

INCH-POUND

MIL-T-5666D  
11 September 1990  
SUPERSEDING  
MIL-T-5666C  
22 August 1969

## MILITARY SPECIFICATION

## TAPE, TEXTILE, NYLON, MULTIPLE TUBULAR

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

## 1. SCOPE

1.1 Scope. This specification covers one type of nylon multiple tubular tape.

## 2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

## SPECIFICATIONS

## MILITARY

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

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be used in improving this document should be addressed to: U.S. Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5014 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 8315

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STANDARDS

FEDERAL

- FED-STD-191 - Textile Test Methods
- FED-STD-595 - Colors Used in Government Procurement

MILITARY

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

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

FEDERAL TRADE COMMISSION

Rules and Regulations Under the Textile Fiber Products Identification Act

(Copies may be obtained from the Federal Trade Commission, Correspondence Branch, Washington, DC 20580-0001.)

2.2 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.3) in accordance with 4.3.

3.2 Samples. The dyed tape 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 6.4).

3.3 Material. It is encouraged that recycled material be used when practical as long as it meets the requirements of this specification.

3.3.1 Yarn. The yarn used in the manufacture of the tape shall be 210 denier  $\pm$  5.0 percent for the warp and 420 denier  $\pm$  5.0 percent for the filling; bright, high tenacity, light and heat resistant nylon.

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3.3.2 Twist. The warp and filling yarns shall have a minimum of 2-1/2 turns of twist per inch.

3.4 Color. The tape shall be yarn or piece dyed to Sage Green 1545, Camouflage Green 483, or other color, as specified (see 6.2 and 6.5).

3.4.1 Matching. The color of the dyed tape shall match the standard sample when viewed under filtered tungsten lamps that approximate artificial daylight and that have a correlated color temperature of  $7500 \pm 200\text{K}$ , with illumination of  $100 \pm 20$  foot candles and shall be a good match to the standard sample under incandescent lamplight at  $2300 \pm 200\text{K}$ .

3.4.2 Colorfastness. The dyed tape shall show fastness to laundering equal to or better than the standard sample or equal to or better than a rating of "good" when tested as specified in 4.4.3. The tape shall not be subjected to any type of bleaching process.

3.5 Physical requirements. The dyed tape shall conform to the requirements specified in table I when tested as specified in 4.4.3.

TABLE I. Physical requirements

Characteristic	Requirement
Width	1-5/16 to 1-7/16 inches
Thickness	0.020 to 0.025 inch
Weight (max.)	0.40 ounces per linear yard
Breaking strength (min.)	500 pounds
Elongation (min.)	20 percent
Total ends (min.)	199
Picks per inch (min.)	84

3.5.1 Resistance to light and heat. The tape shall lose no more than 25 percent of the original breaking strength upon exposure to the light and heat tests as specified in 4.4.3.

3.6 Weave. The tape shall be composed of two ground warps (face and back) and one filling. The face and back warps shall weave plain, with one filling yarn per shed. The filling shall accomplish a cross-over; first on the face, then on the back at each 40-warp end interval so that five separated tubular sections shall be formed in the total width.

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3.7 Nonfibrous materials. The water-soluble and chloroform-soluble materials shall be not greater than 2.0 percent when tested as specified in 4.4.3.

3.8 pH. The pH value of the water extract of the dyed and finished tape shall be not less than 5.0 and not greater than 8.5 when tested as specified in 4.4.3.

3.9 Length and put-up. Unless otherwise specified, the tape shall be put up in rolls of not less than 95 yards and not greater than 105 yards. No roll shall contain more than three pieces and no piece shall be less than 10 yards in length.

3.10 Identification tickets. Each roll of tape shall have an identification ticket attached to the roll in accordance with MIL-P-43334.

3.11 Fiber identification. Each roll of tape shall be labeled or ticketed for fiber content in accordance with the Textile Fiber Products Identification Act.

3.12 Workmanship. The end item shall conform to the quality of product established by this document and the 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 (examinations and tests) 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 ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall 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 requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

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4.1.2 Certificate of compliance. Where certificates of compliance are submitted, the Government reserves the right to inspect such items to determine the validity of the certification.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.3).
- b. Quality conformance inspection (see 4.4).

4.3 First article inspection. When a first article is required (see 3.1 and 6.2), it shall be examined for the defects specified in 4.4.2.1 through 4.4.2.3 and tested for the characteristics specified in 4.4.3.

4.4 Quality conformance inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with MIL-STD-105.

4.4.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected in accordance with all the requirements of referenced documents unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.

4.4.2 End item examination.-

4.4.2.1 Yard-by-yard examination. The tape shall be examined on both sides for the defects listed in table II. All defects found shall be counted regardless of their proximity to each other except where two or more defects represent a single local condition, in which case only the more serious defect shall be counted. A continuous defect shall be counted as one defect for each warpwise yard or fraction thereof in which it occurs. The lot size shall be expressed in yards. The sample unit shall be one linear yard. The inspection level shall be III and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 2.5 for minor defects. In addition, the finding of one or more critical defects shall be cause for rejection of the lot. The number of rolls from which the sample yardage is to be selected shall be in accordance with table III. The sample yardage shall be apportioned equally among the selected rolls.

TABLE II. End item visual defects

Examine	Defect	Classification	
		Critical	Minor (1 class)
Abrasion marks	Resulting in rupture of yarns, or in nap sufficient to obscure the identity of any yarn exceeding 10 percent of width or 1 inch in length	1	

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TABLE II. End item visual defects (cont'd)

Examine	Defect	Classification	
		Critical	Minor (1 class)
Broken or missing end	Two or more regardless of length, or a single end exceeding 6 inches in length	2	
	Single end under 6 inches but exceeding 1/4 inch		201
Broken or missing pick	Two or more regardless of extent	3	
	Single, missing for more than 1/4 inch		202
Coarse or light filling bar	Resulting in visible difference in stiffness or thickness of tape and extending for more than 1/4 inch in the length direction	4	
	Resulting in visible difference in stiffness or thickness of tape and extending for 1/4 inch or less in the length direction		203
Twist or distortion	Tape will not lay flat upon application of manual pressure due to twist or distortion		204
Cut, hole or tear	Any cut, hole or tear	5	
Edges	Frayed, slack, or otherwise poorly constructed and exceeding 1/4 inch in length	6	
Floats or skips	Three or more, 1/2 inch or more in combined warp and filling directions or single float or skip more than 1 inch	7	
	Three or more, less than 1/2 inch in combined warp or filling directions or single float or skip more than 1/2 inch but not exceeding 1 inch, if in warp, or more than 1/4 inch of width but not exceeding 1 inch in filling	8	

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TABLE II. End item visual defects (cont'd)

Examine	Defect	Classification	
		Critical	Minor (1 class)
Hitchback, crack	Clearly visible opening between adjoining picks, or warpwise tension area over part of the width resulting in visible light and heavy places <u>1/</u>		205
Jerked-in filling slough-off, slug	A clearly visible loop of filling pulled in at edges <u>1/</u>		206
Kinks	More than three in any 9 linear inches	9	
Knots	More than one knot in any 9 linear inches	10	
	One knot every 2 yards with untrimmed ends extending from surface of tape		207
Mispick, skips	Resulting in widthwise repeated floats, more than 1/4 inch long	11	
	Resulting in break in sequence of weave or widthwise repeated floats 1/4 inch or less long		208
Slack end	Two or more in the same length jerked in between picks, or forming clearly visible loops on the surface	12	
	Single jerked in between picks or forming clearly visible loops on the surface		209
Slub, or slug, gout	More than twice the thickness of the yarn		210
Smash	Any smash	13	
Spot, stain or streak	Any <u>1/</u>		211
Tight end	Up to 12 inches in length <u>1/</u>	14	

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TABLE II. End item visual defects (cont'd)

Examine	Defect	Classification	
		Critical	Minor (1 class)
Wrong draw	Extending for more than 9 inches	15	
Width	Beyond specified tolerances		212
Yarn (filling)	Two yarns per shed	16	

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

TABLE III. Sample size

Lot size in yards	Sample size in rolls	Acceptance number
Up to 1200 <u>1/</u>	3	0
1201 up to and including 3200	5	0
3201 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 3 rolls, each roll in the lot shall be examined.

4.4.2.2 Overall examination. Each defect listed below shall be counted no more than once in each roll examined. The sample unit for this examination shall be one roll. The sample size and acceptance number shall be shown in table III. The lot size shall be expressed in units of 1 yard each.

Defects

Objectionable odor  
Unclean throughout  
Uneven weaving throughout  
Off shade, i.e., not within established tolerance  
Not labeled in accordance with the Textile Fiber  
Products Identification Act



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4.4.2.3 Length examination.

4.4.2.3.1 Examination for length of individual roll. Each roll in the sample shall be examined for the defects listed below. The sample unit for this examination shall be one roll. The sample size and the acceptance number shall be as shown in table III. The lot size shall be expressed in units of 1 yard each.

Defects

Gross length less than specified minimum length  
or more than specified maximum length  
Gross length more than 2 yards less than gross  
length marked on piece ticket  
Any piece less than 10 yards in length  
Any roll containing more than 2 pieces

4.4.2.3.2 Examination for total yardage in sample. The lot shall be unacceptable if the total of the actual gross length of rolls in the sample is less than the total of the gross lengths marked on roll tickets.

4.4.3 End item testing. The end items shall be tested for the characteristics listed in table IV. The methods of testing specified in FED-STD-191 wherever applicable and as listed in table IV shall be followed. 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 used in expressing the final result. The sample unit shall be 10 yards of webbing. The sample size shall be as follows:

<u>Lot size (yards)</u>	<u>Sample size (sample units)</u>
800 or less	2
801 up to and including 22,000	3
22,001 and over	5

The lot shall be unacceptable if one or more sample units fail to meet any requirement specified.

TABLE IV. End item tests

<u>Characteristic</u>	<u>Requirement paragraph</u>	<u>FED-STD-191 Test method</u>
Nylon yarn	3.3.1	<u>1/</u>
Twist	3.3.2	<u>1/</u>

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TABLE IV. End item tests (cont'd)

Characteristic	Requirement paragraph	FED-STD-191 Test method
Colorfastness to: Laundering	3.4.2	5614
Bleaching process	3.4.2	<u>1/</u>
Thickness	3.5	5030
Weight	3.5	5041
Breaking strength (original)	3.5	5100 <u>2/</u>
Elongation	3.5	5100 <u>2/</u>
Total ends	3.5	5050
Picks per inch	3.5	5050
Breaking strength: After light exposure	3.5.1	4.4.3.1 and 5100 <u>2/</u>
After heat exposure	3.5.1	4.4.3.2 and 5100 <u>2/</u>
Weave	3.6	Visual <u>3/</u>
Nonfibrous material	3.7	2611
pH	3.8	2811

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

2/ Breaking strength shall be determined in accordance with method 5100 except that the long dimension of the jaws shall be no less than the width of the specimen. Breaking strength and elongation shall be determined simultaneously.

3/ One determination per sample unit and the results reported as "pass" or "fail".

4.4.4 Packaging inspection. The sampling and inspection for the preservation, packaging, and container marking shall be in accordance with the requirements of MIL-P-43334.

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4.4.5 Methods of inspection.

4.4.5.1 Resistance to light test. Five tests shall be conducted from each sample unit of the tape. The test specimens shall be exposed in the accelerated weathering unit as specified in method 5804 of FED-STD-191. The unbacked specimens shall be placed in a stainless steel holder or suspended from the rack. Corex D filters and sunshine carbons shall be used. The exposure time shall be 50 hours. The spray heads shall be shut off during the entire exposure period. The relative humidity conditions shall be  $55 \pm 5$  percent throughout the test cycle. At the end of the exposure period, the specimens shall be brought to equilibrium under standard conditions as defined in FED-STD-191. The specimens shall then be tested for breaking strength as specified in table IV and the percent of breaking strength (B.S.) loss shall be calculated as follows:

$$\frac{\text{Original average B.S.} - \text{Average B.S. after aging}}{\text{Original average B.S.}} \times 100 = \text{Percent of B.S. loss}$$

4.4.5.2 Resistance to heat test. Five tests shall be conducted on each sample unit of the tape. The test specimens shall be suspended in a circulating air oven at a temperature of  $180^{\circ}\text{C} \pm 3^{\circ}\text{C}$  ( $356^{\circ}\text{F} \pm 5^{\circ}\text{F}$ ) for 1 hour. After removal from the oven, the specimens shall be brought to equilibrium under standard conditions as defined in FED-STD-191. The specimens shall then be tested for breaking strength as specified in table IV and the percent of breaking strength loss shall be calculated as follows:

$$\frac{\text{Original average B.S.} - \text{Average B.S. after ageing}}{\text{Original average B.S.}} \times 100 = \text{Percent of B.S. loss}$$

## 5. PACKAGING

5.1 Preservation, packing, palletization, and marking. Preservation, packing, palletization, and marking for each level of protection shall be in accordance with the applicable requirements of MIL-P-43334 (see 6.2).

## 6. NOTES

6.1 Intended use. The tape is intended for use in the manufacture of parachute packs. Specifically, the tape holds the springs used to pull the pack flaps when the parachute ripcord is pulled.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1).
- c. When a first article is required (see 3.1, 4.3, and 6.3).

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- d. Color required (see 3.4).
- e. Length of roll required (see 3.9).
- f. Levels of preservation and packing (see 5.1).

6.3 First article. When a first article is required, it shall be inspected and approved under the appropriate provisions of FAR 52.209. The first article should be a preproduction sample. The contracting officer should specify the appropriate type of first article and the number of units to be furnished. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

6.4 Sample. For access to samples, address the contracting activity issuing the invitation for bids or request for proposal.

6.5 Yarn dyeing. In order to satisfactorily manufacture tape when dyeing is required, it may be necessary to yarn dye the material. Manufacturers are urged to make experimental dyed tape before making commitments to produce such materials in volume.

6.6 Dye combinations. A suggested but not mandatory dye stuff combination for Sage Green 1545 and Camouflage Green 483 is as follows: (see 3.4)

Sage Green 1545

Direct Fast Gray LVA  
 Direct Green 27  
 Direct Fast Scarlet LGG  
 Direct Yellow 28, C.I. 19555

Camouflage Green 483

Acid Blue 171  
 Acid Orange 162

6.7 Color. Olive Green and Olive Drab colors have been replaced by Camouflage Green 483. Any end item which previously required Olive Green or Olive Drab shall use Camouflage Green 483.

6.8 Subject term (key word) listing.

High tenacity  
 Light and heat resistant  
 Parachute packs  
 Ripcord

6.9 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

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Custodians:

Army - GL  
Navy - AS  
Air Force - 99

Preparing activity:

Army - GL  
(Project 8315-0350)

Review activities:

Air Force - 82  
DLA - CT

User activities:

Army - AV  
Navy - OS

# STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

## INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

**NOTE:** This form may not be used to request copies of documents, nor to request waivers, or clarification of 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.

### I RECOMMEND A CHANGE:

1. DOCUMENT NUMBER  
MIL-T-5666D

2. DOCUMENT DATE (YYMMDD)  
1990 September 11

### 3. DOCUMENT TITLE

TAPE, TEXTILE, NYLON, MULTIPLE TUBULAR

### 4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

### 5. REASON FOR RECOMMENDATION

### 6. SUBMITTER

a. NAME (Last, First, Middle Initial)

b. ORGANIZATION

c. ADDRESS (Include Zip Code)

d. TELEPHONE (Include Area Code)  
(1) Commercial  
(2) AUTOVON  
(if applicable)

7. DATE SUBMITTED  
(YYMMDD)

### 8. PREPARING ACTIVITY

a. NAME

U.S. Army Natick RD&E Center

b. TELEPHONE (Include Area Code)

(1) Commercial  
508-651-5221

(2) AUTOVON  
256-5221

c. ADDRESS (Include Zip Code)

Commander, U.S. Army Natick RD&E Center  
ATTN: STRNC-ES  
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Defense Quality and Standardization Office  
5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466  
Telephone (703) 756-2340 AUTOVON 289-2340