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400 Commonwealth Dr., Warrendale, PA 15096

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 3784

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Submitted for recognition as an American National Standard

TAPE, NYLON, LOOP

1. SCOPE:

1.1 Form: This specification covers one type of nylon loop tape.

1.2 Application: Primarily for use as lacing tape in flight clothing.

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.

2.2.1 Federal Standards:

FED-STD-191 - Textile Test Methods

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
MIL-STD-129 - Marking for Shipment and Storage

3. TECHNICAL REQUIREMENTS:

3.1 Material:

3.1.1 Yarn: Nylon yarn used in this tape shall be made from 210 denier, bright, 34 filament, high tenacity, polyamide prepared from hexamethylene diamine and adipic acid or its derivatives. It shall have a melting point of 250°C + 6 (482°F ± 10), determined in accordance with FED-STD-191, Method 1534.

3.1.2 Loop Cord: Shall be constructed in such a manner and with such yarn tension that the core yarns are held firmly in place to prevent puckering of the core yarns when released from stress. This cord shall conform to the requirements of the core or coreless construction of Table I, when tested as specified in 4.5.

TABLE I

CORE REQUIREMENTS

Property	Core Construction			Coreless Construction
	Sleeve	Core	Cord	
Yarn size, denier	210	210		210
Yarn Ply, min	3	2 or 3		6
Yarn Twist, turns per in. (25.4 mm)	8S 6Z	8S 6Z		2.5S 2.5Z
Number of Carriers	20			16
Ends per Carrier	1			1
Number of Ends	20	6 or 9		16
Picks per in. (25.4 mm)	26 - 28			15
Weave	Plain, (1 up 1 down)			Basket
Thickness of Cord		0.065 - 0.085 in. (1.65 - 2.15 mm)		
Breaking Strength, lb (N), min			150 (665)	150 (665)
Yd per lb (m/kg), min			180 (360)	180 (360)

3.2 Properties: Tape shall conform to Table II and the following, determined in accordance with 4.5.

3.2.1 Weave: Shall be in accordance with the weave diagram, Fig. 1.

3.2.2 Length: Shall contain not less than 41 in. (1025 mm) of cord for each yard (metre) of tape in order to produce the desired loop opening.

3.2.3 Color: Shall match Air Force Sage Green Shade No. 520.

3.2.3.1 Colorfastness: Tape shall have a colorfastness rating of "good" after exposure to light, laundering, crocking, and perspiration, determined in accordance with FED-STD-191, Methods 5660 (exposure time 20 hr), 5614, 5650, and 5682, respectively.

TABLE II

PROPERTIES AND REQUIREMENTS

Property	Requirement
Yarn Ply	
Warp	Singles
Filling	3
Thread Count, min	
Face Warp, full width	38
Back Warp, full width	37
Cord Warp, full width	1
Total Warp, full width	76
Filling	60 picks per in. (25.4 mm)
Thickness (exclusive of cord)	0.030 to 0.040 in. (0.75 to 1.00 mm)
Weight, max	67 yd per lb (135 m/kg)
Width	
Tape and Cord Woven Together	5/16 in. ± 1/32 (7.94 mm ± 0.80)
Tape and Cord Loop	7/16 in. ± 1/32 (11.11 mm ± 0.80)
Breaking Strength, min	175 lb (780 N)

3.2.3.2 Color Matching: Tape shall match the approved standard shade under natural (north sky) daylight, or artificial daylight having a color temperature of 7500° K and shall be a close approximation of the standard shade under incandescent lamp light at 2800° K.

3.3 Finish:

3.3.1 Nonfibrous Material: Tape shall have not more than 4.25% nonfibrous material, determined in accordance with FED-STD-191, Method 2611, omitting determination of water-soluble material, weight of desized specimens, residue ash, and total inorganic material.

3.3.2 Acidity: Tape shall have a pH of 5.0 to 9.0, determined in accordance with FED-STD-191, Method 2811.

3.4 Quality: Tape, as received by purchaser, shall be clean, evenly woven, and free from foreign materials and from imperfections detrimental to usage of the tape.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of tape 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 tape conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to the following requirements are classified as acceptance tests and shall be performed on each lot:

Requirement	Paragraph
Weight	Table II
Breaking Strength	Table II
Quality	3.4

4.2.2 Preproduction Tests: Tests to determine conformance to all technical requirements of this specification are classified as preproduction tests and shall be performed prior to or on the initial shipment of tape to a purchaser, when a change in material, processing, or both requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.2.1 For direct U.S. Military procurement, substantiating test data, and, when requested, preproduction tape 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: Sufficient tape shall be taken at random from each lot to perform all required 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 tape of the same size produced in a single production run under the same fixed conditions and presented for vendor's inspection at one time. An inspection lot shall not exceed 1,000 lb (450 kg). A lot may be packaged and delivered in smaller quantities under the basic lot approval provided lot identification is maintained.

4.3.1.2 When a statistical sampling plan and acceptance quality level (AQL) have been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3.1 and the report of 4.6.1 shall state that such plan was used.

4.3.1.3 For direct U.S. Military procurement, sampling and inspection shall be in accordance with MIL-STD-105 and the following:

4.3.1.3.1 Acceptance Quality Levels: Shall be as follows:

4.3.1.3.1.1 Yard-by-Yard (Metre-by-Metre) Examination: Shall be not more than two major defects and 15 total defects per 100 units [100 yd (90 m)].

4.3.1.3.1.2 Overall Examination: Shall be not more than one defect per 100 units (pieces). The pieces to be examined shall be those selected for the yard-by-yard (metre-by-metre) examination as shown in 4.3.1.3.2.1.

4.3.1.3.1.3 Length of Spool Examination: Shall be not more than one defect per 100 units (spools). The spools to be examined shall be those from which the pieces for the yard-by-yard (metre-by-metre) examination were taken as shown in 4.3.1.3.2.1.

4.3.1.3.2 Inspection Levels: Shall be as follows:

4.3.1.3.2.1 For Yard-by-Yard (Metre-by-Metre) Examination: Shall be in accordance with MIL-STD-105, Level III. The lot size shall be expressed in units of 1 yd (1 m) each. An approximately equal number of yards (metres) shall be examined from each piece in the sample. The number of pieces to be drawn shall be computed as follows:

In inch/pound units:

$$\text{Number to be Drawn} = \frac{\text{Yards in Sample}}{35}$$

In SI units:

$$\text{Number to be Drawn} = \frac{\text{Metres in Sample}}{35}$$

4.3.1.3.3 For Table III Tests: A sample at least 15 yd (14 m) long shall be taken from each 5000 yd (4570 m), or fraction thereof, of finished tape and of the component cord submitted for acceptance testing at one time.

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

4.4 Approval:

4.4.1 Sample tape shall be approved by purchaser before tape for production use is supplied, unless such approval be waived by purchaser. Results of tests on production tape 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 tape which are essentially the same as those used on the approved sample tape. If necessary to make any change in material or processing, 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 tape. Production tape 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 Yard-by-Yard (Metre-by-Metre) Examination: The required yards (metres) of each piece shall be inspected and visual defects classified as listed in Table IV. The defects found shall be counted regardless of their proximity to each other, except where two or more defects represent a single local condition of the tape, in which case, only the more serious defect shall be counted. A continuous defect shall be counted as one defect for each warpwise yard (metre), or fraction thereof, in which it occurs. The unit of tape for this examination shall be 1 linear yd (1 linear m).

4.5.2 Overall Examination: The unit of tape for this examination shall be one piece. The tape shall be inspected for the following defects:

Property	Defect
Finish	Objectionable odor Unclean throughout
Shade	Off shade, i.e., not within established tolerances Shaded, cloudy, or streaky color throughout Poor penetration, two sidedness
Weaving	Uneven weave throughout

4.5.3 Examination for Length of Spool: The spool shall be examined for gross length. Any gross length found to be less than the specified minimum length or any gross length found to be more than 2 yd (2 m) below the gross length marked on the piece ticket shall be considered as a defect with respect to length. The unit for this examintion shall be one spool.

TABLE III

TEST METHODS

Property	Test Method FED-STD-191, Method
Breaking Strength	4102
Width	5020
Thickness	5030
Twist	4054
Weight	5040
Thread Count	5050

TABLE IV

CLASSIFICATION OF DEFECTS

Characteristic	Defect	Major	Minor
Abrasion mark	Resulting in rupture of individual yarns or plies, distortion in the orientation of threads, dimensional distortion, areas noticeably thinner than adjoining unaffected areas, or in nap sufficient to obscure the identity of any yarns.	X	
Broken or missing end	Any broken or missing end.	X	
Broken or missing pick	Two or more contiguous regardless of length.	X	
Broken or missing pick	Single, over 0.5 in. (12 mm) in the width of the tape.		X
Coarse filling bar, heavy place	Resulting in noticeably increased stiffness or thickness of tape and extending over 0.25 in. (6 mm) in the length direction.	X	
	Resulting in noticeably increased stiffness or thickness of tape and extending 0.25 in. (6 mm) or under in the length direction.		X

TABLE IV

CLASSIFICATION OF DEFECTS (Continued)

Characteristic	Defect	Major	Minor
Crease or wrinkle (edge folded or rolled)	Any hard, embedded crease or wrinkle.		X
Cut, hole, or tear	Any cut, hole, or tear.	X	
Drop-ply	Two or more drop-ply ends in the same length.	X	
	Single drop-ply end (See "fine or light filling bar").	X	
Edge cut, torn, or frayed	Any cut, torn, or frayed edge.	X	
Edge beaded or corded	Noticeable increase in edge thickness or misformed edge.		X
Edge loopy	Forming clearly noticeable filling loops or edges tied loosely to body of tape for 2 linear in. (50 linear mm) or over.	X	
Edge loose (slack)	Resulting in waviness, distortion in orientation of filling, or looseness along the edge.	X	
Edge scalloped	Any noticeable indentation of edge.		X
Edge tight	Resulting in noticeable tension along edge, or pucker, waviness, bagginess, or slackness that cannot be flattened by manual pressure.	X	
Fine or light filling bar, light place	Any clearly noticeable.	X	
Floats or skips	Any multiple floats or skips.	X	
	Single floats over 0.25 in. (6 mm) in length in warp or filling direction.	X	

TABLE IV

CLASSIFICATION OF DEFECTS (Continued)

Characteristic	Defect	Major	Minor
Floats or skips	Single, floating 0.25 in. (6 mm) and under in warp direction, or up to 0.25 in. (6 mm) or one-third of the width of the tape (whichever is less) in the filling direction.		X
Hitchback crack, open place	Clearly noticeable opening between adjoining picks or warpwise tension area over part of the width, resulting in noticeable light and heavy places.		X
Jerked-in filling, slough-off, slug	More than twice the thickness of the normal yarn.		X
Kinks	More than 3 kinks in any 9 linear in. (225 mm).	X	
Knots	More than 1 knot in any 9 linear in. (225 mm).	X	
	Single knot with untrimmed ends extending from the surface of the tape.		X
Mispick or double pick	Two or more contiguous.	X	
	Single.		X
Slack end	Two or more in same length, jerked in between picks, or forming clearly noticeable loops on surface of tape.	X	
	Single, jerked in between picks, or forming clearly noticeable loops on surface of tape.		X
Smash	Any smash.	X	
Spot, stain, or streak	Any uncleaned dirt, rust, grease or oil spot, stain, or streak.		X
Tight end	Clearly noticeable.		X
Tight pick or tight filling	Resulting in rolling of tape (See also "edge scalloped").	X	

TABLE IV

CLASSIFICATION OF DEFECTS (Continued)

Characteristic	Defect	Major	Minor
Weak, soft, or tender spot	Any weak, soft, or tender spot.	X	
Width	Over 1/32 in. (0.8 mm) narrower or wider than specified.		X
Wrong draw	Extending over 9 in. (225 mm).		X

4.6 Reports:

4.6.1 The vendor of tape shall furnish with each shipment a report showing the results of tests to determine conformance to the acceptance test requirements and stating that the tape conforms to the other technical requirements of this specification. This report shall include the purchase order number, AMS 3784, vendor's material designation, lot number, tape weight, and quantity.

4.6.2 The vendor of finished or semi-finished parts shall furnish with each shipment a report showing the purchase order number, AMS 3784, contractor or other direct supplier of tape, supplier's material identification, part number, and quantity. When tape for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of tape to determine conformance to the requirements of this specification and shall include in the report either a statement that the tape 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 tape 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 tape 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 Tape shall be furnished in rolls of a type and size agreed upon by purchaser and vendor.