



## Standard Specification for Gypsum Board<sup>1</sup>

This standard is issued under the fixed designation C 1396/C 1396M; 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.

### 1. Scope\*

1.1 This specification covers the gypsum boards described in 1.1.1-1.1.9.

NOTE 1—Specifications C 840, C 841, C 844 and C 1280 contain application procedures for gypsum board.

1.1.1 *Gypsum wallboard*, designed for use on walls, ceilings, or partitions and that affords a surface suitable to receive decoration.

1.1.2 *Predecorated gypsum board*, designed for use as the finished surfacing for walls, ceilings, or partitions.

1.1.3 *Gypsum backing board, coreboard, and shaftliner board*, designed for use as a base in multilayer systems or as a gypsum stud or core in semisolid or solid gypsum board partitions, or in shaft wall assemblies.

NOTE 2—The terms backing board, coreboard, and shaftliner board refer to different end uses. The term gypsum backing board, as used in this specification, shall include gypsum coreboard and gypsum shaftliner board unless otherwise stated.

1.1.4 *Water-resistant gypsum backing board*, 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.

1.1.5 *Exterior gypsum soffit board*, designed for use on exterior soffits and carport ceilings that are completely protected from contact with liquid water.

1.1.6 *Gypsum sheathing board*, designed for use as sheathing on buildings.

1.1.7 *Gypsum base for veneer plaster*, designed for use as a base for the application of gypsum veneer plaster.

1.1.8 *Gypsum lath*, designed for use as a base for the application of gypsum plaster.

1.1.9 *Gypsum ceiling board*, designed for use on interior ceilings with framing spaced not more than 24 in. [610 mm] on center and that affords a surface suitable to receive water-based texture and other decoration. This product is also suitable for use on interior walls.

1.2 Specifications applicable to all gypsum boards are located in Section 1-4 and 13-15. Specifications applicable to specific gypsum boards are located in the following sections:

|                                                                 | Section |
|-----------------------------------------------------------------|---------|
| Gypsum wallboard, predecorated gypsum board                     | 5       |
| Gypsum backing board, gypsum coreboard, gypsum shaftliner board | 6       |
| Water-resistant gypsum backing board                            | 7       |
| Exterior gypsum soffit board                                    | 8       |
| Gypsum sheathing board                                          | 9       |
| Gypsum base for veneer plaster                                  | 10      |
| Gypsum lath                                                     | 11      |
| Gypsum Ceiling Board                                            | 12      |

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.

### 2. Referenced Documents

#### 2.1 ASTM Standards:<sup>2</sup>

- 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
- C 841 Specification for Installation of Interior Lathing and Furring
- C 844 Specification for Application of Gypsum Base to Receive Gypsum Veneer Plaster
- C 1264 Specification for Sampling, Inspection, Rejection, Certification, Packaging, Marking, Shipping, Handling, and Storage of Gypsum Board
- C 1280 Specification for Application of Gypsum Sheathing
- E 84 Test Method for Surface Burning Characteristics of Building Materials
- E 96 Test Methods for Water Vapor Transmission of Materials

<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 May 1, 2004. Published June 2004. Originally approved in 1998. Last previous edition approved in 2003 as C 1396/C 1396M – 03a.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto: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.

## E 119 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 C 11.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *decorative coating, n*—a paint or other liquid material with or without aggregate.

3.2.2 *decorative sheet or film, n*—a plastic film, either backed or unbacked; plastic sheet; or combination of these.

3.2.3 *edge, n*—the bound edge as manufactured.

3.2.4 *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.

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

### 4. Materials and Manufacture

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

4.1.1 Gypsum sheathing board shall consist of a noncombustible water-resistant core, essentially gypsum, surfaced on both the face and back with water-repellant paper bonded to the core.

4.1.2 Gypsum coreboard shall be either a single board or composed of two factory-laminated gypsum boards to provide up to 1 in. [25.4 mm] total nominal thickness.

4.1.3 Water-resistant gypsum backing board shall consist of a noncombustible water-resistant core, essentially gypsum, surfaced on both the back and face with water-repellant paper bonded to the core.

4.1.4 Predecorated gypsum board shall consist of a noncombustible core, essentially gypsum, surfaced with paper bonded to the core with the face covered with a decorative sheet, film, or coating.

4.1.4.1 Class I predecorated gypsum board shall have a decorative sheet or film laminated to the face.

4.1.4.2 Class II predecorated gypsum board shall have a decorative coating applied to the face.

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

4.3 *Gypsum Board, type X (Special Fire-Resistant):*

4.3.1 *Gypsum Board, type X*, designates gypsum board, except gypsum lath, gypsum coreboard, and gypsum shaftliner board, complying with this specification that provides not less than 1 h fire-resistance rating for boards  $\frac{5}{8}$  in. [15.9 mm] thick or  $\frac{3}{4}$  h fire-resistance rating 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 centers 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 centers with gypsum board joints staggered 16 in. [406 mm] on each side of the partition and tested in accordance with Test Methods E 119.

4.3.2 *Gypsum Lath, type X* designates gypsum lath complying with this specification that provides not less than a 1-h fire-resistance rating for gypsum lath  $\frac{3}{8}$  in. [9.5 mm] thick,

when applied at right angles to and on each side of loadbearing 2 × 4 wood studs spaced 16 in. [406 mm] on centers with blue lath nails spaced 5 in. [127 mm] on centers over which is applied  $\frac{1}{2}$  in. [12.7 mm] 1:2 gypsum sand plaster and tested in accordance with the requirements of Test Method E 119.

NOTE 3—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.

4.3.3 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 4.3.3.1 and tested in accordance with Test Methods E 119 with thermocouple locations as specified in 4.3.3.2.

4.3.3.1 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 24-in. [610 mm] on centers.

4.3.3.2 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 Gypsum wallboard, gypsum backing board, exterior gypsum soffit board, and gypsum ceiling board shall have a flame spread index of not more than 25 when tested in accordance with Test Method E 84.

4.5 *Physical Properties, Dimensions, and Tolerances of Gypsum Board:*

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

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

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 and 11 lbf [49 N] when tested 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 gypsum board 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 gypsum board.

### 5. Gypsum Wallboard and Predecorated Gypsum Board

5.1 *Physical Properties of Gypsum Wallboard and Predecorated Gypsum Board:*



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,<br>in. [mm] | Method A<br>Bearing Edges<br>Perpendicular<br>to Panel Length,<br>lbf [N] | Method A<br>Bearing Edges<br>Parallel to Panel<br>Length, lbf [N] | Method B<br>Bearing Edges<br>Perpendicular<br>to Panel Length,<br>lbf [N] | Method B<br>Bearing Edges<br>Parallel to Panel<br>Length, lbf [N] |
|------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------|
| ¼ [6.4]                | 50 [222]                                                                  | 20 [89]                                                           | 46 [205]                                                                  | 16 [71]                                                           |
| ⅜ [9.5]                | 65 [289]                                                                  | 25 [111]                                                          | 62 [276]                                                                  | 21 [93]                                                           |
| ½ [12.7]               | 80 [356]                                                                  | 30 [133]                                                          | 77 [343]                                                                  | 26 [116]                                                          |
| ⅝ [15.9]               | 110 [489]                                                                 | 40 [178]                                                          | 107 [476]                                                                 | 36 [160]                                                          |
| ¾ [19.0]               | 150 [667]                                                                 | 50 [222]                                                          | 147 [654]                                                                 | 46 [205]                                                          |
|                        | 170 [756]                                                                 | 60 [267]                                                          | 167 [743]                                                                 | 56 [249]                                                          |

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

| Thickness,<br>in. [mm] | Deflection,<br>eighths of an inch [mm] |
|------------------------|----------------------------------------|
| ¼ [6.4]                | not required                           |
| ⅜ [9.5]                | not required                           |
| ½ [12.7]               | 15 [48]                                |
| ⅝ [15.9]               | 10 [32]                                |
| ¾ [19.0]               | 5 [16]                                 |
|                        | 5 [16]                                 |

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

| Thickness,<br>in. [mm] | Method A,<br>lbf [N] | Method B,<br>lbf [N] |
|------------------------|----------------------|----------------------|
| ¼ [6.4]                | 40 [178]             | 36 [160]             |
| ⅜ [9.5]                | 50 [222]             | 46 [205]             |
| ½ [12.7]               | 60 [267]             | 56 [249]             |
| ⅝ [15.9]               | 80 [356]             | 77 [343]             |
| ¾ [19.0]               | 90 [400]             | 87 [387]             |
|                        | 100 [445]            | 97 [432]             |

5.1.4 *Foil-Backed Gypsum Wallboard and Foil-Backed Predecorated Gypsum Board*:

5.1.4.1 Foil-backed gypsum wallboard and foil-backed predecorated gypsum board shall meet all of the requirements for gypsum wallboard and predecorated gypsum board.

5.1.4.2 When tested in accordance with Test Methods E 96, the permeance of foil-backed gypsum wallboard and foil-backed predecorated gypsum board 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 board, and 0 % relative humidity on the back (foil-covered) side of the board.

5.2 *Dimensions and Tolerances of Gypsum Wallboard and Predecorated Gypsum Board*:

5.2.1 *Thickness*—The nominal thickness shall be from ¼ to ¾ in. [6.4 to 19.0 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 gypsum wallboard shall be either square, beveled, featured, tapered, or featured and tapered.

5.3.2 The edges of predecorated gypsum board shall be either square, beveled, or featured.

## 6. Gypsum Backing Board, Gypsum Coreboard, and Gypsum Shaftliner Board

6.1 *Physical Properties of Gypsum Backing Board and Gypsum Coreboard*:

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,<br>in. [mm] | Method A<br>Bearing Edges<br>Perpendicular<br>to Panel Length,<br>lbf [N] | Method A<br>Bearing Edges<br>Parallel to Panel<br>Length, lbf [N] | Method B<br>Bearing Edges<br>Perpendicular<br>to Panel Length,<br>lbf [N] | Method B<br>Bearing Edges<br>Parallel to Panel<br>Length, lbf [N] |
|------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------|
| ¼ [6.4]                | 50 [222]                                                                  | 20 [89]                                                           | 46 [205]                                                                  | 16 [71]                                                           |
| ⅜ [9.5]                | 80 [356]                                                                  | 30 [133]                                                          | 77 [343]                                                                  | 26 [116]                                                          |
| ½ [12.7]               | 110 [489]                                                                 | 40 [178]                                                          | 107 [476]                                                                 | 36 [160]                                                          |
| ⅝ [15.9]               | 140 [622]                                                                 | 50 [222]                                                          | 137 [609]                                                                 | 46 [205]                                                          |
| ¾ [19.0]               | 170 [756]                                                                 | 60 [267]                                                          | 167 [743]                                                                 | 56 [249]                                                          |
| 1 [25.4]               | 230 [1023]                                                                | 80 [356]                                                          | 228 [1014]                                                                | 77 [343]                                                          |

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

| Thickness,<br>in. [mm] | Deflection,<br>eighths of an inch [mm] |
|------------------------|----------------------------------------|
| ¼ [6.4]                | not required                           |
| ⅜ [9.5]                | 15 [48]                                |
| ½ [12.7]               | 10 [32]                                |
| ⅝ [15.9]               | 5 [16]                                 |
| ¾ [19.0]               | not required                           |
| 1 [25.4]               | not required                           |

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

| Thickness,<br>in. [mm] | Method A,<br>lbf [N] | Method B,<br>lbf [N] |
|------------------------|----------------------|----------------------|
| ¼ [6.4]                | 40 [178]             | 36 [160]             |
| ⅜ [9.5]                | 60 [267]             | 56 [249]             |
| ½ [12.7]               | 80 [356]             | 77 [343]             |
| ⅝ [15.9]               | 90 [400]             | 87 [387]             |
| ¾ [19.0]               | not required         | not required         |
| 1 [25.4]               | not required         | not required         |

6.1.4 *Foil-Backed Gypsum Backing Board and Foil-Backed Gypsum Coreboard*:

6.1.4.1 Foil-backed gypsum backing board and foil-backed gypsum coreboard shall meet all of the requirements for gypsum backing board and gypsum coreboard.

6.1.4.2 When tested in accordance with Test Methods E 96, the permeance of foil-backed gypsum backing board and foil-backed gypsum coreboard 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 board, and 0 % relative humidity on the back (foil-covered) side of the board.

6.2 *Dimensions and Tolerances of Gypsum Backing Board and Gypsum Coreboard*:

6.2.1 *Thickness*—The nominal thickness shall be from ¼ to 1 in. [6.4 to 25.4 mm] with tolerances in the nominal thickness of  $\pm \frac{1}{32}$  in. [ $\pm 0.8$  mm], and with local variations of  $\pm \frac{1}{16}$  in. [ $\pm 1.6$  mm] from the nominal thickness.

6.2.2 *Width*—The width shall be from 16 to 48 in. [406 to 1220 mm] with a tolerance of  $\frac{1}{8}$  in. [3.2 mm] under the specified width.

6.2.3 *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.



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

## 7. Water-Resistant Gypsum Backing Board

7.1 *Physical Properties of Water-Resistant Gypsum Backing Board*:

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,<br>in. [mm] | Method A<br>Bearing Edges<br>Perpendicular<br>to Panel Length,<br>lbf [N] | Method A<br>Bearing Edges<br>Parallel to Panel<br>Length, lbf [N] | Method B<br>Bearing Edges<br>Perpendicular<br>to Panel Length,<br>lbf [N] | Method B<br>Bearing Edges<br>Parallel to Panel<br>Length, lbf [N] |
|------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------|
| ½ [12.7]               | 110 [489]                                                                 | 40 [178]                                                          | 107 [476]                                                                 | 36 [160]                                                          |
| ⅝ [15.9]               | 150 [667]                                                                 | 50 [222]                                                          | 147 [654]                                                                 | 46 [205]                                                          |

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

| Thickness,<br>in. [mm] | Deflection,<br>eighths of an inch [mm] |
|------------------------|----------------------------------------|
| ½ [12.7]               | 10 [32]                                |
| ⅝ [15.9]               | 5 [16]                                 |

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

| Thickness,<br>in. [mm] | Method A,<br>lbf [N] | Method B,<br>lbf [N] |
|------------------------|----------------------|----------------------|
| ½ [12.7]               | 80 [356]             | 77 [343]             |
| ⅝ [15.9]               | 90 [400]             | 87 [387]             |

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

7.1.5 *Surface Water Absorption*—The specimens shall have an average surface water absorption of not more than 1.6 g on each surface, face and back, after 2 h of elapsed time.

7.2 *Dimensions and Tolerances of Water-Resistant Gypsum Backing Board*:

7.2.1 *Thickness*—The nominal thickness shall be ½ or ⅝ in. [12.7 or 15.9 mm] with tolerances in the nominal thickness of  $\pm 1/64$  in. [ $\pm 0.4$  mm], and with local variations of  $\pm 1/32$  in. [ $\pm 0.8$  mm] from the nominal thickness.

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

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

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

## 8. Exterior Gypsum Soffit Board

8.1 *Physical Properties of Exterior Gypsum Soffit Board*:

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,<br>in. [mm] | Method A<br>Bearing Edges<br>Perpendicular<br>to Panel<br>Length, lbf [N] | Method A<br>Bearing Edges<br>Parallel to Panel<br>Length, lbf [N] | Method B<br>Bearing Edges<br>Perpendicular<br>to Panel Length,<br>lbf [N] | Method B<br>Bearing Edges<br>Parallel to Panel<br>Length, lbf [N] |
|------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------|
| ½ [12.7]               | 110 [489]                                                                 | 40 [178]                                                          | 107 [476]                                                                 | 36 [160]                                                          |

|          |           |          |           |          |
|----------|-----------|----------|-----------|----------|
| ⅝ [15.9] | 150 [667] | 50 [222] | 147 [654] | 46 [205] |
|----------|-----------|----------|-----------|----------|

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

| Thickness,<br>in. [mm] | Deflection,<br>eighths of an inch [mm] |
|------------------------|----------------------------------------|
| ½ [12.7]               | 7 [22]                                 |
| ⅝ [15.9]               | 4 [13]                                 |

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

| Thickness,<br>in. [mm] | Method A,<br>lbf [N] | Method B,<br>lbf [N] |
|------------------------|----------------------|----------------------|
| ½ [12.7]               | 80 [356]             | 77 [343]             |
| ⅝ [15.9]               | 90 [400]             | 87 [387]             |

8.2 *Dimensions and Tolerances of Exterior Gypsum Soffit Board*:

8.2.1 *Thickness*—The nominal thickness shall be ½ or ⅝ in. [12.7 or 15.9 mm] with tolerances in the nominal thickness of  $\pm 1/64$  in. [ $\pm 0.4$  mm], and with local variations of  $\pm 1/32$  in. [ $\pm 0.8$  mm] from the nominal thickness.

8.2.2 *Width*—The width shall be up to 48 in. [1220 mm] with a tolerance of  $3/32$  in. [3 mm] under the specified width.

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

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

## 9. Gypsum Sheathing Board

9.1 *Physical Properties of Gypsum Sheathing Board*:

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,<br>in. [mm] | Method A<br>Bearing Edges<br>Perpendicular<br>to Panel<br>Length, lbf [N] | Method A<br>Bearing Edges<br>Parallel to Panel<br>Length, lbf [N] | Method B<br>Bearing Edges<br>Perpendicular<br>to Panel Length,<br>lbf [N] | Method B<br>Bearing Edges<br>Parallel to Panel<br>Length, lbf [N] |
|------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------|
| ⅜ [9.5]                | 80 [356]                                                                  | 30 [133]                                                          | 77 [343]                                                                  | 26 [116]                                                          |
| ⅞ [10.2]               | 88 [391]                                                                  | 32 [142]                                                          | 85 [378]                                                                  | 28 [125]                                                          |
| ½ [12.7]               | 110 [489]                                                                 | 40 [178]                                                          | 107 [476]                                                                 | 36 [160]                                                          |
| ⅝ [15.9]               | 150 [667]                                                                 | 50 [222]                                                          | 147 [654]                                                                 | 46 [205]                                                          |

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

| Thickness,<br>in. [mm] | Deflection,<br>eighths of an inch [mm] |
|------------------------|----------------------------------------|
| ⅜ [9.5]                | 15 [48]                                |
| ⅞ [10.2]               | 12 [38]                                |
| ½ [12.7]               | 10 [32]                                |
| ⅝ [15.9]               | 5 [16]                                 |

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

| Thickness,<br>in. [mm] | Method A,<br>lbf [N] | Method B,<br>lbf [N] |
|------------------------|----------------------|----------------------|
| ⅜ [9.5]                | 60 [267]             | 56 [249]             |
| ⅞ [10.2]               | 70 [312]             | 67 [298]             |
| ½ [12.7]               | 80 [356]             | 77 [343]             |
| ⅝ [15.9]               | 90 [400]             | 87 [387]             |

9.1.4 *Water Resistance of Gypsum Sheathing Board*—The specimens shall have an average water absorption of not more than 10 weight % after 2-h immersion.





9.1.5 *Surface Water Absorption*—The specimens shall have an average surface water absorption of not more than 1.6 g on each surface, face, and back after 2 h of elapsed time.

9.2 *Dimensions and Tolerances of Gypsum Sheathing Board*:

9.2.1 *Thickness*—The nominal thickness shall be from  $\frac{3}{8}$  to  $\frac{1}{2}$  in. [9.5 to 15.9 mm] with tolerances in the nominal thickness of  $\pm\frac{1}{32}$  in. [ $\pm 0.8$  mm], and with local variations of  $\pm\frac{1}{16}$  in. [ $\pm 1.6$  mm] from the nominal thickness.

9.2.2 *Width*—The nominal width shall be 24 or 48 in. [610 or 1220 mm] with a tolerance of  $\frac{1}{8}$  in. [3.2 mm] under the specified width.

9.2.3 *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.

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

## 10. Gypsum Base for Veneer Plaster

10.1 *Physical Properties of Gypsum Base for Veneer Plaster*:

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

| Thickness,<br>in. [mm] | Method A<br>Bearing Edges<br>Perpendicular<br>to Panel<br>Length, lbf [N] | Method A<br>Bearing Edges<br>Parallel to Panel<br>Length, lbf [N] | Method B<br>Bearing Edges<br>Perpendicular<br>to Panel Length,<br>lbf [N] | Method B<br>Bearing Edges<br>Parallel to Panel<br>Length, lbf [N] |
|------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------|
| $\frac{3}{8}$ [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]   | 150 [667]                                                                 | 50 [222]                                                          | 147 [654]                                                                 | 46 [205]                                                          |

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

| Thickness,<br>in. [mm] | Deflection,<br>eighths of an inch [m] |
|------------------------|---------------------------------------|
| $\frac{3}{8}$ [9.5]    | 15 [48]                               |
| $\frac{1}{2}$ [12.7]   | 10 [32]                               |
| $\frac{5}{8}$ [15.9]   | 5 [16]                                |

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

| Thickness,<br>in. [mm] | Method A,<br>lbf [N] | Method B,<br>lbf [N] |
|------------------------|----------------------|----------------------|
| $\frac{3}{8}$ [9.5]    | 60 [267]             | 56 [249]             |
| $\frac{1}{2}$ [12.7]   | 80 [356]             | 77 [343]             |
| $\frac{5}{8}$ [15.9]   | 90 [400]             | 87 [387]             |

10.1.4 *Foil-Backed Gypsum Base for Veneer Plaster*:

10.1.4.1 Foil-backed gypsum base for veneer plaster shall meet all of the requirements for gypsum base for veneer plaster.

10.1.4.2 When tested in accordance with Test Methods E 96, the permeance of foil-backed gypsum base for veneer plaster 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 board, and 0 % relative humidity on the back (foil-covered) side of the board.

10.2 *Dimensions and Tolerances of Gypsum Base for Veneer Plaster*:

10.2.1 *Thickness*—The nominal thickness shall be from  $\frac{3}{8}$  to  $\frac{5}{8}$  in. [9.5 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.

10.2.2 *Width*—The width shall be 48 in. [1220 mm] with a tolerance of  $\frac{3}{32}$  in. [3 mm] under the specified width.

10.2.3 *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.

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

## 11. Gypsum Lath

11.1 *Physical Properties of Gypsum Lath*:

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

| Thickness,<br>in. [mm] | Method A<br>Bearing Edges<br>Perpendicular<br>to Panel<br>Length, lbf [N] | Method A<br>Bearing Edges<br>Parallel to Panel<br>Length, lbf [N] | Method B<br>Bearing Edges<br>Perpendicular<br>to Panel Length,<br>lbf [N] | Method B<br>Bearing Edges<br>Parallel to Panel<br>Length, lbf [N] |
|------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------|
| $\frac{3}{8}$ [9.5]    | 60 [267]                                                                  | 25 [111]                                                          | 56 [249]                                                                  | 21 [93]                                                           |
| $\frac{1}{2}$ [12.7]   | 100 [445]                                                                 | 35 [156]                                                          | 97 [431]                                                                  | 31 [138]                                                          |

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

| Thickness,<br>in. [mm] | Deflection,<br>eighths of an inch [m] |
|------------------------|---------------------------------------|
| $\frac{3}{8}$ [9.5]    | 15 [48]                               |
| $\frac{1}{2}$ [12.7]   | 10 [32]                               |

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

| Thickness,<br>in. [mm] | Method A,<br>lbf [N] | Method B,<br>lbf [N] |
|------------------------|----------------------|----------------------|
| $\frac{3}{8}$ [9.5]    | 50 [222]             | 46 [205]             |
| $\frac{1}{2}$ [12.7]   | 70 [312]             | 66 [294]             |

11.1.4 *Foil-Backed Gypsum Lath*:

11.1.4.1 Foil-backed gypsum lath shall meet all of the requirements for gypsum lath.

11.1.4.2 When tested in accordance with Test Methods E 96, the permeance of foil-backed gypsum lath 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 board, and 0 % relative humidity on the back (foil-covered) side of the board.

11.2 *Dimensions and Tolerances of Gypsum Lath*:

11.2.1 *Thickness*—The nominal thickness shall be  $\frac{3}{8}$  or  $\frac{1}{2}$  in. [9.5 or 12.7 mm] with tolerances in the nominal thickness of  $\pm\frac{1}{32}$  in. [ $\pm 0.8$  mm], and with local variations of  $\pm\frac{1}{16}$  in. [ $\pm 1.6$  mm] from the nominal thickness.

11.2.2 *Width*—The nominal width shall be up to 48 in. [1220 mm] with a tolerance of  $\frac{3}{16}$  in. [4.8 mm] under and  $\frac{1}{8}$  in. [3.2 mm] over the specified width.

11.2.3 *End Squareness*—Corners shall be square with a tolerance of  $\pm\frac{1}{4}$  in. [ $\pm 6.4$  mm] in the full width of the board.

11.3 *Edges*—The edges shall be either round or square.

## 12. Gypsum Ceiling Board

12.1 *Physical Properties of Gypsum Ceiling Board*:



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

| Thickness in.<br>[mm] | METHOD A                                                       |                                                                     | METHOD B                                                       |                                                                     |
|-----------------------|----------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------------|
|                       | Load, lbf [N]<br>Bearing Edges<br>Across Fiber of<br>Surfacing | Load, lbf [N]<br>Bearing Edges<br>Parallel to Fiber<br>of Surfacing | Load, lbf [N]<br>Bearing Edges<br>Across Fiber of<br>Surfacing | Load, lbf [N]<br>Bearing Edges<br>Parallel to Fiber<br>of Surfacing |
| ½ [12.7]              | 110 [489]                                                      | 40 [178]                                                            | 107 [476]                                                      | 36 [160]                                                            |

12.1.2 *Humidified Deflection*—The specimens shall have an average humidified deflection of not more than 5/16 in. [8 mm].

12.1.3 *Nail Pull Resistance*—The specimens shall have an average nail-pull resistance of not less than 80 lbf [356 N] when tested by Method A and 77 lbf [343 N] when tested by Method B.

## 12.2 Dimensions and Tolerances of Gypsum Ceiling Board:

12.2.1 *Thickness*—The nominal thickness shall be ½ in. [12.7 mm] with tolerances in the nominal thickness of ±1/64 in. [0.4 mm] with local variations of ±1/32 in. [0.8 mm] from the nominal thickness.

12.2.2 *Width*—The width shall be up to 48 in. [1220 mm] with a tolerance of 3/32 in. [3 mm] under the specified width.

12.2.3 *End Squareness*—Corners shall be square with a tolerance of ±1/8 in. [3 mm] in the full width of the board.

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

## 13. Finish and Appearance

13.1 The surfaces of gypsum board shall be true and free from imperfections that would render it unfit for use with or without decoration.

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

14.1 Sampling, inspection, rejection, certification, packaging, marking, shipping, handling, and storage of gypsum board shall be in accordance with Specification C 1264.

## 15. Keywords

15.1 ceiling; coreboard; drywall; exterior gypsum soffit board; foil-backed; gypsum; gypsum backing board; gypsum base; gypsum board; gypsum ceiling board; gypsum coreboard; gypsum lath; gypsum sheathing; gypsum sheathing board; gypsum wallboard; partitions; plaster; predecorated gypsum board; shaftliner; sheathing; type X; veneer base; veneer plaster; wall; wallboard; water-resistant gypsum board

## APPENDIX

### (Nonmandatory Information)

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

The definition of type X as given in 4.3.1-4.3.3 and the alternate definition given in this appendix, are intended only as a test to define the gypsum board as meeting the requirements of type X products. These tests do not indicate a preferred application nor do they limit the use of the product in other fire rated assemblies.

All gypsum panel products for which type X is defined, except gypsum lath and gypsum shaftliner board, use the same test for type X products, therefore the type X definition indicates a consistent level of fire resistance.

### X1. ALTERNATE DEFINITION FOR TYPE X

X1.1 Gypsum board, type X (special fire-resistant) designates gypsum board, except gypsum lath, providing a greater fire-resistance than regular gypsum board of the same thickness. Type X (special fire-resistant) gypsum board, when tested in accordance with Test Methods E 119, shall provide the following minimum fire resistance ratings 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 gypsum board 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 2½-in. [64-mm] deep non-loadbearing galvanized steel studs complying with Specification C 645, spaced 24 in. [610 mm] on center. The 48-in. [1220-mm] wide base layer shall be attached using 1-in. [25-mm] long drywall screws spaced 12 in. [305 mm] on center along board 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 48-in. [1220-mm] wide face layer shall be attached using 15/8-in. [41-mm] long drywall screws spaced 12 in. [305 mm] along board 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.

### SUMMARY OF CHANGES

Committee C11 has identified the location of selected changes to this specification since the last issue, C 1396/C 1396M-03a, that may impact the use of this specification. (Approved May 1, 2004)

- |                                                               |                                                                            |
|---------------------------------------------------------------|----------------------------------------------------------------------------|
| (1) Added “water-resistant” after “combustible” in 4.1.1.     | (5) Deleted references to “Treated Core and Nontreated Core” in Section 9. |
| (2) Deleted 4.1.1.1.                                          | (6) Deleted 14.2 and 14.3.                                                 |
| (3) Added “rating” after “fire-resistance” in 4.3.1.          | (7) Added “ratings” after “fire resistance” in X1.1.                       |
| (4) Changed “classification” to “rating” in 4.3.2 and Note 3. |                                                                            |

Committee C11 has identified the location of selected changes to this specification since the last issue, C 1396/C 1396M-03, that may impact the use of this specification. (Approved Oct. 1, 2003)

- (1) Removed “recessed” from referenced edge types throughout the standard.

Committee C11 has identified the location of selected changes to this specification since the last issue, C 1396/C 1396M-02, that may impact the use of this standard. (Approved June 10, 2003)

- (1) Added new paragraph 14.3.

*ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.*

*This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.*

*This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or [service@astm.org](mailto:service@astm.org) (e-mail); or through the ASTM website ([www.astm.org](http://www.astm.org)).*