

MIL-C-332H
 17 October 1986
 SUPERSEDING
 MIL-C-332G
 13 September 1973

MILITARY SPECIFICATION

CLOTH, BALLOON, COTTON

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

1. SCOPE

1.1 Scope. This document covers cotton balloon cloth.

1.2 Classification. The cloth shall be of the following types and classes as specified (see 6.2):

Type I	- 3.9 ounces
Type III	- 2.25 ounces
Type IV	- 3.6 ounces
Class 1	- Unbleached
Class 2	- Dyed and finished

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Documents. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to U.S. Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5014, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 8305

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

MIL-C-332H

SPECIFICATIONS

FEDERAL

- V-T-276 - Thread, Cotton
- PPP-P-1134 - Packaging of Cotton and Cotton-Synthetic Fiber Blend Fabrics (Excluding Duck Fabrics)

STANDARDS

FEDERAL

- FED-STD-4 - Glossary of Fabric Imperfections
- FED-STD-191 - Textile Test Methods

(Copies of documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.1.2 Other Government documents. The following other Government documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

Rules and Regulations Under the Textile Fiber Products Identification Act

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

* 2.2 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 shall take precedence. Nothing in this document, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

* 3.1 Standard sample. Unless otherwise indicated (see 3.3.2), the dyed and finished cloth shall match the standard sample for shade and appearance. The cloth shall be equal to or better than the standard sample with respect to all characteristics for which the standard sample is referenced (see 6.3).

3.2 Material.

3.2.1 Yarn. The yarn shall be made from cotton that has been carded, combed, drawn, and spun into singles yarn.

MIL-C-332H

3.3 Color. The color of the class 2 cloth shall be as specified and shall match the standard sample (see 6.2, 6.3, and 6.4). The use of dyes and compounds containing elementary sulfur capable of oxidation to sulfuric acid is prohibited. The dyestuffs shall be chosen and applied so that the dyed and finished cloth shall show no more labile sulfur than shown by the standard sample when tested as specified in 4.2.3. When a standard sample is not available, the dyed and finished cloth shall show not more than a slight trace of labile sulfur as defined in the test method when tested as specified in 4.2.3.

3.3.1 Matching. The finished cloth shall match the standard sample when viewed under filtered tungsten lamps that approximate artificial daylight and that have a correlated color temperature of $7000 \pm 500\text{K}$ with illumination of 100 ± 20 foot candles. The color shall be a good match to the standard sample under incandescent lamplight at $2300 \pm 100\text{K}$.

3.3.2 Colorfastness. The dyed and finished cloth shall show fastness to wet drycleaning, laundering (after 3 cycles), and light equal to or better than the standard sample or equal to or better than a rating of "good" when tested as specified in 4.2.3

3.4 Physical requirements. The finished cloth shall conform to the requirements specified in table I when tested as specified in 4.2.3.

TABLE I. Physical requirements

Type	Class	Weight per square yard (ounces), maximum	Yarns per inch, minimum		Breaking strength (pounds), minimum		Weave
			Warp	Filling	Warp	Filling	
I	1	3.90	124	118	70	70	Plain
I	2	3.90	126	112	63	63	Plain
III	1	2.25	116	124	40	40	Plain
III	2	2.25	120	120	35	35	Plain
IV	1	3.60	96	100	55	55	Plain
IV	2	3.60	100	95	50	50	Plain

MIL-C-332H

* 3.4.1 Width. The width of the cloth shall be as specified (see 6.2) and shall be the minimum acceptable width inclusive of the selvage when fly shuttle looms or shuttleless looms with tuck-in selvage looms are used. For all other shuttleless looms, the width measurement shall be made between the last warp yarn on each side excluding the protruding fringe(s).

3.5 Finish. The class 1 cloth shall be unbleached. The class 2 cloth shall be singed before dyeing or finishing.

3.5.1 Nonfibrous material. The starch and protein content, including chloroform-soluble and water-soluble material, of the finished cloth shall not exceed 2.0 percent when tested as specified in 4.2.3. When water repellent finish is specified, determination shall be made prior to application of the water repellent treatment.

3.6 Water repellency (type I, class 1 and types III and IV, classes 1 and 2). When specified (see 6.2), the cloth shall be given a nondurable water repellent finish. The measurements of the three individual determinations on the sample unit for spray rating shall be equal to or better than 90, 90, 80 before weathering and equal to or better than 80, 80, 80 after 40 hours weathering, when tested as specified in 4.2.3.

3.7 Water repellency (type I, class 2). When specified (see 6.2), the cloth shall be given an approved durable water repellent treatment (see 6.5) and shall conform to the water repellency requirements of 3.7.1 through 3.7.3 when tested as specified in 4.2.3.

3.7.1 Spray rating (type I, class 2). The measurements of the three individual determinations on the sample unit for initial spray rating, shall be equal to or better than 90, 90, 80.

* 3.7.2 Hydrostatic pressure (type I, class 2). The initial hydrostatic pressure shall be not less than 30cm for the average of the sample units, with no sample unit less than 25cm. After laundering, the hydrostatic pressure shall be not less than 20cm for the average of the sample units, with no sample unit less than 18cm.

* 3.7.3 Dynamic absorption (type I, class 2). The initial dynamic absorption shall be not more than 25 percent for the average of the sample units, with no sample unit greater than 30 percent. After laundering, the dynamic absorption shall be not more than 35 percent for the average of the sample units, with no sample unit greater than 40 percent.

* 3.8 pH. The pH value of the finished cloth shall be no lower than 5.0 nor higher than 8.5 when tested as specified in 4.2.3.

MIL-C-332H

* 3.9 Dimensional stability. When specified (see 6.2), the cloth shall be preshrunk and shall not shrink or elongate in either the warp or the filling direction greater than 2.0 percent for the individual sample unit and 1.5 percent for the average of the sample units (lot average), when tested as specified in 4.2.3. The preshrinkage process used shall not be identified by name or trademark on either the cloth, ticket, or package.

3.10 Seam efficiency. The cloth shall have a seam efficiency of not less than 85 percent when tested as specified in 4.2.3.

3.11 Down and feather retention. When specified (see 6.2), the cloth shall show a rating not less than "satisfactory" for down and feather retention when tested as specified in 4.2.3.

3.12 Length and put-up. Unless otherwise specified (see 6.2), the cloth shall be in continuous lengths, each not less than 40 yards. Each length shall be put-up on full width rolls as specified in 5.1.

3.13 Fiber identification. Each piece of cloth shall be labeled, ticketed, or invoiced for fiber content in accordance with the Rules and Regulations Under the Textile Fiber Products Identification Act.

3.14 Face identification. The face side of the cloth shall be identified by applying a stamping on that side of the cloth with the word "FACE" at each end of the piece.

3.15 Workmanship. The finished cloth shall conform to the quality established by this document. The demerit points per 100 square yards when calculated as specified in section 4 shall not exceed the established maximum point value.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor 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 this document where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

MIL-C-332H

* 4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this document shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirement in the document shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.1.2 Certificates of compliance. When certificates of compliance are submitted, the Government reserves the right to inspect such items to determine the validity of the certification.

4.2 Quality conformance inspection.

4.2.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected in accordance with all the requirements of referenced documents unless otherwise excluded, amended, modified, or qualified in this document or applicable purchase document.

4.2.2 End item examination.

4.2.2.1 Yard-by-yard examination. Each roll in the sample shall be examined on the face side only. When the total yardage in the roll does not exceed 100 yards, the entire yardage in the roll shall be examined. When the total yardage in the roll exceeds 100 yards, only 100 yards shall be examined. All defects as defined in Section I of FED-STD-4 that are clearly noticeable at normal inspection distance (3 feet) shall be scored and assigned demerit points as listed in 4.2.2.1.1 except that only those slubs and knots which exceed the maximum limits shown on Sears Fabrics Defect Scales (see 6.6) D or 3 1/2, as applicable, for slubs and C or 4, as applicable, for knots shall be scored. No linear yard shall be penalized more than four points. The sample size shall be 20 rolls selected from 20 containers. The lot shall be unacceptable if the points per 100 square yards of the total yardage examined exceeds the following applicable point value:

30.0 points for class 1 cloth
25.0 points for class 2 cloth

The lot shall be unacceptable if the points per 100 square yards of two or more individual rolls exceed the following applicable point value:

45.0 points for class 1 cloth
38.0 points for class 2 cloths

MIL-C-332H

If one roll exceeds 45.0 (class 1) or 38.0 (class 2) points per 100 square yards, a second sample of 20 rolls shall be examined for individual roll quality only. The lot shall be unacceptable if one or more rolls in the second sample exceeds 45.0 (class 1) or 38.0 (class 2) points per 100 square yards. Point computation for lot quality and individual roll quality shall be as follows:

<u>Total points scored in sample x 3600</u>	= Points per 100
<u>Contracted width of cloth (inches) x Total yards inspected</u>	square yards

4.2.2.1.1 Demerit points. Demerit points shall be assigned as follows:

For defects up to and including 3 inches in any dimension	- one point
For defects exceeding 3 inches but not exceeding 6 inches in any dimension	- two points
For defects exceeding 6 inches but not exceeding 9 inches in any dimension	- three points
For defects exceeding 9 inches in any dimension	- four points

The following defects, when present, shall be scored four points for each yard in which they occur:

- Baggy, ridgy, or wavy cloth
- Objectionable odor
- Width less than specified
- Poor dye penetration, mottled, streaky, or cloudy
- Excessive neppiness
- Not singed (class 2)

4.2.2.2 Length examination. During the yard-by-yard examination, each roll in the sample shall be examined for length. Any length found to be less than the minimum specified or more than 2 yards less than the length marked on the ticket shall be considered a defect with respect to length. The lot shall be unacceptable if two or more rolls in the sample are defective with respect to length or if the total of the actual lengths of rolls in the sample is less than the total of the lengths marked on the tickets.

4.2.2.3 Shade and appearance examination. During the yard-by-yard examination, each roll in the sample shall be examined for shade and finish appearance. Any roll in the sample that is off shade, shaded side to side, shaded side to center, shaded end to end, or does not have the same appearance as the standard sample shall be cause for rejection of the entire lot represented by the sample.

MIL-C-332H

4.2.2.4 Roll identification examination. During the yard-by-yard examination, each roll in the sample shall be examined for the defects listed below. The lot shall be unacceptable if two or more pieces in the sample contain one or more of the following defects:

Face identification missing from either or both ends
 Preshrinkage process identified by name or trademark on cloth or ticket
 Not labeled or ticketed in accordance with the Rules and Regulations Under the Textile Fiber Products Identification Act

* 4.2.3 End item testing. The cloth shall be tested for the characteristics listed in table II. The methods of testing specified in FED-STD-191, wherever applicable, and as listed in table II shall be followed. The physical and chemical values specified in section 3, except where otherwise specified, apply to the results of the determinations made on a sample unit for test purposes as specified in the applicable test method. The sample unit shall be as follows:

- a. Four yards width of the finished cloth when either dimensional stability or down and feather retention is required.
- b. Five yards full width of the finished cloth when both dimensional stability and down and feather retention are required.
- c. Two yards full width of the finished cloth for all other conditions.
- d. For (a) and (b), one-fourth yard, full width of the cloth prior to application of the water repellent treatment, shall also be included in the sample unit for determination of nonfibrous material content.

The lot shall be unacceptable if one or more sample units or the lot average, as applicable, fails to meet any specified test requirement. The sample size shall be in accordance with the following:

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

MIL-C-332H

TABLE II. End item tests

Characteristics	Requirement reference	Test method
Material (combed cotton yarn)	3.2.1	1200 <u>1/</u>
Presence of labile sulfur	3.3	2020 <u>1/</u>
Colorfastness to:		
Wet drycleaning	3.3.2	5622
Laundering (after 3 cycles)	3.3.2	5610
Light	3.3.2	5660
Weave	3.4	Visual <u>2/</u>
Weight	3.4	5041
Yarns per inch	3.4	5050
Breaking strength	3.4	5100
Nonfibrous material	3.5.1	2611
Water repellency (except type I, class 2):		
Spray rating, initial	3.6	5526
Spray rating, after accelerated weathering	3.6	5671, 5526
Water repellency (type I, class 2):		
Spray rating, initial	3.7.1	5526
Hydrostatic pressure:		
Initial	3.7.2	5514
After laundering	3.7.2	5518, 5514
Dynamic absorption:		
Initial	3.7.3	5500
After laundering	3.7.3	5518, 5500
pH	3.8	2811
Dimensional stability	3.9	5550
Seam efficiency	3.10	5110 <u>3/</u>
Down retention	3.11	5530

1/ Unless otherwise specified, a certificate of compliance shall be submitted and will be acceptable for the stated requirement.

2/ One determination shall be made on each sample unit and the results reported as "pass" or "fail".

MIL-C-332H

3/ The needle shall measure 0.040 inch (plus or minus 0.001 inch) across the blade at the eye. The cotton thread shall be type IA1 conforming to V-T-276, ticket No. 40, 3 ply in the needle and ticket No. 60, 3 ply in the looper.

* 4.2.4 Packaging examination. The examination shall be in accordance with the quality assurance provisions of PPP-P-1134.

* 5. PACKAGING

5.1 Put-up and preservation. Put-up and preservation shall be level A or Commercial, as specified (see 6.2).

5.1.1 Levels A and Commercial. The cloth shall be put-up and preserved in accordance with the applicable requirements of PPP-P-1134.

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

5.2.1 Levels A, B, and Commercial. The cloth shall be packed in accordance with the applicable requirements of PPP-P-1134.

5.3 Marking. In addition to any special marking required in the contract or purchase order, shipments shall be marked in accordance with the requirements of PPP-P-1134.

6. NOTES

6.1 Intended use. The cloth is intended for use in the manufacture of clothing and equipage items. A specific use of type I cloth is for sleeping bags.

6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number, and date of this document.
- b. Type and class of cloth required (see 1.2).
- c. Color, when required (see 3.3).
- d. Width of cloth required (see 3.4.1).
- e. Nondurable water repellent treatment, when required (see 3.6).
- f. Durable water repellent treatment (type I, class 2), when required (see 3.7).
- g. Preshrinkage, when required (see 3.9).
- h. Down retention, when required (see 3.11).

MIL-C-332H

- i. Length required if other than specified (see 3.12).
- j. Selection of applicable levels of preservation and packing (see 5.1 and 5.2).

6.3 Sample. For access to samples, address the contracting activity issuing the invitation for bids (see 3.1).

6.4 Dye formulation, Olive Green. A suggested but not mandatory dyestuff formulation of Olive Green 107 is as follows:

Vat Black 25, C.I. 69525
 Vat Green 3, C.I. 69500
 Vat Green 8, C.I. 71050

Shaded with either or both of the following:

Vat Brown 3, C.I. 69105
 Vat Yellow of suitable fastness

6.5 Water repellent. Because of the time necessary to conduct full evaluation, only those chemical treatments already approved and so listed in the invitation for bids or request for proposal shall be considered acceptable for the related acquisition.

6.6 Fabric defect scales. Fabric Defect Replica Kits are available from:

Sears, Roebuck and Company
 Dept. 817, ATTN: BSC 23-29
 Sears Tower
 Chicago, IL 60684

* 6.7 Subject term (key word) listing.

Cloth, balloon
 Cotton
 Equipage items
 Water repellency

6.8 Changes from previous issue. The margins of this document 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, as written, irrespective of the marginal notations and relationship to the last previous issue.

MIL-C-332H

Custodians:

Army - GL
Navy - NU

Preparing activity:

Army - GL
Project No. 8305-0095

Review activity:

Army - MD

User activity:

Navy - MC

INSTRUCTIONS In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge (*DO NOT STAPLE*), and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

NOTE This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

(Fold along this line)

(Fold along this line)

DEPARTMENT OF THE ARMY

US Army Natick Research and Development Center
Natick, Massachusetts 01760



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE \$300
STRNC-ES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO 12082 WASHINGTON D C
POSTAGE WILL BE PAID BY THE DEPARTMENT OF THE ARMY

Commander
US Army Natick Research and Development Center
ATTN: STRNC-ES
Natick, MA 01760



