



Designation: D7897 – 18 (Reapproved 2023)

Standard Practice for Laboratory Soiling and Weathering of Roofing Materials to Simulate Effects of Natural Exposure on Solar Reflectance and Thermal Emittance¹

This standard is issued under the fixed designation D7897; 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 Practice D7897 applies to simulation of the effects of field exposure on the solar reflectance and thermal emittance of roof surface materials including but not limited to field-applied coatings, factory-applied coatings, single-ply membranes, modified bitumen products, shingles, tiles, and metal products. The solar reflectance and thermal emittance of roof surfacing materials can be changed by exposure to the outdoor environment. These changes are caused by three factors: deposition and retention of airborne pollutants, microbiological growth, and changes in physical or chemical properties. This practice applies to simulation of changes in solar reflectance and thermal emittance induced by deposition and retention of airborne pollutants and, to a limited extent, changes caused by microbiological growth.

1.2 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.3 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

C1371 Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emis-someters

¹ This practice is under the jurisdiction of ASTM Committee D08 on Roofing and Waterproofing and is the direct responsibility of Subcommittee D08.20 on Roofing Membrane Systems.

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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.

C1549 Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflec-tometer

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

G151 Practice for Exposing Nonmetallic Materials in Accel-erated Test Devices that Use Laboratory Light Sources

G154 Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Materials

2.2 Other Standards:

ANSI/CRRC S100 Standard Test Methods for Determining Radiative Properties of Materials³

3. Terminology

3.1 Definitions:

3.1.1 *solar energy*—the radiant energy originating from the sun.

3.1.1.1 *Discussion*—Approximately 99 % of terrestrial solar radiation lies between the wavelengths of 0.3 and 2.5 μm, with peak radiation near 0.5 μm. This spectrum includes ultraviolet, visible, and near-infrared radiation.

3.1.2 *solar reflectance*—the fraction of incident solar flux reflected by a surface.

3.1.3 *thermal emittance*—efficiency with which a surface emits thermal radiation, measured on a scale from 0 to 1, where a value of 1 indicates perfect emission (that is, equal to that of a black body).

3.1.4 *thermal radiation*—the radiant energy originating from a 300 K (about 27 °C) black body.

3.1.4.1 *Discussion*—Approximately 99 % of thermal radiation lies between the wavelengths of 4 and 80 μm, with peak radiation near 10 μm.

4. Summary of Practice

4.1 This practice presents a rapid laboratory method for weathering and soiling, which simulates natural changes in solar reflectance and thermal emittance of materials in the field.

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