This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

Designation: D1442 – 06 (Reapproved 2019)

Standard Test Method for Maturity of Cotton Fibers (Sodium Hydroxide Swelling and Polarized Light Procedures)[1]

This standard is issued under the fixed designation D1442; 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 percentage of mature fibers in a sample of loose, chemically untreated cotton fibers, whether taken before processing or unravelled from a textile product.

1.2 This test method gives two optional procedures for determining maturity, as follows:

1.2.1 *Procedure 1*—Sodium Hydroxide Swelling.

1.2.2 *Procedure 2*—Polarized Light.

NOTE 1—For other test methods for the determination of maturity of cotton fibers refer to Test Methods D1464 and D2480.

1.3 The values stated in SI units are to be regarded as standard. No other units of measure are included in this standard.

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

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D123 Terminology Relating to Textiles

D1440 Test Method for Length and Length Distribution of Cotton Fibers (Array Method)

D1447 Test Method for Length and Length Uniformity of Cotton Fibers by Photoelectric Measurement

D1464 Practice for Differential Dyeing Behavior of Cotton

D1776 Practice for Conditioning and Testing Textiles

D2480 Test Method for Maturity Index and Linear Density of Cotton Fibers by the Causticaire Method (Withdrawn 1992)[3]

D7139 Terminology for Cotton Fibers

3. Terminology

3.1 For all terminology relating to D13.11, Cotton Fibers, refer to Terminology D7139.

3.1.1 The following terms are relevant to this standard: cotton fiber maturity, immature fibers, in testing with sodium hydroxide solutions (See Fig. 1 and Fig. 2), immature fibers, observed under polarized light, lumen, mature fibers, in testing with sodium hydroxide solutions (see Fig. 3), mature fibers, observed under polarized light (see Table 1), micronaire reading, test specimen, in cotton maturity test.

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

4. Summary of Test Method

4.1 Fibers are laid parallel on a microscope slide, covered with a cover glass, treated with a mounting medium, and the magnified images are then classified as mature or immature fibers.

4.2 The method offers two procedures for classifying the fibers as mature or immature:

4.2.1 *Procedure 1, Sodium Hydroxide Swelling,* which uses an 18 % solution of sodium hydroxide as the mounting medium and a laboratory microscope for viewing the fibers at a magnification of 400×.

4.2.2 *Procedure 2, Polarized Light,* which uses clear mineral oil as the mounting medium and requires a polarizing microscope giving a magnification of 100×. Fibers are classified according to their second-order interference colors, using a first-order (or full wave) retardation plate (Table 1).

[1] This test method is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.11 on Cotton Fibers.

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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.

[3] The last approved version of this historical standard is referenced on www.astm.org.

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