



Standard Specification for Tensile Testing Machines for Textiles¹

This standard is issued under the fixed designation D76/D76M; 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 specification covers the operating characteristics of three types of tensile testing machines used for the determination of the force-elongation properties of textile materials. These types of tensile testing machines are:

- 1.1.1 Constant-rate-of-extension, CRE.
- 1.1.2 Constant-rate-of-traverse, CRT.
- 1.1.3 Constant-rate-of-loading (force), CRL.

1.2 Specifications for tensile testing machines to measure other tensile-related properties of textile materials not covered by this standard are given in the ASTM standards using those machines.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.4 The following safety hazards caveat pertains only to the test methods described in this specification: *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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards*:²

[D123 Terminology Relating to Textiles](#)

[D2256 Test Method for Tensile Properties of Yarns by the Single-Strand Method](#)

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

[E4 Practices for Force Verification of Testing Machines](#)

¹ This specification 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 July 1, 2016. Published July 2016. Originally approved in 1920. Last previous edition approved in 2011 as D76 – 11. DOI: 10.1520/D0076_D0076M-11R16.

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.

[E74 Practice of Calibration of Force-Measuring Instruments for Verifying the Force Indication of Testing Machines](#)

3. Terminology

3.1 For terminology related to tensile testing, see Terminology [D4849](#).

3.1.1 The following terms are relevant for this standard: bench marks, calibrate, capacity, clamp, constant-rate-of extension type tensile testing machine (CRE), constant-rate-of-load tensile testing machine (CRL), constant-rate-of-traverse tensile testing machine (CRT), effective carriage mass, effective gauge length, grip, jaw face, jaw liner, jaws, least count, nominal gauge length, response time, sensitivity, *in electronic systems*, sensitivity, stress, tensile testing machine, test skein, time-to-break, true gauge length.

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

4. Performance Requirements

4.1 Individual ASTM methods for tensile testing of textile materials that prescribe apparatus which conforms to this specification shall also include such other detailed specifications as may be necessary to describe the testing machine and its operation completely.

4.1.1 This specification shall not be construed as being intended to preclude the evolution of improved methods of testing or testing apparatus, which is recognized as being vital in an advancing technology.

4.2 Comparison of results from tensile testing machines operating on different principles is not recommended. When these machines are used for comparison testing however, constant time-to-break at 20 ± 3 s is the established way of producing data, but even then the data may differ significantly.

4.2.1 Comparison of test data from machines of the same type, especially two or more CRT-type or two or more CRL-type machines, requires consideration of the effect of individual machine characteristics; for example, inertia effects, capacity, sensitivity, type of loadcell, etc., which may cause significant differences in results even though uniform procedures are employed. Data from different CRE-type testing machines, however, should not be significantly different.

4.2.2 In any case, all types of tensile testing machines must satisfy the accuracy requirements as given in Section 7.