



Standard Practice for Field Use of Pyranometers, Pyrheliometers and UV Radiometers¹

This standard is issued under the fixed designation G183; 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 practice describes deployment conditions, maintenance requirements, verification procedures and calibration frequencies for use of pyranometers, pyrheliometers and UV radiometers in outdoor testing environments. This practice also discusses the conditions that dictate the level of accuracy required for instruments of different types.

1.2 While both pyranometers and UV radiometers may be employed indoors to measure light radiation sources, the measurement of ultraviolet and light radiation in accelerated weathering enclosures using manufactured light sources generally requires specialized radiometric instruments. Use of radiometric instrumentation to measure laboratory light sources is covered in ISO 9370.

NOTE 1—An ASTM standard that is similar to ISO 9370 is under development and deals with the instrumental determination of irradiance and radiant exposure in weathering tests.

1.3 The characterization of radiometers is outside the scope of the activities required of users of radiometers, as contemplated by this standard.

2. Referenced Documents

2.1 ASTM Standards:²

E772 Terminology of Solar Energy Conversion

G7 Practice for Atmospheric Environmental Exposure Testing of Nonmetallic Materials

G24 Practice for Conducting Exposures to Daylight Filtered Through Glass

G90 Practice for Performing Accelerated Outdoor Weathering of Nonmetallic Materials Using Concentrated Natural Sunlight

G113 Terminology Relating to Natural and Artificial Weathering Tests of Nonmetallic Materials

¹ This practice is under the jurisdiction of ASTM Committee G03 on Weathering and Durability and is the direct responsibility of Subcommittee G03.09 on Radiometry.

Current edition approved Feb. 1, 2015. Published February 2015. Originally approved in 2005. Last previous edition approved in 2010 as G183 – 05(2010). DOI: 10.1520/G0183-15.

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.

ering Tests of Nonmetallic Materials

2.2 ISO Standards:³

ISO 877 Plastics—Methods of Exposure to Direct Weathering, Indirect Weathering Using Glass-Filtered Daylight and Indirect Weathering by Daylight Using Fresnel Mirrors

ISO 9060 Solar Energy—Specification and Classification of Instruments for Measuring Hemispherical Solar and Direct Solar Radiation

ISO 9370 Plastics—Instrumental Determination of Radiant Exposure in Weathering Tests—General Guidance

ISO TR 9901 Solar Energy—Field Pyranometers—Recommended Practice for Use

2.3 WMO Reference:⁴

World Meteorological Organization (WMO), 1983 “Measurement of Radiation,” *Guide to Meteorological Instruments and Methods of Observation*, seventh ed., WMO-No. 8, Geneva

3. Terminology

3.1 *Definitions*—The definitions given in Terminologies E772 and G113 are applicable to this practice.

4. Radiometer Selection

4.1 Criteria for the Selection of Radiometers:

4.1.1 There are several criteria that need to be considered for selection of the radiometer that will be used:

4.1.1.1 Function specific criteria, such as whether a pyranometer, pyrheliometer or UV radiometer is required,

4.1.1.2 Task specific criteria, such as the accuracy requirements for the selected incident angle and temperature ranges, and maximum response time,

4.1.1.3 Operational criteria, such as dimensions, weight, stability and maintenance, and

4.1.1.4 Economic criteria, such as when networks have to be equipped, or whether the instrument is being acquired for internal reference purposes, or for research purposes, etc.

³ Available from International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, CP 56, CH-1211 Geneva 20, Switzerland, <http://www.iso.org>.

⁴ Available from World Meteorological Organization, 7 bis, avenue de la Paix, CP. 2300, CH-1211 Geneva 2, Switzerland, <http://www.wmo.int>.