



Designation: C 1325 – 99

Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cement Interior Substrate Sheets¹

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1. Scope

1.1 This specification covers *non-asbestos fiber-mat reinforced* cement substrate sheets manufactured to be dimensionally stable and suitable as either an unfinished substrate (see Note 1) or as a substrate for decoration such as natural stone or tile in internal wet and dry areas.

NOTE 1—When used as an unfinished substrate, consult the manufacturer's written installation literature for proper application details.

1.2 This specification is not applicable to asbestos-cement flat sheets (Specification C 220); non-asbestos fiber cement flat sheets for exterior applications such as claddings, facades, curtain walls, and soffits (Specification C 1186); gypsum backing board and coreboard (Specification C 442); water-resistant gypsum backing board (Specification C 630); glass mat gypsum backing board (Specification C 1178); particle boards (Definitions D 1554); and discrete non-asbestos fiber cement interior substrate sheets (Specification C 1288).

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are provided for information only.

2. Referenced Documents

2.1 ASTM Standards:

- C 220 Specification for Flat Asbestos-Cement Sheets²
- C 442 Specification for Gypsum Backing Board and Coreboard³
- C 473 Test Methods for Physical Testing of Gypsum Panel Products³
- C 630 Specification for Water-Resistant Gypsum Backing Board³
- C 666 Test Method for Resistance of Concrete to Rapid Freezing and Thawing⁴
- C 947 Test Method for Flexural Properties of Thin-Section Glass-Fiber-Reinforced Concrete (Using Simple Beam

with Third-Point Loading)²

- C 1154 Terminology for Non-Asbestos Fiber-Reinforced Cement Products²
- C 1178 Specification for Glass Mat Water-Resistant Gypsum Backing Panel³
- C 1186 Specification for Flat Non-Asbestos Fiber-Cement Sheets²
- C 1288 Specification for Discrete Non-Asbestos Fiber-Cement Interior Substrate Sheets²
- D 1037 Methods for Evaluating the Properties of Wood-Base Fiber and Particle Panel Materials⁵
- D 1554 Definitions of Terms Relating to Wood-Base Fiber and Particle Panel Materials⁵
- D 2394 Method for Simulated Service Testing of Wood and Wood-Base Finish Flooring⁵
- E 84 Test Method for Surface Burning Characteristics of Building Materials⁶
- G 21 Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi⁷
- G 22 Practice for Determining Resistance of Plastics to Bacteria⁷

2.2 ANSI Standards:⁸

- A118.1 Specification for Dry-Set Portland Cement Mortar
- A118.4 Specification for Latex-Portland Cement Mortar
- A136.1 Standard for Organic Adhesives for Installation of Ceramic Tile

3. Terminology

3.1 *Definitions:* Refer to Terminology C 1154.

4. Classification

4.1 *Flat Sheets Covered by This Specification are Intended for:*

4.1.1 Interior dry or wet area applications as a desired unfinished substrate or an unfinished substrate for decoration such as natural stone or tile, where substrate dimensional stability is required.

¹ This specification is under the jurisdiction of ASTM Committee C-17 on Fiber-Reinforced Cement Products and is the direct responsibility of Subcommittee C17.01 on Test Methods.

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² *Annual Book of ASTM Standards*, Vol 04.05.

³ *Annual Book of ASTM Standards*, Vol 04.01.

⁴ *Annual Book of ASTM Standards*, Vol 04.02.

⁵ *Annual Book of ASTM Standards*, Vol 04.10.

⁶ *Annual Book of ASTM Standards*, Vol 04.07.

⁷ *Annual Book of ASTM Standards*, Vol 14.02.

⁸ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

4.2 Flat sheets may be supplied coated or uncoated.

5. Composition and Manufacture

5.1 *Composition*—This specification is applicable to *fiber-mat reinforced* non-asbestos cement substrate sheets consisting essentially of an inorganic hydraulic binder or a calcium silicate binder formed by the chemical reaction of a siliceous material and a calcareous material, reinforced by *fiber-mat* made of organic fibers, inorganic non-asbestos fibers, or both. Process aids, fillers, pigments, and other fibers that are compatible with the fiber-mat cement may be added.

5.2 *Manufacture*—These products may be formed either with or without pressure and cured, either under natural or accelerated conditions, to meet the property requirements of this specification.

6. Mechanical and Physical Properties

6.1 Mechanical and physical properties shall be determined on an uncoated product wherever practical. Where the products are supplied coated, this material shall also be tested with the results identified as applying to coated material.

6.2 *Sampling*—Obtain 5 samples of the particular cement substrate sheet to be tested from a commercial lot of not less than 50 000 ft² to conduct the tests described in this specification except for the Moisture Movement test (6.4.3).

6.3 Mechanical Properties:

6.3.1 *Flexural Strength*—When tested in accordance with Test Method C 947, flexural strength shall be not less than 750 psi (5170 kPa).

6.3.2 Sheets shall be tested and specified in both the wet and equilibrium conditions and shall meet the minimum wet and minimum equilibrium flexural strength requirements.

NOTE 2—When sampled from continuous production, these tests may be conducted on dry, equilibrium, or saturated specimens, provided a relationship can be established between this testing and the specified values.

6.4 Physical Properties:

6.4.1 *Density*—Nominal values and tolerances for density shall be stated by the manufacturer for each of the products. When tested in accordance with the test method specified in Test Methods C 1185, the value for the density shall comply with the value stated by the manufacturer.

6.4.2 *Modulus of Elasticity*—Values for the modulus of elasticity shall be stated by the manufacturer for each of the products. When tested in accordance with Test Method C 947, the value for modulus of elasticity shall comply with the value stated by the manufacturer. Calculate the modulus of elasticity for each sample specimen by the following equation:

$$E = 5(P_2 - P_1) \times L^3 / 27bd^3(y_2 - y_1) \quad (1)$$

where:

- E = modulus of elasticity, psi (kg/mm²),
- P_2 and P_1 = loads, lb (kg), taken from two points within the linear section of the plot,
- y_2 and y_1 = deflections, in. (mm) corresponding to the loads selected,
- b = width of specimen, in. (mm),
- d = thickness of specimen, in. (mm), and

L = span, in. (mm).

6.4.3 *Moisture Movement*—The linear variation with change in moisture content shall be stated as the percentage change in length based on a relative humidity change from 30 % to 90 % in accordance with Test Method D 1037. The linear variation with change shall be ≤ 0.07 %. For the purpose of this test, obtain 5 samples of the particular cement substrate sheet to be tested from a commercial lot of not less than 50 000 ft² once every six months.

7. Dimensions and Permissible Variations

7.1 *Method of Measurement*—The method of measurement shall be in accordance with Test Methods C 473.

7.2 *Nominal Length and Width*—Fiber-mat reinforced substrate sheets are typically supplied in nominal lengths of 48 in. (1219 mm), 60 in. (1524 mm), 72 in. (1828 mm), 84 in. (2134 mm), 96 in. (2438 mm) and nominal widths of 48 in. (1219 mm), 36 in. (914 mm), and 32 in. (811 mm). Greater or lesser nominal lengths and widths may be supplied.

7.3 *Nominal Thickness*—Fiber-mat reinforced substrate sheets are normally available in thicknesses of 1/4 in. (6 mm) to 5/8 in. (16 mm), although thicknesses outside of this range may be supplied.

7.4 *Length and Width Tolerance*—The permissible variation from the nominal value shall be $\pm 1/8$ in. (3 mm).

7.5 *Thickness Tolerance*—The maximum difference between extreme values of the thickness measurement within a sheet shall not exceed 0.03 in. (0.8 mm). Thickness variation from sheet to sheet shall not exceed 0.03 in. (0.8 mm).

7.6 *Squareness Tolerance*—The length of the diagonals shall not vary by more than 1/32 in./ft (2.6 mm/m) of the length of the sheets. Opposite sides of the sheet shall not vary in length by more than 1/32 in./ft (2.6 mm/m).

7.7 *Edge Straightness Tolerance*—The sheet edges shall be straight within 1/32 in./ft (2.6 mm/m) of length or width.

8. Workmanship

8.1 *Workmanship*—Sheets shall be free of defects that will impair erection, use, or serviceability.

9. Inspection and Acceptance

9.1 Inspection of material, if required, shall be at the point of shipment. The inspector representing the purchaser shall have authorized access to the carriers being loaded for shipment to the purchaser. The purchaser shall be afforded all reasonable and available facilities at the point of shipment for sampling and inspection of the material, which shall be conducted so as not to interfere unnecessarily with the loading of the carriers.

9.2 Third party certification, either continuous or at regular intervals, shall be recognized as an alternative to lot inspection.

9.3 Failure to conform to any one of the requirements of this specification shall constitute grounds for nonacceptance.

10. Product Marking

10.1 *Identification*—Product marking shall include trademark or other means of identification that ensure that the