge of the spherical or rectangular bearing block to the end of the specimen. The bar or plate shall be used in such a manner that the load will be uniformly applied over the entire ~~intended split length of the specimen.~~gross split length.