



Designation: C1126 – 24

Standard Specification for Faced or Unfaced Rigid Cellular Phenolic Thermal Insulation¹

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1. Scope

1.1 This specification covers faced or unfaced, rigid cellular phenolic thermal insulation. Boards shall be faced or unfaced. Tubular forms and board cut from a block or bun covered by this standard shall be unfaced. It does not apply to field expanded cellular phenolic materials.

NOTE 1—If a facer or vapor retarder is to be used for the tubular form or board, then refer to Practice C921.

1.2 Materials covered by this specification are used as roof insulation; sheathing or rigid board for non-load bearing, building material applications; and pipe or board insulation cut from a block or bun for use between -40 and 257°F (-40 and 125°C). Type II and Type III materials with an appropriate vapor retarder covering on the warm surface are used to a lower temperature limit of -290°F (-180°C). (See 7.3.)

1.3 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.

1.4 This specification covers closed cell rigid cellular phenolic thermal insulation manufactured using blowing agents with an ozone depletion potential of 0 (ODP 0).

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* For specific precautionary statements, see Section 16.

1.6 *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.*

2. Referenced Documents

2.1 ASTM Standards:²

- C165 Test Method for Measuring Compressive Properties of Thermal Insulations
- 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
- C209 Test Methods for Cellulosic Fiber Insulating Board
- C335/C335M Test Method for Steady-State Heat Transfer Properties of Pipe Insulation
- C390 Practice for Sampling and Acceptance of Thermal Insulation Lots
- C518 Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- C550 Test Method for Measuring Trueness and Squareness of Rigid Block and Board Thermal Insulation
- C585 Practice for Inner and Outer Diameters of Thermal Insulation for Nominal Sizes of Pipe and Tubing
- C921 Practice for Determining the Properties of Jacketing Materials for Thermal Insulation (Withdrawn 2021)³
- C1045 Practice for Calculating Thermal Transmission Properties Under Steady-State Conditions
- C1058/C1058M Practice for Selecting Temperatures for Evaluating and Reporting Thermal Properties of Thermal Insulation
- C1303/C1303M Test Method for Predicting Long-Term Thermal Resistance of Closed-Cell Foam Insulation
- C1363 Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
- C1763 Test Method for Water Absorption by Immersion of Thermal Insulation Materials
- D1621 Test Method for Compressive Properties of Rigid Cellular Plastics

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 www.astm.org/contact. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

- D1622** Test Method for Apparent Density of Rigid Cellular Plastics
- D1623** Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
- D2126** Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging
- D6226** Test Method for Open Cell Content of Rigid Cellular Plastics
- E84** Test Method for Surface Burning Characteristics of Building Materials
- E96/E96M** Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials

3. Terminology

3.1 The definitions and terms in Terminology **C168** shall apply to this specification.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *foam core*—rigid cellular thermal installation without any facers or barriers on the surface of the installation.

3.2.2 *closed cell material*—foam where more than 90 % of the cells are totally enclosed by cell walls, and not interconnected with other cells.

3.2.3 *open cell material*—foam whose cells are not totally enclosed by its walls and therefore exhibits a predominance of interconnecting cells.

3.2.4 *ozone depletion potential (ODP)*—a relative index indicating the extent to which a chemical product causes ozone depletion.

3.2.4.1 *Discussion*—The reference level of 1 is the potential of trichlorofluoromethane (R-11 or CFC-11) to cause ozone depletion. ODP 0 is an ozone depletion potential of zero.

4. Classification

4.1 The thermal insulation shall be of the following types:

4.1.1 *Type I*—For use as roof insulation board. Produced without integral vapor retarder facers.

4.1.2 *Type II*—For use as sheathing or rigid panel for non-load bearing applications. Produced with integral vapor retarder facers.

4.1.3 *Type III*—For use as pipe insulation. Produced without integral vapor retarder facers.

4.1.3.1 *Type III, grade 1*—Density, min 2 lbs/ft³

4.1.3.2 *Type III, grade 2*—Density, min 3.75 lbs/ft³

4.1.3.3 *Type III, grade 3*—Density, min 5 lbs/ft³

4.1.3.4 *Type III, grade 4*—Density, min 7.5 lbs/ft³

5. Ordering Information

5.1 Orders for materials purchased under this specification shall include the following information:

5.1.1 Designation of this specification.

5.1.2 Product name and type.

5.1.3 Size and dimensions.

5.1.4 Quantity of material.

5.1.5 Special requirements for inspection and/or testing.

5.1.6 Pipe insulation jacketing (optional).

6. Materials and Manufacture

6.1 *Foam Core Chemical Composition*—The foam shall be produced by a chemical reaction of a phenolic resin, surfactant, blowing agent, and other additives as needed.

6.2 *Facings*—Facing on Type II material shall be adhered to the core stock and suitable for the service intended. They shall be supplied as agreed upon between manufacturer and purchaser.

7. Physical Properties

7.1 The material shall conform to the requirements as shown in **Table 1** and **Table 2**.

7.2 The Type III higher density material shall conform to the requirements as shown in **Table 2**.

7.3 Not all physical properties at temperatures below –40°F (–40°C) have been fully tested, and the user shall consult the manufacturer for any properties and performance required at these lower temperatures.

8. Dimensions and Tolerances

8.1 *Dimensions*—The dimensions shall be as agreed upon between the purchaser and the supplier, but commonly shall be as follows:

8.1.1 *Type I*—Width, 24 in., 36 in., or 48 in. (610 mm, 915 mm, or 1220 mm). Length, 48 in. or larger (1220 mm or larger).

8.1.2 *Type II*—Width, 48 in. (1220 mm). Length, 96 in. or larger (2440 mm or larger).

8.1.3 *Type III*—Pipe insulation with dimensions that are in accordance with Practice **C585**.

8.2 *Tolerances*—Unless otherwise agreed upon between the purchaser and the supplier, the tolerances shall be as follows:

8.2.1 *Types I and II*—When measured at 73.4 ± 3.6°F (23 ± 2°C) and 50 ± 5 % relative humidity, these types shall conform to the following:

8.2.1.1 *Length*—Not to exceed ± ¼ in. (± 6.4 mm).

8.2.1.2 *Width*—Not to exceed ± ¼ in. (± 6.4 mm).

8.2.1.3 *Thickness*—Not to exceed ± ⅛ in. (± 3.1 mm).

8.2.2 *Type III*—Thicknesses available for various pipe and tube sizes shall be in accordance with Practice **C585**. The average measured length shall not differ from the standard dimension of the manufacturer by more than ± ¼ in. (6.4 mm).

8.3 *Other Parameters for Types I and II:*

8.3.1 *Squareness*—Board squareness shall be within required tolerance if the two diagonal measurements of the board differ by no more than ¼ in. (6.4 mm).

8.3.2 *Straightness*—Unless otherwise specified, the boards shall be furnished with straight edges which shall not deviate by more than ⅓ in./ft (2.6 mm/m).

8.3.3 *Flatness*—The boards shall not depart from absolute flatness by more than ⅓ in./ft of width or length (5.2 mm/m).

8.3.4 The straightness and flatness shall be determined in accordance with Practice **C550**, except that a straight edge longer than the dimension being determined shall be used.