INCH-POUND
MIL-DTL-530J
18 March 2020
SUPERSEDING
MIL-W-530H
29 April 1988

DETAIL SPECIFICATION

WEBBING, TEXTILE, COTTON, GENERAL PURPOSE, NATURAL OR IN COLORS

This document is approved for use by all Departments and Agencies of the Department of Defense (DoD).

1. SCOPE

1.1 Scope. This specification covers the requirements for a cotton, general purpose webbing, natural or in colors.

1.2 Classification. This specification covers the following types and classes.

1.2.1 Types.

Type I	- Deleted
Type Ia	- Deleted
Type II	- Medium weight webbing (hard texture)
Type IIa	- Medium weight webbing (soft texture)
Type IIb	- Medium heavyweight webbing
Type III	- Heavyweight webbing
Type IV	- Webbing, special use
Type V	- Webbing, multiple weave
Type VI	- Webbing, special (appliances and wicks)

Comments, suggestions, or questions on this document should be addressed: Attn: DLA Troop Support, 700 Robbins Street, Philadelphia, PA 19111-5096. Since contact information can change, verify the currency of the address information using Acquisition Streamlining and Standardization Information System (ASSIST) online database https://assist.dla.mil.

AMSC N/A FSC 8305

1.2.2 Classes.

Class 1	- Natural
Class 1a	- Natural, water repellent and mildew resistant
Class 1b	- Natural, water repellent, mildew and rot resistant
Class 2	- Bleached
Class 2a	- Bleached, water repellent, and mildew resistant
Class 3	- Dyed
Class 4	- Dyed, water repellent, mildew and rot resistant
Class 5	- Deleted
Class 6	- Deleted
Class 7	- Dyed, water repellent, and mildew resistant
Class 8	- Dyed, water repellent

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 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 cited in the solicitation or contract.

DEPARTMENT OF DEFENSE HANDBOOKS

MIL-STD-3064 - Evaluation of Quality of Textile Materials

(Copies of this document are available online at https://quicksearch.dla.mil.)

2.2.2 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 or contract.

FEDERAL TRADE COMMISSION

Rules and Regulations under the Textile Fiber Products Identification Act

(Copies of this document are available online at https://www.ftc.gov.)

2.3 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 cited in the solicitation or contract.

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

AATCC Evaluation Procedure 1, Gray Scale for Color Change
AATCC Evaluation Procedure 2, Gray Scale for Staining
AATCC Evaluation Procedure 8, AATCC 9 Step Chromatic Transference Scale
AATCC Evaluation Procedure 9, Visual Assessment of Color Difference of Textiles
AATCC Test Method 8 - Colorfastness to Crocking: Crockmeter Method
AATCC Test Method 15 - Colorfastness to Perspiration
AATCC Test Method 20 - Fiber Analysis: Qualitative
AATCC Test Method 30 - Antifungal Activity, Assessment on Textiles Materials: Mildew and Rot Resistance of Textile Materials
AATCC Test Method 61 - Colorfastness to Laundering: Accelerated
AATCC Test Method 70 - Water Repellency: Tumble Jar Dynamic Absorption Test
AATCC Test Method 81 - pH of Water-Extract from Wet Processed Textiles
AATCC Test Method 169 - Weather Resistance of Textiles: Xenon Lamp Exposure

(Copies of these documents are available online at https://www.aatcc.org.)

AMERICAN SOCIETY FOR QUALITY (ASQ)

ASQ/ANSI Z1.4 - Sampling Procedures and Tables for Inspection by Attributes

(Copies of this document are available online at https://asq.org.)

ASTM INTERNATIONAL

ASTM D1776/D1776M - Standard Practice for Conditioning and Testing Textiles
ASTM D1777 - Standard Test Method for Thickness of Textile Materials
ASTM D1907/D1907M - Standard Test Method for Linear Density of Yarn (Yarn Number) by the Skein Method
ASTM D/3775 - Standard Test Method for End (Warp) and Pick (Filling) Count of Woven Fabrics
ASTM D3776/D3776M - Standard Test Methods for Mass Per Unit Area (Weight) of Fabric
ASTM D5035 - Standard Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)

INFORMA HEALTHCARE

Repeat Insult Patch Test - Modified Draize Procedure –
Principles and Methods of Toxicology, A Wallace Hayes (editor).

(Copies of this document are available online at https://www.crcpress.com)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Unless a specific exemption has been obtained, nothing in this document, supersedes applicable laws and regulations.

3. REQUIREMENTS

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

3.2 Figures. 1 through 5 are furnished for informational purposes only. To the extent of any inconsistencies between the written document and the figure, the written document shall govern.

3.3 Standard sample. Unless otherwise indicated, the finished webbing shall match the standard sample for shade and appearance, 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).

3.4 Recycled, recovered, environmentally preferable, or biobased materials. Recycled, recovered, environmentally preferable, or biobased materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.5 Materials.

3.5.1 Yarns. The yarns shall be made from cleaned and carded cotton or combed cotton, except that the catch-cord utilized on the shuttleless loom shall be combed peeler cotton yarn or as specified in the applicable table. The yarns shall be spun and twisted into ply yarns as specified in 3.10.

3.6 Color. The webbing shall be unbleached, bleached white, or dyed Tan 499, Camouflage Green 483, black, or other color as specified in the contract or purchase order (see 6.2) and it shall match the standard sample when tested as specified in 4.6.

3.6.1 Labile sulfur. Dyes and compounds containing elementary sulfur capable of oxidation to sulfuric acid shall not be used. The dyed webbing shall be "Free" of labile sulfur when tested as specified in 4.6.

3.6.2 Colorfastness. Unless otherwise specified in the contract or procurement documents, the finished webbing referenced in 3.5 shall conform to the colorfastness requirements listed below in Table I when tested as specified in 4.6.

TABLE I. Colorfastness requirement.

Type	Class	Weathering 40 AFU or 170 kJ/(m^{2}nm)@420 nm (min) 1/	Laundering (after 3 cycles) (min)	Crocking Dry/Wet (min)
All, except Black and Dark Blue	3	3	--	3.5
Black and Dark Blue	3	3	--	1.5
Type IV, 1 and 1-1/4-inch webbing	3	3	3-4	3.5
All	4 and 7	3	--	1.5
All	8	3	3-4	3.5

1/ AFU: AATCC Fading Units

3.7 Spectral reflectance. The reflectance values for Tan 499 and Camouflage green 483 webbings greater than 1-1/4 inches shall conform to the requirements listed below, in Table II, when tested as specified in 4.6.

THIS SECTION IS INTENTIONALLY LEFT BLANK

TABLE II. Spectral reflectance requirements.

Reflectance values (percent)				
Wavelength Nanometers (nm)	Tan 499		Camouflage green 483	
	Min.	Max.	Min.	Max.
600	8	26	3	10
620	8	26	3	10
640	8	30	3	10
660	8	34	3	11
680	12	38	3	13
700	12	40	4	28
720	16	46	5	40
740	22	50	7	52
760	30	50	11	60
780	34	54	17	64
800	36	56	24	67
820	38	58	32	70
840	38	58	37	71
860	40	60	40	73

3.8 Finish. When specified (see 6.2), the webbing shall be treated with either a mildew, or a mildew with rot resistant, and a water resistant treatment, or a combination thereof.

3.8.1 Water repellency. Classes 1a, 1b, 2a, 4, 7, and 8 webbing shall be water repellent treated. The dynamic absorption of the treated material shall be no greater than 40 percent when tested as specified in 4.6.

3.8.2 Mildew resistant treatment (Class 1a, 2a, and 7). The webbing shall be treated with an organic mildew inhibitor that is EPA registered under the FIFRA and the observable fungi shall be no greater than “Microscopic Growth” (visible only under the microscope) after leaching when tested as specified in 4.6.

3.8.3 Mildew and rot resistant treatment (Class 1b and 4). The tape shall be treated with an organic mildew inhibitor that is EPA registered under the FIFRA and it shall retain a 75 percent breaking strength after 12 weeks of soil burial exposure after leaching when tested as specified in 4.6.

3.9 pH. The pH value of the water extract of Classes 1a, 1b, 2a, 4, 7, and 8 shall be not less than 5.5 nor more than 8.5 when tested as specified in 4.6.

3.10 Physical requirements. The finished and unfinished webbing shall conform to the requirements, listed in Tables III to IX, when tested as specified in 4.6. Webbings shall be furnished in the widths shown in Tables III to IX inclusive, as specified (see 6.2). The tolerances in width for webbing (except Type IV, 1-1/4 inches an 1-inch webbing), Tables II to VI inclusive, shall be -1/32 and (+1/16) inch for webbing up to and including 1-1/2-inches in width; (±1/16) inch for webbing over 1-1/2-inches and up to and including 2-3/4-inches; and (±3/32) inch for webbing over 2-3/4-inches in width. The Type IV, 1-inch and 1-1/4-inches webbing shall have a width tolerance of (±1/32)-inch.

THIS SECTION IS INTENTIONALLY LEFT BLANK

TABLE III. Physical requirements for Type II – Medium weight webbing (hard texture).

Width (inches)	Weight, ounces per linear yard (min)	Yarns per inch, (min)		Breaking strength, pounds (min)			Yarn size, (±5 percent)	
		Warp (full width total)	Filling 1/	Warp (full width)	Warp (per inch)	Filling (per inch) 3/	Warp 2/	Filling 1/
3/8	0.20	48	40 or 80	100	--	--	16/2	16/2 or 36/2
1/2	0.32	24	14 or 28	160	--	--	8/4	8/4 or 16/4
5/8	0.40	30	14 or 28	200	--	--	8/4	8/4 or 16/4
3/4	0.48	36	14 or 28	235	--	--	8/4	8/4 or 16/4
1	0.65	48	14 or 28	315	--	--	8/4	8/4 or 16/4
1-1/4	0.81	60	14 or 28	385	--	--	8/4	8/4 or 16/4
1-1/2	0.97	72	14 or 28	460	--	--	8/4	8/4 or 16/4
2	1.30	96	14 or 28	585	--	--	8/4	8/4 or 16/4
2-3/4	1.78	132	14 or 28	760	--	--	8/4	8/4 or 16/4
3	1.95	144	14 or 28	810	--	140	8/4	8/4 or 16/4
3-3/4	2.43	180	14 or 28	--	315	140	8/4	8/4 or 16/4
5	3.25	240	14 or 28	--	315	140	8/4	8/4 or 16/4
5-5/8	3.65	270	14 or 28		315	140	8/4	8/4 or 16/4

1/ 40 yarns per inch (1 yarn per shed) of 16/2 ply, or 80 yarns per inch (2 yarns per shed) of 36/2 ply; 14 yarns per inch (1 yarn per shed) of 8/4 ply or 28 yarns per inch (2 yarns per shed) of 16/4 ply.

2/ The catch-cord for the bobbin type edge shall be 24/4 ply combed peeler cotton yarn and 40/2 combed peeler cotton yarn. The color of the catch cord (either type) shall be the color of the webbing for the latch-needle type edge.

3/ The jaws for the break strength filling direction shall be 1-inch part.

TABLE IV. Physical requirements for Type IIa – Medium weight webbing (soft texture).

Width (inches)	Weight, ounces per linear yard (min)	Yarns per inch, (min) Full width				Breaking strength, pounds (min)	Yarn size, (±5 percent)		
		Warp (Face and Back)	Warp Binder	Warp Stuffer	Filling 1/	Warp Full width	Warp Except stuffer 2/	Warp Stuffer	Filling 1/
3/8	0.25	41	5	10	36 or 72	130	12/2	8/3	12/2 or 24/2
1/2	0.33	47	6	12	36 or 72	160	12/2	8/3	12/2 or 24/2
5/8	0.41	53	7	14	36 or 72	195	12/2	8/3	12/2 or 24/2
3/4	0.49	65	9	18	36 or 72	230	12/2	8/3	12/2 or 24/2
1	0.65	83	12	24	36 or 72	300	12/2	8/3	12/2 or 24/2
1-1/4	0.81	101	15	30	36 or 72	370	12/2	8/3	12/2 or 24/2
1-1/2	0.97	119	18	36	36 or 72	440	12/2	8/3	12/2 or 24/2
2	1.30	155	24	48	36 or 72	580	12/2	8/3	12/2 or 24/2
2-1/4	1.47	173	27	54	36 or 72	645	12/2	8/3	12/2 or 24/2

1/ 36 yarns per inch (1 yarn per shed) of 12/2 ply or 72 yarns per inch (2 yarns per shed) of 24/2 ply.

2/ The catch-cord for the bobbin type edge shall be 24/2 ply combed peeler cotton yarn and 40/2 ply combed peeler cotton yarn. The color of the catch-cord (either type) shall be the color of the webbing for the latch-needle type edge.

THIS SECTION IS INTENTIONALLY LEFT BLANK

TABLE V. Physical requirements for Type IIb – Medium heavyweight webbing.

Width (inches)	Weight, ounces per linear yard (min)	Yarns per inch, (min) Full width			Breaking strength, pounds (min)	Yarn size, (±5 percent)	
		Warp (Face and Back)	Warp Binder	Filling 1/	Warp Full width	Warp 2/	Filling 1/
5/8	0.60	49	5	24 or 48	310	8/4	10/3 or 20/3
3/4	0.72	57	6	24 or 48	365	8/4	10/3 or 20/3
1	0.96	73	8	24 or 48	475	8/4	10/3 or 20/3
1-1/4	1.20	89	10	24 or 48	590	8/4	10/3 or 20/3
1-1/2	1.44	105	12	24 or 48	700	8/4	10/3 or 20/3
2	1.92	137	16	24 or 48	925	8/4	10/3 or 20/3
2-1/4	2.25	161	19	24 or 48	1050	8/4	10/3 or 20/3
3	2.88	201	24	24 or 48	1375	8/4	10/3 or 20/3

1/ 24 yarns per inch (1 yarn per shed) of 10/3 ply or 48 yarns per inch (2 yarns per shed) of 20/3 ply.

2/ The catch-cord for the bobbin type edge shall be 24/4 ply combed peeler cotton yarn and 40/2 ply combed peeler cotton yarn. The color of the catch-cord (either type) shall be the color of the webbing for the latch-needle type edge.

THIS SECTION IS INTENTIONALLY LEFT BLANK

TABLE VI. Physical requirements for Type III – Heavy weight webbing.

Width (inches)	Weight, ounces per linear yard (min)	Yarns per inch, (min) Full width				Breaking strength, pounds (min)	Yarn size, (±5 percent)		
		Warp (Face and Back)	Warp Binder	Warp Stuffer	Filling 2/	Warp Full width	Warp Except stuffer 3/	Warp Stuffer 4/	Filling 2/
5/8	1.00	57	5	12	24 or 48	380	8/4	8/4	8/4 or 16/4
3/4	1.20	65	6	14	24 or 48	460	8/4	4/4	8/4 or 16/4
1	1.33	81	8	18	24 or 48	550	8/4	8/4	8/4 or 16/4
1-1/4 1/	1.50	89	10	11	24 or 48	650	8/4	8/4	8/4 or 16/4
1-1/4 1/	2.00	97	10	22	24 or 48	720	8/4	4/4	8/4 or 16/4
1-1/2	2.40	113	12	26	24 or 48	860	8/4	4/4	8/4 or 16/4
2	2.65	145	16	34	24 or 48	1100	8/4	8/4	8/4 or 16/4
2-1/2	4.00	177	20	42	24 or 48	1360	8/4	4/4	8/4 or 16/4
3	4.80	209	24	50	24 or 48	1560	8/4	4/4	8/4 or 16/4

1/ Acquisition document should specify in addition to width, weight per linear yard to identify each of the 1-1/4 inch webbings (see 6.2).

2/ 24 yarns per inch (1 yarn per shed) of 8/4 ply or 48 yarns per inch (2 yarns per shed of 16/4 ply).

3/ The catch-cord for the bobbin type edge shall be 24/4 ply combed peeler cotton yarn and 40/2 ply combed peeler cotton yarn. The color of the catch-cord (either type) shall be the color of the webbing for the latch-needle type edge.

4/ When 4/4 ply yarn is specified, two ends of 8/4 ply yarn may be substituted for each end of 4/4 ply yarn.

THIS SECTION IS INTENTIONALLY LEFT BLANK

TABLE VII. Physical requirements for Type IV – Webbing, special use.

Width (inches)	Weight, ounces per linear yard (min)	Yarns per inch, (min) Full width				Breaking strength, pounds (min)	Yarn size, (±5 percent)		
		Warp (Face, middle, and back) 4/	Warp Binder	Warp Stuffer	Filling 2/	Warp Full width	Warp Except stuffer 7/	Warp Stuffer	Filling 2/
5/8	0.90	48	7	--	40	255	8/4	--	8/4
1 1/	1.05	78 or 48 6/	22 (2 as 1)	20 6/	40 or 36 6/	370	8/3 or 9/4 6/	9/4 6/	8/3 or 8/2 6/
1-1/4 1/, 5/	1.90	94 or 64 6/	15	56 6/	46 or 36 6/, 8/	500	8/4 or 9/4 6/	9/4 6/	8/4 or 8/2 6/
1-3/8	2.25	119	18	--	40	800	10/5	--	10/5
2-1/4 2/	3.40	167	10	99	28	1200	8/4	8/4	8/4
2-1/4 2/, 3/	4.30	196	32	--	38	1100	8/4	--	8/7

1/ The thickness of the 1-1/4 inch webbing shall be not more than 0.135-inch; the thickness of the 1-inch webbing shall be 0.095 to 0.105-inch.

2/ Acquisition documents should specify, in addition to width, the weight per linear yard to identify each of the 2-1/4 inch webbings (see 6.2).

3/ The thickness of the webbing shall be not more than 0.155 nor less than 0.135-inch.

4/ Yarns minimum, for the 2-1/4 inch, 3.40-ounce webbing shall be for face and back warp.

5/ Except that the width tolerance specified in 3.9 for the 1-1/4 inch webbing shall be ± 1/32-inch.

6/ Applicable to shuttleless loom construction only.

7/ The catch-cord for the latch-needle type edge shall be 420 denier nylon dyed the same shade as the standard sample, except that for unbleached and bleached white webbing, the catch-cord shall be natural.

8/ 46 yarns per inch (1 yarn per shed) of 8/4 ply or 72 yarns per inch (2 yarns per shed) of 8/2 ply.

TABLE VIII. Physical requirements for Type V – Webbing, multiple weave.

Width (inches)	Weight, ounces per linear yard (min)	Yarns per inch, (min)		Thickness (inches)	Breaking strength, pounds (min)	Yarn size, (±5 percent)	
		Warp (total yarns)	Filling		Full width	Warp	Filling
1-3/4 ± 1/32	2.75	333	100	1/8 ± 1/64	1,000	12/3	12/3

TABLE IX. Physical requirements for Type VI – Webbing, special (appliances and wicks).

Width (inches)	Thickness (inches) ± 0.55	Weight, ounces per linear yard (min)	Yarns per inch, (min)			Breaking strength, pounds (min)	Yarn size, (±5 percent)	
			Warp (face and back)	Warp Binder	Filling		Warp	Filling
1 ± 1/16	0.080	0.53	49	11	18	350	5/2	10/2

THIS SECTION IS INTENTIONALLY LEFT BLANK

3.11 Curvature. The finished webbing shall show no more lateral curvature than 1/4-inch within a yard when tested as specified in 4.6.

3.12 Weave. The weave of the webbing shall be as specified in 3.12.1 through 3.12.7.

3.12.1 Type II. Webbing shall consist of one warp and one filling, and weaving shall be plain weave. Two warp ends shall weave as one, except that at the selvages there shall be four warp ends weaving singly in each selvage edge. When latch type shuttleless looms are utilized, the filling yarn shall traverse the full width of the webbing and shall be held at the edge 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).

3.12.2 Type IIa. Webbing shall consist of two warps bound together by a single filling and a binder warp. The face warp shall weave plain with the picks showing on the face. The back warp shall weave plain with the picks showing on the back. The binder-warp ends shall weave plain. There shall be two suffer-warp ends between each binder warp and, in addition, one stuffer on each edge. One selvage shall consist of nine ground-warp ends, and the other selvage shall consist of eight ground-warp ends. The filling shall weave alternately on the face and on the back. When latch needle type shuttleless looms are utilized, the filling yarn shall traverse the full width of the webbing and shall be held at the edge 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 unitized, interlacing of the catch-cord and the filling shall occur within the selvage area before the first binder end (see Figure 2).

3.12.3 Type IIb. Webbing shall consist of two warps bound together by a single filling and a binder warp. The face warp shall weave plain with the picks showing on the face. The back warp shall weave plain with the picks showing on the back. The binder-warp ends shall weave plain. One selvage shall consist of nine ground-warp ends, and the other selvage shall consist of eight ground-warp ends. The filling shall weave alternately on the face and on the back. When latch-needle type shuttleless looms are utilized, the filling yarn shall traverse in the full width of the webbing and shall be held at the edge 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 the filling shall occur within the selvage area before the first binder end (see Figure 2).

3.12.4 Type III. Webbing shall be the same as Type IIa, except that there shall be 2 ends of ground-warp weaving as one: there shall be 2 stuffer-warp ends between each binder warp and on each edge, 13 ground-warp ends weaving singly on one edge, and 12 ground-warp ends weaving singly on the other edge. The 1-1/4 inch, 1.50 ounce webbing shall be woven with one stuffer-warp end between each binder warp and on each edge, 9 ground-warp ends weaving singly on one edge and 8 ground-warp ends weaving singly on the other edge. When latch needle type shuttleless looms are utilized, the filling yarn shall traverse the full width of the

webbing and shall be held at the edge by an extra catch-cord end, interlacing with the filling yarns, in the method depicted in Figure 1 or 3. When bobbin type shuttleless looms are utilized, interlacing of the catch-cord and the filling shall occur within the selvage area before the first binder end (see Figure 2).

3.12.5 Type IV.

3.12.5.1 Type IV 5/8 inch; 1 inch; 1-1/4 inch; 1-3/8 inch; and 2-1/4 inch. Webbing shall be composed of three ground-warps (face, middle, and back), one binder warp, and one 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 middle warp shall weave plain with the picks that weave in the middle. The binder warp shall weave three up (one face, one middle, one face) and three down (one back, one middle, one back). Each binder shall weave the same so as to form a filling rib effect on both face and back of webbing. The selvage on the 2-1/4 inch and 1-1/4 inch webbing shall be five ground-warp ends on each side, for the 5/8 inch, six ground-warp ends on each side; and for the 1-3/8 inch, nine ground-warp ends on one side and eight ground-warp ends on the other. For the 1-inch Type IV webbing, there shall be nine ground ends on each selvage. The filling shall weave as follows:

1 pick on face
1 pick in middle
1 pick on face
1 pick on back
1 pick in middle
1 pick on back

3.12.5.2 Type IV 2-1/4 inch. Webbing shall be the same as for Type IIa, except that there shall be two ends of ground-warp weaving as one: 11 warp ribs formed by having 9 stuffer-warp ends in each rib with at least one binder between each rib, 8 ground-warp ends weaving singly on one edge, and 7 ground-warp ends weaving on the other edge.

3.12.5.3 Type IV 1-1/4 inch, shuttleless loom webbing. Webbing shall consist of two warps bound together by a single filling and binder warp. The face warp shall weave plain with the picks showing on the face. The back warp shall weave plain with the picks showing on the back. The binder-warp ends shall weave 2 up and 2 down. There shall be 4 stuffer-warp ends between each binder warp and no stuffer on each side. Each selvage shall consist of 4 ground-warp ends. The filling shall weave 2 picks on the face and 2 picks on the back. When latch needle type shuttleless looms are utilized, the filling yarn shall traverse the full width of the webbing and shall be held at the edge by an extra catch-cord end, interlacing with the filling yarn, in a method depicted in Figures 1 or 3.

3.12.6 Type V. The weave shall be as shown on Figure 5.

3.12.7 Type VI. The webbing shall consist of two warps 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 plain throughout.

3.13 Toxicity. The finished (item name) shall not present a health hazard and shall show compatibility with prolonged, direct skin contact when tested as specified in 4.7.5. Chemicals recognized by the Environmental Protection Agency (EPA) as human carcinogens shall not be used.

3.14 Length and put-up. (For Government procurements only) Unless otherwise specified (see 6.2), the webbing shall be put on rolls and each roll shall contain no more than three (3) pieces and the minimum length of any piece shall be 3 yards. One end of each piece in the roll shall be marked with paper or other means to reveal the number of pieces in the roll. The length of the rolls shall be as follows:

a. Type II: Not more than 100 yards nor less than 80 yards per roll, except that, for widths narrower than 5/8-inch, the minimum roll length may be 50 yards, with not more than two (2) pieces per roll.

b. Type IIa: Not more than 80 yards nor less than 60 yards per roll, except that, for widths narrower than 5/8-inch, the minimum roll length may be 40 yards, with not more than two (2) piece per roll.

c. Type IIb: Not more than 80 yards nor less than 60 yards per roll, except that the 5/8-inch width shall be furnished in rolls not less than 35 yards nor more than 40 yards in length, with not more than two pieces per roll; or not less than 41 yards to a maximum length roll of 50 yards, with not more than three (3) pieces per roll.

d. Type III: Not more than 60 yards nor less than 50 yards per roll, except that the 5/8-inch width shall be furnished in rolls not less than 35 yards nor more than 40 yards in length, with not more than two (2) pieces per roll; or not less than 41 yards to a maximum length roll of 50 yards, with not more than three (3) pieces per roll.

e. Type IV: For 5/8-inch, 0.90 ounce, not more than 40 yards nor less than 35 yards per roll with not more than two (2) pieces per roll, or not less than 41 yards to a maximum length roll of 50 yards with not more than three (3) pieces per roll.

f. Type IV: For 1-1/4 inches, 1.90 ounces; 1-3/8 inches, 2.25 ounces; and 1-inch, 1.05 ounces not more than 60 yards nor less than 52 yards per roll in multiples of 1-1/3 yards, and the shortest piece shall be not less than 4 yards for the 1-3/8 inch width and 1-1/2 yards for the 1-1/4 inch width. The use of adhesive tape, staples, butt sewing, or other devices to fasten adjoining ends of pieces of the 1-1/4 inch and 1-inch

width in the same roll is prohibited.

g. Type IV: For 2-1/4 inches, 3.40 and 4.30 ounces to be furnished in 36 to 78 yard rolls. No more than 10 percent of rolls furnished are to be rolls of no more than three (3) pieces. When a roll contains more than one (1) piece of webbing, adjacent end of pieces shall be overlapped a distance of approximately 24 inches and not butted end to end. No single piece shall be less than 50 inches in length.

h. Type V: Not more than 60 yards nor less than 50 yards per roll. No roll shall contain more than two (2) pieces, and no piece shall be less than 10 yards in length.

i. Type VI: To be furnished in rolls, the roll shall be in one continuous piece, with a minimum of 30 yards and a maximum of 35 yards per roll.

3.15 Fiber identification. Each roll of finished cloth shall be labeled or ticketed for fiber content in accordance with the Rules and Regulations under the Textile Fiber Products Identification Act.

3.16 Workmanship. The finished webbing shall be uniform in quality and shall conform to the quality of product established by this specification. The (occurrence of defects or demerit points), as specified in 4.5, shall not exceed the criteria specified in the contract or purchase order.

4. VERIFICATION

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

a. First article inspection (see 4.3)
b. Conformance inspection (see 4.4)

4.2 Inspection conditions. Unless otherwise specified, excluded, amended, modified or qualified in this specification or applicable procurement documents (see 6.2), all inspections shall be performed in accordance with all the requirements of referenced documents.

4.3 First article inspection. A first article, submitted in accordance with (3.1), shall be inspected, examined for appearance, color and finished defects and tested for the characteristics as specified in Table X.

4.4 Conformance inspection. Conformance inspection shall include the examination of 4.5 and the tests of 4.6 through 4.7 as applicable. Sampling for inspection shall be performed in accordance with ASQ/ANSI Z1.4 and with acceptance quality limits as specified in the contract and/or order, except where otherwise indicated.(see 6.2).

4.5 Yard-by-yard examination.

4.5.1 Visual examination. Each webbing roll in the sample shall be examined yard-by-yard on the face side for defects in accordance with MIL-STD-3064, Type IV.

4.5.2 Roll identification and marking examination. During the yard-by-yard examination each roll in the sample shall be examined for defects as specified in MIL-STD-3064.

4.5.3 Shade variation examination. During the yard-by-yard examination, each roll in the sample shall be examined for shade variation as specified in MIL-STD-3064.

4.5.4 Length examination. During the yard-by-yard examination, each roll in the sample shall be examined for length as specified in MIL-STD-3064.

4.6 End item testing. The webbing shall be tested for the characteristics listed in Table I through IX. The methods of testing as specified in Table X and 4.7 shall be followed. All test reports shall contain the individual values utilized in expressing the final results. The sample unit for the webbing shall be as follows for all physical and chemical tests:

a. Classes 1, 2, and 3 webbing – six (6) linear yards
b. Classes 1a, 1b, and 2a - nine (9) linear yards of the finished webbing, and 1/2 linear yard of the webbing prior to treatment.
c. Classes 4, 7, and 8 – 30 linear yards of the dyed and finished webbing, and 1/2 linear yard of the dyed webbing prior to treatment.

The lot shall be unacceptable if one (1) or more sample units or the lot average fail to meet any requirement specified. The sample size shall be in accordance with the following:

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

TABLE X. End item tests.

Characteristic	Requirement reference	Test method
Cotton fiber content	3.5.1	AATCC 20 (see 6.4)
Yarn ply	3.5.1	Visual 1/
Catch-cord yarn count	3.5.1	Visual
Labile sulfur	3.6.1	4.7.1
Visual shade matching	3.6	4.7.2
Colorfastness: Weathering Laundering (after 3 cycles) Perspiration (Acid & Alkaline) Crocking (Wet & Dry)	 Table I Table I Table I Table I	 AATCC 169, Option 1, 2/ AATCC 61 Test 3A, 3/, 4/, 5/ AATCC 15, 3/, 4/ AATCC 8, 6/
Spectral reflectance	3.7	4.7.3
Water repellency: Dynamic absorption	 3.8.1	 AATCC 70
Mildew resistance, Class 1a, 2a, and 4 (observed fungus growth), 8/ After leaching, 10/	3.8.2	 AATCC 30, Test III, 9/
Rot resistance, Class 1b, and 4 (percent strength retained), 11/ After leaching and burial, 10/	3.8.3	 AATCC 30, Test I, 9/, 12/
Width	Table III - IX	Precision steel rule
Weight	Table III - IX	ASTM D3776/D3776M
Yarns per inch (warp & filling)	Tables III - IX	ASTM D3775, 1/
Yarn size (warp & filling)	Table III - IX	ASTM D1907/D1907M
Breaking strength (warp & filling)	Table III - IX	ASTM D5035, 7/
Thickness	Table VIII and IX	ASTM D1777, Option 2
pH	3.9	AATCC 81
Curvature	3.11	4.7.4
Weave	3.12 - 3.12.7	Visual, 1/, 2/
Toxicity	3.13	4.7.5

1/ One specimen shall be tested for each sample unit.

2/ Rated using AATCC Evaluation Procedure 1, Gray Scale for Color Change.

3/ Rated using AATCC Evaluation Procedure 1, Gray Scale for Color Change and AATCC Evaluation Procedure 2, Gray Scale for Staining.

4/ Color transfer cloth, only the stain on the cotton fibers of the color transfer cloth shall be evaluated.

5/ The specimen must be dried after each of the 3 laundering cycles.

6/ Rated using the AATCC Evaluation Procedure 8, AATCC 9-Step Chromatic Transference Scale.
7/ During the breaking strength test, it shall be observed whether the nonconventional edge of the shuttleless loom webbing ruptures prior to the body of webbing. When the edge ruptures at a breaking strength value less than the minimum requirement specified, the webbing shall be rejected.
8/ AATCC 30, Test III will be used for First Article (see 6.2).
9/ Five (5) specimens shall be evaluated.
10/ Leaching shall be conducted in accordance with procedure in Appendix A1 of AATCC 30, prior to testing.
11/ AATCC 30, Test I will be required for First Article (see 6.2).
12/ The samples shall be evaluated for breaking strength using ASTM D5035 before soil burial exposure and after leaching and soil burial exposure to calculate the percent strength retained from soil burial exposure. It shall be calculated as follows:

Percent strength retained = $100-((O-F/O)\ x100)$
Where:
O = Original (treated) breaking strength before soil burial exposure
F = Final breaking strength after leaching and solid burial exposure

4.7 Methods of inspection.

4.7.1 Presence of labile sulfur test. In the determination of presence of labile sulfur in textile materials with lead acetate, two (2) 1.50 (± 0.01) gram samples from each material submitted for evaluation shall be tested. Each of the two (2) samples shall be cut into very small pieces and placed into separate test tubes. The samples shall be submersed in a stannous chloride solution that contains 100 grams of stannous chloride crystals ACS in 100 milliliters of hydrochloric acid ACS (35 percent concentration) and 50 milliliters of distilled water. A filter paper wet out with a 5.0 percent lead acetate solution shall be placed over top of the test tube. The lead acetate solution contains 5.0 grams of lead acetate CP reagent grade and enough distilled water to make up a 100 milliliter solution; if the solution is not clear, add a few drops (one at a time) of glacial acetic acid until the solution is clear. The test tube containing the textile sample, stannous chloride and wet filter paper shall be heated over a low flame until the solution is boiling. The solution should not be heated for more than 15 seconds. A brown to black stain on the filter paper should be evaluated as follows:

Free - The filter paper shows no discoloration or staining of any kind.
Slight - The filter paper shows a light tan to light brown discoloration stain.
Moderate - The filter paper shows a dark brown discoloration stain.
Severe - The filter paper shows a black color stain.

The rating shall be recorded. The results shall be recorded as “pass” or “fail”.

4.7.2 Visual shade matching. The color and appearance of the webbing shall match the standard sample when viewed using the AATCC Evaluation Procedure 9, Option C (see 6.5), with sources simulating artificial daylight D75 illuminant with a color temperature of 7500K (± 200) illumination of 100 (±20) foot candles, and shall be a good match to the standard sample under incandescent A illuminant with a color temperature of 2856K (± 200).

4.7.3 Spectral reflectance test. Spectral reflectance data shall be obtained from 600 to 860 nanometer (nm) at 20nm intervals on a spectrophotometer relative to the polytetrafluoroethylene (PTFE) family of compounds, the preferred white standard. Other white reference materials may be used provided they are calibrated to absolute white or vitrolite tiles. The spectral band width shall be less than 20 nm at 860 nm. Reflectance measurements shall be made by either the monochromatic or polychromatic mode of operation. When the polychromatic mode of operation is used, the spectrophotometer shall operate with the specimen diffusely illuminated with the full emission of a continuous source that simulates in the visible spectrum either CIE Source A or CIE Source D65. The specimen shall be viewed at an angle of no greater than 10º from normal, the specular component included. Measurements shall be taken on a minimum of two (2) different areas and the data averaged. The webbing shall be measured as a single layer backed with four (3) layers of the same shade cut from the standard. Specimens shall be oriented in different directions during testing. When possible, the specimens tested shall not contain the same warp and filling yarns. Photometric accuracy of the spectrophotometer shall be within one (1) percent and wavelength accuracy within two (2) nm. Any color having spectral reflectance values falling outside the limits at four (4) or more of the wavelengths specified shall be considered a test failure.

4.7.4 Measurement of lateral curvature.

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

4.7.4.2 Number of determinations. Five (5) specimens shall be tested from each sample unit. Each specimen shall not exceed 1/4-inch.

4.7.4.3 Apparatus.

a. A sheet of poly methyl methacrylic (PMMA) (plexiglass) 5weighing approximately 35 ounces with dimensions of 45 inches by 5 inches by 1/4 inch.
b. A straight edge ruler - a rigid straight edge measuring 36 inches in length capable of measuring to 1/32 of an inch.
c. A roller – a roller one (1) inch in diameter and weighting 1-1/2 pounds.

4.7.4.4 Procedure. Place the specimens flat on a smooth, horizontal flat surface without tension and allow them to reach moisture equilibrium as defined in ASTM D1776/D1776M.

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 PMMA on the specimen for a period of 1 hour. Without moving the PMMA on the specimen, place the straight edge on the PMMA so that both ends of the straight edge are aligned perpendicular to the outermost edge of the specimen. Determine the highest degree of curvature of the specimen from the specimen from the straight edge by measuring to the nearest 1/32 inch perpendicular to the straight edge. Record the highest measurement (see Figure 4).

4.7.4.5 Report. The results of each determination from each sample unit shall be recorded.

4.7.5 Toxicity test. When required, (see 6.2), an acute dermal irritation study and a skin sensitization study shall be conducted. When the results of these studies indicate the webbing is not a sensitizer or irritant, a Repeat Insult Patch Test shall be performed in accordance with the Modified Draize Procedure (see 2.3). If the toxicity requirement (see 3.13) can be demonstrated with historical use data on the finishing treatments used, toxicity testing may not be required (see 6.2).

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

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 for use in the manufacture of tentage, clothing, and equipage items.

6.2 Acquisition requirements.

a. Title, number, and date of this specification.
b. Type and Class required (see 1.2).
c. The specific issue of individual documents referenced (see 2.2).
d. When first article is required (see 3.1, 4.3).
e. When toxicity testing is required (see 3.13 and 4.7.5).
f. Length required if other than specified (see 3.14).
g. Conformance inspection acceptance quality limits (AQL) (see 4.4).
h. Inspection conditions (see 4.2).
i. Packaging (see 5.1).

6.3 Standard sample. For access to samples and pattern drawings, address the contracting activity issuing the invitation for bids or request for proposal.

6.4 Certificate of compliance. The contracting activity may select to accept a certificate of compliance for stated requirement.

6.5 Visual shade matching. In 2019, Option A of AATCC Evaluation Procedure 9, Visual Assessment of Color Difference of Textiles was changed to Option C. NOTE: In case of confusion, the viewing geometry should be "The specimen plane and illumination source shall be parallel to each other and aligned so that the light flux is incident at the center of the specimen plane, which is set at a 35 (± 5º) angle relative to the horizontal. The observer shall view the specimens at a 90º angle, relative to the plane of the specimens".

6.6 Subject term (key word) listing.

Clothing
Mildew treatment
Plain weave
Tentage

6.7 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

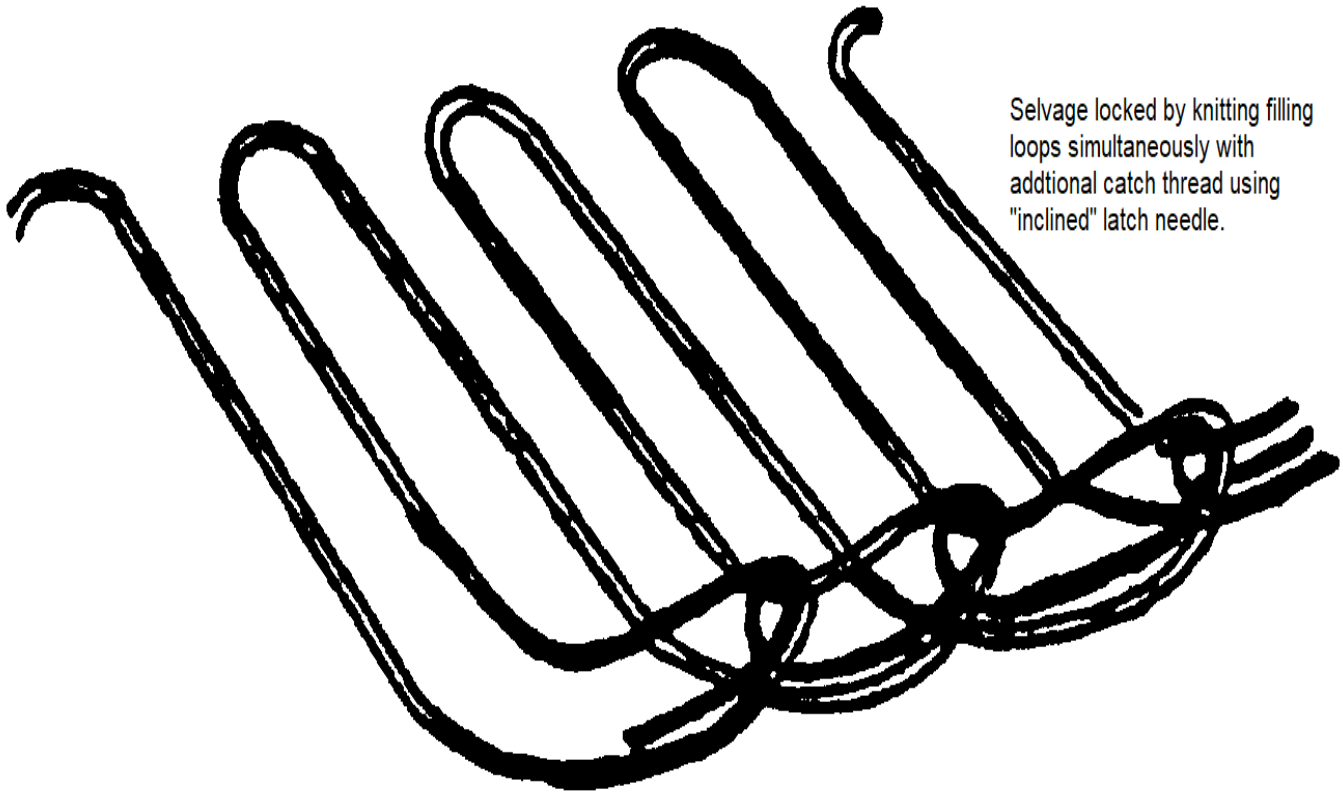

FIGURE 1. Catch-cord diagram

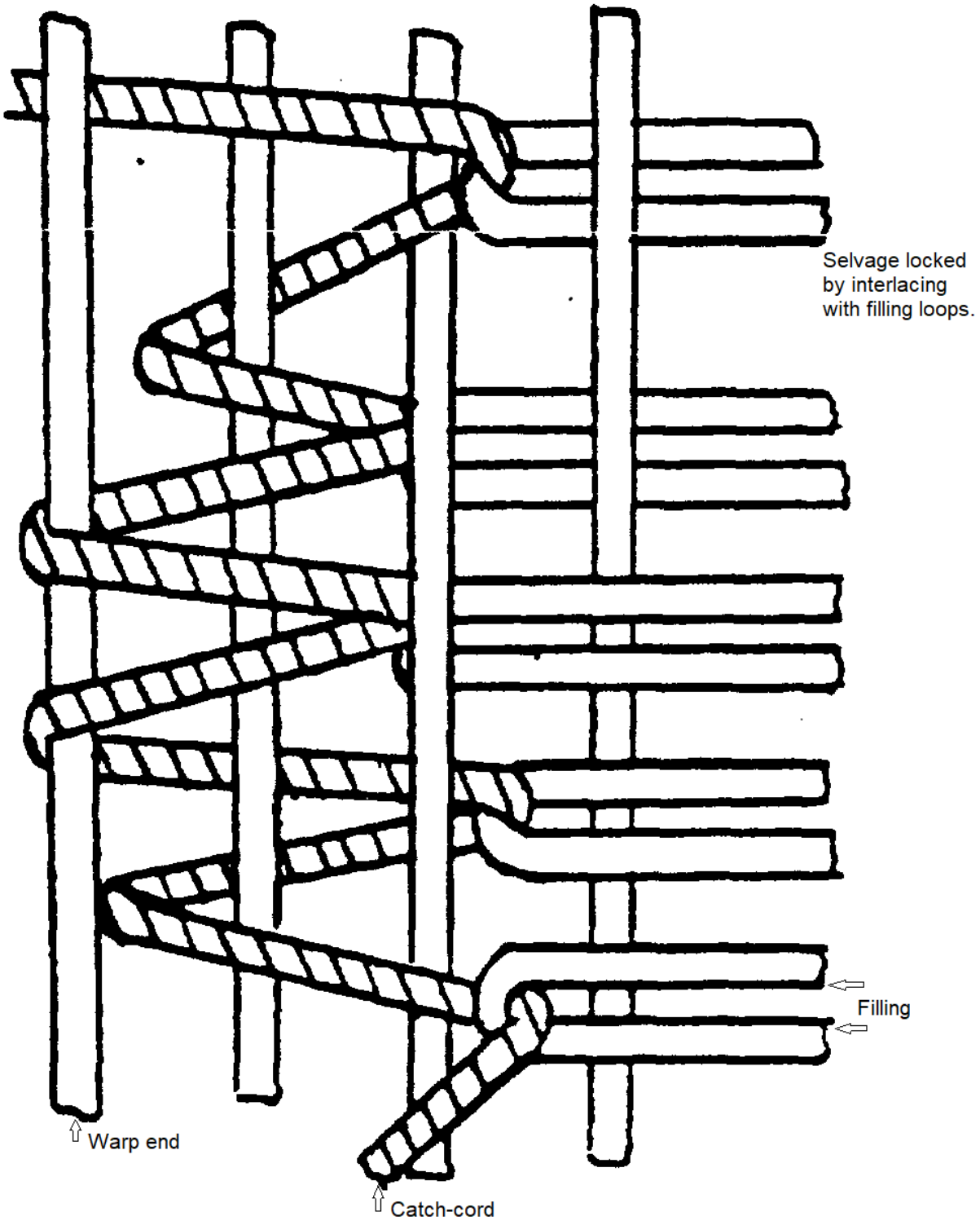

FIGURE 2. Catch-cord diagram.

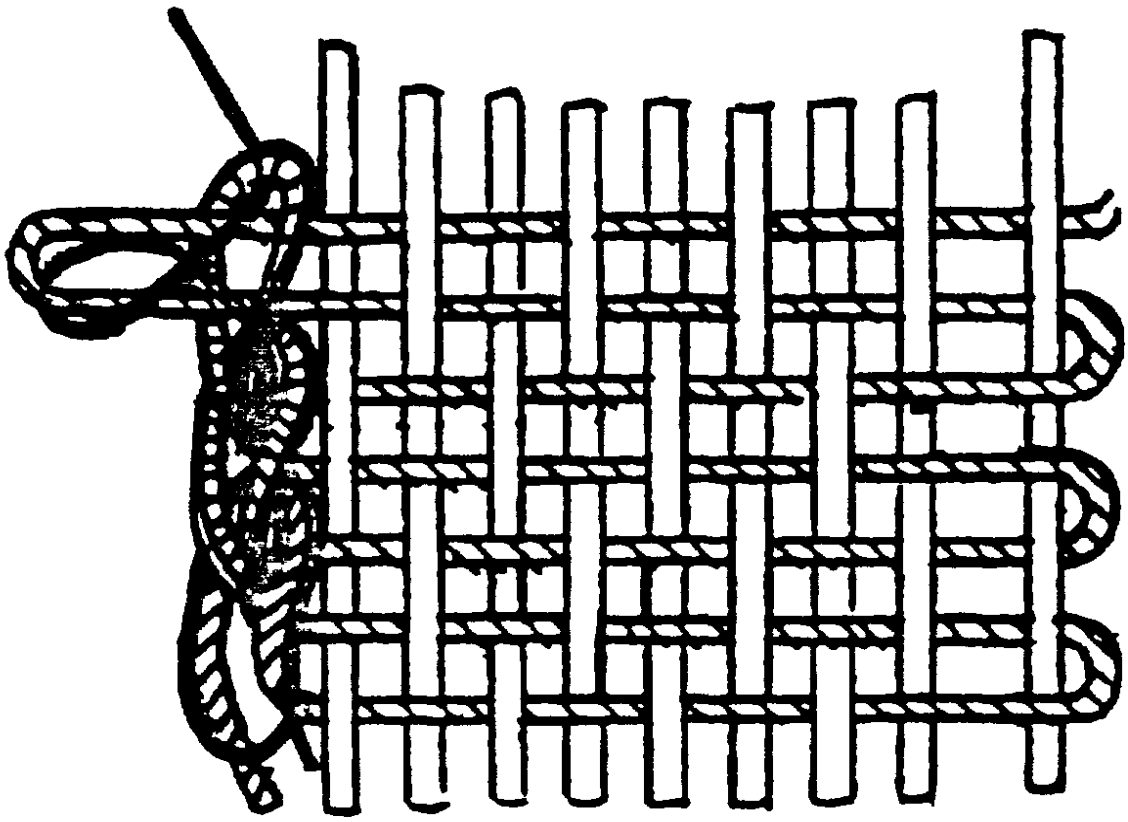

FIGURE 3. Catch-cord diagram

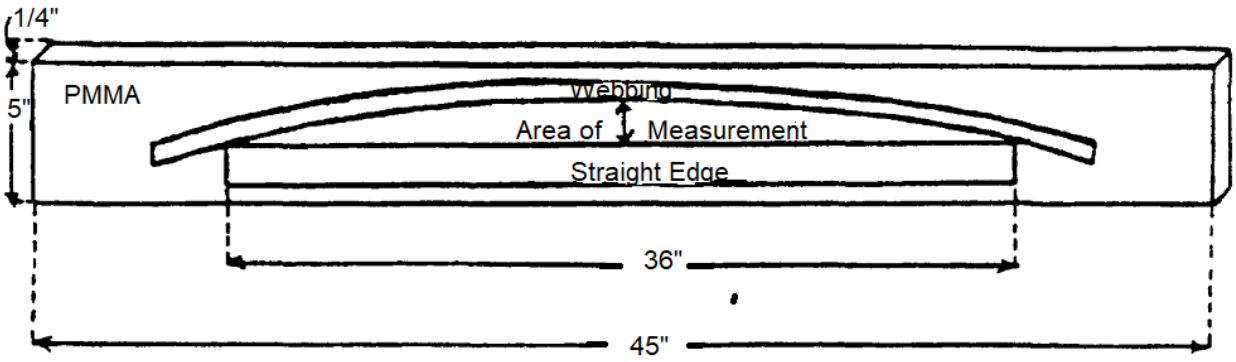

FIGURE 4. Diagram curvature measurement.

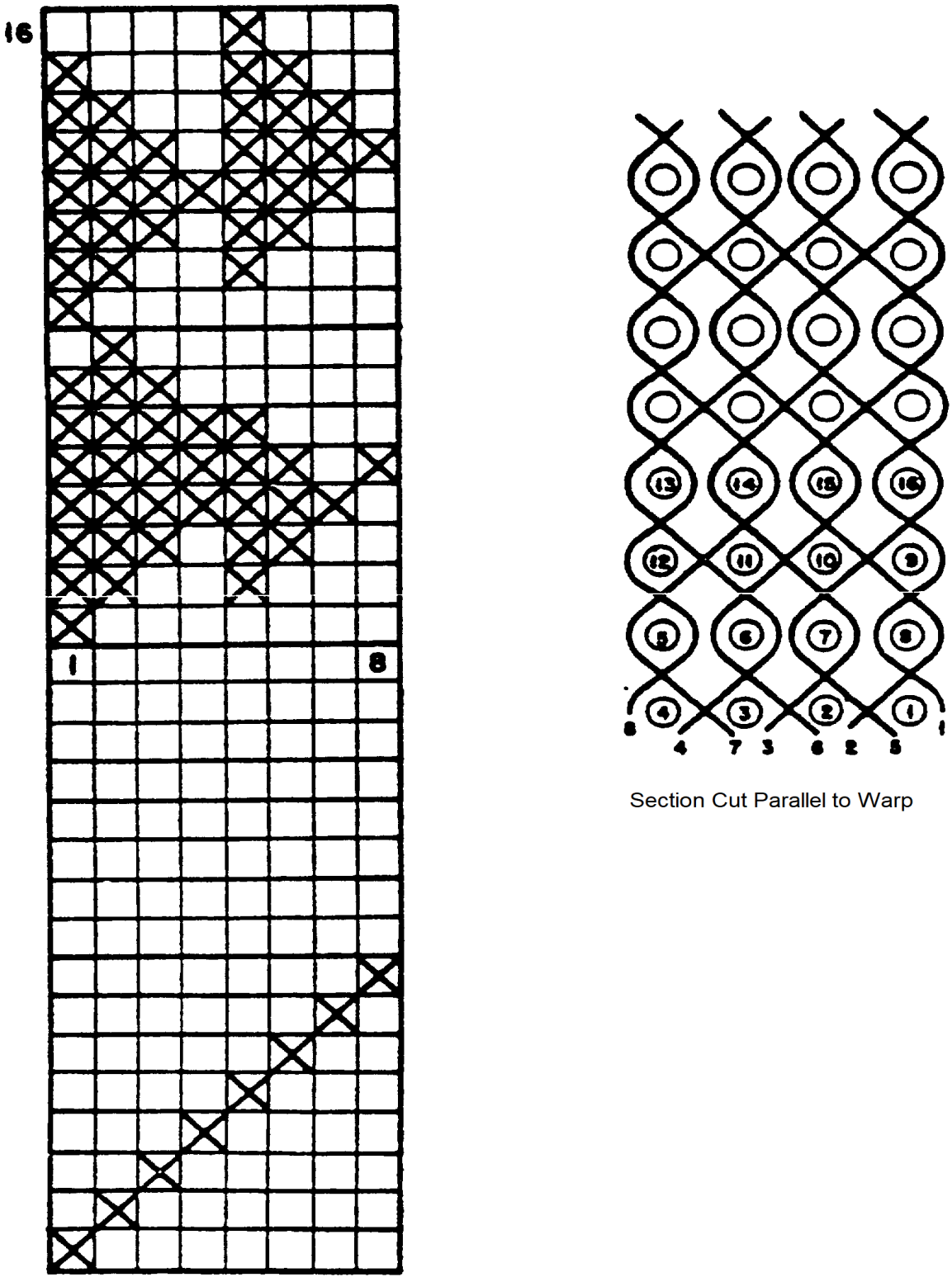

FIGURE 5. Weave of webbing for Type V.

Custodians:
Army - GL
Navy - NU

Preparing activity:
DLA-CT

Review activities:
Navy - MC

(Project: 8305-2020-007)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using ASSIST Online database at https://assist.dla.mil.