



Designation: D 2096 – 00 (Reapproved 2005)

Standard Test Method for Colorfastness and Transfer of Color in the Washing of Leather¹

This standard is issued under the fixed designation D 2096; 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 the determination of the colorfastness of colored leathers, with or without a surface coating. The leathers to be tested are of the type normally expected to withstand frequent laundering. This test method also covers the simultaneous staining of adjacent textile materials when the leather specimens are washed. This test method does not apply to wet blue. Two procedures are covered depending on the apparatus used:

1.1.1 *Procedure A*, using the Launder-Ometer,² and

1.1.2 *Procedure B*, using an alternative washing machine.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values stated in parentheses are provided 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*:³
D 499 Specification for White Floating Toilet Soap
- 2.2 *ISO Standard*:⁴

¹ This test method is under the jurisdiction of ASTM Committee D31 on Leather and is the direct responsibility of Subcommittee D31.04 on Apparel and Upholstery. This test method was developed in cooperation with the American Leather Chemists Assn.

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² The Launder-Ometer and its development are described in the *American Dyestuff Reporter*, Oct. 29, 1928, p. 679. It is described also in the current Technical Manual of the American Association of Textile Chemists and Colorists. The Launder-Ometer is manufactured by Atlas Electric Devices Co., 4114 N. Ravenswood Ave., Chicago, IL 60613; telephone: (773) 327-4520; fax: (773) 327-5787. Such an apparatus is illustrated in Figs. 3, 4, and 5.

³ 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.

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

ISO R105/I, Part 2 Gray Scale for Evaluating Change in Color

ISO R105/I, Part 3 Gray Scale for Evaluating Staining

3. Summary of Test Method

3.1 Three leather specimens 50 by 80 mm (approximately 2 by 3 in.), and one piece of multifiber test fabric of nearly equal size are washed together in soapy water at 120°F (49°C). After ½ h of washing, the leather specimens and cloth are removed and rinsed carefully in running water at about 95°F (35°C). One leather specimen and the test cloth are removed and air-dried. A new piece of test cloth is added to the remaining two leather specimens and these are washed, as above, for ½ h. The rinsing is repeated; again one leather specimen and the test cloth are removed for drying. The remaining leather specimen, with a new piece of test cloth, is washed again for ½ h. This final leather specimen and test cloth are then rinsed and dried as above. When dry, the color of the washed leather specimens is rated by comparing it with an unwashed piece of leather. Transfer of color to the test fabric is rated by comparison with an unwashed piece of test fabric. These comparisons are made with the aid of the proper Gray Scale. All ratings are made on dry test specimens.

4. Significance and Use

4.1 The procedure is intended, primarily to evaluate the ability of a leather specimen to withstand fixed, and rather strenuous, laundering conditions. This test is not intended as a recommended washing procedure, neither household nor commercial. Although this test concerns itself with colorfastness and transfer of color during washing, the washed leather specimens are available also for comparing other properties (that is, tensile strength, area change, change in outline, etc.) with those of unwashed samples.

5. Apparatus

5.1 *Washing Machine*—A Launder-Ometer, or an assembly of apparatus capable of similar test conditions (**Note 1**). In either machine, 1-pt (500-mL) specimen containers are held with their bases toward a horizontal shaft and 2-in. (50 mm) out from its center of rotation. Speed of rotation shall be 40 to 45 rpm. Provision shall be made for maintaining the initial



FIG. 1 Washing Machine, Heated Air Bath (Procedure B)

temperature of the specimen containers throughout the test. Additional agitation shall be provided by ¼-in. (6.4 mm) stainless steel balls in the specimen containers.

NOTE 1—A motor-driven assembly, designed to hold 1-pt (500-mL) specimen containers so that they are relative to the axis of the motor shaft in the same way as in the Launder-Ometer, can be used.⁵ The entire assembly, fitted with specimen containers, shall be turned at 40 to 45 rpm inside a simple boxlike container which is heated at 120°F (49°C) with thermostatic control. Thus, heat loss from the preheated contents of the specimen containers is held at a minimum during the 30-min washing periods. Such an apparatus is illustrated in Figs. 1 and 2.

5.2 *Specimen Containers*, glass or stainless steel, 1-pt (500-mL), washer, and cap.

5.3 *Balls*, type 316 stainless steel, ¼-in. (6.4-mm) diameter, 20 per specimen container.

5.4 *Test Cloth*,⁶ multifiber, 50 by 80 mm, three pieces per test.

NOTE 2—Multifiber test fabrics are available in 6-fiber cloth, containing filling strips of wool, Orlon,⁷ Dacron,⁷ nylon-66, bleached cotton, and acetate, assembled in 2-in. (50-mm) repeats. Tests may be run with any test fabric of special interest and reported accordingly.

⁵ Detailed drawings for such an apparatus are available at a nominal cost from the ASTM Headquarters, 100 Barr Harbor Drive, W. Conshohocken, PA 19428-2959. Request Adjunct ADJD2096.

⁶ The sole source of supply of the test cloth known to the committee at this time is Testfabrics, Inc., 200 Blackford Ave., P.O. Box 420, Middlesex, NJ 08846-0420; telephone: (201) 469-6446; fax: (201) 469-1147. If you are aware of alternative suppliers, please provide this information to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend.

⁷ Trademark of E. I. du Pont de Nemours & Co.

5.5 *Gray Scales*,⁸ consisting of the following:

5.5.1 ISO R105/I, Part 2, British, for assessing the effect in fastness testing, and

5.5.2 ISO R105/I, Part 3, British, for determining the degree of staining in fastness testing.

6. Reagent

6.1 *Mild Soap Solution*, 0.5 %, such as made from a white, floating, toilet soap (Specification D 499). The solution shall be made with distilled water; 300 mL are required for a complete three-wash test for each specimen container.

7. Test Specimen

7.1 The specimen shall be a piece of leather 2 by 3 in. (approximately 50 by 80 mm). Three specimens are required for each complete wash test. A fourth piece, unwashed, is required for purposes of comparison.

8. Procedure A—Using Launder-Ometer

8.1 Adjust the Launder-Ometer to maintain the temperature at 120°F (49°C).

8.2 Preheat the soap solution to 120°F (49°C) and add 150 mL to each specimen container.

⁸ These scales and their use are described in the 1989 Technical Manual of the American Association of Textile Chemists and Colorists. Additional references on the use of Gray Scales in leather washing tests are as follows:

Journal, JSLTC, Society Leather Trades Chemists, Vol 43, 1959, pp. 117–128.

Journal, JSLTC, Society Leather Trades Chemists, Vol 40, 1956, pp. 183–184.

Journal, JSLTC, Society Leather Trades Chemists, Vol 42, 1958, pp. 229–231.

The Gray Scales are available from the American Association of Textile Chemists and Colorists, Box 12215, Research Triangle Park, NC 27709.