

MIL-W-5665K
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SUPERSEDING
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MILITARY SPECIFICATION

WEBBING, TEXTILE, COTTON WARP

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

1. SCOPE

1.1 Scope. This document covers materials and construction of various types of cotton and cotton-nylon webbing woven on both shuttle and shuttleless looms.

1.2 Classification. The webbing shall be of the types indicated in tables I, II, and III as specified (see 6.2). Unless otherwise specified (see 6.2), webbings woven on both shuttle and shuttleless looms shall be permitted.

1.3 Classes. The webbing shall be furnished in the following classes, as specified (see 6.2).

- Class 1A - Undyed and not fungus proofed
- Class 1B - Undyed and fungus proofed
- Class 2A - Dyed and not fungus proofed
- Class 2B - Dyed and fungus proofed
- Class 3 - Resin dyed and fungus proofed during dyeing

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5014, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 8305

DISTRIBUTION STATEMENT A. Approved for public release, distribution is unlimited.

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2. APPLICABLE DOCUMENTS

2.1 Government documents.

- * 2.1.1 Documents. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

MILITARY

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

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 contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.1.2 Other Government documents. The following other Government documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

FEDERAL TRADE COMMISSION

Rules and Regulations Under the Textile Fiber Products Identification Act

(Copies may be obtained without charge from the Federal Trade Commission, Pennsylvania Avenue at Sixth Street, N. W., Washington, DC 20580.)

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2.2 Other publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issues of the nongovernment documents which are current on the date of the solicitation.

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

AATCC Chromatic Transference Scale

(Application for copies should be addressed to the American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, NC 27709.)

(Technical society and technical association documents are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

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. 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 webbing 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 Materials. (See 6.4.)

3.2.1 Cotton yarns. The warp yarns for all types and the filling yarns for types I, II, III, IV, V, VI, VII, IX, XII, XIII, XVII, XVIII, XIX, and XX shall be spun and twisted from carded or combed cotton. The catch-cord thread on the shuttleless loom, where applicable, shall be combed peeler mercerized cotton yarn (see table III).

3.2.2 Nylon yarns. The filling yarn for types VIII, X, XV, and XVI, and the catch-cord thread on the shuttleless loom, where applicable (see table III), shall be continuous filament, bright, high tenacity, light and heat resistant polyamide prepared from hexamethylene diamine and adipic acid derivatives, and shall have a minimum melting point of 471°F. The nylon yarns shall not be bleached in any manner or process.

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3.3 Weave.

3.3.1 Types VII, X, and XV. The weave for types VII, X, and XV shall be in accordance with figure 5 with one twill reversal in the center of the webbing.

3.3.2 Type XIX. The weave for type XIX shall consist of a face warp and a back warp bound together by a binder warp and a filling. The face warp shall weave plain with the picks that show on the face and the back warp shall weave plain with the picks that show on the back. The binder warp ends shall weave over two and under two.

3.3.3 Type XX. The weave for type XX shall be composed of two ground warps (face and back), a binder warp, and a filling. The face warp shall weave plain with the picks that show on the face. The back warp shall weave plain with the picks that show on the back. The binder warp shall weave one up and one down.

3.3.4 All other types. The weave for all other types shall be two up, two down herringbone twill with one twill reversal in the center of the webbing.

3.3.5 Catch-cord. When latch type shuttleless looms are utilized, the filling yarn shall traverse the full width of the webbing and shall be held by an extra catch-cord end interlacing with the filling yarn in a method depicted in figure 1 or 3. When bobbin type shuttleless looms are utilized, interlacing of the catch-cord and filling shall occur within the first four ends of warp yarn at the edge (see figure 2).

3.4 Type identification. Types VII, VIII, XIII, XV, and XVI shall be identified by the inclusion of colored marker threads in the weave as specified in 3.4.1. The marker threads shall have fair colorfastness to weathering when tested as specified in 4.2.3.

3.4.1 Marker threads. Marker threads of the same material and forming part of the warp construction shall be:

- Type VII - Two black threads adjacent to each selvage.
- Type VIII - Two black threads in center of webbing.
- Type XIII - Two red threads in center of webbing.
- Type XV - Two red threads adjacent to each selvage.
- Type XVI - Two yellow threads in center of webbing.

* 3.5 Physical requirements. The webbing shall conform to the physical requirements specified in tables I, II, or III when tested as specified in 4.2.3.

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TABLE I. Construction and physical properties all types except XIX (shuttle loom)

Type	Width (inches)	Thickness (inches)	Weight (oz/yd), max	Breaking strength, warp full width (pounds), min	Ply of warp ends, min	No. of warp ends full width, min	Filling (yarns per inch), min	Filling yarn size (± 5 percent)
I	9/16 \pm 1/16	0.040-0.050	0.40	350	4	68	20	20/4
II	1 \pm 1/16	0.040-0.050	0.75	575	4	122	20	20/4
III	1 1/4 \pm 1/16	0.040-0.050	0.90	750	4	158	20	20/4
IV	3 \pm 1/8	0.050-0.100	2.50	1,900	3	220	16	8/4
V	5 \pm 1/8	0.050-0.100	4.30	2,750	3	350	16	8/4
VI	1 3/4 \pm 1/16	0.070-0.090	2.10	1,800	5	116	11	8/4
VII	1 3/4 \pm 1/16	0.140-0.170	3.00	2,600	7	122 1/	24	8/5
VIII	1 3/4 \pm 1/16	0.070-0.095	3.00	2,700	7	132	10	210/5 or 1050/1
IX	3 \pm 1/8	0.090-0.115	4.65	4,500	6	175	12	8/5
X	1 3/4 \pm 1/16	0.125-0.170	4.00	4,700	6	160 1/	20	210/5 or 1050/1
XII	1 3/4 \pm 1/16	0.040-0.060	1.25	900	4	220	20	20/4
XIII	1 3/4 \pm 1/16	0.095-0.130	3.40	3,400	6	126	11	10/5
XV	1 3/4 \pm 1/16	0.130-0.150	3.50	4,500	6	150 1/	20	210/5 or 1050/1
XVI	1 3/4 \pm 1/16	0.090-0.115	2.60	2,700	7	124	10	210/6 or 1260/1
XVII	1 \pm 1/16	0.075-0.095	1.25	900	5	70	11	8/4
XVIII	2 1/2 \pm 1/16	0.050-0.060	1.40	1,250	4	270	20	20/4
XX	5/8 \pm 1/16	0.075-0.095	0.45	200	3	40 2/	19	20/4

1/ In types VII, X, and XV, the total ends include 12 warp ends woven as selvage.

2/ Includes a minimum of 5 binder warp ends.

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TABLE II. Construction and physical properties type XIX (shuttle loom)

Type	Width (inches)	Thickness (inches)	Weight (oz lin yd), min	Threads, full width, min, face and back warp		Filling per inch, min	Breaking strength, warp full width (pounds), min	Yarn sizes (\pm 5 percent) Warp, face and back		Binder, warp	Filling
XIX	2 \pm 1/16	0.130 \pm 0.010	3.68	139	33	21	2500	11/9 or 10/7	10.4	8/7	

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TABLE III. Construction and physical properties (shuttleless loom)

Type	Width (inches)	Thickness (inches)	Weight (oz/yd), max	Breaking strength, warp full width (pounds), min		Ply of warp ends, min	No. of warp full width, min	Filling (yarns per inch), min 2/	Catch-cord yarn size		Filling yarn size (± 5 percent)
									Bobbin 3/	Latch needle 3/	
I	9/16 \pm 1/16	0.040-0.050	0.40	350		4	68	40		50/2	20/2
II	1 \pm 1/16	0.040-0.050	0.75	575		4	122	40		50/2	20/2
III	1 1/4 \pm 1/16	0.040-0.050	0.90	750		4	158	40		50/2	20/2
IV	3 \pm 1/8	0.050-0.100	2.50	1900		3	220	32	8/2		8/2
VI	1 3/4 \pm 1/16	0.070-0.090	2.10	1800		5	116	22	8/2		8/2
VIII	1 3/4 \pm 1/16	0.070-0.095	3.00	2700		7	132	20	840		840
X	1 3/4 \pm 1/16	0.125-0.170	4.00	4700		6	160 1/	40	840		840
XII	1 3/4 \pm 1/16	0.040-0.060	1.25	900		4	220	40		50/2	20/2
XV	1 3/4 \pm 1/16	0.130-0.150	3.50	4500		6	150 1/	40	840		840
XVII	1 \pm 1/16	0.075-0.095	1.25	900		5	70	22	8/2	20/2	8/2
XX	5/8 \pm 1/16	0.075-0.095	0.60	200		3	41 4/	38		50/2	

1/ In types X and XV, the total ends include 12 warp ends woven as selvage.

2/ 2 yarns per shed.

3/ The catch-cord for the bobbin and latch needle type edges shall be no finer than the yarn sizes shown for each type of webbing. A nylon catch-cord shall be used for types VIII, X, and XV, see 3.2.2. For all other types, a combed peeler mercerized cotton yarn shall be used for the catch-cord. The cotton catch-cord yarn for the latch needle edge shall be vat dyed Black Cable Number 65018.

4/ Includes a minimum of 5 binder warp ends.

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3.5.1 Nonfibrous materials. The starch and protein content, including chloroform-soluble and water-soluble material, shall not exceed 7.0 percent when tested as specified in 4.2.3. The webbing for classes 1B, 2B, and 3 shall be tested prior to adding the fungus-resistant treatment and resin formulation.

3.5.2 Shrinkage. The shrinkage of the finished webbing shall not exceed 12.5 percent when tested as specified in 4.2.3.

3.5.3 Curvature. The finished webbing shall show no more lateral curvature than 1/4 inch within a yard when tested as specified in 4.2.3.

3.6 Color. Webbing shall be natural, dyed Olive Drab 7, or other color as specified (see 6.2). The nylon yarn shall not be bleached in any manner or in any subsequent process. Unless otherwise specified, when dyed webbing is required to be fungus proofed, class 2B or 3 may be used.

3.6.1 Dyeing, classes 2A and 2B. Oil dyeing and the use of dyes and compounds containing elementary sulfur capable of oxidation to sulfuric acid is prohibited. The dyestuff shall be chosen and applied so that the dyed and finished webbing shall contain no more labile sulfur than shown by the standard sample when tested as specified in 4.2.3. When a standard sample is not available, the dyed and finished webbing shall show no more than a slight trace of labile sulfur as defined in the test method specified in 4.2.3. For treated webbing, determination of sulfur content shall be made after dyeing but prior to the application of the finish. The shade of the class 2B webbing prior to the application of the finish shall match the standard sample. The shade of the class 2B webbing after finishing shall be that resulting from the base shade and the color imparted by the specified finish.

3.6.1.1 Colorfastness. The dyed webbing, before application of the treatment, for all classes except class 3 shall show fastness to light and wet and dry crocking equal to or better than the standard sample or equal to or better than the adjective rating specified below. When no standard sample is established for colorfastness, the dyed webbing for all classes except class 3 shall show "fair" colorfastness to light, no more wet crocking than AATCC Chromatic Transference Scale rating of 1.5 and no more dry crocking than AATCC Chromatic Transference Scale rating of 3.5 when tested as specified in 4.2.3.

3.6.2 Dyeing, class 3. Class 3 shall be resin dyed, and the fungus resistant treatment shall be added during the dyeing process. The dyed and finished class 3 webbing shall match the standard for the shade specified.

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3.6.2.1 Colorfastness, class 3. The class 3 dyed webbing shall show fastness to accelerated weathering and dry crocking equal to or better than the standard sample or equal to or better than the adjective rating specified below. When no standard sample is established for colorfastness, the class 3 dyed webbing shall show "fair" colorfastness to accelerated weathering and shall show no more dry crocking than AATCC Chromatic Transference Scale rating of 1.5 when tested as specified in 4.2.3. The class 3 webbing shall not bleed in water and shall show "fair" colorfastness when tested as specified in 4.2.3.

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

3.7 Fungus-resistant treatments. Class 1B, 2B, and 3 shall be treated with either copper 8-quinolinolate or 2,2' methylene-bis-(4-chlorophenol) mildew-inhibiting agents, as specified (see 6.2).

3.7.1 Mildew inhibitors.

3.7.1.1 Copper 8-quinolinolate (see 6.1.1). The webbing shall be mildew resistant treated by evenly depositing within the webbing a minimum of 0.13 percent to a maximum of 0.40 percent copper as metal from copper 8-quinolinolate using the method of application specified in 3.7.1.1.1. The test for copper content shall be as specified in 4.2.3.

3.7.1.1.1 Application. The inhibitor shall be applied using a one bath solvent process containing a solubilized or a well dispersed form of copper 8-quinolinolate, and not a combination of both, or a treating bath of bound oxine and copper octoate. The contractor shall certify that the process used was either solubilized or dispersed. The contractor shall certify that any petroleum fractions, oils, or resins are of a nonoxidizing type and shall be free of other copper compounds or naphthenic acid and its salts. If solvents are used in processing of copper 8-quinolinolate treatment, it is necessary that the webbing be thoroughly dried, so that no residual solvent shall be present.

3.7.1.2 2,2' methylene-bis-(4-chlorophenol) (see 6.1.2). The webbing shall be treated to resist mildew with 1.1 to 1.6 percent of 2,2' methylene-bis-(4-chlorophenol), using the method specified in 3.7.1.2.1. The concentration of the inhibitor shall be determined as specified in 4.2.3.

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3.7.1.2.1 Application. The inhibitor for the webbing shall be applied from a solvent solution of such concentration as to deposit the specified concentration on webbing so treated. The webbing shall be dried so that no residual solvent shall be present.

3.7.2 pH. The pH value of the water extract of classes 1B, 2B, and 3 shall be no less than 5.5 nor more than 8.5 when tested as specified in 4.2.3.

3.8 Calendering. The webbing shall be subjected only to light spring calendering to smooth out the surface of the webbing.

3.9 Length and put-up. Unless otherwise specified (see 6.2), webbing shall be furnished in rolls containing not more than 110 yards nor less than 90 yards per roll, except for types VII, X, XV, and XIX webbing, which shall be furnished in rolls containing no more than 55 yards nor less than 45 yards per roll. Unless otherwise specified, each roll shall contain no more than two pieces, and no piece shall be less than 10 yards in length.

3.10 Identification tickets. Each roll of webbing shall have an identification ticket attached to the roll in accordance with MIL-W-43334.

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

3.12 Workmanship. The finished webbing shall conform to the quality of product established by this document and 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 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 document where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

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4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this document shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirement in the document 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 in 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.

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

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 documents unless otherwise excluded, amended, modified, or qualified in this document or applicable purchase document.

4.2.2 End item examination.

4.2.2.1 Yard-by-yard examination. The required yardage of each roll shall be inspected on both sides for the defects listed in table IV. 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 warpwise 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 II 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. The number of rolls from which the sample yardage is to be selected shall be in accordance with table V. The sample yardage shall be apportioned equally among the selected rolls.

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TABLE IV. End item defects

Examine	Defect	Classification	
		<u>Major</u>	<u>Minor</u>
Abrasion mark	Resulting in rupture of individual yarns or plies, distortion in the orientation of threads, dimensional distortion, areas noticeably thinner than adjoining unaffected areas, or in nap sufficient to obscure the identity of any yarns	X	
Broken or missing ends or picks	Two or more contiguous regardless of extent	X	
	Single		X
Crease or wrinkle, edge folded or rolled	Hard, embedded		X
Cut, hole, or tear	Any cut, hole, or tear	X	
Drop-ply	Two or more drop-ply ends in the same length	X	
	Single drop-ply end (see "fine or light filling bar")		X
Edge	Any cut, torn, or frayed edge	X	
	Noticeable increase in thickness, or misformed edge		X
	Loopy forming clearly visible in filling loops, or edge tied loosely to body of webbing for 2 linear inches or more <u>1/</u>	X	
	Loopy resulting in abrupt break in sequence of weave, or widthwise repeated floats 1/4 inch or less long		X
	Loose resulting in waviness, distortion in orientation of filling, or looseness along edge		X

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TABLE IV. End item defects - (Continued)

Examine	Defect	Classification	
		Major	Minor
Edge - continued	Tight resulting in visible tension along edge, or pucker, waviness, bagginess, or slackness that cannot be flattened by manual pressure <u>1</u> /	X	
	Scalloped, any visible indentation of edge <u>1</u> /	X	
Filling bar	Coarse resulting in noticeably increased stiffness or thickness of webbing	X	
	Fine or light, clearly visible <u>1</u> /	X	
Float	Multiple, in combined warp and filling direction: 1/2 inch or more	X	
	Less than 1/2 inch		X
	Single in warp direction more than 1/2 inch in length		X
	Single in filling direction: More than 1/4 but not more than 1/2 of the width (not more than 1 inch in any case)		X
	More than 1/2 of the width (more than 1 inch in any case)	X	
Heavy place	Noticeably stiffer or thicker than adjoining unaffected webbing	X	
Hitchback, crack, open place	Clearly visible opening between adjoining picks or warpwise tension area over part of the width resulting in noticeable light and heavy places	X	
Jerked-in filling, slough-off	More than twice the thickness of the normal yarn		X
Kinks	More than three in any 9 linear inches		X
Knot	More than one knot in any 9 linear inches	X	

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TABLE IV. End item defects - (Continued)

Examine	Defect	Classification	
		Major	Minor
Knot - continued	Single knot with untrimmed ends extending from surface of webbing		X
Mispick, skips (harness)	Resulting in widthwise repeated floats more than 1/4 inch long	X	
Shade bar, mixed filling	Clearly visible <u>1/</u>		X
Slack end	Two or more in the same length, jerked in between picks, or forming clearly visible loops on surface of webbing <u>1/</u>	X	
	Single, jerked in between picks, or forming clearly visible loops on surface of webbing <u>1/</u>		X
Slub, slug, or gout	More than twice the thickness of the yarn		X
Smash	Any smash	X	
Spot, stain, or streak	Any clearly visible <u>1/</u>		X
Tight end	Clearly visible <u>1/</u>		X
Tight pick or tight filling	Resulting in rolling of webbing (see also "edge scalloped")	X	
Wavy or ridgy webbing	Clearly visible, will not flatten under manual pressure (resulting from uneven tension) <u>1/</u>	X	
Weak, soft, or tender spot	Any weak, soft, or tender spot	X	
Wrong draw	Extending for more than 9 inches		X

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

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TABLE V. Sample size and examination criteria

Lot size (yards)	Sample size (rolls)	Acceptance number <u>2/</u>
Up to 1200	3 <u>1/</u>	0
1201 up to and including 3200	5	0
3201 up to and including 10,000	8	0
10,001 up to and including 35,000	13	0
35,001 up to and including 150,000	20	1
150,001 and over	32	2

1/ If a lot contains fewer than three rolls, each roll in the lot shall be examined.

2/ Applicable to overall examination (see 4.2.2.2) and length examination (see 4.2.2.3).

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

<u>Examine</u>	<u>Defect</u>
Finish	Heavily calendered finish, objectionable odor, unclean throughout Clearly noticeable crystallization of mildew inhibitor
Shade (classes 2A and 3)	Off shade, not within established tolerance Uneven dyeing, shaded, poor penetration
Weaving	Uneven weaving throughout
Marker threads (type identification, types VII, VIII, XIII, XV, (XVI)	Missing or misplaced, wrong color

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<u>Examine</u>	<u>Defect</u>
Labeling	Identification ticket missing, incomplete, illegible, or insecurely attached Not labeled in accordance with the Textile Fiber Products Identification Act
Width	More or less than the specified tolerance

4.2.2.3 Length examination. During the yard-by-yard examination, each roll in the sample shall be examined for the defects listed below. If the total number of defects in the sample rolls exceeds the acceptance number specified in table V, the lot shall be rejected. In addition, the lot shall be unacceptable if the total of the actual gross lengths of rolls in the sample is less than the total of the gross lengths marked on the roll tickets.

Defect

Gross length less than specified minimum length or more than specified maximum length
Gross length more than 2 yards less than gross length marked on piece ticket
Any piece less than the allowable minimum length of piece
Any roll containing more than the allowable number of pieces permitted for the applicable type of webbing

4.2.3 End item testing. The cloth shall be tested for the characteristics listed in table VI. The methods of testing specified in FED-STD-191, wherever applicable, and as listed in table VI shall be followed. The physical and chemical values specified in section 3 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 lot shall be unacceptable if one or more sample units fail to meet any requirement specified. The lot size shall be expressed in units of 1 linear yard. The sample unit for testing shall be as follows:

Class 1A	- 11 yards finished webbing
Class 1B	- 1/2 yard untreated webbing and 19 yards of finished webbing
Class 2A	- 12 yards of finished webbing
Class 2B	- 1/2 yard of dyed, untreated webbing and 20 yards of finished webbing
Class 3	- 1/2 yard of undyed, untreated webbing and 20 yards of finished webbing

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The sample size shall be in accordance with the following:

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

TABLE VI. End item test

<u>Characteristic</u>	<u>Requirement paragraph</u>	<u>Test method</u>
Cotton yarn identification	3.2.1	1200 <u>1/</u>
Catch-cord thread (where applicable) identification	3.2.1	<u>1/</u>
Nylon identification	3.2.2	<u>1/</u>
Weave	3.3	Visual <u>2/</u>
Yarn ply	3.5	Visual <u>2/</u>
Yarn size	3.5	4021 <u>1/</u>
Weight	3.5	5041
Thickness	3.5	5030
Texture:		
Warp ends	3.5	5050
Filling, picks	3.5	5050
Breaking strength	3.5	4108 <u>3/</u>
Nonfibrous material	3.5.1	2611

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TABLE VI. End item test - Continued

Characteristic	Requirement paragraph	Test method
Shrinkage	3.5.2	4.3.1
Curvature	3.5.3	4.3.2
Oil dyeing	3.6.1	<u>1/</u>
Labile sulfur (dyed only)	3.6.1	2020
Resin dyed (class 3)	3.6.2	<u>1/</u>
Colorfastness to:		
Crocking (wet)	3.6.1.1	5651
Crocking (dry)	3.6.1.1	5651
	and	
	3.6.2.1	
Light	3.6.1.1	5660 <u>4/</u>
Weathering (class 3)	3.6.2.1	5671 <u>4/</u>
Weathering (marker threads)	3.4	5671 <u>4/</u>
Water (class 3)	3.6.2.1	5630
Mildew inhibitors:		
Copper 8-quinolin- olate	3.7.1.1	<u>5/</u>
Copper content, percent	3.7.1.1	2050
2,2' methylene- bis-(4-chloro- phenol)	3.7.1.2	2011
pH (classes 1B, 2B, 3)	3.7.2	2811

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- 1/ A certificate of compliance shall be submitted and will be acceptable for the stated requirement.
- 2/ One determination per sample unit and the result reported as "pass" or "fail".
- 3/ For types I, II, and III, flat surface clamps may be used. For all other types, the split drum type jaws shall be used.
- 4/ Time of exposure shall be 40 standard fading hours.
- 5/ The supplier shall certify that only copper 8-quinolinolate was used in the treatment of the webbing and that the process used was either solubilized or dispersed and not a combination of both.

4.2.4 Packaging inspection. An inspection shall be made in accordance with the provisions of MIL-P-43334.

4.3 Methods of inspection.

4.3.1 Shrinkage test. Three specimens of webbing measuring a minimum of 22 inches in length shall be selected from the sample unit and conditioned under standard conditions. Mark 18-inch lengths on each specimen with water-proof ink, or other suitable marking medium, at least 1 inch in from the ends of the specimens. Immerse the specimens in distilled water maintained at a temperature of 110°F to 115°F for 6 hours. It may be necessary to attach weights to the specimens to ensure complete immersion for the specified time. After immersion, the specimens shall be air dried at room temperature, or they may be dried in a circulating oven at a temperature not exceeding 180°F. After drying, condition the specimens under standard conditions as defined in FED-STD-191, measure the specimens, compute the shrinkage to the nearest 0.1 percent based on the original 18-inch measurement, average the results, and report results to the nearest 0.1 percent.

4.3.2 Measurement of curvature test.

4.3.2.1 Test specimen. The test specimen shall be a length of webbing, full width, measuring a minimum of 40 inches. The specimen shall not be stretched, smoothed, or otherwise changed from its original condition prior to testing.

4.3.2.2 Number of determinations. Five specimens shall be tested from each sample unit.

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4.3.2.3 Apparatus.

Plexiglass or equal - plexiglass weighing approximately 35 ounces with dimensions of 45 inches by 5 inches by 1/4 inch.

Straight edge - a rigid straight edge measuring 36 inches in length.

Roller - a roller 1 inch in diameter, weighing 1 1/2 pounds.

4.3.2.4 Procedure. Place the specimens flat on a smooth, horizontal flat surface without tension and allow them to reach moisture equilibrium as defined in section 4 of FED-STD-191. After equilibrium is reached, place a weight at one end of the webbing. Place the roller on the specimen at the end of the webbing where the weight is located. The specimen should be approximately in the center of the roller. Roll the roller along the length of the specimen, taking care to keep the specimen in the center of the roller and not to exert any pressure on the roller. When the roller has passed the length of the webbing, place the plexiglass on the specimen for a period of 1 hour. Without moving the plexiglass on the specimen, place the straight edge on the plexiglass so that both ends of the straight edge are aligned perpendicularly with the outermost edge of the specimen. Determine the highest degree of curvature of the specimen from the straight edge by measuring to the nearest 1/32 of an inch perpendicularly from the straight edge. Record the highest measurement (see figure 4).

4.3.2.5 Report. The results of each determination from each sample unit shall be taken.

5. PACKAGING

5.1 Preservation. Preservation 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 preserved 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 packing. Webbing, preserved as specified in 5.1, shall be packed in accordance with the applicable requirements of MIL-P-43334.

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

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6. NOTES

6.1 Intended use. The webbing is intended for use in cargo parachute harnesses and packs, cargo drop kits, cargo tie down lines, hoists and slings, life raft belts, and crew bunk safety belts.

6.1.1 Fungicidal treatment (copper 8-quinolinolate). Copper 8-quinolinolate fungicidal treatment is to be used in the fungus proofing of webbing intended for equipage subject to considerable ground contact under conditions of actual use and when color is not of primary importance. It is not to be used on webbing in contact with natural rubber materials.

6.1.2 Fungicidal treatment (2,2' methylene-bis-(4-chlorophenol). 2,2' methylene-bis-(4-chlorophenol) is to be used in the fungus proofing of webbing when color is of prime importance or when the webbing may be in contact with natural rubber materials.

6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number, and date of this document.
- b. Type and class required (see 1.2, 1.3, and tables I, II, and III).
- c. When shuttle loom webbing is required (see 1.2).
- d. Color required (see 3.6).
- e. Type of fungicide to be used, when applicable (see 3.7).
- f. Length of roll required (if other than specified in 3.9).
- g. Selection of applicable levels of preservation and packing (see 5.1 and 5.2).

6.3 Standard sample. For access to standard sample, address the contracting activity issuing the invitation for bids.

6.4 Recycled material. It is encouraged that recycled material be used when practical as long as it meets the requirements of this document (see 3.2).

6.5 Combed cotton usage. It is suggested, but not mandatory, that combed cotton be used for the filling yarns for the types I, II, III, and XII.

* 6.6 Subject term (key word) listing.

Airdrop equipage
Belts, safety
Cargo equipage
Parachutes
Webbing, woven

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6.7 Changes from previous issue. The margins of this document are marked with an asterisk (*) 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, as written, irrespective of the marginal notations and relationship to the last previous issue.

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Army - GL
Navy - AS
Air Force - 99

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Project No. 8305-0159

Review activities:

Army - MD, AR, ME
Navy - NU
Air Force - 82
DLA - CT

User activities:

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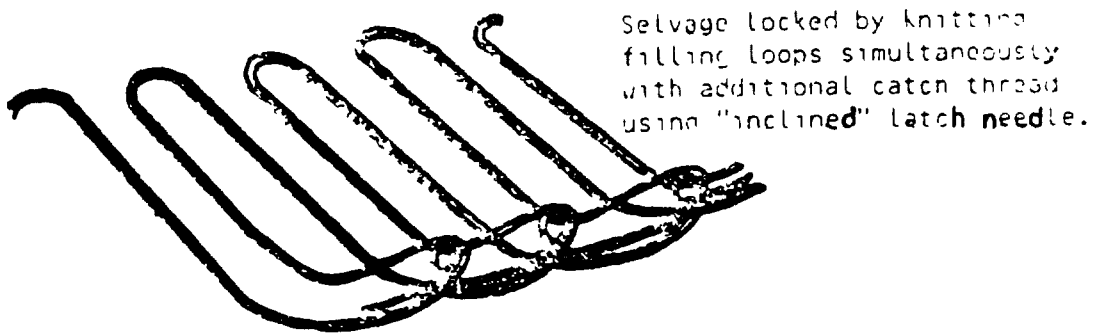


FIGURE 1 Catch-cord diagram

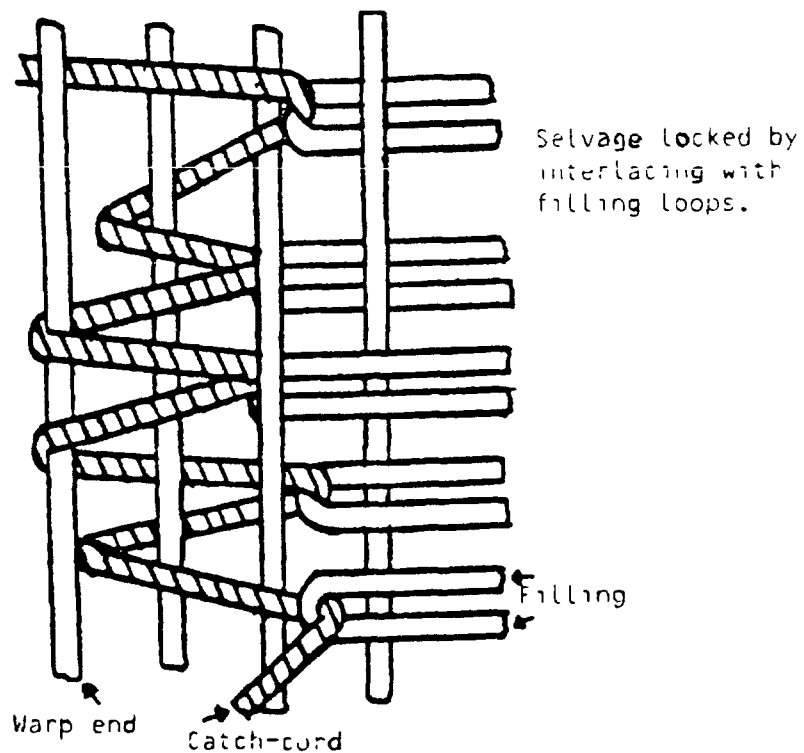


FIGURE 2 Catch-cord diagram

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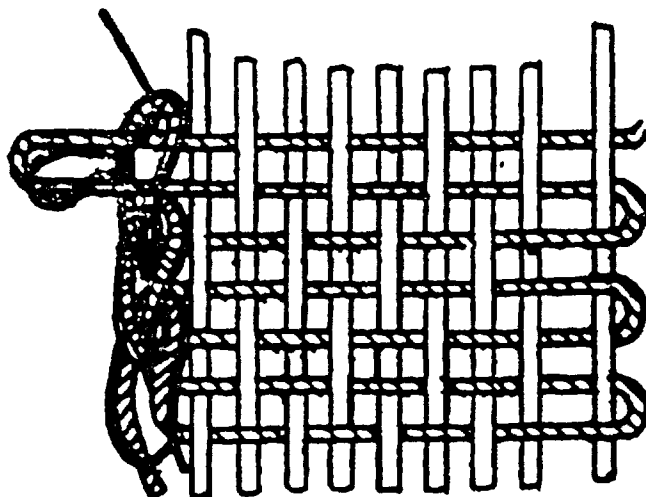


FIGURE 3 Catch-cord diagram

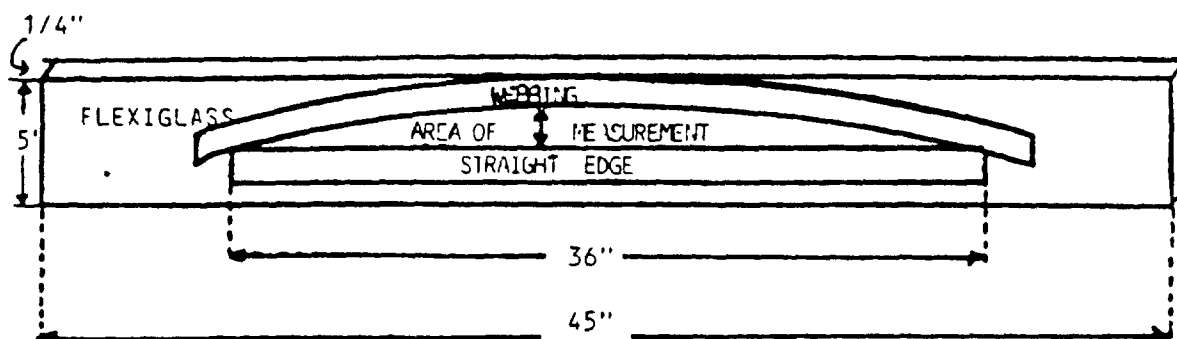


FIGURE 4 Diagram Curvature Measurement

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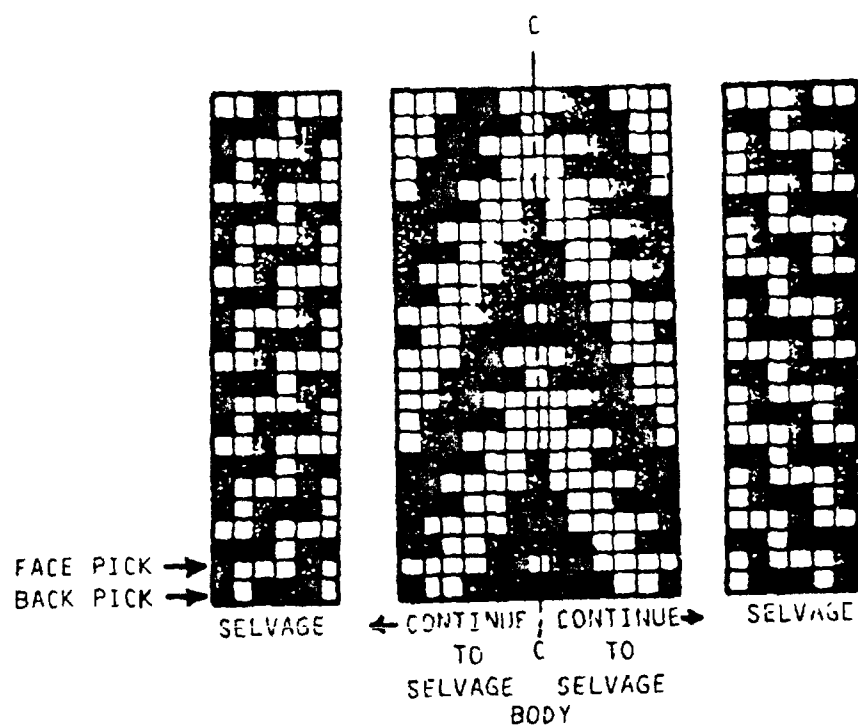


FIGURE 5 Weave design of types VII, X, and XV webbing

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