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# Standard Terminology Relating to Fabrics and Fabric Test Methods<sup>1</sup>

This standard is issued under the fixed designation D4850; 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.

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<sup>ε1</sup> NOTE—Terms from Test Method ~~D3774~~ were added editorially in August 2018.

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## 1. Scope

1.1 This terminology covers definitions of technical terms used in the industry related to textile fabrics. Terms that are generally understood or adequately defined in other readily available sources are not included. Other terminology standards that have terms related to textile fabrics are shown in 2.1

1.2 *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:<sup>2</sup>

- [D737 Test Method for Air Permeability of Textile Fabrics](#)
- [D1230 Test Method for Flammability of Apparel Textiles](#)
- [D1336 Test Method for Distortion of Yarn in Woven Fabrics](#)
- [D1388 Test Method for Stiffness of Fabrics](#)
- [D1424 Test Method for Tearing Strength of Fabrics by Falling-Pendulum \(Elmendorf-Type\) Apparatus](#)
- [D1775 Test Method for Tension and Elongation of Wide Elastic Fabrics \(Withdrawn 2000\)<sup>3</sup>](#)
- [D1776/D1776M Practice for Conditioning and Testing Textiles](#)
- [D1777 Test Method for Thickness of Textile Materials](#)
- [D2261 Test Method for Tearing Strength of Fabrics by the Tongue \(Single Rip\) Procedure \(Constant-Rate-of-Extension Tensile Testing Machine\)](#)
- [D2594/D2594M Test Method for Stretch Properties of Knitted Fabrics Having Low Power](#)
- [D2724 Test Method for Bond Strength of Bonded, Fused, and Laminated Apparel Fabrics](#)
- [D2906 Practice for Statements on Precision and Bias for Textiles \(Withdrawn 2008\)<sup>3</sup>](#)
- [D3107 Test Methods for Stretch Properties of Fabrics Woven from Stretch Yarns](#)
- [D3511/D3511M Test Method for Pilling Resistance and Other Related Surface Changes of Textile Fabrics: Brush Pilling Tester](#)
- [D3512/D3512M Test Method for Pilling Resistance and Other Related Surface Changes of Textile Fabrics: Random Tumble Pilling Tester](#)

<sup>1</sup> This terminology is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.59 on Fabric Test Methods, General Physical Test Methods A.

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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).

- [D3514/D3514M](#) Test Method for Pilling Resistance and Other Related Surface Changes of Textile Fabrics: Elastomeric Pad
- [D3773/D3773/D3773M](#) Test Methods for Length of Woven Fabric
- [D3774](#) Test Method for Width of Textile Fabric
- [D3775](#) Test Method for End (Warp) and Pick (Filling) Count of Woven Fabrics
- [D3776/D3776/D3776M](#) Test Methods for Mass Per Unit Area (Weight) of Fabric
- [D3786/D3786/D3786M](#) 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
- [D3789](#) Practice for Labeling Cans of Consumer Spray Paint (Withdrawn 1997)<sup>3</sup>
- [D3882](#) Test Method for Bow and Skew in Woven and Knitted Fabrics
- [D3883](#) Test Method for Yarn Crimp and Yarn Take-up in Woven Fabrics
- [D3884](#) Guide for Abrasion Resistance of Textile Fabrics (Rotary Platform Abrader Method)
- [D3885](#) Test Method for Abrasion Resistance of Textile Fabrics (Flexing and Abrasion Method)
- [D3886](#) Test Method for Abrasion Resistance of Textile Fabrics (Inflated Diaphragm Apparatus)
- [D3887](#) Specification for Tolerance for Knitted Fabrics (Withdrawn 2017)<sup>3</sup>
- [D3939/D3939/D3939M](#) Test Method for Snagging Resistance of Fabrics (Mace)
- [D3990](#) Terminology Relating to Fabric Defects
- [D4032](#) Test Method for Stiffness of Fabric by the Circular Bend Procedure
- [D4033](#) Test Method for Resistance to Yarn Slippage at the Sewn Seam in Upholstery Fabrics (Dynamic Fatigue Method) (Withdrawn 2001)<sup>3</sup>
- [D4034/D4034/D4034M](#) Test Method for Resistance to Yarn Slippage at the Sewn Seam in Woven Upholstery Fabrics
- [D4157](#) Test Method for Abrasion Resistance of Textile Fabrics (Oscillatory Cylinder Method)
- [D4158](#) Guide for Abrasion Resistance of Textile Fabrics (Uniform Abrasion)
- [D4390](#) Practice for Evaluation of the Performance of Terry Bathroom Products for Household Use (Withdrawn 1994)<sup>3</sup>
- [D4772](#) Test Method for Surface Water Absorption of Terry Fabrics (Water Flow)
- [D4350](#) Test Method for Corrosivity Index of Plastics and Fillers
- [D4685/D4685/D4685M](#) Test Method for Pile Fabric Abrasion
- [D4848](#) Terminology Related to Force, Deformation and Related Properties of Textiles
- [D4850](#) Terminology Relating to Fabrics and Fabric Test Methods
- [D4851](#) Test Methods for Coated and Laminated Fabrics for Architectural Use
- [D4964](#) Test Method for Tension and Elongation of Elastic Fabrics (Constant-Rate-of-Extension Type Tensile Testing Machine)
- [D4966](#) Test Method for Abrasion Resistance of Textile Fabrics (Martindale Abrasion Tester Method)
- [D4970/D4970/D4970M](#) Test Method for Pilling Resistance and Other Related Surface Changes of Textile Fabrics: Martindale Tester
- [D5034](#) Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)
- [D5035](#) Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)
- [D5103](#) Test Method for Length and Length Distribution of Manufactured Staple Fibers (Single-Fiber Test)
- [D5278/D5278/D5278M](#) Test Method for Elongation of Narrow Elastic Fabrics (Static-Load Testing)
- [D5362](#) Test Method for Snagging Resistance of Fabrics (Bean Bag)
- [D5378](#) Performance Specification for Woven and Knitted Shower Curtains for Institutional and Household Use
- [D5426](#) Practices for Visual Inspection and Grading of Fabrics Used for Inflatable Restraints
- [D5430](#) Test Methods for Visually Inspecting and Grading Fabrics
- [D5446](#) Practice for Determining Physical Properties of Fabrics, Yarns, and Sewing Thread Used in Inflatable Restraints
- [D5587](#) Test Method for Tearing Strength of Fabrics by Trapezoid Procedure
- [D5684](#) Terminology Relating to Pile Floor Coverings
- [D5793](#) Test Method for Binding Sites per Unit Length or Width of Pile Yarn Floor Coverings
- [D6207](#) Test Method for Dimensional Stability of Fabrics to Changes in Humidity and Temperature
- [D6614/D6614/D6614M](#) Test Method for Stretch Properties of Textile Fabrics – CRE Method
- [D6674](#) Guide for Proficiency Test Program for Fabrics
- [D6770](#) Test Method for Abrasion Resistance of Textile Webbing (Hex Bar Method)
- [D6797](#) Test Method for Bursting Strength of Fabrics Constant-Rate-of-Extension (CRE) Ball Burst Test

### 3. Terminology

#### 3.1 Definitions:

**abrasion**, *n*—the wearing away of any part of a material by rubbing against another surface. **D3884, D3885, D3886, D4157, D4158, D4685/D4685/D4685M, D4966**

**abrasion cycle**, *n*—one complete movement across the surface of a material.

DISCUSSION—

The complete movement for an abrasion cycle is dependent on the action of the abrasion machine and the test method used. It may consist of one back-and-forth unidirectional movement or one circular movement, or a combination of both. **D3885**

**abrasion cycle**, *n*—*for the Martindale Abrasion Tester*, 16 rubs required to complete a geometric shape, known as a Lissajous. **D4966**

**abrasion cycle**, *n*—*in abrasion testing*, one or more movements of the abradant across a material surface, or the material surface across the abradant, that permits a return to its starting position.

DISCUSSION—

The abrasion cycle is dependent on the programmed motions of the abrasion machine and the test standard used. It may consist of one back-and-forth unidirectional movement such as for the flexing and abrasion test method; a circular movement such as for the rotary platform test method, or a combination of both such as for the inflated diaphragm test method. For the oscillatory cylinder abrasion method, an abrasion cycle consists of one double-rub. See **double-rub**. **[D13.60] D4157, D6770**

**absorption**, *n*—a process in which one material (the absorbent) takes in or absorbs another (the absorbate); as the absorption of moisture by fibers. **[D13.59] D4772**

**accuracy**, *n*—*of a test method*, the degree of agreement between the true value of the property being tested (or accepted standard value) and the average of many observations made according to the test method, preferably by many observers. **[D13.60] D2906, D6674**

**air permeability**, *n*—the rate of air flow passing perpendicular through a known area under a prescribed air pressure differential between the two surfaces of a material.

DISCUSSION—

Air permeability of fabric at a stated pressure differential between two surfaces of the fabric is generally expressed in SI units as  $\text{cm}^3/\text{s}/\text{cm}^2$  and in inch-pound units as  $\text{ft}^3/\text{min}/\text{ft}^2$  calculated in operating conditions. (See **permeability**, **porosity**.) **D737**

**air-supported roof**, *n*—a fabric roof-system that is properly secured and primarily supported and held in place by air pressure. **D4851**

**architectural-use**, *n*—*in the building trade*, a descriptive term for fabrics used in fabric roof-systems or similar industrial applications. (See also **fabric roof-system**.) **D4851**

**bagging**, *n*—any material, such as fabric or other suitable material used to protect commodities during shipment and/or storage.

DISCUSSION—

Fabrics may be of the woven, knitted, or non-woven type, and are typically produced with cotton, jute, polyethylene, or polypropylene fibers. **D4850**

**batch sample**, *n*—the material(s) used for the proficiency test study taken from a common roll or garment lot and distributed to the participants. **[D13.60] D6674**

**bending length**, *n*—(1) *general*—a measure of the interaction between fabric weight and fabric stiffness as shown by the way in which a fabric bends under its own weight. It reflects the stiffness of a fabric when bent in one plane under the force of gravity, and is one component of drape; (2) *specific*—the cube root of the ratio of the flexural rigidity to the weight per unit area. **D1388**

**bias**, *n*—*in statistics*, a constant or systematic error in test results. **[D13.60] D6674**

**blister**, *n*—*in bonded, fused, or laminated fabrics*, a bulge, swelling, or similar surface condition on either the face fabric or the backing fabric characterized by the fabric being raised from the plane of the underlying component over a limited area to give a puffy appearance. **D2724**

**bond strength**, *n*—of *bonded, fused, or laminated fabrics*, the tensile force expressed in ounces per 25 mm (1 in.) of width, required to separate the component layers under specified conditions. **D2724**

**bonded fabric**, *n*—a layered fabric structure wherein a face or shell fabric is joined to a backing fabric, such as tricot, with an adhesive that does not significantly add to the thickness of the combined fabrics. (See also **laminated fabric, coated fabric**.) **D2724**

**book fold**, *n*—a fabric doubled selvage to selvage, then folded back and forth upon itself in predetermined lengths. (See also **shoe fold**.)

DISCUSSION—

When the piece is completed, the fold-edges on each side are folded once more upon themselves so that the fold-edges are inside, forming a compact package as long as one half the width of the fabric. **D4850**

**bow**, *n*—a fabric condition resulting when filling yarns or knitted courses are displaced from a line perpendicular to the selvages and form one or more arcs across the width of the fabric. (See also **double bow**.) **D3882, D3990**

**braided fabric**, *n*—a structure produced by interlacing three or more ends of yarns in a manner such that the paths of the yarns are diagonal to the vertical axis of the fabric. **D4850**

**breaking force**, *n*—the maximum force applied to a material carried to rupture (compare *breaking point, breaking strength*). **[D13.60] D3884, D3885, D4157, D4848, D5034, D5035, D6770**

**breaking load**, *n*—deprecated term. Use *breaking force*. **[D13.60] D4848, D5034**

**broken end**, *n*—in *woven fabrics*, a void in the warp direction due to yarn breakage. **D3990**

**bubble**—See preferred term *blister*. **[D13.59] D2724**

**burlap**, *n*—a coarse, heavy, plain weave fabric of yarns, such as bast or cotton fiber yarn. **D4850**

**bursting strength**, *n*—the force or pressure required to rupture a textile by distending it with a force, applied at right angles to the plane of the fabric, under specified conditions.

DISCUSSION—

The angle of application of force, and the area of the fabric upon which the force is applied varies continuously as the fabric stretches when it is tested as directed in this method. **D6797**

**bursting strength**, *n*—the force or pressure required to rupture a fabric by distending it with a force, applied at right angles to the plane of the fabric, under specified conditions. **D3786, D3786M, D3787, D3887**

**calibrate**, *v*—to determine and record the relationship between a set of standard units of measure and the output of an instrument or test procedure. **[D13.60] D6674**

**circular bend**, *n*—simultaneous, multidirectional deformation of a fabric in which one face of a flat specimen becomes concave and the other becomes convex. **D4032**

**coated fabric**, *n*—a flexible material composed of a fabric and any adherent polymeric material applied to one or both surfaces. (See also **laminated fabric**.) **D4850, D4851, D5446**

**color contrast**, *n*—in *textiles*, a general term for a visible color difference between two adjacent areas.

DISCUSSION—

For the purpose of Test Methods [D3939D3939/D3939M](#) and [D5362](#), a color contrast is a visible color difference between a snag and the immediate surrounding area of the fabric that has no defects. Color contrasts often occur when printed fabrics are snagged. [D3939D3939/D3939M](#), [D5362](#)

**constant-rate-of-extension tensile testing machine (CRE), *n***—a testing machine in which the rate of increase of the specimen length is uniform with time. [D6797](#)

**constant-rate-of-extension type tensile testing machine (CRE), *n***—*in tensile testing*, an apparatus in which the pulling clamp moves at a uniform rate, and the force-measuring mechanism moves a negligible distance with increasing force, less than 0.13 mm (0.005 in.). [D3787](#)

**constant-rate-of-load (CRL) tensile testing machine**—a testing machine in which the rate of increase of the load being applied to the specimen is uniform with time after the first 3 s. [\[D13.60\]](#) [D4964](#), [D5035](#), [D5034](#)

**constant-rate-of-traverse (CRT) tensile testing machine**—a testing machine in which the pulling clamp moves at a uniform rate and the load is applied through the other clamp which moves appreciably to actuate a weighing mechanism, so that the rate of increase of load or elongation is dependent upon the extension characteristics of the specimen. [\[D13.60\]](#) [D3787](#), [D5035](#), [D5034](#)

**corduroy, *n***—a filling cut-pile fabric in which the cut fibers form a surface of wales (rounded cords or ribs) which usually run warpwise. [D4685D4685/D4685M](#), [D4850](#)

**count, *n***—*in woven fabric*, the number of warp yarns (ends) and filling yarns (picks) per unit distance as counted while the fabric is held under zero tension, and is free of folds and wrinkles. [D3775](#)

**count, *n***—*in knitted fabrics*, the number (counted units) of wale loops and course loops per 25 mm (1 in.). [D3787](#)

**course, *n***—*in knitted fabrics*, a row of successive loops in the width direction of the fabric. [D2594D2594/D2594M](#)

**crack mark, *n***—*in bonded, fused, or laminated fabrics*, a sharp break or crease in the surface contour of either the face fabric or the backing fabric that becomes evident when the bonded, fused, or laminated composite is rolled, bent, draped, or folded. [\[D13.54\]](#) [D2724](#)

**crease retention, *n***—that property of a fabric which enables it to maintain an inserted crease. [D4850](#)

**critical defect, *n***—a serious defect that judgment and experience indicate is likely to prevent the usability or proper performance of a product from its intended purpose. [D5430](#)

**cross-machine direction, CD, *n***—the direction in the plane of the fabric perpendicular to the direction of manufacture.

DISCUSSION—

This term is used to refer to the direction analogous to coursewise or filling direction in knitted or woven fabrics, respectively. [\[D13.59, D13.60\]](#) [D737](#), [D1388](#), [D1424](#), [D1777](#), [D2261](#)

**cut, *n***—*as applied to woven fabric*, a length approximately 60 yard in the greige. [D4850](#)

**cut strip test, *n***—*in fabric testing*, a strip test in which the specimen is cut to the specified testing width. [D5035](#)

**cycle, *n***—16 movements required for the completion of one Lissajous figure on a Martindale tester. [\[D13.60\]](#) [D4970D4970/D4970M](#)

**cycle**, *n*—in the Martindale tester, the sixteen movements required to complete one Lissajous figure. **[D13.60] D4966**

**defect**, *n*—in inspection and grading, the departure or non-conformance of some characteristic from its intended level or state.

DISCUSSION—

In inspection and grading the characteristic is usually a visual one. However, defects such as heat damage or poorly finished textiles grading by hand may be required. **D5430**

**denim**, *n*—a durable woven twill fabric, usually of all cotton or a blend of cotton and manufactured fibers, made from a variety of yarn numbers, and in various fabric weights, colors, designs, and finishes. **D4850**

**dimensional change**, *n*—a generic term for changes in length, width, or thickness of a specimen subjected to specified conditions.

DISCUSSION—

Dimensional change is usually expressed as a percent of the original dimension of the specimen. When a dimension increases it is often referred to as growth. When a dimension decreases it is often referred to as shrinkage. **D4850**

**dimensional stability**, *n*—the ability of a material to retain its length and width dimensions under specified conditions.

DISCUSSION—

The dimensions are length and width and the specified conditions are those of cycled humidity and temperature. **D6207**

**direction of slippage**, *n*—at the seam, the line of movement parallel to either the filling or the warp on a woven fabric in which minimum force is required to produce yarn slippage.

DISCUSSION—

The fabric may be pulled in both directions in many cases. **D4034D4034/D4034M**

**distortion**, *n*—in fabrics, a general term for a visible defect in the texture of a fabric.

DISCUSSION—

For the purpose of Test Methods **D3939D3939/D3939M** and **D5362**, snags are composed of different combinations of protrusions and distortions. A distortion is characterized by a group of fibers, yarn, or a yarn segment that is displaced from its normal pattern so that there is a visible change in the texture of the fabric; however, the displaced group of fibers, yarn, or yarn segment does not extend above the fabric surface. Distortions include conditions where (1) tension on a snagged yarn has changed the size of some loops within a knitted fabric and the result is a pucker on the surface of the fabric, and (2) tension on a snagged yarn has caused a yarn to break off within a woven fabric and the result is a change in the texture where the yarn used to be. **D3939D3939/D3939M, D5362**

**double bow**, *n*—two fabric bows, arcing in the same direction, as in a flattened M or W depending on the viewing angle. (Compare **double reverse bow** and **double bow**.)

DISCUSSION—

In tubular knits, there may be differential bowing between the top and the bottom of the tube. **D3882, D3990**

**double hooked bow**, *n*—one hooked bow at each side of the fabric that arc in opposite directions. (See also **hooked bow**.) **D3882, D3990**

**double reverse bow**, *n*—two fabric bows arcing in opposite directions. (See also **bow**. Compare **double bow**.) **D3882**

**double-rub**, *n*—in oscillatory cylinder abrasion testing, one forward and one backward motion required to complete one cycle. **[D13.60] D4157**

**double-stroke**, *n*—in flex and abrasion testing, an abrasion cycle that consists of one forward and one backward motion. **D3885**

**duck**, *n*—a compact, firm, heavy, plain-weave cotton fabric, mass per square yard 6 to 50 oz. (See also **flat duck**, and **plied yarn duck**.) **D4850**



**durable-press**, *adj*—having the ability to retain substantially the initial shape, flat seams, pressed-in creases, and unwrinkled appearance during use and after laundering or drycleaning. (See **wash and wear**.)

DISCUSSION—

The use of the term **permanent-press**, *adj*, as a substitute for **durable-press** is not recommended.

**D4850**

**elastic fabric**, *n*—a fabric made from an elastomer either alone or in combination with other textiles.

DISCUSSION—

At room temperature an elastic fabric will stretch under tension and will return quickly and forcibly to substantially its original dimensions and shape when tension is removed.

Elastic fabrics may be manufactured by weaving, braiding, knitting, or other processes.

**D1775, D4850, D4964**

**elastic tape**, *n*—a tape containing rubber or other elastomers to permit rubber-like stretch in at least one direction. **D4850**

**elastic webbing**, *n*—a webbing containing rubber or other elastomers to permit rubber-like stretch in at least one direction. **D4850**

**elongation**, *n*—the ratio of the extension of a material to the length of the material prior to stretching, expressed as a percent. **[D13.60] D4848, D4964, D5034, D5035**

**elongation**, *n*—the ratio of the extension of a material to the length of the material prior to stretching. (Compare extension.) **[D13.59] D4848, D5278/D5278M**

**end**, *n*—*in woven fabric*, an individual warp yarn (single or ply) or cord. **D3775**

**end count**, *n*—*in woven fabric*, the number of individual warp yarns per inch of fabric regardless of whether they are comprised of single or plied components **D3775**

**extension**, *n*—the change in length of a material due to stretching. **[D13.59, D13.60] D4848, D4964, D5034**

**extension-recovery cycle**, *n*—*in tension testing*, the continuous extension of a specimen, with a momentary hold at a specified extension, followed by a controlled rate of return to zero extension. **[D13.59] D4848, D4964**

**fabric**, *n*—*in textiles*, a planar structure consisting of yarns or fibers. **D737, D1388, D1424, D3787, D4850, D5587, D6797**

**fabric growth**, *n*—*in stretch testing*, the increase in the original dimension of a specimen after the application of a specified force for a prescribed time and subsequent removal of the force. (Compare **fabric stretch**.)

DISCUSSION—

Fabric growth is usually expressed as a percentage of the specimen prior to application of force (see also **permanent deformation**).

**fabric roof-system**, *n*—a system of coated fabric or laminated fabric along with support cables, edge ropes, clamps, neoprene, roof drains, arch wear strips, and anchor bolts that constitutes the outside top covering of a building. **D4851**

**fabric stretch**, *n*—the increase in the dimension of a specimen of fabric resulting from a force applied under specified conditions. (Compare **elongation, extension, fabric growth**.)

DISCUSSION—

The difference is usually expressed as a percentage of the initial dimension of the specimen.

**fatiguing force**, *n*—*in testing sewn seams*, the force that is repeatedly applied to a test specimen. **D4033**

**filler**, *n*—*in testing sewn seams*, nonfibrous material, such as insoluble clays or gypsum, together with starches, gums, and so