



Designation: **D 2497 – 9501**

## **Standard Tolerances for Man-Made Manufactured Organic-Base Filament Single Yarns<sup>1</sup>**

This standard is issued under the fixed designation D 2497; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### **1. Scope**

1.1 These tolerances cover first-quality, ~~man-made~~, manufactured, organic-base filament single yarns (namely, bright, semi-dull, dull, solution-dyed, bleached, unbleached, etc.) regardless of the package type. These tolerances cover permissible variations in linear density, tenacity, elongation, twist, and commercial weight.

1.1.1 These tolerances do not apply to rubber yarns, spandex yarns, metal-covered yarns, nor to bulk yarns since test methods for these types of yarn are not available. These tolerances do not apply to industrial filament yarns.

NOTE 1—Tolerances for ~~cords made from manmade filament yarns appear in Specification D 3219.~~ Tolerances for inorganic glass yarns are given in Specifications and Methods D 578.

1.2 This standard covers only tolerances. It does not cover specifications or quality levels, for yarns to be used for any purpose. Specifications for specific properties are subject to agreement by the purchaser and the supplier.

NOTE 2—While the tolerances specified may be applied to yarn taken from fabric, the properties of such yarns will likely differ from the original level.

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:*

---

<sup>1</sup> These tolerances are under jurisdiction of ASTM Committee D-13 on Textiles, and are the direct responsibility of Subcommittee D13.58 on Yarn Test Methods, General. Current edition approved ~~May 15, 1995; April 10, 2001.~~ Published ~~July 1995; June 2001.~~ Originally published as D 2497 – 63 T replacing D 1235, D 1236, and D 1237. Last previous edition ~~D 2497 – 80 (1990); D 2497 – 95.~~

D 123 Terminology Relating to Textiles<sup>2</sup>

D 578 Specification for Glass Fiber ~~Yarns~~ Strands<sup>2</sup>

D 1423 Test Method for Twist in Yarns by ~~the Direct-Counting-Method~~<sup>2</sup>

D 1907 Test Method for Linear Density of Yarn (Yarn Number) by the Skein Method<sup>2</sup>

D 2256 Test Method for Tensile Properties of Yarns by the Single-Strand Method<sup>2</sup>

D 2258 Practice for Sampling Yarn for Testing<sup>2</sup>

D 2494 Test Method for Commercial ~~Weight~~ Mass of a Shipment of Yarn or Man-Made Staple Fiber or Tow<sup>2</sup>

---

<sup>2</sup> *Annual Book of ASTM Standards*, Vol 07.01.

~~D 3219 Tolerances for Industrial Filament Yarns, Tire Cords, and Tire Cord Fabrics Made from Man-Made Organic-Base Fibers<sup>3</sup>~~

### 3. Terminology

#### 3.1 Definitions:

3.1.1 *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.

3.1.2 For definitions of other terms used in these tolerances, refer to Terminology D 123.

### 4. Significance and Use

4.1 These tolerances may be used as a guide in purchaser/supplier disputes, or to assist in assigning nominal values for linear density and twist. The tolerances listed for each property represent the maximum variations deemed acceptable in the trade.

### 5. Test Methods

5.1 Take a sample of yarn as directed in Practice D 2258. Make the indicated tests as directed in Test Method D 1907 for Yarn Number, Test Method D 1423 for Direct Twist, Test Method D 2256 for Single Strand Breaking Strength, and Test Method D 2494 for Commercial Mass.

### 6. Tolerances

6.1 *Linear Density*—The average linear density shall conform to the average linear density agreed upon between the purchaser and the supplier with the tolerances specified in Table 1.

6.2 *Strength*—The average breaking ~~load~~ force of the yarn determined in single strand tests or the average ~~load~~ force at a specific level of elongation, in each packing case of ten or more yarn packages or on a beam, shall be equal to or exceed the previously agreed upon level.

6.3 *Elongation*—The average elongation of the yarn at the breaking ~~load~~ force or at a specified ~~load~~ force, in each packing case of ten or more yarn packages or on a beam, shall conform to the limits: specified elongation  $\pm 20\%$  of the specified average elongation.

#### 6.4 Twist:

6.4.1 *Direction*—The direction of twist shall be S or Z as specified.

6.4.2 *Number of Turns*—The average number of turns per unit length of yarn, in each packing case of ten or more yarn packages or on a beam, shall conform to the tolerances specified in Table 2.

6.5 *Commercial Mass*—Commercial mass shall conform to the limits: invoice mass  $\pm 1.0\%$  of the invoiced mass.

NOTE 3—Particular attention is drawn to the results of an interlaboratory test described in Section 10 of Method D 2494.

### 7. Conformance

7.1 The purchaser and the supplier may agree on a procedure to establish conformance, including control charts furnished by the supplier, a sequential-sampling plan, or the double-sampling plan outlined in 7.2.

7.2 In the absence of a control-chart or sequential-sampling plan, proceed as directed in 7.2.1-7.2.3.

7.2.1 If the test results for the lot conform to the tolerances for all characteristics specified in Section 6, consider the lot a valid delivery.

7.2.2 If the test results for one or more characteristics do not conform to the tolerances, take a new laboratory sample from either the original lot sample or a new lot sample. Retest the lot for the characteristic(s) that did not conform to the tolerances in the first test, and average the results of the first and second samples as if all results were from one test of double the original number of specimens. If the new average(s) conform(s) to the specified tolerances, consider the lot a valid delivery.

7.2.3 If the test results obtained as directed in 7.2.2 do not conform to the specified tolerances, consider the lot a nonvalid delivery.

### 8. Keywords

8.1 breaking strength; cellulose-base man-made fibers; commercial mass; elongation strand; man-made-fibers; organic base;

**TABLE 1 Average Linear Density Tolerances**

	Tolerance of Average Linear Density, %
Each Individual Yarn Package, Except Beams:	
All yarns with linear density of 4.4 tex and above or 40 denier and above	$\pm 4.0$
All yarns with linear density below 4.4 tex or 40 denier	$\pm 6.0$
Each Beam, or Each Case Comprising 10 or More Packages:	
All yarns	$\pm 3.0$

**TABLE 2 Twist Tolerances**

	Tolerances
<i>Turns per Metre:</i>	
From zero to 40, incl	$\pm 10$ turns per metre
Over 40 and up to and including 400	$\pm 20$ turns per metre
Over 400	$\pm 5.0$ % of the specified average twist
<i>Turns per Inch:</i>	
From zero to 1, incl	$\pm 0.25$ turn per inch
Over 1 and up to and including 10	$\pm 0.5$ turn per inch
Over 10	$\pm 5.0$ % of the specified average twist

strand; synthetic base; tolerances; twist; yarn; 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).*