



Standard Practice for Selecting and Characterizing Weathering Reference Materials Used to Monitor Consistency of Conditions in an Exposure Test¹

This standard is issued under the fixed designation G 156; 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 reappraisal. A superscript epsilon (ε) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This standard describes the criterion to be used for selection of a WRM and procedures to be used for determining within lab and between lab tolerances of changes in measured properties of a reference material intended for use in monitoring operating conditions to establish the consistency of exposure tests.

NOTE 1—Examples of laboratory accelerated tests in which a weathering reference material could be used to monitor consistency are light and water exposure tests such as those described in Practices G 152, G 153, and G 154 G 155 and other standards in which tests conducted according to these standards are referenced. Examples of outdoor exposures where a weathering reference material could be used to monitor consistency are those conducted according to Practices G 7, G 24, or G 90. A reference material can also be used to monitor consistency of exposure or conditioning test that do not involve exposure to light.

1.2 This practice does not cover (1) control materials used for comparison of stability with test materials, or (2) standard materials used to time exposures.

1.3 This practice provides an outline of experiments required to determine how the measured properties of the reference material change as a function of exposure to specified test conditions. It includes establishment of reproducible measurement procedures, determination of the critical region in the light source causing the changes, and effects of other critical exposure stresses such as temperature and moisture.

1.4 This practice describes procedures for conducting round-robin tests with the weathering reference material to determine reproducibility of the reference material property change in exposures conducted in different laboratories, and the repeatability when replicate reference material specimens are exposed in a single device and tested in one laboratory.

1.5 This practice describes procedures for using the results from analysis of variance on results from round-robin tests to determine the contribution of the exposure, the measurement device, reference material variability, and operator error to total variability.

2. Referenced Documents

2.1 ASTM Standards:

- D 3980 Practice for conducting an Interlaboratory Study for Test of Paints and Related Coatings²
- E 177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods³
- E 691 Practice for Conducting an Interlaboratory Study to Determine Precision of a Test Method³
- E 1169 Guide for Conducting Ruggedness Tests³
- G 7 Practice for Atmospheric Environmental Exposure Testing of Nonmetallic Materials⁴
- G 24 Practice for Conducting Exposures to Daylight Filtered Through Glass⁴
- G 90 Practice for Performing Accelerated Outdoor Weathering of Nonmetallic Materials Using Concentrated Natural Sunlight⁴
- G 113 Terminology Relating to Natural and Artificial Weathering Tests of Nonmetallic Materials⁴
- G 152 Practice for Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials⁴
- G 153 Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials⁴
- G 154 Practice for Operating Fluorescent Light Apparatus for Exposure of Nonmetallic Materials⁴
- G 155 Practice for Operating Xenon-Arc Light Apparatus for Exposure of Nonmetallic Materials⁴

2.2 SAE Standard:

- SAE J1960, Accelerated Exposure of Automotive Exterior Materials using a Controlled Irradiance Water-Cooled Xenon Arc Apparatus⁵
- SAE J1885, Accelerated Exposure of Automotive Interior Materials Using a Controlled Irradiance Water-Cooled Xenon Arc Apparatus⁵

3. Terminology

3.1 Definitions—The definitions listed in Terminology

¹ This practice is under the jurisdiction of ASTM Committee G3 on Weathering and Durability and is the direct responsibility of Subcommittee G03.01 on Joint Weathering Projects.

Current edition approved Feb. 10, 2002. Published May 2002. Originally published as G 156–97. Last previous edition G 156–97.

² Discontinued—See *Annual Book of ASTM Standards*, Vol 06.02.

³ *Annual Book of ASTM Standards*, Vol 14.02.

⁴ *Annual Book of ASTM Standards*, Vol 14.04.

⁵ Available from Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.