

**INCH-POUND**

**MC/PD 04-2011 SYSCOM**

**26 June 2012**

**SUPERSEDING**

A-A-59453A, dated

25 June 2007

## **CAP, HARDFACE, MICROFLEECE**

This specification is approved for use by all departments and agencies of the Department of Defense.

### 1. SCOPE

1.1 Scope. This purchase description covers the requirements for the U.S. Marine Corps cold weather cap. This item is intended for wear by military personnel of the Department of Defense.

1.2 Classification. The caps will be in the following sizes.

#### Schedule of Sizes

Small/Medium

Large/X-Large

### 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 or 4 of this purchase description. This section does not include documents in other sections of this purchase description or recommended for additional information, or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3 or 4 of this purchase description, whether or not they are listed.

Comments, suggestions, or questions on this document should be addressed to: Defense Supply Center Philadelphia, Clothing and Textiles Directorate, Attn: DPSC-FQS, 700 Robbins Avenue, Bldg. 6D, Philadelphia, PA 19111-5092, or emailed to [pat.alldrige@dla.mil](mailto:pat.alldrige@dla.mil). Since contact information can change, you may want to verify the currency of this address information by using the ASSIST Online database at [www.dodssp.daps.mil](http://www.dodssp.daps.mil).

AMSC N/A.

DISTRIBUTION STATEMENT A

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2.2 Government documents.

2.2.1 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 shall be cited in the solicitation or contract (see 6.1).

FEDERAL STANDARDS

FED-STD-4                      Glossary of Fabric Imperfections

COMMERCIAL ITEM DESCRIPTIONS

A-A-50199                      Thread, Polyester Core, Cotton or Polyester-Covered  
A-A-52095                      Thread, Polyester

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-DTL-32075                Label: For Clothing, Equipment, and Tentage, (General Use)

(Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch/> or from the Standardization Documents Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract (see 6.1).

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

AATCC-8    Colorfastness to Crocking: AATCC Crockmeter Method  
AATCC-15    Colorfastness to Perspiration  
AATCC-16    Colorfastness to Light  
AATCC-20    Fiber Analysis: Qualitative  
AATCC-22    Water Repellency: Spray Test  
AATCC-61    Colorfastness to Laundering, Home and Commercial: Accelerated  
AATCC-107    Colorfastness to Water  
AATCC-135    Dimensional Changes of Fabrics after Home Laundering  
AATCC Evaluation Procedure 1    Gray Scale for Color Change  
AATCC Evaluation Procedure 2    Gray Scale for Staining  
AATCC Evaluation Procedure 8    9-Step Chromatic Transference Scale  
AATCC Evaluation Procedure 9    Visual Assessment of Color Difference of Textiles

(Copies of these documents are available online at <http://www.aatcc.org> or AATCC, PO Box 12215, Research Triangle Park, NC 27709-2215.)

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AMERICAN SOCIETY FOR QUALITY (ASQ)

ANSI/ASQ Z1.4 Sampling Procedures and Tables for Inspection of Attributes

(Copies for these documents are available online at <http://www.asq.org/> or from American Society for Quality, P.O. Box 3005, Milwaukee, WI 53201-3005.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS

ASTM D-276 Standard Test Method for Identification of Fibers in Textiles  
ASTM D-737 Standard Test Method for Air Permeability of Textile Fabrics  
ASTM D-1777 Standard Test Method for Thickness of Textile Materials  
ASTM D-1907 Standard Test Method for Linear Density of Yarn (Yarn Number) by Skein Method  
ASTM D-2594 Standard Test Method for Stretch Properties of Knitted Fabrics Having Low Power  
ASTM D-3512 Standard Test Method for Pilling  
ASTM D-3776 Standard Test Method for Mass Per Unit Area (Weight) of Fabric  
ASTM D-4966 Standard Test Method for Abrasion  
ASTM D-6193 Stitch and Seam Types

(Copies of these documents are available online at <http://www.astm.org> or from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

MISCELLANEOUS

Marzulli, F. and H. Maibach, "Contact Allergy: Predictive Testing in Humans,"  
Advances in Modern Toxicology, Volume 4, pp 353-372, 1977.  
(Copies of this document are available from the U.S. Army Center for Health Promotion and Preventative Medicine, ATTN: MCHB-DC-TTE, Bldg., E-2100, Aberdeen Proving Ground, MD 21010-5422.)

Principle and Methods of Toxicology, A Wallace Hayes (editor), pp 394-396, 1989.

(Applications for copies of referenced documents should be addressed to Raven Press, 1185 Avenue of the Americas, New York, NY 10036)

ISO 11092 "Measurement of Thermal and Water Vapor Resistance under Steady-State Conditions (Sweating Guarded- Hot Plate Test)

(Copies for these documents are available from American National Standards Institute, 25 West 43<sup>rd</sup> Street, Fourth Floor, New York, NY 10036-7417.)

2.4 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 6.1), a sample shall be subjected to first article inspection (see 6.2), in accordance with 4.2.

3.2 Design. The cap is a single ply construction, bell shape, pull-on style with a crown shaped by four equal sections joined together by three darts of equal length and a joining seam. The cap has a  $4 \pm 1/8$  inch wide hem that can be worn cuffed or down over the ears. (See Figure 1)

3.3 Materials and components. The materials and components shall conform to applicable specifications, standards, drawings, and patterns required herein.

3.3.1 Basic Material. The basic material for the cap shall be a blend of 95% polyester and 5% spandex, in a circular knit with an abrasion resistant jersey stretch face and velour back. The stretch jersey face shall provide water resistance, wind resistance and breathability based on the knit construction, surface treatment and shall have no lamination. The color of the fabric shall be Coyote 498. The material shall conform to the physical requirements specified in Table I.

**TABLE I. – Material physical requirements**

| <b>Material Characteristic</b>  | <b>Material Requirement</b>                                  | <b>Test Method</b>   |
|---|--|--|
| Fiber Content   | 95% polyester and 5% spandex                                 | AATCC 20 or ASTM D 276   |
| Yarn Denier (Average, Pile), denier per filament  | 1.1  | ASTM D 1907  |
| Construction  | circular terry knit / single sided velour                    |  |
| Weight, ounces/square yard  | $8.8 \pm 0.85$   | ASTM D 3776  |
| Air Permeability, cubic feet/minute/square foot   | 40   | ASTM D 737   |
| Colorfastness to: (minimum)<br>Laundering (3 cycles)<br>Crocking<br>Wet<br>Dry<br>Light (20 hrs or 85 KJ) | 3-4 minimum<br><br>3.0 minimum<br>4.0 minimum<br>4.0 minimum | AATCC 61- 2A, grade polyester only <u>1/</u> , <u>2/</u><br>AATCC 8 <u>3/</u><br>AATCC 8 <u>3/</u><br>AATCC 16 OPT A and E |
| Dimensional Stability – % (3 cycles)  | Wales: 5 maximum<br>Courses: 5 maximum                       | AATCC 135, IIIA <u>4/</u>  |
| Pilling   | 4.5 minimum  | ASTM D3512 (Random Tumble)   |
| Stretch, Loose fit  | Length (Wales): 30 minimum<br>Width (Courses): 40 minimum    | ASTM 2594, Width Loose fit   |
| Durable Water Repellency  | PASS   | AATCC 22   |
| Colorfastness   |  |  |

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| Material Characteristic                                       | Material Requirement       | Test Method  |
|---|----------------------------|--|
| Water staining – Polyester                                    | 3 minimum                  | AATCC 107  |
| Thickness @ 0.6 pounds per square inch                        | 0.06 – 0.12                | ASTM D-1777  |
| Colorfastness to Perspiration                                 | 3 minimum                  | AATCC 15   |
| Clo – Thermal insulation<br>Initial<br>After 3 launderings    | 0.3 minimum<br>0.3 minimum | ISO 11092<br>AATCC TM 135 (120 ± 5°F,<br>tumble dry low) |
| Abrasion Resistance<br>Martindale, face-to-face, 1,000 cycles | PASS                       | ASTM D 4966 <u>5</u> /                                   |

1/ AATCC Evaluation Procedure 1, Gray Scale for Color Change

2/ AATCC Evaluation Procedure 2, Gray Scale for Staining

3/ AATCC Evaluation Procedure 8, AATCC 9 – Step Chromatic Transference Scale

4/ Sample dimensions: 22 x 22 inches. AATCC 135 Table I, 3, iii, Aiii. Use 18-inch marks to determine dimensional stability.

3.4 **Thread.** Thread for needle and bobbin (looper) shall be 100% textured, 2 or 3 ply, polyester thread, approximate Tex size 35, conforming to A-A-52095; or 2 or 3 ply cotton or polyester covered polyester core thread, approximate Tex size 35, conforming to A-A-50199. The thread color shall be Coyote 498.

3.5 **Labels.** Each cap shall have a combination identification/size label, an instruction label, and a bar code label/tag.

3.5.1. **Identification label.** The identification label shall be in accordance with Type VI, Class 4 of MIL-DTL-32075. The label shall contain the item description, contract number, NSN, fiber content information, the contractor’s name and size. The inscription shall have a minimum font size of 10 points. The color of the label shall be white. The inscription legibility, label, and label attachment shall last the expected life of the cap. The label shall include the following information:

**Identification Information:**  
 CAP, HARDFACE, MICROFLEECE  
 CONTRACT NO.:  
 NSN:  
 FIBER CONTENT:  
 CONTRACTOR’S NAME:  
 SIZE:

3.5.2 **Instruction label.** The instruction label shall be in accordance with Type VI, Class 3 of MIL-DTL-32075. The color of the label shall be white. If available, a basic material supplier care label and hang tag may be used, but must contain the information listed below. The instruction label shall include the following information:

**Instruction Information:**  
 Cold Wash

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Tumble Dry Low  
Or Line Dry  
DO NOT USE BLEACH  
DO NOT IRON

3.5.3 Bar code label/tag. Each cap shall be individually bar coded with a label/tag in accordance with Type VI, Class 17 of MIL-DTL-32075. The Label/Tag shall be located so that it is completely visible on the item when it is folded and/or packaged as specified and shall cause no damage to the item.

3.5.4 Label placement. The labels shall be securely attached to the cap and positioned as follows:

- (1) Identification label. On inside of cap as worn, right of center back joining seam (+ 1/2 inch), placed horizontally with the top edge no more than 1/4 inch below the hem cover stitching, and remaining edges stitched to hem 1/16 to 3/16 inch from edge. The label attachment stitching shall not be visible on the outside of the cap.
- (2) Instruction label. Catch in center back joining seam, 1/2 + 1/8 inch above top edge of hem.
- (3) Bar code label. Attach to cap at center of crown.

3.6 Toxicity. The finished cap shall not present a health hazard and shall show compatibility with prolonged, direct skin contact when tested as specified in 3.6.1. Chemicals recognized by the Environmental Protection Agency (EPA) as human carcinogens shall not be used.

3.6.1 Toxicity Test. An acute dermal irritation study and a skin sensitization study shall be conducted on laboratory animals. When the results of the studies indicate the cap is not a sensitizer or irritant, a Repeat Insult Patch Test shall be performed in accordance with the Modified Draize Procedure. If the toxicity requirement (see 3.6) can be demonstrated with historical data, toxicity testing may not be required (see 2.3). All finishes/chemicals used to process the cap shall be identified and accompanied by the appropriate Material Safety Data Sheet (MSDS) information. The use of chemicals recognized by the Environmental Protection Agency (EPA) as human carcinogens is prohibited.

3.7 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.8 Construction.

3.8.1 Patterns. The Government will provide a complete set of patterns (see 6.1) which show size, directional lines, placement marks, and notches for assembly. Standard patterns provide an allowance of 3/8 inch for all joining seams. The Government pattern shall be used to create a working pattern. Minor modifications are permitted to the working pattern where necessary when using automatic equipment or to accommodate a manufacturing process. These modifications shall not alter the dimensional, serviceability, or appearance requirements cited in this specification.

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3.8.1.1 Pattern Parts. The component parts of the cap shall be cut from materials as specified and in accordance with the number of parts required as specified in Table II.

**TABLE II. Pattern parts**

| Nomenclature | Cut Parts |
|--------------|-----------|
| CAP          | 1         |

3.8.2 Stitches, seams, and stitching. All stitching shall conform to ASTM-D-6193. The caps shall be constructed in accordance with the stitch types and stitches per inch in Table III.

**TABLE III. Stitching**

| Seaming Area                          | Seam Type | Gage                          | Stitch Type |
|---------------------------------------|-----------|-------------------------------|-------------|
| Join darts and close center back seam | SSa-1     | 3/8 inch                      | 607         |
| Identification label                  | EFa-1     | 1/16 to 3/16 inch from edges. | 301         |
| Hem stitching                         | EFa-2     | ¼ inch width                  | 605         |

3.8.3 Tacking and backstitching. Ends of seams and rows of stitching with 301 type stitch, when not caught in other seams or stitching, shall be securely backstitched not less than 1/4 inch. Thread breaks (all stitch types) shall be secured by stitching back of the break not less than 1/2 inch.

3.9 Color.

3.9.1 Visual shade matching. The color and appearance of the material shall match the standard sample when viewed using the AATCC Evaluation Procedure 9, Option A, with sources simulating artificial daylight D75 illuminant with a color temperature of 7500 ± 200 K illumination of 100 ± 20 foot candles, and shall be a good match to the standard sample under incandescent lamplight at 2856 ± 200K

3.10 Finished measurements. The cap shall conform to the dimensions specified (in inches) in Table IV:

**TABLE IV. Finished measurements**

|                                      | Small/Medium | Large/X-Large | Tolerance |
|--------------------------------------|--------------|---------------|-----------|
| 1/2 Circumference @ Bottom <u>1/</u> | 10-1/2       | 11-1/4        | ± 1/4     |
| Cap height <u>2/</u>                 | 10           | 10            | ± 1/4     |
| Hem Width <u>3/</u>                  | 4            | 4             | ± 1/4     |

Measurements shall be taken as follows:

1/ 1/2 Circumference - Cap shall be laid flat with hem edges even and measure from folded edge to folded edge at base of cap.

2/ Cap height - Measure along center back joining seam from top of cap to bottom edge of hem.

3/ Hem width - Measure from top of cover stitch to base of hem.

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3.11 Workmanship. The finished caps shall be free from loose thread, foreign matter, and irregular defects that can adversely affect usage or durability. The finished caps shall be uniform in quality, free from defects that adversely affect form, fit or function and those defects specified in Table V.

4. VERIFICATION.

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

1. First article inspection (see 4.2).
2. Conformance inspection (see 4.4).

4.2 First article inspection. A first article inspection when required (see 6.1) shall consist of the end item examinations and tests specified in Table IV. The first article inspection shall be unacceptable if the requirements in Tables IV and V are not met.

4.3 First article samples. Unless otherwise specified in the procurement document, first article samples shall be provided. The sample size will be specified in the procurement document. The sample unit shall be one cap and the lot size shall be expressed in units of caps.

4.3.1 Materials and components inspection. In accordance with 4.1, components and materials shall be inspected 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 document. In addition to testing provisions specified in referenced documents, components shall be tested for the characteristics specified in this specification. Tests shall be conducted with both the specimen and test apparatus under standard conditions as defined in the various ASTM, and AATCC test methods. All requirements are applicable to the sample unit. All test reports shall contain the individual values utilized in expressing final results. The lot shall be unacceptable if one or more sample units fail to meet any test requirement specified. Unless otherwise specified in subsidiary specifications, sampling shall be as follows:

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

4.4 Conformance inspection. In accordance with 4.1, conformance inspection shall include the examination specified in 4.3.1. Sampling for inspection shall be performed in accordance with ASQC Z1.4.

4.4.1 Conformance inspection samples. Sampling for conformance inspection shall be performed in accordance with ASQC Z1.4 (see 6.2). The sample unit shall be one cap and the lot shall be expressed in units of caps.

4.5 Examinations and tests.

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4.5.1 Visual examination. The end item shall be visually examined for compliance to 3.2. The caps shall be examined for defects in shade, design, material, construction, and workmanship, with defects classified in accordance with Table V.

**Table V. Defects**

| Examination         | Defect   | Classification |       |
|---------------------|--|----------------|-------|
|                     |  | Major          | Minor |
| Material            | Hole, cut, tear, mend, patch, run, needle chew or weakening defect in the material on outside of cap   | 101            |       |
| Shade               | Shade variation within a part  | 102            |       |
|                     | Color not as specified.  | 103            |       |
|                     | NOTE: Parts suspected as being shaded shall be examined at a distance of 3 feet against the background of the other parts and colors of the garment. When the shade difference is readily discernible under these examining conditions, it shall be scored as a shaded part.           |                |       |
| Seams and Stitching | Seams: puckered, distorted, pleated, wavy, or twisted  |                | 201   |
|                     | Irregular or open seam; raw edges (More than 1/8 inch up to 1/4 inch).   |                | 202   |
|                     | Irregular or open seam; raw edges (More than 1/4 inch)   | 104            |       |
|                     | Stitches: broken or missing thread or stitch   |                | 203   |
|                     | Loose stitch tension resulting in loose seam (more than 1 inch but not more than 2 inches)   |                | 204   |
|                     | Loose stitch tension resulting in loose seam (more than 2 inches)  | 105            |       |
|                     | Seam or stitch type not as specified   |                | 205   |
|                     | NOTE: One or more broken or two or more continuous skipped or run-off stitches constitute an open seam. On double stitched seams, a seam is considered open when one or both sides of the seam is open. Raw edge not securely caught in stitching shall be classified as an open seam. |                |       |
| Cleanness           | Spot, stain, excessive thread ends not trimmed or removed, raw edges, unpleasant odor.   |                | 206   |
| Labels              | Label omitted, incorrect, illegible, not attached as specified;  | 106            |       |
|                     | Bar codes omitted, not readable by scanner; human-readable interpretation (HRI) omitted or illegible;  |                | 207   |
|                     | Bar code not visible on folded, packaged item;   |                | 208   |
|                     | Bar code attachment causes damage to the cap.  | 107            |       |
| Workmanship         | Any component part omitted or not as specified, distorted, full, tight or twisted parts. Any defect not specified in this table which affects, form, fit or function   | 108            |       |

4.5.2 Dimensional examination. The end item shall be examined for conformance to the dimensions specified in Table IV.

## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.1). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

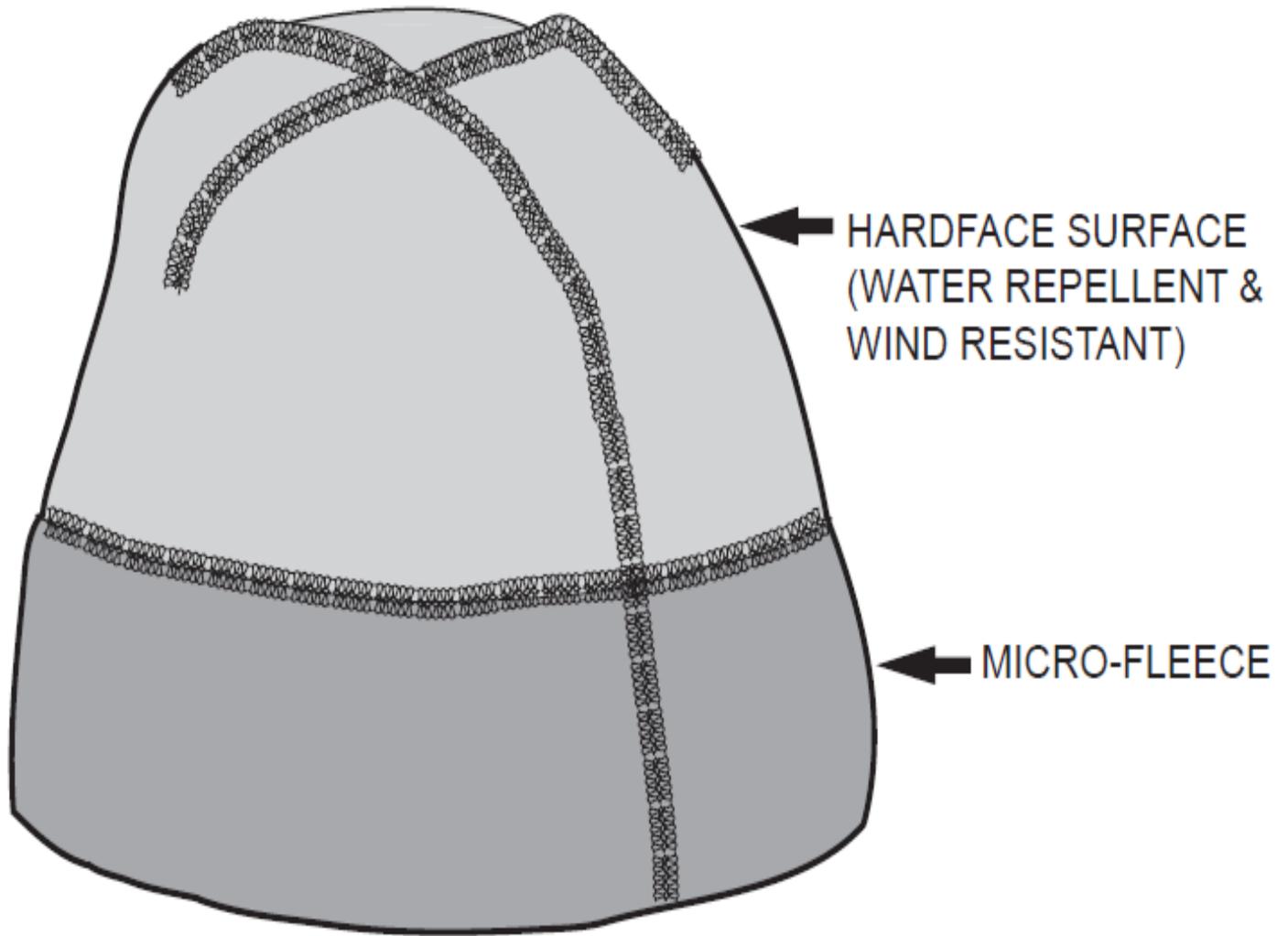
6.1 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number and date of this document, including any amendments.
- b. Types, classes and sizes required (see 1.2).
- c. National stock number.
- d. Applicable Government patterns and drawings, including revisions (see 3.8.1).
- e. When first article sample is required (see 4.2 and 6.2).
- f. Number of first article inspection samples (see 4.3)
- g. Issue of DODISS to be cited in the solicitation and, if required, the specific issue of individual documents referenced (see 2.2 and 2.3).
- h. Packaging requirements (see 5.1)

6.2 First article. When first article inspection (see 4.2) is required, the contracting officer should provide specific guidance to offerors whether the item(s) should be first article sample, a first production item, or a standard production item from the contractor's current inventory, and the number of items to be tested as specified in 4.3. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for pending contract. Bidders should not alternate submit bids unless specifically requested to do so in the solicitation.

6.3 Key words:

Cold weather  
Fleece  
Headwear  
Polyester



**Figure 1 – Cap, Hardface, Microfleece**