



Standard Specification for Rigid Cellular Polystyrene-Cellulosic Fiber Composite Roof Insulation¹

This standard is issued under the fixed designation C 1050; 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 composition and physical properties of insulating boards composed of wood fiber insulation board laminated to rigid cellular polystyrene insulation board, flat or tapered, used principally above structural roof decks for thermal insulation as well as a base for roofing in building construction.

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

1.3 When the installation or use of thermal insulation materials, accessories, and systems may pose safety or health problems, the manufacturer shall provide the user appropriate current information regarding any known problems associated with the recommended use of the company's products and shall also recommend protective measures to be employed in their safe utilization. The user shall establish appropriate safety and health practices and determine the applicability of regulatory requirements prior to use.

2. Referenced Documents

2.1 ASTM Standards:

C 168 Terminology Relating to Thermal Insulating Materials²

C 208 Specification for Insulating Board (Cellulosic Fiber), Structural and Decorative²

C 209 Test Methods for Cellulosic Fiber Insulating Board²

C 390 Criteria for Sampling and Acceptance of Preformed Thermal Insulation Lots²

C 550 Practice for Measuring Trueness and Squareness of Rigid Block Thermal Insulation²

C 578 Specification for Preformed, Cellular Polystyrene Thermal Insulation²

D 312 Specification for Asphalt Used in Roofing³

2.2 Other Standard:

PS 51-71 NBS Product Standard for Hardwood and Decorative Plywood⁴

3. Terminology

3.1 The products described in this specification are thermal insulations in board form. Terms used in this specification are defined in Terminology C 168.

4. Classification

4.1 Materials covered by this specification are divided into three types, three grades, and four classes based on characteristics of the individual components. The types, grades, and classes are detailed in Section 6 and Tables 1-4 of this specification.

5. Ordering Information

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

5.1.1 This specification number including type, grade, and class;

5.1.2 Dimensions (composite thickness, width, and length);

5.1.2.1 Cellulosic fiber board will be ½-in. (12.7-mm) thickness unless otherwise agreed to by seller and purchaser;

5.1.3 Square feet (square metres) required;

5.1.4 "Ship to" address if different from purchaser's address;

5.1.5 Date material is required; and

5.1.6 Special requirements such as specific delivery time of day, special trucking requirements. When an order includes more than one size of composite board, specify what sizes should be delivered first.

6. Materials and Manufacture

6.1 *Rigid Cellular Polystyrene*—Cellulosic fiber composite roof insulation shall consist of rigid cellular polystyrene (RCPS) board and cellulosic fiber board (CFB) bonded together at the time of manufacture.

6.1.1 The RCPS board shall be manufactured in accordance with Specification C 578 as shown in Table 1.

6.1.2 Cellulosic fiber board insulation shall meet the requirements defined by Specification C 208. The minimum

¹ This specification is under the jurisdiction of ASTM Committee C-16 on Thermal Insulation and is the direct responsibility of Subcommittee C16.22 on Organic and Nonhomogeneous Inorganic Thermal Insulations.

Current edition approved March 15, 1991. Published May 1991. Originally published as C 1050 – 85. Last previous edition C 1050 – 85.

² Annual Book of ASTM Standards, Vol 04.06.

³ Annual Book of ASTM Standards, Vol 04.04.

⁴ Available from National Bureau of Standards, U.S. Department of Commerce, Washington, DC 20234.

TABLE 1 RCPS Manufacture Requirements

Composite Roof Insulation RCPS Portion	Type I	Type II	Type III
	C 578, Type I (0.90 lb/ft ³) 14.4 kg/m ³	C 578, Type VIII (1.15 lb/ft ³) 18.4 kg/m ³	C 578, Type II (1.35 lb/ft ³) 21.6 kg/m ³

TABLE 2 Cellulosic Fiber Board Construction Requirements

Composite Roof Insulation Cellulosic Fiber Board Portion	Grade 1	Grade 2	Grade 3
	C 208 Roofing Board	C 208 Reg Sheathing	C 208 Intermediate Sheathing

TABLE 3 Adhesive Requirements

Composite Roof Insulation, Adhesive Material	Class A, Asphalt	Class B, Water-Based Adhesive	Class C, Water-Based Adhesive	Class D, Water-Based Adhesive
Adhesive Standard	D 312 Type II or Type III	PS 51-71 Type III (Humidity Resistant)	PS 51-71 Type II (Water Resistant)	PS 51-71 Type I (Boiling Water Resistant)

TABLE 4 Tensile (Bond) Strength Requirements

Composite Roof Insulation	Grade 1	Grade 2	Grade 3
Minimum Tensile Strength	500 lb/ft ² (24 kPa)	600 lb/ft ² (29 kPa)	800 lb/ft ² (38 kPa)

thickness (see 12.2) shall be ½ in. (12.7 mm). The cellulosic fiber board shall be one of the construction grades shown in Table 2.

6.1.3 Rigid cellular polystyrene and cellulosic fiber board shall be laminated together with an adhesive that shall meet the requirements of Specification PS 51-71 or Specification D 312, Type II or Type III as shown in Table 3.

6.1.4 The specifier shall choose the combination of type, grade, and class required for each project, for example, Type II, Grade 2, Class D.

7. Physical Properties

7.1 The tensile (bond) strength perpendicular to the surface of the finished composite board shall be as shown in Table 4.

7.2 Physical properties such as thermal conductivity, compressive strength, and water absorption of the composite insulation will vary dependent on thickness, type, and grade. These properties for each of the components are detailed in the specifications referenced in Tables 1 and 2. For specific design recommendations, consult the composite insulation manufacturer.

7.2.1 The manufacturer of the composite insulation board shall furnish to the buyer a statement (upon request) of *R* value for the specified (average) or (minimum) thickness.

7.2.2 The *R*-value of the individual components shall comply with the respective ASTM specifications detailed in Section 6.

8. Dimensions and Permissible Variations

8.1 The dimensions shall be agreed upon by the purchaser and seller.

8.2 The tolerances shall be as follows:

8.2.1 *Length*—+0 in., – ¼ in. (6 mm).

8.2.2 *Width*—+0 in., – ¼ in. (6 mm).

8.2.3 *Thickness*—±0.11 in. (4 mm).

8.2.4 *Squareness*—The two diagonal measurements of the board shall differ by no more than ¼ in. (6 mm).

8.2.5 *Face Trueness*—With the composite board concave side up measure in accordance with 8.2–8.2.5 of Practice C 550. The deviation shall be no more than ⅜ in. across 48 in. when measured at 75°F (24°C).

9. Workmanship, Finish, and Appearance

9.1 Insulation boards shall not have visible defects that may adversely affect performance qualities.

10. Sampling

10.1 Sampling for qualification tests, if required, shall be in accordance with Criteria C390. Qualification tests shall be conducted on the physical properties in Section 7 and other standards referenced in this specification.

10.2 Sampling for inspection tests, if required, shall be in accordance with Criteria C390. Inspection requirements are dimensions (Section 8) plus any other properties agreed upon by the purchaser and supplier.

11. Specimen Preparation

11.1 Specimens for all tests shall be cut from the composite board. Care shall be taken to avoid delamination of the specimens during sample preparation. All cut edges shall be smooth and free of any physical damage that could affect test results.

11.2 Condition samples prior to cutting specimens for at least 12 h at 73 ± 4°F (23 ± 2°C), 50 ± 5 % relative humidity before testing.