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Superseding
MIL-I-6903B
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MILITARY SPECIFICATION

INK, MARKING (FOR PARACHUTES AND OTHER TEXTILE ITEMS)

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

1. SCOPE

1.1 Scope. - This specification covers permanent and colorfast marking ink for fabrics and webbing.

1.2 Classification. - The ink shall be of four types and shall be furnished in colors, as specified by the procuring activity (see 6.2):

Type I - Stamp pad
Type II - Felt tip
Type III - Ball point
Type IV - Stencil

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

SPECIFICATIONS

Federal

TT-I-600	Inking Pad, Rubberstamp
PPP-T-45	Tape, Gummed, Paper, Reinforced and Plain, for Sealing and Securing
CCC-T-191	Textile Test Methods
PPP-B-636	Box, Fiberboard

Military

MIL-W-4088	Webbings, Textile, Woven Nylon
MIL-C-7020	Cloth, Nylon, Parachute
MIL-C-7219	Cloth, Duck, Nylon, Parachute Packs

FGS 7510

STANDARDS

Military

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage

(Copies of specifications and standards required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 Material. - The ingredients used in the manufacture of these products shall be of a high quality and suitable for the purpose intended.

3.2 Thinner. - When specified, a thinner suitable for use with the ink, and instructions for its use, shall be furnished with the ink. The thinner, when used in the ink as directed, shall not affect the performance qualities of the ink (see 6.2).

3.3 Color. - The color of the ink shall be as specified (see 6.2). Unless color standards are specified or are included with the order, the ink need only comply with the generic requirements for color, e.g., light blue, orange-yellow, or black.

3.4 Marking characteristics. -

3.4.1 Legibility. - When tested as specified in 4.3.3, the marking ink shall produce a dry, sharp, legible impression of uniform intensity on nylon cloth, nylon duck, and nylon webbing.

3.4.2 Drying time. - When tested as specified in 4.3.3, impressions of marking ink shall dry within 10 seconds after stamping on nylon cloth, nylon duck, and nylon webbing.

3.5 Stability characteristics. -

3.5.1 Exposure stability. - When tested as specified in 4.3.4, the type I marking ink, when applied to a stamp pad, shall not harden or form a crust upon exposure to the atmosphere for 6 hours. At the end of this time the marking ink shall produce a sharp, legible impression of uniform intensity.

3.5.2 Storage stability. - When tested as specified in 4.3.2, the ink shall show no livering, curdling or excessive bodying. After the completion of this test the marking ink shall produce sharp, legible impressions.

3.6 Effect on breaking strength of nylon cloth or webbing. -

3.6.1 Breaking strength. - When tested as specified in 4.3, the breaking strength of the marked nylon cloth (warp and filling) and nylon webbing shall be not less than 95 percent of the breaking strength of the unmarked specimens.

3.6.2 Weathering. - When tested as specified in 4.3, the breaking strength of the marked nylon cloth (warp and filling) and nylon webbing, after being subjected to accelerated weathering for 80 hours, shall be not less than 90 percent of the breaking strength of the unmarked samples subjected at the same time to the same conditions as marked cloth and marked webbing.

3.6.3 Distillation test. - When tested as specified in 4.3.5, the breaking strength of the unmarked cloth (warp and filling), which has been immersed in the distillate obtained from a steam distillation of the marking ink, shall be not less than 90 percent of its original breaking strength.

3.6.4. Oven aging. - The breaking strength of the marked nylon cloth (warp and filling), after being subjected to oven aging for 100 hours, shall be not less than 90 percent of the unmarked nylon cloth subjected at the same time under the same conditions as the marked cloth (see 4.3.6).

3.7 Fastness characteristics. -

3.7.1 Fastness to light. - When tested as specified in 4.3, the impressions made on nylon cloth for weathering (see 3.6.2) shall be examined for light fastness and shall show not less than fair fastness to light.

3.7.2 Fastness to laundering. - When tested as specified in 4.3, the impressions made on nylon cloth shall show good fastness to laundering.

3.7.3 Fastness to water and salt solution. - When tested as specified in 4.3.7 and 4.3.8, the impressions made on nylon cloth shall not run or spread.

4. QUALITY ASSURANCE PROVISIONS

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

4.2 Quality conformance inspection. - Except where otherwise indicated, inspection shall be in accordance with MIL-STD-105.

4.2.1 Examination of packaging, packing, and marking. - The packaging, packing, and marking shall be examined to determine compliance with section 5 of this specification. The lot size shall be expressed in units of shipping containers; and the sample unit shall be one shipping container, fully packed and selected prior to the sealing operation. Shipping containers fully prepared for delivery shall be examined for closure defects. Inspection level S-2 of MIL-STD-105 shall apply and the Acceptable Quality Level (AQL) shall be 4.0 defects per 100 units. Defects shall be noted as follows:

<u>Examine</u>	<u>Defect</u>
Marking (unit package and shipping container)	Not in accordance with specification requirements; omitted, incomplete, incorrect, or illegible; improper size, location, sequence or method of application.
Materials	Any component not as specified, or missing. Any component damaged, affecting serviceability. Bottle cap other than noncorrosive type.
Workmanship	Any package or container not closed properly. Bulging or distortion of the container. Ink residue on outside of bottle or tube. Bottle not securely closed; cap not tight.
Content	Bottle or tube underfilled. Bottle overfilled with absence of air space at spout. Number of bottles or tubes less than specified.

4.2.2 End-item testing. - A lot shall consist of ink of one color manufactured from one batch and offered for delivery at the same time. The lot size shall be expressed in units of one bottle or one tube. The sample unit for tests shall be a composite sample drawn in equal quantities from no less than 4 unit containers. The samples shall be tested in accordance with the performance characteristics tests (see 4.3). The lot shall be considered unacceptable if the sample unit fails to meet any of the inspection requirements as specified.

4.3 Performance characteristics tests. - The performance characteristics tests shall be conducted in accordance with the referenced test paragraphs, or methods of CCC-T-191, as specified in table I. The requirement values as specified in section 3 shall apply to the average of the determinations made on a unit of product for test purposes. When the "results reported as" column is not specified in table I, it shall be as specified by the referenced test method or paragraph.

TABLE I. Tests

Characteristics	Requirement paragraph	Test paragraph or method of CCC-T-191	Number of determinations	Results reported as
Legibility and drying	3.4.1	4.3.3	1	Pass or fail
Exposure stability	3.5.1	4.3.4	1	Pass or fail
Effect on nylon cloth initial breaking strength (unmarked and marked)	3.6.1	5104	3	<u>1</u> /
After weathering breaking strength (unmarked and marked)	3.6.2	4108 5104 <u>2</u> / 5804	3	<u>1</u> /
After distillation breaking strength (initial unmarked and subjected unmarked)	3.6.3	5104 4.3.5	3	<u>1</u> /
After oven aging	3.6.4	4.3.6	3	<u>1</u> /
<u>Permanence qualities</u>				
Fastness to light	3.7.1	<u>3</u> / 5662	3	
Laundrying	3.7.2	<u>2</u> / 5614	3	
Transference				
Water, tap	3.7.3	4.3.7	1	Pass or fail
Water, salt	3.7.3	4.3.8	1	Pass or fail

- 1/ In addition to recording actual pounds, the result shall indicate the loss in strength to the nearest 0.1 percent.
- 2/ In addition to recording the rating, the results shall indicate pass or fail regarding legibility.
- 3/ Method 5662 will be used for evaluation only. The test sample shall be the same sample used for "after weathering" (see 3.6.2).

4.3.1 Preparation for tests. - The materials and equipment necessary to prepare specimens for tests shall be as follows:

- (a) Cloth, nylon parachute, white, in accordance with type I and II of MIL-C-7020.
- (b) Cloth, nylon duck, plied yarn, for parachute packs, in accordance with type I, II, or III of MIL-C-7219.
- (c) Webbing, textile nylon, woven, natural white, in accordance with type XIII, XXII, or XXVII of MIL-W-4088.
- (d) Stamp pads in accordance with TT-I-600.
- (e) Rubber stamps containing numbers and letters of the following sizes: 1/4-inch, 1/2-inch, and 1-inch.
- (f) Application brush.

The type I ink shall be applied to the stamp pad by brushing. The saturated appearance of the cloth and the satisfactory functioning of the pad will indicate that sufficient ink has been applied. For breaking strength tests (warp and filling), specimens required shall be cut and ravelled in accordance with the applicable test method of CCC-T-191. Nylon webbing required shall be cut in accordance with the applicable test method. Sufficient specimens shall be left unmarked, and others shall be marked with a stripe of marking ink, 1/2 inch wide across the center, parallel to the short dimension. For the fastness tests, specimens of each type of nylon cloth or nylon webbing shall be marked with impressions of ink by means of the rubber stamp, stencil brush, felt tip or ball point applicators and allowed to dry at least 12 hours prior to testing.

4.3.2 Storage stability test. - A full, closed, 4-ounce container of ink, or tube of the specified size, shall be stored at a temperature of 43° C (110° F) for 100 hours. At the end of that time, the ink shall be examined for livering, curdling, or excessive bodying. The ink impressions produced with rubber stamp, stencil brush, felt tip or ball point applicators on nylon fabric shall be examined for sharpness and legibility.

4.3.3 Legibility and drying test. - Impressions shall be made on each type of nylon cloth, duck, and webbing with the rubber stamps, brush, felt tip or ball point applicator, as applicable. The impressions shall be examined for sharpness, legibility, and uniform intensity. The ink shall be considered dry if impressions do not smear when rubbed 10 seconds after impressions are made.

4.3.4 Exposure stability test (type I). Inking of the stamp pad shall be as specified in 4.3.2. The pad shall be uncovered and exposed to the atmosphere for 6 hours at 21° \pm 1° C (70° \pm 2° F) and 65 \pm 2 percent relative humidity (RH). The pad shall be examined for any hardness or crust formation. The impressions made on nylon cloth by means of rubber stamp shall be examined for sharpness, legibility, and uniform intensity.

4.3.5 Distillation test. - A 50-milliliter (ml.) sample of marking ink shall be steam distilled in an apparatus such as shown on figure 1, or its equivalent. Raveled specimens of nylon cloth and the center section of specimens of nylon webbing shall be immersed in the top layer of distillate for 1 hour, air dried, conditioned, and tested for breaking strength.

4.3.6 Oven aging. - Specimens of nylon fabric, measuring 3 by 8 inches, and 1-yard samples of nylon webbing shall be exposed in an air circulating oven at 71.1°C (160°F) for a period of 100 hours. The specimens shall then be removed, conditioned at $21^{\circ}\pm 1^{\circ}\text{C}$ ($70^{\circ}\pm 2^{\circ}\text{F}$) and 65 ± 2 percent RH, and tested for breaking strength.

4.3.7 Fastness to water. - Specimens, measuring 2 by 4 inches of white nylon cloth, and nylon duck cloth, and 1-yard samples of nylon webbing shall be prepared. These samples shall be marked with ink, allowed to dry at least 12 hours (see 4.3.2), folded several times, and soaked in tap water at $38^{\circ}\pm 1^{\circ}\text{C}$ ($100\pm 2^{\circ}\text{F}$) for 24 hours. The specimens shall be removed at the end of this period, air dried, and examined for running or spreading of the ink.

4.3.8 Fastness to salt water. - Specimens shall be prepared as specified in 4.3.7, soaked at $38^{\circ}\pm 1^{\circ}\text{C}$ ($100^{\circ}\pm 2^{\circ}\text{F}$) in a salt water solution containing 20 parts by weight of sodium chloride and 80 parts by weight of distilled water for 24 hours. The specimens shall be removed at the end of this period, air dried, and examined for running or spreading of the ink.

5. PREPARATION FOR DELIVERY

5.1 Packaging shall be level A or C (see 6.2). -

5.1.1 Level A. - Ink shall be furnished in bottles or tubes, as applicable, in the size specified by the procuring activity. The bottles or tubes shall be securely closed with noncorrosive caps. The bottles or tubes shall be packaged in a corrugated box conforming to type CF, class domestic, style TS, of PPP-B-636. Both ends of the box shall be securely sealed with paper tape conforming to PPP-T-45.

5.1.2 Level C. - Bottled ink and tubes of ink shall be packaged in accordance with the manufacturer's commercial practice.

5.2 Packing. - Packing shall be level A, B, or C (see 6.2).

5.2.1 Level A. - Twelve bottles or tubes, packaged as specified in 5.1.1, shall be packed in a fiberboard box conforming to type CF, class weather resistant, grade V3c, style RSC, of PPP-B-636. Each shipping container shall be waterproofed, closed, and reinforced with pressure-sensitive filament tape in accordance with the appendix to the container specification.

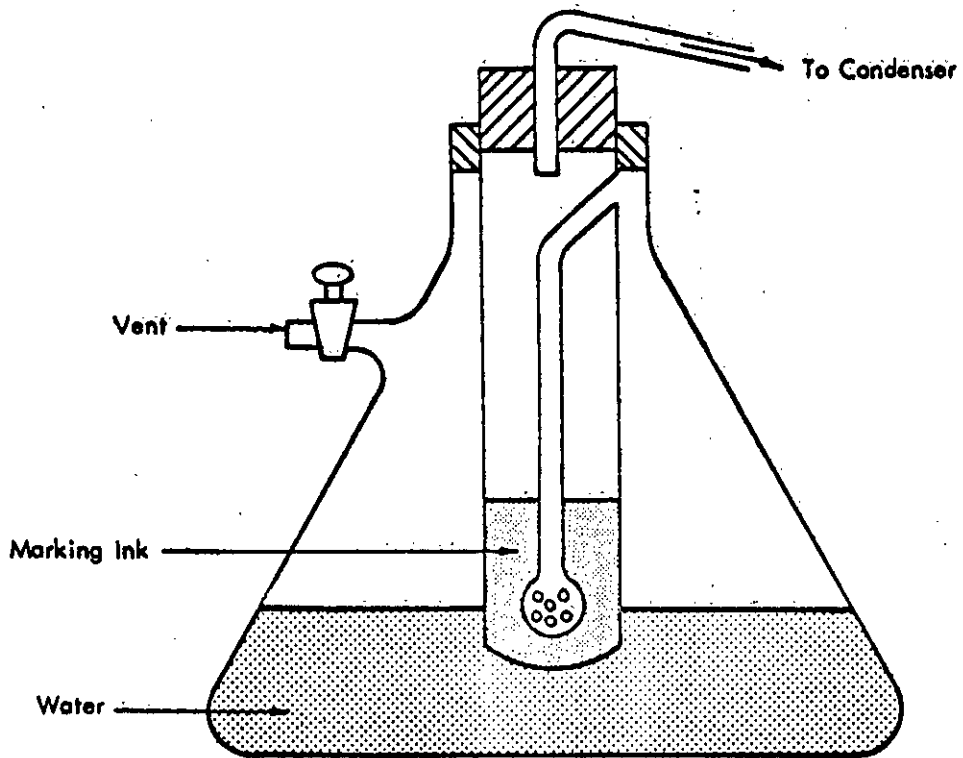


FIGURE 1. Steam distillation apparatus

5.2.2 Level B. - Twelve bottles or tubes, packaged as specified in 5.1.1, shall be packed in fiberboard boxes conforming to type CF, class domestic, style RSC, of PPP-B-636, except that the minimum bursting strength of the fiberboard shall be 275 pounds per square inch (psi). The boxes shall be closed in accordance with the container specification appendix.

5.2.3 Level C. - Bottled ink or tubes of ink shall be packed in a manner to insure carrier acceptance and safe delivery at destination at the lowest transportation rate for such supplies. Shipping containers shall comply with the rules and regulations of carriers applicable to the mode of transportation.

5.3 Marking and labeling. -

5.3.1 Labels. - The following information shall be printed in black on a white label and affixed to each bottle or tube:

Nomenclature and color of ink
 Stock number
 Volume of contents
 Manufacturer's name and location
 Contract number
 Date of manufacture (month and year)

5.3.2 Marking. - Interior boxes and shipping containers shall be marked in accordance with MIL-STD-129, except for the following special marking, when applicable, which shall be clearly indicated on the top of each shipping container:

"GLASS-THIS SIDE UP"

6. NOTES

6.1 Intended use. - The marking ink covered by this specification is intended for identifying parachute components and other items of cloth construction.

6.2 Ordering data. - Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Type of ink (see 1.2).
- (c) The amount of thinner, when necessary (see 3.2)
- (d) Color required (see 1.2 and 3.3)
- (e) Size and type of container (bottle or tube).
- (f) Levels of packaging and packing required (see 5.1 and 5.2).

Custodians:
 Army - GL
 Navy - SA
 Air Force - 84

Preparing activity:
 Navy - AS

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Reviewer activities:
 Army - GL
 Air Force - 85

User activity:
 Army - AV

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a. Paragraph Number and Wording:

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7a. NAME OF SUBMITTER (Last, First, MI) - Optional

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