



Designation: ~~C1692-09~~ Designation: C1692 – 10

Standard Practice for Construction and Testing of Autoclaved Aerated Concrete (AAC) Masonry¹

This standard is issued under the fixed designation C1692; 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.

INTRODUCTION

Masonry units of autoclaved aerated concrete (AAC) can be produced with dimensional tolerances as small as 0.06 in. (1.5 mm). As a consequence, AAC masonry units can be laid with mortar joints approximately 0.38 in. (10 mm) thick, and also with thinner joints. The exterior face of the resulting AAC masonry wall is then protected from the elements using an exterior wythe of masonry, a cladding system, or a breathable coating resistant to penetration by liquid water. The interior face can be plastered, furred, or painted.

1. Scope

1.1 This practice applies to construction and testing of masonry made of AAC units. It includes or references terminology, material specifications, and methods of test. It references specifications and test methods.

1.2 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.

1.3 *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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

C270 Specification for Mortar for Unit Masonry

C476 Specification for Grout for Masonry

C1072 Test Methods for Measurement of Masonry Flexural Bond Strength

C1232 Terminology of Masonry

C1660 Specification for Thin-bed Mortar for Autoclaved Aerated Concrete (AAC) Masonry

C1691 Specification for Unreinforced Autoclaved Aerated Concrete (AAC) Masonry Units

C1693 Specification for Autoclaved Aerated Concrete (AAC) ~~E72 Test Methods of Conducting Strength Tests of Panels for Building Construction~~

C1717 Test Methods for Conducting Strength Tests of Masonry Wall Panels

E96/E96M Test Methods for Water Vapor Transmission of Materials

E514 Test Method for Water Penetration and Leakage Through Masonry

E518 Test Methods for Flexural Bond Strength of Masonry

E519 Test Method for Diagonal Tension (Shear) in Masonry Assemblages

2.2 ~~Other Standard:~~ Other Standards:

TMS 402-08 / ACI 530-09 / ASCE 5-08 Building Code Requirements for Masonry Structures³

TMS 602-08 / ACI 530.1-08 / ASCE 6-08 Specification for Masonry Structures³

¹ This practice is under the jurisdiction of ASTM Committee C15 on Manufactured Masonry Units and is the direct responsibility of Subcommittee C15.10 on Autoclaved Aerated Concrete Masonry Units.

Current edition approved July 1, 2009. Published November 2009. DOI: 10.1520/C1692-09.

Current edition approved Dec. 15, 2010. Published December 2010. Originally approved in 2009. Last previous edition approved in 2009 as C1692-09. DOI: 10.1520/C1692-10.

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.

³ Available from The Masonry Society, 3970 Broadway, Suite 201-D Boulder, CO 80304-1135, <http://www.masonrysociety.org>.

3. Terminology

3.1 *Definitions*—Terms defined in Terminology C1232 shall apply in this practice.

3.2 *Definitions of Terms Specific to This Standard*:

3.2.1 *autoclaved aerated concrete (AAC)*—low-density cementitious product of calcium silicate hydrates in which the low density is obtained by the formation of macroscopic air bubbles, mainly by chemical reactions within the mass during the liquid or plastic phase. The air bubbles are uniformly distributed and are retained in the matrix on setting, hardening, and subsequent high-pressure steam curing, to produce a cellular structure. Material specifications for this product are prescribed in Specification C1693.

~~3.2.2 *thick-bed AAC masonry*—AAC masonry whose mortar joints are approximately 0.38-in. (10-mm) thick.~~

~~3.2.3 *thin-bed AAC masonry*—AAC masonry whose mortar joints are approximately 0.06-in. (1.5-mm) thick.~~

4. Significance and Use

4.1 This practice applies to the materials and methods used in the construction of AAC masonry. It directly references the AAC materials standards under the jurisdiction of ASTM Committee C27 and the workmanship requirements of TMS 602-08 / ACI 530.1-08 / ASCE 6-08 and supplements those workmanship requirements with additional requirements particular to AAC masonry.

5. Materials

5.1 AAC masonry units shall conform to Specification C1691.

5.2 Mortar for thick-bed AAC masonry shall meet the performance standards prescribed by the AAC manufacturer.

~~5.3 Mortar for thin-bed AAC masonry shall meet the performance standards prescribed by the AAC manufacturer. Mortar for thin-bed AAC masonry shall comply with Specification C1660.~~

NOTE 1—In general, AAC manufacturers' performance standards for mortar for AAC masonry address minimum dry compressive strength, minimum wet compressive strength, minimum bond strength, minimum open time, and minimum working time. They also require that the mortar provide sufficient bond to the AAC masonry unit so that flexural tensile strength is controlled by the flexural tensile strength of the units rather than by the bond between units and mortar.

5.4 Grout shall conform to Specification C476.

6. Methods of Test

6.1 *Compressive Strength Test for AAC Masonry*—Report the compressive strength of the AAC masonry as the strength of the AAC material determined in accordance with Specification C1693.

NOTE 2—Bond-strength requirements for AAC masonry mortar (Note 1) result in AAC masonry assemblages that behave monolithically. The compressive strength of an AAC prism depends on the prism's aspect ratio only, and not on the presence, number, or orientation of joints. Any reasonable aspect ratio can be used to verify compressive strength, provided that the same aspect ratio is used to calibrate design equations. Design equations for AAC masonry are calibrated using compressive strengths determined in accordance with Specification C1693. It is therefore appropriate to report those same strengths, which Specification C1693 requires AAC manufacturers to determine and report.

~~6.2~~

~~NOTE 3—The tests noted in subsections 6.2 through 6.4 are not required by TMS 402-08 / ACI 530-09 / ASCE 5-08 or TMS 602-08 / ACI 530.1-08 / ASCE 6-08. They may be required for research purposes or other reasons.~~

~~6.2 *Flexural Strength Test for AAC Masonry Assemblages*—If required, conduct flexural strength tests in accordance with Test Methods E72, C1717, E518, or C1072.~~

6.2.1 If conducting flexural strength tests in accordance with Test Methods E518, construct at least five test specimens as stack-bonded prisms at least 32 in. (0.81 m) high. Use mortar meeting the performance requirements of the AAC manufacturer. Conduct the flexural strength test in accordance with Test Methods E518, Test Method A (Simply Supported Beam with Third-point Loading).

~~6.2.2 If conducting flexural strength tests in accordance with Test Method C1072, construct test specimens as stack-bonded prisms comprising at least three bed joints. Test a total of at least five joints. Use mortar meeting the performance requirements of the AAC manufacturer.~~

~~NOTE 3—Until a relationship is developed between full panel tests (Test Methods E72) and small-scale test specimens (Test Methods E518 and C1072) for AAC masonry, Test Methods E72 should be used to establish design stresses. Construct test specimens as stack-bonded prisms comprising at least three bed joints. Test a total of at least five joints. Use mortar complying with 5.2 or 5.3 as appropriate.~~

6.3 *Shear Strength Test for AAC Masonry Assemblages*—If required, conduct shear strength tests in accordance with Test Method E519. Cure the gypsum capping material for at least six hours prior to testing.

~~6.4. Cure the gypsum capping material for at least six hours prior to testing. Use mortar complying with 5.2 or 5.3 as appropriate.~~

6.4 *Modulus of Elasticity of AAC Units*—If required, determine the modulus of elasticity in accordance with Specification C1693.