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Standard Performance Specification for Woven Swimwear Fabrics[1]

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1. Scope

1.1 This performance specification covers woven fabrics for use in men's, women's and children's swimwear, composed of any textile fiber or mixture of textile fibers.

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

1.3 The following safety hazards caveat pertains only to the test method 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.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 123 Terminology Relating to Textiles[2]

D 434 Test Method for Resistance to Slippage of Yarns in Woven Fabrics Using a Standard Seam[2]

D 1284 Test Methods for Relaxation and Consolidation Dimensional Changes of Stabilized Knit Wool Fabrics[2]

D 1424 Test Method for Tear Resistance of Woven Fabrics by Falling-Pendulum (Elmendorf) Apparatus[2]

D 2261 Test Method for Tearing Strength of Woven Fabrics by the Tongue (Single Rip) Method (Constant-Rate-of-Extension) Tensile Testing Machine[2]

D 2262 Test Method for Tearing Strength of Woven Fabrics by Tongue (Single Rip) Method (Constant-Rate-of-Traverse Tensile Testing Machine)[2]

D 2905 Practice for Statements on Number of Specimens for Textiles[2]

D 5034 Test Method for Breaking Force and Elongation of Textile Fabrics (Grab Test)[3]

2.2 *AATCC Test Methods:*[4]

8 Colorfastness to Crocking: AATCC Crockmeter Method

15 Colorfastness to Perspirationn

16 Colorfastness to Light

23 Colorfastness to Burnt Gas Fumes

61 Colorfastness to Washing, Domestic, and Laundering, Commercial Accelerated

106 Colorfastness to Water: Sea

107 Colorfastness to Water

116 Colorfastnessto Crocking: Rotary Vertical Crockmeter Method

129 Colorfastnessto Ozone in the Atmosphere Under High Humidities

135 DimensionalChanges in Automatic Home Laundering of Durable Press Woven or Knit Fabrics

162 Colorfastness to Water: Chlorinated Pool

Evaluation Procedure No. 1 Gray Scale for Color Change

Evaluation Procedure No. 2 Gray Scale for Staining

Evaluation Procedure No. 3 AATCC Chromatic Transference Scale.

2.3 *Federal Standard:*

16 CFR 1610 Standard for Flammability of Clothing Textiles[5]

16 CFR, Chapter II—Consumer Product Safety Commission, Subchapter D—Flammable Fabrics Act Regulations[5]

2.4 *Military Standard:*

MIL-STD-105D Sampling Procedures and Tables for Inspection by Attributes[6]

NOTE 1—Reference to test methods in this standard 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 *swimwear, n*—textile garments intended for wear in fresh, chlorinated, or salt water.

3.2 For definitions of textile terms used in this specification, refer to the individual ASTM and AATCC test methods and 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 fabrics for woven swimwear shall conform to the specification requirements in Table 1.

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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, U.S. Government Printing Office, Washington, DC 20402.

[6] Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

TABLE 1 Specification Requirements

NOTE 1—Class in a, b, and c is based on a numerical scale of 5 for negligible or no color change or color transfer to 1 for very severe color change or color transfer.

Characteristic	Requirements	Section
Breaking strength (load)[A] (CRT):		7.1
Nonstretch fabrics	133 N (30 lbf), min	
Stretch fabrics	89 N (20 lbf), min @ 40 % or greater elongation	
Yarn slippage ¼-in. (6-mm) separation	89 N (20 lbf), min	7.2
Tear strength (nonstretch direction)	6.7 N (1.5 lbf), min	7.3
Dimensional change:		
Laundering	3 %, max	7.4.1
Colorfastness:		
Burnt gas fumes—1 cycle		7.5.1
Shade change, original fabric and after 1 laundering	Class 4[B], min	
Laundering		7.5.2
Shade change	Class 4[B], min	
Staining	Class 4[C], min	
Crocking		7.5.3
Dry	Class 4[D], min	
Wet	Class 4[D], min	
Water		7.5.4
Shade change	Class 4[B], min	
Staining	Class 4[C], min	
Chlorinated Pool	Class 4[B]	7.5.5
Perspiration		7.5.6
Shade change	Class 4[B]	
Staining	Class 4[C]	
Sea water		7.5.7
Shade change	Class 4[B], min	
Staining	Class 4[C], min	
Ozone		
Shade change	Class 3–4[B], min	
Light (20 AATCC FU) (xenon-arc)	Step 4[B], min	7.5.9
Flammability	Class 1 or Class 2	7.6

[A] See Note 2.
[B] AATCC Gray Scale for Color Change.
[C] AATCC Gray Scale for Staining.
[D] AATCC Chromatic Transference Scale.

5. Significance and Use

5.1 Upon mutual agreement between the purchaser and the supplier, woven 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 by mutual agreement between the purchaser and the supplier.

5.2.1 In such cases, any references to the specification shall specify that: "This fabric meets ASTM Specification D 3994, except for the following characteristic(s)."

5.3 Where no prepurchase agreement has been reached between the purchaser and the supplier, 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 *Acceptance Testing Lot*—Unless there is prior agreement consider as a lot for acceptance testing all material of a single item received as a single shipment.

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 seller, 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.

6.4 *Test Specimens*—Take the number of specimens directed in each of the applicable test methods. Perform the tests on the fabric as it will reach the customer. Any "partially finished" or "post-finish" fabrics should be processed in accordance with the fabric manufacturer's instructions.

6.5 If the applicable test method does not specify the number of specimens, use the procedures in Practice D 2905 to determine the number of specimens per laboratory sampling unit. Use (*1*) a reliable estimate of the variability of individual observations on similar materials in the user's laboratory, (*2*) a 95 % probability level, and (*3*) an allowable difference of 5 % of the average between the test results on laboratory sampling units and the average for the laboratory sampling unit. The average for a laboratory sampling unit is the average that would be obtained by applying the test method to all of the potential specimens from that laboratory sampling unit.

7. Test Methods

7.1 *Breaking Force*—Determine the dry breaking force, in the standard atmosphere for testing textiles, as directed in Test Method D 5034, using a constant rate of traverse (CRT) tensile testing machine with the speed of the pulling clamp at 300 + 10 mm (12 + 0.5 in.)/min.

NOTE 2—Fabrics that include fibers which are known to lose strength when wet, such as rayon, should be tested for wet breaking strength, also.

NOTE 3—If preferred, the use of a constant-rate-of-extension (CRE) testing machine is permitted. The crosshead speed should be as agreed between the purchaser and the supplier. There may be no overall correlation between the results obtained with the CRT and the CRE machines. Consequently these two breaking load testers cannot be used interchangeably. In case of controversy, the CRT machine shall prevail.

7.2 *Resistance to Yarn Slippage*—Determine the resistance to yarn slippage as directed in Test Method D 434.

NOTE 4—The precision of Test Method D 434 has not been established, and it may not be suitable for fabrics with low yarn counts in terms of the number of ends and picks per inch.

7.3 *Tear Strength*—Determine the tear strength in the non-stretch direction as directed in Test Method D 1424.

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

7.4 *Dimensional Change*:

7.4.1 *Laundering*—Determine the maximum dimensional change after five launderings as directed in the applicable procedure in AATCC 135 or as agreed between the purchaser and supplier.

7.4.1.1 The wash conditions and drying procedure shall be as agreed between the purchaser and the supplier.

7.5 *Colorfastness*:

7.5.1 *Burnt Gas Fumes*—Determine the colorfastness to burnt gas fumes on the original fabric and after one laundering as directed in AATCC Test Method 23.

NOTE 6—Washing conditions shall be the same as those used in 7.4.1.1.

7.5.2 *Laundering*—Determine the colorfastness to laundering as directed in the applicable procedure of AATCC Test Method 61. The test conditions shall be agreed between the purchaser and the supplier.

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

7.5.4 *Colorfastness to Water*—Determine the colorfastness to water as directed in AATCC Test Method 107.

7.5.5 *Colorfastness to Water-Chlorinated Pool*—Determine the colorfastness as directed in AATCC Test Method 162.

7.5.6 *Colorfastness to Perspiration*—Determine the colorfastness to perspiration as directed in AATCC Test Method 15.

7.5.7 *Colorfastness to Sea Water*—Determine the colorfastness to sea water as directed in AATCC Test Method 106.

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

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

NOTE 7—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.

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

8. Keywords

8.1 fabric; performance; specification; swimwear