



Designation: C 236 – 89 (Reapproved 1993)^{ε1}

Standard Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box¹

This standard is issued under the fixed designation C 236; 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 Department of Defense.

^{ε1} NOTE—Section 12 was added editorially in September 1993.

1. Scope

1.1 This test method, known as the guarded hot box method, covers the measurement of the steady-state thermal transfer properties of panels. In distinction to Test Method C 177, which is primarily applicable to homogeneous samples, the guarded hot box method provides for the evaluation of thermal performance of building assemblies. This test method is suitable for building construction assemblies, building panels, and other applications of nonhomogeneous specimens at similar temperature ranges. It may also be used for homogeneous specimens.

1.2 This test method may be applied to any building construction for which it is possible to build a reasonably representative specimen of size appropriate for the apparatus.

NOTE 1—A calibrated hot box, Test Method C 976, may also be used for the described measurements and may prove more satisfactory for testing assemblies under dynamic conditions (nonsteady-state) and to evaluate the effects of water migration and air infiltration. The choice between the calibrated or the guarded hot box should be made only after careful consideration of the contemplated use.

1.3 In applying this test method, the general principles outlined must be followed; however, the details of the apparatus and procedures may be varied as needed.

1.3.1 The intent of this test method is to give the essential principles and the general arrangement of the apparatus. Any test using this apparatus must follow those principles. The details of the apparatus and the suggested procedures that follow are given not as mandatory requirements but as examples of this test method and precautions that have been found useful to satisfy the essential principles.

1.3.2 Persons applying this test method shall be trained in the methods of temperature measurement, shall possess a knowledge of the theory of heat flow, and shall understand the general requirements of testing practice.

1.4 *This standard does not purport to address all of the*

safety problems, 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.

NOTE 2—While various units may be found for thermal properties, the International System of units is used exclusively in this test method. For conversion factors to inch-pound and kilogram-calorie systems, see Table 1.

2. Referenced Documents

2.1 ASTM Standards:

C 168 Terminology Relating to Thermal Insulating Materials²

C 177 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus²

C 518 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus²

C 578 Specification for Preformed Cellular Polystyrene Thermal Insulation²

C 976 Test Method for Thermal Performance of Building Assemblies by Means of a Calibrated Hot Box²

C 1045 Practice for Calculating Thermal Transmission Properties from Steady-State Heat Flux Measurements²

E 178 Practice for Dealing With Outlying Observations³

E 230 Temperature-Electromotive Force (EMF) Tables for Standardized Thermocouples⁴

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method³

3. Terminology

3.1 Definitions— For definitions of terms used in this test method, refer to Terminology C 168.

3.2 Symbols: Symbols:

3.2.1 The symbols used in this test method have the following significance:

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

Current edition approved Sept. 29, 1989. Published June 1990. Originally published as C 236 – 60. Last previous edition C 236 – 87.

² Annual Book of ASTM Standards, Vol 04.06.

³ Annual Book of ASTM Standards, Vol 14.02.

⁴ Annual Book of ASTM Standards, Vol 14.03.