



Designation: D4120 – 07

## Standard Test Method for Fiber Cohesion in Roving, Sliver, and Top in Dynamic Tests<sup>1</sup>

This standard is issued under the fixed designation D4120; 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 describes the measurement of fiber cohesion as the dynamic cohesive force required to maintain drafting in rovings, slivers or tops when they are subjected to stress induced by passing between pairs of drafting rolls of different surface speeds. The cohesive force is converted to cohesive tenacity based on the linear density of the material.

NOTE 1—For static tests refer to Test Method D2612.

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:*<sup>2</sup>

- D123 Terminology Relating to Textiles
- D519 Test Method for Length of Fiber in Wool Top
- 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
- D1776 Practice for Conditioning and Testing Textiles
- D2258 Practice for Sampling Yarn for Testing
- D2612 Test Method for Fiber Cohesion in Sliver and Top (Static Tests)
- D3333 Practice for Sampling Manufactured Staple Fibers, Sliver, or Tow for Testing
- 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.

<sup>1</sup> 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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<sup>2</sup> 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.

3.1.1 The following terms are relevant to this standard: cohesive force, fiber cohesion, roving, sliver, tenacity, top.

3.2 For all other terms related to textiles, refer to Terminology D123.

### 4. Summary of Test Method

4.1 This test method provides an indication of the ability of fibers to hold together by measuring the force required to slide fibers in a direction parallel to their length. Specific lengths of roving, sliver, or top are drafted between two pairs of rollers, with each pair moving at a different peripheral speed. The draft forces are recorded. Test specimens are then weighed and the linear density calculated. Drafting tenacity, calculated as the draft resisting force per unit linear density, is considered to be a measure of the dynamic fiber cohesion.

### 5. Significance and Use

5.1 This test method for the determination of cohesion in sliver, roving, or top in dynamic tests may be used for the acceptance testing of commercial shipments but caution is advised since information on between-laboratory precision is lacking. Comparative tests as directed in 5.1.1 may be advisable.

5.1.1 If there are differences or practical significance between reported test results for two laboratories (or more), comparative test should be performed to determine if there is a statistical bias between them, using competent statistical assistance. As a minimum, test samples that are as homogeneous as possible, drawn from the material from which the disparate test results were obtained, and randomly assigned in equal numbers to each laboratory for testing. The test results 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.

5.2 The cohesive forces overcome in continuous drafting of slivers, rovings, or tops are affected by surface lubricants and such fiber properties as linear density, surface configuration, fiber length, fiber crimp, and fiber-frictional characteristics.

5.2.1 The concept of drafting is one of the most important principles in the production of yarn from fibrous raw stock.