



Standard Test Method for Neps in Cotton Fibers¹

This standard is issued under the fixed designation D5866; 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.

1. Scope

1.1 This test method covers the measurement of the quantity and size of neps in cotton using various instruments.

1.2 This test method is intended for testing ginned cotton and cotton taken from various fiber processing stages.

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](#)

[D1441 Practice for Sampling Cotton Fibers for Testing](#)

[E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method](#)

[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: ginned lint, nep, sliver.

3.2 For all other terminology related to textiles, refer to Terminology [D123](#).

4. Summary of Test Method

4.1 A pre-weighed mass of cotton fibers is prepared per instrument manufacturer specifications. The instrument then quantifies the neps and measures the size (diameter) of each nep.

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.

4.2 Test data shows the mean or average nep size and the total number of neps per unit mass.

5. Significance and Use

5.1 Entangled cotton fibers that form neps have two sources: those that occur naturally as the cotton fiber develops on the plant into lint that is ready to be harvested and those that occur from mechanical action in harvesting, ginning, cleaning, carding or from a combination of mechanical action.

5.2 This test method does not identify whether the neps counted and measured are a result of seed variety, environmental influences, type of harvesting, or a result of mechanical processing. However, this information can be obtained from studies where samples are taken from plants in the field before harvesting and ginning, before and after cleaning, and carding before spinning.

5.3 The measurement of nep size and quantity going into, and coming out of, a fiber processing stage are commonly used to make adjustments in the processing machinery to reduce or eliminate the generation of mechanical neps. Neps that remain in spun yarns have a direct influence on neps in fabrics. For almost all types of yarn or fabric, neps are considered defects.

5.4 This test method provides a consistent and repeatable measurement of fiber nep count and size. Check cotton samples supplied by the manufacturer are used to verify consistent measurement levels and laboratory-to-laboratory precision.

5.5 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. At 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

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.

6. Apparatus and Material

6.1 An instrument with a fiber individualizer for opening, cleaning, and individualizing the fibers, and with an appropriate sensor for counting and sizing neps.

6.2 *Check Cottons*³

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 **D1441**.

NOTE 1—An adequate specification or other agreement between the buyer and seller 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 ginned cotton testing, take the recommended amount of cotton fiber as indicated by the manufacturer from each sampling unit in the lot sample or subsamples from the lot samples.

7.3 For processing evaluations, take laboratory samples from processing stages while opening and cleaning lines are operating at normal production flow rates or from carding machines while they are operating at specific processing speeds.

7.3.1 Laboratory samples from opening and cleaning processing stages will be in loose fiber form and will require special handling to prepare test specimens. Please refer to the manufacturer's specific instructions for the proper preparation and handling for testing.

7.3.2 Laboratory samples from carding process will be in sliver form ready for specimen preparation. The sliver laboratory should contain a complete cross section of the entire card or comber web.

8. Preparation and Adjustment of Apparatus

8.1 Set up the instrument as directed by the manufacturer's instructions.

8.2 Allow the instrument to warm up for at least 5 min before performing any tests, giving time for the electronics and any airflow to stabilize.

8.3 If the instrument requires airflow, check the requirements according to the manufacturer's instructions.

8.4 From two check cotton samples, test ten specimens prepared according to **10.1** and **10.2** at least once a week. Record the test data and compare them to the values supplied by the manufacturer.

8.4.1 The average of the ten tests on each of the check cotton samples should be within $\pm 15\%$ of the designated

values; otherwise, consultation with the manufacturer's representative is necessary.

9. Conditioning

9.1 Neither laboratory samples nor test specimens need to be conditioned before testing. Moisture and temperature levels have no effect on the nep measurement.

10. Specimens

10.1 *Test Specimens*—Take the manufacturer's suggested number of specimens at random from each laboratory sample for single specimen feed instruments and for models with an automatic specimen feeding accessory. The weight and length of each specimen should be measured carefully according to the manufacturer's instructions.

10.2 For instruments that require the specimen to be in sliver form, hand draft each specimen into a sliver to within ± 10 mm of the length specified by the instrument's manufacturer. The consistency of the sliver specimen should be uniform, having no gaps or large undrafted clumps of cotton fibers.

11. Procedure

11.1 Test each specimen following the instrument's instruction manual.

11.1.1 For instruments that have a single-specimen feeding slot, slowly feed a test specimen under the rotating feed roll to allow the specimen to be pulled into the feed roll belt without wadding. Allow the specimen to be pulled completely through the test zone. If the instrument has an automatic specimen feeding carousel feature, insert a specimen into the appropriate cylinder.

11.1.2 For instruments that have an automatic specimen feeding carousel, prepare specimens from all laboratory samples up to the limit allowed for the carousel. Take care to keep specimens from the same sample in sequential order. To assist with inserting sliver specimens into the carousel cylinders, a knitting needle may be used to push the specimen into the lower section of the cylinder to ensure the specimen will be taken into the testing zone.

11.2 For both of the single-feed and automatic specimen feed instruments, the instrument will automatically purge the system and clean the fiber individualizer when a test is completed.

11.3 The instrument will require the fiber individualizer to be manually cleaned after operating for a certain amount of time or number of tests. Refer to the manufacturer's instructions for suggested manual cleaning.

12. Calculation

12.1 All calculations are performed by test instrument's microprocessor and software reporting programs.

13. Report

13.1 State that the specimens were tested for neps as directed in this test method and note the make and model of the

³ Equipment and check cottons are available from each specific manufacturer.

instrument used to test the specimens. Describe the sampling method used, lot sample, and sample identification.

13.2 Report the following information for each laboratory sample:

- 13.2.1 Nep count,
- 13.2.2 Average nep size (diameter in mm).

TABLE 1 Summary of Precision Parameters

Material	Average Nep Count	Repeatability Standard Deviation (Within a Laboratory)	Reproducibility Standard Deviation (Between Laboratories)	95 % Repeatability Limit (Within a Laboratory)	95 % Reproducibility Limit (Between Laboratories)
C	6	3.1	3.1	8.6	9.6
B	86	15.1	16.5	42.1	46.1
F	109	15.0	18.8	42.1	52.7
G	138	31.6	37.3	88.6	104.4
H	348	32.4	37.2	87.8	104.2
D	516	44.3	44.3	124.0	124.0
A	650	50.6	63.5	141.8	177.9
E	824	49.7	58.2	139.2	163.1

13.2.3 Summary histogram of nep sizes (if given by the instrument).

14. Precision and Bias⁴

14.1 *Precision*—The averages of observed values should be considered significantly different at the 95 % probability level if the differences equal or exceed the precision parameter listed in **Table 1**.

14.1.1 The statistical report was prepared using ASTM software for Practice **E691**.

14.2 *Bias*—Since there is no accepted reference material for determining bias in this test method for measuring neps, no statement on bias is being made.

15. Keywords

15.1 cotton; neps; slivers

⁴ A copy of this research report is on file and available at ASTM Headquarters. Request RR:D13-1091.

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