



Designation: C687 – 17

Standard Practice for Determination of Thermal Resistance of Loose-Fill Building Insulation¹

This standard is issued under the fixed designation C687; 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 practice presents a laboratory guide to determine the thermal resistance of loose-fill building insulations at mean temperatures between -20 and 55°C (-4 to 131°F).

1.2 This practice applies to a wide variety of loose-fill thermal insulation products including fibrous glass, rock/slag wool, or cellulosic fiber materials; granular types including vermiculite and perlite; pelletized products; and any other insulation material installed pneumatically or poured in place. It does not apply to products that change their character after installation either by chemical reaction or the application of binders or adhesives, nor does it consider the effects of structures, containments, facings, or air films.

1.3 Since this practice is designed for reproducible product comparison, it measures the thermal resistance of an insulation material which has been preconditioned to a relatively dry state. Consideration of changes of thermal performance of a hygroscopic insulation by sorption of water is beyond the scope of this practice.

1.4 The sample preparation techniques outlined in this practice do not cover the characterization of loose-fill materials intended for enclosed applications. For those applications, a separate sample preparation technique that simulates the installed condition will be required. However, even for those applications, some other aspects of this practice are applicable.

1.5 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.6 *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.*

1.7 *This international standard was developed in accordance with internationally recognized principles on standard-*

ization 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

C167 Test Methods for Thickness and Density of Blanket or Batt 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

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

C653 Guide for Determination of the Thermal Resistance of Low-Density Blanket-Type Mineral Fiber Insulation

C739 Specification for Cellulosic Fiber Loose-Fill Thermal Insulation

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

C1114 Test Method for Steady-State Thermal Transmission Properties by Means of the Thin-Heater Apparatus

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

C1373 Practice for Determination of Thermal Resistance of Attic Insulation Systems Under Simulated Winter Conditions

3. Terminology

3.1 Unless otherwise stated, the terms and definitions found in Terminology **C168** are applicable herein.

4. Significance and Use

4.1 The thermal resistance, R , of an insulation is used to describe its thermal performance.

¹ This practice is under the jurisdiction of ASTM Committee **C16** on Thermal Insulation and is the direct responsibility of Subcommittee **C16.30** on Thermal Measurement.

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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.