



# Standard Performance Specification for Seamless Knit Garments Including Intimates and Swimwear<sup>1</sup>

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## 1. Scope

1.1 This specification covers the evaluation of specific performance characteristics of importance in seamless knit garments, including camisoles, panties, slips, girdles and swimwear.

1.2 The following safety hazards caveat pertains only to the test methods described in this performance 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 (See Note 1)

### 2.1 ASTM Standards:<sup>2</sup>

- D123 Terminology Relating to Textiles
- D629 Test Methods for Quantitative Analysis of Textiles
- D1230 Test Method for Flammability of Apparel Textiles (Withdrawn 2010)<sup>3</sup>
- D2905 Practice for Statements on Number of Specimens for Textiles (Withdrawn 2008)<sup>3</sup>
- D3107 Test Methods for Stretch Properties of Fabrics Woven from Stretch Yarns
- D3136 Terminology Relating to Care Labeling for Apparel, Textile, Home Furnishing, and Leather Products
- D3786 Test Method for Bursting Strength of Textile Fabrics—Diaphragm Bursting Strength Tester Method
- D3787 Test Method for Bursting Strength of Textiles—Constant-Rate-of-Traversal (CRT) Ball Burst Test
- D7022 Terminology Relating to Apparel

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

- 8 Colorfastness to Crocking: AATCC Crockmeter Method
- 15 Colorfastness to Perspiration
- 16 Colorfastness to Light
- 20 Fiber Analysis: Qualitative
- 20 A Fiber Analysis: Quantitative
- 61 Colorfastness to Laundering, Home and Commercial: Accelerated
- 106 Colorfastness to Water: Sea
- 107 Colorfastness to Water
- 116 Colorfastness to Crocking: Rotary Vertical Crockmeter Method
- 132 Colorfastness to Drycleaning
- 150 Dimensional Changes in Automatic Home Laundering of Garments
- 158 Dimensional Changes on Drycleaning in Perchloroethylene: Machine Method
- 162 Colorfastness to Water: Chlorinated Pool
- 172 Colorfastness to Non-Chlorine Bleach in Home Laundering
- 179 Skewness Change in Fabric and Garment Twist Resulting from Automatic Home Laundering
- 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 8 9–Step Chromatic Transference Scale
- Glossary for AATCC Standard Terminology
- AATCC-ASTM TS-001 Quick Methods for Colorfastness to Chlorine and Non-Chlorine Bleach

<sup>1</sup> 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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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> The last approved version of this historical standard is referenced on [www.astm.org](http://www.astm.org).

NOTE 1—AATCC-ASTM TS-001 contains quick test methods for color change from chlorine and non-chlorine bleach. The methods have not been validated for verified. In case of dispute use AATCC 172 and/or 188 for bleach test results.

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

### 2.3 Federal Standards:<sup>5</sup>

#### 16 CFR 1610 Flammable Fabrics Act

NOTE 2—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.

### 3. Terminology

3.1 For all terminology related to Apparel, see Terminology **D7022**.

3.2 The following terms are relevant to this standard: camisole, girdle, intimates, panties, seamless knit garment, slip, swimwear.

3.3 For definitions of all other textile terms see Terminology **D123**.

### 4. Significance and Use

4.1 Upon mutual agreement between the purchaser and the supplier, seamless knit garments intended for this end use should meet all of the requirements listed in **Table 1** of this specification.

4.2 It is recognized that, for purposes of fashion or aesthetics, the ultimate consumer of articles made from these fabrics may find acceptable products that do not conform to all of the requirements listed in **Table 1**. Therefore, one or more of the requirements in **Table 1** may be modified by mutual agreement between the purchaser and the supplier.

4.2.1 In such cases, any references to the specifications should specify that: “This product meets ASTM specifications XXXX except for the following characteristic(s).”

4.3 Where no pre-purchase agreement has been reached between the purchaser and supplier, and in case of controversy, the requirements listed in **Table 1** are intended to be used as a guide only. As noted in **4.2**, ultimate consumer demands dictate varying performance parameters for a particular product.

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

### 5. Sampling

5.1 *Acceptance Testing Lot*—Unless agreed otherwise, consider as a lot for acceptance testing all material of a single item as a single shipment.

5.2 *Lot Samples and Laboratory Samples*—For acceptance testing, take lot samples and laboratory samples as directed by each of the applicable test methods.

5.3 *Specimens*—Take the number of specimens directed in each of the applicable test methods. Perform the tests on the product as it reaches the consumer. Any “partially finished” or “post-finish” fabrics should be processed in accordance with the fabric manufacturer’s instructions.

5.3.1 If the applicable test method does not specify the number of specimens, use the procedures in Practice **D2905** to determine the number of specimens per laboratory sample unit.

5.3.2 Use a reliable estimate of the variability of individual observations on similar materials in the user’s laboratory, a

<sup>5</sup> Available from Superintendent of Documents, Government Printing Office, Washington, DC 20402.

**TABLE 1 Specification Requirements**

Characteristic	Requirements	Section
Bursting Strength	<5 oz 30 lb/in <sup>2</sup>	
Colorfastness		
Laundering <sup>A</sup>	Color Change Staining	4.0 Min 3.0 Min
Drycleaning	Color change Staining	4.0 Min 3.0 Min
Crocking <sup>A</sup>	Dry Wet	4.0 Min 3.0 Min
Light Swimwear 40 AFU's		Grade 3.5 Min
Intimates 20 AFU's		Grade 3.5 Min
Perspiration <sup>A</sup>	Color change Staining	4.5 Min 3.5 Min
Water <sup>A</sup>	Color change Staining	4.5 Min 3.5 Min
Sea Water (Swimwear only) <sup>A</sup>	Color change	4.0 Min
Chlorinated Pool Water (Swimwear only)	Color change	4.0 Min
Bleach		
Chlorine		Grade 4 Min
Non-Chlorine		Grade 4 Min
Dimensional Change		
Laundering — Each direction		±5.0 % Max
Drycleaning- Each direction		±3.0 % Max
Stretch		Record Actual
Flammability		Class 1
Garment Twist		5 % max
Fiber Content	Blends	±3.0 % Max
	100 % Fibers	±0.0 % Max

<sup>A</sup> See **Note 4**.

95% probability level, and an allowable difference of 5% of units and the average for the laboratory sampling unit.

## 6. Specification Requirements

6.1 The properties of seamless knit garments shall conform to the specification requirements of [Table 1](#).

## 7. Test Methods (See [Note 1](#))

7.1 *Bursting Strength*—Determine bursting strength of knit fabrics as directed in Test Method [D3786](#) (preferred method) or Test Method [D3787](#)

**NOTE 3**—The precision of the bursting strength testers has not been established and the results are not interchangeable. The methods are accordingly not recommended for acceptance testing unless preceded by an interlaboratory check in the laboratories of the purchaser and the supplier, using randomized replicate specimens of the material to be evaluated.

7.2 *Colorfastness to Laundering*—Determine the colorfastness to laundering as directed in AATCC Test Method 61 or as otherwise agreed upon between purchaser and the supplier.

**NOTE 4**—It has been reported that the results for staining, obtained by standard AATCC Test Methods, on fabrics dyed to dark shades that contain a combination of polyester and spandex, or their blends, may not show the full staining propensity of such fabrics in consumer use. It is, therefore, recommended that the staining results obtained by these tests not be used for acceptance testing of such fabrics.

7.3 *Colorfastness to Drycleaning*—For drycleanable fabrics, determine the colorfastness to laundering as directed in AATCC Test Method 132 or as otherwise agreed upon between purchaser and the supplier.

7.4 *Colorfastness to Crocking*—Determine the colorfastness to crocking as directed in AATCC Test Method 8 for shades and AATCC Test Method 116 for prints or as otherwise agreed upon between purchaser and the supplier (see [Note 4](#)).

7.5 *Colorfastness to Light*—Determine the colorfastness to light as directed in AATCC Test Method 16, Option 3.

**NOTE 5**—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 *Colorfastness to Perspiration*—Determine the colorfastness to perspiration as directed in AATCC Test Method 15 (see [Note 4](#)).

7.7 *Colorfastness to Water*—Determine the colorfastness to water as directed in AATCC Test Method 107 (see [Note 4](#)).

7.8 *Colorfastness to Sea Water*—For swimwear, determine the colorfastness to sea water as directed in AATCC Method 106 (see [Note 4](#)).

7.9 *Colorfastness to Chlorinated Pool Water*—For swimwear, determine the colorfastness to chlorinated pool water as directed in AATCC Method 162.

7.10 *Colorfastness to Chlorine and Non-Chlorine Bleach*—Determine the colorfastness to bleach as directed in AATCC/ASTM TS-001 or AATCC Test Methods 172 and 188. (See [Note 1](#).)

7.11 *Dimensional Change*—Determine the dimensional change following the permanently attached care label instructions or as directed in AATCC Test Method 150 for laundering or AATCC Test Method 158 for drycleaning.

7.11.1 If there is no attached care label, the refurbishing conditions shall be as specified by the supplier when using the AATCC Test Method 150 for laundering or AATCC Test Method 158 for drycleaning.

7.12 *Stretch*—Determine the amount of stretch as directed in Test Method [D3107](#).

7.13 *Flammability*—The flammability requirements shall be as agreed upon between the purchaser and the supplier except when regulated by applicable government mandatory standards. If flammability is to be tested, Test Method [D1230](#) can be used as the method of evaluation.

7.14 *Garment Twist*—Determine twist as directed in AATCC 179.

7.15 *Fiber Content*—Determine fiber content as directed in AATCC 20, 20A, or Test Method [D629](#).

## 8. Keywords

8.1 performance specification; seamless knit garments

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