



Standard Specification for Vacuum Insulation Panels¹

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1. Scope

1.1 This specification covers the general requirements for Vacuum Insulation Panels (VIP). These panels have been used wherever high thermal resistance is desired in confined space applications, such as transportation, equipment, and appliances.

1.2 Vacuum panels typically exhibit an edge effect due to differences between panel core and panel barrier thermal properties. This specification applies to composite panels whose center-of-panel apparent thermal resistivities (sec. 3.2.3) typically range from 87 to 870 m²·K/W at 24°C mean, and whose intended service temperature boundaries range from –70 to 480°C.

1.3 The specification applies to panels encompassing evacuated space with: some means of preventing panel collapse due to atmospheric pressure, some means of reducing radiation heat transfer, and some means of reducing the mean free path of the remaining gas molecules.

1.4 Limitations:

1.4.1 The specification is intended for evacuated planar composites; it does not apply to non-planar evacuated self-supporting structures, such as containers or bottles with evacuated walls.

1.4.2 The specification describes the thermal performance considerations in the use of these insulations. Because this market is still developing, discrete classes of products have not yet been defined and standard performance values are not yet available.

1.5 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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 specifications and determine the applicability of regulatory limitations prior to use.*

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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NOTE 1—For specific safety considerations see Annex A1.

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
- C203 Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation
- C390 Practice for Sampling and Acceptance of Thermal Insulation Lots
- C480 Test Method for Flexure Creep of Sandwich Constructions
- C518 Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- C740 Practice for Evacuated Reflective Insulation In Cryogenic Service
- C1045 Practice for Calculating Thermal Transmission Properties Under Steady-State Conditions
- C1055 Guide for Heated System Surface Conditions that Produce Contact Burn Injuries
- C1058 Practice for Selecting Temperatures for Evaluating and Reporting Thermal Properties of Thermal Insulation
- C1114 Test Method for Steady-State Thermal Transmission Properties by Means of the Thin-Heater Apparatus
- C1136 Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation
- C1363 Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
- C1667 Test Method for Using Heat Flow Meter Apparatus to Measure the Center-of-Panel Thermal Resistivity of Vacuum Panels
- D999 Test Methods for Vibration Testing of Shipping Containers
- D1434 Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheet

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.