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INCH-POUND

MIL-W-5625K
23 August 1991
SUPERSEDING
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MILITARY SPECIFICATION

WEBBING, TEXTILE, NYLON, TUBULAR

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

1. SCOPE

1.1 Scope. This specification covers woven nylon tubular webbing for parachutes.

* 1.2 Classification. The webbing shall be of the following widths as specified (see 6.2).

3/8-inch 1/2-inch 9/16-inch 5/8-inch 3/4-inch 7/8-inch 1-inch

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).

SPECIFICATION

MILITARY

MIL-P-43334 - Packaging of Textile Webbing and Tape

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be used in improving this document should be addressed to: U.S. Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5019 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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MIL-W-5625K

STANDARDS

FEDERAL

FED-STD-191 - Textile Test Methods

MILITARY

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

(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.

FEDERAL TRADE COMMISSION

Rules and Regulations Under the Textile Fiber Products Identification Act

(Copies are available from the Federal Trade Commission, Pennsylvania Avenue at Sixth Street, N.W., Washington, DC 20580-0001.)

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 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.3), in accordance with 4.3.

3.2 Standard sample. The dyed webbing shall match the standard sample for shade and appearance shall, unless otherwise indicated, be equal to or better than the standard sample with respect to all characteristics for which the standard sample is referenced (see 6.4).

3.3 Material.

3.3.1 Yarn. The nylon yarn shall be a bright, high tenacity, light and heat resistant polyamide (see 3.9) prepared from hexamethylene diamine and adipic acid or its derivatives. It shall have a minimum melting point of 472°F. The yarn shall not be bleached in any manner or in any subsequent process.

3.3.2 Denier. The singles yarn shall be 840 denier (nominal).

3.3.3 Ply twist. The final ply of yarn whether single, or multiple, shall have a minimum of 2-1/2 turns per inch, when taken from the webbing and tested as specified in 4.4.3.

* 3.4 Color. Except for the identification yarns (see 3.4.1), the webbing shall be furnished in the following colors as specified (see 6.2).

- a. Natural
- b. Yellow 1365
- c. Camouflage Green 483 (see 6.6)
- d. Air Force Sage Green 1531

When dyed webbing is required, the webbing shall be either piece dyed or yarn dyed (see 6.5).

3.4.1 Identification yarns.

* 3.4.1.1 For natural color webbing. The identification yarns for natural color webbing shall be polyester, nylon 6, or nylon 6,6 and shall be as follows:

a. Webbing of 1/2, 3/4, and 1-inch width shall have a yellow or black warp yarn woven in the center of one side.

b. Webbing of 9/16-inch width shall have 3 yellow or black warp yarns woven only on the face. They shall be woven in such a manner that when the webbing is flattened these yarns will weave over the same face pick. One of the 3 yellow or black yarns shall be positioned in the center of the face side; the other 2 shall be spaced on each side of this center yarn at a distance of not less than 9, but not more than 11 face warp yarns.

c. Webbing of 5/8-inch width shall have 2 yellow or black warp yarns separated by 3 face warp yarns located in the center of the face side. The yellow or black yarns shall be woven in such a manner that when the webbing is flattened the yarns will weave over the same face pick.

d. Webbing of 3/8-inch width shall have 2 yellow or black warp yarns on the face with no ends of natural in between.

e. Webbing of 7/8-inch width shall have no identification warp yarns.

3.4.1.2 For dyed webbing. When dyed webbing is required, the identification yarns shall be as specified in 3.4.1.1 except that the color shall be black and the yarns shall be spun-dyed polyester, spun-dyed nylon 6, or yarn-dyed nylon 6,6. The identification yarns shall not pucker or form loops after the webbing has been dyed.

MIL-W-5625K

3.4.2 Colorfastness.

3.4.2.1 Dyed webbing. The dyed webbing shall show fastness to light and laundering equal to or better than the standard sample or equal to or better than a rating of "fair". Testing shall be as specified in 4.4.3.

3.4.2.2 Identification yarn. The dyed identification yarn shall show fastness to light and laundering equal to or better than the standard sample or equal to or better than a rating of "fair". Testing shall be as specified in 4.4.3.

3.4.3 Matching. The color of the webbing shall match the standard sample when viewed under filtered tungsten lamps that approximate artificial daylight and that have a correlated color temperature of $7500 \pm 200K$, with illumination of 100 ± 20 foot candles, and shall be a good match to the standard sample under incandescent lamplight at $2300 \pm 200K$.

3.5 Physical requirements. The construction and physical properties of the finished webbing shall be as specified in table I.

TABLE I. Physical requirements

Width in inches $\pm 1/16$	Thickness inch, (max)	Weight oz/lin yd (max)	Breaking strength, lbs. (min)	Ends warp (min)	Yarns per inch, filling (min)	Final ply of yarn	
						Warp	Filling
3/8	0.090	0.40	950	83	26	1	1
1/2	0.090	0.50	1000	111	26	1	1
9/16	0.090	0.60	1500	137	26	1	1
5/8	0.100	0.75	2250	89	26	2	2
3/4	0.120	1.05	2300	109	26	2	2
7/8	0.120	1.00	3100	121	26	2	1
1	0.120	1.70	4000	159	26	2	2

3.6 Weave. The webbing weave shall be tubular, plain, one up and one down. Webbing woven with two filling yarns per shed is prohibited.

3.7 pH. The pH value of the water extract of the finished webbing shall be not less than 5.0 and not greater than 8.5 when tested as specified in 4.4.3.

3.8 Residual shrinkage. The residual shrinkage of the natural and dyed webbing shall be not greater than 2.0 percent when tested as specified in 4.4.3.

3.9 Resistance to light and heat. The webbing shall lose not more than 25.0 percent of its original breaking strength when tested for resistance to light and to heat as specified in 4.4.3.

* 3.10 Length and put-up (for Government procurements only). Unless otherwise specified (see 6.2), webbing shall be furnished on spools containing the yardage specified in table II for each width of webbing. Spools of 3/8, 1/2, and 9/16 inch width webbing shall contain no more than ten pieces and spools of all other widths shall contain no more than four pieces. No piece shall be less than 20 yards in length.

TABLE II. Length of put-up

Webbing width (inches)	Yards per spool	
	Minimum	Maximum
3/8	490	500
1/2	390	400
9/16	315	325
5/8	250	260
3/4	190	200
7/8	150	160
1	115	125

3.11 Identification label. Each spool of webbing shall have an identification label attached to the head end of the spool in accordance with MIL-P-43334.

3.12 Fiber identification. Each spool of webbing shall be labeled, or ticketed, for fiber content in accordance with the Textile Fiber Products Identification Act.

3.13 Workmanship. The finished webbing shall conform to the quality of product established by this specification. The occurrence of defects shall not exceed the applicable acceptable quality levels.

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 shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection

MIL-W-5625K

system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Certificates of compliance. When certificates of compliance are submitted, the Government reserves the right to inspect such items to determine the validity of the certification.

* 4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.3).
- b. Quality conformance inspection (see 4.4).

* 4.3 First article inspection. When a first article is required (see 3.1 and 6.2), it shall be examined for the defects specified in 4.4.2.1 through 4.4.2.3 and shall be tested for the characteristics specified in table V.

4.4 Quality conformance. Unless otherwise specified, sampling for inspection shall be performed in accordance with MIL-STD-105.

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

4.4.2 End item examination.

4.4.2.1 Yard-by-yard examination. The required yardage of each spool shall be inspected on both sides for the defects listed in table III. All defects found shall be counted regardless of their proximity to each other, except where two or more defects represent a single local condition of the webbing, in which case only the more serious defect shall be counted. A continuous defect shall be counted as one defect for each warp-wise yard or fraction thereof in which it occurs. The lot size shall be expressed in yards. The sample unit shall be 1 linear yard. The inspection level shall be III and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 0.40 for major defects and 1.5 for total (major and minor combined) defects. In addition, the finding of one or more critical defects will be cause for rejection of the lot. The number of spools from which the sample yardage is to be selected shall be in accordance with table IV. The sample yardage shall be apportioned equally among the selected spools.

TABLE III. End item visual defects

Examine	Defect	Classification		
		Critical	Major	Minor
Abrasion marks	Resulting in rupture of yarns, or in nap sufficient to obscure the identity of any yarn, exceeding 10 percent of width or 1 inch in length	1		
Broken or missing end	Two or more regardless of length or a single end exceeding 6 inches in length Single end under 6 inches but not exceeding 1/4 inch	2		201
Broken or missing pick	Two or more regardless of extent	3		
Coarse or light filling bar	Resulting in visible difference in stiffness or thickness of webbing and extending for more than 1/4 inch in the length direction 1/		101	
	Resulting in visible difference in stiffness or thickness of webbing for 1/4 inch or less in the length direction 1/			202
Crease or wrinkle	Twisted or distorted, will not lay flat upon application of manual pressure			203
Cut, hole, or tear	Any cut, hole, or tear	4		
Drop-ply	Clearly visible on more than two ends within same length and extending over 9 linear inches or more 1/	5		
	Clearly visible on one or two ends within same length and extending over 9 linear inches or more 1/			204
Edge beaded or corded	Visible increase in edge thickness or misformed edge 1/			205

MIL-W-5625K

TABLE III. End item visual defects (cont'd)

Examine	Defect	Classification		
		Critical	Major	Minor
Edge folded or rolled	(See crease or wrinkle defect.)			206
Edge loopy	Forming clearly visible filling loops, or edge tied loosely to body of webbing for 2 linear inches or more 1/		102	
Edge loose (slack)	Resulting in waviness, distortion in orientation of filling, or looseness along edge			103
Edge-nicks or bumps	Any nick or bump falling outside the width tolerance as specified or exceeding 1/4 inch in length			104
Edge cut, torn or frayed	Any cut, torn, or frayed edge; or any clearly visible rupture of yarn along edge 1/	6		
Edge tight	Resulting in visible tension along edge or pucker, waviness, bagginess, or slackness that cannot be flattened by manual pressure 1/		7	
Fine or light filling bar, light place	Clearly visible 1/			105
Floats or skips	Multiple, 1/2 inch or more in combined warp and filling directions or single float or skip over more than 1 inch		8	
	Multiple, less than 1/2 inch in combined warp and filling directions or single float or skip over more than 1/2 inch but not exceeding 1 inch, if in warp, or more than 1/4 inch of the width but not exceeding 1 inch, if in filling			207

TABLE III. End item visual defects (cont'd)

Examine	Defect	Classification		
		Critical	Major	Minor
Hitchback crack	Clearly visible opening between adjoining picks, or warp-wise tension area over part of the width resulting in visible light and heavy places 1/			208
Jerked-in filling, slough-off, slug	More than twice the thickness of the normal yarn			209
Kinks	More than three in any 9 linear inches		106	
Knots	More than two knots in any 9 linear inches		107	
	Single knot with untrimmed ends extending more than 1/16 from surface			210
Mispick, double pick	Two or more across the full width	108		
	Single across the full width			211
Slack end	Two or more in the same length, jerked in between picks, or forming clearly visible loops on the surface 1/		109	
	Single, jerked in between picks, or forming clearly visible loops on the surface 1/			212
Slub or slug, gout	More than twice the thickness of the yarn (or ply, if plied)			213
Smash	Any smash	9		
Spot, stain, or streak	Any clearly visible dirt, rust, grease, oil spot, stain, or streak 1/			214
Tight end	Clearly visible 1/		110	
Tight pick or tight filling	Resulting in rolling of webbing (also see "Edge tight" defect)			111

MIL-W-5625K

TABLE III. End item visual defects (cont'd)

Examine	Defect	Classification		
		Critical	Major	Minor
Wrong draw	Extending for more than 9 inches		112	
Width	Beyond specified tolerances			215
Yarns (filling)	Two yarns per shed	10		

1/ Clearly visible at normal inspection distance (approximately 3 feet).

TABLE IV. Sample size and acceptance criteria

Lot size (spools)	Sample size (spools)	Acceptance number 1/
50 or less	2	0
51 up to and including 500	8	1
501 and over	13	2

1/ Applicable only to overall examination in 4.4.2.2 and length examination in 4.4.2.3.

4.4.2.2 Overall examination. Each spool selected for yard-by-yard examination in accordance with table IV shall be examined over its entire length for the defects listed below. Each defect shall be counted not more than once in each spool examined. If the total number of defects in the sample spools exceeds the applicable acceptance number specified in table IV, the lot shall be rejected.

Defects

- Uncleanliness throughout
- Uneven weaving throughout
- Identification yarns:
 - Missing
 - Wrong color
 - Misplaced (see 3.4.1)

Defects (cont'd)

Shade (when other than natural):

Off shade

Poor penetration

Mottled; cloudy or streaky throughout

Not labeled in accordance with the Textile Fiber Products
Identification Act

4.4.2.3 Length examination. During the overall examination, each spool in the sample shall be examined for the defects listed below. If the total number of length defects in the sample exceeds the applicable acceptance number specified in table IV, the lot shall be rejected. In addition, the lot shall be rejected if the total of the actual gross lengths of all the spools in the sample is less than the total of the gross lengths marked on the spool labels.

Length defects

Gross length is more than 2 yards less than the gross length
marked on the spool label

Gross length is less than specified minimum length or more than
specified maximum length

Any individual piece of webbing is less than 20 yards in length

Any spool containing more than the maximum allowable number of pieces

4.4.3 End item testing. The webbing shall be tested for the characteristics indicated in table V. The methods of testing specified in FED-STD-191, wherever applicable and as listed in table V shall be followed. Except for breaking strength, the physical and chemical values specified in section 3 apply to the average of the determinations made on a sample unit for test purposes as specified in the applicable test methods. For breaking strength, the requirement applies to the individual specimens. Except as otherwise specified, all tests shall be performed under standard conditions in accordance with FED-STD-191. All test reports shall contain the individual values utilized in expressing the final result. The sample unit shall be 25 yards of webbing. Except for breaking strength, the lot shall be unacceptable if one or more sample units fail to meet any requirement specified. The sample size shall be as follows:

Lot size (yards)

Sample size (sample units)

800 or less

2

801 up to and including 22,000

3

22,001 and over

5

MIL-W-5625K

TABLE V. End item tests

Characteristic	Requirement paragraph	Test method
Material identification	3.3.1	1530 <u>1/</u>
Melting point	3.3.1	1534 <u>1/</u>
Absence of bleaching	3.3.1	<u>1/</u>
Denier	3.3.2	4021 <u>1/</u>
Twist	3.3.3	4052 or 4054 <u>1/</u>
Colorfastness to:		
Light	3.4.2.1	5660
Laundering	3.4.2.1	5614 <u>2/</u>
Light (identification yarns)	3.4.2.2	5660
Laundering (identification yarns)	3.4.2.2	5614 <u>2/</u>
Thickness	3.5	5030
Weight	3.5	5041
Breaking strength	3.5	4108
Total ends	3.5	5050
Yarns per inch (filling)	3.5	5050
Ply	3.5	Visual <u>3/</u>
Weave	3.6	Visual <u>3/</u>
pH	3.7	2811
Shrinkage	3.8	4.5.3
Light resistance	3.9	4.5.1
Heat resistance	3.9	4.5.2

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

2/ On the color transfer cloth evaluation, only the stain on the nylon fibers of the color transfer cloth shall be evaluated.

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

* 4.4.4 Packing inspection. The sampling and inspection of the preservation, packaging, and container marking shall be in accordance with the requirements of MIL-P-43334.

4.4.5 Palletization examination. The examination shall be in accordance with the quality assurance provisions of MIL-P-43334.

4.5 Methods of inspection.

4.5.1 Resistance to light test. Specimens of webbing shall be exposed in the accelerated weathering unit as specified in Method 5804 of FED-STD-191. A sufficient quantity of specimens to make five warp breakage tests shall be exposed. Corex D filters and Sunshine Carbons shall be used. The total exposure time shall be 50 hours at 55 percent relative humidity and black panel temperature of $155^{\circ} \pm 10^{\circ}\text{F}$. The spray heads shall be shut off during the entire exposure period. At the end of the exposure period, the specimens shall be brought to equilibrium under standard conditions as defined in FED-STD-191. They shall then be tested for breaking strength as specified in table V and the percent of breaking strength loss shall be calculated as follows:

$$\frac{\text{Original breaking strength} - \text{Breaking strength after aging}}{\text{Original breaking strength}} \times 100 = \text{Percent of breaking strength loss}$$

4.5.2 Resistance to heat test. Five 1-yard specimens of webbing shall be selected from the sample unit. The test specimen shall be suspended in a circulating air oven at a temperature of $356^{\circ} \pm 5^{\circ}\text{F}$ for 1 hour. After removal from the oven, the specimens shall be brought to equilibrium under standard conditions as defined in FED-STD-191. They shall then be tested for breaking strength as specified in table V and the percent of breaking strength loss shall be calculated as follows:

$$\frac{\text{Original breaking strength} - \text{Breaking strength after aging}}{\text{Original breaking strength}} \times 100 = \text{Percent of breaking strength loss}$$

4.5.3 Residual shrinkage test. Three 24-inch full width specimens shall be selected from the sample unit. The specimens shall be brought to equilibrium under standard conditions as defined in FED-STD-191. Eighteen-inch gage marks shall then be placed on the specimens with an indelible marking medium. The specimens shall then be placed in a container of water maintained at $100^{\circ} \pm 2^{\circ}\text{F}$ and kept submerged at that temperature for 60 to 70 minutes. (NOTE: It may be necessary to attach weights to the specimens during the exposure period.) At the end of the exposure period, the specimens shall be removed and air dried without tension at a temperature not exceeding 105°F . After drying, the specimens shall be brought to equilibrium under standard conditions as defined in FED-STD-191, the distance between the gage marks remeasured and shrinkage calculated as follows:

$$\frac{\text{Original length} - \text{Final length}}{\text{Original length}} \times 100 = \text{Percent shrinkage}$$

MIL-W-5625K

5. PACKAGING

5.1 Packaging. Packaging shall be level A, B, or C as specified (see 6.2).

5.1.1 Levels A, B, and C. Webbing, put up as specified, shall be packaged in accordance with the applicable requirements of MIL-P-43334.

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

5.2.1 Levels A, B, and C. Webbing shall be packed in accordance with the applicable requirements of MIL-P-43334.

5.3 Palletization. When specified (see 6.2), the webbing shall be packed as specified in 5.2, shall be palletized in accordance with MIL-P-43334.

5.4 Marking. In addition to any special marking required by the contract or purchase order, shipment shall be marked in accordance with MIL-P-43334.

6. NOTES

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

6.1 Intended use. The webbing is intended for use in parachute construction. The 3/8-inch webbing is utilized for drogue chute shroud lines of a parachute deploying system.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Width required (see 1.2).
- c. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1).
- d. When a first article is required (see 3.1, 4.3, and 6.3).
- e. Color required (see 3.4).
- f. When length on spool is other than specified (see 3.10).
- g. Levels of preservation and packing (see 5.1 and 5.2).
- h. When palletization is required (see 5.3).

* 6.3 First article. When a first article is required, it shall be inspected and approved under the appropriate provisions of FAR 52.209. The first article should be a preproduction sample. The contracting officer should specify the appropriate type of first article and the number of units to be furnished. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

6.4 Sample. For access to samples, address the contracting activity issuing the invitation for bids or request for proposal.

6.5 Web dyeing. In order to satisfactorily manufacture webbing when dyeing is required, it may be necessary to yarn dye the material. Manufacturers are urged to make experimental dyed webbings before making commitments to produce such materials in volume.

* 6.6 Dyestuff formulations. Suggested but not mandatory dyestuff formulation for Camouflage Green 483 is as follows:

Acid Blue 171
Acid Orange 162

* 6.7 Subject term (key word) listing.

Droque chute
Parachute
Shroud line

6.8 Changes from previous issue. The margins of this specification are marked with asterisks to indicate where changes (additions, modifications, corrections, deletions) 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 contractors 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.

Custodians:

Army - GL
Navy - NU
Air Force - 99

Preparing activity:

Army - GL
(Project 8305-0430)

Review activities:

Army - ME, MI
Navy - AS, MC
Air Force - 82
DLA - CT

User activity:

Air Force - 45

