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17 March 1982

SUPERSEDING
MIL-C-43824
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MILITARY SPECIFICATION

CLOTH, SYNTHETIC FUR, KNITTED

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

1. SCOPE

- * 1.1 Scope. This specification covers the requirements for synthetic fur material of knitted pile cloth. The pile portion of the cloth consists of modacrylic fiber guard hair and polyester fiber base fur interlaced into knitted polyester or polypropylene backing yarn.

2. APPLICABLE DOCUMENTS

- * 2.1 Issues of documents. The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

SPECIFICATIONS

FEDERAL

UU-P-268	- Paper, Kraft, Untreated, Wrapping.
PPP-B-636	- Boxes, Shipping, Fiberboard.
PPP-P-1133	- Packaging and Packing of Synthetic Fiber Fabrics.

STANDARDS

FEDERAL

FED-STD-191	- Textile Test Methods.
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Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: US Army Natick Research and Development Laboratories, Natick, MA 01760 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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| MIL-STD-105 | - Sampling Procedures and Tables for Inspection by Attributes. |
| MIL-STD-129 | - Marking for Shipment and Storage. |
| MIL-STD-1491 | - Glossary of Knitting Imperfections. |

PUBLICATIONS

Rules and Regulations Under the Textile Fiber Products Identification Act

(Copies may be obtained without charge from the Federal Trade Commission, Washington, DC 20580.)

Rules and Regulations Under the Flammable Fabrics Act

(Copies may be obtained from the Federal Trade Commissioner, Washington, DC 20580.)

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

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply:

National Motor Freight Traffic Association, Inc., Agent

National Motor Freight Classification

(Application for copies should be addressed to the American Trucking Associations, Inc., Tariff Order Section, 1616 P Street, N.W., Washington, DC 20036.)

Uniform Classification Committee, Agent

Uniform Freight Classification

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

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3. REQUIREMENTS

3.1 First article. ~~When specified~~ (see 6.2), the supplier shall furnish a sample for first article inspection and approval (see 4.3 and 6.3).

3.2 Standard sample. The cloth 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. The fibers shall be as specified below. The use of waste or reprocessed fibers is prohibited. The material shall meet the Flammable Fabrics Act requirements.

* 3.3.1 Backing yarn. The yarn for the knitted backing shall be made from multifilament or spun polyester, or fabricated polypropylene fiber of sufficient quality to meet the requirements of this specification.

3.3.2 Modacrylic. The modacrylic fibers used as the guard hairs shall be 40 denier, 4-1/2 inch staple fiber with a specific gravity of 1.34 to 1.38 g/cc and a melting point of not less than 400°F.

3.3.3 Polyester. The polyester fibers used as the base fur shall be 6 denier, 2 inch staple fiber with a specific gravity of 1.20 to 1.24 g/cc and a melting point of not less than 540°F.

3.3.4 Guard hair and base fur. The fibers used for the guard hair and the base fur shall be well blended and formed into a smooth even sliver. The sliver shall be a blend of 60 percent (+ 3 percent) modacrylic and 40 percent (+ 3 percent) polyester fibers by weight.

3.3.5 Backing compound. The knitted backing shall be coated with a neoprene or butadiene latex-acrylonitrile mixture suitably compounded to form a flexible backing (see 6.5).

* 3.4 Physical requirements. The finished cloth shall conform to the properties specified in table I when tested as specified in 4.7.

TABLE I. Physical requirements

Characteristic	Requirements (minimum)
Weight, total, oz. per sq. yd.	35.0
Weight, pile, oz. per sq. yd.	18.5
Wales, per inch	11.0
Courses, per inch	20.0

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3.4.1 Resistance to blocking. The backing material shall show no signs of blocking and shall have a scale rating of 1 when tested as specified in 4.7.

3.4.2 Flexibility. The backing material shall not crack or break when tested as specified in 4.7.

* 3.5 Color. The color shall be natural white and shall match the standard sample.

3.5.1 Matching. The color of the finished cloth shall match the standard sample under natural (north sky) daylight or artificial daylight having a color temperature of 7500° Kelvin and shall be a good approximation to the standard sample under incandescent lamplight at 2800° Kelvin.

3.6 Finish. The cloth and pile characteristics shall be equal to those of the standard sample.

3.7 Width. The minimum relaxed width of the finished cloth shall be $54 \pm 1/2$ inches.

3.8 Length and put-up. The cloth shall be furnished full width in rolls $15 \pm 1-1/2$ yards in length. Not more than two pieces of cloth shall be in each roll and no piece shall be less than 3 yards long. The two pieces shall be sewn together to form a continuous 15 yard length roll.

3.9 Fiber identification. Each roll shall be labeled, ticketed or invoiced for fiber content in accordance with the Textile Fiber Products Identification Act.

3.10 Workmanship. The finished cloth shall conform to the quality established by this specification. 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 supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier 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 the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

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4.1.1 Certificate of compliance. Where certificates of compliance are submitted, the Government reserves the right to check test such items to determine the validity of the certification.

4.2 Classification of inspection. 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. When specified (see 6.2), the preproduction sample submitted in accordance with 3.1, shall be inspected as specified in 4.4.2.3 and 4.6.

4.4 Quality conformance inspection.

4.4.1 Inspection. Sampling for inspection shall be performed in accordance with MIL-STD-105, except where otherwise indicated hereinafter.

4.4.2 Component and material inspection. In accordance with 4.1 above, components and materials shall be tested in accordance with all the requirements of referenced specifications, drawings and standards unless otherwise excluded, amended, modified or qualified in this specification or applicable purchase documents. In addition, the supplier shall furnish a certificate of compliance for the characteristics listed in table II.

*TABLE II. Component tests

Characteristic	Requirement reference
Backing, polyester:	
New fiber	3.3
Identification	3.3.1
Pile, modacrylic and polyester:	
Identification	3.3.2 and 3.3.3
New fiber	3.3
Specific gravity	3.3.2 and 3.3.3
Melting point	3.3.2 and 3.3.3
Backing compound neoprene on nitrile type	3.3.5

4.4.2.1 Examination of the end item. Examination of the end item shall be in accordance with 4.4.2.2 through 4.5.

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4.4.2.2 Yard-by-yard examination. The required yardage shall be examined for defects as listed below. The back side of the material shall be examined for cuts, holes, tears and creases. The face side shall be examined for the remaining defects listed. Defects shall be defined in accordance with MIL-STD-1491. The defects found shall be counted regardless of their proximity to each other. The sample unit shall be 1 linear yard, and the lot size shall be expressed in units of one yard each. The acceptable quality level (AQL) shall be 2.5 defects per one hundred units and the inspection level shall be level I. An equal number of yards (approx.) shall be examined from each roll selected in accordance with table III from among separate containers in the lot.

Individual defects

Cut, hole, or tear.
 Any pile matted or glazed.
 Any bare spot (i.e. pile missing).
 Local area with pile of abnormal height or density.
 Any imbedded crease or curled edge not removable by hand pressure.
 Spot, stain or streak.
 Color does not match standard sample.

4.4.2.3 Overall examination. Each defect listed shall be counted not more than once in each roll examined. The sample unit shall be one roll. The sample size and the acceptable number of defects shall be as shown in table III. The back side of the material shall be examined for defects applicable to the backing compound and the face side shall be examined for the remaining defects listed.

Overall defects

Pile character or shade not matching that of the standard sample.
 Appreciable shedding of loose fiber.
 Color contrast not approximating that of the standard sample.
 Width not as specified.
 Backing compound missing or not uniformly applied.
 Uncleanliness.
 Objectionable odor.

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TABLE III. Sample size

Lot size (yards)	Sample size (rolls)	Maximum acceptable number of defects
1,200 or less	5	0
1,201 up to and including 3,200	8	0
3,201 up to and including 10,000	13	1
10,001 and over	20	2

4.4.2.4 Examination for length and put-up.

4.4.2.4.1 Individual rolls. During the yard-by-yard examination each roll shall be examined for length. Any roll found to be less than the minimum length specified or more than 1-1/2 yards below the length marked on the ticket, any piece less than 3 yards long, more than 2 pieces in a roll, pieces not sewn together to form a continuous length, shall be considered defects. The maximum acceptable number of defects shall be in accordance with table III. All length determinations shall be based on the relaxed condition of the cloth. Measuring devices and conditions used shall be checked, and corrected as indicated, by lengths determined on cloth relaxed for one hour while loosely placed on a smooth table top or similar surface, and then measured without re-rolling or tensioning. In case of dispute, measurement so made shall govern.

4.4.2.4.2 Total yardage in sample. The lot shall be unacceptable if the total of the length of rolls in the sample is less than the total of the lengths marked on the tickets.

4.5 Examination for compliance with the Textile Fiber Products Identification Act. During the yard-by-yard examination, each roll in the sample shall be examined for identification of fiber content. The lot shall be unacceptable if two or more rolls in the sample are not labeled or ticketed in accordance with the Rules and Regulations under the Textile Fiber Products Identification Act.

4.6 Examination of preparation for delivery requirements. An examination shall be made to determine that packaging, packing and marking comply with the section 5 requirements. Defects shall be scored in accordance with the list below. The sample unit shall be one shipping container fully prepared for delivery except that it need not be closed. Defects of closure listed below shall be examined on shipping containers fully prepared for delivery. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be S-2 and the AQL shall be 2.5 defects per hundred units.

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<u>Examine</u>	<u>Defect</u>
Marking (exterior and interior)	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application.
Materials	Any component missing. Any component damaged, affecting serviceability or not as specified.
Workmanship	Inadequate application of components, such as: incomplete closure of container flaps, improper taping, loose strapping or inadequate stapling. Bulged or distorted container.
Content	Number of rolls per container is more or less than required.

4.7 Testing of the end item. The methods of testing specified in FED-STD-191, wherever applicable and as listed in table IV shall be followed. Except as otherwise indicated, the physical values specified in section 3 apply to the average 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 as well as the final results. The sample unit shall be 1-1/2 yards full width of the cloth. The sample size (number of sample units) shall be as shown in the following table. The lot shall be unacceptable if one or more sample units fail to meet any requirement specified.

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

*TABLE IV. Test methods

<u>Characteristic</u>	<u>Requirement paragraph</u>	<u>Test method</u>
Flammability	3.3	<u>1/</u>
Blend percentage	3.3.4	<u>1/</u>
Weight		
Total	3.4	4.7.1
Pile	3.4	4.7.1
Texture		
Wales per inch	3.4	5070
Courses per inch	3.4	5070
Resistance to blocking	3.4.1	5872 <u>2/</u>
Flexibility	3.4.2	5874 <u>3/</u>

1/ A certificate of compliance shall be submitted and will be acceptable for the stated requirement.

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2/ Method 5872 shall be used except that the specimen shall be two 4 x 4 inch pieces of the cloth placed back to back. The specimens shall be exposed to a temperature of $170^{\circ} \pm 2^{\circ}\text{F}$. for a period of 4 hours.

3/ Method 5874 shall be used except that:

- a. Paragraphs 3.2, 4.4, 4.5, 4.6.1 and 5.3 for hydrostatic resistance shall not apply.
- b. Paragraph 4.1 shall be changed to read " $-40^{\circ} \pm 3.6^{\circ}\text{F}$. for 4 hours".
- c. Paragraph 4.2 delete sentences 7 and 8 and substitute:
"The cloth shall be folded pile side out, in both the wales and course directions."

4.7.1 Test for pile weight. The original total weight of the specimen (pile cloth with the latex backing) shall be determined by Method 5041 of FED-STD-191, except that the specimen size shall be not less than 4 ± 0.01 inches square. The specimen shall be cut from the back using a template and fine razor blade. The weighed specimen shall then be placed on a flat surface with the pile side up, and the pile sheared off with an electric clipper (see 6.6). Shearing shall be done in the direction of the wales, and in the direction of the courses, with the base of the cutting head parallel to the plane of the specimen. Following shearing, the specimen shall be shaken to remove the shearings and shall be weighed. This procedure shall be repeated until the sheared backing attains a constant weight of 0.05 gram tolerance. The sheared backing shall be examined for damage to the backing yarns. If damage is found, the results shall be discarded and the entire procedure repeated. The weight of the pile shall be determined by subtracting the weight of the sheared backing from the original weight. Reporting shall be in accordance with Method 5041.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Packaging shall be level A or C as specified (see 6.2).

5.1.1 Level A. The cloth, put-up as specified, shall be rolled with the face to the inside on a convolute or spiral-wound chipboard tube. The tube shall have an outer cover of kraft paper glued to the surface or an equivalent smooth finish surface that will prevent the fibers of the chipboard from transferring to the cloth. The tube shall have a minimum wall thickness of 0.1875 inch with a minimum inside diameter of 1.5 inches. The ends of the tube shall be flush with or extend not more than one inch beyond each side of the maximum width of the rolled cloth. Rolls of cloth shall be restrained from unwinding by securing the cloth with cloth or cotton tape. Each roll of cloth shall be completely wrapped including the ends with 60-pound minimum basis weight kraft paper conforming to grade B of UU-P-268. The kraft paper wrap shall be secured with gummed or pressure sensitive paper tape.

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5.1.2 Level C. Cloth shall be packaged to afford adequate protection against deterioration and physical damage during shipment from the supply source to the first receiving activity. The supplier may use his standard practice when it meets these requirements.

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

5.2.1 Level A. Each roll of cloth, packaged as specified in 5.1, shall be individually packed in a snug-fitting fiberboard shipping container conforming to style RSC-L, grade V2s of PPP-B-636. The inside of each shipping container shall be fitted with a taped box liner conforming to type CF, class weather-resistant, variety DW, grade V15c of PPP-B-636. Each shipping container shall be closed, waterproofed and reinforced in accordance with the appendix of PPP-B-636.

5.2.2 Level B. Each roll of cloth, packaged as specified in 5.1, shall be individually packed in a snug-fitting fiberboard shipping container conforming to style RSC-L, type CF (variety SW) or SF, class domestic, grade 275 of PPP-B-636. The inside of each fiberboard shipping container shall be fitted with a taped box liner conforming to type CF, class domestic, grade 275 of PPP-B-636. Each shipping container shall be closed in accordance with method II as specified in the appendix of PPP-B-636.

5.2.2.1 When specified (see 6.2), the shipping container shall be a grade V3c, V3s, or V4s fiberboard box fabricated in accordance with PPP-B-636 and closed in accordance with the appendix of the container specification.

5.2.3 Level C. Cloth, packaged as specified in 5.1, shall be packed in a manner to insure carrier acceptance and safe delivery at destination at the lowest transportation rate for such supplier. Containers shall be in accordance with Uniform Freight Classification Rules or National Motor Freight Classification Rules, as applicable.

5.3 Marking. In addition to any special marking required by the contract or order, interior packages and shipping containers shall be marked in accordance with MIL-STD-129. Each roll shall have affixed a piece ticket (tag) containing information desired as specified in PPP-P-1133.

5.3.1 Precautionary marking. Each shipping container shall be marked on the top in 1-inch height letters with the following:

"DO NOT STAND ON END"

6. NOTES

6.1 Intended use. The cloth covered by this specification is intended for use in arctic clothing and equipment.

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6.2 Ordering data. Procurement documents should specify the following:

- (a) Title, number and date of this specification.
- (b) When first article is required (see 3.1 and 4.3).
- (c) Selection of applicable levels of packaging and packing (see 5.1 and 5.2).
- (d) When weather resistant grade fiberboard shipping containers are required for level B packing (see 5.2.2.1).

6.3 First article. When a first article is required, it shall be inspected and approved under the appropriate provisions of ASPR 7-104.55. The first article should be a preproduction sample. The first article should consist of a full width, 15 yard roll. The contracting officer should include specific instructions in all procurement instruments regarding arrangements for inspection and approval of the first article.

6.4 Standard sample. For access to standard sample, address the procuring office issuing the invitation for bids.

- * 6.5 The cloth covered by this specification is based on commercial cloth made from 14/1 natural polyester yarn, or 360 denier polypropylene yarn with a coating of neoprene or butadine latex-acrylonitrile binder on the back. The dry weight of the binder is approximately 5.5 ounces per square yard.

6.6 An Oster model (or equal) No. 111 electric clipper carrying a No. 50, size 000 cutting head is recommended, and in case of dispute shall be used in the determination that shall be considered final. Local barber supply agencies may be sources for the clipper described. A source is Oster Manufacturing Co., 5055 N. Lydell Street, Milwaukee, WI 53217.

6.7 Changes from previous issue. The margins of this specification are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

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Army - GL
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Army - GL
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DOCUMENT IDENTIFIER (Number) AND TITLE

MIL-C-43824A - Cloth, Synthetic Fur, Knitted

NAME OF ORGANIZATION AND ADDRESS OF SUBMITTER

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