



Designation: D4114 – 21

# Standard Performance Specification for Woven Flat Lining Fabrics for Women's and Girls' Apparel<sup>1</sup>

This standard is issued under the fixed designation D4114; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

## 1. Scope

1.1 This performance specification covers woven flat fabrics comprised of any textile fiber or mixture of fibers to be used as linings for women's and girls' apparel.

1.2 This performance specification is not applicable to woven pile, woven fusible, fire-bonded fusible, sliver-knit pile, and sheepskin lining fabrics.

1.3 These requirements apply to the length and width directions for those properties where fabric direction is pertinent.

1.4 The following precautionary statement pertains only to the test methods portion, Section 7, of this performance specification. *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

D123 Terminology Relating to Textiles

D434 Test Method for Resistance to Slippage of Yarns in

Woven Fabrics Using a Standard Seam (Withdrawn 2003)<sup>3</sup>

D1336 Test Method for Distortion of Yarn in Woven Fabrics

D1424 Test Method for Tearing Strength of Fabrics by Falling-Pendulum (Elmendorf-Type) Apparatus

D2261 Test Method for Tearing Strength of Fabrics by the Tongue (Single Rip) Procedure (Constant-Rate-of-Extension Tensile Testing Machine)

D2724 Test Method for Bond Strength of Bonded, Fused, and Laminated Apparel Fabrics

D5034 Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)

D7022 Terminology Relating to Apparel

### 2.2 AATCC Test Methods:<sup>4</sup>

TM8 Colorfastness to Crocking: Crockmeter Method

TM15 Colorfastness to Perspiration

TM16.3 Colorfastness to Light: Xenon-Arc

TM23 Colorfastness to Burnt Gas Fumes

TM61 Colorfastness to Laundering: Accelerated

TM116 Colorfastness to Crocking: Rotary Vertical Crockmeter Method

TM124 Smoothness Appearance of Fabrics After Repeated Home Laundering

TM132 Colorfastness to Drycleaning

TM 135 Dimensional Changes of Fabrics after Home Laundering

TM 172 Colorfastness to Powdered Non-Chlorine Bleach in Home Laundering

TM 188 Colorfastness to Sodium Hypochlorite Bleach in Home Laundering

EP No. 1 Gray Scale for Color Change

EP No. 2 Gray Scale for Staining

EP No. 8 AATCC 9-Step Chromatic Transference Scale

M11 A Glossary of AATCC Standard Terminology

<sup>1</sup> This performance specification is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.61 on Apparel.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> The last approved version of this historical standard is referenced on [www.astm.org](http://www.astm.org).

<sup>4</sup> Available from American Association of Textile Chemists and Colorists (AATCC), P.O. Box 12215, Research Triangle Park, NC 27709, <http://www.aatcc.org>.

2.3 *Federal Standard*.<sup>5</sup>

16 CFR 1610 Chapter II—Consumer Product Safety Commission Subchapter D—Flammable Fabrics Act Regulations

2.4 *Military Standard*.<sup>6</sup>

MIL-STD-105D Sampling Procedures and Tables for Inspection by Attributes

NOTE 1—Reference to test methods in this performance specification give only the permanent part of the designation of ASTM, AATCC, or other test methods. The current editions of each test method cited shall prevail.

### 3. Terminology

#### 3.1 Definitions:

3.1.1 For terminology related to apparel see Terminology D7022.

3.1.2 For definitions of textile terms used in this performance specification, refer to the individual ASTM and AATCC methods and to Terminology D123.

<sup>5</sup> Available from Superintendent of Documents, Government Printing Office, Washington, DC 20402.

<sup>6</sup> Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

3.2 Definitions found in a dictionary of common terms are suitable for this performance specification.

### 4. Specification Requirements

4.1 The properties of woven flat fabrics, to be used as linings in women’s and girls’ apparel, shall conform to the specification requirements in Table 1.

### 5. Significance and Use

5.1 Upon agreement between the purchaser and the supplier, fabrics intended for this end use should meet all of the requirements listed in Table 1 of this performance specification.

5.2 It is recognized that for purposes of fashion or aesthetics the ultimate consumer of articles made from these fabrics may find acceptable fabrics that do not conform to all of the requirements in Table 1. Therefore, one or more of the requirements listed in Table 1 may be modified upon agreement between the purchaser and the supplier.

5.2.1 In such cases, any references to the specification shall specify that: “This fabric meets ASTM Specification D4114 except for the following characteristic(s).”

**TABLE 1 Specification Requirements<sup>A</sup>**

NOTE 1—The grade for color change and color transfer is based on a numerical scale of 5 for negligible or no color change or color transfer to 1 for severe color change or color transfer. A grade for fabric smoothness requirements is based on SA-5 for a very smooth, pressed, finished appearance to a grade of SA-1 crumpled, creased and severely wrinkled appearance.

Characteristic	Requirements	Section
Breaking strength (load)(CRE)	111 N (25 lbf), min	7.1
Yarn slippage	6.3-mm (¼-in.) separation at 67 N (15 lbf), min	7.2
Tongue-tear strength	6.7 N (1.5 lbf), min	7.3
Yarn distortion		7.4
Satis	2.5 mm (0.10 in.), max	7.4
All other	1 mm (0.05 in.), max	7.4
Dimensional change:		
After five launderings	3 %, max	7.5.1
After three dry cleanings	2% , max	7.5.2
Colorfastness:		
Burnt gas fumes—2 cycles:		7.6.1
Shade change, original fabric	Grade 4 <sup>B</sup> , min	
Shade change after one laundering or one dry cleaning	Grade 4 <sup>B</sup> , min	
Sodium Hypochlorite Bleach	Grade 4 <sup>B</sup> , min	7.6.7
Powdered Non-Chlorine Bleach	Grade 4 <sup>B</sup> , min	7.6.8
Laundering: <sup>F</sup>		7.6.2
Shade change	Grade 4 <sup>B</sup> , min	
Staining	Grade 3 <sup>C</sup> , min	
Dry cleaning:		7.6.3
Shade change	Grade 4 <sup>B</sup> , min	
Crocking: <sup>F</sup>		7.6.4
Dry	Grade 4 <sup>D</sup> , min	
Wet	Grade 3 <sup>D</sup> , min	
Perspiration: <sup>F</sup>		7.6.5
Shade change	Grade 4 <sup>B</sup> , min	
Staining	Grade 3 <sup>C</sup> , min	
Light (10 AFUs)(xenon-arc)	Grade 4 <sup>B</sup> , min	7.6.6
Fabric smoothness appearance (see 7.7.1)	SA 3.5 <sup>E</sup> , min	7.7
Flammability	Class 1	7.8

<sup>A</sup> There is more than one method that can be used to measure breaking strength (load), and tear strength. These methods cannot be used interchangeably since there may be no overall correlation between them (see Note 2 and Note 3).

<sup>B</sup> AATCC Gray Scale for Color Change.

<sup>C</sup> AATCC Gray Scale for Staining.

<sup>D</sup> AATCC Chromatic Transference Scale.

<sup>E</sup> For durable-press fabrics only.

<sup>F</sup> See Note 7.

5.3 Where no prepurchase agreement has been reached between the purchaser and the supplier, and in case of controversy, the requirements listed in **Table 1** are intended to be used as a guide only. As noted in **5.2**, ultimate consumer demands dictate varying performance parameters for any particular style of fabric.

5.4 The uses and significance of particular properties and methods are discussed in the appropriate sections of the specified test methods.

## 6. Sampling

6.1 *Lot Sample*—As a lot sample for acceptance testing, take at random the number of rolls as directed in an applicable specification or other agreement between the purchaser and the supplier, such as an agreement to use MIL-STD-105D.

6.2 *Laboratory Sample*—From each roll or piece in the lot sample, cut two laboratory samples the full width of the fabric and at least 375 mm (15 in.) along the selvage.

## 7. Test Methods (See **Note 1** and **Note 1** in **Table 1**)

7.1 *Breaking Force*—Determine the dry breaking force, in the standard atmosphere for testing textiles, as directed in Test Method **D5034**, using a constant rate of extension (CRE) tensile-testing machine with the speed of the pulling clamp at  $300 \pm 10$  mm ( $12 \pm 0.5$  in.)/min.

**NOTE 2**—If preferred, the use of a constant-rate-of-traverse (CRT) tensile-testing machine is permitted. The crosshead speed should be as agreed upon between the purchaser and the supplier. There may be no overall correlation between the results obtained with the CRT machine and with the CRE machine. Consequently, these two breaking-load testers cannot be used interchangeably. In case of controversy, the CRT method shall prevail.

7.2 *Resistance to Yarn Slippage*—Determine the resistance to yarn slippage as directed in Test Method **D434**.

**NOTE 3**—The precision of Test Method **D434** is being established, and it may not be suitable for fabrics with a low number of warp (ends) and filling (picks) counts (see **5.2**).

7.3 *Tongue-Tear Strength*—Determine the tongue-tear strength as directed in Test Method **D2261**.

**NOTE 4**—If preferred, the use of Test Method **D1424** is permitted with existing requirements as given in this performance specification. There may be no overall correlation between the results obtained with the tongue-tear machine and with the Elmendorf machine. Consequently, these tear testers cannot be used interchangeably. In case of controversy, Test Method **D2261** shall prevail.

7.4 *Yarn Distortion*—Determine the yarn distortion as directed in Test Method **D1336**.

### 7.5 Dimensional Change:

7.5.1 *Laundering*—Determine the maximum dimensional change after five launderings, or as agreed upon between the purchaser and the supplier, as directed in the applicable procedure in AATCC TM 135 (**Note 5**).

7.5.1.1 The wash conditions and drying procedures shall be as specified by the supplier.

7.5.2 *Dry cleaning*—Determine the maximum dimensional changes after three dry cleanings, or as agreed upon between the purchaser and the supplier, as directed in 10.1.1 through 10.1.5 of Test Methods **D2724**.

**NOTE 5**—Launderable fabrics are expected to be dry-cleanable except where all or part of the fabric is not dry-cleanable and is so labeled. For example, the fabric could contain a functional finish that is soluble in the solvent, or the fiber could be degraded by the solvent, which would be the case with poly(vinyl chloride) fiber. “Dry-cleanable” goods are to be dry-cleaned only.

### 7.6 Colorfastness:

7.6.1 *Burnt Gas Fumes*—Determine the colorfastness to burnt gas fumes on the original fabric and after one laundering or one dry cleaning as directed in AATCC TM 23 after 2 cycles.

**NOTE 6**—Washing conditions shall be the same as those used in **7.5.1.1**. Dry-cleaning conditions shall be the same as those used in **7.5.2**.

7.6.2 *Laundering*—Determine the colorfastness to laundering as directed in the applicable procedure of AATCC TM 61. The test conditions shall be as specified by the supplier (**Note 5**, **Note 7**).

**NOTE 7**—It has been reported that the results for staining, obtained by standard AATCC Test Methods, on fabrics dyed to dark shades that contain a combination of polyester and spandex, or their blends, may not show the full staining propensity of such fabrics in consumer use. It is, therefore, recommended that the staining results obtained by these tests not be used for acceptance testing of such fabrics.

7.6.3 *Dry cleaning*—Determine colorfastness to dry cleaning as directed in AATCC TM 132 (**Note 5**).

7.6.4 *Crocking*—Determine colorfastness to dry and wet crocking as directed in AATCC TM 8 for solid shades and AATCC TM 116 for prints, or as agreed upon between the purchaser and the supplier (**Note 7**).

7.6.5 *Perspiration*—Determine colorfastness to perspiration as directed in AATCC TM 15 (**Note 7**).

7.6.6 *Light*—Determine colorfastness to light as directed in AATCC TM 16.3, Option 3.

7.6.7 *Colorfastness to Sodium Hypochlorite Bleach*—Determine colorfastness to chlorine bleach as directed in AATCC TM 188. The test conditions shall be as specified by the seller.

7.6.8 *Colorfastness to Powdered Non-Chlorine Bleach*—Determine colorfastness to non-chlorine bleach as directed in AATCC TM 172. The test conditions shall be as specified by the seller.

7.7 *Fabric Smoothness Appearance*—Determine the fabric smoothness appearance as directed in AATCC TM 124 after laundering using the wash-and-wear cycle or the normal cycle as agreed upon between the purchaser and the supplier as specified in **7.5.1.1** for washable fabrics or after dry cleaning as specified in **7.5.2** for dry-cleanable fabrics (see **Note 5**).

7.7.1 The fabric smoothness (SA) rating of such fabrics, and the SA rating of dry-cleaned fabrics, shall have decreased no more than 0.5 SA rating from that of the fabric before it is laundered or drycleaned.

7.8 *Flammability*—The flammability requirements shall be as agreed upon between the purchaser and the supplier.

7.8.1 When lining fabrics are used for purposes other than linings, (for example, as apparel fabrics), they shall meet or exceed the requirements of the applicable Part (1610, 1615, or 1616) of the Flammable Fabrics Act Regulations.