



Designation: D3994-95a Designation: D 3994 - 02 (Reapproved 2008)

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 reapproval. 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 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:²

D 123 Terminology Relating to Textiles

~~D 434 Test Method for Resistance to Slippage of Yarns in Woven Fabrics Using a Standard Seam²~~

~~D 1284 Test Methods for Relaxation and Consolidation Dimensional Changes of Stabilized Knit Wool Fabrics²~~ Test Method for Resistance to Slippage of Yarns in Woven Fabrics Using a Standard Seam

~~D 1424 Test Method for Tear Resistance~~ Tearing Strength of Woven Fabrics by Falling-Pendulum Type (Elmendorf) Apparatus

~~D 2261 Test Method for Tearing Strength of Woven Fabrics by the Tongue (Single Rip) Method (Constant-Rate-of-Extension) Procedure (Constant-Rate-of-Extension Tensile Testing Machine² Machine)~~

~~D 2262 Test Method for Tearing Strength of Woven Fabrics by Tongue (Single Rip) Method (Constant-Rate-of-Traverse Tensile Testing Machine)²~~ 2622 Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry

D 2905 Practice for Statements on Number of Specimens for Textiles

D 5034 Test Method for Breaking Force Strength and Elongation of Textile Fabrics (Grab Test)

2.2 AATCC Test Methods:³

8 Colorfastness to Crocking: AATCC Crockmeter Method 994-02(2008)

15 Colorfastness to Perspiration

16 Colorfastness to Light http://www.astm.org/standards/sist/4912c232-91b8-4b34-a844-7b72b47cf3ed/astm-d3994-022008

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

¹ This specification is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.61 on Apparel. Current edition approved Dec. 10, 1995. Published May 1996. Originally published as D3994-81. Last previous edition D3994-95.

² This performance specification is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.61 on Apparel. Current edition approved Aug. 1, 2008. Published October 2008. Originally approved in 1981. Last previous edition approved in 2002 as D 3994 - 02.

³ 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*, Vol 07.01, volume information, refer to the standard's Document Summary page on the ASTM website.

⁴ Annual Book of ASTM Standards, Vol 07.02.

⁵ Available from American Association of Textile Chemists and Colorists (AATCC), P.O. Box 12215, Research Triangle Park, NC 27709, <http://www.aatcc.org>.

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.

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

⁴ 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 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.

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 (load)</i> ^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.