



Designation: C844 – 04

Standard Specification for Application of Gypsum Base to Receive Gypsum Veneer Plaster¹

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

1. Scope*

1.1 This specification covers the minimum requirements for, and methods of, application of gypsum veneer base for gypsum veneer plasters.

1.2 Gypsum veneer base shall not be used as a base for direct adhesive application of ceramic, metal, or plastic tile in areas exposed to abnormal moisture or humidity or temperature.

1.3 Details of construction for a specific assembly to achieve the required fire resistance shall be obtained from reports of fire-resistance tests, engineering evaluations, or listings from recognized fire testing laboratories.

1.4 Where a specific degree of sound control is required for veneer plaster assemblies and constructions, details of construction shall be in accordance with official reports of tests conducted in recognized sound testing laboratories in accordance with the applicable sound tests, Test Method C423, Test Method E90, or Test Method E492.

1.5 Where this specification is more stringent (size or thickness of framing; spacing of fasteners) than the fire-rated construction, this specification shall govern; otherwise, the construction described in the fire test report shall govern.

1.6 Unheated spaces above gypsum veneer base ceilings shall be properly ventilated (see Appendix X3).

1.7 The values stated in inch-pound units are to be regarded as the standard. The SI (metric) values given in parentheses are approximate and are provided for information purposes only.

1.8 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

¹ This specification is under the jurisdiction of ASTM Committee C11 on Gypsum and Related Building Material and Systems, and is the direct responsibility of Subcommittee C11.03 on Specifications for Application of Gypsum and Other Products in Assemblies.

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2. Referenced Documents

2.1 ASTM Standards:²

C11 Terminology Relating to Gypsum and Related Building Materials and Systems

C423 Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

C514 Specification for Nails for the Application of Gypsum Board

C587 Specification for Gypsum Veneer Plaster

C588/C588M Specification for Gypsum Base for Veneer Plasters³

C754 Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products

C954 Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness

C955 Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases

C1002 Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs

C1007 Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories

C1047 Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base

C1546 Guide for Installation of Gypsum Products in Concealed Radiant Ceiling Heating Systems

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

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

E90 Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

E492 Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine

2.2 *American Softwood Lumber Standard:*

PS–20 American Softwood Lumber Standard⁴

3. Terminology

3.1 *Definitions*—Definitions shall be in accordance with Terminology **C11**.

3.2 *Definitions of Terms Specific to this Standard:*

3.2.1 *base ply*—first ply of gypsum base in multiple ply application.

3.2.2 *face ply*—outer or visible layer of gypsum base in multiple ply application.

3.2.3 *fastener, n*—nails, screws, or staples used for the application of the gypsum base or backing board.

3.2.4 *framing member, n*—that portion of the framing, furring, blocking, etc., to which the gypsum base is attached. Unless otherwise specified, the surface to which abutting edges or ends are attached shall be not less than 1½ in. (38 mm) wide for wood members, not less than ¼ in. (32 mm) wide for steel members, and not less than 6 in. (152 mm) wide for gypsum studs. For internal corners or angles, the bearing surface shall be not less than ¾ in. (19 mm).

3.2.5 *parallel application, n*—gypsum base application where the gypsum base edge is applied parallel to the framing members.

3.2.6 *perpendicular application, n*—gypsum base application where the gypsum base edge is applied at right angles to the framing members.

4. Materials

4.1 Materials shall conform to the respective specifications and standards and to the requirements specified herein.

4.2 *Gypsum Base for Veneer Plasters* (hereinafter referred to as “gypsum base”)—Specification **C588/C588M**.

4.3 *Gypsum Backing Board or Coreboard*—Specification **C442**.

4.4 *Special Fire-Retardant Gypsum Base*—Specification **C588/C588M**, Type X.

4.5 *Foil-Backed Gypsum Base*—Specification **C588/C588M**.

4.6 *Gypsum Veneer Plaster*—Specification **C587**.

4.7 *Nails*—Specification **C514**.

4.8 *Screws:*

4.8.1 *Non-load bearing steel*—Specification **C1002**.

4.8.2 *Load bearing steel*—Specification **C954**.

4.9 *Staples*—No. 16 USS gage 0.063 in. (1.6-mm) flattened galvanized wire with 7/16-in. (11.1-mm) wide-crown minimum outside measure and divergent points. Staples shall be used only for the base ply of two-ply application over wood framing.

4.10 *Steel Framing, Non-load bearing*—Specification **C645** for the specified design criteria.

4.11 *Accessories*—Specification **C1047**.

4.12 *Adhesive:*

4.12.1 For application of gypsum base to steel framing, the adhesive shall be as recommended by the manufacturer of the gypsum base.

4.13 *Steel Framing Load Bearing*—Specification **C955**.

4.14 *Wood Framing*—American Lumber Softwood Standard **PS–20**.

5. Delivery of Materials

5.1 All materials shall be delivered in the original packages, containers, or bundles bearing the brand name and manufacturer (or supplier) identification.

6. Shipping, Handling and Storage

6.1 Gypsum board shall be shipped so as to be kept dry.

6.2 Gypsum board shall be stored so as to be kept dry, preferably inside a building, under a roof. Gypsum board shall be neatly stacked flat with care taken to prevent sagging or damage to edges, ends, and surfaces.

6.3 Where necessary to store gypsum board outside, it shall be stacked flat, off the ground, supported on a level platform and fully protected from weather and direct sunlight exposure.

6.4 Prior to application, the building exterior shall be so enclosed to protect the gypsum base from exposure to weather and direct sunlight.

NOTE 1—The bond of alkaline veneer plaster to gypsum base will be impaired if the base is exposed to direct light or sunlight for extended periods.

7. Environmental Conditions

7.1 *Application of Gypsum Base and Adhesives*—A room temperature of not less than 40 °F (4 °C) shall be maintained during application of gypsum base except when adhesive is used for the attachment of gypsum base. For the bonding of adhesive, a room temperature of not less than 50 °F (10 °C) shall be maintained for 48 h prior to application and continuously thereafter until adhesive is completely dry. When a temporary heat source is used, the temperature shall not exceed 95 °F (35 °C) in any room or area. Adequate ventilation shall be maintained in the working area during the application and adhesive curing process.

8. Application of Gypsum Base

8.1 *General Requirements:*

8.1.1 Installation of steel framing shall be in accordance with applicable Specifications **C754** or **C1007** except where superseded by requirements of **Table 1**.

NOTE 2—For general wood framing requirements, see **Appendix X2**.

8.1.2 *Method of Cutting*—The gypsum base shall be cut by scoring and breaking or by sawing, working from the face side. When cutting by scoring, the face shall be cut with a knife or other suitable tool and the gypsum base snapped back away from the cut face. The back shall be broken by snapping the gypsum base in the reverse direction, or by cutting with a knife or other suitable tool.

⁴ Available from National Institute of Standards and Technology, Gaithersburg, MD 20899.

TABLE 1 Maximum Framing Spacing

Single-ply Base (Thickness), in. (mm)	Application to Framing	Maximum On Center Spacing of Framing, in. (mm)
Ceilings:	parallel	16 (406)
	perpendicular	24 (610)
	perpendicular	24 (610)
Sidewalls:	perpendicular	16 (406)
	parallel	16 (406)
	perpendicular	24 (610)
	parallel or perpendicular	24 (610)
	parallel or perpendicular	24 (610)

^A 1/2-in. (12.7-mm) gypsum base applied perpendicular on 24-in. (610-mm) on centers framing shall be considered to be minimum construction.

^B For 5/8-in. (15.9-mm) base, perpendicular on ceilings and either perpendicular or parallel on sidewalls at 24-in. (610-mm) on centers spacing, only two-component veneer plaster or special joint reinforcement, as recommended by the gypsum veneer plaster manufacturer, shall be used.

^C 3/8-in. (9.5-mm) gypsum base shall be used over wood framing with two-component veneer plaster systems only.

8.1.3 All cut edges and ends of the gypsum base shall be smoothed to obtain neat jointing. Cut-outs for pipes, fixtures, or other small openings on the face and back of the base shall be scribed in outline before removing or cut out with a saw or other suitable tool. The gypsum base shall be scribed where it meets projecting surfaces. Base shall be brought lightly into contact with adjacent panels but not forced into place. Abutting ends and edges shall fit neatly.

8.1.4 When gypsum base is to be applied to both ceiling and walls, the base shall be applied to the ceiling and then to the walls.

8.2 Fastening, Mechanical:

8.2.1 The gypsum base shall be held in firm contact with the underlying support while driving any fastener.

8.2.2 Fastener application shall proceed from the center of the field of the gypsum base to the ends and edges or shall begin along one edge and proceed toward the other edge.

8.2.3 Except where required for fire rating, structural performance, or other special considerations, fastening to top or bottom plates shall not be required.

8.2.4 Fasteners shall be spaced not less than 3/8 in. (9.5 mm) from the edges and ends of the gypsum base. Fasteners used at edges or at base ends in horizontal application shall not be more than 1 in. from edges or ends.

8.2.5 Nails and screws shall be driven to a point flush with the gypsum base surface without breaking the surface paper or damaging the surrounding gypsum core and without stripping the framing member around the screws.

8.2.6 Staples shall be driven so that both legs penetrate the support member and the crown bears tightly against the backing board, but does not cut into the face paper. The staple shall be driven with the crown parallel to framing members. Staples shall be used only for the first ply in two-ply gypsum base systems.

8.2.7 Penetration of mechanical fasteners into supporting framing members shall be not less than:

	Nails	Screws	Staples
Wood:	7/8 in. (22 mm)	5/8 in. (15 mm)	5/8 in. (15 mm), each leg
Steel:	...	3/8 in. (9 mm)	...

8.3 Control Joints

8.3.1 Control joints shall be installed in ceilings more than 2500 ft² (232 m²) in area that are constructed with perimeter relief. The distance between control joints shall be not more than 50 ft (15 m) in either direction.

8.3.2 Ceilings of more than 900 ft² (85 m²) in area constructed without perimeter relief shall have control joints installed with spacing not to exceed 30 ft (9 m) in either direction.

8.3.3 Control joints shall be installed where ceiling framing or furring changes direction or where construction joints occur in the base building construction. In partitions, walls, or wall furring, the distance between control joints shall be not more than 30 ft (9 m).

8.3.4 A ceiling height door frame, installed in accordance with the spacing requirements set forth in 8.3, functions as a control joint.

9. Application of Single-Ply Gypsum Base

9.1 The maximum spacing of framing members for single-ply gypsum base construction shall be not more than those shown in Table 1.

9.2 In single-ply installation, all ends and edges of gypsum base shall occur over framing members or other solid backing except where treated joints occur at right angles to framing or furring members.

9.3 Joints on opposite sides of a partition shall be arranged to occur on different framing members.

9.4 Fasteners (Single Ply Application):

9.4.1 Nail Spacing—Space nails a maximum of 7 in. (178 mm) on centers on the ceiling and a maximum of 8 in. (203 mm) on centers on the walls.

9.4.2 Double Nailing—Nails shall be spaced as shown in Fig. 1 and applied as follows:

9.4.2.1 Starting at the center of the base, nails shown as solid dots shall be applied by row starting with row 1, then rows 2 and 2A, 3 and 3A, 4 and 4A. Base shall be kept tight against the framing throughout the procedure.

9.4.2.2 Using the procedure in 9.4.2.1, second nails shown by circles shall be applied.

9.4.2.3 As an alternative procedure, second nails shall be permitted to be applied immediately after all first nails in each individual row have been driven in accordance with 9.4.2.1.

9.4.2.4 Single nails shall be used on the perimeter of the base.

NOTE 3—It may be necessary to reset the first nails in each row after the second nails have been set.

9.4.3 Nails for single-ply application over wood members shall be as follows:

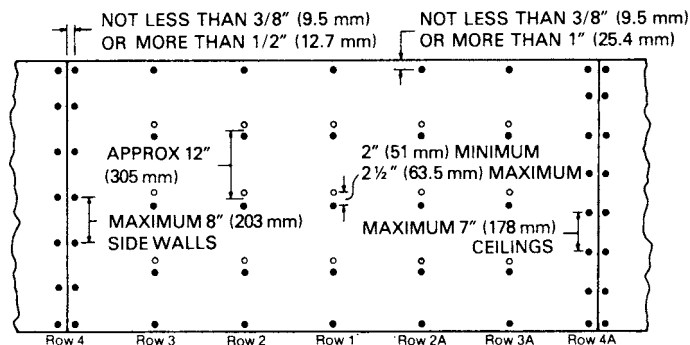


FIG. 1 Double Nailing

Gypsum Base Thickness, in. (mm)	Nails, in. (mm)
3/8 (9.5)	1/4 (32)
1/2 (12.7)	3/8 (35)
5/8 (15.9)	1/2 (38)

9.4.4 Where a specific degree of fire resistance is required for gypsum board assemblies and constructions, nails of same or larger length, shank diameter, and head bearing area, as those described in the applicable fire test report shall be used.

9.4.5 *Screw Spacing*—Screws shall be spaced not more than 12 in. (305 mm) on center along framing members for wall or ceiling application.

9.5 *Floating Interior Angles*—The floating angle method of application is applicable where single nailing, double nailing, or screw attachment is used, and helps to minimize the possibility of cracking in areas adjacent to a wall and ceiling intersection. When using this method the base shall be applied to ceilings first.

9.5.1 *Ceilings*—Fasteners shall be spaced in accordance with 9.4 except that for single nailing the nail adjacent to the ceiling/wall intersection shall be located 7 in. (178 mm) away from the wall, or 11 to 12 in. (279 mm to 305 mm) away for double nailing or screw application.

9.5.2 *Walls*—The gypsum base shall be fastened to walls to provide a firm support for the floated edges of the ceiling gypsum base. The top attachment shall be located into each stud 8 in. (203 mm) down from the ceiling intersection for single nailing (Fig. 2), and 11 to 12 in. (279 to 305 mm) for double nailing (Fig. 1) or screw application (see Fig. 3 and Fig. 4). At sidewall vertical angles (Fig. 5), the overlapping base shall be applied so as to bring the back of the underlying board into firm contact with the face of the framing member behind it.

10. Adhesive-Mechanical Fastener Application

10.1 Except as modified herein, application shall be in accordance with Section 9.

10.2 Surfaces of gypsum base and framing to receive adhesive shall be free of any foreign matter that impairs the bond.

10.3 A bead of adhesive 3/8 in. (9.5 mm) in diameter shall be applied to the face of all wood framing members, except plates, that support the gypsum base. As pressure is applied to the base the adhesive shall spread to an average width of 3/4 in. (19 mm) approximately 1/8 in. (3.2 mm) thick. Application patterns shall be shown as in Fig. 6.

10.3.1 Where two adjacent pieces of gypsum base abut (ends or edges) on a framing member, two parallel beads of adhesive shall be applied to the framing member. Application patterns shall be as shown in Fig. 6.

10.4 Adhesive shall be applied to an area no greater than will be covered with gypsum base within the “open time” of the adhesive.

10.5 Fastener Spacing:

10.5.1 Where the properties of the adhesive ensure bridging between the gypsum base and the wood framing, no fastening shall be required in the field of the base for walls. In such cases, perimeter fastening, 16 in. (406 mm) on center, shall be required.

10.5.2 Where the properties of the adhesive achieve no positive bridging between the board and the wood framing, either temporary field nailing or temporary bracing shall be required to ensure contact between the base, the adhesive, and the stud face until the adhesive develops adequate bond strength. Fasteners shall be spaced in accordance with Table 2.

11. Application over Existing Surfaces

11.1 Gypsum base installed over uneven or broken surfaces, on the interior of all exterior masonry or concrete walls or columns, or over reasonably smooth, solid interior surfaces such as concrete or unit masonry shall be applied over furring strips or furring channels in accordance with Section 9 of this specification.

11.2 Over reasonably smooth, sound, existing surfaces, such as gypsum wallboard or plaster in good condition, the gypsum base shall be applied by using fasteners of sufficient length to penetrate into the underlying framing members in accordance with 8.2.7. Fasteners shall be spaced in accordance with Sections 8 and 9 of this specification.

11.3 Fastener and adhesive attachment of gypsum base to existing surfaces shall be in accordance with Section 10 of this specification.

12. Foil-Backed Gypsum Base

12.1 The application of foil-backed gypsum base shall conform to all of the specifications for the application of gypsum base except that it shall not be used as follows:

- 12.1.1 The face ply on a two-ply laminating system.
- 12.1.2 Laminated directly to masonry.
- 12.1.3 Directly over plaster or other existing surfaces.