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Standard Performance Specification for Men's and Women's Knitted Career Apparel Fabrics: Dress and Vocational[1]

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1. Scope

1.1 This performance specification covers the minimum performance requirements for men's and women's knitted fabrics for dress and vocational career apparel composed of any textile fiber or mixtures of textile fibers.

1.2 This performance specification is not applicable to career apparel fabrics such as those used in protective clothing, that do not patently fit the categories in 3.1.1 and 3.1.2. Minimum performance specifications for such fabrics should be as agreed between the purchaser and the seller.

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

1.4 The following precautionary statement pertains only to the test methods portion, Section 7, of 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.*

2. Referenced Documents

2.1 *ASTM Standards:*

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[1] This specification is under the jurisdiction of ASTM Committee D~~-~~13 on Textiles and is the direct responsibility of Subcommittee D13.~~5~~61 on ~~Performance Standards for Textile Fabrics.~~ Apparel.

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D 123 Terminology Relating to Textiles[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 3786 Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics—Diaphragm Bursting Strength Tester Method[3]
D 3787 Test Method for Bursting Strength of Knitted Goods—Constant-Rate-of-Traverse (CRT) Ball Burst Test[3]
D 3887 Specification for Tolerances for Knitted Fabric[3]
2.2 *AATCC Methods:*[4]
AATCC 8 Colorfastness to Crocking: AATCC Crockmeter Method
AATCC 15 Colorfastness to Perspiration
AATCC 16 Colorfastness to Light
AATCC 23 Colorfastness to Burnt Gas Fumes
AATCC 61 Colorfastness to Washing, Domestic Laundering, Commercial: Accelerated
AATCC 116 Colorfastness to Crocking, Rotary Vertical Crockmeter Method
AATCC 124 Appearance of Durable Press Fabrics After Repeated Home Launderings
AATCC 132 Colorfastness to Drycleaning
AATCC 135 Dimensional Change in Automatic Home Laundering of Durable Press Woven or Knit Fabrics
AATCC 172 Colorfastness to Non-Chlorine Bleach in Home Laundering
AATCC 188 Colorfastness to Sodium Hypochlorite Bleach in Home Laundering
Evaluation Procedure 1 Gray Scale for Color Change
Evaluation Procedure 2 Gray Scale for Staining
Evaluation Procedure 3 Chromatic Transference Scale
2.3 *Federal Standard:*[5]
16 CFR 1610 Standard for Flammability of Clothing Textiles

NOTE 1—The specific dated editions of ASTM test methods that prevail in this standard are referenced in Section 7 on Test Methods.

3. Terminology

3.1 *Definitions:*

3.1.1 *career apparel, n*—garments which are manufactured for a variety of end uses and for which performance requirements vary.

3.1.1.1 *Discussion*—The two major end uses for career apparel are dress apparel and vocational apparel.

3.1.2 *career apparel, dress, n*—a category of tailored uniform in which abusive wear is not common and in which appearance is much more important than durability (see also *career apparel, vocational career apparel*).

3.1.3 *career apparel, vocational, n*—a type of garment worn as a uniform in which abusive wear is common and durability is generally more important than appearance (see also *career apparel, dress career apparel*).

3.1.4 *dimensional change in pressing and finishing, n*—the change in dimensions undergone by a fabric subjected to pressing and finishing during garment manufacturing.

3.1.5 For definitions of other terms used in this specification, refer to the individual ASTM and AATCC test methods and Terminology D 123.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *pressing and finishing, n*—this term takes into account a variety of industrial pressing and finishing treatments used in garment manufacturing.

NOTE 2—No standard method is available for reproducing on a laboratory level the results of industrial press or finishing treatments, or both, used in the manufacture of knitted apparel garments.

4. Specification Requirements

4.1 The properties of knitted fabric for men's and women's career apparel shall conform to the specification requirement in Table 1.

5. Significance and Use

5.1 Upon mutual 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.

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[2] *Annual Book of ASTM Standards*, Vol 07.01.
[3] *Annual Book of ASTM Standards*, Vol 07.02.
[4] Available from American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, N.C. 27709.
[5] Available from Superintendent of Documents, Government Printing Office, Washington, DC 20402.

TABLE 1 Specification Requirements

NOTE 1—The classes of colorfastness and DP rating are based on a numerical scale of 5 for negligible or no color change, color transfer, or wrinkle to 1 for very severe color change, color transfer, or wrinkle.

Characteristics	Requirements		Section
	Career Dress Apparel	Career Vocational Apparel	
Bursting strength (ball burst)	60 lbf (267 N) min	60 lbf (267 N) min	7.1
Dimensional stability (each direction):			
Pressing and finishing	2 % max shrinkage, 0 % growth	2 % max shrink, 0 % growth	7.2.1
After 5 washes	3 % max	3 % max	7.2.2
After 3 drycleanings	3 % max	3 % max	7.2.4
Fabric smoothness	Class 4, DP, min	Class 3, DP, min	7.3
Flammability	Class 1 or Class 2	Class 1 or Class 2	7.4
Colorfastness:			
Laundering:			7.5.1
Color change	Class 4, min[A]	Class 4, min[A]	
Staining	Class 3 or 4, min,[B]	Class 3 or 4, min[B]	
Sodium Hypochlorite Bleach	Class 4, min[A]	Class 4, min[A]	7.5.8
Non-Chlorine Bleach	Class 4, min[A]	Class 4, min[A]	7.5.9
Drycleaning:			7.5.3
Color change	Class 4, min,[A]	Class 4, min[A]	
Crocking			7.5.4
Dry	Class 4, min[C]	Class 4, min[C]	
Wet	Class 3, min[C]	Class 3, min[C]	
Burnt Gas Fumes—1 cycle:			7.5.5
Shade change, original fabric and after 1 laundering or 1 drycleaning	Class 4, min	Class 4, min[A]	
Light: (xenon-arc)			7.5.6
Outdoor (40 AATCC SFU)	Step 4, min[A]	Step 4, min[A]	
Indoor (20 AATCC SFU)	Step 4, min[A]	Step 4, min[A]	
Perspiration			7.5.7
Color change	Class 4, min[A]	Class 4, min[A]	
Staining	Class 3, min[B]	Class 3, min[B]	

[A] AATCC Gray Scale for Color Change.
[B] AATCC Gray Scale for Staining.
[C] AATCC Chromatic Transference Scale.

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 modifed 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 3995 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 significance and use 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. Any "partially finished" or "post-finished" fabrics or those which will be pleated, creased, steamed, or pressed during manufacturing should be processed in accordance with the fabric manufacturer's instructions before tests are made.

6.2 Unless otherwise agreed upon, as when specified in an applicable material specification, take the number of specimens directed 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 no more than 5 % of the average above or below the lot average (that is, the average that would be obtained by applying this method to the entire lot) 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 *Bursting Strength*—Determine the bursting strength as directed in Test Methods D 3787 or D 3786.

NOTE 3—There is no overall correlation between the results obtained with the CRT machine equipped with a bursting attachment and the diaphragm bursting tester. Consequently, these two bursting testers cannot be used interchangeably. In case of controversy, Method D 3787 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 seller using randomized replicate specimens of the material to be evaluated.

7.2 *Dimensional Change*:

7.2.1 *Pressing and Finishing During Garment Manufacturing*—Where applicable mark the specimen(s) as directed in Section 4.3.1 of AATCC Method 135. Press and finish specimen(s) as agreed by the purchaser and the seller with respect to time, cycles, temperature, steam, vacuum, and mechanical pressure of the press head. Measure the specimen(s) and calculate the dimensional change as directed in Sections 6 and 7 of AATCC Method 135.

7.2.1.1 If no agreement has been made between the purchaser and the seller, press the specimen(s) using a flat-bed steam press according to the cycle in 10.1.3.1 through 10.1.3.5 of Test Methods D 2724.

7.2.2 *Home Laundering*— Determine the maximum dimensional change after five launderings as directed in the applicable procedure in AATCC Method 135 or as agreed upon between the purchaser and the seller.

7.2.2.1 The wash conditions and drying procedure shall be as agreed upon between the purchaser and the seller (see Notes 5 and 6).

7.2.3 *Institutional Laundering*—The wash conditions and drying procedure shall be as agreed upon between the purchaser and the seller.

7.2.4 *Drycleaning*— Determine the maximum dimensional change after three drycleanings as directed in 10.1.3.1 through 10.1.3.5 of Test Methods D 2724 (see Notes 5 and 6).

NOTE 5—Launderable fabrics are expected to be drycleanable except where all or part of the fabric is not drycleanable 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. "Drycleanable" goods are to be drycleaned only.

NOTE 6—Specimens prepared for 7.2.1 may be used for 7.2.2, 7.2.3, and 7.2.4 as desired. When this is done, the dimensional change due to laundering or drycleaning is calculated using Eq 1, due to laundering. The dimensional change to pressing and finishing will have occurred in the fabric before it reaches the user. Therefore, it should not be included as a part of the dimensional change to laundering or drycleaning of the fabric as it will reach the consumer (see 6.1).

$$\% \text{ dimensional change} = 100\ (D_2 - D_1)/D_2 \quad (1)$$

where:

D_1 = measurement after laundering or drycleaning, and
D_2 = measurement after pressing and finishing.

7.3 *Fabric Smoothness Appearance*—Determine the fabric smoothness appearance, as directed in AATCC Method 124, after laundering using the wash-and-wear cycle, or the normal cycle as agreed upon between the purchaser and the seller, as specified in 7.2.2 or 7.2.3 for washable fabrics or after drycleaning as specified in 7.2.4 for drycleanable fabrics.

7.3.1 For washable fabrics not intended for use in "durable press" garments determine the fabric smoothness after pressing as specified in Section 5.12 of AATCC Method 96.

7.3.1.1 The fabric smoothness durable press (DP) rating of such fabrics, and the DP rating of drycleaned fabrics, shall have decreased no more than 1/2 DP rating from that of the fabric before it is laundered or drycleaned.

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

7.5 *Colorfastness*:

7.5.1 *Home Laundering*— Determine the colorfastness to laundering of home laundered fabrics as directed in Method AATCC 61.

7.5.2 *Institutional Laundering*—Determine the colorfastness to laundering of institutional laundered fabrics as agreed upon between the purchaser and the seller.

7.5.3 *Drycleaning*— Determine the colorfastness to dry-cleaning as directed in AATCC Method 132 (Note 3).

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

7.5.5 *Burnt Gas Fumes*— Determine the colorfastness to burnt gas fumes on the original fabric and after one laundering as in 7.2.2 or 7.2.3 or after one dry cleaning as in 7.2.4 as directed in AATCC Method 23.

7.5.6 *Light*—Determine colorfastness to light as directed in AATCC Method 16.

NOTE 7—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.

7.5.7 *Perspiration*— Determine the colorfastness to perspiration as directed in AATCC Method 15.

7.5.8 *Colorfastness to Sodium Hypochlorite Bleach*— Determine the colorfastness to sodium hypochlorite bleach as directed in Method AATCC 188.

7.5.9 *Colorfastness to Non—Chlorine Bleach*— Determine the colorfastness to non—chlorine bleach as directed in Method AATCC 172.

7.6 When a claim is made for a special performance characteristic not covered by this specification, it should be tested as directed in a test method and performance standard mutually acceptable to the purchaser and the seller.

8. Keywords

8.1 career apparel; smoothness