

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

SAE AMS 3795

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WEBBING, WOVEN NYLON FABRIC

1. SCOPE:

- 1.1 Form: This specification and its supplementary detail specifications cover three types of nylon in the form of webbing.
- 1.2 Application: Primarily for use in manufacture of aerial retrieval parachutes and their accessories requiring high strength, high energy absorption, good abrasion resistance, and minimum weight and bulk.
- 1.3 Classification: Webbing shall be as specified in the applicable detail specification, classified by breaking strength and weight.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

- 2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods

- 2.2 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120 except as specified in 2.2.4.

2.2.1 Federal Standards:

FED-STD- 4 - Glossary of Fabric Imperfections
FED-STD-191 - Textile Test Methods

REAFFIRMED

10/91
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2.2.2 Military Specifications:

MIL-W-43334 - Webbing and Tape, Textile, Packaging and Packing of

2.2.3 Military Standards:

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

2.2.4 Other Publications: Available from Federal Trade Commission, Washington, DC 20580.

Textile Fiber Products Identification Act

3. TECHNICAL REQUIREMENTS:

3.1 Detail Specifications: The requirements for a specific cloth shall consist of all requirements specified herein in addition to requirements specified in the applicable detail specification. In case of conflict between requirements of this specification and requirements of the applicable detail specification, requirements of the detail specification shall govern.

3.2 Material: Webbing shall be fabricated as follows:

3.2.1 Nylon yarn shall be bright, and light and heat resistant. It shall have a high tenacity and a melting point not lower than 245°C (427°F). It shall be prepared from hexamethylene diamine and adipic acid or its derivatives. It shall have a denier and filament coded 840-140-1/2Z (the denier is 840, the number of filaments is 140 with 1 per strand and 2 twisted together in a Z twist). The supplier of the yarn shall certify that the yarn has not been subjected to any type of bleaching process.

3.2.2 Twist: The final ply twist of the warp and filling yarns shall be 1-1/2 to 2-1/2 turns per in. (25.4 mm) for all types. The number of singles yarn specified shall be twisted together (plied) in one operation. No additional twist shall be added to the parent singles yarn prior to plying. The binder yarn shall have a twist of 2 to 3 turns per in. (25.4 mm).

3.2.3 Weave: Finished webbing shall have a weave as shown in Fig. 1.

3.2.4 Color: Shall be natural white (undyed).

3.2.5 Finish: After weaving, a webbing finish shall be applied. Webbing shall be subjected to an aqueous scour to remove the yarn spin finish. The scoured webbing shall be treated with a suitable silicone emulsion. The finish shall be applied by padding from an aqueous dispersion containing 17.5% by weight total solids. Treated webbing shall be dried and conditioned webbing shall have a weight add-on of 5.5 to 6.5%.

- 3.2.6 Identification Yarn: A nylon warp end shall be woven into one selvage edge, plainly visible on the surface, to permanently identify the webbing by type. The color of this warp end shall be as specified in the detail specification.
- 3.3 Properties: Shall be as specified in the applicable detail specification, determined in accordance with 4.5, and as specified in 3.3.1 and 3.3.2.
- 3.3.1 Vendor's certificate of compliance will be acceptable for determining conformance to requirements for identification, tenacity, luster, light resistance, and heat resistance of yarn.
- 3.3.2 Width and number of singles yarn for final yarn shall be examined visually for conformance; ply shall also be examined visually, using one specimen per unit sample and reporting results as "pass" or "fail".
- 3.4 Quality: Webbing, as received by purchaser, shall be clean, evenly woven, and free from foreign materials, and from imperfections detrimental to usage of the webbing.
- 3.4.1 Imperfections: Acceptability of each lot of webbing shall be based on the defects defined in FED-STD-4 and as specified herein. The term "clearly visible" used in Table I shall be interpreted to mean visible at normal inspection distance of approximately 3 ft (1 m).
- 3.4.2 Yard-by-Yard (Metre-by-Metre) Examination: The required length of each piece shall be examined on both sides and visual defects classified as listed in Table I. All defects found shall be counted regardless of their proximity to one another, except where two or more defects represent a single local condition of the webbing, in which case only the more serious defect shall be counted. A continuous defect shall be counted as one defect for each warp-wise yard (metre) or fraction thereof in which it occurs. The acceptance quality level (AQL) for minor defects shall be 2.5 defects per 100 units (yd or m) and the lot shall be unacceptable if one or more critical defects appear in the sample. The lot size shall be expressed in units of 1 linear yd (1 linear m) each. An approximately equal number of yards (metres) shall be examined from each roll selected.
- 3.4.3 Overall Examination: Each defect, listed below, shall be counted no more than once in each roll examined.

Defects

Objectionable odor

Uneven weaving throughout

Identification yarns misplaced, missing, or wrong color

Not labeled in accordance with Textile Fiber Products Identification Act

3.4.4 Examination for Length:

3.4.4.1 Individual Roll: Each roll in the sample shall be examined for the defects listed below:

3.4.4.1.1 Gross length under specified minimum length or over specified maximum length.

3.4.4.1.2 Gross length over 2 yd (1.9 m) less than the gross length marked on piece ticket.

3.4.4.1.3 Any length under 10 yd (9 m) in length.

3.4.4.1.4 Any roll containing more than three pieces.

3.4.4.2 Total Yards (Metres): The lot shall be unacceptable if the total of the actual lengths of the rolls in the sample is less than the total of the lengths marked on the ticket.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of the webbing shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.6. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the webbing conforms to the requirements of this specification and the applicable detail specification.

4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification and the detail specifications are classified as acceptance tests and as preproduction tests and shall be performed prior to or on the initial shipment of webbing to a purchaser, on each lot, when a change in material, processing, or both requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, the contracting officer, or the request for procurement.

4.3 Sampling: Shall be as follows:

4.3.1 For Acceptance Tests: Each lot of webbing shall be visually examined as required below for quality (3.4) and sampled at random for all other tests. The number of determinations for each requirement shall be as specified in the applicable test procedure or, if not specified therein, not less than three.

4.3.1.1 A lot shall be all webbing of a single size and configuration produced in a single production run under the same fixed conditions and presented for vendor's inspection at one time. For mechanical property testing, an inspection lot shall not exceed 5000 yd (4570 m). A lot may be packaged and delivered in smaller quantities under the basic lot approval provided lot identification is maintained.

4.3.1.2 Yarn Tests: Lot size shall be expressed in lb (kg) and the sample unit shall be 500 yd (455 m) of the yarn. The lot shall be unacceptable if one or more units fail to meet any requirement specified. Sample size shall be as follows:

Lot Size		Sample Size
Pounds	Kilograms	
Up to 800, incl	Up to 360, incl	2
Over 800 to 22,000, incl	Over 360 to 9,980, incl	3
Over 22,000	Over 9,980	5

4.3.1.3 Webbing Tests: Lot size shall be expressed in units of 1 linear yd (1 linear m) and the sample unit shall be 10 yd (9 m). The lot shall be unacceptable if one or more units fail to meet any requirements specified. Sample size shall be as follows:

Lot Size		Sample Size
Yards	Metres	
Up to 800, incl	Up to 730, incl	2
Over 800 to 22,000, incl	Over 730 to 20,100, incl	3
Over 22,000	Over 20,100	5

4.3.1.3.1 Yard-by-Yard (Metre-by-Metre) Examination: The sample unit shall be 1 linear yd (1 linear m). The sample size shall be in accordance with MIL-STD-105, Level III. The number of rolls from which the sample is to be selected shall be in accordance with Table II.

4.3.1.3.2 Overall Examination: The sample unit shall be one roll. The sample size and acceptance number shall be as shown in Table II.

4.3.1.3.3 Resistance to Light: Five specimens for testing.

4.3.1.3.4 Resistance to Heat: Five specimens for testing.

TABLE II
Sampling Plan

Lot Size		Sample Size (Rolls)	No. of Defects max
Yards	Metres		
Up to 1,200, incl	Up to 1,095, incl	3	0
Over 1,200 to 3,200, incl	Over 1,095 to 4,295, incl	5	0
Over 3,200 to 10,000, incl	Over 4,295 to 14,295, incl	8	0
Over 10,000 to 35,000, incl	Over 14,295 to 49,295, incl	13	0
Over 35,000 to 150,000, incl	Over 49,295 to 137,160, incl	20	1
Over 150,000	Over 137,160	32	2

4.3.1.3.4.1 If a lot contains less than three rolls, each roll in the lot shall be examined.

4.3.2 For Preproduction Tests: As agreed upon by purchaser and vendor.

4.4 Approval:

4.4.1 Sample webbing shall be approved by purchaser before webbing for production use is supplied, unless such approval be waived by purchaser. Results of tests on production webbing shall be essentially equivalent to those on the approved sample.

4.4.2 Vendor shall use ingredients, manufacturing procedures, processes, and methods of inspection on production webbing which are essentially the same as those used on the approved sample webbing. If necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in material, processing, or both and, when requested, sample webbing. Production webbing made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Test Methods: Shall be in accordance with Table III and the following:

4.5.1 Breaking Strength: Shall be determined on the untreated (unfinished) webbing in accordance with FED-STD-191, Method 5100, with the following exceptions:

4.5.1.1 Width of the jaws shall be not less than the width of the specimen.

4.5.1.2 Split-drum type jaws shall be used and a no-load rate of jaw separation shall be 2 to 4 in. (50 to 100 mm) per minute. The distance between the jaws at the start of the test shall be 10 in. \pm 0.5 (250 mm \pm 12).

4.5.1.3 Length of the specimen for tests shall be not less than 45 in. (1125 mm).

4.5.2 Resistance to Light:

- 4.5.2.1 Five specimens shall be exposed in an accelerated weathering unit, as specified in FED-STD-191, Method 5804.
- 4.5.2.2 The specimens shall be placed side by side on the rack in such a manner that only the center portion of each specimen is exposed. Corex D filters and sunshine carbons shall be used. The exposure time shall be 50 hr + 1. The spray heads shall be shut off during the entire exposure period.
- 4.5.2.3 At the end of the exposure period, the specimens shall be conditioned at $21^{\circ}\text{C} \pm 1$ ($70^{\circ}\text{F} \pm 2$) and 65% relative humidity for 24 hr ± 0.5 .
- 4.5.2.4 The conditioned specimens shall be tested for breaking strength in accordance with FED-STD-191, Method 4108, and the percent of the breaking strength (B.S.) loss shall be calculated as follows:
- $$\frac{(\text{Original B.S.} - \text{B.S. after aging}) \times 100}{\text{Original B.S.}} = \% \text{ of breaking strength loss}$$

4.5.3 Resistance to Heat:

- 4.5.3.1 Five specimens shall be suspended in a circulating-air oven at $180^{\circ}\text{C} \pm 3$ ($355^{\circ}\text{F} \pm 5$) for 60 min. ± 5 .
- 4.5.3.2 After removal from the oven, specimens shall be conditioned at $21^{\circ}\text{C} \pm 1$ ($70^{\circ}\text{F} \pm 2$) and 65% ± 2 relative humidity for 24 hr ± 0.5 .
- 4.5.3.3 The conditioned specimens shall be tested for breaking strength in accordance with FED-STD-191, Method 4108, and the percent of breaking strength loss calculated as specified in 4.5.2.4.

4.6 Reports:

- 4.6.1 The vendor of the webbing shall furnish with each shipment a report showing the results of tests to determine conformance to the technical requirements of this specification. This report shall include the purchase order number, AMS 3795 and the applicable detail specification number, vendor's material designation, lot number, quantity, and weight.
- 4.6.2 The vendor of finished or semi-finished parts shall furnish with each shipment a report showing the purchase order number, AMS 3795 and the applicable detail specification number, contractor or other direct supplier of webbing, supplier's product identification, part number, and quantity. When webbing for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of webbing to determine conformance to the requirements of this specification and the applicable detail specification and shall include in the report either a statement that the webbing conforms or copies of laboratory reports showing the results of tests to determine conformance.

- 4.7 **Resampling and Retesting:** If any specimen used in the above tests fails to meet the specified requirements, disposition of the webbing may be based on the results of testing three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the webbing represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. **PREPARATION FOR DELIVERY:**

5.1 **Packaging and Identification:**

- 5.1.1 Webbing shall be supplied in rolls of 90 to 110 yd (80 to 100 m). Each roll shall contain not more than three pieces and no piece shall be under 10 yd (10 m) in length.
- 5.1.2 Each roll shall have a durable label or tag attached with not finer than 5-ply cotton string doubled to not less than 6 in. (150 mm) long. The tickets shall be made of paperboard not less than 0.015 in. (0.38 mm) in thickness and the color shall be manila or light in intensity to permit easy reading of printed, stamped, or typed markings. Handwritten entries are prohibited. The ticket shall have clipped corners at the end where a reinforcing patch (with or without a metal eyelet) is firmly affixed for attaching the tying string. The ticket shall be legibly printed with water insoluble ink with not less than the following information:

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MANUFACTURER'S NAME _____

MANUFACTURER'S MATERIAL DESIGNATION _____

WIDTH OF WEBBING, if other than specified _____

LOT NUMBER _____

ROLL NUMBER (If used) _____

DATE OF MANUFACTURE _____

QUANTITY _____

* Insert applicable detail specification number

- 5.1.3 Each roll of webbing shall be labeled or ticketed for fiber content in accordance with Textile Fiber Products Identification Act.
- 5.1.4 Individual rolls of webbing shall be wrapped in a suitable protective film and packaged in an exterior shipping container in such a manner that the rolls, during shipping and storage, will be protected from exposure to moisture, weather, or any other normal hazard.

- 5.1.5 Each exterior shipping container shall be legibly marked with not less than the following information in such a manner that the markings will not smear or be obliterated during normal handling or use:

WEBBING, TEXTILE, WOVEN NYLON FABRIC
AMS 3795/*

PURCHASE ORDER NUMBER _____

MANUFACTURER'S NAME _____

MANUFACTURER'S MATERIAL DESIGNATION _____

DESCRIPTION _____

LOT NUMBER _____

NET WEIGHT _____

QUANTITY _____

- 5.1.6 Containers of webbing shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the webbing to ensure carrier acceptance and safe delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.
- 5.1.7 For direct U.S. Military procurement, packaging, packing, and marking shall be in accordance with MIL-W-43334, Level A, Level B, or Level C, as specified in the request for procurement. Commercial packaging as in 5.1.1, 5.1.4, and 5.1.6 will be acceptable if it meets the requirements of Level C.
6. ACKNOWLEDGMENT: A vendor shall mention this specification number and the applicable detail specification number in all quotations and when acknowledging purchase orders.
7. REJECTIONS: Webbing not conforming to this specification and the applicable detail specification or to modifications authorized by the purchaser will be subject to rejection.
8. NOTES:
- 8.1 Dimensions and properties in inch/pound units and the Celsius temperatures are primary; dimensions and properties in SI units and the Fahrenheit temperatures are shown as the approximate equivalents of the primary units and are presented only for information.
- 8.2 For direct U. S. Military procurement, purchase documents should specify not less than the following:

Title, number, and date of this specification and the applicable detail specification

Width and strength of webbing desired

Quantity of webbing desired

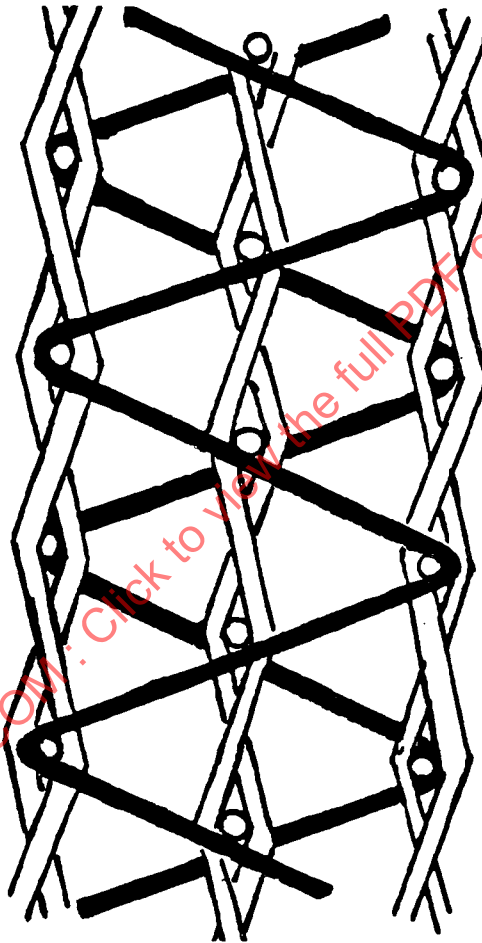
Applicable level of packaging (See 5.1.6)

8.3 Similar specifications: This specification is the equivalent of MIL-W-83279, dated 16 June 1970.

8.4 Webbing meeting the requirements of this specification has been classified under Federal Supply Classification (FSC) 8305.

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This specification and its detail specifications are under the jurisdiction of AMS Committee "C P".



Warp Yarns - Weaving One End as One
Binder Yarns - Weave One End as One

Figure 1. Cross Section Filling

TABLE I
CLASSIFICATION OF DEFECTS

Defect	Description	Critical	Minor
Abrasion marks	Resulting in rupture of yarns or in nap sufficient to obscure the identity of any yarn exceeding 10% of width or 1 in. (25 mm) in length, whichever is more.	X	
Broken or missing end	Two or more regardless of length or a single end over 6 in. (150 mm) in length.	X	
	Single end under 6 in. (150 mm) but over 0.25 in. (6 mm).		X
Broken or missing pick	Two or more regardless of extent. The filling tie-in or joining shall not be construed as a defect of any nature.	X	
Coarse or light filling bar	Resulting in visible difference in stiffness or thickness of webbing and extending over 0.25 in. (6 mm) in the length direction.	X	
	Resulting in visible difference in stiffness or thickness of webbing and extending 0.25 in. (6 mm) and under in the length direction.		X
Twist or distortion	Webbing will not lay flat upon application of manual pressure due to twist or distortion.		X
Cut, hole, or tear	Any cut, hole, or tear.	X	
Drop-ply	Clearly visible on more than 2 ends within same length and extending over 9 linear in. (225 mm) or more.	X	
	Clearly visible on 1 or 2 ends within same length and extending over 9 linear in. (225 mm) or more.		X