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Standard Specification for Sheet Radiant Barriers for Building Construction Applications[1]

This standard is issued under the fixed designation C1313/C1313M; 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 specification covers the general physical property requirements of radiant barrier materials for use in building construction. The scope is specifically limited to requirements for radiant barrier sheet materials that consist of at least one surface having a far-infrared emittance of 0.1 or less, such as metallic foils or metallic deposits mounted or unmounted on substrates.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.3 The following safety hazards caveat pertains only to the test methods (Section 10) described in this specification. *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]

C168 Terminology Relating to Thermal Insulation

C390 Practice for Sampling and Acceptance of Thermal Insulation Lots ~~C1158Practice for Installation and Use of Radiant Barrier Systems (RBS) in Building Construction~~

C1338 Test Method for Determining Fungi Resistance of Insulation Materials and Facings

C1371 Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers

C1743 Practice for Installation and Use of Radiant Barrier Systems (RBS) in Residential Building Construction

C1744 Practice for Installation and Use of Radiant Barrier Systems (RBS) in Commercial/Industrial Building Construction

D2261 Test Method for Tearing Strength of Fabrics by the Tongue (Single Rip) Procedure (Constant-Rate-of-Extension Tensile Testing Machine)

D3310 Test Method for Determining Corrosivity of Adhesive Materials

E84 Test Method for Surface Burning Characteristics of Building Materials

E96/E96M Test Methods for Water Vapor Transmission of Materials

E2599 Practice for Specimen Preparation and Mounting of Reflective Insulation, Radiant Barrier and Vinyl Stretch Ceiling Materials for Building Applications to Assess Surface Burning Characteristics

2.2 *Other Standards:*

TAPPI Test Method T 512 sp-02: Creasing of Flexible Packaging Material Paper Specimens for Testing[3]

3. Terminology

3.1 *Definitions*—For definitions of terms used in this specification, refer to Terminology C168.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *radiant barrier*—a low emittance (0.1 or less) surface used in the construction of a radiant barrier system.

3.2.2 *radiant barrier system (RBS)*—a building construction consisting of a radiant barrier bounded by an open air space.

3.2.3 *non-structural radiant barrier*—a radiant barrier material design that during manufacture is not bonded to a structural building material.

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[1] This specification is under the jurisdiction of ASTM Committee C16 on Thermal Insulation and is under the direct responsibility of Subcommittee C16.21 on Reflective Insulation.

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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 Technical Association of the Pulp and Paper Industry (TAPPI), 15 Technology Parkway South, Norcross, GA 30092, http://www.tappi.org.

3.2.4 *structural radiant barrier*—a radiant barrier material design that during manufacture is bonded (leaving no air space between the radiant barrier and the bonding substrate) to a structural building material such as plywood or oriented strand board (OSB).

4. Ordering Information

4.1 Prior to purchase, for sampling and acceptance procedures, Practice C390 is an option when agreed to by purchaser and manufacturer.

4.2 Specify the width and total area to be installed.

4.3 Specify any special markings.

5. Materials and Manufacture

5.1 Sheet radiant barrier materials shall consist of low emittance surface(s) that are in combination with any substrates and adhesives required to meet the specified physical material properties.

6. Workmanship, Finish, and Appearance

6.1 Sheet radiant barriers shall be manufactured, packaged and shipped in such a manner that, when received by the customer, they are suitable for installation in accordance with either Practice ~~C1158~~C1743 or C1744.

7. Physical Requirements

7.1 The low–emittance materials shall conform to the physical properties as specified in Table 1 and local building codes.

7.2 The following physical characteristics of sheet radiant barriers are important:

7.2.1 *Surface Emittance*—Radiant barriers derive effectiveness from a low-emittance surface. The surface emittance of sheet radiant barriers shall be determined in accordance with Test Method C1371.

7.2.2 *Water Vapor Transmission*—~~Sheet radiant barriers may or may not be vapor retarders. If the radiant barrier is to serve as a vapor retarder, the permeance of the material shall not exceed one perm, as determined in accordance with Test Methods~~ —Sheet radiant barriers are manufactured as vapor retarders or vapor transmitting materials. A radiant barrier that is to serve as a vapor retarder shall not have a permeance greater than one perm, as determined in accordance with Test Methods E96/E96M (Procedure A—Desiccant Method).

~~7.2.2.1If the radiant barrier is to be vapor transmitting then the permeance of the material shall exceed five perms as determined with Test Methods~~

7.2.2.1 A vapor transmitting radiant barrier shall have a permeance greater than five perms as determined with Test Methods E96/E96M (Procedure A—Desiccant Method).

7.2.3 *Surface Burning Characteristics* —Determine in accordance with 10.3.

7.2.4 *Corrosivity*— Sheet radiant barriers shall be tested for corrosion resistance in accordance with Test Method D3310. Evidence of significant corrosion shall be cause for rejection. A corrosion test that results in less than 2 % affected surface is satisfactory.

7.2.5 *Tear Resistance*— Sheet radiant barriers shall be tested for tear resistance using Test Method D2261. The tear resistance shall be included in the manufacturer's technical data.

7.2.6 *Adhesive Performance*:

7.2.6.1 *Bleeding*—Adhesives, when used in bonding, shall show no sign of bleeding when tested in accordance with the test procedure in 10.1. Bleeding at cut edges ~~may~~shall be disregarded. The total of bleeding or delamination, covering more than 2 % of the sample area, shall be cause for rejection.

7.2.6.2 *Pliability*—Specimens tested in accordance with the test procedure in 10.2 shall not show cracking or delamination. This test does not apply to materials that are not flexible and not intended to be bent or flexed.

7.2.7 *Mold and Mildew*— Fungal resistance of sheet radiant barriers shall be tested in accordance with Test Method C1338. The samples are then examined visually under 5× magnification for the extent of mold growth and for indications of deterioration. Evidence of mold growth beyond the inoculation area shall be cause for rejection.

8. Significance and Use

8.1 This specification recognizes that the effectiveness of a sheet radiant barrier is dependent on proper installation. Practices

TABLE 1 Physical Properties of Low Emittance Materials

Foils or Deposits
Purity—at least 99 % aluminum (where applicable)
Emittance—0.1 or less
Corrosivity—Test Method D3310 result <2.0 %
Bleeding or delamination—<2.0 %
Pliability—no cracking or delamination
Mold and mildew—growth or delamination outside inoculation area is cause for rejection