



Standard Practice for Performing Accelerated Outdoor Weathering of Nonmetallic Materials Using Concentrated Natural Sunlight¹

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1. Scope

1.1 Fresnel-reflecting concentrators using the sun as source are utilized in the accelerated outdoor exposure testing of nonmetallic materials.

1.2 This practice covers a procedure for performing accelerated outdoor exposure testing of nonmetallic materials using a Fresnel-reflector accelerated outdoor weathering test machine. The apparatus (see Fig. 1 and Fig. 2) and guidelines are described herein to minimize the variables encountered during outdoor accelerated exposure testing.

1.3 This practice does not specify the exposure conditions best suited for the materials to be tested but is limited to the method of obtaining, measuring, and controlling the procedures and certain conditions of the exposure. Sample preparation, test conditions, and evaluation of results are covered in existing methods or specifications for specific materials.

1.4 The Fresnel-reflector accelerated outdoor exposure test machines described may be suitable for the determination of the relative durability of materials exposed to sunlight, heat, and moisture, provided the mechanisms of chemical or physical change, or both, which control the rates of acceleration factors for the materials do not differ significantly.

1.5 This practice establishes uniform sample mounting and in-test maintenance procedures. Also included in the practice are standard provisions for maintenance of the machine and Fresnel-reflector mirrors to ensure cleanliness and durability.

1.6 This practice shall apply to specimens whose size meets the dimensions of the target board as described in 8.2.

1.7 For test machines currently in use, this practice may not apply to specimens exceeding 13 mm (½ in.) in thickness because cooling may be questionable.

1.8 Values stated in SI units are to be regarded as the standard. The inch-pound units in parentheses are provided for information only.

1.9 *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

- D859 Test Method for Silica in Water
- D1014 Practice for Conducting Exterior Exposure Tests of Paints and Coatings on Metal Substrates
- D1435 Practice for Outdoor Weathering of Plastics
- D1898 Practice for Sampling of Plastics (Withdrawn 1998)³
- D4141 Practice for Conducting Black Box and Solar Concentrating Exposures of Coatings
- D4517 Test Method for Low-Level Total Silica in High-Purity Water by Flameless Atomic Absorption Spectroscopy
- E816 Test Method for Calibration of Pyrheliometers by Comparison to Reference Pyrheliometers
- E824 Test Method for Transfer of Calibration From Reference to Field Radiometers
- E903 Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres
- G7 Practice for Atmospheric Environmental Exposure Testing of Nonmetallic Materials
- G24 Practice for Conducting Exposures to Daylight Filtered Through Glass
- G113 Terminology Relating to Natural and Artificial Weathering Tests of Nonmetallic Materials
- G167 Test Method for Calibration of a Pyranometer Using a Pyrheliometer

¹ This practice is under the jurisdiction of ASTM Committee G03 on Weathering and Durability and is the direct responsibility of Subcommittee G03.02 on Natural and Environmental Exposure Tests.

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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 The last approved version of this historical standard is referenced on www.astm.org.