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Standard Terminology for Cotton Fibers[1]

This standard is issued under the fixed designation D7139; 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.

~~ε^1 NOTE—The terms "lot" and "lot sample" were removed editorially in September 2013.~~

1. Scope

1.1 This standard is the compilation of all terminology developed by Subcommittee D13.11 on Cotton Fibers.

1.2 This terminology is unique to the Cotton Fibers industry. Meanings of the same terms used outside the industry can be found in other compilations or in dictionaries of general usage.

1.3 In addition to being a specialized dictionary, D7139 is also a tool for managing the Subcommittee's terminology. This includes finding, eliminating, and preventing redundancies, that is, where two or more terms relating to the same concept are defined in different words.

1.4 Terms listed are under the jurisdiction of Subcommittee D13.11.

1.5 For definitions of other textile terms see Terminology D123.

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
D1440 Test Method for Length and Length Distribution of Cotton Fibers (Array Method)
D1442 Test Method for Maturity of Cotton Fibers (Sodium Hydroxide Swelling and Polarized Light Procedures)
D1445 Test Method for Breaking Strength and Elongation of Cotton Fibers (Flat Bundle Method)
D1447 Test Method for Length and Length Uniformity of Cotton Fibers by Photoelectric Measurement
D1448 Test Method for Micronaire Reading of Cotton Fibers (Withdrawn 2020)[3]
D1464 Practice for Differential Dyeing Behavior of Cotton
D1684 Practice for Lighting Cotton Classing Rooms for Color Grading
D2495 Test Method for Moisture in Cotton by Oven-Drying

[1] This terminology is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.11 on Cotton Fibers.

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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.

D2496 Test Method for Seed Coat Fragments and Funiculi in Cotton Fiber Samples (Withdrawn 1986)[3]
D2812 Test Method for Non-Lint Content of Cotton
D3025 Practice for Standardizing Cotton Fiber Test Results by Use of Calibration Cotton Standards
D3990 Terminology Relating to Fabric Defects
D5332 Test Method for Fiber Length and Length Distribution of Cotton Fibers (Withdrawn 2006)[3]
D5426 Practices for Visual Inspection and Grading of Fabrics Used for Inflatable Restraints
D5867 Test Methods for Measurement of Physical Properties of Raw Cotton by Cotton Classification Instruments
D7642 Practice for Establishment of Calibration Cottons for Cotton Classification Instruments
D7785 Test Method for Water in Lint Cotton by Oven Evaporation Combined with Volumetric Karl Fischer Titration

3. Terminology

A-tuft, *n*—a single-pass process for aligning hook free fibers on the Fibroliner FL-101. **D5332**

amount, *n—in cotton length testing with the Fibrograph (optical) or Length Analyzer (pneumatic)*, a measure of the thickness, optical or pneumatic density, of the test beard, proportional to the number of fibers present at various distances from the base of the comb(s) (Fibrograph) or the specimen clamp jaws (Length Analyzer). **D5867**

amount, *n—in cotton length testing with the Fibrograph*, a measure of the thickness, or optical density, of the test beard, proportional to the number of fibers present at various distances from the base of the comb(s). **D1447**

B-tuft, *n*—a two-pass process for aligning hooked fibers on the Fibroliner FL-101. **D5332**

blending plan, *n*—the instructions for mixing fibers during specimen preparation. **D5332**

bound water, *n*—the amount of water in a test specimen that is hydrogen bonded to cellulose and expressed as a percentage of the mass of the specimen. **D7785**

calibration cotton standards, *n*—cotton samples taken from blended bulk source on which fiber properties have been determined under the International Calibration Cotton Standards Program. **D1448, D3025, D5867**

calibration cotton standards, *n*—bales of cotton with established values of micronaire, length, uniformity index and breaking tenacity (strength) for the purpose of calibrating cotton classification instruments for length, uniformity index and breaking tenacity (strength). **D7642**

candidate bale, *n*—bale of saw ginned cotton selected for potential use as a calibration cotton standard. **D7642**

coefficient of length variation, *n*—a measure of fiber length distribution. **D1440, D5332**

color grading, *n*—the act of identifying a specimen by a color grade or color score that is specific to the color and the material graded. **D1684**

color lamp, *n—in color determination of cotton with a Color Meter*, a lamp with a specific energy output function used in conjunction with special tristimulus filters to obtain a desired response function. **D5867**

color meter, *n*—an instrument which measures the fiber sample color as presented in the viewing window, in terms of the tristimulus values Y and Z and transmits these values to the IC/TC for further processing. **D5867**

color space, *n—specific to this standard*, the daylight color of opaque specimens are represented by points in a space in terms of three color scales: reflectance, R_d, and the chromaticity coordinates for redness or greenness, $\pm a$, and yellowness or blueness, $\pm b$.

comber/brusher, *n*—an instrument which prepares the test beard of fibers for length, length uniformity, strength, and elongation measurements by combing the test specimen to remove loose or unclamped fibers and paralleling the individually clamped fibers, and by brushing the clamped fibers to remove fiber crimp and smooth the test beard of cotton. **D5867**

control limits, *n*—predetermined ranges based on the variability of past observations between which the instrument data for a test must fall to be considered valid. **D5867**

cotton, *n*—a vegetable seed fiber consisting of unicellular hairs attached to the seed of several species of the genus *Gossypium* of the family Malvaceae. **D1445**

cotton color diagram, *n*—a diagram showing the color ranges of standards officially established by the U.S. Department of Agriculture for the various grades of cotton in relation to scales of reflectance. R_d, on the vertical axis, and yellowness, + *b*, on the horizontal axis. **D5867**

cotton maturity, *n*—the degree of fiber wall development. **D1442**

cotton waste, *n*—material removed from seed cotton, ginned lint, or stock in process by any cleaning or processing machinery and usually consisting of undesirable fibers or a mixture of cotton fibers with foreign matter. **D2495**

differential dyeing behavior, *n—of cotton*, the tendency of cotton fibers to absorb and retain selectively varying proportions of different dyes from a binary dye bath. **D1464**

elevator, *n*—a general term describing a mechanical device on the Motion Control, Inc. Fiber Information System which moves the specimen clamp while preparing the specimen or while taking a length/uniformity index or strength/elongation measurement. **D5867**

elongation at breaking force, *n—in fiber strength testing of cotton*, the elongation corresponding to the maximum force, and expressed as a percentage of the 1/8-in. (3.2-mm) gage length. **D1445, D5867**

extra long staple cotton, *n*—also known as Pima cotton, cotton that is of the gossypium barbadense species which is characterized by longer, stronger and finer fibers compared to Upland cotton. **D7642**

fanhead, *n*—the process of removing one half of the bands from one end of a cotton bale to expand (swell out) the layers of the bale in order to facilitate bale sampling. **D7642**

fanheading, *n*—the process of removing one half of the bands from one end of a cotton bale to expand (swell out) the layers of the bale in order to facilitate bale sampling. **D7642**

Fiberweigh, *n*—an instrument having a capacity for weighing a 51-grain (3.30-g) specimen with a sensitivity of at least 0.2 % of the mass being weighed. **D5867**

fibrogram, *n—in testing cotton fibers for length*, the curve representing the second cumulation of the length distribution of the fibers sensed by the length measuring instrument in scanning the fiber board. **D5867**

fibrogram, *n—in cotton length testing with the Fibrograph*, the curve representing the second cumulation of the length distribution of the fibers sensed by the length measuring instrument in scanning the fiber board. **D1447**

Fibronaire, *n*—an instrument which determines the micronaire reading of raw cotton fibers using the “porous-plug” air flow technique. **D5867**

foreign matter, *n*—in cotton, non-lint material commonly referred to as waste or trash such as dust, sand, seed-coat fragments, leaves, and stems normally present in raw and partially processed cotton. **D2812, D5426**

free water, *n*—the amount of water in a test specimen that is hydrogen bonded to other water in cellulose and expressed as a percentage of the mass of the specimen.

DISCUSSION—

Free water in cellulose freezes. A distinction of bound water into the freezing and non-freezing kinds is not necessary. Both kinds of bound water, if present, come off the fibers since no residual water can be detected. **D7785**

ginned lint, *n*—cotton fibers that have been separated from their seeds by ginning but not subjected to any further processing after ginning. (See **lint cotton**.) **D2495**

hooks, *n—in fiber testing*, curved or bent fiber ends caused by the carding or specimen preparation processes. **D5332**

horseshoe, *n*—a length of sliver folded in a manner such that the two ends can be fed simultaneously into the needle field of the Fibroliner FL-101. **D5332**

IC/TC, *n*—abbreviation for Intelligent Color/Trash Coordinator. **D5867**

IDT, *n*—abbreviation for Intelligent Data Terminal. **D5867**

illumination, *n—in lighting*, the density or flux of light on a unit area of surface. **D1684**

immature fibers, *n*—(*1*) (cotton fibers treated with sodium hydroxide solution)—fibers that either (*a*) have swollen and assumed a spiral form, or (*b*) remained flat, thinly outlined, and almost transparent. Total wall width is less than the lumen width. (*2*) (cotton fibers observed under polarized light)—fibers that appear purple, indigo, or blue, turn orange or yellow-orange upon rotation to the subtractive position, and upon removal of the selenite plate show parallel extinction. (Compare **mature fibers**.) **D1442**

invisible waste, *n—in cotton testing*, weight loss due to dust, moisture, loose fibers, etc., carried away by the air stream during the test. **D2812**

length (for cotton classification), *n*—an industry term for upper half mean length reported in millimeters or inches. **D7642**

length analyzer, *n*—an instrument which determines the upper-half-mean length and length uniformity index of a test beard of cotton. **D5867**

length group, *n*—all fibers, or pulls, whose lengths fall within a given length interval. **D1440**

length interval, *n*—a class interval of ⅛ in. (3 mm), usually designated by its midpoint length in odd-numbered sixteenths of an inch. **D1440**

lint, *n—in loose cotton*, fibers mostly of spinnable length. (See also **linters**.) **D2812**

lint content, *n*—that portion of a mass of cotton fiber consisting of fiber, including normal moisture content, but excluding foreign matter. **D2812**

lint cotton, *n*—loose cotton fibers in any form, either raw or processed, free of seeds and not bound together in yarn or fabric. (See also **ginned lint**.) **D2495**

linters, *n*—the short fibrous material adhering to the cotton seed after the spinnable lint has been removed by ginning and which is subsequently recovered from the seed by a process called "delinting." D5867

lumen, *n—in vegetable fibers*, the central canal of the fiber. D1442

mature fibers, *n—cotton fibers treated with sodium hydroxide solution*—fibers that have swollen into unconvoluted and almost rod-like shapes, where total wall width is equal to or greater than the lumen width. D1442

mature fibers, *n—cotton fibers observed under polarized light*—fibers that appear yellow, yellow green, or green and are yellow or light yellow upon rotation to the subtractive position (through 90°) and show little or no parallel extinction on removal of the selenite plate. (Compare **immature fibers**.) D1442

maturity index, *n*—a relative indication of cotton fiber maturity.

mean length, *n—in testing of cotton fibers*, the average length of all the fibers in the test specimen based on mass-length data. D1440, D1447

micronaire reading, *n*—a relative measurement of fiber fineness derived from the porous plug air-flow method. D1442, D1448, ~~D 5867~~D5867

mote, *n*—a whole, immature cotton seed. D2496, ~~D 5867~~D5867

non-lint content, *n*—that portion of a mass of cotton fiber which is essentially foreign matter. D2812

number of pieces of trash, *n—in testing cotton with the Trash Meter*, a number correlated with the total number of pieces of trash on the surface of the sample of cotton over the viewing window. D5867

one-percent length (L1 %N), *n—in fiber testing*, the length exceeded by 1 % of the number of fibers in a test specimen. D5332

percent area, *n—in testing cotton with the Trash Meter*, the ratio of total area of trash on the surface of a sample of cotton to that of the area of the viewing window, expressed in a percentage of the area of the viewing window. D5867

pull, *n*—a group of fibers grasped by the forceps at one time and drawn from the specimen in the combs. D1440

ratch-setting by number (L1 % N), *n*—the basis for setting roll spacing in the drafting zone, namely, the length exceeded by 1 % of the number of fibers in a test specimen. D5332

raw cotton, *n*—ginned lint that has not been subjected to any textile manufacturing process. (See also **ginned lint**.) D2495

R_d and +b, *n—for the purpose of this test method for color*, the daylight color of opaque cotton specimens represented by points in a space as described by Hunter in terms of two color scales: reflectance, R_d, and the chromaticity coordinates for yellowness, + *b*. D5867

reference standard, *n—in cotton testing*, a homogeneous lot of cotton having a known or accepted value for one or more physical properties. D3025

ringer cotton, *n*—bale of saw ginned cotton with established values referenced to the benchmark cottons for the purpose of assuring consistency in the establishment of calibration cotton standards between value settings. D7642