



## Designation: ~~C1278/C1278M – 07a (Reapproved 2015)~~ C1278/C1278M – 17

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

This standard is issued under the fixed designation C1278/C1278M; 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 described in 1.1.1 – 1.1.4.

1.1.1 *Interior Fiber-Reinforced Gypsum Panels* are designed to be used for walls, ceilings, or partitions and affords a suitable surface to receive decoration.

1.1.2 *Water-Resistant Fiber-Reinforced Gypsum Backing Panels* are designed primarily to be used as a base for the application of ceramic or plastic tile on walls or ceilings. This product is also suitable for decoration.

1.1.3 *Exterior Fiber-Reinforced Gypsum Soffit Panels* are designed for use on exterior soffits and carport ceilings that are completely protected from contact with liquid water.

1.1.4 *Water-Resistant Exterior Fiber-Reinforced Gypsum Sheathing Panels* are designed for use as sheathing on buildings.

1.1.5 *Interior Fiber-Reinforced Gypsum Underlayment Panels* are designed for use as a base for application of finished flooring materials.

1.1.6 *Fiber-Reinforced Gypsum Board Panels* are designed for use in roofing systems.

1.2 Specifications applicable to all fiber-reinforced gypsum panels are located in Sections 1 – 4 and 11 – 13 except as modified by applicable product sections. Specifications applicable to specific panels are located in the following sections:

Interior Fiber-Reinforced Gypsum Panels	5
Water-Resistant Fiber-Reinforced Gypsum Backing Panels	6
Exterior Fiber-Reinforced Gypsum Soffit Panels	7
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Interior Fiber-Reinforced Gypsum Underlayment Panels	9
Fiber-Reinforced Gypsum Roof Board Panels	10

1.3 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.

1.4 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.

1.5 *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:*<sup>2</sup>

[C11 Terminology Relating to Gypsum and Related Building Materials and Systems](#)

[C22/C22M Specification for Gypsum](#)

[C473 Test Methods for Physical Testing of Gypsum Panel Products](#)

[C645 Specification for Nonstructural Steel Framing Members](#)

<sup>1</sup> 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.

Current edition approved Dec. 1, 2015; May 1, 2017. Published December 2015; May 2017. Originally approved in 1994. Last previous edition approved in 2014 as C1278/C1278M – 07a (2011); (2015). DOI: 10.1520/C1278-C1278M-07AR15-10.1520/C1278-C1278M-17.

<sup>2</sup> 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

- [C1264 Specification for Sampling, Inspection, Rejection, Certification, Packaging, Marking, Shipping, Handling, and Storage of Gypsum Panel Products](#)
- [D1037 Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials](#)
- [D3273 Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber](#)
- [E84 Test Method for Surface Burning Characteristics of Building Materials](#)
- [E96/E96M Test Methods for Water Vapor Transmission of Materials](#)
- [E119 Test Methods for Fire Tests of Building Construction and Materials](#)

### 3. Terminology

3.1 *Definitions*—Definitions of terms shall be in accordance with Terminology [C11](#).

3.1.1 *nominal thickness, n*—the manufacturer-stated fractional value of thickness of the gypsum panel product expressed in decimal value to the nearest one-thousandth (0.001) of an inch.

### 4. Materials and Manufacture

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

4.1.1 *Gypsum*—Specification [C22/C22M](#).

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 Water-resistant fiber-reinforced gypsum panels shall be treated with a material that imparts water resistance throughout.

4.4 Fiber-reinforced gypsum panels, mold resistant, designates fiber-reinforced gypsum panels having not more than 20 % mold growth, based on surface area coverage, when tested in accordance with Test Method [D3273](#).

4.5 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 rating for panels 5/8-in. [15.9-mm] thick or 3/4-h fire resistance rating for panels 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 7/8-in. [48-mm] long, 0.0915-in. [2.3-mm] diameter shank, 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~~][406 mm] on each side of the partition and tested in accordance with Test Methods [E119](#).

NOTE 1—Consult producers for independent test data on assembly details and fire resistance ratings for other types of construction. See fire test reports or listings from recognized fire testing laboratories for assembly particulars, materials, and ratings.

4.6 Fiber-reinforced gypsum panels shall have a flame spread index of not more than 25 when tested in accordance with Test Method [E84](#).

4.7 *Physical Properties, Dimensions, and Tolerances of Gypsum Panel:*

4.7.1 Specimens shall be taken from samples obtained in accordance with Specification [C1264](#).

4.7.1.1 Specimens shall be tested in accordance with Test Methods [C473](#).

4.7.2 *Core, End, and Edge Hardness*—The specimens shall have an average hardness of not less than 20 lbf [90 N] when tested in accordance with Method B.

4.7.3 *Edges and Ends*—The edges and ends shall be straight.

4.7.4 *Length*—The nominal length shall be from 6 to 24 ft [1830 to 7320 mm], with a tolerance of  $\pm 1/4$  in. [6 mm] from the specified length.

4.7.5 *Tapered Edge Depth*—The average thickness of the edge of recessed or tapered edge shall be not less than 0.020 in. [0.51 mm] but not more than 0.090 in. [2.29 mm] less than the average thickness of the fiber-reinforced gypsum panel.

### 5. Interior Fiber-Reinforced Gypsum Panels

5.1 *Physical Properties of Interior Fiber-Reinforced Gypsum Panels:*

5.1.1 *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 B, lbf [N]
1/2 [12.7]	110 [490]
5/8 [15.9]	155 [690]

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

Thickness, in. [mm]	Deflection, eighths of an inch, [mm]
1/2 [12.7]	3 [10]
5/8 [15.9]	2 [6]

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

Thickness, in. [mm]	Method B, lbf [N]
1/2 [12.7]	120 [535]
5/8 [15.9]	145 [645]

5.2 *Dimensions and Tolerances of Interior Fiber-Reinforced Gypsum Panel:*

5.2.1 Specimens shall be taken from samples in accordance with Specification **C1264**.

5.2.1.1 Specimens shall be tested in accordance with Test Methods **C473**.

5.2.2 *Thickness*—The thickness shall be 1/2 or 5/8 in. [12.7 or 15.9 mm] with tolerances of  $\pm 0.015$  in. [ $\pm 0.40 \pm 0.015$  in. [ $\pm 0.40$  mm]], and with a local tolerance of  $\pm 0.030$  in. [ $\pm 0.80 \pm 0.030$  in. [ $\pm 0.80$  mm]].

5.2.3 *Width*—The width shall be up to 54 in. [1370 mm], with a tolerance of 3/32 in. [3 mm] under the specified width.

5.2.4 *End Squareness*—Corners shall be square with a tolerance of  $\pm 1/8$  in. [ $\pm 3$  mm] in the full width of the panel.

5.3 *Edges*—The edges shall be either square, beveled, featured, tapered, or featured and tapered.

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

5.4.1 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.

5.4.2 When tested in accordance with Test Methods **E96/E96M**, 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. Water-Resistant Fiber-Reinforced Gypsum Backing Panels**

6.1 *Physical Properties of Water-Resistant Fiber-Reinforced Gypsum Backing Panels:*

6.1.1 *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 B, lbf [N]
1/2 [12.7]	110 [490]
5/8 [15.9]	155 [690]

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

Thickness, in. [mm]	Deflection, eighths of an inch, [mm]
1/2 [12.7]	3 [10]
5/8 [15.9]	2 [6]

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

Thickness, in. [mm]	Method B, lbf [N]
1/2 [12.7]	120 [535]
5/8 [15.9]	145 [645]

6.1.4 *Water Resistance*—The specimens shall have an average water absorption of not more than 5 weight percentage after 2-h immersion.

6.1.5 *Surface Water Absorption*—The specimens shall have an average face surface water absorption of not more than ~~1.6 g~~ **1.6 g** after two hours of elapsed time.

6.2 *Dimensions and Tolerances of Water-Resistant Fiber-Reinforced Gypsum Backing Panel:*

6.2.1 Specimens shall be taken from samples obtained in accordance with Specification **C1264**.

6.2.1.1 Specimens shall be tested in accordance with Test Methods **C473**.

6.2.2 *Thickness*—The nominal thickness shall be 1/2 or 5/8 in. [12.7 or 15.9 mm] with tolerances of  $\pm 1/64$  in. [ $\pm 0.4$  mm], and with a local tolerance of  $\pm 1/32$  in. [ $\pm 0.8$  mm].

6.2.3 *Width*—The width shall be up to 54 in. [1370 mm], with a tolerance of 3/32 in. [3 mm] under the specified width.

6.2.4 *End Squareness*—Corners shall be square with a tolerance of  $\pm 1/8$  in. [ $\pm 3$  mm] in the full width of the panel.

6.3 *Edges*—The edges shall be either square, beveled, featured, tapered, or featured and tapered.

**7. Exterior Fiber-Reinforced Gypsum Soffit Panels**

7.1 *Physical Properties of Exterior Fiber-Reinforced Gypsum Soffit Panels:*

7.1.1 *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 B, lbf [N]
1/2 [12.7]	110 [490]
5/8 [15.9]	155 [690]

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

Thickness, in. [mm]	Deflection, eighths of an inch, [mm]
1/2 [12.7]	3 [10]
5/8 [15.9]	2 [6]

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

Thickness, in. [mm]	Method B, lbf [N]
1/2 [12.7]	120 [535]
5/8 [15.9]	145 [645]

7.2 *Dimensions and Tolerances of Exterior Fiber-Reinforced Gypsum Soffit Panel:*

7.2.1 Specimens shall be taken from samples obtained in accordance with Specification **C1264**.

7.2.1.1 Specimens shall be tested in accordance with Test Methods **C473**.

7.2.2 *Thickness*—The nominal thickness shall be 1/2 or 5/8 in. [12.7 or 15.9 mm] with tolerances in the thickness of  $\pm 1/64$  in. [ $\pm 0.4$  mm], and with a local tolerance of  $\pm 1/32$  in. [ $\pm 0.8$  mm].

7.2.3 *Width*—The width shall be up to 54 in. [1370 mm], with a tolerance of 3/32 in. [3 mm] under the specified width.

7.2.4 *End Squareness*—Corners shall be square with a tolerance of  $\pm 1/8$  in. [ $\pm 3$  mm] in the full width of the panel.

7.3 *Edges*—The edges shall be either square, beveled, featured, tapered, or featured and tapered.

## 8. Water-Resistant Exterior Fiber-Reinforced Gypsum Sheathing Panels

8.1 *Physical Properties of Water-Resistant Exterior Fiber-Reinforced Gypsum Sheathing Panels:*

8.1.1 *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 B, lbf [N]
1/2 [12.7]	110 [490]
5/8 [15.9]	155 [690]

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

Thickness, in. [mm]	Deflection, eighths of an inch, [mm]
1/2 [12.7]	3 [10]
5/8 [15.9]	2 [6]

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

Thickness, in. [mm]	Method B, lbf [N]
1/2 [12.7]	120 [535]
5/8 [15.9]	145 [645]

8.1.4 *Water Resistance of Water-Resistant Exterior Fiber-Reinforced Gypsum Sheathing Panel*—The specimens shall have an average water absorption of not more than 10 weight percentage after 2-h immersion.

8.2 *Dimensions and Tolerances of Water-Resistant Exterior Fiber-Reinforced Gypsum Sheathing Panels:*

8.2.1 Specimens shall be taken from samples obtained in accordance with Specification **C1264**.

8.2.1.1 Specimens shall be tested in accordance with Test Methods **C473**.

8.2.2 *Thickness*—The nominal thickness shall be from 1/2 or 5/8 in. [12.7 or 15.9 mm] with tolerances of  $\pm 1/32$  in. [ $\pm 0.8$  mm], and with a local tolerance of  $\pm 1/16$  in. [ $\pm 1.6$  mm].

8.2.3 *Width*—The nominal width shall be 24 or 48 in. [610 or 1220 mm], with a tolerance of 1/8 in. [3.2 mm] under the specified width.

8.2.4 *End Squareness*—Corners shall be square with a tolerance of  $\pm 1/8$  in. [ $\pm 3$  mm] in the full width of the panel.

8.3 *Edges*—The edges shall be either square or V-tongue and groove.

## 9. Interior Fiber-Reinforced Gypsum Underlayment Panels

9.1 *Physical Properties of Interior Fiber-Reinforced Gypsum Underlayment Panels:*

9.1.1 *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 B, lbf [N]
1/4 [6.4]	40 [175]
3/8 [9.5]	70 [310]
1/2 [12.7]	110 [490]

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

Thickness, in. [mm]	Method B, lbf [N]
1/4 [6.4]	70 [310]
3/8 [9.5]	90 [400]
1/2 [12.7]	120 [535]

9.2 *Dimensions and Tolerances of Interior Fiber-Reinforced Gypsum Underlayment Panels:*

9.2.1 Specifications shall be taken from samples in accordance with Specification **C1264**.