



Standard Test Methods for Rubber Property—Staining of Surfaces (Contact, Migration, and Diffusion)¹

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1. Scope

1.1 These test methods cover techniques to evaluate three types of staining that rubber may cause when in contact with, or in proximity to, another surface that may be light colored.

1.2 The test methods also describe how to qualitatively evaluate the degree of staining produced under the conditions of exposure to heat alone or heat and light.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 *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

D1148 Test Method for Rubber Deterioration—Discoloration from Ultraviolet (UV) or UV/Visible Radiation and Heat Exposure of Light-Colored Surfaces

D3182 Practice for Rubber—Materials, Equipment, and Procedures for Mixing Standard Compounds and Preparing Standard Vulcanized Sheets

D3183 Practice for Rubber—Preparation of Pieces for Test Purposes from Products

E145 Specification for Gravity-Convection and Forced-Ventilation Ovens

G151 Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources

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

¹ These test methods are under the jurisdiction of ASTM Committee D11 on Rubber and are 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.

G155 Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *stain, contact*—discoloration of a product by another material or product in the area of direct contact.

3.1.1.1 *Discussion*—A test for direct surface discoloration of rubber is covered by Test Method **D1148**.

3.1.2 *stain, diffusion*—discoloration of a light colored veneer or coating, caused by the diffusion of staining materials from the rubber through the veneer or coating.

3.1.2.1 *Discussion*—The veneer or coating is in direct intimate contact with the underlying rubber.

3.1.3 *stain, migration*—discoloration, caused by constituents of a rubber, that occurs on any portion of the surface of any object in the proximity of or adjacent to but not in direct contact with the rubber causing the stain.

4. Summary of Test Methods

4.1 The test methods are as follows:

4.1.1 *Method A*—Contact Stain.

4.1.2 *Method B*—Migration Stain.

4.1.3 *Method C*—Diffusion Stain.

4.2 *Method A*—Specimens to be tested for *contact* staining are sandwiched between two metal panels. The metal panels are furnished with a desired light colored organic finish, which is in contact with the rubber. The assembly is exposed to elevated temperatures for a specified length of time and the specimens are then removed from the metal. The degree of staining of the surface that was in contact with the rubber is rated against a reference standard and a control panel (a metal plate without rubber) which are simultaneously tested with the specimen.

4.3 *Method B*—Specimens to be tested for *migration* staining are placed on a metal plate with a desired light colored organic finish, and exposed to either fluorescent UVA-340 lamps or filtered xenon arc radiation for a specified period of time. The degree of staining beyond the area that was in contact with the specimens is then rated against a reference standard