Designation: C1410 – 14

Standard Specification for Cellular Melamine Thermal and Sound-Absorbing Insulation[1]

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1. Scope

1.1 This specification covers the type, physical properties, and dimensions of open-cell melamine foam intended for use as thermal and sound-absorbing insulation for temperatures from −40 to +350°F (−40 to +177°C) in industrial environments.

1.2 Some uses of thermal insulation materials covered by this specification are governed by building codes that address fire performance.

1.3 The use of an appropriate vapor retarder is required on cold surface applications where water vapor condense and cause a decrease in thermal performance. Refer to Practice C755 for selection of vapor retarders. Facings shall be agreed upon between the purchaser and the manufacturer or supplier.

1.4 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.5 *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.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C168 Terminology Relating to Thermal Insulation

C177 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus

C335 Test Method for Steady-State Heat Transfer Properties of Pipe Insulation

C356 Test Method for Linear Shrinkage of Preformed High-Temperature Thermal Insulation Subjected to Soaking Heat

C390 Practice for Sampling and Acceptance of Thermal Insulation Lots

C423 Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

C518 Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

C585 Practice for Inner and Outer Diameters of Thermal Insulation for Nominal Sizes of Pipe and Tubing

C755 Practice for Selection of Water Vapor Retarders for Thermal Insulation

C1045 Practice for Calculating Thermal Transmission Properties Under Steady-State Conditions

C1104/C1104M Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation

C1363 Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus

D2863 Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)

D3574 Test Methods for Flexible Cellular Materials—Slab, Bonded, and Molded Urethane Foams

E84 Test Method for Surface Burning Characteristics of Building Materials

E176 Terminology of Fire Standards

E662 Test Method for Specific Optical Density of Smoke Generated by Solid Materials

E795 Practices for Mounting Test Specimens During Sound Absorption Tests

[1] This specification is under the jurisdiction of ASTM Committee C16 on Thermal Insulation and is the direct responsibility of Subcommittee C16.22 on Organic and Nonhomogeneous Inorganic Thermal Insulations.

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[2] 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.

TABLE 1 Common Dimensions

	Type I	Type II
Width, in. (mm)	12 to 50 (305 to 1270)	N/A
Length, in. (mm)	48 to 100 (1219 to 2540)	36 or 48 (914 or 1219)
Thickness, in. (mm)	¼ to 20 (6.4 to 508)	½ to 5 (12.7 to 127)

TABLE 2 Insulation Tolerances

Type	Type I	Type II
Width, in. (mm)	±¼ (6.4)	N/A
Length, in. (mm)	±¼ (6.4)	±⅛ (3.2) –0
Thickness, in. (mm)	±⅛ (3.2) or 2 % whichever is smaller	±⅛ (3.2) –0 or 2 % whichever is smaller

E2231 Practice for Specimen Preparation and Mounting of Pipe and Duct Insulation Materials to Assess Surface Burning Characteristics

2.2 *Boeing Standards:*

Boeing Specification Support Standard 72396[3]

2.3 *International Maritime Organization:*

Resolution MSC.41(64) Interim Standard for Measuring Smoke and Toxic Products of Combustion Interim Standard for Measuring Smoke and Toxic Products of Combustion[4]

3. Terminology

3.1 *Definitions*—Terms used in this specification are defined in Terminology C168 and also in Terminology E176 as appropriate

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *melamine foam*—a low-density, flexible cellular, open-cell foam made from the polymerization and foaming of melamine-formaldehyde resins.

3.2.2 *flexible cellular*—a cellular organic polymeric material that will not rupture within 60 s when a specimen 8 by 1 by 1 in. (200 by 25 by 25 mm) is bent around a 1-in. (25-mm) diameter mandrel at a uniform rate of one lap in 5 s in the form of a helix at a temperature between 65 and 85°F (18 and 29°C).

4. Classification

4.1 Melamine thermal insulation are furnished in the following types and grades:

4.1.1 *Type I*—Flat slab:

4.1.1.1 *Grade 1*—Regular (core foam with no facing).

4.1.1.2 *Grade 2*—Faced foam.

4.1.2 *Type II*—Pipe and tubing insulation:

4.1.2.1 *Grade 1*—Regular (core foam with no facing).

4.1.2.2 *Grade 2*—Faced foam.

4.1.3 *Type III*—Special shapes.

4.1.4 Special Facings.

5. Ordering Information

5.1 Purchase orders for melamine thermal insulation shall specify any or all of the following:

5.1.1 Title, number, and year of this specification.

5.1.2 Type and grade designation (see 4.1).

5.1.3 Length, width and thickness required (see Table 1).

5.1.4 Tolerance, if other than specified (see Table 2).

5.1.5 Quantity of material.

5.1.6 Special packaging or marking, when required.

5.1.7 Special requirements for inspection and for testing.

5.1.8 Thermal conductivity at mean temperature of flat stock.

5.1.9 Manufacturers name, address, and telephone number.

5.1.10 Jacket facing type.

6. Materials and Manufacture

6.1 Typically a hydrocarbon blowing agent is used to foam melamine formaldehyde resins. The result is an open-cell melamine foam. The blowing agent is drawn off in the manufacturing process and is not residual in the foam.

6.2 Facing materials incorporated into the design of pipe insulation or flat slab shall be agreed upon between the purchaser and the manufacturer or seller. Typical materials are as follows:

6.2.1 *Aluminum Foil*—Aluminum foil laminated to a supporting membrane.

6.2.2 *Aluminized Mylar*—Aluminized mylar film laminated to a supporting membrane.

6.2.3 *Polyvinylchloride*—Polyvinylchloride either plain or reinforced with polyester.

6.2.4 *Polyvinylfluoride*—Polyvinylfluoride reinforced with fiberglass and rubber.

7. Physical Properties

7.1 Melamine thermal insulation shall conform to the physical requirements in Table 3, which shall constitute acceptance or rejection values for this specification when tested by test methods specified in Section 14.

NOTE 1—Data in Table 3 is for unfaced products; facings affect the properties listed.

NOTE 2—Melamine foams are hydrophilic and will absorb water or moisture. Any system exposed to water, moisture, high humidity or that is used on cold installations must be protected by a vapor retarder or moisture retarder system.

7.2 The sound-absorption results for unfaced melamine foam shall conform to the performance requirements in Table 4 of this specification.

7.3 Do not use values stated in Tables 3 and 4 as design values. It is the buyer's responsibility to specify design requirements and obtain supporting documentation from the material supplier.

8. Inspection Requirements

8.1 The physical requirements for density and thermal conductivity at 75°F mean temperature (unless otherwise agreed upon between the purchaser and the supplier) as listed in Table 3 are defined as inspection requirements (refer to Practice C390).

8.2 All dimensional requirements, as described in Tables 1 and 2, are defined as inspection requirements.

[3] The Boeing Company, Boeing Technology Services, Seattle, WA, http://www.boeing.com.

[4] International Maritime Organization, 4 Albert Embankment, London, United Kingdom, http://www.imo.org.