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Standard Test Methods for Moisture in Textiles¹

This standard is issued under the fixed designation D 2654; 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 These test methods cover measurement of moisture in textile materials as (1) moisture content or pick-up (3.5 and 3.12) using ambient air for oven-drying, (2) moisture content or pick-up using standard atmosphere for testing textiles for oven-drying, (3) moisture content or pick-up at moisture equilibrium (3.9 and 3.10), and (4) moisture regain (3.12). These test methods are applicable to all fibers, natural or man-made, and in all forms from fiber or filament to finished fabric, subject to the limitations set forth in 1.1.1 through 1.1.4. Blends of fibers may also be tested by these methods.

1.1.1 *Procedure 1*—This oven-drying technique, using ambient air heated to 105°C, may be used in any situation in which a simple and convenient method for routine process control or when in-plant evaluation is needed to determine an approximation of the moisture content or pickup. It is not recommended for jute or grease wool, or for acceptance testing in commercial transactions.

1.1.2 *Procedure 2*—This oven-drying technique, using air from the standard atmosphere air for testing textiles that is heated to 105°C and other refinements in technique, may be used as a basis for commercial transactions for all materials for which it is known that no significant quantity of nonaqueous volatile matter is present on, or in, the material to be tested.

NOTE 1—The air supply for Procedure 2 has been changed from desiccated air to the air from the standard atmosphere for testing textiles because the latter is in common use and is prescribed in Test Method D 2494 for commercial mass of a shipment. By agreement, however, desiccated air may be used.

1.1.3 *Procedure 3*—This oven-drying technique uses specimens in moisture-equilibrium under specified conditions and an oven with an air supply of specified temperature and relative humidity heated to 105°C, and other refinements in technique. The procedure is used to determine the moisture content or pick-up of a material in equilibrium conditions, usually the standard atmosphere for testing textiles.

NOTE 2—The previous Procedure 3 for determining moisture using distillation with toluene has been dropped from this method because it is essentially the same as Test Method D 2462 which is the preferred method for jute and grease wool in any circumstance. Test Method D 2462 is the preferred method for any material in which it is known, or suspected, that a significant quantity of nonaqueous and non-water-miscible volatile matter is present.

1.1.4 *Procedure 4*—This new technique is for determination of actual moisture regained by a material under specified conditions after the material has been extracted by a suitable procedure, if surface materials are present, and dried in vacuum at a low temperature.

1.2 In Procedures 1, 2, and 3, alternative techniques are described for weighing oven-dried specimens: in the oven while hot, and outside the oven at room temperature.

1.3 The word *water* refers to the chemical compound, H₂O. The terms *water* and *moisture* are frequently used interchangeably in the literature and in the trade even when the "moisture" is known to contain other volatile materials. When the loss during oven exposure is not known to be all water, it should be considered a "volatiles loss" rather than a "moisture loss" for technical accuracy.

1.4 Moisture calculations commonly involve the mass of a specimen that has been dried by heating in an oven. If the air in the oven contains moisture, the oven-dried specimen will contain moisture (in equilibrium with that in the oven air) even when it no longer shows a significant change in mass. Therefore, if very precise measurement of the moisture present is required and oven drying is used, the mass must be exposed to desiccated air until it shows no further significant change in mass.

NOTE 3—Other ASTM Standards related to the determination of moisture of textile materials are Methods D 681, Testing and Tolerances for Jute Rove and Plied Yarn for Electrical and Packing Purposes,² D 1576, Test for Moisture in Wool by Oven Drying,² D 2495, Test for Moisture in Cotton by Oven Drying,² and D 2118 Assigning a Standard Commercial Moisture Content for Wool and its Products.²

1.5 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems 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. See Section 32 and Note 13.*

2. Referenced Documents

2.1 ASTM Standards:

- D 123 Terminology Relating to Textiles³
- D 584 Test Method for Wool Content of Raw Wool—Laboratory Scale²
- D 629 Test Method for Quantitative Analysis of Textiles²
- D 1441 Practice for Sampling Cotton Fibers for Testing²
- D 1776 Practice for Conditioning Textiles for Testing³

¹ These test methods are under the jurisdiction of ASTM Committee D-13 on Textiles and are the direct responsibility of Subcommittee D13.51 on Chemicals, Conditioning and Performance Tests.

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² Annual Book of ASTM Standards, Vol 07.02.

³ Annual Book of ASTM Standards, Vols 07.01 and 07.02.