



Designation: D 5866 – 95

## Standard Test Method for Neps in Cotton Fibers (AFIS-N Instrument)<sup>1</sup>

This standard is issued under the fixed designation D 5866; 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.

### 1. Scope

1.1 This test method covers the quantity and size of neps in cotton using the AFIS-N instrument.

1.2 This test method is intended primarily for testing raw and processed cotton fibers.

1.3 The values stated in SI units are to be regarded as the 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:*

D 123 Terminology Relating to Textiles<sup>2</sup>

D 1441 Practice for Sampling Cotton Fibers for Testing<sup>2</sup>

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method<sup>3</sup>

### 3. Terminology

3.1 *Definitions:*

3.1.1 *nep, n*—one or more fibers occurring in a tangled and unorganized mass.

3.2 For definitions of other textile terms in this test method, refer to Terminology D 123.

### 4. Summary of Test Method

4.1 Fibers in a specimen are individualized and cleaned by an aeromechanical separator, then transported by an airstream to an optical sensor. Fibers and neps pass through an infrared light source. The scattered light is measured by detectors located at optimum angles to the light source. The detected light from the fibers and neps generate voltages and respective waveforms.

4.2 The AFIS-N instrument counts the number of neps detected and measures the size (diameter) of each nep in a 0.4 to 0.6-g specimen. Test data are presented in a histogram showing the mean or average nep size and the total number of neps.

### 5. Significance and Use

5.1 This test method provides a consistent and repeatable measurement of fiber nep count and size. Standard check cottons are supplied by the manufacturer to ensure consistent measurement levels and laboratory-to-laboratory precision.

5.2 Results of the instrument correlate well to eye counts from card web samples. The instrument is more sensitive than the human eye, giving the instrument a higher level of count than is normally counted by the human eye.

5.3 This test method is an objective way to count neps in raw and processed cotton because there is no operator influence on nep count or size.

5.4 Neps are made by one or more of the various mechanical processes from cotton harvesting to spinning. For almost all types of yarn or fabric, neps are considered defects. The measurement of nep size and quantity going into, and coming out of, a process is used to make adjustments in machinery to reduce or eliminate the manufacture of neps.

5.5 This test method for determination of the quantity and size of neps in cotton samples used in the trade and is considered satisfactory for acceptance testing of commercial shipments when the level of tests results in the laboratory of the purchaser and the laboratory of the supplier are controlled by the use of the same laboratory control samples.

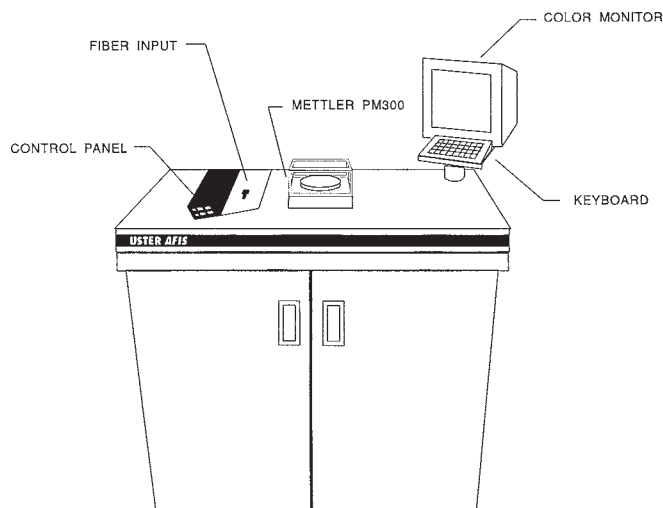
5.5.1 In case of dispute arising from differences in reported test results when using this test method for acceptance testing of commercial shipments, the purchaser and the supplier should conduct comparative tests to determine if there is a statistical bias between their laboratories. Competent statistical assistance is recommended for the investigation of bias. As a minimum, the two parties should take a group of test specimens that are as homogeneous as possible and that are from a lot of material of the type in question. The test specimens should then be randomly assigned in equal numbers to each laboratory for testing. The average results from the two laboratories should be compared using Student's *t*-test for

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D-13 on Textiles and is the direct responsibility of Subcommittee D13.11 on Cotton Fibers. Current edition approved Dec. 10, 1995. Published February 1996.

<sup>2</sup> *Annual Book of ASTM Standards*, Vol 07.01.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 14.02.

unpaired data and an acceptable probability level chosen by the two parties before testing is begun. If a bias is found, either its cause must be found and corrected or the purchaser and the supplier must agree to interpret future test results with consideration to the known bias.

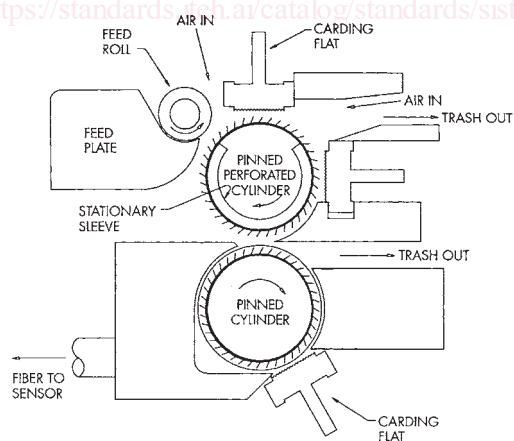


**FIG. 1 Front View of the AFIS-N Instrument**

**6. Apparatus and Material**

6.1 *AFIS-N Instrument*<sup>4</sup> with accessories as shown in Fig. 1. The capacity of the balance is 300 g with at least 0.01-g sensitivity.

6.1.1 *Fiber Individualizer*, for opening, cleaning, and individualizing the fibers. See Fig. 2.



**FIG. 2 Diagram of the AFIS Fiber Individualizer**

6.1.2 *Optical Sensor*, for counting and sizing neps. See Fig. 3.

6.2 *Check Cottons*<sup>4</sup>

**7. Sampling**

7.1 *Lot Sample*—For acceptance testing, take lot samples in the applicable material specifications or, in the absence of such a document, as directed in Practice D 1441.

NOTE 1—An adequate specification or other agreement between the purchaser and the supplier requires taking into account the variability between sampling units, between laboratory samples within a sampling unit, and between test specimens within a laboratory sample to provide a sampling plan with a meaningful producer’s risk, acceptable quality level, and limiting quality level.

7.2 *Laboratory Samples*—For acceptance testing, take a 10 to 12-g sample from each laboratory sampling unit in the lot sample.

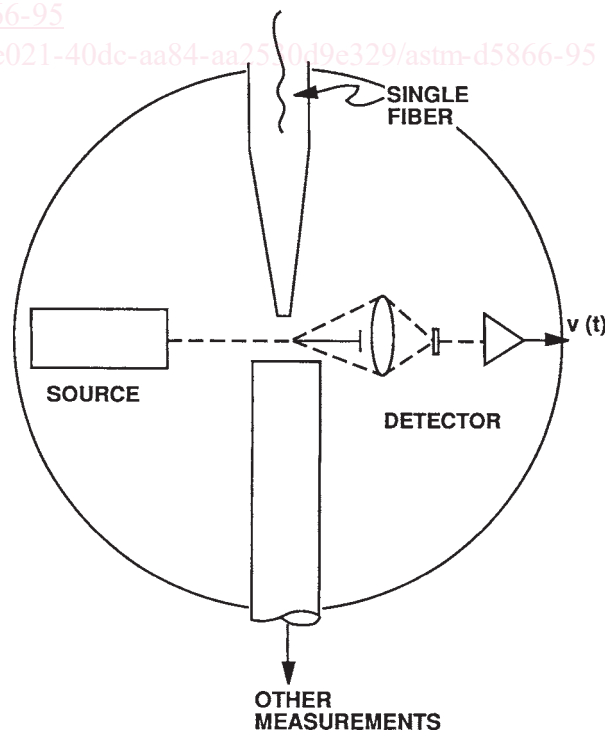
7.2.1 For process evaluation, take card sliver samples while cards are operating at processing speeds. Take other processed material samples while the yarn mill opening and cleaning lines are operating at production flow rates.

7.3 *Test Specimens*—Take five 0.4 to 0.6-g specimens at random from each laboratory sampling unit. Specimens of sliver should contain a complete cross section of the entire card or comber web.

7.3.1 For specimens not in sliver form, hand draft each specimen into a sliver to within ± 10 mm of the length specified by the instrument software. The specimen sliver should be uniform, having no gaps or large undrafted clumps of cotton.

7.3.2 For specimens in sliver form, use the techniques given in the instrument’s instruction manual.

**FIBER SENSOR**



**FIG. 3 Schematic of a AFIS Optical Sensor**

<sup>4</sup> Equipment and check cottons are available from Zellweger Uster, Inc., 456 Troy Circle, P.O. Box 51270, Knoxville, TN 37950-1270.