

PURCHASE DESCRIPTION
UNDERSHIRT, LIGHT WEIGHT COLD WEATHER (GEN III)

1. SCOPE.

1.1 Scope. This document covers the requirements for Lightweight Undershirt fabricated in 100% polyester plaited jersey knit that dimensionally wicks moisture/perspiration away from the body.

2. CLASSIFICATION. The undershirt shall be color Desert Sand. The undershirt shall be of one type in the following sizes:

Small - Regular
Medium - Regular
Large - Regular
Extra Large - Regular

Large - Long
Extra Large - Long

3. SALIENT CHARACTERISTICS.

3.1 Description. The Undershirt shall have a crew neck, contoured long tail in the back and long sleeves with a thumbhole to aid in donning. All joining seams shall be flat locked construction.

3.2 Material.

* 3.2.1 Basic Material. The basic material shall be 100% polyester, circular knit plaited jersey (see 7.4). The plaited circular knit construction shall provide multi-dimensional moisture management via both yarn denier differential face to back in the construction and permanent rendering of hydrophilic properties. The color of fabric shall be Desert Sand 503. The fabric shall conform to the physical requirements specified in Table I when tested as specified in Table I. Unless otherwise specified, the fabric shall be conditioned and tested in accordance with ASTM D-1776.

TABLE I. Basic Material Requirements

CHARACTERISTIC	REQUIREMENT	TEST METHOD
Fiber Identification	100% Polyester	AATCC-20 <u>1/</u>
Knit Type	Plaited jersey circular knit with face to back yarn denier gradient 1.0:1.5 and permanent rendering of hydrophilic properties	Visual
Weight (oz. per sq. yard)	3.7 +/- 0.4	ASTM D-3776 (Method C)
Colorfastness to Laundering, rating (min)	3.0	AATCC – 61, Option 2a, 3 cycles, grade polyester only
Colorfastness to Crocking, rating (min)	Dry - 4.0 Wet - 3.0	AATCC- 8
Colorfastness to Light, rating (min), Xenon method	4.0	AATCC-16, Option E (85 kJ)
Dimensional Stability, percent (max), applies to each of Wale and Course directions	5.0	AATCC – 135, 3 Cycles, (1), III, (A), ii
Pilling, rating (min)	4.5	ASTM D-3512
Air Permeability, ft ³ /ft ² /min.	200 (min) to 375 (max)	ASTM D-737
Stretch, percent, Course direction only (min)	60	ASTM D-2594 (Loose Fit)
Water sorption and wicking Initially After 20 launderings cycles	Pass Pass	3.2.2 AATCC – 135, 20 Cycles, (1), III, (A), ii and 3.2.2
Color	Desert Sand 503	<u>2/</u>
Toxicity	<u>3/</u>	<u>4/</u>

1/ Certificate of Compliance.

2/ Color 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/ The finished cloth shall not present a dermal health hazard when used as intended and tested as specified in footnote 4/.

4/ Toxicity assessment. The contractor must furnish information, which certifies that the finished product is composed of materials, which have been safely used commercially or provided sufficient toxicity data to show compatibility with prolonged, direct skin contact. At a minimum, toxicity data should include results from a primary dermal irritation study in laboratory animals and a repeated insult human patch test (Modified Draize Procedure) (See 7.3.3). The latter must be conducted under the supervision of a qualified dermatologist using at least 100 free-living individuals. All finishes/chemicals used to process the garment shall be identified and accompanied by the appropriate Material Safety Data Sheet (MSDS) information. The use of chemicals recognized by the Environmental Protection Agency (EPD) as human carcinogens is prohibited.

* 3.2.2 Water sorption and wicking. Water sorption and wicking shall be determined using the following procedure:

Fabric specimens shall be conditioned in accordance with ASTM-D-1776 and tested in that environment. The specimen size shall be 6-inches by 6-inches; three (3), separate specimens shall be used for each of the face side and back side tests. A fabric shall be considered Passing only when tests on both the face side and the back side meet the respective test pass/fail criteria on all individual specimens tested.

1. Face side wicking test. The test specimen shall be laid flat on a glass plate with back side up (i.e., inner or skin surface when used in a garment). One (1) drop of 0.10 ± 0.01 milliliters of distilled water at $70^{\circ}\text{F} \pm 2^{\circ}\text{F}$ shall be placed in the center of the test specimen using a pipette and a stopwatch/timer immediately started. The test specimen shall then be immediately turned over on the glass plate with test specimen face side up. The diameter of the wicked water area (denoted by a darkened water mark) shall be measured at a total elapsed time of 10 seconds. The specimen shall be considered passing if the diameter of the wicked water area (darkened water mark) is equal to or greater than 1-3/16 inches.

2. Back side sorption test. The test specimen shall be laid flat on a glass plate with back side up (i.e., inner or skin surface when used in a garment). One (1) drop of 0.10 ± 0.01 milliliters of distilled water at $70^{\circ}\text{F} \pm 2^{\circ}\text{F}$ shall be placed in the center of the test specimen using a pipette and a stopwatch/timer immediately started. The water (denoted as a darkened water mark) shall be observed and the time for the water mark to disappear (water sorption, denoted as a lightened water mark approximating the shade of the basic material) shall be recorded. The specimen shall be considered passing if the water sorption (disappearance of the darkened water mark) is 10 seconds or less.

3.2.3 Thread. Thread for needle and bobbin (looper) shall be commercial 100% textured polyester thread, conforming to Type I, Class 1 of A-A-52095. The color of the thread shall match Desert Sand 503.

3.2.4 Labels. The lightweight undershirt shall have a label in accordance with Type VI, Class 14 of MIL-DTL-32075. The color of the labels shall approximate the ground shade of the basic fabric or white. In addition it shall contain a bar coding label in accordance with Type VIII and Class 17.

3.2.4.1 The combination size, identification and instruction label for the jacket. The top (only) of the combination label (size, identification and instruction label) shall be sewn on inside left side seam near bottom of shirt. The printed labels shall be facing the body and it shall not be visible from the outside when in use. The instruction label shall include the following information:

**Machine or Hand Wash Warm Water,
Tumble dry in low heat or Line Dry
Do Not Bleach or Dry Clean
Do Not Use Fabric Softeners and Do Not Iron**

3.3 Patterns. Standard patterns, providing a seam allowance of ¼-inch for all seams, except where otherwise specified, will be furnished by the Government. The pattern list in Table III is provided to insure that the pattern set provided is complete. The Government patterns shall not be altered in any way, and are to be used only as a guide for cutting the contractor's working patterns. The working patterns will be identical to the Government patterns, except that additional notching to facilitate manufacture is possible. Also, minor modifications are permitted where necessary to accommodate manufacturer's processes and using automatic equipment. These modifications shall not alter the serviceability or appearance requirements.

3.3.1 Pattern parts. The component parts shall be cut from the materials indicated and in accordance with the pattern parts listed in Table II.

TABLE II. List of Pattern Parts.

Material/Item	Nomenclature	Cut Parts
100% polyester, plaited jersey knit	Front	1
	Back	1

	Sleeve	2
	Collar binding (1 inch wide Cross-cut)	1

3.4 Construction. End item construction and appearance shall conform to Figure 1 – Lightweight Undershirt.

3.4.1 Seaming. The seams shall be consistent, exhibit a uniform appearance and conform to the ASTM D-6193, Stitch and Seam Types listed in the Construction of Lightweight Undershirt, Table III, below. All material edges shall not ravel.

TABLE III. Construction of Lightweight Undershirt.

Operation	Stitch Type	Seam Type
Join shoulders and set right sleeve with coverstitch.	607	FSa-1
Set 1 inch wide silkweight binding around neckline.	605	BSa-2
Join left shoulders and set left sleeve with coverstitch.	607	FSa-1
Hem thumbhole openings on sleeves with 3-needle top rocker hemmer.	605	FSa-2
Close sleeves and sides with coverstitch, catching ends of thumbholes and inserting size label, and care label in left side seam, approximately 2 ½ inches from bottom edge.	607	FSa-1
Turn under coverstitch tails at top and bottom of thumbholes and at neckline, then bartack all to secure.	Bartack	--
Hem sleeves and shirt bottom 1/2 inch with 3-needle top rocker hemmer.	605	EFa-2

4. REGULATORY REQUIREMENTS

4.1 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.

5. PRODUCT CONFORMANCE

5.1 Product Conformance. The product provided shall meet the salient characteristics and shall conform to the cited patterns, specifications, standards and quality assurance practices. The Government reserves the right to require proof of such conformance.

5.2 Quality Conformance Inspection. Sampling for inspection shall be performed in accordance with ANSI/ASQ Z1.4, as specified in the contract or order.

5.3 Component and End Item Inspection. In accordance with 3.2 and 5.1, components and end items shall be tested in accordance with all the requirements of referenced documents unless otherwise excluded, amended, modified, or qualified in this document or applicable procurement documents. The Government reserves the right to inspect all components and end items to determine conformance to requirements.

5.4 End Item Visual Examination. The lightweight undershirts shall be examined for the defects listed in Table V as defined in FED-STD-4.

TABLE V. Material and end item examination

EXAMINATION	DEFECT
Material and Workmanship	Component part omitted, distorted, full, tight, or twisted; any part of Underwear caught in any unrelated stitching, the edge of any component part required to be forced out having folds of more than 1/8 inch.
	Hole, cut, tear, smash, burn, drill hole, run, thin place, dye streak, color not as specified, misweave.
	Seam: puckered, distorted, pleated, wavy, twisted, irregular or open, loose or tight stitch tension, broken or missing thread or stitch, needle chew, visible mend, edge or raised stitching sewn too close to edge, resulting in damage to cloth, seam allowance not as specified, raw edge.
Cleanness	Spot, stain, excessive thread ends not trimmed or removed, odor.
Shade	Shade variation within a part or between parts. Thread color not as specified.
Labels	Omitted, incorrect, illegible, not attached where specified; bar-codes omitted, not readable by scanner; human-readable interpretation (HRI) omitted or illegible; barcode not visible on folded, packaged item; barcode attachment causes damage to the item.
Packaging	Any Undershirts not packaged in accordance with the contract or purchase order.

5.5 Finished Dimensions. The finished Lightweight Undershirt shall conform to the measurements listed in Table IV.

TABLE IV. Undershirt Finished Measurements (inches)

SIZE	½ CHEST <u>1/</u>	SLEEVE LENGTH <u>2/</u>	BACK LENGTH <u>3/</u>
SMALL-REG	20-¼	33-¼	29-5/8
MEDIUM-REG	21-¾	34-¼	30-1/8
LARGE-REG	23-¼	35-¼	30-5/8
X-LARGE-REG	25-¼	36-¼	31-1/8
LARGE-LONG	23-¼	36-¾	32-5/8
X-LARGE-LONG	25-¼	37-¾	33-1/8
TOLERANCE	+/- ½	+/- ½	+/- ½

Note: ¼" Seam Allowance for sewing.

1/ Chest measurement taken from armseye to armseye with garment laid flat.

2/ Sleeve Length measurement taken as follows with garment face down and sleeve extended, measure from center back neck seam straight across top folded edge of sleeve hem.

3/ Back Length measurement taken from the center back neck seam to the bottom of shirt with garment laid flat.

6. PACKAGING

6.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order. When actual packaging of material is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Department 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.

7. NOTES.

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory unless otherwise stated in the contract or purchase order.)

7.1 Intended Use. The GEN III Undershirt is for wear by soldiers as an undergarment component of the Third Generation, Extended Cold Weather Clothing System.

7.2 Acceptance criteria. Acceptance criteria shall be as stated in the contract or order.

7.3 Reference documents.

7.3.1 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 cited in the solicitation or contract.

SPECIFICATIONS

A-A-52095 - Thread, Polyester

STANDARDS

FED-STD-4 - Glossary of Fabric Imperfections

(Copies of Military and Federal documents are available from: Standardization Documents Order Desk, Bldg 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094)

7.3.2 Other Government documents, drawings, and publications

FEDERAL TRADE COMMISSION

Rules and Regulations Under the Textile Fiber Products Identification Act

(Copies are available online at www.ftc.gov or from the Federal Trade Commission, 600 Pennsylvania Avenue, N.W., Washington, DC 20580-0001

7.3.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issue of documents which are DOD adopted shall be those in the issue of the Acquisition Streamlining and Standardization Information System (ASSIST) database cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the ASSIST are the documents cited in the solicitation.

AMERICAN SOCIETY FOR TESTING AND MATERIALS

ASTM D-204 Standard Test Method for Sewing Threads

ASTM D-737 Standard Test Method for Air Permeability of Textile Fabrics

ASTM D-1776 Standard Practice for Conditioning Textiles for Testing

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-3951 Standard Test Method for Air Permeability of Textile Fabrics

ASTM D-6193 Stitch and Seam Types

(For all inquires please contact the American Society for Testing and Materials, 100 Barr Harbor, West Conshohocken, PA 19428-2959. Website address: <http://www.astm.org>)

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

AATCC – 8 Colorfastness to Crocking: AATCC Crockmeter Method
AATCC - 16 Colorfastness to Light
AATCC - 20 Fiber Analysis: Qualitative
AATCC - 61 Colorfastness to Laundering, Home and Commercial: Accelerated.
AATCC -135 Dimensional Changes in Automatic Home Laundering of Woven and Knit Fabrics
AATCC Evaluation Procedure-9 Visual Assessment of Color Difference of Textiles

(For all inquiries please contact the American Association of Textile Chemists and Colorists, P.O. Box 12215, Triangle Park, NC 27709-2215.)

AMERICAN NATIONAL STANDARDS INSTITUTE

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

(For all inquires please contact the American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY 10036. Website address: <http://www.ansi.org>)

MISCELLANEOUS

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

(Copies of this document is available from Raven Press, 1185 Avenue of the Americas, New York, NY 10036)

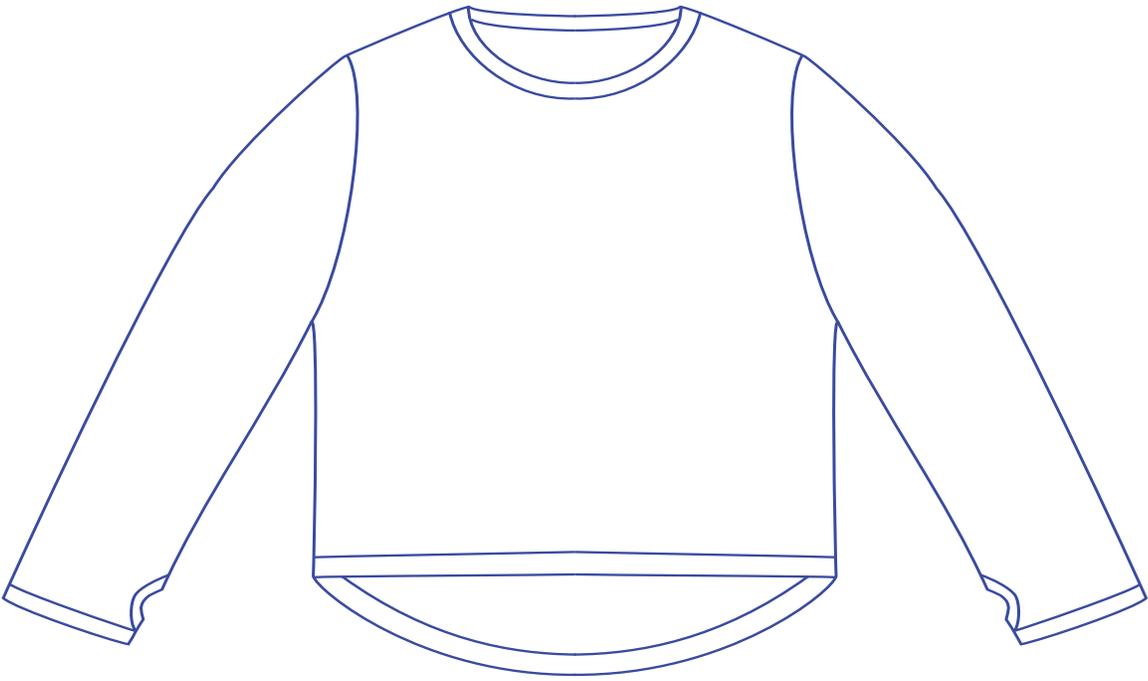
Marzulli, F. and H. Maibach, "Contact Allergy: Predictive Testing in Humans,"
Advances in Modern Toxicology, Volume 4, pp 353-372, 1977.

(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.)

7.4 Source of supply. Sources of supply for the Polartec® PowerDry™ Silkweight style 9042.

Malden Mills Industries, Inc.
50 Broadway
Lawrence, MA 01841

7.5 Asterisk (*) denotes change/update has been made to the paragraph compared to previous revision.



Front View



Back View

FIGURE 1. Lightweight Undershirt