



Designation: D 861 – 01

Standard Practice for Use of the Tex System to Designate Linear Density of Fibers, Yarn Intermediates, and Yarns¹

This standard is issued under the fixed designation D 861; 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.

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 D 2260.

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:

D 123 Terminology Relating to Textiles²

D 2260 Tables of Conversion Factors and Equivalent Yarn Numbers Measured in Various Numbering Systems²

2.2 ISO Standards:

ISO 1144 Textiles—Universal System for Designating Linear Density (Tex System)³

ISO 2947 Textiles—Integrated Conversion Table for Replacing Traditional Yarn Numbers by Rounded Values in the Tex System³

2.3 Other Document:

Guide to Metrication for the Textile Industry⁴

3. Terminology

3.1 Definitions:

3.1.1 *linear density, n.*—mass per unit length.

3.1.1.1 *Discussion*—It is common practice to determine the “mass” of objects on beam balances or scales and call the result the “weight” of the object instead of the technically correct term “mass” used in the definitions of “tex,” and “linear density.”

3.1.2 *tex, n.*—the unit of linear density equal to the mass in grams of 1000 m of fiber, yarn, or other textile strand, that is used in a direct yarn numbering system.

3.1.2.1 *Discussion*—The terms kilotex, decitex, and millitex are frequently used to express linear density. Conversion factors from tex to these measures are contained in Tables D 2260.

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

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 D 2260 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

¹ This practice is under the jurisdiction of ASTM Committee D13 on Textile Materials, and is the direct responsibility of Subcommittee D13.58 on Yarn Test Methods, General.

Current edition approved April 10, 2001. Published June 2001. Originally published as D 861 – 45 T. Last previous edition D 861 – 95.

² *Annual Book of ASTM Standards*, Vol 07.01.

³ Available from the American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036.

⁴ Available from The American Textile Manufacturers Institute, Inc., 1101 Connecticut Ave., N.W., Suite 300, Washington, DC 20036.

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.

5.3 It is recommended that linear density be expressed in

decitex 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

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org).