

Comments on proposed amendments to the Trade Regulation Rule Concerning the Labeling and Advertising of Home Insulation

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Comments and Suggestions

Editorial

In many cases, reflective insulation manufacturers in the United States use metallized aluminum film in place of aluminum foil to provide low-emittance surfaces. In addition, low-emittance surfaces are not limited to foil or film of aluminum.

This suggests a change in **460.2 line 4: replace (aluminum foil) with (metal foil or metallized film)**. This will provide a more inclusive description of products being marketed.

450.5 (a) line 2: change to read: **All types of insulation except reflective insulation** must be tested.....

450.5 (b) line 1. Suggested change to: **Single sheet reflective insulation materials** must be tested....

Use of the term “system “lacks precision. The system consists of material plus adjacent air spaces.

450.5 (b) line 10 change of wording to; **This test determines the emittance of the reflective surfaces...**

450.5 (b) line 12 change to: for a specific **emittance**, air space,”

450.5(c) change “aluminum foil systems” to **reflective insulation systems**

450.5(c) line 3 **delete “of aluminum foil”**

The words “emittance” and “emissivity” are often used interchangeably. The preferred term for a real surface is “emittance”, see Reference 1. The test methods required by 460 are methods stated in the titles to be for determining emittance. **All references to emissivity should be changed to emittance.**

The word “difference” correctly describes the test temperatures being discussed. It is the temperature of a hot surface (or region) minus the temperature of a cold surface (or region). Differential is a term generally used in the calculus. The word “differential” appearing in 460.5(a) line 21 and 450.5(b) line 20 should be changed to “difference”.

Technical

460.5(b) identifies test methods ASTM E408-13 and ASTM C1371-15 for the determination of emittance. Test method E408 determines “normal emittance” while C1371 determines “hemispherical emittance” (Reference 2) Hemispherical emittance is radiation in all directions while normal is radiation perpendicular to the surface. For low-emittance metallic surfaces, the normal emittance is less than the hemispherical emittance (Reference 3) and, as a result, overestimates the thermal resistance that will be provided. Radiative transport is a component of the overall heat transfer that is directly related to R-value. **Delete E408 and require C1371 for the determination of emittance.**

460.5(b) line 18 limits the use of the ASHRAE Handbook of Fundamentals to one line in Table 3 (pages 26.14 and 26.15) is overly restrictive. This limitation is removed by allowing interpolation and moderate extrapolation for air spaces greater than 3.5 as stated in the current edition of the ASHRAE Handbook – Fundamentals.⁴

You must use the R-value shown for 50 degrees Fahrenheit with a difference of 30 degrees Fahrenheit. Interpolation and moderate extrapolation for air spaces greater than 3.5 inches are also permissible (Table 3, pages 26.14-26.15 in Reference 4).

References

- (1) Michael F. Modest, “Radiative Heat Transfer”, McGraw-Hill, Inc., New York (1993) p 37.
- (2) Kollie, Thomas G., Freddie J. Weaver, and David L. McElroy, “Evaluation of a commercial, portable, ambient-temperature emissometer”, *Rev. Sci Instrum.* 61(5) 1509-1517 (1990).
- (3) Siegel, Robert and James R. Howell, “Thermal Radiation Heat Transfer” McGraw-Hill Book Company, New York (1972) p 110.
- (4) 2017 ASHRAE Handbook-Fundamentals I-P Edition, “Effective Thermal Resistance of Plane Air Spaces” footnote d, p 26.15.