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Standard Specification for Asbestos-Cement Fiberboard Insulating Panels[1]

This standard is issued under the fixed designation C551/C551M; 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.

ε[1] NOTE—Units information was editorially corrected in January 2012.

1. Scope

1.1 This specification covers asbestos-cement insulating panels consisting of a core of insulating fiber board sandwiched between, and bonded to, two sheets of asbestos-cement facing board. Asbestos-cement insulating panels are designed for exterior and interior walls, partitions, curtain walls, roof decks, and for decorative purposes.

1.2 All measurements and tests necessary for determining the conformity of asbestos-cement insulating panels with this specification are made in accordance with the methods covered in Section 9.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.4 **Warning**—Breathing of asbestos dust is hazardous. Asbestos and asbestos products present demonstrated health risks for users and for those with whom they come into contact. In addition to other precautions, when working with asbestos-cement products, minimize the dust that results. For information on the safe use of chrysoltile asbestos, refer to "Safe Use of Chrysotile Asbestos: A Manual on Preventive and Control Measures."[2]

1.5 The following safety hazards caveat pertains only to the test method portion, Section 9, of this specification. *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* See for a specific hazard warning.

2. Referenced Documents

2.1 *ASTM Standards:*[3]

C150 Specification for Portland Cement
C208 Specification for Cellulosic Fiber Insulating Board
C220 Specification for Flat Asbestos-Cement Sheets
C236 Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box (Withdrawn 2001)[4]
C458 Test Method for Organic Fiber Content of Asbestos-Cement Products
C518 Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
C595 Specification for Blended Hydraulic Cements
C618 Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
D2946 Terminology for Asbestos and Asbestos–Cement Products
E96/E96M Test Methods for Water Vapor Transmission of Materials

2.2 *Federal Standard:*

Fed. Std. No. 123 Marking for Shipment (Civil Agencies)[5]

2.3 *Military Standard:*

MIL-STD-129 Marking for Shipment and Storage[5]

2.4 *Other Standards:*

Uniform Freight Classification Rules[6]
National Motor Freight Classification Rules[7]

3. Terminology

3.1 *Definitions:*

[1] This specification is under the jurisdiction of ASTM Committee C17 on Fiber-Reinforced Cement Products and is the direct responsibility of Subcommittee C17.03 on Asbestos - Cement Sheet Products and Accessories.

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[2] Available from The Asbestos Institute, http://www.chrysotile.com/en/sr_use/manual.htm.

[3] 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.

[4] The last approved version of this historical standard is referenced on www.astm.org.

[5] Available from Standardization Documents, Order Desk, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094.

[6] Available from the Uniform Classification Commission, Room 1106, 222 S. Riverside Plaza, Chicago, IL 60606.

[7] Available from National Motor Freight Inc., 1616 "P" St. NW, Washington, DC 20036.

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3.1.1 *dimensions*—for the purpose of this specification, include the length, width, thickness, and squareness (defined hereunder) of asbestos-cement insulating panels as measured under specified conditions.

3.1.2 *flexural strength*—the average breaking load in newtons per meter of width [or lbf/ft of width] of dried specimens loaded as simple beams on a 762 mm [30 in.] span with the load applied equally and simultaneously at both one-third points of the span.

NOTE 1—The flexural performance is defined as the moment capacity in N·m/m [or ft·lbf/ft] of width, obtained from the product of flexural strength and span divided by 6.

3.1.3 *lot*—shipment, or part thereof, of a quantity of product of identical type produced during a single production run.

3.1.4 *squareness*—deviation from squareness is defined as the percent difference in the length of the two diagonals of a panel. Panels with perfect squareness have zero difference between the length of their diagonals.

3.1.5 Additional terminology is presented in Terminology D2946.

4. Materials and Manufacture

4.1 Asbestos-cement insulating panels shall be composed of an insulating core sandwiched between, and bonded to, two facing sheets of asbestos-cement. The insulating core shall be manufactured from wood, fiber, or other suitable vegetable fiber, by a felting or molding process, with suitable sizing material incorporated into the product to render it water resistant. The material shall be subjected to such drying temperatures as to effect complete destruction of rot producing fungi. The asbestos-cement facing boards shall be composed of a combination of asbestos fiber and portland cement prescribed in Specification C150, or portland slag or pozzolan cements meeting Specification C595, with or without the addition of curing agents or additives meeting Specification C618, water-repellent substances, mineral fillers, coatings, pigments, or mineral granules, formed under pressure and cured to meet the physical requirements of this specification. Sheets may contain not more than mass percent of non-deleterious organic components as determined by Test Method C458. The bonding adhesive shall cover essentially 100 % of the bonding surfaces.

5. Dimensions, Mass, and Permissible Variations

5.1 *Physical Requirements:*

5.1.1 Asbestos-cement facing sheets shall conform to the requirements for Type F or U of Specification C220.

5.1.2 The insulating core board shall conform to the requirements for Class C or E of Specification C208.

5.1.3 *Flexural Strength*—The average breaking load, obtained by loading equally and simultaneously at both one-third points of the span, for panel specimens dried for 24 h at 70 ± 3°C [160 ± 5°F] shall not be less than shown in Table 1.

5.1.4 *Vapor Permeability*—The average vapor permeability of any panel board thickness shall not exceed 0.35 g/MPa.s.m^2 [81 perms, or grains of water vapor per square foot per hour per inch of water vapor pressure differential) when tested according to the wet cup method of Test Methods E96/E96M.

TABLE 1 Flexural Strength Requirements for Panels

Nominal Thickness		Minimum Breaking Load	
mm	[in.]	N	[lbf]
17	[11/16]	1300	300
29	[1 1/8]	2700	600
40	[1 9/16]	4000	900
51	[2]	5300	1200

5.1.5 *Thermal Resistance, R*—The average thermal resistance, *R*, K·m^2/W [deg F·h·ft^2/Btu] of the panel shall not be less than the requirements in Table 2 when tested in accordance with Test Method C236 or Test Method C518.

5.1.6 *Adhesive Line Bond*—The glue shall be suitable for outdoor use and have such adhesion that specimens resist the shear stress generated during flexural testing with all failures occurring within the core board and not at any of the glue lines.

5.2 *Dimensions:*

5.2.1 This specification is applicable only for panels of the dimensions shown in Table 3 and Table 4.

5.2.2 *Permissible Variation in Dimensions:*

5.2.2.1 *Thickness*—The average thickness of all panels supplied under this specification shall be as prescribed in Table 4. The average thickness of any one sheet shall not differ from the average of all sheets by more than 10 percent.

5.2.2.2 *Width and Length*—The permissible variation from the nominal width shall be −3 mm [0.12 in.] and +1.5 mm [0.06 in.] and, from the nominal length, −3 mm [0.12 in.] and +1.5 mm [0.06 in.] as measured after 48 h at 25 ± 5°C [70 ± 10°F] and 50 % relative humidity.

5.2.2.3 *Squareness*—The deviation from squareness shall not exceed 0.2 % of width or length.

6. Supplementary and Finishing Pieces, Accessories

6.1 Fasteners of suitable size and type for securing asbestos-cement insulating board to metal or wood supporting members of all sizes and types shall be furnished when specified. The fasteners shall be corrosion-resistant and complete information regarding the supporting structure must be supplied by the purchaser.

7. Workmanship, Finish, and Appearance

7.1 *Workmanship*—The surfaces on both sides of the panel shall be free of major defects that will impair appearance, erection, use, or serviceability.

7.2 *Finish*—The surfaces of the panel shall be smooth, grained, granuled-coated, or otherwise textured.

TABLE 2 Thermal Resistance, *R*

Nominal Thickness		*R* Value at 24°C [70°F]	
mm	[in.]	K.m^2/W	[°F.h.ft^2/Btu]
17	[11/16]	0.23	[1.3]
29	[1 1/8]	0.44	[2.5]
40	[1 9/16]	0.59	[3.3]
51	[2]	0.71	[4.0]

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