

PURCHASE DESCRIPTION

SHIRT, MID WEIGHT COLD WEATHER (GEN III)

1. SCOPE.

1.1 Scope. This document covers the requirements for a synthetic grid fleece shirt fabricated in 93% polyester and 7% spandex heavy weight jersey with stretch to wick moisture/perspiration away from the body.

2. CLASSIFICATION. The grid fleece shirt shall be color Desert Sand. The grid fleece shirt 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 grid fleece shirt has long sleeves, a collar that converts to a mock turtleneck when the front opening slide fastener is completely closed. The slide fastener front opening extends from the top of the collar to the mid-chest. The slide fastener is backed with a throat protection flap at the neck. The base of the front opening is reinforced with a 1 x 1-1/2 inch piece of nylon webbing. To provide additional insulation and lower back protection, the back of the grid shirt is shaped to be longer than the front. All joining seams shall be flat locked and all, hems shall be cover stitched. This design provides a garment that is light in weight, low in bulk, has environmental protection, and comfort in movement.

3.2 Material.

3.2.1 Basic Material. The basic material for the grid fleece shirt shall be 93% polyester and 7% spandex circular knit plaited jersey, heavyweight jersey with stretch (see 7.4). The plaited circular knit construction shall provide dimensional moisture management via both yarn denier differential face to back in the construction and chemical treatment. The jersey face shall be durable and low pilling. The color of the 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 Content	93% Polyester and 7% Spandex	AATCC-20 <u>1/</u>
Knit Type	Plaited Grid Jersey Circular Knit Heavy Weight Solid with face to back yarn denier gradient 1:2 differential for dimensional moisture management plus wicking chemical treatment.	Visual
Weight (oz. per square yard)	6.6 ± 0.6	ASTM D-3776
Colorfastness to: Laundering, rating (min)	4.0	AATCC – 61, Option 2a, 3 cycles, grade polyester only
Crocking, rating (min)	Dry - 4.0; Wet - 3.0	AATCC - 8
Light, rating (Xenon)(min)	Good - 4	AATCC - 16, Option E (85 kJ)
Dimensional Stability, % (max) – Wale Course	5.0 5.0	AATCC – 135, 3 Cycles, (1), III, (A), ii
Pilling on jersey face (min): Initial After Laundering	4.0 4.0	ASTM D-3512 AATCC – 135, 3 Cycles, (1), III, (A), ii & ASTM D-3512
Water sorption and wicking	Pass	3.2.2.1
Air Permeability, ft ³ /ft ² /min (min)	150	ASTM D-737
Thickness, inch	0.06 -0.11	ASTM D-1777 <u>2/</u>
Stretch, percent Wale Course	30 – 80 70 – 120	ASTM D-2594 (Loose Fit)
Compressed Volume, cubic inches (max)	18	3.2.2.2
Thermal insulation, Clo (min)	0.8	3.2.2.3
Color	Desert Sand 503	<u>3/</u>
Toxicity	<u>4/</u>	<u>5/</u>

1/ Certificate of Compliance.

2/ At pressure of 0.6 pounds per square inch.

3/ 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 ± 200 K.

4/ The finished cloth shall not present a dermal health hazard when used as intended and tested as specified in footnote 5/.

5/ 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 Fabric testing methods.

* 3.2.2.1 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.

3.2.2.2 Compressed Volume Test Method.

Summary: Fabric compressibility is measured by using a standard fabric area that is subjected to a standard pressure or force while contained in standard cylinder. The test does not account for any trim types that might impact a fabric's packability in the finished form. Its purpose is to standardize fabric area, pressure applied, and limiting volume to determine a volume that is achieved when a particular fabric is exposed to a standard set of compression conditions.

Sample: One specimen, 20" x 20", shall be cut from the fabric to be tested.

Apparatus: A tensile tester (in accordance with ASTM D-5034) shall be used. A compression attachment consisting of a lower attachment is a 3.5" inner diameter and 13" high cylinder that is etched along the outside of the cylinder 12" from the inner bottom of the cylinder. The upper attachment is a plunger made of similar material that is approximately 3.25" in diameter and drilled with holes to allow for airflow out during the test.

Method: The 20" x 20" fabric specimen is folded in half once and then rolled. It is placed in the cylinder below the 12" etch line. The plunger is lowered to the 12" etch line and the test commences. The plunger descends at a rate of 24 in/min. Once a resistant force of 45 pounds is achieved the plunger shall be stopped and the distance traveled by the plunger is subtracted from 12" to determine the compressed height. The fabric should not have escaped through the small area between the inside of the cylinder and the plunger during the test. If it did the fabric should be removed, shaken out, re-rolled, and retested. If there is any indication of permanent deformation another sample should be taken. Fabric volume in the compressed condition is then determined by the following equation: Volume (cubic inches) = 9.621 x compressed height (inches).

3.2.2.3 Thermal Insulation Test. Thermal conductivity shall be tested as follows:

Apparatus: A Reeves Brothers Thermal Conductivity tester shall be used. The tester consists of a highly insulated chamber containing an air circulating device and electrical heaters. One end of the chamber is closed by the test specimen. Electrical input controls and temperature measuring means are external.

Procedure: A 16" x 16" test specimen is clamped to the face of the preheated test chamber with the insulated side of the specimen facing inwardly. Starting temperature is noted and the test is continued until equilibrium of the inside temperature is reached as noted by identical readings of temperature at 30 minute intervals with a fixed electrical input of 70 watts. The test is conducted in a constant temperature room.

Results: Results are reported in terms of temperature rise over room temperature. The highest the reading the greater the insulation value of the sample tested.

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 grid fleece shirt 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 grid fleece shirt. The top (only) of the combination size, identification and instruction label shall be securely attached to the shirt at center back neck (+/- 1 inch off center) and caught in collar setting seam. 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 on low heat or Line Dry
Do Not Bleach or Dry Clean
Do Not Use Fabric Softeners
Do Not Iron**

3.2.5 Slide fastener. The slide fastener for the front opening shall be a continuous element polyester mono-filament, size 5-6 with a minimum crosswise breaking strength of 175 lbs., conforming to type I, Style 7 of A-A-55634 and shall be Desert Sand in color. The slider shall have an opening large enough to accommodate a 3/8-inch wide thong. Slide fastener lengths for the front opening are: 14 inches for all sizes.

3.2.6 Webbing, nylon. The webbing used to reinforce the end of the slide fastener shall be 1-inch wide, 4 panel, Desert Sand 503 color, nylon webbing conforming to Elastic Cord and Webbing Style # N1401 or equal. Webbing cut edges shall be seared.

3.3 Patterns. The government shall furnish a complete set of patterns or a master pattern with grade rules, to maintain uniformity and consistency in manufacturing. Standard patterns provide an allowance of 1/2-inch for setting slide fasteners and for all major joining seams. The government patterns shall be used to create the contractor's working patterns. Minor modifications are permitted to accommodate manufacturing procedures however the design and finished measurements shall be maintained.

TABLE II. List of Pattern Parts.

Material/Item	Nomenclature	Cut Parts
Grid Fleece – 93% Polyester and 7% Spandex.	Front	1
	Back	1
	Collar	1
	Sleeve	2
	Sleeve Side	2
	Neck Protection flap	1

3.4 Construction. End item construction and appearance shall conform to Figure 1 – Grid Fleece Shirt.

3.4.1 Seaming. All seams shall exhibit a uniform appearance and conform to the ASTM D-6193, Stitch Types listed in Table III. All material edges shall not ravel. Edges may be turned-in, turned-under, or serged to prevent raveling.

TABLE III. Seams and stitch type

Seaming Areas	Seam Type	Stitch Type
Join shoulders with coverstitch.	FSa-1	607
Overedge bottom of collar and collar tab.	EFd-1	504
Set collar to neckline with coverstitch.	FSa-1	607
Set zipper to front opening with tab.	LSbu-2 (a&b)	301
Close collar with size label at center inside back, and topstitch collar and zipper with single needle.	LSbu-2 (a&b)	301
Set reinforcement webbing (1 1/2 inch by 1 inch) at bottom of zipper with box stitch.	BOX Stitch	301
Hem thumbhole openings on sleeve front and backs with hemmer.	EFa-2	605
Coverstitch sleeve fronts and back together, catching ends of thumbholes.	FSa-1	607
Set sleeves flat with coverstitch. Close sleeves/sides with coverstitch, catching care and Peckham logo label in left side seam 2-3 inches above bottom, and catching thumbhole opening ends.	FSa-1	607
Bartack top and bottom of thumbholes openings.	Bartack	Bartack
Hem sleeves 1/2 inch turn outside and hem bottom 3/4" to outside with 3-needle top rocker hemmer, turning hem to outside.	EFa-2	605

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 characteristic of Commercial Item Description, 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 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 Grid shirt shall be examined for the major defects as listed in Table IV as defined in FED-STD-4.

TABLE IV. Material and end item visual examination

EXAMINATION	DEFECT
Material and Workmanship	Component part omitted, distorted, full, tight, or twisted; any part of grid shirt 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.
	Box X-stitching missing, insecure, misplaced, not specified size, stitches loose or broken.
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; bar-code not visible on folded, packaged item; barcode attachment causes damage to the item.
Packaging	Any Grid shirt not packaged in accordance with the contract or purchase order.

5.5 Finished Dimensions. The finished grid fleece shirt shall conform to the measurements listed in the Table V below.

TABLE V. Grid Fleece shirt finished measurements (inches)

SIZE	½ CHEST <u>1/</u>	BACK LENGTH <u>2/</u>	SLEEVE LENGTH <u>3/</u>
Small-Reg	19-½	28-½	33-¾
Medium-Reg	21-½	29	34-¾
Large-Reg	23-½	29-½	35-¾
Large-Long	23-½	31-½	37-¼
X-Large-Reg	25-½	30	36-¾
X-Large-Long	25-½	32	38-¼
Tolerance	+/- ½	+/- ½	+/- ½

Note: ¼-inch Seam Allowance for sewing.

1/ With the front slide fastener and the Grid fleece shirt laid flat and as smooth as possible, measure from folded edge to folded edge at base of armhole.

2/ Measure from collar seam along center back to bottom edge of Grid fleece shirt

3/ With garment face down and sleeve extended, measure from center back neck seam straight across to top folded edge of sleeve hem.

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, Mid Weight Shirt is for wear by soldiers as an under garment 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.

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-737 Standard Test Method for Air Permeability of Textile Fabrics
ASTM D-1776 Standard Practice for Conditioning Textiles for Testing
ASTM D-1777 Standard Test Method for Thickness of Textile Materials
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-5034 Standard Test Method for Breaking Force and Elongation of Textile Fabrics (Grab)
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.)

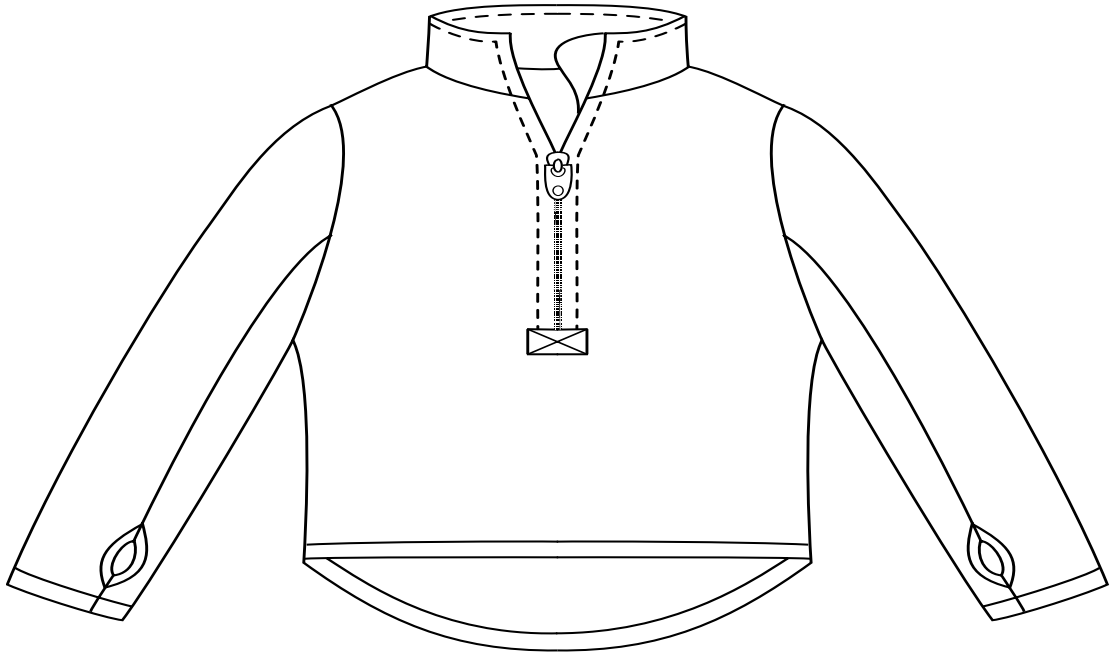
7.4 Source of supply. Suggested sources of supply for component materials:

7.4.1 Basic Material: Polartec(R) PowerDry(TM) Heavyweight Jersey/Shearling Grid, Style 9110.

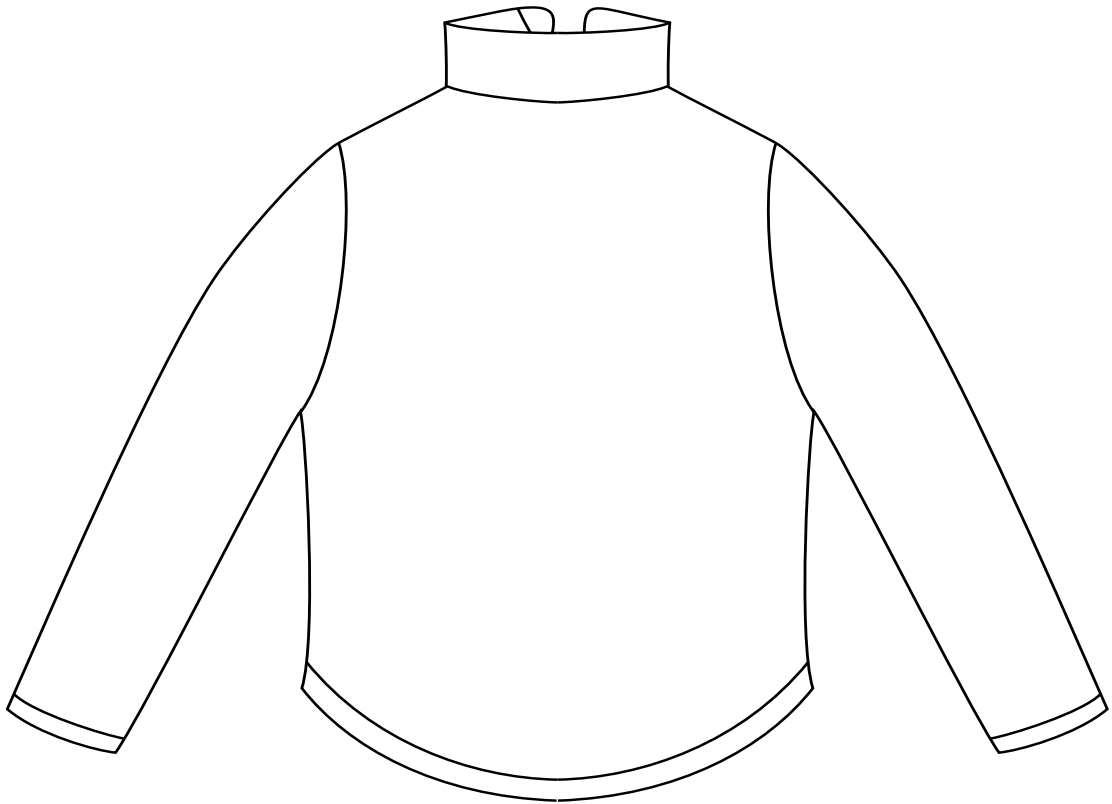
Malden Mills Industries, Inc.
50 Broadway
Lawrence, MA 01841

7.4.2 Slide Fasteners: YKK style# CNFN 56 DALHD E 5/8", color number D698 Desert Sand slide fastener has been found to meet the requirements of 3.2.9.

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



Front View



Back View

Figure 1. Grid Fleece Shirt