



Designation: ~~D5431-93 (Reapproved 2001)~~^{ε1} Designation: D 5431 – 08

Standard Performance Specification for Woven and Knitted Sheeting Products for Institutional and Household Use¹

This standard is issued under the fixed designation D 5431; 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.

~~^{ε1}Note—~~ Editorial corrections were made throughout in February 2001.

1. Scope

1.1 This specification covers the evaluation of specific performance characteristics of importance in woven and knit flat, fitted, and waterbed sheet products for use in institutional and household environments.

1.2 This specification may be used by mutual agreement between the purchaser and the supplier to establish purchasing specification requirements.

1.3 The requirements in Table 1 apply to the length and width directions for those properties where fabric direction is pertinent.

1.4 This specification is not applicable to woven and knit products used for sheet blankets or to woven and knitted sheet products used for apparel.

1.5 *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 629 Test Methods for Quantitative Analysis of Textiles

D 1230 Test Method for Flammability of Apparel Textiles

D 1424 Test Method for Tear Resistance of Woven Fabrics by Falling Pendulum (Elmendorf) Apparatus²

~~D 1776 Practice for Conditioning Textiles for Testing²~~ Test Method for Tearing Strength of Fabrics by Falling-Pendulum Type (Elmendorf) Apparatus

D 1776 Practice for Conditioning and Testing Textiles

D 2262 Test Method for Tearing Strength of Woven Fabrics by the Tongue (Single Rip) Method (Constant-Rate-of-Transpose Tensile Testing Machine)

D 2905 Practice for Statements on Number of Specimens for Textiles

D 3136 Terminology Relating to Care Labeling for Apparel, Textile, Home Furnishing, and Leather Products

D 3512 Test Method for Pilling Resistance and Other Related Surface Changes of Textile Fabrics: Random Tumble Pilling Tester Method

~~D 3786 Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics—Diaphragm Bursting Strength Tester Method³~~ Test Method for Bursting Strength of Textile Fabrics—Diaphragm Bursting Strength Tester Method

D 3787 Test Method for Bursting Strength of Knitted Goods: Textiles Constant-Rate-of-Transpose (CRT) Ball Burst Test

D 3882 Test Method for Bow and Skew in Woven and Knitted Fabrics

D 3938 Guide for Determining or Confirming Care Instructions for Apparel and Other Textile Products

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

2.2 AATCC Methods:³

8 Colorfastness to Crocking: AATCC Crockmeter Method

¹ This specification is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.63 on Home Furnishings. Current edition approved Aug. 15, 1993. Published October 1993.

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

³ Available from American Association of Textile Chemists and Colorists (AATCC), P.O. Box 12215, Research Triangle Park, NC 27709, <http://www.aatcc.org>.

TABLE 1 Specification Requirements

Characteristics	Requirements				Section
	Non-flannel		Woven		
	Polyester/Cotton	100 % Cotton	Flannel	Knitted Flannel/Non-flannel	
Breaking Force					7.1
CRT Method Each Direction ^A	222 N (50 lbf) min	178 N (40 lbf) min	156 N (35 lbf) min		
Bursting Force ^A				222 N (50 lbf) min	7.1.2
Tear Resistance, Elmendorf ^A					7.1.3
Each Direction	7 N (1.5 lbf) min	7 N (1.5 lbf) min	7 N (1.5 lbf) min		
Pilling	4.0	NA	NA	4.0	7.1.4
Dimensional Change:					7.1.5
Durable Press (In Each Direction)	<u>2 % max</u>	<u>3 % max</u>	<u>3.5 % max</u>	<u>4 % max</u>	
Durable Press (In Each Direction)	<u>5 % max</u>	<u>5 % max</u>	<u>3.5 % max</u>	<u>4 % max</u>	
Nondurable Press (Nonpreshrunk)					
Length	8 % max	8 % max	8 % max		
Width	6 % max	6 % max	6 % max		
Preshrunk (In Each Direction)	2 % max	3 % max	3.5 % max		
Laundered Appearance	Acceptable	Acceptable	Acceptable	Acceptable	7.2.1
Fabric Appearance	SA 3.0 min	SA 2.2 min ^E	NA	SA 3.0 min	7.1.6
Bow and Skewness	3 % max	3 % max	3 % max	3 % max	7.1.7
Colorfastness To: ^C					
Laundering:					7.1.8.1
Alteration in Shade	Class 4 min ^D	Class 4 min ^D	Class 4 min ^D	Class 4 min ^D	
Staining	Class 3 min ^E	Class 3 min ^E	Class 3 min ^E	Class 3 min ^E	
Crocking:					7.1.8.2
Dry	Class 4 min ^F	Class 4 min ^F	Class 4 min ^F	Class 4 min ^F	
Wet	Class 3 min ^F	Class 3 min ^F	Class 3 min ^F	Class 3 min ^F	
Light (20 AATCC FU), Xenon-Arc ^E	Step 4 min ^D	Step 4 min ^D	Step 4 min ^D	Step 4 min ^D	7.1.8.3
Perspiration					7.1.8.4
Alteration In Shade	Class 4 min ^D	Class 4 min ^D	Class 4 min ^D	Class 4 min ^D	
Staining	Class 3 min ^E	Class 3 min ^E	Class 3 min ^E	Class 3 min ^E	
Flammability	Class I	Class I	Class I	Class I	7.1.9

^AThere is more than one standard method that can be used to measure breaking force, bursting force, tear resistance, and lightfastness. These methods cannot be used interchangeably since there may be no overall correlation between them. See Notes 2-5 and Note 8.

^BRecommended requirement for Easy Care Products which must be ironed.

^CClass in colorfastness and 5A rating is based on a numerical scale of 5.0 for negligible color change, color transfer, or wrinkling to 1.0 for very severe color change, color transfer or wrinkling. The numerical rating in Table 1 or higher is acceptable.

^DAATCC Gray Scale for Color Change.

^EAATCC Gray Scale for Staining.

^FAATCC Chromatic Transference Scale.

ASTM D5431-08

<https://standards.iteh.ai/catalog/standards/sist/d44d224-72e2-4b17-a430-b2a498b3dec9/astm-d5431-08>

15 Colorfastness to Perspiration

16A Colorfastness to Light: Carbon-Arc Lamp, Continuous Light

16E Colorfastness to Light: Water-Cooled Xenon-Arc Lamp, Continuous Light

61 Colorfastness to Laundering, Home, and Commercial: Accelerated

88B Appearance of Seams in Durable Press Items After Repeated Home Launderings

96 Dimensional Changes in Commercial Laundering of Woven and Knitted Fabrics Except Wool

116 Colorfastness to Crocking: Rotary Vertical Crockmeter Method

124 Appearance of Fabrics After Repeated Home Laundering

135 Dimensional Changes in Automatic Home Laundering of Woven and Knit Fabrics

143 Appearance of Apparel and Other Textile End Products After Repeated Home Launderings

Evaluation Procedure 1 Gray Scale for Color Change

Evaluation Procedure 2 Gray Scale for Staining

Evaluation Procedure 3 AATCC Chromatic Transference Scale

NOTE 1—Reference to test methods in this specification give only the pertinent part of the designation of ASTM, AATCC, or other test methods. The current edition of each test method shall prevail.

3. Terminology

3.1 Definitions:

3.1.1 *fitted sheet, n*— in textiles, a product usually made with boxed corners, sometimes elasticized with shape and size to conform to the contours of the mattress and used for covering the mattress on a bed.

3.1.2 *flannel, n*—as applied to bed sheeting, a napped fabric used in the fabrication of sheeting products.

3.1.3 *flat sheet, n*—in textiles, a flat, hemmed product, usually rectangular, used for covering the mattress on a bed and used for sleeping on or under.

3.1.4 *muslin, n*—as applied to bed sheeting, a plain weave fabric with not fewer than 128 yarns/in. ² (128 yarns/645 mm²).