



Designation: D4851 – 07 (Reapproved 2025)

Standard Test Methods for Coated and Laminated Fabrics for Architectural Use¹

This standard is issued under the fixed designation D4851; 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 These test methods cover the testing of coated and laminated fabrics made primarily for use in fabric roof systems. These coated and laminated fabrics are generally in either an air supported or tension supported construction of fabric roof systems.

1.2 These methods can be used for most fiber-based, coated and laminated architectural fabrics.

1.3 This standard includes the following sections that provide test procedures for coated and laminated architectural fabrics:

	Section
Fabric Count	8
Mass per Unit Area	9
Fabric Thickness	10
Fabric Width	11
Fabric Length	12
Fabric Bow	13
Adhesion of Coating to Fabric	14
Uniaxial Elongation Under Static Load	15
Fabric Breaking Force	16
Breaking Strength After Crease Fold	17
Elongation at Break	18
Fabric Trapezoid Tear Force	19
Resistance to Accelerated Weathering	20
Solar Optical Properties	21
Fabric Flame Resistance	22
Noise Reduction Coefficient	23

1.4 These test methods include only testing procedures and do not include specifications or tolerances. They are intended as a guide for specifications. Any of these methods may be used in material specifications to evaluate requirements for a specific end use as related to a particular job.

1.5 The values stated in either SI 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 are not exact equivalents; therefore, each system shall be used independently of the other.

1.6 *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. Specific warning statements are given in 14.1, A1.3.3.1, A2.3.3.1, and A3.3.3.1.

1.7 *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

- C423 Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
- D123 Terminology Relating to Textiles
- D751 Test Methods for Coated Fabrics
- D1003 Test Method for Haze and Luminous Transmittance of Transparent Plastics
- D1776/D1776M Practice for Conditioning and Testing Textiles
- D1777 Test Method for Thickness of Textile Materials
- 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
- D3773/D3773M Test Methods for Length of Woven Fabric
- D3774/D3774M Test Method for Width of Textile Fabric
- D3775 Test Method for End (Warp) and Pick (Filling) Count of Woven Fabrics
- D3776/D3776M Test Methods for Mass Per Unit Area (Weight) of Fabric
- D3882 Test Method for Bow and Skew in Woven and Knitted Fabrics
- D4850 Terminology Relating to Fabrics and Fabric Test Methods

¹ These test methods are under the jurisdiction of ASTM Committee D13 on Textiles and are the direct responsibility of Subcommittee D13.59 on Fabric Physical Test Methods A.

Current edition approved June 1, 2025. Published June 2025. Originally approved in 1988. Last previous edition approved in 2019 as D4851 – 07(2019)^{ε1}. DOI: 10.1520/D4851-07R25.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. 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.

- D5035** Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)
- D5587** Test Method for Tearing Strength of Fabrics by Trapezoid Procedure
- E84** Test Method for Surface Burning Characteristics of Building Materials
- E108** Test Methods for Fire Tests of Roof Coverings
- E136** Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 °C
- E424** Test Methods for Solar Energy Transmittance and Reflectance (Terrestrial) of Sheet Materials
- G23** Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials (Withdrawn 2000)³
- G26** Practice for Operating Light-Exposure Apparatus (Xenon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials (Discontinued 2001) (Withdrawn 2000)³
- G53** Practice for Operating Light-and Water-Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Materials (Withdrawn 2000)³

2.2 Federal Standards:

- Federal Test Method Standard 191b**, Method 5903, Vertical Flame Resistance of Cloth⁴
- NFPA 701** National Fire Protection Standards—701 Standard Methods of Fire Tests for Flame Resistant Textiles and Films⁵

3. Terminology

3.1 For all terminology relating to D13.59, Fabric Test Methods, General, refer to Terminology **D4850**.

3.1.1 The following terms are relevant to this standard: air-supported roof, architectural-use, coated fabric, fabric roof-system, laminated fabric, tension-supported roof.

3.2 For all other terminology related to textiles, refer to Terminology **D123**.

4. Summary of Test Method

4.1 A summary of the directions prescribed for the determination of specific properties is stated in the appropriate sections of specific methods or in the referenced test methods.

5. Significance and Use

5.1 The procedures in this standard can be used for acceptance testing of commercial shipments of coated and laminated fabrics for architectural use since these test methods have been used extensively in the trade for acceptance testing. Caution is advised, however, when testing adhesion of coating to fabric and breaking strength after crease fold because between laboratory precision is known to be poor (see **24.2**). For these cases, comparative tests conducted, as directed in **5.1.1**, may be advisable.

5.1.1 In cases of a dispute arising from differences in reported test results when using Test Methods D4851 for acceptance testing of commercial shipments, the purchaser and the supplier should conduct comparative tests to determine if there is a statistical bias between their laboratories. Competent statistical assistance is recommended for the investigation of bias. As a minimum, the two parties should take a group of test specimens which are as homogeneous as possible and from a lot of material of the type in question. The test specimens should then be randomly assigned in equal numbers to each laboratory for testing. The average results from the two laboratories should be compared using appropriate statistical analysis for unpaired data and an acceptable probability level chosen by the two parties before the testing is begun. If a bias is found, either its cause must be found and corrected or the purchaser and the supplier must agree to interpret future test results with consideration of the known bias.

5.2 The uses and significance of specific properties are discussed in the appropriate sections of specific test methods.

6. Sampling

6.1 *Lot Size*—The size of an acceptance sampling lot of fabric for architectural use shall be the number of fabric rolls in a shipment or consignment of a single fabric style unless otherwise agreed upon between the purchaser and supplier.

6.2 *Lot Sample*—Unless otherwise agreed upon, as when specified in an applicable order or contract, take as a lot sample the number of rolls in a shipment or consignment of fabric. Specify the number of rolls of fabric in the lot sample for each property of interest. Consider rolls of fabric to be the primary sampling units.

NOTE 1—An adequate specification or other agreement between the purchaser and supplier requires taking into account the variability between rolls of fabric and between specimens from a swatch or roll of fabric to provide a sampling plan with a meaningful producer's risk, consumer's risk, acceptable quality level, and limiting quality level.

6.3 *Laboratory Sample*—As a laboratory sample, take the following samples:

6.3.1 For fabric width, fabric bow, and fabric length, the rolls in the lot sample serve as the laboratory sample.

6.3.2 For noise reduction coefficient, flame resistance other than small scale NFPA 701, solar optical properties, and resistance to accelerated weathering, take as a laboratory sample a full-width swatch 12 m (12 yd) long from the end of each randomly selected roll in the lot sample as determined by agreement between the purchaser and supplier.

NOTE 2—Properties such as noise reduction coefficient, some flame resistance tests, solar optical, and resistance to weathering are dependent upon fabric style and manufacturing processes. The extent of the sampling for these properties is usually defined in the applicable order or contract. Among the options available to the purchaser and the supplier is for the purchaser to accept a certification by the manufacturer that the material in question meets the specification agreed upon by the two parties and what the basis for the certification is, such as, historical data generated from material manufactured under the same conditions.

6.3.3 For other properties take as a laboratory sample a full-width swatch 1 m (1 yd) long from the end of each roll in the lot sample.

⁴ Available from U.S. Government Printing Office, Superintendent of Documents, 732 N. Capitol St., NW, Washington, DC 20401-0001, <http://www.access.gpo.gov>.

⁵ Although discontinued by the National Fire Protection Association, this standard continues to be used by the industry.