



Designation: D 2151 – 95 (Reapproved 2000)

Standard Practice for Staining of Poly(Vinyl Chloride) Compositions by Rubber Compounding Ingredients¹

This standard is issued under the fixed designation D 2151; 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 measures the tendency for staining of a poly(vinyl chloride) composition to occur due to migration into the plastic of a staining antioxidant (or other compounding additive) from rubber with which it is in intimate contact.

1.2 This practice may be used to determine relative staining resistance of vinyl compounds by testing them against a single standard rubber composition (Note 1). It may also be used to compare relative staining tendencies of two or more rubber compositions by testing them against a single standard poly(vinyl chloride) composition.

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

NOTE 1—The preparation of suggested standard compositions is described in the Appendix X1. This procedure may also be applicable to determine stain resistance of plastic materials other than poly(vinyl chloride) in contact with rubber.

NOTE 2—There is no similar or equivalent ISO standard.

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:

D 925 Test Methods for Rubber Property—Staining of Surfaces (Contact, Migration and Diffusion)²

D 1249 Specification for Octyl Ortho-Phthalate Ester Plasticizers³

D 1712 Practice for Resistance of Plastics to Sulfide Staining³

D 1755 Specification for Poly(Vinyl Chloride) Resins³

D 1898 Practice for Sampling of Plastics³

¹ This practice is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.15 on Thermoplastic Materials.

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This edition contains changes in Sections 1 and 10 to include an ISO equivalency statement and Keywords.

² *Annual Book of ASTM Standards*, Vol 09.01.

³ *Annual Book of ASTM Standards*, Vol 08.01.

D 3186 Test Method for Rubber—Evaluation of SBR (Styrene-Butadiene Rubber) Mixed with Carbon Black or Carbon Black and Oil²

G 23 Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials⁴

3. Significance and Use

3.1 Compounding ingredients used in the manufacture of rubber can migrate into some vinyl compositions in contact with the rubber. These materials can then cause staining of the vinyl either immediately, or under the action of ultraviolet light. This latter behavior is especially likely when certain antioxidants migrate into the vinyl. Although they may be relatively colorless in their pure state, the action of light can transform these antioxidants into chromophoric agents.

NOTE 3—Vinyl compositions containing lead, cadmium, mercury, or antimony compounds may stain when in contact with rubber due to the formation of colored sulfides. This type of stain is due to chemical interaction between ingredients in the rubber and the vinyl compounds. Sulfide stain tendencies of vinyl compositions can be determined by Practice D 1712.

4. Apparatus

4.1 *For Test Specimen Preparation*—A mill, a press, and other auxiliary equipment for the preparation of test specimens.

4.2 *Oven*—An oven of the forced-air or convection type, having the following characteristics:

4.2.1 Control the oven by an accurate thermoregulator, maintaining set point within $\pm 0.5^\circ\text{C}$ (0.9°F) or better.

4.2.2 Equip the oven with a calibrated ASTM thermometer, and the proper stem correction shall be applied to the temperature measurement.

4.2.3 Maintain the oven at the temperature of test for at least 1 h prior to insertion of the test specimens.

4.2.4 Determine the uniformity of temperature over the area on which the specimens are to be aged by means of thermocouple readings prior to the start of the test.

4.3 *Weights*—Weights (for example, lead shot in a suitable

⁴ Discontinued: see 2000 *Annual Book of ASTM Standards*, Vol 14.04.