ASTM INTERNATIONAL

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Standard Test Method for
Yarn Number Based on Short-Length Specimens[1]

This standard is issued under the fixed designation D1059; 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 determination of the yarn number of all types of cotton, woolen, worsted, and man-made fiber yarns taken from packages; or from any textile fabrics in which the yarns are intact and can be removed in measurable lengths. The test method is not applicable to yarns taken from napped or cut pile fabrics. Because this test method is based on short-length specimens, the results should only be considered as approximations of yarn number.

NOTE 1—For a more precise procedure for the determination of yarn number, refer to Test Method D1907.

NOTE 2—The following additional methods for the determination of yarn number have been approved for yarns made from specific fibers: Specification D541, D578, and D681.

1.2 This test method is applicable to yarns which stretch less than 5 % when tension on yarn is increased from 0.25 to 0.75 cN/tex (0.25 to 0.75 gf/tex). By mutual agreement it may be adapted to yarns which stretch more than 5 % by use of tension lower than that specified in the method for elastomers or use of tension higher than that specified in the method to pull the crimp out of textured yarns.

1.3 The values stated in SI units are to be regarded as standard. The values given in parentheses after SI units are provided for information only and are not considered 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *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:*

D123 Terminology Relating to Textiles

D541 Specification for Single Jute Yarn (Withdrawn 1996)[2]

D578 Specification for Glass Fiber Strands

D629 Test Methods for Quantitative Analysis of Textiles

D681 Specification for Jute Rove and Plied Yarn for Electrical and Packing Purposes (Withdrawn 2000)[2]

D1423 Test Method for Twist in Yarns by Direct-Counting

D1776 Practice for Conditioning and Testing Textiles

D1907 Test Method for Linear Density of Yarn (Yarn Number) by the Skein Method

D2258 Practice for Sampling Yarn for Testing

3. Terminology

3.1 *Definitions*—The following terms are relevant to this standard: cotton count, cut, indirect yarn numbering system, lea, metric count, run, tex, type, worsted count, yarn number, yarn numbering system.

3.2 For definitions of other textile terms used in this test method, refer to Terminology D123.

4. Summary of Test Method

4.1 Specimens of prescribed length, usually 1 m (1.1 yd) or less, are cut from a conditioned sample, which is under prescribed tension, and weighed. The yarn number is calculated from the mass and the measured length of the yarn.

5. Significance and Use

5.1 This is a quick method used for the determination of the approximate yarn number of short-length specimens taken from packages or fabrics.

5.2 Because any error present in the reported length of the specimen is multiplied many times when calculating the theoretical yarn number using Eq 2 or Eq 3, it is extremely important that the length be measured as precisely as practicable.

5.3 For the analysis of fabrics, this test method is adequate for estimating the approximate yarn number of the yarn used to weave or knit the fabric, but the results obtained by this test method may not agree with the nominal yarn number of the yarns actually used to make the fabric because of the changes in the yarn number produced by the weaving or knitting operations, the finishing treatments, and the dissecting operations. This test method is suitable for the evaluation of yarns as they occur in the finished fabric, when that information is needed.

5.4 The yarn number obtained from the lengths taken from packages should not be expected to agree exactly with the values obtained by the use of the more precise methods of determining the yarn number included in Test Method D1907. If a sufficient number of consecutive specimens were tested, however, a close agreement with Option 1 of Test Method D1907 can be expected.

5.5 This test method is designed to measure the yarn number of the single yarns present as a component of a plied yarn and the yarn number of the original single yarns used to produce a high twist yarn for a crepe fabric.

5.6 This test method is not recommended for acceptance testing because of the short lengths used. 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 method, even though the method has not been recommended for acceptance testing of commercial shipments.

5.6.1 In such a case, if there is disagreement arising from the differences in values reported by the purchaser and supplier when using this method for acceptance testing, the statistical bias, if any, between the laboratory of the purchaser and the laboratory of the supplier should be determined with each comparison being based on testing specimens randomly drawn from one sample of material of the type being evaluated.

6. Apparatus

6.1 *Twist Tester,* equipped with a tension device and means of measuring the change in length of the specimen due to untwisting, as specified in Test Method D1423.

6.2 *Length Measuring Device,* A tape or scale measuring at least 1.00 m (1.1 yd) in length, graduated in millimetres, and with two clamps, one adjustable, to permit measuring various lengths of yarn up to and including 1 m (1.1 yd). The scale should be accurate to 1 part in 1000. Means should be provided for applying a specified tension to the specimen and for cutting it without damaging the scale.

6.3 *Razor-Edge Craft Knife, or Sharp Pointed Scissor or Equivalent.*

6.4 *Tensioning Weights,* accurate to 1 part in 100.

6.5 *Balance,* capable of weighing to within 0.1 % of the specimen mass.

6.6 *Dissecting Needle,* Scribe, or Stylus, (hereafter needle).

6.7 *Auxiliary Equipment for Raveling Tricot Fabric:*

6.7.1 *Metal Clamps,* four to six (1 g to 5 g depending on the mass per unit area of the tricot fabric).

6.7.2 *Sharp Pointed Scissors.*

6.7.3 *Tweezers.*

6.8 *Masking Tape.*

6.9 *Test (or Specimen) Board*—of a stiff material, such as cardboard, covered with a short pile fabric (for example, velvet, velveteen, or a plush or napped surface).

7. Sampling

7.1 *Lot Sample*—As a lot sample for acceptance testing, take at random the number of shipping containers directed in an applicable material specification or other agreement between the purchaser and the supplier, such as an agreement to use Practice D2258.

7.2 *Laboratory Sample*—As laboratory sample for acceptance testing, proceed as follows:

7.2.1 For packages such as cones, spools, or bobbins, take a total number of packages as directed in Section 7 of Test Method D1907.

7.2.2 For beams, remove 1.5 m (1.5 yd) of yarn from all ends across the beam. Handle carefully to avoid tangling. secure the ends of the sample yarns by sandwiching them at the ends with strips of masking tape.

7.2.3 For fabrics, take a swatch of full-width fabric at last 1.5 m (1.5. yd).

7.3 *Test Specimens*—From each unit of the laboratory sample, take specimens at the time of testing as follows:

7.3.1 For packages such as cones, spools, or bobbins, take one specimen per package.

7.3.2 For beams, take ten ends at random from each half of the beam sheet.

7.3.3 For woven fabrics, take ten separate specimens from the warp and ten separate specimens from the filling. Take the filling specimens at random. Discard specimens that appear to be damaged.

7.3.4 For weft knit fabrics, take ten specimens at random unless the fabric is known to be a multifeed fabric or double knit fabric. For multifeed fabric, take ten specimens from ten successive courses in one part of the laboratory sample. For double knit fabric, take five specimens from each knitting type of yarn (short and long feed length courses).

7.3.5 For warp knit fabrics, cut a walewise strip from which specimens can be raveled. Cut the strip at least 0.2 m (8 in.) longer than the specimen length and wide enough to contain more than the required number of specimens. Test five specimens from each bar.

NOTE 3—When testing for other than acceptance testing, the specimens may have to be taken in a different manner than directed above. A minimum of ten specimens in each test result is recommended.

8. Conditioning

8.1 Bring the laboratory samples or specimens to moisture equilibrium for testing in the standard atmosphere for testing textiles as directed in Practice D1776, except that preconditioning is not necessary.

9. Preparation of Apparatus

9.1 *Yarn from Packages*—Normally, specimens having a length of 1 m (1.1 yd) can be obtained from pirns, cones,