

NIL-C-539A(OS)
22 December 1976
SUPERSEDING
JAN-C-539
28 November 1947

MILITARY SPECIFICATION

CLOTH, SILK, CARTRIDGE-BAG

This specification is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all the departments and agencies of the Department of Defense

1. SCOPE

1.1 Scope. This specification covers one grade of silk cartridge-bag cloth. (See 6.1.)

1.2 Classification. Silk cartridge-bag cloth shall be of the following classes, as specified (see 6.2):

Class A--Breaking strength 165 pounds per square inch (minimum)
Class B--Breaking strength 125 pounds per square inch (minimum)
Class C--Breaking strength 90 pounds per square inch (minimum)
Class D--Breaking strength 60 pounds per square inch (minimum)
Class E--Breaking strength 30 pounds per square inch (minimum)
Class F--Breaking strength 85 pounds per square inch (minimum)
Class G--Breaking strength 25 pounds per square inch (minimum)

2. APPLICABLE DOCUMENTS

2.1 Issues of documents. The following documents of the issues in effect on date of invitation for bids or request for proposals form a part of this specification to the extent specified herein. In the event of conflict between this specification and other documents referenced herein, requirements of this specification shall apply.

Beneficial comments (recommendations, additions, deletions, and any pertinent data which may be of use in improving this document should be addressed to Naval Ordnance Station, Indian Head, Md 20640, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter

FSC 8305

MIL-C-539A(OS)

SPECIFICATIONS

Federal

PPP-B-591	Boxes, Fiberboard, Wood-Cleated
PPP-B-601	Boxes, Wood, Cleated-Plowwood
PPP-B-621	Boxes, Wood, Nailed and Lock-Corner

Military

MIL-P-130	Paper, Wrapping, Laminated and Creped
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STANDARDS

Federal

FED-STD-191	Textile Test Methods
FED-STD-751	Stitch, Seam and Stitching

Military

MIL-STD-129	Marking for Shipment and Storage
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(Copies of specifications and standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer)

3. REQUIREMENTS

3.1 Material. The cloth shall be manufactured from pure silk without the admixture of any other material whatever, except the amount of sizing absolutely necessary to facilitate weaving. Only silk not used before shall be used in the manufacture of cartridge-bag cloth.

3.2 Fiber. The fiber shall be pure silk.

3.3 Weave. Unless otherwise specified, the weave shall be a plain single or a double basket weave.

3.4 Slippage value. The slippage value of the cloth shall be not less than 60 in either direction of the filling or the direction of the warp.

3.5 Stretch. The stretch of the cloth shall be not greater than 12.5 percent in either the direction of the filling or the direction of the warp.

3.6 Width. The width of the cloth shall be as specified in the contract or order (see 6.2). A tolerance in width of ± 0.25 inch will be permitted.

3.7 Objectionable sizing. The character and quality of the sizing materials (see 6.3) shall be such that there is not indication of smoldering when the cloth is ignited sufficiently to give a good flame and then extinguished. The cloth shall pass the objective sizing test prescribed in 4.3.6.

3.8 Ether extract. The ether extract shall be not greater than 10 percent.

3.9 Acidity or alkalinity.

3.9.1 pH of water extract. The pH of water extract of the cloth shall be not less than 4.4 nor greater than 9.7.

3.9.2 Organic acidity or alkalinity. The water extract of the cloth shall show not greater than 0.1 percent acidity, calculated as acetic acid, nor greater than 0.1 percent alkalinity, calculated as sodium carbonate.

3.10 Ash. The ash content shall be not greater than 0.2 percent.

3.11 Weight. Unless otherwise specified, the weight of the cloth shall conform to the requirements specified in table I.

3.12 Breaking strength. Unless otherwise specified, the breaking strength of the cloth shall conform to the requirements specified in table II.

3.13 Workmanship. The cloth shall be woven so as to be close and uniform and shall be free from defects which might affect the serviceability.

MIL-C-539A(OS)

TABLE I. Weight.

Class	Pounds per inch, either direction, minimum
A	165
B	125
C	90
D	60
E	30
F	85
G	25

TABLE II. Breaking strength.

Class	Ounces per square yard	
	Minimum	Maximum
A	--	14.0
B	8.0	10.0
C	--	7.0
D	--	6.0
E	--	5.0
F	5.5	6.5
G	--	4.0

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, as specified herein. Except as otherwise specified in the contract or 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 assure supplies and services conform to prescribed requirements.

4.2 Quality conformance inspection.

4.2.1 Size of lot. Unless otherwise specified, a lot shall consist of each 100,000 yards, or a fraction thereof, of cloth of one class submitted for inspection at the same time.

4.2.2 Sampling. Ten percent, but in no case more than 10, of the bales or boxes comprising the lot shall be selected so as to be representative of the lot. One bolt of cloth shall be removed from each selected bale or box, at least 50 feet unrolled, and a sample of 2 running yards cut from the bolt. Each sample shall be labeled so that the bale or box from which it was taken can be identified. A composite sample of the lot, consisting of approximately 1 yard from each of the primary samples, shall be made. All samples shall be labeled, giving the name of the material, class, manufacturer, plant, contract or order number, and the number of yards in the lot. All acceptance tests shall be made on the composite sample representative of the lot. The primary samples shall be held for possible future examination should the composite sample fail to meet the requirements of this specification.

4.3 Test methods. Tests shall be made in accordance with the following:

4.3.1 Fiber. Unravel warp and fill threads 1 to 2 inches in length from each piece of cloth comprising the sample. Immerse a 50-milligram (mg) beaker or test tube containing 10 ml of boiling 17.5 percent sodium hydroxide solution. Note whether solution of the fibers occurs. Immerse another 5-mg portion of the fibers in a 30-ml beaker or test tube containing 10-ml of 95 to 96 percent sulfuric acid solution at a temperature of 25° to 30° C, and agitate the mixture for 5 minutes. Note whether solution of the fibers occurs. Consider the material to be silk, if the fibers dissolve in both alkali and acid. In testing disregard the failure of a few fine short hairlike fibers to dissolve.

4.3.2 Weave. Determine the weave by visual examination.

4.3.3 Slippage value. Cut 10 test specimens as directed in FED-STD-191 and supplement thereto for use in determining the breaking strength, except that each specimen shall be 16 inches in length. Use the five specimens having the short dimension parallel to the warp threads for the determination of warp slippage and the five having the short dimension parallel to the filling threads for the determination of fill slippage. For making this test, use a machine of the standard type specified in FED-STD-191 for use in the determination of elongation. Adjust the distance between the jaws of the testing machine to 3 inches. Fold a test specimen back on itself so that the distance from the fold to one edge, parallel to the short dimension, measures approximately 5 inches and to the other, at least 10 inches. Take care to have the fold parallel to the crosswise yarns in the specimen. At 0.38 inch from the fold sew a seam parallel to the crosswise yarns of the specimen. Use a seam of the type designated as 301-SSa-1 by FED-STD-191 (seam SSa-1 formed with 1 row of stitch type 301). Use 1 row of stitch type 301, 12 stitches per inch to make the seam. In making the seam use a suitable needle and a heavy silk thread of sufficient strength so that it will not break when

MIL-C-553A (S)

the seam is tested for elongation as directed below (a No. 21 needle and commercial grade "14 pound) waterproofed silk, fishing line thread with a left-hand machine twist has been found satisfactory). Place the test specimen, with the 10-inch portion uppermost, symmetrically in the upper jaws so that the long dimension of the 10-inch portion of the specimen is parallel to the direction of application of the load. Clamp the specimen in the upper jaws so that the seam is at least 3 inches below the lower jaws. Attach a 6-ounce clamp to the specimen at a point beneath the lower jaws so that a uniform tension of the amount is applied to the specimen, and clamp the lower jaws, taking care to grip the same yarns in the lower jaws as are gripped in the upper jaws. The clamp can be assembled from (a) a metal photographic film clip, (b) a brass or steel rod 6 inches long and 5/16 inch in diameter, and (c) equal brass or steel weights which are sufficient to bring the total weight of the assembly to 6 ounces. Arrange the apparatus to obtain a tension-stretch curve up to the breaking strength of the specimen, the stretch being indicated in inches by the vertical component and the tension being indicated in pounds by the horizontal component. Start the machine and allow it to apply tension until the specimen breaks. Designate this graphic record as the fabric-stretch curve. Insert the same specimen in the jaws of the machine so that the seam is in a position parallel to the jaws and midway between the upper and lower jaws. Clamp the specimen in the jaws, applying tension by means of the 6-ounce clamp, as directed above, before tightening the lower jaws. Arrange the apparatus so that the graphic record of this test will be made on the same chart and start at the same point. Start the machine and allow tension to be applied to the specimen until either the cloth breaks or the seam fails. Designate this graphic record as the seam-stretch curve. Note the tension at which the vertical distance between the seam-stretch curve and the fabric-stretch curve is equal to the sum of (a) the vertical distance between these curves equivalent to 0.25 inch on the cloth. Calculate the slippage value as follows

$$\text{Slippage value} = \frac{100A}{B}$$

where

A = tension at which the difference between the seam-stretch curve and the fabric-stretch curve is 0.25 inch plus the difference between these curves when the tension is 1 pound

B = the minimum breaking strength for the class of cloth being tested as specified in 3.1.2.

Report the average value obtained for the five warp specimens and for the five fill specimens.

4.3.4 Stretch. From the fabric-stretch curves obtained in the test for slippage as outlined in 4.3.3, calculate the percent of stretch for each specimen as follows:

$$\text{Percent of stretch} = \frac{100(A-B)}{C}$$

where

- A = vertical component of the fabric-stretch curve measured in units equivalent to the distance in inches between the jaws at the tension listed below for the class of cloth being tested.
- B = vertical component of the fabric-stretch curve measured in units equivalent to the distance in inches between the jaws before a just perceptible load is assumed by the specimen.
- C = length, in inches, of the portion of the specimen tested before a just perceptible load is assumed by the specimen.

<u>Class</u>	<u>Tension (pounds)</u>
A	50
B	50
C	40
D	30
E	20
F	40
G	20

4.3.5 Width. Determine the width in accordance with the requirements of section XII, paragraph 1, of CCC-T-191.

4.3.6 Objectionable sizing.

4.3.6.1 Apparatus. Prepare a Mackey test apparatus (see Figure 1) consisting of a cylindrical water jacketed metal oven of the following dimensions: Outside, 8 inches high and 6 inches in diameter inside, 7 inches high and 4 inches in diameter. Seal the vessel with lid lined with nonconducting material having three holes, one at the center for a thermometer, and two diametrically opposite near the rim. These holes receive copper tubes of 1/2-inch diameter so arranged that when the lid is in place, one tube enters the oven to a depth of 6 inches while the other rises to an equal height above the lid. These tubes assure a constant draft of air through the instrument. On a common vertical axis with the central hole, a cylinder of wire gauze, 6 inches long and 1-1/2 inches in diameter, shall be supported within the oven.

MIL-C-539A(OS)

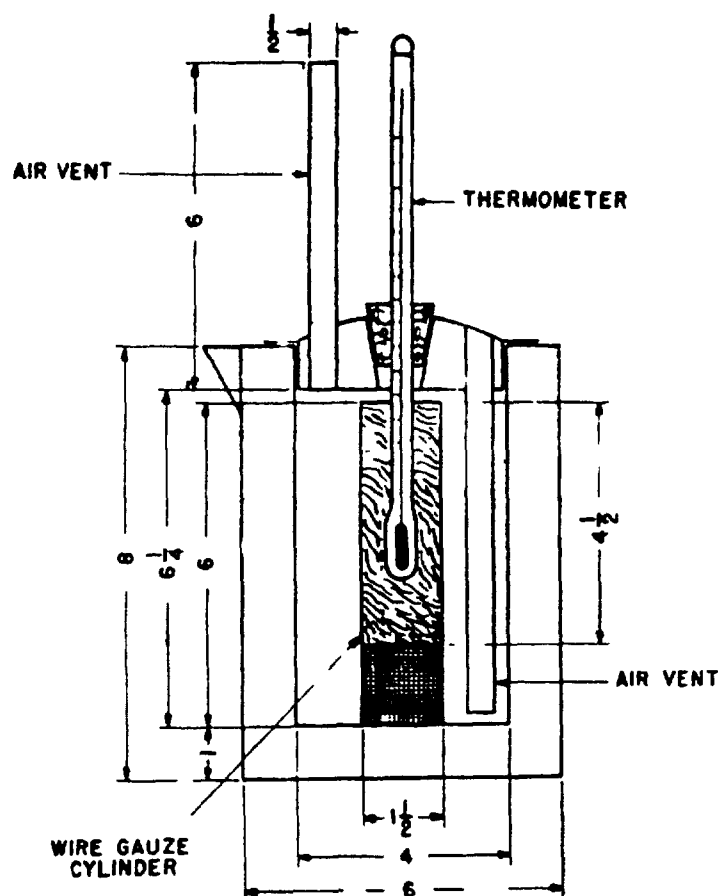


Figure 1. Mackey test apparatus (for use in sizing test).

4.3.6.2 Procedure. Place 12 ± 1 gram of the sample cut into 1/4-inch to 1/2-inch squares within the wire cylinder, compressing it to occupy the upper 4-1/2 inches. Arrange the thermometer so that the bulb is in the center of this mass. Heat the water to the boiling point then introduce the cylinder and thermometer, allowing the latter to protrude through a cork placed in the central hole in the lid: Allow the water to boil and record the temperature at frequent intervals for 1-1/2 hours. Consider the material to fail with respect to the presence of objectionable sizing if the fabric attains a temperature of 100°C within 1 hour, or if it reaches a temperature of 120°C , within 1-1/2 hours.

4.3.7 Ether extract. Cut 10 pieces of cloth, weighing approximately 0.5 gram each, from various portions of the sample. Weigh these pieces together and transfer them to the extraction chamber of a Soxhlet extraction apparatus having ground-glass connections. Assemble the extraction chamber to a tared receiving flask and transfer ether to the extraction chamber until the sample is covered and the ether siphons over the flask. Add approximately 25 ml more ether to the extraction chamber, assemble a condenser to it, and place the assembled apparatus on a steam bath. Allow the extraction to proceed for 1.5 hours. Discontinue heating at a time when the ether content of the extraction chamber is nearly sufficient to cause the ether to siphon over the receiving flask. Heat the flask, containing the oily ether extract, on a steam bath until the ether is removed. Dry the flask and residue in an oven at 100° C for 1 hour, cool in a desiccator, and weigh. Calculate the weight of residue to percent ether extract.

4.3.8 Acidity or alkalinity.

4.3.8.1 pH or water extract. Cut 10 pieces of cloth, weighing approximately 0.5 gram each, from various portions of the sample. Combine these pieces, weigh, and transfer to a 250-ml beaker. Add 150 ml of freshly boiled, distilled water to the beaker, cover with a watch glass, and boil the water gently for 30 minutes. In case the volume of water becomes less than one-half the original amount during the boiling period, add sufficient boiling distilled water to restore it to the original volume. At the end of 30 minutes remove the covered beaker and contents from the source of heat, and bring the volume to 150 ml by adding freshly boiled distilled water. Cool the covered beaker and contents to 25° to 30° C without agitating the contents, to minimize the absorption of carbon dioxide from the atmosphere. Determine the pH of the cooled liquid using a glass electrode pH electrometer within 1 hour after removing the beaker from the source of heat. The distilled water used for this test should be carried through the above operations as a blank and must show a pH value in the range 6.0 to 7.0.

4.3.8.2 Organic acidity or alkalinity. Filter the solution used in 4.3.8.1. If the pH of the solution is between 7.0 and 9.7, titrate the solution with N/10 hydrochloric acid solution using methyl red as the indicator. If the pH of the solution is between 7.0 and 4.4, titrate with N/10 sodium hydroxide solution using phenolphthalein as the indicator. Calculate any acidity to percent acetic acid and any alkalinity to percent sodium carbonate.

4.3.9 Ash. Cut parts from each of the pieces comprising the sample so as to obtain a total of approximately 2 grams, transfer to a rated

MIL-C-539A(OS)

platinum or porcelain crucible, and moisten with concentrated nitric acid. Heat the crucible on a steam bath for 1 hour and then heat carefully over a flame so as to avoid any loss. When the contents of the crucible have been charred, heat to dull redness until all carbonaceous matter has been burned off. Cool the crucible in a desiccator and weigh. Calculate the gain in weight to percent ash in the sample.

4.3.10 Weight. Determine the weight in accordance with the requirements of section X of FED-STD-191.

4.3.11 Breaking strength. Determine the breaking strength in accordance with the requirements of grab method, section VI, of FED-STD-191.

4.4 Retests. If a lot is rejected, the manufacturer shall have the option of reworking the material by a method satisfactory to the procuring activity and resubmitting the lot for acceptance. Samples for retest shall be taken from each 500 yards of resubmitted material.

5. PACKAGING

5.1 Preservation-packaging. Unless otherwise specified, the cartridge-bag cloth shall be packaged in bolts, the cloth being either folded or rolled. If rolled, the cloth shall be placed on a cardboard or other suitable tube having an internal diameter of approximately 2 inches, length approximating that of the width of the cloth, and sufficient strength to prevent distortion in shipping. The bolt shall contain no piece of cloth less than 20 yards in length. The bolt shall be wrapped in three or more thicknesses of paper conforming to type 1 of MIL-P-130 except that the paper shall be free of any material that could transfer from the paper to the cloth. The wrapping shall be securely taped by running three bands completely around the roll and one strip the full length of the overlap seam. The paper shall be long enough to tuck into the ends of the tube. The tape shall be gummed kraft having as a minimum a 2-1/2-inch width and a 60-pound basis weight.

5.2 Packing. Unless otherwise specified, cloth packaged as specified in 5.1 shall be packed in the form of bales or boxes. Each class of cloth shall be packed in a separate container. If packed in bales, the bolts of cloth shall be wrapped in burlap. If packed in wood boxes conforming to the requirements of PPP-B-591, PPP-B-601, and PPP-B-621, respectively. A bale or box shall not contain more than 200 pounds of cloth.

MIL-C-539A(OS)

5.3.1 Individual bolts. Unless otherwise specified, a tag shall be attached to each bolt of cloth, indicating the class, width, number of yards in the bolt, date of manufacture, name of manufacturer, and number of contract or order.

5.3.2 Shipping containers. In addition to any special marking required by the contract or order, shipments shall be marked in accordance with the requirements of MIL-STD-129.

6. NOTES

6.1 Intended use. Cartridge-bag silk cloth covered by this specification is intended for use in the manufacture of cartridge bags and cartridge-igniter pads.

6.2 Ordering data. Procurement documents should specify the following

- a. Title, number, and date of this specification
- b. Class of cloth required (see 1.2)
- c. Width required (see 3.6).

6.3 The following sizing materials have been found to be satisfactory in the manufacture of cloth covered by this specification:

Sodium aluminate
 Aluminum silicate
 Sodium aluminum sulfate
 Potassium aluminum sulfate
 Aluminum sulfate
 (Soap may be used if free from alkali).

6.4 Because of the extensiveness of changes, asterisks are not used in this revision to identify changes with respect to the previous revision.

Reviewer
 ME

Preparing activity
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