



Designation: D5344 – 22

Standard Test Method for Extension Force of Partially Oriented Yarn¹

This standard is issued under the fixed designation D5344; 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 measurement of extension force developed while drawing a partially oriented filament yarn between pairs of draw rolls of different surface speeds.

1.2 Extension force provides an estimate of the yarn orientation.

1.3 This test method applies to partially oriented filament yarns less than 33.3 tex (300 denier), but it can be used for higher deniers by applying the test conditions as directed in [Appendix X1](#).

1.4 The values stated in SI units are to be regarded as standard. The values given in parentheses are provided for information only.

1.5 *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.*

1.6 *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](#)

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

[D2258 Practice for Sampling Yarn for Testing](#)

[D2904 Practice for Interlaboratory Testing of a Textile Test Method that Produces Normally Distributed Data \(Withdrawn 2008\)](#)³

[D2906 Practice for Statements on Precision and Bias for Textiles \(Withdrawn 2008\)](#)³

[D4849 Terminology Related to Yarns and Fibers](#)

3. Terminology

3.1 For terminology related to yarn test methods refer to Terminology [D4849](#).

3.2 The following terms are relevant to this standard: drawing; draw ratio (DR); draw texturing; extension; extension force; partially oriented yarn.

3.3 For definitions of other textile terms used in this test method refer to Terminology [D123](#).

4. Summary of Test Method

4.1 Partially oriented filament yarn withdrawn from a package is pretensioned, heated, and drawn on an instrument under conditions similar to those used in the draw-texturing process. A tension measuring head senses the force required to draw the running yarn a specified amount of its original length under given conditions.

5. Significance and Use

5.1 This test method is considered satisfactory for acceptance testing of commercial shipments because current estimates of between-laboratory precision are acceptable and the method is used extensively in the trade for acceptance testing.

5.1.1 If there are differences or practical significance between reported test results for two laboratories (or more), comparative tests should be performed to determine if there is a statistical bias between them, using competent statistical assistance. As a minimum, the test samples to be used are as homogeneous as possible, are drawn from the material from which the disparate test results are obtained, and are assigned randomly in equal numbers to each laboratory for testing. Other materials with established test values may be used for this purpose. The test results from the two laboratories should be compared using a statistical test for unpaired data, at a

¹ This test method is under the jurisdiction of ASTM Committee [D13](#) on Textiles and is the direct responsibility of Subcommittee [D13.58](#) on Yarns and Fibers.

Current edition approved Nov. 1, 2022. Published December 2022. Originally approved in 1993. Last previous edition approved in 2017 as D5344–99 (2017). DOI: 10.1520/D5344-22.

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.