



Designation: D 4153 – 95a

# Standard Performance Specification for Men's, Women's, and Children's Woven Handkerchief Fabrics<sup>1</sup>

This standard is issued under the fixed designation D 4153; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This performance specification covers woven fabrics to be used in the manufacture of men's, women's, and children's handkerchiefs, both utilitarian and decorative.

1.2 This performance specification is not applicable to open-work fabrics such as lace which is used primarily to decorate handkerchiefs, or woven fabrics used for the manufacture of scarves.

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

1.4 *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<sup>2</sup>
  - D 1424 Test Method for Tear Resistance of Woven Fabrics By Falling-Pendulum (Elmendorf) Apparatus<sup>2</sup>
  - D 2261 Test Method for Tearing Strength of Woven Fabrics by the Tongue (Single Rip) Method (Constant-Rate-of-Extension Tensile Testing Machine)<sup>2</sup>
  - D 2262 Test Method for Tearing Strength of Woven Fabrics by the Tongue (Single Rip) Method (Constant-Rate-of-Traverse Tensile Testing Machine)<sup>2</sup>
  - D 2905 Practice for Statements on Number of Specimens for Textiles<sup>2</sup>
  - D 5034 Test Method for Breaking Force and Elongation of Textile Fabrics (Grab Test)<sup>3</sup>
- ### 2.2 AATCC Test Methods:<sup>4</sup>
- 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
  - 96 Dimensional Changes in Laundering of Woven and Knitted Textiles Except Wool
  - 116 Colorfastness to Crocking: Rotary Vertical Crockmeter Method
  - 124 Appearance of Durable Press Fabrics after Repeated Home Launderings
  - 135 Dimensional Changes in Automatic Home Laundering of Woven or Knit Fabrics
- ### 2.3 Federal Standard:
- 16CFR—Code of Federal Regulations, Chapter II—Consumer Product Safety Commission, Subchapter D—Flammable Fabrics Act Regulations<sup>5</sup>
- ### 2.4 Military Standard:
- MIL-STD—105 Sampling Procedures and Tables for Inspection by Attributes<sup>6</sup>

NOTE 1—Reference to test methods in this performance 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 Definitions:

3.1.1 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 performance specification.

## 4. Specification Requirements

4.1 The properties of woven fabric for men's, women's, and children's handkerchiefs shall conform to the specification requirements in Table 1.

## 5. Significance and Use

5.1 Upon mutual agreement between the purchaser and the supplier, fabrics intended for this end use should meet all of the

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 07.01.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 07.02.

<sup>4</sup> AATCC Technical Manual, available from the American Association of Textile Chemists and Colorists, PO Box 12215, Research Triangle Park, NC 27709.

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

<sup>6</sup> 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—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.

Characteristic	Requirements	Section
Breaking strength (load) (CRT) <sup>A</sup>	80 N (18 lbf), min	7.1
Tongue tear strength <sup>A</sup>	4.5 N (1 lbf)	7.2
Dimensional change: After 5 launderings	50 % max	7.3
Colorfastness to: Laundering:		7.4.1
Shade change	Class 4 <sup>B</sup> min	
Staining	Class 3 <sup>C</sup> min	
Burnt gas fumes:	Class 4 <sup>B</sup> min	7.4.2
Alteration in shade: 1 cycle on original and after 1 washing	Class 4 <sup>B</sup> min	7.4.2
Crocking:		7.4.3
Dry	Class 4 <sup>D</sup> min	
Wet	Class 3 <sup>D</sup> min	
Perspiration:		7.4.4
Shade change	Class 4 <sup>B</sup> min	
Staining	Class 3 <sup>C</sup> min	
Light (xenon arc) <sup>A</sup> 20 AATCC Fading units	Step 4 <sup>B</sup> min	7.4.5
Fabric appearance (see 7.5.1.1)	DP 3.5 <sup>E</sup> min	7.5
Flammability	pass	7.6

<sup>A</sup> More than one method can be used to measure these properties. These methods cannot be used interchangeably since there can be no overall correlation between them (see Note 2, Note 3, and Note 5).

<sup>B</sup> AATCC Gray Scale for Color Change.

<sup>C</sup> AATCC Gray Scale for Staining.

<sup>D</sup> AATCC Chromatic Transference Scale.

<sup>E</sup> For durable press fabrics only.

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 4153 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 uses and significance of particular properties and test methods are discussed in the appropriate sections of the specified test methods.

## 6. Sampling

6.1 *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-105.

6.2 *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.

6.2.1 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) when 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 (see Note 1)

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  $300 \pm 10$  mm ( $12 \pm 0.5$  in.)/min.

NOTE 2—If preferred, the use of a constant-rate-of-extension (CRE) testing machine is permitted. The crosshead speed should be as agreed upon between the purchaser and the supplier. There may be no overall correlation between the results obtained with the CRT machine and the CRE machine. Consequently, these two breaking load testers cannot be used interchangeably. In case of controversy, the CRT machine shall prevail.

7.2 *Tear Strength*—Determine the tear strength as directed in Test Method D 2262.

NOTE 3—If preferred, the use of Test Method D 1424 or Test Method D 2261 is permitted with existing requirements as given in this performance specification. There may be no overall correlation between the results obtained with the tongue tear machines and the Elmendorf machine. Consequently, these three testers cannot be used interchangeably. In case of controversy, Test Method D 2262 shall prevail.

7.3 *Dimensional Change in Laundering*—Determine the maximum dimensional change after five launderings, or as agreed upon between the purchaser and the supplier, as directed in the applicable procedure in AATCC Test Method 135.

7.4 *Colorfastness:*

7.4.1 *Laundering*—Determine the colorfastness to laundering as directed in AATCC Test Method 61. The test conditions shall be as specified by the supplier.

7.4.2 *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 4—Washing conditions shall be the same as those used in 7.3.

7.4.3 *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 upon between the purchaser and the supplier.

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

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

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.

7.5 *Fabric Appearance After Repeated Home Launderings*—Determine the fabric appearance as directed in AATCC Test Method 124 after laundering using the wash-and-wear

cycle or the normal cycle as agreed upon between the purchaser and the supplier as specified in 7.3 for washable fabrics.

7.5.1 For fabrics not intended for use in “Durable Press” products, determine the fabric smoothness after pressing as specified in Section 5.12 of AATCC Test Method 96.

7.5.1.1 The fabric smoothness, or durable press (DP) rating of such fabrics shall have decreased no more than ½ durable press rating from that of the fabric before it is laundered.

7.6 *Flammability*—The flammability requirements shall be as agreed upon between the purchaser and the supplier, provided they met or exceed those of 16CFR–Part 1610 of the Flammable Fabrics Act Regulations.

## 8. Keywords

8.1 fabric; handkerchief; performance; specification; woven fabric

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