



Designation: **C1780—16 C1780 – 16a**

Standard Practice for Installation Methods for Adhered Manufactured Stone Masonry Veneer¹

This standard is issued under the fixed designation C1780; 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 practice is intended to provide accepted procedures to designers and installers of adhered manufactured stone masonry veneer in residential and commercial construction. This information is meant to complement the specific installation instructions provided by manufacturers of adhered manufactured stone masonry veneers and recognized building codes, but is not meant to replace them. This practice does not address installation methods or techniques for all materials in the building envelope. This practice covers the installation of adhered manufactured stone masonry veneer units for application as adhered veneer to exterior and interior walls, columns, landscape structures and other structures suitable to receive adhered veneer. The units included in this practice are manufactured to meet the requirements of Specification C1670. This practice is limited to the installation of units. This practice does not cover all flashing or moisture management requirements. Refer to the applicable building code and project documents for additional flashing and moisture management requirements.

NOTE 1—The Masonry Veneer Manufacturers Association (MVMA) publication *Installation Guide for Adhered Concrete Masonry Veneer* provides generally accepted methods and details for installation and flashing.

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 All workmanship and materials related to the installation of adhered manufactured stone masonry veneer units shall meet the requirements of the contract documents and building code having jurisdiction over the project.

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 and health practices and determine the applicability of regulatory limitations prior to use. (Warning—Fresh hydraulic cementitious mixtures are caustic and may cause chemical burns to skin and tissue upon prolonged exposure.²)*

2. Referenced Documents

2.1 ASTM Standards:³

- C90 Specification for Loadbearing Concrete Masonry Units
- C270 Specification for Mortar for Unit Masonry
- C482 Test Method for Bond Strength of Ceramic Tile to Portland Cement Paste
- C847 Specification for Metal Lath
- C926 Specification for Application of Portland Cement-Based Plaster
- C932 Specification for Surface-Applied Bonding Compounds for Exterior Plastering
- C933 Specification for Welded Wire Lath
- C979 Specification for Pigments for Integrally Colored Concrete
- C1032 Specification for Woven Wire Plaster Base
- C1059 Specification for Latex Agents for Bonding Fresh To Hardened Concrete
- C1063 Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster
- C1180 Terminology of Mortar and Grout for Unit Masonry

¹ This practice 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 Annual Book of ASTM Standards, Vol 04.01. See the section on Safety Precautions in the Manual of Cement Testing.

³ 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

- C1232 Terminology of Masonry
- C1325 Specification for Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units
- C1384 Specification for Admixtures for Masonry Mortars
- C1670 Specification for Adhered Manufactured Stone Masonry Veneer Units
- C1714 Specification for Preblended Dry Mortar Mix for Unit Masonry
- E2556/E2556M Specification for Vapor Permeable Flexible Sheet Water-Resistive Barriers Intended for Mechanical Attachment
- 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
 - ICC ES AC 376 Acceptance Criteria for Reinforced Cementitious Sheets Used as Wall and Ceiling Sheathing and Floor Underlayment⁵
- 2.3 *ANSI Standards:*⁶
 - ANSI A118.1-2013.1 American National Standard Specifications for Dry-Set Cement Mortar
 - ANSI A118.4-2013.1 American National Standard Specifications for Modified Dry-Set Cement Mortar
- 2.4 *ICRI International Concrete Repair Institute:*⁷
 - No. 310.2–1997 Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings and Polymer Overlays (formerly No. 03732). Concrete Surface Profile Chips.
- 2.5 *Masonry Veneer Manufacturers Association:*⁸
 - MVMA Installation Guide for Adhered Concrete Masonry Veneer

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *adhered manufactured stone masonry veneer, n*—the assembly of thin masonry units adhered to a backing with a cementitious mortar.

⁴ Available from The Masonry Society (TMS), 105 South Sunset Street, Suite Q, Longmont, CO 80501, <http://www.masonrysociety.org>.

⁵ Available from ICC Evaluation Service, 3060 Saturn Street, Suite 100 Brea, California 92821, <http://www.iccsafe.org>.

⁶ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

⁷ Available from International Concrete Repair Institute (ICRI), 38800 Country Club Drive Farmington Hills, MI 48331, <http://www.icri.org>.

⁸ Available from Masonry Veneer Manufacturers Association (MVMA), 13750 Sunrise Valley Drive Herndon, VA 20171, <http://www.masonryveneer.org>.

3.1.1.1 Discussion—

Other names have been used for this product since it was developed and the Masonry Veneer Manufacturers Association can provide historic information regarding names.

3.1.2 *back butter, v*—the act of applying a setting bed mortar to the back of a masonry unit.

3.1.3 *brown coat, n*—in multiple coat stucco work, the second coat, applied over the scratch coat.

3.1.4 *drainage wall system, n*—a system installation that creates a physical planar air gap between cladding system and water resistive barrier.

3.1.5 *foundation weep screed, n*—an accessory used to terminate adhered manufactured stone masonry veneer at the bottom of exterior framed walls.

3.1.5.1 Discussion—

This accessory shall have a sloped, solid, or perforated, ground or screed flange to facilitate the removal of moisture from the air gap and a vertical attachment flange not less than 3½ in. (89 mm) long.

3.1.6 *full setting bed, n*—mortar bed of specified thickness, covering the complete back of units and free of voids.

3.1.7 *scratch coat, n*—the first coat of mortar or hydraulic cement based plaster applied to a base and then scratched to create additional bonding area and mechanical interlock.

3.1.8 *setting bed, n*—the mortar used to bond units to a prepared surface or scratch coat.

3.1.9 *sheathed frame substrate, n*—wood or metal/steel framing covered by a building code approved sheathing material.

3.1.10 *thumb-print hard, adj*—description of mortar joints to determine their readiness for tooling determined when the mortar will retain the imprint of a thumb but no mortar is transferred to the thumb.

3.1.11 *tight fit joint, n*—a joint created when units are installed with edges touching or less than ⅜ in. (10 mm) distance between units.

3.1.11.1 Discussion—

Many units have varied and random edges which make it impossible to define specific minimum or maximum joint space.

3.1.12 *water resistive barrier (WRB), n*—a material behind an exterior wall covering that is intended to resist liquid water that has penetrated the exterior covering from further intruding into the exterior wall assembly.

3.2 Refer to Terminology **C1180** for additional terminology for mortar and Terminology **C1232** for additional terminology for masonry.

4. Materials

4.1 Adhered manufactured stone masonry veneer shall comply with the following requirements:

4.1.1 Units shall comply with Specification **C1670**.

4.2 Water Resistive Barrier shall comply with Specification **E2556/E2556M**.

4.3 Lath shall comply with one of the following:

4.3.1 Expanded metal lath shall be corrosion resistant, shall have a minimum weight of 2.5 lb/yd² (1.4 kg/m²) and shall comply with the requirements of Specification **C847**.

4.3.2 A 3/8-in. rib, expanded metal lath shall be corrosion resistant and shall have a minimum weight of 3.4 lb/yd² (1.8 kg/m²) and shall comply with the requirements of Specification **C847**.

4.3.3 Woven wire mesh shall be corrosion resistant, shall be a minimum of 18 gauge, and shall comply with the requirements of Specification **C1032**.

4.3.4 Welded wire lath shall be corrosion resistant and shall comply with Specification **C933**.

4.3.5 Non-metallic lath material shall be corrosion resistant, with a published evaluation report from an ANSI accredited evaluation service that rates the lath as acceptable substitute for the above listed laths and be rated for use behind adhered manufactured stone masonry veneer.

NOTE 2—It is acceptable to use lath materials that comply with 4.3 that also provide a paper backing which complies with the requirements of 4.2.

4.4 *Cement Board*—Cementitious Backer Units shall comply with Specification **C1325**. Cement boards shall have been evaluated for interior or exterior use in accordance with ICC-ES Acceptance Criteria AC 376 by an ANSI-accredited evaluation service.

4.5 *Mortar*:

4.5.1 Mortar shall comply with one of the following:

4.5.1.1 Type N or Type S of Specification **C270**.

4.5.1.2 Type N or Type S of Specification **C1714**. [ASTM C1780-16a](#)

4.5.1.3 ANSI A118.1-2013.1 or ANSI A118.4-2013.1. [98e69e0-e088-482b-bfc2-0c7f74f54e2e/astm-c1780-16a](#)

NOTE 3—Mortar may be specified by the proportion method or the property method of Specification **C270**.

4.5.2 Admixtures shall comply with Specification **C1384**.

4.5.3 Bonding agents shall comply with Specification **C1059** or Specification **C932**.

4.5.4 Mortar coloring pigments shall comply with Specification **C979**.

4.6 Lath fasteners shall comply with Specification **C1063**.

4.7 Foundation weep screed shall comply with Specification **C1063**.

4.8 Stucco system scratch or brown coat, when used as the adhered manufactured stone masonry veneer scratch coat, shall comply with Specification **C926** up to the brown coat without application of the finish coat.

4.9 Water used for mixing mortar or dampening units, scratch coat, or masonry surface shall be clean and free of amounts of oils, acids, alkalies, salts, organic materials, or other substances that are deleterious to mortar or any metal in the wall.

5. Ambient Conditions

5.1 *Hot and Dry Conditions*—If the ambient conditions exceed 100°F (37°C) or 90°F (32°C) with a wind velocity greater than 8 mph (12.9 km/h) comply with the hot weather construction requirements of local building code, the recommendations of adhered manufactured stone masonry veneer unit manufacturer and hot weather construction provisions of TMS 602/ACI 530.1/ASCE 6. If there is a contradiction among documents, local building code shall prevail.

5.1.1 When adhered manufactured stone masonry veneer is applied in hot or dry weather, before applying mortar, moisten the scratch coat with a fine spray of water or a wet brush to prevent excessive absorption of water from the mortar. The scratch coat shall appear wet but without free water on the surface. Units shall also be moistened following the requirements of 7.2.1.

5.2 *Freezing or Low Temperatures*—Accelerating admixtures shall comply with Specification **C1384**. Anti-freeze admixtures to lower freezing point of mortar shall not be used. Accelerating admixtures containing calcium chloride shall not be used. If the ambient conditions are below 40°F (4°C), the installation shall comply with the cold weather construction provisions of TMS 602/ACI 530.1/ASCE 6.

6. Substrate/Surface Preparation

6.1 The substrates and preparation that follow are typical and field proven applications. Installation over any other substrate requires the approval of the unit manufacturer.

6.1.1 Alternative surface preparation shall be tested in accordance with Test Method **C482** as modified by this practice. The minimum shear bond strength between the unit and the prepared surface shall be 50 psi (0.34 MPa). Refer to the modifications outlined in **Appendix X1**.

6.2 Masonry:

6.2.1 Install units directly on masonry that is clean and free of paint, dirt, sealers, loose or spalling material.

6.2.2 All masonry surfaces that are dirty, painted, coated with curing compounds or surface sealed, shall be cleaned by power washing, sandblasting, beadblasting or appropriate solvent to form a substrate suitable for bonding. If the surface condition cannot support direct application, install lath. If masonry wall exhibits spalling, cracking or general deterioration, the wall shall be evaluated by the designer of record for integrity before proceeding.

6.3 Wood/Metal Framing:

6.3.1 *Water Resistive Barrier (WRB) Installation*—Install two separate layers of WRB outboard of the sheathing material, in accordance with the WRB manufacturer’s installation instructions. Each layer is not required to be the same material. The WRB shall be integrated with all flashing materials in such a manner that prevents penetration of water beyond the WRB. WRB shall overlap a minimum 6 in. (152 mm) at vertical joints and a minimum 2 in. (50 mm) at horizontal joints and shall be applied in shingle fashion. WRB fasteners shall be spaced in accordance with the water resistive barrier manufacturer’s installation instructions.

NOTE 4—Some building code jurisdictions allow a single layer WRB when a drainage wall system is used. This is an acceptable installation when the drainage wall system meets the requirements of Section **10** of this practice.

6.3.2 Sheathed Frame Substrate:

6.3.2.1 *Foundation Weep Screed*—Install foundation weep screed in accordance with Specification **C1063**.

6.3.2.2 *Lath*—Install lath which meets the requirements of **4.3** in accordance with Specification **C1063**, or the alternate lath manufacturer’s installation instructions, or the project design documents.

NOTE 5—In order to facilitate embedment of lath in mortar, some lath products will require furring. Furring and self-furring lath are addressed in Specification **C1063**, Table 3.

6.3.2.3 *Scratch Coat*—Install a scratch coat with a minimum thickness of ½ in. (13 mm). The scratch coat shall be applied with sufficient material and pressure to fully engage and encapsulate the lath and with sufficient thickness of material to allow for scoring the surface. As soon as the scratch coat becomes somewhat firm the entire surface shall be scored in the horizontal direction only.

6.3.3 Open Studs, Non-Solid Sheathing and Metal Building Panels:

NOTE 6—Non-solid sheathing description is intended to address products such as foam sheathing, fiberboard sheathing, and other sheathing products that would not resist the force used to press units onto scratch coat, resulting in detrimental lath movement.

6.3.3.1 *Foundation Weep Screed*—Install foundation weep screed in accordance with Specification **C1063**.

6.3.3.2 *Lath*—Install paperbacked 3.4 lb (1.54 kg) ⅜ in. (10 mm) rib lath in accordance with Specification **C1063** unless the design documents provide other criteria. Paper backing must meet **4.2** to be considered one of the WRB layers.

NOTE 7—Paperbacked lath is an effective method to prevent mortar from reaching insulation cavity in open stud construction or space between ribs in metal building panels. A separately applied layer of WRB can serve the same purpose. Non-solid sheathing applications do not require paperbacked lath as there is no air space to be filled by mortar.

6.3.3.3 *Scratch Coat*—Install a scratch coat with a minimum thickness of ½ in. (13 mm). The scratch coat shall be applied with sufficient material and pressure to fully engage and encapsulate the lath and with sufficient thickness of material to allow for scoring the surface. As soon as the scratch coat becomes somewhat firm, the entire surface shall be scored in the horizontal direction only. This scratch coat shall be cured for at least 48 hours prior to the unit installation. Scratch coats shall be evenly dampened with water just prior to placing units. There shall be no free water on the surface when units are applied.

NOTE 8—The purpose of a 48 hour cured scratch coat in the applications outlined in **6.3.3** is to assure a firm surface to install the units. These applications would otherwise not have a firm substrate to resist the force of pressing units into place, leading to lath movement, causing bond failure on previously installed units.