

INCH-POUND

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SUPERSEDING  
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MILITARY SPECIFICATION

WEBBING, TEXTILE, TEXTURED OR MULTIFILAMENT NYLON

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

1. SCOPE

1.1 Scope. This document covers textured or multifilament nylon webbing used for individual equipment belts.

1.2 Classification. The webbing shall be of the following types as specified (see 6.2). All types may be supplied in an alternate construction of shuttleless loom webbing. Type I alternate and Type III (see table I) alternate are acceptable substitutes for Types I and III respectively.

|          |                |
|----------|----------------|
| Type I   | - 2-1/4 inches |
| Type II  | - 1-1/4 inches |
| Type III | - 1 inch       |
| Type IV  | - 3/4 inch     |
| Type V   | - 5/8 inch     |

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 self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 8305

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2. APPLICABLE DOCUMENTS

2.1 Government documents.

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

SPECIFICATION

MILITARY

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

STANDARDS

FEDERAL

FED-STD-191 - Textile Test Methods

MILITARY

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

(Copies of specifications, standards, and handbooks required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this specification to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

FEDERAL TRADE COMMISSION

Rules and Regulations Under the Textile Fiber Products Identification Act

(Copies may be obtained from the Federal Trade Commission, Pennsylvania Avenue at Sixth Street, N.W., Washington, DC 20580.)

(Copies of drawings, publications, and other Government documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issues of the nongovernment documents which are current on the date of the solicitation.

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

Chromatic Transference Scale

(Copies should be obtained from the American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, NC 27709-2215.)

(Nongovernment standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 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. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Standard sample. The dyed webbing 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 6.3).

3.2 First article. When specified in the contract or purchase order, a sample shall be subjected to first article inspection (see 4.3, 6.2, and 6.4).

3.3 Material. (See 6.4).

3.3.1 Yarn. The yarn for the warp and filling for types I, II, III, IV, V and the filling for type III alternate shall be heat and light resistant, continuous filament textured nylon. The yarn for warp and filling for type I alternate and the warp for type III alternate shall be heat and light resistant multifilament nylon. The textured and multifilament nylon yarns shall not be subjected to any type of bleaching process.

3.3.1.1 Twist. The face, back and binder warps of the type I alternate construction shall have a minimum of 2-1/2 turns per inch in the final twist. The number of singles yarn shall be twisted together in one operation.

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3.4 Color. The webbing shall be natural, dyed Olive Drab 7, Camouflage Green 483, Black 375, or another color, as specified (see 6.2).

3.4.1 Dyeing. The webbing shall be yarn or piece dyed, and the dye penetration shall be equal to or better than the standard sample.

3.4.2 Matching. The color of the dyed webbing shall match the standard sample when viewed under filtered tungsten lamps which approximate artificial daylight having a correlated color temperature of 7500 +/- 200 K, with illumination of 100 +/- 20 foot candles, and shall be a good match to the standard sample under incandescent lamplight at 2300 +/- 200 K.

3.4.3 Colorfastness. The dyed webbing shall show fastness to light and laundering equal to or better than the standard sample or equal to or better than a rating of "good". The dyed webbing shall show fastness to crocking equal to or better than the standard sample or shall have an AATCC Chromatic Transference Scale rating of not lower than 3.5. Testing shall be as specified in 4.4.3.

3.4.4 Spectral reflectance for Camouflage Green 483. Finished Camouflage Green 483 webbing greater than 1 1/4 inches in width shall meet the spectral reflectance factors (in percent) for the visible/near infrared wavelength range 600 to 860 nanometers (nm) as specified below when tested as specified in 4.4.3.

Spectral Reflectance Requirements for Camouflage Green 483

| <u>Wavelength (nm)</u> | <u>Reflectance (%)</u> |            | <u>Wavelength (nm)</u> | <u>Reflectance (%)</u> |            |
|------------------------|------------------------|------------|------------------------|------------------------|------------|
|                        | <u>Min</u>             | <u>Max</u> |                        | <u>Min</u>             | <u>Max</u> |
| 600                    | 3                      | 10         | 740                    | 7                      | 52         |
| 620                    | 3                      | 10         | 760                    | 11                     | 60         |
| 640                    | 3                      | 10         | 780                    | 17                     | 64         |
| 660                    | 3                      | 11         | 800                    | 24                     | 67         |
| 680                    | 3                      | 13         | 820                    | 32                     | 70         |
| 700                    | 4                      | 28         | 840                    | 37                     | 71         |
| 720                    | 5                      | 40         | 860                    | 40                     | 73         |

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

TABLE I. Physical requirements

| Characteristics                           | Type I        | Type I<br>(alternate) | Type II       | Type III      | Type III<br>(alternate) | Type IV       | Type V        |
|---|---------------|-----------------------|---------------|---------------|-------------------------|---------------|---------------|
| Width, inches                             | 2-1/4 ± 1/16  | 2-1/4 ± 1/16          | 1-1/4 ± 1/16  | 1 ± 1/16      | 1 ± 1/16                | 3/4 ± 1/16    | 5/8 ± 1/16    |
| Thickness,<br>inches                      | 0.135 - 0.150 | 0.135 - 0.150         | 0.075 ± 0.007 | 0.046 ± 0.007 | 0.046 ± 0.007           | 0.055 - 0.070 | 0.038 - 0.050 |
| Weight<br>oz./lin. yd.<br>(min)           | 4.0           | 4.0                   | 1.10          | 0.5           | 0.65                    | 0.48          | 0.32          |
| Stiffness<br>load pounds<br>withwise only | 1.40 - 2.30   | 1.4 - 2.30            | --            | --            | --                      | --            | --            |
| Warp ends, full<br>width:                 |               |                       |               |               |                         |               |               |
| Face, back, and<br>middle warps (min)     | 202           | --                    | --            | --            | --                      | --            | --            |
| Face and back (min)                       | --            | 83                    | 89            | 101           | 97                      | 69            | 65            |
| Binder warp (min)                         | 50            | 38                    | 10            | 15            | 22                      | 8             | 9             |
| Stuffer warp (min)                        | --            | 304                   | --            | --            | --                      | 14            | --            |
| Picks/inch (min)                          | 33            | --                    | 23            | 36            | --                      | 33            | 36            |
| Picks/inch (min)<br>(shuttleless loom)    | 64 1/2        | 58 1/2                | 46 1/2        | 72 1/2        | 80 1/2                  | 66 1/2        | 72 1/2        |
| Breaking strength<br>lbs. (min)           | --            | --                    | 2000          | 1000          | 1000                    | 875           | 625           |

1/2 picks per shed.

### 3.6 Weaves.

3.6.1 Type I (see 6.5). The type I webbing shall be composed of three ground warps (face, middle and back), one binder warp, and one filling (see figure 1). The face warp shall weave plain weave with the picks that show on the face. The back warp shall weave with the picks that show on the back. The middle warp, 2 ends weaving as 1, shall weave plain weave with the picks that weave in the middle. The binder warp, 2 ends weaving as 1, shall weave three up (one face, one middle, one face) and three down, (one back, one middle, one back). Each binder shall weave the same so as to form a filling rib effect on both face and back of the webbing. The selvage of the webbing shall be five ground warp ends on each side. The filling shall weave as follows:

1 pick on face  
 1 pick on middle  
 1 pick on face  
 1 pick on back  
 1 pick on middle  
 1 pick on back

3.6.1.1 Type I (alternate construction (see 6.5)). The weave for type I alternate shall be as shown on figure 5.

When shuttleless loom construction is used, the filling yarn shall traverse the full width of the webbing and shall be held at the edge by an extra catchcord interlacing with the filling yarn in a method depicted on figure 2 or 3.

3.6.2 Type II (see 6.5). The type II webbing shall be a double fabric consisting of face and back warps with two ends weaving as one, bound together by a binder-warp weaving singly and a single filling. The face warp shall weave plain with the picks that show on the face. The back warp shall weave plain weave with the picks that show on the back. The binder-warp shall weave plain weave throughout. One selvage shall consist of nine ground-warp ends weaving singly and the other selvage shall consist of eight ground-warp ends weaving singly. The filling yarn shall traverse the full width of the webbing with one filling yarn per shed. The filling shall weave alternately on the face and back.

When shuttleless loom construction is used, the filling yarn shall traverse the full width of the webbing and shall be held at the edge by an extra catchcord interlacing with the filling yarn in a method depicted on figure 2 or 3.

3.6.3 Type III (see 6.5). The type III webbing shall be a double fabric consisting of two warps bound together by a single filling and a binder-warp. The face warp shall weave plain weave with the picks showing on the face. The back warp shall weave plain weave with the picks showing on the back. The

binder warp shall weave plain weave. One selvage shall consist of nine ground-warp ends and the other selvage shall consist of eight ground-warp ends. The filling yarn shall traverse the full width of the webbing with one filling yarn per shed. The filling shall weave alternately on the face and on the back. When shuttleless loom construction is used, the filling yarn shall traverse the full width of the webbing and shall be held at the edge by an extra catchcord interlacing with the filling yarn in a method depicted on figure 2 or 3.

3.6.3.1 Type III (alternate construction (see 6.5)). The webbing shall be a double fabric consisting of face and back warps with two ends weaving as one bound together by a binder warp weaving singly and a single filling. The face warp shall weave plain weave with the picks showing on the face. The back warp shall weave plain weave with the picks showing on the back. The binder warp ends shall be evenly spaced across the width of the webbing. One binder warp end shall weave 2 up and 2 down. The adjacent binder warp end shall weave 2 down and 2 up. One selvage shall consist of nine ground-warp ends and the other selvage shall consist of eight ground-warp ends weaving singly. The filling yarn shall traverse the full width of the webbing and shall be held at the edge by an extra catch-cord interlacing with the filling yarn in a method depicted on figure 2 or 3. The filling shall weave alternately on the face and back.

3.6.4 Type IV (see 6.5). The type IV webbing shall be a double fabric consisting of two warps bound together by a single filling and a binder warp. The face warp shall weave plain weave with the picks showing on the face. The back warp shall weave plain weave with the picks showing on the back. The binder-warp ends shall weave plain weave. There shall be two stuffer warp ends between each binder warp end. The filling yarn shall traverse the full width of the webbing with one filling yarn per shed. The filling shall weave alternately on the face and back.

When shuttleless loom construction is used, the filling yarn shall traverse the full width of the webbing and shall be held at the edge by an extra catchcord interlacing with the filling yarn in a method depicted on figure 2 or 3.

3.6.5 Type V. The type V webbing shall be a double fabric consisting of two warps bound together by a single filling and a binder warp. The face warp shall weave plain weave with the picks showing on the face. The back warp shall weave plain weave with the picks showing on the back. The binder warp ends shall weave plain weave. One selvage shall consist of eight ground warp ends weaving singly. The filling yarn shall traverse the full width of the webbing and shall be held at the edge by an extra catch-cord interlacing with the filling yarn in a method depicted on figure 2 or 3. The filling shall weave alternately on the face and back.

3.7 pH. The pH value of the water extract of the dyed webbing shall be no less than 5.0 nor more than 8.5 when tested as specified in 4.4.3.

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3.8 Curvature. The finished webbing shall show no more lateral curvature than 1/4 inch within a yard when tested as specified in 4.5.1.

3.9 Length and put-up. For Government procurement only, unless otherwise specified (see 6.2), the webbing shall be put up in rolls of no less than 36 yards nor more than 78 yards. No roll shall contain more than two pieces and no piece shall be less than 50 inches in length.

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

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

3.12 Workmanship. The finished webbing 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 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 document where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this document shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the document shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.1.2 Certificates of compliance. When 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 6.2), it shall be examined for the defects specified in table III, 4.4.2.2, 4.4.2.3. and tested for the characteristics specified in table IV. The presence of any defect or failure to pass any test shall be cause for rejection of the first article.

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 document or applicable purchase document.

4.4.2 End item examination.

4.4.2.1 Yard-by-yard examination. The webbing shall be examined on both sides for the defects listed in table III. 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 1 linear yard. The inspection level shall be II and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 0.65 for major defects and 2.5 for total (major and minor combined) defects. The number of rolls from which the sample yardage is to be selected shall be in accordance with table II. The sample yardage shall be apportioned equally among the selected rolls.

TABLE II. Sample size

| Lot size in yards                  | Sample size in rolls | Acceptance number |
|------------------------------------|----------------------|-------------------|
| 1200 or less 1/                    | 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 lot contains fewer than three rolls, each roll in lot shall be examined.

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TABLE III. Webbing visual defects

| Examine                        | Defect   | Classification |       |
|--------------------------------|--|----------------|-------|
|                                |  | Major          | Minor |
| 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  | X              |       |
| Broken or missing warp end     | Two or more regardless of length or a single exceeding 6 inches in length  | X              |       |
|                                | Single under 6 inches but exceeding 1/4 inch   |                | X     |
| Broken or missing pick         | Two or more regardless of extent   | X              |       |
| Cut, hole or tear              | Any cut, hole or tear  | X              |       |
| Catchcord missing              | Any (shuttleless construction)   | X              |       |
| Dropped knitted stitch on edge | Any (shuttleless construction)   | X              |       |
| Fine or light filling bar      | Resulting in visible difference in stiffness or thickness, extending more than 1/4 inch in length direction <u>1/</u>  | X              |       |
|                                | Resulting in visible difference in stiffness or thickness extending for 1/4 inch or less in length direction   |                | X     |
| Floats or skips                | Three or more, 1/2 inch or more in combined warp and filling directions or a single float or skip over more than 1 inch  | X              |       |
|                                | Three or more, less than 1/2 inch in combined warp and filling directions or a 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 width but not exceeding 1 inch in filling |                | X     |

TABLE III. Webbing visual defects (cont'd)

| Examine                    | Defect   | Classification |       |
|----------------------------|--|----------------|-------|
|                            |  | Major          | Minor |
| Knots                      | More than 1 knot in any 9 linear inches  | X              |       |
| Slack or tight end or ends | Two or more in same length, jerked in between picks, or forming clearly visible loops on surface             | X              |       |
|                            | Single jerked in between picks or forming clearly visible loops on the surface                               |                | X     |
| Smash                      | Any smash  | X              |       |
| Spot, stain or streak      | Any clearly visible <u>1/</u>  |                | X     |
| Wrong draw                 | Extending more than 9 inches in length   | X              |       |
| Edges                      | Cut, frayed or torn  | X              |       |
|                            | Slack, poorly constructed  | X              |       |
| Wavy or puckered           | Will not lie flat upon application of manual pressure (due to twist, distortion or uneven tension) <u>2/</u> | X              |       |
| Width                      | Beyond tolerances  |                | X     |

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

2/ A three yard length of webbing shall be lain on a flat, smooth surface without tension. If the webbing does not lie flat or if the webbing is wavy or puckered, it shall be scored as a defect.

4.4.2.2 Overall examination. The webbing shall be examined for the defects listed below. Each defect listed shall be counted not more than once in each roll examined. The sample size shall be the applicable number of rolls indicated in table II. Each roll in the sample examined over its entire length. The lot shall be rejected if the total number of defects in the sample exceeds the applicable acceptance number specified in table II.

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Defects

Off shade, not within established tolerances.  
Uneven dyeing, shaded, spottiness, poor penetration.  
Not labeled in accordance with Textile Fiber Products  
Identification Act.  
Uneven weaving throughout.

4.4.2.3 Length examination. During the overall examination, each roll in the sample shall be examined for the defects listed below. If the total number of defects in the sample rolls exceeds the applicable acceptance number specified in table II or if the total of the actual lengths of the rolls in the sample is less than the total of the lengths marked on the roll tickets, the lot shall be rejected.

Defects

Gross length less than specified minimum or more than  
specified maximum length.  
Gross length more than 2 yards less than gross  
length marked on ticket.  
Any piece less than 50 inches in length.  
Any roll containing more than two pieces.

4.4.3 End item testing. The webbing 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. All test reports shall contain the individual values utilized in expressing the final results. The sample unit for testing shall be as follows:

For type I webbing 7 yards  
For type II, III, IV and V webbing 12 yards

The sample size shall be in accordance with the following:

| <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 up to and including 150,000 | 5                                 |

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

TABLE IV. End item tests

| Characteristic  | Requirement paragraph | Test method    |
|---|-----------------------|----------------|
| Nylon yarn  | 3.3.1                 | <u>1/</u>      |
| Colorfastness to:                                     |                       |                |
| Crocking  | 3.4.3                 | 5651           |
| Light   | 3.4.3                 | 5660           |
| Laundering  | 3.4.3                 | 5614 <u>2/</u> |
| Spectral reflectance                                  | 3.4.4                 | 4.5.2          |
| Thickness   | 3.5                   | 5030           |
| Weight  | 3.5                   | 5041           |
| Stiffness   | 3.5                   | 5202 <u>3/</u> |
| Warp ends, full width:                                |                       |                |
| Face, back and middle (type I)                        | 3.5                   | 5050           |
| Face and back (types I alternate, II, III, IV, and V) | 3.5                   | 5050           |
| Binder warp   | 3.5                   | 5050           |
| Stuffer warp  | 3.5                   | 5050           |
| Picks per inch  | 3.5                   | 5050           |
| Breaking strength                                     | 3.5                   | 4108           |
| Weave   | 3.6                   | Visual         |
| pH  | 3.7                   | 2811           |
| Curvature   | 3.8                   | 4.5.1          |

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

2/ On the color transfer cloth evaluation, only the stain on the nylon fibers of the color transfer cloth shall be evaluated.

3/ Test specimen shall be a rectangle of webbing 2 by 1 inches with the long dimension parallel to the filling. The specimen shall be bent to a 20° angular deflection.

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4.4.4 Packaging inspection. The inspection shall be in accordance with the quality assurance provisions of MIL-P-43334.

4.4.5 Palletization examination. The examination shall be in accordance with the quality assurance provisions of MIL-P-43334.

4.5 Methods of inspection.

4.5.1 Measurement of lateral curvature.

4.5.1.1 Test specimen. The test specimen shall be a length of webbing, full width, measuring a minimum of 40 inches. The specimen shall not be stretched, smoothed, or otherwise changed from its original condition prior to testing.

4.5.1.2 Number of determinations. Five specimens shall be tested from each sample unit.

4.5.1.3 Apparatus.

- |                     |  |
|---------------------|--|
| Plexiglass or equal | - plexiglass weighing approximately 35 ounces with dimensions of 45 inches by 5 inches by 1/4 inch |
| Straight edge       | - a rigid straight edge measuring 36 inches in length  |
| Roller              | - a roller 1 inch in diameter and weighing 1-1/2 pounds  |

4.5.1.4 Procedure. The specimens shall be placed flat, on a smooth, horizontal flat surface without tension and allowed to reach moisture equilibrium as defined in Section 4 of FED-STD-191. After equilibrium is reached, a weight shall be placed at one end of the webbing. The roller shall be placed on the specimen at the end of the webbing where the weight is located. The specimen should be approximately in the center of the roller. The roller shall be rolled along the length of the specimen, care being taken to keep the specimen in the center of the roller and not to exert any pressure on the roller. When the roller has passed the length of the webbing, the plexiglass shall then be placed on the specimen for a period of 1 hour. Without moving the plexiglass on the specimen, the straight edge shall be placed on the plexiglass so that both ends of the straight edge are aligned perpendicularly with the outermost edge of the specimen. Determine the highest degree of curvature of the specimen from the straight edge by measuring to the nearest 1/32 inch perpendicularly from the straight edge. Record the highest measure (see figure 4).

4.5.1.5 Report. The average of five determinations from each sample unit shall be recorded.

#### 4.5.2 Spectral reflectance measurements in the visible/near infrared.

Spectral reflectance data shall be obtained from 600 to 860 nanometers (nm), at 20 nm intervals on a spectrophotometer (see 6.7) relative to a barium sulfate standard, the preferred white reference standard. Other white reference materials may be used, provided they are calibrated to absolute white; e.g. Halon, magnesium oxide, or vitrolite tiles (see 6.8). The spectral band width shall be less than 26 nm at 860 nm. Reflectance measurements may be made by either the monochromatic or polychromatic mode of operation. When the polychromatic mode is used, the spectrophotometer shall operate with the specimen diffusely illuminated with the full emission of a source that simulates either CIE Source A or CIE Source D65. The specimen shall be measured as a single layer, backed with two layers of the same webbing and shade. Measurements will be taken on a minimum of two different areas and the data averaged. The specimen shall be viewed at an angle no greater than 10 from normal, with the specular component included. Photometric accuracy of the spectrophotometer shall be within one percent and wavelength accuracy within 2 nm. The standard aperture size used in the color measurement device shall be 1.0 to 1.25 inches in diameter. When the measured reflectance values for any color at four or more wavelengths do not meet the limits specified in 3.4.4, it shall be a test failure.

### 5. PACKAGING

5.1 Put-up and preservation. Put-up and preservation shall be level A, or Commercial as specified (see 6.2).

5.1.1 Levels A, and Commercial. The webbing, shall be put up and preserved in accordance with the applicable requirements of MIL-P-43334.

5.2 Packing. Packing shall be level A, B, or Commercial as specified (see 6.2).

5.2.1 Levels A, B, or Commercial. Webbing shall be packed in accordance with the applicable requirements of MIL-P-43334.

5.3 Palletization. When required, palletization shall be in accordance with the applicable requirements of MIL-P-43334.

5.4 Marking. In addition to any special marking required by the contract or purchase order, shipments shall be marked in accordance with MIL-P-43334.

### 6. NOTES

6.1 Intended use. The webbing is intended for use in rifle slings and load carrying equipment.

6.2 Ordering data. Procurement documents should specify the following:

- a. Title, number and date of this specification.
- b. Type required (see 1.2).
- c. Color required (see 3.4).
- d. Length of roll required (if other than specified in 3.9).
- e. Selection of applicable levels of preservation and packing (see 5.1 and 5.2).

6.3 Standard sample. For access to the standard sample, address the procuring activity issuing the invitation for bids.

6.4 First article. When a first article sample 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 include specific instructions in all acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

6.5 Weave construction recommendations.

6.5.1 The requirements of the type I webbing have been met using the following yarns:

- |  |   |
|--|---|
| Face, middle, back<br>and binder warps | - 2840 denier (316 tex) producer bulked nylon |
| Filler                                 | - 2840 denier (316 tex) producer bulked nylon |

The following yarns were used in producing the type I alternate shuttleless loom webbing:

- |                     |   |
|---------------------|---|
| Face and back warps | - 3/840 denier (3x93 tex) multifilament nylon |
| Stuffer warp        | - 1680 denier (186 tex) multifilament nylon   |
| Binder warp         | - 2/840 denier (2x93 tex) multifilament nylon |
| Filling             | - 3/840 denier (3x93 tex) multifilament nylon |
| Catchcord           | - 420 denier (47 tex) multifilament nylon     |

6.5.2 The requirements of the type II webbing have been met using the following yarns:

- |                     |   |
|---------------------|---|
| Face and back warps | - 2900 denier (322 tex) producer bulked nylon           |
| Binder warp         | - 1050 denier (117 tex) producer bulked nylon <u>1/</u> |
| Filling             | - 1050 denier (117 tex) producer bulked nylon <u>1/</u> |



The following yarns were used in producing the type II shuttleless loom webbing:

|                     |   |
|---------------------|---|
| Face and back warps | 2900 denier (322 tex) producer bulked nylon.          |
| Binder warp         | 1050 denier (117 tex) producer bulked nylon <u>1/</u> |
| Filling             | 500 denier (nominal) (56 tex) producer bulked nylon.  |
| Catchcord           | 210 denier (23 tex) multifilament nylon.              |

6.5.3 The requirements of the type III webbing have been met using the following yarns:

|                             |  |
|-----------------------------|--|
| Face, back and binder warps | - 965 denier (107 tex) producer bulked nylon <u>1/</u> |
| Filling                     | - 965 denier (107 tex) producer bulked nylon <u>1/</u> |

The following yarns were used in producing the type III shuttleless loom webbing:

|                             |  |
|-----------------------------|--|
| Face, back and binder warps | - 965 denier (107 tex) producer bulked nylon <u>1/</u> |
| Filling                     | - 500 denier (nominal) (56 tex) (bulked nylon)         |
| Catch cord                  | - 210 denier (23 tex) multifilament nylon              |

1/ These yarn sizes may be replaced by nominal 1000 denier (111 tex) producer bulked nylon.

6.5.4 The following yarns were used in producing the alternate type III shuttleless loom webbing:

|                             |   |
|-----------------------------|---|
| Face, back and binder warps | - 840 denier (93 tex) multifilament nylon               |
| Filling                     | - 1000 denier (111 tex) (nominal) producer bulked nylon |
| Catch cord                  | - 210 denier (23 tex) multifilament nylon               |

6.5.5 The requirements of the type IV webbing have been met using 1000 denier (111 tex) producer bulked nylon.

The following yarns were used in producing the type IV shuttleless loom webbing:

|                     |  |
|---------------------|--|
| Face and back warps | 1000 denier (111 tex) producer bulked nylon.         |
| Binder warp         | 1000 denier (111 tex) producer bulked nylon.         |
| Stuffer warp        | 1000 denier (111 tex) producer bulked nylon.         |
| Filling             | 500 denier (nominal) (56 tex) producer bulked nylon. |
| Catchcord           | 210 denier (23 tex) multifilament nylon.             |

6.5.6 The requirements for type V webbing have been met using the following yarns:

|                     |  |
|---------------------|--|
| Face and back warps | 1000 denier (111 tex) producer bulked nylon. |
| Binder warp         | 1000 denier (111 tex) producer bulked nylon. |
| Filling             | 1000 denier (111 tex) producer bulked nylon. |

The following yarns were used in producing the type V shuttleless loom webbing:

|                     |  |
|---------------------|--|
| Face and back warps | 1000 denier (111 tex) producer bulked nylon.         |
| Binder warp         | 1000 denier (111 tex) producer bulked nylon.         |
| Filling             | 500 denier (nominal) (56 tex) producer bulked nylon. |
| Catchcord           | 210 denier (23 tex) multifilament nylon.             |

6.6 Recycled material. It is encouraged that recycled material be used when practical as long as it meets the requirements of this document (see 3.3).

6.7 Spectrophotometers. Suitable spectrophotometers for measuring spectral reflectance in the visible/near infrared are the Diano Hardy, Diano Match Scan, Hunter D54P-IR and Macbeth 1500 with IR options.

6.8 White standard. Barium sulfate of suitable quality for use as a white reference standard is available from the Eastman Kodak Company. The same source has available, magnesium reagent (ribbon) and Halon. Suitable tiles can be obtained from the National Bureau of Standards or the instrument manufactureres.

6.9 Dye combinations for Camouflage Green 483. A suggested but not mandatory dye combination for Camouflage Green 483 is as follows:

Acid Orange - 162  
Acid Blue - 171

6.10 Subject term (key word) listing.

Multifilament  
Nylon  
Textured  
Webbing

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

Custodians:

Army - GL  
Navy - AS  
Air Force - 99

Preparing activity:

Army - GL  
Project No. 8305-0216

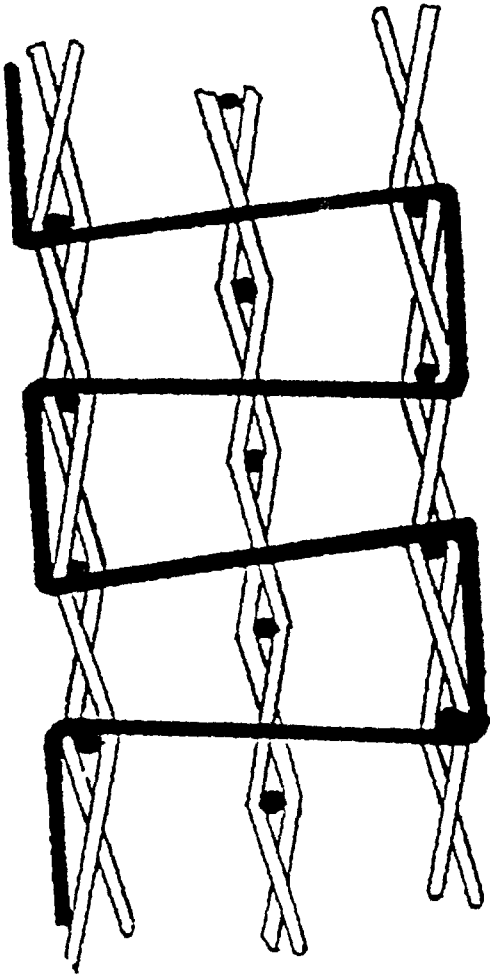
Review activities:

Army - MD  
Navy - NU  
Air Force - 11  
DLA - CT

User activity:

Navy - MC

MIL-W-443668C

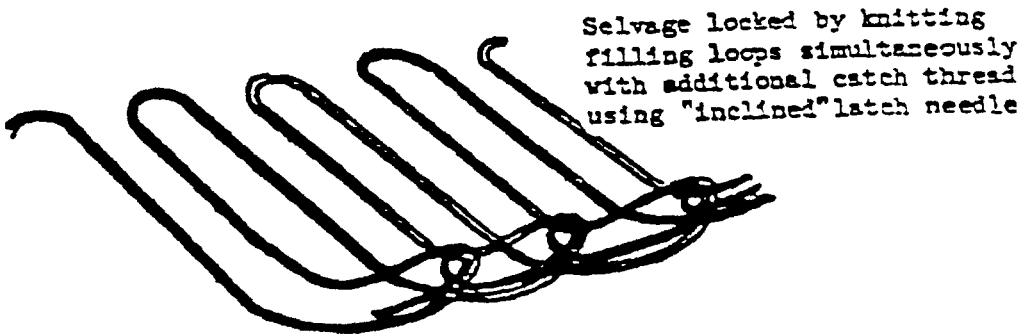


FACE AND BACK WARP YARNS WEAVING ONE END AS ONE  
MIDDLE WARP YARNS WEAVING TWO ENDS AS ONE  
BINDER WARP YARNS WEAVING TWO ENDS AS ONE

FIGURE 1. CROSS SECTION FILLING

Figure 3

Catch-Cord Diagram



MIL-W-43668C

Figure 4  
Catch-Cord Diagram

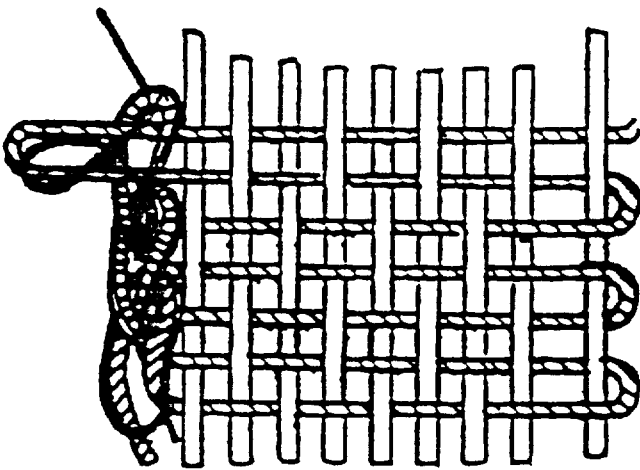


Figure 4

Diagram Curvature Measurement

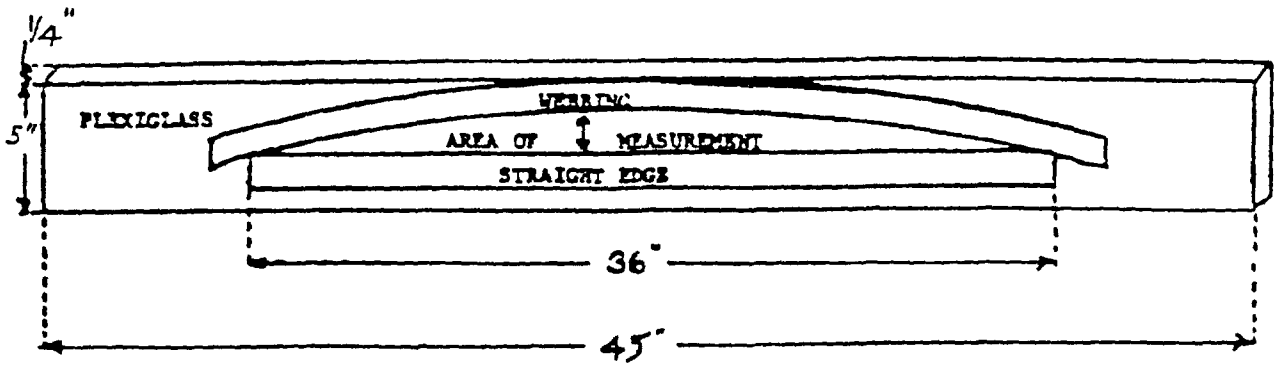
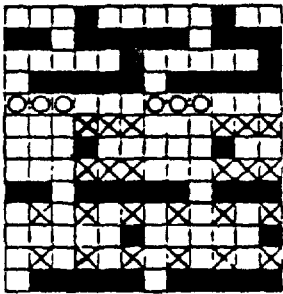
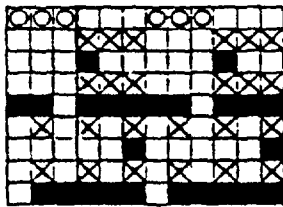


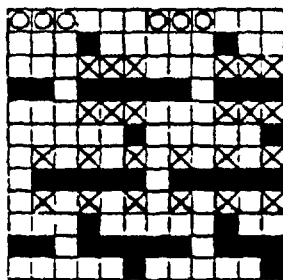
FIGURE 5



EDGE



BODY  
(ONE REPEAT)



EDGE

WEAVE DIAGRAM

- FACE WARP - WEAVE 1 END AS 1
- ⊗ STUFFER WARP - WEAVE 4 ENDS AS 1
- ⊙ BINDER WARP - WEAVE 2 ENDS AS 1





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