



Designation: ~~C901~~—~~10~~ **C901** – 18

Standard Specification for Prefabricated Masonry Panels¹

This standard is issued under the fixed designation C901; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope*

1.1 This specification covers the structural design and quality control of fabrication for load-bearing and non-load-bearing prefabricated masonry panels. Methods of prefabrication, field erection, and jointing are not covered in this specification.

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 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 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

- C67 Test Methods for Sampling and Testing Brick and Structural Clay Tile
- C109/C109M Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens)
- C140 Test Methods for Sampling and Testing Concrete Masonry Units and Related Units
- C270 Specification for Mortar for Unit Masonry
- C476 Specification for Grout for Masonry
- C780 Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
- C1019 Test Method for Sampling and Testing Grout
- C1180 Terminology of Mortar and Grout for Unit Masonry
- C1232 Terminology for Masonry
- C1314 Test Method for Compressive Strength of Masonry Prisms
- C1357 Test Methods for Evaluating Masonry Bond Strength (Withdrawn 2016)³
- C1717 Test Methods for Conducting Strength Tests of Masonry Wall Panels
- E518 Test Methods for Flexural Bond Strength of Masonry

2.2 Other Standards:

- TMS 402/ACI-530/ASCE-5 Building Code Requirements for Masonry Structures⁴
- TMS 602/ACI-530.1/ASCE-6 Specification for Masonry Structures⁴

3. Terminology

3.1 The terms used in this specification are identified in Terminologies C1180 and C1232.

¹ This specification is under the jurisdiction of ASTM Committee C15 on Manufactured Masonry Units and is the direct responsibility of Subcommittee C15.05 on Masonry Assemblies.

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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.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from The Masonry Society, 3970 Broadway, Suite 201-D, Boulder, CO 80304-1135; 105 South Sunset Street, Suite Q, Longmont, CO 80501-6172, http://www.masonrysociety.org.

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

4. Materials and Manufacture

4.1 *Masonry*—Masonry units, mortar, grout, reinforcement, anchors, ties, and accessories shall conform to ~~TMS 602~~TMS 602/~~ACI 530.1~~/ASCE 6.

5. Structural Design

5.1 *General*—Structural design of panels shall be performed in accordance with the provisions of the applicable local building code and the requirements of ~~TMS 402~~TMS 402/~~ACI 530~~/ASCE 5. Structural design of panels shall consider all loading and restraint conditions from initial fabrication to in-service conditions in the completed structure, including storage, transportation, and erection. The design loads shall be of the type and magnitude required by the applicable building code. Panels and connections required to resist wind, seismic, or other dynamic loads shall be designed to resist the required positive and negative forces in all directions. The joints between dissimilar materials within each panel, between panels, and between panels and their structural supports shall be designed to accommodate differential movement and deflections of each material, panel, and adjacent building elements.

5.2 *Lifting Devices*—Lifting devices and their connections to the panels shall have an ultimate capacity of four times the dead weight of the appropriate portion of the panel. Inclination of the lifting forces shall be considered.

6. Dimensions and Permissible Variations

6.1 *Standard Dimensions*—The standard nominal widths and heights of the panels shall be in multiples of nominal individual masonry unit heights and lengths. The nominal thickness of panels shall be the sum of the nominal thicknesses of the masonry units in the panels plus the nominal thickness of cavities, if any. The specified dimensions may be less than the required nominal dimensions by the thickness of one mortar joint but not by more than ½ in. (13 mm).

6.2 *Custom Dimensions*—For custom installations, all dimensions of panels shall be as shown on the drawings or as specified.

6.3 *Thickness of panels*—The specified thickness of the panels shall be as required for adequate strength, fire resistance, or other design criteria for the type of construction and occupancy as required by the applicable building code.

6.4 *Dimensional Tolerances*—Based on actual dimensions, a prefabricated masonry wall panel shall not vary from the specified face dimensions by more than the following:

- 10 ft (3.05 m) or under—±½ in. (3.2 mm)
- 10 to 20 ft (3.5 to 7.1 m)—+½ in. (3.2 mm) or -¾ in. (4.8 mm)
- 20 to 30 ft (6.096 to 9.144 m)—+½ in. (3.2 mm) or -¾ in. (6.4 mm)
- For each additional 10 ft (3.5 m)—±½ in. (1.6 mm)

The maximum permissible variation from the specified thickness of prefabricated masonry panels shall be not greater than -½ in. (3.2 mm) or +¼ in. (6.4 mm). Prefabricated masonry panels shall have maximum out-of-square differential dimensions (difference in length of the two diagonal face measurements) not greater than ⅛ in./6 ft (3.2 mm/1.83 m) nor an absolute maximum of greater than ¼ in. (6.4 mm).

7. Workmanship, Finish, and Appearance

7.1 *General*—For facing panels, the workmanship and appearance shall be equal to or better than that of the approved sample. The method of fabrication shall be such as to prevent misalignment of individual units, and the joints shall be even and aligned properly within each panel and with adjacent panels. Mortar, grout, or other stains on all panel surfaces to be left exposed shall be removed before the panel is delivered to the job site. Panels shall be protected from further staining during storage, shipment, and erection.

7.2 *Warpage*—The faces of the panels shall not be out of plane more than ⅛ in. (3.2 mm) for each 6 ft (1.83 m) of either height or width.

7.3 *Location of Inserts and Fittings*—The location of anchors, inserts, and lifting and connection devices shall not vary from center-line location shown on the plans or shop drawings, or both, by more than ⅜ in. (9.5 mm).

8. Quality Assurance

8.1 Preparation of Materials:

8.1.1 *Brick*—Test the initial rate of absorption (suction) of the brick in accordance with Test Methods **C67**, and when required, adjust the initial rate of absorption by wetting the units prior to pouring grout or spreading mortar.

8.1.2 *Mortar and Grout*—Proportion the mortar and grout by weight or volume on the basis of the unit weights of the ingredients as given in Specifications **C270** or **C476**. If a high-bond mortar admixture is used, proportion and mix the mortar and grout in accordance with the admixture manufacturer's specifications.

8.2 Quality Control Tests:

8.2.1 Subject a sample of at least ten specimens of masonry units for each 50 000 units of a given type used in the fabrication of panels to the compressive strength and absorption tests in accordance with Test Methods **C67** or **C140**.