Designation: D 1448 – 97

Standard Test Method for Micronaire Reading of Cotton Fibers[1]

This standard is issued under the fixed designation D 1448; 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 determination of the micronaire reading of loose cotton fibers by measuring the resistance of a plug of cotton fibers to air flow under prescribed conditions.

NOTE 1—For other methods for determining the fineness of fibers based on the air-flow principle, refer to Test Method D 1449, Test Method for Specific Area and Immaturity Ratio of Cotton Fibers (Arealometer Method),[2] and to Test Method D 1282, Test Method for Resistance to Air Flow as an Indication of Average Fiber Diameter of Wool Top, Card Sliver, and Scoured Wool.[3]

1.2 *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[3]
D 1441 Practice for Sampling Cotton Fibers for Testing[3]
D 1776 Practice for Conditioning Textiles for Testing[3]

3. Terminology

3.1 *Definitions:*

3.1.1 *calibration cotton standards*, *n*—cotton samples taken from blended bulk source on which fiber properties have been determined under the International Calibration Cotton Standards Program.

3.1.1.1 *Discussion*—The International Calibration Cottons are available from the Cotton Division, Agriculture Marketing Service; USDA, 3275 Appling Rd., Memphis, TN 38133. Currently there are ten such cottons, which cover the range of the micronaire scale.

3.1.2 *fineness*, *n—of fibers,* a relative measure of size, diameter, linear density, or mass per unit length expressed in a variety of units.

3.1.2.1 *Discussion*—For cotton, the weighted mean linear density expressed in micrograms per inch or in millitex.

3.1.3 *micronaire reading*, *n*—a measure of specific surface area which is influenced by fiber perimeter and fiber wall thickness is determined by the resistance to air flow through a known mass of cotton fiber compressed to a fixed volume.

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

4. Summary of Test Method

4.1 The resistance a plug of cotton fibers offers to the flow of air is measured as an approximate indication of the fineness of fiber. A predetermined mass of loose cotton fibers is placed in the specimen holder and compressed to a fixed volume. The resistance to air flow is measured and expressed as micronaire reading. Instruments available to measure resistance to air flow use compressed air or vacuum and are constructed to measure air flow under constant pressure drop across the plug, to measure pressure drop when a constant flow of air is maintained, or to indicate resistance to air flow from both a balanced and unbalanced wheatstone bridge.

5. Significance and Use

5.1 This test method for determining micronaire reading of cotton fibers is considered satisfactory for acceptance testing of commercial shipments when the levels are controlled by use of a full range of calibration cotton standards.

5.1.1 In case of a 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 unpaired data and an acceptable probability level chosen by the two parties before the 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 in the light of the known bias.

[1] 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.
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[2] Discontinued, see *1977 Annual Book of ASTM Standards,* Part 33.

[3] *Annual Book of ASTM Standards,* Vol 07.01.