INCH-POUND
MIL-DTL-368K
19 November 2019
SUPERSEDING
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DETAIL SPECIFICATION

CLOTH, SATIN, RAYON AND CLOTH, TWILL, RAYON

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

1. SCOPE

1.1 Scope. This specification covers the requirements for rayon twill cloth and rayon satin cloth used in various clothing items.

1.2. Classification. The cloth will be available in the following classes, as specified.

Class 1 - Twill, 3.7 ounces per square yard
Class 2 - Twill, 4.2 ounces per square yard
Class 3 - Satin, 4.5 ounces per square yard

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 or 4 of this specification. This section does not include documents cited in other sections of this specification 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 specification, whether or not they are listed.

2.2. Government documents.

Comments, suggestions, or questions on this document should be addressed: ATTN: DLA Troop Support, 700 Robbins Street, Philadelphia, PA 19111-5096. Since contact information can change, verify the currency of the address information using Acquisition Streamlining and Standardization Information System (ASSIST) online database https://assist.dla.mil.

AMSC N/A FSC 8305

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 are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-STD-3064 - Evaluation of Quality of Textile Materials

(Copies of this document are available online at https://quicksearch.dla.mil.)

2.2.2 Other government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation or contract.

FEDERAL TRADE COMMISSION

Rules and Regulations under the Textile Fiber Products Identification Act

(Copies of this document are available online at https://www.ftc.gov.)

2.3 Non-government publications. The following documents 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.

AMERICAN ASSOCIATION OF TEXTILES CHEMISTS AND COLORISTS (AATCC)

AATCC Evaluation Procedure 1, Gray Scale for Color Change
AATCC Evaluation Procedure 2, Gray Scale for Staining
AATCC Evaluation Procedure 8, AATCC 9 Step Chromatic Transference Scale
AATCC Evaluation Procedure 9, Visual Assessment of Color Difference of Textiles
AATCC Test Method 8 - Colorfastness to Crocking: Crockmeter Method
AATCC Test Method 15 - Colorfastness to Perspiration
AATCC Test Method 20 - Fiber Analysis: Qualitative
AATCC Test Method 81 - pH of the Water Extract from Wet Processed Textiles
AATCC Test Method 132 - Colorfastness to Drycleaning
AATCC Test Method 158 - Dimensional Changes on Drycleaning in Perchloroethylene: Machine Method

(Copies of these documents are available online at https://www.aatcc.org.)

AMERICAN SOCIETY FOR QUALITY

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

(Copies of this document are available online at https://asq.org.)

ASTM INTERNATIONAL

ASTM D3775	- Standard Test Method for Fabric Count of Woven Fabric
ASTM D3776/D3776M	- Standard Test Methods for Mass Per Unit Area (Weight) of Fabric
ASTM D3990	- Standard Terminology Relating to fabric Defects
ASTM D5034	- Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)
ASTM D5430	- Standard Test Method for Visually Inspecting and Grading Fabrics

(Copies of these documents are available online at https://www.astm.org.)

INFORMA HEALTHCARE

Repeat Insult Patch Test – Modified Draize Procedure
Principles and Methods of Toxicology, A. Wallace Hayes (editor)

(Copies of this document are available online at https://www.crcpress.com)

SDL ATLAS

Part Number 402985 – Slub/Knot Replica Set

(Replica Set is available for purchase from SDL Atlas Customer Service, 1-803-329-2110.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Unless a specific exemption has been obtained, nothing in this document supersedes applicable laws and regulations.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2) a sample shall be subjected to first article inspection (see 4.3 and 6.3).

3.2 Standard sample. Unless otherwise specified, the finished cloth shall match the standard sample for shade and appearance, 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 Recycled, recovered, or environmentally preferable, or biobased materials. Recycled, recovered environmentally preferable, or biobased 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.

3.4 Material. The yarns shall be multifilament rayon (see 6.9). Material composition and yarn plies shall be verified as specified in Table IV.

3.5 Color.

3.5.1 Visual shade matching. The color and appearance of the dyed cloth shall be as specified in the contract (see 6.2) and shall match the standard sample when tested as specified in Table IV.

3.5.2 Colorfastness. The finished dyed cloth shall meet the colorfastness requirements of Table I when tested as specified in Table IV.

TABLE I. Colorfastness requirements (all types).

	Crocking Dry/Wet (Staining) (minimum)	Dry Cleaning (1 cycle) (Color change and Staining) (minimum)	Perspiration (acid and alkaline) / (Color change and Staining) (minimum)
All colors except black	3.5 / 3.5	3	3
Black	2.5 / 2.5	3	3

3.5.3 Labile Sulfur. The use of dyes and compounds containing elementary sulfur capable of oxidation to sulfuric acid shall not be used. The dyed cloth shall be “Free” of labile sulfur when tested as specified in Table IV.

3.6 Physical requirements. The finished cloth shall conform to the requirements in Table II, when tested as specified in Table IV.

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TABLE II. Physical requirements.

Characteristic	Class 1	Class 2	Class 3
Weight, oz./sq.yd. (minimum)	3.7	4.2	4.5
Yarns per inch, (minimum) Warp Filling	 121 67	 142 71	 180 67
Breaking Strength, (dry) pounds, (minimum) Warp Filling	 100 50	 115 55	 150 55
Breaking Strength, (wet) pounds, (minimum) Warp Filling	 40 20	 46 22	 60 22

3.6.1 Weave.

3.6.1.1 Class 1 and Class 2. The weave for the Class 1 and 2 cloths shall be two-over-one (2/1) right-hand twill.

3.6.1.2 Class 3. The weave of the Class 3 cloth shall be a 5-harness satin (see Figure 1).

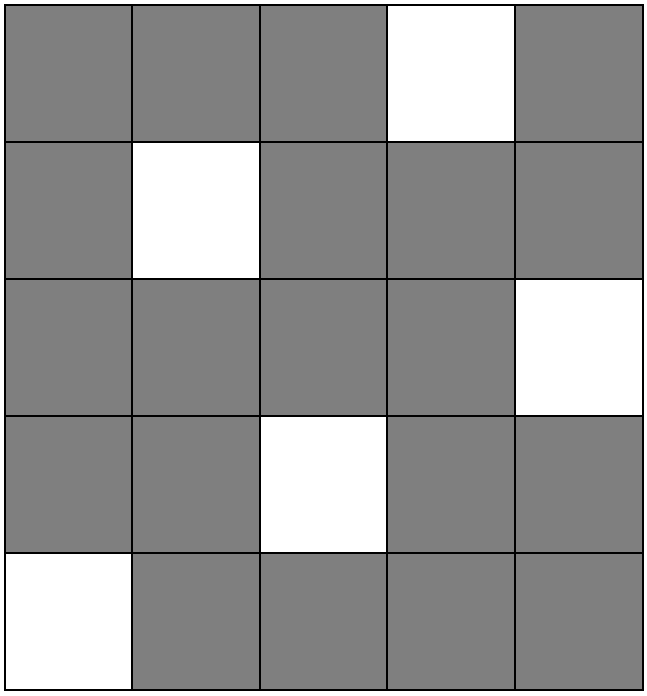

FIGURE 1. 5-harness satin weave (Class 3).

3.7 Finish. The Class 1, 2 and 3 cloth shall be natural finish. The use of resins, oils, starches or gums in the finishing of the cloth shall be prohibited.

3.8 pH. The pH of the water extract of the finished cloth shall be no less than 5.0 nor more than 8.5 when tested as specified in Table IV.

3.9 Shrinkage. The shrinkage or elongation in both the warp and filling directions shall be no greater than 3.5% for the individual sample and not greater than 3.0% for the lot average when tested as specified in Table IV.

3.10 Toxicity. The finished fabric shall not present a health hazard and shall show compatibility with prolonged direct skin contact when tested as specified in 4.6.4. The use of chemicals recognized by the Environmental Protection Agency (EPA) as human carcinogens is prohibited.

3.10.1 Toxicity documents. All treatments used to process the cloth shall be identified and accompanied by the appropriate Safety Data Sheet information. The use of chemicals recognized by the Environmental Protection Agency (EPA) as known human carcinogens is prohibited.

3.11 Length and put-up. Unless otherwise specified (see 6.2), the finished cloth shall be furnished in continuous lengths, each not less than 50 yards. Each length shall be put-up on rolls with width, including selvage, as specified (see 6.2). Length and width shall be verified as specified in Table IV.

3.12 Fiber identification. Each roll of the finished cloth shall be labeled or ticketed for fiber content in accordance with the rules and regulations under the Textile Fiber Products Identification Act.

3.13 Marking. The back or face of the cloth shall be marked “BACK” or “FACE”, as applicable. The marking shall be clearly legible using any indelible marking method used commercially.

3.14 Workmanship. The finished cloth shall be uniform in quality and shall conform to the quality of product established by this specification. The demerit points, as specified in 4.5, shall not exceed the criteria specified in the contract or purchase order (see 6.2).

4. VERIFICATION

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

a. First article inspection (see 4.3)
b. Conformance inspection (see 4.4)

4.2 Inspection conditions. Unless otherwise specified, excluded, amended, modified or qualified in this specification or applicable procurement documents (see 6.2), all inspections shall be performed in accordance with all the requirements of referenced documents.

4.3 First article inspection. A first article, submitted in accordance with 3.1, shall be inspected, examined for appearance, color and finished defects listed in 4.5 and tested for the characteristics as specified in 4.6.

4.4 Conformance inspection. Conformance inspection (see 3.2) shall include the visual examination of 4.5 and the tests of 4.6, as applicable. Sampling for inspection shall be performed in accordance with ASQ/ANSI Z1.4 and with acceptance quality limits (AQLs) as specified in the contract and/or order, except where otherwise indicated (see 6.2).

4.5 Visual examination. Each roll in the sample shall be examined yard-by-yard (full width excluding selvage) on the face side only with both overhead and back lighting. The defects are as defined in Table III below, and in accordance with Table I of MIL-STD-3064. Only defects that are clearly noticeable at normal inspection distance (3-feet) shall be scored. Demerit points are assigned in accordance with ASTM D5430, Option A, with the exceptions listed below:

a. The defects found shall be counted regardless of their proximity to each other, except where two (2) or more defects represent a single local condition of the cloth, in which case only the more serious defect shall be counted.
b. Only coarse yarns that exceed twice the normal diameter shall be scored.
c. The defects specified in Table III shall be scored four (4) points for each yard in which they occur.

TABLE III. Defects.

Biased or bowed filling – distortion of two (2) or more inches from normal alignment
Fiber identification label or ticket missing (see 3.12)
Face or back markings missing (see 3.13)
Uneven weave throughout

4.5.1 Shade variation examination. During the yard-by-yard examination, each roll in the sample shall be examined for shade variation. Any roll in the sample containing uneven shade or shade variation side to side, side to center, or end to end, shall be cause for rejection of entire lot represented by the sample.

4.5.2 Shade match and appearance examination. The shade match and appearance examination shall be as specified in the contract or purchase order.

4.5.3 Length examination. For Government procurements only, during the yard-by-yard examination, each roll in the sample shall be examined for length.

4.5.3.1 Individual roll. Any length found to be less than the minimum length specified in the basic material document or more than 2 yards less than the length marked on the ticket shall be scored as a defect. The lot shall be unacceptable if two or more rolls in the sample are defective in respect to length.

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

4.6 Inspection methods.

4.6.1 End item testing. The cloth shall be tested for the characteristics listed in Table IV. The methods of testing specified, wherever applicable and as listed in Table IV shall be followed. Unless otherwise specified, tests are applicable to all classes of cloth covered by this specification. All test reports shall contain the individual values utilized in expressing the final results. The sample unit shall be five (5) continuous yards full width of the finished cloth for all physical and chemical tests. The lot shall be unacceptable if one (1) or more sample units fail to meet any requirement specified. The sample size shall be in accordance with the following, and only one sample shall be taken from each roll in the lot.

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

TABLE IV. Finished cloth tests.

Characteristic	Requirement Reference	Test method
Material composition	3.4	AATCC 20 1/
Yarm ply	3.4	Visual 2/
Visual shade matching	3.5.1	4.6.2
Colorfastness: Perspiration, acid & alkaline drycleaning one (1) cycle Crocking, wet & dry	Table I	 AATCC 15 3/ AATCC 132 3/ AATCC 8 4/
Dimensional stability after dry cleaning one (1) cycle	3.9	AATCC 158
Labile sulfur	3.5.3	4.6.3
Weight	Table II	ASTM D3776/3776M
Yarns per inch	Table II	ASTM D3775
Breaking strength	Table II	ASTM D5034
Weave	3.6.1	Visual 2/
pH	3.8	AATCC 81
Toxicity	3.10	4.6.4

1/ See 6.5.
2/ One (1) determination will be made per sample unit and result reported as “pass” or “fail”
3/ Rated using the AATCC Evaluation Procedure 1, Gray Scale for Color Change and AATCC Evaluation Procedure 2, Gray Scale for Staining
4/ Rated using the AATCC Evaluation Procedure 8, AATCC 9-Step Chromatic Transference Scale

4.6.2 Visual shade matching. The color and appearance of the finished cloth shall match the standard sample (see 6.4) when viewed using the AATCC Evaluation Procedure 9, Option C with sources simulating artificial daylight D75 illuminant with a color temperature of 7500K (± 200) illumination of 100 (± 20) foot candles, and shall be a good match to the standard sample under incandescent A illuminant with a color temperature of 2856K (± 200).

4.6.3 Presence of labile sulfur. The following procedure shall be followed to determine the presence of labile sulfur in textile materials with lead acetate. Two (2) 1.50 gram (± 0.01) gram samples from each material submitted for evaluation shall be tested. Each of the two (2) samples shall be cut into very small pieces and placed into separate test tubes. The samples shall be submersed in a stannous chloride solution that contains 100 grams of stannous chloride crystals ACS in 100 millimeters of hydrochloric acid ACS (35 percent concentration) and 50 milliliters of distilled water. A filter paper wet out with a 5.0 percent lead acetate solution shall be placed over the top of the test tube. The lead acetate solution contains 5.0 grams of lead acetate CP reagent grade and enough distilled water to make up a 100 milliliter solution; if the solution is not clear, add a few drops (one at a time) of glacial acetic acid until the solution is clear. The test tube containing the textile sample, stannous chloride and wet filter paper shall be heated over a low flame until the solution is boiling. The solution should not be heated for more than 15 seconds. A brown to black stain on the filter paper should be evaluated as follows.

Free	-	The filter paper shows no discoloration of staining of any kind.
Slight	-	The filter paper shows a light tan to light brown discoloration stain.
Moderate	-	The filter paper shows a dark brown discoloration stain.
Severe	-	The filter paper shows a black color stain.

4.6.4 Toxicity test. When required, (see 6.2), an acute dermal irritation study and a skin sensitization study shall be conducted. When the results of these studies indicate the finished cloth is not a sensitizer or irritant, a Repeat Insult Patch Test shall be performed in accordance with the Modified Draize Procedure (see 2.3). If the toxicity requirement (see 3.10) can be demonstrated with historical use data, toxicity testing may not be required.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). 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 Intended use. The cloth is intended for use in the manufacture of military dress apparel for wear by male and female personnel. The fabric is commonly used for lining coats and headwear, as well as other dress uniform applications.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Class of cloth required (see 1.2).
c. The specific issue of individual documents referenced (see 2.2).
d. When first article is required (see 3.1).
e. Color required (see 3.5).
f. Length and width required if other than specified (see 3.11).
g. Conformance inspection acceptance quality limits (AQL) (see 3.14 and 4.4)
h. Inspection conditions (see 4.2)
i. When toxicity testing is required (see 4.6.4)
j. Packaging (see 5.1)

6.3 First article. When first article inspection is required (see 3.1), it will be inspected and approved under the appropriate provisions of FAR 52.209-4. 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 acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

6.4 Standard sample. For access to samples, address the contracting activity issuing the invitation for bids or request for proposal.

6.5 Certificate of compliance. The contracting activity may select to accept a certificate of compliance for stated requirement.

6.6 SDL Atlas. Fabric Defect Replica Scales are available for purchase from SDL Atlas. Contact Customer Service 1-803-329-2110 and request item number 402985 – Slub/Knob Replica Set.

6.7 Subject term (key word) listing.

5-Harness
Lining

6.8 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

6.9 Domestic Non-availability Determination (DNAD). As of the publication of this specification, a Domestic Non-Availability Determination (DNAD), signed 20 July 2001, has been made that covers rayon yarn. Vendors are advised to verify that this DNAD is still active and valid prior to using non-domestically sourced rayon yarn.

Custodian:
Army - GL
Navy – NU
Air Force – 11

Preparing activity:
DLA-CT

(Project 8305-2019-027)

Reviewing Activities:
Navy – MC

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using ASSIST online database at https://assist.dla.mil.