

INCH-POUND

MIL-DTL-7620D

30 October 2002

SUPERSEDING

MIL-P-7620C

7 October 1982

DETAIL SPECIFICATION

PARACHUTES AND COMPONENTS, CARGO, EXTRACTION AND
DECELERATION, GENERAL SPECIFICATION FOR

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

1. SCOPE

1.1 Scope. This Specification cover cargo, extraction and deceleration parachute assemblies and components.

1.2 Classification. The classification of parachute assemblies are defined as part numbers (See 6.2).

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are cited in sections 3 and 4 of this specification. These lists do 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 these lists, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 or this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications and Standards. The following specifications and standards form a part of this document to the extent herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

Beneficial comments (recommendations, additions, deletions) and any pertinent data that may be of use in improving this document should be addressed to: Natick Soldier Center ATTN: AMSSB-RAD-AD(N), Natick, MA 01760-5017, using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 1670

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SPECIFICATIONS

FEDERAL

A-A-59291 - Ink, Marking (For Parachutes and other Textile Items)

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-849 - Inspection Requirements, Definitions and Classification of Defects in Parachutes

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 the documents that are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 6193 - Standard Practice for Stitches and Seams

ASTM D 737 - Test Methods for Air Permeability of Textile Fabrics.

(Application for copies should be addressed to the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated specifications or specification sheets), 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. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2.

3.2 Materials. Materials shall conform to the requirements of the applicable TDP, to subsidiary specifications and standards applicable thereto, and as specified herein.

3.2.1 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided

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the material meets or exceeds the operational requirements, and promotes economically advantageous to life cycle costs.

3.3 Construction. Details of construction shall be in accordance with manufacturing specifications supplied by the procuring activity, the TDP for the associated item and the additional requirements specified herein.

3.3.1 Assembly aids. Drilling, notches, stapling, basting or any other such techniques used as aids in the manufacturing process of parachutes shall be kept to a minimum, and the use thereof shall be restricted to the same limitations as marking (see 3.3.1.2). All assembly aids, such as staples, shall be removed during or after assembly.

3.3.1.1 Basting. Basting requirements shall be as specified in the TDP or be in accordance with common industry practices. Basting stitches shall not be seen in the finished seam or assembly. Contractors unfamiliar with commercial practices shall contact the contracting officer for specific details prior to assembly of the item.

3.3.1.2 Assembly markings. Markings on the canopy, riser, and other components as an aid to assembly and to indicate stitching patterns shall be accomplished in a manner that will not adversely affect the utility, strength, or appearance of the parachute.

3.3.2 Measuring and cutting of textiles. Unless otherwise specified on the applicable drawings, all textile materials shall be measured and cut while substantially free of any tension. Tightly wound textile materials shall be unrolled and allowed to relax before they are measured or cut. Webbing and tapes shall be relaxed for not less than 24 hours. Devices used for measuring textile materials shall not induce false or uneven loads on the materials. If materials are measured and cut under tension, a standard time for load application, marking, and cutting shall be established and maintained. When multiple layers of textile materials are cut at one time, care shall be taken to prevent the material from slipping during the cutting operation. Where large changes in temperature and humidity occur, care shall be taken to minimize the effect of these changes on the measurements of materials. When patterns are specified on drawings, they shall be used as specified. Pattern dimensions and details shall not be changed.

3.3.3 Coreless nylon cord. The carrier ends of coreless nylon cord may be spliced during the manufacture of the cord.

3.3.3.1 Cargo parachute assemblies. The carrier ends of coreless nylon cord for cargo parachute assemblies shall be trimmed flush.

3.3.3.2 Extraction and deceleration parachute assemblies. The finished length of the carrier ends of coreless nylon cord for extraction and deceleration parachute assemblies shall not be more than 1 inch. Carrier ends not exceeding 1 inch shall be left exposed and uncut. Carrier ends exceeding 1 inch in length shall be trimmed to a maximum finished length of 1 inch.

3.3.4 Trimming of canopy gores. Where trimming of the canopy gores is required to conform to construction requirements, the trimming shall be as specified in 3.3.4.1 and 3.3.4.2.

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3.3.4.1 Side of gore at cross seam. Trimming from the side of the gore at the cross seam shall not be more than $\frac{3}{4}$ inch and shall be a tapering cut to avoid abrupt changes in the width of the gore. The adjacent section of the mating gore shall not be trimmed.

3.3.4.2 Lower edge of gore at main seam. A maximum of 3 inches may be trimmed from the lower edge of one gore at each main seam of canopies that are over 35 feet in diameter. A maximum of 1-1/2 inches may be trimmed from the lower edge of one gore at each main seam of canopies that are under 35 feet in diameter. The trimming shall be a long tapering out.

3.3.5 Stitches and stitching.

3.3.5.1 Machine stitching. All machine stitching shall conform to ASTM-D-6193 and shall be the type specified on the applicable drawings. Stitches shall be smooth without looping. The thread tension shall not cause the cloth under the seam to pucker or result in the thread breaking when the seam is placed under tension. Multiple-needle machines shall be adjusted to provide uniform tension for each needle insofar as practicable.

3.3.5.2 Automatic machinery stitching. Stitching patterns produced by automatic machines may be utilized in lieu of those specified, providing the basic design and size of the pattern, the size of the thread, and number of stitches per inch are as specified on the drawing. A minimum of three tie-in, overlapping, or back stitches shall be used to secure the ends.

3.3.5.3 Thread breaks during sewing. If the thread breaks in either stitch type 304 or 308 during sewing, the end of the break shall be overlapped a minimum of three stitches and the sewing shall then be resumed. If the thread breaks in stitch type 301 during sewing, the end of the break shall be overlapped a minimum of 1 inch and the sewing shall then be resumed.

3.3.6 Searing and dipping. Unless otherwise specified on the drawings, no searing shall be done after stitching. Searing shall not result in sharp edges or points. During the dipping operation, the temperature of the paraffin and beeswax mixture shall be maintained at 180 degrees (plus or minus 20 degrees) Fahrenheit.

3.3.7 Stitching repairs.

3.3.7.1 Loose stitches. Loose stitches shall not be removed but shall be reinforced by adjacent stitching.

3.3.7.2 Tight stitches. Tight stitches shall be removed, and the section shall be restitched.

3.3.7.3 Broken or skipped stitches. Broken or skipped stitches in stitch type 301 shall be repaired by adjacent stitching with the stitches extending a minimum of 1 inch beyond the ends of the stitches being repaired. Broken or skipped stitches in stitch type 304 or 308 shall be repaired by adjacent stitching with the stitches extending a minimum of three stitches beyond the ends of the stitches being repaired. Broken or skipped stitches in stitch type 401 shall be repaired with stitch type 301 and as specified for broken or skipped stitches in stitch type 301.

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3.3.7.4 Run-offs. A run-off shall be repaired by stitching within the seam margin tolerance with the stitches extending a minimum of 1 inch or three stitches, as applicable to the type of stitch, from the start and the end of the run-off.

3.3.7.5 Less than specified number of stitches per inch. Where the number of stitches per inch is less than the specified number, repairs shall be made by adjacent stitching, with the repair extending either 1 inch or three stitches, as applicable to the type of stitch, beyond the end of the repair.

3.3.8 Darning of canopy. Darning of the canopy shall be held to a minimum. Holes and linear cuts or tears not exceeding the limitations specified in MIL-STD-849 may be darned without authorization from the procuring activity. The darned area for holes may be either round or square and shall cover a 3/8-inch area beyond the hole on all sides. The darned area of linear tears or cuts shall be rectangular and shall cover a 1/4-inch area beyond the sides and the ends of the tear or cut. Size A nylon thread or yarns from canopy cloth shall be used for darning. The color of the thread shall match the color of the canopy cloth upon which it is used.

3.3.9 Repairs. The following repairs may be made without authorization from the procuring activity.

3.3.9.1 Repairs to vent and skirt hem pleats. Vent and skirt hem pleats in excess of the limitations specified in MIL-STD-849 shall be repaired as follows: Remove the inside row of stitching then distribute the cloth of the pleat and restitch using the specified stitch type.

3.3.9.2 Patching of packs and bags. Parachute packs and deployment bags may be repaired by patching. Patching shall be neat and shall not exceed an area of 6 inches by 6 inches nor a length of 8 inches. No deployment bag or parachute pack shall contain more than one patch.

3.3.9.3 Patching of a canopy. A canopy may have one sewn patch not to exceed a damaged area size of 49 square inches. The patch shall not be located closer than 1 inch to a radial seam, edge reinforcement or lower lateral band. The patch shall be square or rectangular in shape. A canopy having one patch shall be classified as a minor defect – more than one patch a major defect.

3.3.9.3.1 Patching procedure. The patch shall be applied to the inside of the canopy as shown in Figure 1, and installed as follows:

a. Place the repairable item on a repair table, smooth the fabric around the damaged area, and secure the item to the table with pushpins. Do not pin the damaged area.

b. Using an authorized marking aid of contrasting color, mark a square or rectangle around the area to be patched and insure that one side of the marking square or rectangle is parallel to the warp or filling of the fabric.

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- c. Cut the damaged area fabric along the lines made in (b) above. Further cut the fabric diagonally at each corner to allow a $\frac{1}{2}$ inch fold back in the raw edges.
- d. Make a $\frac{1}{2}$ inch foldback on each raw edge. Pin and baste each foldback to complete the prepared hole.
- e. Using the same type material as in original construction, mark and cut a patch 2-1/2 inches wider and longer than the inside measurements of the prepared hole. Insure that the patch material is marked and cut along the warp or filling of the fabric.
- f. Center the patch material over the prepared hole and insure the warp or filling of the patch material matches the warp or filling of the fabric being patched. Pin the patched material in position.
- g. Make a $\frac{1}{2}$ inch fold under on each edge of the patch material and baste the patch to the prepared area.
- h. Remove the pushpins securing the item to the repair table and secure the patch by machine stitching, using the applicable details in Figure 1. The stitching should be accomplished with thread that is contrasting in color to the fabric. Thread shall be V-T-295, size "E" Nylon, Type I, II or III, Class A, Type 301, using 7 to 11 stitches per inch in accordance with ASTM-D-6193. Back stitch $\frac{1}{2}$ inch minimum or lock by at least 2" minimum and not more than 4 inches at each end of a stitch row.

3.4 Air permeability. When tested in accordance with 4.5, complete canopies shall have an average permeability of not more than 10 percent over the top limit or 10 percent below the lower limit of the fabric specification. The average air permeability reading for any one gore shall not exceed the upper limit, nor be less than the lower limit of the fabric specification by over 20 percent.

3.5 Identification of product.

3.5.1 Component. Unless otherwise specified in the contract or purchase order, components shall be marked for identification in accordance with the applicable drawings.

3.5.2 Canopy. Unless otherwise specified on the applicable drawings, each parachute canopy shall be marked on either the lower section of gore number 1 or the last gore in the numbering order which is adjacent to gore number 1. The size of the letters shall be not less than $\frac{1}{2}$ inch high. The marking on the gore shall contain the following information:

Nomenclature
 Number of gores
 Type
 Specification No.
 Part No.
 Order No.

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Stock No.
Manufacturer's Serial No.
Manufacturer's Name or Identifiable Trademark
Date of Manufacture (Month and Year)
U.S.

3.5.3 Gore numbers. All gores shall be number by stamping or stenciling the number in the corner of the sections on or adjacent to the skirt reinforcement. The number sequence shall be clockwise when viewing the canopy from the top. The size of the numbers shall be not less than 1 inch high.

3.5.4 Additional marking. Each parachute canopy for deceleration shall have the words THIS SIDE OUT stamped or stenciled near the skirt on the outside of the skirt section of each gore. Each extraction parachute canopy procured for Army use shall be stamped or stenciled THIS SIDE OUT on the top and bottom gores only near the skirt, on the outside of the skirt sections. The letters shall be red in color and not less than 1 inch high.

3.5.5 Marking ink. The marking ink shall conform to A-A-59291. Contrasting color shall be used for use in identification.

3.6 Workmanship. The parachute assemblies and components shall conform to the quality of product established by the specification and documents reference herein.

4. VERIFICATION

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

- a. First article inspection (see 4.2)
- b. Conformance inspection (see 4.4)

4.2 First article inspection. First article inspection shall be performed on one complete parachute assembly, unless otherwise stated in the contract, when a first article sample is specified (see 3.1). The inspection shall include the tests and examinations of 4.3.1, 4.3.2, 4.4, and 4.5. Any defect or nonconformance shall be cause for rejection of the first article.

4.3 Conformance inspection. Conformance inspections shall include the examinations of 4.3.1, 4.3.2, 4.4 and the test of 4.5. Sampling plans and acceptance/rejection criteria for 4.4 and 4.5 shall be as specified in the contract or purchase order. Parachute assemblies which fail the acceptance criteria shall be cause for rejection of the lot.

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

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4.3.2 In-process inspection. Inspection of subassemblies shall be made to ascertain that construction details and dimensional requirements which cannot be examined in the finished product are in accordance with specified requirements. The Government reserves the right to exclude from consideration of acceptance any material or service for which in-process inspection has indicated nonconformance.

4.4 Examinations. The parachute assemblies shall conform to the visual and dimensional examinations as specified in the TDP for the associated item. Deviations from the TDP shall be classified in accordance with MIL-STD-849.

4.5 Tests.

4.5.1 Air permeability. The number of completed canopies specified in Table I shall be selected at random from production and tested for air permeability. The cloth of completed parachute canopies shall be tested for air permeability to determine the compliance with the requirements of 3.4. The test shall be performed in accordance with ASTM D 737. The number of permeability readings shall be made from canopies constructed from one fabric shall be five in every fourth gore, excluding the top and bottom sections. The number of permeability readings shall be made from canopies constructed from more than one fabric shall be three in the bottom section, two in the second section and three in the third section in every fourth gore. The permeability readings of each fabric shall be averaged.

Table I. Canopies to be tested

Number of canopies produced per week	Number of canopies to be tested
0 - 10	1
11 - 25	2
26 - 50	3
51 and above	1 per day

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of material is to be performed by DoD 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 activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contracting the responsible packaging activity.

6. NOTES

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

6.1 Intended use. The cargo and extraction parachute assemblies and components covered by this document are intended to be used to air drop supplies and equipment. The deceleration parachute assembly and components are intended to be used to slow down aircraft upon landing.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number and date of the specification
- b. Part number (see 1.2)
- c. Issue of DoDISS to be cited in the solicitation and if required, the specification of individual documents referenced (see 2.2.1)
- d. When a first article is required (see 3.1)
- e. Sampling plan (see 4.3)
- f. Packing requirements (see 5.1)

6.3 Subject term (key word) listing.

Aerodynamics
Canopy
Drag producing devices
Decelerators

6.4 Changes from previous issue. Marginal notations are not used to identify changes with respect to the previous issues due to the extent of the changes.

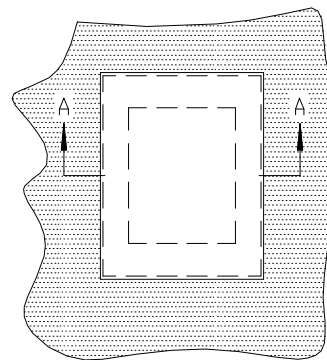
Custodians:
Army – GL2
Navy - AS
Air Force – 11

Preparing Activity:
Army - GL2

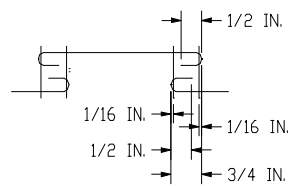
(Project 1670-1017)

Review Activities:
Navy - MC

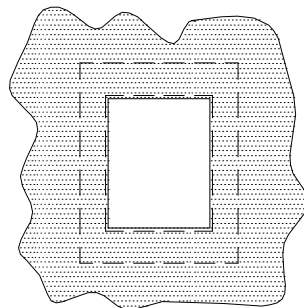
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INSIDE VIEW



SECTION A-A



OUTSIDE VIEW

FIGURE 1. SEWN PATCH APPLICATION TO SOLID PARACHUTE
CANOPY - CARGO

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of 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.

I RECOMMEND A CHANGE:

1. **DOCUMENT NUMBER**
MIL-DTL-7620D

2. **DOCUMENT DATE (YYYYMMDD)**
20020930

3. DOCUMENT TITLE

Parachutes and Components, Cargo, Extraction and Deceleration, General Specification For

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME *(Last, First, Middle Initial)*

b. ORGANIZATION

c. ADDRESS *(Include Zip Code)*

d. TELEPHONE *(Include Area Code)*
(1) Commercial
(2) DSN
(if applicable)

7. **DATE SUBMITTED**
(YYYYMMDD)

8. PREPARING ACTIVITY

a. NAME
Natick Soldier Center

b. TELEPHONE *Include Area Code*
(508) 233-4258

c. ADDRESS *(Include Zip Code)*

AMSSB-RAD-AD(N), J. Riley
Natick, Ma 01760-5017

IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: