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Standard Specification for Tolerances for Knitted Fabrics[1]

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1. Scope

1.1 This specification covers test methods and tolerances applicable to the following properties of knitted fabrics: yield, mass (weight), width, length, fabric count, bursting strength, moisture regain, thickness, extractable matter, and fiber composition.

1.2 These tolerances are applicable to knitted fabrics of all types, such as warp knits, weft knits, flat bed knits, and the like.

NOTE 1—The values stated in SI units are to be regarded as the standard.

2. Referenced Documents

2.1 *ASTM Standards:* [2]

D 123 Terminology Relating to Textiles
D 629 Test Methods for Quantitative Analysis of Textiles
D 2257 Test Method for Extractable Matter in Textiles
D 2494 Test Method for Commercial Mass of a Shipment of Yarn or Man-Made Staple Fiber or Tow
D 2654 Test Methods for Moisture in Textiles
D 2720 Practice for Calculation of Commercial Weight and Yield of Scoured Wool, Top, and Noil for Various Commercial Compositions
D 2905 Practice for Statements on Number of Specimens for Textiles
D 3773 Test Methods for Length of Woven Fabric
D 3774 Test Method for Width of Woven Fabric
D 3776 Test Method for Mass per Unit Area (Weight) of Fabric
D 3786 Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics—Diaphragm Bursting Strength Tester Method
D 3787 Test Method for Bursting Strength of Knitted Goods—Constant-Rate-of-Traverse (CRT), Ball Burst Test

2.2 *Other Documents:*

Textile Fiber Products Identification Act[3]
Wool Products Labeling Act of 1939[4]

2.3 *Military Standard:*[5]

MIL-STD-105D Sampling Procedures and Tables for Inspection by Attributes

NOTE 2—Reference to test methods in this specification give only the permanent part of the ASTM designation. The current editions of each test method cited shall prevail.

3. Terminology

3.1 *Definitions:*

3.1.1 *bursting strength, n*—the force or pressure required to rupture a fabric by distending it, when applied at right angles to the plane of the fabric, under specified conditions.

3.1.2 *commercial mass, n*—billed weight (mass) as determined by a generally accepted method or as agreed upon between the purchaser and the seller.

3.1.2.1 *Discussion*—The basis for determining the commercial weight (mass) of a shipment of textile product is generally one of the following:

(1) Man-Made Fibers:

(a) CMRU Basis (commercial moisture regain with unscoured material)—the weight (mass) of unscoured, moisture-free textile product plus the weight (mass) corresponding to its commercial *moisture regain*.

(b) CMRS Basis (commercial moisture regain with scoured material)—the weight (mass) of moisture-free textile product after scouring by definite prescribed methods plus the weight corresponding to its commercial *moisture regain.*

(c) CAS Basis (commercial allowance with scoured material)—the weight (mass) of moisture-free textile product after scouring by definite prescribed methods plus the weight corresponding to its *commercial allowance*.

(d) UN Basis (unadjusted net)—the weight (mass) of unscoured textile product with no adjustment for the amount of moisture or finish, or both.

(2) Wool:

(a) CC Basis (commercial composition)—the weight (mass) of

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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] Act of Congress, "Textile Fiber Products Identification Act," 85th Congress, Second Session, approved Sept. 2, 1958.

[4] Act of Congress, "Wool Products Labelling Act of 1939," 76th Congress, Third Session, approved Oct. 14, 1939.

[5] Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

wool base as determined by definite prescribed methods plus the weights (masses) of moisture and other components corresponding to the commercial composition of the commercially designated material (for explanation, see Practice D 2720).

(b) UN Basis (unadjusted net)—the weight (mass) of unscoured textile product with no adjustment for the amount of moisture or finish, or other components.

3.1.3 *commercial moisture regain (CMR), n*— a formally adopted, arbitrary value, to be used with the oven-dried mass of textile fibers, when calculating the commercial mass of a shipment or delivery.

3.1.4 *course, n—in knitted fabrics*, a row of successive loops parallel to the width direction of the fabric.

3.1.5 *finished fabric weight, n*—mass per unit area expressed in grams per square metre (ounces per square yard), grams per linear metre (ounces per linear yard), or inversely as metres per kilogram (linear yards per pound), or square metres per kilogram (square yards per pound).

3.1.5.1 *Discussion*—When weight (mass) is based on metres or linear yards, the fabric width must be stated.

3.1.6 *finished yield, n— in knitted fabrics*, the number of finished square metres per kilogram (square yards per pound) of finished fabric.

3.1.7 *greige yield, n— in knitted fabrics*, the number of finished square metres per kilogram (square yards per pound) of greige fabric.

3.1.8 *knitted fabric, n*—a structure produced by interlooping one or more ends of yarn or comparable material.

3.1.9 *knitted fabric count, n*—the number (counted units) of wale and courses per 25 mm (1 in.).

3.1.10 *length, n—in fabric*, the distance from one end to the other, measured parallel to the selvage or flattened tube edge of fabric that is under zero tension and free of folds and wrinkles.

3.1.11 *tolerances, n—in mathematics*, prescribed limits of variation for specified properties of a particular material based on observed values obtained by specified test methods and on samples that are representative of the material.

3.1.12 *wale, n—in knitted fabrics*, a column of successive loops parallel to the length direction of the fabric.

3.1.13 *width, n—in open-width knit fabric*, the perpendicular distance between the selvages when the fabric is laid flat, under zero tension, and free from folds or wrinkles.

3.1.14 *width, n—in tubular knit fabric*, the perpendicular distance between the edges of a flattened tube of fabric that is under zero tension and free from folds or wrinkles.

3.1.15 For definitions of other textile terms used in this specification, refer to Terminology D 123.

4. Tolerances

4.1 The following are the tolerances for each knitted fabric property:

Characteristic	Requirements	Section
Yield	±5.0 %	8
Weight (mass)	±5.0 %	9
Width	−0 to +25 mm (1 in.)	10
Length	±2.0 %	11
Fabric count	±5.0 %	12
Bursting strength (ball burst)	±10.0 %	13
Extractable matter	1.0 %, max	14
Fiber content	pass[A]	15

[A] Those products to which the Wool Products Labeling Act of 1939[4] apply, shall conform to the requirements of that act. Other fabrics shall conform to the requirements of the Textile Fiber Products Identification Act of 1958.[3]

5. Significance and Use

5.1 Knitted fabrics are known to exhibit inherent variations in properties. This specification lists the tolerances for each property deemed acceptable in the trade.

5.1.1 These tolerances can be used to determine if knitted fabrics meet specifications for properties, and provide a guide in case of dispute.

5.2 Tolerances agreed upon between the purchaser and the seller shall take precedence over those listed in this specification.

6. Sampling

6.1 *Lot Sample*—As a lot sample for acceptance testing, take at random the number of rolls as directed in an applicable specification or other agreement between the purchaser and the supplier, such as an agreement to use MIL-STD-105D.

6.2 *Laboratory Sample*—From each roll or piece in the lot sample, cut two laboratory samples the full width of the fabric and at least 375 mm (15 in.) along the selvage.

7. Conditioning

7.1 For tests made on conditioned material, precondition the specimens by bringing them to approximate moisture equilibrium in the standard atmosphere for preconditioning, then bring the specimens to moisture equilibrium for testing in the standard atmosphere for testing. It shall be considered that moisture equilibrium for testing has been reached when, after free exposure to air in motion, the change in weight (mass) of the specimen at successive intervals of not less than 2 h does not exceed 0.1 % of the specimen weight (mass).

7.2 Properties not significantly affected by minor variations in atmospheric conditions may be tested in prevailing room atmospheres by agreement of all parties concerned.

7.3 If the samples comprise whole rolls or bolts of fabric that cannot be properly conditioned in a reasonable time with the facilities available, perform the test determinations on the material without conditioning. When tests are carried out under conditions that vary from the standard, report the actual conditions prevailing at the time of test. It must be recognized that such results may not correspond with the results obtained after testing in the standard atmosphere for testing textiles.

TEST METHODS

8. Yield

8.1 Determine the greige yield on unscoured or scoured fabric by dividing the commercial mass (weight) of the greige fabric, obtained as directed in Test Method D 2494, into the total finished square metres (square yards), as calculated from the width and lengths on invoices.

8.1.1 The general practice in the trade is to determine greige yield on unscoured fabric. However, in some cases, greige yield is determined on scoured fabric. Hence, the report for the greige yield should specify whether unscoured or scoured basis was used.