

## MILITARY SPECIFICATION

PARACHUTES, PERSONNEL, DETAIL MANUFACTURING  
INSTRUCTIONS FOR

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

## 1. SCOPE

1.1 Scope. This specification covers detail instructions relative to the dimensions, tolerances, and repair procedures to be used in the manufacture of personnel parachutes. The personnel parachutes covered include the chest, seat, back, troop, training, rescue, integrated, maneuverable, and special purpose.

## 2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified (see 6.2), the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation, form a part of this specification to the extent specified herein.

## SPECIFICATIONS

## MILITARY

MIL-P-5610	Parachute Assembly and Subassemblies, Packaging and packing of.
MIL-I-45208	Inspection System Requirements.

## STANDARDS

## FEDERAL

FED-STD-751	Stitches, Seams and Stitchings.
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## MILITARY

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-849	Inspection Requirements, Definitions and Classification of Defects for Parachutes.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: the Engineering Division, San Antonio ALC/MMEDO, Kelly AFB, Texas 78241 by using the self addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.
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(Copies of specifications and standards required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.1.2 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

### 3. REQUIREMENTS

3.1 Materials. Materials used in the construction of personnel parachutes shall be in accordance with the applicable drawing bill of materials for the type parachute assembly or subassembly being manufactured. Changes or substitutions shall not be made by a contractor or his vendor unless waived in the detailed contract requirements, or authorized by the procuring activity.

3.2 Canopy. The canopy normally consists of the drag producing surface, suspension lines, and connector links. It includes those canopies used for premeditated parachute descents employing a secondary parachute for emergency use. The following component requirements shall also apply to pilot parachutes and drag (drogue) parachutes, unless waived by the procuring activity.

3.2.1 Cloth defects. The acceptability of cloth used in the manufacture of the canopy shall be governed by the pertinent cloth specification unless waived by the procuring activity. During the spreading, cutting and manufacturing process, components having material defects or damages that are classified as defects in the applicable cloth specification shall be removed from production and replaced with non-defective components. Defects noted after construction shall be evaluated, and disposition shall be in accordance with section 4. Cloth damage during seam ripping shall be cause for total rejection of the damaged section. No imperfection that requires darning shall be allowed in a gore before seam joining.

3.2.1.1 Canopy damage during construction. The maximum number of darns permitted in the main drag producing surface shall not exceed three darns per canopy, and one darn per gore. The maximum number of darns permitted for the drag producing surface of a pilot and drag (drogue) parachute shall not exceed one per canopy. Darns are not allowed for stretch fabric panels. Damaged or stretch fabric panels must be patched or replaced.

3.2.2 Dimensions after cutting. The dimensions of the gore sections after cutting will not be required to duplicate the measurements on the applicable drawing because the latter dimensions are intended for the pattern only. Variation in the finished width of cloth due to humidity or relaxation of tension after cutting and variation of measurement from the top to the bottom of the lay after cutting shall be recognized.

3.2.3 Seams and hems. Unless otherwise specified herein, tight gores, poorly folded seams resulting in ragged edges, cloth edges not caught in stitching, doubling over of cloth on the inside of the seam, and pleats in folding of seams shall not be permitted. The cross seam may contain sewing, folding, or material defects not detrimental to strength when the defects occur for a distance not to exceed 1 inch from the ends of the seam after the main gore seam is formed. Seams and hems shall comply with MIL-STD-849 and FED-STD-751. They shall be flat and smooth and no exposed raw edges of the canopy cloth shall be permitted.

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3.2.3.1 Pleating. Pleating of cloth at the vent or skirt hems in excess of 1/8 inch measured along the inside edge of the hem and one pleat per gore shall be removed and repaired. For this purpose, a pleat shall be considered to be a fold in the cloth, caught by the inside row of stitching, extending into the uppermost section. Pleats and tucks shall not be permitted in the main or the cross seams.

3.2.3.2 Overfolds and underfolds (main seam). Underfolds in the main seam (four needle seams) shall be caught with three rows of stitching by at least 1/16 inch. The main seam overfolds shall not extend into the center channel, except that seams caught with only two rows of stitching 1 inch from the inside of the top and the bottom hems or within 1 1/2 inches above and below the centerline of the end of the cross seam as it crosses the third row of stitching inside the main seam will be acceptable.

3.2.3.3 Skirt hem. In forming the skirt hem of the canopy, not more than two pieces of webbing shall be used. If two pieces are used, the length of the shorter piece shall be sufficient to cross at least four gores, and the splice stitch pattern shall be the same as that which normally joins a single piece of webbing for this particular application.

3.2.3.4 Suspension lines. Suspension lines crossing the vent shall be in proper rotation order and twisting of a line at the vent opening which kinks when relaxed shall not be acceptable. A maximum twist of 180 degrees will be permitted in the suspension line between the skirt and the intermediate zigzag stitching above. The twist shall be determined by pulling the suspension line while approximately 5 pounds of tension are applied between the vent and the suspension-line reinforcement at the skirt and while holding the suspension-line reinforcement and observing for rotation of the intermediate zigzag stitching. The variation in length of the longest and the shortest vent line of the parachute shall not exceed 1/2 inch. The distance from the top of the vent hem to the bottom of the skirt hem of the longest and the shortest suspension lines of the parachute, measured after installation and under 5 pounds of tension, shall not vary more than 2 inches. The distance from the skirt hem to the connector links of the longest and the shortest suspension lines of the parachute, measured after installation and under 5 pounds of tension, shall not vary more than 2 1/2 inches.

3.2.3.4.1 Threading. In threading the suspension line or the reinforcing webbing through the main seams, the threading needle shall be started with two layers of cloth above and two layers of cloth below the needle. Normal care shall be exercised to minimize deviation of the threading needle from the middle position of the cloth layers in canopies fabricated from nylon cloth that is heavier than 1.1 ounces or canopies utilizing two-needle main-seam construction. In canopies fabricated from nylon cloth that is 1.1 ounces or lighter, and not of the two-needle main-construction, the suspension line shall be positioned in the center of the four layers of cloth, and suspension lines threaded out of position shall be removed and properly rethreaded.

3.2.3.4.2 Protruding core ends. Core ends protruding through the outer casing sleeve and carrier ends protruding from the surface of coreless line as a result of manufacturing overlaps shall be trimmed flush with the surface of the casing with the cord in a relaxed condition.

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3.2.4 Stitching. The stitching shall lie smoothly on the cloth without looping. The tension of bobbin and needle thread shall be equal. The thread lock of stitching in the main and the cross seams shall lie close to the surface of the cloth. (All other sewing performed on hems and suspension lines is through material of sufficient thickness so that the thread lock will lie below the surface.) Multiple-needle machines shall be adjusted to provide the same tension from each needle. Basting thread, if used, need not be removed, providing that size B or lighter nylon thread is used and that the thread is concealed within the hem or seam. The basting thread shall not restrict the channel of the main seam.

3.2.5 Stitching defects and repairs. A stitching repair shall be considered to be all the overlapping and the stitching required to correct stitching that is not in accordance with applicable drawings.

3.2.5.1 Improper tension. Stitching with improper tension, that is, too tight or too loose, shall be removed and replaced, as specified in 3.2.5.6, with stitching of proper tension. (Tension shall be determined by a firm pull with the hands along the line of stitching. If the tension is too tight, the stitching will break or appear tight to the point of breaking. If the tension is too loose, the stitching will appear as a series of loops.)

3.2.5.2 Run-offs. Run-offs onto a single cloth or beyond the seams or hem margins shall be removed and replaced as specified in 3.2.5.6.

3.2.5.3 Kinks. Kinks (sometimes called "knotty thread") may occasionally be encountered. Stitching containing kinks that are closer to each other than 2 inches shall be reinforced as specified in 3.2.5.5.

3.2.5.4 Splices. The stitching splices shall be either superimposed stitching or adjacent stitching that is placed a maximum of 1/16 inch, but within the minus tolerance specified for the seam margins, from the stitching which is being spliced. The stitching splices shall overlap 2 to 4 inches.

3.2.5.5 Reinforcement stitching. Reinforcement stitching shall lie adjacent to, or superimpose, the stitching being reinforced but shall not exceed the minus tolerance specified for the seam margins. Reinforcement stitching shall reasonably match the length and the tension of the stitches being reinforced, and the stitching shall overlap the ends of the defective stitching 1 inch each end.

3.2.5.6 Replacement of stitching. Repairs that require the replacement of single rows of stitching may be made using a single-needle machine. Repairs that require the replacement of both rows of double-needle stitching shall be made using a double-needle machine. Repairs that require the replacement of triple rows of stitching may be made using either a single-needle machine or a four-needle machine from which one needle has been removed. Ends of replacement stitching shall overlap the ends of the stitching being replaced 2 inches at each end.

3.2.5.7 Holes and linear cuts or tears. Holes not exceeding 1/4 inch diameter and linear tears or cuts up to 1/2 inch length may be darned. The darned area of holes shall extend 3/8 inch beyond the edge of the hole on all sides and shall be either a round or rectangular pattern. The darned area of

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linear tears and cuts shall form a rectangular pattern extending 1/4 inch beyond each side and each end of the tear or cut. The darns shall lay flat, and the stitches shall interlace sufficiently with themselves and the canopy to insure that the repair will not decrease the efficiency of the canopy. Continued requirements for repairing holes, tears, or cuts indicate careless handling, and steps shall be taken to reduce the number of darns occurring and to correct the conditions that make darns necessary. Darns are not allowed for stretch fabric panels. Damaged and/or stretched fabric panels must be patched or replaced.

3.2.5.8 Vent hem. Defective stitching in the vent hem shall be removed and that portion of the stitching replaced, as specified in 3.2.5.6, when there are less than 7 stitches per inch. A maximum of 2 continuous inches for all four rows may be stitched with not less than 6 nor more than 14 stitches per inch with not more than two such defects per vent hem. Vent hems having in excess of 14 stitches per inch shall not be repaired and shall be rejected. Broken, missing, or skipped stitching may be repaired by single-needle machine, using either superimposed or adjacent stitching. Not more than two four-needle repairs nor more than two single-needle repairs per single row of stitching shall be allowed per vent hem, except that the bottom row may have four single-needle repairs.

3.2.5.9 Cross seams. Defective stitching in the cross seams shall be repaired as follows:

- a. Defective stitching in the cross seams shall be removed and that portion of the stitching replaced, as specified in 3.2.5.6, when there are less than 7 stitches per inch.
- b. The seam shall be acceptable and need not be repaired if for a length of 1 1/2 inches or less the number of stitches per inch exceeds 11 but not 14. The distance between such defects shall be not less than 12 inches.
- c. Seams having in excess of 14 stitches per inch shall be rejected and shall not be repaired, except that one such defect per row of stitching per seam and not exceeding 1 inch in length is acceptable.
- d. Broken stitches, consecutively skipped stitches, or intermittently skipped stitches shall be reinforced, as specified in 3.2.5.5, by either double-needle or single-needle stitching, as necessary, without requiring the removal of the original stitching. Two single skipped stitches on the longest cross seam and on the next longest cross seam will be acceptable without repair, provided the distance between the skips on either or both lines of stitching is at least 12 inches.
- e. Except for the top cross seam, not more than two repairs per single row of stitching shall be permitted. Only one repair per single row of stitching shall be permitted in the top cross seam.
- f. Cross seams should be made with the two sections started evenly; however, a trimming tolerance of 1/4 inch will be allowed, exclusive of cutting of the bias point.

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- g. Not more than 3/4 inch to the side of the gore, measured perpendicular, may be trimmed from the finished side of the gore at a cross seam. Trimming shall be neatly tapered to avoid abrupt changes in the width of the gores.

3.2.5.10 Main seam. Defective stitching in the main seam shall be repaired as follows:

- a. Defective stitching shall be removed and that portion of the stitching replaced, as specified in 3.2.5.6, when there are less than 7 stitches per inch.
- b. The main seam shall be acceptable and need not be repaired if the number of stitches per inch exceeds 11 but does not exceed 14, and the length of the defect does not exceed 2 inches. There shall be not more than two such defects per seam.
- c. Seams having more than 14 stitches per inch shall not be repaired and shall be rejected, except that one such defect per row of stitching per seam, and not exceeding 1 inch in length, is acceptable.
- d. Broken stitching or stitching containing more than one skip shall be reinforced, as specified in 3.2.5.5, by rows of either single-needle or multiple stitching, as necessary, without requiring the removal of the original stitching. Single skip stitches occurring more than 18 inches apart for all four rows of stitching with a maximum of six such defects per seam will be acceptable.
- e. Four-needle repairs shall be a minimum of 36 inches apart per seam. Not more than 2 such defects and 14 per canopy shall be permitted.
- f. The distance between the points where opposite cross seams join the main seam when measured from center to center of the cross seams on the center of the main seam shall not exceed 2 inches on the first seam from the vent, 2 1/2 inches on the second seam from the vent, and 2 1/2 inches on the third seam from the vent. A maximum of 2 1/2 inches may be trimmed from the lower edge of one gore at each main seam.

3.2.5.11 Skirt hem (defective stitching). Defective stitching in the skirt hem shall be repaired as follows:

- a. Stitching shall be removed and replaced, as specified in 3.2.5.6, when there are less than 7 stitches per inch, except that 6 stitches per inch for a maximum length of 12 inches for all four rows of stitching will be acceptable providing there are not more than three such defects per hem.
- b. The skirt hem shall be acceptable and need not be repaired if the number of stitches per inch exceeds 11 but does not exceed 14, the length of the defect is not more than 8 inches, there are not more than four such defects per skirt or intermediate hem, and the defects are a minimum of 36 inches apart.

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- c. A skirt hem having more than 14 stitches per inch shall not be repaired and shall be rejected, except that two such defects not exceeding 2 inches in length will be acceptable.
- d. Broken stitching or stitching containing more than one skip shall be reinforced, as specified in 3.2.5.5, by single-needle or multiple-needle rows of stitching, as necessary, without requiring the removal of the original stitching. Single skip stitches will be acceptable 18 inches apart, for all four rows of stitches and for a maximum of eight such defects per hem.
- e. Not more than six four-needle repairs and not more than six single-needle repairs per row of stitching shall be made per skirt or intermediate hem.

3.2.5.12 Zigzag stitching. Crowding of the zigzag stitching at the V turn of the "V" tab is permitted, provided that such crowding does not exceed 1/4 inch in length. More than three crowded zigzag stitches shall be removed, except in the overlapping of repair stitching where the appearance of crowded stitching is effected. If thread breakage occurs during the sewing operation, after an initial run of not less than 1 inch of zigzag stitching, resumption of sewing may be made by overlapping a minimum of three stitches beyond the end of the stitching.

3.3 Packs/containers. Unless waived by detailed contract specification or drawing requirements, the following requirements shall be maintained.

3.3.1 Binding. In binding of packs/containers, splicing of the binding tape shall be permitted, provided that all raw ends of the binding tape are turned under a minimum of 1/4 inch and that the splice is not made at a point of wear such as on the belt panel assembly strap end on the troop or the rescue parachute packs.

3.3.2 Optional stitching. The optional use of automatic sewing patterns shall be permitted, provided the stitching pattern conforms to the specified overall external dimensions and is of equal strength. The procuring activity shall be advised of such a change. The contractor may be required to provide proof of equivalency.

3.3.3 Run-off stitching. Run-off stitching shall be repaired without requiring the removal of the defective stitching.

3.4 Harnesses. Floats or any other defects caused by breakage of the webbing fill yarns during stitching and appearing as floats in the nylon harnesses will be acceptable provided that there are not more than three such defects in any one harness, that such a defect does not occur in the risers, the leg straps, or the back straps, and that such defects are not in excess of 3/8 inch in length and 1/8 inch in width. *Stitching defects in harnesses shall be repaired as follows:*

- a. Broken stitches and excessive skip stitches in the harness shall be reinforced. When replacement of stitching is required, the webbing shall be inspected before it is re-sewn to insure that it has not been damaged.

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- b. Skip stitches shall not be permitted in the riser stitching; however, one skip stitch per stitching pattern will be acceptable in the stitching of the back strap or the leg strap. A maximum of three skipped stitches per harness shall be permitted in stitching of the seat sling or the main lift straps below the shoulder adapters or the canopy releases, except that two consecutive skips shall not be allowed.
- c. Loops in the harness stitching resulting from stitching over varying thicknesses of webbing will be acceptable, provided that no loop is in excess of 3/32 inch long (or high), the loops are a maximum of 2 inches apart, there are not more than three such defects per harness, and none of the defects occur in the riser, the back straps, or the leg strap stitching patterns.

3.5 Component parts. The major component parts of the parachute being manufactured will normally consist of all or some, but will not be limited to, of the following as applicable: Canopy, pilot parachute, drag (drogue) parachute, pack, container, bag, parachute release device, harness, cushion, and hardware.

3.6 Construction. The construction of the components of each parachute shall conform to the construction details of the applicable drawings, detail specification and the requirements specified herein. In the event of a conflict between the applicable drawing and this specification, the drawing shall govern.

3.6.1 Stitches and tolerances.

\* 3.6.1.1 Stitching. Stitching shall conform to FED. STD. No. 751. Unless otherwise specified on the applicable drawing the number of stitches per inch shall be as specified in table I for the stitch type indicated.

Table I. Thread size and stitches per inch

Thread Size	Stitches per inch	Zig Zag (Single Throw) type 304	Zig Zag (Single Throw) type 308
B	7 to 11	12 to 16	8 to 12
E	7 to 11	12 to 14	7 to 10
F	7 to 11	12 to 14	7 to 10
FF	6 to 9	-	-
3	5 to 8	-	-
5	4 to 6	-	-
6	4 to 6	-	-

3.6.1.2 Tolerances. Dimension tolerances, unless specifically called out differently on the detailed part drawing, shall be in accordance with table II.

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TABLE II. Tolerances.

Dimension (inches) <u>1/</u>	Tolerance (+)
1/16	1/32 in.
More than 1/16 but less than 2	1/16 in.
2 or more, but less than 10	1/8 in.
10 or more, but less than 30	1/4 in.
30 or more, but less than 60	3/8 in.
60 or more	1/2 in.

1/ Tolerances are not cumulative.

3.7 Hardware. All hardware; such as quick release devices, adapters, retention snaps and rings shall be in accordance with applicable detailed standards or specifications. Hardware used in the manufacture of harnesses shall be new and completely qualified, if required, unless waived by the contract or contracting officer of the procuring activity.

3.8 Chemical and physical properties. Detailed requirements for verification of chemical and physical properties are contained in the specifications and standards for the thread, cord, tape, webbing, cloth, hardware, pyrotechnics, and so forth, which are used to manufacture and construct the detailed parts, sub-assemblies and assemblies of a parachute. It shall be the contractor's responsibility to assure that materials used comply with the required standards and specifications and shall not be substituted, unless substitution is authorized by detailed contract specifications or by the procuring activity.

3.9 Government furnished property. When government furnished property is to be included in the construction of a parachute assembly or components, the nomenclature, part number and quantities involved shall be written in as a part of the contractual specifications.

3.10 Workmanship. The parachutes shall be constructed in a thoroughly workmanlike manner. The finished parachutes shall be clean and free from any defects that might affect appearance or functionability.

#### 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 the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

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4.1.1 If inspection requirements are not contained in the procurement documents, MIL-STD-105, MIL-STD-849, and MIL-I-45208 shall be followed, as applicable.

5. PACKAGING

5.1 Preservation and packaging. Preservation and packaging shall be in accordance with MIL-P-5610. Level A and C as specified (see 6.2).

5.2 Packing. Level A, B and C of packing shall be in accordance with MIL-P-5610 and as specified (see 6.2).

5.3 Marking. Level A, B and C marking shall be in accordance to MIL-P-5610 in addition to any special or other identification marking required by the contract (see 6.2).

6. NOTES

6.1 Intended use. The manufacturing instructions covered by this specification are intended to provide detailed manufacturing and inspection requirements of personnel type parachutes.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following: Levels of preservation, packaging and packing required (See 5.1).

6.3 Changes from previous issue. The margins of this specification are marked with asterisks 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 irrespective of the marginal notations and relationship to the last previous issue.

Custodians:  
Army - GL  
Navy - AS  
Air Force - 99

Preparing activity:  
Air Force - 82

Reviewer activities:  
Army - AV  
Air Force - 11

(Project 1670-0697)

## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

*(See Instructions - Reverse Side)*

1. DOCUMENT NUMBER MIL-P-7567B		2. DOCUMENT TITLE Parachutes, Personnel, Detail Manufacturing Instructions For	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION <i>(Mark one)</i> <input type="checkbox"/> VENDOR <input type="checkbox"/> USER <input type="checkbox"/> MANUFACTURER <input type="checkbox"/> OTHER <i>(Specify):</i> _____	
b. ADDRESS <i>(Street, City, State, ZIP Code)</i>			
5. PROBLEM AREAS			
a. Paragraph Number and Wording:			
b. Recommended Wording:			
c. Reason/Rationale for Recommendation:			
6. REMARKS			
7a. NAME OF SUBMITTER <i>(Last, First, MI) - Optional</i>		b. WORK TELEPHONE NUMBER <i>(Include Area Code) - Optional</i>	
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**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.

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