

INCH-POUND

MIL-C-7020H
16 March 1992
 SUPERSEDING
 MIL-C-7020G
 22 August 1978

MILITARY SPECIFICATION

CLOTH, PARACHUTE, NYLON-RIP STOP AND TWILL WEAVE

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers rip stop and twill weave nylon parachute cloth.

1.2 Classification. There shall be six types of nylon cloth of the following types and weaves, as specified (See 6.2).

Type I	- 1.1 oz./sq. yd., Rip Stop Weave
Type II	- 1.6 oz./sq. yd., Twill Weave
Type III	- 1.6 oz./sq. yd., Rip Stop Weave
Type Ia	- 1.1 oz./sq. yd., Rip Stop Weave, Reinforced Selvage
Type IIa	- 1.6 oz./sq. yd., Twill Weave, Reinforced Selvage
Type IIIa	- 1.6 oz./sq. yd., Rip Stop Weave, Reinforced Selvage

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Technology & Industrial Services Division, SA-ALC/TIRDM, Kelly AFB, TX 78241-5000 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 8305

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SPECIFICATIONS

FEDERAL

PPP-P-1133 - Packaging and Packing of Synthetic Fiber Fabrics.

STANDARDS

FEDERAL

FED-STD-191 - Textile Test Methods.

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection
by Attributes.
MIL-STD-109 - Quality Assurance Terms and Definitions.
MIL-STD-851 - Coding; Manufacturer's Color, Nylon
Parachute Cloth.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

Rules and Regulations Under the Textile Fiber Products Identification Act.

(Application for copies should be addressed to the Federal Trade Commission, Washington, DC 20580.)

FAR 27 (DOD Supplement) - Data Requirements. DOD 5000.19-L, Volume II- DOD Acquisition Management System and Data Requirements Control List (AMSDL).

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

(Copies of specifications, standards, and other government documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Material. The nylon used in the manufacture of all types of parachute fabric shall be multi-filament, bright, high tenacity, light and heat resistant polyamide prepared from hexamethylene diamine and adipic acid, or its derivatives. It shall have a melting point of $489^{\circ} \pm 9^{\circ}$ Fahrenheit (F) ($254^{\circ} \pm 5^{\circ}$ Celsius (C) when tested in accordance with 4.5. The yarn shall not be bleached in any manner or process. The use of any recycled material is prohibited; unless otherwise specified.

3.1.1 Yarn twist. Any yarn twist (warp and/or filling) is acceptable, but not required, provided all requirements of this specification are satisfied.

3.2 Fiber identification. Each roll of the finished cloth shall be labeled or ticketed and invoiced for fiber content in accordance with the Rules and Regulations Under the Textile Fiber Products Identification Act.

3.3 Weave.

3.3.1 Type I weave. The weave pattern for type I cloth shall be as specified in figure 1. Reinforcement ribs in both warp and filling shall form a uniform pattern of squares.

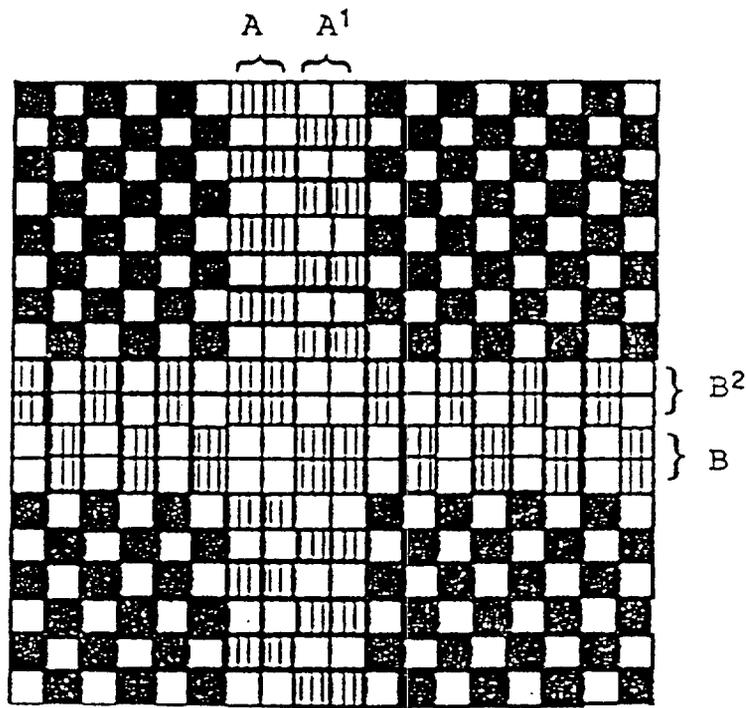


FIGURE 1. RIP-STOP WEAVE PATTERN FOR TYPE I CLOTH³

¹A = Two warp ends woven as one.

²B = Two filling picks per shed.

³ One repeat of weave pattern shown.

3.3.2 Type II weave. The weave pattern for type II cloth shall be a two-up and one-down twill.

3.3.3 Type III weave. The weave pattern for type III cloth shall be as specified in figure 2. Reinforcement ribs in both the warp and the filling directions shall approximate squares.

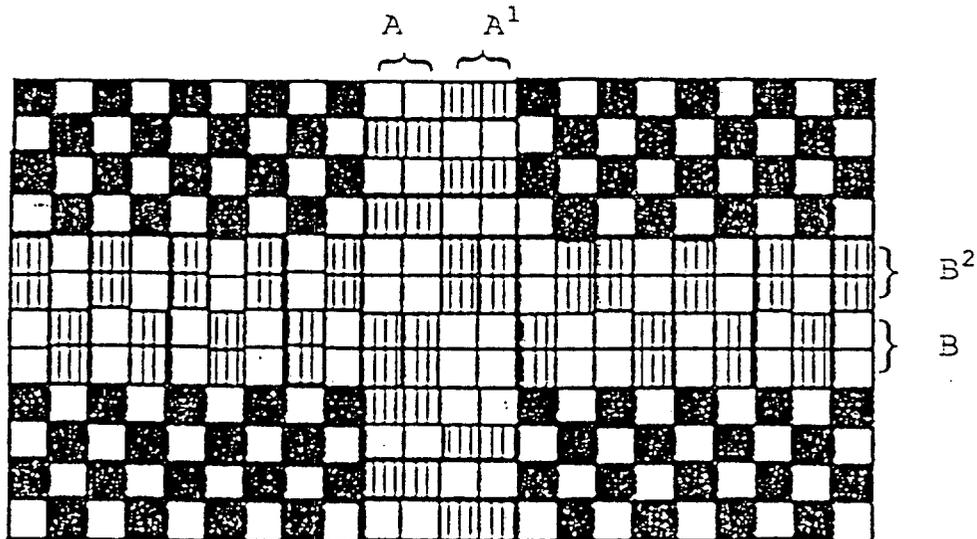


FIGURE 2. RIP-STOP WEAVE PATTERN FOR TYPE III CLOTH³

¹A = Two warp ends woven as one.

²B = Two filling picks per shed.

³ One repeat of weave pattern shown.

3.3.4 Types Ia, IIa and IIIa. The weave of the edge for types Ia, IIa and IIIa shall be of a construction that will meet the requirements in table I. If the fabric is woven wider than 36 inches and is cut to a narrower width, a false selvage with the same requirements as specified in table I shall be woven and the cut made 1/8 inch from the false selvage using a heat sealed edge. This heat sealed edge shall be straight, have no loose yarns greater than 1/8 inch in length, be effectively locked against fraying, have no sharp or protruding edges, and shall meet all other requirements of this specification.

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TABLE I. Physical properties.

Property	Types I & Ia	Types II & IIa	Types III & IIIa
Yarns per inch (Minimum)	120	120	120
Warp	120	76	76
Filling			
Weight, ounces/square yard (Maximum)	1.1	1.6	1.6
Thickness, inches (Maximum)	0.003	0.004	0.004
Breaking strength, pounds per inch (Minimum ¹)			
Warp and Filling	42	50	50
Elongation, percent (Minimum ¹)			
Warp and Filling	20	20	20
Tear Strength, pounds (Minimum ¹)			
Warp and Filling	5	5	5
Air permeability, cubic feet per minute per square feet	100 \pm 20	130 \pm 30	130 \pm 30
Selvage requirements ²			
Width	1/2 \pm 1/8	1/2 \pm 1/8	1/2 \pm 1/8
Thickness, inches (Maximum)	0.005	0.005	0.005
Breaking strength, pounds ³	75	75	75

¹All individual readings shall meet or exceed the minimum requirement.

²Types Ia, IIa, and IIIa only.

³For 3/4 inch wide specimen.

3.4 Physical and chemical properties. The physical and chemical properties shall conform to table I and the following subparagraphs thereto. The frequency of testing shall be dependent on the width of the fabric delivered. For fabrics wider than 36 inches, the number of tests made shall be increased proportionately with the increase of width--for example, 1/3 more readings (two) shall be taken for 48 inch wide fabric. For 72 inch wide fabric delivered without splitting, the number of tests shall be doubled; if the fabric is split by the finisher, the fabric is considered as 36 inches wide and will be tested at the frequency specified herein.

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3.4.1 Permanence of set. When the cloth is subjected to the test specified in 4.5.2, the permanence of the cloth set shall be as follows:

- a. The average of the air permeability readings taken after testing shall be within 15 percent of the average of the readings taken before testing.
- b. The cloth shrinkage measured after testing shall not exceed three (3) percent in either the warp or filling direction.

3.4.2 Nonfibrous materials.

3.4.2.1 Silicone oil. The finished cloth shall contain a silicone oil; so applied that it is evenly distributed throughout the cloth. The amount of oil added shall be a minimum of 0.3 percent based on the weight of the dry cloth. The finisher shall submit a certification for each finisher's roll (see 4.4) indicating that the silicone oil was used (see 6.3).

3.4.2.2 Chloroform soluble material. The chloroform soluble material of the finished cloth shall not exceed 2.0 percent when tested as specified in 4.5.

3.4.3 Acidity - alkalinity (pH). The pH value of the finished cloth shall be within the range of 5.5 to 9.0 when tested as specified in 4.5.

3.4.4 Color. The color shall be as specified by the procuring activity.

3.4.4.1 Colorfastness. Unless otherwise specified by the procuring activity, the dyed and finished cloth shall show "GOOD" fastness to light and crocking when tested as specified in 4.5.

3.4.5 Light and heat resistance. The finished cloth shall not lose more than 25 percent of its original strength when tested in accordance with 4.5.

3.4.6 Dimensions.

3.4.6.1 Width. Unless otherwise specified by the procuring activity, the overall width of the finished fabric shall be 36 1/2 inches \pm 1/2 inch or 48 1/2 inches \pm 1/2 inch. The acceptable width shall be inclusive of the selvages but exclusive of fringed ends produced on shuttleless looms (see 6.2).

3.4.6.2 Length and put up. The fabric shall be in roll form as specified by the procuring activity.

3.4.6.2.1 Length and put up for fabric shipped to government activity. Unless otherwise specified (see 6.2), the fabric shall be in continuous lengths, each not less than 100 yards with the following exceptions: A maximum of 9 percent of the yardage may be in pieces that are 50 to 99 yards long, and a maximum of 1 percent in 25 to 49 yard pieces.

3.5 Identification yarns. Dyed yarns shall be woven 1 1/2 inches \pm 1/2 inch from selvage edges of the cloth to identify the cloth to the procuring activity. When a false selvage is to be removed during the manufacturing of the end product, the identification yarns shall be woven within 1 1/2 inches of the cut edges, \pm 1/2 inch. The colors used shall be those indicated in MIL-STD-851. Additional dyed yarns may be used to identify the converter (supplier) provided

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that the converter has identification yarns assigned by MIL-STD-851 or by the procuring activity. The dye used in the marker yarns shall have no deteriorative effect on the physical properties of the yarn, and the dyed yarns shall show no bleeding or color transfer when subjected to the tests as specified in 4.5.

3.6 Identification of product. Each roll of finished cloth shall be marked for identification in accordance with PPP-P-1133. In addition, each piece of cloth in each finisher's roll shall be clearly and legibly marked with the finisher's roll number or code, as specified in 4.3, and each roll shall have attached a durable tag on which the finisher's roll number or code is listed. The date of manufacture of the cloth shall be included on the tag attached to each roll.

3.7 Age. The cloth shall be not more than 3.5 years old from the date of manufacture of the yarn to the date of delivery of cloth.

3.8 Workmanship. The finished cloth shall be clean and evenly woven and shall conform to the quality and grade of product established by this specification. The finished cloth shall be free from defects except to the extent specified herein.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling for quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.2 Classification of inspection. The inspection and testing of nylon parachute cloth shall be classified as follows:

- a. Quality conformance inspection (see 4.3).
- b. Quality conformance testing (see 4.4 and 4.5).

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4.2.1 Certificates of compliance. When certificates of compliance are submitted, the Government reserves the right to inspect and/or test such items to determine the validity of the certificate.

4.3 Quality conformance inspection. The quality conformance inspections shall be performed on each and every shipper's rolls as specified. Shipper's rolls are created after finishing when a finisher's roll is divided for the purpose of handling and delivery. Each shipper's roll shall be tagged (see 3.6) with the number or code of the finisher's roll of which it was a part. Unless otherwise specified by the procuring activity, sampling for examination shall be performed in accordance with section 4.4.3.

4.3.1 Components and material. In accordance with 4.1, components and materials shall be tested (see 4.4.1 and table II) in accordance with all the requirements of referenced documents unless otherwise specified by the procuring activity.

TABLE II. Components and materials.

	Character- istics	Requirement paragraph	FED-STD-191 test method	Tests for each pro- duct used	Results Reported
Material warp and filling yarns	Tenacity	3.1	#1	#1	Pass or Fail
	Luster	3.1	#1	#1	Pass or Fail
	Melting point	3.1	1534	#2	Pass or Fail
	Bleaching	3.1	#1	#1	Pass or Fail
	Heat and light resistance	3.1	#1	#1	Pass or Fail
Identification yarns	Colorfastness to laundering	3.4.4.1	5614	#1	Pass or Fail on bleeding and color transfer
	Deleterious effect of dye	3.5	#1	#1	Pass or Fail

#1. Acceptance with respect to this characteristic will be based on a contractor's certificate of compliance.

#2. (Two (2) determinations per warp yarns and two (2) determinations per filling yarns.

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4.3.2 Definitions. MIL-STD-109 shall apply for definitions of inspection terms used herein.

4.4 Quality conformance sampling and testing.

4.4.1 Components and material. In addition to the quality assurance provisions of the subsidiary specifications, components and materials listed in table II shall be tested for the characteristics specified and in accordance with the referenced test methods of FED-STD-191. The lot size shall be expressed in units of one cone, tube, or spool for each component. The sample size shall be in accordance with inspection level S-1 in MIL-STD-105, table: "Sample size code letters for small-sample inspection." The acceptance quality level for each characteristic shall be 6.5 test failures per 100 units. The test data required by this sampling plan shall be provided to the finisher by the greige goods weaver or the yarn producer unless otherwise specified by the procuring activity.

4.4.2 End item cloth. The cloth shall be sampled (see 4.4.2.1) and tested (see 4.4.2.1, table III and 4.5) for the characteristics as specified therein. The methods of testing specified in FED-STD-191, wherever applicable, and as listed in table III shall be followed. The physical and chemical values specified in section 3, except where otherwise specified, apply to the average of the determinations made on a sample unit for test purposes as specified in the applicable test method. All individual test results must also be recorded and reported. The identity (see 3.6 and 4.4.2.1) of a particular shipper's roll from which all the cloth samples were derived must also be reported per each test result.

TABLE III. Sample size.

Lot Size (Rolls)	Sample Size (Rolls)
1-10	1
11-20	2
21-30	3 ¹
31-40	4 ¹

¹Select one more roll for every 10 rolls, or fraction thereof, over 40.

4.4.2.1 Sampling and tests.

4.4.2.1.1 Lot. A lot shall consist of all shipper's rolls, from the same finisher's roll, received at the procuring activity at one time. A shipper's roll is defined as one continuous length of finished cloth without any splices (see 3.4.6.2 and 3.4.6.2.1). A finisher's roll is made up of greige rolls fastened together in one large roll, and subjected to the same finishing operation.

4.4.2.1.2 Sampling of shipper's rolls.

Every shipper's roll from each lot shall be tested as required in paragraphs a through g (below). Full width samples, of sufficient length to perform these tests (see 3.4.6.1), will be taken a minimum of two (2) yards from the end of every shipper's roll in each lot.

(See 4.4.2.1.1).

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- a. Weight.
- b. Weave.
- c. Breaking strength and elongation (original only).
- d. Yarns per inch.
- e. Tearing strength.
- f. Reinforced selvage breaking strength, as applicable.
- g. Original air permeability.

4.4.2.1.3 Additional sampling. In addition to the tests specified in 4.4.2.1.2, the following tests shall be performed on randomly selected shipper's rolls from each lot. One roll shall be selected for each 10 rolls as shown in table III (see page 8). The samples shall be the full width of the cloth and of sufficient length to perform all of the tests specified in paragraphs a through h, below. The sample shall be taken a minimum of 2 yards from the end of the roll, or immediately following the sample for paragraph 4.4.2.1.2 tests. Failure of a sample to conform to any one of the tests shall be cause for rejection of the entire lot represented by the sample.

- a. Thickness.
- b. Reinforced selvage thickness.
- c. Permanence of set.
- d. Chloroform soluble material.
- e. Acidity-alkalinity.
- f. Colorfastness to light.
- g. Colorfastness to crocking.
- h. Light and heat resistance.

4.4.3 Sampling for examination.

4.4.3.1 Yard-by-yard examination. Each shipper's roll shall be visually examined yard-by-yard for defects as specified in 4.6.1. Accept/reject criteria for each shipper's roll in lot is; each shall contain an average of not more than seven (7) major defects per 100 continuous linear yards.

4.4.3.2 Overall examination. Each shipper's roll shall be visually examined for overall defects as specified in 4.6.2. A shipper's roll shall contain no defects.

4.4.3.3 Inspection of manufacturing process. The contractor shall furnish a certificate of compliance indicating the following processing requirements were satisfied:

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- a. Silicone oil (see 3.4.2.1) percent added.
- b. Age of cloth (see 3.7).
- c. Bleach (see 3.1).

4.4.4 Examination for length. The examination for length shall be as specified in 3.4.6.2.

4.4.5 Examination and preparation for delivery. An examination shall be made as specified in 4.7.

4.5 Test methods. The methods of testing are specified in tables II and IV and paragraphs 4.5.1 through 4.5.3. The physical and chemical values specified in section 3 apply to the test determinations made on the samples in accordance with these procedures.

TABLE IV. Test methods.

Test characteristics	Requirement Paragraph	Test Method	
		Paragraph	FED-STD-191
Weave	3.3	(visual)	5050
Yarns per inch	Table 1		5041
Weight	Table 1		5030
Thickness	Table 1		5104
Breaking strength and elongation (ravel strip)	Table 1		
Tear Strength (tongue)	Table 1		5134
Reinforced selvage thickness	Table 1		5030
Reinforced selvage strength	Table 1		5104
Air permeability	3.4.1	4.5.1	5450
Shrinkage	3.4.1	4.5.2	
Chloroform soluble material	3.4.3.2		2611
pH	3.4.4		2811
Colorfastness to light	3.4.5.1		5660
Colorfastness to crocking	3.4.5.1		5651
Resistance to light	3.4.6	4.5.5.1	
Resistance to heat	3.4.6	4.5.5.2	
Width	3.4.7.1		5020

¹Per figure 1 and paragraph 3.3.

²The individual readings shall be reported; each value must meet or exceed the minimum requirement.

³Except that the clamp jaws shall be 1 inch by 1 1/2 inches or larger, with the long dimension of jaw perpendicular to the direction of the load application.

⁴The specimen shall be raveled to form a 3/4 inch wide strip.

⁵The individual readings shall be reported.

⁶Except that the specimen shall be exposed for 20 standard fading hours.

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4.5.1 Air permeability. The test specimen shall be nine (9) inches long and the full width of the fabric. The air permeability test shall consist of five (5) individual readings for the 36 inch wide fabric made in accordance with method 5450 of FED-STD-191. For wider fabric the number of readings shall be increased proportionately with the increase of width. The individual readings shall be equally spaced across the cloth width (see 3.4.6.1) of the test specimen. The air permeability of the test specimen shall be the average of all the individual readings. However, all individual readings shall also be recorded and reported.

4.5.2 Permanence of set. Two 20 inch square specimens of the cloth shall be prepared. Using a template and indelible ink, an 18 inch square shall be marked on each specimen. The specimens shall be subjected to the air permeability in accordance with method numbers 5450 and 5030 of FED-STD-191. The following test procedures shall be followed:

- a. The specimens shall be prepared by stapling the opposite sides of the specimen together to form a loop or "skein." One of the specimen will be prepared so that the warp yarns are parallel to the edges of the loop, the other so that the fill yarns are parallel to the edges.
- b. The specimens shall be attached to a glass rod, with twine or non-rusting wire. The twine shall be long enough so the specimen will be completely submerged during the test. The glass rod must be long enough to rest on top of the test chamber.
- c. A glass rod, 1/4 inch diameter by 21 inches long, and weighing 45 ± 5 grams shall be placed in the bottom of the loop.
- d. The container shall be filled to within 3 inches of the top with water, and the water brought to a rapid boil.
- e. Both loops shall then be suspended freely in the boiling water bath and subjected to the action of the boiling water bath for a period of 15 minutes, after which they shall be removed from the bath and allowed to drain for 15 minutes.
- f. The staples shall be removed from the specimens and the specimens shall be placed on a horizontal screen to air dry.
- g. After the specimens are thoroughly dry, they shall be exposed for at least four (4) hours to a standard atmosphere of 65 percent \pm two (2) percent relative humidity and a temperature of $70 \pm 2^\circ$ Fahrenheit.
- h. The width of each 18 inch square shall be measured to the nearest 0.01 inch in six (6) places, three (3) in the warp direction and three (3) in the filling direction. The percentage of shrinkage shall be computed as follows:

$$\frac{W_0 - W_F}{W_0} \times 100 = \text{Percent Shrinkage}$$

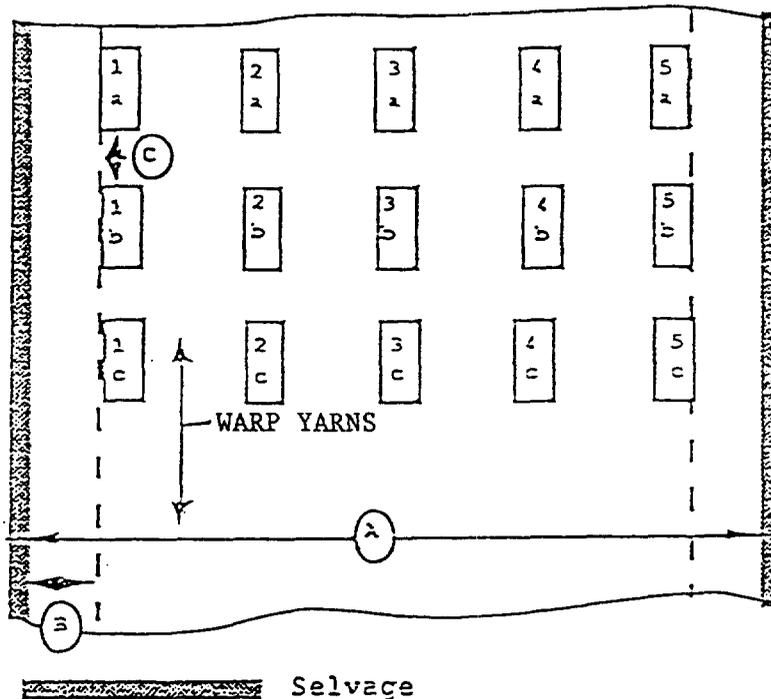
NOTE: W_0 is the original width, W_F is the corresponding final width.

- i. The air permeability shall be remeasured in accordance with FED-STD-191, Method 5450.

4.5.2.1 Reports. The results of the warp skein and filling skein for air permeability and shrinkage shall be averaged, and acceptance based on the average results.

4.5.3 Breaking strengths: Original, after exposure to light and after exposure to heat. The test specimens for determining all breaking strengths shall be so selected that identical warp and filling yarns are tested originally and after light exposure or heat exposure. The layout for breaking strength test specimens shall be as depicted in figures 4 and 5. This shall be done by marking the test specimens with dye resistant ink before cutting as depicted in figures 4 and 5.

NOTE: A minimum 1/2 inch border is included around all four sides of all exposure test specimens (both warp and filling). This outside border is to be removed only after exposure to light or heat and prior to testing the specimen for strength.



NOTE¹

Figure 4. Warp Tensile Strength Specimen Layout

¹ A = cloth width, B = 10% (min) cloth width, C = distance between specimen groups (5" minimum). Lower case a, b, c identifies specimen groups. Specimens are equally spaced across cloth width.

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At the end of the exposure period, the specimen shall be brought to equilibrium under standard conditions. The specimen shall be tested for breaking strength in accordance with FED-STD-191, method 5104. The percent loss in breaking strength shall be calculated as follows:

$$\frac{(\text{Original Avg B.S.} - \text{B.S. after exposure})}{\text{Original Avg B.S.}} \times 100 = \text{percent loss}$$

4.5.3.1 Test procedure: resistance to light. The test specimens (see figures 4 and 5) shall be exposed in the accelerated weathering unit as specified in FED-STD-191, method 5804.

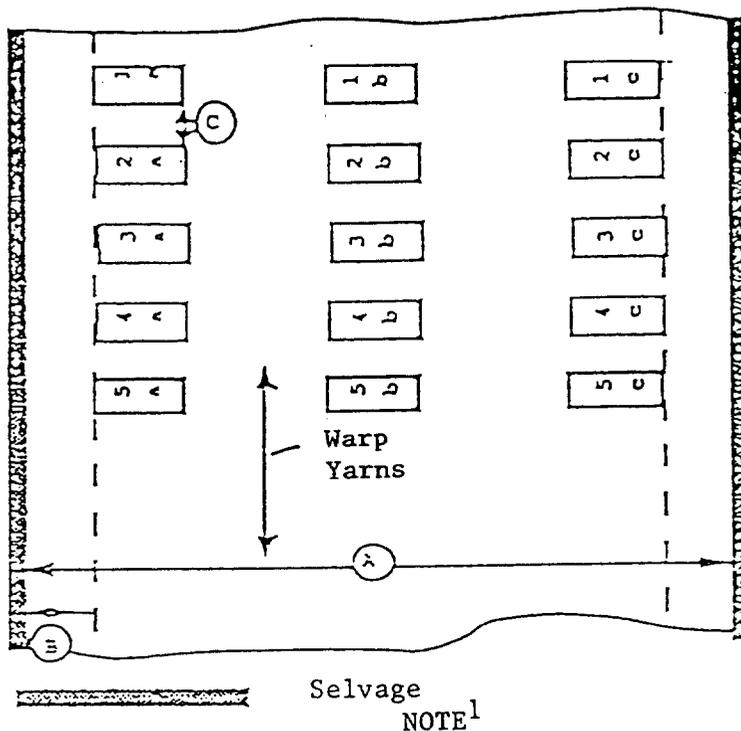


Figure 5. Fill Tensile Strength Specimen Layout

¹A = cloth width, B = 10% (min) cloth width, C = distance between specimen groups (5" minimum). Lower case a, b, c identifies specimen groups. Specimens are equally spaced across cloth width.

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4.5.3.1.1 Test exceptions. The following exceptions are applicable to method 5804:

- a. The specimen shall be suspended on the rotating rack by attaching the corners (see Figure 6) to the rack. Care must be taken to assure that the filling specimens are not shielded by the center specimen rack.
- b. Corex D filters and sunshine carbons shall be used.
- c. The exposure time shall be 50 hours.
- d. The spray heads shall be shut off during the entire exposure period.
- e. The drain pan shall contain 1/2 to one inch of water during the entire exposure period.
- f. The relative humidity shall be maintained at $55\% \pm 5\%$, and the black panel temperature shall be $155^{\circ}\text{F} \pm 10^{\circ}\text{F}$ ($68 \pm 5.6^{\circ}\text{C}$) during the entire exposure period.
- g. The black panel shall be removed and polished every 500 hours of use. When the black panel surface begins to fade, it shall be replaced.
- h. The filter age shall range from less than 250 hours to a maximum of 2,000 hours. This shall be accomplished in the following manner.
 1. Number the filter frames 1 through 8.
 2. Replace all filters with new filters.
 3. Change one filter every 250 hours until all filters are replaced; then repeat the cycle, (paragraphs (2) and (3) above, starting with the number one (1) filter frame.

4.5.3.2 Test procedure: resistance to heat. The test specimens (see figure 7) shall be exposed in a circulating air oven at a temperature of $356^{\circ} \pm 10^{\circ}\text{F}$ ($180^{\circ} \pm 5^{\circ}\text{C}$) for one hour. The velocity of the air shall be adequate to maintain a constant temperature throughout the oven chamber. The velocity will not be so great that the specimens are forced against the rack or walls of the chamber. The specimens shall be attached to the rack at two corners and suspended free with a one-ounce clamp attached to each of the free corners (see figure 6). The oven chamber shall be preheated to $356^{\circ} \pm 9^{\circ}\text{F}$ ($180^{\circ} \pm 5^{\circ}\text{C}$); the rack containing the specimens shall be placed in the chamber and the one-hour cycle started immediately.

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NOTE: When placing the specimens in the chamber, do so as quickly as possible to prevent loss of chamber temperature.

4.6 Examination.

4.6.1 Yard-by-yard examination. All cloth shall be carefully examined yard-by-yard and the defects classified in accordance with 4.6.1.3. The unit of product for this examination shall be one linear yard--that is, increment of one yard on the measuring device of the inspection machine. For each unit of product, the defects shall be counted as follows:

- a. One minor defect and one major defect per yard shall be counted as one major defect.
- b. Three or more minor defects per yard shall be counted as one major defect.
- c. One or more major defects per yard shall be counted as one major defect.
- d. A continuous major defect shall be counted as one defect for each yard in which it occurs.

4.6.1.1 Marking of defects. Each major defect shall be marked by a red string sewn, or attached plastic tag, in the selvage (for direct government procurement only). Three or more minor defects occurring in a yard shall also be marked by a red string (or plastic tag) in the selvage. A continuous major defect shall be marked as follows: a single yellow string shall be sewn into, or a yellow plastic tag attached to the selvage for each yard containing the defect.

4.6.1.2 Classification for defects. Defects found during the yard-by-yard examination shall be classified in accordance with table V and counted as specified in 4.6.1.

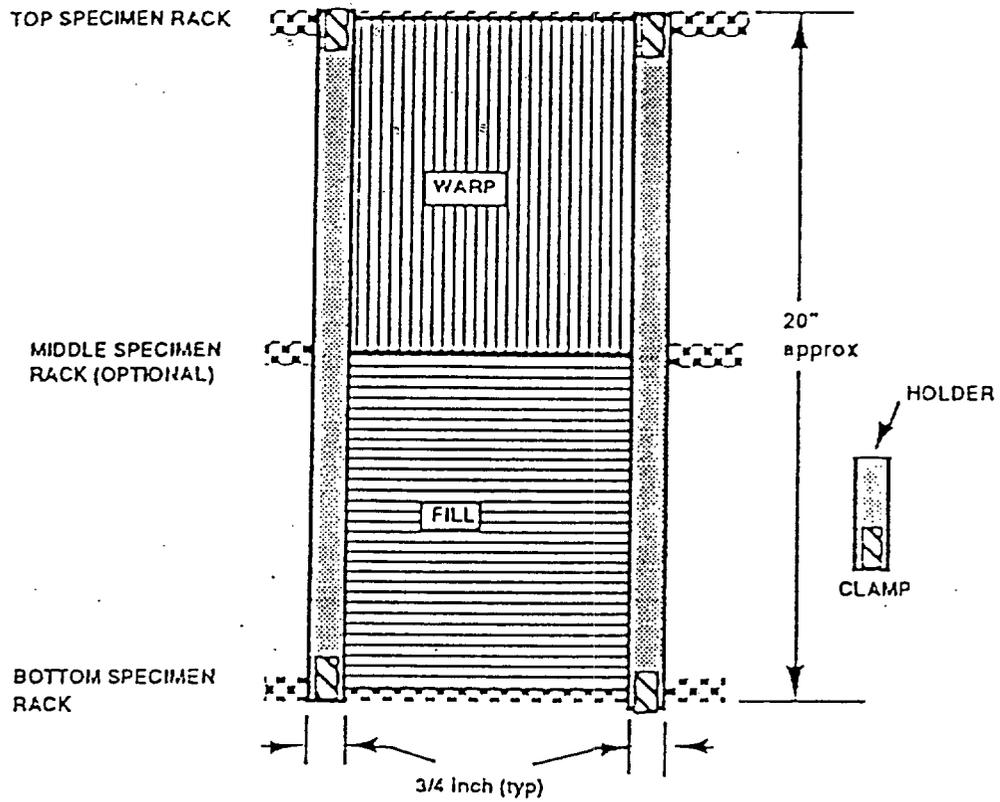


Figure 6 Test Specimens: Resistance to Light

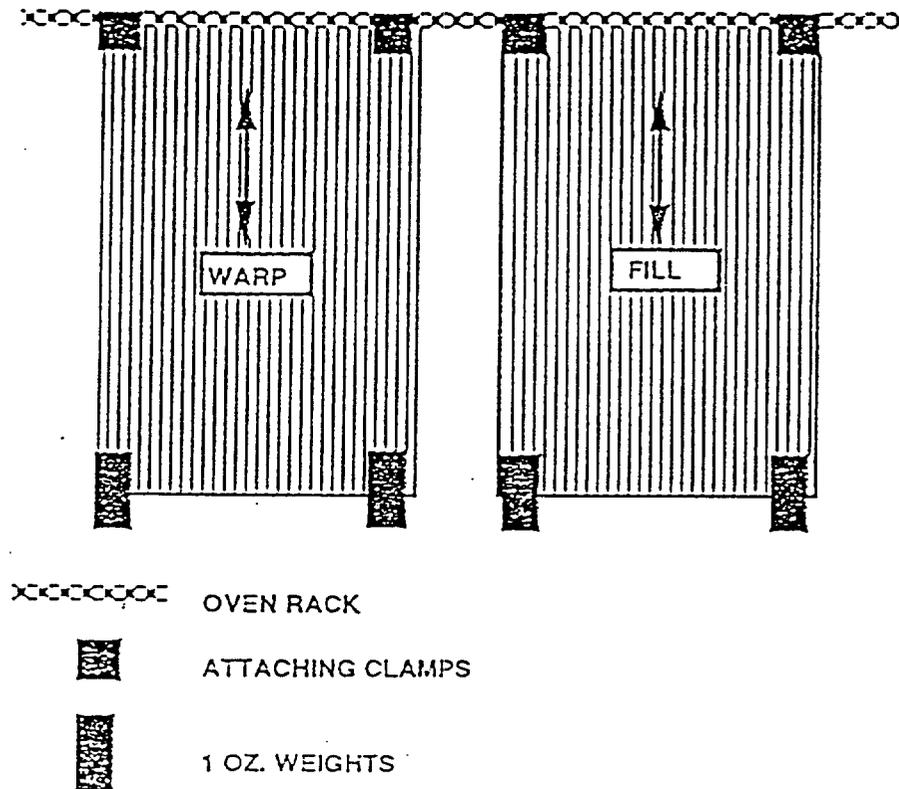


Figure 7. Test specimens, resistance to heat.

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TABLE V. Classification of defects

Defect	Description	Major	Minor
Abrasion	Any abrasion mark showing fuzziness	X	
Biased filling	Biased filling more than two inches from horizontal at greatest point of bias.	X	
Bowed filling	Bowed filling more than two inches in height (as measured from a straight line chord to highest point of arc)	X	
Missing end	Two or more contiguous, regardless of length	X	
Missing Pick	Two or more contiguous, regardless of length	X	
	One missing pick, full width		X
Break, cut, hole or tear (other than pinhole, etc.)	Three or more warp or filling yarns ruptured at adjoining points	X	
Floats or skips	Any multiple float 3/16 inch square or more	X	
	Single floats 1/4 inch or more in length	X	
	Contiguous pin floats, the sequence of which measures one inch or more in length		X
	Single floats up to 1/4 inch long		X
	Contiguous floats or pin floats, the sequence of which measures less than one inch in length	X	
	Multiple floats up to 3/16 inch square		X
Filling bar variations	Over 1/8 inch and up to 1/2 inch in width with 10% or less variation above normal pick count		X
	Over 1/8 inch and up to 1/2 inch in width with more than 10% variation below normal pick count	X	
	Over 1/2 inch in width with more than 10% variation from normal pick count	X	
	1/8 inch or less in width and varying 10% or more from normal pick count		X

¹A pin float is a float measuring 1/8 inch or less. Single pin floats are not considered defects.

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TABLE V. Classification of defects - Continued.

Defect	Description	Major	Minor
Jerked-in filling	Any jerked-in filling occurring more than 4 times within 10 linear inches		X
Loops, kinks, or snarls (except selvage)	All over 1/8 inch in length	X	
	3 or more in any linear yard, up to 1/8 inch in length	X	
	4 or more in the center of the warp caused by the loom center fork, up to 1/8 inch long	X	
Mispick	3 or more picks	X	
	double or 2 picks		X
Yarn deformations	Over 6 yarn deformations or shifts of 1/32 inch or more over 6 inches in length occurring within an area equal to a 6 inch diameter circle	X	
	3- to 6-yarn deformations of 1/32 inch or more over 6 inches in length occurring within an area equal to a 6 inch diameter circle		X
Selvage defects	Any cut, broken, torn, scalloped or curly noted waviness along selvage edge (check for waviness under no tension)	X	
	Any clearly noticeable roll of edge or edges when tension is released (tight selvage)	X	
	Continuous string or loopy selvage projecting up to 1/8 inch		X
	More than 3 inches of continuous stringy or loopy selvage projecting 1/8 inch or more	X	
	Any frayed selvage	X	
Smash	Any smash	X	
Weaver's stain	Any spot, stain or streak (not dye streaks) of the following magnitudes:		
	a. Single ends or picks 15 inches or more in length	X	

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TABLE V. Classification of defects - Continued.

Defect	Description	Major	Minor
	b. Double ends or picks 8 inches or more in length	X	
	c. More than 2 ends or picks 5 inches or more in length or a clearly noticeable area more than 1/4 inch square inch in area, whichever is greater	X	
	d. Single ends or picks 2 1/2 inches up to 15 inches in length		X
	e. Double ends or picks 2 1/2 inches up to 8 inches in length		X
	f. Over 2 ends or picks less than 5 inches in length or a clearly noticeable area 1/4 square inch or less in area, whichever is greater		X
Slubs, strip-back, etc.	Any abruptly thickened place in the fabric caused by extraneous material woven in the fabric or a stripback continuing for more than 1 1/2 inches and being more than 1/16 inch wide for that length Slubs smaller than 1 1/2 inch long or 1/16 inch wide	X	X
Weave	Pattern other than that specified	X	
Width	Less than specified width	X	
Wrong draw	Clearly noticeable warpwise streak more than 18 inches in length	X	
Manufacturer's identification yarns	Missing or wrong yarn	X	

4.6.1.3 Examination for compliance with the Textile Fiber Products Identification Act. During the yard-by-yard examination, each roll shall be examined for fiber identification. The lot shall be unacceptable if two or more rolls in the sample are not labeled in accordance with the Rules and Regulations Under the Textile Fiber Products Identification Act.

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4.6.2 Overall examination. The unit of product for overall examination shall be one shipper's roll (see 4.4). Each roll shall be carefully examined and presence of any defect listed shall be cause for rejection of the lot.

- a. Objectionable odor.
- b. Uncleanliness throughout.
- c. Spottiness or off shade of standard range.
- d. Uneven weaving throughout.
- e. Abraded warp condition visible when examined over a dark background showing as intermitten or continuous streaks, dull or dusty in appearance, running in the warp direction at least 1/16 inch wide and confirmed by examination with a 100X (minimum) microscope. A tensile test of the streak area, regardless of where it appears in the fabric width shall be conducted, and if the single break falls below the minimum breaking strength for the fabric, the lot shall be rejected.

4.6.3 Examination for length.

4.6.3.1 Individual rolls. During the yard-by-yard examination, each roll shall be examined for length. Any roll length found to be less than the minimum specified or more than two yards below the length as specified by the procuring activity, or any piece less than 75 yards (see 3.4.6.2) shall be considered a defect with respect to length.

4.6.3.2 Total yardage. The lot shall be unacceptable if the total of the actual lengths of rolls examined is less than the total of the lengths marked on the ticket (see 4.4.5).

4.7 Examination and preparation for delivery. An examination shall be made in accordance with the provisions of PPP-P-1133 to determine that packaging, packing and marking requirements (section 5) are complied with.

5. PACKAGING/PACKING

5.1 Packaging shall be levels A, or commercial, as specified (see 6.2). The cloth, put up as specified, shall be packaged in accordance with PPP-P-1133.

5.2 Packing. Packing shall be level A, B, or commercial as specified (see 6.2). The cloth shall be packed in accordance with the applicable requirements of PPP-P-1133.

5.3 Marking. In addition to any special marking required by contract or order, shipments shall be marked in accordance with the applicable requirements of PPP-P-1133.

6. NOTES

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(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The primary use of this cloth is in the manufacture of ejection and nonejection parachutes for personnel, cargo parachutes and other types of deceleration devices. However, it may be used as a base cloth in coated fabrics for other applications.

6.2 Ordering data. Procurement documents should specify the following:

- a. Title, number, and date of the specification.
- b. Type (see 1.2).
- c. Color (see 3.4.4)
- d. Quantity.
- e. Width (see 3.4.6.1).
- f. Length and put up (see 3.4.6.2 and 3.4.6.2.1).
- g. Selection of the applicable levels of packaging and packing (see 5.1 and 5.2).

6.2.1 Data requirements. When this specification is used in an acquisition and data are required to be delivered, the data requirements identified below shall be developed as specified by an approved Data Item Description (DID) (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (CDRL), incorporated into the contract. When the provisions of DOD FAR Supplement, Part 27, Sub-part 27.410-6 (DD Form 1423) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification are cited in the following paragraph.

<u>Paragraph</u>	<u>Data requirement</u>	<u>Applicable DID</u>
4.2.1	Certificate of Quality Compliance	Certification Data/ Report

(Data item descriptions related to this specification, and identified in section 6, will be approved and listed as such in DOD 5000.19L, Vol. II.AMSDL. Copies of data item descriptions required by the contractors in connection with the specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the officer.)

6.3 Silicone oil. Dow Chemical Company's emulsion 36 has proved satisfactory for use in the finishing of this cloth.

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6.4 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

6.5 Subject term (key word) listing.

Air Permeability
Aging
Selvage
Yarn
Weight
Filling
Tear Strength
Length
Yarn
Warp

Custodians:

Army - GL
Navy - AS
Air Force - 99

Preparing activity:

Air Force - 82

(Project 8305-0227)

Review activities:

Army - AV
Air Force - 11
DLA - DPSC - CT