



Standard Terminology Relating to Thermal Insulation¹

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1. Scope

1.1 This standard provides definitions, symbols, units, and abbreviations of terms used in ASTM standards pertaining to thermal insulating materials, and to materials associated with them.

1.2 This terminology is not intended to be used to classify insulation materials as having particular properties. Rather, classification of insulation materials is to be done by the material standards themselves.

1.3 *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.*

2. Referenced Documents

2.1 ASTM Standards:²

D3574 Test Methods for Flexible Cellular Materials—Slab, Bonded, and Molded Urethane Foams

E456 Terminology Relating to Quality and Statistics

E2282 Guide for Defining the Test Result of a Test Method

2.2 ISO Standard:

ISO 7345 Thermal Insulation—Physical Quantities and Definitions³

3. Terminology

3.1 Definitions:

absorptance, n —the ratio of the radiant flux absorbed by a body to that incident upon it.

absorption, n —transformation of radiant energy to a different form of energy by interaction with matter.

¹ This terminology is under the jurisdiction of ASTM Committee C16 on Thermal Insulation and is the direct responsibility of Subcommittee C16.94 on Terminology.

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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.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

apparent thermal conductivity, λ_a , k_a , n —a thermal conductivity assigned to a material that exhibits thermal transmission by several modes of heat transfer resulting in property variation with specimen thickness, or surface emittance. See **conductivity, thermal**.

DISCUSSION—Thermal conductivity and resistivity are normally considered to be intrinsic or specific properties of materials and, as such, should be independent of thickness. When nonconductive modes of heat transfer are present within the specimen (radiation, free convection) this may not be the case. To indicate the possible presence of this phenomena (for example, thickness effect) the modifier “apparent” is used, as in apparent thermal conductivity.

DISCUSSION—Test data using the “apparent” modifier must be quoted only for the conditions of the measurement. Values of thermal conductance (material C) and thermal resistance (material R) calculated from apparent thermal conductivity or resistivity, are valid only for the same conditions.

DISCUSSION—Test data labeled with “apparent” shall not include any equipment related measurement errors induced due to measurement attempts beyond an apparatus range or calibration.

DISCUSSION—Use of the “apparent” modifier with system C or system R measurements is not permitted.

apparent thermal resistivity, r_a , n —a thermal resistivity assigned to a material that exhibits thermal transmission by several modes of heat transfer resulting in property variation with specimen thickness, or surface emittance. See **resistivity, thermal**.

DISCUSSION—See entire discussion under **apparent thermal conductivity**.

area weight, n —weight per unit area for a specified sample, in units of lb/ft² (kg/m²).

aerogel, n —a homogeneous, low-density solid phase material derived from a gel, in which the liquid component of the gel has been replaced with a gas.

DISCUSSION—The resulting material has a porous structure with an average pore size below the mean free path of air molecules at standard atmospheric pressure and temperature.

batt, n —blanket insulation manufactured to dimensions as required by a specific application.

blackbody, n —the ideal, perfect emitter and absorber of thermal radiation. It emits radiant energy at each wavelength at the maximum rate possible as a consequence of its temperature, and absorbs all incident radiance.