



# Standard Test Method for Breaking Strength of Yarn in Skein Form<sup>1</sup>

This standard is issued under the fixed designation D1578; 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 ( $\epsilon$ ) 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 determination of the breaking strength of yarn in skein form. The observed breaking strength is expressed in units of force, and equations are provided to convert breaking strength to skein breaking tenacity and to skein break factor.

NOTE 1—For the determination of the breaking strength and elongation of yarn by the single strand method, refer to Test Method [D2256](#).

1.2 This test method is applicable to spun yarns, either single or plied, composed of any fiber or blend of fibers, but is not suitable for yarns which stretch more than 5 % when the tension is increased from 2.5 to 7.5 mN/tex or 0.03 to 0.08 gf/denier.

1.3 This test method provides three options based on the perimeter of the reel, the number of wraps in the skein, and the machine speed or time-to-break.

1.3.1 *Option 1*—Eighty, forty, or twenty turns on a 1.50-m or 1.5-yd reel, broken at 300 mm/min or 12 in./min.

1.3.2 *Option 2*—Fifty turns on a 1.00-m or 1-yd reel, broken at 300 mm/min or 12 in./min.

1.3.3 *Option 3*—Fifty turns on a 1-m reel, broken in 20 s.

NOTE 2—Option 1 is in general use in the United States, Option 2 is used for woolen yarns, and Option 3 has been proposed in the International Standards Organization (ISO) for international use.

NOTE 3—Metric reels are available with 1 and 1.125-m circumferences. Data from the two reels will be about 1 % different (see [5.6](#)). ISO uses a 1-m circumference reel.

1.4 This test method is frequently combined with the determination of linear density carried out on the same skeins. Special precautions for reeling such skeins are noted.

1.5 Where appropriate, this test method states all requirements in SI units. The traditional units are inch-pound and are exact values.

1.6 *This standard does not purport to address all of the safety problems, 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:<sup>2</sup>

[D76](#) Specification for Tensile Testing Machines for Textiles

[D123](#) Terminology Relating to Textiles

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

[D1907](#) Test Method for Linear Density of Yarn (Yarn Number) by the Skein Method

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

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

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

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

## 3. Terminology

### 3.1 Definitions:

3.1.1 For definitions of textile terms used in this test method: breaking force, force, skein break factor, skein, skein breaking tenacity, skein strength, strength, refer to Terminology [D4849](#).

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

## 4. Summary of Test Method

4.1 A skein of yarn, prepared by winding the prescribed number of turns on a reel, is broken on a tensile testing machine.

NOTE 4—If the yarn number is also required for the determination of skein breaking tenacity or break factor, the broken skein may be weighed and the yarn number calculated as directed in Test Method [D1907](#).

<sup>1</sup> 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.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> The last approved version of this historical standard is referenced on [www.astm.org](http://www.astm.org).