



Designation: C840 – 23

Standard Specification for Application and Finishing of Gypsum Board¹

This standard is issued under the fixed designation C840; 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.

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

1. Scope*

1.1 This specification covers the minimum requirements for the methods of application and finishing of gypsum board, including related items and accessories to interior walls and ceilings and to exterior soffits.

1.2 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.

1.2.1 Where this specification is more stringent (size or thickness of framing; size and spacing of fasteners) than the fire-rated construction, this specification shall govern.

1.3 Where sound control is required for a gypsum board assembly, details of construction shall be in accordance with reports of acoustical tests of assemblies that have met the required acoustical values.

1.4 Unheated spaces above gypsum board ceilings shall be properly ventilated (see [Appendix X2](#)).

1.5 The various application systems are located in the following sections:

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

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1.6 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.

1.7 The text of this specification 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 specification.

1.8 The following precautionary caveat pertains only to Sections 6 – 26. *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use. For specific precautionary statements, see 4.1.1, 4.1.2, and 24.5.*

1.9 *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

- C11 Terminology Relating to Gypsum and Related Building Materials and Systems
- C475/C475M Specification for Joint Compound and Joint Tape for Finishing Gypsum Board
- C514 Specification for Nails for the Application of Gypsum Board
- C557 Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing
- C645 Specification for Nonstructural Steel Framing Members

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

- C754** Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
- C920** Specification for Elastomeric Joint Sealants
- 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 Cold-Formed Steel Structural Framing Members
- C1002** Specification for Steel Self-Piercing Tapping Screws for 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
- C1396/C1396M** Specification for Gypsum Board
- C1546** Guide for Installation of Gypsum Products in Concealed Radiant Ceiling Heating Systems
- E2634** Specification for Flat Wall Insulating Concrete Form (ICF) Systems

2.2 U.S. Department of Commerce Publication:³

PS20 American Softwood Lumber Standard

2.3 ANSI Standards:⁴

ANSI A108 Specifications for the Installation of Ceramic Tile

ANSI A136.1 Specifications for Organic Adhesives for Installation of Ceramic Tile, Type I and Type II

2.4 AISI Standards:⁵

S220 North American Standard for Cold-Formed Steel Framing – Nonstructural Members

S240 North American Standard for Cold-Formed Steel Structural Framing

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 *critical lighting, n*—a condition where interior surfaces are flooded by natural or artificial lighting at an oblique angle.

3.2.2 *decoration, n*—a material or materials designed to conceal or protect the surface of the gypsum board (see **Appendix X3**).

3.2.3 *dry type, n*—a compound in powder form to be mixed with water before use.

3.2.4 *drying type, n*—a joint compound that hardens due to evaporation.

3.2.5 *face panel, n*—outside ply of multiple layer gypsum board assemblies.

³ Available from U.S. Government Printing Office, Superintendent of Documents, 732 N. Capitol St., NW, Washington, DC 20401-0001, <http://www.access.gpo.gov>.

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

⁵ Available from American Iron and Steel Institute (AISI), 25 Massachusetts Ave., NW, Suite 800, Washington, DC 20001, <http://www.steel.org>.

3.2.6 *finish(ing), v*—the act of concealing joints with joint compound and tape; concealing fastener heads and edges or flanges of accessories with joint compound.

3.2.7 *flange, n*—that part of an accessory extending over the face of the gypsum board intended to become a part of the monolithic plane of the prepared surface.

3.2.8 *joint photographing, n*—a condition where the finished joint areas are visible after final decoration.

3.2.9 *joint treatment, n*—application of joint tape and compound to the joint between gypsum boards.

3.2.10 *laminating compound, n*—a material used to adhere gypsum board to gypsum board or other monolithic materials.

3.2.11 *moderate contact, n*—the edges and ends are butted at joints but not forced together.

3.2.11.1 *Discussion*—Small gaps not greater than ¼ in. (6 mm) are acceptable (see **7.4**).

3.2.12 *parallel or vertical application, n*—gypsum board applied with the edges parallel to the framing member to which it is attached.

3.2.13 *perpendicular or horizontal application, n*—gypsum board application with the edges applied at right angles to the framing member to which it is attached.

3.2.14 *ready-mix type, n*—a factory-prepared compound ready to be used without the addition of water.

3.2.15 *setting type, n*—a joint compound that hardens by a chemical reaction and increases in strength through drying.

3.2.16 *skim coat, n*—either a thin coat joint compound applied at a trowel consistency or a material manufactured specifically for this purpose, applied in accordance with manufacturer's recommendations over the entire surface.

3.2.16.1 *Discussion*—A skim coat is essentially a film of joint compound and is not applied at a readily measurable thickness. There is no specific mil thickness that constitutes a proper skim coat (see **Appendix X7**).

3.2.17 *spotted, adj*—a fastener head that has been covered with joint compound.

3.2.18 *treated joint, n*—a joint between gypsum boards that is reinforced with tape and joint compound or covered by strip moldings.

4. Environmental Conditions

4.1 *Application of Gypsum Board, Joint Treatment Materials, and Adhesives*—Room temperature shall be maintained at not less than 40 °F (4 °C) during application of gypsum board except when adhesive is used for the attachment of gypsum board. For the bonding of adhesive, joint treatment, texturing, and decoration, the room temperature shall be maintained at not less than 50 °F (10 °C) for 48 h prior to application and continuously thereafter until occupancy. See **X7.7** for additional detail regarding environmental control during the installation and finishing process.

4.1.1 When a temporary heat source is used, the temperature shall not exceed 95 °F (35 °C) in any given room or area.

4.1.2 Adequate ventilation shall be maintained in the working area during installation and curing period.

4.1.2.1 When portable gas or kerosene heaters are used, the extra humidity that they produce shall be removed by ventilation or mechanical dehumidification.

4.2 Gypsum board shall be protected from direct exposure to rain, snow, sunlight, or other excessive weather conditions.

NOTE 1—Where manufacturers' recommendations differ from the above, follow their recommendations.

4.3 Ready-mixed joint compounds shall be protected from freezing, exposure to extreme heat, and direct sunlight.

5. Materials and Manufacture

5.1 *Gypsum Boards*—A family of gypsum sheet products as defined in Terminology **C11**.

5.1.1 *Type X (Special Fire-resistant) Gypsum Wallboard, Gypsum Backing Board, Water-resistant Gypsum Backing Board, or Exterior Gypsum Soffit Board*—Gypsum board that provides a greater degree of fire resistance than regular gypsum board as defined in Specification **C1396/C1396M**.

5.1.2 *Foil-backed Gypsum Wallboard or Gypsum Backing Board*—Regular or Type X gypsum board with foil laminated to the back surface. The foil is a vapor retarder.

5.1.3 *Predecorated Gypsum Board*—Gypsum board with a decorative wallcovering or coating applied in-plant by the gypsum board manufacturer.

5.2 *Gypsum Wallboard*—See Specification **C1396/C1396M**.

5.3 *Gypsum Backing Board and Coreboard*—See Specification **C1396/C1396M**.

5.4 *Water-resistant Gypsum Backing Board*—See Specification **C1396/C1396M**.

5.5 *Exterior Gypsum Soffit Board*—See Specification **C1396/C1396M**.

5.6 *Gypsum Ceiling Board*—See Specification **C1396/C1396M**.

5.7 *Finishing Materials:*

5.7.1 *Compounds*—Taping compound, finishing compound, and all-purpose compound shall meet the requirements of Specification **C475/C475M**.

5.7.2 Mix compounds in accordance with the manufacturers' directions.

5.7.3 *Joint Tape*—See Specification **C475/C475M**.

5.8 *Fasteners:*

5.8.1 *Nails*—See Specification **C514**.

5.8.1.1 Nails for use with pressure treated lumber shall be compatible with the preservative treated and fire retardant treated lumber.

5.8.2 *Screws:*

5.8.2.1 See Specification **C1002** for screws for fastening gypsum board to wood members, steel members less than 0.033 in. (0.84 mm) in thickness, and to gypsum board.

5.8.2.2 See Specifications **C754** and **C954** for screws for fastening gypsum board to steel members from 0.033 in. to 0.112 in. (0.84 mm to 2.84 mm) in thickness.

5.8.2.3 Screws for use with pressure treated lumber shall be compatible with the preservative treated and fire retardant treated lumber.

5.8.3 *Staples*—No. 16 USS gauge flattened galvanized wire staples with $\frac{7}{16}$ in. (11 mm) wide crown outside measurement. Legs shall have divergent points.

NOTE 2—Use only for the base ply of two-ply gypsum board application.

5.8.3.1 Staples for use with pressure treated lumber shall be compatible with the preservative treated and fire retardant treated lumber.

5.9 *Adhesives:*

5.9.1 *Fastening Gypsum Board to Wood Framing*—See Specification **C557**.

5.9.2 *Fastening Gypsum Board to Steel Framing*—As specified by the manufacturer.

5.9.3 *Laminating Gypsum Board to Gypsum Board*—Laminating compounds, taping compound, or adhesive shall be as specified by the manufacturer.

5.10 *Framing Members:*

5.10.1 Wood framing members shall conform to PS20, American Softwood Lumber Standards. The surface to which abutting edges or ends are attached shall be not less than 1½ in. (38 mm) wide. For internal corners or angles, the bearing surface shall not be less than ¾ in. (19 mm).

5.10.2 *Steel Studs, Furring Channels, and Runners:*

5.10.2.1 Non-load-bearing (see Specification **C645** or AISI S220).

5.10.2.2 Load-bearing (see Specification **C955** or AISI S240).

5.10.3 *Gypsum Studs*—Specification **C1396/C1396M**, not less than 1 in. (25 mm) thick by 6 in. (150 mm) wide. Studs shall be either solid or laminated.

5.11 *Accessories*—See Specification **C1047**.

5.12 *Water*—Water shall be clean, fresh, and potable (suitable for domestic consumption).

5.13 *Face Panels*—Face panels shall be ½ in. (12.7 mm), ⅝ in. (15.9 mm), or multiple laminations of regular or Type X gypsum board.

5.14 *Core Board*—Core board shall be ¾ in. or 1 in. (19 mm or 25.4 mm) either single thickness or multiple layers to the required 25 mm thickness.

6. Substrate, Surface Preparation

6.1 The attachment surface of any framing member shall not vary more than ⅛ in. (3 mm) from the plane of the faces of adjacent framing members.

6.2 Wood framing shall be as straight and true as possible. Wood framing shall be securely attached following acceptable engineering practices and as required for the intended design.

NOTE 3—For installation of wood framing, see **Appendix X4**.

6.3 Metal framing members shall be of the proper size and design for their intended use and shall be installed in accordance with Specifications **C754** or **C1007** as required.

6.4 Where used as an alternative to framing, backing, or blocking, specially designed corner clips and edge clips shall