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Designation: D 4120 – 01

Standard Test Method for Fiber Cohesion in Roving, Sliver, and Top in Dynamic Tests[1]

This standard is issued under the fixed designation D 4120; 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 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 D 2612.

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:* [2]

D 123 Terminology Relating to Textiles
D 519 Test Method for Length of Fiber in Wool Top
D 1440 Test Method for Length and Length Distribution of Cotton Fibers (Array Method)
D 1447 Test Method for Length and Length Uniformity of Cotton Fibers by Fibrograph Measurement
D 1575 Test Method for Fiber Length of Wool in Scoured Wool and in Card Sliver
D 1776 Practice for Conditioning and Testing Textiles
D 2258 Practice for Sampling Yarn for Testing
D 2612 Test Method for Fiber Cohesion in Sliver and Top in Static Tests
D 3333 Practice for Sampling Manufactured Staple Fibers, Sliver, or Tow for Testing
D 4848 Terminology of Force, Deformation and Related Properties

3. Terminology

3.1 *Definitions:*

3.1.1 *cohesive force*, *n—in a textile strand*, the force required to overcome fiber cohesion as the strand is being reduced in linear density.

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

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

3.1.2.1 *Discussion*—This resistance is due to the combined effects of the surface characteristic, length, crimp, finish, and linear density of the fibers. Cohesion should not be confused with adhesion or sticking together as in a glutinous substance.

3.1.3 *roving*, *n*—a loose assemblage of fibers drawn or rubbed into a single strand, with very little twist. In spun yarn systems, the product of the stage, or stages, just prior to spinning.

3.1.4 *sliver*, *n*—a continuous strand of loosely assembled fibers that is approximately uniform in cross-sectional area and without twist.

3.1.5 *tenacity*, *n—in a tensile test*, the force exerted on the specimen based on the linear density of the unstrained material.

3.1.6 *top*, *n—(1) worsted process* —a sliver in which the fibers have been parallelized, and usually combed; (2) *manufactured fibers or tow to top process*—a sliver obtained by drafting, along with breaking or cutting a multifilament tow.

3.1.7 For definitions of 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 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

[1] This test method is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.58 on Yarn and Fiber Test Methods.

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[2] 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.

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