



Designation: D 3994 – 02

Standard Performance Specification for Woven Swimwear Fabrics¹

This standard is issued under the fixed designation D 3994; 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 approval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

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 hazard 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:²

- D 123 Terminology Relating to Textiles
- D 434 Test Method for Resistance to Slippage of Yarns in Woven Fabrics Using a Standard Seam
- D 1284 Test Methods for Relaxation and Consolidation Dimensional Changes of Stabilized Knit Wool Fabrics
- D 1424 Test Method for Tear Resistance of Woven Fabrics by Falling-Pendulum (Elmendorf) Apparatus
- D 2261 Test Method for Tearing Strength of Woven Fabrics by the Tongue (Single Rip) Method (Constant-Rate-of-Extension) Tensile Testing Machine
- D 2262 Test Method for Tearing Strength of Woven Fabrics by Tongue (Single Rip) Method (Constant-Rate-of-Traverse Tensile Testing Machine)
- D 2905 Practice for Statements on Number of Specimens for Textiles
- D 5034 Test Method for Breaking Force and Elongation of

- Textile Fabrics (Grab Test)
- 2.2 AATCC Test Methods:³
 - 8 Colorfastness to Crocking: AATCC Crockmeter Method
 - 15 Colorfastness to Perspiration
 - 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 Colorfastness to Crocking: Rotary Vertical Crockmeter Method
 - 129 Colorfastness to Ozone in the Atmosphere Under High Humidities
 - 135 Dimensional Changes in Automatic Home Laundering of Durable Press Woven or Knit Fabrics
 - 162 Colorfastness to Water: Chlorinated Pool
 - 172 Colorfastness to Non-Chlorine Bleach in Home Laundering
 - 188 Colorfastness to Chlorine Bleach in Home Laundering 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 Textiles⁴
 - 16 CFR, Chapter II—Consumer Product Safety Commission, Subchapter D—Flammable Fabrics Act Regulations⁴
- 2.4 Military Standard:
 - MIL-STD-105D Sampling Procedures and Tables for Inspection by Attributes⁵

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.

¹ This specification is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.61 on Apparel.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, N.C. 27709.

⁴ Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

⁵ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

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.

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

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
<i>Breaking strength</i> (load) ^A (CRT):		7.1
Nonstretch fabrics	133 N (30 lbf), min	
Stretch fabrics	89 N (20 lbf), min @ 40 % or greater elongation	
<i>Yarn slippage</i> ¼-in. (6-mm) separation	89 N (20 lbf), min	7.2
<i>Tear strength</i> (nonstretch direction)	6.7 N (1.5 lbf), min	7.3
<i>Dimensional change:</i>		
Laundering	3 %, max	7.4.1
<i>Colorfastness:</i>		
Burnt gas fumes—1 cycle		7.5.1
Shade change, original fabric and after 1 laundering	Class 4 ^B , min	
Chlorine Bleach	Class 4 ^B , min	7.5.10
Non-Chlorine Bleach	Class 4 ^B , min	7.5.11
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.