



Standard Test Method for Fiber Cohesion in Sliver and Top (Static Tests)¹

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1. Scope

1.1 This test method describes the measurement of fiber cohesion as the force required to cause initial drafting in a bundle of fibers in sliver and top. The observed cohesive force required to separate the fibers is converted to cohesive tenacity based on the linear density of the specimen.

NOTE 1—For determination of fiber cohesion in dynamic tests, refer to Test Method D 4120.

1.2 The values stated in SI units or other units (in parentheses) are to be regarded separately as standard. The values in each system are not exact equivalents; therefore, each system shall be used independently of the other without any combination.

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

2. Referenced Documents

2.1 ASTM Standards:

D 76 Specification for Tensile Testing Machines for Textiles²

D 123 Terminology Relating to Textiles²

D 1776 Practice for Conditioning Textiles for Testing²

D 2258 Practice for Sampling Yarn for Testing²

D 3333 Practice for Sampling Man-Made Staple Fibers, Sliver, or Tow for Testing³

D 4120 Test Method for Fiber Cohesion in Roving, Sliver, and Top in Dynamic Tests³

D 4848 Terminology for Force and Deformation Properties of Textiles³

3. Terminology

3.1 Definitions:

3.1.1 *fiber cohesion, n*—the resistance to separation of fibers in contact with one another.

3.1.1.1 *Discussion*—This resistance is due to the combined

TABLE 1 Specimens Required in the User's Laboratory Under Conditions of Unknown Variability Based on Estimated Coefficients of Variation, % of the Average

Fiber	Average Number of Specimens	Basis ^A
Cotton	14	$\nu = 11.2$
Man-made	48	$\nu = 21.0$
Wool	25	$\nu = 15.0^B$

^A The values for ν are somewhat larger than will usually be found in practice.

^B This value is based on the opinions of knowledgeable users.

effects of the surface characteristics, length, crimp, finish, and linear density of the fibers. Cohesion should not be confused with adhesion or sticking together as in a glutinous substance.

3.1.2 *cohesive force, n*—in sliver and top testing, the force required to overcome cohesion of a test specimen held in a fixed position between two slowly separating clamps.

3.1.2.1 *Discussion*—In static tests, cohesive force is measured while a test specimen is held in fixed position between two slowly separating clamps. In dynamic tests, cohesive force is the force required to maintain drafting in a roving, sliver, or top.

3.1.3 For definitions of other terms related to force and deformation in textiles, refer to Terminology D 4848. For definitions of other textile terms used in this test method, refer to Terminology D 123.

4. Summary of Test Method

4.1 The test procedure is based upon the measure of the maximum resisting force when a length of sliver or top is pulled in an axial direction. Specified lengths of sliver or top are placed in the clamps of a tensile testing machine and the maximum force developed during separation of the clamps is recorded. The cohesive tenacity is calculated in terms of the force per unit linear density of the tested specimen. The cohesive tenacity is considered a measure of the cohesion of the fibers in the specimen and is reported in micronewtons/tex (gf/denier).

5. Significance and Use

5.1 Fiber cohesion is related to the resistance to drafting encountered during textile processing and is affected by such fiber properties as surface lubrication, linear density, surface configuration, fiber length, and crimp.

5.2 Fiber cohesion is affected by the alignment of fiber in sliver in addition to the factors listed in 5.1. A half turn of twist in a 140-mm specimen has been found to increase the breaking

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² *Annual Book of ASTM Standards*, Vol 07.01.

³ *Annual Book of ASTM Standards*, Vol 07.02.