



Designation: D4111 – 24

Standard Performance Specification for Woven Napery and Tablecloth Fabrics: Household and Institutional¹

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1. Scope

1.1 This performance specification covers woven fabrics comprised of any textile fiber or mixture of fibers to be used in napery and tablecloths (household and institutional).

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

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *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:²

D123 Terminology Relating to Textiles

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)

¹ This specification is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.63 on Home Furnishings.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

D7023 Terminology Relating to Home Furnishings

2.2 *AATCC Methods:*³

TM8 Test Method for Colorfastness to Crocking. Crockmeter

TM16.3 Test Method for Colorfastness to Light: Xenon-Arc

TM23 Test Method for Colorfastness to Burnt Gas Fumes

TM61 Test Method for Colorfastness to Laundering: Accelerated

TM92 Test Method for Chlorine, Retained, Tensile Loss: Single Sample

TM96 Test Method for Dimensional Changes in Commercial Laundering of Woven and Knitted Fabrics Except Wool (withdrawn)

TM116 Test Method for Colorfastness to Crocking: Rotary Vertical Crockmeter

TM124 Test Method for Smoothness Appearance of Fabrics after Home Laundering

TM130 Test Method for Soil Release: Oily Stain Release

TM135 Test Method for Dimensional Changes of Fabrics after Home Laundering

TM172 Test Method for Colorfastness to Powdered Non-Chlorine Bleach in Home Laundering

TM188 Test Method for Colorfastness to Sodium Hypochlorite Bleach in Home Laundering

EP1 Evaluation Procedure for Gray Scale for Color Change

EP2 Evaluation Procedure for Gray Scale for Staining

EP8 Evaluation Procedure for AATCC 9-Step Chromatic Transference Scale

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

3. Terminology

3.1 Definitions:

3.1.1 For all terminology related to home furnishings see Terminology **D7023**.

3.2 For definitions of all other textile terms see Terminology **D123**.

³ Available from American Association of Textile Chemists and Colorists (AATCC), P.O. Box 12215, Research Triangle Park, NC 27709-2215, <http://www.aatcc.org>.

4. Specification Requirements

4.1 The properties of woven fabrics for napery and tablecloths for household and institutional uses shall conform to the specification requirements in **Table 1**.

5. Significance and Use

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

5.2.1 In such cases, any references to the specification shall specify that: “This fabric meets ASTM Specification D4111 except for the following characteristic(s).”

5.3 Where no prepurchase agreement has been reached between the purchaser and the seller, 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 methods.

TABLE 1 Specification Requirements

NOTE 1—Grade for color change, color transfer, and appearance is based on a numerical scale of 5 for negligible or no color change, color transfer, or wrinkle, to 1 for severe color change, color transfer, or wrinkle.

Characteristic	Requirements	Section
Breaking strength (load) (CRT):		7.1
Household	133 N (30 lbf), min	
Institutional	242 N (55 lbf), min	
Yarn distortion	1 mm (0.05 in.), max	7.2
Tongue-tear strength:		7.3
Household	9 N (2 lbf), min	
Institutional	13 N (3 lbf), min	
Colorfastness:		
Burnt gas fumes—1 cycle:		
Shade change, original fabric	Grade 4 ^A , min	7.4.1
Shade change, after one laundering	Grade 4 ^A , min	
Chlorine Bleach	Grade 4 ^A , min	7.4.5
Non-Chlorine Bleach	Grade 4 ^A , min	7.4.6
Light (20 AFU)	Grade 4 ^A , min	7.4.2
Crocking:		7.4.3
Dry	Grade 4 ^B , min	
Wet	Class 3 ^B , min	
Laundering:		7.4.4
Shade change	Class 4 ^A , min	
Staining	Grade 3 ^C , min	
Dimensional change	±5 %, max	7.5
Fabric appearance (see 7.6.1.1)	SA 3.5 ^D , min	7.6
Chlorine retention	see 7.7.1.1	7.7
Retention of hand, character, and appearance	see 7.9	7.9
Soil release	Grade 4, min	7.10

^A AATCC Gray Scale for Color Change.

^B AATCC 9-Step Chromatic Transference Scale.

^C AATCC Gray Scale for Staining.

^D For durable-press (DP) fabrics only.

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.

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**)

7.1 **Breaking Strength**—Determine the breaking strength as directed in Test Method **D5034**, using a constant-rate-of-extension (CRE) tensile-testing machine.

NOTE 2—If preferred, the use of a constant-rate-of-traverse (CRT) tensile testing machine is permitted. There may be no overall correlation between the results obtained with the CRT machine and the CRE machine, consequently, these two breaking-force testers cannot be used interchangeably. In case of controversy, the CRE method (Test Method **D5034**) shall prevail.

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

7.3 **Tear Strength**—Determine the tear strength as directed in Test Method **D1424**.

NOTE 3—If preferred, the use of Test Method **D2261** is permitted with existing requirements as given in this specification. There may be no overall correlation between the results obtained with the tongue-tear method (Test Method **D2261**) and the Elmendorf machine (**D1424**). Consequently, these tear testers cannot be used interchangeably. In case of controversy, Test Method **D1424** shall prevail.

7.4 Colorfastness:

7.4.1 **Burnt Gas Fumes**—Determine the colorfastness to burnt gas fumes (on the original fabric and after one laundering or one drycleaning) as directed in AATCC TM 23 after 1 cycle.

7.4.2 **Light**—Determine the colorfastness to light as directed in AATCC TM16.3.

NOTE 4—In case of controversy, results obtained with the Xenon-Arc machine specified in Option 3 shall prevail.

7.4.3 **Crocking**—Determine the colorfastness to crocking as directed in AATCC TM8 for solid shades and AATCC TM116 for prints, or as agreed upon between the purchaser and the seller.

7.4.4 **Laundering**—Determine the colorfastness to laundering as directed in the applicable procedure of AATCC TM61. The test conditions shall be as specified by the seller.

7.4.5 **Colorfastness to Sodium Hypochlorite Bleach**—Determine the colorfastness to chlorine bleach as directed in AATCC TM188.

7.4.6 **Colorfastness to Powdered Non-Chlorine Bleach**—Determine the colorfastness to non-chlorine bleach as directed in AATCC TM172.

7.5 **Dimensional Change**—Determine the maximum-dimensional change after 5 launderings, or as agreed upon between the purchaser and the seller, as directed in the applicable procedure in AATCC TM96 for institutional fabrics, or as directed in the applicable procedure in AATCC TM135 for household fabrics.