Designation: D1334 – 05 (Reapproved 2009)

Standard Test Method for Wool Content of Raw Wool—Commercial Scale[1]

This standard is issued under the fixed designation D1334; 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 the wool base content and the clean wool fiber present in a lot of raw wool by commercial-scale scouring of the lot followed by laboratory tests on samples of the scoured wool.

NOTE 1—The sampling of lots of raw wool in packages is covered in Practice D1060, and the determination of the wool content of such samples is covered in Test Method D584. The determination of vegetable matter and other alkali-insoluble impurities in scoured wool is covered in Test Method D1113. For factors for the conversion of wool base content to its equivalent in terms of scoured wool, top, or noil of various commercially specified compositions, refer to Practice D2720.

NOTE 2—The values stated in U.S. Customary Units are to be regarded as the standard because of common commercial practice. The S.I. units in parentheses are provided for information only.

NOTE 3—Because of trade practice the term "weight" is used in this test method instead of the technically correct term "mass".

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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:*[2]

D123 Terminology Relating to Textiles

D584 Test Method for Wool Content of Raw Wool—Laboratory Scale

D1060 Practice for Core Sampling of Raw Wool in Packages for Determination of Percentage of Clean Wool Fiber Present

D1113 Test Method for Vegetable Matter and Other Alkali-Insoluble Impurities in Scoured Wool

D2720 Practice for Calculation of Commercial Weight and Yield of Scoured Wool, Top, and Noil for Various Commercial Compositions

D4845 Terminology Relating to Wool

3. Terminology

3.1 For all terminology related to wool and wool felt, refer to Terminology D4845.

3.1.1 The following terms are relevant to this standard: clean wool fiber present, other alkali-insoluble impurities, oven-dried, raw wool, vegetable matter base, vegetable matter present, wool base.

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

4. Summary of Test Method

4.1 The entire lot of raw wool is weighed, prepared, scoured, and dried in the usual commercial equipment, with special precautions against loss of wool at any stage of the operations. The commercially dried scoured wool is weighed, then sampled for laboratory determination of its oven-dried weight (mass) and its content of alcohol-extractable matter, mineral matter, vegetable-matter base, and other alkali-insoluble impurities. The wool base content and the clean wool fiber present are calculated as percentages of the net weight (mass) of the lot of raw wool.

5. Significance and Use

5.1 This test method is considered satisfactory for use as a referee method for the determination of the wool base content and the clean wool fiber present in a lot of raw wool. If there are differences of 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, use the samples for such a comparative test that are as homogenous as possible, drawn from the same lot of material as the samples that resulted in the disparate results during the initial testing and randomly assigned in equal numbers to each laboratory. The test results from the laboratories involved should be compared using a statistical test for unpaired data,

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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.

probability level chosen prior to the testing series. If bias is found, either its cause must be found and corrected, or future results for that material be adjusted in consideration of the known bias.

5.2 This test method is also used in studies aimed at deriving suitable formulas for estimating the allowances to be made for wool unavoidably lost or destroyed in such commercial operations as carding, combing, or carbonizing.

6. Apparatus

6.1 *Wool Opener, Scouring Bowl Train, Dryer*—Usual commercial equipment, with accessories, modified, if necessary, to prevent loss of any significant quantity of wool.

6.2 *Laboratory Apparatus,* for the determination of oven-dried weight (mass), alcohol-extractable matter, mineral matter, and total alkali-insoluble impurities, as described in Test Methods D584 and D1113.

6.3 *Scales,* accurate to 1 lb (0.5 kg), for weighing the raw wool and the scoured product.

7. Reagents

7.1 *Scouring Solution A*—A solution containing approximately 0.3 % by weight (mass) of soda ash (Na_2CO_3), 0.1 % by weight (mass) of soap having a titer of not over 25°C, and a water-softening agent of the polyphosphate type slightly in excess of the quantity required to soften the water used.

7.2 *Scouring Solution B*—Same as Scouring Solution A but with only one half the concentration of soda ash and soap.

NOTE 4—Neutral nonionic detergent of the ethoxylated alkylphenol type may be substituted for the soap and soda ash or the soap alone in Scouring Solutions A and B. Quantity used should reflect normal commercial practice for obtaining residual grease levels in the range of 0.4-0.8 %.

7.3 *Test Reagents*—As described in Test Methods D584 and D1113 for the determination of alcohol-extractable matter and alkali-insoluble impurities.

8. Sampling

8.1 Sampling of the lot of raw wool is not required.

8.2 For sampling of the scoured wool for determination of its oven-dried weight (mass) and its residual impurities, see 10.4.4.

9. Conditioning

9.1 Neither preconditioning nor conditioning in the standard atmosphere is required.

10. Procedure

10.1 *Weighing*—Determine the net weight (mass) of the lot by weighing each package of raw wool to the nearest 1 lb (0.5 kg) and deducting the known or ascertained tare.

10.2 *Grading and Sorting*—If required, grade or sort the weighed wool, or both. Treat each grade or sort, or both, separately as directed in 10.4, and each waste or off-sort, or both, as directed in 10.5.

10.3 *Opening and Dusting*—If the use of a wool opener or duster is required prior to scouring, recover all wool wastes from these operations for treatment as directed in 10.5.

10.4 *Treatment of Grades and Sorts*—Separately treat each grade and sort as follows:

10.4.1 *Scouring*—Using Scouring Solution A in the first bowl and Scouring Solution B in the second bowl, both at 52± 3°C, scour and rinse by the usual commercial procedure. Make sure that the equipment is free of wool both before and after the scouring and that all wool wastes are recovered.

10.4.2 *Drying*—Dry the scoured wool at the temperature and under the operating conditions customary with the equipment being used and the type of wool involved. Make sure that the equipment is free of wool both before and after the drying and that all wool wastes are recovered. Store the dried wool, either in bulk form or packaged, for at least 24 h, preferably in a space having an atmosphere not subject to large variations in temperature or humidity during that period.

10.4.3 *Weighing*—Determine to the nearest 1 lb (0.5 kg) the net weight (mass) of the scoured wool in each package, or other unit, after storage for 24 h (10.4.2).

10.4.4 *Sampling*—During or immediately after the weighing (10.4.3) select a sample for the laboratory determination of oven-dried weight (mass), alcohol-extractable matter, mineral matter, vegetable matter, and other residual impurities, as follows:

10.4.4.1 If the scoured wool is weighed in bulk form or in soft bags, take at random from each 100 lb (50 kg) a handful of wool weighing about 1 oz (30 g). Promptly place each selected portion of wool in a moisture-proof container of suitable size. Seal the container when sampling is complete.

10.4.4.2 If the scoured wool is weighed in compressed bales, core sample the bales with the equipment described in Practice D1060, taking 2 cores (Note 4) from each bale at random locations on the sampling surfaces. Promptly place each core in a moisture-proof container of suitable size. Seal the container when sampling is complete.

NOTE 5—If the number of bales and the diameter of the sampling tube are such that the expected weight (mass) of a sample consisting of 2 cores per bale is less than 100 g, increase the number of cores per bale sufficiently to ensure a sample weight (mass) of 100 g or more.

10.4.5 *Laboratory Tests*—After the sample (10.4.4.1 or 10.4.4.2) has been in its sealed container for at least 24 h, determine its net weight (mass) to 4 significant figures and make the following tests:

10.4.5.1 *Oven-Dried Weight*—Determine the oven-dried weight (mass) of the entire sample, or of a representative specimen thereof weighing at least 100 g, as directed in Test Method D584.

10.4.5.2 *Alcohol-Extractable [A] and Mineral Matter [E]*—Determine the percentage of alcohol-extractable matter and mineral matter in the oven-dried sample or specimen (10.4.5.1), as directed in Test Method D584.

10.4.5.3 *Alkali-Insoluble Impurities*—Determine the percentage of total alkali-insoluble matter in the oven-dried sample or specimen (10.4.5.1), as directed in Test Method D1113.

10.5 *Treatment of Wastes and Off-Sorts*—Using the appropriate procedures in Test Methods D584 and D1113, determine the weight (mass) of wool base present in the several recovered wool wastes and off-sorts, if any, resulting from the grading and sorting operations (10.2).

11. Calculation

11.1 Calculate the weight (mass) of wool base present in each grade or sort (10.4) using Eq 1:

$$W_i = S_i m_i (100 - A_i - E_i - T_i)/w_i \quad (1)$$

where:

W_i = weight (mass) of wool base present in the ith grade or sort,

S_i = weight (mass) of commercially dried scoured wool obtained from the ith grade or sort (10.4.3),

m_i = oven-dried weight (mass) of the entire sample or of the specimen (10.4.5.1), as the case may be, of the commercially dried scoured wool obtained from the ith grade or sort,

A_i, E_i, T_i = contents of mineral matter, alcohol-extractable matter, and total alkali-insoluble matter, respectively, in the oven-dried sample or specimen (10.4.5.1), as a percentage of the weight (mass) of the oven-dried sample or specimen from the ith grade or sort, and

w_i = net weight (mass) of the entire sample, or of the specimen (10.4.5.1), as the case may be, from the ith grade or sort.

11.2 Calculate the wool base content of the lot of raw wool using Eq 2:

$$B = 100\left(\sum W_i + \sum W_j\right)/W \quad (2)$$

where:

B = wool base content of the lot of raw wool, as a percentage of the net weight (mass) of the lot,

W_j = weight (mass) of wool base in the jth waste or off-sort (10.5),

W = net weight (mass) of the lot of raw wool, and

W_i has the meaning assigned in 11.1.

11.3 Calculate the clean wool fiber present in the lot of raw wool using Eq 3:

$$F = B/0.86 \quad (3)$$

where:

F = clean wool fiber present in the lot of raw wool, as a percentage of the net weight (mass) of the lot,

0.86 = factor for converting a weight (mass) of clean wool fiber present to the corresponding weight (mass) of wool base content, (see 3.1) and

B has the meaning assigned in 11.2.

12. Report

12.1 State that the test was made as directed in ASTM Test Method D1334. Describe the material or product sampled and the method of sampling used.

12.2 Include the following information:

12.2.1 Percentages of wool base content and clean wool fiber present, to the nearest 0.1 percentage point, and

12.2.2 Number of packages in the lot, and the net weight (mass) of the raw wool to the nearest 1 lb (0.5 kg).

13. Precision and Bias

13.1 *Precision*—Since the entire lot of raw wool is used up in a test by this method, a precision statement is not applicable.

NOTE 6—For the precision of the laboratory determination of the clean wool fiber present in the sample of scoured wool (10.4.5), refer to Test Method D584.

13.2 *Bias*—Test Method D1334 for testing wool content of raw wool has no known bias and is generally accepted as a referee method.

14. Keywords

14.1 content; wool