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Superseding AMS-3777

TAPE, NYLON, NONMELTING, REINFORCING

1. SCOPE:

1.1 Form: This specification and its supplementary detail specifications cover a nonmelting nylon in the form of tape.

1.2 Application: Primarily for use in binding and reinforcing applications in parachute packs.

1.3 Classification: The tape shall be as specified in the applicable detail specification, classified by width and breaking strength. An example is shown in 8.1. The tape covered by each detail specification appears as a part of the title.

1.4 Safety-Hazardous Material: While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The applicable issue of referenced publications shall be the issue in effect on the date of the purchase order.

2.1 ASTM Publications: Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM D 123 - Terminology Relating to Textile Materials

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2.2 U.S. Government Publications: Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094 except as specified in 2.2.4.

2.2.1 Federal Standards:

FED-STD-191 - Textile Test Methods
FED-STD-595 - Color

2.2.2 Military Specifications:

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

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, Rules and Regulations

3. TECHNICAL REQUIREMENTS:

3.1 Detail Specification: The requirements for a specific tape 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: The tape shall be made of a nonmelting aromatic polyamide which shall not begin to char below 355°C (671°F).

3.2.1 Age: The tape shall be not more than two years old from date of manufacture to date of delivery.

3.3 Properties: Shall be as specified in the applicable detail specification. Tests shall be performed on the tape supplied and in accordance with the specified test methods of FED-STD-191, insofar as practicable.

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

3.4.1 Imperfections: Acceptability of each lot of tape shall be based on imperfections as listed in Table I. Refer to ASTM D 123 for definitions used herein. The term "clearly noticeable" used in Table I shall be interpreted to mean visible at normal inspection distance of approximately 3 feet (1 m).

TABLE I

CLASSIFICATION OF IMPERFECTIONS

Imperfection	Description	Major	Minor
Abrasion marks	Resulting in rupture of yarns or in nap sufficient to obscure the identity of any yarns over 10% of width or 1 inch (25 mm) in length.	X	
Broken or missing end	Two or more regardless of length or a single end over 6 inches (152 mm) in length.	X	
	Single end over 0.25 to 6 inches (6.4 to 152 mm), incl, in length.		X
Broken or missing pick	Two or more regardless of extent.	X	
	One or single.		X
Coarse or light filling bar	Resulting in clearly noticeable difference in stiffness or thickness of tape and extending over 0.25 inch (6.4 mm) in length direction	X	
	Resulting in clearly noticeable difference in stiffness or thickness of tape and extending 0.25 inch (6.4 mm) or under in length direction.		X
Cut, hole, or tear	Any cut, hole, or tear.	X	
Drop-ply	Clearly noticeable on more than two ends within same length and extending over 9 linear inches (229 mm) or more.	X	
	Clearly noticeable on one or two ends within same 9 linear inches (229 mm) or more.		X
Edges	Frayed, slack, or otherwise poorly constructed and over 0.25 inch (6.4 mm) in length.	X	
Fine or light filling bar, light place	Clearly noticeable.	X	

TABLE I

CLASSIFICATION OF IMPERFECTIONS (Continued)

Imperfection	Description	Major	Minor
Floats or skips	Multiple floats or skips, 0.5 inch (13 mm) or more in warp and filling directions.	X	
	Single float or skip over 1 inch (25 mm).	X	
	Multiple floats or skips, under 0.5 inch (13 mm) in combined warp and filling directions.		X
	Single float or skip over 0.5 inch (13 mm) if in the warp.		X
	Single float or skip over 0.25 inch (6.4 mm) but not exceeding 1 inch (25 mm) if in the filling.		X
Hitchback crack	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 three in any 9 linear inches (229 mm).	X	
Knots	More than two in any 9 linear inches (229 mm).	X	
	Single with untrimmed ends extending over 1/16 inch (1.6 mm) from surface of tape.	X	
Mispick, double pick	Two or more across the full width.	X	
	Single across the full width.		X
Slack end	Two or more in the same length, jerked in between picks, or forming clearly noticeable loops on the surface of tape.	X	
	Single jerked in between picks or forming clearly noticeable loops on surface of tape.		X

TABLE I

CLASSIFICATION OF IMPERFECTIONS (Continued)

Imperfection	Description	Major	Minor
Slub (slug), or gout	More than twice the thickness of the yarn (or ply, if plied).		X
Smash	Any smash.	X	
Spot, stain, or streak	Any clearly noticeable dirt, rust, grease, oil spot, stain, or streak.		X
Tight end	Clearly noticeable.	X	
Tight pick or tight filling	Resulting in rolling of tape.	X	
Twist or distortion	Twisted or distorted. Will not lay flat upon application of manual pressure.		X
Weak, soft, or tender spot	Any weak, soft, or tender spot.	X	
Width	Beyond specified tolerance.		X
Wrong draw	Extending over 9 inches (229 mm).		X

3.4.2 Yard-by-Yard (Metre-by-Metre) Examination: The required length of each piece shall be inspected prior to the resin treatment and visual imperfections classified as listed in Table I. The imperfections found shall be counted regardless of their proximity to each other, except where two or more imperfections represent a single local condition of the tape, in which case, only the more serious imperfection shall be counted. A continuous imperfection shall be counted as one imperfection for each warp-wise yard (metre), or fraction thereof, in which the imperfection occurs. The lot shall be unacceptable when one or more critical imperfections are found in the same sample. The lot size shall be expressed in units of 1 linear yard (1 linear m) each. An approximately equal number of yards (metres) shall be examined from each roll selected. The number of rolls from which the sample is to be taken shall be in accordance with 4.3.1.1.

3.4.3 Overall Examination: Each imperfection listed below shall be counted no more than once in each roll examined. The lot size shall be expressed in units of 1 linear yard (1 linear m) each.

Objectionable odor
Overall uncleanness
Uneven weaving throughout

3.4.4 Examination for Length:

3.4.4.1 Individual Roll: Each roll in the sample shall be examined for the following imperfections; the lot size shall be expressed in units of 1 linear yard (1 linear m) each:

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

Gross length over 2 yards (2 m) under gross length marked on piece ticket.

Any piece under allowable minimum length of piece.

Any roll containing more than the allowable number of pieces.

3.4.4.2 Total Length: 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 the roll tickets.

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. 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 and the applicable detail specification.

4.2 Classification of Tests: Tests for all technical requirements are acceptance tests and preproduction tests and shall be performed prior to or on the initial shipment of tape to a purchaser, on each lot, when a change in ingredients and/or processing 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, contracting officer, or request for procurement.

4.3 Sampling and Testing: Shall be as follows:

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4.3.1 For Acceptance Tests:

4.3.1.1 Properties specified in the applicable detail specification apply to the average of the determinations made on a single unit. Sample size shall be as shown below. The sample unit for testing shall be 10 yards (9 m). The lot shall be unacceptable if one or more units fail to meet the specified requirement. The lot size shall be expressed in units of 1 linear yard (1 linear m).

Lot Size		Number of Sample Units
Yards	Metres	
Up to 800, incl	Up to 732, incl	2
Over 800 to 10,000, incl	Over 732 to 9144, incl	3
Over 10,000	Over 9144	5

4.3.1.2 Yard-by Yard (Metre-by-Metre) Examination: The unit of tape for this examination shall be 1 linear yard (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.

TABLE II

Lot Size		Sample Size, Rolls	Max No. Imperfections Acceptable in Sample
Yards	Metres		
Up to 1,200, incl	Up to 1,097, incl	5	0
Over 1,200 to 3,200, incl	Over 1,097 to 2,926, incl	7	0
Over 3,200 to 10,000, incl	Over 2,926 to 9,144, incl	10	0
Over 10,000 to 35,000, incl	Over 9,144 to 32,004, incl	15	0
Over 35,000 to 150,000, incl	Over 32,004 to 137,160, incl	25	1
Over 150,000	Over 137,160	35	1

4.3.1.3 Overall Examination: The sample unit for this examination shall be one roll. The sample size and acceptance number shall be as in Table II.

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

4.3.1.4 Length of Individual Roll Examination: The sample unit for this examination shall be one roll. The sample size and acceptance number shall be as shown in Table II.

4.3.1.5 A lot shall be all tape 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. A lot may be packaged in small quantities and delivered under the basic lot approval provided lot identification is maintained.

4.3.1.6 When a statistical sampling plan has 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 shall state that such plan was used.

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 ingredients, in type of equipment for processing, or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in ingredients and/or processing 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 as specified in Table III and the following:

TABLE III

Property	FED-STD-191 Test Method	Number of Determinations per Individual Sample Unit <u>1/</u>	Results Reported as <u>1/</u>
<u>Yarn:</u>			
Denier	4021		
Twist	4054		
Carbonization	1534 <u>2/</u>		

TABLE III (Continued)

Property	FED-STD-191 Test Method	Number Determinations per Individual Sample Unit <u>1/</u>	Results Reported as <u>1/</u>
<u>Tape:</u>			
Texture			
Warp yarns	5050 <u>3/</u>	3	Nearest whole number
Binder yarns	5050 <u>3/</u>	3	Nearest whole number
Picks per inch (25.4 mm)	5050		
Thickness	5030 <u>4/</u>		
Width	5020	5	Nearest 1/32 inch (0.8 mm)
Weight	5040		
Breaking Strength			
Unaged <u>5/</u>	4108	5	Nearest 1.0 pound force (4.5 N)
Aged <u>5/</u>	4108	5	Nearest 1% loss
Elongation <u>6/</u>	4108	5	Nearest 1%

1/ When the data in these columns are not specified in the table, they shall be as required by the referenced test method.

2/ Supplier's certificate of compliance will be acceptable in lieu of testing.

3/ Determination shall be made on full width of tape.

4/ Except that a 6-ounce (170 gram) total load shall be applied and the presser foot shall be 3/8 inch (9.5 mm).

5/ For AMS-3777/4 only, the no-load rate of jaw separation shall be 4 inches (102 mm) per minute.

6/ In lieu of an elongation-recording device on the testing machine, the elongation determination shall be performed in accordance with the following:

a. Distance between bench marks on the test specimen shall be 5 inches (127 mm) minimum.

b. Maximum extension at 90% of breaking load.

4.5.1 Ply and Weave: Shall be determined visually on one specimen per sample unit and results reported as "pass" or "fail".

4.5.2 Breaking Strength After Aging: Specimens shall be placed in an oven for 4 hours \pm 0.05 at 260°C \pm 5 (500°F \pm 9). After removal, the specimens shall be conditioned for 4 hours \pm 0.5 at 21°C \pm 1 (70°F \pm 2) and 65% \pm 2 relative humidity and tested for breaking strength. The loss in breaking strength due to aging shall be reported as percent loss from the unaged specimens.