



Designation: C728 – 17

Standard Specification for Perlite Thermal Insulation Board¹

This standard is issued under the fixed designation C728; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This specification covers the composition and physical properties for perlite thermal insulation board used principally above structural roof decks and as a base for built-up, modified, and elastomeric membrane roofing in building construction.

1.2 When adopted by an authority having jurisdiction, codes that address fire properties in many applications regulate the use of the thermal insulation materials covered by this specification. Fire properties are controlled by job, project, or other specifications where codes or government regulations do not apply.

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 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.*

1.5 *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 The following standards, of the issue in effect on the date of material purchase, form a part of this specification to the extent specified herein:

2.2 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
- C203 Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation
- C209 Test Methods for Cellulosic Fiber Insulating Board
- 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
- C1289 Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
- E84 Test Method for Surface Burning Characteristics of Building Materials
- C1763 Test Method for Water Absorption by Immersion of Thermal Insulation Materials

3. Terminology

3.1 For complete descriptions of terms used in this specification, refer to Terminology C168.

4. Classification

4.1 Perlite thermal insulation board is classified as follows:

4.1.1 *Type 1, Roof Insulation Board*—A perlite based roof insulation cover board.

4.1.2 *Type 2, Roof Cover or Recover Board*—This is used primarily as a field-applied cover board over other roof insulations or in reroofing applications. The product is also available to manufacturers of laminated rigid foam products as specified in Specification C1289, Type III.

4.1.3 *Type 3, Roof Cover or Recover Board*—A perlite based cover board that is field applied over other roof insulations or in re-roofing and recover applications. The product is also

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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.

available to manufacturers of laminated rigid foam products as specified in Specification C1289, Type III.

5. Ordering Information

- 5.1 Orders shall at least include the following information:
- 5.1.1 Title and designation Specification C728.
- 5.1.2 Product name, nominal thickness and dimensions.
- 5.1.3 Quantity of material ordered.
- 5.1.4 Manufacturer's name, address, and telephone number.

6. Materials and Manufacture

6.1 *Composition*—The basic material of the insulation board shall be perlite expanded by the application of heat to form glassy, cellular aggregates. The insulation and cover board shall be composed of expanded perlite and fibers formed into rigid, flat, rectangular units with a suitable sizing material incorporated in the product. A facing or coating is potentially present on one or both surfaces to prevent excessive hot bitumen strike-in or adhesive absorption during roofing installation.

6.2 *Lamination*—The finished board is either single-ply or multiple-ply. When multiple-ply boards are supplied, a suitable adhesive shall be used to join the plies.

7. Physical Properties

7.1 *Thermal Resistance*—Perlite thermal insulation boards and cover shall conform to the following thermal resistances:

Nominal Thickness in. (mm)	Thermal Resistance, F·h·ft ² /btu (Km ² /W)		
	Type 1	Type 2	Type 3
1/2 (13)	1.4 (0.25)	1.3 (0.23)	1.2 (0.22)
3/4 (19)	2.0 (0.35)	...	...
1 (25)	2.7 (0.48)	...	...
1 1/2 (38)	4.1 (0.72)	...	...
2 (51)	5.4 (0.95)	...	...
2 1/2 (64)	6.5 (1.1)	...	...
3 (76)	8.1 (1.4)	...	...

7.1.1 Nominal thickness is the thickness of insulation required to obtain the desired resistance value. It is possible that the nominal thickness will fall outside the thicknesses shown in 7.1. See 8.1 for tolerances.

7.1.2 It is acceptable for insulation and cover boards having thermal resistances other than those values listed to be supplied as agreed upon by purchaser and seller.

7.2 The insulation and cover board shall further conform to the physical requirements shown in Table 1.

8. Standard Dimensions and Tolerances

8.1 The dimensions and tolerances shall conform to those listed below. It is acceptable for other dimensions to be supplied as agreed upon by purchaser and seller.

Dimensions, in. (mm)	Tolerance, in. (mm)
Length, 36 (915), 48 (1220) 72 (1830), 96 (2440)	+ 1/4 (6) −1/8 (3)
Width, 24 (610), 48 (1220)	+ 1/4 (6) −1/8 (3)
Thickness, 1/2 to 3, (13 to 76), incl	±1/16 (1.6)

8.1.1 Board squareness shall be within required tolerance if the two diagonal measurements of the board differ by no more than 1/4 in. (6 mm).

8.2 The fabrication of tapered perlite roof insulation board products shall be acceptable if dimension and installation specifications are agreed upon between buyer and seller.

9. Workmanship, Finish, and Appearance

9.1 The surface of the board shall be clean, dry, and free of visual defects that will adversely affect the service quality. Edges shall be square.

10. Sampling

10.1 Unless otherwise specified, sampling for qualification and inspection tests, if required, shall be in accordance with Practice C390.

11. Test Methods

11.1 *Thermal Resistance*—Test Method C177 or C518 at a mean temperature of 75 ± 2°F (24 ± 1°C) and a minimum temperature difference of 40°F (22°C). In the event of challenge, Test Method C177 shall be the referee method.

11.2 *Compressive Strength*—Test Method C165, Procedure A, at a crosshead speed of 0.05 in./min for all thicknesses using specimen dimensions of 2 in. (51 mm) length by 2 in. (51 mm) width.

11.3 *Tensile Strength Perpendicular to the Surface*—Section 12 on Tensile Strength Perpendicular to Surface of Test Methods C209 using specimen dimensions of 2 in. (51 mm) length by 2 in. (51 mm) width.

TABLE 1 Physical Requirements

Property	Units	Type 1	Type 2	Type 3
Density	lb/ft ³ (kg/m ³)	8 (128) min	10 (160) min	12 (192) min
Compressive strength at 5 % consolidation	psi (kPa)	20(138) min	20 (138) min	50 (345) min
Tensile strength, perpendicular	lbf/ft ² (kPa)	575 (27.5) min	800 (38.3) min	1800 (86) min
Break Load Strength	lbf (kgf)	6.5 (2.9) min	4.5 (2.0) min	8 (3.6) min
Flexural strength ^A	psi (kPa)			
< 1 in.		50 (345) min	35 (241) min	65 (448) min
≥ 1 in.		10 (69) min	5 (34) min	15 (103) min
Water absorption	volume %	1.5 max	3.5 max	3.5 max

^A Minimum flexural strength requirement is based on the calculated value from the minimum required break load strength and the maximum current available thicknesses including the thickness tolerance in 8.1. Reference Test Methods C203 for appropriate calculations.

11.4 *Flexural Strength and Break Load*—Test Methods **C203**, Method I, Procedure D, except test at a strain rate of 2 in./min using 3 in. (76 mm) wide specimens on a 10 in. (254 mm) span.

11.5 *Flame Spread Classification*—Test Method **E84** in the event that surface burning characteristics are required.

11.6 *Water Absorption*—Test Methods **C1763**, Procedure B.

11.7 *Thickness*—Thickness section of Test Methods **C209**.

11.8 *Oven-Dry Density*—Moisture Content and Density section of Test Methods **C209**.

12. Qualification and Inspection

12.1 Qualification tests shall be run on the physical requirements given in **7.1** and **7.2**.

12.2 Inspection requirements are given in **8.1**.

13. Rejection

13.1 Failure to conform to any of the requirements of this specification shall constitute grounds for rejection. In case of

rejection, the seller shall have the right to reinspect the rejected shipment and resubmit the lot after removal of that portion not conforming to the specified requirements.

14. Packaging and Package Marking

14.1 *Packaging*—Unless otherwise specified, boards shall be packaged in the manufacturer's standard commercial containers. Special packaging shall be provided when agreed to in writing between purchaser and seller.

14.2 *Marking*—Unless otherwise specified, each container shall be plainly marked with the supplier's name, address, telephone number, board dimensions, quantity, and the coverage area per container. Additional marking shall be provided when agreed to in writing between purchaser and seller.

15. Keywords

15.1 cover/recover board; laminated rigid foam board; perlite; perlite thermal insulation board; roof insulation; thermal insulation

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