



Designation: D 4030 – 99

Standard Specification for Glass Fiber Cord and Sewing Thread¹

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1. Scope*

1.1 This specification covers the requirements for continuous glass filament sewing thread; and continuous filament cord, untreated and neoprene treated.

1.2 This specification is intended to assist ultimate users by designating the types of these products that are typical in the industry.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the 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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

- D 76 Specification for Tensile Testing Machines for Textiles
- D 123 Terminology Relating to Textiles
- D 204 Test Methods for Sewing Threads
- D 578 Specification for Glass Fiber Strands
- D 1423 Test Method for Twist in Yarns by the Direct-Counting Method
- D 1776 Practice for Conditioning Textiles for Testing
- D 1907 Test Method for Yarn Number by the Skein Method
- D 2256 Test Method for Tensile Properties of Yarns by the Single-Strand Method
- D 4963 Test Method for Ignition Loss of Glass Strands and Fabrics

¹ This specification is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.18 on Glass Fiber and Its Products.

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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.

2.2 ANSI Standard:

ANSI/ASQC Z1.4 Sampling Procedures for Inspection by Attributes³

3. Terminology

3.1 Definitions:

3.1.1 *cord, n—of glass fiber*, a strand made by combining multiple ends of filament stands, including cabled yarns, primarily for structural application.

3.1.2 *neoprene treated, n, adj— in glass fiber*, a descriptive term for the application of polychloroprene rubber compound to improve the stability, knot holding properties, and abrasion resistance of the cord.

3.1.3 *sewing thread, n—*a flexible, small diameter yarn or strand, usually treated with a surface coating, lubricant, or both, intended to be used to stitch one or more pieces of material or an object to a material.

3.1.4 *twist balance, n— in glass fiber cord and sewing thread*, the relationship of primary and final twist to each other and to the cord size such that residual torsional effects are nullified.

3.1.5 *untreated, n, adj—*a descriptive term for glass fiber yarns having no applied chemicals or coatings, other than the minimal lubricant or binder used to control intra-fiber abrasion.

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

4. Designation of Construction

4.1 The yarn designations of fiber glass cords and sewing threads are specified as directed in Specification D 578 except that for the cords either the letter “U” or the letter “N” is added to the last segment of the designation.

4.1.1 Cord designations may include a type number that describes the relative diameter of the cords and treatment. The first character of this designation is a numeral from 1 to 10 that indicates the relative diameter of the cord to other cords, that is, 2 is larger than 1, 3 is larger than 2, etc. The second character of this designation is the letter “U” or the letter “N”. The “U” indicates that the cord is untreated, and the “N” indicates that

³ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

*A Summary of Changes section appears at the end of this standard.

the cord is neoprene treated. The type number for cord is included in Tables 1 and 2 to show its relationship to designation.

4.1.2 Sewing thread construction includes a type number that describes a manufacturer’s code and the size. The second character is a numeral and indicates the relative diameter of the sewing threads, that is, 4 is larger than 2, 6 is larger than 4, etc. This type number for sewing thread is included in Table 3 to show its relationship to designation.

REQUIREMENTS

5. Material

5.1 The fiber shall be electrical grade, free of any free alkali metal oxides, such as soda or potash, and foreign particles, dirt, and other impurities.

6. Designation

6.1 The nominal designation of fiber glass cords listed in Table 1 or Table 2 shall conform to the requirements of Table 1 or Table 2. The nominal designation of fiber glass sewing threads listed in Table 3 shall conform to the requirements of Table 3. The nominal designations of other fiber glass cords or sewing threads shall be agreed upon between the purchaser and the supplier. The requirements of the individual elements of the designation are specified in Sections 7-9.

7. Filament Diameter

7.1 The nominal filament diameter of fiber glass cords shall be designated by the letter designation “G”. The nominal filament diameter of fiber glass sewing threads shall be designated by the letter designation “B” to “DE”, as applicable. The numerical values associated with letter designations are specified in Specification D 578. The average filament diameter for the yarns in the cord or sewing thread shall conform to Specification D 578 for the specified filament diameter.

NOTE 1—Because of the application of fiber glass sewing threads, it is desirable to utilize somewhat finer filament sizes.

8. Yarn Number

8.1 Since the yarn number in the designation does not include size, the nominal yarn number for strands including size is stated separately for strands listed in Table 1, Table 2, or Table 3. For strands not listed in those tables, the nominal yarn number including size shall be agreed upon between the purchaser and the supplier. The average yarn number for the lot

shall be within the interval: nominal yarn number $\pm 10\%$ of the nominal yarn number.

9. Strand Construction

9.1 For strands listed in Table 1, Table 2, or Table 3, the strand construction shall conform to the requirements of Table 1, Table 2, or Table 3. For strands not listed in Table 1, Table 2, or Table 3, the strand construction shall be agreed upon between the purchaser and the supplier.

10. Direction of Twist

10.1 For fiber glass cords the primary twist shall be “Z” twist and the final twist shall be “S” twist unless otherwise agreed upon between the purchaser and the seller. For fiber glass sewing threads the primary twist shall be “S” twist and the final twist shall be “Z” twist unless otherwise agreed upon between the purchaser and the supplier.

11. Twist Level

11.1 The nominal twist of fiber glass cords and sewing threads shall be agreed upon between the purchaser and the supplier. The tolerances for the primary twist and for the final twist shall conform to Table 4.

12. Breaking Strength

12.1 The minimum breaking strength for fiber glass cords listed in Table 1 or Table 2 shall conform to the requirements of Table 1 or Table 2. The minimum breaking strength of fiber glass sewing thread listed in Table 3 shall conform to the requirements of Table 3. The minimum breaking strength of other fiber glass cords or sewing threads shall be agreed upon between the purchaser and the supplier. No individual break shall be less than the specified minimum breaking strength.

13. Yarn Diameter

13.1 The nominal yarn diameter for some generally available fiber glass cords are listed in Table 1 or Table 2, and the nominal yarn diameter for some generally available fiber glass sewing threads are listed in Table 3. The nominal yarn diameters are included for information only and are not considered a cause for rejection unless otherwise agreed upon, as when specified in an applicable material specification. In that case, the yarn diameter tolerances shall be agreed upon between the purchaser and the supplier.

TABLE 1 Physical Properties of Typical Continuous Filament Glass Cords, Untreated

Type ^A	Designation		Nominal Yarn Number		Breaking Strength, min		Nominal Yarn Diameter	
	tex	inch-pound units	tex	yd/lb	N	lbf	mm	in.
1U	EC9 33 2 × 2U	ECG 150 2/2U	137	3620	44	10	0.25	0.010
2U	EC9 33 4 × 5U	ECG 150 4/5U	710	700	249	56	0.66	0.026
3U	EC9 33 4 × 8U	ECG 150 4/8U	1165	425	418	94	0.86	0.034
4U	EC9 33 4 × 16U	ECG 150 4/16U	2400	210	827	186	1.32	0.02
5U	EC9 33 4 × 10 × 3U	ECG 150 4/10/3U	4700	105	1277	287	1.93	0.06
6U	EC9 33 4 × 12 × 3U	ECG 150 4/12/3U	5500	90	1401	315	2.11	0.083
7U	EC9 33 4 × 12 × 4U	ECG 150 4/12/4U	7400	67	1601	360	2.41	0.095
8U	EC9 33 4 × 24 × 3U	ECG 150 4/24/3U	11000	45	2571	578	3.02	0.119
10U	EC9 33 4 × 36 × 3U	ECG 150 4/36/3U	17100	29	3363	756	3.78	0.149

^A Commercial designation.