Designation: D1447 – 07 (Reapproved 2012)ε1

Standard Test Method for Length and Length Uniformity of Cotton Fibers by Photoelectric Measurement[1]

This standard is issued under the fixed designation D1447; 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—The terminology section was updated in July 2012.

1. Scope

1.1 This test method covers the measurement of the length and length uniformity of cotton fibers by use of photoelectric measurement. The test method is applicable to fibers taken from raw or partially processed cotton (up to card mat) or some types of cotton waste, but not to fibers from blends of cotton with other fibers or to fibers recovered from cotton yarns, fabrics or to 100 % synthetic fibers.

1.2 This test method is especially adapted for determining the length and length uniformity of cotton fibers by models of the Digital Fibrograph, hereafter referred to as Fibrograph.

NOTE 1—Instructions for the use of Manual and Servo Fibrograph Models were included in the text of Test Method D1447 in 1971 and previous editions.

NOTE 2—For other methods covering the measurement of the length of cotton fibers refer to Test Method D1440.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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:*[2]

D123 Terminology Relating to Textiles
D1440 Test Method for Length and Length Distribution of Cotton Fibers (Array Method)
D1441 Practice for Sampling Cotton Fibers for Testing
D1776 Practice for Conditioning and Testing Textiles
D3025 Practice for Standardizing Cotton Fiber Test Results by Use of Calibration Cotton Standards
D7139 Terminology for Cotton Fibers

3. Terminology

3.1 For all terminology related to D13.11, refer to Terminology D7139.

3.1.1 The following terms are relevant to this standard: fibrogram, mean length, uniformity index, upper-half-mean length.

3.2 For all other terminology related to textiles, refer to Terminology D123.

4. Summary of Test Method

4.1 Fibers are placed on comb(s) in such a way that they are caught at random points along their lengths to form a beard. The beard is scanned photoelectrically from base to tip, the amount of light passing through the beard being used as a measure of the number of fibers that extend various distances from the comb(s).

4.2 The Fibrograph shows the amount and the length readings from the Fibrogram being sensed on separate dials.

5. Significance and Use

5.1 This test method is considered satisfactory for acceptance testing when the levels of the laboratories are controlled by the use of the same reference standard cotton samples because the current estimates of between-laboratory precision are acceptable under these conditions. If there are differences of practical significance between reported test results for two laboratories (or more), comparative tests should be performed to determine if there is a statistical bias between them, using competent statistical assistance. As a minimum, ensure the test samples to be used are as homogeneous as possible, are drawn from the material from which the disparate test results were obtained, and are randomly assigned in equal numbers to each laboratory for testing. The test from the two laboratories should be compared using a statistical test for unpaired data, at a probability level chosen prior to the testing series. If a bias is

[1] This test method 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.

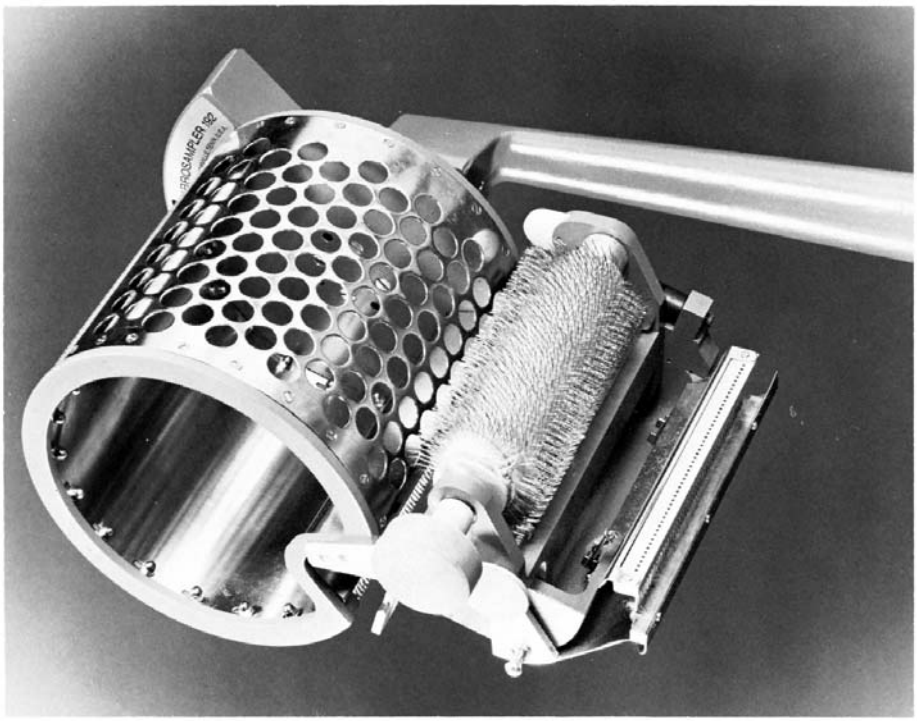

FIG. 1 Fibrosampler

found, either its cause must be found and corrected, or future test results for that material must be adjusted in consideration of the known bias.

5.2 Fibrograph measurements provide a relatively fast method for determining the length and length uniformity of the fibers in a sample of cotton in a reproducible manner.

5.3 Results of the Fibrograph length tests do not necessarily agree with those obtained by other methods for measuring lengths of cotton fibers because of the effect of fiber crimp and other factors.

5.4 Fibrograph tests are more objective than commercial staple length classifications and also provide additional information on fiber length uniformity of cotton fibers. The cotton quality information provided by these results is used in research studies and quality surveys, in checking commercial staple length classifications, in assembling bales of cotton into uniform lots, and for other purposes.

5.5 Fibrograph measurements are based on the assumptions that a fiber is caught randomly along its length.

6. Apparatus

6.1 *Fibrograph,*[3] digital model, with accessory equipment as shown in Fig. 2.

6.2 *Fibrosampler,* for the preparation of test specimens (required) as shown in Fig. 1.

[3] Instruments and accessories meeting these requirements may be obtained from Uster Technologies, Inc., 456 Troy Circle, P. O. Box 51270, Knoxville, TN 37919-1270.

7. Sampling

7.1 *Division into Lots*—For acceptance testing purposes, the purchaser and the supplier shall agree on what material constitutes a lot.

7.2 *Lot Sample*—As a lot sample for acceptance testing, take at random the number of shipping containers directed in an applicable material specification or other agreement between the purchaser and the supplier, such as an agreement to use Practice D1441.

7.3 *Laboratory Sample*—As a laboratory sample for acceptance testing, select and prepare a 30 to 50 g subsample from each of the shipping containers in the lot sample, proceeding as directed in Practice D1441 using either the blended sample procedure or the subsample procedure as agreed between the purchaser and the supplier.

7.4 *Test Specimens*—As directed in Section 10, prepare either two or four specimens from each subsample in the laboratory sample. For acceptance testing, test either two or four specimens from each subsample in the laboratory sample as agreed between the purchaser and the supplier.

8. Preparation and Adjustment of Apparatus

8.1 Set up the Fibrograph and adjust it as directed in the manufacturer's instructions for the model being used.

8.2 Set up and adjust the Fibrosampler as directed in the manufacturer's instructions.

8.3 Before making Fibrograph length tests, allow the instrument to warm up until it is electronically stable (5 minutes),