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## Standard Performance Specification for Knitted Upholstery Fabrics for Indoor Furniture<sup>1</sup>

This standard is issued under the fixed designation D 4771; 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.

<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 ~~May 15, 1995~~; April 2002. Published July ~~1995~~; 2002. Originally published as D 4771 – 88. Last previous edition D 4771 – 94<sup>5</sup>(2001).

### 1. Scope

1.1 This performance specification covers the performance requirements for knitted upholstery fabrics as used in the manufacture of new indoor furniture for general domestic use. These requirements apply to both the wale and course directions for those factors where each fabric direction is pertinent.

1.2 This performance specification is not applicable to fabrics used in contract, porch, deck, or lawn furniture; nor for woven fabrics, bonded or laminated fabrics, or surface-coated fabrics (such as vinyls and urethanes).

1.3 The following safety hazards caveat pertains only to the test methods described in this 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 and health practices and determine the applicability of regulatory limitations prior to use.* See Note 2.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

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

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

D 4033 Test Method for Resistance to Yarn Slippage at the Sewn Seam in Upholstery Fabrics (Dynamic Fatigue Method)<sup>3</sup>

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

8 Colorfastness to Crocking: AATCC Crockmeter Method

16 Colorfastness to Light

23 Colorfastness to Burnt Gas Fumes

107 Colorfastness to Water

116 Colorfastness to Crocking: Rotary Vertical Crockmeter Method

129 Colorfastness to Ozone in the Atmosphere Under High Humidities

Evaluation Procedure No. 1 Gray Scale for Color Change

Evaluation Procedure No. 2 Gray Scale for Staining

Evaluation Procedure No. ~~3~~ 9-Step AATCC Chromatic Transference Scale

#### 2.3 Federal Standard:

16CFR, Chapter II-Consumer Product Safety Commission, Subchapter D-Flammable Fabrics Act Regulations<sup>5</sup>

#### 2.4 Military Standard:

~~MIL-STD-105D Sampling~~

ASQ/ANSI Z1.4 Sampling Procedures and Tables for Inspection by Attributes<sup>6</sup>

#### 2.5 Other Documents:

Joint Industry Knit Upholstery Fabric Standards and Guidelines<sup>7</sup>

Guides for the Household Furniture Industry<sup>8</sup>

<sup>2</sup> Annual Book of ASTM Standards, Vol 07.01.

<sup>3</sup> Annual Book of ASTM Standards, Vol 07.02.

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

<sup>5</sup> Available from Superintendent of Documents, U.S. 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.

<sup>7</sup> Issued 1980, available from American Furniture Manufacturers Association, Box HP-7, High Point, NC 27261.

<sup>8</sup> Available from the Bureau of Consumer Protection, Federal Trade Commission, Washington, DC 20580. Promulgated by the FTC on Dec. 21, 1973, to be effective on March 21, 1974.

California Bulletin 117<sup>9</sup>  
 UFAC Fabric Classification Test Method for Cigarette Smolder Resistance<sup>10</sup>

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 <sup>11</sup>

### 3. Terminology

#### 3.1 Definitions:

3.1.1 *contract furniture, n*—furniture manufactured for use in non-household applications.

3.1.2 *indoor furniture, n*—furniture manufactured for use in the interior of a building.

3.1.3 *upholstery fabric, n*—the exterior fabric covering applied to a furniture unit.

3.1.4 *upholstered furniture, n*—furniture covered with such materials as textiles or leather and generally with padding or cushions, or both.

3.2 For definitions of other textile terms used in this specification, refer to Terminology D 123. Definitions found in a dictionary of common terms are suitable for terms used in this specification.

### 4. Specification Requirements

4.1 The properties of knitted upholstery fabrics shall conform to the specification requirements in Table 1.

### 5. Significance and Use

~~5.1 Upon mutual agreement between the purchaser and the seller, knitted fabrics~~

~~5.1 Fabrics intended for this end-use should meet all of the requirements listed in Table 1 of this specification. 1.~~

5.2 ~~It is should be~~ recognized that ~~for purposes~~ fabrics can be produced utilizing an almost infinite number of combinations of construction variables (for example, type of fibers, percentage of fibers, yarn twist, yarn number, warp and pick count, chemical and mechanical finishes.) Additionally, fashion or aesthetics dictate that the ultimate consumer ~~of~~ may find acceptable 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 by mutual 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 D 4771 except for the following characteristic(s)."~~

~~5.3 Where 1.~~

5.2.1 Hence, ~~no pre-purchase agreement has been reached between the purchaser and the seller, and in case of controversy, the requirements listed in Table 1 are intended~~ single performance specification can possibly apply to all the various fabrics that could be used as a guide only. As noted in 5.2, ultimate consumer demands dictate varying performance parameters utilized for any particular style of fabric.

~~5.4 The this end-use.~~

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

### 6. Sampling

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

6.2 *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.

6.3 *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.

6.3.1 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 no more than 5 % of the average above or below the true average for each unit in the laboratory sample 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

7.1 *Resistance to Yarn Slippage*—Determine the resistance to yarn slippage (seam integrity) as directed in Test Method D 4033.

NOTE 2—Yarn slippage at the seams in knit fabrics is a relatively rare occurrence, limited to certain types of knit fabrics, for example, coarse-gage Raschels and weft insertion knits. By a substantial majority, the failures which occur at the seams in knit fabrics are splitting or tearing caused by needle

<sup>9</sup> Available from California Department of Consumer Affairs, Bureau of Home Furnishings, 3485 Orange Grove Ave., North Highlands, CA 95660.

<sup>10</sup> Available from UFAC Central, Box 2436, High Point, NC 27261.

<sup>11</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 April 2002. Published July 2002. Originally published as D 4771 – 88. Last previous edition D 4771 – 95(2001).

**TABLE 1 Specification Requirements**

Characteristics	Requirements	Section
Resistance to yarn slippage	1/8 in. max at 7000 cycles	7.4
Resistance to yarn slippage	1/8 in. max at 7000 cycles	6.1
Dimensional change:		
—Wale or course	5.0 % shrinkage max, to 2.0 % —gain max	7.2
Wale or course	5.0 % shrinkage max, to 2.0 % —gain max	6.2
Colorfastness to: <sup>A</sup>		
—Water, Color Change	Class 4 <sup>B</sup> min	7.3
Water, Color Change	Grade 4 <sup>B</sup> min	6.3
—Solvent, Color Change	Class 4 <sup>B</sup> min	7.4
Solvent, Color Change	Grade 4 <sup>B</sup> min	6.4
Crocking:		
—Dry	Class 4 <sup>C</sup> min	7.5
Dry	Grade 4 <sup>C</sup> min	6.5
—Wet	Class 3 <sup>C</sup> min	7.5
Wet	Grade 3 <sup>C</sup> min	6.5
Burnt gas fumes—2 cycles	Class 4 <sup>B</sup> min	7.6
Burnt gas fumes—2 cycles	Grade 4 <sup>B</sup> min	6.6
Light—40 AATCC Fading Units	Class 4 <sup>B</sup> min	7.7
Light—40 AATCC Fading Units	Grade 4 <sup>B</sup> min	6.7
Ozone 1 cycle	Class 4 <sup>B</sup> min	7.8
Ozone 1 cycle	Grade 4 <sup>B</sup> min	6.8
Retention of hand, character, —and appearance	Shall not change more than —limitations set by prior agree- —ment between the buyer and the seller	7.9
Retention of hand, character, —and appearance	Shall not change more than —limitations set by prior agree- —ment between the buyer and the seller	6.9
Durability of back coating	No peeling or cracking of the —backcoating shall occur; durabil- —ity shall be compatible with clean- —ing code	7.10
Durability of back coating	No peeling or cracking of the —backcoating shall occur; durabil- —ity shall be compatible with clean- —ing code	6.10
Flammability:		
—California Bulletin 117	pass	7.11.1
California Bulletin 117	pass	6.11.1
—UFAC Fabric Classification	Class I—vertical char length is —equal to or less than 1.75 in.	7.11.2
UFAC Fabric Classification	Class I—vertical char length is —equal to or less than 1.75 in. Class II—vertical char length is —greater than 1.75 in.	6.11.2
FTC Requirements	pass	7.12
FTC Requirements	pass	6.12

<sup>A</sup> The class rating in the colorfastness requirements is based on a numerical scale of 5 for negligible for no color change or color transfer to 1 for very severe color change or color transfer.

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

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

cutting or weak yarns, or both, and stitch line thread breakage. All or any of these problems can be discovered in Test Method D 4033 if they exist in any fabric or stitch line. If it is suspected that the problem is needle cutting, seams should be sewn with progressively smaller needles until a “passing” result is obtained. Then it is equally important to specify that production on that particular fabric should be sewn only with the needle size and type with which the “passing” result was obtained. The sewn seam shall contain a stitch density of seven stitches per inch (25.4 mm) and a minimum of 0.5-in. (12.7-mm) seam allowance. Experience has indicated that a Size 22 (or smaller) needle with a light ball point will successfully sew most knitted upholstery fabrics; however, if needle cutting problems do occur, simply changing to smaller ball point needles will usually solve most problems. If production conditions dictate that smaller needles cannot be used because of breakage problems, then the knit construction must be reviewed for potential change. Another point of equal importance is that knit upholstery fabrics should never be sewn with regular point, sharp point (SET), or cutting point needles. Knit fabrics should also never be sewn with medium or heavy ball point needles, that is nothing but the light ball point (SES) needle should be used.

**76.2 Dimensional Change**—Determine dimensional change as directed in the Joint-Industry Knit Upholstery Fabric Standards and Guidelines.

**76.3 Colorfastness to Water:**

**76.3.1** Determine colorfastness to water as directed in AATCC 107.

**76.3.2** This method provides a procedure to evaluate color change within the cleaned area under standardized conditions.

Although not directly related to consumer cleansing with water-base or solvent-base cleansing agents, it will give reliable information on the fastness of the fabric coloration to water and solvent, which are the principal agents that would cause color migration or bleeding, or both. In this context, the color change occurring in these tests denotes any change due to color loss or bleeding and migration of one color to another within the cleaned area.

76.3.3 In the evaluation of the test results, the fabric tested is compared against the original to establish color change.

76.3.4 Those fabrics that are not fast to water or solvent media, or both, and show a color change, should be so labeled.

76.4 *Colorfastness to Solvent*—Determine the colorfastness to solvent as directed in AATCC Method 107 using the modifications presented in 76.4.1 and 76.4.2.

76.4.1 Use technical grade perchloroethylene for the test solution.

NOTE 3—**Warning:** Perchloroethylene is toxic, and the usual precautions for handling chlorinated solvents should be taken. Use only under well-ventilated conditions. The solvent is nonflammable.

NOTE 4—The rollers in the wringer used should be such that they will not be affected by the solvent.

76.4.2 After loading the specimens in the Perspiration Tester, Perspirometer, or similar device, allow them to stand for 2 h in the prevailing room atmosphere. Do not press or iron the specimens.

76.4.3 See 76.3.2-76.3.4.

76.4.4 The precision and bias for the modified procedure for determining colorfastness to solvent has not been established. The method is accordingly not recommended for acceptance testing unless preceded by an interlaboratory check test in the laboratory of the purchaser and the laboratory of the ~~seller~~ supplier using randomized replicate specimens of the material(s) to be evaluated.

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

76.6 *Colorfastness to Burnt Gas Fumes*—Determine the colorfastness to burnt gas fumes as directed in AATCC Method 23. Do not wash or dry-clean these fabric specimens either before or after testing.

76.7 *Colorfastness to Light*—Determine the colorfastness to light as directed in AATCC Method 16.

NOTE 5—There are distinct differences in spectral distribution between the various types of machines listed in AATCC 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.

76.8 *Colorfastness to Ozone*—Determine the colorfastness to ozone as directed in AATCC Method 129.

76.9 *Retention of Hand, Character, and Appearance*—After the fabric has been tested as directed in 76.3-76.5, it should be evaluated for any change in hand, character, or appearance.

NOTE 6—Water tests would not apply, if labeled “Solvent Clean Only.”

76.10 *Durability of Back Coating*—After the fabric has been tested as directed in 76.3-76.5, it should be evaluated for cracking or peeling of the back coating.

76.11 *Flammability*—The flammability requirements shall be as agreed upon between the purchaser and the ~~seller~~ supplier, provided they meet or exceed those of Part 1610 of the Flammable Fabric Act Regulations.

76.11.1 Fabrics sold and used in California must be tested as directed in California Bulletin 117.

76.11.2 All upholstery fabrics shall be evaluated for cigarette ignition resistance by the UFAC Fabric Classification Test Method.

76.12 *Federal Trade Commission (FTC) Requirements*—The FTC promulgated the Guides for the Household Furniture Industry<sup>5</sup>. Although the Textile Fiber Products Identification Act specifically exempts outer coverings of furniture from the application of the act, the FTC has very specific regulations covered in detail in Guide 5 of the Guides for the Household Furniture Industry. In brief, this rule covers the following:

76.12.1 False or deceptive representation as to fiber content.

76.12.2 How to identify fibers properly in advertising.

76.12.3 How to identify fibers properly on tags or labels.

76.12.4 Restrictions concerning representation of fabric tests.

76.12.5 Restrictions concerning representation of performance characteristics of upholstery fabrics.

## 87. Keywords

87.1 indoor furniture; knitted upholstery fabric

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