Designation: D1441 – 12

Standard Practice for Sampling Cotton Fibers for Testing[1]

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1. Scope

1.1 This practice covers procedures for taking a lot sample of cotton fibers, from a designated source (lot), and reducing the lot sample through a series of steps to produce test specimens that are representative of the source and suitable for the determination of fiber properties according to established procedures.

1.2 This practice has been used extensively for commercial acceptance testing of cotton fibers as well as for arbitration testing and research.

NOTE 1—This practice is used in taking samples of cotton for testing by Test Methods D1440, D1442, D1445, D1447, D1448, D1464, D2480, D2812, D5866 and D5867.

1.3 The procedures do not cover the selection of samples for the determination of moisture. Special handling and protection of the sample from the prevailing atmosphere required for samples taken for the determination of moisture are not provided for in this practice. See Test Method D2495.

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

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]

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

D1464 Practice for Differential Dyeing Behavior of Cotton

D1776 Practice for Conditioning and Testing Textiles

D2480 Test Method for Maturity Index and Linear Density of Cotton Fibers by the Causticaire Method (Withdrawn 1992)[3]

D2495 Test Method for Moisture in Cotton by Oven-Drying

D2812 Test Method for Non-Lint Content of Cotton

D5866 Test Method for Neps in Cotton Fibers (AFIS-N Instrument)

D5867 Test Methods for Measurement of Physical Properties of Raw Cotton by Cotton Classification Instruments

D7139 Terminology for Cotton Fibers

3. Terminology

3.1 For all terminology relating to D13.11, Cotton Fibers, refer to Terminology D7139.

3.1.1 The following terms are relevant to this standard: laboratory sample, lot, in acceptance sampling of cotton, lot sample, in cotton, and specimen.

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

4. Summary of Practice

4.1 Sampling procedures for obtaining samples from the lot and for the reduction of the lot samples to the size required for fiber test specimens are presented. Steps are outlined to secure reduction of the amount of cotton fibers to be handled at various stages, so that the reduced sample continues to be representative of the lot. Provision is made for the omission of intermediate steps in the reduction of the lot sample in cases where this is desirable or necessary (see 13.1).

5. Significance and Use

5.1 The reliability of the results of any test method depends primarily upon how well the specimens tested represent the

[1] This practice 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.

original source material or lot. Failure to provide a test specimen which accurately represents the lot from which it is drawn will produce misleading test results regardless of the accuracy and precision of the test method.

6. Apparatus

6.1 *Mechanical Fiber Blender,*[4] designed especially for cotton fibers (optional).

6.2 *Balance,* 100 g capacity, 0.5 g sensitivity (optional).

7. Conditioning

7.1 For laboratory samples that are not to be blended, neither preconditioning or conditioning is required.

7.2 For laboratory samples that are to be blended, bring the lot sample from the prevailing atmosphere to moisture equilibrium with the standard atmosphere for testing textiles as directed in Practice D1776. Preconditioning is not required.

8. Lot

8.1 Unless there is information to the contrary, consider all the cotton fiber in a single shipment or consignment as a single lot for sampling purposes. If the shipment or consignment contains cotton fiber from two or more sources, consider the material from each source as a separate lot.

9. Lot Sample

9.1 *Acceptance Testing*—Take at random from the shipment the number of containers as directed in an applicable material specification or other agreement between the purchaser and the supplier as a lot sample. In the absence of such an agreement, take ten shipping containers or 10 % of the shipping containers in the lot, whichever is the greater. Individual or multiple bales may be considered as a lot.

NOTE 2—An adequate specification or other agreement between the purchaser and the supplier requires taking into account the variability between shipping containers.

9.2 *Other Testing*—Select the lot sample to meet the requirements of the particular experimental design or purpose of the fiber tests desired. Select the lot sample in such a manner that it will be as uniform and homogeneous as practical, on the basis of available information. If the lot sample is non-homogeneous, divide it into rational subgroups; for example, individual bales in a commercial shipment.

9.2.1 Take portions of cotton fiber from different parts of the source carefully and at random to provide a composite lot sample of sufficient size. Approximately 100 g is sufficient for most tests.

10. Laboratory Sample

10.1 *Acceptance Testing:*

10.1.1 For bales, take a 100 g subsample of cotton from opposite sides of each bale in the lot and combine the two subsamples into a single laboratory sample weighing 200 g.

10.1.2 For sliver, beginning with the first material from the lead end of the package that has a clean, uniform appearance, take a length weighing at least 100 g as the laboratory sample. If the shipping containers in the lot sample contain multiple packages, take a laboratory sample from one package drawn at random for each container.

10.2 *Other Testing*—From each unit in the lot sample, take a single laboratory sample containing at least 100 g.

11. Laboratory Sample Preparation

11.1 After the laboratory samples have been taken as directed in Section 10, spread the material into a thin layer or manipulate it in such a way that fibers are taken from all locations.

11.1.1 When the lot sample consists of samples cut from bales (Note 5), avoid the inclusion of any cut fibers in the laboratory sample. Cut fiber can be avoided by pulling off and discarding the cut portions or by being careful not to take the test specimen from the cut edges.

12. Blended Method (Preferred)

12.1 Take 25 to 30 pinches of loose fibers at random throughout the laboratory sample weighing approximately 30 g (Note 3). Blend the composite laboratory sample by preparing either a hand sliver or a mechanically blended sliver as follows:

12.1.1 *Hand Sliver*—With a drawing or drafting action of the fingers, pull each of the tufts or pinches into a long uniform strand. Lay the strands parallel to each other and compress the whole mass gently to form one large composite sliver. Discard the ends of the sliver as there is a possibility of bias existing in this portion.

12.1.2 *Mechanically Blended Sliver*—Slightly draw or draft the pinches to form a bat or sliver about 300 mm long to be fed into the mechanical fiber blender. Use any mechanical blender designed for cotton fibers that will produce a substantially homogeneous sample without breaking, or damaging the fibers to the extent that the accuracy of the test methods would be affected (Note 4).

NOTE 3—A laboratory sample weighing 30 g will provide sufficient material for most fiber tests. When a smaller amount is sufficient for the tests, the size of the pinches may be reduced accordingly. The number of pinches may be reduced when the bulk lot sample is sufficiently homogeneous for a smaller number to preserve representativeness.

NOTE 4—Most mechanical blending procedures require that the sample be passed through the blender three times to ensure adequate mixing.

13. Unblended Method (Alternative)

13.1 Divide the whole or representative portions of the lot sample into laboratory samples on the basis of available information. From each laboratory sample take test specimens for one or more observations of each property to be tested as required (Note 5).

NOTE 5—This method is especially adapted to commercial practice where the laboratory sample consists of classer's samples cut from bales of cotton. Laboratory samples are taken in such a manner as to ensure that fibers from each layer in the classer's sample, representing each side of the bale, are included.

[4] Commercially available.

14. Test Specimens

14.1 Take from each laboratory sample the number of specimens specified in the applicable test method(s). When directed in the test method, use the laboratory sample as the test specimen.

15. Report

15.1 If a report on the sampling procedure used is required, state that the material was sampled as directed in ASTM Practice D1441, and specify how the samples were drawn, whether or not they were blended, and the number of pieces (pinches) taken from the larger sample to make the laboratory sample and the number of specimens taken. Report the identification of the lot or shipment sampled, and note the lot number, or bale number.

16. Keywords

16.1 cotton; fibers; sampling