



Standard Guide for Conducting Wear Tests on Textiles¹

This standard is issued under the fixed designation D3181; 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 guide is designed to provide data on which a prediction can be based concerning the expected wear performance of a wide variety of textiles in end-use conditions.

1.2 *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

- D123 Terminology Relating to Textiles
- D1335 Test Method for Tuft Bind of Pile Yarn Floor Coverings
- D2051 Test Method for Durability of Finish of Zippers to Laundering
- D2052 Test Method for Colorfastness of Zippers to Dry-cleaning
- D2057 Test Method for Colorfastness of Zippers to Laundering
- D2058 Test Method for Durability of Finish of Zippers to Drycleaning
- D3511 Test Method for Pilling Resistance and Other Related Surface Changes of Textile Fabrics: Brush Pilling Tester
- D3512 Test Method for Pilling Resistance and Other Related Surface Changes of Textile Fabrics: Random Tumble Pilling Tester
- D3514 Test Method for Pilling Resistance and Other Related Surface Changes of Textile Fabrics: Elastomeric Pad
- D3884 Test Method for Abrasion Resistance of Textile Fabrics (Rotary Platform, Double-Head Method)
- D3885 Test Method for Abrasion Resistance of Textile Fabrics (Flexing and Abrasion Method)

¹ This guide is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.60 on Fabric Test Methods, Specific.

Current edition approved June 1, 2010. Published July 2010. Originally approved in 1973. Last previous edition approved in 2008 as D3181 – 95 (2008). DOI: 10.1520/D3181-10.

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.

- D3886 Test Method for Abrasion Resistance of Textile Fabrics (Inflated Diaphragm Apparatus)
 - D3936 Test Method for Resistance to Delamination of the Secondary Backing of Pile Yarn Floor Covering
 - D3938 Guide for Determining or Confirming Care Instructions for Apparel and Other Textile Products
 - D3939 Test Method for Snagging Resistance of Fabrics (Mace)
 - D4157 Test Method for Abrasion Resistance of Textile Fabrics (Oscillatory Cylinder Method)
 - D4231 Practice for Evaluation of Launderable Woven Dress Shirts and Sports Shirts³
 - Practice for the Evaluation of the Performance of Terry Bathroom Products for Household Use
 - D4721 Practice for Evaluation of the Performance of Machine Washable and Drycleanable Bedcoverings and Accessories³
 - D4850 Terminology Relating to Fabrics and Fabric Test Methods
 - D4852 Practice for Evaluation of Attached Upholstery Fabrics
- ### 2.2 AATCC Standards:
- 5 Evaluation Procedure: Subjective Evaluation of Fabric Hand⁴
 - 8 Colorfastness to Crocking: AATCC Crockmeter Method⁴
 - 88B Appearance of Seams in Wash-and-Wear Items After Home Laundering⁴
 - 88C Appearance of Creases in Wash-and-Wear Items After Home Laundering⁴
 - 96 Dimensional Changes in Laundering of Woven and Knitted Textiles (Excluding Wool)⁴
 - 119 Color Change Due to Flat Abrasion (Frosting): Screen Wire Method⁴
 - 120 Color Change Due to Flat Abrasion (Frosting): Emery Method⁴
 - 121 Carpet Soiling: Visual Rating Method⁴
 - 122 Carpet Soiling: Service Soiling Method⁴
 - 123 Carpet Soiling: Accelerated Soiling Method⁴
 - 124 Appearance of Fabrics After Repeated Home Launderings⁴

³ Withdrawn. The last approved version of this historical standard is referenced on www.astm.org.

⁴ *Annual AATCC Technical Manual*, available from American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, NC 27709.

- 128 Wrinkle Recovery of Fabrics: Appearance Method⁴
- 130 Soil Release: Oily Stain Release Method⁴
- 150 Dimensional Changes in Automatic Home Laundering of Woven Garments⁴
- 158 Dimensional Changes on Drycleaning in Perchloroethylene: Machine Method⁴
- 163 Color Fastness: Dye Transfer in Storage: Fabric-to-Fabric⁴
- 2.3 *Other Documents:*
- Knit Upholstery Fabric Standards and Guidelines⁵
- Woven Upholstery Fabric Standards and Guidelines⁶

3. Terminology

3.1 For all terms relating to D13.60 Fabric Test Methods, Specific, refer to Terminology [D4850](#).

3.1.1 The following terms are relevant to this standard: *control textile, end-use, evaluation period, grade, participant, performance property, rating, wear level, wear-refurbishing cycle, wear-service condition, wear test.*

3.2 For all other terminology related to textiles, see Terminology [D123](#).

4. Summary of Guide

4.1 Textiles are subjected to actual wear under service conditions. This practice recommends a control textile having a known wear performance history to be included with other items being tested. Statistical methods for design of test and analysis of data are included that are applicable to all wear tests. Standard procedures for evaluation of textiles are provided.

5. Significance and Use

5.1 This guide may be used to evaluate textiles used in apparel, upholstered furniture, floor coverings, window treatments, and bed, bath and table linens.

5.2 This guide may be used for several purposes:

5.2.1 To determine the comparative performance of new or existing products,

5.2.2 To determine the suitability of current products in different end-uses, and

5.2.3 To evaluate and compare the effect of wear of construction details as well as specific fabrics, fibers, dyeings, finishing, fabrication techniques, etc.

5.3 This guide provides for flexibility in design and evaluation since the information sought from each wear test will vary (see [Appendix X1](#)).

5.4 This guide may be used to compare the wear performance of two or more textiles when these are included in the same test, or to compare a textile whose properties have not been evaluated with one having a known performance history.

6. Apparatus

6.1 *Viewing Board*, with standard lighting, as specified in AATCC [124](#).

⁵ Issued in 1982 by the Joint-Industry Fabric Standards Committee. Available from the American Furniture Mfrs. Assc., P. O. Box Hp-7, High Point, NC 27261.

⁶ Re-issued in 1986 by the Joint-Industry Fabric Standards Committee. Available from the American Furniture Mfrs. Assc., P. O. Box Hp-7, High Point, NC 27261.

6.2 *Smoothness Appearance Replicas*, as specified in AATCC [124](#).

6.3 *Gray Scale for Color Change*, as specified in AATCC Evaluation Procedure 1.⁷

6.4 *Soil Release Replicas*, as specified in AATCC [130-1981](#).

6.5 *Pilling Standards*, as specified in Test Method [D3512](#).

6.6 *Seam Puckering Standards*, as specified in AATCC [88B-1984](#).

6.7 *Crease Retention Standards*, as specified in AATCC [88C](#).

6.8 *Photographic Standards for Evaluating Shirt Components (collar, pocket, placket)*, as specified in Practice [D4231](#).

6.9 *Work Sheets*, to record data (see [Fig. 1](#)).

7. Sampling, Selection, and Number of Specimens

7.1 *Division into Lots*—For acceptance testing, divide the product into lots as agreed upon between the purchaser and the supplier.

7.2 *Lot Sample*—As a lot sample for acceptance testing, take at random the number of shipping cartons directed in an applicable material specification or other agreement between the purchaser and the supplier.

NOTE 1—A realistic specification or other agreement between the purchaser and the supplier requires taking into account the variability between shipping cartons, between items within a carton, and between specimens within an item so as to provide a sampling plan which has a meaningful producer's risk, meaningful consumer's risk, acceptable quality level, and limiting quality level.

7.3 *Laboratory Sample*—As a laboratory sample for acceptance testing, take at least two items from each shipping carton in the lot sample.

7.4 *Test Specimens*—Take test specimens from each item in the laboratory sample as directed in the individual test methods or as agreed upon between the purchaser and the supplier. Perform each test on the product as it will reach the consumer.

8. Procedure

8.1 Decide on the type and design of the textile to be tested.

8.2 Define the objectives of the test clearly.

8.3 List the information to be obtained from the test.

8.4 Select the performance properties that must be evaluated to obtain the necessary information. See [Table 1](#).

8.5 Decide which specific areas of the textile will be evaluated for each property. See [Table 2](#).

8.6 Establish how each performance property will be evaluated and what rating scale will be used.

8.7 For each performance property, decide what test value or grade will constitute a satisfactory or unsatisfactory performance to meet the objectives of the test (see [Note 2](#)).

NOTE 2—These values are established based on experience and may vary with end use. There are generally accepted techniques or references for establishing these values.

8.8 Identify which evaluation procedures are destructive and nondestructive. Nondestructive evaluations can occur during the total wear period at predetermined times. Destructive

⁷ This is the same as ISO R105/1, Part 2.