



## Standard Specification for Fiber-Reinforced Gypsum Panels<sup>1</sup>

This standard is issued under the fixed designation C 1278/C 1278M; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This specification covers fiber-reinforced gypsum panels designed to be used for walls, ceilings, or partitions and affords a suitable surface to receive decoration.

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

1.3 The text of this specification references notes and footnotes that provide explanatory material. These notes and footnotes shall not be considered as requirements of the standard.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

C 11 Terminology Relating to Gypsum and Related Building Materials and Systems<sup>2</sup>

C 22 Specification for Gypsum<sup>2</sup>

C 473 Test Methods for Physical Testing of Gypsum Board Products and Gypsum Lath<sup>2</sup>

C 645 Specification for Nonstructural Steel Framing Members<sup>2</sup>

C 1264 Specification for Sampling, Inspection, Rejection, Certification, Packaging, Marking, Shipping, Handling, and Storage of Gypsum Board<sup>2</sup>

E 84 Test Method for Surface Burning Characteristics of Building Materials<sup>3</sup>

E 96 Test Methods for Water Vapor Transmission of Materials<sup>4</sup>

E 119 Test Methods for Fire Tests of Building Construction and Materials<sup>3</sup>

### 3. Terminology

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

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee C-11 on Gypsum and Related Building Materials and is the direct responsibility of Subcommittee C11.01 on Specifications and Test Methods for Gypsum Products.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 04.01.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 04.07.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 04.06.

### 4. Materials and Manufacture

4.1 Fiber-reinforced gypsum panels shall consist essentially of gypsum with fibers dispersed throughout.

4.1.1 *Gypsum*—Specification C 22.

4.1.2 *Fibers*—Cellulose, derived from paper, paperboard stock, wood, or other organic material.

4.2 The back surface of foil-backed fiber-reinforced gypsum panels shall in addition be covered with aluminum foil.

4.3 Fiber-reinforced gypsum panels, type X (special fire-resistant) designates fiber-reinforced gypsum panels complying with this specification that provide not less than 1-h fire resistance for panels  $\frac{5}{8}$ -in. [15.9-mm] thick or  $\frac{3}{4}$ -h fire resistance for panels  $\frac{1}{2}$ -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,  $1\frac{1}{8}$ -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 fiber-reinforced gypsum panel joints staggered 16 in. [406 mm] on each side of the partition and tested in accordance with Test Methods E 119.

NOTE 1—Consult producers for independent test data on assembly details and fire resistance classifications for other types of construction. See official fire test reports for assembly particulars, materials, and classification.

4.4 Fiber-reinforced gypsum panels shall have a flame spread index of not more than 25 when tested in accordance with Test Method E 84.

### 5. Mechanical Properties

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

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

5.2.1 *Flexural Strength*—The specimens shall have an average breaking load of not less than the following when tested face up or face down:

Thickness, in. [mm]	Breaking Load, lbf [N], Bearing Edges Parallel or Perpendicular to Panel Length, Method B
$\frac{1}{4}$ [6.4]	50 [222]
$\frac{3}{16}$ [7.9]	65 [289]
$\frac{3}{8}$ [9.5]	75 [334]
$\frac{1}{2}$ [12.7]	110 [490]
$\frac{5}{8}$ [15.9]	155 [689]

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

Thickness, in. [mm]	Humidified Deflection, Eighths of an in. [mm]
1/4 [6.4]	not applicable
5/16 [7.9]	not applicable
3/8 [9.5]	not applicable
1/2 [12.7]	3 [10]
5/8 [15.9]	2 [6]

5.2.3 *Core, End and Edge Hardness*—The specimens shall have an average hardness of not less than 20 lbf [89 N] when tested in accordance with 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]	Nail Pull Resistance, lbf [N], Method B
1/4 [6.4]	40 [178]
5/16 [7.9]	50 [222]
3/8 [9.5]	75 [334]
1/2 [12.7]	120 [534]
5/8 [15.9]	145 [645]

5.3 *Foil-Backed Fiber-Reinforced Gypsum Panels:*

5.3.1 Foil-backed fiber-reinforced gypsum panels shall meet all of the requirements for fiber-reinforced gypsum panels. In addition, aluminum foil shall be bonded to the back surface.

5.3.2 When tested in accordance with Test Methods E 96, the permeance of foil-backed fiber-reinforced gypsum panels shall be not more than 0.30 perm [17 ng/Pa·s·m<sup>2</sup>] (Desiccant Method) for the condition of 50 % relative humidity on the face of the panel and 0 % relative humidity on the foil-covered back side of the panel.

6. Dimensions and Permissible Variations

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

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

6.2.1 *Thickness*—The nominal thickness shall be 1/4, 5/16, 3/8, 1/2, or 5/8 in. [6.4, 7.9, 9.5, 12.7, or 15.9 mm], with

permissible variations in the nominal thickness of ±1/64 in. [0.4 mm] and permissible local variations of ±1/32 in. [0.8 mm] from the nominal thickness.

6.2.2 *Width*—The nominal width shall be 24 to 96 in. [610 to 2440 mm], with permissible variation of 3/32 in. [3 mm] under the specified width.

6.2.3 *Length*—The nominal length shall be from 6 to 24 ft [1830 to 7315 mm], with permissible variations of ±1/4 in. [6 mm] from the specified length.

6.2.4 The average thickness of the edge of recessed or tapered-edge shall be not less than 0.015 in. [0.38 mm] but not more than 0.075 in. [1.90 mm] less than the average thickness of the fiber-reinforced gypsum panel.

6.3 *Squareness:*

6.3.1 Corners of panels not more than 54 in. [1370 mm] in width shall be square with a permissible variation of ±1/8 in. [3 mm] in the full width of the panel.

6.3.2 Corners of panels more than 54 in. [1370 mm] in width shall be square with a permissible variation of ±5/16 in. [8 mm] in the full width of the panel.

7. Workmanship, Finish, and Appearance

7.1 The surfaces of the fiber-reinforced gypsum panels shall be true and free from imperfections that would render the panels unfit for use with or without decoration.

8. Sampling, Inspection, Rejection, Certification, Packaging, Marking, Shipping, Handling, and Storage

8.1 Shall be in accordance with Specification C 1264.

9. Keywords

9.1 ceiling; fiber-reinforced gypsum panels; foil-backed; FRGP; gypsum; partition; type X; wall

APPENDIX

(Nonmandatory Information)

X1. ALTERNATE DEFINITION FOR TYPE X


This Appendix gives general information and also suggestions for inclusions to be made elsewhere by the specifier. They are not part of this specification.

X1.1 Fiber-reinforced gypsum panels, type X (special fire-resistant) designates fiber-reinforced gypsum panels providing a greater fire resistance than regular fiber-reinforced gypsum panels of the same thickness. Type X (special fire-resistant) fiber-reinforced gypsum panels, when tested in accordance with Test Methods E 119, shall provide the following minimum fire resistance for the assemblies described:

X1.1.1 One hour for a 5/8-in. [15.9-mm] thickness applied to a partition in a single layer application on each side of 35/8-in. [92-mm] deep non-loadbearing galvanized steel studs complying with Specification C 645 spaced 24 in. [610 mm] on center. The 5/8-in. [15.9-mm] thick fiber-reinforced gypsum panels 48-in. [1220-mm] wide shall be attached using 1-in. [25-mm] long drywall screws spaced 8 in. [203 mm] on center along the

edges and ends, and 12 in. [305 mm] along intermediate studs. All joints shall be oriented parallel to and located over studs and staggered on opposite sides of the assembly, and

X1.1.2 Two hours for a 1/2-in. [12.7-mm] thickness applied to a partition in a double layer application on each side of 21/2-in. [64-mm] deep non-loadbearing galvanized steel studs complying with Specification C 645 spaced 24 in. [610 mm] on center. The base layer 48-in. [1220-mm] wide shall be attached using 1-in. [25-mm] long drywall screws spaced 12 in. [305 mm] on center along panel edges, ends and along intermediate studs. Joints shall be oriented parallel to and located over studs and staggered on opposite sides of the assembly. The face layer 48-in. [1220-mm] wide shall be attached using 15/8-in. [41-mm] long drywall screws spaced 12 in. [305 mm] along panel

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edges, ends and along intermediate studs. Joints shall be oriented parallel to and located over studs, offset 24 in. [610 mm] from the base layer joints, and staggered on opposite sides of the assembly.

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