



Standard Practice for Rubber Deterioration Using Artificial Weathering Apparatus¹

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This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This practice covers specific variations in the test conditions and procedures which shall be applicable when Practice G 151 plus either Practices G 152, G 153, G 154, or G 155 are employed for exposure of vulcanized rubber compounds. It also covers the preparation of test specimens and the evaluation of results.

1.2 The values stated in SI units are to be regarded as the standard.

1.3 *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

D 412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension

D 925 Test Methods for Rubber Property—Staining of Surfaces (Contact, Migration, and Diffusion)

D 3182 Practice for Rubber—Materials, Equipment, and Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets

D 3183 Practice for Rubber—Preparation of Pieces for Test Purposes from Products

G 151 Practice for Exposing Nonmetallic Materials in Accelerated Test Devices That Use Laboratory Light Sources

G 152 Practice for Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials

G 153 Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials

G 154 Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

G 155 Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

3. Significance and Use

3.1 This practice describes procedures to use in determining the effects of an open-flame carbon-arc light source, an enclosed carbon-arc light source, a xenon-arc light source, or a fluorescent UV light source along with heat and moisture on rubber specimens held in a jig or holder with or without a specified strain. The purpose is to attempt to accelerate the effects produced by light, heat, and moisture in the natural environment. Exposures are not intended to simulate the deterioration caused by localized weather phenomena, such as atmospheric pollution, biological attack, and saltwater exposure.

3.2 Results obtained by using any of these test procedures shall not be represented as equivalent to those of any natural exposure test until the degree of quantitative correlation has been established for the material in question.

3.3 Because of differences in the spectral power distributions of the exposure sources as well as other conditions used in the different types of laboratory weathering tests, the procedures may not result in the same performance rankings or types of failure modes of the materials. Comparisons shall not be made of the relative stabilities of materials exposed in different types of apparatus.

3.4 When conducting exposures in devices that use laboratory light sources, it is important to consider how well the artificial weathering conditions will reproduce property changes and failure modes caused by end-use environments on the materials being tested.

NOTE 1—Refer to Practice G151 for full cautionary guidance regarding laboratory weathering.

3.5 The primary criterion used in estimating resistance to light aging is the percentage decrease in tensile strength and in elongation at break. A supplementary criterion for estimating resistance to light aging is the observed extent of surface crazing and cracking.

3.6 Practices G 151, G 152, G 153, G 154, and G 155 recommend that a similar material of known performance (a control) be exposed simultaneously with the test specimen to provide a standard for comparative purposes. Preferably, two

¹ This test method is under the jurisdiction of ASTM Committee D11 on Rubber and is the direct responsibility of Subcommittee D11.15 on Degradation 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.