JJ-W-155H
June 30, 1988
SUPERSEDING
JJ-W-155G
August 10, 1983

FEDERAL SPECIFICATION

WEBBING, TEXTILE, (COTTON, ELASTIC)

This specification is approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers webbing, textile, cotton, elastic.

1.2 Classification.

1.2.1 Types and classes. Webbing shall be of the following types and classes as specified (see 6.2).

Type I - Woven		
Class 1	Unbleached, bleached, or dyed	Water repellent, mildew resistant
Class 2	Unbleached, bleached, or dyed	-
Class 3	Unbleached, bleached, or dyed	-
Class 4	Unbleached, bleached, or dyed	-
Class 5	Unbleached, bleached, or dyed	Mildew resistant
Class 6	Unbleached, bleached, or dyed	-
Class 7	Unbleached, bleached, or dyed	-
Class 8	Dyed	-
Class 9	Bleached	-

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

Class 10	Unbleached, bleached, or dyed	-
Class 11	Unbleached, bleached, or dyed	-
Class 12	Unbleached, bleached, or dyed	-
Class 13	Unbleached	-
Class 14	Unbleached, bleached, or dyed	-
Class 15	Unbleached	
Class 16	Unbleached	
Class 20	Unbleached, bleached, or dyed	Water repellent, mildew resistant
Class 22	Unbleached, bleached, or dyed	-
Class 24	Unbleached, bleached, or dyed	-
Class 26	Unbleached, bleached, or dyed	Water repellent, mildew resistant
Class 27	Unbleached	Mildew resistant
Class 28	Bleached or dyed	-
Class 29	Bleached	-

Type II - Braided

Class 1	Unbleached, bleached, or dyed	-
Class 2	Unbleached, bleached, or dyed	-
Class 3	Unbleached, bleached, or dyed	-

2. APPLICABLE DOCUMENTS

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

Federal Standards:

FED-STD-123 - Marking for Shipment (Civil Agencies)
FED-STD-191 - Textile Test Methods

(Activities outside the Federal Government may obtain copies of Federal specifications, standards, and commercial item descriptions as outlined under General Information in the Index of Federal Specifications, Standards and Commercial Item Descriptions. The Index, which includes cumulative bimonthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-0001.)

(Single copies of this specification and other Federal specifications and commercial item descriptions required by activities outside the Federal Government for bidding purposes are available without charge from General Services Administration Business Service Centers in Boston, MA; New York, NY; Philadelphia, PA; Washington, DC; Atlanta, GA; Chicago, IL; Kansas City, MO; Fort Worth, TX; Denver, CO; San Francisco, CA; Los Angeles, CA; and Seattle, WA.)

(Federal Government activities may obtain copies of Federal standardization documents and the Index of Federal Specifications, Standards, and Commercial Item Descriptions from established distribution points in their agencies.)

Military Specification:

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

Military Standard:

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

Federal Regulations:

Federal Trade Commission

Rules and Regulations Under the Textile Fiber Products Identification Act

(The Code of Federal Regulations (CFR) and the Federal Register (FR) are for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-0001. When indicated, reprints of certain regulations may be obtained from the Federal agency responsible for issuance thereof.)

(Copies of military specifications and standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on the date of invitation for bids or request for proposal shall apply.

American Society for Testing and Materials (ASTM)

D 572 - Test for Rubber - Deterioration by Heat and Oxygen Pressure
D 573 - Test for Rubber - Deterioration in an Air Oven

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187.)

(Industry association specifications and standards 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 specification and the references cited herein, the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Standard sample. The finished webbing or braid 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.

3.2.1 Yarn. Yarn shall be made from cotton which has been cleaned, either carded or combed, spun, and twisted to a count and ply as specified in tables I and II.

3.2.2 Elastic strands. The elastic strands for all webbing shall be made of compounded natural rubber, synthetic rubber, or a mixture thereof. The strands shall be of the gage specified in tables I and II. Where a core is covered, it shall be wrapped with multiple ends of cotton yarns as specified in tables I and II.

3.3 Color. The webbing shall be unbleached, bleached, or dyed as specified in tables I and II (see 6.2). When dyed webbing is specified, the cotton yarns shall be vat dyed before weaving. 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 not more than a slight trace of labile sufur as defined in the test method specified in 4.2.3.

3.3.1 Matching. The color of the finished 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 ± 200K, with illumination of 100 ± 20 foot candles and shall be a good match to the standard sample under incandescent lamplight at 2300 ± 200K.

3.3.2 Colorfastness. The dyed webbing for all types and classes except type I, classes 2, 3, 4, 7, and 12 and type II, classes 1 and 2 shall show fastness to laundering and accelerated weathering equal to or better than the standard sample or equal to or better than a rating of "good." The dyed webbing for type I classes 2, 3, 4, 7, and 12 and type II, classes 1 and 2 shall show fastness to light and laundering equal to or better than the standard sample or equal to or better than a rating of "good." When black is specified, it shall show fastness to laundering and accelerated weathering equal to or better than the standard sample or equal to or better than a rating of "fair." Testing shall be as specified in 4.2.3.

3.4 Physical requirements. Physical requirements shall be as shown in tables I and II. The following tolerances shall be permitted:

Width of webbing (inches)	Tolerance (inch)
1/4 to 7/8 inclusive	± 1/32 1/
1 to 2 inclusive	± 1/16
2-1/4 to 6 inclusive	± 1/8
6-1/2 to 18 inclusive	± 1/4

1/ For class 20 the tolerance shall be +1/16 -1/32.

3.5 Construction and weave.

3.5.1 Weave No. 1. Type I, classes 2, 3, 4, 7, 11, 12, and 26 webbing shall be composed of one ground warp, one stuffer warp, one elastic warp and one filling. The ground warp shall weave in a two up to two down order, one end per heddle, and one pick, so as to produce a plain weave effect on the face and back of the webbing. The stuffer warp ends and elastic warp strands shall weave in such a manner as to be over all the back picks and under all face picks.

3.5.2 Weave No. 2. Type I, classes 1, 5, 6, 13, 14, and 27 webbing shall be composed of one ground warp (elastic strands wrapped with multiple cotton ends) and one filling weaving plain.

3.5.3 Weave No. 3. Type I, classes 9, 10, and 29 webbing shall be composed of one ground warp, one sewing section warp, one elastic warp, and one filling. The ground warp and the sewing section warp shall weave two up and two down. The elastic warp shall weave one up and one down, over all back picks and under all face picks. Class 9 webbing shall have four sewing sections with each sewing section unit consisting of a minimum of six ends. Class 10 webbing shall have three sewing sections with the outside sewing section a minimum of three ends and the other two sewing sections a minimum of

four ends. Class 29 webbing shall have three sewing sections with the outside sewing section containing a minimum of four ends and the other two sewing sections containing a minimum of six ends each.

3.5.4 Weave No. 4. Type I, classes 8, 15, and 16 webbing shall be composed of one ground warp and one elastic warp (with strands wrapped) and one filling. The ground warp shall weave in a two up and two down order and the elastic warp shall weave in such a manner as to be over all the back picks and under all the face picks.

3.5.5 Weave No. 5. Type I, classes 20, 22, and 24 webbing shall be composed of two ground warps (one face and one back), one elastic warp, one stuffer warp, one binder warp, and one filling. The face and back warps of the webbing shall be crossed with picks so as to produce a plain weave effect on the face and on the back of the webbing. The stuffer warp and elastic warp shall weave in such a manner as to be over all the back picks and under all the face picks. A binder warp shall weave between the face pick and the back pick, over all the face picks and under all back picks.

3.5.6 Weave No. 6. Type I, class 28 webbing shall be composed of one ground warp, one elastic warp, and one filling. The ground warp shall weave one up and one down. The elastic warp shall weave one up and one down, over all back picks and under all face picks.

3.5.7 Weave No. 7. Type II, classes 1, 2, and 3 webbing shall be plain weave, two over and two under.

3.6 Tension.

3.6.1 Initial. All webbing shall meet the initial tension requirements specified in table III when tested as specified in 4.2.3 using the carriage load and elongation specified for the applicable class in table III.

3.6.2 After accelerated aging.

3.6.2.1 Tension (except class 5). All webbing except class 5 shall change not more than 20.0 percent from the initial tension after subjection to accelerated aging (oven method) when tested as specified in 4.3.

3.6.2.2 Tension (class 5). Class 5 webbing shall change not more than 20.0 percent from the initial tension after subjection to accelerated aging (oxygen bomb) when tested as specified in 4.3.

3.7 Permanent set.

3.7.1 Initial. The permanent set of all webbing shall not exceed more than 8.0 percent initially when tested as specified in 4.3.

3.7.2 Accelerated aging.

3.7.2.1 Permanent set (except class 5). The permanent set of all webbing except class 5 webbing after subjection to accelerated aging (oven method) shall be not more than 20.0 percent when tested as specified in 4.3.

3.7.2.2 Permanent set (class 5). The permanent set of class 5 webbing after subjection to accelerated aging (oxygen bomb) shall be not more than 20.0 percent when tested as specified in 4.3.

3.7.3 After low temperature. The permanent set of class 5 webbing at -25°F shall be not more than 35 percent when tested as specified in 4.3.

3.8 Elongation at low temperature (not applicable to classes 28 and 29).

3.8.1 Elongation (except classes 5, 28, and 29). The elongation of all other webbing at -40°F shall be not less than 10.0 percent when tested as specified in 4.3.

3.8.2 Elongation (class 5). The elongation of class 5 webbing after subjection to elongation at -25°F shall be not less than 50.0 percent when tested as specified in 4.3.

3.9 Class 5 webbing, after subjection to boiling water. The class 5 webbing shall meet all the requirements for the following characteristics after subjection to boiling water as specified in 4.3.13 when tested as specified in 4.3.

a. Tension before and after aging (3.6.1 and 3.6.2.2).
b. Elongation at -25°F (3.8.2).
c. Permanent set before and after aging (3.7.1, 3.7.2.2).
d. Permanent set at -25°F (3.7.3).

TABLE I. Physical requirements (finished), type I, woven

Class	Width (inches)	Thickness of webbing (inches)	Weight per linear yard ounces (min)	Color	Yarns, full width (min)				Min yarns per inch filling	Yarn size ± 2 counts/ply		Elastic strands gage (per in, max fineness)	Weave number (see 3.5.1 thru 3.5.7)
					Ground warp	Binder warp	Stuffer warp	Elastic strands		Warp	Filling		
1	1/2	0.040-0.060	0.25	1/	18	-	-	7	50 2/	20/2	24/2	36 1/	2
2	1/2	0.042 (min)	0.30	1/	21	-	6	8	100	24/2	24/2	30	1
3	3/4	0.042 (min)	0.43	1/	30	-	9	11	100	24/2	24/2	30	1
4	7/8	0.042 (min)	0.50	1/	36	-	11	13	100	24/2	24/2	30	1
5	7/8	0.040-.060	0.45	1/	33	-	-	12	50 2/	20/2	24/2	36 1/	2
6	1	0.045-.060	0.50	1/	36	-	-	13	50	20/2	24/2	36 1/	2
7	1	0.042 (min)	0.57	1/	42	-	13	15	100	24/2	24/2	30	1
8	1-1/4	0.050-0.065	0.54	1/	26	-	-	14	52	24/2	20/2	50 1/	4
9	1-1/4	-	0.62	Bleached	28	24 3/	-	14	60 4/	20/2	20/2	36 5/	3
10	1-1/2	0.050 (min)	0.65	1/	26	11 3/	-	17	70 6/	16/2	12/1	44 1/	3
11	1-1/2	0.038 (min)	0.85	1/	100	-	24	26	96 7/	24/2	24/2	30 8/	1
12	1-1/2	0.043 (min)	0.87	1/	66	-	21	23	100	24/2	24/2	30	1
13	1-3/4	0.048 (min)	0.95	Unbleached	54	-	-	19	40	12/2	12/1	36 1/	2

TABLE I. Physical requirements (finished), type I, woven - Continued

Class	Width (inches)	Thickness of webbing (inches)	Weight per linear yard ounces (min)	Color	Yarns, full width (min)				Min yarns per inch filling	Yarn size ± 2 counts/ply		Elastic strands gage (per in, max fineness)	Weave number (see 3.5.1 thru 3.5.7)
					Ground warp	Binder warp	Stuffer warp	Elastic strands		Warp	Filling		
14	2	0.048 (min)	1.25	11/	63	-	-	22	40	12/2	12/1	36 1/	2
15	3	0.049	1.28	Unbleached	42	-	-	22	52	24/2	20/2	50 1/	4
16	6	0.049	2.60	Unbleached	82	-	-	42	52	24/2	20/2	50 1/	4
20	1/2	0.09	0.55	11/	53	7	6	28	60 10/	20/2	20/2	30	5
22	1-1/2	0.09	1.50	11/	153	36	17	19	60	20/2 and 12/2	12/2	30	5
24	1-1/2	0.09	2.10	11/	182	40	38	44	86	20/2 and 12/2	24/2	30	5
26	5/8	0.053	0.43	11/	46	-	10	12	96	30/2	24/2	28	1
27	5	0.048	3.25	11/	162	-	-	55	40	12/2	12/1	36 1/	2

TABLE I. Physical requirements (finished), type I, woven - Continued

Class	Width (inches)	Thickness of webbing (inches)	Weight per linear yard ounces (min)	Color	Yarns, full width (min)				Min yarns per inch filling	Yarn size ± 2 counts/ply		Elastic strands gage (per in, max fineness)	Weave number (see 3.5.1 thru 3.5.7)
					Ground warp	Binder warp	Stuffer warp	Elastic strands		Warp	Filling		
28	1-1/4	-	0.50	Bleached or Olive Drab 7	35	-	-	12	40 9/	16/2	16/2	42	6
29	1-1/4	-	0.62	Bleached	36	16 2/	-	14	60 6/	20/2	20/2	36 3/	3

1/ Elastic thread shall be covered with a double spiral wrap with 1 to 4 ends in bottom layer, and 1 to 4 ends spiralling in opposite direction in the top layer.

2/ 50 yarns per inch of 24/2 yarn or 90 yarns per inch of 40/2 yarn with 2 yarns in a shed.

3/ Sewing section warp.

4/ 60 yarns per inch of 20/2 yarn or 120 yarns per inch of 20/1 yarn with 2 yarns in a shed.

5/ Core wrapped with minimum of 3 ends cotton on bottom cover and 1 end cotton in opposite direction as top cover.

6/ 70 yarns per inch of 12/1 yarn or 140 yarns per inch of nominal 20/1 yarn with 2 yarns in a shed.

7/ 96 yarns per inch of 24/2 yarn or 160 yarns per inch of 40/2 yarn with 2 yarns in a shed.

8/ Unwrapped elastic strands. The edges may be covered rubber.

9/ 40 yarns per inch of 16/2 yarn or 80 yarns per inch of 16/1 yarn with 2 yarns in a shed.

10/ 60 yarns per inch of 20/2 yarn or 120 yarns per inch of 40/2 yarn with 2 yarns in a shed.

11/ [illegible] r shall be as specified.

TABLE II. Physical requirements (finished), type II braided

Class	Width (inch)	Thickness (inch)	Weight per linear yard, (ounces, min)	Color	Yarns full width (min)		Yarns per inch, filling	Yarn size ±2 counts/ply	Elastic strand gage per inch (max fineness)	Weave number
					Elastic strands	Carriers				
1	5/16	0.035-0.050	0.16	1/	8	17	68	20/2	42	7
2	7/16	0.035-0.050	0.20	1/	12	25	68	20/2	42	7
3	9/16	0.035-0.050	0.24	1/	16	33	68	20/2	42	7

1/ Color shall be dyed as specified.

3.10 Treatment. Unless otherwise specified (see 6.2) type I, classes 1, 20, and 26 webbing shall be furnished water repellent and mildew resistant treated as specified below. Type I, class 5 and class 27 webbing shall be furnished mildew resistant treated. All other types and classes shall meet all applicable requirements of this specification and, unless otherwise specified, shall be furnished in the untreated state.

3.10.1 2,2' Methylenebis-(4-chlorophenol). The webbing specified in 3.10 shall be mildew resistant treated with 2,2' methylenebis-(4-chlorophenol) so that the concentration of the inhibitor deposited on the cotton component of the webbing shall be 1.35 ± 0.25 percent, when tested as specified in 4.3. No single determination shall fall below the minimum specified.

3.10.1.1 Application. The inhibitor shall be applied from a two-bath aqueous emulsion so as to deposit the specified concentration of the inhibitor evenly on the webbing.

3.10.2 Water repellency. Classes 1, 20, and 26 shall have a water repellent finish. The water repellent shall consist of aluminum salts of saturated carboxylic acid (such as formate, acetate, palmitate or stearate) mixed with refined mineral and vegetable waxes, titanate esters, or a combination of both. The product shall be applied either in the form of an aqueous emulsion or in the form of a water-free solvent solution. The dynamic absorption of the treated material shall be no more than 40 percent when tested as specified in 4.3.

TABLE III. Elongation load

Type	Class	Carriage load, lbs	Percent elongation	Tension, lbs	
				Minimum	Maximum
I	1	10	50	1.20	1.50
	2	15	50	1.30	1.60
	3	15	50	1.70	2.05
	4	15	50	2.05	2.45
	5	15	50	1.65	3.25
	6	15	50	2.30	2.75
	7	20	50	2.35	2.85

TABLE III. Elongation load - Continued

Type	Class	Carriage load, lbs	Percent elongation	Tension, lbs	
				Minimum	Maximum
	8	10	50	0.75	1.10
	9	15	50	1.45	1.95
	10	15	50	1.30	1.60
	11	25	40	4.50	7.00
	12	25	50	3.60	4.45
	13	20	50	1.95	2.40
	14	20	50	2.35	2.85
	15	20	50	1.25	1.55
	16	10	50	1.05	1.35
	20	30	50	4.40	6.00
	22	40	40	6.10	7.50
	24	50	40	11.60	14.10
	26	15	50	2.10	2.50
	27	30	50	3.15	4.65
	28	15	50	1.15	1.75
	29	15	50	1.45	1.75
II	1	10	50	0.70	1.00
	2	10	50	0.80	1.10
	3	15	50	1.00	1.50

TABLE IV. Elongation load (low temperature)

Type	Class	Elongation load, lbs
1	1	1.50
	2	1.80
	3	2.30
	4	2.60
	5	4.00
	6	2.60
	7	3.10
	8	1.00
	9	1.75
	10	1.60
	11	7.75
	12	4.70
	13	2.50
	14	2.75
	15	1.60
	16	3.00
	20	5.80
	22	15.25
	24	18.50
	26	2.30
	27	6.50

TABLE IV. Elongation load (low temperature) - Continued

Type	Class	Elongation load, lbs
II	1	0.90
	2	1.00
	3	1.10

3.11 Put-up. Unless otherwise specified (see 6.2), the webbing shall be put-up on rolls or double-headed spools, except that type I, class 20 webbing shall be put-up on double-headed spools only, containing the yardage specified in table V. All type webbing except the type I, class 20 webbing shall contain not more than 3 pieces per roll or spool with no piece less than 1 yard long. Type I, class 20 webbing shall contain not more than 6 pieces per spool with no piece less than 2 yards long. The use of metal staples and other metallic devices to abutt pieces on individual rolls is prohibited.

TABLE V. Roll or spool size

		Roll or spool length (yards), minimum to maximum			
Type	Class	50 to 60	60 to 70	95 to 105	35 to 37
I	1	X	-	-	-
	2	-	-	-	X
	3	-	-	-	X
	4	-	-	-	X
	5	X	-	-	-
	6	X	-	-	-
	7	-	-	-	X
	8	X	-	-	-

TABLE V. Roll or spool size - Continued

Type	Class	Roll or spool length (yards), minimum to maximum			
		50 to 60	60 to 70	95 to 105	35 to 37
	9	X	-	-	-
	10	X	-	-	-
	11	X	-	-	-
	12	-	-	-	X
	13	X	-	-	-
	14	X	-	-	-
	15	X	-	-	-
	16	X	-	-	-
	20	-	-	X	-
	22	-	-	-	X
	24	-	-	-	X
	26	X	-	-	-
	27	X	-	-	-
	28	X	-	-	-
	29	X	-	-	-
II	1	-	-	-	X
	2	-	-	-	X
	3	-	-	-	X

3.1.12 Textile fiber label. The webbing shall be labeled or ticketed for fiber content in accordance with the Textile Fiber Products Identification Act.

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

4.1.1 Responsibility for compliance. All items must 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 system or quality program. The absence of any inspection requirement in the specification 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 specifications unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.

4.2.1.1 Component testing. In addition to the quality assurance provisions of applicable subsidiary specifications, drawings and standards, testing shall be performed on components and materials listed in table VI for the characteristics shown. Test methods cited shall be in accordance with FED-STD-191 except where otherwise specified. The lot size shall be expressed in pounds or yards, and the sample unit shall be 500 yards of the cotton yarn and 2 yards of the rubber yarn. The lot shall be unacceptable if one or more

units fail to meet any requirement specified. All test reports shall contain the individual values utilized in expressing the final results. The sample size shall be as follows:

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

TABLE VI. Component tests

Characteristic	Requirement reference	Test method	No. of determinations per sample unit	Results reported as
Cotton yarns:				
Material	3.2.1	1200 1/	-	-
Ply	Tables I and II	Visual	1	Pass or fail
Count	Tables I and II	4021	4	Nearest whole number
Rubber yarns:				
Material	3.2.2	1/	-	-
Gage	Tables I and II	4.2.1.1.1	2	Number of strands in one inch

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

4.2.1.1.1 Gage of rubber. The gage of rubber shall be determined by counting the actual number of strands, laid side by side, contained in one inch. The gage is equivalent to the actual number of the rubber yarns contained in one inch. A measuring device which measures the gage of the rubber yarns may be utilized providing results are comparable.

4.2.2 End item examination.

4.2.2.1 Yard-by yard examination. The required yardage of each roll or spool shall be inspected on both sides and visual defects classified as listed in table VII. All defects found shall be counted regardless of their proximity one to another, except where two or more defects represent a single

local condition of the webbing or braid in which case only the more serious defects 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 sample unit shall be 1 linear yard. The sample size shall be in accordance with inspection level II of MIL-STD-105. The acceptable quality levels, expressed in terms of defects per hundred units, shall be as follows:

For widths up to and including 1-1/2 inches	0.40 major 1.5 total defects
For widths over 1-1/2 inches up to and including 3 inches	0.65 major 2.5 total defects
For widths over 3 inches up to and including 9 inches	1.0 major 4.0 total defects
For widths over 9 inches	1.5 major 6.5 total defects

The lots size shall be expressed in units of 1 linear yard each. An approximate equal number of yards shall be examined for each roll or spool selected. The number of rolls or spools from which the sample is to be selected shall be in accordance with table VIII.

TABLE VII. Classification of defects

Defects	Classification Major	Minor
Any cut, hole, or tear	X	
Broken or missing end:		
Rubber - one or more	X	
Cotton - two or more contiguous	X	
Cotton - one		X
Broken or missing pick:		
Two or more contiguous regardless of length	X	
One more than 1 inch in length or full width of webbing 1 inch or less in width		X
Mispick		X
Fine or light filling bar 1/	X	

TABLE VII. Classification of defects - Continued

Defects	Classification Major	Minor
Fine thread, less than 1/2 the thickness of the normal yarn 1/		X
Float:		
Multiple, more than 1/2 inch in either warp or filling directions or more than 1/4 inch in filling direction for webbing or braid less than 1 inch in width	X	
Multiple, 1/2 inch or less in either warp or filling directions or less than 1/4 inch in filling direction for webbing or braid less than 1 inch in width		X
Single, more than 1 inch in length		X
Knot, oversized or untrimmed yarns, more than 1/4 inch in length		X
Slack or tight end or ends, clearly visible 1/		X
Slub, slug, jerked-in filling, or slough-off, more than three times the thickness of the normal yarn		X
Smash	X	
Weak or soft spot, abrasion mark	X	
Wrong draw, more than 9 inches in length 1/		X
Spots, stains, or streaks, two or more within 9 linear inches regardless of size, or one, 1 inch or more in combined directions 1/		X
Edges:		
Frayed, slack, cut, torn, or poorly constructed	X	
Shade (when colors are specified):		
Shade bar 1/		X
Dye streak 1/		X
Width beyond specified tolerances		X

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

4.2.2.2 Overall examination. Each defect listed below shall be counted no more than once in each roll or spool examined. The lot size shall be expressed in units of 1 linear yard. The sample unit shall be one roll or spool. The sample size and acceptance number shall be as shown in table VIII.

Defects

Off-shade, not within established tolerances
Cloudy, mottled, or streaky throughout
Poorly constructed, not firmly and tightly woven or braided
Solvent odor
Unevenness of application of treatments (when applicable)
Tackiness (when mildew treated)
Clearly noticeable crystallization of mildew inhibitor (when mildew treated)

4.2.2.3 Length examination.

4.2.2.3.1 Individual rolls or spools. Each roll or spool in the sample shall be examined for gross length. Any gross length found to be less than the specified minimum length or more than maximum gross length, or any gross length found to be more than 2 yards less than the gross length marked on the ticket, shall be considered a defect with respect to length. Any roll containing more than the maximum number of pieces allowed or any piece less than the specified minimum length shall be considered a defect. The sample size and acceptance number shall be as shown in table VIII.

TABLE VIII. Sample size in rolls or spools and acceptance number

Lot size in yards	Sample size	Maximum number of defects acceptable in sample 2/
Up to 1,200 1/	3	0
1,201 up to and including 3,200	5	0
3,201 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 or spools, each roll in the lot shall be examined.

2/ Except that the acceptance number shall be zero for color and uniformity of shade defects found in the overall examination (4.2.2.2).

4.2.2.3.2 Examination for total yardage in sample. The rolls or spools examined shall be those selected for the examination in 4.2.2.3.1. 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 roll or spool tickets.

4.2.3 End item testing. The end item shall be tested for the characteristics listed in table IX. The methods of testing specified in FED-STD-191, wherever applicable, and as listed in table IX shall be followed. When the data in the "number of determinations" and "results reported as" column are not specified in the table, they shall be as required by the referenced test method. 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 results. 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

The lot size shall be expressed in units of 1 linear yard. The lot shall be unacceptable if one or more units fail to meet any requirements specified. The sample unit shall be as follows:

a. 9 yards untreated webbing, except class 5.
b. 10 yards of treated webbing.
c. 15 yards of class 5 treated webbing.

TABLE IX. End item tests

Characteristic	Requirement reference	Test method	No. of determinations per individual sample unit	Results reported as
Thickness	Tables I, II	5030	1	Nearest 0.001 inch
Weight	Tables I, II	5041	5	Average of the 5 determinations to nearest 0.01 ounce
Yarns, full width:				
Type I:				
Ground warp	Table I	5050	1	Nearest whole number
Binder warp	Table I	5050	1	Nearest whole number
Stuffer warp	Table I	5050	1	Nearest whole number
Elastic strands	Table I	5050	1	Nearest whole number
Type II:				
Elastic strands	Table II	5050	1	Nearest whole number
Carriers	Table II	5050	1	Nearest whole number
Filling yarns per inch	Tables I, II	5050	1	Nearest whole number
Ply	Tables I, II	Visual	1	Pass or fail
Labile sulfur	3.3	2020	-	-
Vat dyes	3.3	1/	-	-
Colorfastness to:				
Light	3.3.2	5660	-	-
Laundering	3.3.2	5610	-	-
Weathering	3.3.2	5671	-	-
Weave	3.5.1 thru 3.5.7	Visual	1	Pass or fail

TABLE IX. End item tests - Continued

Characteristic	Requirement reference	Test method	No. of determinations per individual sample unit	Results reported as
Tension:				
Initial				
All webbing	3.6.1	4.3.1	5	Nearest 0.01 pound
After accelerated aging, all webbing except class 5	3.6.2.1	4.3.2	5	Nearest 0.1 percent
Class 5 only	3.6.2.2	4.3.3	5	Nearest 0.1 percent
Permanent set:				
Initial	3.7.1	4.3.5	3	Nearest 0.1 percent
After accelerated aging, all webbing except class 5	3.7.2.1	4.3.6	3	Nearest 0.1 percent
Class 5 only	3.7.2.2	4.3.7	3	Nearest 0.1 percent
After low temperature, class 5 only	3.7.3	4.3.8	3	Nearest 0.1 percent
Elongation at low temperature, all webbing except classes 5, 28, and 29	3.8.1	4.3.10	3	Nearest 0.1 percent
Class 5 only	3.8.2	4.3.11	3	Nearest 0.1 percent
Boiling water immersion, class 5 only:				
Initial tension	3.6.1 and 3.9	4.3.1 and 4.3.13	5	Nearest 0.01 pound

TABLE IX. End item tests - Continued

Characteristic	Requirement reference	Test method	No. of determinations per individual sample unit	Results reported as
Tension after accelerated aging	3.6.2.2 and 3.9	4.3.1 and 4.3.13	5	Nearest 0.01 pound
Elongation at -25°F	3.8.2 and 3.9	4.3.11 and 4.3.13	3	Nearest 0.1 percent
Initial permanent set	3.7.1 and 3.9	4.3.5 and 4.3.13	3	Nearest 0.1 percent
Permanent set after accelerated aging	3.7.2.2 and 3.9	4.3.7 and 4.3.13	3	Nearest 0.1 percent
Permanent set at -25°F	3.7.3 and 3.9	4.3.8 and 4.3.13	3	Nearest 0.1 percent
Mildew inhibitor (content)	3.10.1	2011 2/	2	Nearest 0.01 percent
Dynamic absorption	3.10.2	5500	2	Nearest 1.0 percent

1/ A certificate of compliance shall be submitted and will be acceptable for the stated requirement.

2/ Determination shall be made on the cotton component of the webbing after the rubber component has been separated and removed.

4.2.4 Packaging examination. An examination shall be made in accordance with the provisions of MIL-P-43334 to determine whether packing and marking comply with the section 5 requirements.

4.2.5 Palletization examination. An examination shall be made for palletization in accordance with MIL-P-43334.

4.3 Methods of inspection.

4.3.1 Initial tension test. Five test specimens shall be prepared. Each specimen shall be 14 inches in length and the full width of the webbing, except on webbing more than 3 inches in width, in which case the specimen shall be raveled so that a 3-inch width is centered in the webbing. Bench marks shall be exactly 10 inches apart on each specimen and sewn together on the marks to form a loop 10 inches in circumference. The loop specimen shall be placed over the pins attached to the clamps of the constant rate of load machine (see 6.4). The starting gage shall be 5 inches and shall be measured from the farthest edges of each holding pin. See table III for specified load and elongation. The loading curve shall be recorded on the fifth cycle and each cycle shall take 40 seconds to load and unload. The tension in pounds of the five individual specimens shall be determined on the loading curve at the specified elongation. The results shall be averaged and then divided by 2 and reported to the nearest 0.01 pounds and recorded as "A."

4.3.2 Tension after accelerated aging test (all except class 5). Five test specimens shall be prepared as specified in 4.3.1 and then subjected to accelerated aging in conformance with ASTM D 573, except that the oven temperature shall be 300°F and the time exposure shall be 2 hours. After aging, the specimens shall be relaxed under standard conditions until they reach equilibrium and then tested in accordance with 4.3.1 for tension. The tension results after accelerated aging shall be averaged and then divided by 2 and reported to the nearest 0.01 pounds and recorded as "B." The percent change in tension shall be calculated as specified in 4.3.4 and reported to the nearest 0.1 percent.

4.3.3 Tension after accelerated aging test (class 5 only). Five test specimens shall be prepared as specified in 4.3.1 and then suspended for a continuous period of 96 hours in a closed chamber, and subjected to oxygen, having a pressure of 275 to 300 pounds per square inch and maintained at a temperature of 158°F ± 2°F, as specified in ASTM D 572. At the end of a 96 hour period, the test specimens shall be removed from the chamber and relaxed under standard conditions until they reach equilibrium, and then tested in accordance with 4.3.1 for tension. The tension results after accelerated aging shall be averaged and then divided by 2 and reported to the nearest 0.01 pound and recorded as "B." The percent change in tension shall be calculated as specified in 4.3.4 and reported to the nearest 0.1 percent.

4.3.4 Calculation of percent change in tension. The percent change in tension after accelerated aging shall be calculated as follows:

$$\text{Percent change in tension after accelerated aging} = \frac{A - B}{A} \times 100$$

where A = initial tension (lbs), see 4.3.1 and
B = tension after accelerated aging (lbs).

4.3.5 Initial permanent set test. Three test specimens each measuring 14 inches shall be cut and marked so that a distance of 10 inches (measurement A) is between the gage marks. The specimens shall then be stretched 50 percent, held at that elongation for 24 hours under standard conditions, and then released and allowed to rest for 10 minutes. The distance between the gage marks of the three specimens shall be remeasured, averaged, and recorded as measurement B. The percent permanent set shall be calculated as specified in 4.3.9 and reported to the nearest 0.1 percent.

4.3.6 Permanent set after aging test (all except class 5). Three test specimens each measuring 14 inches shall be cut and marked so that a distance of 10 inches (measurement A) is between the gage marks. The specimens shall then be subjected to accelerated aging in conformance with ASTM D 573, except that the oven temperature shall be 300°F and the time of exposure shall be 2 hours. After aging, the specimens shall be relaxed under standard conditions until they reach equilibrium and then tested for permanent set in accordance with 4.3.5.

4.3.7 Permanent set after aging test (class 5 only). Three test specimens each meauring 14 inches shall be cut and marked so that a distance of 10 inches (measurement A) is between the gage marks. The specimens shall be subjected to the presence of oxygen having a pressure of 275 to 300 pounds per square inch and maintained at a temperature of 158° ± 2°F as specified in ASTM D 572. At the end of a 96-hour period, the specimens shall be removed from the chamber and relaxed under standard conditions until they reach equilibrium and then tested for permanent set in accordance with 4.3.5.

4.3.8 Permanent set at -25°F test (class 5 only). Three set specimens each measuring 7 inches in length shall be cut and 5 inches shall be marked off (measurement A) in the approximate center of each specimen. Stretch each specimen to approximately 75 percent elongation three times to break up the sizing. Elongate the specimen 50 percent and condition at -25° ± 2°F for a minimum of 72 hours, release, and after 30 ± 2 seconds measure the distance between gage marks. The measurements of the three specimens shall be averaged and recorded as measurement B. The percent permanent set shall be calculated as specified in 4.3.9 and reported to the nearest 0.1 percent.

4.3.9 Calculation of percent permanent set. The percent permanent set shall be calculated as follows:

$$\text{Percent permanent set} = \frac{B - A}{A} \times 100$$

where A = initial measurement and
B = measurement after permanent set.

4.3.10 Elongation at -40°F test (all except classes 5, 28, and 29). Three test specimens shall be prepared. Each specimen shall be cut 7 inches in length and 5 inches (measurement A) shall be marked off in the approximate center of the specimen. The specimen shall then be exposed to a temperature of -40° ± 5°F for 2 hours, after which at that temperature it shall be suspended from a clamp in such a manner as to allow a weight to be hung on the lower end. The elongation load shall conform to the requirements specified in table IV. The weight shall be gradually lowered until the entire load is carried by the specimen. After 2 minutes, measure the distance between the gage marks. The measurements of the three specimens shall be averaged and recorded as measurement B. The percent elongation shall be calculated as specified in 4.3.12 and reported to the nearest 0.1 percent.

4.3.11 Elongation at -25°F test (class 5 only). Three test specimens shall be prepared. Each specimen shall be cut 7 inches in length and 5 inches (measurement A) shall be marked off in the approximate center of the specimen. Stretch each specimen approximately 75 percent elongation, three times to break up the sizing. Condition the specimen (unstretched) at -25° ± 2°F for a minimum of 72 hours. Following the conditioning and maintaining the temperature at -25° +2° F, the specimen shall be suspended vertically and a tension load of 4 pounds shall be attached. The measurements fo the three specimens shall be averaged and recorded as measurement B. The percent elongation shall be calculated as specified in 4.3.12 and reported to the nearest 0.1 percent.

4.3.12 Calculation of elongation at -25°F. The percent elongation shall be calculated as follows:

$$\text{Percent temperature elongation} = \frac{B - A}{A}$$

where A = initial measurement and
B = measurement of elongation at low temperature.

4.3.13 Boiling water pretreatment (class 5 only). Approximately 9 yards of webbing loosely arranged shall be submerged in boiling water for 1 hour. Remove the webbing and air dry at room temperature. After the webbing is dry it shall then be placed in standard conditions until equilibrium is reached prior to testing. Specimens for test should be marked out on the sample prior to subjection to boiling water.

5. PACKAGING

5.1 Preservation. Preservation shall be level A, B, or Commercial as specified (see 6.2).

5.1.1 Levels A, B, and Commercial. 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 Commercial as specified (see 6.2).

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

5.3 Palletization. When required, palletization shall be in accordance with the applicable requirements of MIL-P-43334.

5.4 Marking. Marking shall be in accordance with 5.4.1 or 5.4.2, as specified (see 6.2).

5.4.1 Civil agencies requirements. In addition to any special marking required by the contract or purchase order, shipping containers shall be marked in accordance with FED-STD-123. The identification ticket shall contain the same information as specified for military requirements of MIL-P-43334.

5.4.2 Military requirements. In addition to any special marking required by the contract or purchase order, shipping containers shall be marked in accordance with MIL-P-43334.

6. NOTES

6.1 Intended use. The type I, class 1, mildew-resistant and water repellent webbing is used in the fabrication of various types of Army goggles. Type I, class 14 webbing is used in Navy swim trunks. Type I, class 20 webbing, mildew resistant and water repellent, is used in the fabrication of helmet, camouflage, bands. Type I, classes 1, 5, 6, 9 and 26 and type II, classes 1, 2, and 3 are used by the Chemical Corps. The type I, class 5 webbing is used by the Chemical Corps, in one type of protective mask, head harness. Type I, class 28 webbing is used in boxer type shorts. Type I, class 13 webbing is used in quilted underwear worn by Air Force flight personnel. Type I, class 29 webbing is used in brief type military drawers.

6.2 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents:

a. Title, number, and date of this specification.
b. Type and class required (see 1.2.1).

c. Whether bleached, unbleached, or dyed webbing is required (see 3.3).
d. If dyed, the color of webbing required (see 3.3).
e. When water repellency and mildew resistance are not required (see 3.10.1 and 3.10.2).
f. When put-up other than specified is required (see 3.11).
g. Selection of applicable levels of preservation and packing (see 5.1 and 5.2).
h. When palletization is required (see 5.3).
i. Whether special marking is required (see 5.4).

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

6.4 Constant rate of load machine. The Scott Incline Plane Tester IP-4 meets the requirements for the loading and unloading time of the complete cycle

6.5 Subject term (key word) listing.

Webbing, cotton
Webbing, elastic

MILITARY INTERESTS

Custodians

Army - GL
Navy - NU
Air Force - 99

Review Activities

Army - MD, AR, ER
Navy - MC
Air Force - 11, 82
DLA - CT

User Activities

Army - ME
Navy - AS
Air Force - 45

CIVIL AGENCY COORDINATING ACTIVITY:

GSA-FSS

PREPARING ACTIVITY:

Army - GL

Project No. 8305-0205

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
JJ-W-155H	Webbing, Textile, (Cotton, Elastic)

3a. NAME OF SUBMITTING ORGANIZATION

b. ADDRESS *(Street, City, State, ZIP Code)*

4. TYPE OF ORGANIZATION *(Mark one)*

- ☐ VENDOR
- ☐ USER
- ☐ MANUFACTURER
- ☐ OTHER *(Specify)* _____

5. PROBLEM AREAS

a. Paragraph Number and Wording

b. Recommended Wording

c. Reason/Rationale for Recommendation

6. REMARKS

NAME OF SUBMITTER *(Last, First, MI)* - Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* - Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* - Optional	8. DATE OF SUBMISSION *(YYMMDD)*

DD FORM 82 MAR 1426 PREVIOUS EDITION IS OBSOLETE.

NATICK/OP, 1 Apr 84

INSTRUCTIONS. In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge *(DO NOT STAPLE)*, and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

NOTE. This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

(Fold along this line)

(Fold along this line)

DEPARTMENT OF THE ARMY

US Army Natick Research, Development, and
Engineering Center
Natick, MA 01760-5014

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300
STRNC-ES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 12062 WASHINGTON D C
POSTAGE WILL BE PAID BY THE DEPARTMENT OF THE ARMY

Commander
US Army Natick Research, Development,
and Engineering Center
ATTN: STRNC-ES
Box 14A
Natick, MA 01760-5014