Designation: D861 – 07 (Reapproved 2013)

Standard Practice for Use of the Tex System to Designate Linear Density of Fibers, Yarn Intermediates, and Yarns[1]

This standard is issued under the fixed designation D861; 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 Department of Defense.

1. Scope

1.1 This practice covers the use of the tex system to designate the linear density (number, or count) of fibers and of yarns made from any type of fiber or combination of fibers. It is also applicable to other textile materials, including yarn intermediates (slivers, rovings, tops, etc.), single or plied yarns, cords, and threads.

NOTE 1—The mass per unit length concept of linear density is applicable to any material which has a high ratio of length to cross section.

1.2 Conversion factors for various indirect and direct yarn numbers to exact tex equivalents can be found in Standard Tables D2260.

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.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D123 Terminology Relating to Textiles

D2260 Tables of Conversion Factors and Equivalent Yarn Numbers Measured in Various Numbering Systems

D4849 Terminology Related to Yarns and Fibers

2.2 *ISO Standards:*

ISO 2947 Textiles—Integrated Conversion Table for Replacing Traditional Yarn Numbers by Rounded Values in the Tex System[3]

3. Terminology

3.1 For all terminology relating to D13.58, Yarns and Fibers, refer to Terminology D4849.

3.1.1 The following terms are relevant to this standard: linear density, tex.

3.2 For all other terminology relating to textiles, see Terminology D123.

4. Significance and Use

4.1 The tex system has been approved for general use by the International Organization for Standardization, Technical Committee 38 on Textiles (ISO/TC 38), which has also recommended a list of rounded tex numbers for use with fibers and all types of yarns. Conversion tables showing the rounded tex numbers corresponding to various numbers in different traditional systems are given in Tables D2260 and ISO 2947.

4.2 The tex system for designation of the linear density of fibers and yarns is a direct system based on mass per unit length, *M/L,* and employs metric units of length and mass. The tex unit, grams per kilometre (1000 m) has been approved by ISO/TC 38 for use with all fibers and all types of yarn. The committee has also approved the use of kilotex and decatex numbers for coarse structures and decitex and millitex numbers for fibers.

4.3 The tex system relates to the property commonly associated with coarseness, or inverse fineness of a yarn because the tex numbers increase with an increase in the size or mass per unit length of the yarn. The tex system is intended for use by all branches of the textile industry, in all countries, for yarns made from all types of fibers or mixtures of fibers.

5. Recommended Applications

5.1 It is recommended that tex units, including their multiples and submultiples, be used to designate the linear density of all natural and man-made fibers, filaments, yarns, cords, rovings, tops, etc.

5.2 It is recommended that linear density be reported to three significant figures, using either millitex, decitex, or tex units.

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[1] This practice is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.58 on Yarns and Fibers.

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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 the American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036.

5.3 It is recommended that linear density be expressed in dicitex or tex units and reported to three significant figures, and that kilotex units be used for all numbers above 999.9 tex.

5.4 It is recommended that the breaking tenacity or tenacity at any specified elongation for individual fibers, filaments, or yarns be expressed in newtons (decinewtons, centinewtons, or millinewtons) per tex.

NOTE 2—In calculating breaking tenacity, the values for the average breaking force and the average linear density used in the calculations should retain two more significant figures than the single observed values.

6. Keywords

6.1 linear density; tex; tex system; textile fibers; textile strand; yarn; yarn intermediates; yarn number