



Standard Test Method for Fiber Length and Length Distribution of Cotton Fibers¹

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1. Scope

1.1 This test method can be used to determine the fiber length and length distribution of staple fibers of 100 mm (4 in.) or less, using the Fiber Length Measuring Unit AL-101. It includes determination of the fiber length parameters for loose fibers, carded slivers, drawn slivers, finisher slivers, combed slivers, and roving.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *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.* For specific precautionary statements, see 8.1.

2. Referenced Documents

2.1 ASTM Standards:

D 123 Terminology Relating to Textiles²

D 1440 Test Method for Length and Length Distribution of Cotton Fibers (Array Method)²

D 1441 Practice for Sampling Cotton Fibers for Testing²

D 1776 Practice for Conditioning Textiles for Testing²

3. Terminology

3.1 *Definitions*—For definitions of textile terms used in this test method other than those listed below, refer to Terminology D 123.

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

3.1.1.1 *Discussion*—The standard deviation expressed as a percent of the mean length.

3.1.2 *length distribution, n*—of fibers, a graphic or tabular presentation of the proportion or percent (by number or weight) of fibers having different lengths.

3.1.3 *short-fiber content (SFC), n*—that percent of fibers (by number or weight) in a test specimen that is shorter than 12.5 mm (0.5 in.) in length.

3.1.4 *upper-quartile length (UQL), n*—that length that is exceeded by 25 % of the fibers by either weight or number in a test specimen.

3.2 Definitions of Terms Specific to This Standard:

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

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

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

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

3.2.5 *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.

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

3.2.7 *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.

3.2.8 *test beard, n*—in length testing of cotton, the portion of the test specimen that has been combed and brushed into a “beard” that protrudes from the outside of the comb(s) or clamp(s).

4. Summary of Test Method

4.1 Lay loose fibers parallel to form a laboratory sample for processing on the Fibroliner FL-101. Feed the laboratory sample into the needle field of the FL-101. The FL-101 straightens and aligns the fiber to form a test specimen. Transfer the straightened and aligned test specimen to the Fiber Length Measuring Unit AL-101. Protected between two foils, the drawer moves the test specimen through the condenser (capacitor) slot. The condenser scans the fibers of the test specimen every 0.125 mm (0.005 in.). The fiber-length distributions and all length parameters of the fiber in the test specimen are computed from these data. All data can be read from the built-in display or printed with the printer.

5. Significance and Use

5.1 This test method provides objective measurements for fiber length and length distribution in a sample of short-staple fibers. The results of the fiber distribution are presented on the

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² *Annual Book of ASTM Standards*, Vol 07.01.