



Designation: C 442/C 442M – 04

Standard Specification for Gypsum Backing Board, Gypsum Coreboard, and Gypsum Shaftliner Board¹

This standard is issued under the fixed designation C 442/C 442M; 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 Department of Defense.

1. Scope*

1.1 This specification covers gypsum board designed to be used as a base in multilayer systems, as a gypsum stud or core in semi-solid or solid gypsum board partitions, or in shaftwall assemblies.

NOTE 1—Specification C 840C 840 contains application procedures for gypsum backing board, gypsum coreboard, and gypsum shaftliner board.

1.2 The values stated in inch-pound units are to be regarded as standard. Within the text, the SI units are shown in brackets. The values stated in each system shall be used independent of the other. Values from the two systems shall not be combined.

1.3 The terms “backing board,” “coreboard,” and “shaftliner board,” refer to different end uses of the gypsum board specified in this specification. The term “gypsum backing board,” in this specification, shall include gypsum coreboard and gypsum shaftliner board unless otherwise stated.

1.4 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.

2. Referenced Documents

2.1 *ASTM Standards*:²

- C 11 Terminology Relating to Gypsum and Related Building Materials and Systems
- C 473 Test Methods for Physical Testing of Gypsum Panel Products
- C 645 Specification for Nonstructural Steel Framing Members
- C 840 Specification for Application and Finishing of Gypsum Board

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 C11.01 on Specifications and Test Methods for Gypsum Products.

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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.

- C 1264 Specification for Sampling, Inspection, Rejection, Certification, Packaging, Marking, Shipping, Handling, and Storage of Gypsum Board
- E 84 Test Method for Surface Burning Characteristics of Building Materials
- E 96 Test Methods for Water Vapor Transmission of Materials
- E 119 Test Methods for Fire Tests of Building Construction and Materials

3. Terminology

3.1 Definitions—Definitions of terms shall be in accordance with Terminology C 11C 11.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *gypsum backing board, n*—a $\frac{1}{4}$ to $\frac{5}{8}$ -in. [6.4 to 15.9-mm] gypsum board used as a backing for gypsum wallboard, acoustical tile, or other dry cladding.

3.2.2 *gypsum coreboard, n*—a $\frac{3}{4}$ or 1-in. [19.0 to 25.4-mm] gypsum board used as a gypsum stud or core in semisolid or solid gypsum board partitions.

3.2.3 *gypsum shaftliner board, n*—a $\frac{3}{4}$ or 1-in. [19.0 or 25.4-mm] gypsum board used in shaftwall assemblies.

4. Materials and Manufacture

4.1 Gypsum backing board shall consist of a noncombustible core, essentially gypsum, surfaced with paper bonded to the core.

4.2 Gypsum coreboard is a single $\frac{3}{4}$ -in. [19.0-mm] or 1-in. [25.4-mm] thick board or is composed of two factory laminated boards to provide $\frac{3}{4}$ -in. [19.0-mm] or 1-in. [25.4-mm] total nominal thickness.

4.3 Gypsum shaftliner board is a single $\frac{3}{4}$ -in. [19.0-mm] or 1-in. [25.4-mm] thick board.

4.4 Foil-backed gypsum backing board shall consist of gypsum backing board with a layer of aluminum foil laminated to the back surface.

4.5 *Gypsum Backing Board, Type X (Special Fire-Resistant):*

4.5.1 Gypsum backing board, type X, designates gypsum backing board, except gypsum coreboard and gypsum shaftliner board, complying with this specification that provides not

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

less than 1-h fire-resistance for boards $\frac{5}{8}$ -in. [15.9-mm] thick or $\frac{3}{4}$ -h fire-resistance for boards $\frac{1}{2}$ -in. [12.7-mm] thick, applied parallel with and on each side of load bearing 2 by 4 wood studs spaced 16-in. [406-mm] on center with 6d coated nails, $1\frac{7}{8}$ -in. [48-mm] long, 0.0915-in. [2.3-mm] diameter shank, $\frac{1}{4}$ -in. [6.4-mm] diameter heads, spaced 7-in [178-mm] on center with gypsum backing board joints staggered 16-in. [406-mm] on each side of the partition and tested in accordance with Test Methods E 119E 119.

4.5.2 Gypsum shaftliner board, type X, designates gypsum shaftliner board complying with this specification that meets the acceptance criteria for temperature rise for not less than $1\frac{1}{2}$ h for boards $\frac{3}{4}$ -in. [19.0-mm] thick or 2 h for boards 1-in. [25.4-mm] thick, when applied in a double layer solid nonload bearing partition as described in 4.5.2.1 and tested in accordance Test Methods E 119E 119 fire endurance exposure with thermocouple locations as specified in 4.5.2.2.

4.5.2.1 Two layers of gypsum shaftliner board applied vertically and friction fit into vertical 25-gage steel “H” members, $1\frac{1}{2}$ -in. [38.1-mm] deep for boards $\frac{3}{4}$ -in. [19.0-mm] thick or 2-in. [50.8-mm] deep for boards 1-in. [25.4-mm] thick, spaced 24-in. [610-mm] on centers and 25-gage steel track at the perimeter of the partition. “H” members shall be formed with a single web or shall be two pieces of perimeter track fastened together along the web with screws spaced 25-in. [610-mm] on centers.

4.5.2.2 Temperature rise on the unexposed surface shall be measured using not less than five thermocouples; one shall be located at the center of the assembly and one shall be located at the center of each quadrant. Thermocouples shall be located not less than 3 in. [76-mm] from an “H” member.

NOTE 2—Consult gypsum backing board producers for independent test data on assembly details and fire resistance classifications for other types of construction. See fire test reports or listings from recognized fire testing laboratories for assembly particulars, materials, and classifications.

4.6 Gypsum backing board shall have a flame spread index of not more than 25 when tested in accordance with Test Method E 84E 84.

5. Physical Properties

5.1 Specimens shall be taken from the samples obtained in accordance with Specification C 1264C 1264.

5.2 Specimens shall be tested in accordance with Test Methods C 473C 473.

5.2.1 *Flexural Strength*—The specimens shall be tested face up and face down. The average breaking load shall be not less than the following:

Thickness, in. [mm]	Method A		Method B	
	Bearing Edges Across Fiber of Surfacing Load, lbf [N]	Bearing Edges Parallel to Fiber of Surfacing Load, lbf [N]	Bearing Edges Across Fiber of Surfacing Load, lbf [N]	Bearing Edges Parallel to Fiber of Surfacing Load, lbf [N]
$\frac{1}{4}$ [6.4]	50 [222]	20 [89]	46 [205]	16 [71]
$\frac{3}{8}$ [9.5]	80 [356]	30 [133]	77 [343]	26 [116]
$\frac{1}{2}$ [12.7]	110 [489]	40 [178]	107 [476]	36 [160]
$\frac{5}{8}$ [15.9]	140 [622]	50 [222]	137 [609]	46 [205]
$\frac{3}{4}$ [19]	170 [756]	60 [267]	167 [743]	56 [249]
1 [25.4]	230 [1023]	80 [356]	228 [1010]	77 [343]

5.2.2 *Humidified Deflection*—The specimens shall have an average deflection of not more than the following:

Thickness, in. [mm]	Humidified Deflection, in. [mm]
$\frac{1}{4}$ [6.4]	not required
$\frac{3}{8}$ [9.5]	$1\frac{5}{8}$ [48]
$\frac{1}{2}$ [12.7]	$1\frac{9}{8}$ [32]
$\frac{5}{8}$ [15.9]	$\frac{5}{8}$ [16]
$\frac{3}{4}$ [19.0]	not required
1 [25.4]	not required

5.2.3 *Core, End, and Edge Hardness*—The specimens shall have an average hardness of not less than 15 lbf [67 N] when tested by Method A and 11 lbf [49 N] when tested by Method B.

5.2.4 *Nail-Pull Resistance*—The specimens shall have an average nail-pull resistance of not less than the following:

Thickness, in. [mm]	Test Method A	Test Method B
	Nail Pull Resistance, lbf [N]	Nail Pull Resistance, lbf [N]
$\frac{1}{4}$ [6.4]	40 [178]	36 [160]
$\frac{3}{8}$ [9.5]	60 [267]	56 [249]
$\frac{1}{2}$ [12.7]	80 [356]	77 [343]
$\frac{5}{8}$ [15.9]	90 [400]	87 [387]
$\frac{3}{4}$ [19]	not required	not required
1 [25.4]	not required	not required

5.3 Foil-Backed Gypsum Backing Board:

5.3.1 Foil-backed gypsum backing board shall meet all the requirements for gypsum backing board. In addition, aluminum foil shall be bonded to the back surface.

5.3.2 When tested in accordance with Test Methods E 96E 96 (Desiccant Method), the permeance of foil-backed gypsum backing board shall be not more than 0.30 perm [17 ng/Pa · s · m²] for the condition of 50 % relative humidity on the face of the board and 0 % relative humidity on the foil-covered side of the board.

6. Dimensions and Tolerances

6.1 Specimens shall be taken from the samples obtained in accordance with Specification C 1264C 1264.

6.2 Thickness, width, length, and end squareness shall be determined in accordance with Test Methods C 473C 473.

6.2.1 *Thickness*—The nominal thickness shall be $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, and 1 in. [6.4, 9.5, 12.7, 15.9, 19.0, and 25.4-mm] with tolerances in the nominal thickness of $\pm 1/32$ in. [± 0.8 mm] and with a local tolerance of $\pm 1/16$ in. [± 1.6 mm] from the nominal thickness.

6.2.2 *Width*—The nominal width shall be up to 48 in. [1220 mm], and widths up to 54 in. [1370 mm], with a tolerance of $\frac{1}{8}$ in. [3 mm] under the specified width.

6.2.3 *Length*—The nominal length shall be from 4 to 16 ft [1220 to 4866 mm] with a tolerance of $\pm \frac{1}{4}$ in. [± 6 mm] from the specified length.

6.2.4 *End Squareness*—Corners shall be square with a tolerance of $\pm \frac{1}{8}$ in. [± 3 mm] in the full width of the board.

6.3 *Edges and Ends*—The edges and ends shall be straight and either square, beveled, round, V-tongue and groove, or featured.

7. Finish, and Appearance

7.1 The surfaces of the gypsum backing board shall be true and free from imperfections that render it unfit for use.