



Designation: **C549 – 06 (Reapproved 2012) C549 – 18**

Standard Specification for Perlite Loose Fill Insulation¹

This standard is issued under the fixed designation C549; 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 of expanded perlite loose fill insulation. The specification also includes the testing procedures by which the acceptability of the material is determined. These testing procedures deal primarily with material performance in the temperature range associated with the thermal envelope of buildings; however, the commercially usable temperature range for this insulation is from -459 to 1400°F (1 to 1033 K). For specialized applications, refer to the manufacturer's instructions.

1.2 The specification also covers the composition and properties of perlite that has been surface-treated to produce dust suppression for installations where dust is a factor.

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 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. For additional precautionary statements, see Section 12.~~

1.4 The following applies to Test Methods E84 and E136—This standard is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions, but does not by itself incorporate all factors required for fire hazard or fire risk assessment of the materials, products, or assemblies under actual fire conditions.

1.5 The following applies to Test Methods E84 and E136—Fire testing is inherently hazardous. Adequate safeguards for personnel and property shall be employed in conducting these tests.

~~1.6 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. For additional precautionary statements, see Section 12.~~

1.7 *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.*

1.8 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

C136 Test Method for Sieve Analysis of Fine and Coarse Aggregates

¹ This specification is under the jurisdiction of ASTM Committee C16 on Thermal Insulation and is the direct responsibility of Subcommittee C16.23 on Blanket and Loose Fill Insulation.

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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.

- 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
- 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
- C520 Test Methods for Density of Granular Loose Fill Insulations
- E84 Test Method for Surface Burning Characteristics of Building Materials
- E136 Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C
- E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

3. Terminology

3.1 Terms used in this specification are defined in Terminology C168.

4. Classification

4.1 Perlite loose fill insulation shall conform to the physical requirements of 7. Expanded perlite that has been treated to limit the amount of dust generated during application shall be identified on the product label.

5. Ordering Information

5.1 All purchase orders shall designate the density of insulation desired or require conformance with the properties in 7.1. The purchase order shall designate surface-treated product when desired.

6. Materials and Manufacture

6.1 Perlite is a generic term for a naturally occurring siliceous mineral which is mined, crushed, sieved and dried to produce a crude perlite ore. The crude ore, in the form of particles of varying size, weighing 60 to 75 lb/ft³ (960 to 1200 kg/m³), is expanded in high-temperature furnaces to densities in the range from 2.0 to 11.0 lb/ft³ (32 to 176 kg/m³). As a naturally occurring mineral, it is classified as an elementary building material. It is noncombustible as determined by Test Method E136.

7. Physical Requirements

7.1 The physical requirements listed in this section are defined as inspection requirements (see Practice C390). The insulation shall conform to the following requirements:

Bulk density, lb/ft ³ (kg/m ³)	2–11 (32–176)
Grading (particle size):	
Percentage retained, maximum (by weight), Sieve No. 4 (4.75 mm), %	5
Small-scale fire test	no sparking or ignition

7.2 The physical requirements listed in this section are defined as Qualification Requirements (see Practice C390). The insulation shall conform to the following requirements:

Thermal resistance, h-ft ² -°F/Btu (m ² -K/W)	See Table 1	
Moisture absorption, weight %/14 days, max, %	1.0	
Combustibility (by Test Method E136)	noncombustible	
Surface burning characteristics:		
Flame spread, max	0	25
Smoke developed, max	0	50
Dust suppression: (for surface treated product)		
Weight of collected material, max, mg		85

8. Sampling

8.1 For purposes of standard tests, sampling shall be in accordance with Practice C390.

9. Test Methods

9.1 *Bulk Density*—Test Methods C520, Method A.

9.2 *Grading*—Test Method C136, except that when a mechanical sieving device is used, the sieving time shall be 5 min and the test sample shall be 0.11 ± 0.02 lb (50 ± 9g) of material.

9.3 *Small-Scale Fire Test*:

9.3.1 *Scope*—The purpose of this quality control test is to confirm that excessive coating or organic material has not been added during processing.