

Standard Specification for Greige Woven Glass Tapes and Webbings¹

This standard is issued under the fixed designation D580/D580M; 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 primarily covers greige tapes and webbings woven from "E" electrical classification glass fiber yarns. This specification can also be applied to tapes and webbings made of other glass fiber grades upon agreement between the purchaser and the supplier.

1.2 This specification is intended to assist ultimate users by designating the types of these products that are typical in the industry. This specification permits the application of organic materials to the glass fiber yarn during manufacture that helps facilitate weaving. When used as permitted in this specification, such materials will not interfere with the intended end use requirements.

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
D578 Specification for Glass Fiber Strands
D579 Specification for Greige Woven Glass Fabrics
D1059 Test Method for Yarn Number Based on Short-Length Specimens (Withdrawn 2010)³

D1423 Test Method for Twist in Yarns by Direct-Counting D1776 Practice for Conditioning and Testing Textiles

- D1777 Test Method for Thickness of Textile Materials
- D3773 Test Methods for Length of Woven Fabric
- D3774 Test Method for Width of Textile 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
- D5035 Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)
- D7018 Terminology Relating to Glass Fiber and Its Products 2.2 ANSI Standard:⁴
- ANSI/ASQC Z1.4 Sampling Procedures for Inspection by Attributes

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 For definitions of glass fiber and product terms used in this specification refer to Terminology D7018.

3.1.2 The following terms are relevant to this standard: *continuous filament yarn, greige goods, tape, webbing.*

3.1.3 For definitions of other textile terminology used in this specification, refer to Terminology D123.

4. Classification

4.1 Greige glass fiber tapes and webbings are produced in two types and are constructed with yarns designated as directed in Specification D578. The standard types are:

4.1.1 Type A—Medium texture.

4.1.2 Type B—Open texture.

4.2 The designation of a tape or webbing shall be by style numbers that are standard throughout the industry.

4.3 Two segments of characters are used to describe tapes and webbings.

4.3.1 The first segment of the description of tape or webbing describes the glass classification, the type fiber in the warp, and the type fiber in the filling.

4.3.1.1 The first letter in the first segment is one of the following glass classification codes: "E" for electrical," C" for chemical, "S" for high force.

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.

Current edition approved Feb. 1, 2015. Published March 2015. Originally approved in 1940. Last previous edition approved in 2004 as D580/D580M – 10. DOI: 10.1520/D0580_D0580M-15

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.

 $^{^{3}\,\}text{The}$ last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

4.3.1.2 The second letter in the first segment specifies the fiber type in the warp direction: "C" describes continuous filament fiber using either SI units or inch-pound units, staple (discontinuous) fiber is described by "D" in SI units or "S" in inch-pound units.

4.3.1.3 The third letter in the first segment specifies the fiber type in the filling direction: "C" describes continuous filament fiber using either SI units or inch-pound units, staple (discontinuous) fiber is described by "D" in SI units or "S" in inch-pound units.

4.3.2 The second segment of the description of tape or webbing describes the texture: "A" describes medium texture and" B" describes close texture.

4.4 Examples of glass fiber tapes or webbings.

4.4.1 Example 1a (SI units):

$$ECD - B$$
 (1)

where:

E = electrical glass,

C = continuous filament yarn warp direction,

D = discontinuous (staple) yarn filling direction, and

B = close textured.

4.4.2 Example 1b [inch-pound units]:

$$ECS - B$$
 (2)

where:

- E = electrical glass,
- C = continuous filament yarn warp direction,
- S = staple (discontinuous) filament yarn filling direction, and

B = close textured.

REQUIREMENTS

5. Material

5.1 The fiber shall be continuous filament or staple (discontinuous) fiber, as agreed upon between the purchaser and supplier, free of any free alkali metal salts, such as soda or potash, and foreign particles, dirt, and other impurities.

6. Fabric Count

6.1 For tapes listed in Tables 1 and 2, and webbings listed in Table 3, the nominal fabric count shall conform to the requirements of Table 1, Table 2, and Table 3, respectively. For tapes or webbings not listed in Table 1, Table 2, and Table 3, the nominal fabric count shall be agreed upon between the purchaser and the supplier. The average count of warp ends shall be within one end of the nominal count and the average count of the filling picks shall be within two picks of the nominal count.

7. Yarn Designations

7.1 For tapes and webbings, the yarn designations shall be as agreed upon between the purchaser and supplier. The requirements of the individual elements of the designation are specified in Sections 8 - 12.

8. Yarn Number

8.1 For tapes and webbings, the nominal size-free yarn numbers of the yarns designated shall conform to Specification D578.

9. Filament Diameter

9.1 The nominal values for the filament diameters when agreed upon between purchaser and supplier are listed in Table 1 of Specification D578. The average filament diameter for the yarns in the tape or webbing shall conform to Specification D578 for the specified filament diameter.

10. Strand Construction

10.1 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.

11. Direction of Twist

11.1 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.

12. Twist Level

12.1 The nominal twist in the component strands and the finished yarns shall be agreed upon between the purchaser and supplier. The tolerances for the primary twist and the final twist shall conform to Table 4.

13. Tape Weave Type

13.1 For tapes listed in Tables 1 and 2 and webbings listed in Table 3, the weave type shall be plain weave. For tapes and webbings not listed in Table 1, Table 2, and Table 3, the weave type shall be agreed upon between the purchaser and the supplier.

14. Length per Unit Mass

14.1 For tapes listed in Tables 1 and 2, and webbings listed in Table 3, the nominal length per unit mass shall conform to the requirements of Table 1, Table 2, and Table 3, respectively. For tapes and webbings not listed in Table 1, Table 2, and Table 3, the nominal length per unit mass shall be agreed upon between the purchaser and the supplier. The average length per unit mass for the lot shall be within the interval: specified length per unit mass ± 10 %.

15. Thickness

15.1 For tapes listed in Tables 1 and 2, and webbings listed in Table 3, the nominal thickness shall conform to the requirements of Table 1, Table 2, and Table 3, respectively. For tapes and webbings not listed in Table 1, Table 2, and Table 3, the nominal thickness shall be agreed upon between the purchaser and the supplier. The average thickness of the tape or webbing in the lot shall conform to the requirements of Table 5, unless specified otherwise.

16. Breaking Force

16.1 For tapes listed in Tables 1 and 2, and webbings listed in Table 3, the average breaking force shall conform to the

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| Tape No. | Thickness | | ckness Width | | Pic Total Ends | Pick C | Count | Lengt Unit I | | Minimum Breaking Force | |
|----------|-----------|-------|--------------|------|-------------------|--------|-------|-----------------|-------|---------------------------|----|
| | mm | in. | mm | in. | | 25 mm | in. | tex | yd/lb | Ν | lb |
| ECC-A | 0.130 | 0.005 | 12.7 | 1/2 | 24 | 34 | 35 | 1923 | 258 | 445 | 10 |
| | | | 19.0 | 3/4 | 32 | 34 | 35 | 2681 | 185 | 600 | 13 |
| | | | 25.4 | 1 | 42 | 34 | 35 | 3543 | 140 | 712 | 16 |
| | | | 25.4 | 1 | 36 | 33 | 34 | 3398 | 146 | 712 | 16 |
| | | | 38.1 | 11/2 | 62 | 34 | 35 | 5222 | 95 | 1112 | 25 |
| | | | 50.8 | 2 | 72 | 33 | 34 | 6795 | 73 | 1334 | 30 |
| | | | 63.5 | 21/2 | 104 | 34 | 35 | 9186 | 54 | 1557 | 35 |
| | | | 76.2 | 3 | 108 | 33 | 34 | 10124 | 49 | 2224 | 50 |
| | | | 102.0 | 4 | 144 | 33 | 34 | 13407 | 37 | 2513 | 56 |
| ECC-A | 0.180 | 0.007 | 12.7 | 1/2 | 24 | 31 | 32 | 2771 | 179 | 578 | 13 |
| | | | 19.0 | 3/4 | 32 | 31 | 32 | 3875 | 128 | 778 | 17 |
| | | | 25.4 | 1 | 42 | 31 | 32 | 5114 | 97 | 1068 | 24 |
| | | | 38.1 | 1½ | 62 | 31 | 32 | 7404 | 67 | 1646 | 37 |
| | | | 50.8 | 2 | 88 | 31 | 32 | 10334 | 48 | 2313 | 52 |
| | 0.255 | 0.010 | 12.7 | 1/2 | 16 | 21 | 21 | 3730 | 133 | 712 | 16 |
| | | | 19.0 | 3/4 | 24 | 21 | 21 | 5574 | 89 | 1112 | 25 |
| | | | 25.4 | 1 | 32 | 21 | 21 | 7295 | 68 | 1557 | 35 |
| | | | 38.1 | 11/2 | 48 | 21 | 21 | 11023 | 45 | 2446 | 55 |
| ECC-A | 0.380 | 0.015 | 12.7 | 1/2 | 14 | 16 | 16 | 5222 | 95 | 934 | 21 |
| | | | 19.0 | 3/4 | 20 | 16 | 16 | 7516 | 66 | 1423 | 32 |
| | | | 25.4 | 1 | 26 | 16 | 16 | 9921 | 50 | 1957 | 44 |
| | | | 38.1 | 11/2 | 40 | 16 | 16 | 15032 | 33 | 2936 | 66 |
| ECC-B | 0.075 | 0.003 | 9.5 | 3⁄8 | 21 | 41 | 42 | 800 | 620 | 200 | 2 |
| | | | 12.7 | 1/2 | 30 | 41 | 42 | 1184 | 419 | 267 | e |
| | | | 19.0 | 3/4 | 45 | 41 | 42 | 1759 | 282 | 423 | ç |
| | | | 25.4 | 1 | 63 | 41 | 42 | 2408 | 206 | 600 | 13 |
| | | | 38.1 | 11/2 | 108 | 41 | 42 | 4066 | 122 | 845 | 19 |
| | 0.130 | 0.005 | 9.5 | 3⁄8 | 21 | 38 | 39 | 1778 | 279 | 512 | 11 |
| | | | 12.7 | 1/2 | 27 | 38 | 39 | 2297 | 216 | 600 | 13 |
| | | | 19.0 | 3⁄4 | 39 | 38 | 39 | 3329 | 149 | 1001 | 22 |
| | | | 25.4 | 1 | 51 | 38 | 39 | 4390 | 113 | 1379 | 31 |
| | | | 38.1 | 11/2 | 75 | 38 | 39 | 6442 | 77 | 1957 | 44 |
| ECC-B | 0.178 | 0.007 | 9.5 | 3⁄8 | 21 | 38 | 39 | 2147 | 231 | 512 | 11 |
| | | | 12.7 | 1/2 | 27 | 38 | 39 | 2771 | 179 | 600 | 13 |
| | | | 38.1 | 3⁄4 | 39 | 38 | 39 | 4033 | 123 | 1001 | 22 |
| | | | 25.4 | 1 | 51 | 38 | 39 | 5277 | 94 | 1379 | 31 |
| | | | 38.1 | 11/2 | 75 | 38 | 39 | 7874 | 63 | 1957 | 44 |

TABLE 1 Physical Properties of Generally Available "E" Glass Greige Woven Glass Continuous Filament Tape, Plain Weave

TABLE 2 Physical Properties of Generally Available "E" Glass Greige Woven Glass Staple (Discontinuous) Filament Tape, Plain Weave

| Tape No. | Thicl | kness | V | Vidth | Total Ends | Pick C | Count | Lengt Unit I | | Minir Brea For | iking |
|----------|-------|-------|------|------------|------------|--------|-------|-----------------|-------|----------------------|-------|
| | mm | in. | mm | in. | | 25 mm | in. | tex | yd/lb | Ν | lbf |
| ESS-A | 0.255 | 0.010 | 12.7 | 1/2 | 18 | 21 | 21 | 3906 | 127 | 445 | 100 |
| | | | 19.0 | 3/4 | 26 | 21 | 21 | 5977 | 83 | 667 | 150 |
| | | | 25.4 | 1 | 34 | 21 | 21 | 7632 | 65 | 890 | 200 |
| | | | 38.1 | 11/2 | 52 | 21 | 21 | 11811 | 42 | 1334 | 300 |
| | 0.038 | 0.015 | 19.0 | 3⁄4 | 20 | 16.5 | 16.5 | 8268 | 60 | 890 | 200 |
| | | | 25.4 | 1 | 28 | 16.5 | 16.5 | 11023 | 45 | 1112 | 250 |
| | | | 38.1 | 1 ½ | 52 | 16.5 | 16.5 | 17105 | 29 | 1557 | 350 |

requirements of Table 1, Table 2, and Table 3, respectively. For tapes and webbings not listed in Table 1, Table 2, and Table 3, the average breaking force shall be agreed upon between the purchaser and the supplier. The average breaking force for the lot shall exceed the specified breaking force and no individual break shall be less than 80 % of the specified average breaking force.

17. Width

17.1 For tapes listed in Tables 1 and 2, and webbings listed in Table 3, the nominal width shall conform to the requirements of Table 1, Table 2, and Table 3, respectively. For tapes and webbings not listed in Table 1, Table 2, and Table 2, and Table 3, the nominal width shall be agreed upon between the purchaser and

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TABLE 3 Physical Properties of Generally Available "E" Glass Greige Woven Glass Staple (Discontinuous) Filament Webbing, Plain Weave

| Tape No. | Thickness | | Width | | Total Ends | Pick Count | | Length per Unit Mass | | Minimum Breaking Force | |
|----------|-----------|-------|-------|------|------------|------------|-----|-------------------------|-------|------------------------------|-----|
| | mm | in. | mm | in. | | 25 mm | in. | tex | yd/lb | Ν | lbf |
| ESS-A | 0.510 | 0.020 | 19.0 | 3/4 | 20 | 14 | 14 | 10124 | 49 | 1112 | 250 |
| | | | 25.4 | 1 | 28 | 14 | 14 | 13779 | 36 | 1334 | 300 |
| | | | 38.1 | 11/2 | 44 | 14 | 14 | 19842 | 25 | 2002 | 450 |
| | 0.635 | 0.025 | 19.0 | 3⁄4 | 20 | 10 | 10 | 11274 | 44 | 934 | 210 |
| | | | 25.4 | 1 | 28 | 10 | 10 | 15502 | 32 | 1334 | 300 |
| | | | 38.1 | 11/2 | 44 | 10 | 10 | 27559 | 18 | 2446 | 550 |

TABLE 4 Twist Tolerances

| | Tolerances |
|---|---|
| Turns per Centimeter: | |
| From zero to 0.4 | ±0.1 turn per centimeter |
| Over 0.4 and up to and including 4.0 | ±0.2 turn per centimeter |
| Over 4 | ±5.0 % of the specified average twist |
| Turns per Meter: | average twist |
| From zero to 40, incl | ±10 turns per meter |
| Over 40 and up to and including 400 | ±20 turns per meter |
| Over 400 | ±5.0 % of the specified av erage twist |
| Turns per Inch: | Ū. |
| From zero to 1 | ±0.25 turn per inch |
| Over 1 and up to and including 10 | ±0.5 turn per inch |
| Over 10 | ±5.0 % of the specified average twist |

| TABLE 5 Tolerances | s—Thickness |
|--------------------|-------------|
|--------------------|-------------|

| | Permissible Variations, Average | | | |
|-----------------------|---------------------------------|---------------------------|--|--|
| Nominal Thickness | Continuous | Staple (discontinuous) | | |
| | millimetres | | | |
| 0.125 and under | ±0.013 | | | |
| Over 0.125 to 0.250 | ±0.025 | ±0.050 | | |
| Over 0.250 to 0.380 | ±0.050 | ±0.075 | | |
| Over 0.380 to 0.025 | | ±0.075 | | |
| | inches | | | |
| 0.0050 and under | ±0.0005 | | | |
| Over 0.0050 to 0.0100 | ±0.0010 | ±0.0020 | | |
| Over 0.0100 to 0.0150 | ±0.0020 | ±0.0030 | | |
| Over 0.0150 to 0.0250 | | ±0.0030 | | |
| | Permissible Var | iations, Individual | | |
| | Continuous | Staple (discontinuous) | | |
| | millimetres | | | |
| 0.125 and under | ±0.025 | | | |
| Over 0.125 to 0.250 | ±0.040 | ±0.075 | | |
| Over 0.250 to 0.380 | ±0.060 | ±0.090 | | |
| Over 0.380 to 0.635 | | ±0.090 | | |
| | inches | | | |
| 0.0050 and under | ±0.0010 | | | |
| Over 0.0050 to 0.0100 | ±0.0015 | ±0.0030 | | |
| Over 0.0100 to 0.0150 | ±0.0025 | ±0.0035 | | |
| Over 0.0150 to 0.0250 | | ±0.0035 | | |

the supplier. The tolerances for width shall conform to Table 6 unless otherwise agreed upon between the purchaser and the supplier.

TABLE 6 Tolerances—Tape Width

| Nominal Tape Width, | Permissible Variation, |
|----------------------|------------------------|
| mm [in.] | mm [in.] |
| Less than 25.4 [1.0] | ±0.8 [1/32] |
| Over 25.4 [1.0] | ±1.6 [½16] |

18. Length Per Package

18.1 The nominal length of tape or webbing on each package, such as a spool or serving tube, shall be no more than 36 m [40 yd] nor no less than 32 m [36 yd] except for 0.075 mm [0.003 in.] thick tape or webbing which shall be no more than 68 m [76 yd] nor no less than 65 m [72 yd], unless otherwise agreed upon between the purchaser and the supplier.

18.2 Unless otherwise agreed upon between the purchaser and the supplier, no piece of tape or webbing shall be less than 14 m [15 yd] long and there shall be no more than two pieces in a package.

18.3 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.

19. Ignition Loss

19.1 The organic content of greige tape or webbing shall be less than 4.0% unless otherwise agreed upon between the purchaser and the supplier.

20. Visual Appearance

20.1 The woven greige tape or webbing shall be generally uniform in quality and condition, clean, smooth, and free of foreign particles and from defects detrimental to fabrication, appearance, or performance.

20.2 The tape or webbing in the laboratory sample for the visual appearance shall be examined on both sides for the defects listed in Table 7 and the acceptable quality levels (AQLs) shall be 0.65 major and 2.5 total (major and minor combined) defects per hundred units of tape or webbing unless otherwise agreed upon between the purchaser and the supplier.

21. Put-Up

21.1 The tape or webbing shall be furnished in rolls and shall be wound on suitable tubes or serving spools with cores

TABLE 7 Classification of Defects

| Defect | Cla | ssification |
|--|-------|-------------|
| Defect | Major | Minor |
| Any hole, cut, tear, or smash | Х | |
| Baggy, ridgy, or wavy cloth or tape | Х | |
| Spot or stain, uncleaned: | | |
| 13 mm [½ in.] or more in combined length and width directions | Х | |
| Less than 13 mm [$\frac{1}{2}$ in.] in combined length and width directions | | Х |
| Tender, weak, or thin place | Х | |
| Broken or missing yarn: | | |
| Two or more contiguous, regardless of length | Х | |
| Single, 50 mm [2 in.] or more in length | Х | |
| Single, less than 50 mm [2 in.] in length | | Х |
| Untreated area: | | |
| 13 mm [½ in.] or more in combined length and width directions | Х | |
| Less than 13 mm [1/2 in.] in combined length and width directions | | Х |
| Floats and skips: | | |
| Two or more, regardless of length | Х | |
| Single, 50 mm [2 in.] or more in length | Х | |
| Single, more than 6.5 mm [1/4 in.] but less than | 50 | Х |
| mm [2 in.] in length | | |
| Any hard embedded crease | Х | |
| Any brittle or fused area | Х | |
| Width beyond specified tolerances | | Х |
| Uneven weaving | | Х |
| At a normal inspection distance of 1 m [3 ft]. | | |

of the same width as the tape or webbing, measuring 9.5 mm [$\frac{3}{8}$ in.] inside diameter, unless otherwise specified. The ends of the rolls shall be securely fastened with gummed tape to prevent slippage and unrolling of the tape or webbing. The maximum number of pieces contained in any roll shall be as specified in 18.2. The supplier may use his standard practice when agreed upon between the purchaser and the supplier.

22. Packaging

22.1 Each roll of tape or webbing, put up as specified, shall be packaged to afford adequate protection against physical damage during shipment from the supply source to the receiving activity. The supplier may use his standard practice when it meets this requirement.

23. Marking

23.1 Each package shall be marked to show the following information unless specified otherwise between the purchaser and the supplier. Characters shall be of such size as to be clearly legible and shall not be obliterated by normal handling:

100 % Fiber Glass Style Length Width Purchase Order Number Manufacturers' Identification

23.1.1 All tapes and webbings will be considered Type" E" electrical grade unless specified otherwise. If glass type is other than electrical Grade "E", each package shall be marked accordingly.

SAMPLING AND CONDITIONING

24. Sampling

24.1 *Lot Size*—A lot shall consist of each 9000 m [10 000 yd] of a single tape or webbing style, thickness, and width unless otherwise agreed upon between purchaser and the supplier.

24.2 *Lot Sample*—Unless otherwise agreed upon, take at random as a lot sample the number of rolls of tape or webbing specified in ANSI/ASQC Z1.4 and a single sampling plan.

24.3 *Laboratory Sample*—As a laboratory sample, take the following samples:

24.3.1 For visual appearance, width, and length, the rolls in the lot sample serve as the laboratory sample.

24.3.2 For other properties, take at random from the rolls in the lot sample the number of rolls specified in Table 8.

24.4 *Test Specimens*—For visual appearance, width, and length, the rolls in the lot sample serve as test specimens. For other properties, take material from the outside of each roll in the laboratory sample as a source of the test specimens required in the respective test methods in this specification after first discarding a minimum of 1 m [1 yd] from the very outside of the roll.

25. Conditioning

25.1 Condition the laboratory samples for a period of at least 5 h in the atmosphere in accordance with Practice D1776. Test under the same conditions. Preconditioning is not required.

Note 1-Glass textiles are normally tested under either the atmosphere for textiles or for plastics depending on their end use.

TEST METHODS

26. Material

26.1 Accept the supplier's certification that the material is of the correct classification as specified in Specification D578. Verify that the fiber is continuous or staple (discontinuous) as specified, during testing for strand construction as directed in Section 30. Determine the freedom from detrimental impurities during the inspection for visual appearance as directed in Section 40.

27. Fabric Count

27.1 Determine the fabric count as directed in Test Method D3775, making one count in the warp direction across the full width and three counts in the fill direction spaced 1 m [1 yd] apart, on each of the selected rolls in the laboratory sample.

TABLE 8 Sample Size Determination for Construction and Physical Properties

| Lot Size in Units, m or yd | Sample Size, Number of Units |
|--------------------------------|------------------------------------|
| 800 or less | 2 |
| 801 up to and including 22 000 | 3 |
| 22 001 and over | 5 |



28. Yarn Number

28.1 Determine the size-free yarn number in tex or yards per pound for both the warp and filling yarns as directed in Specification D578, using a skein length of 1 m or 1 yd for each specimen and three specimens from each of the rolls in the laboratory sample. Several shorter lengths of yarn can be used to prepare the 1 m [1 yd] specimen length.

29. Filament Diameter

29.1 Determine the filament diameter for both the warp and filling yarns as directed in Specification D578 by using 50 individual filaments from one yarn test specimen from both the warp and filling yarns in each of the rolls in the laboratory sample.

30. Strand Construction

30.1 Verify the number of singles strands and the number of plied or cabled strands on one test specimen of warp yarn and one specimen of filling yarn in each of the rolls in the laboratory sample while determining the twist direction or twist level. See also Section 26.

31. Direction of Twist

31.1 Verify the direction of twist in each strand of the yarns as directed in Test Method D1423 for one test specimen of warp yarn and one test specimen of filling yarn from each of the rolls in the laboratory sample.

32. Twist Level

32.1 Determine the twist level in each of the component strands as directed in Test Method D1423 on five test specimens of warp yarn and five test specimens of filling yarn from each of the rolls in the laboratory sample.

33. Weave Type

33.1 Determine the weave type as directed in Specification D579 using one test specimen from each of the rolls in the laboratory sample.

34. Length Per Unit Mass

34.1 Determine the length per unit mass in tex or yards per pound of the tape or webbing as directed in Test Method D1059, using a skein length of 2 m [2 yd] for each specimen and three specimens from each of the selected rolls in the laboratory sample except:

34.1.1 A length of tape or webbing 2.5 m $[2\frac{1}{2} \text{ yd}]$ long from each laboratory sample shall be smoothly laid on a flat surface using sufficient tension to keep the sample flat. A specimen 2 m [2 yd] long shall be accurately measured from the center of this piece and cut off with a sharp instrument. The 2 m [2 yd]specimen shall then be weighed.

35. Thickness

35.1 Determine the thickness of the tape or webbing as directed in Test Method D1777 using ten test specimens from each roll in the laboratory sample and using the gage with a presser foot with a diameter of 6.35 ± 0.03 mm [0.25 ± 0.001 in.] that is weighted to apply a total load of 5.5 ± 0.5 N

[20 + / - 2 oz-force] or a pressure of 158 to 186 kPa [23 to 27 psi], unless otherwise specified.

36. Breaking Force

36.1 Determine the breaking force in newtons or poundsforce of tape or webbing in the warp direction as directed in Test Method D5035, unless otherwise specified between purchaser and supplier, excluding preconditioning using five specimens from each of the rolls in the laboratory sample. Test tapes and webbings 38 mm [1½ in.] and under in width in full width. Test tapes and webbings over 38 mm [1½ in.] in width by the raveled-strip method in accordance with Test Method D5035. There may be no overall correlation between the results obtained with the CRE-type tensile testing machine and the CRT-type tensile testing machine. Consequently, these two tensile testing machines cannot be used interchangeably. In case of controversy, the CRE-type tensile testing machine shall prevail.

37. Width

37.1 Determine the width of the tape or webbing as directed in Test Methods D3774, Option A, and the free of tension procedure, except that five measurements per roll shall be made on each of the rolls in the lot sample.

38. Length

38.1 Measure the length of each roll in the lot sample as directed in Test Methods D3773 using any one of the four optional procedures. Verify that none of the sample rolls does not contain more than the allowable number of pieces. Total the yardages for each of the rolls measured and compare the total to the total of the yardages specified on the identification labels for those rolls. In case of dispute, use Option A of Test Methods D3773 to resolve the dispute.

39. Ignition Loss

39.1 Determine the ignition loss as directed in Test Method D4963, unless otherwise agreed to between the purchaser and the supplier.

40. Visual Appearance

40.1 Determine the visual appearance as directed in Specification D579 on each of the rolls in the lot sample.

41. Put-Up, Packaging, and Marking

41.1 During the sampling and testing of the shipment, verify the correctness of put-up, packaging, and marking.

CONFORMANCE AND KEYWORDS

42. Conformance

42.1 The purchaser and the supplier shall agree on a procedure to establish conformance, including control charts furnished by the supplier, a sequential sampling plan, ordouble-sampling plan outlined in 42.2.

42.2 In the absence of a control chart or sequential sampling plan, proceed as directed in 42.2.1 - 42.2.3.

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42.2.1 If the test results for a lot conform to the requirements for all characteristics listed in Sections 5 - 23, and Tables 1–7, the lot shall be considered acceptable.

42.2.2 If the test results for one or more characteristics do not conform to the requirements, take a new laboratory sample from either the original lot sample or a new lot sample. Test the new sample for the characteristic(s) that did not conform to the requirements in the first test and average the results of the first and second samples as if they were one test of double the original number of specimens. If the new average(s) conform(s) to the specified requirements, the lot shall be considered acceptable.

42.2.3 If the test results obtained as directed in 42.2.2 do not conform to the specified requirements, the lot shall be considered unacceptable.

43. Keywords

43.1 appearance; breaking force; construction designation; fabric count; glass tapes; glass webbings; ignition loss (organic content); length; thickness

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