



Designation: C 1045 – 9701

Standard Practice for Calculating Thermal Transmission Properties Under Steady-State Conditions¹

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1. Scope

1.1 This practice covers requirements and guidelines provides the user with a uniform procedure for calculating the determination of thermal transmission properties based upon steady-state one dimensional heat transfer tests on of a thermal insulation material or system for which values of from data generated by steady state, one dimensional test methods used to determine heat flux; and surface temperatures. This practice is intended to eliminate the need for similar calculation sections in Test Methods C 177, C 335, C 518, C 976, C 1033, C 1114 and specimen geometry are reported from C 1363 by permitting use of these standard test methods, calculation forms by reference.

1.2 The thermal transmission properties described include: thermal conductance, thermal resistance, apparent thermal conductivity, apparent thermal resistivity, surface conductance, surface resistance, and overall thermal resistance or transmittance.

1.3 This practice is restricted to calculation of provides the method for developing the apparent thermal transmission properties conductivity as a function of temperature relationship for a specimen from heat transfer data generated by standard test methods. These methods include: (1) planar geometries such as those at small or large temperature differences. This relationship can be used in Test Methods C 177, C 236, C 518, C 745, C 976, to characterize material for comparison to material specifications and C 1114; and (2) radial geometries for use in calculation programs such as those Practice C 680.

1.4 The SI unit values used in Test Methods C 335 and C 1033.

1.4 This this practice are considered standard.

1.5 This practice includes a discussion of the procedure definitions and underlying assumptions for development the calculation of thermal conductivity as a function of temperature equation transmission properties. Tests to detect deviations from data generated by standard test methods.

1.5 The values stated in SI units these assumptions are described. This practice also considers the complicating effects of uncertainties due to be regarded as the standard.

1.6 The attached appendixes provide discussions measurement processes and material variability. See Section 7.

1.6 This practice is not intended to cover all possible aspects of thermal properties data base development. For new materials, the user should investigate the variations in thermal properties seen in similar materials. The information contained in Section 7, the Appendix and the technical papers listed in the References section of this practice may be helpful in determining whether the material under study has thermal properties that can be described by equations using in this practice. Some examples where this method has; limited application include: (1) the development onset of convection in insulation as described in Reference (21); (2) a phase change of one of the basic relationships used insulation system components such as a blowing gas in this practice; foam; and examples (3) the influence of heat flow direction and temperature difference changes for reflective insulations.

2. Referenced Documents

2.1 ASTM Standards:

¹ This practice is under the jurisdiction of ASTM Committee C-16 on Thermal Insulation and is the direct responsibility of Subcommittee C16.30 on Thermal Measurements.

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