



Designation: D581 – 07

Standard Specification for Glass Fiber Greige Braided Tubular Sleeving¹

This standard is issued under the fixed designation D581; 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 specification covers the requirements for continuous glass filament greige braided tubular sleeving and is suitable for use as electrical insulation and for structural and mechanical applications.

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

D123 Terminology Relating to Textiles

D350 Test Methods for Flexible Treated Sleeving Used for Electrical Insulation

D578 Specification for Glass Fiber Strands

D579 Specification for Greige Woven Glass Fabrics

D1059 Test Method for Yarn Number Based on Short-Length Specimens

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

D3773 Test Methods for Length of Woven Fabric

D3775 Test Method for Warp (End) and Filling (Pick) Count of Woven Fabrics

D4963 Test Method for Ignition Loss of Glass Strands and Fabrics

D7018 Terminology Relating to Glass Fiber and Its Products

2.2 *ANSI Standard:*

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

3. Terminology

3.1 For all terminology related to D13.18, Glass Fiber and Its Products, see Terminology D7018.

3.1.1 The following terms are relevant to this standard² braid, carrier, continuous filament yarn, greige goods, sleeving, and tubing.

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

4. Tubing Classifications

4.1 Glass fiber greige braided tubular sleeving is produced in one type and two styles within that type and uses yarns designated as directed in Specification D578. The standard type and styles are:

4.1.1 *Type G*—Glass fiber greige braided tubular sleeving.

4.1.2 *Style A*—Glass fiber greige braided tubular sleeving having a nominal wall thickness of 0.20 mm (0.008 in.).

4.1.3 *Style B*—Glass fiber greige braided tubular sleeving having a nominal wall thickness of 0.15 mm (0.006 in.).

REQUIREMENTS

5. Material

5.1 All yarns for braided tubular sleeving shall be electrical classification, (E glass), continuous filament glass yarns, and shall fall within the chemical composition that is utilized for general applications as described in Specification D578, Section 4.2.2. Filament size shall be agreed upon between purchaser and supplier and shall meet the requirements of Specification D578, Table 1 Letter Designations for Glass Strand Filament Diameters.

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

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.

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

6. Yarn Number

6.1 The nominal yarn number of the yarns in the braided tubular sleeving shall be agreed upon between the purchaser and the supplier. The average yarn number shall fall within the interval: nominal yarn number $\pm 10\%$ of the nominal yarn number.

7. Strand Construction

7.1 The basis for specifying strand construction is given in Specification **D578**. The construction of the component strands shall be agreed upon between the purchaser and the supplier.

8. Direction of Twist

8.1 Unless otherwise agreed upon between the purchaser and the supplier, the primary twist in the singles strands shall be “Z” twist and the final twist in the plied yarns shall be “S” twist.

9. Twist Level

9.1 The nominal twist in the component strands and the finished yarns shall be agreed upon between the purchaser and the supplier. The tolerances for the primary twist and the final twist shall conform to **Table 1**.

10. Ends Per Carrier

10.1 The nominal number of ends per carrier shall be agreed upon between the purchaser and the supplier. The observed number of ends per carrier shall not exceed that specified.

11. Number of Carriers

11.1 The nominal number of carriers shall be agreed upon between the purchaser and the supplier. The observed number of carriers shall not be less than that specified.

12. Picks Per Unit Length

12.1 The nominal number of picks per centimetre (picks per inch) shall be agreed upon between the purchaser and the supplier. The observed number of picks per inch shall be within 1 pick per centimetre (3 picks per inch) of the specified value.

TABLE 1 Twist Tolerances

	Tolerances
Turns per Centimetre:	
From zero to 0.4, incl	± 0.1 turn per centimetre
Over 0.4 and up to and including 4.0	± 0.2 turn per centimetre
Over 4	$\pm 5.0\%$ of the specified average twist
Turns per Metre:	
From zero to 40, incl	± 10 turns per metre
Over 40 and up to and including 400	± 20 turns per metre
Over 400	$\pm 5.0\%$ of the specified average twist
Turns per Inch:	
From zero to 1, incl	± 0.25 turn per inch
Over 1 and up to and including 10	± 0.5 turn per inch
Over 10	$\pm 5.0\%$ of the specified average twist

13. Inside Diameter

13.1 For braided tubular sleeving listed in **Table 2**, the nominal inside diameter shall conform to the requirements of **Table 2**. For sleeving not listed in **Table 2**, the nominal inside diameter shall be agreed upon between the purchaser and the supplier. The average inside diameter shall conform to the requirements of **Table 3** unless otherwise agreed upon between the purchaser and the seller.

14. Wall Thickness

14.1 For braided tubular sleeving listed in **Table 2**, the nominal wall thickness shall conform to the requirements of **Table 2**. For sleeving not listed in **Table 2**, the nominal wall thickness shall be agreed upon between the purchaser and the supplier. The average wall thickness shall be within 0.03 mm (0.001 in.) of the nominal value.

15. Length Per Unit Mass

15.1 For braided tubular sleeving listed in **Table 2**, the nominal length per unit mass shall conform to the requirements of **Table 2**. For sleeving not listed in **Table 2**, the nominal length per unit mass shall be agreed upon between the purchaser and the supplier. The average length per unit mass shall be within the interval: nominal length per unit mass $\pm 10\%$ of the nominal length per unit mass.

16. Length Per Package

16.1 The nominal length of braided tubular sleeving on each package, such as a spool or serving tube, shall be no more than 108 m (120 yd) nor less than 72 m (80 yd) unless otherwise agreed upon between the purchaser and the supplier.

16.2 Unless otherwise agreed upon between the purchaser and the supplier, no piece of braided tubular sleeving shall be less than 14 m (15 yd) long and there shall be no more than three pieces in a package.

16.3 None of the sample tubes or serving spools shall contain more than the allowable pieces, and the combined length of all of the sample tubes or serving spools shall not be less than the combined length of those tubes or serving spools on the identification labels.

17. Ignition Loss

17.1 The organic content of greige braided tubular sleeving shall be at least 1.0% and no greater than 4.0% unless otherwise agreed upon between the purchaser and the supplier.

18. Visual Appearance

18.1 The braided tubular sleeving shall be generally uniform in quality and condition, clean, smooth, and free of foreign particles and defects detrimental to fabrication, appearance, or performance.

18.2 The braided tubular sleeving in the laboratory sample for the visual appearance shall be examined on both sides for the defects listed in **Table 4**, and the acceptable quality levels (AQLs) shall be 0.65 major and 2.5 total (major and minor combined) defects per hundred units of braided tubular sleeving unless otherwise agreed upon between the purchaser and the supplier.