



Designation: D5103 – 07 (Reapproved 2024)

Standard Test Method for Length and Length Distribution of Manufactured Staple Fibers (Single-Fiber Test)¹

This standard is issued under the fixed designation D5103; 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 average staple length and staple length distribution of both manufactured and natural fibers by manually measuring single fiber lengths. This test method is also used to measure the length of fibers removed from a staple yarn, but such a measurement may not represent the fiber's staple length, as manufactured.

1.2 Because this test method requires measuring the length of only 50 fibers, it is not suitable for use in determining the number of long fibers that occur infrequently in a sample.

NOTE 1—For determination for overlength fibers, refer to Test Method [D3513](#).

NOTE 2—For methods covering the determination of the average length and length distribution of natural fibers, refer to the following methods: for cotton, Test Method [D1440](#), and Test Method [D1447](#), for wool, Test Method [D519](#), Test Method [D1234](#), and Test Method [D1575](#).

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

[D123 Terminology Relating to Textiles](#)

¹ This test method is under the jurisdiction of ASTM Committee [D13](#) on Textiles and is the direct responsibility of Subcommittee [D13.58](#) on Yarns and Fibers

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[D519 Test Method for Length of Fiber in Wool Top \(Withdrawn 2022\)](#)³

[D1234 Test Method for Sampling and Testing Staple Length of Grease Wool \(Withdrawn 2022\)](#)³

[D1440 Test Method for Length and Length Distribution of Cotton Fibers \(Array Method\)](#)

[D1447 Test Method for Length and Length Uniformity of Cotton Fibers by Photoelectric Measurement](#)

[D1575 Test Method for Fiber Length of Wool in Scoured Wool and in Card Sliver \(Withdrawn 2022\)](#)³

[D1776/D1776M Practice for Conditioning and Testing Textiles](#)

[D2258/D2258M Practice for Sampling Yarn for Testing](#)

[D3333 Practice for Sampling Manufactured Staple Fibers, Sliver, or Tow for Testing](#)

[D3513 Test Method for Overlength Fiber Content of Manufactured Staple Fiber](#)

[D4849 Terminology Related to Yarns and Fibers](#)

3. Terminology

3.1 For all terminology relating to D13.58, Yarns and Fibers, refer to Terminology [D4849](#).

3.1.1 The following terms are relevant to this standard: length distribution, velveteen.

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

4. Summary of Test Method

4.1 Each fiber to be tested is gripped at the tips with forceps, fully extended without stretching, and measured. The average fiber length of the measured fibers is calculated and the length distribution curve is plotted.

5. Significance and Use

5.1 This test method is used for research, development, quality control, product specifications, and may be used for acceptance testing of commercial shipments of textile fibers. However, caution is advised since information on between-laboratory precision is lacking. Comparative tests as directed in [5.1.1](#) may be advisable.

³ The last approved version of this historical standard is referenced on www.astm.org.