



Standard Specification for Greige Woven Glass Fabrics¹

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This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This specification covers greige fabrics woven from “E” electrical glass fiber yarns. This specification can also be applied to fabrics made of other glass fiber types as agreed upon between the purchaser and the supplier.

1.2 This specification specifies the terminology, definitions, general requirements and physical requirements for greige glass fiber fabrics. This specification permits the application of organic materials to the glass fiber yarn during manufacture that helps facilitate weaving.

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 non-conformance with the standard.

1.4 This specification is one of a series to provide a substitute for Military Specifications: MIL-Y-1140 Yarn, Cord, Sleeve, Cloth, and Tape-Glass; and MIL-C-9084 Cloth, Glass Finished for Resin Laminates.

1.5 Additional ASTM specifications in this series have been drafted and appear in current editions of the Annual Book of ASTM Standards. These include finished glass fabrics, unfinished glass fabrics, glass tapes, glass sleeveings, glass cords, glass sewing threads, and finished laminates made from finished glass fabrics.

1.6 *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.*

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. Referenced Documents²

2.1 ASTM Standards:

- D123 Terminology Relating to Textiles
- D578 Specification for Glass Fiber Strands
- D1059 Test Method for Yarn Number Based on Short-Length Specimens (Withdrawn 2010)³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
- D3776 Test Methods for Mass Per Unit Area (Weight) of Fabric
- 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 Standards:

- ANSI/ASQC Z1.4 Sampling Procedures for Inspection by Attributes⁴

2.3 Military Standard and Specifications:

- MIL-Y-1140H Yarn, Cord, Sleeve, Cloth and Tape-Glass⁵
- MIL-C-9084C Cloth, Glass Finished for Resin Laminates⁵

2.4 Textile Institute Documents:

- Textile Terms and Definitions⁶

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 The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

⁵ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

⁶ Available from the Textile Institute, 10 Blackfriars St., Manchester, M3 5DR England.

Woven Cloth Construction⁶

3. Terminology

3.1 For all terminology relating to D13.18, Glass Fibers and Its Products, refer to Terminology **D7018**.

3.1.1 The following terms are relevant to this specification: atmosphere for testing textiles, continuous filament, crowfoot weave, eight-harness satin, greige goods, leno weave, mock leno weave, twelve-harness satin

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

CLASSIFICATION

4. Classification

4.1 The designation of a fabric shall be by style numbers that are standard throughout the industry. Generally used style numbers are listed in numerical order in **Table 8**.

REQUIREMENTS

5. Material

5.1 The yarn shall be continuous filament, unless otherwise specified, 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 fabrics listed in **Table 8**, the nominal fabric count shall conform to the requirements of **Table 8**. For fabrics not listed in **Table 8**, the nominal fabric count shall be agreed upon between the purchaser and the supplier. The average count of warp ends shall be within two ends 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 fabrics listed in **Table 8**, the yarn designations shall conform to the requirements of **Table 8**. For fabrics not listed in **Table 8**, the yarn designations shall be agreed upon between the purchaser and the supplier. The requirements of the individual elements of the designation are specified in Sections **8 – 12**.

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	±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	±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	±5.0 % of the specified average twist

TABLE 2 Tolerances—Mass/Unit Area

Nominal Mass/Unit Area, g/m ² [oz./yd ²]	Permissible Variation, %
136 [4.0] and under	±10
Over 136 [4.0]	±6

TABLE 3 Tolerances—Thickness

Nominal Thickness	Permissible Variations	
	millimetres	
0.075 and under	±0.013	
Over 0.075 to 0.250	±0.025	
Over 0.250 to 0.380	±0.050	
Over 0.380	±0.075	
inches		
0.0030 and under	±0.0005	
Over 0.0030 to 0.0100	±0.0010	
Over 0.0100 to 0.0150	±0.0020	
Over 0.0150	±0.0030	

7.1.1 In some cases ECE 225 yarn is specified in **Table 8**. ECD 225 may be substituted with no significant decrease in property performance.

8. Yarn Number

8.1 For fabrics listed in **Table 8**, the nominal size-free yarn numbers of the yarns designated shall conform to Specification **D578**. For fabrics not listed in **Table 8**, the nominal size-free yarn number shall be agreed upon between purchaser and supplier.

9. Filament Diameter

9.1 The nominal filament diameter for yarns in the fabric shall conform to the nominal range for filament diameter average values specified in Table 1 of Specification **D578**.

10. Strand Construction

10.1 The basis for specifying strand construction is given in Specification **D578**. For fabrics listed in **Table 8**, the construction of the component strands shall conform to the requirements of **Table 8**. For fabrics not listed in **Table 8**, 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 conform to the requirements of **Table 8** in Specification **D578**. The tolerances for the primary twist and the final twist shall conform to **Table 1** of this document unless otherwise agreed upon between the purchaser and the supplier.

13. Fabric Weave Type

13.1 For fabrics listed in **Table 8**, the fabric weave type shall conform to the requirements of **Table 8**. For fabrics not listed

TABLE 4 Classification of Defects^A

Defect	Description	Major	Minor
Bias or bowed filling	Pick line distortion from horizontal by more than 2.5 % for entire width	X	
Baggy, ridged, or wavy cloth	Clearly noticeable	X	
Cut or tear	6.5 mm [0.25 in.] or more in any direction (body only)	X	
Hole	13 mm [0.5 in.] or more in diameter	X	
	Less than 13 mm [0.5 in.] in diameter		X
Spots, streaks, or stains, foreign inclusions	Clearly noticeable	X	
Tender or weak spot	Clearly noticeable 50 mm [2 in.] or more in combined directions	X	
	Clearly noticeable less than 50 mm [2 in.] but greater than 6.5 mm [0.25 in.] in combined directions		X
Smash	76 mm [3 in.] or more in combined directions	X	
	Less than 76 mm [3 in.] in combined directions		X
Broken, missing ends or picks	2 or more contiguous regardless of length	X	
Floats and skips	50 mm [2 in.] or more in combined directions	X	
	Less than 50 mm [2 in.] in combined directions		X
Light marks	Greater than 6.5 mm [0.25 in.] in width	X	
	2 picks less than nominal pick construction		X
Heavy marks	Puckering clearly noticeable	X	
	2 picks more than nominal pick construction		X
Crease	Hard embedded and folded over on self	X	
Waste	Clearly noticeable over 6.5 mm [0.25 in.] in length	X	
	Clearly noticeable less than 6.5 mm [0.25 in.] in length		X
Weave separation	Clearly noticeable 3 mm [0.125 in.] or more	X	
Brittle or fused area	Any	X	
Selvage Defects	Curled or folded under		X
	Cut or torn less than 6.5 mm [0.25 in.] in length		X
	Cut or torn 6.5 mm [0.25 in.] and over in length	X	
Selvage leno ends out	Greater than 5 m [5 yd] missing (continuously)	X	
	Less than 5 m [5 yd] missing		X
Feather edge	Greater than 5 mm [0.1875 in.] running more than 5 m [5 yd]	X	
	Greater than 5 mm [0.1875 in.] but running less than 5 m [5 yd]		X

^A At a normal viewing distance of 1 m or 3 ft.

TABLE 5 Sample Size Determination for Construction, Mass, Width, and Physical Properties

Lot Size in Units, m or [yd]	Sample Size, Number of Units (Rolls)
800 or less	2
801 up to and including 22 000	3
22 001 and over	5

in Table 8, the fabric weave type shall be agreed upon between the purchaser and the supplier.

14. Mass Per Unit Area

14.1 For fabrics listed in Table 8, the nominal mass per unit area shall conform to the requirement of Table 8. For fabrics not listed in Table 8, the nominal mass per unit area shall be agreed upon between the purchaser and the supplier. The average mass per unit area for the lot shall conform to the requirements of Table 2.

15. Thickness

15.1 For fabrics listed in Table 8, the nominal thickness shall conform to the requirements of Table 8. For fabrics not listed in Table 8, the nominal thickness shall be agreed upon between the purchaser and the supplier. The average thickness of the fabric in the lot shall conform to the requirements of Table 3, unless specified otherwise.

16. Breaking Force

16.1 For fabrics listed in Table 8, the minimum breaking force shall conform to the requirements of Table 8. For those fabrics in which breaking force is not listed in Table 8, the minimum 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 minimum breaking force.

17. Width

17.1 Fabric width shall be agreed upon between the purchaser and the supplier. The fabric width, including both selvages but excluding any feathered edges, shall be no narrower than the specified width and no more than 13 mm [0.5 in.] wider than the specified width.

NOTE 1—During the processing of glass fabrics, the selvages may be slit to minimize tension influences. This slit distance is generally excluded when measuring the fabric width.

18. Length

18.1 The fabric roll length, length between splices, and number of splices per roll shall be agreed upon between purchaser and supplier. All splices must be thermoset unless otherwise agreed upon between the purchaser and supplier.

TABLE 6 Values of *b* for Critical Differences in Defect Counts, *a* and *b*, for Two Test Results

Probability Level			Probability Level			Probability Level			Probability Level		
<i>r</i> = <i>a</i> + <i>b</i>	90 %	95 %	<i>r</i> = <i>a</i> + <i>b</i>	90 %	95 %	<i>r</i> = <i>a</i> + <i>b</i>	90 %	95 %	<i>r</i> = <i>a</i> + <i>b</i>	90 %	95 %
1			26	8	7	51	19	18	76	30	28
2			27	8	7	52	19	18	77	30	29
3			28	9	8	53	20	18	78	31	29
4			29	9	8	54	20	19	79	31	30
5	0		30	10	9	55	20	19	80	32	30
6	0	0	31	10	9	56	21	20	81	32	31
7	0	0	32	10	9	57	21	20	82	33	31
8	1	0	33	11	10	58	22	21	83	33	32
9	1	1	34	11	10	59	22	21	84	33	32
10	1	1	35	12	11	60	23	21	85	34	32
11	2	1	36	12	11	61	23	22	86	34	33
12	2	2	37	13	12	62	24	22	87	35	33
13	3	2	38	13	12	63	24	23	88	35	34
14	3	2	39	13	12	64	24	23	89	36	34
15	3	3	40	14	13	65	25	24	90	36	35
16	4	3	41	14	13	66	25	24	91	37	35
17	4	4	42	15	14	67	26	25	92	37	36
18	5	4	43	15	14	68	26	25	93	38	36
19	5	4	44	16	15	69	27	25	94	38	37
20	5	5	45	16	15	70	27	26	95	38	37
21	6	5	46	16	15	71	28	26	96	39	37
22	6	5	47	17	16	72	28	27	97	39	38
23	7	6	48	17	16	73	28	27	98	40	38
24	7	6	49	18	17	74	29	28	99	40	39
25	7	7	50	18	17	75	29	28	100	41	39

Probability levels are for two-sided limits. If the observed value of *ILM* the tabulated value, the two test results should be considered significantly different at the indicated probability level.

a = the larger of two defect counts, each of which is the total count for all specimens in a test result and each of which is based on the same number of specimens,

b = the smaller of the two defect counts taken as specified for *a*, and

r = *a* + *b*.

When *r* > 100, use the following approximation:

$$b = c - 1 - k \sqrt{c}$$

where:

b = calculated value of *b*, rounded to the nearest whole number,

c = *r*/2, and

k = 1.386 and 1.163 respectively for the 95 % and 90 % probability levels.

19. Ignition Loss

19.1 The ignition loss of greige fabric shall be less than 4.0 % unless otherwise agreed upon between the purchaser and the supplier.

20. Fabric Appearance

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

20.2 The fabric in the laboratory sample for the fabric appearance shall be examined for the defects listed in [Table 4](#) and the acceptable quality levels (AQLs) are 2.5 major and 6.5 total (major and minor combined) defects per hundred units of fabric unless otherwise agreed upon between the purchaser and the supplier.

20.3 When specified, the warp direction of the fabric shall be marked by blue direction-indicator yarns running warpwise in the cloth and spaced approximately 150 mm [6 in.] apart.

21. Put-Up

21.1 Fabric shall be furnished in rolls and shall be wound on spiral tubes. The tube dimensions shall be as agreed upon between the purchaser and supplier. The maximum number of pieces contained in any roll shall be as specified in [18.1](#).

22. Sampling

22.1 *Lot Size*—A lot shall consist of each 9000 m [10 000 yd] of a single fabric style unless otherwise agreed upon between the purchaser and the supplier.

22.1.1 When small multiple shipments are made from an inspected lot, the shipments may be made without additional inspection as agreed upon between the purchaser and the supplier.

22.2 *Lot Sample*—Take at random as a lot sample the number of rolls of fabric specified in ANSI/ASQC Z1.4 and a single sampling plan, unless otherwise agreed upon.

**TABLE 7 95 % Confidence Limits for Number of Defect Counts per Test Result**

Observed Count	Lower Limit	Upper Limit
0	0.0	3.7
5	1.6	11.7
10	4.8	18.4
15	8.4	24.7
20	12.2	30.9
25	16.2	36.9
30	20.2	42.8
35	24.4	48.7
40	28.6	54.5
45	32.8	60.2
50	37.1	65.9
60	45.8	77.2
70	54.6	88.4
80	63.4	99.6
90	72.4	110.6
100	81.4	121.6
120	99.5	143.5
140	117.8	165.2
160	136.2	186.8
180	154.7	208.3
200	173.2	229.7

Lower confidence limit for counts = $c[1 - (1/9c) - t(1/9c)^{1/2}]^3$
Upper confidence limit for count = $d[1 - (1/9d) + t(1/9d)^{1/2}]^3$

where:

c = observed number of counts,

d = $c + 1$, and

t = 1.960, the value of Student's t for infinite degrees of freedom, two-sided limits, and the 95 % probability level.

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

22.3.1 For fabric appearance, fabric width, mass per unit area, and fabric length, the rolls in the lot sample serve as the laboratory sample.

22.3.2 For other properties, take at random from the rolls in the lot sample the number of rolls specified in **Table 5**. From each roll in the laboratory sample, take a 1 m [1 yd] full-width swatch from the end of the roll after first discarding a minimum of 1 m [1 yd] of fabric from the very outside of the roll. Remove only the outer layer of fabric if the circumference of the roll is less than 1 m [1 yd].

22.4 Test Specimens—For fabric appearance, fabric width, and fabric length, the rolls in the lot sample serve as test specimens. For other properties, take test specimens from the swatches in the laboratory sample as directed in the respective test methods in this specification.

23. Packaging

23.1 Each roll of fabric, 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.

23.2 Unless otherwise agreed upon, as when specified in an applicable contract or purchase order, each roll shall be wrapped in polyethylene not less than 0.05 mm [0.002 in.] thick in such a manner as to ensure that the fabric, during

shipment and storage, will be protected against damage from exposure to moisture, weather, or any other normal hazard.

24. Marking

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

100 % Fiber Glass Cloth
Style
Length
Width
Purchase Order Number
Manufacturer's Identification
Finish Designation

24.1.1 All fabrics will be considered Type “E” electrical unless specified otherwise. If glass type is other than electrical “E,” each package shall be marked accordingly.

SAMPLING AND CONDITIONING

25. Conditioning

25.1 Condition the laboratory samples without preconditioning, for a period of at least 5 h in the atmosphere for testing glass textiles as directed in Practice **D1776**, unless otherwise specified.

TEST METHODS

26. Material

26.1 Accept the supplier's certification that the material is of the correct grade as specified in Specification **D578**. Unless otherwise specified, during testing for strand construction as directed in Section **30**, verify that the yarn is continuous filament. Determine the freedom from objectionable impurities during the inspection for fabric appearances as directed in Section **40**.

27. Fabric Count

27.1 Determine the fabric count as directed in Test Method **D3775**, making one count in each direction on each of the swatches in the laboratory sample.

28. Yarn Number

28.1 Determine the yarn number in tex [yards per pound] for both the warp and filling yarns as directed in Test Method **D1059**.

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 swatches 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 while determining the twist direction or twist level.

31. Direction of Twist

31.1 Verify the direction of twist in each strand of the yarns as directed in Test Method [D1423](#) in each of five test specimens of warp and filling yarns taken from each of the swatches 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](#) upon five test specimens of warp yarn and five test specimens of filling yarn from each of the swatches in the laboratory sample.

33. Fabric Weave Type

33.1 *Scope*—This method covers the recognition of the six fabric weave types referred in [Table 8](#). The weaves included are: crowfoot, leno, mock leno, plain, eight-harness satin, and twelve-harness satin.

33.2 *Significance and Use:*

33.2.1 The fabric weave type is important. It can affect the performance of the final product depending on its end use in terms of force, durability and aesthetics. This method specifies a procedure for recognizing specified weaves.

33.2.2 This procedure for recognizing fabric weave type is considered satisfactory for acceptance testing of commercial shipments.

33.3 *Apparatus:*

33.3.1 *Rectangular Coordinate Graph Paper.*

33.3.2 *Linen or Magnifying Glass.*

33.3.3 *Marking Pen or Pencil.*

33.4 *Procedure:*

33.4.1 Place a swatch of the sample on a flat surface, face side up (see Terminology [D7018](#) for definitions relative to Eight and Twelve Harness Satins). Position the swatch with the warp direction extending forward and away from the observer.

33.4.2 Select a starting point on the surface of the fabric where a warp end is raised over a filling pick (raiser yarn).

33.4.3 Denote a filling end raised over a warp end (Sinker yarn) on the face of the fabric by an unmarked block.

33.4.4 Plot the weave construction by first marking a block on the graph paper designating the starting raiser yarn.

33.4.5 Continue plotting from left to right, from the first raiser yarn, showing raiser yarns as marked blocks and sinker yarns as unmarked blocks until a minimum of two repeats of the pattern are observed. In a like manner, plot up from the first raiser yarn until a minimum of two repeats of the pattern are observed corresponding to each designated block in the left-to-right pattern.

33.4.6 Compare the design plot to [Figs. A1.1-A1.6](#).

33.4.6.1 Leno and mock leno have a distinct visual appearance and may be identified without plotting.

33.5 *Report:*

33.5.1 State that the fabric weave type of the rolls of fabric was determined as directed in Section [33](#) of Specification [D579](#). Describe the material or product sampled and the method of sampling used.

33.5.2 Report the fabric weave type for each roll including the raiser/sinker pattern in terms of the warp ends up and down.

33.6 *Precision and Bias*—No justifiable statement can be made either on the precision or on the bias of this procedure since the procedure merely determines whether the weave in the test specimen conforms to that specified.

34. Mass Per Unit Area

34.1 Determine the mass per unit area of the fabric as directed in Test Method [D3776](#), Option A, using each of the rolls in the laboratory sample.

35. Thickness

35.1 Determine the thickness of the fabric as directed in Test Method [D1777](#), using ten test specimens from each swatch in the laboratory sample.

35.2 For glass fabrics and tapes made with continuous filament yarns, use Table 1 Option 3 of Method [D1777](#). For fabrics made with textured or open-end yarns, use Table 1 Option 1 of Method [D1777](#).

36. Breaking Force

36.1 Determine the breaking force in newtons per 25 mm [or pounds-force per inch] of fabric in both the warp and filling directions as directed in Test Method [D5035](#). There may be no overall correlation between the results obtained with the CRE machine and the CRT machine. Consequently, these two testers cannot be used interchangeably. In case of controversy the CRE tensile tester shall prevail.

36.1.1 The use of hydraulic pneumatic clamping systems with 50 by 75-mm [2 by 3-in.] serrated jaw faces is recommended for testing samples prepared as directed in [36.4](#) and [36.5](#). The 50-mm [2-in.] dimension of the jaw face shall be in the direction of test. Manual clamping is permitted.

NOTE 2—When using jaw faces other than serrated, minimize crushing and cutting of the glass yarns in the test specimens by lining the inside surface of the jaws with cardboard 0.25 to 0.40 mm [0.010 to 0.015 in.] in thickness or moleskin. Secure the end of the jaws with pressure-sensitive tape.

36.2 Prepare specimens as directed in [36.3](#), [36.4](#), or [36.5](#), as applicable.

36.3 *Procedure 1*—Procedure 1 is for fabrics having breaking forces of 445 N/25 mm [100 lbf/in.] or less.

NOTE 3—Fabrics having breaking force less than 445 N/25 mm [100 lbf/in.] can be prepared as outlined in [36.4](#) with no effect on the obtained value. Preparation Procedure 1 is provided to allow for a lower test specimen preparation cost when extensive preparation is not required.

36.3.1 *Reagents and Materials:*

36.3.1.1 *Butyl Methacrylate Solution* is prepared by mixing 45 parts by mass of butyl methacrylate with 55 parts by weight of toluene or xylene and adding a small amount of oil-soluble dye. The viscosity of this solution should be about mPa·s (3000 cP), approximately that of honey at room temperature. It may be necessary to change the consistency for some types of fabrics to permit complete penetration of all interstices and to prevent capillary migration of the solution along the yarns into the test area.

NOTE 4—Substitute solutions can be used providing specimen damage does not occur or that specimens break or slip at the jaw faces.

36.3.1.2 **Precaution**—Butyl methacrylate solution ingredients are flammable. Keep away from heat, sparks and open flame. Keep containers closed. Use only with adequate ventilation. Avoid prolonged breathing of vapor or spray mist. Avoid prolonged or repeated contact with skin. Spillage and fire instructions will depend on nature of solution.

36.3.1.3 *Multipurpose Paper*, 20 lb bond or greater (as needed to prevent slippage in the grips).

36.3.1.4 *Paint Brush*, 16 to 25 mm [0.6 to 1.0 in.] ,with bristles 25 mm [1 in.] long.

36.3.2 Cut two swatches of fabric from the laboratory sample each 200 by 250 mm [8 by 10 in.], one with the warp yarns and the other with filling yarns parallel to the 200 mm [8 in.] direction.

36.3.3 Lay each sample cut as directed in 36.3.2 on a piece of wrapping paper of similar size. Lay out five test specimens 38 by 150 mm [1.5 by 6 in.] on the fabric by drawing light lines with a soft, black wax pencil so that the yarns to be tested, warp or filling, are parallel to the longer direction. Draw lines across the specimens 40 mm [1.6 in.] from each end, using very light pressure on the wax pencil to avoid possible damage to the surface filaments. Thoroughly impregnate the 40 mm [1.625 in.] specimen end strips with butyl methacrylate solution (or substitute) which must soak through the fabric in order to secure firm adhesion to the paper. Spread the solution in an even film to secure a uniform pressure from the testing machine jaws against the test specimen. Dry the impregnated sample slowly, 24 h without forcing, until the solvent is completely removed. Be sure to have the impregnant cover the cross lines to reinforce those sections where some of the surface fibers may have been fractured when those lines were drawn. On thick fabrics, paint both sides of the specimens by applying a coat of the impregnant to the back of the fabric or to the top surface of the backing paper.

36.3.4 Cut the 150 by 38 mm [6 by 1.5 in.] test specimen strips from the prepared sample without removing the paper backing. Ravel the central unimpregnated portion of the specimen to 25 mm [1 in.] in width as directed in Test Method D5035. After raveling, load samples in the test clamps, cut the 38 mm [1.5 in.] wide paper backing across midway between the ends, taking care not to damage the fabric specimen.

NOTE 5—Raveling of the specimen can be facilitated by slitting each test specimen at its center, perpendicular to the yarn components severing all yarns except those in the central 25 mm [1 in.].

36.4 *Procedure 2*—Procedure 2 is for fabrics having breaking forces greater than 445 N/mm [100 lbf/in.] or tending to consistently break in, or slip from, the jaws when using Procedure 1 stated in 36.3.

36.4.1 Prepare test specimens as directed in 36.3 except as described in 36.4.2 – 36.4.10.

36.4.2 Substitute Sub 65 grade white cardboard in place of the wrapping paper.

36.4.3 Draw two legible lines 75 ± 1 mm [3.0 ± 0.05 in.] from each other and parallel across the center section of the cardboard.

36.4.4 Uniformly apply a resin solution on the cardboard along the drawn lines and outwards for a distance of 50 ± 1

mm [2.0 ± 0.05 in.] . Do not include the center 75 ± 1 mm [3.0 ± 0.05 in.] between the drawn lines.

NOTE 6—A mixture by weight of 60 parts CIBA Giegy 6004 Epoxy resin and 40 parts General Mills Versimid 125 polyamide resin has been found suitable for this purpose.

36.4.5 Lay the cut swatches of fabrics each 200 by 250 mm [8 by 10 in.], one with the warp yarns and the other with the filling yarns parallel to the 200 mm [8 in.] direction, centrally and equally spaced on the resin prepared cardboard. The shorter direction of the sample is perpendicular to the drawn lines.

36.4.6 Uniformly reapply the resin mixture on the specimen directly above the first application.

36.4.7 Place a 50 ± 1 mm [2.0 ± 0.05 in.] by 250 mm [10 in.] strip of cardboard over the resin-impregnated area of the specimen. Allow to dry a minimum of 16 h.

NOTE 7—When substitute solutions are used, drying time may vary.

36.4.8 Cut five specimens, 150 by 38 mm [8.0 by 1.5 in.] in each of the warp and filling directions, and label accordingly, having the longer direction in the direction of test.

36.4.9 Ravel a sufficient number of yarns from each side of the specimen so that the central portion is a 25 mm [1.0 in.] width plus two yarns.

36.4.10 After the specimen is loaded in the test clamps, cut and ravel one yarn from each side of the test specimen and cut the cardboard backing across, midway between the ends, taking care not to damage the fabric specimen.

36.4.11 In the case of hydraulic pneumatic clamps, apply a pressure of 6750 to 7650 N [1500 to 1700 lbf] to the clamp faces. In the case of manual clamping, tighten sufficiently to prevent slippage of the test specimen.

36.5 *Procedure 3*—Procedure 3 is for fabrics having breaking forces greater than 2224 N/25 mm [500 lbf/in.] or that show cascading breaks across the specimen when using Procedure 2 stated in 36.4, or both.

NOTE 8—Glass yarns have a tendency to move within some fabrics when cut and handled in the greige state. This procedure is designed to ensure straightness of individual yarn components throughout the test.

36.5.1 Cut five specimens, 300 by 50 mm [12 by 2 in.] from the laboratory sample in each of the warp and filling directions, and label accordingly, having the longer direction in the direction of test.

36.5.2 Draw two legible lines 75 ± 1 mm [3.0 ± 0.05 in.] from each other and parallel to the long directions and across the center section of a 200 by 280 mm [8 by 11 in.] piece of Sub 65 white cardboard. Prepare one for each the warp and filling directions.

36.5.3 Place the cardboard sections at the outer edge of a workbench that is covered with a 0.19 mm [75 in.] thick piece of plywood. The 280 mm [11 in.] length is parallel to the bench edge.

36.5.4 Lay the cut specimens on the lined cardboard so that one end is 25 mm [1 in.] above the cardboard and the other end is hanging over the bench edge. Secure the top edge of the specimen to the plywood base by nailing through a 25 by 50 mm [1 by 2 in.] 19 mm [0.75 in.] plywood block placed above the specimen to the base. The 50 mm [2 in.] dimension is

placed parallel to the specimen width. Four or five 32 mm [1.25 in.] nails equally spaced have been found acceptable for this purpose.

NOTE 9—A permanent fixture can be designed to replace the wooden blocks to facilitate testing.

36.5.5 Place two similar wooden blocks, one on each side of the other end of the specimen so that the fabric is sandwiched between the blocks. Nail the blocks and fabric together.

36.5.6 Fold the specimen upwards and away from the lined cardboard.

36.5.7 Apply a resin solution as directed in 36.4.4.

36.5.8 Secure a 2.3-kg [5-lb] mass to the free specimen end. With an arc motion, apply the load to the specimen while placing the specimen on the resin prepared cardboard, allowing the weight to hang over the bench edge.

36.5.9 Reapply the resin mixture on the specimen directly above the first application.

36.5.10 Proceed as directed in 36.4.8 – 36.4.10.

36.5.11 If a specimen slips in the jaws, breaks at the edge of, or in, the jaws, or if for any reason attributed to faulty operation the result falls markedly below the average for the set of specimens, discard the result and take another specimen. Continue this procedure until the required number of acceptable breaks have been obtained.

NOTE 10—The decision to reject a break shall be based on observation of the specimen during the test and upon the inherent variability of the fabric. In the absence of other criteria for rejecting a so-called jaw break, any break occurring within 6 mm [0.25 in.] of the jaws that results in a value below 50 % of the average of all the other breaks shall be discarded. No other break shall be discarded unless it is known to be faulty.

NOTE 11—It is difficult to determine the precise reason why certain specimens break near the edge of the jaws or specimen tab edges. If this is caused by damage to the specimen by the jaws, then the results should be discarded. If, however, it is merely due to randomly distributed weak places, it is a perfectly legitimate result. In some cases, it may also be caused by a concentration of stress in the area adjacent to the jaws or specimen tab edges because they prevent the specimen from contracting in width as the force is applied. In these cases, a break near the edge of the jaws or specimen tab edges is inevitable and shall be accepted as a characteristic of the particular test method.

36.5.12 *Precision and Bias*—The precision and bias of this procedure are as specified in Test Method D5035.

37. Width

37.1 Determine the width of the fabric 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 contains 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 upon between the purchaser and the supplier.

40. Fabric Appearance

40.1 *Scope*—This method establishes a means of examining defects in glass fiber fabrics by a major and minor evaluation system. A list of defects is provided designating the degree of the defect, whether minor or major.

40.2 *Significance and Use*—This method for determining fabric appearance is considered satisfactory for acceptance testing of commercial shipments because the method has been used extensively in the trade for fabric appearance acceptance determination. In cases of disagreement arising from differences in values reported by the purchaser and the supplier when using this method for acceptance testing, the statistical bias, if any, between the examination station of the purchaser and the examination station of the supplier should be determined with each comparison being based on the examination results of inspection of the same rolls of fabric.

40.3 Apparatus:

40.3.1 *Fabric-Inspection Machine* that provides a flat viewing area and an interruptable controlled fabric-rewinding mechanism.

40.3.2 *Lighting Source* mounted parallel to the viewing surface of the fabric-inspection machine so as to illuminate the surface with overhead direct perpendicular impinging light rays that produce a minimum illumination level of 1075 lx (100 fc).

40.4 *Conditioning*—There are no specific requirements for conditioning.

40.5 Procedure:

40.5.1 Visually examine (inspect) each roll in the lot sample in the linear direction, full width, on the face side of the fabric. Examine the entire length of each roll.

40.5.2 Traverse the fabric longitudinally through the inspection machine at a compatible visual inspection speed.

40.5.3 View and inspect the moving fabric from a distance of approximately 1 m [1 yd]. Stop and traverse to affirm marginal or suspected defects.

40.5.3.1 Count all defects found, regardless of their proximity to one another, except where two or more defects represent a single local condition (one linear metre or yard) of the fabric. In this case, count only the more serious defect as one defect. A continuous defect is counted as one defect for each lengthwise metre or yard, or fraction thereof, in the sample which it appears. Classify the defects as listed in Table 4.

40.6 Report:

40.6.1 State that the rolls of fabric were visually inspected for defects as directed in Section 40 of Specification D579. Describe the fabric sampled, method of sampling, and the roll widths and lengths sampled.

40.6.2 Report, for each roll, the number and type of defects per roll length.

40.6.3 Report, for the lot average, the number and type of defects for each roll visually inspected.

40.6.4 Report the Quality Level (QL) of the major and the total (major and minor combined) defects per 100 units (metres or yards).

40.7 *Precision and Bias:*

40.7.1 *Introduction*—Test results are reported as the average defect count per roll of fabric for a specific material. The precision of test results is evaluated in terms of the total defect count for all rolls of fabric included in each test result since such total counts have a Poisson distribution while the average defect counts do not have such a distribution. If the total counts for actual test results include bias due to systematic sampling or testing errors, the critical differences in **Table 6** will be overly optimistic and the confidence limits in **Table 7** will be widened by the existence of such bias.

40.7.2 *Critical Differences*—**Table 6** contains criteria for determining if the total defect counts for two test results, each based on the same number of rolls of fabric of a stated size, should be considered significantly different at the indicated probability levels. No justifiable statement can be made about the between-laboratory precision of this procedure until the amount of bias, if any, between the two specific laboratories has been established by comparisons based on recent data obtained on rolls of fabric randomly drawn from one sample of material of the type to be tested.

40.7.3 *Confidence Limits*—**Table 7** shows the 95 % confidence limits for the total defect count in a single test result obtained as directed in the specification.

40.7.4 *Bias*—The true value of visual inspection for defects to determine the appearance of the fabric can be defined only

in terms of a specific test method. Within this limitation, this procedure has no known bias.

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

42. Conformance

42.1 The test results for the lot must conform to the requirements for all characteristics listed in this specification for the lot to be considered acceptable.

42.2 The purchaser and the supplier shall agree on other procedures to establish conformance, including control charts furnished by the supplier, and other sampling plans such as sequential or double-sampling.

42.3 Upon request of the purchaser in the contract or order, a manufacturer's certification that the material was manufactured and tested in accordance with this specification together with a report of the test results shall be furnished at the time of shipment.

42.4 Upon the request of the purchaser in the contract or order, the certification of an independent third party indicating conformance to the requirements of this specification may be accepted instead of the manufacturer's certification.

43. Keywords

43.1 appearance; classification; construction; fabric weave; glass fabrics; organic content; twist; yarn number

TABLE 8 Physical Properties of Typical “E” Glass Greige Woven Glass Fabrics

Commercial Style Designation	Fabric Count, Warp × Fill yarns/25 mm [yarns/in.]	Yarn Designation, tex ^A [inch-pound units]		Fabric Weave Type ^B	Mass per Unit Area, g/m ² [oz/yd ²]	Thick-ness, mm [in.]	Breaking Force, min, ^C Warp × Fill N/5 cm [lb/in.]
		Warp	Filling				
100	79 × 69	EC5 5.5 1 × 0	EC5 2.75 1 × 0	plain	27	0.038	438 × 175
	80 × 70	ECD 900 1/0	ECD 1800 1/0		0.80	0.0015	50 × 20
101	74 × 74	EC5 2.75 1 × 0	EC5 2.75 1 × 0	plain	16.9	0.020	162 × 162
	75 × 75	ECD 1800 1/0	ECD 1800 1/0		0.50	0.0008	19 × 19
104	59 × 51	EC5 5.5 1 × 0	EC5 2.75 1 × 0	plain	18.6	0.028	260 × 112
	60 × 52	ECD 900 1/0	ECD 1800 1/0		0.55	0.0011	30 × 13
105	59 × 51	EC5 5.5 1 × 0	EC5 5.5 1 × 0	plain	25	0.038	420 × 192
	60 × 52	ECD 900 1/0	ECD 900 1/0		0.73	0.015	48 × 42
106	55 × 55	EC5 5.5 1 × 0	EC5 5.5 1 × 0	plain	24.4	0.033	242 × 242
	56 × 56	D900 1/0	D900 1/0		0.72	0.0013	28 × 28
107	59 × 34	EC5 5.5 1 × 2	EC5 5.5 1 × 0	plain	35	0.043	613 × 175
	60 × 35	ECD 900 1/2	ECD 900 1/0		1.06	0.0017	70 × 20
108	59 × 46	EC5 5.5 1 × 2	EC5 5.5 1 × 2	plain	47.5	0.061	578 × 456
	60 × 47	D900 1/2	D900 1/2		1.40	0.0024	66 × 52
112	39 × 38	EC5 11 1 × 2	EC5 11 1 × 2	plain	71	0.082	718 × 701
	40 × 39	ECD 450 1/2	ECD 450 1/2		2.10	0.0032	82 × 80
113	59 × 63	EC5 11 1 × 2	EC5 5.5 1 × 2	plain	83	0.076	1077 × 525
	60 × 64	ECD 450 1/2	ECD 900 1/2		2.46	0.0030	123 × 60
116	59 × 57	EC5 11 1 × 2	EC5 11 1 × 2	plain	107	0.089	1095 × 1051
	60 × 58	ECD 450 1/2	ECD 450 1/2		3.16	0.0035	125 × 120
117	53 × 38	EC5 11 1 × 2	EC5 11 1 × 2	plain	84	0.089	1007 × 727
	54 × 39	ECD 450 1/2	ECD 450 1/2		2.49	0.0035	115 × 83
118	89 × 59	EC5 11 1 × 2	EC5 11 1 × 2	crowfoot	136	0.127	1664 × 1226
	90 × 60	ECD 450 1/2	ECD 450 1/2		4.00	0.0050	190 × 140
119	53 × 49	EC5 11 1 × 2	EC5 11 1 × 2	plain	95	0.086	963 × 876
	54 × 50	ECD 450 1/2	ECD 450 1/2		2.80	0.0034	110 × 100
120	59 × 57	EC5 11 1 × 2	EC5 11 1 × 2	crowfoot	107	0.089	1095 × 1051
	60 × 58	ECD 450 1/2	ECD 450 1/2		3.16	0.0035	125 × 120
125	35 × 33	EC5 11 2 × 2	EC5 11 2 × 2	plain	127	0.127	1313 × 1226
	36 × 34	ECD 450 2/2	ECD 450 2/2		3.75	0.0050	150 × 140
126	33 × 31	EC5 11 3 × 2	EC5 11 3 × 2	plain	180	0.178	1970 × 1751
	34 × 32	ECD 450 3/2	ECD 450 3/2		5.30	0.0070	225 × 200
127	41 × 31	EC5 11 3 × 2	EC5 11 3 × 2	plain	203	0.191	2189 × 1751
	42 × 32	ECD 450 3/2	ECD 450 3/2		6.00	0.0075	250 × 200
128	41 × 31	EC7 22 1 × 3	EC7 22 1 × 3	plain	201	0.165	2189 × 1751
	42 × 32	ECE 225 1/3	ECE 225 1/3		5.94	0.0065	250 × 200
132	47 × 31	EC9 33 2 × 2	EC9 33 2 × 2	crowfoot	441	0.406	5254 × 3503
	48 × 32	ECG 150 2/2	ECG 150 2/2		13.00	0.0160	600 × 400
138	63 × 59	EC5 11 2 × 2	EC5 11 2 × 2	crowfoot	227	0.178	2277 × 2145
	64 × 60	ECD 450 2/2	ECD 450 2/2		6.70	0.0070	260 × 245
139	63 × 55	EC7 22 1 × 2	EC7 22 1 × 2	crowfoot	217	0.178	2277 × 2014
	64 × 56	ECE 225 1/2	ECE 225 1/2		6.41	0.0070	260 × 230
141	31 × 21	EC7 22 3 × 2	EC7 22 3 × 2	plain	297	0.279	3503 × 2539
	32 × 21	ECE 225 3/2	ECE 225 3/2		8.75	0.0110	400 × 290
143	48 × 30	EC7 22 3 × 2	EC5 11 1 × 2	crowfoot	297	0.229	5254 × 5254
	49 × 30	ECE 225 3/2	ECD 450 1/2		8.75	0.0090	600 × 600
162	28 × 16	EC7 22 2 × 5	EC7 22 2 × 5	plain	400	0.381	3940 × 3065
	28 × 16	ECE 225 2/5	ECE 225 2/5		11.80	0.0150	450 × 350
164	20 × 18	EC7 22 4 × 3	EC7 22 4 × 3	plain	429	0.406	4378 × 3940
	20 × 18	ECE 225 4/3	ECE 225 4/3		12.65	0.0160	500 × 450
166	59 × 57	EC5 11 1 × 2	EC5 22 1 × 0	plain	105	0.0889	1313 × 1576
	60 × 58	ECD 450 1/2	ECD 225 1/0		3.10	0.0035	150 × 180
181	56 × 53	EC7 22 1 × 3	EC7 22 1 × 3	8-H satin	302	0.203	3065 × 2890
	57 × 54	ECE 225 1/3	ECE 225 1/3		8.90	0.0080	350 × 330
182	59 × 55	EC7 22 2 × 2	EC7 22 2 × 2	8-H satin	424	0.343	3853 × 3503
	60 × 56	ECE 225 2/2	ECE 225 2/2		12.50	0.0135	440 × 400
183	53 × 47	EC7 22 3 × 2	EC7 22 3 × 2	8-H satin	559	0.425	5692 × 5166
	54 × 48	ECE 225 3/2	ECE 225 3/2		16.50	0.0170	650 × 590
184	41 × 35	EC7 22 4 × 3	EC7 22 4 × 3	8-H satin	881	0.686	8318 × 7005
	42 × 36	ECE 225 4/3	ECE 225 4/3		26.00	0.0270	950 × 800
190	20 × 10	EC7 22 1 × 3	EC7 22 1 × 3	leno	83	0.152	806 × 508
	20 × 10	ECE 225 1/3	ECE 225 1/3		2.45	0.0060	92 × 58
191	20 × 10	EC7 22 1 × 2	EC7 22 1 × 2	leno	54	0.127	543 × 350
	20 × 10	ECE 225 1/2	ECE 225 1/2		1.60	0.0050	62 × 40
220	59 × 57	EC7 22 1 × 0	EC7 22 1 × 0	4-H Satin	109	0.089	1094 × 1051
	60 × 58	ECE 225 1/0	ECE 225 1/0		3.22	0.0035	125 × 120
248	26 × 20	CD7 71R 1 × 2	CD7 71R 1 × 2	plain	264	0.305	999 × 981
	26 × 20	CSE 70/2R	CSE 70/2R		7.81	0.012	114 × 112
261	20 × 14	CD7 124R 1 × 2	CD7 124R 1 × 2	plain	348	0.381	1480 × 1051
	20 × 14	CSE 40/2R	CSE 40/2R		10.3	0.015	169 × 120

**D579/D579M – 15****TABLE 8** *Continued*

Commercial Style Designation	Fabric Count, Warp × Fill yarns/25 mm [yarns/in.]	Yarn Designation, tex ^A [inch-pound units]		Fabric Weave Type ^B	Mass per Unit Area, g/m ² [oz/yd ²]	Thick-ness, mm [in.]	Breaking Force, min. ^C Warp × Fill N/5 cm [lb/in.]
		Warp	Filling				
294	16 × 16	CD7 198R 1 × 2	CD7 198R 1 × 2	plain	496	0.584	1542 × 1770
	16 × 16	CSE 25/2	CSE 25/2		14.7	0.023	176 × 202
325	89 × 43	EC5 5.5 1 × 0	EC5 2.75 1 × 0	plain	23.8	0.030	525 × 88
	90 × 44	ECD 900 1/0	ECD 1800 1/0		0.70	0.0012	60 × 10
332	47 × 34	EC9 134 1 × 0	EC9 134 1 × 0	4-H Satin	427	0.343	3502 × 3065
	48 × 35	ECG 37 1/0	ECG 37 1/0		12.6	0.0135	400 × 350
341	30 × 48	EC5 11 1 × 2	EC7 22 3 × 2	crowfoot	298	0.228	525 × 5254
	30 × 49	ECD 450 1/2	ECE 225 3/2		8.78	0.0090	60 × 600
401	53 × 51	EC6 33 1 × 2	EC6 33 1 × 2	crowfoot	281	0.203	3065 × 2846
	54 × 52	ECDE 150 1/2	ECDE 150 1/2		8.30	0.0080	350 × 325
1000	84 × 84	BC 4 1.65 1 × 0	BC 4 1.65 1 × 0	plain	11.1	0.012	—
	85 × 85	BC 3000 1/0	BC 3000 1/0		0.33	0.00047	—
1012	69 × 69	BC 4 2.2 1 × 0	BC4 2.2 1 × 0	plain	12.3	0.18	—
	70 × 70	BC 2250 1/0	BC 2250 1/0		0.36	0.00071	—
1015	94 × 94	BC4 2.20 1 × 0	BC4 2.20 1 × 0	plain	16.9	0.015	—
	96 × 96	BC 2259 1/0	BC 2259 1/0		0.50	0.00059	—
1017	94 × 94	BC 4 1.65 1 × 0	BC 4 1.65 1 × 0	plain	12.3	0.13	—
	95 × 95	BC 3000 1/0	BC 3000 1/0		0.36	0.00053	—
1020	54 × 54	EC4.5 2.76 1 × 0	EC4.5 2.76 1 × 0	plain	12.2	0.25	—
	55 × 55	ECC 1800 1/0	ECC 1800 1/0		0.36	0.00098	—
1024	90 × 90	BC4 3.31 1 × 0	BC4 3.31 1 × 0	plain	23.8	0.020	—
	91 × 91	BC 1500 1/0	BC 1500 1/0		0.70	0.00079	—
1027	74 × 74	BC4 3.31 1 × 0	BC4 3.31 1 × 0	plain	19.9	0.019	—
	75 × 75	BC 1500 1/0	BC 1500 1/0		0.59	0.00075	—
1030	90 × 90	EC4.5 4.1 1 × 0	EC4.5 4.1 1 × 0	plain	29.7	0.026	—
	91 × 91	EC 1200 1/0	EC 1200 1/0		0.88	0.00102	—
1035	65 × 67	EC5 5.5 1 × 0	EC5 5.5 1 × 0	plain	30	0.28	—
	66 × 68	ECD 900 1/0	ECD 900 1/0		0.88	0.0011	—
1037	69 × 72	EC4.5 4.1 1 × 0	EC4.5 4.1 1 × 0	plain	23	0.028	—
	70 × 73	EC 1200 1/0	EC 1200 1/0		0.68	0.0011	—
1042	87 × 43	EC5 5.5 1 × 0	EC5 2.75 1 × 0	plain	25	0.033	525 × 88
	88 × 44	ECD 900 1/0	ECD 1800 1/0		0.74	0.0013	60 × 10
1044	43 × 43	EC6 51 1 × 0	EC6 51 1 × 0	plain	171	0.142	—
	44 × 44	ECDE 100 1/0	ECDE 100 1/0		5.05	0.0056	—
1047	92 × 92	EC6 51 1 × 0	EC6 51 1 × 0	plain	184.4	0.147	1638 × 1638
	47 × 47	DE 100 1/0	DE 100 1/0		5.44	0.0058	188 × 188
1064	17 × 20	EC9 68 1 × 2	EC9 34 1 × 2	plain	159	0.160	1926 × 1313
	18 × 21	ECG 75 1/2	ECG 150 1/2		4.68	0.0063	220 × 150
1065	55 × 55	EC5 11 1 × 0	EC5 5.5 1 × 0	plain	37.3	0.053	—
	56 × 56	ECD 450 1/0	ECD 900 1/0		1.08	0.0021	—
1067	69 × 69	EC5 5.5 1 × 0	EC5 5.5 1 × 0	plain	30.7	0.36	—
	70 × 70	ECD 900 1/0	ECD 900 1/0		0.91	0.0014	—
1070	59 × 34	EC5 11 1 × 0	EC5 5.5 1 × 0	plain	35.9	0.048	613 × 175
	60 × 35	ECD 450 1/0	ECD 900 1/0		1.06	0.0019	70 × 20
1071	59 × 29	EC5 5.5 1 × 0	EC5 5.5 1 × 0	plain	21	0.030	438 × 175
	60 × 30	ECD 900 1/0	ECD 900 1/0		0.61	0.0012	50 × 20
1076	59 × 24	EC5 11 1 × 0	EC5 5.5 1 × 0	plain	33	0.046	876 × 131
	60 × 25	ECD 450 1/0	ECD 900 1/0		0.98	0.0018	100 × 15
1078	53 × 53	EC5 11 1 × 0	EC5 11 1 × 0	plain	47.8	0.043	—
	54 × 54	ECD 450 1/0	ECD 450 1/0		1.41	0.0017	—
1080	59 × 46	EC5 11 1 × 0	ECD 450 1/0	plain	48.5	0.051	613 × 350
	60 × 47	ECD 450 1/0	EC5 11 1 × 0		1.43	0.0020	70 × 40
1081	69 × 69	EC5 11 1 × 0	EC5 11 1 × 0	plain	58.3	0.061	—
	70 × 70	ECD 450 1/0	ECD 450 1/0		1.72	0.0024	—
1087	68 × 67	EC5 11 1 × 0	EC5 11 1 × 0	plain	62	0.056	—
	69.5 × 68	ECD 450 1/0	ECD 450 1/0		1.83	0.0022	—
1116	59 × 57	EC5 22 1 × 0	EC5 22 1 × 0	plain	104.0	0.089	1226 × 1182
	60 × 58	ECD 225 1/0	ECD 225 1/0		1.38	0.0035	140 × 135
1125	39 × 38	EC5 11 1 × 2	EC9 33 1 × 0	plain	89	0.089	788 × 1138
	40 × 39	ECD 450 1/2	ECG 150 1/0		2.62	0.0035	90 × 130
1131	119 × 51	EC5 11 1 × 0	EC9 34 1 × 0	plain	124	0.127	1226 × 1313
	120 × 52	ECD 450 1/0	ECG 150 1/0		3.65	0.005	140 × 150
1142	30 × 20	EC9 134 1 × 0	EC9 134 1 × 0	plain	285	0.282	2627 × 1926
	31 × 21	ECG 37 1/0	ECG 37 1/0		8.42	0.011	300 × 220
1161	99 × 41	EC5 11 1 × 0	EC6 51 1 × 0	plain	131	0.122	1051 × 1532
	100 × 42	ECD 450 1/0	ECDE 100 1/0		3.87	0.0048	120 × 175
1165	59 × 51	EC5 11 1 × 2	EC9 33 1 × 0	plain	125	0.107	1095 × 1226
1167	60 × 52	ECD 450 1/2	ECG 150 1/0	plain	3.70	0.0042	125 × 140
	59 × 54	EC5 11 1 × 2	EC9 33 1 × 0		130	0.109	1313 × 1751
	60 × 55	ECD 450 1/2	ECG 150 1/0		3.82	0.0043	150 × 200

**D579/D579M – 15****TABLE 8** *Continued*

Commercial Style Designation	Fabric Count, Warp × Fill yarns/25 mm [yarns/in.]	Yarn Designation, tex ^A [inch-pound units]		Fabric Weave Type ^B	Mass per Unit Area, g/m ² [oz/yd ²]	Thick-ness, mm [in.]	Breaking Force, min. ^C Warp × Fill N/5 cm [lbf/in.]
		Warp	Filling				
1180	59 × 49	EC5 11 1 × 0	EC5 11 1 × 0	plain	49	0.058	—
	60 × 50	ECD 450 1/0	ECD 450 1/0		1.44	0.0023	
1185	89 × 45	EC5 11 1 × 2	EC9 33 1 × 0	crowfoot	143	0.132	1664 × 1226
	90 × 45	ECD 450 1/2	ECG 150 1/0		4.23	0.0052	190 × 140
1188	46 × 29	EC10 198 1 × 0	EC9 34 1 × 0	4-H satin	428	0.300	5691 × 788
	47 × 30	ECH 25 1/0	ECG 150 1/0		12.63	0.0118	650 × 90
1257	59 × 45	EC5 11 1 × 2	EC5 11 1 × 2	plain	97	0.089	1138 × 876
	60 × 46	ECD 450 1/2	ECD 450 1/2		2.85	0.0035	130 × 100
1280	59 × 59	EC5 11 1 × 0	EC5 11 1 × 0	plain	54.25	0.0635	482 × 482
	60 × 60	ECD 450 1/0	ECD 450 1/0		1.60	0.0025	55 × 55
1297	49 × 19	EC5 11 1 × 0	EC5 5.5 1 × 0	plain	28	0.058	613 × 88
	50 × 20	ECD 450 1/0	ECD 900 1/0		0.82	0.0023	70 × 10
1299	49 × 19	EC5 11 1 × 0	EC5 11 1 × 0	plain	31	0.056	744 × 219
	50 × 20	ECD 450 1/0	ECD 450 1/0		0.92	0.0022	85 × 25
1316	60 × 60	EC5 22 1 × 0	EC5 22 1 × 0	plain	108	0.102	—
	61 × 61	ECD 225 1/0	ECD 225 1/0		3.18	0.004	
1500	48 × 41	EC7 51 1 × 0	EC7 45 1 × 0	plain	166	.1372	1051 × 1051
	49 × 42	ECE 100 1/0	ECE 110 1/0		4.90	0.0054	120 × 120
1501	45 × 45	EC7 44 1 × 0	EC7 44 1 × 0	plain	165	0.14	—
	46 × 46	ECE 110 1/0	ECE 110 1/0		4.86	0.0055	
1502	51 × 49	EC7 42 1 × 0	EC7 42 1 × 0	plain	162	0.150	—
	52 × 50	ECE 125 1/0	ECE 125 1/0		4.76	0.0059	
1503	63 × 45	EC6 33 1 × 0	EC6 33 1 × 0	plain	148	0.135	—
	64 × 46	ECDE 150 1/0	ECDE 150 1/0		4.36	0.0053	
1504	59 × 59	EC6 33 1 × 0	EC6 33 1 × 0	plain	148	0.124	—
	60 × 60	ECDE 150 1/0	ECDE 150 1/0		4.36	0.0049	
1505	10 × 10	EC9 33 4 × 3	EC9 33 4 × 3	plain	327	0.457	3240 × 3240
	10 × 10	ECG 150 4/3	ECG 150 4/3		9.65	0.018	370 × 370
1510	31 × 29	EC9 33 1 × 2	EC9 33 1 × 2	plain	166	0.114	1707 × 1576
	32 × 29	ECG 150 1/2	ECG 150 1/2		4.90	0.0045	195 × 180
1520	18 × 17	EC9 33 3 × 2	EC9 33 3 × 2	plain	292	0.305	2890 × 2890
	18 × 17	ECG 150 3/2	ECG 150 3/2		8.60	0.012	330 × 330
1522	23 × 21	EC9 34 1 × 2	EC9 34 1 × 2	plain	124	0.122	1094 × 963
	24 × 22	ECG 150 1/2	ECG 150 1/2		3.67	0.0048	125 × 110
1523	27 × 19	EC9 33 3 × 2	EC9 33 3 × 2	plain	390	0.356	4597 × 3284
	28 × 20	ECG 150 3/2	ECG 150 3/2		11.50	0.014	525 × 375
1526	33 × 31	EC9 33 1 × 2	EC9 33 1 × 2	plain	180	0.152	1970 × 1751
	34 × 32	ECG 150 1/2	ECG 150 1/2		5.30	0.0060	225 × 200
1527	17 × 17	EC9 33 3 × 3	EC9 33 3 × 3	plain	417	0.381	4115 × 4115
	17 × 17	ECG 150 3/3	ECG 150 3/3		12.30	0.0150	470 × 470
1528	41 × 31	EC9 33 1 × 2	EC9 33 1 × 2	plain	201	0.165	2189 × 1751
	42 × 32	ECG 150 1/2	ECG 150 1/2		5.94	0.0065	250 × 200
1532	16 × 14	EC9 33 3 × 2	EC9 33 3 × 2	plain	247	0.279	2627 × 2277
	16 × 14	ECG 150 3/2	ECG 150 3/2		7.30	0.0110	300 × 260
1533	18 × 18	EC9 33 2 × 2	EC9 33 2 × 2	plain	197	0.216	1926 × 1926
	18 × 18	ECG 150 2/2	ECG 150 2/2		5.80	0.0085	220 × 220
1534	16 × 14	EC9 33 4 × 2	EC9 33 4 × 3	plain	407	0.406	3503 × 4553
	16 × 14	ECG 150 4/2	ECG 150 4/3		12.00	0.0160	400 × 520
1539	38 × 28	EC9 33 1 × 2	EC9 33 1 × 2	plain	185	0.165	2102 × 1489
	39 × 28	ECG 150 1/2	ECG 150 1/2		5.45	0.0065	240 × 170
1543	48 × 30	EC9 33 2 × 2	EC5 22 1 × 0	crowfoot	288	0.203	5254 × 525
	49 × 30	ECG 150 2/2	ECD 225 1/0		8.50	0.0080	600 × 60
1557	56 × 30	EC9 33 1 × 2	EC7 22 1 × 0	crowfoot	184	0.140	3065 × 525
	57 × 30	ECG 150 1/2	ECE 225 1/0		5.42	0.0055	350 × 60
1561	16 × 14	EC9 33 3 × 3	EC9 33 3 × 3	plain	373	0.406	3852 × 3371
	16 × 14	ECG 150 3/3	ECG 150 3/3		11.00	0.0160	440 × 385
1562	30 × 16	EC9 33 1 × 0	EC9 33 1 × 0	leno	62	0.114	657 × 438
	30 × 16	ECG 150 1/0	ECG 150 1/0		1.82	0.0045	75 × 50
1564	20 × 18	EC9 33 4 × 2	EC9 33 4 × 2	plain	424	0.356	4378 × 3940
	20 × 18	ECG 150 4/2	ECG 150 4/2		12.50	0.0140	500 × 450
1579	29 × 15	EC9 34 1 × 2	EC9 68 1 × 0	plain	125	0.114	1226 × 1226
	30 × 16	ECG 150 1/2	ECG 75 1/0		3.68	0.0045	140 × 140
1581	56 × 53	EC9 33 1 × 2	EC9 33 1 × 2	8-H satin	302	0.203	3065 × 2890
	57 × 54	ECG 150 1/2	ECG 150 1/2		8.90	0.0080	350 × 330
1582	59 × 55	EC9 33 1 × 3	EC9 33 1 × 3	8-H satin	471	0.340	4597 × 4378
	60 × 56	ECG 150 1/3	ECG 150 1/3		13.90	0.0134	525 × 500
1583	53 × 47	EC9 33 2 × 2	EC9 33 2 × 2	8-H satin	546	0.406	5692 × 5166
	54 × 48	ECG 150 2/2	ECG 150 2/2		16.10	0.0160	650 × 590
1584	43 × 35	EC9 33 4 × 2	EC9 33 4 × 2	8-H satin	864	0.648	8318 × 7005
	44 × 35	ECG 150 4/2	ECG 150 4/2		25.50	0.0255	950 × 800



TABLE 8 Continued

Commercial Style Designation	Fabric Count, Warp × Fill yarns/25 mm [yarns/in.]	Yarn Designation, tex ^A [inch-pound units]		Fabric Weave Type ^B	Mass per Unit Area, g/m ² [oz/yd ²]	Thick-ness, mm [in.]	Breaking Force, min. ^C Warp × Fill N/5 cm [lb/in.]
		Warp	Filling				
1585	63 × 20	EC9 33 4 × 2	EC9 33 3 × 2	8-H satin	864	0.610	13134 × 3284
	64 × 20	ECG 150 4/2	ECG 150 3/2		25.50	0.0240	1500 × 375
1587	39 × 21	EC9 33 4 × 2	EC9 33 4 × 2	mock leno	678	0.749	8318 × 4553
	40 × 21	ECG 150 4/2	ECG 150 4/2		20.00	0.0295	950 × 520
1588	41 × 35	EC9 33 4 × 4	EC9 33 4 × 4	12-H satin	1798	1.143	14010 × 11033
	42 × 36	ECG 150 4/4	ECG 150 4/4		53.00	0.0450	1600 × 1260
1589	13 × 12	EC9 33 4 × 3	EC9 33 4 × 3	plain	414	0.406	4378 × 3984
	13 × 12	ECG 150 4/3	ECG 150 4/3		12.20	0.0160	500 × 455
1590	10 × 5	EC9 33 4 × 3	EC9 33 4 × 5	leno	302	0.508	2890 × 2714
	10 × 5	ECG 150 4/3	ECG 150 4/5		8.90	0.0200	330 × 310
1609	31 × 9	EC9 34 1 × 0	EC5 11 1 × 0	plain	61	0.066	1138 × 131
	32 × 10	G-150 1/0	ECD 450 1/0		1.80	0.0026	130 × 15
1610	31 × 28	EC9 33 1 × 0	EC9 33 1 × 0	plain	83	0.097	1007 × 876
	32 × 28	ECG 150 1/0	ECG 150 1/0		2.45	0.0038	115 × 100
1614	29 × 13	EC9 34 1 × 0	EC9 68 1 × 0	leno	79	0.127	613 × 700
	30 × 14	ECG 150 1/0	ECG 75 1/0		2.33	0.005	70 × 80
1620	20 × 20	EC9 33 1 × 0	EC9 33 1 × 0	plain	54	0.076	701 × 613
	20 × 20	ECG 150 1/0	ECG 150 1/0		1.60	0.0030	80 × 70
1621	30 × 14	EC9 33 1 × 0	EC9 33 1 × 2	leno	79	0.127	657 × 744
	30 × 14	ECG 150 1/0	ECG 150 1/2		2.33	0.0050	75 × 85
1628	39 × 27	EC6 34 1 × 0	EC6 34 1 × 0	plain	91	0.086	1313 × 963
	40 × 28	ECDE 150 1/0	ECDE 150 1/0		2.69	0.0034	150 × 110
1634	50 × 29	EC9 34 1 × 0	EC9 34 1 × 0	plain	107	0.094	1226 × 1051
	51 × 30	ECG 150 1/0	ECG 150 1/0		3.16	0.0037	140 × 120
1636	39 × 23	EC6 34 1 × 0	EC6 34 1 × 0	plain	88	0.094	1313 × 876
	40 × 24	ECDE 150 1/0	ECDE 150 1/0		2.61	0.0037	150 × 100
1643	55 × 47	EC6 33 1 × 0	EC6 33 1/0	crowfoot	141	0.1194	1926 × 1489
	56 × 48	ECDE 150 1 × 0	ECDE 150 1/0		4.16	0.0047	220 × 170
1647	50 × 29	EC9 34 1 × 0	EC9 34 1 × 0	plain	123	0.104	876 × 613
	51 × 30	ECG 150 1/0	ECG 150 1/0		3.62	0.0041	100 × 70
1649	50 × 37	EC9 33 1 × 0	EC7 44 1 × 0	plain	135.9	0.119	—
	51 × 38	ECG 150 1/0	ECE 110 1/0		4.01	0.0047	—
1651	50 × 26	EC9 34 1 × 0	EC9 74 1 × 0	plain	149	0.135	788 × 876
	51 × 27	ECG 150 1/0	ECG 67 1/0		4.39	0.0053	90 × 100
1652	51 × 51	EC6 33 1 × 0	EC6 33 1 × 0	plain	136.9	0.114	1591 × 1591
	52 × 52	DE 150 1/0	DE 150 1/0		4.04	0.0045	182 × 182
1657	50 × 29	EC9 33 1 × 0	EC9 74 1 × 0	plain	154.2	0.150	—
	51 × 29	ECG 150 1/0	ECG 67 1/0		4.53	0.0059	—
1658	20 × 10	EC9 33 1 × 0	EC9 66 1 × 0	plain	54	0.102	701 × 613
	20 × 10	ECG 150 1/0	ECG 75 1/0		1.60	0.0040	80 × 70
1659	20 × 10	EC9 33 1 × 0	EC9 68 1 × 0	leno	54	0.0107	569 × 744
	20 × 10	ECG 150 1/0	ECG 75 1/0		1.60	0.0042	65 × 70
1660	59 × 12	EC9 33 1 × 0	EC9 33 1 × 0	plain	96	0.127	1620 × 219
	60 × 12	ECG 150 1/0	ECG 150 1/0		2.84	0.0050	185 × 25
1667	59 × 12	EC9 33 1 × 0	EC5 5.5 1 × 0	plain	85	0.076	1620 × 61
1669	60 × 12	ECG 150 1/0	ECD 900 1/0	plain	2.50	0.0030	185 × 7
	58 × 11	EC9 34 1 × 0	EC5 11 1 × 0		84.76	0.0889	1751 × 131
	59 × 12	ECG 150 1/0	ECD 450 1/0		2.50	0.0035	200 × 15
1674	39 × 31	EC9 33 1 × 0	EC9 33 1 × 0	plain	96.5	0.109	1226 × 832
	40 × 32	ECG 150 1/0	ECG 150 1/0		2.85	0.0043	140 × 95
1675	39 × 31	EC6 33 1 × 0	EC6 33 1 × 0	plain	96.5	0.109	1226 × 832
	40 × 32	ECDE 150 1/0	ECDE 150 1/0		2.85	0.0043	140 × 95
1676	55 × 47	EC6 33 1 × 0	EC6 33 1 × 0	plain	139	0.122	1707 × 1313
	56 × 48	ECDE 150 1/0	ECDE 150 1/0		4.10	0.0048	195 × 150
1677	39 × 39	EC6 33 1 × 0	EC6 33 1 × 0	plain	109	0.114	1226 × 1138
	40 × 40	ECDE 150 1/0	ECDE 150 1/0		3.21	0.0045	140 × 130
1678	79 × 79	EC9 33 1 × 0	EC9 33 1 × 0	plain	105.8	0.091	1051 × 1051
	40 × 40	G150 1/0	G150 1/0		3.12	0.0036	120 × 120
1680	71 × 69	EC6 33 1 × 0	EC6 33 1 × 0	8-H satin	189	0.158	2207 × 2146
	72 × 70	ECDE 150 1/0	ECDE 150 1/0		5.61	0.0062	252 × 245
1681	55 × 35	EC6 33 1 × 0	EC6 33 1 × 0	plain	122	0.119	1707 × 963
	56 × 36	ECDE 150 1/0	ECDE 150 1/0		3.60	0.0047	195 × 110
1687	39 × 41	EC9 33 1 × 0	EC9 33 1 × 0	plain	111.5	0.1067	1664 × 1532
	40 × 42	ECG 150 1/0	ECG 150 1/0		3.29	0.0042	190 × 175
1692	39 × 21	EC9 34 1 × 0	EC9 68 1 × 0	plain	115	0.117	1313 × 1401
	40 × 22	ECG 150 1/0	ECG 75 1/0		3.39	0.0046	150 × 160
1694	39 × 23	EC9 34 1 × 0	EC9 68 1 × 0	plain	120	0.124	1313 × 1401
	40 × 24	ECG 150 1/0	ECG 68 1/0		3.54	0.0049	150 × 160
1697	43 × 37	EC9 33 1 × 0	EC9 33 1 × 0	plain	111.2	0.094	—
	44 × 38	ECG 150 1/0	ECG 150 1/0		3.15	0.0037	—

**D579/D579M – 15****TABLE 8** *Continued*

Commercial Style Designation	Fabric Count, Warp × Fill yarns/25 mm [yarns/in.]	Yarn Designation, tex ^A [inch-pound units]		Fabric Weave Type ^B	Mass per Unit Area, g/m ² [oz/yd ²]	Thick-ness, mm [in.]	Breaking Force, min. ^C Warp × Fill N/5 cm [lb/in.]
		Warp	Filling				
1800	16 × 14	EC13 275 1 × 0	EC13 275 1 × 0	plain	326	0.330	3940 × 3065
	16 × 14	ECK 18 1/0	ECK 18 1/0		9.60	0.0130	450 × 350
1874	43 × 34	EC13 275 1 × 0	EC13 275 1 × 0	8-H satin	884	0.8307	9369 × 8625
	44 × 35	ECK 18 1/0	ECG 37 1/2		26.08	0.0245	1070 × 985
1884	43 × 34	EC13 275 1 × 0	EC13 275 1 × 0	8-H satin	860	0.670	8318 × 7005
	44 × 35	ECK 18 1/0	ECK 18 1/0		24.50	0.0260	950 × 800
1887	39 × 20	EC13 275 1 × 0	EC13 275 1 × 0	mock leno	715	0.0749	8318 × 4553
	40 × 21	ECK 18 1/0	ECK18 1/0		21.10	0.0295	960 × 520
2013	46 × 44	EC7 22 1 × 0	EC7 22 1 × 0	plain	81	0.070	—
	47 × 45	ECE 225 1/0	ECE 225 1/0		2.39	0.00276	—
2112	39 × 38	EC7 22 1 × 0	EC5 22 1 × 0	plain	71.2	0.086	788 × 701
	40 × 39	ECE 225 1/0	ECD 225 1/0		2.10	0.0034	90 × 80
2113	59 × 55	EC7 22 1 × 0	EC5 11 1 × 0	plain	80.7	0.081	1226 × 525
	60 × 56	ECE 225 1/0	ECD 450 1/0		2.38	0.0032	140 × 60
2114	55 × 47	EC7 22 1 × 0	EC7 22 1 × 0	plain	90.9	0.084	—
	56 × 48	ECE 225 1/0	ECE 225 1/0		2.69	0.0033	—
2116	59 × 57	EC7 22 1 × 0	EC5 22 1 × 0	plain	109	0.102	1095 × 1051
	60 × 58	ECE 225 1/0	ECD 225 1/0		3.20	0.0040	125 × 120
2117	65 × 64	EC7 22 1 × 0	EC7 22 1 × 0	plain	108	0.094	—
	66 × 54	ECE 225 1/0	ECE 225 1/0		3.18	0.0037	—
2118	39 × 62	EC7 22 1 × 0	EC7 22 1 × 0	plain	111.7	0.091	—
	40 × 63	ECE 225 1/0	ECE 225 1/0		3.29	0.0036	—
2119	53 × 49	EC7 22 1 × 0	EC6 22 1 × 0	plain	90.2	0.086	1489 × 1357
	54 × 50	ECE 225 1/0	ECE 225 1/0		2.66	0.0034	170 × 155
2120	59 × 57	EC7 22 1 × 0	EC6 22 1 × 0	crowfoot	107	0.102	1095 × 1051
	60 × 58	ECE 225 1/0	ECE 225 1/0		3.16	0.0040	125 × 120
2125	39 × 38	EC7 22 1 × 0	EC9 33 1 × 0	plain	88.8	0.094	788 × 1138
	40 × 39	ECE 225 1/0	ECG 150 1/0		2.62	0.0037	90 × 130
2129	19 × 9	EC6 22 1 × 0	EC5 11 1 × 0	plain	22	0.053	438 × 88
	20 × 10	ECDE 225 1/0	ECD 450 1/0		0.66	0.0021	50 × 10
2150	65 × 47	EC5 22 1 × 0	EC5 22 1 × 0	plain	87	0.076	—
	66 × 48	ECD 225 1/0	ECD 225 1/0		2.56	0.0030	—
2157	59 × 34	EC7 22 1 × 0	EC9 68 1 × 0	plain	148	0.130	—
	60 × 35	ECE 225 1/0	ECG 75 1/0		4.36	0.0051	—
2165	59 × 51	EC7 22 1 × 0	EC9 33 1 × 0	plain	125	0.114	1095 × 1226
	60 × 52	ECE 225 1/0	ECG 150 1/0		3.70	0.0045	125 × 140
2166	59 × 37	EC7 22 1 × 0	EC9 68 1 × 0	plain	155	0.140	—
	60 × 38	ECE 225 1/0	ECG 75 1/0		4.6	0.0055	—
2218	89 × 59	EC7 22 1 × 0	EC6 22 1 × 0	crowfoot	138	0.0127	1664 × 1776
	90 × 60	ECE 225 1/0	ECE 225 1/0		4.06	0.005	190 × 140
2225	35 × 33	EC7 22 1 × 2	EC6 22 1 × 2	plain	127	0.0127	1402 × 1313
	36 × 34	ECE 225 1/2	ECE 225 1/2		3.75	0.005	160 × 150
2238	63 × 59	EC7 22 1 × 2	EC6 221 × 2	crowfoot	231	0.0178	2802 × 2452
	64 × 60	ECE 225 1/2	ECE 225 1/2		6.80	0.007	320 × 280
2313	59 × 63	EC7 22 1 × 0	EC511 1 × 0	plain	80.5	0.084	1182 × 701
	60 × 64	ECE 225 1/0	ECD 450 1/0		2.38	0.0033	135 × 80
2316	60 × 60	EC7 22 1 × 0	EC6 22 1 × 0	plain	108	0.1016	1226 × 1226
	61 × 61	ECE 225 1/0	ECE 225 1/0		3.18	0.0040	140 × 140
2319	48 × 48	EC7 22 1 × 0	EC7 22 1 × 0	plain	92.2	0.086	—
	48.5 × 49	ECE 225 1/0	ECE 225 1/0		2.72	0.0034	—
2500	16 × 16	EC10 190 1 × 0	EC10 190 1 × 0	leno	255	0.4572	3502 × 3459
	16 × 16	ECH 25 1/0	ECH 25 1/0		7.52	0.0180	400 × 395
2523	28 × 20	EC10 198 1 × 0	EC10 198 1 × 0	plain	390	0.3277	5079 × 3371
	28 × 20	ECH 25 1/0	ECH 25 1/0		11.50	0.0129	580 × 385
2532	16 × 14	EC10 198 1 × 0	EC10 198 1 × 0	plain	246	0.254	2627 × 2452
	16 × 14	ECH 25 1/0	ECH 25 1/0		7.25	0.0100	300 × 280
3070	69 × 69	EC6 17.5 1 × 0	EC6 17.5	plain	93.6	0.078	1104 × 1104
	70 × 70	DE 300 1/0	DE 300 1/0		2.76	0.0031	133 × 133
3080	50 × 29	EC6 17.5 1 × 0	EC6 17.5 1 × 0	plain	54	0.061	—
	51 × 30	ECDE 300 1/0	ECDE 300 1/0		1.59	0.0024	—
3113	50 × 29	EC7 22 1 × 0	EC9 34 1 × 0	plain	86	0.084	—
	51 × 30	ECE 225 1/0	ECG 150 1/0		2.54	0.0033	—
3132	59 × 59	EC5 11 1 × 0	EC7 22 1 × 0	plain	79	0.071	—
	60 × 60	ECD 450 1/0	ECE 225 1/0		2.32	0.0028	—
3313	59 × 61	EC6 17.5 1 × 0	EC6 17.5	plain	80.5	0.084	944 × 976
	60 × 62	DE 300 1/0	DE 300 1/0		2.38	0.0033	114 × 118
3323	59 × 45	EC6 16.5 1 × 0	EC7 22 1 × 0	plain	81.3	0.086	—
	60 × 46	ECDE 300 1/0	ECE 225 1/0		2.4	0.0034	—
3700	15 × 14	EC9 134 1 × 2	EC9 134 1 × 2	plain	311	0.3124	3240 × 2890
	15 × 14	ECG 37 1/2	ECG 37 1/2		9.18	0.0123	370 × 330



TABLE 8 Continued

Commercial Style Designation	Fabric Count, Warp × Fill yarns/25 mm [yarns/in.]	Yarn Designation, tex ^A [inch-pound units]		Fabric Weave Type ^B	Mass per Unit Area, g/m ² [oz/yd ²]	Thick-ness, mm [in.]	Breaking Force, min. ^C Warp × Fill N/5 cm [lbf/in.]
		Warp	Filling				
3701	12 × 6	EC9 134 1 × 0	EC9 134 1 × 0	leno	134.6	0.2438	1401 × 1357
	12 × 6	ECG 37 1/0	ECG 37 1/0		3.97	0.0096	160 × 155
3731	16 × 14	EC9 134 1 × 0	EC9 134 1 × 0	plain	177	0.140	1751 × 1489
	17 × 15	ECG 37 1/0	ECG 37 1/0		5.21	0.0055	200 × 170
3732	47 × 31	EC9 134 1 × 0	EC9 134 1 × 0	crowfoot	427	0.345	4816 × 3503
	48 × 32	ECG 37 1/0	ECG 37 1/0		12.60	0.0135	550 × 400
3733	18 × 18	EC9 134 1 × 0	EC9 134 1 × 0	plain	197	0.203	2189 × 1751
	18 × 18	ECG 37 1/0	ECG 37 1/0		5.8	0.0080	250 × 200
3734	47 × 31	EC 6134 1 × 0	EC 6134 1 × 0	crowfoot	432	0.3658	5254 × 3590
	48 × 32	ECDE 37 1/0	ECDE 37 1/0		12.74	0.0144	600 × 410
3743	48 × 30	EC9 134 1 × 0	EC7 22 1 × 0	crowfoot	286	0.203	5254 × 525
	49 × 30	ECG 37 1/0	ECE 225 1/0		8.45	0.0080	600 × 60
3744	28 × 14	EC9 134 1 × 2	EC9 134 1 × 4	2 end plain	610	0.508	5998 × 5998
	28 × 14	ECG 37 1/2	ECG 37 1/4		18.00	0.0200	688 × 688
3745	27 × 28	EC9 134 1 × 0	EC9 134 1 × 2	2 pk. plain	593	0.4699	5692 × 5911
	27 × 28	ECG 37 1/2	ECG 37 1/2		17.50	0.185	650 × 675
3783	53 × 47	EC9 134 1 × 0	EC9 134 1 × 0	8-H satin	576	0.3937	5692 × 5512
	54 × 48	ECG 37 1/2	ECG 37 1/2		16.99	0.0155	650 × 630
3784	43 × 34	EC9 134 1 × 0	EC9 134 1 × 0	8-H satin	901	0.6096	7881 × 7005
	44 × 35	ECG 37 1/2	ECG 37 1/2		26.57	0.0240	900 × 800
3787	39 × 21	EC9 134 1 × 2	EC9 134 1 × 2	mock leno	695	0.761	6567 × 3940
	40 × 21	ECG 37 1/2	ECG 37 1/2		20.50	0.0300	750 × 450
3788	41 × 35	EC9 134 1 × 4	EC9 134 1 × 4	12-H satin	1856	1.1557	13397 × 11121
	42 × 36	ECG 37 1/4	ECG 37 1/4		54.75	0.0455	1530 × 1270
5020	18 × 18	EC9 99 1 × 2	EC9 99 1 × 2	plain	294	0.305	2890 × 2890
	18 × 18	ECG 50 1/2	ECG 50 1/2		8.68	0.0120	330 × 330
5023	48 × 30	EC9 99 1 × 2	EC9 99 1 × 2	crowfoot	288	0.203	5254 × 525
	49 × 30	ECG 50 1/2	ECG 50 1/2		8.50	0.0080	600 × 60
5027	17 × 17	EC9 99 1 × 3	EC9 99 1 × 3	plain	417	0.318	4115 × 4115
	17 × 17	ECG 50 1/3	ECG 50 1/3		12.30	0.0150	470 × 470
5032	16 × 14	EC9 99 1 × 2	EC9 99 1 × 2	plain	2.45	0.254	2677 × 2277
	16 × 14	ECG 50 1/2	ECG 50 1/2		7.23	0.0100	300 × 260
5082	59 × 55	EC9 99 1 × 0	EC9 99 1/0	8-H satin	471	0.340	4597 × 4378
	60 × 56	ECG 50 1/0	ECG 50 1/0		13.90	0.0134	525 × 500
6060	59 × 59	EC6 8.75 1 × 0	EC6 8.75 1 × 0	plain	39.0	0.048	472 × 472
	60 × 60	DE 600 1/0	G75 1/0		1.15	0.0019	57 × 57
7196	50 × 32	EC9 74 1 × 0	EC9 74 1 × 0	plain	230	0.201	—
	51 × 33	ECG 67 1/0	ECG 67 1/0		6.72	0.0079	—
7500	16 × 14	EC9 68 2 × 2	EC9 68 2 × 2	plain	325	0.356	3503 × 3065
	16 × 14	ECG 75 2/2	ECG 75 2/2		9.60	0.0140	400 × 350
7520	18 × 18	EC9 68 1 × 3	EC9 68 1 × 3	plain	294	0.305	2890 × 2890
	18 × 18	ECG 75 1/3	ECG 75 1/3		8.68	0.0120	330 × 330
7532	16 × 14	EC9 68 1 × 3	EC9 68 1 × 3	plain	245	0.254	2627 × 2277
	16 × 14	ECG 75 1/3	ECG 75 1/3		7.23	0.0100	300 × 260
7533	18 × 18	EC9 68 1 × 2	EC9 68 1 × 2	plain	196	0.203	1926 × 1926
	18 × 18	ECG 75 1/2	ECG 75 1/2		5.79	0.0080	220 × 220
7539	38 × 28	EC9 68 1 × 0	EC9 68 1 × 0	plain	1.80	0.178	2102 × 1489
	39 × 28	ECG 75 1/0	ECG 75 1/0		5.30	0.0070	240 × 170
7543	48 × 30	EC9 68 1 × 2	EC7 22 1 × 0	crowfoot	288	0.203	5254 × 525
	49 × 30	ECG 75 1/2	ECE 225 1/0		8.50	0.0080	600 × 60
7544	28 × 14	EC9 68 2 × 2	EC9 68 2 × 4	2-end plain	610	0.508	5998 × 5998
	28 × 14	ECG 75 2/2	ECG 75 2/4		18.00	0.0200	685 × 685
7557	56 × 30	EC9 68 1 × 0	EC7 22 1 × 0	crowfoot	184	0.140	3065 × 525
	57 × 30	ECG 75 1/0	ECE 225 1/0		5.42	0.0055	350 × 60
7581	56 × 63	EC9 68 1 × 0	EC9 68 1 × 0	8-H satin	302	0.203	3055 × 2890
	57 × 54	ECG 75 1/0	ECG 75 1/0		8.90	0.0080	350 × 330
7583	53 × 47	EC9 68 1 × 0	EC9 68 1 × 2	8-H satin	546	0.406	5692 × 5166
	54 × 48	ECG 75 1/2	ECG 75 1/2		16.10	0.0146	650 × 590
7585	63 × 20	EC9 68 2 × 2	EC9 68 1 × 3	8-H satin	864	0.610	13134 × 3284
	64 × 20	ECG 75 2/2	ECG 75 1/3		25.50	0.0240	1500 × 375
7587	39 × 21	EC9 68 2 × 2	EC9 68 2 × 2	mock leno	695	0.761	6567 × 3940
	40 × 21	ECG 75 2/2	ECG 75 2/2		20.50	0.0300	750 × 450
7624	43 × 23	EC9 68 1 × 0	EC9 68 1 × 0	plain	188	0.163	1839 × 1576
	44 × 24	ECG 75 1/0	ECG 75 1/0		5.53	0.0064	210 × 180
7626	33 × 31	EC9 68 1 × 0	EC9 68 1 × 0	plain	183	0.168	1970 × 1751
	34 × 32	ECG 75 1/0	ECG 75 1/0		5.40	0.0066	225 × 200
7627	87 × 59	EC9 68 1 × 0	EC9 68 1 × 0	plain	199.0	0.165	2210 × 1499
	44 × 30	G75 1/0	G75 1/0		5.87	0.0065	251 × 171
7628	43 × 31	EC9 68 1 × 0	EC9 68 1 × 0	plain	201	0.178	2189 × 1751
	44 × 32	ECG 75 1/0	ECG 75 1/0		5.94	0.0070	250 × 200

TABLE 8 *Continued*

Commercial Style Designation	Fabric Count, Warp × Fill yarns/25 mm [yarns/in.]	Yarn Designation, tex ^A [inch-pound units]		Fabric Weave Type ^B	Mass per Unit Area, g/m ² [oz/yd ²]	Thick-ness, mm [in.]	Breaking Force, min, ^C Warp × Fill N/5 cm [lbf/in.]
		Warp	Filling				
7629	43 × 33	EC9 68 1 × 0	EC9 68 1 × 0	plain	213.0	0.0180	2189 × 1989
	44 × 34	ECG 75 1/0	ECG 75 1/0		6.19	0.0071	250 × 2105
7635	86 × 57	EC9 68 1 × 0	EC9 100 1 × 0	plain	230.9	0.196	2184 × 2508
	44 × 29	G75 1/0	G50 1/0		6.81	0.0077	251 × 290
7640	59 × 33	EC9 68 1 × 0	EC9 100 1 × 0	plain	258	0.249	—
	60 × 34	G-75 1/0	ECG 50 1/0		7.60	0.0098	
7641	31 × 21	EC9 68 1 × 2	EC9 68 1 × 2	plain	297	0.254	3503 × 2539
	32 × 21	ECG 75 1/2	ECG 75 1/2		8.70	0.0100	400 × 290
7642	43 × 20	ET9 68 1 × 0	ET9 133 1 × 0	plain	227	0.234	2846 × 963
	44 × 20	ETG 75 1/0	ETG 37 1/0		6.70	0.0092	325 × 110
7650	43 × 23	EC9 68 1 × 0	EC9 100 1 × 0	plain	208	0.191	—
	44 × 23	ECG 75 1/0	ECG 50 1/0		6.12	0.0075	
7652	31 × 31	EC9 99 1 × 0	EC9 99 1 × 0	plain	259	0.216	3284 × 2627
	32 × 32	ECG 50 1/0	ECG 50 1/0		7.65	0.0085	375 × 300
7658	43 × 31	EC9 68 1 × 0	EC9 68 1 × 0	crowfoot	203	0.173	2189 × 1751
	44 × 32	ECG 75 1/0	ECG 75 1/0		6.00	0.0068	250 × 200
7660	30 × 30	EC9 68 1 × 0	EC9 68 1/0	plain	163.0	0.0137	1620 × 1532
	30 × 30	EC9G 75 × 1/0	ECG 75 × 1/0		4.80	0.0054	185 × 175
7664	20 × 18	EC9 68 2 × 2	EC9 68 2 × 2	plain	427	0.381	4378 × 3940
	20 × 18	ECG 75 2/2	ECG 75 2/2		12.60	0.0150	500 × 450
7667	59 × 31	EC9 74 1 × 0	EC9 74 1 × 0	plain	220	0.183	—
	60 × 31	ECG 67 1/0	ECG 67 1/0		6.54	0.0072	
7669	43 × 31	EC9 68 1 × 0	EC9 74 1 × 0	plain	209	0.178	—
	44 × 31	G-75 1/0	ECG 67 1/0		6.17	0.0070	
7688	43 × 34	EC9 68 1 × 0	EC9 74 1 × 0	plain	220	0.191	—
	44 × 35	G-75 1/0	ECG 67 1/0		6.49	0.0075	
7743	119 × 19	EC6 68 1 × 0	EC9 33 1 × 0	8-H satin	346	0.280	7005 × 525
	120 × 20	ECDE 75 1/0	ECG 150 1/0		10.22	0.0110	800 × 60
7781	56 × 53	EC6 68 1 × 0	EC6 68 1 × 0	8-H satin	304	0.228	3065 × 2977
	57 × 54	ECDE 75 1/0	ECDE 75 1/0		8.95	0.0090	350 × 340

^A Yarn designations are as specified in Specification D578.

For engineering information only. May be made by substituting other yarn equivalents, providing fiber diameter and other properties are not affected. For example, when EC9 68 2 × 2 (ECG 75 2/2) is substituted with EC9 134 1 × 2 (ECG 37 1/2), the final yarn number remains the same.

^B See Annex A1.

^C The minimum breaking force for Fabric styles 3080 and 3113 are not included in Table 8 at this time. These values will be published upon their availability from the industry.

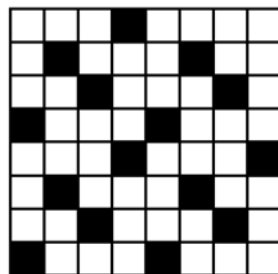
ANNEX

(Mandatory Information)

A1. BASIC WEAVE DIAGRAMS

A1.1 The basic weaves illustrated in Figs. A1.1-A1.6 are typical weaves used in conjunction with Table 5 unless otherwise specified. Other weave variations of these basic

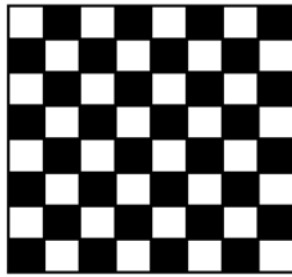
forms shall be agreed upon between the purchaser and the supplier. An acceptable source for reference is “Textile Terms and Definitions” by the Textile Institute, Manchester, England.



Standard Form Filling Flush

- 1 up
- 3 down
- 2 adjacent ends left
- 2 adjacent ends right
- 2 repeats high, 2 repeats wide

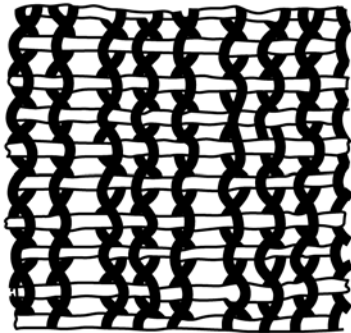
FIG. A1.1 Crowfoot



Standard Form

1 up
1 down
4 repeats high, 4 repeats wide

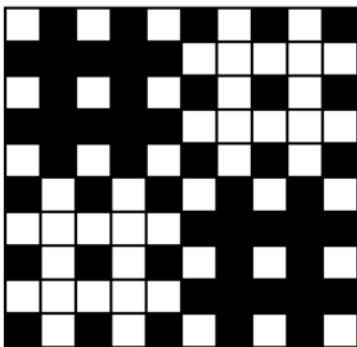
FIG. A1.2 Plain



Standard Form

Two adjacent warp yarns cross each other between picks.

FIG. A1.3 Leno



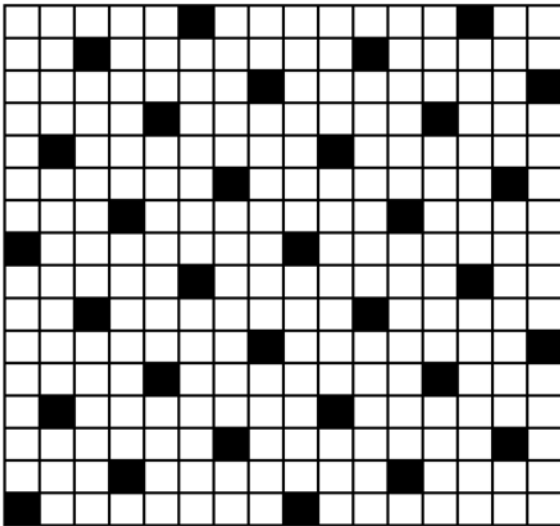
Standard Form

This weave begins with 1 end of plain weave 1 up, 1 down, 5 repeats high followed by 1 end of 5 down, 5 up, 2 repeats high, 2 repeats wide. This is followed by 1 end plain weave 1 up, 1 down, 5 repeats high.

The pattern is completed by reversing a comparable number of ends, that is, substituting warp lifts for filling lifts and filling lifts for warp lifts.

The total pattern is 1 repeat high, 1 repeat wide.

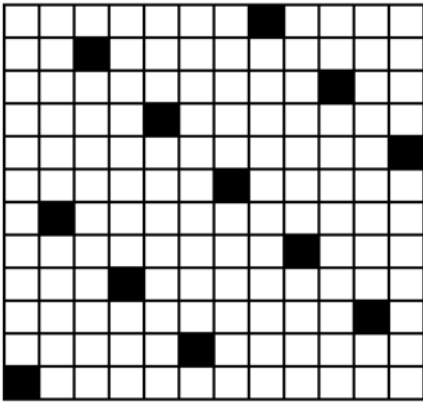
FIG. A1.4 Mock Leno



Standard Form Filling Flush

8 ends base of 3
2 repeats high, 2 repeats wide

FIG. A1.5 8-Harness Satin



Standard Form Filling Flush

12 ends base of 5
1 repeat high, 1 repeat wide

FIG. A1.6 12-Harness Satin

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