Designation: ~~D580/D580M – 15~~ D580/D580M – 24

Standard ~~Specification~~Practice for Greige Woven Glass Tapes and Webbings[1]

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~~practice primarily covers greige tapes and webbings woven from "E" electrical classification glass fiber yarns. This ~~specification~~practice 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~~practice is intended to assist ultimate users by designating the types of these products that are typical in the industry. This ~~specification~~practice permits the application of organic materials to the glass fiber yarn during manufacture that helps facilitate weaving. When used as permitted in this ~~specification,~~practice, such materials will not interfere with the intended end use requirements.

1.3 *Units*—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~~are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the ~~other. Combining~~other, and values from the two systems ~~may result in nonconformance with the standard.~~shall not be combined.

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~~safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D123 Terminology Relating to Textiles
~~D578~~D578/D578M Specification for Glass Fiber Strands
~~D579~~D579/D579M Practice for Greige Woven Glass Fabrics
D1059 Test Method for Yarn Number Based on Short-Length Specimens
~~D1423~~D1423/D1423M Test Method for Twist in Yarns by Direct-Counting
~~D1776~~D1776/D1776M Practice for Conditioning and Testing Textiles
D1777 Test Method for Thickness of Textile Materials
~~D3773~~D3773/D3773M Test Methods for Length of Woven Fabric

[1] This ~~specification~~practice 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.

D3774 Test Method for Width of Textile Fabric
D3775 Test Method for End (Warp) and Pick (Filling) Count of Woven Fabrics
~~D4963~~D4963/D4963M Test Method for Ignition Loss of Glass Fiber Strands and Fabrics
D5035 Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)
~~D7018~~D7018/D7018M Terminology Relating to Glass Fiber and Its Products (Withdrawn 2021)[3]

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~~practice refer to Terminology ~~D7018~~D7018/D7018M.

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

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

4. Significance and Use

4.1 This standard practice may be used to classify, construct, and test woven greige fiberglass tapes and webbings formed from both continuous and discontinuous fiber.

5. Classification

5.1 Greige glass fiber tapes and webbings are produced in two types and are constructed with yarns designated as directed in Specification ~~D578~~D578/D578M. The standard types are:

5.1.1 *Type A*—Medium texture.

5.1.2 *Type B*—~~Open~~Close texture.

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

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

5.3.1 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.

5.3.1.1 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.

5.3.1.2 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.

5.3.1.3 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.

5.3.2 The second segment of the description of tape or webbing describes the texture: “A” describes medium texture ~~and“ B”~~and “B” describes close texture. Close Textured tapes have a greater number of ends in both the warp and fill directions relative to a Medium Texture tape with the same thickness and width.

5.4 Examples of glass fiber tapes or webbings.

[3] 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~~Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY ~~10036.~~10036, http://www.ansi.org.

5.4.1 Example 1a (SI units):

$$ECD - B \quad (1)$$

where:

E = electrical glass,
C = continuous filament yarn warp direction,
D = discontinuous (staple) yarn filling direction, and
B = close textured.

5.4.2 Example ~~1b~~lb [inch-pound units]:

$$ECS - B \quad (2)$$

where:

E = electrical glass,
C = continuous filament yarn warp direction,
S = staple (discontinuous) filament yarn filling direction, and
B = close textured.

~~REQUIREMENTS~~

6. Material

6.1 The fiber ~~shall~~may 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.

6.2 Accept the supplier's certification that the material is of the correct classification as specified in Specification D578/D578M. Verify that the fiber is continuous or staple (discontinuous) as specified, during testing for strand construction as directed in Section 10. Determine the freedom from detrimental impurities during the inspection for visual appearance as directed in Section 22.

7. Fabric Count

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

7.2 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.

8. Yarn Designations

8.1 For tapes and webbings, the yarn designations ~~shall~~may be as agreed upon between the purchaser and supplier. The requirements of the individual elements of the designation are specified in Sections 8~~9~~ – ~~12~~13.

9. Yarn Number

9.1 For tapes and webbings, the nominal size-free yarn numbers of the yarns designated ~~shall~~may conform to Specification ~~D578~~D578/D578M.

9.2 Determine the size-free yarn number in tex or yards per pound for both the warp and filling yarns as directed in Specification D578/D578M, 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.

TABLE 1 Physical Properties of ~~Generally Available~~ "E" Glass Greige Woven Glass Continuous Filament Tape, 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	N	lbf
ECC-A	0.130	0.005	12.7	½	24	34	35	1923	258	445	100
			19.0	¾	32	34	35	2681	185	600	135
			25.4	1	42	34	35	3543	140	712	160
			25.4	1	36	33	34	3398	146	712	160
			38.1	1½	62	34	35	5222	95	1112	250
			50.8	2	72	33	34	6795	73	1334	300
			63.5	2½	104	34	35	9186	54	1557	350
			76.2	3	108	33	34	10124	49	2224	500
			102.0	4	144	33	34	13407	37	2513	565
ECC-A	0.180	0.007	12.7	½	24	31	32	2771	179	578	130
			19.0	¾	32	31	32	3875	128	778	175
			25.4	1	42	31	32	5114	97	1068	240
			38.1	1½	62	31	32	7404	67	1646	370
			50.8	2	88	31	32	10334	48	2313	520
ECC-A	0.255	0.010	12.7	½	16	21	21	3730	133	712	160
			19.0	¾	24	21	21	5574	89	1112	250
			25.4	1	32	21	21	7295	68	1557	350
			38.1	1½	48	21	21	11023	45	2446	550
ECC-A	0.380	0.015	12.7	½	14	16	16	5222	95	934	210
			19.0	¾	20	16	16	7516	66	1423	320
			25.4	1	26	16	16	9921	50	1957	440
			38.1	1½	40	16	16	15032	33	2936	660
ECC-B	0.075	0.003	9.5	⅜	21	41	42	800	620	200	45
			12.7	½	30	41	42	1184	419	267	60
			19.0	¾	45	41	42	1759	282	423	95
			25.4	1	63	41	42	2408	206	600	135
			38.1	1½	108	41	42	4066	122	845	190
ECC-B	0.130	0.005	9.5	⅜	21	38	39	1778	279	512	115
			12.7	½	27	38	39	2297	216	600	135
			19.0	¾	39	38	39	3329	149	1001	225
			25.4	1	51	38	39	4390	113	1379	310
			38.1	1½	75	38	39	6442	77	1957	440
ECC-B	0.178	0.007	9.5	⅜	21	38	39	2147	231	512	115
			12.7	½	27	38	39	2771	179	600	135
			38.1	¾	39	38	39	4033	123	1001	225
			25.4	1	51	38	39	5277	94	1379	310
			38.1	1½	75	38	39	7874	63	1957	440

TABLE 2 Physical Properties of ~~Generally Available~~ "E" Glass Greige Woven Glass Staple (Discontinuous) Filament Tape, 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	N	lbf
ESS-A	0.255	0.010	12.7	½	18	21	21	3906	127	445	100
			19.0	¾	26	21	21	5977	83	667	150
			25.4	1	34	21	21	7632	65	890	200
			38.1	1½	52	21	21	11811	42	1334	300
ESS-A	0.038	0.015	19.0	¾	20	16.5	16.5	8268	60	890	200
			25.4	1	28	16.5	16.5	11023	45	1112	250
			38.1	1½	52	16.5	16.5	17105	29	1557	350

10. Filament Diameter

10.1 The nominal values for the filament diameters when agreed upon between purchaser and supplier are listed in Table 1 of Specification ~~D578~~D578/D578M. The average filament diameter for the yarns in the tape or webbing ~~shall~~may conform to Specification ~~D578~~D578/D578M for the specified filament diameter.

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	N	lbf
ESS-A	0.510	0.020	19.0	¾	20	14	14	10124	49	1112	250
			25.4	1	28	14	14	13779	36	1334	300
			38.1	1½	44	14	14	19842	25	2002	450
ESS-A	0.635	0.025	19.0	¾	20	10	10	11274	44	934	210
			25.4	1	28	10	10	15502	32	1334	300
			38.1	1½	44	10	10	27559	18	2446	550

10.2 Determine the filament diameter for both the warp and filling yarns as directed in Specification D578/D578M 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.

11. Strand Construction

11.1 The basis for specifying strand construction is given in Specification ~~D578~~D578/D578M. The construction of the component strands ~~shall~~may be agreed upon between the purchaser and the supplier.

11.2 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.

12. Direction of Twist

12.1 Unless otherwise agreed upon between the purchaser and the supplier, the primary twist in the singles strands ~~shall~~may be "Z" twist and the final twist in the plied yarns ~~shall~~may be "S" twist.

12.2 Verify the direction of twist in each strand of the yarns as directed in Test Method D1423/D1423M for one test specimen of warp yarn and one test specimen of filling yarn from each of the rolls in the laboratory sample.

13. Twist Level

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

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:	
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 average twist~~
Over 400	±5.0 % of the specified average twist
Turns per Inch:	
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

13.2 Determine the twist level in each of the component strands as directed in Test Method D1423/D1423M on five test specimens of warp yarn and five test specimens of filling yarn from each of the rolls in the laboratory sample.

14. Tape Weave Type

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

14.2 Determine the weave type as directed in Specification D579/D579M using one test specimen from each of the rolls in the laboratory sample.

15. Length per Unit Mass

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

15.2 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:

15.2.1 A length of tape or webbing 2.5 m [2½ yd] long from each laboratory sample may be smoothly laid on a flat surface using sufficient tension to keep the sample flat. A specimen 2 m [2 yd] long may be accurately measured from the center of this piece and cut off with a sharp instrument. The 2 m [2 yd] specimen may then be weighed.

16. Thickness

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

TABLE 5 Tolerances—Thickness

Nominal Thickness	Permissible Variations, Average	
	Continuous	Staple (discontinuous)
	~~millimetres~~	
	millimeters	
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 Variations, Individual	
	Continuous	Staple (discontinuous)
	~~millimetres~~	
	millimeters	
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