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SUPERSEDING
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MILITARY SPECIFICATION

CLOTH, NYLON, RAFT BOTTOM

This specification is approved for use by the Naval Air Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the requirements for two types of nylon base cloth suitable for coating for use in the manufacture of raft bottoms.

* 1.2 Classification. The nylon cloth shall be of the following types as specified (see 6.2):

Type I - plain weave rip stop, 2.5 ounce per square yard
Type II - plain weave, 5 ounce per square yard

2. APPLICABLE DOCUMENTS

* 2.1. Specifications, standards, and handbooks. Unless otherwise specified, the following specifications, standards, and handbooks of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

* PPP-P-1133 - Packaging of Synthetic Fiber Fabrics

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Engineering Specifications and Standards Department (Code 93), Naval Air Engineering Center, Lakehurst, NJ 08733, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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STANDARDS

FEDERAL

FED-STD-191 - Textile Test Methods

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes

(Copies of documents required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Other publications. Unless otherwise specified, the following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this document to the extent specified herein.

Rules and Regulations Under the Textile Fiber Products Identification Act

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

2.3 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 shall take precedence.

* 3. REQUIREMENTS

3.1 Materials.

* 3.1.1 Yarn. The yarn used in the manufacture of the cloth shall be a bright, high tenacity multifilament nylon prepared from hexamethylene diamine and adipic acid or its derivatives. It shall have a minimum melting point of 471°F (244°C). The yarn shall not be bleached in any form or in any subsequent process.

* 3.1.1.1 Weave. The Type I rip stop cloth shall be a plain weave containing 4 reinforcing ribs per inch spaced at uniform intervals and produced by weaving two ends as one in the warp and filling. The Type II cloth shall be plain weave without rip stops (see 6.3).

3.2 Physical requirements. The finished cloth shall conform to the physical requirements listed in Table I when tested as specified in 4.4.

3.3 Width. The width shall be as specified by the procuring activity.

3.4 Length. Unless otherwise specified, the cloth shall be furnished in continuous lengths each not less than 50 yards. Each length shall be put up on rolls as specified in PPP-P-1133.

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3.5. Finish.

* 3.5.1 Heat setting. The cloth shall be heat set and shall show no appreciable distortion or puckering and not more than 2.0 percent dimensional change in either the warp or filling direction when tested as specified in 4.4.2.

3.5.2 Nonfibrous material. The total chloroform-soluble and water-soluble material in the cloth shall not exceed 1.0 percent when tested as specified in 4.4.

3.5.3 Acidity. The pH value of the cloth shall be not less than 5.0 or more than 8.5 when tested as specified in 4.4.

3.6 Fiber identification. Each roll shall be labeled, ticketed, or invoiced for fiber content in accordance with the Textile Fiber Products Identification Act.

3.7 Workmanship. The finished cloth shall conform to the quality and grade of product established by this specification. The occurrence of defects shall not exceed the acceptable quality levels specified herein.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier 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 the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Certificate of compliance. Where certificates of compliance are submitted in accordance with 4.4, they shall contain verifiable actual test and inspection data. The Government reserves the right to inspect and test the cloth to verify the validity of the certification.

4.2 Quality conformance inspection. Sampling for quality conformance inspection shall be performed in accordance with MIL-STD-105, except where otherwise indicated.

4.2.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected and tested in accordance with all the requirements of referenced specifications, drawings, and standards unless otherwise excluded, amended, modified or qualified in this specification or applicable purchase document.

4.2.2 Examination of the end item. The end item shall be examined in accordance with the classification of defects and at the inspection levels and acceptable quality levels (AQL's) set forth below. The lot shall be expressed in units or yards for the examination in 4.2.2.1 and 4.2.2.2.

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4.2.2.1 Yard-by-yard examination. The required yardage of each roll shall be examined and visual defects classified as listed in Table II. All defects found shall be counted regardless of their proximity one to another, except where two or more defects represent a single local condition of the cloth, in which case only the more serious defect shall be counted. A continuous defect shall be counted as one defect for each lengthwise yard or fraction thereof in which it occurs. The sample unit for this examination shall be one linear yard. The sample size shall be in accordance with the Inspection Level II of MIL-STD-105. The AQL shall be 2.5 major defects and 6.5 minor defects per 100 units (yards). The lot size shall be expressed in units of one linear yard each. An approximate equal number of yards from each roll selected shall also be examined for the general defects listed in Table III.

4.2.2.2 Dimensional examination. Each piece of finished cloth in each roll shall be counted and measured. Width and length shall be measured as specified in Methods 5020 and 5010 of FED-STD-191. Any of the following dimensions of the sample found to be less than the minimum dimensions specified for a roll in the contract shall be considered a defect; namely:

- (a) Gross length of roll
- (b) Width of roll
- (c) Length of shortest piece on roll

When the number of pieces per roll exceed that specified in the contract, this shall also be considered a defect. The lot shall be unacceptable if the total of the actual gross lengths of pieces in the sample is less than the total of the gross lengths marked on piece tickets. The lot shall be unacceptable if the width of the finished cloth is not within tolerances specified in the contract.

4.2.2.3 In-process material examination. The examination will be made at any point or any phase of the manufacturing process to determine whether the material, weave, and workmanship is as specified in Section 3.

4.2.2.4 Examination for compliance with the rules and regulations under the Textile Fiber Products Identification Act. During the yard-by-yard examination, each roll in the sample shall be examined for conformance to the rules and regulations under the Textile Fiber Products Identification Act. Each roll not labeled in accordance with the Act shall be a defect.

4.3 Sample for packaging, packing, and marking examination. The sample unit shall be one shipping container, fully prepared for delivery. The lot size shall be the number of containers in the inspection lot. The sample size shall be determined in accordance with MIL-STD-105, Inspection Level S-2, and the Acceptable Quality Level shall be 2.5 percent defective.

* 4.3.1 Packaging inspection. An examination that shall be made in accordance with the provisions of PPP-P-1133 to determine the preservation, packing, and marking requirements of Section 5 of this specification are complied with.

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- * 4.4 Testing of the end item. The test methods specified in FED-STD-191, wherever applicable, and as listed in Table IV shall be followed. The physical and chemical values specified in Section 3, except where otherwise specified, apply to the results of the determinations made on a sample unit for test purposes as specified in the applicable test method. The sample unit shall be 3 continuous yards, full width, of the finished cloth. All test reports shall contain the individual values utilized in expressing the final result. The lot size shall be expressed in units of 1 yard. The lot shall be unacceptable if one or more units fail to meet any requirement specified. The sample size shall be as follows:

Lot size (yards)	Sample size
800 or less	2
801 to 22,000	3
22,001 and over	5

- * 4.4.1 Shrinkage. After conditioning for a minimum of 4 hours in a standard atmosphere of 21°C (70°F), 65 percent relative humidity, an 18-inch square shall be marked-off on a 20-inch square cloth specimen using a template and indelible ink. The two opposite sides of the test specimen shall then be overlapped and stapled to form a loop for testing purposes. The loop shall then be completely immersed in a tank or vessel of boiling water for 15 minutes. The test vessel used shall be of sufficient size to accommodate the looped specimen while it hangs from a supporting 1/4-inch diameter 21-inch glass rod which is weighted by a glass rod of similar dimensions weighing approximately 100 grams. This test assembly shall be suspended from a 1/4-inch diameter glass rod of sufficient length to rest on the sides of the testing tank using twine or wire attached to the sample supporting rod. This will permit the weighted specimen to hang freely and be uniformly exposed to the action of the boiling water. When the required time has elapsed the sample shall be removed and placed in a flattened state on a horizontal screen and allowed to dry at room temperature. After the specimen is thoroughly dry, it shall be conditioned from the dry side at standard condition for not less than 4 hours. The 18-inch square shall then be measured in three places in both the warp and filling directions. Dimensional changes shall be noted and percent shrinkage shall be calculated and recorded.

- * 4.4.2 Heat test. The test specimen shall be a cloth square not less than 12 by 12 inches with the edges cut parallel to the warp and filling. It shall be placed flat without tension on a grill or open shelf in an air circulated oven maintained at $138 \pm 1^\circ\text{C}$ ($282 \pm 2^\circ\text{F}$) for a period of two hours. At the end of this period, the specimen shall be removed from the oven and conditioned under standard atmosphere conditions for not less than 4 hours. The specimen shall then be visually compared with the original unheated cloth for the presence of distortion, puckering or change in color.

- * 5. PREPARATION FOR DELIVERY

- * 5.1 Preservation: Preservation shall be level A or Commercial as specified (see 6.2).

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* 5.1.1 Levels A and Commercial. The cloth shall be put up as specified in accordance with the applicable requirements of PPP-P-1133.

5.2 Packing Packing shall be level A, B or Commercial as specified (see 6.2).

5.2.1 Levels A, B and Commercial. 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 the contract or order, shipment shall be marked in accordance with the requirements of PPP-P-1133.

* 6. NOTES

* 6.1 Intended use. Nylon cloth covered by this specification is intended to be coated and used in the manufacture of raft bottoms. Type I is used for one-man life rafts and Type II for multi-place life rafts.

6.2 Ordering data. Procurement documents should specify the following:

(a) Title, number, and date of this specification

(b) Quantity and dimensions of cloth required

(c) Selections of applicable levels of preservation and packing

6.2.1 In the preparation of contracts and orders, it must be noted that various options, choices, and alternatives as indicated in PPP-P-1133 may be exercised in the preparation of this cloth for delivery.

* 6.3 In weaving Type II cloth, either four ends of 210 denier multifilament yarn or one end of 840 denier multifilament yarn may be used. When using four ends of 210 denier yarn, the four ends should be woven as one.

6.4 The margins of this specification are marked with an asterisk to indicate where changes (additions, modifications, corrections) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and suppliers are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Preparing Activity:

Navy - AS

(Project No. 8305-N925)

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Table I. Physical requirements.

Characteristic	Requirement	
	Type I	Type II
Weight, ounces per square yard	2.4-2.7	5±0.5
Thickness, inches, maximum	-	0.015
Yarns per inch, minimum <u>1/</u>		
Warp	80	22
Filling	80	22
Breaking strength, pounds, minimum		
Warp	115	225
Filling	115	225
Tearing strength, pounds, minimum		
Warp	8	45
Filling	8	38
Shrinkage, percent, maximum		
Warp	2.0	2.0
Filling	2.0	2.0

1/ For Type II cloth, see 6.3

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Table II. List of defects.

Defects	Major	Minor
Fillingwise		
Broken or Missing Picks Two or more adjacent picks missing or broken One pick missing or broken 3 inches or more	X	X
Double Pick or Mispick Clearly visible <u>1</u> / heavy pick caused by pick woven in improper place		X
Jerked-in or Pulled-in Filling Extra thread lashed into filling Clearly visible <u>1</u> / open place or distortion of fabric extending more than 4 inches from edge	X	X
Mixed, Uneven, or Soiled Filling; Barre Mark; Fine or Coarse Filling Adjacent filling wise areas varying visibly in shade		X
Pick Out Mark as Pressure Mark Clearly visible <u>1</u> / pick out of pressure mark resulting in open place or distortion of fabric		X
Slack or Tight Pick Clearly visible <u>1</u> /		X
Warpwise		
Broken or Missing End Two or more adjacent ends missing or broken One broken or missing end 3 inches or more	X	X
Slack or Tight Ends Clearly visible <u>1</u> /		X
Reed Mark Clearly visible <u>1</u> /		X
Floats or Skips 3/8 inch or more in either direction Less than 3/8 inch in either direction	X	X
Fuzz Balls or Stripbacks <u>2</u> / Clearly visible <u>1</u> /		X
Slub, Slough-off, Bunch, Knots, Kinks, or Loops Large, loose and bulky, 3 times or more than normal thickness One or more small and tight	X	X

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Table II. List of defects. - Continued

Defects	Major	Minor
Cut, Torn, or Broken Selvages Extending into body of cloth	X	
Holes, Cuts, or Tears Any hole, cut, or tear in the body of cloth	X	
Finishing Crease or Mill Wrinkles Sharp and permanent Multiple soft creases	X	X
Finishing Bar Clearly visible <u>1/</u>		X
General Abrasion, Chafe, or Bruise Mark Clearly visible <u>1/</u>		X
Bias or Bowed Filling 1-1/2 inches or more from straight line of filling Less than 1-1/2 inches from straight line but more than 1/2 inch	X	X
Smash Texture definitely ruptured	X	
Spots, Stains, or Streaks Clearly visible <u>1/</u>		X
Tender or weak spots Clearly visible <u>1/</u>	X	
Pucker Mark (wavy) caused by burling <u>2/</u> Three or more inches		X

1/ Clearly visible at examination distance 2 feet

2/ Removal of cloth defect shall not cause puckering

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Table III. Overall defects.

Defect	Disposition
<p>Edges curled, folded, rolled, beaded, or slack throughout the roll. Tight selvage resulting in slackness or waviness of cloth.</p>	<p>Class as minor defect and include in AQL determination by class unless these defects either prevent normal handling and working of the cloth or are detrimental to processing or the end use, then reject the lot.</p>
<p>Overall uncleanness.</p>	<p>Class as a major defect and include in AQL determination by class, unless the nature of the uncleanness will prevent normal handling or be detrimental to further processing or final use, then reject the lot.</p>
<p>Width less than specified.</p>	<p>See paragraph 4.2.2.2.</p>

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Table IV. Test methods.

Characteristic	Reference Paragraph	Test Method
Identification of nylon.	3.1	1530 <u>1/</u>
Melting point	3.1	1533 <u>1/</u>
Weave	3.3	Visual
Weight	Table I	5041
Thickness <u>2/</u>	Table I	5030
Yarns per inch	Table I	5050
Breaking strength	Table I	5100
Tearing strength	Table I	5134
Width	3.4	5020
Heat setting	3.5.1	4.4.2
Nonfibrous material	3.5.2	2611
Acidity (pH)	3.5.3	2811
Shrinkage	Table I	4.4.1

1/ Unless otherwise specified, a certificate of compliance shall be submitted and will be acceptable for the stated requirement.

2/ Except that a 6 ounce total load shall be applied and the pressure foot diameter shall be 3/8 inch.