



Standard Test Method for Tensile Strength and Breaking Tenacity of Wool Fiber Bundles 1-in. (25.4-mm) Gage Length¹

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1. Scope

1.1 This test method covers the determination of the breaking force (or load) and estimation of the tensile strength and tenacity of wool fiber bundles with a 1-in. (25.4-mm) gage length. A procedure for preparation of the fiber bundle is included.

1.2 The values stated in inch-pound units are to be regarded as standard; the values in SI units are provided for information only. Because the instrument is calibrated in inch-pound units, inch-pound units are shown first, contrary to Committee D13 policy.

NOTE 1—For other methods of measuring breaking tenacity of fiber bundles, refer to Test Methods D 1445 and D 2524.

NOTE 2—This test method can be used for other fibers that lend themselves to the same kind of preparation but the difference in density must be taken into account when calculating the tensile strength. It is not necessary to know or correct for the density of a fiber when calculating breaking tenacity.

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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

- D 76 Specification for Tensile Testing Machines for Textiles²
- D 123 Terminology Relating to Textiles²
- D 1445 Test Method for Breaking Strength and Elongation of Cotton Fibers (Flat Bundle Method)²
- D 1776 Practice for Conditioning Textiles for Testing²
- D 2524 Test Method for Breaking Tenacity of Wool Fibers, Flat Bundle Method— $\frac{1}{8}$ -in. (3.2-mm) Gage Length²
- D 2525 Practice for Sampling Wool for Moisture²

3. Terminology

3.1 Definitions:

3.1.1 *breaking tenacity, n*—the tenacity corresponding to the breaking load.

3.1.1.1 *Discussion*—Breaking tenacity is commonly expressed as grams-force per tex (gf/tex), grams-force per denier (gf/den), millinewtons per tex (mN/tex), or millinewtons per denier (mN/den). Millinewtons are numerically equal to grams-force times 9.81.

3.1.2 *constant-rate-of-extension (CRE) type tensile testing machine, n—in tensile testing*, an apparatus in which the pulling clamp moves at a uniform rate, and the force-measuring mechanism moves a negligible distance with increasing force, less than 0.13 mm (0.005 in.).

3.1.3 *constant-rate-of-loading (CRL) type tensile testing machine, n—in tensile testing*, an apparatus in which the rate of increase of the force is uniform with time after the first 3 s and the specimen is free to elongate, this elongation being dependent on the extension characteristics of the specimen at any applied force.

3.1.4 *constant-rate-of-traverse tensile testing machine (CRT), n—in tensile testing*, an apparatus in which the pulling clamp moves at a uniform rate and the force is applied through the other clamp, which moves appreciably to actuate a force-mechanism, producing a rate of increase of force or extension that is usually not constant and is dependent upon the extension characteristics of the specimen.

3.1.5 *gage length, n—in tensile testing*, the length of a specimen measured between the points of attachment to clamps while under uniform tension.

3.1.6 *recycled wool, n—as defined in the Wool Products Labeling Act as amended in 1980*, “the resulting fiber when wool has been woven or felted into a wool product which, without ever having been utilized in any way by the ultimate consumer, subsequently has been made into a fibrous state, or the resulting fiber when wool or reprocessed wool has been spun, woven knitted or felted into a wool product which, after having been used in any way by the ultimate consumer, subsequently has been made into a fibrous state.”

3.1.6.1 *Discussion*—In the amended Act of 1980, the term “recycled wool” replaced the terms “reprocessed wool” and “reused wool.”

3.1.7 *tenacity, n—in a tensile test*, the force exerted on the specimen based on the linear density of the unstrained specimen.

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² *Annual Book of ASTM Standards*, Vol 07.01.