MIL-W-38461C(USAF)
23 July 1982
SUPERSEDING
MIL-W-38461B(USAF)
15 August 1972

MILITARY SPECIFICATION

WEBBING, NYLON, AIRCRAFT ARRESTING

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

1. SCOPE

1.1 Scope. This specification covers two types of nylon and one type of nylon/polyester webbing for use in landbased aircraft arresting systems.

1.2 Classification. The webbing shall be of the following types, as specified (see 6.2). The types shall be for use with the designated arresting systems.

Type I - BAK-12/B32A
Type II - BAK-13/F48A
Type III - BAK-13/F48A
(Center Pick)

2. APPLICABLE DOCUMENTS

2.1 Government documents.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to the Air Force Wright Aeronautical Laboratories, MLSA, Wright-Patterson Air Force Base, Ohio 45433, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 1710

2.1.1 Standard and drawings. Unless otherwise specified (see 6.2), the following standard and drawings of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation, form a part of this specification to the extent specified herein.

STANDARDS

FEDERAL

FED-STD-191	Textile Test Methods

DRAWINGS

E.W. Bliss Company 52-D-844, Revision A	Sewing Requirements, BAK-13
E.W. Bliss Company P-574	Shipping Reel
E.W. Bliss Company P-311	Shipping Reel

(Copies of standards and drawings required by manufacturers in connection with acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.1.2 Other Government publications. The following other Government document forms a part of this specification to the extent specified herein.

FEDERAL TRADE COMMISION

Textile Fiber Products Identification Act, Effective March 3, 1960.

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

2.1.3 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.

3. REQUIREMENTS

3.1 Yarn. The yarn used shall be as follows: Types I and II - 840 or 1260 denier, bright, high-tenacity, light and heat resistant polyamide prepared from hexamethylene diamine and adipic acid or its derivatives and have a minimum melting point of 472°F (244°C). Type III Ground, Binder, and Stuffer - 1260 denier, bright, high-tenacity, light and heat resistant polyamide prepared from hexamethylene diamine and adipic acid or its derivatives and have a minimum melting point of 472°F (244°C). Filling 1000 or 1100 denier, polyester fiber identified as polyethylene glycol terephthalate with a minimum melting point of 472°F (244°C).

3.1.1 Ply and twist. The final ply of yarn, as specified in Table I, shall be twisted together in one operation.

3.2 Resin treatment.

3.2.1 Resin. The resin used to treat the webbing shall consist of polyvinyl butyral plasticized with butyl ricinoleate and applied by water dispersion. Fine carbon black shall be added to the resin to produce a uniform black color.

3.2.2 Extractable matter. The extractable matter from the resin treated webbing shall be from 3.1 to 8.5 percent by weight, when tested as specified in 4.6.3.

3.3 Color. The color of the webbing, after resin treatment, shall be black.

3.4 Construction and physical properties. The finished webbing shall conform to the requirements of Table I.

3.4.1 Sewed loops - type II and III only.

3.4.1.1 Breaking strength. The loops for Types II and III webbing, one loop on each end, shall be sewed in accordance with E.W. Bliss Company Drawing 52-D-844. Three (3) of five (5) test specimens thus prepared shall have a minimum breaking strength of not less than 110,000 pounds each and the other two test specimens shall have a minimum breaking strength of not less than 100,000 pounds each.

3.4.1.2 The maximum width of the sewed loop shall be no greater than 8-1/8 inches at any point along the entire length of the loop. Any roll not meeting this requirement is not acceptable.

3.5 Weave. The weave for Types I, II, and III shall be as shown in Figures 1, 2, and 3 respectively.

3.5.1 Edge wear markers. There shall be 2 yellow marker ends in the center of each selvage stuffer as shown in Figures 1, 2, and 3. The yellow marker shall be a 840/5 ply for types I and III and 840/7 ply for type II. The marker yarns shall be solution dyed nylon or yarn dyed polyester to cable No. 65023, Color Association of United States, Incorporated, 200 Madison Avenue, New York, NY 10016.

3.6 Length of roll. The length of roll shall be as specified by the procuring activity.

3.7 Fiber identification. Each roll of webbing shall be labeled, ticketed, or invoiced for fiber content in accordance with the Textile Fiber Products Identification Act, effective 3 March 1960.

3.8 Stiffness. The angle subtended by the verticle distance drop of the end of a 36 inch length of webbing when extended 16 inches beyond the edge of a horizontal surface shall not be greater than 35 degrees when tested in accordance with 4.6.4.

3.9 Workmanship. The finished webbing shall be clean, evenly woven, and shall conform to the quality and grade of product established by this specification.

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 the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Quality conformance inspection. The quality conformance inspection shall consist of the examinations and tests specified herein. The manufacturer shall examine all webbing prior to resin teatment for

TABLE I. Construction and physical requirements.

Characteristics	Requirements		
	Type I	Type II	Type III
Width, inches 3/	8-1/2 + 1/8 1/ 2/ 8-1/2 - 1/16	7-15/16 + 1/8 1/ 2/ - 1/16	7-15/16 + 18 1/ 2/ - 1/16
Thickness, inches	0.225 ± 0.010	0.340 ± 0.010	0.345 ± 0.010
Weight, oz/linear yd. (max)	37.0	50.0	50.0
Breaking strength, pounds (min)			
Average	105,000	130,000	130,000
Single Determination	95,000	125,000	125,000
Ends in warp (min)			
Ground	649	558	574
Binder	160	136	136
Stuffer	1190 (840 denier) or 991 (1260 denier)	1460 (840 denier) or 1362 (1260 denier)	
Yellow marker	4	4	4
Filling, yarns per inch (min)	14	13	19.5
Yarn			
Ply (min)			
Ground	3 (840 denier) or 2 (1260 denier)	3 (840 denier) or 2 (1260 denier)	
Binder	3 (840 denier) or 2 (1260 denier)	3 (840 denier) or 2 (1260 denier)	

TABLE I. Construction and physical requirements. - Continued.

Characteristics	Requirements		
	Type I	Type II	Type III
Stuffer	5 (840 denier) or 4 (1260 denier)	7 (840 denier) or 5 (1260 denier)	
Filling	6 (840 denier) or 4 (1260 denier)	7 (840 denier) or 4 (1260 denier)	
Twist, turns per inch			
Ground (min-max)	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Binder (min-max)	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Stuffer (min-max)	1.0 - 2.0	1.0 - 2.0	1.0 - 2.0
Filling (min-max)	1.0 - 2.0	1.0 - 2.0	1.0 - 2.0

1/ Single determination.
2/ A maximum of 2 single determinations per roll may deviate to -1/8".
3/ Nonconformance shall be based on a length greater than twelve (12) inches.

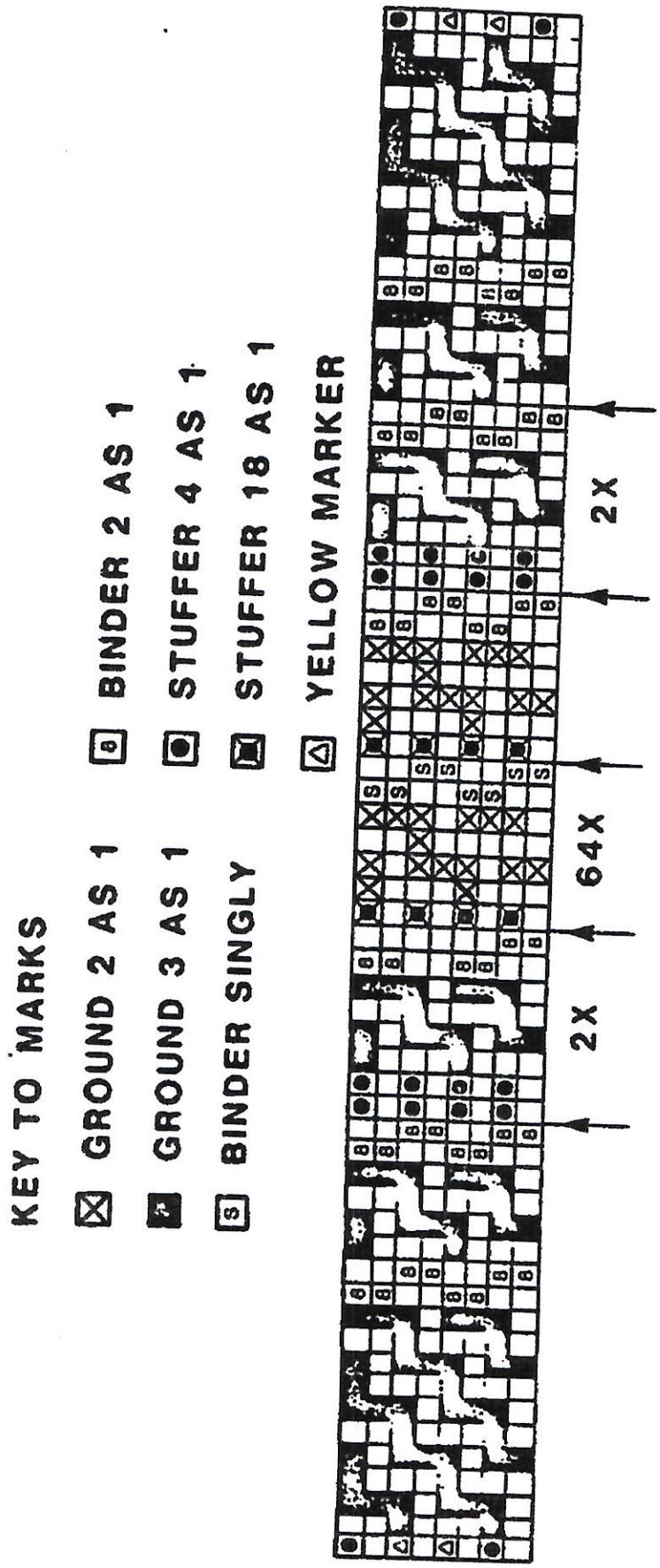

Figure 1. WEAVE DIAGRAM-TYPE I

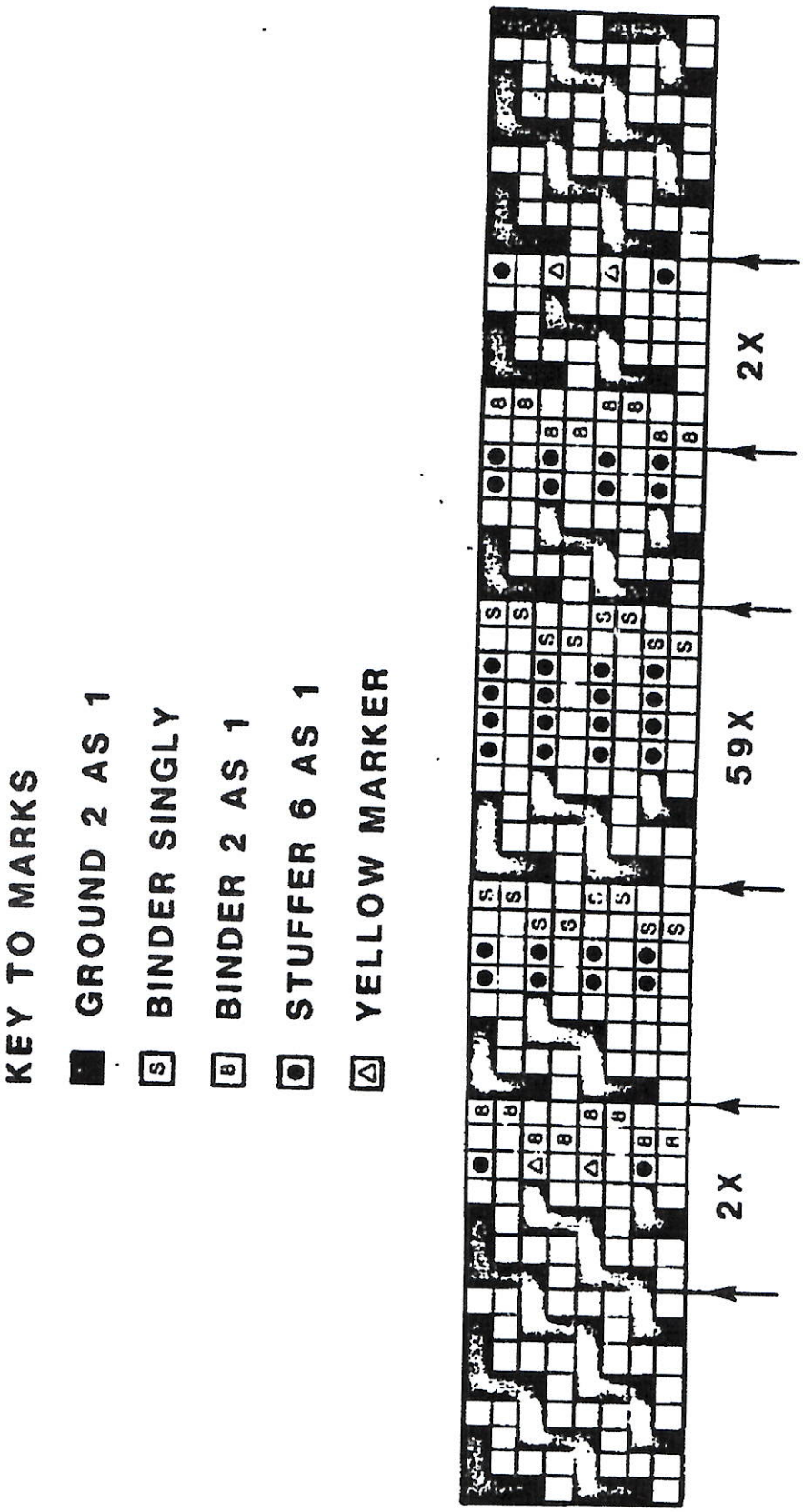

Figure 2. WEAVE DIAGRAM-TYPE II

KEY TO MARKS

■	GROUND 2 AS 1	NYLON 1260 DENIER 2 PLY 574 ENDS
⊙	STUFFER 5 AS 1	NYLON 1260 DENIER 5 PLY 56 ENDS
◉	STUFFER 10 AS 1	NYLON 1260 DENIER 5 PLY 1180 ENDS
S	BINDER SINGLY	NYLON 1260 DENIER 2 PLY 120 ENDS
8	BINDER 2 AS 1	NYLON 1260 DENIER 2 PLY 16 ENDS
△	YELLOW MARKER	

FILLING-19 1/2 PICKS/INCH POLYESTER 1100 DENIER 7 PLY

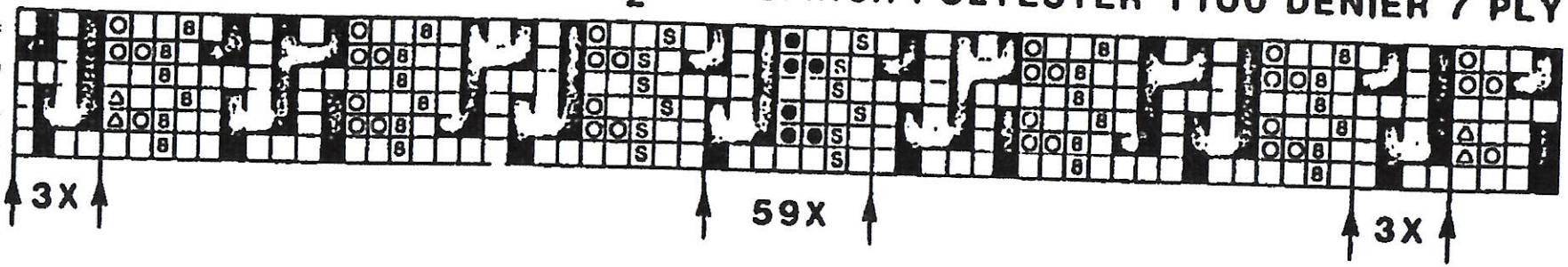

Figure 3. WEAVE DIAGRAM TYPE III

critical defects and for overall cleanliness to insure uniformity of resin application. Any contamination which may interfere with the level of resin application shall be removed before processing.

4.3 Yard-by-yard examination. The sample size shall be examined on both sides prior to the resin treatment and visual defects classified as listed in Table II. All defects found shall be counted regardless of their proximity one to another, except when two or more defects represent a single local condition of the webbing, in which case only the more serious defect shall be counted. A continuous defect shall be counted as one defect for each warp-wise yard or fraction thereof in which it occurs. The sample unit for this examination shall be one linear yard. The lot size shall be expressed in units of one linear yard. There shall be no more than five tapes in any one lot. The sample size shall be in accordance with inspection level III of MIL-STD-105. The acceptable quality level (AQL) shall be 1.0 defects per hundred linear yards for major defects, and 2.5 defects per hundred yards for total (major plus minor) defects. The lot shall be unacceptable if one or more critical defects appear in the sample. For any clearly visible defect not described in Table II a classification shall be made by the contractor according to the severity of the defect and shall be subject to approval by the Government.

4.4 Examination for compliance with Textile Fiber Products Identification Act. Each roll of the webbing shall be examined for conformance to the Textile Fiber Products Identification Act.

4.5 Test conditions. A producer may elect to conduct physical testing under other than standard laboratory conditions of $70^{0} \pm 2^{0}$F ($21^{0} \pm 17^{0}$C) and 65 $\pm$ 2 percent relative humidity. However, the Government reserves the right to specify testing conditions in cases of dispute or whenever deemed necessary to assure conformance to physical requirements.

4.6 Testing of the end item. The methods of testing specified in FED STD 191, wherever applicable, as listed in Table III, 4.6.1, 4.6.2 and 4.6.3 shall be followed. Conformance for width and thickness shall be based on a single determination. Failure of any sample of webbing to conform to the requirements of section 3 shall be cause for rejection of the roll.

TABLE II. Classification of defects.

Defects	Description	Critical	Major	Minor
Abrasion marks	Resulting in broken filaments greater than 1 inch in any direction and to the degree sufficient to obscure the identity of an individual yarn.		X	
	Resulting in broken filaments 1 inch or less in any direction and to the degree sufficient to obscure the identity of an individual yarn.			X
Broken or missing pick	Occurring separately or in combination for two or more adjacent picks on the same side of the webbing.	X		
	Occurring separately or in combination two or more picks not adjacent in 1 linear yard on the same side of webbing.		X	
	Single pick regardless of frequency.			X
Broken or missing end(s)	Two or more adjacent ends exceeding 6 inches in length or single end exceeding 12 inches in length.	X		
	Two or more adjacent ends less than 6 inches but longer than 3 inches in length or a single end less than 12 inches but longer than 6 inches in length.		X	
	Two or more adjacent ends less than 3 inches in length but exceeding 1 inch or a single end less than 6 inches but exceeding 1 inch.			X

TABLE II. Classification of defects. - Continued.

Defects	Description	Critical	Major	Minor
Coarse or light filling bar	Resulting in visible difference in thickness of webbing extending for more than 1/2 inch in the length direction over more than 50% of the width.	X		
	Resulting in visible differences in thickness of webbing extending for more than 1/4 inch but less than 1/2 inch in the length direction over more than 50% of width.		X	
	Resulting in visible differences in thickness of webbing extending less than 1/4 inch in the length direction over more than 25% of the width.			X
Cut, hole (minimum of 1/8 inch away from edge)	Resulting in exposure of stuffer yarns.	X		
Drop ply	Clearly visible on more than two ends and extending over 9 linear inches or more.		X	
Edge loopy	Forming loops greater than 1/8 inch diameter within 1/4 inch of the edge for 2 linear inches or more.	X		
	Forming loops greater than 1/8 inch in diameter within 1/4 inch of the edge for more than 1/2 inch but less than 2 linear inches.		X	

TABLE II. Classification of defects. - Continued.

Defects	Description	Critical	Major	Minor
Edge cut, torn or frayed	Complete separation of two or more yarns within 1/8 inch of the edge.	X		
	Complete separation of one yarn within 1/8 inch of the edge.		X	
Floats or skips	Multiple, 1/2 inch or more in combined warp and filling direction or single float or skip over more than 1 inch.		X	
	Multiple, less than 1/2 inch in combined warp or filling directions or single float or skip over more than 1/2 inch, but not exceeding 1 inch, if in warp, or more than 1/4 inch of the width, but not exceeding 1 inch, if in filling.			X
Jerked in, filling, slough-off, slug	A clearly visible loop of filling pulled in at edges.			X
Kinks	More than three in any 9 linear inches.		X	
Knots	More than one knot in any 5 linear inches.		X	
Mispick, double pick	Two or more across full width.		X	
	Single across the full width.			X

TABLE II. Classification of defects. - Continued.

Defects	Description	Critical	Major	Minor
Slack end	Two or more for a minimum of of 1/2 inch in length when the tape is laid flat and without loop distortion with the insertion of a 1/8 inch diameter rod.		X	
	Single for a minimum of 1 inch in length when the tape is laid flat and without loop distortion with the insertion of a 1/8 inch diameter rod.			X
Slub or slag	More than twice the thickness of the yarn (or ply, if plied).			X
Smash	Any smash.	X		
Wrong draw	Extending for more than 9 inches.		X	

NOTE: The contractor may repair all major and minor defects listed any time before resin treatment. A properly done repair is not a defect unless it can still be seen and classified. Critical defects shall not be repaired.

4.6.1 Component and material inspection. Components and materials shall be tested in accordance with all the requirements of referenced specifications, drawings and standards unless otherwise excluded, amended, modified or qualified in this specification or applicable purchase documents. In addition to the quality assurance provisions of the subsidiary specifications, component materials listed in Table III shall be tested for the characteristics specified and in accordance with the referenced test methods of FED STD 191. The lot size shall be expressed in pounds, and the sample unit shall be 500 yards of the nylon 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 result. The sample size shall be as follows:

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

4.6.2 Breaking strength - types I, II, III.

4.6.2.1 Sampling. A 30-foot sample shall be taken from the lead end of the first roll of the resin treated webbing. Continuous roll lengths shall have a 30-foot sample taken from the last end. Each roll length and corresponding 30-foot sample shall have the same number and shall be numbered consecutively. Three ten-foot specimens shall be cut from each 30-foot sample.

4.6.2.2 Apparatus. The test grips for holding the specimen shall be so designed that webbing failure will not occur within the grip. The no-load rate of jaw separation shall be 4 to 8 inches per minute.

4.6.2.3 Sewed loops - type II and III. Five specimens of type II or III webbing shall be taken from the first production roll and loops formed in accordance with the sewing pattern of E.W. Bliss Company Drawing 52-D-844. The sewed loops shall be tested on a sufficient high enough load capacity machine so that the webbing rated breaking strength is not at the extreme machine limits.

4.6.3 Extractable matter. The extractable matter, inclusive of the resin deposit, shall be determined on one (1) specimen of approximately 10 grams of the webbing. The sample, after separation of the warp and filling yarns, shall be dried to constant weight in a weighing bottle at a temperature of $220^{\circ} \pm 8^{\circ}F$ ($104^{\circ} \pm 4.5^{\circ}C$). The specimen shall then be placed in a Soxhlet apparatus and after a 6-hour extraction with methyl-ethyl-ketone, the final weight of the extracted sample shall be obtained by repeating the constant weight drying conditions as specified above. The percent of extractable matter shall be calculated as follows:

$$\text{Percent extractable matter} = \frac{\text{Loss in weight on extraction}}{\text{Original dry weight on sample}} \times 100$$

4.6.4 Stiffness test. A 36 inch length of webbing shall be preconditioned by placing the webbing on a horizontal surface and placing sufficient weight on the webbing to remove any longitudinal curvature at 70-75°F and 65-70 percent RH. Immediately after the preconditioning period under the same atmospheric conditions the sample shall be extended 16 inches beyond the edge of the horizontal surface. The webbing shall be sufficiently weighted to keep it flat on the horizontal surface. At the end of a 4-hour period measurements shall be made to determine the drop angle.

TABLE III. Test methods.

Characteristics	Requirement	Test Method Fed Std 191 Para. Ref.	Frequency 1/	Number of determinations	Results reported as
Width 5/	Table I	5020	A	1 Every 40 ft. ± 6 inches	Nearest 1/16 inch
Thickness 2/	Table I	5030	A	1 Every 40 ft. ± 6 inches	Nearest 0.010 inch
Weight	Table I	5040	A	1	Nearest 0.1 oz.
Length	3.6	5010	A	1	Nearest 1 ft.
Breaking strength- (type I, II, and III)	Table I	4.6.1	A	3/ 2 or 3	Nearest 100 lb.
Breaking strength- sewed loops (type II and III)	3.4.1	4.6.2.3	C	5	Nearest 100 lb.
Extractable matter	3.2.2	4.6.2	A	1	Nearest 0.1%
Ends in warp 6/			B		
Ground	Table I	Visual		1	Nearest whole number
Binder	"	"		1	"
Stuffer	"	"		1	"
Filling yarns/inch	"	5050	B	3	"
Yarn:			B		
Ply 7/					
Ground	"	Visual		1	"
Binder	"	"		1	"
Stuffer	"	"		1	"
Filling	"	"		1	"

Table III footnotes (continued).

5/ For any visual width variation a width determination may be made at that location even though this may not occur at the specified 40 foot linear interval.

6/ Contractor's certification based on count of ends in loom creel or beams is acceptable in lieu of visual count from a webbing sample.

7/ Contractor's certification based on Ply and Turns/in. produced in the yarn throwing process is acceptable in lieu of visual and physical testing of the yarn from the webbing sample.

5. PACKAGING

5.1 Packaging, packing and marking. Unless otherwise specified each roll shall be wound and enclosed for shipping on wooden reel in accordance with E.W. Bliss Company Drawing P-574 or P-311.

5.1.1 Special marking. One of the following special markings shall appear on the interior and the exterior of the shipping containers.

Webbing, Nylon, Aircraft Arresting, BAK-12/B32A.
Webbing, Nylon, Aircraft Arresting, BAK-13/F48A.

6. NOTES

6.1 Intended use. The webbing is intended for use in landbased aircraft arresting systems BAK-12/B32A and BAK-13/F48A.

6.2 Ordering data. Acquisition documents should specify:

a. Title, number and date of this specification.

b. Type.

c. Quantity (rolls).

d. Length of roll.

e. Manufacturer's identification.

f. Packaging and packing requirements (see 5.1).

6.3 For access to a representative sample of webbing, address the procuring activity issuing the invitation for bids.

Custodian:
Air Force - 20

Review activity:
Air Force - 99

Preparing activity:
Air Force - 20

Project Number:
1710-F037

☆U.S. GOVERNMENT PRINTING OFFICE: 1982—503-022/3689

TABLE III. Test methods. Continued

Characteristics	Requirement	Test Method Fed Std 191 Para. Ref.	Frequency	Number of determinations	Results reported as
Twist, turns per inch 7/			B		
Ground	Table I	4054		3	Nearest 0.1 turn
Binder	"	"		3	"
Stuffer	"	"		3	"
Filling	"	"		3	"
Weave	Figures 1, 2,3	Visual	B	1	Pass or fail
Component material					
Yarn					
Melting point	3.1	1534 & 4/	B	1	Nearest 1°
Denier	3.1	4021 & 4/	B	1	Pass or fail
Luster	3.1	4/	B	1	"
Tenacity	3.1	4/	B	1	"
Nylon identification	3.1	4/	B	1	Pass or fail

1/ Frequency of testing: A - Each roll, B - One roll in each lot, C - Once during a contract except whenever deemed necessary by the Government to assure conformance to requirements.

2/ Except that a six-ounce total load shall be applied and the presser foot diameter shall be a minimum of one inch. A substitute instrument may be used if approved by the contracting officer.

3/ When the first two specimens of the sample tested meet the requirements for acceptance of the roll, testing is not required on the third specimen.

4/ Contractor's certification.

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS: This form is provided to solicit beneficial comments which may improve this document and enhance its use. DoD contractors, government activities, manufacturers, vendors, or other prospective users of the document are invited to submit comments to the government. Fold on lines on reverse side, staple in corner, and send to preparing activity. Attach any pertinent data which may be of use in improving this document. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity. A response will be provided to the submitter, when name and address is provided, within 30 days indicating that the 1426 was received and when any appropriate action on it will be completed.

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

DOCUMENT IDENTIFIER *(Number)* AND TITLE

MIL-W-38461C(USAF)

NAME OF ORGANIZATION AND ADDRESS OF SUBMITTER

☐ VENDOR ☐ USER ☐ MANUFACTURER

1. ☐ HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? ☐ IS ANY PART OF IT TOO RIGID, RESTRICTIVE, LOOSE OR AMBIGUOUS? PLEASE EXPLAIN BELOW.

A. GIVE PARAGRAPH NUMBER AND WORDING

B. RECOMMENDED WORDING CHANGE

C. REASON FOR RECOMMENDED CHANGE(S)

2. REMARKS

SUBMITTED BY *(Printed or typed name and address — Optional)*

TELEPHONE NO.

DATE

DD FORM 1 OCT 76 1426 PREVIOUS EDITION WILL BE USED.