



Designation: D1388 – 23

Standard Test Method for Stiffness of Fabrics¹

This standard is issued under the fixed designation D1388; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope*

1.1 This test method covers the measurement of stiffness properties of fabrics. Bending length is measured and flexural rigidity is calculated. Two procedures are provided.

1.1.1 *Option A*—Cantilever Test, employing the principle of cantilever bending of the fabric under its own mass.

1.1.2 *Option B*—Heart Loop Test, employing the principle of a loop formed in a fabric strip and hung vertically.

1.2 This test method applies to most fabrics including woven fabrics, air bag fabrics, blankets, napped fabrics, knitted fabrics, layered fabrics, pile fabrics. The fabrics may be untreated, heavily sized, coated, resin-treated, or otherwise treated.

1.2.1 This method may be used to determine the stiffness of nonwoven materials (for example, hydroentangled, dry laid, needlepunch, resin bonded, thermal, and wet laid) or refer to Test Method [D5732](#). To determine the stiffness of medical textiles (for example, surgical mesh, films, and membranes), refer to Test Method [F3260](#).

NOTE 1—The formula to calculate flexural rigidity in [D5732-95](#) (2001) is incorrect and should not be used. Utilize the formula presented in 11.5 of Test Method D1388.

1.3 *Units*—The values stated in SI units are to be regarded as the standard. The values given in parentheses after SI units are provided for information only and are not considered 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 Recom-*

mendations 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

[D1776](#) Practice for Conditioning and Testing Textiles

[D2904](#) Practice for Interlaboratory Testing of a Textile Test Method that Produces Normally Distributed Data (Withdrawn 2008)³

[D2906](#) Practice for Statements on Precision and Bias for Textiles (Withdrawn 2008)³

[D3776](#) Test Methods for Mass Per Unit Area (Weight) of Fabric

[D4850](#) Terminology Relating to Fabrics and Fabric Test Methods

[D5732](#) Test Method for Stiffness of Nonwoven Fabrics Using the Cantilever Test (Withdrawn 2008)³

[F3260](#) Test Method for Determining the Flexural Stiffness of Medical Textiles

3. Terminology

3.1 For all terminology relating to D13.59, Fabric Test Methods, General, refer to Terminology [D4850](#).

3.1.1 The following terms are relevant to this standard: bending length, cross-machine direction, (CD), fabric, flexural rigidity, machine direction, (MD), stiffness.

NOTE 2—Machine direction (MD) may represent wale and warp directions and cross-machine direction (CD) may represent course and weft directions in knit fabrics or woven fabrics or both.

3.2 For all other terminology related to textiles, refer to Terminology [D123](#).

4. Summary of Test Method Options

4.1 *Option A, Cantilever Test*—A specimen is slid at a specified rate in a direction parallel to its long dimension, until

¹ This test method is under the jurisdiction of ASTM Committee [D13](#) on Textiles and is the direct responsibility of Subcommittee [D13.60](#) on Fabric Physical Test Methods B.

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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.

*A Summary of Changes section appears at the end of this standard