



Designation: D5431 – 08 (Reapproved 2019)

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

This standard is issued under the fixed designation D5431; 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 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

[D123 Terminology Relating to Textiles](#)

[D629 Test Methods for Quantitative Analysis of Textiles](#)

[D1230 Test Method for Flammability of Apparel Textiles](#)

[D1424 Test Method for Tearing Strength of Fabrics by Falling-Pendulum \(Elmendorf-Type\) Apparatus](#)

[D1776 Practice for Conditioning and Testing Textiles](#)

[D2262 Test Method for Tearing Strength of Woven Fabrics by the Tongue \(Single Rip\) Method \(Constant-Rate-of-Traverse Tensile Testing Machine\) \(Withdrawn 1995\)](#)³

[D2905 Practice for Statements on Number of Specimens for Textiles \(Withdrawn 2008\)](#)³

[D3136 Terminology Relating to Care Labeling for Apparel, Textile, Home Furnishing, and Leather Products](#)

[D3512 Test Method for Pilling Resistance and Other Related Surface Changes of Textile Fabrics: Random Tumble Pilling Tester](#)

[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-Traverse \(CRT\) Ball Burst Test](#)

[D3882 Test Method for Bow and Skew in Woven and Knitted Fabrics](#)

[D3938 Guide for Determining or Confirming Care Instructions for Apparel and Other Textile Products](#)

[D5034 Test Method for Breaking Strength and Elongation of Textile Fabrics \(Grab Test\)](#)

2.2 *AATCC Standards:*⁴

[TM8 Colorfastness to Crocking: AATCC Crockmeter Method](#)

[TM15 Colorfastness to Perspiration](#)

[TM16.1 Colorfastness to Light: Outdoor](#)

[TM16.3 Colorfastness to Light: Xenon-Arc](#)

[TM61 Colorfastness to Laundering, Home, and Commercial: Accelerated](#)

[TM88B Seam Smoothness in Fabrics after Home Laundering](#)

[TM96 Dimensional Changes in Commercial Laundering of Woven and Knitted Fabrics Except Wool](#)

[TM116 Colorfastness to Crocking: Rotary Vertical Crockmeter Method](#)

¹ This performance specification is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.63 on Home Furnishings.

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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 The last approved version of this historical standard is referenced on www.astm.org.

⁴ 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 CRT Method Each Direction ^A	222 N (50 lbf) min	178 N (40 lbf) min	156 N (35 lbf) min		7.1
Bursting Force ^A				222 N (50 lbf) min	7.1.2
Tear Resistance, Elmendorf ^A Each Direction	7 N (1.5 lbf) min	7 N (1.5 lbf) min	7 N (1.5 lbf) min		7.1.3
Pilling	4.0 min	NA	NA	4.0 min	7.1.4
Dimensional Change: Durable Press (In Each Direction)	±5 % max	±5 % max	±3.5 % max	±4 % max	7.1.5
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 ^C	Grade 3.0 min	Grade 2.2 min ^B	NA	Grade 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
Shade Change	Grade 4 min ^D	Grade 4 min ^D	Grade 4 min ^D	Grade 4 min ^D	
Staining	Grade 3 min ^E	Grade 3 min ^E	Grade 3 min ^E	Grade 3 min ^E	
Crocking:					7.1.8.2
Dry	Grade 4 min ^F	Grade 4 min ^F	Grade 4 min ^F	Grade 4 min ^F	
Wet	Grade 3 min ^F	Grade 3 min ^F	Grade 3 min ^F	Grade 3 min ^F	
Light (20 AFU), Shade Change ^D	Grade 4 min ^D	Grade 4 min ^D	Grade 4 min ^D	Grade 4 min ^D	7.1.8.3
Perspiration					7.1.8.4
Shade Change	Grade 4 min ^D	Grade 4 min ^D	Grade 4 min ^D	Grade 4 min ^D	
Staining	Grade 3 min ^E	Grade 3 min ^E	Grade 3 min ^E	Grade 3 min ^E	
Flammability	Class I	Class I	Class I	Class I	7.1.9

^A There 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 9.

^B Recommended requirement for Easy Care Products which must be ironed.

^C Colorfastness and SA grade 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.

^D AATCC 9-Step Gray Scale for Color Change.

^E AATCC Gray Scale for Staining.

^F AATCC 9-Step Chromatic Transference Scale.

TM124 Smoothness Appearance of Fabrics After Home Laundering

TM135 Dimensional Changes of Fabrics after Home Laundering

TM143 Appearance of Apparel and Other Textile End Products After Home Laundering

EP1 Gray Scale for Color Change

EP2 Gray Scale for Staining

EP8 9-Step Chromatic Transference Scale

NOTE 1—Reference to documents in this specification give only the pertinent part of the designation of ASTM, AATCC, or other test methods and standards. 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).

3.1.5 *percale, n—as applied to bed sheeting*, a plain weave fabric with not fewer than 180 yarns/in.² (180 yarns/645 mm²).

3.1.6 *sheet, n—in textiles*, a large rectangular fabricated product which is used over a mattress on a bed. The product may be carded or combed yarn in a wide range of fabric constructions.

3.1.7 For definitions of other textile terms used in this specification, refer to the individual ASTM and AATCC test methods, Terminology D123 and Terminology D3136, or your dictionary.

4. Significance and Use

4.1 Upon mutual agreement between the purchaser and the supplier, woven and knitted products 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 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.