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**Designation: D 3691 – 02**

# Standard Performance Specification for Woven, Lace, and Knit Household Curtain and Drapery Fabrics<sup>1</sup>

This standard is issued under the fixed designation D 3691; 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.

*This standard has been approved for use by agencies of the Department of Defense.*

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.63 on Home Furnishings. Current edition approved ~~Dec. April 10, 1995~~; 2002. Published ~~March 1996~~; July 2002. Originally published as D 3691 – 78. Last previous edition D 3691 – 95a(2001).

## 1. Scope

1.1 This performance specification covers the requirements for all knit, lace, foam back, stitch-bonded, conventional weights, and sheer woven fabrics to be used in the manufacture of curtains and draperies.

1.2 This performance specification is ~~not~~ applicable to all fabrics except those made of glass.

1.3 For those properties where fabric direction is pertinent, these requirements apply to the length and width directions for woven fabric and to both the wale and course directions for knit fabric.

1.4 *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:

D 123 Terminology Relating to Textiles<sup>2</sup>

D 231 Methods of Testing Tolerances for Knit Goods<sup>3</sup>

D 1336 Test Method for Distortion of Yarn in Woven Fabrics<sup>2</sup>

D 1424 Test Method for ~~Tear Resistance~~ Tearing Strength of Woven Fabrics by Falling-Pendulum (Elemendorf) Apparatus<sup>2</sup>

D 2262 ~~1~~ Test Method for Tearing Strength of ~~Woven~~ Fabrics by the Tongue (Single Rip) ~~Method (Constant-Rate-of-Traverse Procedure (Constant-Rate-of-Extension~~ Tensile Testing Machine)<sup>2</sup>

D 2724 Test Methods for Bonded, Fused, and Laminated Apparel Fabrics<sup>2</sup>

D 2905 Practice for Statements on Number of Specimens for Textiles<sup>2</sup>

D 5034 Test Method for ~~Force~~ Strength and Elongation of Textile Fabrics (Grab Test)<sup>2</sup>

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

8 Colorfastness to Crocking: AATCC Crockmeter Method

16 Colorfastness to Light

23 Colorfastness to Burnt Gas Fumes

61 Colorfastness to ~~Washing, Domestic, Laundering Home and Laundering, Commercial: Accelerated~~

116 Colorfastness to Crocking: Rotary Vertical Crockmeter Method

124 Appearance of ~~Durable Press Fabric~~ Fabrics After Repeated Home Laundering

129 Colorfastness to Ozone in the Atmosphere Under High Humidities

132 Colorfastness to Dry Cleaning

135 Dimensional Changes in Automatic Home Laundering of Durable Press Woven or Knit Fabric

172 Colorfastness to Non-Chlorine Bleach in Home Laundering

187 Dimensional Changes of Fabrics: Accelerated

188 Colorfastness to Sodium Hyperchlorite Bleach in Home Laundering

Evaluation Procedure 1 Gray Scale for Color Change

Evaluation Procedure 2 Gray Scale for Staining

<sup>2</sup> Annual Book of ASTM Standards, Vol 07.02.

<sup>3</sup> Discontinued—See 1979 Annual Book of ASTM Standards, Part 32.

<sup>4</sup> Available from American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, NC 27709.

Evaluation Procedure 3—~~AATCC Chromatic Transference Scale 9~~ Visual Assessment of Color Difference of Textiles

NOTE 1—Reference to test methods in this 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 *sheer, n*—~~a woven fabric that is transparently thin or diaphanous.~~

3.2 For definitions of other textile terms used in this specification, refer to Terminology D 123 and to the Technical Manual of the American Association of Textile Chemists and Colorists.<sup>4</sup>

### 4. Performance Requirements

~~4.1 The properties of woven, lace, significance and knit fabrics Use~~

4.1 ~~Fabrics intended for curtains and draperies shall conform to this end-use should meet all of the specification requirement in Table requirements listed in Table 1.~~

4.2 ~~It should be recognized that fabric can be produced utilizing an almost infinite number of construction variables (e.g., type of fibers, percentage of fibers, yarn twist, yarn number, warp and pick count, chemical and mechanical finished). Additionally, fashion and aesthetics dictate that the ultimate consumer may find acceptable articles made from fabrics that do not conform to all of the requirements in Table 1.~~

4.2.1 ~~Hence, no single performance specification can possibly apply to all the various fabrics that could be utilized for this end-use.~~

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

### 5. Significance and Use

5.1 ~~Woven lace and knit fabrics should meet all of the requirements in Table 1 to be suitable for use in the manufacture of curtains and draperies.~~

5.2 ~~It is recognized that for purposes of fashion or aesthetics, the ultimate consumer of articles made from these fabrics may find acceptable some fabrics that do not conform to all of the requirements in Table 1. For example, the fabric could be dyed in shades that do not meet the requirement in Table 1 for colorfastness to light, yet be acceptable to the ultimate consumer because the shade is fashionable. In such cases, one or more of the requirements may be modified by mutual agreement between the purchaser and the supplier.~~

5.2.1 ~~If any of the requirements in Table 1 are modified by mutual agreement between the purchaser and the supplier, any reference to the specification shall specify that: "This fabric meets ASTM Specification D 3691 except for the following characteristic(s)."~~

5.3 ~~The uses and significance of particular properties are discussed in the appropriate sections of the specific methods.~~

### 6. Sampling

6.1 ~~Tests shall be performed on the fabric as it will reach the user.~~

6.2 ~~Unless otherwise agreed upon, as when specified in an applicable material specification, take the number of specimens specified in each of the applicable test methods.~~

6.2.1 ~~If there has been no prior agreement and the test method does not specify the number of specimens, use the procedures in Practice D 2905 to determine the number of specimens, such that the user may expect at the 95 % probability level that the test result is not more than 5 % of the average above or below the true average (that is, a theoretical average from an infinite number of observations) when using a reliable estimate of variability of individual observations on similar materials in the user's laboratory under conditions of single-operator precision.~~

### 7. Test Methods (Note 1)

7.1 *Breaking Force* (Woven Fabrics Only)—~~Determine the dry breaking force in the standard atmosphere for testing textiles, (load) as directed in the grab test procedure of Test Method D 5034, using a constant rate of traverse (CRT) extension (CRE) tensile testing machine with the speed of the pulling clamp at 300 ± 10 mm (12 ± 0.5 in.)/min. machine.~~

NOTE 2—~~If preferred a constant-rate-of-extension (CRE) tensile testing machine may be used. 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 CRE method shall prevail.~~

7.2 *Bursting Strength Pressure* (Knit Fabrics Only)—~~Determine the bursting strength of knit fabrics as directed in Methods D 231 using an approved type of CRT machine equipped with a diaphragm bursting attachment tester or an approved type of diaphragm CRT machine equipped with a bursting tester attachment as agreed upon between the purchaser and the supplier.~~

NOTE 3—~~Care should be taken to subtract the tare diaphragm pressure from the gross pressure to obtain actual bursting strength of fabric when using the diaphragm bursting tester. Calibrate the equipment according to the manufacturer's instruction before use. Since there is no overall correlation between~~

**TABLE 1 Performance Requirements**

Characteristics	Knit and Lace	Sheer (woven)	Foam Back, Stitch Bonded, and Conventional Weights (woven)	Section
Breaking strength (load), (CRT method), in both directions <sup>A</sup>	...	67 N (15 lbf), min	89 N (20 lbf), min	7.4
Breaking strength (load), (CRT method), in both directions <sup>A</sup>	...	67 N (15 lbf), min	89 N (20 lbf), min	5.1
Bursting strength (ball burst) <sup>A</sup>	138 kPa (20 lbf/in. <sup>2</sup> ), min	...	...	7.2
Bursting strength (ball burst) <sup>A</sup>	138 kPa (20 lbf/in. <sup>2</sup> ), min	...	...	5.2
Tear strength (tongue tear), in both directions <sup>A</sup>	...	4.4 N (1 lbf), min	6.7 N (1.5 lbf), min	7.3
Tear strength (tongue tear), in both directions <sup>A</sup>	...	4.4 N (1 lbf), min	6.7 N (1.5 lbf), min	5.3
Dimensional change:				
After 5 launderings in both directions	3.0 % max	3.0 % max	3.0 % max	7.4.1
After 5 launderings in both directions	3.0 % max +0.0%	3.0 % max 0.0%	3.0 % max +0.0%	5.4.1
After 3 dry cleanings in both directions	3.0 % max	3.0 % max	3.0 % max	7.4.2
After 3 dry cleanings in both directions	3.0 % max +0.0%	3.0 % max +0.0%	3.0 % max +0.0 %	5.4.2
Distortion of yarn:				
4-lbf load	...	2.54 mm (0.1 in.), max	...	7.5
1-lbf load	...	2.54 mm (0.1 in.), max	...	5.5
2-lbf load	...	...	2.54 mm (0.1 in.), max	
Colorfastness to laundering: <sup>B</sup>				
Alteration in shade	Class 4 <sup>C</sup> min	Class 4 <sup>C</sup> min	Class 4 <sup>C</sup> min	7.6.1
Staining	Class 3 <sup>D</sup> min	Class 3 <sup>D</sup> min	Class 3 <sup>D</sup> min	
Shade Change	Class 4 <sup>C</sup> min	Class 4 <sup>C</sup> min	Class 4 <sup>C</sup> min	5.6.1
Staining	Class 3 <sup>D</sup> min	Class 3 <sup>D</sup> min	Class 3 <sup>D</sup> min	
Colorfastness to dry cleaning:				
Alteration in shade	Class 4 <sup>C</sup> min	Class 4 <sup>C</sup> min	Class 4 <sup>C</sup> min	7.6.2
Shade change	Class 4 <sup>C</sup> min	Class 4 <sup>C</sup> min	Class 4 <sup>C</sup> min	5.6.2
Burnt gas fumes, 2 cycles:				
Alteration in shade	Class 4 <sup>C</sup> min	Class 4 <sup>C</sup> min	Class 4 <sup>C</sup> min	7.6.3
After 1 refurbishing	Class 4 <sup>C</sup> min	Class 4 <sup>C</sup> min	Class 4 <sup>C</sup> min	
Shade change	Class 4 <sup>C</sup> min	Class 4 <sup>C</sup> min	Class 4 <sup>C</sup> min	5.6.3
After 1 refurbishing	Class 4 <sup>C</sup> min	Class 4 <sup>C</sup> min	Class 4 <sup>C</sup> min	
Crocking:				
Dry	Class 4 <sup>E</sup> min	Class 4 <sup>E</sup> min	Class 4 <sup>E</sup> min	7.6.4
Wet	Class 3 <sup>E</sup> min	Class 3 <sup>E</sup> min	Class 3 <sup>E</sup> min	
Dry	Class 4 <sup>E</sup> min	Class 4 <sup>E</sup> min	Class 4 <sup>E</sup> min	5.6.4
Wet	Class 3 <sup>E</sup> min	Class 3 <sup>E</sup> min	Class 3 <sup>E</sup> min	
Light (60 AATCC FU), xenon <sup>A</sup>	Step 4 <sup>C</sup> min	Step 4 <sup>C</sup> min	Step 4 <sup>C</sup> min	7.6.5
Light (60 AATCC FU), xenon <sup>A</sup>	Step 4 <sup>C</sup> min	Step 4 <sup>C</sup> min	Step 4 <sup>C</sup> min	5.6.5
Ozone, 1 cycle	Class 4 <sup>C</sup> min	Class 4 <sup>C</sup> min	Class 4 <sup>C</sup> min	7.6.6
Ozone, 1 cycle	Class 4 <sup>C</sup> min	Class 4 <sup>C</sup> min	Class 4 <sup>C</sup> min	5.6.6
Fabric appearance	DP 3.5 <sup>F</sup> min	DP 3.0 min	DP 3.5 min	7.7
Fabric appearance	SA 3.5 <sup>F</sup> min	SA 3.0 min	SA 3.5 min	5.7
Retention of hand, character, and appearance	pa-ss	pa-ss	pa-ss	7.8
Retention of hand, character, and appearance	No significant change	No significant change	No significant change	5.8
Durability of back coating	pa-ss	pa-ss	pa-ss	7.9
Durability of back coating	No significant change	No significant change	No significant change	5.9
Flammability	pass	pass	pass	7.10
Flammability	pass	pass	pass	5.10
Light degradation <sup>G</sup>	...	...	...	7.11
Light degradation <sup>G</sup>	...	...	...	5.11

<sup>A</sup> There is more than one standard test method that can be used to measure breaking strength, bursting strength, tear strength, and lightfastness. These test methods cannot be used interchangeably since there may be no overall correlation between them (see Note 2, Note 3, Note 4, Note 5, and Note 9).

<sup>B</sup> Class in colorfastness and DP rating is based on a numerical scale of 5.0 for negligible color change, color transfer, or wrinkling to 1.0 for very severe color change, color transfer, or wrinkling. The numerical rating in Table 1 or higher is acceptable.

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

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

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

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

<sup>G</sup> The development of a standard method has been referred to the American Association of Textile Chemists and Colorists.

the results obtained with the CRT machine equipped with a bursting attachment and the diaphragm bursting tester, these two bursting testers cannot be used interchangeably. In case of controversy, the CRT machine equipped with a diaphragm bursting attachment tester method shall prevail.

NOTE 4—The precision of the ball burst method using the CRT machine equipped with a bursting attachment and the precision of the diaphragm bursting tester method are being established by Subcommittee D13.59. The methods are accordingly not recommended for acceptance testing unless preceded by an interlaboratory check test in the laboratory of the purchaser and the laboratory of the supplier using randomized replicate specimens of the type of material to be evaluated.

~~7.3 Tongue Tear Strength~~

~~5.3 Tearing Resistance (Woven Fabrics Only)—Determine the tear strength tearing resistance as directed in Test Method D 2262<sup>1</sup>.~~

NOTE 5—If preferred, use of Test Methods D 1424 and D 2261 is permitted with existing requirements as given in this specification. There may be no overall correlation between the results obtained with the tongue tear machine and with the Elmendorf machine. Consequently, these two ~~tongue~~ tear testers cannot be used interchangeably. In case of controversy, Test Method D 2262<sup>1</sup> shall prevail.

~~7.5.4 Dimensional Change:~~

~~7.5.4.1 Laundering—Determine the dimensional change after five launderings as directed in Table I (I), (II), (Ai), Test II B of AATCC Test Method 135 unless otherwise agreed upon between the purchaser and the supplier.~~

NOTE 6—Launderable fabrics are expected normally 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 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.

~~7.4.1.1 Mark the test specimens in sets of three 18-in. (460-mm) gage distance in both the length and width directions.~~

~~7.4.1.2 Proceed as outlined in AATCC Test Method 135.~~

NOTE 7—Nondurable-press items can be flat-bed pressed after tumble drying to eliminate wrinkles before measuring.

~~7.5.4.2 Dry Cleaning—Determine the dimensional change after three dry cleanings as directed in 10.1.1 to 10.1.4 of Test Methods D 2724 (see Note 6).~~

~~7.4.2.1 Mark test specimens in sets of three 18-in. (460-mm) gage distance in both the length and width directions.~~

~~7.4.2.2 Proceed as outlined in 10.1.1 to 10.1.4 of Test Methods D 2724.~~

~~7.5 Distortion of Yarn~~

~~5.5 Yarn Distortion (Woven Fabrics Only)—Determine the distortion of yarn as directed in Test Method ~~D 1336~~ using a 1-lbf (4.4-N) load for sheer fabrics and a 2-lbf (8.9-N) load for all other woven fabrics.~~

~~7.6 D 1336.~~

~~5.6 Colorfastness:~~

~~7.5.6.1 Laundering—Determine the colorfastness to laundering as directed in Test II A of AATCC Test Method 61 unless otherwise agreed upon between the purchaser and the seller (Note see Note 6).~~

~~7.6.1.1 In this test method, use~~

~~5.6.1.1 Use Multifiber Test Fabric No. 10<sup>5</sup> and evaluate only cotton, polyester, and self-fiber.~~

~~5.6.1.2 Bleaching—Determine the colorfastness to bleaching as directed in the applicable procedures of AATCC Test Methods 172 and 188.~~

~~5.6.2 Dry Cleaning—Determine the colorfastness to dry cleaning as directed in AATCC Test Method 132 (Note 6).~~

~~7.5.6.3 Burnt Gas Fumes—Determine the colorfastness to burnt gas fumes after 2 cycles on the original fabric as directed in AATCC Test Method 23. Repeat test for 2 cycles on another specimen after one laundering or one dry cleaning.~~

NOTE 8—Laundering conditions shall be the same as those in ~~7~~ 5.4.1 and dry-cleaning conditions shall be the same as those in ~~7~~ 5.4.2.

~~7.5.6.4 Crocking—Determine the colorfastness to wet and dry crocking as directed in AATCC Test Method 8 for solid shades and AATCC Test Method 116 for prints, or as agreed upon between the purchaser and supplier.~~

~~7.6.5 prints.~~

~~5.6.5 Light—Determine colorfastness to light as directed in AATCC Test Method 16.~~

NOTE 9—There are distinct differences in spectral distribution between the various types of machines listed in AATCC Test Method 16, with no overall correlations between them. Consequently, these machines cannot be used interchangeably. In case of controversy, results obtained with the water-cooled xenon-arc machine listed in Option E shall prevail.

NOTE 10—Standardization of the xenon-arc lamp to 60 AATCC FU can be done by using three L4 Blue Wool Lightfastness Standards.

~~7.5.6.6 Ozone Fading—Determine the colorfastness to ozone fading after one cycle as directed in AATCC Test Method 129.~~

~~7.5.7 Fabric Appearance—Determine the appearance of durable-press fabric after five launderings as directed in Test Table II B (I), (111), (Ai) of AATCC Test Method 124 unless otherwise agreed upon between the purchaser and the supplier.~~

~~7.8 Method 124.~~

~~5.8 Retention of Hand, Character, and Appearance—Fabric tested in accordance with ~~7~~ 5.4.1 and ~~7~~ 5.4.2 shall not change more significantly in hand, character, or appearance than in the limitation set by prior agreement between the purchaser and the seller.~~

~~7.9 appearance.~~

<sup>5</sup> Available from Testfabrics, Inc., P.O. Box 118, Middlesex, NJ 08846.

5.9 Durability of Back Coating—A fabric shall exhibit no evidence of cracking or peeling of back coating when subjected to tests in accordance with 7.5.4.1 and 7.5.4.2.

7.10 Flammability—The flammability requirements shall be as agreed upon between the purchaser and the seller, except when regulated by applicable Government mandatory standards.

NOTE 11—The technical need for an ASTM test method for determining the flammability of the types of fabric addressed by this specification has been referred to Subcommittee D13.52 on Flammability and will be incorporated here should a test method become available.

7.11 Resistance to Light Degradation—No standard method is available for the determination of light degradation of curtain and drapery fabrics.<sup>6</sup>

## **86. Keywords**

~~8.1 drapery; durability; fabric; lace fabric; performance; specification~~

6.1 curtain; drapery

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<sup>6</sup> The development of a standard method has been referred to the American Association of Textile Chemists and Colorists.

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