

**5100-86B**  
**July 2002**  
Supercedes  
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**U.S. DEPARTMENT OF AGRICULTURE  
FOREST SERVICE  
SPECIFICATION FOR  
CLOTH, DUCK, NYLON (POLYURETHANE COATED)**

**1. SCOPE AND CLASSIFICATION**

1.1 Scope. This specification covers the requirements for three types of polyurethane coated nylon duck cloth.

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

- Type I - Deleted
- Type II - 11 ounces per square yard.
- Type III - 15 ounces per square yard.

**2. APPLICABLE DOCUMENTS**

2.1 Government documents. The following government documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

2.1.1 Government specifications and standards.

**STANDARDS**

**FEDERAL**

- FED-STD-4 - Glossary of Fabric Imperfections
- FED-STD-191 - Textile Test Methods

**MILITARY**

- MIL-STD-1487 - Glossary of Cloth Coating Imperfections

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Department of Defense Single Stock Point (DODSSP), Building 4/Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094.)

Beneficial comments (recommendations, additions, deletions) and any pertinent data that may be used in improving this document should be addressed to: USDA Forest Service, Missoula Technology and Development Center, 5785 Highway 10 West, Missoula, MT 59808 by using the Specification Comment Sheet at the end of this document or by letter.

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2.1.2 Other Government publications. The following form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the solicitation or agreement.

### LAWS AND REGULATIONS

#### Rules and Regulations Under the Textile Fiber Products Identification Act

(Copies may be obtained without charge from the Federal Trade Commission, Washington. DC 20580.)

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals.

### AMERICAN SOCIETY FOR QUALITY CONTROL (ASQC)

#### Z1.4 - Sampling Procedures and Tables for Inspection by Attributes

(Copies are available from the American Society for Quality Control, 611 East Wisconsin Avenue, Milwaukee, WI 53202.)

### AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

#### D 276 - Standard Test Methods for Identification of Fibers in Textiles

(Copies are available from ASTM, 100 Barr Harbor Dr., West Conshohocken, PA 19428-2959.)

(Non-Government standards and other publications normally are available from the organizations that prepare and distribute the documents. These documents also may be available in or through libraries or other informational services.)

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

## 3. REQUIREMENTS

3.1 Standard sample. The finished cloth shall match the standard sample for shade and shall be equal to or better than the standard sample with respect to all characteristics for which the standard sample is referenced (see 6.3).

3.2 Yarn. The yarn for the type II and III shall be continuous filament, nominal 1000 denier, producer bulked nylon for both warp and filling when tested as specified in 4.2.4.

3.3 Color. The color shall be as specified (see 6.2), and shall match the standard sample (see 6.3).

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3.3.1 Matching. The color of the dyed and finished cloth shall match the standard sample under artificial daylight having a color temperature of  $7000 \pm 500^\circ\text{Kelvin}$ , and shall be a good approximation to the standard sample under incandescent lamplight at  $2850 \pm 100^\circ\text{Kelvin}$ .

3.3.2 Colorfastness. The dyed and finished cloth shall show fastness to accelerated weathering and crocking equal to or better than the standard sample. When no standard sample is available, the dyed and finished cloth shall show "good" fastness to accelerated weathering and shall show a Munsell value for crocking not less than 8.5. Testing shall be as specified in 4.2.4.

3.3.3 Melt temperature. The melt temperature of the uncoated fabric for both type II and type III fabrics shall be a minimum of  $482^\circ\text{F}$  when tested in accordance with 4.2.3.

3.4 Physical requirements. The cloth shall conform to the requirements specified in table I when tested as specified in 4.2.4.

3.5 Width. The width of the cloth shall be as necessary to allow production of the referencing product. The minimum acceptable width shall be inclusive of the woven selvage when fly shuttle looms are used and exclusive of the lock in selvage when shuttleless looms are used.

3.6 Weave. The weave for the type II cloth shall be plain, one up and one down. The weave for type III cloth shall be a basket weave (plain) two up and two down. The use of fly shuttle or shuttleless loom is permitted.

Table I - Physical requirements

Characteristics	Type II		Type III	
	Min	Max	Min	Max
Weight (oz./sq. yd.)				
Uncoated base material	8.00	9.75	13.50	14.25
Polyurethane coating	1.25	-	1.25	-
Yarns per inch				
Warp	33	-	43	-
Filling	26	-	41	-
Breaking strength				
Warp	475	-	700	-
Filling	380	-	600	-
Blocking (scale rating) (max)		No. 3		No. 3
Water repellency/Dynamic absorption (maximum % increase)				
Initial	-	20	-	20
After one laundering	-	20	-	20

3.7 Finish. The cloth shall be scoured, dyed, heat set, water repellent treated, and back coated to meet the requirements of this specification.

3.7.1 Water repellent treatment. The water repellent treatment shall consist of an aliphatic fluorochemical combined with a melamine extender.

3.7.2 Back coating. The scoured, dyed, heat set, and water repellent treated cloth shall be coated on one side only with a suitable clear polyurethane coating compound. If plasticizers are used in the coating, only phosphate or phthalate ester type plasticizers shall be used.

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3.8 Resistance to low temperature. The finished coated cloth shall be exposed to a temperature of minus  $40 \pm 5^{\circ}\text{F}$  for a minimum of 4 hours and shall not show any cracking, flaking or separation of the coating from the base cloth when tested as specified in 4.2.4.

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3.9 Spray rating. The results of three individual determinations on the finished coated cloth for spray rating shall be equal to or better than 100, 100, 90 initially and 90, 90, 80 after one laundering when tested as specified in 4.2.4.

3.10 Resistance to organic liquid. The finished coated cloth shall show no wetting by n-dodecane, either initially or after one laundering when tested as specified in 4.2.4.1.

3.11 pH. The pH value of the water extract of the finished cloth shall be not less than 4.5 nor more than 8.5 when tested as specified in 4.2.4.

3.12 Dimensional stability. The cloth shall have an average dimensional change of no more than 3.5 percent in the warp direction and no more than 2.5 percent in the filling direction, with no single determination over 4.0 and 3.0 percent respectively.

3.13 Fiber identification. Each roll shall be labeled or ticketed, for fiber content in accordance with the Rules and Regulations Under the Textile Fiber Products Identification Act.

3.14 Face identification. The face side of the cloth shall be identified by applying a stamping on that side of the cloth with the word "Face" at each end of the roll (see 4.2.2.3).

3.15 Workmanship. The finished cloth shall conform to the quality established by this specification. The occurrence of nonconformities shall not exceed the applicable acceptable quality levels. There shall be no nonconformities that affect use, appearance, or serviceability.

3.16 Metric products. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch/pound units, provided they fall within the tolerances specified using conversion tables contained in the latest revision of FED-STD-376, and all other requirements of this specification are met.

3.17 Recovered materials. The contractor/offeror is encouraged to use recovered materials to the maximum extent possible in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR).

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract, the contractor may use her or 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, the Government reserves the right to check test such items to determine the validity of the certification.

4.2 Quality conformance inspection. Sampling for inspection shall be performed in accordance with ASQC Z1.4, except when otherwise indicated hereinafter.

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4.2.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected 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. Examination of the end item shall be in accordance with 4.2.2.1 through 4.2.2.4. The lot size for purposes of determining the sample size in accordance with ASQC Z1.4 shall be expressed in terms of one yard each for the examination in 4.2.2.1.

4.2.2.1 Yard-by-yard examination. The required yardage of each roll shall be inspected on one side only. However, the side shall be alternated, so that alternate rolls are examined on the face and back respectively. The nonconformities found shall be classified as listed in table III. The nonconformities found shall be counted, regardless of their proximity to each other, except where two or more nonconformities represent a single local condition of the cloth, in which case, only the more serious nonconformity shall be counted. The lot size shall be expressed in units of one linear yard. The sample unit for this examination shall be one linear yard. The Acceptable Quality Levels (AQL's) for the examination shall be 2.5 for major nonconformities and 4.0 for total nonconformities (Major and Minor) per 100 units (yards). The inspection level shall be Level II. The number of rolls from which the sample is to be selected shall be in accordance with table II. An approximately equal number of yards shall be examined in each roll sampled. Fabric and coating imperfections are defined in FED-STD-4 and MIL-STD-1487 respectively.

Table II. Sample size

Lot size (yards)	Sample size (yards)
Up through 1200 <sup>1/</sup>	3
1201 through 3200	5
3201 through 10,000	8
10,001 through 35,000	13
35,001 through 150,000	20
150,001 and over	32

<sup>1/</sup> If the lot contains fewer than 3 rolls, each piece in the lot shall be examined.

4.2.2.2 Examination for shade. During the yard-by-yard examination, each roll in the sample shall be examined for shade. Any roll in the sample off shade, shaded side to side, side to center or end to end shall be cause for rejection of the entire lot represented by the sample.

4.2.2.3 Examination for compliance with the Textile Fiber Products Identification Act and face marking. During the yard-by-yard examination, each roll in the sample shall be examined for nonconformities listed below. The lot shall be unacceptable if two or more of the following nonconformities are present in the sample:

- Not labeled or ticketed in accordance with the Rules and Regulations Under the Textile Fiber Products Identification Act.
- Face marking missing from either or both ends.
- Face marking on wrong side.

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TABLE III. Classification of nonconformities

Examine	Nonconformity	Classification	
		Major	Minor
Uncoated Side	Width less than specified	X	
	Any hole, cut or tear	X	
	Any slub, smash or multiple float	X	
	Baggy, ridgy or wavy cloth	X	
	Any strike through of coating		X
	Any spot or stain		X
Coated Side	Poor dye penetration, mottled, streaky or cloudy	X	
	Any cut, hole or tear	X	
	Any uncoated area	X	
	Any thinly coated area	X	
	Any blister, tunnel or delamination of coating	X	
	Any lump or heavily coated area		X
	Crease or wrinkle that cannot be corrected by manual pressure or resulting in doubling or adhesion of surfaces	X	
	Any spot, stain or streak - more than 1 inch in its longest dimension <sup>1/</sup>		X
	Any embedded foreign matter	X	
	Any scorch or burn	X	
	Tackiness	X	

<sup>1/</sup> Clearly visible at normal inspection distance (approximately 3 feet)

4.2.3 Melting temperature. The sample size shall be 1 yard of uncoated cloth, full width. Uncoated cloth shall be tested for its melting temperature in accordance with section 28 of ASTM D 276.

4.2.4 Testing of the end item. The methods of testing 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 indicated, apply to the results of the determinations made on a sample unit for test purposes as specified in the applicable test methods. All test reports shall contain the individual values utilized in expressing the final result. The sample unit shall be 2 yards, full width of the finished cloth. The lot size shall be expressed in units of 1 yard. The sample size shall be as follows and the lot shall be unacceptable if one or more sample units fail to meet any requirements specified.

<u>Lot size (yards)</u>	<u>Sample size (units)</u>
800 or less	2
801 up to and including 22,000	3
22,001 and over	5

4.2.4.1 Test for resistance to organic liquid. Place a small specimen of the cloth on a smooth horizontal surface, face up. Using a pipette or eye dropper, gently deposit one drop of n-dodecane on the surface of the specimen. After one minute, examine the specimen under light at an angle. Absence of light reflectance at the fabric drop interface shall be taken as evidence of wetting. Three specimens taken at various locations across the sample shall be tested. Evidence of wetting on any specimen shall be cause for rejection of the lot.

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Table IV. Test methods

Characteristic	Requirement paragraph	Test method
Yarn	3.2.1	(1/)
Colorfastness:		
Accelerated weathering	3.3.3	5671 (2/)
Crocking	3.3.3	5651
Weight		
Coated	3.4	5041
Uncoated	3.4	(1/)
Yarns per inch		
Warp	3.4	5050
Filling	3.4	5050
Breaking strengths		
Filling	3.4	5100
Blocking	3.4	5872
Water repellency		
Initial	3.4	5500
After one laundering	3.4	5500
Weave	3.6	Visual (3/)
Finish	3.7	(1/)
Water repellent treatment	3.7.1	(1/)
Polyurethane coating	3.7.2	(1/)
Plasticizers	3.7.2	(1/)
Resistance to low temperature	3.8	5874
Spray rating	3.9	5526
Resistance to organic liquid	3.10	4.2.4.1
pH	3.11	2811
Dimensional stability	3.12	5556 (4/)

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

<sup>2/</sup> The time of exposure shall be 40 hours.

<sup>3/</sup> One determination per sample unit and the results reported as "pass" or "fail."

<sup>4/</sup> The wool laundering procedure shall be used.

## 5. PREPARATION FOR DELIVERY

5.1 Packaging, packing and marking. This specification is intended to be a reference for the material from which various items are produced, therefore, no packaging or packing requirements are included.



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### 6. NOTES

6.1 Intended use. This specification specifies the basic heavy duty nylon cloth material which is used as a component in various sewn products. The following is intended as a general guide:

Type II - General equipage items.

Type III - Heavy use items.

6.2 Ordering data. Documents utilizing this material should specify the following:

(a) Number of this specification.

(b) Type required (see 1.2).

(c) Color of cloth required (see 3.3.1).

6.3 Standard shade sample. Color shade samples may be obtained from the preparing activity (see 6.5).

6.4 Notice. When Government drawings, specifications or other data are used for any other purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever.

6.5 Preparing Activity. USDA Forest Service, Missoula Technology and Development Center (MTDC), 5785 Highway 10 West, Missoula, Montana 59808.

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# Standardization Document Improvement Proposal

This form is provided to solicit beneficial comments that may improve this document and enhance it's use. Contractors, government activities, manufacturers, vendors, and users are invited to submit comments to:

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USDA Forest Service  
Missoula Technology and Development Center  
5785 Highway 10 West  
Missoula, MT 59808

NOTE: This form shall not be used to submit requests for waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the document, or to amend contractual requirements.

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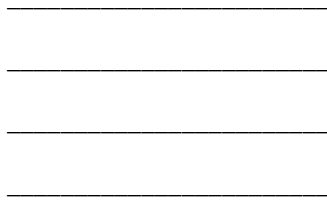
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