



Designation: C1658/C1658M – 19

# Standard Specification for Glass Mat Gypsum Panels<sup>1</sup>

This standard is issued under the fixed designation C1658/C1658M; 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 the glass mat gypsum panels described in 1.1.1 – 1.1.3.

1.1.1 *Glass mat interior gypsum panel*, designed for use on walls, ceilings, or partitions and that affords a surface suitable to receive decoration.

1.1.2 *Glass mat coreboard gypsum panel, and glass mat shaftliner gypsum panel*, designed for use as a base in multilayer systems or as gypsum studs or cores in semisolid or solid gypsum board partitions, or in shaftwall assemblies.

1.1.3 *Glass mat water-resistant gypsum panel*, designed 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. (*This is distinct from a coated glass mat water-resistant gypsum panel ASTM 1178.*)

1.2 Specifications applicable to all glass mat gypsum panels are located in Sections 1 – 4 and 8 – 10. Specifications applicable to specific glass mat gypsum panels are located in the following sections:

	Section
Glass mat interior gypsum panel	5
Glass mat coreboard gypsum panel, and glass mat shaftliner gypsum panel	6
Glass mat water-resistant gypsum panel	7

1.3 The values stated in either inch-pound units or SI (metric) are to be regarded separately 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.

1.4 *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.*

<sup>1</sup> This test method 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. 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

C1264 Specification for Sampling, Inspection, Rejection, Certification, Packaging, Marking, Shipping, Handling, and Storage of Gypsum Panel Products

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

E119 Test Methods for Fire Tests of Building Construction and Materials

## 3. Terminology

3.1 Definitions used in this specification shall be in accordance with Terminology C11.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *glass mat, n*—a mat of glass fibers with or without a binder.

## 4. Materials and Manufacture

4.1 Glass mat gypsum panel shall consist of a noncombustible core, essentially gypsum complying with Specification C22/C22M, surfaced with glass mat partially or completely embedded in the core.

4.1.1 Glass mat interior gypsum panel shall consist of a noncombustible core, essentially gypsum complying with Specification C22/C22M, surfaced on both the face and back with glass mat partially or completely embedded into the core.

4.1.2 Glass mat coreboard gypsum panel, and glass mat shaftliner gypsum panel shall be either a single panel or

<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

composed of two factory-laminated gypsum panels to provide up to 1 in. [25.4 mm] total nominal thickness, surfaced on both face and back with glass mat partially or completely embedded into the core.

4.1.3 Glass mat gypsum water-resistant panel shall consist of a noncombustible water-resistant core, essentially gypsum complying with Specification **C22/C22M**, surfaced on the face with water-resistant glass mat partially or completely embedded into the core.

4.1.4 Glass mat gypsum panels, mold resistant, designates gypsum panels having not more than 20 % mold growth, based on surface area coverage, when tested in accordance with Test Method **D3273**.

4.2 *Glass Mat Interior Gypsum Panel, and Glass Mat Water-resistant Gypsum Panel, Type X (Special Fire-resistant)* designates glass mat gypsum panel complying with this specification that provide not less than 1 h fire resistance for panel  $\frac{5}{8}$  in. [15.9 mm] thick or  $\frac{3}{4}$  h fire resistance for panel  $\frac{1}{2}$  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 glass mat gypsum panel joints staggered 16 in. [406 mm] on each side of the partition and tested in accordance with Test Methods **E119**.

NOTE 1—Consult manufacturers 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.

4.3 *Glass Mat Shaftliner Gypsum Panel, type X*, designates glass mat gypsum shaftliner panel complying with this specification that meets the acceptance criteria for temperature rise for not less than panels 1-in. [25.4 mm] thick, when applied in a double layer solid non-load bearing partition as described in **4.3.2** and tested in accordance with Test Methods **E119** with thermocouple locations as specified in **4.3.2**.

4.3.1 Two layers of glass mat gypsum shaftliner panel applied vertically and friction fit into vertical 25-gauge steel “H” members, 2-in. [50.8 mm] deep for panels 1-in. [25.4 mm] thick, spaced 24-in. [610 mm] on centers and 25-gauge 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 24-in. [610 mm] on centers.

4.3.2 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.

4.4 Glass mat gypsum panels shall have a flame spread index of not more than 25 when tested in accordance with Test Method **E84**.

4.5 *Physical Properties, Dimensions, and Tolerances of Glass Mat Gypsum Panel:*

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

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

4.5.2 *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 or by Method B.

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

4.5.4 *Length*—The tolerance in length shall be  $\pm\frac{1}{4}$  in. [ $\pm 6$  mm].

4.5.5 *Tapered Edge Depth*—The average thickness of the edge of recessed or tapered edge glass mat gypsum panel 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 glass mat gypsum panel.

## 5. Glass Mat Interior Gypsum Panel

5.1 *Physical Properties of Glass Mat Interior Gypsum Panel:*

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]	Load, lbf [N] Bearing edges perpendicular to the panel edge	Method A or B Load, lbf [N] Bearing edges parallel to the panel edge
$\frac{1}{4}$ [6.4]	50 [222]	40 [178]
$\frac{3}{8}$ [9.5]	75 [334]	60 [267]
$\frac{1}{2}$ [12.7]	100 [445]	80 [356]
$\frac{5}{8}$ [15.9]	140 [623]	100 [445]

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

Thickness, in. [mm]	Deflection, sixteenths of an in. [mm]
$\frac{1}{4}$ [6.4]	not required
$\frac{3}{8}$ [9.5]	not required
$\frac{1}{2}$ [12.7]	5 [8]
$\frac{5}{8}$ [15.9]	4 [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 A or B, lbf [N]
$\frac{1}{4}$ [6.4]	40 [178]
$\frac{3}{8}$ [9.5]	60 [267]
$\frac{1}{2}$ [12.7]	80 [356]
$\frac{5}{8}$ [15.9]	90 [400]

5.2 *Dimensions and Tolerances of Glass Mat Interior Gypsum Panel:*

5.2.1 *Thickness*—The nominal thickness shall be from  $\frac{1}{4}$  to  $\frac{5}{8}$  in. [6.4 to 15.9 mm] with tolerances in the nominal thickness of  $\pm\frac{1}{64}$  in. [ $\pm 0.4$  mm], and with local variations of  $\pm\frac{1}{32}$  in. [ $\pm 0.8$  mm] from the nominal thickness.

5.2.2 *Width*—The width shall be up to 48 in. [1220 mm], or up to 54 in. [1370 mm], with a tolerance of  $\frac{3}{32}$  in. [3 mm] under the specified width.

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

5.3 *Edges:*

5.3.1 The edges of glass mat interior gypsum panel shall be either square, beveled, featured, tapered, or featured and tapered.

## 6. Glass Mat Coreboard Gypsum Panel, and Glass Mat Shaftliner Gypsum Panel

6.1 *Physical Properties of Glass Mat Coreboard Gypsum Panel and Glass Mat Shaftliner Gypsum Panel:*