

INCH-POUND

MIL-STD-3064

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DEPARTMENT OF DEFENSE
STANDARD PRACTICE

EVALUATION OF QUALITY
OF TEXTILE MATERIALS



AMSC N/A

FSC 8305

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Foreword

1. This standard is approved for use by all Departments and Agencies of the Department of Defense (DoD).
2. This standard provides the following information:
 - A standard test method for visually inspecting and grading fabrics using the demerit point system and standard terminology relating to fabric defects.
 - Defect tables for six (6) types of materials as follows:
 - Type I - Solid colors and printed fabrics
 - Type II - Coated fabrics
 - Type III - Laminated fabrics
 - Type IV - Webbing, braids, tapes, and elastics
 - Type V - Knits
 - Type VI - Threads.
 - A list of exceptions to ASTM D5430, Option A.
3. Comments, suggestions or questions on this document should be addressed to: Attn: DLA Troop Support, 700 Robbins Street, Philadelphia, PA 19111-5096. Since contact information can change, you may want to verify the currency of this address information using Acquisition Streamlining and Standardization Information System (ASSIST) online database at <https://assist.dla.mil>.

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1. SCOPE

1.1 Purpose: The purpose of this standard is to provide standardized examination provisions for evaluating quality of textile materials: including selected fabrics, cloths, webbings, braids, tapes, elastics, knits, and threads that are the basic materials for quality uniform and individual equipment items.

1.2 Scope. This standard covers the inspection provisions requirements for textile materials (woven fabrics, webbings, knits, threads, etc.) used in military clothing and individual equipment items.

1.3 Classification. Inspection provisions are provided for the following types for use in the inspection of various textile materials, as specified (see 6.2).

Type I - Solid colors and printed fabrics

Type II - Coated fabrics

Type III - Laminated fabrics

Type IV - Webbings, braids, tapes, and elastics

Type V - Knits

Type VI - Threads.

1.4 Applicability. The inspection provisions cited in this standard can be used by all Services to inspect textile materials used in clothing and individual equipment items.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4 and 5 of this standard. This section does not include documents cited in other sections of this standard 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, 4 and 5 of this standard, whether or not they are listed.

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 are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-1487 – Glossary of Cloth Coating Imperfections

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

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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.

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 SOCIETY FOR QUALITY (ASQ)

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

(Copies are available online at <https://www.asq.org>.)

ASTM INTERNATIONAL

ASTM D3990 – Standard Terminology Relating to Fabric Defects

ASTM D5430 – Standard Test Method for Visually Inspecting and Grading Fabrics

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

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. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. DEFINITIONS.

3.1 Textile material defects. A textile material defect is defined as an abnormality or imperfection in the material. Defect definitions applicable to this standard are as described in ASTM D3990 - Standard Terminology Relating to Fabric Defects and MIL-STD-1487 – Military Standard Glossary of Cloth Coating Imperfections.

3.2 Textile materials. Textile materials covered by this document are woven fabrics, webbings, braids, tapes, elastics, knits, and threads.

3.3 Coated fabric. A fabric to which a viscous polymeric layer is applied directly to one (1) or both surfaces of the fabric.

3.4 Laminated fabric. A fabric that consists of two (2) or more layers, one (1) of which is a textile fabric, bonded to one (1) or more component layers such a polymer film or membrane by using adhesives or by using heat and pressure.

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4. GENERAL REQUIREMENTS.

4.1 General. This standard contains provisions for visual examination of defects in fabrics (cloths, narrow fabrics such as webbings) and threads. The demerit 4-point system shall be used for visually inspecting and grading fabrics and threads. The ASTM D5430 - Standard Test Method for Visually Inspecting and Grading Fabrics shall be used to establish numerical designations for grading of fabrics from a visual inspection. This method includes the description of a suitable apparatus, suggested lighting conditions and proper procedure used to conduct the inspection.

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

5. DETAILED REQUIREMENTS.

5.1 Yard-by-yard examination. Each roll or spool in the sample shall be examined yard-by-yard on the face side or face and back as deemed necessary for defects. The defects shall be defined in ASTM D3990 and only defects that are clearly noticeable at normal inspection distance (3 feet) shall be scored. The defects shall be assigned demerit points 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 fabrics (cloths, knits, narrow fabrics such as webbings) and threads, in which case only the more serious defect shall be counted.

b. Only coarse yarns that exceed twice or more the normal diameter shall be scored.

c. Mixed filling shall be scored only if attributed to shade bar resulting from wrong ply, wrong twist in the yarn or off shade yarn.

d. The defects for each type as specified in Tables I-VI shall be scored four (4) points for each yard in which they occur.

e. Additional relevant defects can be added.

5.2 Four (4) point defects. Table I-VI list defects to be scored four (4) points for each respective type of material.

5.2.1 Type I - Solid colors and printed fabrics. All defects listed in Table I for solid colors and printed fabrics are scored four (4) points.

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TABLE I. Solid colors and printed fabric defects.

Defect Description
Any hole, cut, tear, abrasion mark.
Edge ravel when pulled outward.
Broken or missing yarn.
Any spot, stain or streak more than 1-inch in combined directions.
Knots greater than Fabric Defect Replica Scale Level C for dress uniforms and D for combat uniforms (see 2.3)
Slubs greater than Fabric Defect Replica Scale Level E for dress uniforms and F for combat uniforms (see 2.3)
Color not a good match to reference.
Any area of poor dye penetration, streak or shade bar that is 9-inches or less. Defective shade areas that are greater than 9-inches constitute a failure (when applicable).
Width not as specified within a tolerance of less than 1/2-inch.
Objectionable odor.
Slack or tight selvages.
Any embedded foreign matter or uncleanness.
Edges rolled folded, creases, scalloped or corded, baggy, ridgy or wavy cloth.
Tackiness (sticky to touch).

5.2.2 Type II - Coated fabrics. All defects listed in Table II for coated fabrics are scored four (4) points.

TABLE II. Coated fabric defects.

Defect Description
Any hole, cut, pinhole, tear, abrasion mark.
Edge ravel when pulled outward.
Broken or missing yarn.
Any spot, stain or streak more than 1-inch in combined directions.
Uneven or non-uniform coating application, streaky coating application, excessive coating, insufficient coating, thin area, blisters.
Uneven coating adhesion, mottled, brittle coating, strike through, soft coating.
Coating delamination, separation of coating from base cloth.
Tackiness (sticky to the touch from uncured coating).
Excessive dusting material (when applicable).
Color not a good match to reference.
Any area of poor dye penetration, streak or shade bar that is 9-inches or less. Defective shade areas that are greater than 9-inches constitute a failure.
Width not as specified within a tolerance of less than 1/2-inch.
Knots greater than Fabric Defect Replica Scale Level D (see 2.3)

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TABLE II. Coated fabric defects. - (Continued)

Slubs greater than Fabric Defect Replica Scale Level F (see 2.3)
Any embedded foreign matter or uncleanness.
Objectionable odor.
Edges rolled folded, creases, scalloped or corded, baggy, ridgy or wavy cloth.

5.2.3 Type III - Laminated fabrics. All defects listed in Table III for laminated fabrics are scored four (4) points.

TABLE III. Laminated fabric defects.

Defect Description
Any hole, cut, pinhole, tear, abrasion mark.
Edge ravel when pulled outward.
Broken or missing yarn.
Any spot, stain or streak more than 1-inch in combined directions.
Uneven or non-uniform lamination application.
Any pit, blister, tunnel bubbles or delamination of component layers.
Delamination, separation of film polymer from base cloth.
Crease or wrinkle resulting in doubling or adhesion of surfaces that cannot be corrected by manual pressure, adhesion of surfaces against each other or any distortion of face side surface.
Color not a good match to reference.
Any area of poor dye penetration, streak or shade bar that is 9-inches or less. Defective shade areas that are greater than 9-inches constitute a failure.
Width not as specified within a tolerance of less than 1/2-inch.
Objectionable odor.
Knots greater than Fabric Defect Replica Scale Level D (see 2.3)
Slubs greater than Fabric Defect Replica Scale Level F (see 2.3)
Any embedded foreign matter or uncleanness.
Edges rolled folded, creases, scalloped or corded, baggy, ridgy or wavy cloth.

5.2.4 Type IV - Webbing, braids, tapes, and elastics. All defects listed in Table IV are scored four (4) points.

TABLE IV. Webbing, braids, tapes and elastics defects.

Defect Description
Any hole, cut, tear, abrasion mark.
Edge ravel when pulled outward.
Broken or missing yarn.

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TABLE IV. Webbings, braids, tapes and elastics defects. (Continued).

Any spot, stain or streak more than 1-inch in combined directions.
Coarse or light filling bar resulting in noticeable difference in stiffness and thickness and extending for more than 1/4-inch in the length direction.
The [<i>webbing, braid, tape, or elastic</i>] will not lie flat due to twist or distortion.
Floats and skips that are over 1-inch.
Hitch-back crack; light or heavy places resulting from opening between adjoining picks.
Kinks – more than three (3) kinks in any 9-linear inches.
Knots – more than one (1) knot in any 9-linear inches.
Uneven width or width not as specified within a tolerance of $\pm 1/16$ inch.
Color not a good match to reference.
Any area of poor dye penetration, streak or shade bar that is 9-inches or less. Defective shade areas that are greater than 9-inches constitute a failure.
Objectionable odor.
Any embedded foreign matter or uncleanness.
Edges rolled folded, creases, scalloped or corded, baggy, ridgy or wavy.

5.2.5 Type V - knits. All defects listed in Table V are scored four (4) points.

TABLE V. Knit defects.

Defect Description
Any hole, cut, tear, abrasion mark, snag.
Edge ravels when pulled outward.
Skewing.
Broken or missing yarn, dropped stitch, run.
Any spot, stain or streak more than 1-inch in combined directions.
Any mend.
Stretch (stitch tension) knitting tension too high or too loose, washboards.
Coarse or fine yarns resulting in noticeable difference in appearance stiffness and thickness.
Twist yarn.
Kinks or untrimmed ends.
Knots greater than Fabric Defect Replica Scale Level D (see 2.3).
Slubs greater than Fabric Defect Replica Scale Level F (see 2.3).
Width not as specified within a tolerance of not less than 1/2-inch.
Color not a good match to reference, barre.
Any area of poor dye penetration, streak or shade bar that is 9-inches or less. Defective shade areas that are greater than 9-inches constitute a failure.
Objectionable odor.
Slack or tight selvages (when applicable).
Any embedded foreign matter or uncleanness.
Edges rolled folded, creases, scalloped or cockled, baggy, ridgy or wavy knit.

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5.2.6 Type VI - Threads. All defects listed in Table VI are scored four (4) points.

TABLE VI. Thread defects.

Defect Description
Any cut, chafe, slip, spots, stains and lint.
Loose or unattached ply
Unevenly spun, twisted or plied
Not continuous length
Number of plies not as specified.
Knots and splices averaging more than one (1) full thread knot or splice per 1000 yards
Color not uniform, uneven. Apparent on successive layers or end to end.
Objectionable odor.
Any embedded foreign matter or uncleanness.
Tackiness – strands adhere to each other or to holder affecting unwinding tension.
Not firmly wound resulting in knots, kinks, entangling, or slippage during unwinding.

5.3 Roll examination.

5.3.1 Roll examination. During the yard-by-yard examination each roll or spool in the sample shall be examined for defects listed below in Table VII. The lot shall be unacceptable if two (2) or more of the following defects are present in the sample:

TABLE VII - Roll examination defects

Defect Description
Back or face stamping missing, incorrect or illegible from either or both ends, or bleed through occurring.
Back or face stamping on wrong side.
Not labeled or ticketed in accordance with the Rules and Regulations under the Textile Fiber Products Identification Act.
Edge of roll build-up, or softness of roll in body of cloth.

5.4 Shade variation examination. During the yard-by-yard examination, each roll or spool in the sample shall be examined for shade variation. Any roll or spool 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.

5.5 Length examination. During the yard-by-yard examination, each roll in the sample shall be examined for length.

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5.5.1 Individual roll. Any length found to be 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 (2) or more rolls in the sample are defective in respect to length.

5.5.2 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.

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

5.7 Inspection procedures. Sampling for inspection shall be conducted in accordance with ANSI/ASQ Z1.4 – Sampling Procedures and Tables for Inspection of Attributes. The inspection level and acceptance quality limits shall be as specified in the contract purchase order.

6. NOTES

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

6.1 Intended use. To provide a standardized examination procedure for evaluating quality of textile fabrics (cloths, narrow fabrics such as webbings) and threads that are used on military clothing and individual equipment items. These defects are typical defects in the manufacturing of these fabrics and threads.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this standard
- b. Type of material defects required.
- c. The specific issue of individual documents referenced (see 2.3)

6.3 Replica set. The SDL Atlas Slub/Knot Replica Set is not available from their website at this time. Recommend calling customer service, 1-803-329-2110.

6.4 Subject term (key word) listing.

Examination
Fabric defect
Inspection

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Custodians:
Army – GL
Navy – NU
Air Force – 11

Preparing activity:
DLA - CT

Review activities:
Army- MD
Navy – MC, CG1

(Project 8305-2019-005)

Civil agencies:
GSA – FAS

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