



Designation: D8171 – 18

Standard Test Methods for Density Determination of Flax Fiber¹

This standard is issued under the fixed designation D8171; 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 two procedures for determination of the density of flax fiber and are applicable to fibers of any length.

1.1.1 *Test Method A—Gas Pycnometry*—This is the more accurate method of density measurement and is preferred in cases in which specimen conditioning (oven drying) can be applied or outgassing effects can be mitigated by purge settings. The level of accuracy for the test methods can be assessed from the precision and bias tables. Outgassing effects can be assessed by performing a purge cycle, pressurization, and pressure stability check on the sample. If the pressure increases in an isolated sample chamber, outgassing may affect the accuracy of results. Oven dry specimens below 55 °C to equilibrium with a 0 % relative humidity (RH) environment or use longer purge methods, or both, to eliminate outgassing effects.

1.1.2 *Test Method B—Buoyancy (Archimedes) Method*—This is acceptable as an alternative to Test Method A in applications in which less accurate results are sufficient, as represented in the precision and bias tables. Test Method B is preferred in cases in which outgassing effects in Test Method A cannot be addressed by oven drying or purge settings and prevent Test Method A from producing valid results.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* Specific hazard statements are given in Sections 9 and 17.

1.4 *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 Recom-*

mendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 *ASTM Standards:*²

D1577 Test Methods for Linear Density of Textile Fibers

D3800 Test Method for Density of High-Modulus Fibers

D3878 Terminology for Composite Materials

D6798 Terminology Relating to Flax and Linen

E12 Terminology Relating to Density and Specific Gravity of Solids, Liquids, and Gases (Withdrawn 1996)³

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E1309 Guide for Identification of Fiber-Reinforced Polymer-Matrix Composite Materials in Databases (Withdrawn 2015)³

3. Terminology

3.1 *Definitions*—Terminology D3878 defines terms relating to composite materials. Terminology E12 defines terms relating to density. Terminology D6798 defines terms relating to flax and linen. Practice E177 defines terms relating to statistics. In the event of a conflict between terms, Terminology D3878 shall have precedence over other standards.

3.1.1 *impurity, n*—any material (such as, but not limited to, water, shive, or dirt) present in the sample that, if not removed or accounted for, would obfuscate the density measurement of the targeted material in the sample.

3.2 *Symbols:*

M_1	= weight of suspension wire in air, g.
M_2	= weight of suspension wire in liquid (to immersion point), g.
M_3	= weight of suspension wire plus item whose density is to be determined (in air), g.
M_4	= weight of suspension wire plus item whose density is to be determined (in liquid), g.

¹ These test methods are under the jurisdiction of ASTM Committee D13 on Textiles and are the direct responsibility of Subcommittee D13.17 on Flax and Linen.

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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.