

Brief Descriptions of Test Methods and Source Links

ASTM 3512 – random tumble pill (information from <http://www.astm.org/Standards/D3512.htm>)

Significance and Use

Acceptance Testing—This method of testing fabrics for resistance to pilling is not recommended for acceptance testing. If it is used for acceptance testing, it should be used with caution because the between-laboratory precision is poor. In some cases the purchaser and the supplier may have to test a commercial shipment of one or more specific materials by the best available test method, even though the test method is not recommended for acceptance testing.

If there are differences or practical significance between reported test results for two laboratories (or more), comparative tests should be performed to determine if there is a statistical bias between them, using competent statistical assistance. As a minimum, the test samples should be used that are as homogeneous as possible, drawn from the material from which the disparate test results were obtained, and randomly assigned in equal numbers to each laboratory for testing. Other materials with established test values may be used for this purpose. The test results from the two laboratories should be compared using a statistical test for unpaired data, at a probability level chosen prior to the testing series. If a bias is found, either its cause must be found and corrected, or future test results must be adjusted in consideration of the known bias.

The pilling of textile fabrics is a very complex property because it is affected by many factors which may include type of fiber or blends, fiber dimensions, yarn and fabric construction, fabric finishing treatments and refurbishing method. Testing before refurbishing may be advisable. The pilling resistance of a specific fabric in actual wear varies more with general conditions of use and individual wearers than in replicate fabric specimens subjected to controlled laboratory tests. This experience should be borne in mind when adopting levels of acceptability for any series of standards.

Pills vary appreciably in size and appearance and depend on the presence of lint and degree of color contrast. These factors are not evaluated when pilling is rated solely on the number of pills. The development of pills may be accompanied by other surface phenomena such as loss of cover, color change, or the development of fuzz. Since the overall acceptability of a specific fabric is dependent on both the characteristics of the pills and the other factors affecting surface appearance, it is suggested that fabrics tested in the laboratory be evaluated subjectively with regard to their acceptability and not rated solely on the number of pills developed. A series of standards, based on graduated degrees of surface change of the fabric type being tested, may be set up to provide a basis for subjective ratings. The visual standards are most advantageous when the laboratory test specimens correlate closely in appearance with worn fabrics and show a similar ratio of pills to fuzz. Counting the pills and weighing their number with respect to their size and contrast, as a combined measure of pilling resistance, is not recommended because of the excessive time required for counting, sizing, and calculating.

The degree of fabric pilling is evaluated by comparing the tested specimens with visual standards, which may be actual fabrics or photographs of fabrics, showing a range of pilling

resistance. The observed resistance to pilling is reported on an arbitrary scale ranging from 5 (no pilling) to 1 (very severe pilling).

This test method is applicable to a wide variety of woven and knitted fabrics that vary in pilling propensity as a result of variations in fiber, yarn and fabric structure, and finish.

1. Scope

1.1 This test method covers the resistance to the formation of pills and other related surface changes on textile fabrics using the random tumble pilling tester. The procedure is generally applicable to all types of woven and knitted apparel fabrics.

Note 1—For other test methods for the pilling resistance of textiles, refer to Test Methods [D3511](#), [D3514](#), and [D4970](#).

1.2 Some fabrics that have been treated with a silicone resin may not be satisfactorily tested by this procedure because the silicone resin may transfer onto the cork liners in the test chamber and cause erroneous results.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. 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 non-conformance with the standard.

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.

ASTM D3774 – width (information from <http://www.astm.org/Standards/D3774.htm>)

Significance and Use

Option A procedures of Test Method D 3774 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 D 3774 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'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. Scope

D 3774 96 (Reapproved 2008) Standard Test Method for Width of Textile Fabric

Option A procedures of Test Method D 3774 for width are considered satisfactory for acceptance testing of commercial shipments because they are used extensively in the trade.

In case of a dispute arising from differences in reported test values when using Test Method D 3774 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.

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.

REFERENCE:

ASTM Standards:

[D 123](#) Terminology Relating to Textiles

[D 1776](#) Practice for Conditioning and Testing Textiles

ASTM D3775 – courses and wales (information from <http://www.astm.org/Standards/D3775.htm>)

Significance and Use

This test method is considered satisfactory for acceptance testing of commercial shipments because it has been used extensively in the trade for that purpose.

If there are differences of practical significance between reported test results for two laboratories (or more), comparative test should be performed to determine if there is a statistical bias between them, using competent statistical assistance. As a minimum, use the samples for such a comparative test that are as homogeneous as possible, drawn from the same lot of material as the samples that resulted in disparate results during initial testing and randomly assigned in equal numbers to each laboratory. The test results from the laboratories involved should be compared using a statistical test for unpaired data, a probability level chosen prior to the testing series. If bias is found, either its cause must be found and corrected, or future test results for that material must be adjusted in consideration of the known bias.

1. Scope

1.1 This test method covers the measurement of warp end count and filling pick count and is applicable to all types of woven fabrics.

Note 1—Historically, the term fabric count has been used to describe the end and pick count of woven fabrics. The terms warp (end) and filling (pick) count are replacing the term fabric count, to provide clarity.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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.

ASTM D3776 – weight per square yard (information from <http://www.astm.org/Standards/D3776.htm>)

Abstract

These test methods cover the measurement of fabric mass per unit area (weight) and is applicable to most fabrics. There are four approved options in the measurement of fabric mass per unit area: Option A, Option B, Option C, and Option D. Option A may be used for acceptance testing of commercial shipments since it has been used extensively in the trade. The second option is Option B which is applicable to a full-width sample cut from a full piece, roll, bolt, or cut. Unless otherwise specified, these results will include selvages and will be on the basis of conditioned fabric. Option C on the other hand is applicable when a small swatch of fabric is sent to the laboratory to be used as the test specimen. The results are considered to be applicable to the sample only and not necessarily to the lot from which the sample was taken. Measurements by this method do not include selvages and should be reported as such, unless a

selvage allowance is specified. The last option is Option D which is intended for use with narrow fabrics as so designated by the trade.

1. Scope

1.1 These test methods cover the measurement of fabric mass per unit area (weight) and is applicable to most fabrics.

1.2 There are four approved options:

1.2.1 Option A—Full Piece, Roll, Bolt or Cut (Section 7).

1.2.2 Option B—Full Width Sample (Section 8).

1.2.3 Option C—Small Swatch of Fabric (Section 9).

1.2.4 Option D—Narrow Fabrics (Section 10).

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. 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 non-conformance with the standard.

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.

ASTM D 3787 – ball burst (information from <http://www.astm.org/Standards/D3787.htm>)

Significance and Use

This test method for the determination of ball bursting strength of textiles is being used by the textile industry for the evaluation of a wide variety of fabrics.

Test results obtained using the procedures in Test Method D 3787 have not been correlated with actual performance. Test Method D 3787 is considered satisfactory for acceptance testing of commercial shipments of textiles fabrics for bursting strength since the method has been used extensively in the trade for acceptance testing. In cases of disagreement arising from differences in values reported by the purchaser and the seller when using Test Method D 3787 for acceptance testing, the statistical bias, if any, between the laboratory of the purchaser and the laboratory of the seller should be determined with comparison based on testing specimens randomly drawn from one sample of material of the type being evaluated.

Note 2—The kind force transfer and strength that occur when knitted goods are worn is prevented by clamping them as directed in this test method.

5.2.1 If there are differences of practical significance between reported test results for two (or more) laboratories, comparative tests should be performed to determine if there is a statistical bias between them. The test samples used should be: as homogeneous as possible, drawn from the material from which the disparate test results were obtained, and randomly assigned in equal numbers to the laboratories for testing. Other materials with established test values may be used for this purpose. The test results from the two laboratories should be compared using a statistical test for unpaired data at a probability level chosen prior to the testing series. If a bias is found, either the cause must be determined and corrected or future test results must be adjusted in consideration of known bias.

1. Scope

1.1 This test method describes the measurement for bursting strength with a ball burst strength tester of textiles or garments that exhibit a high degree of ultimate elongation.

1.2 The values stated in SI units are to be regarded as the standard.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as the standard. Within the test, the inch-pound units are shown in parenthesis. The values stated in each system are not exact equivalents; therefore, each system may be used independently of the other. Combining values from the two systems may result in nonconformance within the specification.

Note 1

For the measurement of bursting strength with a hydraulic testing machine, refer to Test Method D 3786.

This standard may involve hazardous materials, operations and equipment. 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.

AATCC Test Method 16-2004 – Colorfastness to Light, Developed in 1964 by AATCC Committee RA50
(information from http://www.aatcc.org/Technical/Test_Methods/scopes/tm16.cfm)

1. Purpose and Scope

1.1 This test method provides the general principles and procedures which are currently in use for determining the colorfastness to light of textile materials. The test options described are applicable to textile materials of all kinds and for colorants, finishes and treatments applied to textile materials.

Test Options included are:

- 1-Enclosed Carbon-Arc Lamp, Continuous Light
- 2-Enclosed Carbon-Arc Lamp, Alternate Light and Dark
- 3-Xenon-Arc Lamp, Continuous Light, Black Panel Option
- 4-Xenon-Arc Lamp, Alternate Light and Dark

5-Xenon-Arc Lamp, Continuous Light, Black Standard Option
6-Daylight Behind Glass

1.2 The use of these test options does not imply, expressly or otherwise, an accelerated test for a specific application. The relationship between any lightfastness test and the actual exposure in use must be determined and agreed upon by the contractual parties.

2. Principle

2.1 Samples of the textile material to be tested and the agreed upon comparison standard(s) are exposed simultaneously to a light source under specified conditions. The colorfastness to light of the specimen is evaluated by comparison of the color change of the exposed portion to the masked control portion of the test specimen or unexposed original material, using the AATCC Gray Scale for Color Change or by instrumental color measurement. Lightfastness classification is accomplished by evaluation versus a simultaneously exposed series of AATCC Blue Wool Lightfastness Standards.

AATCC Test Method 61-2010 – Colorfastness to Laundering: Accelerated (home and commercial condition 2A), **Developed in 1950 by AATCC Committee RA60** (information from http://www.aatcc.org/Technical/Test_Methods/scopes/tm61.cfm)

1. Purpose and Scope

1.1 These accelerated laundering tests are to evaluate the colorfastness to laundering of textiles which are expected to withstand frequent laundering. The fabric color loss and surface changes resulting from detergent solution and abrasive action of five typical hand or home launderings, with or without chlorine, are roughly approximated by one 45 min test.

2. Principle

2.1 Specimens are tested under appropriate conditions of temperature, detergent solution, bleaching and abrasive action such that the color change is similar to that occurring in five hand or home launderings.

AATCC Test Method 116-2010 – Colorfastness to Crocking: Rotary Vertical Crockmeter Method, **Developed in 1966 by AATCC Committee RA38** (information from http://www.aatcc.org/Technical/Test_Methods/scopes/tm116.cfm)

1. Purpose and Scope

1.1 This test method is used to determine the amount of color transferred from the surface of colored textile materials to other surfaces by rubbing. It is applicable to textiles made from all fibers in the form of yarn or fabric, whether dyed, printed or otherwise colored and especially to prints where the singling out of areas smaller than possible to test with the standard AATCC Crockmeter (AATCC Test Method 8) is required.

1.2 Test procedures employing test squares either dry or wet with water or other liquids are within the scope of this method.

2. Principle

2.1 A test specimen held at the base of the Rotary Vertical Crockmeter is rubbed with standard test squares under controlled conditions.

2.2 Color transferred to the test squares is assessed by comparison with the Gray Scale for Staining or AATCC Chromatic Transference Scale.

AATCC Test Method 135-2010 – Dimensional Changes of Fabrics after Home Laundering, Developed in 1970 by AATCC Committee RA42 (information from http://www.aatcc.org/Technical/Test_Methods/scopes/tm135.cfm)

1. Purpose and Scope

1.1 This test method is intended for the determination of dimensional changes of fabrics when subjected to home laundering procedures used by consumers. Four washing temperatures, three agitation cycles, two rinse temperatures and four drying procedures cover the common home care options available to consumers using current laundering machines.

2. Principle

2.1 The dimensional changes of fabric specimens subjected to home laundering care are measured using pairs of bench marks applied to the fabric before laundering.

AATCC evaluation procedures for percentage of color retention by measuring DEcmc after 5 and 20 cycles. AATCC provides two methods for this test. The method used for this analysis utilized instrument testing. The test methods requires a colorimeter or spectrophotometer.

Sources: http://www.aatcc.org/Technical/Test_Methods/scopes/ep1.cfm,
http://www.aatcc.org/Technical/Test_Methods/scopes/ep7.cfm)

Uster Tensojet <http://www.uster.com/UI/textile-TENSOJET-4-2-48.aspx>

Zweigle Yarn Hairiness Tester <http://www.uster.com/UI/textile-USTER®-ZWEIGLE-HL400-2-3115.aspx>

Uster evenness tester <http://www.uster.com/UI/textile-USTER-TESTER-5-2-311.aspx>