



## Standard Guide for Abrasion Resistance of Textile Fabrics (Uniform Abrasion)<sup>1</sup>

This standard is issued under the fixed designation D 4158; 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 guide covers the determination of the resistance to abrasion of a wide range of textile materials using the uniform abrasion testing instrument. Fabrics of all types including carpets, garments and nonwovens may be tested under this method.

NOTE 1—Other procedures for measuring the abrasion resistance of textile fabrics are given in: Test Methods D 3884, D 3885, D 3886, D 4157, D 4966, and AATCC Test Method 93.

1.1.1 Provisions are provided for testing specimens in dry and wet conditions. Four options for evaluation are included:

- Option 1—Fabric Rupture
- Option 2—Mass Loss
- Option 3—Thickness Loss
- Option 4—Breaking Strength Loss

1.1.2 Provision is provided for testing specimens in the wet state.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as the standard. Within the text, the inch-pound units are shown in parentheses. 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 nonconformance with the specification.

1.3 *This guide 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 123 Terminology Relating to Textiles<sup>2</sup>
- D 1776 Practice for Conditioning Textiles for Testing<sup>2</sup>
- D 3884 Test Methods for Abrasion Resistance of Textile Fabrics (Rotary Platform, Double Head Method)<sup>3</sup>
- D 3885 Test Method for Abrasion Resistance of Textile Fabrics (Flexing and Abrasion Method)<sup>3</sup>

<sup>1</sup> This method is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.60 on Fabric Test Methods, Specific.

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<sup>2</sup> Annual Book of ASTM Standards, Vol 07.01.

<sup>3</sup> Annual Book of ASTM Standards, Vol 07.02.

D 3886 Test Method for Abrasion Resistance of Textile Fabrics (Inflated Diaphragm Apparatus)<sup>3</sup>

D 4157 Test Method for Abrasion Resistance of Textile Fabrics (Oscillatory Cylinder Method)<sup>3</sup>

D 4966 Test Method for Abrasion Resistance of Textile Fabrics (Martindale Abrasion Tester Method)<sup>4</sup>

D 5035 Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)<sup>3</sup>

#### 2.2 Other Documents:

AATCC Test Method 93, Abrasion Resistance of Fabrics: Accelerator Method<sup>5</sup>

### 3. Terminology

#### 3.1 Definitions:

3.1.1 *abrasion, n*—the wearing away of any part of a material by rubbing against another surface.

3.1.2 *abrasion cycle, n*—one complete movement of an abrading across the surfaces of a material being abraded.

3.1.2.1 *Discussion*—The complete movement for an abrasion cycle is dependent on the action of the abrasion machine and the test method used. It may consist of one back and forth nondirectional movement, or one circular movement, or a combination of both. For the uniform abrasion method, one cycle is one circular movement or rotation as noted on its counter.

3.1.3 *rotation, n*—one count on the counter which is roughly equivalent to one cycle.

3.2 For definitions of other terms used in these methods, refer to Terminology D 123.

### 4. Summary of Test

4.1 A specimen is mounted in a holder and abraded uniformly in all directions in the plane and about every point of the surface of the specimen. The settings of the instrument, method of mounting specimens, conditions of test (conditioned or wet), and criteria to be used in evaluating abrasive wear in the test, depend upon the nature of the specimen to be tested and the use to be made of the test results. Abrasion resistance for wear is evaluated by one or more conditions of destruction, a defined surface damage, loss in the mass, strength or thickness of test specimens, or by increased weakness in the sample as shown by a subsequent test by another method,

<sup>4</sup> Discontinued- See 2000 Annual Book of ASTM Standards, Vol 07.02.

<sup>5</sup> Available from American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, NC 27709.