Designation: D 3691 – 02

Standard Performance Specification for Woven, Lace, and Knit Household Curtain and Drapery Fabrics[1]

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.

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 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[2]
D 231 Methods of Testing Tolerances for Knit Goods[3]
D 1336 Test Method for Distortion of Yarn in Woven Fabrics[2]
D 1424 Test Method for Tearing Strength of Woven Fabrics by Falling-Pendulum (Elemendorf) Apparatus[2]
D 2261 Test Method for Tearing Strength of Fabrics by the Tongue (Single Rip) Procedure (Constant-Rate-of-Extension Tensile Testing Machine)[2]
D 2724 Test Methods for Bonded, Fused, and Laminated Apparel Fabrics[2]
D 2905 Practice for Statements on Number of Specimens for Textiles[2]
D 5034 Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)[2]

2.2 *AATCC Test Methods*[4]

8 Colorfastness to Crocking: AATCC Crockmeter Method
16 Colorfastness to Light
23 Colorfastness to Burnt Gas Fumes
61 Colorfastness to Laundering Home and Commercial: Accelerated
116 Colorfastness to Crocking: Rotary Vertical Crockmeter Method
124 Appearance of 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
Evaluation Procedure 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:*

3.2 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.[4]

4. Significance and Use

4.1 Fabrics intended for this end-use should meet all of the requirements listed inTable 1.

4.2 It should be recognized that fabric can be produced

[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] *Annual Book of ASTM Standards,* Vol 07.02.

[3] *Discontinued*—See *1979 Annual Book of ASTM Standards,* Part 32.

[4] Available from American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, NC 27709.

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[A]	...	67 N (15 lbf), min	89 N (20 lbf), min	5.1
Bursting strength (ball burst)[A]	138 kPa (20 lbf/in.^{2}), min	...	...	5.2
Tear strength (tongue tear), in both directions[A]	...	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 +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 +0.0%	3.0 % max +0.0%	3.0 % max +0.0 %	5.4.2
Distortion of yarn:				
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:[B]				
Shade Change	Class 4[C] min	Class 4[C] min	Class 4[C] min	5.6.1
Staining	Class 3[D] min	Class 3[D] min	Class 3[D] min	
Colorfastness to dry cleaning:				
Shade change	Class 4[C] min	Class 4[C] min	Class 4[C] min	5.6.2
Burnt gas fumes, 2 cycles:				
Shade change	Class 4[C] min	Class 4[C] min	Class 4[C] min	5.6.3
After 1 refurbishing	Class 4[C] min	Class 4[C] min	Class 4[C] min	
Crocking:				
Dry	Class 4[E] min	Class 4[E] min	Class 4[E] min	5.6.4
Wet	Class 3[E] min	Class 3[E] min	Class 3[E] min	
Light (60 AATCC FU), xenon[A]	Step 4[C] min	Step 4[C] min	Step 4[C] min	5.6.5
Ozone, 1 cycle	Class 4[C] min	Class 4[C] min	Class 4[C] min	5.6.6
Fabric appearance	SA 3.5[F] min	SA 3.0 min	SA 3.5 min	5.7
Retention of hand, character, and appearance	No significant change	No significant change	No significant change	5.8
Durability of back coating	No significant change	No significant change	No significant change	5.9
Flammability	pass	pass	pass	5.10
Light degradation[G]	...	...	...	5.11

[A] 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).

[B] Class in colorfastness and SA 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.

[C] AATCC Gray Scale for Color Change.

[D] AATCC Gray Scale for Staining.

[E] AATCC Chromatic Transference Scale.

[F] For durable-press fabrics only.

[G] The development of a standard method has been referred to the American Association of Textile Chemists and Colorists.

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. Test Methods (Note 1)

5.1 *Breaking Force* (Woven Fabrics Only)—Determine the dry breaking force (load) as directed in the grab test procedure of Test Method D 5034, using a constant- rate- of -extension (CRE) tensile testing machine.

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

5.2 *Bursting Pressure* (Knit Fabrics Only)—Determine the bursting strength of knit fabrics as directed in Methods D 231 using an approved type of diaphragm bursting tester or an approved type of CRT machine equipped with a bursting 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 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 diaphragm bursting 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.

5.3 *Tearing Resistance* (Woven Fabrics Only)—Determine the tearing resistance as directed in Test Method D 2261.

NOTE 5—If preferred, use of Test Methods D 1424 and D 2261is 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 tear testers cannot be used interchangeably. In case of controversy, Test Method D 2261 shall prevail.

5.4 *Dimensional Change*:

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 .

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.

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

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).

5.5 *Yarn Distortion* (Woven Fabrics Only)—Determine the distortion of yarn as directed in Test Method D 1336.

5.6 *Colorfastness*:

5.6.1 *Laundering*—Determine the colorfastness to laundering as directed in Test II A of AATCC Test Method 61 (seeNote 6).

5.6.1.1 Use Multifiber Test Fabric No. 10[5] 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).

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 5.4.1 and dry-cleaning conditions shall be the same as those in 5.4.2.

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.

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.

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

5.7 *Fabric Appearance*—Determine the appearance of durable-press fabric after five launderings as directed in Table II (1), (111), (Ai) of AATCC Test Method 124.

5.8 *Retention of Hand, Character, and Appearance*—Fabric tested in accordance with 5.4.1 and 5.4.2 shall not change significantly in hand, character, or appearance.

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 5.4.1 and 5.4.2.

5.10 *Flammability*—The flammability requirements shall be as 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.

5.11 *Resistance to Light Degradation*— No standard method is available for the determination of light degradation of curtain and drapery fabrics.[6]

6. Keywords

6.1 curtain; drapery

[5] Available from Testfabrics, Inc., P.O. Box 118, Middlesex, NJ 08846.

[6] The development of a standard method has been referred to the American Association of Textile Chemists and Colorists.