



# Standard Test Method for Fiber Length of Wool in Scoured Wool and in Card Sliver<sup>1</sup>

This standard is issued under the fixed designation D1575; 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 covers the estimation of the average fiber length and length distribution of wool in nonparallel assemblies, such as scoured wool, and in card sliver.

1.2 This test method is applicable to many fibers other than wool if in the form of a nonparallel assembly or in a card sliver.

1.3 This test method is not applicable to unscoured wool or to wool top.

1.4 This test method specifically requires length in inches and mass in metric units, and is not contrary to ASTM policy. The values stated in inch-pound units are to be regarded as the standard. The information in parentheses is for information only.

NOTE 1—The determination of staple length of grease wool is covered in Method D1234, Sampling and Testing Staple Length of Grease Wool,<sup>2</sup> and the average length of fibers in wool top is covered in Test Method D519.

1.5 *This standard does not purport to address 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

D1234 Test Method of Sampling and Testing Staple Length of Grease Wool

D519 Test Method for Length of Fiber in Wool Top

D1776 Practice for Conditioning and Testing Textiles

D4845 Terminology Relating to Wool

## 3. Terminology

3.1 For all terminology related to D13.13, Wool and Felt, refer to Terminology D4845.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.13 on Wool and Felt.

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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: carded wool, scoured wool, wool.

3.2 For definitions of all other textile terms see Terminology D123.

## 4. Summary of Test Method

4.1 The sample or test specimen is prepared for measurement by hand carding when necessary, manipulated on a comb sorter, and separated into definite length increments. The weight of the fibers in each length increment is obtained, and from these data estimates of the weight-biased average fiber length and weight-biased length distribution are calculated.

## 5. Significance and Use

5.1 This test method is not recommended for acceptance testing due to its poor between-laboratory precision. In some cases the purchaser and the seller may have to test a commercial shipment of one or more specific materials by the best available method even though the method has not been recommended for acceptance testing of commercial shipments. In such a case, if there is a disagreement arising from differences in values reported by the purchaser and the seller when using this method for acceptance testing, the statistical bias, if any, between the laboratory of the purchaser and the laboratory of the seller should be determined with each comparison being based on testing specimens randomly drawn from one sample of material of the type being tested.

5.2 A knowledge of the average length and length distribution of fibers is important to fiber processors. This method is useful for inplant control testing and for research purposes.

## 6. Apparatus

6.1 *Comb Sorter*, similar to that described in Section 6, of Test Method D519,<sup>3</sup> but provided with the modifications discussed in Note 2.

NOTE 2—For specimens in which the longest fibers do not exceed 6 in. (150 mm), the test can be performed on one 15-in. (380-mm) sorter. For specimens in which the longest fibers exceed 6 in., two sorters, 8-in. (200-mm) or 15-in., shall be used. When two sorters are used, no alteration is required. When one 15-in. sorter is used, the sorter shall be

<sup>3</sup> Apparatus meeting these requirements is furnished by Alfred Suter Co., Prell Plaza, Orangeburg, NY 10962.

altered. As shown in Fig. 1, an additional faller supporting rod shall be inserted from the rear of the sorter to support faller bars 9 through 15. Holding brackets for supporting two retaining bars at the rear of the sorter are required. One holding bracket, a suggested design of which is shown in Fig. 2, shall be mounted on each side of the sorter frame over the spaces between faller bars 14 and 15.

6.2 *Balance*, having a capacity of 100 mg and a sensitivity of 0.1 mg.

6.3 *Hand Cards*.

### 7. Sampling, Selection, and Number of Specimens

7.1 Take, at random, samples consisting of at least 2-g portions from separate locations in the lot in accordance with the schedule in the following table.

Size of Lot, lb	Number of Sampling Units
Up to 20 000 (9000 kg)	4
Over 20 000	1 for each additional 5000 lb (2250 kg) or fraction thereof

7.2 Either use each sample as a test specimen or combine the four or more samples into one specimen for testing.

### 8. Conditioning

8.1 Bring the specimens from the prevailing atmosphere to moisture equilibrium in the standard atmosphere for testing textiles.

8.2 Determine that moisture equilibrium for testing has been reached as directed in Practice D1776.

### 9. Preparation of Specimens

9.1 Prepare specimens of scoured wool for testing by hand carding into a short sliver. Spread the 2-g specimen over the teeth of one hand card. Use the other hand to parallel the fibers. Normally, 10 to 15 strokes are sufficient. Exercise caution to prevent fiber breakage. The fibers will be on each card, as shown in Fig. 3, at the end of the carding operation. Remove the fibers from each card in a sheet and place them together with the fringe in the same direction. Form a short sliver by rolling, being careful to keep the fibers parallel.

9.2 Specimens of carded sliver require no preparation.

### 10. Procedure

10.1 Test the conditioned specimens in the standard atmosphere for testing textiles.

10.2 Prepare the comb sorter for testing by lifting and securing the faller bars in a horizontal position. Face the rear of the sorter, for example, the 15-in. (380-mm) bar.

10.3 Place one of the specimens in the left bank of the combs. For scoured wool the fringe shall overhang from the 15-in. (380-mm) bar by approximately one third of its length. Card sliver shall overhang the 15-in. bar by approximately 6 in. (150 mm).

10.4 Using the hands, take and discard small amounts of fibers from the fringe until the overhang is approximately 1 in. (25 mm) for scoured wool or 1½ in. (38 mm) for card sliver. Square off the fringe with the clamp.

10.5 Using the clamp, firmly grip the fibers across the full width of the over-hanging portion to a depth not exceeding ¼ in. (3 mm) from the ends of the fibers. Pull the fibers straight out slowly and place them in the right side or section of the faller bars with the short pins. Starting at the end, or 0-in. faller bar, pull the tuft of fibers forward across the top of the pins. Depress the fibers lightly in place with the fingers of the free hand.

10.6 Release the fibers when the nose of the clamp is exactly in line with the top of the pins of the 15-in. (380-mm) faller bar. Press the released fibers down slowly between the pins with the depressor.

10.7 Square off the fibers of the over-hanging fringe with the clamp. Repeat the procedure in 10.5 and 10.6 until the fibers transferred weigh about 750 mg.

10.8 Remove and discard the remaining fibers from the left side of the sorter. Place the two removable retaining bars as shown in Fig. 4.

10.9 Drop all faller bars between No. 6 and No. 9 and clean the faller bars from 0 to 6 in. (0 to 150 mm) inclusive. Face the side of the sorter having the faller supporting rods.

10.10 Using the drawing clamp, carefully remove and discard the straggler fibers from the fringe opposite the 15-in. (380 mm) faller bar which do not reach the 15-in. faller.

10.11 Using the drawing clamp, grip the fibers in the fringe opposite the 15-in. (380 mm) faller bar, the depth of bite not to exceed ¼ in. (1.5 mm). Draw these fibers from the accumulated specimen slowly. Place the fibers in the 0 to 6 group of

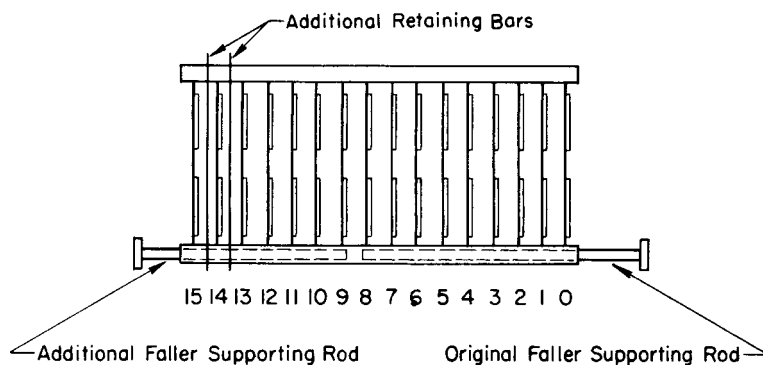


FIG. 1 Faller Supporting Bar

Flat Pattern (Cut Out Shaded Areas)

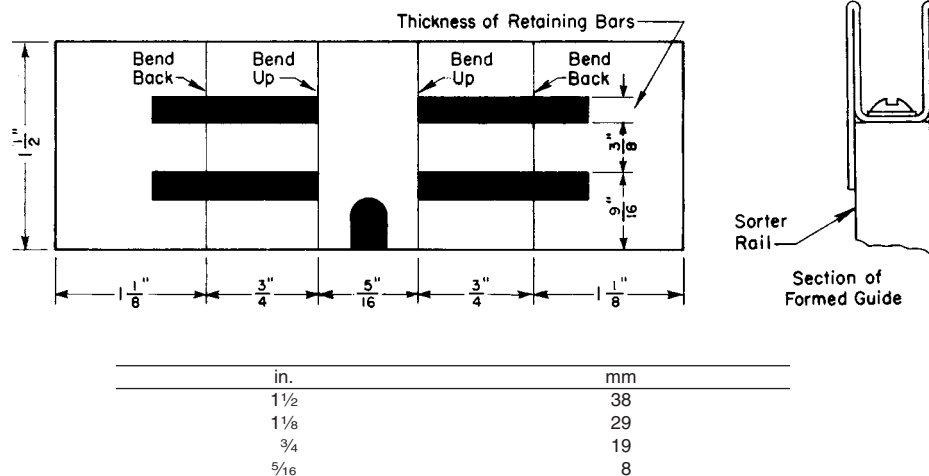


FIG. 2 Baskets for Holding Retaining Bars

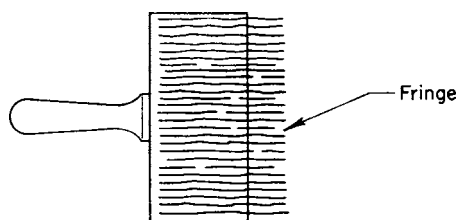


FIG. 3 Carder

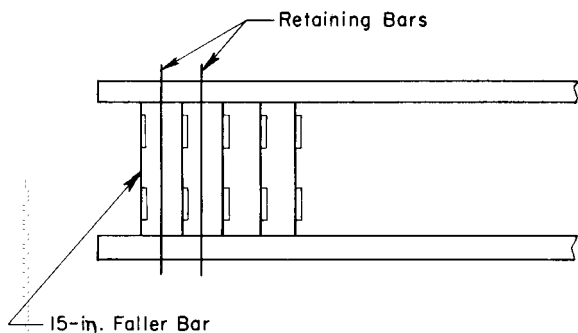


FIG. 4 Sorter

faller bars starting with the 6-in. (152-mm) faller bar and drawing toward the 0 or end faller bar, holding the fibers down gently with the free hand. Release the fibers when the nose of the clamp is in line with the end faller bar. Press the released fibers down between the pins with the depressor.

10.12 Repeat the procedure in 10.11 until all fibers have been transferred, lowering faller bars 9 to 15 as necessary.

10.13 Collect any fibers remaining beyond the 15-in. (380-mm) faller bar and add these to the 0 to 1/4-in. (6-mm) increment.

10.14 From this point, proceed as directed in Method D519, beginning with 9.15.

## 11. Report

11.1 State that the specimens were tested as directed in ASTM Method D1575. Describe the material or product sampled and the method of sampling used.

11.2 Report the following information:

11.2.1 Average length to the nearest 0.1 in. (2.5 mm),

11.2.2 Standard deviation of the fiber length to the nearest 0.1 in. (2.5 mm),

11.2.3 Coefficient of variation of fiber length,

11.2.4 Percentage of fibers under 2 in. (50.8 mm) or under 1.5 in. (38.1 mm), or both, and

11.2.5 Cumulative length frequency curve.

## 12. Precision and Bias

12.1 *Precision*—The precision of the method for fiber length of wool in scoured wool and card sliver has not been established. However, interlaboratory tests, the data for which is unavailable, indicated satisfactory within-laboratory data but poor between-laboratory precision.

12.2 *Bias*—No justifiable statement can be made about the accuracy of Method D1575 for determining fiber length since the true value of the property cannot be established by an accepted reference method.

12.2.1 The apparent length of crimped fibers is strongly dependent upon the tension applied to the fibers when measuring their length. In this method, the fiber is measured with the normal crimp partly removed due to its being packed in the pins of the sorter while under low tension. The observed results are accordingly slightly longer than the length of the crimped fiber and shorter than the fiber length after removal of all crimp.

## 13. Keywords

13.1 length; wool

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