Designation: D3774 – 96 (Reapproved 2016)

Standard Test Method for Width of Textile Fabric[1]

This standard is issued under the fixed designation D3774; 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.

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 measurement of the width of fabrics, pile or napped surface width, or both. The method is applicable to full rolls, bolts of fabric, and short specimens removed from a roll or bolt. Unless otherwise specified, measurements shall include the selvages when present.

1.2 The method offers two options:

1.2.1 *Option A*—Full Roll or Bolt.

1.2.2 *Option B*—Short Specimen Removed from Full Roll or Bolt.

1.3 The values stated in either SI units or U.S. customary units are to be regarded as standard. The U.S. customary units may be approximate.

1.4 *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

D1776 Practice for Conditioning and Testing Textiles

2.2 *Other Standard:*

ANSI/ASQC Z1.4—Inspection by Attributes[3]

3. Terminology

3.1 The following terms are relevant to this standard: width, *of a fabric*; width, *of a raised-surface fabric*; width, *of a fabric woven on a shuttleless loom*.

3.2 For definitions of all other textile terms see Terminology D123.

4. Summary of Test Method

4.1 The width of the fabric is measured directly by using a metal rule.

4.2 Option A offers two procedures for the measurement of fabric width, or pile width or napped surface width, or both, in full rolls or bolts. The first procedure is essentially a tension-free method, the second procedure provides for measurements made during finishing or inspection operations that may impart tension to the fabric.

4.3 Option B covers the measurement of fabric width, pile surface width or napped surface width, or both, when only a short length of fabric is available for testing. This procedure is applicable when a small swatch of fabric is sent to the laboratory to be used as the test specimen.

5. Significance and Use

5.1 Option A procedures of Test Method D3774 for width are considered satisfactory for acceptance testing of commercial shipments because they are used extensively in the trade.

5.1.1 In case of a dispute arising from differences in reported test values when using Test Method D3774 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 which are 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 Student's *t*-test for unpaired data and an acceptable probability level chosen by the two parties before 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 in the light of the known bias.

[1] This test method are under the jurisdiction of ASTM Committee D13 on Textiles and are the direct responsibility of Subcommittee D13.60 on Fabric Test Methods, Specific.

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[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.

[3] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

6. Apparatus

6.1 Measuring device, metre (yard) stick or steel tape having 1-mm (1⁄16-in.) graduations and a length that is greater than the width of fabric to be measured.

7. Sampling

7.1 As a lot sample for acceptance testing, take at random the number of rolls of fabric as directed in an applicable material specification or other agreement between the purchaser and the supplier.

7.2 For Option A, consider rolls of fabric to be the primary sampling units. Consider the rolls of fabric in the lot sample as the laboratory sample and the points at which measurements are made within the rolls as test specimens.

7.3 For Option B, cut a full width swatch at least 2 m (2 yd) long from each lot sampling unit as a laboratory sampling unit, taking care that the weave is not distorted within the swatches. Consider the points at which the measurements are made within the swatch as test specimens. This option is not suitable for acceptance testing because the results are applicable to that swatch only.

8. Conditioning

8.1 Condition the specimens as directed in Practice D1776.

8.2 When full rolls or bolts of fabric cannot be properly conditioned in a reasonable time with available facilities, perform the tests without conditioning and report the actual conditions prevailing at the time of the test. Such results may not correspond with the results obtained after testing conditioned specimens in the standard atmosphere for testing textiles.

9. Procedure

9.1 Make all measurements, when possible, in the standard atmosphere for testing textiles, which is 21 ± 1 °C (70 ± 2 °F) and 65 ± 2 % relative humidity.

9.2 *Option A—Full Roll or Bolt:*

9.2.1 *Free of Tension*—Lay the fabric on a smooth horizontal surface without tension in any direction. Measure the width as defined in D123 to the nearest 1 mm (1⁄16 in.), perpendicular to the selvages using the measuring device or steel tape. Take the measurement in at least five widely spaced places along the length of the roll or bolt. Make no measurement within 1 m (1 yd) of the ends of the roll or bolt. When specified, measurements of width of pile or napped surfaces may be made at the same time. Calculate and record the average of all measurements to the nearest 1 mm (1⁄16) in. Record the minimum and maximum values for each roll and for the lot.

9.2.2 *Running Under Tension*—When agreed upon by all parties concerned, take five measurements of width to the nearest 1 mm (1⁄16 in.) at any convenient time during the finishing or inspection operations using the measuring device. Make no measurement within 1 m (1 yd) of the ends of the roll or bolt. When specified, measurements of width of pile or napped surfaces may be made at the same time. Calculate and record the average of all measurements to the nearest 1 mm (1⁄16) in. Record the minimum and maximum values for each roll and for the lot.

9.3 *Option B—Laboratory Sample Removed From Full Roll or Bolt:*

9.3.1 Lay the fabric on a smooth horizontal surface without tension in any direction and free of wrinkles or distortion. Measure the width of the fabric as defined in 3.1 at three or more points separated by at least 0.3 m (1 ft) along the length of the fabric. Do not make measurements closer than 150 mm (6 in.) to the cut ends. Calculate the average of all measurements on the specimen to the nearest 1 mm (1⁄16 in.). Record the average measurement, the maximum measurement, and the minimum measurement.

10. Report

10.1 State that the specimen was tested as directed in Test Method D3774. Describe the material or product sampled and the source of each specimen.

10.2 Report the following information:

10.2.1 Option used and if tension was used in Option A.

10.2.2 Number of observations.

10.2.3 Average width as defined in Section 3, in millimetres (inches) or as specified between purchaser and seller.

10.2.4 Minimum and maximum measured width for each sampling unit and the lot.

10.2.5 Atmospheric conditions under which the tests were conducted and whether the specimens were conditioned as directed in Practice D1776.

11. Precision and Bias

11.1 *Summary*—In comparing the average of five observations, the difference should not exceed 1.5 mm in 95 out of 100 cases when all of the observations were taken by the same well-trained operator using the same piece of apparatus and specimens randomly drawn from the same sample of material. Larger differences are likely under all other circumstances.

11.2 *Interlaboratory Test Data:*[4]

11.2.1 An interlaboratory test was run in 1980 in which randomly drawn samples of four materials were tested in each of four laboratories. Two operators in each laboratory each tested two specimens of each material. The first fabric was a 65 % polyester and 35 % cotton plisse-type basket weave. The second fabric was a 65 % polyester and 35 % cotton gingham check. The third fabric was an 88 % cotton and 12 % polyester corduroy. The fourth fabric was a 100 % cotton denim. The component of variance for fabric width expressed as standard deviations were calculated to be as follows:

	Single-Operator Component, mm	Within-Laboratory Component, mm	Between-Laboratory Component, mm
Material 1	0.764	0.000	0.722
Material 2	1.181	0.000	0.000
Material 3	0.500	0.500	2.776
Material 4	1.443	0.000	3.116

[4] Supporting data have been filed at ASTM International Headquarters and may be obtained by requesting Research Report RR:D13-1068.

11.2.2 Since differences of 2 mm (1/13 in.) in fabric width are not of practical importance, it was agreed to pool the estimates of the single-operator and within-laboratory components for all materials and to assume two classes of materials for purposes of the between-laboratory component. No rule for classifying the materials with respect to the between-laboratory component is known. The pooled estimates are as follows:

Single-Operator Component	1.038 mm
Within-Laboratory Component	0.250 mm
Between-Laboratory Component	
Class 1	0.510 mm
Class 2	2.951 mm

NOTE 1—The square roots of the components of variance are being reported to express the variability in the appropriate unit of measure rather than as the squares of those units of measure.

11.3 *Critical Differences*—For the components of variance report in 9.2.1, two averages of observed values should be considered significantly different at the 95 % probability level if the difference equals or exceeds the following critical differences:

Number of Observations in each Average	Critical Differences for the Conditions Noted			
	Single-Operator Precision, mm	Within-Laboratory Precision, mm	Between-Laboratory Precision, mm	
			Class 1	Class 2
1	2.9	3.0	3.3	8.7
5	1.3	1.4	2.0	8.3
10	0.9	1.1	1.8	8.3

The critical differences were calculated using $t = 1.960$ which is based on infinite degrees of freedom.

NOTE 2—The tabulated values of the critical differences should be considered to be a general statement, particularly with respect to between-laboratory precision. Before a meaningful statement can be made about two specific laboratories, the amount of statistical bias, if any, between them must be established, with each comparison being based on recent data obtained on specimens taken from a lot of material of the type being evaluated so as to be as nearly homogeneous as possible and then randomly assigned in equal numbers to each of the laboratories.

11.4 *Bias*—The procedure in Option A of Test Method D3774 for measuring the width of fabric free of tension has no known bias and is used as a referee method.

12. Keywords

12.1 woven fabric; width