



Designation: D 4604 – 95

Standard Test Methods for Measurement of Cotton Fibers by High Volume Instruments (HVI) (Motion Control Fiber Information System)¹

This standard is issued under the fixed designation D 4604; 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 These test methods cover procedures for the operation of several instruments measuring various properties of cotton fibers; specifically micronaire, color, trash content, length, length uniformity, strength, and fiber elongation. These instruments are connected through a computer communications network and collectively are known as the Motion Control HVI Fiber Information System (See Fig. 1).² These methods are applicable to loose cotton fibers taken from raw or partially processed cotton or some types of cotton wastes.

1.1.1 The micronaire reading of loose cotton fibers is determined by measuring the resistance of a “plug” of cotton fibers to air flow under prescribed conditions.

1.1.2 The measurement of length and length uniformity is made by an air flow measuring instrument outputting a voltage directly proportional to the amount of fiber in the prepared specimen at a given distance from the base of the prepared test beard, which is held in a clamp.

1.1.3 The measurements of tensile strength or breaking tenacity and elongation are made by an instrument in which the fibers are clamped between jaws with 1/8-in. (3.2-mm) spacing. A strain-gage device is used to measure breaking force, and a displacement measuring device is used to determine the fiber elongation at breaking load.

1.1.4 The measurement of the color of raw cotton is done by means of a cotton color meter of the Nickerson-Hunter type. It can be used to measure color of any type of raw cotton.

1.1.5 The measurement of the surface trash content of raw cotton is accomplished through optical analysis of the sample by a computer governing the scanning action of the sample through a video camera.

1.2 These test methods may exhibit shifts in the levels of the instrument outputs depending on the stage of processing at which the cotton fiber exists for testing.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are for information only; the conversion may be approximate.

1.4 This standard contains the following sections:

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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.* Specific precautionary statements are given in Note 6 and Section 16.

2. Referenced Documents

2.1 ASTM Standards:

- D 123 Terminology Relating to Textiles³
- D 1441 Practice for Sampling Cotton Fibers for Testing³
- D 1445 Test Method for Breaking Strength and Elongation of Cotton Fibers (Flat Bundle Method)³
- D 1448 Test Method for Micronaire Reading of Cotton Fibers³
- D 1776 Practice for Conditioning Textiles for Testing³
- D 2253 Test Method for Color of Raw Cotton Using the Nickerson-Hunter Cotton Colorimeter³
- D 3025 Practice for Standardizing Cotton Fiber Test Results by Use of Calibration Cotton Standards³

3. Terminology

3.1 Definitions:

3.1.1 *breaking tenacity, n*—the tenacity corresponding to the breaking load, for example, grams-force per tex or grams-force per denier.

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

3.1.2.1 *Discussion*—Currently there are ten such cottons,

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² Equipment is available from Motion Control, Inc., P.O. Box 29218, 2615 Brenner Dr., Dallas, TX 75220.

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