Designation: D3157 – 05 (Reapproved 2015)

Standard Test Method for Rubber from Natural Sources—Color[1]

This standard is issued under the fixed designation D3157; 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 test method covers a method of classifying the color of raw rubber according to a standard color scale.

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

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]

D926 Test Method for Rubber Property—Plasticity and Recovery (Parallel Plate Method)

D1485 Practice for Rubber from Natural Sources—Sampling and Sample Preparation

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

D3767 Practice for Rubber—Measurement of Dimensions

3. Summary of Test Method

3.1 The raw rubber is prepared in the form of a molded disk of specified thickness, and the color of this disk is compared and matched as closely as possible with that of colored glass disks referred to as standard glasses. The standard glasses used are calibrated according to the intensity of their amber color. Occasionally the color of the rubber cannot be matched due to the presence of strong yellow, green, or gray tints. Color matching is carried out under diffuse daylight illumination against a matt white background, preferably by use of a comparator that suitably locates and shrouds the test specimen and standard glass. The standard glasses used are calibrated according to the intensity of their color to provide a color index scale in which higher index values correspond to deeper color.

4. Significance and Use

4.1 Color of material rubber is of importance in compounds where product color is determined by the color of the raw rubber.

5. Apparatus

5.1 *Laboratory Mill,* as described in Practice D3182.

5.2 *Hydraulic Press,* capable of giving a molding pressure of not less than 3.5 MPa (500 psi) over the platen surface and platen temperatures of 150 ± 3°C (302 ± 5°F).

5.3 *Mold,* stainless steel or aluminum, 1.60 ± 0.05 mm (0.063 ± 0.002 in.) thick having holes approximately 14 mm (0.55 in.) in diameter in accordance with Fig. 1.

5.4 *Mold Plates,* two, of similar material, 1.60 ± 0.05 mm (0.063 ± 0.002 in.) in thickness.

5.5 *Comparator or Standard Glass Disks*[3]—Standard colored glasses with color index scale: 1 to 5 in half-integral steps and 5 to 16 in integral steps.

5.6 *Test Specimen Cutting Die,* as described in Test Method D926.

5.7 *Thickness Gage,* capable of measuring the test specimen to the nearest 0.02 mm (0.001 in.) in accordance with Practice D3767, Procedure A1.

5.8 *Polyester or Cellulose Film,* transparent of 0.025-mm (0.001-in.) thickness.

6. Sampling

6.1 Sampling shall be carried out in accordance with Test Methods D1485.

[1] This test method is under the jurisdiction of ASTM Committee D11 on Rubber and is the direct responsibility of Subcommittee D11.22 on Natural Rubber.

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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] Lovibond Comparator disks 4/19A for 1 to 5 units and 4/19B for 5 to 16 units have been found to be satisfactory. The sole source of supply of the Lovibond Comparator disks known to the committee at this time is Wilkens Anderson Co. (WACO), 4525 W. Division Street, Chicago, Illinois 60651, waco@wacolab.com. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

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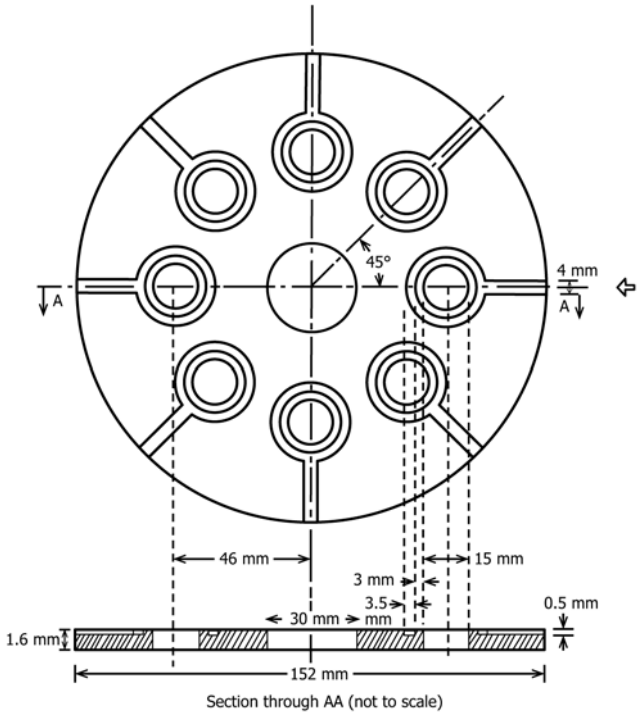

FIG. 1 Mold for Color Index Test

7. Test Specimen and Sample

7.1 Homogenize the piece to be tested in accordance with Test Methods D1485, omitting the weighing procedure unless that is required for other tests.

7.2 Take a test portion of about 30 g from the homogenized piece and pass not more than three times (doubling the sheet between passes) between the mill rolls at room temperature with the nip adjusted so that the final sheet thickness is 1.6 to 1.8 mm (0.06 to 0.07 in.). Immediately double the sheet, which should be uniform in texture and free of holes, and press the two halves lightly together by hand, avoiding the formation of air bubbles. From the sheet, which is 3.2 to 3.6 mm (0.10 to 0.15 in.) thick, punch two pellets (each weighing about 0.3 g) and laminate together by lightly pressing with the fingers. Press the rubber specimen in the mold between sheets of polyester (or cellophane) using mold plates at not less than 3.5 MPa (500 psi) pressure on the mold surface for 5 min at 150°C (302°F). The molded test piece should be 1.4 to 1.8 mm (0.05 to 0.07 in.) thick. The sample should be smooth, free of air bubbles, mold lubricant, rust, grease, soot, or other contaminants and the transparent polyester sheet left in place.

8. Procedure

8.1 Compare the test specimen with the standard glasses. Take its color index as that of the glass giving the closest color match. Color matching should be carried out under diffuse daylight illumination against a matt white background, viewing in a direction normal to the major surface of the test specimen. If the comparator shown in Fig. 2 is used, first place a sheet of matt white paper (with holes to accommodate the projections shown) on the base plate. Fit the disk of standard glasses and the filled mold (with transparent cover films attached) over the projections and place the cover plate in position. Carry out color matching for each test specimen in turn.

9. Report

9.1 The color index of the rubber should be reported to the nearest half unit for index values 1 to 5 and to the nearest unit for higher values. Occasionally the color of the rubber cannot be matched due to the presence of strong yellow, green, or gray tints. In this case, the rubber fails to test, and a note to this effect should be recorded.

10. Precision and Bias

10.1 No statement is made about either the precision or the bias of Test Method D3157, for measuring color of a raw rubber from natural sources, since the results merely state whether there is conformance to the criteria for the parameter in terms of an index using a comparative standard.

11. Keywords

11.1 color; color index; comparator discs; Lovibond; natural rubber

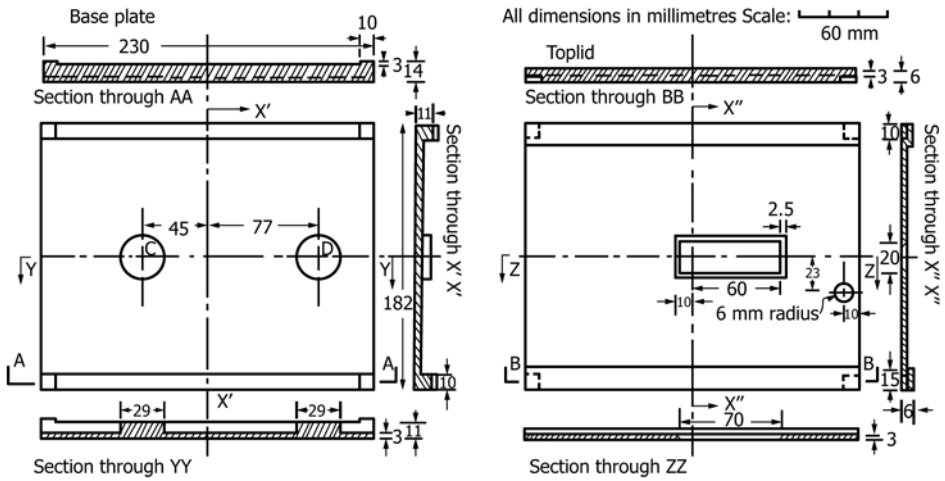

FIG. 2 Comparator Mounting (for use with Commercial Lovibond Comparator Disks)

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